DEPARTMENT OF THE INTERIOR
TASK FORCE ON CLIMATE CHANGE

REPORT OF THE SUBCOMMITTEE
ON LAW AND POLICY

An Analysis of Climate Change Impacts and Options Relevant to Legal and Policy Issues at the Department of the Interior

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PREFACE

Last year, Secretary of the Interior Dirk Kempthorne established the DOI Climate Change Task Force, chaired by Deputy Secretary Lynn Scarlett. It was composed of a Steering Committee and three subcommittees. The Assistant Secretaries, Bureau and Service Directors, the Special Advisor for Alaska, and the Solicitor were members of the Steering Committee. The three subcommittees were made up of land managers, biologists, economists, climatologists, lawyers, policy analysts, and many others (approximately 100 employees in all). The tasks of the subcommittees were identified as follows:

> (1) The Land & Water Management Subcommittee was to identify issues and challenges that may be facing the Department of the Interior (DOI) as a consequence of predicted climate change and to suggest possible options for addressing them.
>
> (2) The Law & Policy Subcommittee to identify the legal and policy issues facing DOI and to suggest possible options for addressing them.
>
> (3) The Science Subcommittee to identify the science and information needed to assist DOI in addressing potential consequences of climate change and to suggest possible options for developing, coordinating, acquiring, and analyzing any additional scientific information that would be helpful for that purpose.

The objective was for the Task Force to canvas the existing information and expertise within the Department and suggest options for the Secretary to consider in ongoing management of the Department. By the nature of the process, these draft reports do not contain budget proposals, set priorities or policies, nor provide legal advice. Any such subsequent activities would be undertaken pursuant to Secretarial direction and be subject to the regular policy procedures, budgetary proposals, solicitor reviews, interagency coordination, and administration priorities. The three Draft DOI Climate Change Task Force subcommittee reports provide an organized means to collect views within the agency and highlight a series of questions and potential options for addressing them.

As drafted, the reports do not represent either Administration or Departmental positions on the issues discussed. But it is hoped that they will begin an informed process for the coordinated consideration of various climate change issues facing the Department and how to address them.

These reports are the product of brainstorming sessions presented in a fashion to organize the material while maintaining the dynamics of subcommittee participation. As such, the drafts do not attempt to prioritize the information presented either by the order of presentation or the length of the discussion associated with any particular issue, option, or grouping of information.

While it would have been consistent with standard operating protocols for the drafts to go to the Secretary without external consideration, it was felt that the Secretary and the decision-making process would be best served if the broader public had an opportunity to consider this information and have an opportunity to weigh in on the issues. Although the Department uses

various processes to involve the public, such as public comment on regulations, Advance Notice of Proposed Rulemaking, and agency scoping meetings, the posting of these documents on the web does not fall into any of these or other existing categories. This is an informal process to provide knowledgeable members of the public an opportunity to provide additional insights into a subject of general concern.

The subject of climate change is being addressed in a wide variety of venues throughout the federal government. These reports are written in the context of that environment and with an acknowledgement that all comments in the reports are made with a strong realization that many efforts discussed therein are related both to activities already conducted by DOI and to actions being taken by other agencies.

For instance, fire management has long been a major focus for DOI in the western states. If future climate change is associated with extending or intensifying the fire season, the issues raised in these reports are an attempt to anticipate trends and adjust our readiness to respond to those threats. Options in the reports on such matters do not constitute new programs; they offer options for possible adjustments and improvements in existing programs to meet new conditions.

Likewise, although carbon sequestration is of major interest to DOI, and the reports highlight important options the Secretary may want to pursue, such programs also relate to the missions of the Department of Energy, the Environmental Protection Agency, the Forest Service, and the Department of Commerce. All options proposed in the DOI reports are in the context of coordination with the responsibilities of each of those agencies, where appropriate, and a desire to maximize the efficiency with which the government addresses the emerging issues.

Finally, the effort to address climate change is being organized and managed through various Administration organizations, including the Climate Change Science Program, the Council on Environmental Quality, and the National Economic Council. Congress is also placing an increasing focus on the issue with new committees, hearings, and legislation. The options presented in the draft subcommittee reports range from those which DOI can implement directly to those requiring Administration action or Congressional enactment. Some options would require coordination and leadership from state, local and private initiatives. Consequently, the reports discuss issues and propose options that are important to the Department but which may require many other stakeholders for effective implementation. The hope is that, by raising these issues and potential options in a timely manner, better solutions will be adopted.

EXECUTIVE SUMMARY

The Law and Policy Subcommittee, with 36 members representing eight bureaus, was tasked with reviewing a number of the primary statutes, court cases, executive orders, legal documentation, and departmental policy guidance materials to assess how the Department can constructively respond to potential climate change impacts. This document assumes that any broader laws or policies concerning the regulation of greenhouse gases will result from congressional or overarching executive branch action rather than falling under DOI jurisdiction and decision making.[1]

The Department of the Interior has been delegated the joint responsibilities of managing our resources to meet human needs as well as conserving the natural resources under DOI's stewardship. Within the realm of natural resources, DOI is a steward of both fixed (e.g., national parks and wildlife refuges) and mobile (e.g., endangered species and migratory birds) resources. In many areas DOI shares that stewardship with states, local governments, and the private sector. All of these responsibilities may be affected by future climate change.

Our legal system has developed to provide both flexibility and stability in the face of ongoing changes to the physical world. With sufficient creativity, the existing legal tools are likely to be adequate to address the climate change effects that are anticipated in the short term. In the long term, however, unanticipated challenges will be encountered. In other words, one thing is certain: uncertainty. The subcommittee has thus provided options to address both types of issues for the Secretary to consider. Below represents a summary of the issues and options:

Major Natural Systems

Climate change impacts may cause location-specific resources to change (e.g., glaciers in Glacier National Park may retreat), migratory patterns may shift outside existing refuges, and insular areas may become inundated. Options include: (i) as the Department identifies new climate change initiatives it wishes to pursue, review the short-term and long-term legal issues facing each bureau in implementing the new or modified programs; (ii) identify any novel long-term legal issues that may need to be addressed in response to climate change effects that cause DOI resources to shift; (iii) determine legal documentation necessary to identify existing baselines to accommodate DOI resource shift.

Shifting Boundaries

In the short term, property boundaries are unlikely to shift; however, if climate change transformations give rise to new property concepts, new legal tools may become necessary. Options include: (i) consulting with states regarding fixing boundaries near areas of growing international interest, e.g., Alaska and Florida; (ii) seeking a Solicitor's opinion on the potential consequences of sea level rise in coastal areas; and/or (iii) determining legal implications from shifts in coastal boundaries and corresponding jurisdictional implications for MMS.

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[1] Although this report considers legal and policy issues, it is not a product of the Solicitor's office or the Office of Policy, Management and Budget and is not an attempt to craft legal advice for the Department. Rather, it is intended to serve as a survey of forward-thinking issues that will be facing the Department in the near-term and long-term.

Mining & Land Claims

It is unclear whether climate change will affect the development of minerals under the 1872 Mining Law. The appropriate offices within the Department may want to monitor the ongoing impact of climate change, if any, on federal mining claim operations. By monitoring the health of the industry, the Department may identify early legal and policy issues in sectors of the industry that are affected by reduced precipitation or shifting of surface resources, such as threatened or endangered species.

Habitat Shift

Endangered Species Act (ESA)

Federal agencies have an affirmative obligation to manage their lands to protect and recover endangered species. These species may be stressed or migrate in response to increased climate change effects. Options include: (i) seeking a Solicitor's opinion concerning the legal meaning of the term "foreseeable future" as used under the ESA, to provide some guidance on the standard for relying on forward-looking models instead of historic data to make decisions; (ii) seek a Solicitor's opinion concerning the options available in designating critical habitat; (iii) exercising greater use of the ESA's authority to introduce experimental populations outside of a species historic range; (iv) streamlining the HCP process; and (v) increasing participation in voluntary species conservation through conservation easements, no-surprises, safe harbor agreements, no-take agreements, financial incentives, and recovery incentives.

Migratory Bird Refugia

Climate change has, and is expected to continue, to shift migratory routes, and thus, will affect wildlife refuges established to coincide with historic routes. Options include: (i) considering other strategic refugia to counter increased stressors outside refuge boundaries and the decrease in current refuge units in response to climate change; (ii) initiating additional cooperation agreements with other landowners to increase available areas for migratory birds; (iii) considering facilitating the use of targeted habitat acquisition.

Invasive Species

Warming, changes in precipitation and moisture, and increased frequency of fire may make native species less resilient and provide opportunities for invasive species. Options include: (i) providing guidance on moving a species outside its historic range to include an invasive species risk assessment; (ii) undertaking changes in regulatory mechanisms to allow earlier intervention and/or eradication of invasive species in sensitive or protected areas; (iii) coordinating with partners to determine whether the definition of native/invasive species needs to be revisited.

Habitat Lost

Some species are sufficiently adapted to a unique habitat that, if their native habitat disappears, the risk of extinction is quite high. Options include: (i) transferring endangered species to other suitable habitat; (ii) preserving endangered species through artificial habitat or captivity; (iii) establishing some basis for making the determination that some species will inevitably be allowed to become extinct.

Indian Country and Alaska

Indian Country faces the same type of challenges posed by climate change as the rest of the United States. Options include setting up a management/legal team to work with BIA to identify any modifications in easements, contracts, partnerships, etc. that may be necessary. For Alaska, options include working with the state regarding the unique ANILCA Title VIII questions raised by climate change predictions; adopting a policy to encourage easements when needed by a dislocated community; and using existing flexibility in ANILCA and FLPMA to address access needs.

BOR Water and Power

Legal issues concerning Reclamation involve the full spectrum of contracts, permits, and river compacts affecting BOR. Options include: (i) setting up management/legal teams to identify modifications that may be needed to respond to climate change effects; (ii) working with existing water and power users/shareholders to begin addressing long-term consequences and future legal challenges of climate change; and (iii) working with states, tribes, and private parties to explore voluntary agreements that would anticipate water transfers or share the effects of shortages; (iv) pursuing permanent BOR Drought Assistance authority; (v) evaluating whether there is a benefit to allowing BOR facilities to be used beyond the currently authorized project purposes; and (vi) extending Water 2025 grants to provide funding for water systems planning.

National Environmental Policy Act (NEPA)

The Department prepares thousands of NEPA documents each year. The challenge is to determine what level of climate change documentation may be appropriate for any given document and how to find consistent and reliable information. Options include providing guidance to managers explaining how to incorporate climate change into NEPA documents. Such guidance would vary depending on the type of NEPA document (i.e., categorical exclusion, environmental assessment, or environmental impact statement). Documentation could range from a statement that the subject had been considered but found inapplicable, to a robust discussion of issues such as: climate change impacts on the project; the direct impacts of greenhouse gases released by the project; and the state of knowledge concerning indirect impacts from greenhouse gas emissions associated with the project. Guidance could also include standard checklists and language that managers could use when determining if and how climate change should be included in a NEPA document. Finally, it could include a request to CEQ to initiate a government-wide framework for addressing climate change in NEPA documents.

Water and Land Rights

Water rights are primarily a function of state law. Climate change is projected to shift precipitation patterns and cause earlier snow melt. The existing system was specifically developed to address periods of excess and shortage. The question will be how well the system

can adapt to change if the shift in water patterns covers a broad geographic area and persists, creating a permanent shift. How are public and private land rights going to be affected by the predicted effects of climate change? Will existing boundaries, land regulations, and expectations of quiet enjoyment still apply? For land rights, under our legal system each piece of property is regarded as unique and ownership expectations play a large role in how we handle and enforce property rights. Climate change presents the challenge of how to address the concept of resources and values shifting across the landscape with underlying ownership rights that may or may not be as fluid. Options include: exploring new paradigms, water markets, and shortage-sharing agreements.

Secretarial Actions

Options include: (i) issuing a "Secretarial Statement" providing direction off which bureau directors could tier their respective climate change decisions; (ii) having each bureau issue its own climate change statement to help frame public discussion; (iii) leaving the current Secretarial Order on climate change in place; (iv) issuing a revised Secretarial order.

Consistent Documentation

Access to consistent, high-quality information on both basic climate change information and DOI's guidance for addressing the subject would enhance the various bureaus' ability to make and document decisions. In order for the Department to access the same information and to avoid duplicative efforts, options include: (i) creating a web site that can only be accessed by the Department; (ii) creating a website that is accessible to the public; (iii) using "push" technology; and (iv) hosting regular conferences or attend those offered by outside parties; and (v) setting up an office in USGS to serve as a call-in center when DOI personnel have questions..

Land Planning Policies

Climate change is on an uncertain time scale and thus provides unique challenges for the DOI land manager. Options to address land use planning include: (i) review planning cycle for each bureau to determine if potential climate change effects to bureau facilities and programs have been taken into consideration; (ii) issue guidance for amending management plans in areas where local conditions suggest a need; (iii) issue guidance for employing additional adaptive management strategies; (iv) issue guidance for determining likely climate changes and ranges of uncertainties that bureau managers should assess in making decisions; (v) set up a mechanism for inter-bureau cooperation; and (vi) review the flexibility in Wild and Scenic River plans to assess whether more frequent updates and amendments are necessary; (vi) setting-up a forum to clarify and reconcile competing roles between the Department of Commerce and FWS over treaty and statutory responsibilities.

Siting Facilities

In some areas, the Department may have to begin managing for a less predictable future when determining where to establish or relocate facilities. Options include: (i) work with OMB to modify the Executive Branch Management Scorecard to allow more robust consideration of the impacts of sea level rise, glacial melt, and other climate change related phenomena; (ii) determine the feasibility of a policy that restricts any new facilities with a long-term lifespan from being constructed in "climate change vulnerable environments;" (iii) review the relevant concessions policies and statutory preferences and modify as necessary to incorporate

consideration of potential climate change effects; (iv) develop policies, economic studies, and risk assessments for considering the long-term strategy for managing and maintaining DOI lands and infrastructure in the face of sea level rise and higher intensity/frequency of storms; and (v) study the feasibility and safety of using deployable structures.

Drought Management

The arid West is particularly susceptible to drought. Climate change is projected to increase drought conditions in certain areas while bringing additional water to others. Options include: (i) pursuing permanent Reclamation Drought Assistance authority; (ii) evaluating whether there is a benefit to allowing Reclamation facilities to be used beyond the currently authorized project purposes; (iii) extending Water 2025 grants.

Adaptive Management

In the past, management decisions have generally been directed to maintain or restore historic conditions or in some cases allow natural processes to alter the terrain. Adaptation may now require actively managing toward a future that is less certain. Options include (i) provide guidance for determining whether specific DOI lands affected by climate change would be better managed for preservation of existing conditions or adaptation to new conditions; (ii) providing guidance for setting climate change-related planning horizons within DOI; (iii) using existing DOI policy offices or a climate change team or management and legal personnel to identify synergies that can be effectuated by joint management of related Department lands; (iv) extending the collective property management concept to other Federal and public land owners; and (v) considering working with all property owners in a specific geographic boundary to voluntarily extend the concept bolstered by management if it proves successful and feasible.

NPS's Natural vs. Man-Made Policy Distinction

NPS makes a policy distinction between natural versus human-induced impacts, which leads to different proposed responses by park managers. Climate change challenges this traditional distinction. Options include: (i) maintain the current policy; and/or (ii) issue a Director's Order setting forth how NPS will address climate related changes since it may remain unclear whether the cause is natural, man-made, or some combination; and (iii) revising the Management Policies to eliminate the distinction.

Access to Resources

Increased erosion may lead to more relocations of Alaska Native villages and a need for new transportation corridors to resources that villages need. DOI may want to adopt a policy to encourage provision of easements and/or use existing flexibility in ANILCA and FLPMA to address access needs.

Mitigation

Mitigation of Greenhouse Gasses at Oil and Gas Facilities

Methane is calculated to have a more significant effect per unit than carbon dioxide in promoting climate change. MMS can continue to refine best practices so that direct natural gas releases can continue to be effectively managed.

Reconciling Greening Goals

As the Department considers options to reduce threats brought about by climate change, the alternatives presented may be at variance with other goals also designed to promote environmental stewardship and energy security. Options include: (i) those DOI offices responsible for greening goals may want to identify trade-offs of competing objectives with an emphasis on ensuring that the policies and limitations that flow from reducing climate change effects are factored into each analysis; and (ii) issue guidance articulating the policies and considerations that should go into managing the effects of climate change when considering greening objectives.

Carbon sequestration

Carbon sequestration is one of the major DOI initiatives designed to meet both existing DOI program goals as well as reduce GHGEs. Options include: (i) Issue guidance extending the existing biological carbon sequestration program to other FWS regions and DOI bureaus. (ii) identify the legal issues to addressed large-scale leasing of geologic structures for underground carbon sequestration.

Outdated Information

Climate changes may ultimately cause some information relied on by DOI bureaus to become outdated and thus will present challenges to DOI land managers. In Alaska, DOI resource managers are seeing evidence of climatic change earlier than other DOI areas. The Department may want to work with Alaska to determine which ANILCA-related studies are sufficient and which may need to be augmented and develop guidance to determine whether studies that underlie DOI decisions remain adequate or should be revisited. Maps may also need to be updated. Other options applicable to DOI lands generally include: (i) review future Indian water needs to evaluate whether water supplied by Indian irrigation projects is provided at prices that reflect the opportunity cost of the resource; (ii) discuss with OMB the feasibility of Indian water right settlement provisions that allow tribes to lease or transfer their water off-reservation; and (iii) consider climate change impacts when determining hazardous waste sites.

Calendar Dates

Certain NPS resource regulations adopt specific dates for certain actions. Climate change may lead to shifts in the timing of natural processes that directly relate to NPS's ability to implement its date-certain regulations. NPS may need to review existing date-specific regulations if they are dependant of climate-related phenomena, as well as reconsider the use of such date-specific criteria in the future.

The Law and Policy Subcommittee believes that this report is only a first step in what will surely be a multi-tiered effort to identify the legal and policy issues that may arise due to climate change. We expect next steps to include refining our work, focusing on Steering Committee priorities, and outreach to other agencies to coordinate approaches to climate change challenges.

INTRODUCTION

THE SUBCOMMITTEE'S PURPOSE

The Law and Policy Subcommittee looked at a number of the primary statutes, court cases, executive orders, legal documentation, and departmental policy guidance materials linked to the Department's various missions as they relate to the issue of climate change. The Subcommittee reviewed the information to determine what direction is given, what issues arise, how to address documentation of the issues, and what challenges may need to be addressed in terms of law and policy. The purpose was not to produce a legal treatise or opinion but to review legal and policy guidance to update the Department's evolving consideration of climate change. The report will assist the Secretary in selecting appropriate options.

The legal portion of the paper focuses on statutes, cases and executive orders pursuant to which the Department operates and the options to consider in administering them. In addition, that section highlights some longer-term legal issues that may ultimately arise that will challenge the Department's ability to manage its lands and resources in the future. The policy portion of the paper reviews materials developed by the Department and options that the Secretary can consider in responding more fully to the challenges anticipated by climate change.

The Department has a very broad set of responsibilities. As a land manager, Interior administers one-in-five acres nationwide. Within that portfolio are some of the most important and celebrated natural resources in America. At the same time, through its many bureaus, the Department is directly responsible for providing water, flood protection, electricity, minerals, forest products, agricultural resources, and energy for millions of Americans. The Department also serves as the primary interface with Native American tribes and the various territories in both the Atlantic and Pacific oceans. As such, the report encompasses both the human and natural implications of climate change.

There are many venues, both in government and the private sector, where the subject of climate change is under consideration. The subject of climate change causation and the policy considerations associated with how greenhouse gas emissions (GHGEs) will be regulated are outside the Department of the Interior's purview and therefore beyond the scope of this report. This document assumes that any broader laws or policies pertaining specifically to GHGEs will result from congressional or overarching executive branch action rather than falling under DOI jurisdiction and decision making.

THE SUBCOMMITTEE'S APPROACH

Climate Change Legal Challenges

The Subcommittee discussed the flexibility of our legal system and the breadth of options available to the Department in carrying out its responsibilities under both anticipated and unforeseen circumstances. Members of the Subcommittee pointed out that our legal system is

indeed robust and designed to address a wide range of human experiences and natural variations. They were also cognizant of the long-term level of uncertainty and change anticipated by climate change influences. Both aspects are discussed at greater length below.

Much of the assessment was structured around the sources of legal guidance and the steps necessary to comply with existing law in a timely manner. The Subcommittee also explored ways to provide access to regularly updated materials so that appropriate documentation is available for the various plans, environmental documents, and policies regularly drafted by the Department.

Analytical Approach

Since the degree of climate change over the short-term is likely to be within the range of variation seen in weather variability historically, the built in flexibility of our legal and policy system provides the capacity to manage current legal implications. There may, however, need to be new analysis applied within the existing structures. Thus, many short-term options are management, rather than legal, issues that lie within the Land and Water Subcommittee report. On the policy side there are opportunities in the short-term to address new issues as they arise. In the long-term (25-100 years), when considering the geographic and temporal potential for changes that may be brought about by climate change, legal challenges are more likely to arise and are discussed below.

For its analysis, the Subcommittee focused on the following potential climate change effects identified by the Science Subcommittee: increased temperature, changes in precipitation patterns, and sea level rise. The magnitude and location of those effects remain uncertain. In many areas, little change may occur and the existing legal system will be as effective in the future as it is today. In others, greater change will mean greater challenge in using existing legal tools. To the extent that change takes place, we have assumed that DOI lands and resources may ultimately be impacted through effects such as:

- Movement or change in the composition of resources currently under the stewardship of the Department as the water sources for refuges shrink, park values undergo change, or grazing lands become less productive due to decreased moisture.

- Species habitat shifts across the landscape in response to temperature increase and changes in ambient moisture. These shifts could expand or contract the available habitat, shift it to a new location, or eliminate it altogether.

- Altered runoff patterns as rain falls in new locations, the timing of spring snow melt changes, or precipitation shifts from snow events to rain events.

- Inundation of resources along coastlines as sea levels rise.

- Increased fires and new manifestations of invasive species.

The challenge in analyzing the legal and policy implications of climate change in relation to DOI resources and missions is to match the considerable flexibility present in the relevant laws with the anticipated management and policy challenges that may arise due to climate change.

Climate History and Legal Systems

Historically, the law reflected human experiences and variations. Not unexpectedly, we tend to structure our laws in reaction to issues as they arise. In other words, laws tend to follow experience, not vice versa. We rarely establish laws concerning an issue when we have not already experienced a conflict or do not anticipate one. Consequently, our experiences have shaped the outer boundaries of our legal system. As new conditions present themselves, we adapt our laws to address the issues. At the same time, the law is a stabilizing element of civil society because it acclimates slowly to integrate evolving trends. This perspective provides assistance in understanding how much flexibility the legal system has and what degree of climate variability it is already designed to accommodate.

Our legal system emerged over an exceptionally stable climatological regime covering the last 3000 years. Within that stability, however, there have been substantial weather variations. Seasonal, annual, and decadal weather pattern shifts have initiated a wide variety of flexible provisions in our legal system.

Conversely, during much of that period the concentrations of human settlements were sparser, often built in less naturally vulnerable locations, and were less tightly interdependent. As a result, weather-related phenomena had relatively smaller effects on human resources than comparable or more expanded changes may have in the future.

In the last 300 years, major cities have been built in locations where flood, drought, or heat increases may have greater impacts in the future. Prior to 1700, natural events may have had a significant effect on local populations. Those societies, however, were generally forced to succumb or migrate rather than attempt to draw on the public resources to remain in place or enact laws to distribute scarcity. Our legal system and policy choices now often favor maintaining status quo conditions even in the face of change.

Today, society has become acutely dependant on the fixed locations of our cities, national parks, and shorelines. Many of our cities are dependant on water supplies hundreds of miles from the municipality they serve or on local reservoirs that hold several months or even years of water supply. These water systems are predicated on a certain predictability of existing precipitation patterns.

There has also been a relatively recent shift in how the legal system relates to the natural environment. For eons, humans were challenged to survive the elements and allow nature to take care of itself. Over the last hundred years or so, society has reached a point where we take an active interest in conserving the natural resources around us. National policies and our legal system have followed suit. The Department of the Interior has been delegated the joint responsibilities of managing our resources to meet human needs as well as conserving the natural

resources under DOI's stewardship. Both of those goals may be affected by future climate change.

GUIDE TO THE SUBCOMMITTEE'S REPORT

The Subcommittee initially formed seven workgroups to cover seven issues presented by the Task Force Steering Committee:

1. Identify the laws, regulations and policies that govern DOI decision-making and which assume a static environment that must be re-thought in light of the likely changes anticipated by global climate change. Determine the range of options that can be pursued to reconcile these static assumptions within a dynamic environment.
2. Identify the laws, regulations and policies where a distinction between natural versus human-induced impacts leads to different proposed responses. Determine the range of options that can be pursued to address these issues when the potential cause (climate change) either is a combination of both natural and human-induced factors or cannot be determined.
3. Review the Department's position on adaptive management and assess its relation to climate change issues. Consider both the short-term and long-term implications of adaptation, including the need to manage to new paradigms.
4. Inventory the existing statutes, court cases, and presidential directives that concern climate change and affect our ability to exercise discretion.
5. Specifically review the need for documentation in NEPA and ESA, considering the high level of uncertainty arising from the current limited ability to predict location-specific impacts of climate change over the next few years.
6. Identify the other "greening" goals found in statutes, regulations, and executive policy which conflict with the goals that might flow from a response to climate change sensitivity. Assess the range of options for addressing those inconsistencies.
7. Consider ways to assist all departmental bureaus and offices in addressing climate change.

As the Subcommittee combined the information and options requested, the material was reformatted to aggregate related material. The "legal" issues in the report are divided into subjects where DOI: has unique responsibilities as the owner and property manager, has regulatory responsibility, and has legal responsibilities generally applicable to all property interest holders. There is then a legal section on climate change documentation.

The "policy" section addresses issues such as planning policy, revisiting decisions based on outdated information, and potential conflicts between climate change goals and the "greening" goals the Department is attempting to integrate. This section also considers how the Department can disseminate climate change information internally to increase consistency, avoid duplication of efforts, and provide a "one stop shop" for Departmental management of climate change. Materials are also presented on the question of whether the Secretary may want to develop a "vision statement" or new Secretarial Order concerning climate change.

The issues in this report were classified as either "Legal" or "Policy" based on whether the management of an issue is guided or constrained by principles embodied in authorities over which DOI has no direct ability to manage or in regulations and guidance which the Department can promulgate. The "Legal" section considers Federal laws enacted by Congress, cases decided by the courts, and executive orders signed by the President in contrast to the "Policy" section dealing with administrative processes where DOI can take the lead in making the change. Often, the distinction is blurred in day-to-day application, and some subjective assignment was necessary. In addition, the implementation of relevant laws also presents policy issues.

The issue also arose as to what constitutes policy and what is management for the purpose of sorting issues between the Law and Policy Subcommittee versus the Land and Water Subcommittee. Again there is inevitable overlap, but the following factors were used in attempting to sort the issues:

1. Issues/decisions addressed made by the Assistant Secretaries or above were more likely to be policy. Decisions made by local facility managers were more likely to be management. Decisions by Regional Directors tended to fall in between.
2. Issues/decisions typically affecting more than one facility or program were viewed as more likely to be policy.
3. Issues/decisions that covered a longer time horizon (more than 20 years) were more likely to be viewed as policy.

For example, a decision to buy one type of vehicle over another by a local manager is viewed as a management decision, while the decision to prefer alternate fuel vehicles generally is viewed as a policy. Likewise, the decision to build a visitor center at one location rather than another would be management, while the decision to take sea-level rise into consideration in making facility-siting determinations is policy.

The report includes three appendices. Appendix A lists the Subcommittee's membership and their affiliation. Appendix B is a flowchart outlining a potential decision-making process for analyzing of climate change in NEPA documents. Appendix C is a survey of greening goals in the context of climate change considerations.

The Subcommittee stresses that this is only a beginning step in what will surely be a multi-tiered effort to identify the legal and policy issues that may arise due to climate change. We expect that next steps will include refining our work to date, follow-up on Task Force priorities, and outreach to other agencies to coordinate approaches to climate change challenges.

SUBCOMMITTEE ORGANIZATION

The Subcommittee comprises 38 individuals representing most of the bureaus and offices within the Department. Membership included natural resource managers, wildlife biologists, park superintendents, policy directors, engineers, and hazardous waste managers as well as several of the associate solicitors and regional solicitors along with many of the attorney-advisors within the Solicitor's Office.

The initial identification of priorities was developed at a meeting with the members in Washington, D.C. on May 3, 2007. Between then and mid-June, working groups refined the breadth of issues and drafted papers, which were aggregated and edited for presentation to the Steering Committee for additional guidance on departmental priorities. The group then developed options in Denver, CO (June 25-28, 2007) and in Seattle, WA (August 20-23, 2007), with weekly meetings and conference calls among the working group heads. There were also periodic coordination meetings and calls among the members of the working groups. In addition, the Subcommittee chairs met with the Deputy Secretary. This report is a product of significant contributions from a wide variety of DOI personnel. Since all of the Subcommittee members hold senior positions within the Department, many of them actively gave of their weekends and evenings to produce a product that made a serious attempt at capturing the depth and breadth of the Department's responsibilities. With the diversity of disciplines in the Subcommittee, there was an opportunity for robust and vigorous discussion of the issues, leading to the contributions contained in this document. This work product covers immediate concerns regarding climate change legal analysis and is also a first step in the process of assessing long-range law and policy considerations for the Department.

Legal Issues

In analyzing the parameters and alternatives affecting the Department, it is important to distinguish between short-term and long-term legal concerns. In most cases, steps can be taken under existing laws and regulations to manage the level of variability that we will experience in the short term. The reason for this, as discussed above in the introduction, is that much of the variability that we will experience in the short-term is consistent with the conditions that gave rise to the legal tools that are already in place. Our legal system handles a wide variety of situations even today. It is primarily a matter of applying those legal tools to the ongoing variability regularly seen in short-term management situations. The short-term management options are, therefore, found primarily in the Land and Water Subcommittee report.

The purpose of the more strategic analysis in this Law and Policy report is to give early consideration to issues that may be need to be addressed if conditions of greater variability emerge in the longer term. A significant consideration is that some of the long-term issues and their ultimate solutions will take many years to bring about. The Department, the government as a whole, and the other interested parties will be best served to begin the deliberative process as early as possible. One of the objectives of this long-term consideration of the issues is to maximize the time available to address the challenges that are raised. Another reason to raise these long-term issues at this time is to provide the opportunity for new plans, management documents, and legal analysis, undertaken in the next few years, to take some of those considerations into account relatively quickly.

Throughout this report a series of issues are raised followed by various options to address those issues. In this "Legal Issues" section, many of the options will, in essence, be to assemble legal and management teams to address the legal implications from ongoing management choices made in anticipation of or response to potential climate change effects. The options for those sections of this report will be driven by the options chosen out of the Land and Water Management report. In other portions of this "Legal Issues" section, the subcommittee members identified areas where it would be helpful for the Solicitor to provide guidance through the issuance of a legal opinion. And finally there are options that relate to developing outreach alternatives to address these legal issues by working with states, tribes, neighboring land owners and public interest groups.

Before addressing specific legal issues, it may be useful to give an illustration of how the legal system handles variability in natural resource systems. There are numerous legal precedents for dealing with the on-the-ground effects of weather changes. One such legal example illustrates the flexibility already built into our legal system to address a range of variations—the governance of shifting boundaries along water bodies. Additional material on this subject will be presented later in the report, but the following illustrates the point.

The movement of boundaries identified with water bodies has been with us for as long as laws, rather than "clubs" have been used to resolve disputes. A comprehensive body of law has developed in response to boundary issues created when lakes dry up or expand and as ever-changing rivers slowly meander from "normal" water flows or undergo great changes from floods. In short, as land appears along a water body through deposits of sediment or the drying of

a lake, the land "accretes" (the process of accretion) to the owner of the upland. Conversely, if the land disappears through inundation or erosion, the process is called "reliction" and the upland owner loses property. However, when the shift is a rapid one, such as when a flood moves the bed of a river hundreds of yards or a couple miles away, the process is referred to as "avulsion", and the property boundary does not shift. In some jurisdictions, a further distinction is made—if the accretion or reliction is determined to be artificial (man-made), the boundary does not shift.

The anticipated long-term effects of climate change are broader than water boundary shifts. They could include changes in vegetation patterns as well as animal species habitat. The character of the landscape itself may change, along with the purposes for which government and private property owners acquired their land. If the concepts of accretion, reliction, and avulsion provide any guidance for the resolution of future climate change legal issues, three major challenges present themselves:

1. The as yet to be determined rate and size of impacts will affect whether the changes are considered to be slow enough to apply the concepts of accretion and reliction or rapidly enough to apply avulsion theory.

2. Because the issue of climate change causation involves both human-induced and natural phenomena, it is unclear which, if any, of the above legal theories will apply. The outcome may affect the flexibility available to address climate change-related legal issues.

3. Finally, through human experience we have come to accept the notion of water boundary shift through natural events. We have little experience, however, accepting the concept of land-based administrative boundaries shifting. Since the law tends to follow rather than lead public acceptance of a concept, development of the law may lag behind climate change experience.

THE DEPARTMENT AS NATIONAL LAND STEWARD

COMMON THEMES

As climate change begins to alter the temperature or moisture at any given location, various natural resources managed by the Department may grow, shrink, or shift across the landscape to maintain equilibrium. Early on, the laws will help us manage the changes because many of them have periodic reviews built in that will allow the Department to adjust to the changes. In addition, near-term changes are likely to remain within the level of variability we currently see in the weather. If future changes become more pronounced, more creative solutions may be necessary. Then the issue may become whether the Department's primary mission is to manage resources as they occur within its existing areas of jurisdiction, or whether the Department will be charged with extending or shifting its stewardship of resources as they shift.

Enormous capital and momentum have been devoted to structuring resource protection in specific locations. We have invested billions of dollars and decades of time to make sure certain resources are managed to conditions that have existed over time. If climate change causes those

resources to shift, more resources may need to be spent if new locations are to be maintained to the level of protection we have come to expect. In addition, there may well be different implications between adjusting legal objectives or boundaries in a relatively short period of time compared to the decades originally devoted to establishing the norms and setting the parameters. Costs and other implications will vary significantly between proposed scenarios of rapid versus cautious responses. Therein may lay a challenge facing the public and the government if we are going to continue to protect and manage the same suite of resources in a more dynamic environment.

If climatic conditions change and the Department remains charged with maintaining resources in the existing location, costs will likely grow as managers strive to remove invasive species and retain habitat. Under some set of circumstances, it may not be possible to mimic or maintain the conditions as we know them now.

Although some effects of a changing climate may be years away, the question could ultimately become one of how to manage the resources if they are in part or in whole outside DOI's jurisdictionally drawn boundaries? Will it be appropriate to acquire lands as they are needed to protect the resources we are charged with managing and release lands that are no longer capable of fulfilling their traditional roles? Can the Department work more collaboratively to build partnerships with surrounding land owners to find incentives for them to manage lands in ways that will complement the Department's mission? These challenges will straddle both our legal and policy venues. Many of those questions, however, are simply a new context for issues currently managed by the Department.

New financial resources will likely continue to be limited as each group within the public seeks ways to address the changes experienced in their sphere. Consequently, it will be important to explore alternatives that minimize the stresses on other parts of the system. Innovative thinking within existing legal and financial parameters may be our most valuable asset.

ISSUES AND OPTIONS

Major Natural Systems

STATEMENT OF ISSUE

Many of the resources managed by the Department have fixed purposes currently tied to a specific location such as national parks and wildlife refuges. To the extent those resources do not undergo appreciable change, existing laws and policies can be used to manage the alternatives with appropriate analysis of the changes experienced. If those principal resources change significantly in continuity or location, the Department can take additional steps to inform and manage the issue or recommend how the law might be changed to address them.

RELATION TO CLIMATE CHANGE

In this section, we consider the concept of fixed geographic resources under the Department's direct ownership (as contrasted with living resources that the Department must manage or

regulate on land that may be owned by others). If climate change manifests itself in a way that causes the current resource mix to evolve away from the existing "approved" location and move toward another location, legal issues will need to be addressed to guide the Department on the path necessary to protect such resources. As those changes are observed, it may be useful to have early discussions to formulate options since solutions could take a considerable time to ascertain and implement.

BACKGROUND

Parks. The National Park Service (NPS) Organic Act, 16 U.S.C. § 1-1a, sets forth basic purposes for parks, and individual laws create other purposes. The NPS's Management Policies (2006) provide a recent articulation of policies derived from the Organic Act. As it is currently amended, the NPS Organic Act requires that national parks be managed unimpaired, consistent with ongoing adjustments provided by Congress. 16 U.S.C. §1. Current policy interprets impairment as a level of impact on park resources that threatens the park's primary resources. If resources undergo transition within a park, the NPS has some degree of flexibility to address a change. If the transition is significant, it may be difficult to sustain the conditions underlying the primary purposes of the park. For example, the continued retreat of glaciers at Glacier Bay National Park or effects in Everglades National Park from sea level rise or shifting precipitation patterns could threaten the primary resources of the parks. How the NPS may respond to the nature and range of change is also addressed below in the policy section "*Natural Versus Man-Made Distinction,*" since the NPS is uniquely charged with maintaining "natural" conditions.

If resources begin to move outside park boundaries, Congress would need to provide guidance concerning management of park resources. Currently, there is some flexibility in specific cases, e.g., the Galisteo Basin Archaeological Protection Sites (minor boundary adjustments to include new lands, by consent of owner, could be made due to new archaeological findings by publishing a notice in the Federal Register) and the Grand Teton National Park land exchange (authorizing acquisition of state lands for inclusion within park boundaries). Other than such specific examples, boundaries may only be expanded or adjusted by an act of Congress.

Refuges. The National Wildlife Refuge Administration Act, as amended by the National Wildlife Refuges System Improvement Act, 16 U.S.C. § 668dd, establishes a National Wildlife Refuge System, defines admission to the system, identifies wildlife and wildlife conservation as overriding purposes of the refuge system, identifies priority types of wildlife-dependent recreation to take place there, and establishes the framework within which wildlife refuges will be managed. Refuges are managed to maintain biological integrity, biodiversity, and environmental health, but it is unclear what this constitutes in a shifting or changing ecosystem. Refuges are established for a specific purpose, and refuge managers currently use historical data as a management tool. To the extent that climate change results in conditions outside the envelope of historic climatic variability, these data may not be an adequate guide, and identified purposes may not be feasible.

As discussed under the section addressing "*Habitat Shift*", the Congress and the Department will need to address the needs of migratory birds, e.g., with respect to changing migration patterns and the need for new refugia on shifting flyways.

New Federally Protected Areas. Other authorities exist to shore up protected areas. The Recreation and Public Purposes Act, 43 U.S.C. §§ 869- 869-4, authorizes the sale or lease of public lands for recreational or public purposes to state and local governments and to qualified nonprofit organizations. The Act authorizes the transfer of public lands, based on a demonstrated public need, for recreational or public purposes. Such transfers are discretionary, giving the Secretary flexibility to address changed circumstances.

The Federal Land Transaction Facilitation Act, 43 U.S.C. § 2301 et seq., allows the sale of public lands and the use of proceeds for the strategic acquisition of lands elsewhere. Although not passed with the type of transfers identified that may be needed in a climate change environment, there may be some lessons to learn and principles to borrow from these laws.

Coastal areas. Many coastal areas owned by the federal government are a part of the Marine Protected Areas (MPA) program. MPAs include all coastal DOI parks and refuges. NOAA sanctuaries are included as well. This national MPA system facilitates coordination and more effective information sharing. It also provides a process for agencies to develop jointly useful scientific information, make more informed management decisions, and identify gaps in current protection efforts. The coordination provided by this system can also be useful in developing common legal tools and articulating relevant approaches to management.

Alaska. Alaska conservation system units have broad mission statements that provide flexibility to address different species composition as well as the shift of species and ecosystems outside current boundaries. Under the Alaska National Interest Lands Act's (ANILCA), 16 U.S.C. § 3101 et seq., broad mission statements were intentionally established and represent the last major step in a land disposition process that began before statehood in 1959.

ANILCA expressly prohibits studies for the sole purpose of creating new conservation system units. It also states that no withdrawal of public land may exceed 5,000 acres, and a new withdrawal terminates in one year if the House and Senate have not passed resolutions authorizing it. ANILCA has some countervailing provisions to allow the redrawing of boundaries (e.g. 16 USC § 3103) and acquisition of lands (16 USC §3192; 16 USC § 3194), if needed, outside current conservation system unit boundaries. Despite the limitation on withdrawals over 5,000 acres, ANILCA anticipates the discovery and administration of archeological and paleontological sites and allows for their protection: up to 7,000 acres for designation on federal land or for purchase, donation or exchange by consenting owner. *See* 16 USC § 3194. There are also provisions for cooperative agreements to co-manage resources on Alaska Native Claims Settlement Act (ANCSA) lands, which often adjoin federal lands. The special status of Alaska has been reconfirmed since 1980; *see e.g.*, Wildlife Refuge System Improvement Act of 1997.

In short, ANILCA has several very flexible provisions, including some to facilitate land transfers and acquisitions if appropriate. With the increased prospect of changes in species range and other potential ecosystem and land modifications possible from climate change in Alaska, proposals may be advanced to set aside more or different land for conservation purposes.

However, that alternative is proscribed by ANILCA. The 1980 balance struck with the State and reflected in the statute itself, provides that no new federal conservation units will be created.

Surface Mining Reclamation. The Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. §§ 1201-1328 (SMCRA), "establish[es] a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations." 30 U.S.C. § 1202(a). The Office of Surface Mining Reclamation and Enforcement (OSM) administers the program, but "because of the diversity in terrain, climate, biologic, chemical, and other physical conditions in areas subject to mining operations," states have the "primary governmental responsibility for developing, authorizing, issuing, and enforcing regulations for surface mining and reclamation operations." 30 U.S.C. § 1201(f).

Because OSM's regulations are national in scope and apply across a wide range of climatic conditions (from the forested mountains of Appalachia through the Great Plains from Texas to North Dakota to the arid and semi-arid intermountain west and on to the Pacific Northwest and Alaska), they are adaptable to climatic changes as they may occur in various locations. Individual states have the authority to revise their state-specific regulatory and reclamation procedures and standards, and particular permit terms, as appropriate to address any significant local changes within their jurisdictions. OSM can assist individual states with training, and sharing of information, analysis, and techniques.

It is unlikely that nationwide rulemaking by OSM would be needed to address localized and variable climate changes, or their consequences. In addition, any overarching determinations concerning indirect GHGEs associated with products mined from Federal lands will be the subject of congressional action or broad executive branch policies.

Insular Areas. Currently, the Department of the Interior has administrative responsibility for coordinating federal policy in the territories of American Samoa, Guam, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands, and oversight of federal programs and funds in the freely associated states of the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau.

Many characteristics of the insular areas make them relatively more exposed to climate change impacts as compared to the mainland United States. Due to their small size, impacts to insular areas could affect entire islands and groups of islands, reducing their ability to absorb impacts. Many islands also do not rise very far above sea level, exacerbating the potential impacts from severe storm events and sea level rise. Infrastructure is less developed. Insular areas are isolated from sources of immediate assistance in cases of emergency. Economies are not diversified and consist primarily of tourism, agriculture, and fisheries, which are acutely sensitive to changes in climate and weather events.

Each of these major natural resource systems managed by the Department has a unique mix of resources that may be affected by climate change processes. They have been set aside, identified or managed for a specific set of circumstances that may now be facing change. In some cases, they may be facing change that will significantly reduce or even eliminate the underlying conditions that were originally present to support the federal reason for protection. To address

these widely varying facts, it will be helpful to work with each of the bureaus to closely identify the original basis for Federal involvement and assess the likelihood of change. In addition to any management considerations there will be contracts, permits, legal interpretations, and liability issues to weigh in choosing a course of action for the future.

OPTIONS

1. Pursuant to options selected from the Land and Water Subcommittee report, set up management/legal teams for each bureau to prioritize the short-term and long-term legal issues facing each bureau for carrying out new climate change initiatives that the Department wishes to pursue.

2. As needed and based on Science Subcommittee projections and options selected from the Land and Water Subcommittee report, set up management/legal teams for each bureau to identifying any novel long-term legal issues that may need to be addressed in response to climate change effects that cause DOI resources to shift.

3. Determine legal documentation necessary to identify existing baselines if steps need to be taken in the future to accommodate resource shifts outside DOI lands.

Shifting Boundaries

STATEMENT OF ISSUE: In the short term, property boundaries are unlikely to be affected by climate change since the changes are anticipated to be relatively consistent with existing legal experiences. In the long term, predicted climate change transformations may give rise to new legal concepts concerning property boundaries if the extent or scale of changes becomes significant. Summarized below are the more fundamental water boundary shifts (both marine as well as inland) that the law has come to address historically. More novel issues are then discussed that could arise in response to the pressure to shift boundaries on the dry land as the character of the landscape itself may shift along with the purposes for which the land was acquired.

SUB-ISSUE 1: The sea level has risen about 400 feet since the last ice age (18,000 years ago). However, from 3,000 years ago until quite recently (the period during which our legal system has developed), the level has risen quite slowly. As seaward boundaries begin to change more rapidly, new legal challenges are likely to arise.

RELATION TO CLIMATE CHANGE: Climate change impacts along oceans could include both sea-level rise and increased coastal erosion. This could affect coastal fast lands (land above the mean high-tide line) as well as the loss of coastal barrier islands. Other related phenomena may include more frequent and severe storm events, which can also hasten erosion.

BACKGROUND: The territorial sea is measured from the "mean lower low water" line. Due to accretion and erosion, this line moves over time. The ocean regularly erodes some portion of its margin, yet also builds land through sedimentary deposits that constitute the natural process

of beach nourishment. As a result, the "National Baseline" shifts, affecting the territorial sea limit, the contiguous zone limit, and the exclusive economic zone limit.

International maritime boundaries are also variable. They are often determined using "median line" principles (i.e., determined from the closest mainland points), unless fixed by coordinates in a treaty or other international agreement. Variability also applies to the boundaries of the Submerged Lands Act (the Submerged Lands Act Boundary and the Limit of '8(g) Zone'). This Act controls unless a particular Submerged Lands Act Boundary is fixed by a United States Supreme Court Supplemental Decree.

The assumption in this legal framework, and most other areas of property law, is that the coastline remains reasonably static and changes are normally slow and imperceptible. As a result, the long, time-consuming process of recalculating offshore boundaries occurs very infrequently. Sea-level rise will affect the location of the mean lower low water line from which both onshore and offshore boundaries are determined. Acceleration of erosion along the coast will necessitate recalculation of non-fixed, offshore boundaries as well as adding to or taking from the upland owners.

A moving coastal boundary creates uncertainty. In addition, industry is reluctant to invest in offshore activities when boundaries are subject to change. States often are interested in asserting their three-mile limit in order to optimize revenues from offshore mineral leasing or for the purposes of conservation. In addition to State interests, tribal governments may be concerned about changes in the coastline. The relation of the National Baseline to areas of international interests, such as the Law of the Sea and the Northwest Passage, is also a consideration.

OPTIONS:

1. Consult with states on the merits of fixing coastal boundaries of states near areas of growing international interest that may be affected by sea-level rise, e.g., Alaska and Florida.

2. Seek a Solicitor's opinion addressing the implications of potential climate change effects on boundaries and jurisdictional issues in coastal areas if it is concluded that sea-level rise may occur within a relevant timeframe. Solicitor opinions can add clarity to such cross-cutting issues as boundary changes and Departmental jurisdiction. It could bring a comprehensive legal perspective to this issue.

3. Establish a management/legal team with the MMS to determine if there are legal and financial implications from shifts in coastal boundaries and corresponding jurisdictional lines for MMS.

SUB-ISSUE 2: With the current emphasis on climate change effects, riparian boundary determinations may become more rapidly caught up in the debate. As discussed above, climate change can be viewed in several different ways from the standpoint of water boundary shifts. While the underlying issue (riparian boundary determinations) is largely a matter of state law, DOI is the single largest landholder in the United States, with more boundary miles to be affected.

RELATION TO CLIMATE CHANGE: Erosion/accretion as well as sudden changes to water courses may be affected by climate change. The rate, location, and extent of change may be affected.

BACKGROUND: Most land along rivers, lakes, and oceans is subject to state water boundary law. "Riparian" is often used to describe any property having water frontage. The term "riparian," however, technically refers to land abutting non-tidal river waters. "Littoral" refers to the land adjoining a navigable ocean, sea, or lake. Because the laws in multiple jurisdictions tend to manage the issues similarly (at least within any given state), the term "riparian" will be used to describe all such water boundaries.

Changes in a riparian boundary that are a reflection of slow and imperceptible changes to the riverbanks or shorelines are termed accretions and relictions. Boundary changes associated with accreted lands are generally assumed to favor the current owner. Conversely, erosion tends to cut against existing ownership. This is the pattern unless there is a sudden or avulsive event such as a flood. There are prescribed means to make determinations as to what is accretion/erosion and what is avulsion. The current riparian boundary law anticipates a fairly bright line between slow minor changes and sudden major changes.

Climate change effects currently fall conceptually between avulsion and reliction/accretion. New perceptions could alter the way riparian boundary shifts are viewed, depending on the extent and rate of change in the course or level of water bodies. If climate change brings about more rain (flood) events and less snow (tending toward accretion/reliction), there will likely be new legal theories articulated to resolve disputed boundaries. Many areas controlled by the DOI are so large that a riparian boundary may be of little consequence. But in others where the size of the property or the character of property adjacent to a water boundary is critical, these issues could come into sharper focus. Riparian land owners may lose their entire parcel, or events could require relocation of owners and facilities to higher ground. The Great Basin lakes, for example, have a high probability for dramatic changes in lake levels and may see significant changes in boundaries and in areas of ownership.

In Alaska, Native allotments and restricted-deed BIA lands along accreting/eroding riverbanks may be affected. In addition, lands selected pursuant to ANCSA, for certain values and on other bases important to local people, may be affected.

International boundaries, such as the St. Lawrence Seaway and the Rio Grande, are also a potential subject for future consideration.

OPTIONS:

The Solicitor, in connection with the operating bureaus, could establish a team to conduct a strategic review of the competing riparian boundary legal theories. The review could assess the potential application of those alternatives to the DOI lands most likely to be affected by climate change.

Mining Claims

STATEMENT OF ISSUE: How might climate change effects impact development of minerals under the 1872 Mining Law?

RELATION TO CLIMATE CHANGE: Climate change impacts on mineral development authorized by the Mining Law are uncertain. Mining methods differ depending on the mineral that is produced. Even if water becomes scarcer in the West, the lack of water will not affect all mining projects because many mining methods require little or no water. For example, gypsum, which is used to make wall board, does not require water for its production. It requires heavy equipment to dig it out of the ground and load it on trucks to transport it to a wallboard manufacturing facility. Gold mining, too, may need little or no water in certain circumstances. Many of the largest open pit mines in Nevada require dewatering of the pit for the mine to be developed. Of course, some mining methods require access to water. Water rights are governed by State law. If a mining company cannot get approval from the State for the water rights it needs to conduct a proposed mine, it must consider other less water-intensive mining methods if it is going to proceed with mining operations.

BACKGROUND: The 1872 Mining Law authorizes the exploration of available public lands for the purpose of finding and the developing valuable mineral deposits under the surface management standards imposed by the Federal Land Policy and Management Act. The Mining Law provides that citizens of the United States may explore for minerals on open public lands, locate mining claims, and seek to develop discovered minerals. The claimant maintains the claim by paying an annual maintenance fee. A valid unpatented mining claim creates a property right that includes the right to mineral extraction, subject to compliance with applicable surface management requirements. Currently, about 330,000 mining claims are located on Federal lands. The claims are located for a wide variety of minerals, such as gold, silver, molybdenum, gypsum, bentonite, uranium, and copper. Although the Mining Law provides a way for mining claimants to obtain fee title to the lands included in a mining claim, Congress has imposed annual moratoria on this patenting process since 1994.

OPTIONS:

1. Monitor the ongoing impact of climate change, if any, on federal mining claim operations. A decrease in water may make it more expensive to develop Federal mining claims. Consequently, there may be an impact on the ability to bring essential minerals to the marketplace. BLM believes mining companies will initiate appropriate operational changes because mining claims and mining operations are self-initiated. However, by monitoring the health of the industry, the Department may identify early legal and policy issues in sectors of the industry that are affected by reduced precipitation or shifting of surface resources, such as threatened or endangered species.

THE DEPARTMENT AS RESOURCE GUARDIAN

COMMON THEMES

In this section, the focus is on resources where the Department has responsibility largely independent of underlying DOI land ownership. It first covers natural resource concerns and then resource management issues that directly affect the human environment.

As discussed above, climate change may cause species that DOI oversees to relocate. Those laws that have recurring reviews built in will make it easier for the Department to adjust to short-term changes, particularly those within the normal range of weather variability. The timing and extent of the changes that may be experienced may raise issues we have yet to address.

In the natural resource conservation area, this theme poses particularly challenging legal issues, since the species and habitat allocated to DOI for management are animals, birds, and plants that are already at special risk. Standard wildlife management is primarily allocated to the states.

In addition to responsibilities for natural resources protections, the Department is also a significant manager of natural resources that are directly utilized by the American public. For example, American Indians depend upon the Department as trustees of extensive natural resources used to support their livelihoods. Millions of Americans also depend upon Bureau of Reclamation projects for irrigation and drinking water supplies, hydropower, and for hunting and fishing opportunities. And minerals managed by BLM and MMS serve the national priorities for energy, agriculture, manufacturing, high tech industries, chemical and defense. Climate change is expected to affect many human activities dependent upon natural resources, including those activities specifically dependent upon Departmental management.

ISSUES AND OPTIONS

Habitat Shift

STATEMENT OF THE ISSUE: The current legal system provides flexibility through periodic reviews and the ability to make changes as new conditions arise. Because the underlying issues are so closely tied to ongoing legal responsibilities, this section will look more closely at short-term concepts that might otherwise be covered in the Land and Water Subcommittee report. We will also cover long-term considerations. To the extent that future climate change effects cause the shifting of plant species and/or animal species substantially beyond their current range, new legal challenges may arise as we try to keep apace of living resources as they move across the landscape.

In a future experiencing regional warming, shifting precipitation, and sea level rise, the location and extent to which individual species and ecosystems may migrate is uncertain. The mix of water, temperature, nutrition, and seasonal sunlight that plants and animals have come to rely on may move in part or in total outside the boundaries of an identified conservation unit or a single-purpose management unit. It is also possible that the necessary overlap of these constituent

elements may shrink or expand or disappear altogether. Consequently, administrative analysis will have to be more robust and more articulate on the range of options under consideration to ensure that subsequent decisions are given appropriate deference.

SUB-ISSUE 1: Endangered Species Act

RELATION TO CLIMATE CHANGE: Over time, the effects of climate change may have a tendency to move existing plant and animal species farther north and to higher elevations to maintain the moisture and temperature resources they need. When, where, and to what extent that will occur will be difficult to predict. This ecosystem movement may ultimately shift species outside of their existing range and the currently designated critical habitat over the next few decades. This section on species movement deals with those circumstances where the species can successfully pursue that mix or resources. The next section addresses the concern that some species may not be able to survive the changing conditions.

BACKGROUND: The Congress has given the Department stewardship of certain birds, animals, and plants pursuant to the Endangered Species Act (ESA), 16 U.S.C. §§ 1531-34. Enacted in 1973, the ESA was, and still is, a national priority statement to conserve fish and wildlife, prevent threats of extinction, and move toward species recovery. Recovery is an increasingly significant goal in managing endangered and threatened species. In addition, cooperation with states, tribes, and the private sector is essential as the Department carries out its responsibilities.

Under the ESA, the Department works with other Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of the critical habitat of such species. In addition, all Federal agencies have an affirmative obligation to carry out programs for the conservation of endangered and threatened species.

Private parties also have ESA obligations that prohibit actions harmful to protected species and their habitat. At the same time, the public has legitimate expectations regarding their ability to use their lands with certain assumptions based on the mix of species that inhabit their land at the time of purchase. If the purposes for which government and private property owners acquired their lands alter in response to climate change, unforeseen conflicts may arise.

By delegation to FWS from the Secretary, the ESA provides for the listing of threatened and endangered species based on their status throughout all or a significant portion of their range. Through the FWS Listing Program, listed species are afforded the full range of protections available under the Endangered Species Act, including various prohibitions on killing, harming or otherwise "taking" species.

Concurrent with the listing decision, the ESA provides for the Secretary to identify areas of habitat that are essential for the species' conservation. Those areas may be designated by the Secretary as "critical habitat." Critical habitat is an area or areas, occupied at the time of listing, that contain features essential for the conservation of listed species and that may require special

management and protection. These features are referred to as "primary constituent elements" in the Service's regulations and include fundamental constituents such as: food and water sources; adequate cover or shelter; and space for growth, breeding, reproduction, and rearing of offspring.

When designating critical habitat, the ESA requires the Secretary to take into consideration other factors such as economic impacts, national security, and any other relevant impact. The Secretary is authorized to exclude any area from critical habitat if he determines, after reviewing biologic and non-biologic factors, that the benefits of such exclusion to other resource values and the public outweigh the benefits of specifying such an area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such an area as critical habitat will result in the extinction of the species concerned. Critical habitat may from time-to-time be revised as appropriate.

In designating critical habitat, the Secretary may include areas that were not occupied by the species at the time of listing only if such areas are essential for the conservation of the species. To date, the Department has only designated unoccupied habitat within the historic range of the species. Yet it is not certain future habitat areas will necessarily follow historic patterns. Designating critical habitat that has not been part of the historic range of a species would be a significant change in the ESA program.

The goals of the ESA remain the subject of considerable legal controversy, however, in part because the national priority to conserve threatened and endangered species is often implemented as a cost to a small minority of individuals. While much of the recovery effort pursuant to the ESA can be accomplished on Federal lands and with Federal budgets, millions of acres of privately held land nationwide are affected by the ESA without positive incentives to encourage owners to pursue voluntary conservation. This issue may heighten as the Department begins to incorporate climate change considerations into its ESA decisions. For example, if habitats shift due to climate change, the Department will need to determine how it will designate new critical habitat or revise existing critical habitat, what steps to take for areas that may not be needed until some future date, and how to engage states, tribes, and private landowners in new approaches to endangered species management.

OPTIONS:

1. **Listing Decisions.** In the short-term, the ESA framework may be sufficiently flexible to manage listed species consistent with initial climate change effects. In the future, additional guidance may be needed through regulation, Solicitor opinions, or Congressional action.

    a. **Existing:** While "endangered species" are listed if they are in danger of extinction throughout all or a significant portion of their range, "threatened species" are listed if they are likely to become an endangered species within the foreseeable future. In either case, there is a significant attempt to predict future events and conditions in making a listing decision. Traditionally, the FWS has depended on historic data to inform such predictions. The Service is beginning, however, to place greater emphasis on the use of forward-looking models which rely on predicted changes outside historic parameters. While there is flexibility within the law indicating such choices may be available, the full

breadth of these alternatives has not been tested in court. The FWS could continue its current practice or may wish to consider regulatory action or guidance to specifically articulate the basis and degree of reliance on such methods.

b. **Future:** As the Service analyzes greater degrees of climate change effects in listing decisions, it could ask the Solicitor for an opinion concerning the legal meaning of the term "foreseeable future" as used under the ESA to provide some guidance on the standard for relying on forward-looking models.

2. Critical Habitat

a. **Existing:** The ESA provides for designating unoccupied habitat as critical habitat and also provides for revising designations of critical habitat. To date, such designations have been limited to areas occupied at some time by the species. The Department may choose to use these sections of the law in the future to accommodate habitat shift due to climate change. Designating critical habitat, that is presently unoccupied, on the basis of climate change, however, should be made in close cooperation with those whose lands may be affected by such a designation. If such a shift in policy is pursued, private landowners, as well as other government (federal, tribal, and state) agencies, will need to be included early in the process. Such a use of the law is untested.

b. **Future:**

i. The current statutory process for designating critical habitat requires that the primary constituent elements be present at the time of designation. However, climate change may alter the factors that guide the designation of critical habitat. Under such a scenario, there may be requests for the Department to anticipate species' needs by designating critical habitat before the full suite of primary constituent elements is present. To be consistent with the spirit of the ESA, scientific information and analysis would have to show that the physical and biological features needed to support a species will exist in the proposed location in the future. However, even if the science validated the prediction with a high degree of certainty, Congress would need to revise the ESA to permit designation of critical habitat when primary constituent elements do not yet exist in an area.

ii. As an alternative to such "pre-designation," the Department may choose to undertake more intense monitoring and alternative forms of analysis in preparation for designating critical habitat when these features actually come into existence. Working with the USGS and other reliable sources of scientific information, the Department may need to anticipate habitat shifts to inform a series of options on how to best prepare habitat designations. Alternatively, the Secretary may determine that critical habitat will be designated after the relevant features to actually support a species are evident.

It is possible that the concept of critical habitat designations may eventually become more fluid, with new critical habitat added when relevant features are present and

dropped off when they disappear. Current law does not readily appear to provide for such flexibility.

iii. The Department may want to pursue a Solicitor's opinion to assess the breadth of options available to the Secretary in designating critical habitat. Even if legally permissible, any such forward-leaning options would need to be closely coordinated with the USGS and other agencies and institutions to identify the reliability of information and the ability to predict specific locations where primary constituent elements will be located.

3. **Cooperative conservation.** Although the Federal government bears a greater responsibility in conserving species, private property owners can be encouraged to develop innovative ways to help species adjust to climate change impacts.

   a. **Existing:** Additional incentives for private parties to conserve endangered and threatened species on their lands could be put in place.

      i. Streamline the Habitat Conservation Planning (HCP) process for small landowners and low-effect incidental take permits. This could reduce the concerns that private landowners have when anticipating that endangered species may be listed or critical habitat may be designated on their land. It could also provide private property owners with regulatory certainty as well as provide protections for listed and unlisted species as their habitats shift due to climate change.

      ii. Increase participation in voluntary species conservation through expanded offerings of prelisting conservation agreements, no surprises alternatives, safe harbor agreements, no take agreements, and recovery plan incentives.

   b. **Future:** More innovative solutions for the future could provide incentives for the public to proactively seek to conserve threatened or endangered species on their land instead of seeing such listings and designations as impairing their property interests without compensation.

      i. Federal agencies could enter into agreements to purchase easements and undertake measures to achieve recovery on private land. For example, agencies might enter into conservation agreements with private landowners or agree to buy private land interests at a value that does not reflect any limitation on use as the result of a critical habitat designation.

      ii. Establish new financial incentives. The government could develop financial incentive programs that offset in part or in whole the financial consequences of listing or critical habitat on private land. See the section below on migratory bird refugia alternatives.

   These alternatives could help address the uncertainty and concerns brought about by listing species outside their historic range and designating unoccupied habitat. Such alternatives

may also act as an incentive for a landowner to manage property in a way that is attractive for listed species rather than to shy away from such action.

4. **Recovery planning:** Pursue the use of more comprehensive recovery planning. This could include identification of biological recovery goals, new recovery measures, and appropriate benchmarks. Other Federal agencies, state programs and conservation activities on private land could provide a basis for such benchmarks. Recovery plans could specifically consider how climate change and habitat will affect recovery. Recovery plans could also assess the needs of multiple species that depend on the same type of habitat and that may be similarly affected by climate change. Such plans could greatly assist overall conservation efforts, build upon principles of ecosystem management (including managing for climate change), reduce conflict with economic activity and property rights, and provide for greater protection for larger numbers of species than would otherwise be practicable under separate, single-species conservation plans.

5. **Experimental Populations:** The Secretary could take greater advantage of ESA §10(j)'s experimental population authority to expand the introduction of species outside of a species' existing range. Critical habitat may only be designated for experimental populations when it is found to be essential to the continued existence of the species. Such a program could be used to proactively reduce the potential impacts of shifting habitat conditions. To be successful, however, it will be necessary to coordinate closely with states, tribes, and private land owners in the affected region. It could be more effective if regulations are adopted and financial incentives are crafted to provide positive incentives for other parties to support the introduction of such experimental populations.

   In addition, Congress could consider revising the 10(j) provisions to directly create greater incentives for states, local governments, tribes, and private land owners to support such experimental populations. This could provide a significant role for Congress to aid species preservation and recovery in an era of potential climate change.

   Regardless of the options undertaken, care must be exercised to address the concerns expressed in the option below on invasive species.

SUB-ISSUE 2: Migratory bird refugia

RELATION TO CLIMATE CHANGE: Climate change has and is expected to continue to shift migratory routes, and thus, will affect wildlife refuges established to coincide with existing routes. The refuge system is strategically placed along bird migration flyways, but climate change may cause migratory patterns to shift. Under climate change, it is difficult to predict migration patterns in 10 or 50 years, and in 100 years such patterns may be different altogether.

BACKGROUND: Under the Migratory Bird Treaty Act (MBTA), 16 U.S. C. §§ 703-12, the Secretary regulates hunting of and bans international trade and commerce of migratory birds. The Secretary is to give "due regard" to zones of temperature, distribution, abundance, breeding habits, and times and lines of migratory flight to determine proper management practices.

The MBTA is flexible in the protection of migratory birds, but its connection to National Wildlife Refuges (NWR) should be noted. Many NWRs, such as the Upper Mississippi River NWR and the Bear River Migratory Bird Refuge, have been created primarily for the protection of migratory birds as well as flyways of migratory waterfowl. Climate change may cause migration patterns to shift, altering migratory bird use of NWRs.

OPTIONS:

1. If the area for migratory bird "refuges" decreases in response to climate change and other stressors increase outside NWR boundaries, new or relocated strategic refugia for migratory birds may need to be considered, where hunting is more closely controlled.

2. In anticipation of potential climate change effects, the Department may want to initiate additional cooperation agreements with other landowners to increase the areas available for migratory birds.

3. The Department may consider facilitating the use of targeted habitat acquisition strategies, similar to the Conservation Reserve Program and Environmental Quality Incentives Program. Both programs are funded through the Commodity Credit Corporation and provide for private land owners to reduce environmental impacts or retire environmentally sensitive areas from production for 10-15 years. This alternative may well require Congressional action to establish and fund the effort.

SUB-ISSUE 3: Invasive Species

Every bureau within DOI has staff working on invasive species issues. The National Invasive Species Council acts as a coordination point to prevent duplication among agencies.

RELATION TO CLIMATE CHANGE: Warming, changes in precipitation and moisture, and increased frequency of fire may make native species less resilient and provide opportunities for invasive species. At the same time, under climate change, native species have been observed to expand their range northward and vertically in elevation. In some cases these species then exhibit invasive properties (e.g., native pine bark beetles range expansion resulting in mortality of pine forests in British Columbia). Under most climate change scenarios, this expansion or change of ranges is expected to increase.

In addition, management options that assist endangered species in adapting to climate change by translocation or acquisition of dispersal corridors may result in unintended adverse consequences. The transferred species themselves may, in essence, become invasive species.

BACKGROUND: Invasive species are those that are not native to an ecosystem, brought into an area through intentional or unintentional opportunistic human assistance (typically human transportation). Not all non-native species have significant disruptive effects on surrounding native flora and fauna. There are, however, serious invasive species issues associated with opportunistic invasions. If species migrate into an area due to climate change alone (i.e., without opportunistic human assistance), they may well not be considered invasive.

The Lacey Act, 16 U.S.C. §§ 3371-78 & 18 U.S.C. § 42, is the strongest enforcement mechanism to control invasive species. It prohibits commerce of certain fish and wildlife in violation of state, federal and international law, and provides criminal penalties for violations.

The human component associated with migration may not always be obvious. Since invasive species are considered to be those brought into an area by direct human involvement, new issues could arise if agencies seek to assist native species by moving them into a new area as an adaptation strategy to address climate change effects. Also, areas vacated by a native species could be claimed by an invasive species, and this invasion may prevent the reclamation or expansion into the area by a more suitable native species.

Executive Order 13112, Section 2(a)(3) states that each Federal agency shall not:

> authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Pursuant to EO 13112, managers apply a Hazard Analysis and Critical Control Points (HACCP) analysis for each invasive species. However, a federal agency is not required to carry out management programs on Federal lands unless similar programs are being implemented on state or private lands in the same area.

At the same time that traditional invasive species issues are considered, new management options are currently being investigated to help "at risk" species adapt to the effects of climate change. Some of these options under discussion include: development of migration corridors, longitudinal biological reserves, other types of reserves, refugia, gene banking, genetic engineering, active transport, experimental relocations, and land swaps. Each will have implications for invasive species management.

Consequently, as managers address species in light of potential climate change developments, the application of EO 13112 requires Federal agencies to insure that invasive species issues are taken into account, subject to risk analysis, before initiating management options. As currently written, EO 13112 does provide flexibility. Options for mitigating the effects of climate change will clearly need to be weighed against the other environmental impacts, such as invasive species consequences. Such evaluations are becoming increasingly relevant for NEPA analysis as well as action taken under the EO.

Questions currently under consideration by land managers include: Will migration corridors be actively managed in a way to prevent the spread of invasives along these same corridors? Will species be put through some sort of risk assessment to determine their potential invasiveness before being actively transported to a new area? Will those same species be screened for

hitchhikers and diseases before being transported? Do the land management agencies have policies regarding use of their lands as refugia? Could we be creating new invasive species as we explore genetic engineering? These are just a few of the many questions being considered.

OPTIONS:

1. Provide guidance so that each management option developed in response to climate change that involves moving a species outside its historic range, includes an invasive species risk assessment. Such assessments would include an HACCP analysis and NEPA review by appropriate DOI programs.

2. Undertake changes in regulatory mechanisms to allow earlier intervention and/or eradication of invasive species in sensitive or protected areas.

3. Coordinate with other federal and non-federal partners to determine whether the definition of native/invasive species needs to be revisited, and if so, the appropriate mechanism.

Habitat Lost

STATEMENT OF ISSUE: Some species are sufficiently adapted to a unique habitat that, if their native habitat disappears, the risk of extinction is quite high.

RELATION TO CLIMATE CHANGE: While many species may not be directly affected by climate change, at least in the near future, some plant and animal species may move farther north and to higher altitudes to pursue their preferred habitat. On the other hand, some species' key habitat may be reduced to zero. A recent IPCC report concludes that around 20-30% of the specific plant and animal species *which they assessed* are likely to be at increased risk of extinction if global average temperatures exceed 1.5° to 2.5°C over late 20th-century levels. However, the IPCC only reviewed a small sampling of species and then only those identified as being at high risk based on global climate change.

BACKGROUND: FWS has already faced the issue of how far to go in maintaining endangered species. The dusky seaside sparrow ultimately had only 4 males alive in captivity, and the FWS determined to let the species become extinct rather than muddying the gene pool by cross-breeding them with other sparrows. If FWS has exhausted all available options to conserve a listed species, what should be the FWS's next step? How far should the FWS, and ultimately the public, go to save a species from extinction due to climate change? This question is especially perplexing if the number of such species is high.

OPTIONS:

1. Transfer endangered species to other suitable habitat. Note concerns regarding invasive species.

The FWS would have to re-think the concept of exotic and non-native species under this option. In addition, application of the ESA § 3(5)(B), unoccupied range, concept would have to be reconsidered. Finally, pursuing the option of habitat transfer will require working in close cooperation with other governments and private landowners on all the issues discussed above under *"Habitat Shift"* ESA options.

2. Preserve endangered species through artificial habitat or captivity.

   New forms of intervention would likely be necessary in order to attempt conservation of biological diversity. This might include creating artificial habitats for subsequent species introduction outside of historical ranges. Species might also be conserved through captivity with the hope of release in suitable habitat at some future time. This is essentially the alternative pursued for the California Condor.

3. Establish criteria for recognizing and addressing the situation when a species will inevitably become extinct.

   Climate change will likely produce some very tough decisions for governments at every level, not least of which could be the extinction of some species. This will be a policy decision for FWS, which could initiate an advance notice of proposed rulemaking and receive comments on how to address a species that is incapable of being survival. It is also an issue that could be addressed directly by the Congress. This decision choice may arise regardless of current and future strategies to reduce GHGEs, since already accumulated GHG levels will persist, with concomitant climate effects, over the next 50 years or more.

Indian Country

STATEMENT OF ISSUE: The Bureau of Indian Affairs (BIA) is responsible for the administration and management of 55.7 million acres of land held in trust by the United States for American Indians, Indian tribes, and Alaska Natives. Developing forestlands, leasing assets on these lands, directing agricultural programs, protecting water and land rights, developing and maintaining infrastructure and economic development are all part of the agency's responsibility.

SUB-ISSUE 1: Indian Trust Responsibilities - Resource Use and Protection.

The federal government has a unique legal and political relationship with American Indian tribal governments. The basis for this relationship derives from the Constitution of the United States and is more fully set out in treaties, federal statutes, and executive orders. Court decisions have analogized this relationship, in some cases, to one with a private trustee or fiduciary, with the United States as the trustee, the respective Indian tribe as the beneficiary, and the land or other property held by the United States as the corpus or body of the trust. This role of the United States government is commonly referred to as the Indian trust responsibility.

RELATION TO CLIMATE CHANGE: Indian communities are situated in fixed locations traditionally inhabited by their tribal members or in areas set aside by the federal government for

their use. These may or may not be in areas where resources are abundant. Some tribes have treaty, executive order, or court-decreed rights to fish, water, and wildlife and other resources, both on and off-reservation. To the extent that a given location remains within climatological norms, the existing laws and management guidance will continue to address trust responsibilities as they do today. In some areas, however, climate change may decrease stream flows or reduce suitable habitat, affecting the production of fish and other wildlife used as tribal subsistence, commercial, or cultural resources.

Increased competition for resources limited or reduced as a result of climate change, such as anadromous fish and other wildlife, may also result in increased conflict between Indian and non-Indian resource users and require additional federal action. On the other hand, in some locations, increased wildlife and water may occur.

BACKGROUND:

Secretarial Order 3215 defines Indian trust assets as "lands, natural resources, money, or other assets held by the Federal government in trust or that are restricted against alienation for Indian Tribes and individual Indians." Executive Order 13084 requires that in "formulating policies significantly or uniquely affecting Indian tribal governments, federal agencies shall be guided by principles of respect for Indian tribal self-government and sovereignty, for tribal treaty and other rights, and for responsibilities that arise from the unique legal relationship between the Federal Government and Indian tribal governments." The Department and bureaus have certain procedures for formal consultation that comply with this directive. The way consultation is conducted is fairly flexible, as tribes vary in size and organization, but if local conditions under climate change take place, there may be a need to consult with individual communities on a more robust or frequent basis.

Some nonprofit entities have already begun efforts to provide guidance to tribes with respect to climate change. The Assistant Secretary for Indian Affairs has raised climate change as an issue under his 2007-2008 modernization consultations.

SUB-ISSUE 2: Tribal Grazing and Agriculture.

RELATION TO CLIMATE CHANGE: Forty-four million acres of Indian agricultural and grazing lands are held in trust by BIA. If projected climate change results in more arid conditions in the southwest, with increased frequency and duration of drought periods, a significant portion of BIA-managed rangeland could be affected.

When there are droughts, fire or other crisis situations, livestock removal can become a management tool. The assumption during these removals is that such extreme weather events are temporary. Under climate change, the temporary situations where removal is utilized may become more frequent, especially under sustained periods of drought. Current agriculture and grazing regulations provide flexibility with regard to adjusting stocking rates for temporary changes in conditions due to drought, fire, or other unusual conditions. However, a long-term reduction would have significant impacts upon Indian farmers and ranchers and Indian people

who rely on these subsistence resources. The result could raise livestock removal issues beyond the capacity of current BIA staff to address and outside the currently used legal framework.

OPTIONS FOR SUB-ISSUES 1 & 2:

1. Pursuant to options selected from the Land and Water Subcommittee report, set up a management/legal team to work within BIA to identify any modifications in easements, contracts, partnerships, etc. that may be needed to carry out any new climate change initiatives.

Alaskan Subsistence

STATEMENT OF ISSUE: Title VIII of ANILCA provides a preference to rural residents for the take of fish and wildlife for subsistence purposes, in times when it is necessary to otherwise limit take. Subsistence is a way of life to many Alaskans who seek to keep a family or other time-honored traditions of living off the land. Alaska Natives also view the preference as a means to keep them connected to a culture that predates European settlement.

RELATION TO CLIMATE CHANGE: The subsistence preference is put into effect "in times of shortage," potentially restricting, for example, sport and commercial harvest. An implicit assumption of the subsistence preference appears to be that fish and wildlife will not disappear completely from within the boundaries of a federal conservation unit. By statute, the subsistence preference applies to persons with "local residency." Theoretically, if the range of a species is altered substantially by climate change, the ability to harvest the species may be threatened. Typically, a state manages take on lands within a state, and the State of Alaska traditionally has preferred such unified management of state and federal lands. Therefore, the State of Alaska has a strong interest in the federal government's implementation of Title VIII of ANILCA. Stakeholders, such as the Alaska Native community have strong interests as well. Both the Governor and the Alaska Legislature are reviewing the state's climate change adaptation issues.

Option: Consider initial consultation with the State of Alaska regarding the potential questions relating to Title VIII that are raised by climate change predictions.

BOR Water and Power

SUB-ISSUE 1: Reclamation Water Management

STATEMENT OF ISSUE: Bureau of Reclamation (BOR) projects were built in specific locations, for specific and often multiple purposes, and based on specific assumptions about the water supplies in the watershed where the project is located. These assumptions, which vary from project to project, are often based on water supply projections developed contemporaneously with the relevant project's authorization. The facilities were built in large part to manage the variability of droughts and floods, as understood at the time the project was constructed.

RELATION TO CLIMATE CHANGE: Climate change may bring an alteration in precipitation to various watersheds, and warming could affect the snow pack, changing the size and timing of flows.

Operational experience over the years has provided guidance to project managers so that they have learned to respond to changing water supply conditions. Whether or not prior experience serves as a good analog for operations under projected climate change effects, operators will attempt to manage the facilities to maintain reliable water supplies and stable operations. To the extent that future precipitation patterns are significantly altered by climate change beyond the design criteria and/or operational flexibility of BOR facilities, it will challenge our ability to meet the needs of industries, farms, homes, and wildlife in the western United States.

BACKGROUND: Reclamation facilities store and deliver water for agricultural use, municipal and industrial use, power generation, and fish and wildlife, depending on the "project purposes" named in each of the individual statutes. BOR currently manages more than 800 dams and irrigation facilities. Each of Reclamation's projects has a unique geographic, hydrologic and legal setting. The efficient operation of these projects relies on understanding both the historic and prospective availability of water. For example, as Reclamation's core mission centers around providing water supplies for irrigation of agriculture, many of Reclamation's contractual elements (e.g., submission of water orders, repayment provisions, maintenance activities, etc.) are structured to reflect the irrigation season.

Reclamation holds water delivery contracts with a variety of users, including tribes, water districts, irrigators, municipalities, and industry. The result is a complex reservoir management system that covers both a given reservoir and the various reservoirs operating in the same watershed. At the same time, in a very real sense, snow packs function as a storage complement to the reservoirs themselves.

In much of the American West, rain and snow occur in the months of November through April, with the balance of the year seeing little or no rain. To meet current and foreseeable water requirements, it is necessary to capture the precipitation during those months and hold it for specifically timed release for the remainder of the year. In anticipation of winter and spring runoff (from melting snows and rains), the water in reservoirs must be released so that there is adequate storage capacity and spillway capacity (the ability to move the water through the dam) to manage the runoff that would otherwise flood many populated areas along the rivers. Understanding runoff patterns is essential to the prudent operation of any water storage facility: release of too little water may mean runoff cannot be controlled as reservoirs fill and spill. Conversely, release of more water than is necessary may result in insufficient water to meet projected deliveries later in the season. Once the emergency of the spring runoff has passed, the water must be released at just the right rate to make sure it lasts until the next season. During that time, the melting snows feed the reservoirs and supplement the water supply.

Timing of releases throughout the spring and summer months also depends on the crops grown in the region. Different crops need water at different times. Conversely, water needed for many municipal and industrial demands requires a more constant delivery schedule. At most Reclamation facilities, due to co-location of hydropower generators, water scheduled for delivery

for project purposes is run through the power turbines to the maximum extent possible. Marketing of the power assists in repaying the federal government for the original cost of constructing the projects. Aside from the repayment concern, hydropower provides a unique safety margin to the power grid. The change in amount and timing of flows would, by definition, affect power generation.

These issues, taken together, indicate that the management of the reservoirs is a highly sophisticated operation. Water availability and timing are constantly in flux and must be balanced on an hourly, daily, weekly, monthly, and annual basis. Climate change may ultimately modify and present new challenges to that balance, making historic delivery patterns difficult to duplicate.

There is no simple characterization of the varied contractual frameworks for Reclamation projects. As a general matter, however, Reclamation's contractual obligations take into consideration uncertainty of supply, as Reclamation is only required to deliver what is available. Climate change is expected to affect the certainty of supply due to its affect on timing and availability of flows.

Under climate change, there may be less snow pack and earlier snow melt, before the growing season. Water may not be available to meet the full demand for water deliveries for drinking, industry, and crops, nor to provide sufficient reserves for desirable in-stream uses, which can be essential to a functioning ecosystem. If the yield of crops is affected, water users with Reclamation contracts may have difficulty remaining economically viable, including facing difficulties meeting their repayment and operations and maintenance obligations. A unique problem facing some farming interests is the management of perennial crops. For trees that take years to grow and replace, an annual water shortage can affect decades of investment and the nation's supply of certain agricultural products.

Changes in project operations may, in some cases, be affected by the need for additional water supplies to meet wildlife requirements under the ESA. In some circumstances, where water supplies may be limited, trade-offs occur between ESA-driven obligations and contract-based water deliveries.

SUB-ISSUE 2: Allocation of Reclamation-generated power.

RELATION TO CLIMATE CHANGE: Climate change effects, such as reduced flows, earlier spring melt, or higher temperatures with associated demands for air conditioning, may affect the generation and use of electricity and, as a result, power revenues. All three of those conditions could affect the availability of impounded water in summer when electricity demand is higher. Power delivery obligations can be supplemented by purchases of energy on the open market. However, this will also lead to increased costs to power customers and probable reliance on fossil fuel generators for energy.

BACKGROUND: Pursuant to The Reclamation Act of 1902 (Act of June 17, 1902, 32 Stat. 388) and related acts, Bureau of Reclamation projects generate power, which is marketed by

other governmental entities (Western Area Power Administration and Bonneville Power Administration). Revenue from WAPA and BPA power sales is paid to the Treasury to directly offset funds appropriated by the Congress to cover the cost of operations. Federal power is sold to irrigation districts for use in pumping irrigation water, as well as to cooperative electric utilities, municipal utilities, and industrial users. Project power is used to operate BOR facilities. The power rates for irrigation districts and other public power users reflect the variable operating costs and allocated capital costs. In some cases, power users have been assigned the responsibility of repaying capital costs allocated to irrigation as well as power generation.

With the potential for climate change to alter water flows and availability, the contracts for BOR water and power users may be affected. While there is a certain amount of flexibility within those contracts to deal with seasonal variability, long-term changes in precipitation patterns would provide unanticipated stresses on repayment formulas, power revenues, and allocations of water. The parties to those agreements may seek to renegotiate the terms based on potentially fundamental changes in conditions.

OPTIONS FOR SUBISSUES 1 & 2:

1. **Review the legal documents relating to BOR water and power that may be affected by climate change effects.** The Land and Water Subcommittee options in this area focus on the programmatic aspects of water shortages and timing shifts. From a legal perspective, there are a number of contracts, river compacts, regulations, and permits that may need to be adjusted to accommodate both climate change effects and the related options identified by the L&W Subcommittee. It would be helpful to set up management/legal teams with BOR to identify modifications that may be needed to respond to climate change effects.

2. **Work with irrigators and power users to anticipate impacts that may arise from projected climate change effects.** Aside from the internal review of documents that may need to be changed, an outreach to western governors, existing water and power users, and the public could be initiated to address long-term consequences. If power agreements must be renegotiated, it would improve the chances for constructive outcomes if discussions are started early, before severe shortages create more intensely vested positions.

National Environmental Policy Act

STATEMENT OF ISSUE: The Department is required under the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321-4370f, to consider the environmental effects of every proposed major federal action upon the quality of the human environment. The Council on Environmental Quality (CEQ) regulations implementing NEPA require Federal agencies to use all practicable means, consistent with NEPA and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment. 40 C.F.R. § 1500.2(f).

RELATION TO CLIMATE CHANGE: New cases indicate that the Department, in drafting NEPA documentation, will need to address how anticipated climate change effects will influence

the proposed action. In *Center for Biological Diversity v. National Highway Traffic Safety Administration (NHTSA),* the Ninth Circuit stated, that "[T]he fact that climate change is largely a global phenomenon that includes actions that are outside of [the agency's] control . . . does not release the agency from the duty of assessing the effects of its action on global warming within the context of other actions that also affect global warming." While some facts in that case are unique to NHTSA, it does raise the issue of what level of climate change documentation is appropriate when completing a NEPA review.

BACKGROUND: The Department prepares an average of more than 100 environmental impact statements (EISs), 6,000 environmental assessments (EAs), and thousands of categorical exclusions (CXs) on an annual basis. Under traditional NEPA analysis, the projects are weighed against the effects that they could have on local and regional resources. There is also an analysis of existing and projected conditions to see what relation they will have to the project. Finally, cumulative effects are considered to assess the impacts of the proposed action in the context of other actions in the area.

Many actions proposed or authorized by Interior may be affected by changes in climate. Illustrations of how climate change may affect those actions are detailed in many of the sections above. At present, it is unclear when, if, where, and how such effects may manifest themselves. To that end, any analysis in NEPA documents of how a potentially changing climate baseline may affect a program or a project will be general in nature. Following this section are alternatives that may more clearly highlight the choices for addressing climate considerations in NEPA analysis.

Consideration of project impacts on global climate change is far more challenging. Methodologies and parameters for assessing the effects of climate change below the global and continental scale do not currently exist, have not been validated, or apply inconsistent approaches. One challenge is that for any fraction where the numerator is represented by potential greenhouse gases emitted by a project and the denominator is represented by greenhouse gas emissions from all human-related activity in the last 150 years, the fraction may be immeasurably small. There is also the cause and effect hurdle of relating any particular emission to any particular consequence. While, at some point, agreed upon methods to conduct such analysis may emerge, they are not currently foreseeable. Although the contribution of project emissions to specific impacts may not be quantifiable with certainty, their contribution to the global effects of climate change on agriculture, water, forests, ecosystems, fisheries, coastal areas, wetlands, and other aspects of the human environment can be monitored at some level. It may be possible in many instances to quantify greenhouse gas emissions directly resulting from a project, even though tying these emissions to particular climate consequences may not be possible.

The typical impacts caused by an action, analyzed locally or regionally, do not easily fit into the complexities related to a global cumulative analysis. Most Departmental actions may have only minimal direct or indirect (secondary) impacts that could contribute to a cumulative analysis of global climate change. Until further regulatory guidance is established, the appropriate approach and content necessary to meet NEPA, CEQ regulations, and DOI requirements, has not been identified.

Nevertheless, it is anticipated that any general determination concerning indirect GHGEs associated with Federal actions will be the subject of congressional legislation or broad executive branch policies.

OPTIONS:

1. The Department may want to consider providing guidance to managers detailing how to incorporate climate change into NEPA documents. See Appendix B.

   Currently, each manager/bureau may seek to address climate change consistent with their own understanding and set of priorities. This may result in inconsistencies across the agency. Departmental guidance would promote consistency and a higher level of performance throughout the Department. Addressing climate change using a standardized approach may also help prevent or limit future litigation.

2. The Department may want to provide guidance on the type of NEPA document that needs to include climate change considerations.

   Non-delegated EISs are those having high Secretarial interest, controversy, litigation potential, or require more than one Assistant Secretary's decision authority. NEPA analyses of these actions will typically consider some of the longest time horizons of any Departmental projects. These analyses may lend themselves to consideration of climate change issues. These types of analyses may produce information that will allow decision makers early opportunities to seek adaptive and mitigation strategies.

3. The Department may want to identify project-level actions where climate change considerations should be included in NEPA documents even though the spatial, temporal, and social effects are less than those in Option 2.

   Impacts associated with project-specific actions are generally more local, short-term (i.e. the period of project), and have less of a cumulative effect. Nevertheless, there may be climate change impacts on the project or resulting from the project that should be considered. Analyzing significant climate change impacts may lead to innovative adaptive management and mitigation strategies that could be otherwise overlooked.

   There is a risk that the metrics used to measure and project potential impacts from climate change will be speculative. Consequently, analyses would need to be general and discuss a range of considerations.

4. The Department may want to identify project-level actions without significant climate change issues but where NEPA documents should include consideration of the issues.

   The Department may want to incorporate standard qualitative language reflecting the expected uncertainty of the impacts associated with the proposed action. Use of standard language, especially where scientific data are unreliable or considered too speculative, would

allow NEPA practitioners to demonstrate to the public that the issue of climate change has not simply been ignored or dismissed.

There remains, however, the risk that the metrics used to measure impacts from climate change at the project level are speculative. Consequently, analyses would need to be general and discuss a range of considerations. Specifically, while it may be possible to measure and report direct GHGEs, it is a more speculative exercise to attribute specific climate change effects from project-level emissions that comprise a tiny fraction of the total global emissions, let alone the cumulative emissions in the industrial era.

5. The Department may want to consider whether there should be a standard checklist when determining if and how climate change should be included in a NEPA document.

   A Departmental standardized checklist would clarify (1) if climate change should be addressed, and (2) if so, how climate change should be addressed. The options above list different NEPA compliance situations that may require different levels of climate change analysis. A checklist could be used to simplify this determination and simplify the NEPA practitioner's determination of what level of climate change analysis should be conducted. A checklist will help maintain the Department's uniformity and consistency with respect to climate change analysis.

6. The Department may want to adopt standard language to document when a bureau has determined that climate change is not relevant to a proposed action.

   Once a bureau has assessed the proposed action and determined that climate change is or is not a relevant issue, standard Departmental language could be used in NEPA compliance documents. Developing and providing such standard language will allow the NEPA practitioner to quickly address climate change in NEPA compliance documents when it is not relevant, thus saving time. Addressing the issue of climate change in this way will ensure that the public knows that the issues are real and given appropriate attention.

7. The Secretary may want to ask the Chairman of CEQ to initiate a Government-wide initiative to develop a framework and guidance on integration of climate change in NEPA and planning documents.

   Each agency will have its own unique actions and ways of analyzing climate change. Nevertheless, guidance by CEQ on ways to incorporate climate change in NEPA analyses and documents would be helpful. Rather than having totally separate initiatives by each agency to address climate change, it may be more appropriate to initiate a single, government-wide effort under the auspices of the CEQ to develop explicit guidance on how to meaningfully apply existing NEPA regulations to this important and evolving topic. Since courts generally exercise a level of deference to well thought-out agency positions, issuance of CEQ climate change guidance may reduce future litigation on this issue.

   Guidance by CEQ would necessarily be broad, and it is anticipated that a "step down" set of guidance documents would still be required by the Department.

THE DEPARTMENT AS NEIGHBOR

COMMON THEMES

By congressional direction, the government and, hence, the Department are subject to a myriad of state and local laws that may be affected by climate change impacts. The issues identified below are by no means comprehensive but are some of the major legal subjects that may affect the Department.

ISSUES AND OPTIONS

Water Rights

STATEMENT OF ISSUE: The use of water in many of the states in the western United States is governed by the doctrine of prior appropriation. It is an outgrowth of the reality that water in the region is a scarce resource and must often have to be impounded and/or transported some distance from the natural water course to the location where it can be used. In essence, the doctrine of prior appropriation provides that, while no one owns the water in a stream, anyone has the right to use the water for beneficial purposes. The fundamental concept "first in time, first in right" evolved to ensure certainty of supply for the earliest user who diverted the water for beneficial consumptive use.

Water rights are generally for direct flow or storage. Direct flow rights are generally measured in terms of a flow rate rather than absolute volume. For example, a water rights holder may be entitled to take "3 cubic feet per second" from a given source. Alternatively, a storage water right is described by volume. In that case, the owner of a storage water right may be entitled to hold one, 50, or 2000 acre-feet of water each year in a reservoir (such as one managed by the Bureau of Reclamation), to be used later in the year. An acre foot is that amount of water required to cover an acre of ground with one foot of water (43,560 cubic feet or 325,851 gallons).

Important to the concept of western water rights in light of the potential for climate change is that such water rights are often specific as to a time of year when they can be exercised. Because water may be used to raise a crop and, therefore, needed only during specific times of year, others can own a water right with virtually the same point of diversion but with permitted access at a complementary time of year. Climate change may bring new challenges to the legal system if watershed basins shift or water supply and timing change.

RELATION TO CLIMATE CHANGE: Climate change is projected to shift precipitation patterns and cause earlier snow melt. The existing system was specifically developed to address periods of excess and shortage. The question will be how well the system can adapt to change if the shift in water patterns covers a broad geographic area and persists, creating a permanent shift.

BACKGROUND: Water rights are principally a function of state water laws. In addition to individual water rights, several of the states have also entered into compacts governing the

allocation of major rivers that run through a shared watershed. The Secretary also has unique responsibilities as the water master of the Lower Colorado River. The Department water rights include consumptive uses, storage, and instream flows.

The federal reserved water rights doctrine was established by the U.S. Supreme Court in 1908 in *Winters v. United States*. In this case, the U.S. Supreme Court found that, by implication, when the Congress set aside an Indian reservation, it reserved water for future use in an amount necessary to fulfill the purpose of the reservation. It held a priority, dating from the time the treaty established the reservation.

The Winters Doctrine was a landmark ruling, because it was the first time the federal government deviated from the established convention that water law was purely a state matter. In 1952, Congress passed the McCarren Amendment, which returned substantial power to the states with respect to the management of water. The McCarren Amendment requires that the federal government waive its sovereign immunity in cases involving the general adjudication of water rights. The Winters Doctrine originally applied to Indian reservations but has since been applied to other federal land reservations.

Federal court decisions since the McCarren Amendment have further limited federal reserved water rights. In the 1976 *Cappaert v. United States of America* decision, the Court ruled that federal reserved water right quantification is limited to the primary purpose of the reservation and only to the minimum amount of water necessary to fulfill the purpose of the reservation. In addition, federal reserved water rights are nontransferable. By law, these rights can only exist on lands owned by the federal government. If a land transfer occurs, any existing federal reserved water right becomes invalid.

Land Rights

STATEMENT OF ISSUE: Our laws and policies have been put in place so that landowners know what their rights are and how long those rights are open to challenge. Courts have consistently declined to apply equitable principles that would protect an injured party who does not discover a defect in title until after the expiration of the statute of limitations period. Land owners have settled expectations concerning the purposes and uses of their land. The need for settled expectations is no less important in lands held under government ownership. The government also expects certain rights with regards to its lands.

RELATION TO CLIMATE CHANGE: How are public and private land rights going to be affected by the predicted effects of climate change? Will existing boundaries, land regulations, and expectations of quiet enjoyment still apply?

BACKGROUND: Implicit in many of the discussions above is the concept that the purposes for which land was acquired by both private as well as public owners may be impacted or changed entirely as a result of climate change. Our free market system of land sales/purchases/exchanges provides enormous flexibility. If climate change effects in any given

location are slow, predictable, and relatively consistent with landowner expectations, there should be ample opportunity to craft transfers of title, easements, leases and other legal rights.

Even if predicted climate change effects are rapid or unpredictable, there are still substantial opportunities to reach accord. Under our legal system, however, each piece of property is regarded as unique, and ownership expectations play a large role in how we handle and enforce property rights. Each owner is regarded as having a relatively sacrosanct right to the property he or she owns. The Fifth Amendment to the U.S. Constitution guarantees that the government cannot take a citizen's property without just compensation. So the challenge is to address the concept of resources and values shifting across the landscape with underlying ownership rights that may or may not be as fluid, either by choice or by circumstances.

Will the Congress, state legislatures, or the courts borrow from concepts of accretion, erosion, and reliction to craft solutions that may result in underlying ownership/rights being affected by ecosystem changes? Will the legal system continue to honor property value principles, recognizing the uniqueness and sanctity of ownership in each piece of property and requiring the government to pay for any interest in land taken from an existing land owner?

Any attempt to address this question is beyond the scope of this report, but it is important to acknowledge that these matters are among the challenges facing the Department in contemplating the potential effects of climate change. Additional considerations on this subject are in the Land and Water Subcommittee report.

OPTIONS FOR WATER AND LAND RIGHTS:

1. **Explore New Paradigms:** Work with interested parties to identify the future legal challenges brought about by climate change that may affect water and land rights. Explore options for addressing new paradigms. It is anticipated that any discussion concerning these issues will be initiated by state representatives, since state legal principles provide the foundation in this arena.

2. **Water Markets and Shortage-sharing agreements:** Works with states, tribes, and private parties to explore voluntary agreements that would anticipate water transfers or share the effects of shortages.

POLICY ISSUES

MANAGEMENT POLICIES

Secretarial Actions

SUB-ISSUE 1: Secretarial Statement on the Departmental response to climate change.

STATEMENT OF THE ISSUE: The Secretary and Steering Committee may want to assess the advantages of a statement to provide increased consistency and provide better guidance on climate change to the bureaus and offices.

RELATION TO CLIMATE CHANGE: A Secretarial Statement could provide a clear statement from which Assistant Secretaries, bureau heads, and managers can tier off their respective climate change decisions.

BACKGROUND: Bureaus such as the NPS have been educating staff and visitors on climate change impacts. Given the uncertainty of climate change, management actions have been guided by a "no regrets" or double benefits approach: taking actions that will help the resource regardless of climate change effects and at the same time providing benefits in terms of managing the effects of climate change.

OPTIONS:

1. Issue a directive to individual bureaus and offices to provide guidance to their land managers for how to address climate change.

2. Develop a Secretarial Statement to frame and initiate a public discussion. Because of the Department's broad mandate, it is in a unique position to provide leadership toward a collective vision for managing our lands, trust resources, and responsibilities. Such a statement could provide a "focal point" not only for the Department but also for department-related constituents and the general public that are seeking to identify a thoughtful response to climate change. This option presents an opportunity to frame and initiate a public discussion.

SUB-ISSUE 2: Revisiting the existing Secretarial Order on climate change.

STATEMENT OF THE ISSUE: The existing secretarial order, No 3225 (SO 3225) dates from January 19, 2001. The understanding of climate change has increased significantly since then and, thus, the order may need to be revisited.

RELATIONSHIP TO CLIMATE CHANGE: The existing order establishes that climate change is occurring and requires all DOI bureaus and offices to consider and analyze potential climate change impacts when planning.

BACKGROUND: SO 3225 requires the bureaus to consider climate change impacts when undertaking long-range planning exercises, setting priorities for research, when developing multi-year plans, and/or when making major decisions about the utilization of resources under DOI's purview. A great deal of scientific progress has been made since 2001 in terms of our understanding of climate change, its impacts on natural and human systems, and framing an appropriate response for government agencies.

OPTIONS:

1. Keep the current Secretarial Order in place. Accounting for climate change for many actions requires a higher level of information than is currently available. The existing Secretarial Order could be applied in some locations or instances: in Alaska, where effects such as permafrost melt are likely to be observed; in coastal areas experiencing sea level rise or salt water intrusion; and for programmatic EISs and other planning. Climate change analysis could focus on adaptation (modifying management due to climate change) and mitigation (e.g., tracking and reducing carbon releases).

2. Rescind the existing order and direct the development of bureau-specific orders. The Secretary and the Steering Committee may determine that a Secretarial-level Climate Change Order is not flexible enough and, instead, determine that each bureau needs to develop its own policies for addressing climate change since the Department manages such a varied and dynamic landscape.

3. Update the existing Secretarial Order and re-issue it. Climate change may offer a challenge for how DOI resources, lands, and trust responsibilities are administered. A revised, general "focal point" may help DOI employees prioritize Departmental resources as appropriate on this issue. It could serve to inform the public and our partners on the steps the Department will be taking to address climate change. In addition, it could guide any efforts to revisit management decisions, planning documents, and other contracts and permits.

Consistent Documentation

STATEMENT OF THE ISSUE: Access to consistent, high-quality information on both basic climate change information and the Department's guidance for addressing the subject would enhance the various bureaus' ability to make and document decisions. This would improve our ability to accomplish program objectives and fulfill the Department's respective missions.

RELATION TO CLIMATE CHANGE: Climate change knowledge is currently in flux and yet important to many of the decisions being made by bureaus and offices throughout the Department. The issues involve both procedural as well as substantive land-use management questions.

BACKGROUND: DOI faces an array of variables in analyzing climate change, any one of which could alter estimated effects of actions. Different opinions, different data, and different interpretations result in different conclusions. The conclusions used to support decision making can range from minimal climate change effects to more robust effects. In some cases, both views can be present within the same planning document and be equally valid based on the dearth of actionable information. In many respects, there is no reference or general consensus on even the most general trends at a location-specific level with respect to effects from climate change. However, various sources of information can inform the decision-making process. Some are more useful than others, and all are undergoing refinement.

It is a challenge for managers to remain abreast of the best data relevant to their responsibilities. As more accurate information becomes available in the broader scientific community and as a result of the efforts pursued in response to this Task Force's Science Subcommittee, it would be helpful if the updated information could be readily available to Department decision makers and managers.

Currently, the various bureaus handle climate change independently when preparing decision documents and supporting information. There would be significant benefits if crosscutting information and analytical approaches are shared so that data and analysis can be applied more consistently to Departmental decisions.

Independent of determining the most effective information to use will be determining how to share information among the bureaus and offices. A key question is who will be responsible for the data, and a second is what are the appropriate mechanisms for distribution?

Some within the Subcommittee raised the possibility of creating a Departmental Climate Change Advisory Board to identify and, as appropriate, report on the state-of-the-science.

OPTIONS:

1. Rely on the science from the larger scientific community in anticipation of the development of a clear (or clearer) consensus on location-specific effects. Provide guidance to the individual bureaus to access whatever information may be most beneficial to their respective program areas. However, the 'larger scientific community' may never develop an effective consensus on location-specific effects. This could leave Departmental projects constantly subject to challenge based on widely varying scientific views.

   This option acknowledges that the effects of climate change are varied and uncertain, that a "one size fits all" approach may not work. The Department, through its various bureaus and services, manages such a varied landscape under a myriad of policies and laws (that often contradict each other) that each bureau/service may be best served to set up its own clearinghouse for information on climate change specifically tailored to that office's concern. This approach, however, could lend itself to duplication of efforts and public attack for its potentially inefficient approach.

2. Use the Department's scientific infrastructure to identify those studies and research efforts that represent the best available science to support decision making. This challenging exercise would place a high responsibility on USGS and the other scientific components of the Department to identify the best available climate change science.

SUB-ISSUE 1 - Data Management: On the first issue (who is in charge of maintaining the database), there are principally two options:

OPTIONS:

1. Establish a single DOI entity charged with identifying recent studies on climate change for distribution to all DOI offices involved in addressing the issue.

2. Set up a clearinghouse system where all practitioners jointly contribute information on climate change for distribution to all DOI offices involved in addressing the issue.

SUB-ISSUE 2 - Information Distribution: On the second issue (information technologies to be used), several alternatives are presented:

OPTIONS:

1. Develop a website that can only be accessed by Department. This could be an intranet site or some other portal that gives Interior land managers easy access to all state-of-the art science on climate change that the Department considers credible and relevant.

2. Create a website that is available on the World Wide Web and, thus, open to the public for scrutiny. Or, alternatively, create "hot links" on each agency or bureau's web site. Both of the above technologies are referred to as "pull" technologies. They require an interested practitioner to access one or several sites.

3. Use "push" technologies. With this type of system, managers or practitioners "subscribe" to types of information and, whenever there are updates or relevant new information, that information is automatically sent to the recipient. Examples of "push" technology include: listserves, e-newsletter subscriptions, and centrally distributed emails.

4. Host regular conferences or ask managers to attend ones conducted by outside entities. Internally, set up an intra-agency council or office that could oversee various aspects of climate change management, including information transfer.

5. Develop a call-in center at USGS and have their office maintain and distribute the information.

In the end, the final mechanism or mechanisms used for effectively keeping practitioners informed may be a mix of the options above. Within these alternatives, the Department would want to set up a working group or charge existing personnel within the Office of Policy, Management, and Budget to explore these choices and identify the best methods for sharing information.

LAND POLICIES

Planning

SUB-ISSUE 1: How to Plan with the Uncertain Time Scale of Climate Change.

STATEMENT OF ISSUE: One of the primary purposes for planning is to bring about certainty in a project, no matter what the scale.

RELATION TO CLIMATE CHANGE: Under climate change, there may be shifts in precipitation, species and habitat on the landscape. However, models cannot yet predict how changes will occur on the ground and how often. Some changes could be imperceptible, taking decades to manifest themselves. Others may become more readily apparent more quickly.

BACKGROUND:

Public lands. The Federal Land Policy and Management Act (FLMPA), 43 U.S.C. §§ 1701-85, directs BLM to manage public lands in conformance with land use plans. FLPMA establishes requirements for the management, exchange, and withdrawal of public lands, and provides for, among many other things, the establishment of protected Areas of Critical Environmental Concern. The definitions of "multiple use" and "sustained yield" are cornerstones of FLPMA and emphasize flexibility. "Multiple use" is defined as managing public lands "so that they are utilized in the combination that will best meet the present and future needs of the American people." "Sustained yield" means "the achievement and maintenance in perpetuity of high-level annual or regular periodic output of various renewable resources of the public lands consistent with multiple use." In general, FLPMA provides broad authority to address changed circumstances, e.g., through emergency closures of sensitive areas. Land use plans attempt to address competing demands under the multiple-use directive.

Currently, the land-use planning process may make it difficult to respond promptly to changes in land conditions, during which time changes to the environment may occur. Some existing land use plans are over 30 years old and may predate FLPMA itself. Despite this, FLPMA does, in fact, give BLM many tools to address changes in land conditions. Plans establish intervals and standards for monitoring and evaluation of plans. 43 CFR § 1610.4-9. Plans may be amended at any time and must be amended "to consider monitoring and evaluation findings, new data . . . a change in circumstances. . ." 43 CFR §1610.5-5. This effort, however, is time-consuming.

Refuges. With respect to refuges, plans outside of Alaska are to last 15 years. The 1997 Wildlife Refuge Improvement Act provides guidelines and directives for administration and management of all areas in the system, e.g., wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas. The National Wildlife Refuge System (NWRS) is managed in a manner that "first protects the purposes of the refuge, and to the extent practicable, that also achieves the mission of the System." There is some flexibility in changing compatible uses for the NWR as needed through planning or by direct temporary authorization by the Secretary.

Comprehensive Conservation Plans (CCPs) are required for each NWR outside of Alaska and are to be revised at least every 15 years as needed. Monitoring of status and trends in refuges, directed by the Act, is an important tool for flexible resource management. Every refuge needs to have a plan completed by 2012. Most CCPs currently in place, before this 2012 deadline, do not address climate change specifically. In addition, the relatively recent adoption of state wildlife plans in states may mean they are not integrated with NWR plans.

Guidelines direct refuge managers to manage for a set of predetermined conservation targets. In addition, the specific provisions for a refuge take precedence over more general directives. FWS manages to historic conditions, i.e., pre-European settlement, but there is no policy that requires a return to conditions no longer appropriate or feasible climatically.

Parks. National Park Service General Management Plans are expected to be in place for 15-20 years. NPS prescribed burn plans may be five years in length.

Wild and Scenic Rivers. The Wild and Scenic Rivers Act, 16 U.S.C. §§ 1271- 87, directs creation of plans, but it is unclear how often they should be updated. The Act establishes a National Wild and Scenic Rivers System to preserve rivers in a "free-flowing condition" and prescribes the methods and standards through which additional rivers may be identified and added to the system. There are three types: wild, scenic, and recreational; each is managed to maintain that classification. Many river segments were designated despite dams and impoundments above and below them. If the river is in another larger unit, such as a park, the provisions relevant to that unit apply to the river as well. Detailed boundaries are established based on fixed distances from the "ordinary high water mark" of a river, but boundary amendments may be effectuated "ninety days after they have been forwarded to the President of the Senate and the Speaker of the House of Representatives."

Each river is to have a Comprehensive River Management Plan (CRMP) in place within three years of authorization. This plan must demonstrate that a certain amount of water is required for the river, and the amount cannot exceed what is needed to preserve its values. There is an assumption in this Act that the "outstandingly remarkable" values for which the river was listed will persist and that the rivers will "be permanently administered as wild, scenic, or recreational rivers." There is no guidance in the Act for delisting rivers that may cease to possess the qualities for which they were listed.

Offshore oil and gas leasing. MMS employs a five-year leasing cycle under the Outer Continental Shelf Lands Act, 43 U.S.C. § 1331 et seq., and the Amendments of 1978 and 1985. The Act requires compliance with natural resource protection programs to protect the environment from damages associated with oil, gas and mineral development activities. MMS believes the five-year plans for the leasing program is appropriate as a basis for planning intervals. It is anticipated that any overarching determinations concerning indirect GHGEs associated with products produced from Federal lands will be the subject of congressional action or broad executive branch policies.

OPTIONS:

1. Have each bureau review its planning cycle to determine if potential climate change effects to bureau facilities and programs have been taken into consideration or when the next regular opportunity to do so will occur. The Department could then require that climate change impacts to Department facilities, plans, and programs are incorporated into the next relevant planning cycle.

2. Issue guidance for amending management plans in areas where local conditions suggest a need for revision due to climatic changes, even if the statutory term of the plan is not ended.

3. Issue guidance for employing additional Adaptive Management strategies. Since Adaptive Management can be expensive, consider developing means to scale the Adaptive Management approach in limited funding scenarios.

4. Issue guidance for determining the likely climate changes and range of uncertainties that bureau managers should assess at the local level and the level of control a manager may have over the response. The level of control a manager has over the uncertainties will likely be contingent on certain basic information, e.g., a robust baseline of a land unit's characteristics and shared information on effects observed elsewhere. Guidance could assist managers in developing these factors.

5. Set up a mechanism for inter-bureau consideration of planning and construction activities where climate change factors are in play. Currently, the Fish and Wildlife Coordination Act provides a mechanism for considering the impact on wildlife when water development projects are under review. It may be useful to have a similar opportunity for review so bureaus can consider options that achieve their primary missions and also mitigate the effects of climate change.

6. Review the flexibility in managing Wild and Scenic Rivers. Assess whether more frequent updates and amendment of Comprehensive River Management Plans would be helpful. Such a process should be developed with the relevant State and local stakeholders.

SUB-ISSUE 2: Climate Change Planning with Jurisdictional Uncertainty.

STATEMENT OF ISSUE: Current jurisdictional cloudiness between the Department of the Interior and the Department of Commerce creates uncertainty and inefficiencies in dealing programmatically with emerging issues on the coasts and other marine areas.

RELATION TO CLIMATE CHANGE: Potential ocean acidification, sea level rise, salt water intrusion and increased/decreased precipitation are changing fresh water levels in estuaries. Anticipated climate change effects will require managers to consider new issues in the planning process.

BACKGROUND:

Coral Reefs. The FWS National Wildlife Refuge System (NWRS) has 174 marine refuges, islands, and salt water areas that encompass 20 million coastal acres and 30,000 coastal miles from the Arctic Circle south and include both hemispheres. Coral reefs occur in all these waters, including Alaska's. Established by E.O. 13089, the Coral Reef Task Force (co-chaired by Commerce and Interior) oversees implementation of policy and Federal agency responsibilities and guides activities of a coral reef initiative. Duties of the task force include mapping and monitoring, research, implementation of measures to reduce and mitigate coral reef ecosystem degradation and restore damaged coral reefs.

The refuge system has some of the best uncompromised coral reefs in the world. Furthermore, FWS has responsibility for corals in other areas. FWS also works in coastal/marine waters with sea turtles and anadromous fish, as well, but jurisdictional authority under the Magnuson Act for this activity is unclear (see below). FWS's mission is to manage for ecosystems, but there are disputes with NOAA over the authority the Service has to work in marine/estuarine areas of ecosystems.

Anadromous Fish. The Anadromous Fish Conservation Act of 1954, 16 U.S.C. § 757a et. seq., authorizes Interior and Commerce to enter into cooperative agreements with states and other non-federal interests for conservation, development and enhancement of anadromous fish. Currently, mechanisms other than this Act provide funding for states for research, construction, and enhancement projects. FWS derives authority for many programs conserving anadromous and estuarine-dependent species from the Act, e.g., the fish passage program and the National Fish Habitat Action Plan; however, identification of jurisdictional species for DOI and Commerce is not clear.

There is some confusion for FWS under the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801-83, as well. It authorizes Commerce and Interior to conserve and manage fishery resources within U.S. waters for maximum sustainable yield. FWS is given jurisdiction over migratory sea birds and most marine mammals to monitor populations and the National Marine Fisheries Service over pinnipeds and whales. The Act also sets up regional fishery management commissions and eight regional councils to manage fish in state waters up to three miles out and manage fisheries in federal waters from 3 to 200 miles out. The regulatory authority in federal waters rests with NOAA-Fisheries, but the Act authorizes FWS involvement in an advisory role for the development of state or federal regional fishery management plans to assess stocks, harvest levels, and ensure sustainability. FWS Regional Directors are nonvoting members of regional councils.

Indian tribes with treaty rights and other interests are stakeholders, as well. Interior acts as trustee over certain trust species on behalf of tribes. This role is separate and distinct from its programmatic jurisdiction over species. This complex role could further be complicated by climate change, if stocks decrease.

OPTIONS:

1. Work with Commerce to clarify FWS jurisdictional authorities over coral reefs and coordinate with Commerce on emerging climate change issues. Lack of jurisdictional clarity makes planning work in estuary areas and for marine species difficult programmatically, even where FWS is responsible for certain species. Under climate change, this lack of clarity will be exacerbated, given more calls for action.

2. Set up a forum to clarify and reconcile competing roles over treaty and statutory responsibilities. Alternatives need to be found to bring in all stakeholders to resolve and clarify trustee, programmatic and statutory responsibilities. Climate change will only exacerbate the already confusing jurisdictional uncertainty over trust species.

Siting Facilities

STATEMENT OF ISSUE: In some areas, the Department may have to begin managing for a less predictable future when determining where to establish facilities. Historical data may not be the most suitable information on which to base a site location.

RELATION TO CLIMATE CHANGE: Sea level rise, glacier melt, more frequent disturbance events and other climate change-related phenomena may lead to inundation or frequent storm events affecting facilities in specific locations. Permafrost and sea ice are melting at accelerated rates, leading to significant coastal erosion in some areas of Alaska.

BACKGROUND:

Visitor Facilities. Management unit visitor facilities often are sited near coasts, glaciers, or rivers, e.g., in scenic spots or near an iconic landmark that is a primary purpose of the management unit. Currently, the criteria/scorecard used by OMB for new facilities does not significantly consider climate change. Therefore, decision makers may not be giving sufficient weight to potential climate change events. Given the anticipated phenomena under climate change, there is a good chance that bureaus are continuing to build new facilities in areas susceptible to climate change during the lifetime of the facility.

In addition, concessions policy considerations and statutory preferences for siting visitor facilities are also taken into consideration for site suitability. For example, ANILCA gives a preference for locating visitor sites on Alaska Native lands.

Non-visitor facilities. The Department has non-visitor facilities in conservation units that serve the administration of the unit. A NEPA process is typically followed in planning and siting these facilities. Additional siting considerations may arise pursuant to climate change projections.

Non-DOI facilities and related DOI facilities. DOI lessees have offshore oil and gas structures designed to withstand a hundred-year storm and other environmental forces. Traditional storm frequencies/intensities may change with climate change. Current policies assume hundred-year storms are rare events and that pack ice and onshore permafrost are permanent fixtures in the

Arctic. 30 CFR pt. 250 simply requires the structures to withstand storms, ice, scour, etc. The longer the lifespan of the facility, the more critical it is to look at changes in storm frequencies and intensities. The actual standards are incorporated by reference. Permafrost and sea ice are melting at accelerated rates, leading to significant coastal erosion in Alaska.

Outside examples. Under the Coastal Zone Management Act, 16 U.S.C. §§ 1451-55, states are encouraged to develop plans that take into account climate impacts. The directive is accomplished by identifying "global warming" as a problem generally, in Congressional Findings, while stating in the specifics of the law the anticipated effects of climate change that are most relevant to coastal areas: sea level rise and subsidence.

OPTIONS:

1. Work with OMB to modify the Executive Branch Management Scorecard to allow more robust consideration of the impacts of sea level rise, glacial melt, and other climate change-related phenomena. Explicitly consider the probability of climate change on location alternatives.

   Capital investment guidelines could also include discussion of appropriate methods of risk analysis, given the uncertainty of the timing and strength of climate change effects. A summary of potential effects and appropriate responses could be developed as Best Management Practices until more information is known for a specific locality. Guidance for existing facilities, their preservation, renovation and/or expansion may also be helpful.

2. Determine the feasibility of a policy that restricts any new facilities with a long-term lifespan (20-50 years) from being constructed in "climate change vulnerable environments."

3. Review relevant concessions policy and statutory preferences.

4. Study the feasibility and safety of using deployable structures, i.e., those capable of being moved when lands change.

   A change in the routine cycle of facility construction and renovation, as well as "brick and mortar" construction, would require education at all bureaus, OMB and Congress. Legislation allowing pilot work on deployable structures would allow early buy-in and spur innovation.

5. Develop policies, economic studies, and risk assessment for considering the long-range strategy for managing and maintaining Interior lands and infrastructure in the face of sea level rise and higher intensity and frequency of storm events. This analysis would be useful for both future construction and any transition of protected areas.

Drought Management

STATEMENT OF THE ISSUE: The arid West is always particularly susceptible to drought.

RELATION TO CLIMATE CHANGE: Climate change is projected to increase drought conditions in certain areas while bringing additional water to others. Even with the extensive water distribution systems in the West, the projected geographic differential between the projected drier versus wetter areas may leave some areas drought prone over an extended period. Such drought conditions may have synergistic and potentially unexpected effects with other stressors. The ongoing rate of population growth occurring in the West, as well as other areas of the country, may complicate drought management issues.

BACKGROUND: Reclamation's Drought Act does not define "Drought." In order to obtain Federal assistance available under the Act, the governor of a State, or governing body of a county, city, or Tribe, must request assistance for, or declare, a "Drought." Then, Reclamation has the authority and flexibility to take measures, except in the case of constructing wells, to alleviate the effects of drought. These measures include making water available from Federal projects for the protection of fish and wildlife resources. Also, the Act allows Reclamation to store and convey water from its facilities for use outside as well as inside authorized project purposes. The Drought Act authority is not permanent; it sunsets on September 30, 2010.

OPTIONS:

1. Pursue permanent Reclamation Drought Assistance authority. If the climate change projections of diminished water supplies in certain are accurate, it may be helpful for Reclamation to have clear, permanent and carefully considered authorities available to address the projected effects.

2. Evaluate whether there is a benefit to allowing Reclamation facilities to be used beyond the currently authorized project purposes. Storage of non-project water raises challenging operational, financial, environmental and policy questions for Reclamation projects. A pre-structured analysis of the appropriate conditions for Reclamation approval of such project adjustments would assist in its development as water management tool. Given the strongly competing demands on the system, full stakeholder and congressional involvement would be essential.

3. Extend Water 2025 grants to provide funding for water systems planning. Such an approach to future water issues could increase the flexibility of water management institutions by putting in place water banks, establishing forbearance arrangements, increased ability to transfer or lease water, etc. Water managers and other leaders in the West have dealt with water shortages and drought for a very long time. Whether climate change requires tools over and above the current approach remains uncertain. But even existing water management challenges continually call for new tools.

RESOURCE POLICIES

Adaptive Management

SUB-ISSUE 1: Adaptation through Preservation.

STATEMENT OF THE ISSUE: What guidance should be in place regarding departmental responses to any new environment brought about by climate change effects? Specifically, what consideration should be given to adaptation versus efforts to use resources to resist changes and continue managing for the purpose of maintaining the existing suite of resources, responsibilities, and property?

RELATIONSHIP TO CLIMATE CHANGE: Existing management decisions are generally directed toward maintaining or restoring historic conditions. One form of adaptation is to expend resources for the continuation of historic conditions, even as climate change alters the surrounding environment.

BACKGROUND: The Land and Water Subcommittee deals extensively with the subject of adaptation. Therefore, this discussion revolves around the policy consideration of when to resist change. For some time into the future (in many cases indefinitely) and in many locations, there will be insufficient change in ambient conditions to warrant any deviation from existing programs and policies. It will be very helpful to identify those locations so that resources can be properly prioritized. In other locations, the changes will be modest enough that protective measures that shelter DOI resources from significant climate change effects will be adequate and cost-effective. These could include locations where additional water supplies can reasonably be obtained to support a refuge or a seawall could preserve a resource that is difficult or impossible to move. For these alternatives, it may be prudent to simply maintain the status quo through judicious allocation of resources.

This form of management response appears to be most appropriate when future conditions are reasonably foreseeable, the relationship between climate change and the various factors causing that change are known with reasonable certainty, the benefits and costs of mitigation measures are understood and deemed acceptable, and ecosystem change is expected to occur within limits that will support existing systems.

SUB-ISSUE 2: Adaptation through Change.

STATEMENT OF THE ISSUE: What guidance should be in place for the Department to favor adapting to any new environment brought about by climate change effects rather than managing for the purpose of maintaining the status quo?

RELATIONSHIP TO CLIMATE CHANGE: In the past, management decisions have generally been directed to maintain or restore historic conditions. Adaptation may now require managing toward a future that is less certain, rather than managing trust responsibilities and resources based on historic conditions. Managing toward future conditions could involve shifting reliance, to some extent, from historic data to future forecast models.

BACKGROUND: Again, the Land and Water Subcommittee deals extensively with the subject of adaptation. Therefore, we will only note that early consideration of challenges may make it possible to increase the adaptive capacity and resiliency of DOI lands and trust resources. Any movement toward significant adaptation will require both on-the-ground management decisions and legal reviews to develop and implement innovative solutions as well as policy consideration at the Departmental level to provide guidance, resources, synergy, and continuity.

From a policy perspective, the primary factors necessary to manage effectively for future conditions based on predictive modeling of DOI resources (natural, historical and cultural) are:

1. a clear identification of the planning horizon to be used;

2. accurate, validated, and verified models for that planning horizon that cover both:

   a) climate change conditions (temperature, precipitation, and sea level); as well as

   b) the biophysical results (vegetation conditions, water availability, etc.)

OPTIONS FOR ADAPTION ISSUES 1 & 2:

1. Use existing DOI policy offices or a special climate change team of management and legal personnel to identify how the department will classify lands on an ongoing basis as better managed for preservation of existing conditions or for the new conditions that may be brought about by climate change.

2. Use existing DOI policy offices or a climate change team of management and legal personnel to identify guidance for setting climate change-related planning horizons within the Department. Work with USGS to develop the parameters and outputs necessary to have accurate predictive models for developing adaptive goals.

3. Determine legal documentation necessary to identify existing baselines, if steps need to be taken in the future to accommodate adaptation goals.

SUB-ISSUE 3: Should DOI, or all federal lands, be managed as an integrated unit?

STATEMENT OF ISSUE: A holistic, landscape approach, at least involving DOI-managed lands (if not all federal lands), may be helpful to maximize our options and make the most efficient use of staff and budget resources.

RELATIONSHIP TO CLIMATE CHANGE: Climate change is likely to require increased flexibility, more rapid response to impacts, and yet-to-be identified management options. This flexibility may be best achieved by managing DOI lands, at least in part, as combined units without respect to individual bureau land holdings. Statutory considerations may, however, limit flexibility to undertake inter-bureau planning and management.

BACKGROUND: Currently, bureaus within DOI have different, and often contradictory, goals. For some purposes, in managing climate change effects, it may be more effective to manage cross-bureau lands as a unit. This approach, however, will present difficult legal challenges as different Departmental lands have different purposes and are subject to different laws, regulations, and policies. Some subcommittee members also raised the question of whether DOI could work with all property owners in a given geographic boundary (such as a watershed) to voluntarily extend the concept of holistic management if it proves successful and feasible.

OPTIONS:

1. Use existing DOI policy offices or a climate change team of management and legal personnel to identify synergies that can be effectuated by joint management of related Department lands. Work with USGS to develop the parameters and outputs necessary to have accurate predictive models for developing adaptive goals.

2. Extend the coordinated property management concept to other federal and public land owners. The concept here is not to have a unified ownership but simply to have coordination that will make it easier to reach mutual national policy goals and provide greater flexibility in adjusting to shifting habitats.

3. Coordinate grant making efforts to maximize the benefits of federal dollars being used to address climate change issues.

Natural Versus Man-Made Distinction

STATEMENT OF THE ISSUE: NPS policy makes a distinction between natural versus human-induced impacts, which lead to different proposed responses by resource managers. A special emphasis is made on natural resource systems.

RELATION TO CLIMATE CHANGE: In the area of climate change, it may become increasingly difficult for the NPS to make such a distinction and to determine the range of options that can be pursued when the potential cause, i.e., climate change, either is a combination of both natural and anthropogenic causes or where the causal link between a particular land condition and climate change cannot be determined.

BACKGROUND: The NPS policy distinction is reflected in how the agency implements its Organic Act. The laws and policies that make a distinction between natural and anthropogenic impacts for the determination of management responses are identified below.

National Park Service Organic Act

The 1916 NPS Organic Act, 16 US.C. § 1, is the key management-related provision for the park system, where NPS derives the natural vs. man-made distinction. The Act says:

> [NPS] shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified…by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The Organic Act was amended in 1978. Known as the Redwood amendment, 16 U.S.C. § 1a-1, Congress reiterated this management standard:

> Congress further reaffirms, declares, and directs that the promotion and the regulation of the various areas of the National Park System. . . shall be consistent with and founded in the purpose established by [the Organic Act], to the common benefit of all the people of the United States. The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the [NPS] and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

NPS Units Established by ANILCA, P.L. 96-487

ANILCA established ten national park or preserves in Alaska. All park purposes include the protection of natural "processes," such as biological and geological processes. The language covering several areas also directs the NPS to maintain certain resources and processes unimpaired. *See* ANILCA § 201.

NPS Management Policies

NPS's Management Policies (2006) set out the framework and provide direction to carry out the management standard to avoid impairment, including the natural versus man-made distinction in responding to impacts.

The NPS response depends first on whether a resource is regarded as a natural resource or a cultural/historic resource. Natural resources (except threatened or endangered species) are to be managed to balance the value of both the resource as well as natural processes affecting the resource, with a recognition that natural processes often preclude maintaining the static conditions. In contrast, when such areas are affected by human disturbances, the NPS will attempt to return the areas to the natural conditions/processes. *See* NPS Management Policies (2006) at 4.1 and 4.1.5.

Cultural/historic resources that are damaged by "fire, storm, earthquake, war or any other accident . . ." are subject to a broader range of management choices and may be managed as ruins or removed, rehabilitated, restored, or reconstructed. *See* NPS Management Policies (2006) at 5.3.5.4.9.

Over time the NPS will have to determine how it will adapt its resource management in response to climate change. NPS managers may be faced with assessing which changing conditions/processes are natural and which are manmade to determine which course of action is appropriate. Since not all changes are significant, NPS managers will need to exercise their professional judgment to ascertain the extent to which a park resource or value is being altered beyond the specific purposes identified in the establishing legislation or proclamation of the park. Climate change, whether human-induced or natural, may result in unacceptable impacts which may or may not require a response under the Management Policies. *Id.* at 1.4.7.1.

OPTIONS:

1. Keep the Management Policy distinction in place.

   NPS may retain its management policy distinction as is. The NPS could also use a step-down process to address climate change through a Director's Order (DO). A DO has the ability to address climate change issues in greater detail than do the management policies. The DO can direct park managers to look at specific effects of climate change, such as wildland fires, sea level rise, glacier melt, etc., and direct how the NPS will address these changes when it is unclear whether the cause is natural, man-made or a combination of both. The DO will, however, have to address how it fits into, i.e., does not contradict, the overall management policy.

   Such a DO could direct park managers to first identify what is at risk, define the baselines that constitute unimpaired resources in a changing world, decide the appropriate scales at which to manage the processes and resources of national parks, and set measurable targets that will define successful or failed outcomes. Identification of "at risk" resources could take place within each unit and occur at the network, regional, and national level. Such prioritization may be able to identify which resources are changing most rapidly. The concept of avoiding impairment will become a moving target as the baseline changes in response to climate change. Managers may need to address whether protecting or recovering certain natural processes will be possible and the ramifications if such ends are not attainable, including legal and policy ramifications.

2. Eliminate the distinction in the Management Policy.

   A second option to consider is for the NPS to eliminate the man-made versus natural distinction with regards to climate change as a basis for management purposes and, instead, incorporate a cost/benefit analysis on whether to respond to a certain impact. Climate change is expected to alter disturbance regimes in ways that could substantially change national park ecosystems. If climate change causes an increase in the intensity of natural phenomena, such as floods, droughts, soil erosion and wildfires, it will become increasingly difficult for NPS to make the distinction of man-made impact and natural processes in the context of climate change-induced impairment.

   If NPS determines it is advisable to eliminate the distinction, it should closely coordinate with the public and its partners through an ongoing dialogue process to ensure

transparency and stakeholder buy-in. NPS could choose a policy that acknowledges the uncertainty and either sets new guidelines or proceeds on a case-by-case decision-making process. The distinction between welcome and unwelcome species will need to be addressed within this approach.

Either of the options presented above would require the NPS to take a careful and deliberative approach to how the agency and its managers will address the effects of climate change. This could include spearheading ecoregional coordination among federal, state, and private entities, valuing human resources, and understanding what climate change means for implementing the Organic Act, the Redwoods Amendment, ANILCA, as well as any other statute that governs park resources and values. Climate change over the next century may well require NPS managers to think differently about park ecosystems than they have in the past.

Access to Resources

STATEMENT OF ISSUE: Those who depend upon access to Federal resources or are surrounded by Federal land have come to expect a certain level of access.

RELATION TO CLIMATE CHANGE: Increased erosion may lead to more relocations of Alaska Native villages and a need for new transportation corridors to resources that villages need.

BACKGROUND: The ability to traverse federal lands is important to a wide group of land users. Like the western United States, Alaska has a checkerboard land ownership that limits the areas where people can settle and what access they can have across public lands to get to needed resources, e.g. a gravel pit. ANILCA addresses the creation of new transportation corridors across public lands. The assumption appears to have been that the need for a corridor would be infrequent; therefore, a very specific, formal process was established in statute for when one is needed. Increased erosion may lead to more relocations of villages and a need for new transportation corridors to resources.

Bureaus have discretion to grant easements without undertaking a laborious process in statute; also, ANILCA's 16 USC § 3171 allows for temporary access across public lands and 16 USC § 3210 allows the Secretary to provide access across FLPMA-managed lands in Alaska for use and enjoyment of inholdings, etc. Villages, often 200 miles from the nearest federal agency, may not be aware of bureau flexibility in land transfers.

A related point is that access across federal lands by snowmachine and other vehicles is allowed for traditional activities, including subsistence.

OPTIONS:

1. Adopt a policy to encourage provision of easements when needed by a dislocated community. Such a dislocated community might find this policy helpful to avoid future conflicts between villages and the Department.

2. Use existing flexibility in ANILCA and FLPMA to address access needs.

Mitigation

SUB-ISSUE 1: Mitigation of greenhouse gasses at oil and gas facilities.

STATEMENT OF THE ISSUE: The extraction of underground natural petroleum products usually results in the extraction of some amount of natural gas. What should be done to address potential natural gas releases?

RELATION TO CLIMATE CHANGE: Methane is calculated to have a more significant effect per unit than carbon dioxide in promoting climate change.

BACKGROUND: The Mineral Leasing Act, 30 U.S.C. § 181 et seq., authorizes leasing public lands for developing coal, oil, gas, and other minerals. To avoid waste of the resource, MMS regulations prohibit venting or flaring, but they make an exception where the amount of the resource will not support the facilities necessary to save or sell the gas or there is not enough gas to market. MMS has extensive regulatory authority over its lessees. If the potential for natural gas releases occurs in a remote location with no supply network to get the gas to market, emissions may occur. Current practices, however, dictate that it is more likely that the gas will be re-injected into the ground, thus taking significant steps to reduce GHGEs. Any overarching determinations concerning indirect GHGEs associated with products produced from Federal lands will be the subject of Congressional action or broad executive branch policies.

OPTIONS:

Continue to work with MMS to refine best practices so that direct natural gas releases can continue to be effectively managed.

SUB-ISSUE 2: Relationship of Existing Greening Goals and Climate Change Objectives.

STATEMENT OF ISSUE: As the Department considers options to reduce threats brought about by climate change, the alternatives presented may be at variance with other goals also designed to promote environmental stewardship and energy security. Most "greening options" have both benefits and disadvantages when they are fully analyzed for the lifecycle and opportunity trade-offs associated with other choices.

RELATIONSHIP TO CLIMATE CHANGE: Though greening goals were instituted to promote sustainable environmental stewardship, they may conflict with goals that may flow from a response to climate change sensitivity if they are implemented without first considering tradeoffs.

BACKGROUND: The term "greening" commonly used in society today emphasizes sustainability, ecology, and community-based economics and social justice, among other issues. As the term applies specifically to the Federal government, based upon executive orders,

"greening" is a phrase used to describe the elements of an agency's operation that reduce impacts upon the environment. These elements include sustainable buildings and facilities design, pollution prevention and recycling, electronic stewardship, energy conservation, vehicle fleet management, environmentally preferable purchasing, and alternative energy source development. Because actions associated with greening goals are not guaranteed to result in an energy savings or water conservation, the Department and bureaus may well benefit from systematically evaluating the tradeoffs associated with investing in green initiatives in a particular location or facility. For example, using bio-fuels in contrast to fossil fuels may not necessarily result in a net positive effect when the amount of energy to grow, move, and convert biomass is considered. This assessment, however, will vary by type of biofuels. Biofuels generated as a side-product of forest vegetation "hazardous fuels reduction" may offer a cost effective and environmentally attractive fuel option at some sites.

The current Federal policy associated with greening is contained in E.O. 13423, signed January 24, 2007. It mandates Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. The EO 13423 definition of "sustainable" is:

> *to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations of Americans.*

Other aspects of greening are mandated by other laws and regulations such as the Resource Conservation and Recovery Act, Energy Policy Act 2005, Pollution Prevention Act, Clean Air Act, and Clean Water Act (see attachment for more detail).

Significant investments in greening activities need to be considered in the context of benefit-cost analysis. "Significant" is difficult to define, but should clearly encompass capital investments. Capital investments are typically considered to be those investments for which the expected use extends over a number of years. In the context of greening initiatives, capital investments could include those associated with facility construction, fleet leasing and purchases, pollution prevention infrastructure, etc.

Appendix C is a summary of greening projects that represent several of the alternatives considered by the Department. The appendix discusses the goals and the trade-off consideration that may exist in light of climate change limitations.

OPTIONS:

1. DOI offices responsible for greening goals could identify trade-offs of competing objectives with an emphasis on ensuring that the policies and limitations that flow from reducing climate change effects are factored into each analysis. Guidance could then be issued to the bureaus providing the factors to balance in making final decisions.

2. Issue guidance articulating the policies and considerations that should go into managing the effects of climate change when considering greening objectives.

SUB-ISSUE 3: Carbon Sequestration.

STATEMENT OF THE ISSUE: Carbon sequestration is one of the major DOI initiatives designed to meet both existing DOI program goals as well as reduce GHGEs.

RELATION TO CLIMATE CHANGE: Carbon sequestration from both biological and geological programs can reduce GHGEs.

BACKGROUND: Carbon sequestration can take the form of both biologic sequestration as well as underground storage of geologic sequestration. The FWS has begun an active program of biologic sequestration through cooperative agreements and donation programs for replanting trees in wildlife refuges. An important part of initiating that program was a review of the legal framework to ensure that steps taken by FWS today would continue to meet their bureau policies over the next 25 years.

Underground storage programs on land and in the oceans are gaining attention globally as a means to offset fossil fuel emissions and atmospheric carbon dioxide concentrations. Storing carbon dioxide could potentially result in leakage and other unanticipated alternatives so care must be exercised in identifying secure sites. Many of the potential prime storage locations are located on DOI lands. Further analyses would help us better determine appropriate storage locations that minimize any potential risks associated with CO_2 and methane injection to better understand the value of injecting carbon underground.

OPTIONS:

1. Issue guidance to support extending the existing biological carbon sequestration program to other FWS regions and other DOI bureaus with potential for reforestation.

2. Conduct a legal review to identify the issues that would need to be addressed prior to large-scale leasing of geologic structures for underground carbon sequestration.

DATA POLICIES

Outdated Information

SUB-ISSUE 1: Information may become outdated as the effects of climate change are experienced.

RELATION TO CLIMATE CHANGE: Climate change can render some of the studies relied on by the Department out of date. BLM, NPS, BOR, and FWS use historical data for planning purposes. This practice may need supplementation with new data and new modeling protocols as climate change effects increase in affected areas.

BACKGROUND: Implementation of a law, regulation or policy may be expressly and directly tied to the findings of a study. In many cases, the documents used may be adequate for the Department until the next periodic review. For those results that may no longer be suitable for making sound management decisions because of climate change effects, unscheduled reviews may be necessary. Determining the currency of available information and ensuring timely distribution is an ongoing challenge. Addressing this concern will assist in the management of both climate change impacts as well as other programmatic areas.

Alaska. Alaska is seeing evidence of climatic change on lands, species, and communities under DOI management earlier than other DOI areas in the "lower 48". Erosion, glacier melt, and permafrost melt are some examples. ANILCA requires the preparation of certain studies and appears to anticipate that bureaus will utilize these studies in its implementation. Many of the relevant studies were completed within a few years of ANILCA's passage in 1980. Some of those studies may need to be updated in light of projected climate change effects. The State of Alaska has established a climate change task force to begin to address the issue of data relevance as well as other climate change issues.

Wilderness Study Areas. Changes in species range and arrival of newer species may change the nature of a certain Wilderness Study Areas. These areas, like Wilderness Act areas, are managed to "preserve natural conditions" but do not specify particular ecosystems. Meanwhile other areas may be become appropriate for designation as potential refugia under climate change, whether as Wilderness units or other designations.

OPTIONS:

1. Work with the State of Alaska and stakeholders in the state to determine which ANILCA-related studies are sufficient and which may need to be augmented.

2. Develop guidance to determine whether studies that underlie Department decisions remain adequate or should be revisited prior to the next regular review period. In the case of studies supporting decisions that do not have periodic review provisions, develop guidance to determine if additional updates are needed.

SUB-ISSUE 2: Outdated resources maps used for planning purposes.

RELATION TO CLIMATE CHANGE: Sea level rise, salt water intrusion, and unanticipated climatic events are projected to affect coastal areas and updated maps may be needed in some areas.

BACKGROUND: The Emergency Wetlands Resource Act, 16 U.S.C. § 3901(b)(2), encourages cooperative efforts among private interests and federal, state and local governments for several purposes: protection, management and conservation; mapping and inventory work of the nation's wetlands; and preparation of reports on the status and trends of wetlands in the United States. It charges FWS with mapping wetlands and coordinating and distributing data for the wetlands geospatial data layer of the National Spatial Data Infrastructure. There was no assumption of change in the final, mapped baseline when originally enacted; that is, the agency was charged

with mapping, but not funded to revisit or even complete digital mapping. The current problem is that only 58% of the lower 48 states have been digitally mapped, though 91% has been mapped in hard copy (~1980). Original paper maps do not reflect changes to landscapes over the past 30 years due to climate and development. Some local jurisdictions do not have access to local wetland maps to assist with land-use planning. FWS is currently able to map wetlands resources for about one percent of all US lands per year. With climate change effects, infrastructure may need to be relocated; also digital mapping is necessary to align efforts with FWS sea level rise models (SLAM) and to enable modeling and planning for temperature and or rainfall changes.

The Coastal Barrier Resources Act (CBRA), 16 U.S.C. §§ 3501-10, was enacted to minimize the loss of human life, wasteful Federal expenditures, and damage to natural resources on undeveloped coastal barriers. CBRA accomplishes these goals by prohibiting most Federal expenditures that promote development within designated areas, including participation in the Federal flood insurance program. Exceptions exist for dredging, Federal navigation projects and some habitat management and enhancement efforts. CBRA does not prevent development; rather, it restricts Federal subsidies that encourage development within these hazard-prone and ecologically sensitive areas.

CBRA provided for a Coastal Barrier Resources System (CBRS), which identified undeveloped coastal barriers along the Atlantic and Gulf Coasts, including islands, spits, tombolos, and bay barriers that are subject to wind, waves, and tides such as estuaries and near-shore waters. The extent of these areas is defined by a set of maps approved by Congress dated 30 September 1982. There are procedures for adjusting maps, but they appear cumbersome. The law requires a reassessment of lines that designate CBRS areas every five years based on erosion or accretion of land. The reassessment, though required, is unfunded, and no areas have been reassessed since 1997. Changes in designated areas are already occurring, and development takes place on new land that, if re-evaluated, should be designated within CBRA. Congress has required digital mapping of these areas, but there are no funds to do this. Only 10% of the areas have been digitally mapped. Re-evaluation of areas is done at the time digital mapping takes place. Re-evaluation would be easier to do if all areas were digitally mapped. The GAO has noted this problem.

Under climate change, there may be an increase in extreme weather events in certain areas. The allocation, quantity, and equity of federal aid is reliant on CBRA maps, which should be accurate to address their increased frequency of use.

A cost analysis of money saved on Federal insurance payouts where mapping has improved may assist in presenting the case for more resources. A periodic update of maps would make the output more certain and reliable and, therefore, potentially increase use of the maps for other programs.

OPTIONS:

Review the policy and budget allocations for updating maps used for resource management.

SUB-ISSUE 3: The Department uses historical records of precipitation and hydrographs to settle Indian water rights claims, plan for Indian irrigation projects, and determine sites for hazardous waste.

RELATION TO CLIMATE CHANGE: New precipitation patterns that may emerge from climate change could cause drought, increased precipitation, or even flash flooding in certain areas that vary substantially from historic records.

BACKGROUND:

Indian Water Rights Settlements. The Bureau of Indian Affairs (BIA) files claims on behalf of Indian tribes for water necessary to carry out the purposes of the reservations. For example, a reservation in the southwest may have 100 acres suitable for irrigation based upon availability of water and practicality of that land for agricultural purposes. Currently, these lands ("Practical Irrigable Acres") are identified based upon an analysis of soil types, precipitation, crop water requirements, and agricultural economics for that particular region. If significant changes in precipitation due to climate change occur, the current assumptions concerning water requirements necessary to fulfill the purposes of the reservation may need to be revisited.

Indian Irrigation projects. Indian irrigation projects store water in certain quantities based upon the need for irrigation and the hydrograph of average annual precipitation. Currently, BIA is able to declare certain lands temporarily un-irrigable for periods not to exceed five years and waive assessments based upon this declaration. The current assumption is that reliance on past hydrographs is adequate to make decisions about future water delivery.

Siting of hazardous waste sites. The amount of precipitation falling on these kinds of units can accelerate the leaching of contaminants to the subsurface and significant increases could cause premature failure. As a result, one of the most important design parameters for a hazardous waste site landfill under the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901-6992k, is the amount of precipitation predicted to fall on a landfill throughout the duration of its life, usually decades to centuries. Historical records of rainfall have always been used as a prediction of future precipitation in the design of hazardous waste management units. Landfill design factors could be compromised by significant climate change effects if increased frequency or duration of storms impact a given hazardous waste disposal facility.

DESCRIPTION OF OPTIONS AND ANALYSIS:

1. Review future Indian Water needs in light of potential climate change impacts. Evaluate the necessity of determining whether water supplied by Indian irrigation projects is provided at prices that reflect the opportunity cost of the resource.

2. With respect to future Indian Water rights settlements, explore the feasibility of more frequent introduction of settlement provisions that would allow flexibility for tribes to lease or transfer their water off reservation.

3. Consider impacts of climate change on existing and future hazardous waste sites and determine the policy for siting such facilities in relation to the potential for negative climate change effects.

Calendar Dates

STATEMENT OF ISSUE: Certain National Park Service (NPS) resource regulations adopt specific dates for certain actions.

RELATION TO CLIMATE CHANGE: Climate change effects may lead to shifts in the timing of natural processes that directly relate to the Department's ability to implement its date-certain regulations.

BACKGROUND: Some NPS resource protection regulations cite specific dates for resource protection needs. As an example, 36 CFR § 13.1304(a) closes a specific area of the Exit Glacier in Kenai Fjords National Park between May 1 and Oct 31 for visitor safety reasons. Likewise 36 CFR § 13.1174 limits vessels in parts of Glacier Bay National Park and Preserve May 15 – September 30 in order to protect feeding Humpback whales. The assumption is that the environmental conditions on a given date will not vary significantly year to year. Where the environment does vary, NPS may utilize temporary closure authorities.

Even under current conditions, states can become concerned about the use of the superintendent's temporary closure authority, preferring instead that recurring closures be made permanent through formal rulemaking procedures. As potential climate change impacts manifest themselves, park management will need more flexibility to change the dates as necessary.

OPTIONS:

1. Review existing date-specific regulations if they are dependant on climate-related phenomena, as well as reconsider the use of such date-specific criteria in the future.

APPENDICES

Appendix A: List of Land and Policy Subcommittee Members and Their Affiliations

Bob Faber, Subcommittee Chair
Assoc. Solicitor, Division of Parks & Wildlife
Washington, DC

Laura Brown, Subcommittee Vice-Chair
Act. Deputy Assoc. Solicitor, Division of Land & Water
Washington, DC

Nicole Alt
Fish & Wildlife Service
Chief, Office of ESA Litigation
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Kaush Arha
Associate Solicitor, Division of Indian Affairs
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Bryan Arroyo
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Act. Asst. Dir., Endangered Species
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Chris Baglin
Director, Office of Policy Analysis
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Jim Bennett
Minerals Management Service
Chief, Branch of Environmental Assessment
Herndon, VA

Nancy Brown-Kobil
Attorney-Advisor, Division of Parks & Wildlife
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Dwight Fielder
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Div. Chief, FW & Plant Conservation
Washington, DC

Jennifer Gimbel
Bureau of Reclamation
Assoc. Dir. Operations
Denver, CO

Nancy Gloman
Fish & Wildlife Service
Acting Asst. Regional Director
Albuquerque, NM

Rick Gooch
Fish & Wildlife Service
Regional SH Coordinator
Atlanta, GA

Greg Gould
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Chief, Environmental Division
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Paul Gugino
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Mary Heying, Engineer
Office of Acquisition and Property Management
Washington, DC

Lynn Johnson
Regional Solicitor, SW Region
Albuquerque, NM

Chris Kearney
DAS Policy/International Affairs
Washington, DC

Dan Kimball
National Park Service
Superintendent
Everglades Natl. Park

Frank Michny
Bureau of Reclamation
Asst. Regional Director
Sacramento, CA

Tim Miller
US Geological Survey
Chief, Office of Water Quality
Reston, VA

Jeff Mow
National Park Service
Superintendent
Kenai Fjords, Natl. Park

Rich Myers
Regional Solicitor, Alaska Region
Anchorage, AK

Don Neubacher
National Park Service
Superintendent
Pt. Reyes Natl. Seashore

Deb Rawhouser
Bureau of Land Management
Division Chief, Planning & Science Policy
Washington, DC

Mike Reynolds
National Park Service
Superintendent
Fire Island Natl. Seashore

Mike Scott
US Geological Survey
Sr. Scien. Leader ID.CO
Moscow, ID

Chris Shaver
National Park Service
Division Chief, Air Resources Division
Denver, CO

LaVerne Smith
Fish & Wildlife Service
ARD-Fisheries & Ecological Service
Anchorage, AK

Robert Snow
Attorney-Advisor, Division of Land & Water
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Debra Sonderman
Director, Office of Acquisition and Property Management
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Amy Sosin
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Miyoshi Stith
Bureau of Land Management
Sr. Hazmat Specialist
Washington, DC

David Stout
Fish & Wildlife Service
Chief, Habitat & Resource Conservation
Arlington, VA

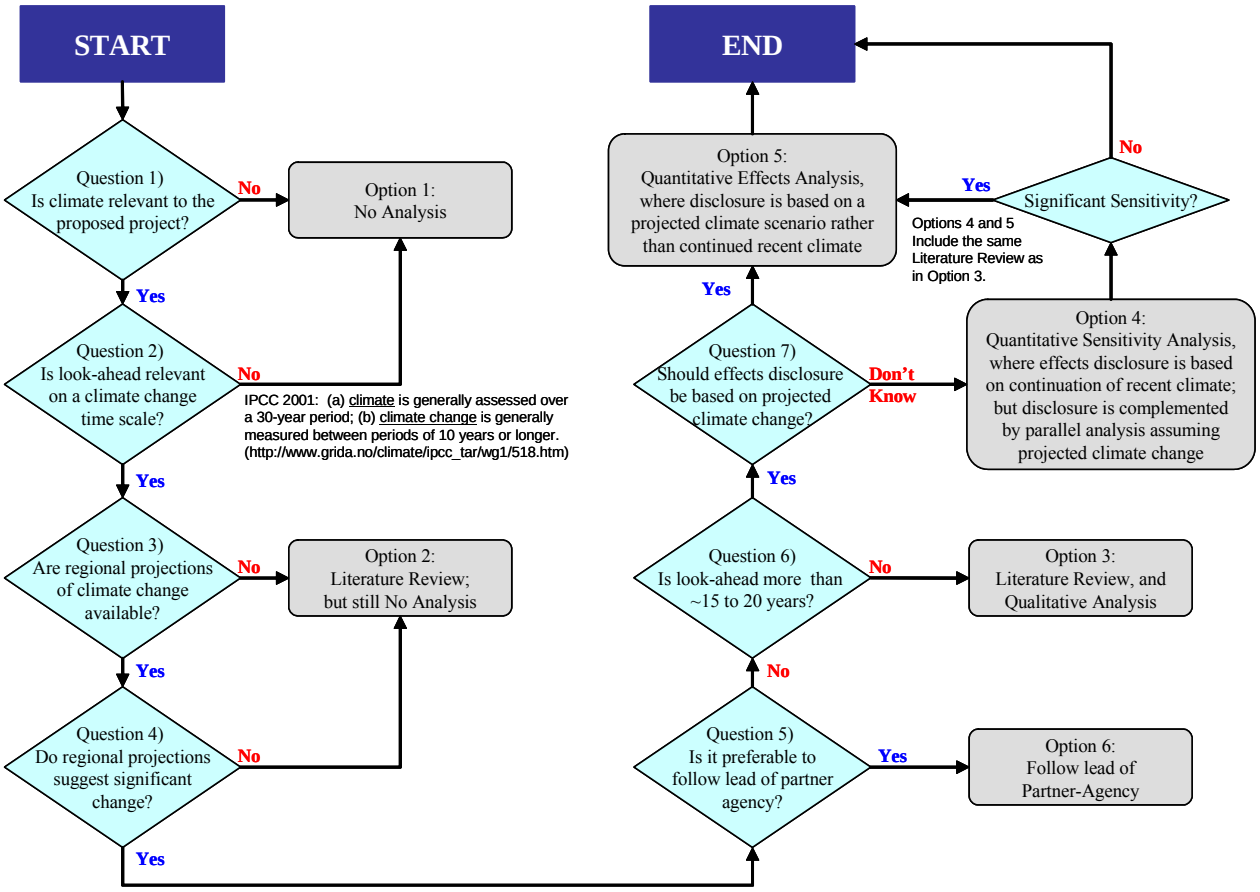
Willie Taylor
Director, Office of Environmental Policy and Compliance
Washington, DC

Doug Tedrick
Bureau of Indian Affairs
Chief, Range Conservation
Washington, DC

Shane Wolfe
Office of the Secretary
Press Secretary
Washington, DC

Appendix B: NEPA Decision Tree

Figure 1 – Potential Scoping Questions and Answers leading to Recommended Options. This chart illustrates a general guidance for considering whether and how to incorporate climate change information into project-specific planning (NEPA, ESA, etc.).



Appendix C: Greening Goals and Climate Change Analysis

Managers benefit from specific, well-defined, qualitative factors when making most day-to-day decisions implementing greening initiatives. Below is a discussion of traditional greening goals/factors that may compliment or present trade offs with the goals that might be pursued in response to climate-change sensitivity.

1. **Geothermal Energy.** Geothermal energy typically qualifies as a green source of energy because it does not produce significant carbon emissions. Geothermal energy can be used as a direct energy source for heating structures such as greenhouses. The major use is for electrical power generation that can be fed into the electrical power grid. The physical footprint of and environmental impacts from geothermal power plants are small in comparison to coal-burning power plants. In 2005, Congress amended the Geothermal Steam Act as part of the Energy Policy Act with the intention of promoting geothermal energy development. The Bureau of Land Management has recently leased new areas for geothermal development. The sustainability of geothermal energy development currently relies on State and Federal subsidies. The availability of this energy resource is also dependent on the geographical location and the life of the resource at particular locations.

2. **Biobased fuels:** Biofuels are produced from renewable resources (plants, organic waste, etc.) and can be used as an alternative to fossil fuels. Ethanol and biodiesel are the two main biofuels widely used today. Although biofuels are considered renewable, they require energy to grow, move, and convert plants into ethanol or transportation of biomass to be burned as fuel a co-generation or other facilities. Thus, the energy balance between plant-based ethanol and conventional fossil fuels may be similar. In addition, agricultural crops rely on water supplies to produce this product. In an era of heightened water shortage or displacement that may occur under climate change, consideration of water availability and water quality will need to be analyzed as part of the overall cost-benefit analysis. In addition, as the demand for corn-based ethanol has increased, the demand for corn also has increased, increasing the price of corn and, thus, the price of products that use corn (food product and animal feed). This, in turn, may involve further ties to resources that could be affected by climate change. Biofuels may also result in land transformations that affect wildlife habitat.

3. **Telecommuting:** Telecommuting conserves energy related to office, vehicle, and highway materials and resources. Additionally, telecommuting may reduce land use requirements for highways. Telecommuting may, however, increase energy consumption in the home. Whether less energy is consumed collectively by employees heating and air conditioning their own individual homes or that of comparable office space or whether distributed work centers would be more efficient may need to be evaluated. Energy displacement and other factors should be evaluated to identify the actual tradeoffs of telecommuting.

4. **Solar Power:** Solar power is regarded as a renewable resource. Its onsite power generation releases no water or air pollution, because there is no chemical reaction from the combustion of fuels. Solar energy can be used efficiently to support heating and lighting. DOI currently uses (e.g., remote locations that receive significant amounts of solar energy) solar power at many locations.

However, although the resulting solar power is renewable, the life-cycle issues associated with manufacturing and disposal, particularly on the scale necessary to impact GHGEs, may be significant.

5. **Hydropower:** In addition to providing electric power opportunities, hydropower plants help to reduce the emission of carbon annually because they produce abundant electricity without producing GHGEs. Also, the dams used to harness the power of water can also create other benefits like recreation and flood control.

   At the same time, dams may disrupt habitats by flooding areas behind the dam and affecting water flow downstream. This disruption can in certain circumstances displace plants, wildlife, and human populations, and can submerge cultural resources like cliff paintings, artifacts, and ancient settlements. Also, dams require large capital investments.

   The nature of hydropower itself provides a unique safety margin to the power grid. Unlike other forms of electric power generation, hydropower can be managed to respond to power fluctuations much faster than other options, thus creating a critical safety margin in managing the nation's power grid. In addition, the nature and location of hydropower facilities can also provide critical ancillary services on a cost-effective basis.

   New, small hydropower facilities could meet the mutual goals of additional water storage/supplies and reduced carbon electricity production. In a national policy shift to lower-carbon energy sources, hydropower may provide a useful alternative.

6. **Wind Power:** Wind power produces virtually no GHGEs. Windmills can, however, have adverse impacts on birds and must be located on large tracts of land or along coastlines to capture the greatest wind movement. To the extent that bird populations are stressed by climate change effects, the location of wind power facilities could become an added stressor.

7. **Natural Gas:** Natural gas is considered a cleaner-burning fuel than other fossil fuels. However, additional analysis may be needed to determine its relative efficacy compared with gasoline and diesel fuel when full lifecycle, distribution system, and vehicle maintenance factors are considered. In addition, its consumption does still produce GHGEs and may need to be weighed against alternatives such as fuel cells in stationary and transportation settings.

8. **Biodiesel:** Biodiesel is an alternative fuel considered to be biodegradable and non-toxic. It can reduce air pollutants associated with vehicle emissions, such as particulate matter, carbon monoxide and hydrocarbons. Even though biodiesel cars emit less CO_2, they still emit particles and pollutants. Additionally, biodiesel fuel can be expensive, and its sensitivity to cold weather may result in more nitrogen oxide emissions, a key ingredient in smog. It must also be considered in terms of the life-cycle implications for GHGEs and water supply challenges.

9. **Waste Product Recycling:** The recycling of waste products can reduce the energy used by industry to produce similar items, thus potentially reducing greenhouse gas emissions. But, recycling may entail tradeoffs that render its environmental effects ambiguous and dependent on local circumstances. Recycling imposes environmental and economic costs through transportation, sorting, processing and remanufacturing, and sometimes these costs may outweigh the gains of reusing a resource. Without knowledge of the tradeoffs, it is difficult to

make responsible decisions. In locations where climate change effects are a factor governing policy choices, recycling would need to be weighed in terms of the whole life-cycle of a product or process.

10. **Water Recycling:** In many areas, water is reclaimed and processed for reuse. Generally, the reclaimed water is re-injected into aquifers, released into surface water storage areas, or used to supplement non-consumptive uses. The quality of the water is nearly equivalent to drinking water standards. The Bureau of Reclamation is already involved in water recycling activities through its Title 16 projects. As water shortages may be experienced pursuant to predicted climate change, more extensive use of recycled water may be desirable.