



The Future of Environmental Protection:

The Case for a National Environmental Legacy Act

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January 2010

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Acknowledgments

**The Center for
Progressive Reform is
grateful to the Deer
Creek Foundation
for its generous
support of
this project.**

Printed in the U.S.A.



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Executive Summary

The nation's march toward environmental progress has often proceeded in the wake of tragedy. The Clean Water Act was adopted in part because of the media attention given to pollutants in the Cuyahoga River catching fire. Similarly, the legislation that created Superfund, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), came into being in great measure because of the publicity surrounding the infamous Love Canal incident, in which residents of Niagara Falls, New York developed a variety of illnesses – in many cases fatal – as a result of the construction of a residential neighborhood and school on the site of a toxic dump site. And the National Forest Management Act was prompted partly by revelations of clearcutting in the Monongahela National Forest.

The legislation that responded to these incidents, as well as the various other environmental statutes now in place, were all good faith efforts to respond to specific types of environmental abuse – pollution in the air and water, extinction of specific species of animals, clearcutting of national forests, toxic chemicals dumped in pits and covered over, and more. They have all made important progress in mitigating or preventing the types of environmental abuse they were designed to address.

But this reactive approach engendered legislation focused on the most egregious conduct. There was little serious attention to the incremental and less visible impact of ongoing patterns of human conduct that were slowly yet surely depleting and degrading the environment around us. Although our laws often stated our ambition to preserve natural resources and the environment for our children and future generations, no statutory framework emerged to successfully achieve this.

Thus, the environmental legacy we will leave our children and their children is far from clear. Climate change induced by fossil fuel use and other human activity is the most pronounced threat to the quality of life for future generations, but it is far from the only environmental problem human conduct is causing. Virtually all of the nation's natural resources – wildlife and ecosystems, air and water, public lands and bodies of water – are in trouble. For example, the U.S. supply of fresh water is drying up, the nation's wetlands are dwindling, its forest and grazing lands are suffering, and fish populations are plummeting. So for all the good intended and accomplished by existing environmental laws, if the objective is to preserve the environment for successive generations, we are failing. Even though we have identified specific threats and taken aim at them, we continue to pursue a policy – consciously adopted or not – of spending down natural resources to meet current economic objectives rather than preserving a sufficient supply of these resources for future generations. While we often avow our commitment to provide for our children's and grandchildren's future, our current course of conduct with regard to the environment belies the claim.

This paper proposes legislation aimed squarely at the problem: a National Environmental Legacy Act (NELA) intended to buttress existing environmental statutes by establishing standards aimed not simply at preventing or mitigating specific abuses, but rather at protecting specific environmental assets from the combined effect of a full range of environmental degradations. So, for example, recognizing biodiversity as an environmental asset, NELA would address the problem of alarming rates of species endangerment and extinction by seeking to protect species long before they become endangered or threatened, through efforts to protect ecosystems by accounting for all the factors in an ecosystem that affect species population. More generally, recognizing the natural resources under federal ownership and control as important -- and in some cases finite -- environmental resources, NELA would address the quickly shrinking store of these resources by establishing a limit on further depletion of publicly owned resources, so that future generations would be able to enjoy these resources.

NELA would identify specific public resources to be preserved and require that a specific share of each resource be preserved for the use of future generations. In so doing, it would compel us to identify our long-term goals for these resources, and help us chart and maintain a course to achieve the shared goal of preserving the resources. The statute would:

- Set forth the goal of defining and preserving a legacy of public natural resources for present and future generations;
- Designate a legacy period, a fixed period of years over which public natural resources must be preserved;
- Prohibit degradation of those resources beyond fixed limits, and prohibit action by any person, government agency or corporation that may produce impermissible degradation;
- Designate specific federal agencies to be stewards responsible for each resource;
- Develop metrics by which to measure progress;
- Charge agencies with the task of devising rules to accomplish the preservation of the resources; and
- Grant agencies the power to enforce these rules, and citizens the right to sue to hold agencies accountable for that enforcement.

NELA takes a longer and broader view of the nation's environmental challenges than any of the individual environmental protection standards now on the books. By identifying what share of a given resource must be preserved and for what period of time, it looks at environmental challenges from a very different perspective than most current environmental standards, which generally look only at incremental harm caused by particular actions, ignoring the cumulative impact of loss "by a thousand cuts." Existing environmental laws are critical to protecting the environment, and NELA seeks to build on their accomplishments. But it embodies a broader vision and would grant the agencies charged with implementing environmental laws a broader mandate and long-needed authority to carry out that mandate.

Introduction

Americans of all political stripes agree that we should protect the interests of our children and grandchildren when we establish environmental, health and safety policy. Indeed, the concepts of sustainability and intergenerational equity – the concepts undergirding the objective – have become increasingly important in environmental law and policy debates in the last 30 years, both in the United States and abroad. In a large number of statutes, Congress and many state legislatures have embraced the goals of protecting a resource legacy for future generations, and promoting sustainable use of the nation's stock of natural resources. In addition, in polls, the American public consistently expresses concern with how well we steward resources, and has shown a strong recognition of a responsibility to future generations.

Yet by any measure, it is clear that the United States is neither using its natural resources in a sustainable fashion nor systematically considering how today's patterns of resource use will affect the next generation. Any number of research studies have documented an ongoing worsening of the environment: decline in supplies of fish species, other biodiversity, energy resources, freshwater, and many of the values and services associated with these and other natural resources. Examples of the documented and predicted impacts include the following:

- A study published in the journal *Science* concluded that continuation of current fishing patterns will lead to a global collapse of all commercial fish species by 2048.
- In its most recent report to Congress, EPA estimated that close to half of the rivers, streams, and lakes it assessed were not clean enough to support the uses for which they are designated, such as fishing and swimming.
- Almost half of America's energy supply is derived from coal, the dirtiest source of fuel, which emits 80 percent of the greenhouse gas emissions from energy sources, and other pollutants such as nitrogen oxides, sulfur dioxide, and mercury.
- Between 1982 and 1997, the amount of urbanized land in the United States increased approximately 47 percent.
- Habitat loss is contributing to significant loss of biodiversity and an extinction rate estimated to be 50 to 100 times greater than baseline "normal" rates.
- Of the 1,560 wetland communities in the United States whose status is known, approximately 60 percent are at risk.
- The United States has the eighth highest per capita use of water in the world and the overall rate of use is increasing faster than population growth.
- Surface water availability is likely to decline as we feel the effects of climate change, and groundwater resources will be unable to meet the demand. In coastal areas, salt water intrusion will impair critical groundwater resources on which communities already depend.

In polls, the American public consistently expresses concern with how well we steward resources.

These environmental harms and patterns of resource depletion are the direct result of public policy choices made at the local, state, and federal levels. Many public natural resources are managed under statutes with notoriously open-ended standards that require federal agencies to “balance” a variety of often incompatible uses, many of which degrade or deplete relevant resources. Many of these statutes contain no enforceable standard mandating protection of any particular quality or quantity of the resource. And while the National Environmental Policy Act (NEPA) mandates *assessment* of the environmental impacts of federal agency actions, it does not mandate *selection* of an environmentally preferable alternative. In other words, NEPA fails to supplement the resource management statutes with an enforceable standard of sustainability.

Clearly the time has come for a new generation of environmental laws, one that embodies the laudable, widely embraced, but largely unrealized goal of protecting a resource legacy for future generations. This report makes the case for enactment of such a statute – a National Environmental Legacy Act (NELA or Legacy Act) – legislation that would require us to define in concrete terms for the first time the environmental legacy we wish to leave to future generations and provide a mechanism to ensure that we preserve that legacy.

The National Environmental Legacy Act proposed here focuses on preserving a public natural resource legacy for the next generation, because the quality and quantity of available natural resources are key determinants of the options and quality of life that future generations will enjoy. Public natural resources include water and land, as well as the ecosystems, biodiversity and minerals found in or on the land or water. The Legacy Act seeks to protect both the resources and the many values and services they provide. As proposed, the Legacy Act applies to resources under public ownership or management or protected by the public trust doctrine, but not to natural resources in wholly private ownership.

The Legacy Act is intended to drive deliberate choices about the preservation of natural resources, and toward that end, borrows from the principles of sound financial management. If we acknowledge that public natural resources are a significant form of natural wealth, concern for the resource legacy we leave follows naturally.¹ The concept of defining and preserving a resource legacy builds on basic principles of wealth management. Just as an estate plan enables individuals with private wealth to ensure that their wealth is protected for the next generation, the Legacy Act provides a mechanism to ensure that public wealth is preserved for the next generation and not depleted or “spent” today. Financial professionals universally recommend that individuals adopt and follow a savings plan if they intend to save for the future, identifying a specified amount to be saved for the future.² NELA adopts this same approach to conserving natural resources. The statute requires us to determine a threshold of resources that we commit to leave to future generations, and it ensures that necessary savings will occur. Just as a savings plan requires that one protect and set aside the money needed for savings and spend only what income remains, NELA requires stewards

of public resources to set aside a defined level of resources for future generations, and only spend or use that which remains or can renew itself.

Given the evidence of a long-term trend toward depletion and degradation of resources, and the systemic biases in favor of economic and consumptive use of resources, we need a better method to help us account for impacts on future generations. A Legacy Act would help us to make conscious policy choices about the legacy we leave and provide the tools to ensure that we manage our natural resource wealth wisely and in accord with our chosen priorities.

This report will first elaborate on the arguments in favor of enacting a Legacy Act. It will go on to introduce the Legacy Act, providing the basic contours of the statute and additional detail on its key attributes. To illustrate how NELA would work, the report will then provide examples of the statute as it would apply to two particular public natural resources – energy and biodiversity. Because of the unique challenges that climate change poses to our ability to secure a defined resource legacy, the report will address the ways in which NELA is designed to deal with the impacts of a warming climate. Finally, the report will anticipate and address some of the arguments that will likely be made in opposition to the concept of a Legacy Act.

For 24 years, the Gallup Poll has shown that a majority of Americans prioritize environmental protection over economic growth.

Why We Need a National Environmental Legacy Act

This report conceives of the Legacy Act as a remedy for the failure of current law to achieve the broadly shared goal of leaving a natural-resource legacy for the benefit of future generations. Accordingly, this section explores the premise that Americans in fact support the goal of leaving such a legacy, provides a summary of the evidence that current law is failing to achieve that goal, and explains the primary reasons for that failure.

Americans Support Leaving a Resource Legacy to Future Generations

Public Opinion

Public opinion polls consistently reveal the American public's concern for how we steward the natural wealth available to us. Since 1984, the Gallup Organization has conducted a poll in which Americans are asked whether economic growth should be given priority even if the environment suffers to some extent, or whether protection of the environment should be given priority even at the risk of curbing economic growth. For 24 years, the majority of Americans prioritized environmental protection above economic growth. In 2009, for the first time in the history of Gallup's asking the question, more Americans (51 percent) prioritized economic growth over environmental protection. This anomaly in the midst of what many have deemed the worst recession in a generation – or even since the Great Depression – is not surprising. The Gallup Organization notes that the findings reflect many of its recent poll results that show “how primary the economy is in Americans' minds.”³ In the current economic climate, what may be surprising is the proportion of Americans who continue to support giving protection of the environment priority, even at the risk of curbing economic growth—42 percent.

On other issues relevant to NELA's purpose—maintaining a stock of public natural resources for the benefit of future generations—public support is similarly evidenced through polling data. The 2009 Gallup poll that studied environment versus economy preferences included a question that asked Americans to select between developing domestic energy supplies at the risk of harming the environment or protecting the environment at the risk of limiting energy supplies.⁴ Americans were almost equally divided on this question – with 47 percent choosing to protect the environment and 46 percent choosing to develop domestic energy supplies – results which, again, speak particularly strongly to our collective commitment to environmental protection given the current economic conditions.

Moreover, the public understands that our current system of laws is not achieving our sustainability goals. When asked in a 2007 poll whether protecting natural habitats and wildlife or providing public access for recreational use should be paramount in managing the National Park System, 79 percent of those polled believed that “protecting nature” was paramount.⁵ However, only 34 percent of respondents believed that protecting nature was

FIGURE 2:**The Coral Reef Conservation Act:
An Example of a Federal Statute Expressing
Sustainability as a Goal**

"The purposes of this title are to preserve, sustain, and restore the condition of coral reef ecosystems."

Purposes, 16 U.S.C. §6401(1)

FIGURE 3:**The National Park Service Organic Act:
An Example of a Federal Statute Incorporating
Sustainability into Mandates**

The [National Park Service] . . . shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . by such means and measures as conform to [their] fundamental purpose, which purpose is to conserve the scenery and the natural and historic objects and the 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.

16 U.S.C. §1

FIGURE 4:**The Conservation Reserve Program: An
Example of a Federal Statute Providing
Incentives for Conservation**

The Secretary shall formulate and carry out a conservation reserve program under which land is enrolled through the use of contracts to assist owners and operators of [certain] land [] to conserve and improve the soil, water, and wildlife resources of such land . . .

16 U.S.C. §3831(a)

policy, or purpose section of relevant statutes. These provisions frequently note the national interest in and value of the resource, and many statutes explicitly acknowledge the need to preserve the resource for present and future generations of Americans. *See* Appendix A for a list of examples of statutes that fall into this category.

In the second category, Congress has more forcefully demonstrated intent to sustain resources by integrating sustainability into various statutory **mandates** governing management or maintenance of public resources. In these statutes, the very structure of the statute requires that the implementing agency consider sustainable use of resources, the interests or needs of future generations, or both. For example, several statutes define the concept of sustainability for the relevant resource and mandate that plans be created for executing the statute's definition of sustainability. Other statutes authorize the creation of monuments and the preservation of landscapes, and direct federal agencies to manage those areas in such a way as to preserve them for future generations. *See* Appendix B for a list of examples of statutes that fall into this second category.

Finally, Congress has also demonstrated its intent to sustain resources by providing **incentives** for the voluntary conservation of resources. Such statutes may provide assistance for conservation practices on private lands, incentives for voluntary granting of easements, state and federal coordination, or they may aim to combat harmful practices by withholding benefits to landowners. Appendix C provides examples of statutes in which Congress has created such incentive programs.

Current Laws Fail to Achieve the Goal of Ensuring a Resource Legacy

Despite general support for a sustainable environmental legacy, the nation's public policy reflects the opposite choice. Notwithstanding the expressed intent to conserve a resource legacy in statutes such as those detailed above, the results of the existing legal regime reflect what could be called a spend-down ethic. That is, current outcomes reflect a decision, albeit not explicitly articulated, to use resources according to the dictates of our current short-term needs, however high the costs we are leaving our children, and however strong the likelihood that they will experience dislocation and loss from the anticipated depletion of key public natural resource including fossil fuels, freshwater supplies, fisheries, etc.

While we do not embrace this spend-down ethic openly, by relying on highly discretionary resource management statutes with open-ended balancing tests, purely procedural impact assessment under NEPA, and analytic approaches like cost-benefit analysis that fail to adequately account for the future, we are tacitly accepting that we do not know and we do not care what the impact of our resource use will be.

Depletion of Resources

The results of this tacit embrace of the spend-down ethic are everywhere. Among the natural resources we have come to depend on for a variety of services and values – both utilitarian and aesthetic – are freshwater, wetlands, land, and fisheries. This section details how our use of each resource has reached unsustainable levels. Nonrenewable energy supplies and biodiversity are two other resources that we have failed to manage in a sustainable manner, and the results of these failures will be explored in more depth in the case study sections of this report.

This list of resources is not intended to be comprehensive, but it provides a representative view of the wide array of values natural resources provide humans that may be severely and permanently impaired if current patterns of depletion and degradation continue. Fresh water supplies are essential to human survival and to most human activity. Wetlands provide critical ecosystem services, including flood control, water filtration, and nurseries for fisheries. Forests provide timber resources and critical ecosystem services as well as aesthetic and recreational values. Fish are an important food supply and provide recreational value, as well as aesthetic and other nonuse values. Biodiversity possesses a wide range of utilitarian values as well as aesthetic, spiritual, and other nonuse values. And energy resources provide an example of a resource valued primarily for utilitarian reasons, extraction of which often impacts other resources and values, including those listed above.

Depleting U.S. Supply of Fresh Water. Americans depend on freshwater resources for thermoelectric power generation, agricultural irrigation, household, industrial, and commercial use. The United States has the third highest annual freshwater withdrawals in the world and the eighth highest per capita use of water in the world.⁷ In the second half of the 20th century, U.S. per capita use accelerated. While population increased almost 90 percent from 1950 to 2000, total withdrawals increased 127 percent during the same period.⁸ Pollution poses another threat to freshwater resources in the United States. The Environmental Protection Agency’s most recent water quality report to Congress states that of the water bodies assessed, 44 percent of the nation’s rivers and streams, 64 percent of our lakes, ponds, and reservoirs, and 30 percent of our bays and estuaries are impaired—that is, not clean enough to support the uses for which they are designated, such as fishing and swimming.⁹

Drying Wetlands. Wetlands provide a variety of crucial ecosystem services, including pollution filtration, habitat, erosion control, and absorption of coastal storm surges.

Our current legal regime reflects a “spend-down” ethic, where we use resources based on short-term needs without considering the impact on future generations.

**Approximately
60 percent
of known
wetlands are
at risk, and
the amount
of urbanized
land in the U.S.
has increased
47 percent
between 1982
and 1997.**

Since European settlement, however, the area of freshwater wetlands in this country has declined by more than 60 percent, from a total of 221 million acres in the lower 48 states to approximately 80 million acres at the turn of the 20th century.¹⁰ Of the 1,560 wetland communities in the United States whose status is known, approximately 60 percent are at risk. Wetlands on the Atlantic and Gulf coasts declined by about 400,000 acres (an eight percent loss) from the mid-1950s to the mid-1990s. More than two-thirds of this shoreline is coastal wetlands, the special importance of which was highlighted in the wake of Hurricane Katrina.

Shrinking Forest Lands. Our commitment of land to various uses -- from natural cover (such as forestland and grasslands) to agricultural, residential, commercial, and industrial -- has far-reaching consequences. As land under natural cover is converted to agricultural and urban uses, its functions necessarily change. And while some benefits are gained, others are lost. Clearing of forests, for example, results in loss of wildlife habitat and watershed protection. During the 20th century, forest area in the United States fluctuated between a low of 735 million acres in 1920 and a high of 749 million acres in 2000.¹¹ However, this acreage is down from more than 1 billion acres before European settlement.¹² And, as with use of freshwater, the rate of what could be called per capita consumption of land has increased dramatically in recent years. Between 1982 and 1997, the amount of urbanized land in the United States increased from approximately 51 million acres to 76 million acres, an increase of 47 percent. Yet the nation's population growth during the same time period was only 17 percent.¹³

Diminishing Fish Populations. Data demonstrate that similarly unsustainable consumption of fish and shellfish is causing serious declines in fisheries. In 2006, a study in the journal *Science* concluded that continuation of current fishing patterns will lead to a global collapse of all commercial fish species by 2048.¹⁴ Although a global collapse of fisheries would be due to global consumption patterns, the United States plays a significant role. Redefining Progress, a think tank dedicated to using "smart economics" to "ensure a sustainable and equitable world for future generations," has developed a sustainability index that quantifies the impact of capture fisheries on marine ecosystems. This index, called the "Fishprint," enables a calculation on a nation-by-nation basis that measures the biocapacity appropriated each year by fisheries.¹⁵ According to Redefining Progress's analysis, the United States has the eighth worst Fishprint in the world.

Absent a conscious change in the U.S. approach to natural resource management, these and other resources will continue to decline at an accelerated rate as continued population growth and the impacts of climate change multiply the pressures on resources. The nation's current population is approximately 306,200,000.¹⁶ The Census Bureau predicts that by mid-century (2050), it will grow to 439,010,000¹⁷ -- an increase of nearly 133 million people, or approximately 43 percent.

This larger population will exert increased demands on resources at the same time those resources are experiencing various pressures due to the impacts of climate change. The Intergovernmental Panel on Climate Change has projected a warming rate of 0.2 degrees Celsius per decade for the next two decades.¹⁸ Climate models used in the National Assessment Report, conducted by the U.S. Global Change Research Program, predict that average warming across the United States will be in the range of 5 to 9 degrees Fahrenheit by 2100.¹⁹

Impacts of these changes in climate on each of the natural resources discussed above will be significant. For example:

- Surface water availability will decline as precipitation variability and drought increase with the changing climate.²⁰
- Groundwater resources will experience a corresponding increase in demand, but their ability to supply that demand will be compromised. Long before the rising sea levels caused by warming temperatures physically submerge coastal communities, salination will impair critical groundwater resources on which those communities depend.
- Rising sea levels will also impact wetlands. As coastal marshes become inundated by rising seas, natural processes would tend to cause them to migrate to areas further inland. However, one aspect of our pattern of land use – excessive development of the land along much of the nation’s coastline – will prevent such relocation.²¹
- Research published in the journal *Science* in January 2009 concludes that climate change is significantly affecting forests in western North America, independent of other human activities.²² Data indicate that as the climate has warmed over the last several decades, the mortality rate of these forests has doubled.
- Fisheries will experience additional stress as increased levels of carbon dioxide in the atmosphere contribute to increasing ocean acidification.²³

Shortcomings in Current Law

Despite public support for sustainable environmental policies and despite statutory assertions of the need for sustainability, public policy has ultimately been insufficient to protect the nation’s natural resources.

Even where Congress has integrated sustainability into statutory mandates governing management of particular public resources (as opposed to simply including sustainability as a goal in the “findings” or “policy” section of a statute, for example), policies that would advance sustainability are frequently just one of several values to be given equal consideration. (See Figure 3, above.) Statutes such as the National Forest Management Act (NFMA) and Federal Land Policy and Management Act (FLPMA) direct the agency to administer the resources for “multiple use” and “sustained yield” but contain no *enforceable*

standard mandating protection of any particular quality or quantity of the resources being managed. Instead, they generally charge the relevant land management agency with development of a plan for the resource, such as a particular unit of the National Forest System. However, the agencies have considerable discretion under these laws, and ultimately produce plans for the resources that reconcile a list of competing potential uses without ever being required to demonstrate that the uses will in fact be sustainable over any period of time.

Unfortunately, as the Center for Progressive Reform documented in its September 2007 report *Squandering Public Resources*, the agencies have failed to use their discretion to achieve stated goals of sustainable use of public natural resources.²⁴ Agencies fail to monitor the depletion and degradation of resources, in part because of inadequate funding. In addition to detailing instances of benign neglect, the report demonstrates the pliability of the statutes and the ability of an executive branch more interested in transferring resources to private economic interests than conserving a public resource legacy to do exactly that. The result has been a systematic pattern of squandering public resources or failing to protect them, notwithstanding stated commitments to sustainable use and resource conservation under existing law.

The current legal regime governing management of public natural resources includes not only resource-by-resource statutes such as NFMA and FLPMA, but also the National Environmental Policy Act—NEPA, a statute that applies across-the-board to decisions affecting a wide range of resources. NEPA arguably contains some of the most inspiring language in the entire U.S. Code regarding the relationship between humans and the natural environment. NEPA is premised on recognition of “the profound impact of man’s activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances.”²⁵ In its statement of policy, NEPA recognizes “the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man.” NEPA aspires to create and maintain conditions under which “man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.”

In seeking to carry out this ambition, NEPA adds to the federal government’s responsibilities a duty to use its resources “to the end that the Nation may – (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.”²⁶ While NEPA also requires agencies to seek to “attain the widest range of beneficial uses of the environment,” this is to be “without degradation, risk to health or safety, or other undesirable and unintended consequences.”²⁷ Thus NEPA can be fairly said to have at its core a legacy ambition—a conscious recognition of a duty we owe as a nation to future generations, and a policy that adds to the mandate of federal agencies a duty to take steps to fulfill the role of steward of our natural resources.

In practice, however, it is widely recognized that NEPA has failed to fulfill all of these lofty ambitions.²⁸ NEPA's most powerful and important mandate requires federal agencies to assess the environmental impacts of their actions by preparing an environmental impact statement (EIS) for every major federal action that significantly affects the human environment.²⁹ Yet it lacks a substantive standard to govern decisions. This is captured by the common complaint that NEPA "lacks teeth."³⁰ Federal agencies complying with NEPA must prepare required documentation³¹ that details impacts of the proposed action and alternatives to the proposed action, but there is no requirement that the agency then pursue the most environmentally preferable alternative identified in the analysis.³²

Because NEPA's main enforceable requirement is that the government's documentation of impacts and alternatives comply with NEPA's standards for completeness, agencies labor to ensure that documentation details every impact and appropriate alternative. Yet NEPA does not ensure that the information on environmental impacts actually affects the agency's decision. Accordingly, even if agencies comply fully with NEPA, critical public natural resources can still be completely depleted and degraded.

Contours and Key Attributes of NELA

The concept of a National Environmental Legacy Act is to define and protect a legacy of public natural resources for future generations. As explored in the preceding section, this goal appears to enjoy broad public support but has not been achieved through the statutes we have so far enacted. This section will sketch out the proposed Legacy Act and its key provisions.

The Contours of a National Environmental Legacy Act

For purposes of discussion, this report proposes a very broad definition of public natural resources that includes all resources under federal ownership or protected by the federal public trust doctrine, together with all the values and services associated with these resources. This formulation would include forests, wetlands, and uplands on public lands and all the biodiversity found in these ecosystems, as well as fisheries under federal protection or control. Minerals encompassing an array of hardrock minerals as well as oil, gas, and other nonrenewable energy sources would also be covered, as well as water resources under federal control. The values and services these resources provide to humans are numerous and varied. For example lands within a National Forest may provide timber for consumptive use, habitat for wildlife, carbon sequestration, watershed and erosion protection, aesthetic, spiritual, and recreational values, to name a few.

Building on the goals already expressed in numerous laws, NELA would for the first time require management of public resources to conserve some stock of resources for future generations. Embrace of the Legacy Act concept would compel us to identify our long term goals and then help us to chart and maintain a course to achieve our shared goals. It would also improve our decisions over the long term by generating the information base needed to support adaptive learning.

At a minimum, the idea of a Legacy Act envisions a statute that defines the public natural resource legacy we wish to preserve and prohibits all actions that will degrade or deplete the defined legacy. These two core objectives of the statute are guideposts that suggest the general contours of the statute. Building on these objectives, this report proposes the following model to achieve the goals of a Legacy Act.³³

Section 1—Goals and Policy: The statute should set out the goal of defining and preserving a legacy of public natural resources for present and future generations of Americans. The statement of goals and policy should also describe in affirmative terms the legacy we wish to leave, defined in relation to our existing stock of resources.

Section 2—Designation of a Legacy Period: The statute should designate a fixed period of years that constitutes the legacy period, over which public natural resources must be conserved.³⁴

Section 3—Prohibited Degradation or Depletion of Legacy Resources: The statute should set forth in clear and enforceable terms the maximum level of degradation or depletion of resources, if any, that will be permitted over the course of the legacy period. This is critical to ensure the enforceability of the statute. The statute should set a single across-the-board standard of permissible degradation for renewable resources and a separate standard for nonrenewable resources, since the decision on the appropriate legacy to leave of these two categories of resources raise distinct questions. The standard could be articulated in narrative terms or in terms of percentage of permissible depletion per year. The statute should in broad terms prohibit actions by any person³⁵ that may produce impermissible degradation or depletion of a legacy resource during the legacy period. Section 3 can only effectively constrain post-enactment human conduct. Therefore, its prohibitions should not preclude changes that are caused solely by (a) human action taken prior to the date of enactment of the Legacy Act or (b) changes in resources or ecosystems that are not caused by human actions.

Section 4—Designation of Legacy Resource Stewardship Agencies: The statute should designate an existing federal agency to serve as the resource stewardship agency (“stewardship agency”) for each public natural resource.³⁶

Section 5—Development of Metrics and Collection of Baseline Data on Resource Quality and Quantity: Each stewardship agency should be charged to develop implementing regulations that designate appropriate metrics of quality and quantity for the resources for which they are stewards. The statute should both mandate and authorize adequate funding for collection of baseline data on the quality and quantity of all public natural resources employing these metrics.

Section 6—Promulgation of Rules Defining Maximum Permitted Levels of Degradation and Depletion Over the Legacy Period: Each stewardship agency should be required to promulgate rules that translate the substantive prohibition articulated in Section 3 into enforceable standards expressed in terms of the metrics developed under Section 5 for each relevant resource. In addition, each stewardship agency should be directed to identify “tipping points” for each ecosystem under their stewardship. Tipping points refer to resilience thresholds – thresholds beyond which degradation of resource quality or quantity will cause loss of ecosystem resilience. The concept of resilience is further explored in the overview of Section 8 and later in this report.

Section 7—Stewardship Agency Mandate to Ensure No Impermissible Degradation Will Occur: The statute should limit stewardship agencies’ discretion under existing law by requiring that each stewardship agency ensure that no degradation or depletion in excess of permissible limits will occur during the legacy period. The statute should also specifically mandate that each stewardship agency develop a “legacy plan” to demonstrate how it will ensure that the mandated resource legacy is conserved over the legacy period and conform its actions to the legacy plan.³⁷ Although the Act’s prohibitions would constrain only post-Legacy Act human conduct, agencies should be required to monitor, assess, and consider degradation and depletion from all sources in planning and in making decisions that affect legacy resources.

The statute should also mandate that each stewardship agency ensures the resilience of relevant ecosystems that encompass legacy resources. If the duty to prevent degradation or depletion of a specific resource and the duty to ensure resilience of the relevant ecosystem conflict, the duty to maintain resilience should prevail.

Section 8—Ecosystem Resilience Assessment: Resilience is a way to describe “the persistence of relationships within a system and . . . a measure of the ability of these systems to absorb changes” and still persist.³⁸ In other words, resilience describes the degree of disturbance a system can tolerate before it flips into another behavior regime.³⁹ Should pre-enactment human conduct or non-human induced changes cause significant degradation or depletion to a legacy resource, the agency should be required to perform a resilience assessment to determine whether the ecosystem retains the capacity to persist in light of the degradation or depletion. If the ecosystem can persist, the agency should be required to modify its legacy plan as needed to promote the continued resilience of the system. In cases where the system has “flipped” to a new regime, the question of whether to attempt to restore the system or to seek to promote the resilience of the new regime should be made by the stewardship agency following public comment. Factors to be considered would include the values and services provided by the ecosystem in its prior state and in its current state, the uniqueness of the resources, and the cost of restoring the ecosystem to its prior behavior regime.

Section 9—Enforcement: To ensure enforcement, both the stewardship agency and citizens should be granted enforcement authority. A citizen suit provision with fee-shifting would be a critical component of the statute. It should authorize any person to bring an action to enjoin and seek penalties for any action that impermissibly degrades or depletes public natural resources. The statute should also permit citizen suits against any stewardship agency to enforce other agency duties under the statute, including the duty to collect information, the duty to develop or update a legacy plan, and the duty to conform agency actions to the terms of the legacy plan.

Section 10—Monitoring and Adaptive Learning: The statute should require and authorize funding for stewardship agencies for ongoing monitoring of legacy resources and the ecosystems of which they form part, and it should require stewardship agencies to update legacy plans according to a fixed schedule.

Section 11—Exceptions: The statute should allow for a narrow exception to its prohibition on degradation or depletion in two circumstances: if it can be shown by clear and convincing evidence that (1) foreseeable technological advances or the availability of substitute resources will obviate the need for and value of the resource in question; or (2) impermissible degradation or depletion is clearly in the public interest, no acceptable alternative that will not cause impermissible degradation or depletion exists that will serve the public interest adequately, and the impacts to all services and values to be impaired can and will be mitigated.

This sketch of a new statutory model departs from current natural resource management statutes in several fundamental and important respects. Among the innovations of prime importance are the following:

- The Legacy Act requires us to consider the effects, including cumulative impacts, our actions have on public natural resources over a substantial time horizon.
- The Legacy Act provides a framework for defining the quantity and quality of various public natural resources that we choose to maintain over a defined time period.
- The Legacy Act mandates that natural resource management agencies develop plans that will conserve the desired quantity and quality of resources over a defined time period.
- The Legacy Act combines the best available science with techniques such as metrics to permit sound decision making notwithstanding uncertainty.
- The Legacy Act requires agencies to adopt rules that will implement their plans, and mandates that permitting and other decisions affecting the resources must comply with the plan and rules.
- The Legacy Act provides for adaptive learning and transparency. It provides a framework for policy to evolve as changes in the available information or in shared values dictate and enables not just federal agencies but states, local governments, and the public to benefit and learn from experience and information collected under the Act.

Key Attributes of a Legacy Act

Interplay of a National Environmental Legacy Act and NEPA

NELA follows the model of NEPA in the sense that it would be a single statute that applies across the board to decisions affecting a wide range of resources. This approach supplements the resource-by-resource approach that characterizes many of the nation's public natural resource conservation and management laws. In addition to sharing with NEPA a scope that encompasses actions affecting a wide variety of federal lands and resources, NELA also echoes NEPA in its embrace of a policy favoring the preservation of resources for future generations.

However, while NELA shares many objectives and goals with NEPA, NELA seeks to achieve them through very different means. Thus NELA prohibits resource degradation or depletion that exceeds a specified standard. In other words, it has teeth, going far beyond a general statement of policy backed only by procedural requirements. Also, unlike NEPA, NELA is designed specifically to focus on the resource legacy left to the next generation—not just the

effects anticipated today, but the position in which those effects will leave our children and their children.

Also, unlike NEPA, a Legacy Act would be designed to permit adaptive learning.⁴⁰ To ensure that we can learn from experience, it would require ongoing monitoring of resource conditions. This would in turn provide data to help make informed decisions in the future and to assess whether past analyses were accurate.

NEPA has also been criticized as failing to generate needed information on cumulative impacts. NELA responds to this by replacing NEPA's primary focus on a *single* action with a focus on the *cumulative* effect of *all projected actions* on a particular resource. Instead of generating information on anticipated impacts of individual actions, NELA will define the quantity and quality of resources Americans wish to leave at the end of the Legacy Period and prohibit incursions into that legacy.

Notwithstanding its significant shortcomings, NEPA has been rightly and widely praised for its ability to bring the environmental consequences of proposed actions into public attention and for educating and focusing government agencies on the environmental effects of their decisions -- impacts that would otherwise have been overlooked. There are many cases in which this has affected the decisions ultimately, by means other than a direct substantive standard.⁴¹ Thus NELA seeks not to replace NEPA, but to complement it.

An Enforceable Substantive Mandate (Sections 1 & 3)

To merit the name Legacy Act, the statute must have “teeth”: it must include a strong substantive mandate that protects resources, instead of merely requiring an assessment of impacts. In a Legacy Act, Congress would articulate the enforceable substantive mandate in two different forms. First, in Section 1 of the statute, Congress would describe in narrative terms the public natural resource legacy we commit to leave to future generations, defined in relation to the current stock of public natural resources. For example, Congress might determine that the legacy should be an identical stock of resources in terms of quantity and quality. Or it might determine that the legacy should be a stock of resources that is not “substantially” diminished in quality or quantity. Or it might choose some other standards of quality and quantity of resources that we commit to preserve for future generations. This is the affirmative vision of the legacy and is central to the Act.

In Section 3 of the statute, Congress would then translate this affirmative vision into a clear and enforceable prohibition that applies to all activities affecting public natural resources. So, for example, if in Section 1, Congress defined the legacy to be preserved as “*identical* in quantity and quality to the existing stock of resources,” then Section 3 would impose a corresponding prohibition on any action that may degrade or deplete public natural resources at the end of the legacy period, with perhaps a *de minimis* exception. In contrast, if the affirmative vision embraced in Section 1 is a legacy of resources that are

not “*substantially* diminished in quality or quantity” from those we have today, then Section 3 would prohibit actions that may “*substantially* diminish the quality or quantity” of public natural resources over the course of the legacy period.

Whatever standard is chosen, it is important that the standard be articulated by Congress in clear and operational terms. To the extent possible, the statute should provide clear guidance on the quantitative and qualitative measures of depletion and degradation of resources that will be permitted.⁴² Because there has not been meaningful public debate on the precise contours of the legacy that we as a society want to leave our children, it would be premature to assume the precise value choices that such a statute should embody. However, public debate surrounding the enactment of NELA would provide an important occasion to crystallize public sentiment on precisely what we want our legacy to be and to resolve this question. The statute would then be drafted to ensure that we preserve that legacy. If our vision of the appropriate legacy subsequently changed, the law could be amended to reflect that change.

This report proposes one standard as a starting point for discussion, mindful that the standard represents a particularly important public value choice and without the intent to preempt that choice. In light of the broad public support for the concept that we should leave our children at least as well off as we ourselves are, debate might **appropriately begin with a presumptive standard of sustainable use of public natural resources**. Sustainability’s most basic justification is intergenerational equity: a desire that present development not compromise the ability of future generations to meet their needs.⁴³ Inherent in a commitment to sustainability is the requirement that goals for economic development, social development, peace and security, and natural resources protection should be met for both present and future generations.⁴⁴

Therefore, this report proposes a standard that prohibits *any* degradation or depletion of covered renewable resources over the legacy period. For nonrenewable resources, selecting a standard would involve more complex tradeoffs. We propose a standard that prohibits *significant* degradation or depletion of nonrenewable resources, a standard that would require considerable further elaboration. But the idea would be to allow some draw down of these resources, perhaps an annual percentage of permissible depletion. These standards seek to balance the needs of the present and future generations. Therefore, the standard for nonrenewable resources is less restrictive than the strict standard of sustainable use that applies to renewable resources, but both leave the legacy of public natural resources largely intact.⁴⁵

Baseline Information and Metrics (Section 5)

As envisioned, the Legacy Act depends upon our ability to assess the quality and quantity of the existing stock of public natural resources now and in the future. Therefore adequate provision for collection of baseline information and ongoing monitoring is critical to the

Act's success. However, an open-ended demand for information on the quality and quantity of public natural resources could prove an endless and excessively costly quest.

Therefore, the Legacy Act should be drafted to incorporate the use of metrics to serve as shorthands for assessing the quantity and quality of resources.⁴⁶ These metrics should be short and concise measures, selected by an independent body of experts, addressing the most important issues, and focusing on outcome rather than output. The metrics would be selected to assess the status of resource quantity and quality in place of comprehensive information. Metrics would provide guidance on the baseline information to be collected and define the parameters for ongoing monitoring of public resource quantity and quality. Developing such metrics poses a challenge, but agencies have developed a wealth of expertise implementing NEPA and the various resource management and protection statutes, and much academic expertise could be brought to bear on the task.

In addition to developing metrics for assessing the quality and quantity of legacy resources, agencies will need to develop measures to assess the resilience of relevant ecosystems and to collect relevant data. Data concerning the resilience of ecosystems will provide stewardship agencies with information on the range of conditions within which the resources, values, and services associated with the ecosystem will persist.

To ensure that the best available scientific and economic methods are employed in developing metrics and in resource planning, Congress should include a mandate to convene an interdisciplinary committee of experts to help develop the metrics. This could follow the model of the Committee of Scientists that was created to develop regulations under the National Forest Management Act or entail a broader undertaking modeled after the Intergovernmental Panel on Climate Change or the Millennium Ecosystem Assessment. Under either model, the goal would be to bring together scientists to assess the state of knowledge and determine if consensus exists on how best to assess the quantity and quality of various resources, given the state of knowledge and available analytic methods. Such a committee could be reconstituted every five to ten years to revisit the methodologies and information demands under NELA, to ensure that the most up-to-date techniques are employed on an ongoing basis.

NELA's information demands should also be designed with an eye to maximizing the transparency and usefulness of the information. Thus, drafters should seek to structure information demands and analysis so that state and local decisionmakers, as well as interested advocates for the public interest can benefit from the information generated. To maximize transparency, the statute should make the information easily and broadly accessible. For example, the statute could mandate that relevant baseline information and updated monitoring data be made accessible on each stewardship agency's website. Ensuring that the data generated under NELA is publicly available and in a form that is readily usable would promote transparency and could enhance the quality of decisionmaking not just by federal agencies, but by state and local governments and private enterprise as well.⁴⁷

Whatever information demands and analytic techniques are ultimately adopted, assessment and monitoring under NELA would have associated costs. But the monitoring would enable the type of adaptive learning that would permit us to make better and better decisions as a society over time, as our base of data grows. Indeed this information collection and analysis would very likely prove less costly than the far less helpful but prevalent demands imposed by cost-benefit analysis.⁴⁸

The Role of Stewardship Agencies (Sections 4, 5, 6, 7, 8 & 9)

The Legacy Act seeks to build upon the expertise and existing administrative structure of resource management agencies within the federal government. Thus it envisions designation of a single agency to serve as the “stewardship agency” for each resource covered by the Act and for all the values and services associated with the relevant resources. As noted above, we recommend assigning this responsibility presumptively to the federal agency already charged with management of the resource, unless circumstances indicate this would not be appropriate or desirable. Most resource management agencies’ jurisdiction under current law is geographically bounded – that is, the National Park Service (NPS), for example, has jurisdiction over resources in the geographic areas defined as national parks. NELA should presumptively build on this structure and assign the NPS, for example, to serve as the stewardship agency for all public natural resources found within the national parks over which they already have jurisdiction under current law. While there might be exceptions where a different agency might have greater expertise that should be drawn on, this would provide a logical starting point for assigning stewardship agencies and would be the most efficient approach.

The Act envisions a number of duties that accompany designation as a stewardship agency:

- promulgation of rules designating metrics of resource quality and quantity;
- collection of baseline information about the quality and quantity of the resource and ecosystem resilience;
- ongoing information collection;
- promulgation of rules defining what constitutes impermissible degradation or depletion of the relevant resource in terms of the selected metrics;
- development and periodic updating of a plan that ensures that the legacy resource will not be impermissibly depleted or degraded over the legacy period;
- compliance with the plan; and
- avoiding and preventing actions that impermissibly degrade or deplete the resource.

In addition to these duties, the statute also provides the stewardship agency and citizens with enforcement authority.

Thus, the stewardship agencies play a central role in implementing the Act and ensuring preservation of the resource legacy. Some of the duties imposed under a Legacy Act may complement the agencies' duties under existing law. Others would directly conflict with and therefore modify their existing duties. The most important instances in which the Legacy Act duties would conflict with and should modify and supersede agency duties under existing statutes are the provisions that prohibit the agency from impermissibly depleting or degrading the resource (Section 3), and require the agency to conform its actions to the legacy plan it develops (Section 7). For a Legacy Act to be effective these mandates must override agency discretion afforded under other resource management laws, acting as a check on agency actions and inactions that would cause impermissible depletion or degradation of the resource.

Coping with Uncertainty (Sections 3, 7, 8, 10, and 11)

The obstacles that uncertainty creates for protecting natural resources, health, and safety under existing statutes is well documented.⁴⁹ Many environmental regulatory statutes require that an agency provide a specified measure of proof of harm before regulatory constraints are imposed. When the burden to prove harm falls on the agency seeking to regulate potentially harmful actions, the inevitability of incomplete and uncertain information can act as a significant impediment to regulation. The difficulty society faces in coping with scientific uncertainty and the value of a precautionary approach is manifest in the experience of formulating a policy response to global warming. Policy development was substantially delayed by a prolonged period in which the views of a few scientists on the margin of the scientific community were cited as sufficient evidence of uncertainty about the cause of global warming to make delay the only reasonable course of action.⁵⁰

Given the purposes of the Legacy Act and our experience under existing law, it is essential that the Legacy Act's prohibition be framed to adopt a precautionary approach.⁵¹ Thus the statute should place the risk created by uncertainty on the party who wishes to deplete or degrade resources. All doubts should be resolved in favor of preserving the resource. Therefore, Section 3 of the statute should be framed to prohibit any person from taking any action that *may* cause impermissible degradation or depletion of any legacy resource, or employ similar or even more precautionary language. In contrast, in granting an exception pursuant to Section 11, doubt should be resolved *against* granting the exception. The statute should also make explicit that any doubt created by inadequate or uncertain information under any section of the statute should be resolved in favor of protecting the legacy, because uncertainty will frequently limit our ability to predict impacts.

Exceptions (Section 11)

NELA should allow for the possibility that the public interest will be better served in some instances by degrading or depleting a resource today provided that mitigation can be and is undertaken to offset the lost values.⁵² Therefore, as described above, the statute

should allow for a narrow exception to its prohibition on degradation or depletion in two circumstances. An exception to the prohibition should be allowed if it can be shown by clear and convincing evidence that:

1. foreseeable technological advances or the availability of substitute resources will obviate the need for or value of the resource in question; or
2. the action that will cause impermissible degradation or depletion is clearly in the public interest; and
 - a). no acceptable alternative that will not cause impermissible degradation or depletion exists that will serve the public interest adequately; and
 - b). the impacts to the services and values to be impaired can and will be mitigated.

This provision allowing exceptions could operate in two different contexts under the statute. First, it might apply in the context of an agency's duty to develop rules under Section 6 of the statute that ensure no impermissible depletion or degradation of a particular resource. In this context, the agency would be permitted to demonstrate in the rulemaking record by clear and convincing evidence that either prong of the exception is met as to a particular resource or value. If it did so, the statutory mandate for developing a plan to preserve the resource or value would be modified to the extent the evidence warrants, and the agency rules could deviate from the statutory mandate to that extent. In that case, agency plan and rules that deviated from the statutory mandate in Sections 1 and 3 could nonetheless be found to be in compliance with the Act under the exception.

The second context in which an exception might be available would be as a defense to an enforcement action. A person subject to enforcement for impermissible degradation or depletion could defend against enforcement if the person could demonstrate by clear and convincing evidence that either prong of the exception is met as to the action giving rise to the enforcement.

An exception permitting resource degradation or depletion under either prong of Section 11 should be extremely rare in cases in which the affected values include aesthetic, spiritual, or other hard to monetize values, or where endangered species or pristine areas would be affected. By definition, mitigation of such losses or creation of such values is extremely difficult and substitutes are often not available for non-economic services and values. Where the only values or services affected are of the sort frequently traded and valued in markets, the possibility of mitigation would be more realistic and thus an exception more likely to be allowed.

In seeking to claim an exception, the proponent would bear the burden of proof on all elements. Unlike many pollution control statutes, the burden of amassing adequate proof should work in favor of conservation rather than depletion or degradation. This burden should provide a sufficient disincentive to proponents that exceptions would be pursued only in cases in which the benefits were substantial and the degradation of resources limited to effects that are relatively easily assessed and mitigated.

Monitoring and Adaptive Learning (Section 10)

A major criticism of NEPA's use of information is the limited one-time use of information to inform a single decision. This limits the value of the information collected, and precludes adaptive learning. To ensure that we can learn from the experience gained during the legacy period, the Legacy Act should require ongoing monitoring of all resources covered under the Act and regular updating of legacy plans by stewardship agencies. This would in turn provide data to help agencies and the public to make informed decisions in the future and to assess whether past analyses were accurate. Post-decision monitoring would also permit adaptive responses in cases in which unanticipated impacts occur, and would thus facilitate adaptive learning.⁵³

Case Studies: NELA in Action

This section will detail the hypothetical application of NELA to two particular public natural resources: one an example of an energy resource, and the other a biodiversity resource. These case studies will illustrate how the contours and key attributes of the Legacy Act would operate in context, and demonstrate how outcomes would differ were NELA enacted. Examination of NELA's application to energy and biodiversity in particular will provide insight on how the statute will apply to resources that provide divergent values and services to humans. Energy resources such as oil and gas reserves underlying public lands provide humans with primarily economic value. Conversely, although some arguments for preserving biodiversity focus on services that may be subject to quantification (for example, the potential of species to yield chemical compounds useful in the treatment of disease), many focus on moral, ethical, aesthetic, spiritual, and recreational values. NELA will apply to the full range of public natural resources, ensuring an appropriate legacy of each. As will be demonstrated by this exploration, however, NELA's application will adapt to the particular resource and the values it provides.

Energy

The energy resources that NELA would seek to conserve as a legacy consist primarily of the nonrenewable energy-rich materials under public ownership or management—materials such as oil, oil shale, coal, and natural gas. The conservation of these resources is important as they make up a key component of the nation's energy portfolio. However, the extraction and use of energy resources has implications for other public resources, such as the biodiversity, water, and air on public lands. And in a much broader sense, how the United States uses energy—both from publicly-owned resources and from private and foreign-owned sources—has major economic, geopolitical, and environmental implications for future generations. Thus, NELA's concern for the legacy created through extraction of energy resources must extend not only to the sustainable management of publicly-owned energy resources but also to the impacts of those resources' extraction and use on other resources, with regard for the impact of the nation's energy policy on the economy, international politics, and the environment.

According to the Energy Information Administration, the United States produces about 194 billion barrels of crude oil, 1,043 cubic feet of natural gas, and 1,145 million short tons of coal annually.⁵⁴ Energy resources in public ownership or management are crucial to meeting the nation's energy needs and will continue to be so. Onshore and offshore federal lands account for 30 percent of U.S. domestic energy production.⁵⁵ Specifically, 8 percent of the country's natural gas and 5 percent of its crude oil are produced on onshore federal lands, while 26 and 25 percent of its crude oil and marketed gas, respectively, are derived from federal offshore areas.⁵⁶ Additionally, the Bureau of Land Management estimates that federal lands contain approximately 68 percent of all undiscovered U.S. oil reserves and 74 percent of undiscovered natural gas.⁵⁷ On the Outer Continental Shelf alone, there is an

estimated 114 billion barrels of oil.⁵⁸ Federal lands are also being increasingly utilized to capture renewable sources of energy, such as sun, wind, and biomass; consider for example that the Bureau of Land Management currently has over 600 installations of photovoltaic systems that generate 177 megawatt hours of electricity a year.⁵⁹

Most of the energy resources under federal ownership exist under the jurisdiction of the Department of the Interior, which has management and resource protection responsibilities for about 450 million acres of onshore lands and three billion acres on the Outer Continental Shelf.⁶⁰ Most of the Department's onshore energy resources are managed by the Bureau of Land Management (BLM), which is responsible for more than 264 million acres of public lands and more than 560 million acres of subsurface mineral resources. Offshore resources are managed by the Department's Minerals Management Service. In total, approximately a third of the nation's natural gas, coal, and oil energy, as well as half of its geothermal energy, 17 percent of its hydropower, and 8 percent of its wind power are produced in areas managed by the Department of the Interior.⁶¹

The DOI and its component agencies are governed by a number of laws and regulations that dictate the nature of energy extraction on federal lands. These same agencies are also responsible for implementing other laws which impose management priorities for these lands such as environmental conservation and recreational use by the public, which may conflict with energy extraction. Additionally, the energy resources on public lands exist within the broader context of the nation's energy policy—which is by no means a comprehensive or coordinated whole—and have an important role within that policy.

Specifically, the extraction of energy resources on federal lands is allocated by the government through several leasing systems.⁶² The leasing, exploration, and development of coal on public lands are governed by the Federal Coal Leasing Amendments Act (FCLAA) of 1976, codified at 30 U.S.C.A. §§ 181-287. The Outer Continental Shelf Lands Act of 1953 (OCSLA), as amended in 1978, 43 U.S.C.A. §§ 1331 to 1343, governs the lease of offshore oil and gas resources. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA), 30 U.S.C.A. §§ 188, 195, 226, governs the lease of onshore oil and gas. Geothermal resources are governed by the Geothermal Steam Act (GSA) of 1970, 30 U.S.C. §§ 1001-1027.

These statutes vary in their approach to regulating resource extraction. For coal, the FCLAA requires competitive bidding for all new leases, encourages the diligent development of coal leases and the economic recovery of coal, and attempts to assure that the federal government obtains fair market value for future coal leases.⁶³ The Secretary of the Interior has discretion whether or not to lease coal (though coal leasing has been largely stagnant since 1976).⁶⁴ In addition, the FCLAA requires the Secretary of the Interior to develop comprehensive land use plans for all coal lands under the Department's jurisdiction.⁶⁵ In these plans, the Secretary must consider both the amount of coal deposits available and the effects of the proposed mining upon the community and the environment.⁶⁶ But the

plans do not affect the Secretary's discretion to lease coal lands and there is no mandate proscribing the leasing of coal lands in any given circumstances.⁶⁷

For offshore oil and gas, the OCSLA requires the Secretary of the Interior to prepare an overall leasing plan and mandates comprehensive environmental reviews throughout the leasing process.⁶⁸ However, in recent years offshore drilling has been limited over most of the Outer Continental Shelf because of legislative moratoria continually enacted from 1982 to 2007 through the annual Interior Appropriations bill.⁶⁹ In September 2008, Congress allowed the moratorium to expire.⁷⁰ For onshore oil and gas, under FOOGLRA the Secretary of the Interior may lease lands "known or believed to contain oil or gas deposits."⁷¹ The statute requires that all new leases be offered in competitive bidding. Evaluation of environmental impacts of oil and gas lease operations is less clear under FOOGLRA, and BLM has fought in the courts to avoid conducting assessments.⁷² Beyond these energy resource development-focused statutes, resource extraction on federal lands is also subject to federal statutes such as FLPMA, NEPA, MUSYA, SMCRA,⁷³ other pollution control legislation, and the ESA, where applicable.

Several recent statutes recognized the importance of federal energy resources for the nation's overall energy policy. The Energy Policy and Conservation Act of 2000, Sec. 604 (as amended by the Energy Policy Act of 2005, Sec. 347) requires DOI to consult with the Departments of Agriculture and Energy to conduct an inventory of energy resources on onshore federal lands and identify any "restrictions or impediments" to their use. The Energy Policy Act of 2005, Sec. 357 requires DOI to conduct a comprehensive inventory of offshore oil and gas resources and to "identify and explain how legislative, regulatory, and administrative programs or processes restrict or impede the development of identified resources and the extent that they restrict domestic supply."

Failure of Current Law to Ensure a Resource Legacy

In general, the United States' energy production and consumption are vast and growing. As of 1999, the nation accounted for over a fifth of worldwide consumption.⁷⁴ Industry uses the most energy in the United States, followed by transportation, private residences, and commerce.⁷⁵ In 2007, Americans consumed 101.600 quadrillion Btu of energy, most of which—88.284 quadrillion Btu—came from fossil fuels (as opposed to renewable energy sources); by 2020, that consumption is projected to rise to 127 quadrillion Btu.⁷⁶

According to the U.S. Department of Energy, by 2020 coal usage is expected to increase by 45 percent, oil consumption by 58 percent, and natural gas by 93 percent.⁷⁷ Absent significant increase in the use of renewable resources, the United States' increased energy consumption will put a drain on nonrenewable resources and increase dependence on foreign sources of energy. This increased dependence comes at a time when the number of vehicles worldwide is expected to double from the 2006 level of 850 million, to 1.7 billion by 2030.⁷⁸ Furthermore, unless measures are taken to reduce carbon dioxide emissions,

the Department of Energy projects that by 2020, U.S. energy-related carbon dioxide emissions will exceed 2 billion metric tons of carbon (7.5 billion tons of gas), 33 percent more than 2000 level emissions.⁷⁹ Meanwhile, the need for alternative fuel sources will grow exponentially as the World Energy Council predicts that oil production will peak by 2022.⁸⁰

Increased worldwide and U.S. demand for energy highlight the need for sustainability as resource supplies from all sources, including from public lands, become stressed. Since 1999, oil and gas drilling on federal public lands has increased by 260 percent.⁸¹ Between 2002 and 2007, the number of drilling permits increased from 3,802 to 7,561.⁸² While industry-backed interest groups often argue that opening more federal lands to energy development—in western states, in the Arctic National Wildlife Refuge, on the Outer Continental Shelf—is necessary to meet America’s security and energy needs, the lands that have been leased are not being efficiently used. Consider that of the 47.5 million acres of on-shore federal lands that are currently being leased for oil and gas development, only about 13 million acres are actually in production; similarly, only 10.5 million of the 44 million leased acres offshore are currently producing oil or gas.⁸³ Beyond the fact that energy companies prefer to identify new leasing sites that may be cheaper to develop, the significant political pressure exerted upon government by industry and its lobbyists to open more lands to energy extraction may also reflect the reality that proved reserves can greatly add to an energy company’s stock prices, even if those reserves are not in production.⁸⁴ Whatever the reason, opening additional lands to production represents a commitment of public lands that drastically changes their current use and value and the legacy they represent.

Oil and gas extraction can have devastating impacts on surrounding lands, from exploration through drilling, transport, and abandonment of wells.⁸⁵ According to the Environmental Working Group, the most common exploration technique—seismic exploration—can cause soil damage and water seepage; drilling preparation often requires road building and the clearing and leveling of large landscapes for the installation of heavy equipment; drilling often causes noise, air, and water pollution, as well as large consumption of groundwater; and abandoned wells can cause oil and gas to leak into groundwater supplies and contaminate them.⁸⁶

It appears that, like NEPA’s procedural requirements, laws such as FCLAA and FOGLRA require informed decision-making but ultimately lack clear mandates that require use of energy resources as part of a sustainable energy policy and prohibit impacts of energy development that may preclude other uses of public land and degrade non-quantifiable values. As a result, it appears that the BLM may often waive environmental protections to allow for energy development. One BLM field office in Wyoming granted at least 251 exceptions to protections for wildlife between September 2002 and July 2003, while another field office reported granting 66 exceptions to protections for wildlife over a one-year period.⁸⁷ Significant effects upon wildlife have been observed. One study recorded a more than 40 percent decline in mule deer populations where oil and gas development occurred in the species’ winter range in Wyoming.⁸⁸ In another example, coal bed methane product

water has been found to dramatically affect water chemistry and fish populations in the Tongue River watershed in Montana.⁸⁹

Renewable resources—while avoiding many of the negative consequences of oil, gas, and coal—have costs of their own and may have negative impacts on public lands that need to be taken into account. Renewable-energy projects often take up more land than conventional sources, and wildlife behavior is often altered by wind and solar transmission-line towers.⁹⁰ As the nation seeks to produce more clean energy, these impacts must be taken into consideration.

The foregoing reveals that in addition to the need to conserve energy resources on public lands for future generations, both current and future use of the resources can become more efficient and less damaging to other public resources. And in light of the negative effects of oil, gas, and coal upon surrounding areas and the global climate, alternatives need to play a more prominent role in meeting the nation's energy needs.

Ensuring a Resource Legacy: NELA and Energy

NELA has the potential to address each of the problems. Primarily, it would serve to sustain the supplies of energy resources on federal lands, ensuring that resource quantity and quality are preserved over a consciously selected time horizon. But the resource legacy implicated by energy extraction on public lands also includes the fate of other public resources and the nation's energy policy as a whole (and consequently its impacts on the global economy, climate, and geopolitical landscape). Both directly and indirectly NELA would provide a framework for conserving energy supplies and ensuring sustainable energy extraction and use while meeting the growing energy needs of the nation. NELA would be a key component of a comprehensive and coordinated national energy policy that meets national demand and addresses such externalities of energy production and consumption as global climate change and international conflict.

NELA guards against impermissible depletion of each energy resource under public ownership or management. To ensure that publicly owned energy resources—which currently account for about 30 percent of U.S. domestic energy production—continue to be available to fulfill their important contribution to the nation's energy portfolio, NELA would set forth in clear and enforceable terms the maximum level of depletion for nonrenewable resources such as oil, gas, and coal (Section 3). Actors—including the federal government, the states, and private corporations—would be prohibited from exceeding this maximum level of depletion in their activities. In this way, NELA's restrictions on depletion would serve as an umbrella under which the federal leasing regimes must operate. For example, the discretion to lease lands that the Secretary of the Interior currently enjoys under FCLAA and FOGLRA would be limited by the maximum levels of depletion allowed for coal, oil, and gas.

As energy resources are physically intertwined with the land on and under which they exist, analysis of energy resource development activities under NELA would also take account of impacts on other resources, such as biodiversity. Extraction activities would be proscribed if they impermissibly depleted or degraded other NELA resources, such as a wildlife species. NELA would restrict the discretion given to the Secretary of the Interior and BLM to proceed with environmentally unsound practices. By curbing the unsustainable depletion of some resources, NELA would promote the sustainable exploitation of others, including energy from the sun, wind, water, and biomass, provided they don't otherwise impermissibly impair other components of the public resource legacy. More renewable energy production on public lands would mean less production of fossil fuels, both on and off public lands.

The two exceptions in NELA's Section 11 hold implications for energy resources. The first exception—which allows for depletion in excess of permissible levels “if it can be shown by clear and convincing evidence that...foreseeable technological advances or the availability of substitute resources will obviate the need for and value of the resource in question”—would permit depletion in cases where technological or other advances make preservation of particular energy resources no longer necessary. This would encourage the development of alternative technologies, such as those for harnessing renewable resources, among companies whose current business depends on development of nonrenewable resources. Clear and convincing proof that alternative technologies will provide an alternative to fossil fuels within the legacy period would trigger the exception that would allow depletion of fossil fuels, for example, in excess of the predetermined permissible level. Thus, the Legacy Act provides an economic incentive for traditional energy companies to become, invest in, or partner with leaders in alternative energy supply. The exception is designed to be available only in circumstances where there is no longer a need to include a particular economic resource in the legacy.

The second exception under NELA Section 11 allows for greater degradation or depletion of a particular resource if “impermissible degradation or depletion is clearly in the public interest, no acceptable alternative that will not cause impermissible degradation or depletion exists that will serve the public interest adequately, and the impacts to all services and values to be impaired can and will be mitigated.” This exception could be invoked in the event of economic or geopolitical factors that warrant depletion for the public interest. However, in such a case, NELA requires that the impermissible degradation be mitigated. The outline of the statute does not provide a detailed scheme for mitigation, but the concept requires that the proponent of degradation or depletion of the resources in excess of permissible levels must provide suitable mitigation to offset these losses in some form. Mitigation of the depletion of a nonrenewable resource could, for example, require contribution to a public fund dedicated to renewable energy development. For impacts to other resources, such as biodiversity, mitigation would also be required. Because of the difficulty of mitigating harm to certain types of non-monetizable values, degradation of unique geological features, pristine wilderness areas or other irreplaceable values would still be highly unlikely under

NELA. Thus this exception provides only a limited exception to protect the public interest in exceptional circumstances.

NELA in Action: Improved Outcomes

Two recent episodes that occurred during the political transition from the Bush Administration to the Obama Administrations highlight the inadequacies of current leasing laws and the federal agencies charged with implementing them. First, in November of 2008, the BLM authorized the sale of new oil and gas leases on 360,000 acres of public land in Utah.⁹¹ Although the BLM conducted a series of environmental reviews under various environmental laws (including the Endangered Species Act, the National Environmental Policy Act and the National Historic Preservation Act), the National Park Service was not consulted even though much of the leased land would have been located in close proximity to Dinosaur National Monument, Arches National Park, and Canyonlands National Park, among others.⁹² The National Park Service expressed concern over the impacts that the energy development would have on air, water, and wildlife within the parks and protested the insufficient opportunity for review that it was given.⁹³ Bowing to political and public pressure, the BLM removed 38,000 of the most hotly contested acres from consideration for leasing in December 2008.⁹⁴ The remaining acreage was pulled out of consideration for leasing in January 2009 by a temporary restraining order issued by a federal judge, who ruled that insufficient environmental analysis had been performed by the BLM.⁹⁵ In February, the Department of the Interior's new Secretary cancelled the oil and gas leases, citing inadequate environmental review.⁹⁶

Also in November 2008, the BLM issued new regulations to commercially develop oil shale deposits that exist on almost two million acres of public lands in Colorado, Utah and Wyoming.⁹⁷ Then, on January 14, 2009, just six days before the Bush Administration left office, the BLM announced it was seeking nominations of parcels up to 640 acres in size for oil shale research and development lease agreements. These decisions were controversial for both substantive and procedural reasons, as critics argued that the oil shale development plans did not allow adequate time for public comment or administrative challenges and that oil shale is generally an environmentally-damaging source of energy.⁹⁸

A largely untapped and controversial energy resource, oil shale exists mostly under U.S. federal ownership: more than 50 percent of the world's supply of oil shale is in the United States and 72 percent of that amount is owned by the federal government.⁹⁹ The world's largest oil shale deposits are in and around the Green River, mostly in Utah. The BLM estimates they contain 1.5 trillion barrels of oil. But the extraction of oil shale is

environmentally costly as current extraction technology requires vast amounts of energy and water to remove oil from sedimentary rocks in a process that emits far more carbon dioxide than most other refining operations.¹⁰⁰ One study found that the equivalent of five coal-fired power plants would be required to produce the power needed to heat enough oil shale to produce just 100,000 barrels of oil a day.¹⁰¹

As with the Bush Administration's "midnight" oil and gas leases, the new Secretary of the Interior withdrew the proposals for research and development leases of oil shale lands in February 2009. He cited inadequate preparation on the part of his predecessors but promised to resume solicitation for a new round of leases once a more deliberate process had been undertaken.¹⁰²

The "midnight" activity of the Bush Administration's BLM related to energy production on federal lands highlights several inadequacies of current law and the ways in which NELA would address these. Although the actions of courts, public interest advocates, and a new administration together prevented the depletion and degradation that would have occurred had the proposed energy development gone forward, the discretion allowed under current law does nothing to prevent the depletion and degradation from occurring in the future. Most importantly, the development of nonrenewable resources on environmentally sensitive land when current leases are underutilized is a poor allocation of public resources. NELA would effectively prioritize among energy sources and potential lands to be leased. NELA's focus on preserving a legacy of public natural resources would favor the development of renewable resources and avoiding development on environmentally sensitive lands.

Biodiversity

Biological diversity provides an interesting subject for a case study of how a National Environmental Legacy Act will operate for several reasons. First, the alarming rate of depletion of this resource amply demonstrates the need for a new policy that will protect the resource for future generations. Second, humans value biodiversity for a wide range of reasons – from its utilitarian value as a food source, provider of ecosystem services, and source of scientific discovery, to its aesthetic, symbolic, and spiritual values. Third, because of the complexity of species and ecosystems, the manner in which both intrinsic and extrinsic factors affect biodiversity is unique and distinct from any other resource. Thus, biodiversity provides an opportunity to demonstrate how NELA may improve upon current law to better protect a legacy resource, how NELA may protect a wide range of values, and how NELA may address complex systems in the face of major changes such as continued human development and climate change.

An attempt to define the resource of biodiversity reveals the complexity that distinguishes it from other resources. The 1992 International Convention on Biological Diversity defines the term *biological diversity* as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of

ecosystems.”¹⁰³ Thus, biodiversity as a whole encompasses a vast multitude of subspecies, species, and ecosystems. Additionally, natural processes such as speciation and ecological succession result in a constantly changing biodiversity. In this way, the legacy owed to future generations includes not only the biodiversity that currently exists, but also what that biodiversity is naturally becoming.

According to the World Resources Institute, U.S. biodiversity consists of about 19,000 species of plants and 428 species of mammals, 508 of birds, 360 of reptiles, 283 of amphibians, and 1,101 fish.¹⁰⁴ This biodiversity is protected at the federal level primarily by the Endangered Species Act (ESA) and at the state level by a potpourri of state endangered species laws and non-regulatory State Wildlife Action Plans. While an important piece of legislation and, in many ways, a successful one, the ESA provides protection only for species that are listed as threatened or endangered, and not for the broader array of species that comprise biodiversity. The ESA’s strengths and shortcomings will be discussed below, to identify the ways in which NELA can enhance outcomes under current law.

Failure of Current Law to Ensure a Resource Legacy

The inadequacy of current law is demonstrated by the current rates of species depletion and the continued existence of major threats. World Wildlife Fund’s Living Planet Report 2008 cites five direct, anthropogenic threats to global biodiversity: habitat loss and fragmentation, overexploitation (particularly due to fishing and hunting), pollution, the spread of invasive species or genes, and climate change.¹⁰⁵ This final threat is especially alarming because of the profound impacts to biodiversity that it threatens. Already, two serious problems have been observed at the species level as a result of climate change: “(1) changes in phenology (timing of seasonal events); and (2) changes in distribution of wildlife (most notably, the disappearance of northern hemisphere wildlife species from the southern portions of their ranges and from lower elevations).”¹⁰⁶

Globally, since 1970, biodiversity has declined in each type of biome and across each of the earth’s biogeographical realms.¹⁰⁷ According to many biologists, human activity has set off a mass extinction that includes the disappearance of 30,000 species a year, a rate that is 1,000 to 10,000 times higher than the background rate at which species naturally go extinct because of evolutionary forces.¹⁰⁸ In the United States, 948 species of animals and 244 species of plants are listed as endangered, critically endangered, or vulnerable on the International Union for the Conservation of Nature’s (IUCN) Red List of Threatened Species.¹⁰⁹ The list also contains 278 species of animals and 23 species of plants designated as “near threatened.” On a large portion of the public lands of the United States, biodiversity is threatened by practices such as livestock grazing and oil drilling, which are authorized by the federal government and primarily benefit private interests.¹¹⁰ Even within national parks—where such commercial activity is prohibited—biodiversity is negatively affected by external factors such as air and water pollution, depletion of water supplies,

climate disruption, and invasive species, problems which lead to loss of plant and animal habitat and loss of wildlife migration paths, among other things.¹¹¹

The United States lists threatened and endangered species of animals and plants in an attempt to prevent extinction. Section 3 of the ESA defines an endangered species as a “species which is in danger of extinction throughout all or a significant portion of its range . . .” and a “threatened species” as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Section 4 charges the wildlife agencies with the responsibility of determining whether species are threatened or endangered, and with designating critical habitat for any species so determined. (The ESA gives jurisdiction over terrestrial and freshwater species to the U.S. Fish and Wildlife Service (FWS) within the Department of the Interior, and jurisdiction over marine and anadromous species to the National Marine Fisheries Service (NMFS) within the Department of Commerce.) Once determined to be threatened or endangered, the wildlife agency must develop a recovery plan for a listed species (Section 4) and all persons subject to the jurisdiction of the United States must refrain from a number of prohibited acts in relation to the species (Section 9). All federal agencies proposing to take actions that may adversely affect a listed species are required to consult with FWS and/or NMFS as appropriate, to ensure their actions are not likely to jeopardize the species. A listed species can be delisted or downlisted based on the Department’s determination that less protection is needed.

The ESA has been called both a success and a failure and has critics on both ends of the political spectrum. It appears that the Act has been successful at slowing the rate of extinctions that occur in the United States¹¹² and has succeeded in stabilizing or improving the population levels of as many as 41 percent of listed species.¹¹³ Species that have rebounded from the brink of extinction because of the Act include the bald eagle, the Florida panther, and the Karner Blue Butterfly.¹¹⁴ However, while the ESA has achieved some success protecting species once they are listed as threatened or endangered, it has been criticized as providing too little protection, too late. As one commentator has noted, “[t]he ESA is the only federal statute designed to protect the national resource of biological diversity by protecting the species that constitute that diversity, and it is only a statute of last resort—the final safety net for many species and a safety net with a number of holes, at that.”¹¹⁵ Another commentator observed that “species typically are not listed until their populations have been greatly reduced...[and] they often require a long time to rebound.”¹¹⁶

To illustrate the shortcomings of the ESA’s last resort approach, consider that since the statute’s passage in 1973, only 16 species have been delisted because of successful recovery, while nine species have been delisted because they became extinct. Besides the structural flaw of only providing protection to species once healthy populations have been largely depleted, the ESA has been criticized for its procedural inefficiencies, such as the resource-intensive processes of species listing and critical habitat designation. Recently, FWS has listed an average of fewer than nine species per year, creating a large backlog of listing

decisions. Additionally, of the 1,311 species listed, critical habitat has been designated for only 543 species and recovery plans have been created for only 1,063. Another major critique of the ESA focuses on its species-by-species approach. Many scientists advocate for ecosystem-based approaches that are more efficient than the current practice of listing and recovery planning, especially in light of major threats such as climate change, which could wipe out as many as 30 percent of all species on Earth.¹¹⁷

Besides the ESA, other federal laws such as FLPMA and NFMA include biodiversity protection as one of several goals. But as explored earlier in this report, these statutes provide the relevant natural resource management agencies with wide discretion to balance biodiversity against competing uses. Often, the result is that the agencies utilize this discretion in ways that prioritize the competing uses, to the detriment of biodiversity.

In sum, current law takes a mostly reactive approach to species preservation, with the result that species are allowed to become threatened or endangered before receiving adequate legal protection and are then subjected to difficult and lengthy recovery efforts. While the ESA and other federal and state laws aimed at protecting biodiversity are crucial tools in the struggle against extinction, it is clear that more is needed in order to adequately protect the resource of biodiversity. If the legacy owed to future generations includes maintaining healthy populations of species and subspecies, communities of species (within ecosystems), and ecosystems, additional authority is needed to conserve the qualities and quantities of biodiversity, as well as the processes such as speciation that change these qualities and quantities over time. Experience demonstrates that waiting until species become threatened and endangered and then attempting to restore them with flawed and inefficient processes cannot secure this legacy.

Ensuring a Resource Legacy: NELA and Biodiversity

Experience under the ESA suggests that a key goal of a Legacy Act must be to protect biodiversity at its highest point (healthy species and ecosystems), not its lowest (threatened and endangered species and degraded ecosystems), in order to adequately preserve the resource. As with all resources covered by NELA, a baseline of the resource to be preserved (here the entire array of biodiversity within the statute's reach) must first be established, and degradation of the resource beyond that baseline prohibited. In this way, NELA would complement and supplement existing law, not amend or replace it. Laws such as ESA and FLPMA – as well as state statutes and regulations – would continue to operate as they currently do, but NELA would impose additional responsibilities upon stewardship agencies (and empower the public to ensure agencies' compliance by filing citizen suits when necessary), in an effort to protect biodiversity to a greater extent. NELA would only supersede existing law where existing law would allow impermissible degradation or depletion of the resource. Significantly, NELA would impose strict mandates prohibiting the stewardship agencies from impermissibly depleting or degrading the biodiversity

resources, thus removing some of the discretion the agencies currently enjoy under laws such as FLPMA and NFMA.

Although NELA would not amend the ESA (or any other statute), it would essentially add a third category (to threatened and endangered) that species may fall into in order to merit protection. This category would represent a state of stability and sustainability to be maintained, rather than degraded states to be recovered. In addition to determining a baseline to be protected for each individual species, NELA would take a more holistic, ecosystem-based approach by protecting communities and ecosystems, taking into account all of the ecological factors that determine the health of a species (habitat, food and water supplies, climate, predation, competition, and so forth). With regard to NELA Sections 3, 5, 6, and 7, conservation biology and other relevant disciplines would be utilized to determine the qualities and quantities to be preserved, and the maximum level of degradation allowed for the biodiversity resource. The key aim of these sections would be to preserve biodiversity at a sustainable level, rather than to restore degraded species and ecosystems. Once the qualities and quantities of the various aspects of the biodiversity resource have been scientifically defined, Sections 3, 6, and 7 will operate to prevent depletion and degradation of the resource.

Sections 5 and 9 will be especially important to conserving biodiversity resources because of the complexity of both the resources and the threats that they face. Species and ecosystems undergo a number of natural processes of change, such as speciation and ecological succession. These alone require regular monitoring and adaptation. Anthropogenic threats such as those discussed above – habitat loss and fragmentation, overexploitation, pollution, the spread of invasive species or genes, and climate change – require even more diligence. Section 5's requirement of the designation of appropriate metrics of quality and quantity and collection of baseline data using those metrics is vital for determining what constitutes healthy populations, communities, and ecosystems. But because those systems change, the metrics and baselines may change as well. Section 9's requirement of ongoing monitoring and adaptation will require the stewardship agencies to observe and account for both natural and anthropogenic changes in a timely manner.

NELA in Action: Improved Outcomes

The imminent threat of the impacts of climate change on biodiversity illustrates a specific instance in which NELA's focus on monitoring and adaptive learning make it better suited than current laws to promote adaptation to the impacts of a warming climate. Recall that two serious problems have been observed at the species level as a result of climate change: 1) changes in the timing of seasonal events; and 2) changes in the geographical distribution of wildlife. Thus, climate change affects how and where certain species live, causing baseline data to shift and metrics to change. If a species migrates north to find a more favorable temperature range, a legacy plan must adapt by ensuring that the new habitat will support the same population as the old one. In some cases, this may require anticipating change and

conserving future habitat (likely to be north and uphill) even before change has occurred, so that it will be available once species' migrations occur.¹¹⁸ NELA's requirement that the stewardship agencies conduct ongoing monitoring of resources and ecosystems, and that they regularly update legacy plans, would ensure that such changes are noted and incorporated into agency plans and management.

The recent delisting of the gray wolf provides another concrete opportunity to highlight the ways in which NELA would produce an outcome more protective of the biodiversity resource than the current legal regime. The gray wolf was originally listed as endangered under the ESA in 1974, after decades of intentional predator extermination programs left the species greatly reduced in population and range. These extermination efforts were so successful that by the 1930s, gray wolf populations had been eliminated from Montana, Idaho, and Wyoming. In the 1990s, FWS initiated reintroduction projects, and by the end of 2000, several wolf populations had achieved their numerical and distributional recovery goals, which they continued to meet over the subsequent nine years.

On April 2, 2009, FWS issued two final rules that delisted the Northern Rocky Mountain (NRM) and Western Great Lakes (WGL) populations of the gray wolf.¹¹⁹ Populations of wolves in Montana, Idaho, parts of Utah, Washington, Oregon, Minnesota, Wisconsin, and Michigan were delisted, while populations in other states, such as Wyoming, remain listed. Section 4 of the ESA requires that a decision to delist a species as recovered be based on a determination by the appropriate agency, supported by the best scientific and commercial data available, that the species is no longer endangered or threatened. FWS found that this condition had been met for the NRM and WGL populations of the wolf, and that that state actions (including state wildlife management plans, laws, and regulations) would provide adequate protection and management of the delisted populations. For both populations, Section 4(g)(1) of the ESA requires the DOI to implement a system of monitoring in order to ensure that the recovered species "remains secure from risk of extinction after it no longer has the protections of the Act."

Despite the state plans and federal monitoring, there is reason to believe that the successful recovery of gray wolf populations achieved under the ESA may be jeopardized as the wolves lose the Act's protection. Critics of the delisting, such as Defenders of Wildlife, argue that recovery is an ongoing process that will be hampered by giving more control to the states. Specifically, they argue that the post-delisting agreements between FWS and the states allow for reductions in the delisted populations that will cause populations to get too small and, consequently, result in reduced dispersal and connectivity among subpopulations.

Prior experience provides additional reason for skepticism. In March 2008, following the delisting of the NRM population of the gray wolf, Idaho authorized hunting of the wolves, and 428 of the state's 1,000 wolves were killed – a population reduction of nearly 50 percent. In July of 2008, the United States District Court for the District of Montana enjoined the delisting because it found that the decision was arbitrary due to a lack of evidence of genetic exchange between subpopulations of the gray wolf. Unfortunately,

in the intervening three months, nearly half the population had been decimated by state-sanctioned hunters. It appears that history is poised to repeat itself as the states again assume complete control of the wolf populations in their jurisdictions. Both Montana and Idaho will reinstate hunting seasons for the wolf and a state's population will only be relisted if the number of animals in that state falls below 150 for three years in a row, a number significantly lower than what was achieved by the federal government's recovery efforts under the ESA.¹²⁰

The gray wolf's gradual recovery over the past several decades illustrates the strength and importance of the ESA. While that recovery may render the Act's full protections unnecessary, it is clear that a policy that allows a state population of more than 800 wolves to fall below 150 is inadequate to protect a legacy of healthy populations of the gray wolf across its range in North America. A continuous pattern of state-sanctioned exploitation followed by difficult recovery processes is not sustainable. NELA holds the potential to fill in the gap between the ESA and state laws and regulations. With regard to viable populations of species, it would operate to prevent biodiversity from becoming threatened or endangered in the first instance. It would also prevent the rapid elimination of costly and hard-won recoveries. If applied to the gray wolf, NELA would require maintenance of healthy populations by establishing a baseline informed by conservation biology and prohibiting depletion and degradation of that number. Whether listed or delisted, gray wolf populations within the reach of NELA's protection would be safe from actions that impermissibly deplete and degrade them. In this way, NELA would supplement and inform the ESA.

Just as the public, acting through Congress, has authorized the federal government to undertake costly recovery efforts to avoid species extinction, the public could mitigate the need for such recovery efforts by directing the federal government to maintain vibrant biodiversity in the first instance. And indeed, in light of the transboundary nature of biodiversity and the existence of major threats such as climate change, the federal government is best positioned to lead a preventative and coordinated approach to biodiversity conservation. NELA would draw on lessons learned from the ESA and complement that law in ways that would better promote effective and adaptive biodiversity conservation.

NELA and Climate Change

The statutes governing public natural resource management, enacted mainly during the 1970s or earlier, do not explicitly grapple with global climate change. Their drafters may not have even contemplated the phenomenon as it is now understood. More than three decades later, however, any proposal that attempts to ensure a legacy of public natural resources for generations to come must consider the impacts of climate change on those resources and provide means of addressing the special challenges that its impacts pose. NELA does so in two principle ways. First, by mandating legacy planning, the statute will necessarily require that stewardship agencies include a focus on the impacts of climate change over the legacy period and adapt their management strategies accordingly. Second, agencies will be permitted to perform resilience assessments in cases where the impacts of climate change fundamentally alter ecosystems to the point that the degradation or depletion of resources within the system may be beyond the agency's control. In appropriate cases, the agencies will be able to comply with NELA through means other than avoiding degradation or depletion, as described below.

Legacy Planning and Protection: Incorporating Adaptation into Resource Management

As previously discussed, climate change will exert significant pressures on many public natural resources, and in some cases is already doing so. The broad discretion that the natural resource management statutes afford federal agencies would, in many cases, allow the agencies to begin incorporating adaptive responses to present and future impacts of climate change in their management of lands and resources. As we have seen, the agencies have failed to use their discretion to achieve sustainable resource management, notwithstanding the explicit support for such goals in governing statutes. Similarly, they have failed to exercise their discretion to begin proactively adapting management practices to protect resources from climate change.¹²¹

By supplementing the resource management statutes with an enforceable mandate to prevent degradation or depletion of natural resources beyond a specified level, the Legacy Act will effectively mandate climate change adaptation. For example, the United States Forest Service will still be required to prepare land management plans under NFMA. However, under NELA, the agency would also be required to develop a legacy plan for each national forest. The legacy plan must ensure that the resources within the forest unit will not be impermissibly depleted or degraded over the legacy period. In order to comply with NELA's prohibition on depletion or degradation, the Forest Service will need to consider the panoply of stresses the forest resources will encounter over the legacy period, and combine that analysis with the projected impacts of its own actions.

In other words, the agency bears responsibility for the ultimate condition of the resource at the conclusion of the legacy period – and that condition is dictated not only by the agency's

own actions but stresses including those produced by climate change. If, for example, a forest will experience some level of climate-related mortality, and/or increased pest infestation as the result of milder winters due to climate change, the Forest Service will be required to consider those factors in developing its legacy plan. In light of these stresses, the agency may be required to reduce the volume of timber harvest it authorizes under its NFMA land management plan in order to prevent significant degradation and/or depletion by the end of the legacy period. Although broader and more precisely defined, NELA's mandate would be consistent with provisions in draft climate adaptation legislation which would require natural resource management agencies to prepare natural resource adaptation plans and adjust their resource management practices accordingly.¹²²

Grappling with Fundamental “Flips”: Resilience Analysis

A difficult reality not dealt with in draft climate legislation to date is that in some instances, no amount of adaptive management will be able to prevent fundamental shifts in ecosystems that will forever change the quality and quantity of resources therein. NELA incorporates the concept of ecological resilience to provide a means of dealing with such climate-related scenarios, and, more broadly, to avoid an overly narrow focus on individual resources that ignores the importance of scale and the dynamic nature of ecosystems.

Sections 6, 7, and 8 all incorporate the concept of ecosystem resilience as an adjunct to protection of specific legacy resources. Section 6 mandates that stewardship agencies develop measures for assessing the resilience of the relevant ecosystems and Section 7 demands that stewardship agencies maintain the resilience of the relevant ecosystems. The demand for information these provisions create may pose an obstacle. However, it may prove not only important but extremely useful as a practical matter for resource stewards to know the critical thresholds and thus the *range* within which they must manage the components of the relevant ecosystem. Ultimately, as we have learned from experience under the ESA, it is futile to seek to preserve a particular resource without preserving the ecosystem on which it depends. Determining how to implement a resilience mandate and whether it is feasible is precisely the type of question that a committee of experts should be charged to address.

Section 8 addresses the problem of impacts to resources that are either not the result of human conduct or result from pre-enactment human conduct. The ongoing and anticipated effects of climate change illustrate vividly why the Legacy Act's design must account for sources of degradation of resources that are beyond the reach of regulation. The Act addresses these types of change in several ways. First, it requires that stewardship agencies monitor and collect data on resources without regard to the cause of any change. Second, it requires that the agency's legacy planning consider and account for this type of change. In other words, as detailed above, the agency must still strive to maintain the legacy notwithstanding these types of change.

However, where significant degradation occurs that is not the result of human conduct or that is the result of pre-enactment conduct, the statute recognizes that it may not be possible to retain the legacy that we sought to preserve. The predictions of migrating ecosystems, coastal erosion, and flooding caused by climate change make clear that we must be prepared for circumstances in which it no longer makes sense to seek to preserve resources in the location where they once were.

Therefore, in cases where forces beyond the reach of the Legacy Act cause significant degradation or depletion of resources, the agency is directed to perform a resilience assessment on the relevant ecosystem. This will permit a reasoned assessment of the likelihood that the ecosystem can persist in the face of the changes. If the assessment suggests that the ecosystem cannot persist, that it has flipped or inevitably will flip into a new behavior regime without intervention, the statute does not assume that restoration will always be undertaken. For example, if the shift results from a permanent change in the climate, such restoration might be both costly and fruitless. In other cases, notwithstanding changes, the ecosystem might be able to be restored and its values and services might warrant the cost to do so.

Because the decision on whether to seek to restore an ecosystem in these circumstances involves important value choices as well as technical decisions, the statute proposes that such a decision should be the subject of at least a notice and comment proceeding to permit public input and debate of the value choices as well as the technical questions. Where a decision is made to undertake restoration, this would be consonant with the mandate under Section 7 of the Act. Where a decision is made to allow the ecosystem to shift to a new behavior regime, Section 8 mandates that the agency update its legacy plan to reflect this change.

Potential Objections to NELA

There are a number of likely objections to the concept of a Legacy Act and the contours proposed here. One objection to the scope of the Act proposed above is that the statute seeks to preserve and constrains use only of public natural resources within the United States. As a nation, we depend on private as well as public natural resources and on resources found outside as well as within the United States. Many important resources within the United States are in private hands and the Legacy Act, as proposed, does not purport to reach or protect these. Similarly, since resources are traded globally, many resources on which we depend are imported from around the globe. Thus some resources on which we depend come from sources outside the United States and some resources we consume from public lands may be available from sources outside the United States. The criticism of the Legacy Act is that it does not protect all or perhaps even most of the resources on which we currently depend.

While it is true that many resources we use are outside the direct scope of the Legacy Act, this fact does not negate the value of such a statute. First, the existence of private resources and resources outside the United States that supplement U.S. public resources does not mean that we should fail to take particular care of the natural resources in federal public ownership. These resources have been reserved or acquired by the government to serve the national interest, and they represent in some cases irreplaceable values. They may have both economic value and value that is more difficult to quantify, but of great importance to our national identity. For example, the history of the national parks reveals that they were created in part to inspire and serve as symbols for the nation.¹²³ The history of Wilderness Areas and National Wildlife Refuges show similar awareness of a broad array of noneconomic values.¹²⁴ The resources on these lands are uniquely affected with a public interest and therefore we owe a duty to set policy for them with the broad public interest in view.

Moreover, notwithstanding the fact that we draw resources from sources other than federal public resources, the resources in public ownership within the United States are uniquely within our control and therefore particularly valuable. Taking special steps to monitor our use and degradation of these resources within public ownership and control, and to decide consciously what stock of public natural resources we wish to preserve is a sound policy notwithstanding global trade in some of these resources. Further, the Legacy Act recognizes and takes into account the availability of substitute resources in achieving its goals. It provides an exception to the prohibition on impermissible resource depletion or degradation if it can be shown that substitute resources will be available at the conclusion of the legacy period.

Finally, as to the exclusion from the statute's reach of privately owned resources within the United States, the decision to exclude reflects a value judgment, which like all value judgments can and should be examined by a legislature considering adoption of a Legacy

Act. Determining the appropriate values to embody in the statute would be an important part of the debate that should precede enactment of such a law.

Another objection sweeps more broadly. One might reject the Legacy Act concept because one rejects the value of retaining public resources. For example, some have argued that public natural resources should be privatized and that private ownership and markets will eliminate all problems associated with allocation of these resources.¹²⁵ But it is clear that “free” markets are not the answer. The combination of externalities associated with natural resource depletion and degradation for which markets fail to account, the lack of markets for many public natural resources as well as the services and values they provide, and the imperfect information about how proposed actions will affect these resources make it virtually certain that unregulated use of public natural resources will not achieve even the minimal goal that market proponents seek – economic efficiency – much less other social goals.

Moreover, just as individuals face pressures in favor of short-term consumption of resources, managers of business enterprises that use and degrade resources are subject to pressures to maximize profits in the short term.¹²⁶ Our system of corporate governance and finance demands that managers of publicly held companies act as stewards not for the public but for the companies’ investors. The quarterly earnings reporting cycles of capital markets impose an extremely short-term horizon within which managers must demonstrate profitability, and they create enormous pressure for short term profits.¹²⁷ Even a company committed in principle to stewardship of public resources cannot be expected to pursue that value when it is at odds with the short-term economic interests of investors, if the company operates within the discipline of the market. Thus, to achieve protection of a legacy requires that we employ some means to offset the incentives of the market.

Finally, some may seek to justify the status quo of public natural resource depletion and degradation by declaring their faith in the ingenuity of future generations to develop alternatives to the resources we deplete today. Proponents of the status quo sometimes imply that those who favor preservation of natural resources lack faith in human creativity and ingenuity. This is incorrect. As envisioned, the Legacy Act counts on the ingenuity and creativity of *today’s* generations to find better, more resource-conserving ways to operate and live, rather than assuming that unidentified future generations will have ingenuity we lack today.¹²⁸

The stunning examples provided by corporate leaders such as Paul Hawken and Ray Anderson, Founder and Chairman of Interface, Inc., provide ample evidence that with motivation, today’s corporate practices can be radically changed in ways that reduce resource depletion and degradation while improving efficiency and generating private profits.¹²⁹ However, the savings are not obvious and require that our ingenuity and creativity be engaged. Because of uncertainty, lack of information and timidity, markets have failed to capture these benefits and regulators have hesitated to require practices that would produce them. NELA would help to stimulate creativity and harness ingenuity in service of our shared goals.

Conclusion

Adopting a National Environmental Legacy Act would represent a first step toward operationalizing the concept of sustainability, and thus defining our environmental legacy. Just as individuals with private wealth engage in estate planning to ensure that their wealth is protected for the next generation, NELA provides a mechanism to ensure that public wealth is preserved. Despite the fact many current laws contain aspirations to sustainability, they provide no meaningful mechanism for determining (much less consciously shaping) the resource legacy we leave to the next generation.

A Legacy Act would help us to transcend the problems created by the short time horizon that governs decisions of many economic enterprises and by the widely acknowledged flaws of the cost-benefit analysis that drives much governmental decisionmaking. By combining a clear statement of objectives with planning and enforceable rules, NELA creates an effective model for achieving intentional stewardship of our public natural resources. Specifically, NELA's enforceable mandate would override the open-ended balancing tests that govern many decisions affecting public natural resources under current law. Thus, this single statute would counterbalance the systematic bias in favor of short-term economic uses of public natural resources produced by our current legal regime, and curtail the attendant depletion and degradation.

Moreover, NELA incorporates several features designed to overcome obstacles encountered by the first generation of environmental and natural resource management laws. For example, NELA is designed to permit adaptive learning and effective decisionmaking in the face of uncertainty, to promote transparency, and to allow for citizen enforcement. Additionally, it includes provisions that direct agencies to explicitly incorporate climate change into their resource management. Such features would allow the Legacy Act to serve not only as a complement to traditional resource management laws, but also a first step toward a new generation of environmental laws.

APPENDIX A:

Examples of Federal Statutes Expressing Sustainability as a Goal

| Statute | Section | Relevant Language |
|-----------------------------------|--|--|
| Coral Reef Conservation Act | Purposes, 16 U.S.C. §6401(1) | The purposes of this title are to preserve, sustain, and restore the condition of coral reef ecosystems. |
| Clean Air Act | Findings, 42 U.S.C. §7651(a)(5) | The Congress finds that current and future generations of Americans will be adversely affected by delaying measures to remedy the problem [of acid deposition]. |
| Clean Water Act | Policy, 33 U.S.C. §1251 | The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. |
| Endangered Species Act | Findings/Purposes 16 U.S.C. §§1531(a) (3), (b) | . . . these species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people . . . The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species . . . |
| Energy Reorganization Act | Policy/Purpose, 42 U.S.C. §5801(a) | The Congress hereby declares that the general welfare and the common defense and security require effective action to develop, and increase the efficiency and reliability of use of, all energy sources to meet the needs of present and future generations . . . |
| Estuarine Protection Act | Declaration of Policy, 16 U.S.C. §1221 | It is therefore the purpose of this Act to provide a means for considering the need to protect, conserve, and restore these estuaries in a manner that adequately and reasonably maintains a balance between the national need for such protection in the interest of conserving natural resources and natural beauty of the Nation and the need to develop these estuaries to further the growth and development of the Nation. |
| Marine Mammal Protection Act | Findings/Policy, 16 U.S.C. §1361(6) | . . . marine mammals have proven themselves to be resources of great international significance, esthetic and recreational as well as economic, and it is the sense of the Congress that they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem . . . |
| National Environmental Policy Act | 42 U.S.C. §4331(a) | The Congress . . . declares that it is the continuing policy of the Federal government . . . to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans. |
| Wilderness Act | Establishment/Policy, 16 U.S.C. §1131(a) | In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. |

APPENDIX B:

Examples of Federal Statutes Incorporating Sustainability into Mandates

| Statute | Section | Relevant Language |
|--|---|--|
| Federal Land Policy and Management Act | Policy and Definitions, 43 U.S.C. §§1701(a)(7), 1702(c) | Congress declares [that] goals and objectives be established by law as guidelines for public land use planning, and that management be on the basis of multiple use and sustained yield . . . “multiple use” means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people . . . |
| Magnuson-Stevens Fishery Conservation and Management Act | 16 U.S.C. §§1852(a)(1), (h); 1851(a)(1) | There shall be established . . . eight Regional Fishery Management Councils . . . Each Council shall, . . . for each fishery under its authority that requires conservation and management, prepare and submit to the Secretary a fishery management plan . . . Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry. |
| Multiple-Use Sustained-Yield Act of 1960 | 16 U.S.C. §§529; 531(a) | The Secretary of Agriculture is authorized and directed to develop and administer the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom . . . “Multiple use” means: The management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output. |
| National Forest Management Act | 16 U.S.C. §§1604(a), (e) (1), (2) | . . . the Secretary of Agriculture shall develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System . . . the Secretary shall assure that such plans—provide for multiple use and sustained yield of the products and services obtained therefrom in accordance with the Multiple-Use Sustained-Yield Act of 1960 and, in particular, include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness; and determine forest management systems, harvesting levels, and procedures in the light of . . . the definition of the terms “multiple use” and “sustained yield” as provided in the Multiple-Use Sustained-Yield Act of 1960, and the availability of lands and their suitability for resource management. |
| National Park Service Organic Act | 16 U.S.C. §1 | The [National Park Service] . . . shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . by such means and measures as conform to [their] fundamental purpose, which purpose is to conserve the scenery and the natural and historic objects and the 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. |

APPENDIX C:

Examples of Federal Statutes Providing Incentives for Conservation

| Statute | Section | Relevant Language |
|---|---|--|
| Coastal Barrier Resources Act | 16 U.S.C. §3501(b) | The Congress declares that it is the purpose of this Act to minimize the loss of human life, wasteful expenditures of Federal revenues, and the damage to fish, wildlife, and other natural resources associated with the coastal barriers along the Atlantic and Gulf coasts and along the shore areas of the Great Lakes by restricting future Federal expenditures and financial assistance which have the effect of encouraging development of coastal barriers . . . |
| Conservation Easement Deduction (Internal Revenue Code) | 26 U.S.C. §§170(b)(1)(E), 170(b)(2)(B) ; 170(h)(4)(a)(i)-(iv) | Provides individual and corporate income tax deductions for donations of qualified easements for conservation purposes, defined as “the preservation of land areas for outdoor recreation by, or the education of, the general public; the protection of a relatively natural habitat of fish, wildlife, or plants, or similar ecosystem; the preservation of open space (including farmland and forest land) where such preservation is— for the scenic enjoyment of the general public, or pursuant to a clearly delineated Federal, State, or local governmental conservation policy, and will yield a significant public benefit; or the preservation of an historically important land area or a certified historic structure.” |
| Conservation Reserve Program | 16 U.S.C. §3831(a) | The Secretary shall formulate and carry out a conservation reserve program under which land is enrolled through the use of contracts to assist owners and operators of [certain] land [] to conserve and improve the soil, water, and wildlife resources of such land . . . |
| Forest Legacy Program | 16 U.S.C. §2103(a)(1), (2) | The Secretary of Agriculture shall establish a forest land enhancement program to provide financial assistance to State foresters; and to encourage the long-term sustainability of nonindustrial private forest lands in the United States by assisting the owners of nonindustrial private forest lands, through State foresters, in more actively managing the nonindustrial private forest lands and related resources of those owners through the use of State, Federal, and private sector resource management expertise, financial assistance, and educational programs. The Secretary, acting through State foresters, shall implement the program— in coordination with the State Forest Stewardship Coordinating Committees; and in consultation with other Federal, State, and local natural resource management agencies, institutions of higher education, and a broad range of private sector interests. |

End Notes

- ¹ Paul Hawken, Amory Lovins and L. Hunter Lovins coined the phrase “natural capital” to capture this idea in their groundbreaking book *NATURAL CAPITALISM: CREATING THE NEXT INDUSTRIAL REVOLUTION* (Little Brown and Co. 1999). See id. at 2-6, 148-169.
- ² See e.g. Terri Cullin, *Fiscally Fit: Making Sense of Retirement Plans*, *The Wall Street Journal*, Sept. 13, 2007 (available at: <http://online.wsj.com/public/article/SB118952742492823919.html>) (last visited Apr. 14, 2009); See e.g. Financial Planning Association, *20 Keys to Being a Smarter Investor 3*, (available at: www.fpanet.org).
- ³ THE GALLUP ORGANIZATION, *Americans: Economy Takes Precedence over Environment*, Mar. 19, 2009, available at: <http://www.gallup.com/poll/116962/Americans-Economy-Takes-Precedence-Environment.aspx> (last visited Mar. 31, 2009).
- ⁴ THE GALLUP ORGANIZATION, *Americans: Economy Takes Precedence over Environment*, Mar. 19, 2009, available at: <http://www.gallup.com/poll/116962/Americans-Economy-Takes-Precedence-Environment.aspx> (last visited Mar. 31, 2009).
- ⁵ *Washington Post-ABC News-Stanford University Poll: Environment Trends*, April 5-10, 2007, available at http://www.washingtonpost.com/wp-srv/nation/polls/postpoll_environment_042007.html (last visited Mar. 31, 2009).
- ⁶ The U.S. Territories of Guam and Puerto Rico also have laws incorporating the concept of sustainability. A complete list of statutory provisions and the relevant text is on file with the authors.
- ⁷ AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS), ATLAS OF POPULATION & ENVIRONMENT, *Natural Resources: Freshwater*, available at <http://atlas.aaas.org/index.php?part=2&sec=natres&sub=water> (last visited Apr. 8, 2009).
- ⁸ Deborah S. Lumia, Kristin S. Linsey, & Nancy L. Barber, *Estimated Use of Water in the US in 2000*, USGS Fact Sheet 2005-3051, available at <http://pubs.usgs.gov/fs/2005/3051/> (last visited Apr. 8, 2009).
- ⁹ UNITED STATES ENVTL. PROT. AGENCY, NATIONAL WATER QUALITY INVENTORY: REPORT TO CONGRESS 2004 REPORTING CYCLE, 1-2 (January 2009), available at <http://www.epa.gov/owow/305b/2004report/report2004pt1.pdf> (last visited Apr. 8, 2009).
- ¹⁰ Thomas E. Dahl, U.S. Department of the Interior, *WETLANDS LOSSES IN THE UNITED STATES 1780'S TO 1980'S* (1999) at 1; Thomas E. Dahl and Craig E. Johnson, U.S. Department of the Interior, *STATUS AND TRENDS OF WETLANDS IN THE CONTERMINOUS UNITED STATES, MID-1970'S TO MID-1980'S* (1991) at 1.
- ¹¹ UNITED STATES FOREST SERVICE, *Forest Inventory and Analysis National Program, Trend Data, 2*, available at <http://www.fia.fs.fed.us/slides/major-trends.pdf> (last visited Apr. 8, 2009).
- ¹² NATIONAL ATLAS OF THE UNITED STATES, *Forest Resources of the United States*, available at http://www.nationalatlas.org/articles/biology/a_forest.html (last visited Apr. 8, 2009).
- ¹³ William Fulton, et al., *Who Sprawls Most? How Growth Patterns Differ Across the U.S.*, 1 (Brookings Institution, Center on Urban & Metropolitan Policy July 2001), available at <http://www.brookings.edu/es/urban/publications/fulton.pdf> (last visited Apr. 8, 2009).
- ¹⁴ Boris Worm, et al., *Impacts of Biodiversity Loss on Ecosystem Services*, 314 *SCIENCE* 787, 780 (2006).
- ¹⁵ John Talberth et al., *The Ecological Fishprint of Nations: Measuring Humanity's Impact on Marine Ecosystems* 3 (Redefining Progress 2006), available at <http://www.rprogress.org/publications/2006/FishprintofNations2006.pdf> (last visited Apr. 8, 2009).
- ¹⁶ U.S. CENSUS BUREAU, *U.S. POPClock Projection*, available at <http://www.census.gov/population/www/popclockus.html> (last visited Apr. 8, 2009).
- ¹⁷ U.S. CENSUS BUREAU, NATIONAL POPULATION PROJECTIONS 2008: *Projections of the Population and Components of Change for the United States, 2010 to 2050*, available at <http://www.census.gov/population/www/projections/summarytables.html> (last visited Apr. 8, 2009).
- ¹⁸ IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 12 (Susan D. Solomon, et al., eds., Cambridge Univ. Press), available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf> (last visited Apr. 8, 2009).
- ¹⁹ NATIONAL ASSESSMENT SYNTHESIS TEAM, CLIMATE CHANGE IMPACTS ON THE UNITED STATES: THE POTENTIAL CONSEQUENCES OF CLIMATE VARIABILITY AND CHANGE, *Overview*, 10 (U.S. Global Change Research Program 2000), available at <http://www.usgcrp.gov/usgcrp/Library/nationalassessment/1IntroA.pdf> (last visited Apr. 8, 2009).
- ²⁰ Zbigniew W. Kundzewicz, et al., *Freshwater resources and their management*. In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (M.L. Parry, et al., eds., Cambridge Univ. Press 2007).
- ²¹ Robert R. Twilley, *Coastal Wetlands & Global Climate Change: Gulf Coast Wetland Sustainability in a Changing Climate*, 10 (Pew Center on Global Climate Change Dec. 2007), available at <http://www.pewclimate.org/docUploads/Regional-Impacts-Gulf.pdf> (last visited Apr. 8, 2009).
- ²² Phillip J. van Mantgem, et al., *Widespread Increase of Tree Mortality Rates in the Western United States*, 323 *SCIENCE* 521 (2009).
- ²³ IPCC, 2007: Summary for Policymakers at 14.
- ²⁴ See Alyson Flournoy, et al., *Squandering Public Resources*, CPR Publication No. 705 (Sept. 2007), available at http://www.progressivereform.org/articles/Squandering_Public_Resources.pdf (last visited Apr. 13, 2009).
- ²⁵ 42 U.S.C. 4331(a).
- ²⁶ 42 U.S.C. §4331(b).
- ²⁷ 42 U.S.C. §4331(b)(3).
- ²⁸ See, e.g., Lynton Keith Caldwell, *THE NATIONAL ENVIRONMENTAL POLICY ACT: AN AGENDA FOR THE FUTURE* (1998); COUNCIL ON ENVIRONMENTAL QUALITY, *THE NATIONAL ENVIRONMENTAL POLICY ACT: A STUDY OF ITS EFFECTIVENESS AFTER TWENTY-FIVE YEARS* (1997) available at <http://ceq.hss.doe.gov/nepa/nepa25fn.pdf> (last visited Apr. 13, 2009); Oliver Houck, *Is that All? A Review of the National Environmental Policy Act: An Agenda for the Future*, 11 *Duke Env'tl. L. & Policy F.* 173, 178-179(2000); Nicholas Yost, *NEPA's Promise—Partially Fulfilled*, 20 *Env'tl. L.* 533 (1990).
- ²⁹ 42 U.S.C. § 4332(C). As implemented by the Council on Environmental Quality Regulations, an agency may be required to prepare and environmental assessment (EA) to determine if an action warrants a full EIS. 42 C.F.R. §1501.3-1501.4. In practice, agencies prepare many times more EAs than EISs. See Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance* 102 *Colum. L. Rev.* 903, 920 (2002).
- ³⁰ Matthew J. Lindstrom, *Procedures Without Purpose: The Withering Away of the National Environmental Policy Act's Substantive Law*, 20 *J. Land Resources & Env'tl. L.* 245, 264 (2000); Oliver A. Houck, *Is That All? A Review of the National Environmental Policy Act: An Agenda for the Future*, 11 *Duke Env'tl. L. & Pol'y F.* 173 (2000); Dinah Bear, *Some Modest Suggestions for Improving Implementation of the National Environmental Policy Act*, 43 *Nat. Resources J.* 931, 931 (2003); Harvey Bartlett, *Is NEPA Substantive Review Extinct, or Merely Hibernating*, 13 *Tul. Env'tl. L.J.* 411 (2000).
- ³¹ The documentation takes the form of an Environmental Assessment, Environmental Impact Statement, or Finding of No Significant Impact, depending on the extent of the impacts identified. See 40 C.F.R. §§1501.3-1501.4.

End Notes

- ³² This interpretation of NEPA was crystallized early on by the Supreme Court in *Strycker's Bay Neighborhood Council, Inc. v. Karlen*, 444 U.S. 223 (1980). See also *Robertson v. Methow Valley Citizens Council*, 490 US 332, 351 (1989).
- ³³ To design the statute will require both considerable technical work and further elaboration of value choices. This sketch of the statute's contours includes section numbers for ease of reference. However, it is intended as a sketch of the contours of a Legacy Act, not a detailed statutory proposal.
- ³⁴ A period of 30 to 50 years would seem appropriate to ensure a long-term perspective.
- ³⁵ The term should be very broadly defined to include all public and private actors. See, e.g., 16 U.S.C. §1532(13). The statute should make clear that the prohibition on actions that impermissibly degrade or deplete legacy resources applies both to private actors and to agencies whose actions affect the relevant resource – including management, permitting, and leasing of the resource.
- ³⁶ Where an agency has stewardship responsibilities for a particular resource under existing law, it would seem most efficient to designate that agency for this role, unless experience suggests this would be inconsistent with achieving the purposes of the Act.
- ³⁷ For those agencies that already undertake planning regarding the relevant resource, this duty should be coordinated with the agencies' planning duties under existing enabling acts.
- ³⁸ C.S. Holling, *Resilience and Stability of Ecological Systems*, 4 ANN. REV. OF ECOLOGY AND SYSTEMATICS 1 (1973).
- ³⁹ Lance Gunderson, *Resilience, Flexibility and Adaptive Management: Antidotes for Spurious Certitude?*, 3 CONS. ECOL. 7 (Winter 1999) available at <http://www.ecologyandsociety.org/vol3/iss1/art7/> (last visited Apr. 14, 2009).
- ⁴⁰ See Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance* 102 Colum. L. Rev. 903, 903 (2002).
- ⁴¹ Oliver Houck, *Unfinished Stories*, 73 U. Colo. L. Rev. 867 (2002); See Daniel R. Mandelker, *NEPA Law and Litigation 2d* §11:3 (2007); William Buzbee, *The Regulatory Fragmentation Continuum, Westway and the Challenges of Regional Growth*, 21 J.L. & Pol. 323, 340-341 (2005).
- ⁴² Despite the desirability of clarity in the legislation itself, the limitations of the legislative process make it inevitable that regulations will contain important clarifications. The recommendation for appointment of a Committee of Scientists, discussed above, is intended to ensure that the regulations are technically well-constructed. However, to the extent possible, the value choices embedded in the standard should be defined as clearly as possible in the statute.
- ⁴³ World Commission on Environment and Development, *Our Common Future* at 43 (1987).
- ⁴⁴ John C. Dernbach, *Sustainable Development as a Framework for National Governance*, 49 Case W. Res. 1 at 31 (1998).
- ⁴⁵ The prohibition is tempered by two exceptions described in Section 11. These would permit otherwise impermissible degradation or depletion if clear and convincing proof shows: (1) that substitute resources are likely to be available by the end of the Legacy Period (whether through natural regeneration or substitution) or (2) that there is an overriding public interest that warrants present use of the resource, and mitigation of the resource and its associated values and services is possible and is undertaken.
- ⁴⁶ Professors Sidney Shapiro and Rena Steinzor propose the use of metrics in a different context with a different objective – as a tool to promote agency accountability. Sid Shapiro & Rena Steinzor, *Capture, Accountability, and Regulatory Metrics*, 86 Texas L. Rev. 1741, 1769 (2008). It would make sense to try to develop metrics that could be used in more than one context – for example for monitoring both agency accountability and compliance with a Legacy Act.
- ⁴⁷ Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance* 102 Colum. L. Rev. 903, 940 (2002).
- ⁴⁸ David M. Driesen, *Is Cost-Benefit Analysis Neutral?*, 77 U. Colo. L. Rev. 335, 339-342 (2006).
- ⁴⁹ Holly Doremus, *Precaution, Science and Learning While Doing in Natural Resource Management*, 82 Wash. L. Rev. 547 (2007); Holly Doremus, *The Purposes, Effects, and Future of the Endangered Species Act's Best Available Science Mandate*, 34 Envtl. L. 397 (2004); Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. Rev. 115, 197 (2004); Howard A. Latin, *The "Significance" of Toxic Health Risks: An Essay on Legal Decisionmaking Under Uncertainty*, 10 Ecology L. Q. 339 (1982); John S. Applegate, *The Perils of Unreasonable Risk: Information, Regulatory Policy, and Toxic Substances Control*, 91 Colum. L. Rev. 261 (1991) Frederic H. Wagner, *Whatever Happened to the National Biological Survey?*, 49 Bioscience 219 (1999); Wendy E. Wagner, *A Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 Duke L.J. 1619, 1623-1624 (2004).
- ⁵⁰ The Intergovernmental Panel on Climate Change developed its first climate change assessment in 1990, which represented scientific consensus that climate change exists and is a global threat. See Intergovernmental Panel on Climate Change (IPCC), *Scientific Assessment of Climate Change – Report of Working Group I*, (1990); Intergovernmental Panel on Climate Change (IPCC), *Impacts Assessment of Climate Change – Report of Working Group II*, (1990); Intergovernmental Panel on Climate Change (IPCC), *The IPCC Response Strategies – Report of Working Group III*, (1990). Despite these reports, as late as 2001, President Bush's statements on climate change focused on reducing the uncertainty of the science as opposed to reversing the global warming trend. See e.g. Office of the Press Secretary, *President's Statement on Climate Change* (July 13, 2001); Office of the White House, *Global Climate Change Policy Book, Executive Summary* (Feb. 2002). These claims were then amplified by the media's approach of reporting on the existence of an alleged "scientific debate" on this issue. See Jules Boykoff and Maxwell Boykoff, *Fairness & Accuracy in Reporting (FAIR), Journalistic Balance as Global Warming Bias: Creating Controversy Where Science Finds Consensus* (Nov/Dec 2004) (available at: <http://www.fair.org/index.php?page=1978>) (last visited Apr. 14, 2009).
- ⁵¹ See John S. Applegate, *The Taming of the Precautionary Principle*, 27 Wm. & Mary Envtl. L. & Pol'y Rev. 13 (2002).

End Notes

- ⁵² Exceptions or exemptions should be employed to achieve balance between the goals of NELA and other public values in tension with its purposes. Obviously, the broader the scope of any exceptions or exemptions, the less effective NELA would be at achieving its purposes. The danger of permitting overly broad and arguably unnecessary exceptions and exemptions for superficially compelling purposes such as national security has been demonstrated by recent experience with NEPA. See Testimony of Michael Anderson, Senior Resource Analyst, The Wilderness Society, to the House Resources Committee National Environmental Policy Act Task Force, Field Hearing on *The Role of NEPA in the States of Washington, Oregon, Idaho, Montana and Alaska* Spokane, WA (Apr. 23, 2005).
- ⁵³ Holly Doremus, *Precaution, Science and Learning While Doing in Natural Resource Management*, 82 WASH. L. REV. 547, 549-550; Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance* 102 COLUM. L. REV. 903, 938-40 (2002).
- ⁵⁴ Energy Information Administration, Annual Energy Review 2007, Table 4.2: Crude Oil and Natural Gas Cumulative Production, Proved Reserves, and Proved Ultimate Recovery, 1977-2006, http://www.eia.doe.gov/emeu/aer/pdf/pages/sec4_5.pdf (last visited June 17, 2009); and Table 7.2: Coal Production, 1949-2007, http://www.eia.doe.gov/emeu/aer/pdf/pages/sec7_7.pdf (last visited June 17, 2009).
- ⁵⁵ Bureau of Land Management, Performance and Accountability Report for Fiscal Year 2007 8, available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Business_and_Fiscal_Resources.Par.78689.File.dat/BLMPARFY07.pdf (last visited June 17, 2009).
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