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FOR IMMEDIATE RELEASE:
March 2, 2000

U.S. CORAL REEF TASK FORCE UNVEILS GROUNDBREAKING PLAN
Will Tackle Major Risks to Economy, Consumers, Environment

Plan Calls for Protecting 20 Percent of All U.S. Coral Reefs by 2010

In a groundbreaking step, the U.S. Coral Task Force today unveiled the first-ever National Action Plan to comprehensively and aggressively address the most pressing challenges facing coral reefs today. As members of the U.S. Coral Reef Task Force, the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce, the U.S. Department of the Interior and other federal agencies are joining with coastal states and territories to launch this cooperative effort to help save the world's remarkable coral reefs.

U.S. Coral Reef Task Force co-chair Secretary of the Interior Bruce Babbitt said, "I commend everyone whose hard work paid off in developing the National Action Plan. We stand at a very critical point for the preservation of vital coral reefs resources. Today's agreement to protect and set aside 20 percent of coral reefs in this nation's waters by 2010 will increase the long-term survival of coral reefs and the vast array of marine species that depend upon them. The action plan, when implemented, will also lead to more robust economies and safer, healthier futures for people and islands protected and sustained by these ancient and magnificent coral reefs."

"Protecting 20 percent of all U.S. reefs and other decisive actions called for in the new plan is crucial because two-thirds of the world's reefs may be dying. If current conditions continue, an alarming 70 percent of the world's reefs may be gone by 2050. This rapid decline represents a serious threat to businesses, consumers, communities, and the environment," said D. James Baker, Task Force co-chair and NOAA Administrator.

Driven largely by such human activities as pollution, overfishing and dredging, the coral reef crisis places a multitude of human, natural and economic needs in jeopardy. As the "rain forests of the sea," coral reefs provide services estimated to be worth as much as $375 billion annually, a staggering figure for an ecosystem covering less than one percent of the Earth's surface.

MORE

ADD 1/coral reefs

In the U.S. alone, coral reef ecosystems support millions of jobs. They support billions of dollars in tourism each year, over $1.2 billion in the Florida Keys alone. In Hawaii, gross revenues generated from just a single, half square mile coral reef reserve are estimated to exceed $8.6 million each year.

The annual dockside value of commercial U.S. fisheries from coral reefs is over $100 million. The annual value of reef-dependent recreational fisheries probably exceeds $100 million per year. In developing countries, coral reefs contribute about one-quarter of the annual total fish catch, providing food to about one billion people in Asia alone.

Further threatened by the current global reef crisis is the exciting promise of life-saving and other critical pharmaceuticals. Coral reefs are the medicine chests of the 21st century – they are considered to be one of the primary sources of new medicines and biochemicals in the new century. Examples include many pharmaceuticals now being developed as possible cures for cancer, arthritis, viruses, and other diseases.

The new National Action Plan is designed to be the nation's roadmap to more effectively understand coral reef ecosystems and reduce the adverse impacts of human activities. Responding to the urgency of the current situation, the new plan draws on the expertise and commitment of hundreds of public and private stakeholders. The plan calls for:

- Designating 20 percent of all U.S. coral reefs as no-take ecological reserves by 2010. With the fishing community and a broad range of other stakeholders, the existing network of coral reef protected areas will be expanded to ensure the survival of key sites.

- Mapping all U.S. coral reefs by 2009. Right now, just five percent of all U.S. reefs have been adequately mapped. To meet critical management needs, the first priority will be to complete ongoing mapping of Caribbean reefs and reefs on the eight main Hawaiian Islands.

- Monitoring to build an integrated national reef monitoring system that profiles and tracks the healthy of U.S. coral reefs. This monitoring will build on and link existing federal, state and territorial monitoring in addition to implementing new monitoring to, wherever possible, fill in current gaps.

- An All-Islands Coral Reef Initiative to address the highest priorities of U.S. state and territorial islands. Since 1994, the islands of Hawaii, American Samoa, Guam, Puerto Rico, the U.S. Virgin Islands, and the Commonwealth of Northern Marianan Islands have been working together to protect and sustainably use coral reefs. In FY 2000, NOAA and the Department of the Interior will provide $1.35 million to assist U.S. islands to improve coral reef management and protection, including monitoring, education and designation of marine protected areas.

-30-

Restoration takes an integrated view

What I have found in the past seven years to be so remarkable is the generative power of the idea of restoration—its capacity to move people, to motivate them. If preservation somehow fails to evoke a lot of emotion, restoration does. Why the extraordinary outburst of energy and approval of the restoration of the gray wolf to Yellowstone? What is it that made that event such a magical moment that captured the attention of this entire nation? The reason is because restoration speaks of optimism, of hope, of change, of the ability in a hands-on fashion to move

U.S. Department of the Interior Bruce Babbitt, pictured here, believes in an integrated approach to watershed restoration.

beyond the status quo. It involves an enormous act of imagination because it says we can change and improve. And in order to have that vision, we have to look back and get beyond our tendency to see the landscape as timeless, present, constant.

The Florida Everglades and the California Bay-Delta nicely illustrate the power of restoration. In the Everglades, I found a National Park drifting towards chaos and ecological death. I trekked out of the Park into Big Cypress National Wildlife Refuge and then up into the Everglade Agricultural Area, following the flow of water across Lake Okeechobee up the Kissimmee River. Soon I'm standing in the suburbs of Orlando. And I'm saying that if this National Park is going to survive, we will have to start in Orlando and finish in Florida Bay and the Florida Keys.

What's happening in California is scarcely less impressive. It was triggered by the decline of the salmon runs in the Bay-Delta, and the Sacramento and San Joaquin Rivers. For decades, we have responded with piecemeal fixes. It took us the better part of a century to figure out that pumping more fish out of hatcheries wasn't working. Then the spate of dam building—thinking we could mitigate dams with fishways and fish hatcheries—well, we've learned that we can't. Ultimately we've been driven to the reality that the salmon is an indicator of a systematic problem—the destruction of the wetland riverine ecosystem of the Central Valley of California. Now we are verging upon a consensus plan involving hundreds of millions of dollars each year to get at the basics, to take down the levees, free up the rivers, and yes, even to go out there and tear down a dam . . . in the name of restoration. We can get beyond seeing the landscape as a constant if we have the capacity to imagine both the past and the future.

So, where do you go? Well, you're probably not going to start with a gray wolf in your neighborhood, but there are amphibians on every square mile of the entire nation. They have accompanied us through our cultural history and people respond—not only children, although especially children—but also their parents. A spotted frog becomes the pathway to a neighborhood or regional restoration project.

We also need to think deeply about watershed restoration. There is something magical about the power in our culture, in our history, in our religious forms. Water evokes an extraordinary response. When you go out across this country to communities and groups and focus on the river that runs through their community, which, most likely was founded on the water's edge—and you begin to talk about water in terms of connectivity and the history and the heritage of that community—well, pretty soon, people start to see that we're going to restore the water and in the process, restore our communities in a very real way.

We're on the verge of a new movement, an integrated view of the American landscape: a view which carries responsibility for every single citizen and every community, which places on us the possibility of pointing the way, illuminating the landscape, encouraging partnerships, finding the links, and putting them back together. ❧

Coral economy

Task force says reef can revive islands

VINCENT BRYDON

ST. CROIX — How is the territory's coral reef related to the local economy?

According to the U.S. Coral Reef Task Force, the protection of one can lead to the revitalization of the other.

The task force, created in response to the global crisis of coral deterioration, was established by President Bill Clinton's executive order No. 13089 in June of 1998.

Members of the task force — which includes U.S. Secretary of the Interior Bruce Babbitt and Under Secretary of Commerce James Baker — convened at the castle of Contessa de Navarro Farber to sign a Memorandum of Understanding Tuesday.

"The memorandum that is being signed here will establish a consortium of marine science research," said University of the Virgin Islands president Orville Kean.

Aida Arellano

From left, Marvin K. Moss, Professor of University of North Carolina Wilmington's Department of Physics and Physical Oceanography; Secretary of the Interior Bruce Babbitt; and D. James Baker, administrator of the National Oceanic and Atmospheric Administration sign documents on Tuesday while Delegate to Congress Donna Christian-Christensen and Gov. Charles W. Turnbull look on.

Gov. Charles Turnbull, Delegate to Congress Donna Christian-Christensen and representatives from the University of North Carolina, Wilmington, the University of South Carolina and Rutgers University were also on hand to sign the proposed Joint Institute for Caribbean Marine Studies.

National Oceanic and Atmospheric Administration press agent Colleen Angeles said that the task force proposes to build the institute where the former West Indies Marine Laboratory stood prior to Hurricane Hugo in 1989.

"With all of the concerns about the environment, we often overlook the ocean, which is 80 percent of it (the environment) and, quite frankly, we don't know much about it," said former U.S. Sen. and Connecticut Gov. Lowell Weicker, a task force member.

Weicker said that information uncovered from research conducted in the proposed center could assist in revitalizing coral reefs, which he said are invaluable ecosystems, supplying food, shoreline protection and tourism to coastal areas.

Task force member and UNCW professor of physics and physical oceanography Marvin Moss said that the institute's main thrust would be education.

"This center is based upon education and research, and I mean it in that order," he said.

Moss also said that, once complete, VI students of all ages will be able to benefit from the knowledge gathered by the marine research center.

But Angeles said that there are still some details to be worked out.

"Once the proposal is accepted, we have to find sponsorship," she said. During a press conference at the Tamarind Reef Hotel later on Tuesday, Babbitt said a large portion of that money will have to come from the private sector.

"It is our hope that we can put together a partnership between the government, universities and the private sector, especially among industries that profit from the Caribbean," he said.

Tuesday morning's signing preceded the third meeting and associated activities of the U.S. Coral Reef Task Force. The two previous meetings were held in Florida in December 1998 and Hawaii in June this year.

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NEWS

For Immediate Release: November 3, 1999

Contact: (DOI) Stephanie Hanna 202/501-4633
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Charting A New Course for Coral Reef Conservation Working Groups of the U.S. Coral Reef Task Force Respond to President Clinton's Order to Conserve the Nation's Coral Reef Ecosystems

The U.S. Coral Reef Task Force adopted and released for public comment a draft *National Action Plan to Conserve Coral Reefs* at their third meeting in the U.S. Virgin Islands on Tuesday, November 2-3, 1999. The Plan focuses on two fundamental themes-Understanding Coral Reef Ecosystems and Reducing the Adverse Impacts of Human Activities. Within these broad themes, 13 integrated conservation strategies were developed to address the nation's coral reef crisis.

The Task Force also adopted a *Guide for Management of Coral Reef Protected Areas*. This Guide will focus on monitoring, education and management to help managers design and build effective coral reef protected areas. The Guide suggests, in conjunction with other scientific information, that a minimum of twenty percent of the area be established as pristine wilderness or replenishment zones.

"Today's actions have made it clear that coral reef ecosystems deserve and will be getting stronger protection from their greatest threats," Secretary of the Interior Bruce Babbitt said. "One of the long-term benefits of the Task Force efforts will be a breaking down of the barriers that separate federal agencies, states, territories and local resource managers. It is important now to share information and strategies that work, put protections in place assess, map and monitor these precious resources that are often in desperate need. The future of sustainable fisheries and tourist economies will be beneficiaries of our success.

Among the National Action Plan recommendations were strategies to : map all coral reefs, assess and monitor reef health, create a network of coral reef marine protected areas, reduce impacts of extractive uses, restore damaged reefs, and increases enforcement on trade in hard corals and marine aquarium species. As part of the National Action Plan, public comment will be sought specifically on whether twenty percent of all coral reefs should be fully protected from all resource extraction.

(More)

"Coral reefs are deteriorating globally at alarming rates. Without a strong understanding of these complicated ecosystems and the challenges that face them, the health of our marine environment and our economy will be jeopardized," said Dr. James Baker, NOAA Administrator and co-chair of the meeting. "The Coral Reef Task Force has taken great strides at this meeting and over the past year to build a strong foundation for coral reef conservation. Together, we are making a difference for generations now and those to come.

Another vital recommendation is to reduce impacts of extractive uses, such as inappropriate fishing methods and global trade of coral reef resources. The United States currently imports over 80% of the live and dead coral in trade and more that 50% of marine aquarium fish. Many of these are overharvested or collected with destructive methods such as cyanide poisoning that destroys reefs. In the Caribbean, more that 20% of the regions dependent species are considered over-fished, while in some Hawaiian reefs, the most abundant reef fish have declined by 40% over the past twenty years. In effort to meet this challenge, the Working Group draft report recommended identifying and protecting critically important U.S. coral reef fisheries habitats and spawning populations by expanding the coverage of no-fishing zones to include reef habitats, in addition to reducing the over exploitation of reef organisms for aquarium trade.

Restoration was also identified by the Task Force as priority strategy. At the Coral Reef Task Force meeting in March 1999, Governor Sunia of American Samoa request that the Task Force develop and implement a comprehensive response and restoration plan for nine longline fishing vessels that came aground on the coral reef flats in Pago Pago Harbor during a 1991 typhoon. In response to Governor Sunia's request, NOAA participated with the U.S. Coast Guard and other trustees to implement removal of the vessels and restoration of the injured coral reefs. This effort marks the shortest time frame for development of restoration plan and it is the first payment of a natural resource damages claim to NOAA from the USCG Oil Spill Liability Trust Fund. Governor Sunia invited the U.S. Coral Reef Task Force to hold their next meeting in American Samoa..

The U.S. Coral Reef Task Force, established by President Clinton in June 1998 at the National Ocean Conference, will also be seeking public comment on the Oversight of U.S. Agency Actions that affect coral reef protection. Both the National Action Plan and the Oversight will be widely available for public comment. Based on the review, revisions will be made and then both documents will be made available for adoption and implementation by the U.S. Coral Reef Force next summer.

U.S. coral reefs cover approximately 17,000 square kilometers. Ninety percent of them are with U.S. islands in the Pacific and the remainder are located off Florida, Georgia, Texas, and the U.S. Islands in the Caribbean. An estimated 10% of reefs worldwide have already been lost and 60% are threatened by human activities including shoreline development, polluted runoff from agriculture and land-use practices, ship groundings over-harvesting, destructive fishing, and climate change. Combined with natural stresses such as storms, bleaching and disease, these pressures put the viability of the world's coral reefs at risk.

For more information about the U.S. Coral Reef Task Force meeting and copies of the National Plan of Action to Conserve Coral Reefs, Oversight of U.S. Agency Action see the Task Force web site at http://www.coralreef.gov Or Contact the NOAA Public Affairs office at 202-482-6090 or the Department of the Interior 202-501-4633.

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NEWS

FOR IMMEDIATE RELEASE
October 22, 1999

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INTERIOR DEPARTMENT, NOAA TO HOST CORAL REEF MEETING IN ST.CROIX

Action plans to be presented for restoration, protection, monitoring of coral reef resources

Secretary of the Interior Bruce Babbitt will be in St. Croix, U.S. Virgin Islands, on November 2 and 3 to co-chair the third meeting of the U.S. Coral Reef Task Force. The meeting will be held at the Tamarind Reef Hotel in Christiansted. Also co-chairing the meeting will be Dr. D. James Baker, Under Secretary of Commerce and Administrator of the National Oceanic and Atmospheric Administration (NOAA).

"The Virgin Islands' spectacular coral reefs are as important to the economy above the water as they are to the health of underwater environment," Secretary Babbitt said. "They are responsible for building and protecting the beautiful beaches that attract millions of tourists each year, sustaining fisheries and saving countless human lives and dollars by protecting the islands from catastrophic hurricane damage."

The U.S. Coral Reef Task Force was created by executive order signed June 11, 1998, by President Clinton. The order directs all federal agencies to protect coral reef ecosystems to the extent feasible and tells agencies to come up with coordinated, science-based plans to restore damaged reefs, both in the United States and around the globe. Federal agencies work closely with representatives from territorial, commonwealth and state governments, recognizing that more than 90 percent of coral reef resources under U.S. protection are located in their waters. Other members of the Task Force include researchers, commercial interests, and non-governmental organizations.

"Coral reefs are the rain forests of the sea. They are home to nearly a million species of marine life and have become an increasingly important source of new medicines," Dr. Baker said. "They are also the foundation of important tourism and fisheries economies. However, it is estimated that two-thirds of the world's coral reefs are seriously threatened, and that is why this meeting and initiative are so important."

(more)

In June, 1998, when President Clinton signed the executive order at the National Ocean Conference in Monterey, Calif., he noted that, "10 percent of the world's coral reefs have been destroyed and another 30 percent will all but disappear within 30 years."

This is the third meeting of the Coral Reef Task Force. The first took place in Florida in December, 1998, and the second in Hawaii in June, 1999. The third meeting will focus on an action plan for future coral reef-related protection, monitoring and restoration activities of the Departments of Interior, Commerce, Agriculture, Justice, Defense, Transportation, and State; the Environmental Protection Agency; the Agency for International Development, the National Science Foundation, and the National Aeronautics and Space Administration.

Secretary Babbitt and Dr. Baker hope to sign a Memorandum of Understanding (MOU) before the Coral Reef Task Force Meeting gets underway. The MOU involves the establishment of a marine research and education laboratory in St. Croix with a consortium of universities. All activities are open to the media The tentative schedule is as follows:

Tuesday, November 2 - approximately 9:30 a.m.: **Governor Turnbull. Secretary Babbitt, Dr. Baker board media board National Park Service Boats leaving from the Buccaneer Hotel dock for a trip to Salt River Bay showing reef ecosystems. A stop will be made, if possible, near the potential site of the marine research laboratory involving the University of the Virgin Islands, Rutgers University, the University of North Carolina - Wilmington and the University of South Carolina. The boats will proceed further toward Salt River Bay to a site within the proposed Salt River Marine Ecological Park and Preserve for a briefing with Secretary Babbitt and Governor Turnbull. Following the tour, boats will return to the hotel.**

Tuesday, November 2, 11:30 a.m.: **Press conference at the Tamarind Reef Hotel (Room number to be determined) on the Coral Reef Task Force meeting, action plan and related coral reef issues. Rep. Donna Christen-Christenson, Secretary Babbitt, Dr. Baker and others.**

Tuesday, November 2, 1:30 p.m.: **Opening statements by Secretary Babbitt and Dr. Baker to members of the U.S. Coral Reef Task Force. Tamarind Reef Hotel - Marina Conference Center. Over 200 people from around the world are expected to attend.**

The U.S. Coral Reef Task Force meeting is open to the media. It will be held in the Marina Conference Center at the Tamarind Reef Hotel. ***The Task Force will meet from 1:30 p.m. until 5:00 p.m. on Tuesday, November 2, and from 9:00.m. until noon on Wednesday, November 3.*** **Closing remarks by Secretary Babbitt and Dr. Baker will likely be given about** ***11:30 a.m. on Wednesday.***

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NEWS
U.S. DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY

FOR IMMEDIATE RELEASE
February 18, 1999

Stephanie Hanna (O) 202/208-6416

BABBITT CALLS ATTENTION TO PLIGHT OF FROGS AND AMPHIBIANS

Amphibian Declines, Deformities and Disappearances Focus of Inter-Agency Taskforce - Interior Budget Increases for Amphibian Response Activities

Secretary of the Interior Bruce Babbitt will speak to an inter-agency Taskforce on Amphibian Decline and Deformities (TADD) on **Wednesday, February 24**, as it meets for the first time since its formation last September. Media is invited to attend the meeting, which will also include presentations by several scientists involved in amphibian research projects.

"Last year, my fellow Cabinet members joined me in responding to an increasing environmental threat showing up in unexplained declines, deformities and even disappearances of frogs, toads and salamanders, species that have been on Earth for 350 million years," Babbitt said. "We agreed to gather the combined expertise of scientists and policy-makers from a variety of government agencies to gain a better understanding of the problems and to point the way toward solutions while there's still time."

In response to this commitment, TADD held an initial meeting in September to organize this multi-agency approach to amphibian problems as to plan outreach strategy to share information with classrooms and private organizations interested in seeking solutions to frog deformities and disappearances in the United States and elsewhere.

The next TADD meeting will discuss new amphibian-related activities in science, conservation and education as well as budget increases for amphibian projects in the Clinton Administrations Fiscal Year 2000 budget request which was introduced earlier this month.

The February 24th meeting will begin at **noon with a briefing by Secretary Babbitt during a working lunch in Room 5160 of the Main Interior Building, 1849 C Street, NW** in Washington, D.C. The TADD meeting is expected to end about 2:30 p.m. The working lunch will also be open to media.

TADD includes representatives from the Departments of the Interior, Agriculture, Education, Justice, Health & Human Services, Defense, State and Energy; the Environmental Protection Agency, U.S. Agency for International Development, Smithsonian Institution, the National Science Foundation, GLOBE; and the White House Council on Environmental Quality and Office of Science & Technology Policy.

To provide the media with additional background and information on amphibian problems, Environmental Media Services will host a **media breakfast on the morning of the 24th at the Willard Hotel in Washington. Secretary Babbitt will kick off the breakfast at 9:00 a.m.**, which will also include presentations by scientists studying frog disappearances and declines nationally and internationally.

-DOI-

NEWS SUMMARY
U.S. Department of the Interior Office of Communications
PICK-UP IN ROOM 1063

The Boston Globe boston.com JAN 28 1999

Nation | World

US sets move on invasive sea organisms

By Peter J. Howe, Globe Staff, 01/27/99

CAMBRIDGE - As soon as next week, President Clinton will order federal agencies to escalate efforts to slow a so-called "bioinvasion" of American harbors by shellfish, crabs and other creatures arriving on barges and ocean freighters, Interior Secretary Bruce Babbitt announced yesterday.

In recent years, as global trade has exploded, shipping has led to the spread of hundreds of species outside their home habitat. Some arrivals threaten to become marine versions of gypsy moths or kudzu, pests wreaking ecological havoc on US harbor life.

In the Great Lakes, for example, the zebra mussel, which apparently arrived in this country from Europe 11 years ago, now breeds so abundantly it clogs up intake pipes for water works and power plants and is blamed for making Chicago's water smelly in summer. The mussel has spread down the Mississippi River and several tributaries as far south as New Orleans.

A Japanese whelk is beginning to devastate oyster beds in Maryland's Chesapeake bay, marine authorities say. Virulent Third World strains of cholera have shown up in some Gulf Coast waters. As many as 4 of 10 species found in Pacific Northwest harbors and estuaries are foreign invaders.

And the United States is not only on the receiving end: The Atlantic comb jelly, a phosphorescent jellyfish that Cape Cod beachwalkers stir up at dusk, has devastated anchovy fisheries in the Black Sea.

At a first-of-its-kind global conference on strategies to fight marine bioinvasion, held at the Massachusetts Institute of Technology, Babbitt told 250 scientists and researchers that Clinton will issue an executive order soon ordering federal agencies to collaborate on stopping the plague.

"We're going to have to find some sort of approach that is more comprehensive," Babbitt said, adding that Clinton's executive order will come "very shortly."

Every year, according to an Australian researcher, Geoff R. Rigby, 10 billion tons of sea water are transferred around the Earth, used as ballast for 29,000 large merchant vessels and naval fleets.

Several strategies could slow the spread of harmful exotic species, but all would create cost and inconvenience for shippers.

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all would create cost and inconvenience for shippers.

Examples include requiring ships to dump or flush out their ballast holds 200 miles offshore where invasive organisms might die, or using engine waste heat, filters or ultraviolet devices to kill them before discharging ballast water in foreign ports.

Many participants, including Craig N. Johnston of the Lewis and Clark Law School in Oregon, say that ballast water and pollutants should be regulated under the Clean Water Act. Babbitt called that "an idea that ought to be discussed. It has some obvious benefits and some obvious problems."

Whatever regulators advise, Babbitt said, "We'll hear a lot of squawking, a lot of squawking" from shipping groups, port authorities and regulators faced with enforcing the law.

James T. Carlton, director of the Williams College Maritime Studies Program at Mystic Seaport, Conn., said, "The science of marine invasions is no more than 10 years old, but huge demands are placed on it to be robustly predictive."

However, data are so scarce that "we suffer from a Swiss-cheese view of invasion ecology, with far too many holes to produce broad, compelling predictions" or guidance on effective solutions, Carlton said.

It could be years or decades before it becomes apparent which of the hundreds of bioinvaders prove problematic. But Chris Bright of the Worldwatch Institute, author of a book on the subject, argued that "bioinvasion may already rank just behind habitat loss" as a trigger for extinction.

Over the past century, Bright said, exotic species have played a role in 68 percent of US fish extinctions.

This story ran on page A03 of the Boston Globe on 01/27/99.

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"Launching a Counterattack Against the Pathogens of Global Commerce"
Prepared Remarks of Secretary of the Interior Bruce Babbitt
First National Conference on Marine Bioinvasions
Massachusetts Institute of Technology, Sea Grant College
10 am January 26, 1999

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At the outset, let me congratulate the conference sponsors. You are taking the initiative in a much neglected field. Marine bioinvasions have large consequences for our food supply, our economy, our fishing industry, and human health. These invasions also threaten to degrade and homogenize coastal waters in every corner of the seven seas.

***

Ten years ago, just after midnight on March 24, the *Exxon Valdez* crashed into a reef in Prince William Sound. Eleven million gallons of crude oil poured into the pristine waters, casting a shroud over hundreds of miles of shoreline. Television crews on the scene broadcast images of seabirds, otters, and sea lions, slicked black with oil. Those images fixated the world on the dangers of oil spills and led to many new laws and regulations designed to prevent another such tragedy.

Yet the biological spills taking place in Prince William Sound from oil tankers go virtually unnoticed. Just over a year ago the U.S. Fish and Wildlife Service discovered four new species of zooplankton spreading through the sound, released from ballast water brought by tankers from East Asia via San Francisco Bay. In the long run, these zooplankton, feeding on phytoplankton utilized by the Dungeness crab, may change the sound more extensively and permanently that any oil spill.. And no one has a clue -- or a dime -- to contribute toward a massive "clean up.". Were that even possible.

With just four, small bioinvasive species, Prince William Sound is relatively lucky. So far. But look farther south, where a prolific, and hungry European stowaway has disembarked. The green crab has begun to infest Pacific coastal waters, devouring anything, from commercially valuable oysters and clams to barnacles, algae and snails. And it's not alone. In the northwest nearly forty percent of all aquatic species are exotic, including the spartina that has choked Willapa Bay and decimated the shellfish industry. This particular invader came from our own Atlantic coastal estuaries.

It gets worse inside the Golden Gate. There, as Interior Secretary, I have worked with environmentalists, irrigation farmers and cities to get more freshwater down California's main rivers into the Delta and San Francisco Bay. Our goal is to help restore endangered native fish like chinook salmon and Delta smelt. Only now I know that it is not enough to ensure healthy flows downstream; our real threats may be coming *upstream*.

Specifically, some 30 species of exotic fish -- Asian goby, Atlantic shad, Mississippi catfish, carp, bass, perch, sunfish...*gold*fish -- are swarming the bay, a veritable marine zoo. An additional 200 bioinvasive species suffocate native fisheries and helped drive the thicktail chub to extinction. Those are only the *documented* cases, with new arrivals every ten weeks.

Moving eastward, the Gulf of Mexico is being mugged by the brown mussel, which displaces native mollusks, threatens mangroves, and fouls water intake systems. In the Chesapeake, a hotspot for over 150 documented bioinvasive species, oyster beds now succumb not only to polluted runoff, or overharvest, but to the new arrival of a predatory whelk. I'll let the courageous researchers detail what's happening less than a mile away from here, in North America's oldest coastal port and fishery. It's too depressing for me.

It might be easier if we could simply blame the rest of the world for our troubles. But the truth is ballast water sloshes both ways. In the early 1980s, a small, luminescent blob called Leidy's comb jelly was pumped aboard ships along our coast, then discharged weeks later into the Black Sea. With no predators, it mushroomed into one of the most intense marine invasions ever recorded, nearly wiping out anchovies and other fisheries. Zebra mussels exchanged for jellyfish: the maritime law of reciprocity at its darkest.

***

No place on earth is immune from the twin threats of extinction and alien invaders. In the mid-nineteenth century, when wooden whaling ships cris-crossed the seas in bloody pursuit, Herman Melville pondered: "whether Leviathan can long endure so wide a chase and so remorseless a havoc; whether he must not at last be exterminated from the waters." He took note of how we were pushing the buffalo to extinction on the prairies, but dismissed it as impossible on the high seas, rationalizing that, surely, whales could escape to polar regions and thus become "immortal in his species."

Mankind never used to navigate such frozen regions, even though the fouled wooden hulls like Ahab's surely carried a few unwelcome guests. To be sure, bioinvasion from ships is as ancient as the Vikings and the Phoenicians. Even when ballast consisted of stones, dirt and iron, some exotic bioinvasive species hitchhiked along.

What has changed in the past half century is the rate of spread, leading to faster, wider, more complex dispersal. We reach remote ports on a weekly, daily, hourly basis. From more diverse trade routes. Loaded with much larger volumes of ballast. Discharge of that ballast is nothing more than "point source pollution" and must be treated as such.

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Global aquaculture -- shrimp farms, public fish hatcheries, commercial oyster beds -- also bears responsibility for the spread of epibionts, parasites, predators and pathogens. So does the aquarium industry. The outbreak of giant African snails in Florida or the *caulerpa taxifolia* clone, an alga taking over the Mediterranean, originated not in ballast, but from aquarium tanks.

All these sources must be included in our response, policy and research. But at a more immediate level, we must grasp the root of the problem. That root lies not in isolated incidents, but in scope: the dramatic rate of spread, the increasing vectors of pathogens that carried cholera to Alabama and seem to multiply toxic "red tides" around the world.

As a very crude rule of thumb, ten percent of invasive species will establish breeding populations; ten percent of those will launch a major invasion. At first, that "one percent" factor seems negligible. Then consider how San Francisco Bay is approaching 300 exotics.

Consider also that ships this century have grown from 3,000 tons to 300,000 tons, and the volume of ballast water slurry -- pumped and sucked at 20,000 cubic meters an hour -- has kept apace. Faster crossings let more species survive, reproduce, make connections, and take baggage. The fall of trade walls brings global exposure to once quiet seaside ports, and vice-versa. In the ballast water of timber cargo ships traveling between Coos Bay, Oregon and Japan, researchers found 367 species of living animals and plants.

That's a single route. Consider how larger ports, say Norfolk and Baltimore, receive more than 12 million metric tons of foreign ballast water per year, originating in 48 different foreign ports, and 90 percent of them carried live organisms, including barnacles, clams, mussels, copepods, diatoms and juvenile fish. Worldwide, it is estimated that tens of thousands of ships carry several thousand species daily.

Let me put this another way: In the time it takes me to deliver this speech, two million gallons of foreign plankton will have been discharged somewhere in American waters. We'd better get busy. And fast.

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How? What is our response? So far it has been pitiful. Frankly, in light of the economic and ecological devastation, we have been too timid. We restrain ourselves with voluntary guidelines, a scattered approach and limited, unenforced codes. No longer.

In 1997, President Clinton, responding to concerns of scientists like yourselves, asked the Departments of Interior and Agriculture to draft an executive order for his consideration. That order, which is now before the President, will contain two broad initiatives. First, it will require federal agencies to review their existing authorities and activities to reduce the risk of bioinvaders. Second, it will create an interagency working group to draft a plan -- possibly including regulatory and legislative change -- necessary for a coordinated response to bioinvaders.

What will this look like in practice? I'll sketch the rough outlines in pencil. For there are existing models, and while there is still much to learn, we do know this: the first and best line of defense against bioinvaders is to keep them out in the first place. Period.

Not one marine bioinvasive species, after it has taken hold, has ever been eliminated or effectively contained. There is simply no silver bullet. This is a sobering fact. It means our efforts must be focused primarily on prevention. And that, in turn, means effective regulation and enforcement.

In 1990, in response to the damage caused by the zebra mussel in the Great Lakes, the Congress enacted Nonindigenous Aquatic Nuisance Prevention and Control Act. Among other

provisions, the Act now requires ballast water exchange at sea rather than in the Great Lakes system. We should now move toward mandatory ballast exchange for not just the Great Lakes, but for all shipping in all American ports. In California water districts whose systems are threatened by invaders working their way upstream out of San Francisco Bay have begun to call for ballast water regulation by federal and state agencies..

We need to mount a coordinated research program to better understand the threats posed by alien invaders including fish, crustaceans, mollusks and pathogens and to guide programs of prevention and control. Perhaps we can find economical and safe means to decontaminate ballast water and sediments in situ. The Agricultural Research Service and APHIS in the Department of Agriculture, the Coast Guard, the National Oceanic and Atmospheric Administration, and the Biological Research Division of the United States Geological Service should mount a coordinated effort to understand agricultural threats, threats to natural ecosystems and new methods of prevention and control.

Does this mean our agency budgets must catch up to, and keep pace with, the ecological devastation they target? Yes. Because that devastation is economic as well. Vast as they are, the Great Lakes are easy compared to the task ahead, and offer few unqualified success stories. Yet as a case study, it makes a strong case why an aggressive, well-funded public response to bioinvasion is well worth the expense and effort.

We spend several million dollars a year sterilizing, catching, poisoning, putting up barriers to suppress the sea lamprey. Well, it's still there. And it may never go away. But for every dollar we invest, the Great Lakes earn $30.25 in increased fisheries revenue. Your stock portfolio should perform as well.

Global cooperation is an imperative. Our joint efforts with Canada on the Great Lakes provides and example. Two global entities -- the Convention on Biological Diversity and the World Trade Organization -- should play a major role in international cooperation. The Convention on Biological Diversity is the place to begin, and indeed preliminary discussions pursuant to section 8 of the Biological Diversity Treaty are underway. Those discussions underline the need for Senate ratification of the Biodiversity Treaty. The World Trade Organization must also take an active role in the movement to develop and harmonize regulations in this area.

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Let me conclude on a cautious note of hope. You've all heard that the flip side of crisis is opportunity? Well, the *Exxon Valdez* crash gave us such an opportunity. It led Congress to require double hulled tankers and stiffen training, navigation and technology within the shipping industry. It prompted state, federal and private agencies to establish habitat restoration programs, and undertake comprehensive research on the North Pacific ecosystem.

We face an even greater opportunity now. The time is at hand for scientists, policy makers, and industry and the public to join together for an intensive coordinated counterattack on the threat of bioinvasions. You have initiated that process, and we in the public sector must now respond in kind. Thank you.

FREQUENTLY ASKED WEED QUESTIONS

What is meant by "exotic," "alien," "non-native" or "non-indigenous" plant species?

These terms refer to plant species that humans have intentionally or unintentionally introduced into an area that is outside of their natural range.

Are all exotic plants harmful or invasive?

Not all exotic plants are harmful or invasive; many exotic plants such as potatoes and soy beans are agriculturally important. Some exotic species upon initial introduction appear to be non-invasive; however, after a long quiescent period some exotic species may become invasive and disrupt natural or agricultural systems.

How are exotic plants spread?

There are many mechanisms that facilitate the spread of exotic plants. Some are spread by physical forces such as wind, water, and gravity. Others are spread by hitching rides or stowing away on clothing, animal fur or feathers, or transportation equipment such as cars, trucks, trains, boats and planes. Some spread by extending roots or stems into new territory. Others such as kudzu, Russian olive, and purple loosestrife are planted by well meaning individuals for wildlife habitat, erosion control or ornamental landscaping.

How many exotic plants are there in the United States? How many of these are harmful or invasive?

Estimates on the total number vary. At least 2000 species of foreign origin have been identified. This is a conservative effort because extensive surveys have not been completed and because this does not include those species native to one part of the U. S. that have been introduced into other areas of the U. S. In a survey conducted by the Exotic Pest Plant Council at least 350 species have been categorized as serious invaders by resource managers, botanists and other knowledgeable sources.

How big is the problem? Are many ecosystems affected?

Estimates of the acreage affected by these species varies, because surveys are either incomplete or they have been conducted at different times using different standards. However, one fact is undisputable, these plants are spreading at alarming rates. In Florida, the melaleuca tree has spread explosively at an accelerating rate over the past three decades.

Noxious Weeds and Invasive Plant Problems
of the Eastern and Tropical United States
Nov 30 - Dec 1, 1995
Fort Lauderdale, FL

Background: In September 1995, a Western Weed Conference held in Denver, Colorado brought Federal, State and local agencies, together with universities and a variety of interest groups. The purpose of this meeting was to develop a strategy to address the increasing ecological and economic problems caused in western states by rapidly expanding populations of non-native, invasive plants.

Participants at this meeting drafted a framework for a national strategy to fight the problems caused by invasive weeds. The five elements of the draft strategy are: 1) education/prevention; 2) inventory/monitoring; 3) integrated weed management systems including, biological, chemical cultural and mechanical methods; 4) cooperative weed management projects; and 5) research and information needs. The participants recommended several actions for each of these five elements.

Governor Romer of Colorado volunteered Colorado as a model for a state-wide state demonstration of the management of western weeds. The planning and development of this multi-partnership effort is already underway.

Purpose: Governor Chiles of Florida will host the Nov 30 - Dec 1 meeting, which will parallel the Western Weed Conference. The first day of the meeting ill focus on the ecological and economic problems posed by non-native plants in the eastern and tropical United States. The second day will bring stakeholders together to continue the development of the national strategy drafted in Denver, with special emphasis on the problems in eastern and tropical areas of the United States.

Results of this meeting will include: Introduction of decision makers to the extent of the problem in the eastern and tropical areas of the United States.

Recommendations for action in each of the five elements of a national strategy, with emphasis on the eastern and tropical areas of the United States. These recommendations will be combined with those from the Western Weed Conference to create a comprehensive national strategy at a joint meeting of the Western Society of Weed Scientists and Western Weed Coordinating Committee in March, 1996.

Establishment of communication networks and cooperative partnerships among organizations, agencies and others who are concerned with the ecological and economic problems created by interested in taking action to resolve the problems created by non-native, invasive plants.

Establishing an eastern or tropical weed management demonstration project at the state level.

Virtually every ecosystem in the United States has been affected by exotic plants. Many of our native grasslands have been or are being replaced by invading non-native grasses and other plant species. Waterways throughout the U. S. have been clogged by such plants as water milfoil, hydrilla, and water hyacinth. Forest ecosystems have been invaded by garlic mustard, kudzu, and honey suckle. Some native species in the Everglades and Hawaii are facing extinction due to the spread of exotic trees and other plant species.

What are some of the ecological effects of invasive exotic plants?

Exotic plants can hybridize with native species. For example the Asiatic bittersweet has genetically swamped entire populations of American bittersweet. Exotic plants serve as reservoirs or transmit diseases for which our native plants do not have resistance. Eastern trees affected by diseases or fungi imported to the U. S. include American beech, American chestnut, dogwood, and butternut. Exotic plants invade habitats, and form single species stands, eliminating many native plant species or entire communities. For example, melalueca in Florida eliminates native plant communities on hammocks, removing critical food, nesting and shelter resources for wildlife. English ivy, kudzu and Japanese honeysuckle are replacing diverse forest herb layers with single species. Exotic species alter natural fire regimes. Exotic grasses in Hawaii support fire and create situations where additional exotics can invade after a fire. Melaleuca on the other hand, is fire retardant and reduces the frequency of fires in the grasslands it has invaded. Exotic species have direct and indirect effects on wildlife species by altering habitat, producing toxins, eliminating food sources or changing soil characteristics. Changes in soil characteristics can result in soils unable to support vegetation or soils without vegetative cover at critical times of the year; both of these conditions increase soil erosion.

What are some of the economic effects of invasive exotic plants?

The economic costs are staggering. The Weed Science Society of America estimated in 1984 that the annual loss in productivity of 64 U.S. and 34 Canadian crops was $7.4 billion and $909 million respectively. The direct loss to range lands in a 1993 study conducted by the Office of Technology Assessment was estimated at $ 3.6 - $ 5.4 billion annually. Tropical soda apple, first reported in Florida in 1987, demonstrates how quickly the costs mount. This plant now covers at least 370,000 acres in Florida and its estimated impact is now placed at $ 28 million annually. Purple loosestrife, found in al least 36 states costs $ 45 million annually in management costs and lost forage costs. Florida spends $ 11 million annually to manage water hyacinth.

In FY 96 the BLM, NPS, FWS, NBS, BR and BIA estimate they will spend $ 14 million for the management of non-native, invasive plants.

What are some of the most common methods of control to keep invasive exotic plants from spreading?

There are six primary methods for preventing the spread or introduction of non-native , invasive

plants. They are: prevention, education, and cultural, mechanical, biological, and chemical control.

Prevention and education are the first lines of defense. Preventing the introduction of unwanted plant species is probably the most economical. This approach requires well trained personnel to be in locations and situations where plants are most likely to be introduced or imported to this country. Education efforts increase public awareness of the economic and ecological impacts of invasive plants and inform individuals of their direct or indirect role in the transport or relocation of unwanted plant species.

Cultural management focuses on the maintenance of sound ecosystems or healthy agricultural systems; healthy ecosystems are less likely to be invaded by non-native plants. This often includes burning to control invasive species, especially in ecosystems such as grasslands, which require frequent low intensity fires to maintain their natural diversity.

Biological control involves the planned introduction of natural enemies of the invasive plant. Many invasive plants thrive in the U. S. because they arrive in their new location without their natural enemies such as diseases, or insects which keep their populations in check in their native habitat. Before a natural enemy is introduced it undergoes extensive testing to ensure that it does not become a pest. Selective grazing is another form of biological control that has proven effective in cases where the livestock have a preference for the weed species. Biological control is probably the most realistic and effective means of managing those species which have established extensive ranges within the U. S.

Mechanical methods such as mowing, pulling, digging or chopping are an effective means of controlling some invasive plants. Mechanical control is frequently used to remove invasive aquatic plants from lakes, reservoirs or irrigation canals. In upland areas mechanical control is used before an invasive plant sets seed. This reduces the potential spread of the plant by seed. Mechanical control is labor intensive and may require special equipment.

Chemical control methods involve the application of herbicides. This method is frequently used for agricultural weeds; it is not always appropriate for environmentally sensitive natural areas. Herbicide use can be expensive and may affect non-target plants as well as the targeted species.

Characteristics of Invasive, Exotic Plants

They often permanently alter native plant communities.

They directly and indirectly adversely affect many wildlife species.

They are spread by wildlife, livestock, recreationists, wind, water, gravity, vehicles and other equipment.

Their initial contamination and propagation are inconspicuous, usually noticed only by experts.

Their impacts are often not apparent until the spread is already out of control.

They increase erosion, fire hazard, and loss of critical water resources.

They can be toxic, painful or injurious to humans, livestock and wildlife.

They increase the vulnerability of threatened and endangered species by eliminating habitat.

They spread at an average rate of 14% per year. Some species can spread at more than 20% per year.

Examples of invasive exotic plant impacts:

The old world climbing fern, not found on the Loxahatchee National Wildlife Refuge in 1983 now covers 17,400 acres. No effective treatment for this species is known.

Florida spends $ 11 million annually to manage water hyacinth in 1,600 miles of canals and 600,00 acres of public lakes.

Purple loosestrife has spread to 36 states, covers 400,000 acres and costs $ 45 million a year in control costs and lost forage. It threatens 90% of the breeding wetlands used by waterfowl on the Atlantic and Mississippi flyway.

Since the early 1900's melaleuca has covered over 488,000 acres in Florida and is spreading at a rate of 50 acres per day.

"GLOBAL WARNING: A CALL TO ACTION ON CLIMATE CHANGE"

Remarks of Secretary of the Interior Bruce Babbitt

In Portland, Monterey, Boulder, Ann Arbor, New York, Palm Beach and Washington, DC

Thank you very much for that great introduction. It gives me great pleasure to come here before this extraordinary, vibrant, and contentious community, to speak on one of the most complex and important issues of our time.

That issue, of course, is global climate change. The irony is this: climate change is the largest, most pervasive and ominous threat that we have ever confronted in this civilization; it will be the dominant issue of your generation. Yet having said that, climate change is at the same time absent from the marketplace of American discussion and contention. It is not yet a significant public issue. And I confess a certain puzzlement that -- having been in all the Western resource issues: water wars, grazing fights, endangered species conflicts, mining battles; having been hanged in effigy in every community in the West for many years -- I know that we're confronting something of an entirely different scope.

This crisis is rushing on, we haven't been able to get the issue before the American marketplace of public opinion, and the hour is late, but what I want to talk about is the science of climate change, the politics involved shaping the Clinton Administration response, the economics, and the desperate need that we share together to strike some sparks and find a way into the marketplace of debate.

The reason I've been targeting college campuses is that this is manifestly an intergenerational problem. The results of climate change are not going to be too visible in my generation, but will be visited many times over in your generation and it poses a challenge for of us to see whether we can persuade this democracy of ours to take hold of this issue, even though the consequences can't be seen, or felt, or smelled, or tasted, or even anticipated.

I thought I'd start on a pessimistic note tonight; wring my hands in front of this audience. As if global climate change weren't enough, to top things off, the usual suspects are out there with a $13 million advertising campaign, run by the auto industry, coal industry, fossil fuel industry. It is a model which is worthy of the best efforts over the last 30 years of the American tobacco industry.

The campaign that is now being put up is based on exactly the same premise. In aid their short term, bottom-line profits, and ignoring mid to long term interests, they say "We will simply first deny that the problem exists; secondly hire and suborn a few pseudo scientists to confuse the American people by creating the appearance of a scientific level of uncertainty -- that in fact does not exist; and thirdly predict the end of civilization as we know it if steps are taken to deal with the problem." They prophesize the collapse of the American economy.

But first, we start on the road to Kyoto -- the next climate change discussion that comes in a few months -- with the scientific facts. Just the facts.
It's very important as we move to broaden the debate, that we be crystal clear that there is a scientific consensus -- backed by 2,600 scientists around the world -- about what is going on. The greenhouse effect has been known for a hundred years. You can feel it sitting in your car on a hot summer day with the windows rolled up. It's just that simple. Again, the driving fact is that the emission of greenhouse gasses is driving climate change; we've seen the effects, it's underway, the line is now emerging above the background noise.

This is what no one can deny: Carbon dioxide content in the atmosphere today is 30 percent higher than it was at the beginning of the industrial age. If we stand by and do nothing, the carbon dioxide content will double within the mid range of the coming century. As sure as sunrise, by laws of chemistry that can be worked out on the back of an envelope, the heating trend will continue.

We're seeming it already, about a one degree rise this century. We're seeing it of course in the thermal expansion of oceans; sea levels have risen an additional 4-6 inches this century, but more importantly, within your lifetime and probably about the middle of the next century those figures are going to move a lot faster. We're going to see a 3-5 degree temperature increase and sea levels rising in the range of 1-3 feet.

Now, you all know these facts, but the bottom line is that the American people don't. Because you can't see or smell or taste or touch these consequences on a day to day or week to week or month to month basis. So how do we talk meaningfully about them?

Let me take you on a tour of the consequences and invite you to think about how to do this more specifically and persuasively. It starts with my position as Secretary of Interior, steward of the public lands. Last week I was in Glacier National Park, and naturally I set out trying to see one. I had a hard time actually finding a glacier. I went up a trail and first of all it said "The glacier was here in 1900." But no longer. I went up farther and another sign said used to be here in 1920; I walked miles up that trail because the glaciers have retreated 50 percent since the beginning of the century. I finally found a glacier, only to read a sign that said "You're just in time, because these glaciers will be totally gone in 2030. And of course that's a worldwide phenomenon. I need not explain the consequence of melting ice masses in terms of rising sea levels and oceans. But I stood in that park and thought to myself, that the only way to keep my responsibilities to the park would be to pick it up and move it north into Canada. I can't do that. And I think of all the endangered species in Rocky Mountain National Park looking for consistent and higher latitudes to replicate current conditions. We can't move parks for them. Species which used to move with slow climate change gradually across the landscape are now going to be isolated, triggering yet another facet of the extinction crisis.

I was in the Everglades about a month ago, a really keystone ecosystem in this country, the only tropical water system that we have, a balance between the sea, freshwater systems across

Florida. It's a magical place. But the bottom line is when I read the Intergovernmental Panel on Climate Change report, backed with scientific consensus, I realized I've got to draw a line that eliminates about a third of the Everglades, because that third will be under the sea in your lifetime. We'll be redrawing a map of Florida, Louisiana, all the coastal states along the Atlantic, with an enormous invasion of seawater and destruction of those ecosystems, with rippling effects into the fisheries, into all the development and sea coast.

We're going to see agricultural consequences of a severe order. The really big ones are going to be abroad, of course, because of the drying effects which will hit tropical agricultural areas, and that will inevitably result in a food supply crisis. Along with this, we've got to ask, what are we going to do with 20 million displaced people in Bangladesh, who have no place to go. For with a two foot sea rise, we're looking at 60-80 million people who have been dispossessed. Some say that's not an American problem, but we all know that in this borderless world we live in that the problems are never confined, they ripple throughout they system.

Some have suggested that the high plains are going to be the first to see problems in American agriculture. That landscape, hundreds of years ago, used to be a shifting sea of sand that has stabilized with very small climate changes in the last few hundred years. But it could all go the other way.

We don't think much of tropical disease in America. But Malaria is the persistent endemic killer in this world. Hundreds of millions of people are affected every year. And we're now starting to see those mosquito vectors in places like New Jersey, Texas, and Florida, a reminder that those changes are going to trigger some really remarkable epidemiological crises. We don't know the exact nature, but it's easy to understand that they will happen.

Now, lastly, let me wrap up this tour by saying that scientists will tell you that there's another dimension to this: Stress responses in non-linear systems. That means that means that as we begin anticipating these consequences, there are some enormous uncertainties. Yet it's no coincidence that civilization has grown up during the 10,000 years in which we've had absolutely steady state stable climactic conditions. But if you go out on the other side of that, there were thousands of feet of ice over New York, when it was less than ten degrees colder that it is today. Less than ten degrees. A movement of ten degrees put 2,000 feet of ice. We're talking about an equivalent move in the other direction, warmer. So what that's talking about is thresholds whose change is truly dynamic consequences. Some of you may say, "Losing New York is no problem". But the consequences aren't going to be limited, but pervasive in the US.

Okay, that's my tour of the science. Now I'm not a scientist. I actually went to college and got a degree in geology, and went to grad school and got a degree in geophysics. But one night, after a long gruelling problem set I was walking home in a reflective mood, and decided with an epiphany that I wasn't really smart enough to do this kind of scientific research. I said to myself that night "I've got to find a softer line of work." So I went to law school. And from

there embarked upon a long spiral down to my present position.

As a practitioner not of hard science but of what you will...social science, let me track this pervasive problem back into the political system, to see if we can find the beginnings to strike sparks and get this back into the public discourse.

First we have to refute the opposition. They've gotten away with bloody murder and we need to call them task, take them on, and refute their arguments. Then we've got to sell our program, saying: Here is what the Clinton Administration proposes to do.
There is a $13 million advertising campaign coming over the airwaves to keep the status quo. It's hard to find the sponsors of this campaign; you need to get a magnifying glass to the newspaper and find out who's behind all these groups called "Center For a Better Environment," "Partnership for Social Responsibility" and all that. But lurking behind those names are the usual suspects. Who are they? Let's talk about three of them: The auto industry, the energy industry led by the coal industry, and the chemicals industry.

I think we should suggest to the American people that the arguments that they are making ought to be judged by what they've said in the past. Judge them by their record. Now, some of you may be old enough to remember the auto industry's dispute over catalytic converters, which were proposed as a way to deal with auto emissions. The industry's response was that "You are threatening American civilization as we know it. The auto industry will be decimated. People will be walking shoeless in the streets." Well, today, we have catalytic converters, have made a major increase of environmental effectiveness. The US auto industry has emerged stronger and revived by setting a world standard with the competitive use of new technology.

A few years later, some brave souls in Congress said we ought to have milage standards. The response in Detroit was, again "You will destroy the industry once and for all." The fact is milage standards are in effect, and the ensuing technological revolution helped revive the competitiveness of the auto industry, which has gone from the Triassic age into a world leader.

Let's talk about the energy industry, coal industry, the people who burn coal and who emit sulfur dioxide. Let's look at their record, as they step forward and say "You're going to decimate our industry, make us less competitive, drive up prices, choke off exports, raise costs and destroy jobs." They started that line with a specific proposal back in the 1980s to do something about acid rain. They said, "Costs will destroy American industry." I remember that one in particular because at the time I was Governor of one of those square western states called Arizona. When controls were proposed, the amassed forces of the American mining industry -- in Arizona they're the 800 pound gorrilla -- came piling in to my office and said: Young Man, you're only the Governor. We hold the power. Line up with us in opposition to the clean air regulations because if you make us put acid controls on those smelters, that's going to cost money, and they don't have those controls in Chile, and therefore American workers will be thrown onto welfare, we're going to close our mines down. It will be the end of Arizona industry, taking your political carreer with it.But I bit my lip and we stood our

ground and ultimately, they shut one smelter down to try to push us into relenting, then complied with the law in other smelters.

Now when I go back to Arizona I hear, "Bruce, all is forgiven. We need a new Governor. Please come home." But what I really hear, seriously, is that Arizona is selling 44 percent more copper under compliance with the Clean Air Act than they were before. Our exports are more competitive than ever. The technological competitiveness is we are now selling technology to other countries around the world to countries who want jobs, growth and clean environments. Those controls prove the prophets of doom and gloom false. They work, they drive efficiency and change, and ultimately make us more productive with more jobs.

The chemical industry is part of the coalition that is crying "The sky is falling, you are set to destroy us all." When did you last hear that from the chemical industry? About ten years ago, when professors at UC Santa Cruz raised the warning flag about the use of freon and clorofllorocarbons and said if we continue to use these things, we'll have big problems with the destruction of the ozone layer. The hue and cry from the chemical industry was "American civilization rests on freon, if you destroy our capacity to use these chemicals to make foam cups, civilization will crumble." And they effectively mounted a campaign to paralyze our ability to change, until the American people figured it out and supported a law to phase out freon. And low and behold, what happened? The chemical industry found a substitute, we have cups. Civilization is safe.

What are they doing here? It's an old American tradition. They say their bottom line might be affected in next several years, and that's the measure of their responsibility to American society. But they must make society work, step up and acknowledge that these problems are real and that in fact *they* are the technological pessimists. Industry underestimates its own capacity for innovation. Yet time and time again, the history of environmental controls is positive that we can innovate, that technology can drive change, promote efficienc, create jobs and improve the environment.

Lastly, having smote the opposition, let me suggest what we need to do from here. The road to Kyoto is now before us. The President has begun talking publicly to the American people about the bottom line. And that is that we must be a signatory to an international agreement setting targets and timetables for the reduction of carbon emissions. We must.

There was an agreement in Rio a few years ago that said we'll do it on a voluntary basis to get back to 1990 emission levels by 2000. It hasn't worked, for many reasons. There is a certain skepticism to take on responsibilities to reduce emissions when elsewhere in the world someone might be erasing your gains because of the failure to come together on a solitary mandatory commitment. That is why the President is publicly committed to targets and timetables. Now, the question coming from the US Senate and from some parts of the naysayers, is "Will it work? Isn't this a huge leap of faith to go to an international convention to sign a mandatory agreement to begin cutting down carbon emissions?"

It is not a leap of faith, but an act based on experience. The fact is that unknown to most Americans, we already have a model before us and have done it in a comparable situation. Remember freon? We went to Montreal in 1989 and signed an agreement doing exactly what it is we need to do in Kyoto in December. The message we need to get out to the American people is that this is not some abstract academic construct, but a road we have already been down, and it's working because the fact is we are on track for a complete phase out of freon, the costs have been way under projections. So when you see those advertisements --with a reader with a furrowed brow saying in essence that developing countries are not in exact lock step and so it won't work -- you know not only that it could. But that it is right now as we speak.

Urge those ad sponsors to tell the truth. Look at the record. History shows in Montreal that we need to acknowledge an equity argument. Everyone in this room are responsible for 20 to 50 times the per capita amount of emissions put out by a resident of a slum in Calcutta, or a farmer in Brazil, so how can we all be expected to act in a similar way? That issue was raised in 1989. This is a practical problem; we can work it out. That meant that the phaseout schedule for developing counties was a little longer. An economic fund to help the costs of transition. The plain fact is that it's working. The opponents of change are trying to tell us that we can't go and negotiate that deal. Act as if we have no historic basis. They're wrong, and we need to counter that argument every step on the road to Kyoto.

The last argument put up by those opponents of change in what I call the Tobacco industry offense is this: After they first deny the problem exists, then create the false appearance of scientific debate, then they say "Well, we can't afford to do anything about it." The counter argument to how we reduce emissions is important. There are two general approaches.

One is to use regulatory models that speak of mandating specific issues such as gas tax, milage, fuel switching, removing subsidies, putting more investment in energy such as solar and wind and geothermal.

The other model, which I have argued may be more effective, is using the marketplace. We have a historical experience, a model with the reduction of acid rain. It's called emission trading permits. We tried this with acid rain: Rather than try to regulate every emission source in the country, we said, "Okay, we're going to lower acid, sulfur dioxide to X level, then issue permits at that level, then create a market in the Chicago exchange, which allows flexibility, fuel switching from coal to natural gas, burn lots of H's from fewer C's. The market helps us move across with simple expediencies. Move subsidies and incentives, all driven by this market. It's just that simple. It's within reach. When our opponents talk about costs and sacrifice our answer is that this is not about a tortuous "hairshirt" response. Use the Montreal Protocol model of international commitments backed up by the acid rain emissions permits trading.

In the process, we are moving down the pathway of doing what we ought to do, a no-regrets policy of cleaning up pollution, making our system more efficient, providing more output and

growing more competitive with more employment. What's holding us up is getting public understanding to a higher level. Which brings me here before you tonight.

I would argue that more than anytime in our public life, this is the time when the understanding of changes is going to be driven by what happens on college campuses across this country. Big changes on complicated issues never originate in Washington, they originate in the matrix of American society. In my time it was the Civil Rights Movement that originated in the South and galvanized University campuses. The opposition to the Vietnam war came with teach-ins that originated on campuses in this country. The incredible gains on environmental legislation in the 1970s began with Earth Day, once again led on American campuses.

Today, global climate change is uniquely a problem where students at Universities, places that are based on rational discourse and knowledge, now have an opportunity and an obligation to repay the American people for their investments in these institutions, by striking some sparks and starting a revolution in our attitudes and understanding and, ultimately, solution to this problem.

Thank you.

NEWS

U.S. DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY

FOR IMMEDIATE RELEASE
October 6, 1998

Stephanie Hanna (O) 202/208-6416

INTERIOR SECRETARY TO CALL ATTENTION TO IMPACT OF CLIMATE SHIFTS ON WILDLIFE AND MARINE SPECIES

Secretary of the Interior Bruce Babbitt will offer the keynote address tomorrow at the National Zoo at a conference about climate change and its effect on natural systems and wildlife.

The keynote speech will begin tomorrow at 1:30 p.m. at the Auditorium in the Visitors Center, immediately to the left at the entrance of the Zoo. The National Zoo is located at 3001 Connecticut Avenue, NW, in Washington.

Secretary Babbitt's speech will focus on his responsibilities and observances as principal steward for the more than 400 million acres managed by the Department of the Interior in the United States. Interior lands are primarily managed for the long-term health of watersheds and wildlife, but have been affected by noticeable climate shifts, particularly in Alaska.

"There is no way that we can move the boundaries of Yellowstone National Park if the vegetation that supports its rich diversity of wildlife dies out in that location," Secretary Babbitt explained. "We have seen some changes on Interior lands that give us great concern; vanishing populations of frogs and other amphibians, rapid retreat of glaciers in Alaska and once-abundant food sources becoming unavailable for endangered wildlife populations or marine species. It is impossible to conclude that climate change plays no role in these things."

WHO: **Secretary of the Interior Bruce Babbitt**

WHEN: **Wednesday, October 7, 1:30 p.m.**

WHERE: **The National Zoo, 3001 Connecticut Avenue, N.W.**

WHAT: **Keynote speech at conference "Is Climate Changing Where the Wild Things Are?"**

-DOI-

NEWS

U.S. DEPARTMENT OF THE INTERIOR

Office of the Secretary
August 11, 1997
FOR IMMEDIATE RELEASE Contact: Paul Bledsoe or Stephanie Hanna(202) 208-6416

BABBITT TO ADDRESS AMERICAN ECOLOGICAL SOCIETY AND THE NATURE CONSERVANCY ON CLIMATE CHANGE

Interior Secretary Bruce Babbitt will address a joint meeting of the Ecological Society of America and The Nature Conservancy in Albuquerque, NM this Tuesday, August 12, on the issue of global climate change. Babbitt's speech to this scientific audience will begin at 8:30 a.m. Mountain Time at the Albuquerque Convention Center located at 410 2nd Street N.W.

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NEWS

U.S. DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY

Contact: Mary Helen Thompson
(202) 208-6416

For Immediate Release: February 11, 1997

INTERIOR DEPARTMENT SCIENTIFIC INFORMATION PROJECTS ARE HIGHLIGHTED IN THE VICE PRESIDENT'S "ACCESS AMERICA" REPORT

Today Vice President Al Gore released his report on information technology called "Access America." This report highlights existing federal programs and proposes actions that will give all Americans the option to get information electronically from the federal government.

"The Interior Department has a wealth of information that is useful to students, teachers, businesses, local and state government and a wide variety of users on the Internet," Interior Secretary Babbitt stated. "I am pleased to announce that the Department has made great strides in this area, particularly the U.S. Geological Survey, and that we plan to continue our efforts to find every opportunity to open up access to all information seekers. Coordination of resources will let every American view on a computer screen, information about America's abundant natural and cultural resources."

"Access America" highlights Interior's on-going effort to bring environmental information to the American people. The

The National Biological Information Infrastructure (NBII) ties together access to a huge inventory of biological data bases. It catalogues the nation's plants and animals through the records of research institutions and museum collections and contains timely information for researchers and educators. The NBII is already working to increase access to many important automated sources of biological information, such as the North American Breeding Bird Survey, a major national database showing population trends and distributions for 400 species of bird over the past 30 years.

Part of the NBII effort includes Interagency Taxonomic Information Systems (ITIS) which will standardize scientific names for every U.S. plant and animal species.

(More)

The Federal Geographic Data Committee is developing a standardized format to describe biological databases so that information can be easily identified by users. The USGS is developing the electronic National Atlas of the United States, often described as a "visual front door" through which a wealth of data can be accessed on the physical, historic, economic and socio-cultural characteristics of this country.

As a focal point for sharing federal information and resources, "Access America" will play a major role in the way a responsive government provides important information to help the average citizen make informed decisions about ever day life.

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NEWS
U.S. DEPARTMENT OF THE INTERIOR

Office of the Secretary
For immediate release: January 26, 1999

Contact: Tim Ahern for copy of prepared text
Web Page: www.doi.gov or (202) 208-6416

Babbitt Launches Counterattack Against Marine Bioinvasive Species

Interior Secretary compares biotic slurry pumped from ship ballast with oil spills

Ten years after the *Exxon Valdez* disaster, Interior Secretary Bruce Babbitt warned assembled international scientists in Boston today that piecemeal, unfunded, voluntary efforts have not stemmed the bioinvasive species that are wreaking billion-dollar havoc on native wildlife and commercial fisheries, and that ballast water must be more strictly regulated worldwide as "point source pollution."

The threat of marine bioinvasion has immediate relevance for U.S. port cities rich in native fisheries, in particular Boston Harbor, the mouth of the Hudson, Chesapeake Bay, Gulf Coasts and San Francisco Bay. Last week, California's water districts joined environmental groups from eight states to ask for regulations on cargo ship ballast water. Yesterday, in Anaheim, scientists at the American Association for the Advancement of Science estimated that bioinvasive species are costing the nation an estimated $123 billion a year.

He launched a comprehensive counterattack, based on: the successful U.S./Canadian partnership in the Great Lakes, current global biodiversity treaties, shipping industry reforms after *Exxon Valdez*, like double hulled tankers, and a proposed executive order on President Clinton's desk. *Excerpts as follows:*

Oil Spills vs Biotic Discharge

"Ten years ago the *Exxon Valdez* seared our memory with oil slicked wildlife struggling to stay alive. Those images fixated the world on the dangers of oil spills and led to many new laws and regulations designed to prevent another such tragedy. Yet the biological spills taking place in Prince William Sound from oil tankers go virtually unnoticed. Just over a year ago the U.S. Fish and Wildlife Service discovered four new species of zooplankton spreading through the sound, released from ballast water brought by tankers from East Asia via San Francisco Bay. In the long run, these zooplankton, feeding on phytoplankton utilized by the Dungeness crab, may change the sound more extensively and permanently that any oil spill.

Sources of the Problem

"Global aquaculture -- shrimp farms, public fish hatcheries, commercial oyster beds -- also bears responsibility for the spread of epibionts, parasites, predators and pathogens. Also, the outbreak of giant snails in Florida or the *caulerpa taxifolia* clone, an alga taking over the Mediterranean, originated not in ballast, but from aquarium tanks. Each of these sources must be included in our response, policy and research. But at a more immediate level, we must grasp the root of the problem. That root lies not in isolated incidents, but in scope: the dramatic rate of spread, the steady vectors of pathogens that carried cholera to Alabama and seem to increase toxic "red tides" around the world.

Pathogens of Shipping

"Consider that ships this century have grown from 3,000 tons to 300,000 tons, and the volume of ballast water slurry -- pumped and sucked at 20,000 cubic meters an hour -- has kept apace. Faster crossings let more species survive, reproduce, make connections, and take baggage. The fall of trade walls brings global exposure to once quiet seaside ports, and vice-versa. In the ballast water of timber cargo ships traveling between Coos Bay, Oregon and Japan, researchers found 367 species of living animals and plants.

"That's a single route. Larger ports like Norfolk and Baltimore receive more than 12 million metric tons of foreign ballast water per year, originating in 48 different foreign ports, and 90 percent of them carried live organisms, including barnacles, clams, mussels, copepods, diatoms and juvenile fish. Worldwide, tens of thousands of ships carry several thousand species daily. In the time it takes me to deliver this speech, two million gallons of foreign plankton will have been discharged somewhere in American waters. We'd better get busy. And fast.

Executive Order

"What is our response? So far it has been pitiful. In light of the economic and ecological devastation, we have been timid, restraining ourselves with voluntary guidelines, a scattered approach and limited, unenforced codes. No longer. In 1997, President Clinton, responding to concerns of scientists like yourselves, asked the Departments of Interior and Agriculture to draft an executive order for his consideration. That order, which is now before the President, will contain two broad initiatives. First, it will require federal agencies to review their existing authorities and activities to reduce the risk of bioinvaders. Second, it will create an interagency working group to draft a plan -- possibly including regulatory and legislative change -- necessary for a coordinated response to bioinvaders.

Preventative Measures

"What will this look like in practice? Let me sketch the rough outlines in pencil. For there are models, and while there is much we can't grasp, we do know this: the first, best and only line of defense against bioinvasion is to keep them out in the first place. Period. Not one marine bioinvasive species, after it has taken hold, has ever been eliminated or effectively contained. There is simply no silver bullet. This is a sobering fact. It means our efforts must be focused primarily on prevention. And that, in turn, means effective regulation and enforcement.

"In 1990, in response to the damage caused by the zebra mussel in the Great Lakes, the Congress enacted Nonindigenous Aquatic Nuisance Prevention and Control Act. Among other provisions; the Act now requires ballast water exchange at sea rather than in the Great Lakes system. We should now move toward mandatory ballast exchange for not just the Great Lakes, but for all shipping in all American ports.

Funding Increases

"Does this mean our agency budgets must catch up to, and keep pace with, the ecological devastation they target? Yes. Because that devastation is economic as well. Vast as they are, the Great Lakes are easy compared to the task ahead, and offer few unqualified success stories. Yet as a case study, it makes a strong case why an aggressive, well-funded public response to bioinvasion is well worth the expense and effort. We spend several million dollars a year sterilizing, catching, poisoning, erecting barriers to suppress sea lamprey. It's still there. It may never go away. But for every dollar we invest, Great Lakes earn $30.25 in increased fisheries revenue. May our stocks perform as well.

International connection

"Global cooperation is an imperative. Our joint efforts with Canada on the Great Lakes provides and example. Two global entities -- the Convention on Biological Diversity and the World Trade Organization -- should play a major role in international cooperation. The Convention on Biological Diversity is the place to begin, and indeed preliminary discussions pursuant to Section 8 of the Biological Diversity Treaty are underway. Those discussions underline the need for Senate ratification of the Biodiversity Treaty. The World Trade Organization must also take an active role in the movement to develop and harmonize regulations in this area."

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NEWS
U.S. DEPARTMENT OF THE INTERIOR

Statement by Secretary of the Interior Bruce Babbitt on Invasive Alien Species
"Science in Wildland Weed Management" Symposium, Denver, CO, April 8, 1998

"The invasion of noxious alien species wreaks a level of havoc on America's environment and economy that is matched only by by damage caused by floods, earthquakes, mudslides, hurricanes, and wildfire. These aliens are quiet opportunists, spreading in a slow motion explosion.

Each year noxious weeds exact an ever-heavier toll: Farmers and ranchers spend more than $5 billion just for control. Losses to crop and rangeland productivity exceed $7 billion. Weeds infest 100 million acres in the U.S., spread at 14 percent per year, and -- on public lands -- consume 4,600 acres of wildlife habitat per day. They diminish or cause the extinction of native plants and animals, a third of all listed species. They homogenize the diversity of creation. They ignore borders and property lines. No place is immune.

Consider the damage done by purple loosestrife, a beautiful, seemingly harmless flower one might be pleased to find in a meadow. But not for long. For this species, found in 36 states, costs $45 million to manage. To bring this into a statewide perspective, consider that Florida spends $11 million each year to manage water hyacinth. Tropical soda apple, first reported in Florida, now covers 370,000 acres and costs the state $28 million.

In the past it was, again, much easier for an individual, a state, a federal agency to dismiss this invasion as someone else's problem. And so the weeds -- slowly, silently, almost invisibly, but steadily -- spread all around us until, literally encircled, we can no longer turn our backs on it. The invasion is now our problem. Our battle. Our enemy.

Conservative estimates count 2,000 alien plant species, 350 of which experts say are serious and dangerous invaders. Each day, new cargo ships arrive in American ports, and new shipments of tropical fish and plants are sold on the open global market. Some noxious weeds were introduced with the best of intentions, shipped to make a garden colorful, to dry up wetlands, to provide ground cover. Obviously, we cannot and should not shut down that global trade in an effort to grind the weed invasion to a halt.

What we can and must do is unite and prepare for that invasion both early and thoroughly. We can establish a responsive and comprehensive network, a network that will stop and someday even reverse the spread of invasive alien weeds, a network that efficiently shares all human and economic resources rather than keep them working alone in isolation.

It must be a network forged by scientists and land managers, by local, state, and federal

officials, by Eastern nurseries, Southern foresters, Midwestern farmers, Rocky mountain cattlemen and Western irrigation engineers.

Last June, the Vice President asked Secretary Glickman, Secretary Daley and I to prepare and action plan that establishes goals, and steps we can take to stop, control, and in some cases eradicate invasive aliens. It is a heavy task, but one big thing helps us: The invasion and spread of noxious alien weeds unites us. It unites across political, economic and property boundaries. It brings solidarity among opposing groups. It compels us to share strategic responses. It draws on our sense of values, calling on us to rise above our sometimes petty day-to-day concerns and disagreements. To restore health and stability.

To forge this continental network, we can draw from a deep and wide pool of resources. For there have been thousands of independent studies, documentation, research projects focused on a narrow, single tract. Scientists have spent their lives to prove weeds:

*Hybridize and swamp native species.
*Transmit disease, like fungi, that kill trees like the American chestnut and beech.
*Wipe out diversity, eliminates food, nesting and shelter for native wildlife.
*Alter fire regimes: melaleuca retards fire where it is needed; exotic grasses in Hawaii fuel fires that are not.

But despite all this extensive proof, there had not been a comprehensive account that puts all these pieces together, looking past borders and property lines, revealing the full, continental scope of the invasion. There was no national library to bring order and usefulness to such a vast, rare collection. Much of our work ahead will be to organize that library, to assess the collective scope of the noxious weed problem, both ecologically and economically.

To that end, the Clinton Adminstration is taking steps that will: bring together our human, technical and informational skills; establish measureable outcomes and goals; identify personnel and other resources, and report on successes with annual updates. We can use these in a way that will help detect, monitor, prevent introduction; educate the public, and pursue international cooperation on invasive alien species.

Invaisve alien species will never have the power to capture the imagination, the headlines, or the nightly news in the same way *El Nino* has. But we can do something about it. For I have seen the spread from the Great Lakes to Glacier and Everglades National Park. I recognize the dangers, and scope, and impact of the spread of weeds. And my resolve and determination only hardens. We can beat this silent enemy. We can beat a threat that erodes our soil, spreads wildfire, and damages our critical water supply and property values. We can tackle a force that is toxic and painful to humans, livestock, and wildlife habitat.

But we cannot ignore it any longer. We must act now, and act as one. We owe it to ourselves and to the next generations that will seek to live from a healthy, stable landscape. Too much is at stake. I look forward to working with you."

Texas Conference

Bruce Babbitt:
The Power & Imagination of Ecological Restoration

The following are edited excerpts from the Secretary of Interior's address to the SER International Conference on 30 Sep 98 in Austin, Texas

You are a part of the beginning of one of the most important transitions in the entire history of the American environmental ecological history movement. Obviously our need is to reach out and make common causes for your efforts — we are driven to an understanding, grounded in conservation biology, that we must find equilibrium with the entire landscape of which we are a part and of which every acre is ultimately implicated.

What I have found in the past six years to be so remarkable is the generative power of the idea of restoration — its capacity to move people, to motivate them. If preservation somehow fails to evoke a lot of emotion, restoration does. Why the extraordinary outburst of energy and approval of the restoration of the gray wolf to Yellowstone? What is it that made that event such a magical moment that captured the attention of this entire nation? The reason is because restoration speaks of optimism, of hope, of change, of the ability in a hands-on fashion to move beyond the status quo. It involves an enormous act of imagination because it says we can change and improve. And in order to have that vision, we have to look back and get beyond our tendency to see the landscape as timeless, present, constant.

It starts, of course, species-specific and as we move beyond that we should nonetheless recognize the power, the message of the gray wolf and of the bison that's returning to the western landscape — a species that carries an enormous possibility of looking backward to imagine, and forward to restore. What we want to do is to take these kinds of possibilities and translate them into the larger regime, which is of course watersheds, ecosystems, the landscape on which we live and must find our equilibrium.

The power of restoration is nicely illustrated by the Florida Everglades and the California Bay-Delta. In the Everglades, I found a National Park drifting towards chaos and ecological death. I trekked out of the Park into Big Cypress National Wildlife Refuge and then up into the Everglades Agricultural Area, following the flow of water across Lake Okeechobee up the Kissimmee River. Soon I'm standing in the suburbs of Orlando. And I'm saying that if this National Park is going to survive, we will have to start in Orlando and finish in Florida Bay and the Florida Keys.

Male wolf #10 from the Yellowstone reintroduction project.
Photo courtesy Barry C Noe, Yellowstone National Park

What's happening in California is scarcely less impressive. It was triggered by the decline of the salmon runs in the Bay-Delta, and the Sacramento and San Joaquin Rivers. For decades, we have responded with piecemeal fixes. It took us the better part of a century to figure out that pumping more fish out of hatcheries wasn't working. Then the spate of dam building — thinking we could mitigate dams with fishways and fish hatcheries — well, we've learned that we can't. Ultimately we've been driven to the reality that the salmon is an indicator of a systemic problem — the destruction of the wetland riverine ecosystem of the Central Valley of California. Now we are verging upon a consensus plan involving hundreds of millions of dollars each year to get at the basics, to take down the levees, free up the rivers, and yes, even to go out there and tear down a dam.... in the name of restoration. We can get beyond seeing the landscape as a constant if we have the capacity to imagine both the past and the future.

So, where do you go? Well, you're probably not going to start with a gray wolf in your neighborhood, but there are amphibians on every square mile of this entire nation. They have accompanied us through our cultural history and people respond — not only children, although especially children — but also their parents. A spotted frog becomes the pathway to a neighborhood or regional restoration project. Pollinators are also one of those pathways. We're in Austin, Texas. A wonderful woman named Ladybird Johnson started a beautification campaign in the '60s which is now evolving into something with larger reach — wildflowers' role not just in beautification but as habitat connectors.

We also need to think deeply about watershed restoration. There is something magical about the power of water in our culture, in our history, in our religious forms. Water evokes an extraordinary response. When you go out across this country to communities and groups and focus on the river that runs through their community, which, most likely was founded on the water's edge — and you begin to talk about water in terms of connectivity and the history and the heritage of that community — well, pretty soon, people start to see that we're going to restore the water and in the process, restore our communities in a very real way.

We're on the verge of a new movement, an integrated view of the American landscape: a view which carries responsibility for every single citizen and every community, which places on us the possibility of pointing the way, illuminating the landscape, encouraging partnerships, finding the links, and putting them back together. Thank you.