STANFORD LAW SCHOOL

# The Natural Resource

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# Stanford Fisheries Policy Project Studies Use Of Science in Management Decision Making

All natural resource management decisions require officials to make effective use of scientific information. At the most basic level, managers need to know how much of a resource there is and the impacts of awarding varying amounts to resource users. Managers then need to use this information in deciding on appropriate policies. Scientific uncertainty makes management decision making more difficult, but it does not eliminate the importance of using the information that is available. Policies will suffer if scientists are not provided needed information or if the managers do not understand or fail to consider the information.

Fishery management is no different. In order to inform fishery management about the state of fish populations, the National Marine Fisheries Service operates a system of Fisheries Science Centers. Each year, these centers spend hundreds of millions of dollars trying to determine fish stocks and safe levels of catch. Once the centers have estimated answers to these questions, they forward their advice to the eight Regional Fisheries Management Councils. The councils then set quotas or take other actions to limit the catches of commercial and recreational fishers.

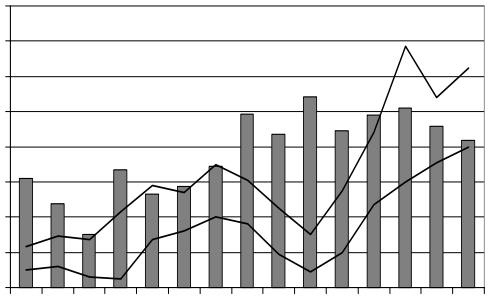

*Figure 1. Scientific recommendations and catch in the Gulf king mackerel fishery, which the National Marine Fisheries Service classifies as overfished. The vertical bars represent annual catch; the two black lines represent the range of values deemed safe by government scientists. (Y axis units are millions of pounds.)*

Very little is known about the science-policy interface in domestic fisheries management. Are scientists providing the type of information that councils need to make good decisions? Is the information being effectively communicated to the councils? Do the councils understand the information? How are councils actually using the information that is provided to them?

The first policy study of the Stanford Fisheries Policy Project — entitled "The Use of Science in U.S. Fisheries Management" — looks at how, if at all, the Councils use the scientific advice they are given. Researchers at the Law School, led by Josh Eagle and Buzz Thompson, set out last summer to gather 25 years of historical records from 11 U.S. fisheries. After obtaining these documents from the National Marine Fisheries Service, researchers carefully analyzed them and compiled statistical information on fisheries management decision making showing the relationship between scientific recommendations and council decisions. Figure 1, for example, shows the relationship between the range of allowable catch recommended by fishery scientists for the Gulf of Mexico king mackerel and the quotas set by the Gulf council.

All of the councils that used quotas set them in some years at levels that were above or below the range recommended by the scientists. In the two fisheries that were in "overfished" or "approaching overfished" conditions, managers typically chose fishing quotas that were toward the high end of the range recommended by scientists. In some years, managers even chose quotas that were above the scientifically recommended range. In the same fisheries, catches typically exceeded the quotas set by managers. The combination of these two tendencies, as shown in Fig-

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*Clinic participant Kristin Boraas, 3L, stands (center) with clinic clients after winning a victory in California Superior Court*

# Environmental Clinic Takes On Invading Species

With accelerating global trade and travel comes increased environmental risk, most notably from the alien species that often ride along. Plants and animals inevitably find their way into the cargo holds of airplanes and the ballast tanks of ocean-going ships, only to be released many hundreds or thousands of miles away. While most of these involuntary hitchhikers die in transit or upon release to their new environment, enough survive the journey to make invading species the single largest threat to many native ecosystems.

Alien or invasive species typically have a leg up on native flora and fauna because they face few or no natural predators. If they take hold and spread, invasives can alter the fundamental balance of life in existing ecosystems by modifying habitat, introducing exotic diseases or parasites, and outcompeting or interbreeding with native species. Often the end result is alteration of food webs, dramatic changes in habitat structure, and regional extirpation or complete extinction of native species.

In the San Francisco Bay and Delta, more than 230 alien species have already become established, fundamentally changing this aquatic ecosystem forever. Terrestrial environments are also vulnerable, especially isolated island habitats like those in Hawai'i where millions of years of isolated evolution mean even fewer potential predators for the arriving invaders.

There are no easy answers to the invasive species problem. For one thing, the state of the science is not sufficiently advanced to predict with any degree of accuracy which species might take hold and wreak havoc on a given environment. For another, there is not a "one size fits all" approach for screening and eradicating incoming invasives. But one thing seems certain: government agencies must acknowledge and begin to address the problem if we ever hope to develop constructive solutions. That means that before agencies approve the expansion of port or airport facilities designed to encourage increased international arrivals, they need to consider invasive species impacts and possible mitigation measures.

The Earthjustice Environmental Law Clinic at Stanford is on the front line of efforts to compel a "hard look" at alien species impacts by state and federal agencies. Three years ago the Clinic filed a case on behalf of the National Parks and Conservation Association and

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## Clinic's Coastal Cases: Real-World Lessons for Students

Two current coastal cases have provided valuable lessons for students in the Earthjustice Environmental Law Clinic at Stanford. On March 16, 2001, 3L Kol Medina presented oral testimony before the California Coastal Commission in San Diego on behalf of La Jolla Friends of the Seals. The client asked the Clinic to develop legal arguments—in the face of opposition from various quarters—to support the establishment of a small marine reserve along the La Jolla, California, coastline. The reserve is designed to protect a group of intertidal rocks where harbor seals regularly haul out of the water to rest, warm up, nurse pups, and heal wounds. Such haul-out sites are critical to the continuing survival of the species and can be jeopardized by repeated human disturbance.

Kol's efforts did not result in a total victory; while the Coastal Commission granted a permit to create the marine reserve, the Commissioners somewhat narrowed the scope of the protections sought by the client in order to accommodate greater public access to the surrounding tidelands. The experience did, however, give Kol an invaluable lesson in administrative and environmental law.

Kol reflected on his first administrative agency appearance: "I learned that agency hearings can be interminable (we waited for 12 hours to be heard). I learned the power staff has over the agency's ultimate decision makers, that working behind the scenes with staff is critical, and that harbor seals, on whose behalf I was arguing, are compelling protagonists, but not compelling enough to override an almost three decade–long Coastal Commission focus on maximizing public access to all intertidal lands along the California coast."

In fact, although Kol's legal arguments for a more expansive marine reserve seemed iron-clad, he learned that a variety of other factors were at work. As Coastal Commission Executive Director Peter M. Douglas advised Kol during a side discussion, the top priority of staff is protecting coastal access, apparently even when it conflicts with protecting other coastal resources. So, despite his compel-

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# THE ENDANGERED SPECIES ACT HANDBOOK

*The Endangered Species Act: A Stanford Environmental Law Society Handbook* is a comprehensive guide to the federal Endangered Species Act, the primary U.S. law aimed at protecting species of animals and plants from human threats to their survival. This handbook is intended for lawyers, government agency employees, students, community activists, business people, and anyone else who needs to understand the Endangered Species Act.

The book guides the reader through the Act's provisions, including the procedures for listing species and designating their critical habitats, the requirements the Act places on federal agencies, and the scope of protections afforded to listed species. It contains a discussion of the modern extinction crisis and a brief history of endangered species protection in the United States.

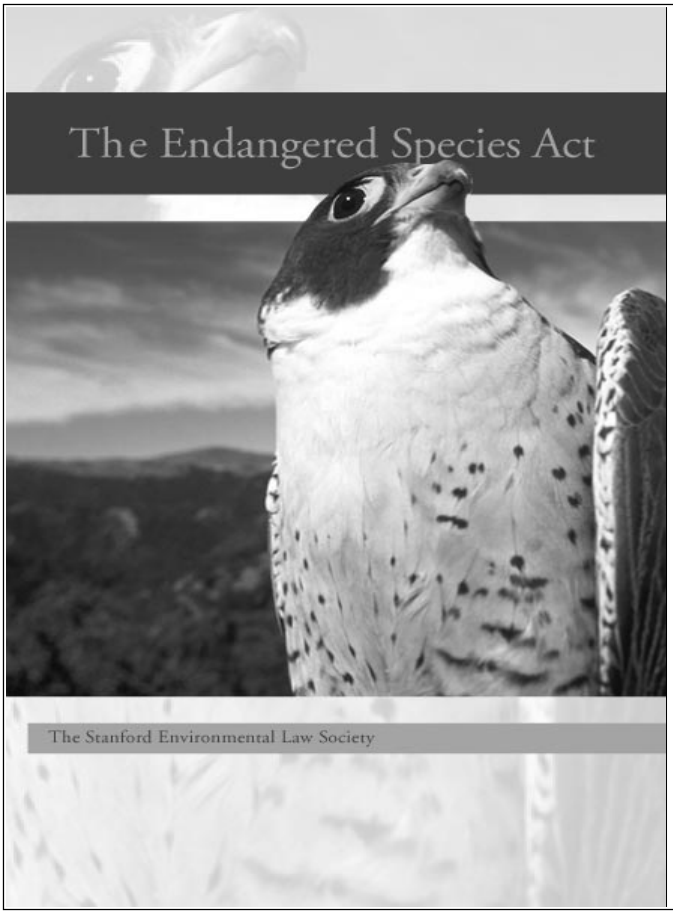
The handbook also explains how the Act and its implementing regulations have been interpreted by courts over the years. It provides valuable tips for citizens who wish to become involved in application and enforcement of the Act. The handbook includes the text of the Act, as well as a bibliography of related legislative materials, case law, and legal scholarship.

The Handbook includes charts and tables explaining ESA procedures and statistics. The book provides other important references, including helpful websites and research tools regarding the Endangered Species Act and its implementation.

To order, contact Stanford University Press at http://www.sup.org/order or 1-800/872-7423.

"This handbook is a comprehensive roadmap to our nation's most powerful environmental law. It is a must for agency officials, lawyers, community activists, business people, and public and private land owners—anyone who needs to know what the Endangered Species Act requires, and how to work with others in this most contentious field."

Bruce Babbitt
Former U.S. Secretary of the Interior




**The Endangered Species Act: A Stanford Environmental Law Society Hanbook**

July 2001, 312 pages

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# Conference at Stanford Examines Practical Value of Ecosystem Services

It is now widely recognized that healthy ecosystems provide a variety of "natural services" such as purifying air and water, detoxifying and decomposing waste, renewing soil fertility, regulating climate, mitigating droughts and floods, controlling pests, and pollinating plants. Economists also agree that the value of these services is extremely high—on the order of many billions of dollars in the United States alone. But what is the practical value of these services in trying to preserve the very ecosystems that provide the services? Are ecosystem services merely another factor that environmental groups can cite in support of stronger environmental protections? Or can ecosystem services play a separate role—for example, in providing a market incentive for the preservation of particular ecosystems?

On November 16 and 17, 2000, a group of three dozen legal academics, scientists, policy makers, business representatives, and environmental representatives met at Stanford University to discuss how ecosystem services might be used to help promote the preservation and restoration of watersheds. Law faculty who were present included Professors Robert Fischman, J.B. Ruhl, James Salzman, and Buzz Thompson. Meg Caldwell and Josh Eagle of Stanford's program also participated.

The workshop arose out of an interdisciplinary EPA STAR grant directed by Professor Salzman. Salzman began work on the project while a visiting faculty member at Stanford in 1998–99 and has continued to collaborate closely on ecosystem services with Gretchen Daily and Paul Ehrlich of Stanford's biology department and with Stanford's Environmental and Natural Resources Law & Policy Program (ENRLP). The workshop was funded jointly by the Environmental Protection Agency, the Rocky Mountain Mineral Law Foundation, and ENRLP.

The workshop began with a discussion, led by Professor Jeffrey Mount of the University of California at Davis Geology Department, of the relevance of ecosystem services to flood management. As Professor Mount explained, current work involving the Consumnes River in California demonstrates not only the benefits of watershed preservation for flood control, but also the potential opportunity to capitalize on multiple ecosystem services through land preservation. Scientists believe that a restored Consumnes River watershed can help reduce flood risks by storing runoff and reducing flow velocity. But scientists also believe that watershed restoration and preservation can provide additional water supplies by promoting groundwater recharge and supporting base flows; improve water quality; increase neighboring soil quality by regulating sediment flux, serving as a sink for fine sediment and nutrients, and providing a source for increased soil moisture; improve air quality by trapping airborne particulates, moderating air temperature, and sequestering carbon in floodplain forests and wetlands; and serve as valuable habitat for both fish and regional wildlife.

The second session, led by Professor Thompson, looked at the opportunities for using water purification as a galvanizing force for the preservation of watersheds. Professor Thompson dis-

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## Why Case Studies?

*Professor Gerald Torres, a leading figure in both environmental law and critical race theory, visited Stanford Law School in the Spring of 2001. While at Stanford, Professor Torres taught environmental law using case studies developed by Stanford Law School. He kindly provided the following thoughts on the effective use of case studies in the classroom.*

Although this was the first year I have taught environmental law using case studies, I am now a firm convert and I trust I will get better at using them. They seem to me to offer two large pedagogical advantages and several smaller ones as well. First, they require students to put the doctrine they have been studying to practical use. Employing real materials from actual cases contributes to the verisimilitude of the exercise. Because I ask students to take on certain roles, I think they learn the importance of having a client who has specific desires, some of which are obtainable through legal processes and others that are not. I have marveled at their transformation during these sessions. The second major pedagogical advantage is that they learn to work in teams. Since almost everything they will do in practice will involve teamwork, learning that skill in law school seems especially important. Their analysis clearly reflects their partnerships.

The other advantages stem from getting to interact with skilled practitioners. Not only do they get to see a practitioner in an unusually self-conscious analytic setting, they also are able to understand the deeper strategic and tactical decisions that go into putting a case together. Finally, they get an appreciation of the different kinds of practice that will be available to them, especially if environmental law is the area in which they intend to specialize. One thing I have been thinking about this term is how to structure the class so that every week they would have a case study to illuminate the material. I think this would be particularly helpful for those times when we do not go over the textual material (as opposed to statutory or case material) in the casebook very closely.

*Faculty interested in trying case studies as part of their environmental or natural resource classes can find copies of the Stanford case studies and accompanying teaching notes at casestudies.stanford.edu.*

# Stanford ELS Works With University to Design "Green" Campus Buildings

Members of the Stanford Environmental Law Society (ELS) joined forces with other graduate and undergraduate students over the past year to advocate for "green" building at Stanford. The Law School may lead the way for the rest of the University.

The ELS helped create the Stanford Task Force on Sustainable Building in the fall of 2000 after a delegation of five ELS members returned from the U.N. Climate Change Conference in The Hague.

The goal of the Task Force is to bring about demonstrable reductions in greenhouse gas emissions through the adoption of a bold, campus-wide green building policy. Meetings with University administrators took place throughout the winter and spring, leading to the proposed formation of a student/staff committee to formulate a green building policy.

Through these consultations, the Task Force developed what it considers the optimum green building policy, considering economics, occupant health, and other environmental benefits.

The proposal also requests that the University certify all of its new construction under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program.

The proposal offers nonbinding recommendations for improving the current campus design processes. These include life-cycle cost analyses, conducting sustainability seminars that involve the entire community, and using outside green building consultants to identify green alternatives at the very initial design stages of a project.

The greatest strides forward have been made at the Law School itself. The Stanford Law School Master Planning Committee, which is considering the construction of several new Law School buildings, asked the Task Force and the ELS to present the groups' proposals on April 19.

The Task Force was fortunate to have the founder of the U.S. Green Building Council, Stanford alumnus David Gottfried, make this presentation with the group. Comments following the presentation suggested that the Committee (on which Vice Dean Buzz Thompson sits) is seriously considering incorporating state-of-the-art green design techniques into its new construction.

For more information on the Stanford Task Force on Sustainable Building, or to offer your suggestions or comments, please contact Grady Jackson '02 at gradyj@stanford.edu.

"Our challenge is to build off of our expanding membership . . . to start realizing some of NAELS' long-term, substantive goals."

## 1L to Serve as Co-Chair of NAELS

*NAELS is the National Association of Environmental Law Societies, a growing, student-run organization with 32 member ELSs across the country. At the NAELS annual meeting in March 2001, Gwen Parker, a 1L at Stanford, was elected by the NAELS membership to serve as NAELS Co-Chair. Below, Gwen lays out her goals for NAELS.*

NAELS has developed in important ways over the past two years. The number of environmental law societies involved has increased from about ten to more than 30. Two successful annual conferences gave members a chance to learn about emerging trends in the practice of environmental law. Organizationally, we established bylaws and a governing board of 30 law students. We also started to build a board of directors of distinguished practitioners and scholars, and NAELS will soon have 501(c)(3) status.

At this juncture, our challenge is to build off of our expanding membership and new organizational structure to start realizing some of NAELS' long-term, substantive goals.

Those goals include improving the availability and quality of clinical and curricular offerings in environmental law, coordinating research and outreach by environmental law students to influence public policy, and helping law students enter environmental professions. NAELS is a student organization, so these projects will be led and carried out by law students. For example, one NAELS committee is researching legal issues related to climate change policy. To facilitate students' efforts, we hope to establish a national office with a small core staff and to build our website (www.naels.org) into an effective organizing tool and resource for environmental law societies nationwide.

# Ecosystem Services

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cussed New York City's efforts to preserve up to 350,000 acres of land in the Catskills watershed and asked whether water quality considerations might lead other cities to embark on comparable watershed protection efforts. Although EPA has estimated that more than 140 cities nationwide are taking steps to preserve watershed lands for their water quality value, few of these efforts come close to New York City's efforts in either scale or importance. As Professor Thompson emphasized, both federal and state governments can help promote watershed preservation efforts by water suppliers through the regulatory incentives that the governments provide. The water quality session also included a presentation on "nitrogen farming" in the Illinois and Mississippi watersheds.

The third session looked at programs outside the United States, focusing particularly on Australia and Costa Rica, to pay for preservation through ecosystem services. Amendments in 1997 to Costa Rica's 1996 Forestry Law, for example, provide the legal and regulatory basis to compensate landowners for "environmental services" from their lands. These services include watershed protection, carbon sequestration and storage, biodiversity protection, and protection of key "life zones." In parts of Australia, landowners are being paid by government and private industry to protect or reestablish native vegetation on critical recharge and riparian lands, establish tree plantations on such areas, and introduce more suitable cropping systems.

A final session consisted of breakout groups that examined what steps need to be taken to further encourage investments in ecosystem services. A summary of the conference, as well as a variety of papers on the potential use of ecosystem services in policy or markets, will be published in the June 2001 issue of the *Stanford Environmental Law Journal*. The conference also formed the basis for a session on ecosystem services at the Eleventh Institute for Natural Resource Law Teachers sponsored by the Rocky Mountain Mineral Law Foundation in May 2001.

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# Fisheries Policy Project

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ure 1, can result in catches exceeding safe levels in a significant number of years.

Fisheries that were not overfished often displayed the opposite characteristics. Quotas were set at the low end of the scientific recommendations, and in some situations even below it, and actual catch typically did not exceed the quotas.

The next phase of this first policy study will expand the study in three ways. First, researchers will examine a number of additional fisheries. Second, researchers will develop a series of case studies designed to look more closely at how the scientific information in a number of the studied fisheries is actually developed, communicated, and used. The current data shows whether quotas and catches reflect the scientific recommendations, but not why. The latter question, however, is critical in determining how the use of science in fishery management can be improved. Finally, the results of the research will be used to develop recommendations to councils and other policy makers about how better use of science might be institutionalized.

Details about this study, as well as the other policy studies being conducted through the Fisheries Policy Project, can be found on the project's website at fisheries.stanford.edu. For more information, please contact Josh Eagle at jeagle@stanford.edu.

*Bruce Babbitt, former U.S. Secretary of the Interior*

## Save the Date!

The third annual Robert Minge Brown Lecture will be held at Stanford Law School on Thursday, November 29, 2001. Each year, the Robert Minge Brown Lectureship honors an outstanding scholar, policy maker, or lawyer who has taken innovative and effective approaches to addressing environmental problems. Former U.S. Secretary of the Interior Bruce Babbitt will deliver this year's lecture. The lectureship is made possible by a generous gift in 1998 from the William and Flora Hewlett Foundation in memory of Stanford alumnus Robert Minge Brown.

# Invading Species

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others against the Federal Aviation Administration over its failure to adequately consider the potential impacts of invasive species on Maui's native ecosystems resulting from the "internationalization" of the Kahului Airport. Along with the National Park Service, the Clinic's clients were especially concerned about nearby Haleakala National Park—the jewel of the island and one of the last, unspoiled vestiges of native Hawaiian flora and fauna. Public pressure and changing economics have caused the state to put this particular project on hold, but the demand for more international flights continues to threaten the native species of Hawai'i.

On the aquatic side, in early 2001 the Clinic filed suit on behalf of the Center for Marine Conservation and WaterKeepers Northern California against the Army Corps of Engineers and two federal wildlife agencies over authorization of a major port expansion project in San Francisco Bay. Again, the agencies approved the project without adequate evaluation of potential invasive species impacts and possible mitigation measures. The Clinic asked the agencies to require, as project mitigation, funding of an onshore pilot project for the treatment of discharged ballast water. Such a pilot facility could significantly advance the science of invasive species control.

Coming at the ballast water problem from a slightly different legal angle, the Clinic also recently teamed up with the Pacific Environmental Advocacy Center at Lewis and Clark Law School in a lawsuit against the EPA over ballast water discharges. The suit seeks revocation of a regulatory exemption to the Clean Water Act permitting requirements for ballast water discharges. This exemption, which is not authorized under the statute, provides a strong disincentive to finding viable solutions for the ballast water discharge problem. If the exemption is revoked, shipping companies and ports are likely to be much more interested in exploring and testing potential mitigation technologies.

The central theme of these cases is that invasive species pose unique, but very real and potentially catastrophic environmental risks that should be taken seriously by agency decision makers, regulated industries, and the general public. The Clinic is using existing legal requirements under traditional environmental statutes to spotlight these risks and to jumpstart the scientific and technical discussion of how best to address them.

## Clinic's Real-World Lessons

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ling presentation, Kol could not persuade the Commissioners to second-guess long-standing staff policy. Nevertheless, the Commission enthusiastically embraced the concept of a marine reserve and rejected the arguments of those who opposed its creation.

After Spring 2001 finals were over, 3L Kristin Boraas was still busy preparing for her appearance before the Santa Clara County Superior Court on behalf of Friends of Neary Lagoon. The issue was the integrity of the City of Santa Cruz's Local Coastal Plan, which was prepared by the City and approved by the California Coastal Commission under the state's Coastal Act of 1976. The hearing before Judge Jamie Jacobs-May had been postponed twice, but the continuances only gave Kristin more time to "moot" her arguments with clinic attorneys Mike Lozeau and Debbie Sivas. The additional practice paid off, and Friends of Neary Lagoon prevailed over the City and the Coastal Commission. The court ruled that the City had wrongly issued a development permit that violated the plain terms of the Local Coastal Plan. Judge Jacobs-May ruled from the bench just two days before Stanford graduation, making Kristin's day in court a true "capstone" law school experience.