Inter-American Dialogue

A Conference Report

The Environment in U.S.-Cuban Relations: Recommendations for Cooperation

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FOREWORD

The Inter-American Dialogue's first effort to address environmental issues in U.S.-Cuban relations was to organize a small workshop of officials and leading environmental experts from the United States and Cuba in New York City in September 1994. Building on that exchange, the Dialogue sponsored a second meeting in Havana in June 1995, hosted by the Cuban Ministry of Science, Technology and the Environment.

The aim of the two sessions was to find ways to promote greater scientific exchange between the two countries on environmental matters. The discussion in Havana, drawing on the background papers collected in this volume, focused on how to take advantage of existing mechanisms for cooperation, such as environmental treaties both governments have signed, and international institutions to which the nations belong. Participants also sought to encourage communication on developing and implementing regulatory frameworks and environmental law.

The Dialogue's work on the environment is part of a larger program of activities under the direction of its Task Force on Cuba, aimed at encouraging changes that would allow Cuba's reincorporation into the inter-American community. At the same time the environment meeting was taking place in Havana, a delegation of the Dialogue's Task Force on Cuba—led by Elliot Richardson and including former presidents Oscar Arias and Osvaldo Hurtado—met with Cuban officials and non-governmental leaders. The findings and policy recommendations from that trip are featured in the second report of the Inter-American Dialogue Task Force on Cuba, *Cuba in the Americas: Breaking the Policy Deadlock* (September 1995).

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Cuba and the United States: Recommendations for Building a Framework for Cooperation on Environmental Matters

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Introduction

In 1994, the Inter-American Dialogue launched an initiative to assess the impact of U.S. policy on cooperation between Cuba and the United States on environmental issues, and to explore the potential for expanded collaboration. The initiative follows up on the recommendation of the Inter-American Dialogue Task Force on Cuba that the United States and Cuba cooperate on issues "serving the interests of both nations."

Since 1960, the United States has maintained a policy of containment and isolation toward Cuba, including a trade embargo. While the economic and political aspects of U.S. policy toward Cuba have been well documented and widely analyzed, little has been said of the policy's effect on other important aspects of U.S.-Cuban relations. Our purpose in this report is precisely to focus on one of these aspects, namely, the environment.

In September 1994, the Inter-American Dialogue convened a conference in New York City on the need and potential for environmental cooperation between the two countries. The conference brought together top policymakers and scientists from the United States and Cuba. Conference participants unanimously agreed that increased cooperation on environmental issues is crucial to advancing important scientific research taking place in the United States and Cuba and to the health of the environment of the Caribbean region. Participants agreed that the most urgent and feasible opportunities for cooperation are in biological diversity ("biodiversity") research and preservation, management and study of marine resources, and monitoring of weather and tropical storms. A report on the conference entitled, *The Environment in U.S.-Cuban Relations: Opportunities for Cooperation*, including essays by U.S. and Cuban scientists on these topics, was published by the Dialogue in March 1995.

In June 1995, at the invitation of Cuba's Ministry of Science, Technology and the Environment, the Dialogue sponsored a second conference in Havana, Cuba. The focus of this second conference was to create a concrete plan of action for pursuing cooperation between Cuba and the United States on environmental issues.

The environment is a significant and timeless issue of mutual interest to both the United States and Cuba. Situated just 90 miles apart and separated only by the Straits of Florida, the two countries are irrevocably connected to each other by their shared natural resources. As a result, what one country does to affect the environment has a significant impact on the other. For example, increases in surface ozone, which have been found over the western coast of Cuba, could result from transport from the southern United States during the passage of cold fronts. Similarly, Cuba's emerging plans to drill for oil in the Gulf of Mexico and the potential of an oil spill there has potentially serious environmental and economic consequences for the United States.

Given their geographic proximity, both countries would benefit greatly from cooperating on the management of their shared environment. This remains true notwithstanding the marked tensions evident in 1996 between the United States and Cuba, and the intensification of some U.S. economic sanctions on Cuba.

Before U.S. economic sanctions went into effect in 1960, the two countries had cooperated on environmental matters, particularly with respect to joint scientific research, information sharing, and on-site scientific studies. However, the U.S. embargo dramatically curtailed this cooperation and terminated efforts by the two governments to jointly manage their shared resources.

This policy brief sets forth the joint recommendations of the Inter-American Dialogue's conference in Havana and explores the conditions necessary to implement them. Before the conference, Cuban and U.S. scientists and policymakers submitted papers with their recommendations on building a framework for cooperation and exchange between the United States and Cuba on environmental matters. This policy brief incorporates the ideas and recommendations contained in those papers, which are included in their entirety in this publication.

Report from the Havana Conference

Both Cuban and U.S. participants at the Havana conference were quick to recognize that the Dialogue's first conference in New York was an important landmark. At the New York conference, U.S. and Cuban scientists and policymakers had achieved a consensus on all key issues: the need for environmental cooperation, the most promising areas for cooperation, and the conditions that exist that make cooperation urgent and essential.

Participants at the Dialogue's New York conference identified compelling reasons for cooperation. They agreed that only a concerted effort by both parties will enable Cuba and the United States to care for their shared natural resources properly and respond to threats to them in an effective way. Furthermore, conference participants noted that Cuba has extraordinary natural resources whose preservation and study are crucial to ongoing scientific research in the United States. For example, Cuba has no doubt the largest amount of biodiversity of any country in the Caribbean, including more native species than any other island in the Western Hemisphere. Moreover, for the United States, Cuba could be the most attractive partner for cooperation in the Caribbean region. Cuba excels among the countries of the Caribbean in terms of the quality of its scientific study, institutions, and professional achievement.

Participants at the New York conference also recognized that the timing in some ways is right for cooperation with Cuba on environmental matters. Following the Rio Conference in 1992, Cuba stepped up its commitment to the environment, creating a new Ministry of Science, Technology and Environment and launching an initiative to craft a comprehensive law to govern the management of Cuba's natural resources. Cuban policymakers report that Cuba is committed to strengthening the enforcement of environmental regulations and the role of environmental impact assessments in economic development.

The call for cooperation has been lent additional urgency by the rapidly deteriorating state of Cuba's vast and irreplaceable scientific collections. These collections, in some cases the only extant record of certain species, are at risk because Cuba lacks the resources to preserve and maintain them. Furthermore, the severe economic crisis from which Cuba has suffered in the early 1990s has resulted in greater pressure on the environment, and Cuban resources alone cannot cope with mounting needs. For example, the lack of preservation of scientific collections occurs not just because alcohol and jars are scarce, but also because of the constant increase of collected materials and the need for computers to manage those collections.

Building a Framework for Cooperation

Given the findings of the Dialogue's New York conference, the goal of the second conference in Havana was to propose a framework for environmental cooperation and exchange and to identify the parties whose involvement is crucial to achieving cooperation between the United States and Cuba on environmental issues. There was an immediate consensus among participants at the Havana conference that cooperation must take place on several levels, with some overlap: scientific cooperation, cooperation among U.S. and Cuban non-governmental organizations (NGOs), and cooperation between the two governments. Participants also acknowledged the need to reach and involve a variety of audiences in both countries in this effort, including the policymaking community and the general public.

Scientific Cooperation

After the institution of the U.S. trade embargo in 1960, scientific cooperation between the United States and Cuba was dramatically reduced. Most collaboration between U.S. and Cuban scientists occurred through correspondence and only a few scientists actually engaged in direct joint research every year. Most of the ties between U.S. and Cuban academic and scientific institutions were severed by the end of the 1960s. As a consequence, the most basic information about the quality of Cuban science, current Cuban scientific research, and Cuba's vast natural resources is unknown in the United States.

Ironically, although scientific cooperation decreased sharply after the enactment of the embargo, the embargo itself does not prohibit many forms of scientific collaboration. For example, under U.S. regulations, U.S. researchers are allowed to travel to and within Cuba for the purpose of scientific research that can be carried out only in Cuba. This has permitted U.S. scientists to conduct extensive field work with Cuban scientists in such site-oriented fields as geology and biogeography. Second, both the purchase and transfer of informational materials have been exempt from the embargo since 1988. That means, for example, that U.S. scientists can correspond freely with their Cuban counterparts, and send them scientific research and publications.

Despite the fact that these and other forms of scientific collaboration are allowed under U.S. regulations, the atmosphere of official hostility has had a dramatic, chilling effect on such collaboration. The U.S. policy of isolating Cuba has created the erroneous but lasting impression that scientific collaboration is impossible or illegal. Both governments have attempted to regulate contact originating from the other country through frequent policy changes, rhetorical statements, changes in administrative procedures, bureaucratic hurdles, and regulation. These activities have limited collaboration.

The pace of cooperative activities did pick up in the 1980s, as U.S. scientists working on regional Caribbean problems, particularly environmental ones, realized the importance of obtaining data from Cuba. Since then, U.S.-Cuban scientific cooperation has had its successes, limited in number but not in importance. These include joint research expeditions and research projects, co-authored publications, exchange of publications and reciprocal visits. One of the biggest barriers has been the shortage in Cuba of basic supplies and equipment to support scientific collaboration, such as computers. The U.S. regulations have made it extremely difficult for U.S. and Cuban scientists to gain equal access to basic resources.

Overall, scientific cooperation between the United States and Cuba since the embargo has remained at an ad hoc level, made possible only by the efforts of individual, committed scientists. But the potential for cooperative activities is far greater and much needed. More and more, scientists in both the United States and Cuba recognize that cooperation on environmental issues can no longer be deferred. As Michael Smith, Senior Research Scientist at the Center for Marine Conserva-

tion, observes in his paper prepared for the Havana conference, "Cuban-U.S. Scientific Collaboration: Achieving Cooperation in an Atmosphere of Hostility":

> Both scientists and, to an increasing degree, policymakers recognize that failure to cooperate in managing these shared systems will result in direct damage to each society. Part of the damage will be immediate but temporary, as in the case of some forms of pollution. Other forms of damage, such as extinction of species or commercial extinction of fisheries, will be permanent and will forever impoverish the resource base of both countries.

At the Havana conference, Smith suggested that the group look to "knowledge-based communities" as a model for a framework for interaction between the Cuban and U.S. scientific communities. According to Smith, knowledge-based communities are groups of scientific peers or specialists that become influential when there is an unmet need for objective, fact-based expertise by a diverse group of decisionmakers facing a shared issue.

The idea that the Cuban and U.S. scientific communities could form a single, knowledge-based community works on one level: there is a defining problem—the joint management of the two countries' shared natural resources—that the scientific community could play a crucial role in solving through the provision of information and the active participation of scientists. But the current situation lacks a key characteristic of knowledge-based communities: a body of decisionmakers to incorporate and act on the scientific findings. We see from the application of this model that for scientific cooperation to realize its full impact, it must inform interaction between the two governments where decisions about shared natural resources are being made.

A laudable example of intergovernmental U.S.- Cuban scientific cooperation occurred in the summer of 1996. A ship from the U.S. National Oceanic and Atmospheric Administration (NOAA), the *Malcolm Baldrige*, completed a trip to the Caribbean to conduct research on the flow of surface waters from the Atlantic Ocean to the Caribbean Sea. Research was conducted in the waters of various Caribbean countries, including Cuban waters, and Cuban scientists were on board the vessel and participated in the research. Clearance for the vessel was provided by the Office of Ocean Affairs at the U.S. State Department and by the Government of Cuba. This joint research demonstrated that bilateral scientific collaboration is both feasible and constructive during a time of deeply strained U.S.-Cuban relations over other matters. Cuban scientists and government officials have repeatedly expressed the desire to work directly with U.S. technical agencies, such as NOAA and the U.S. Environmental Protection Agency. These scientific relations should be encouraged and nurtured.

Recommendations for Advancing Scientific Cooperation:

We recommend that the U.S. and Cuban scientific communities act to remove the barriers—both real and perceived—to scientific cooperation. We recommend that the National Academy of Sciences, the American Association for the Advancement of Science, and similar professional or scientific associations in the United States:

Make the U.S. scientific community more aware of the quality of Cuban scientific work in order to establish that there is scientific parity in many fields. Make known the opportunities to conduct research in Cuba and collaborate with Cuban scientists. Publish and disseminate Cuban scientific work in U.S. publications. Regularly publicize opportunities for joint collaboration and research in newsletters that reach the scientific community and on the Internet. Encourage attendance of U.S. scientists at scientific conferences in Cuba and publicize those conferences.

Educate members of the U.S. scientific community about the type of collaboration

that is permitted under the U.S. regulations, and the procedural steps that scientists have to take to apply for a license to conduct research in Cuba.

Undertake specific collaborative programs with Cuban associations and institutions to restore the exchange of scientific information and insights. This exchange should be updated by using electronic data-sharing tools whenever possible.

We recommend that the Cuban Ministry of Science, Technology and the Environment and professional scientific associations in Cuba:

Identify the obstacles and hurdles to increased collaboration with U.S. scientists and take steps to remove those hurdles. For example, seek financial support from international or multilateral assistance agencies to fund the purchase of basic supplies and equipment such as computers. These activities on the Cuban side should be complementary to the regulations that allow open data exchange from the U.S. side.

Prepare a comprehensive list of opportunities in Cuba for collaborative research with U.S. scientists and update it regularly. Submit this list to scientific publications and universities in the United States and post it on the Internet. Encourage the participation of U.S. scientists at conferences and other events in Cuba. Foster collaborative work, including field research in Cuba, between U.S. and Cuban scientists.

We recommend that institutions in the United States that have been involved in scientific exchange with Cuba, such as the American Museum of Natural History, the Center for Marine Conservation and others, work together in a coordinated effort to:

Hold roundtables, workshops and seminars to involve and inform other U.S. scientific institutions about the opportunities for scientific collaboration with Cuba.

Help to institutionalize scientific cooperation between the United States and Cuba. Sign and encourage other U.S. institutions to sign collaborative agreements with Cuban institutions. Broaden participation greatly to include: centers of policy study, universities and other educational institutions, research centers, museums, libraries, zoological parks, aquariums, conservancies, botanical gardens and herbaria.

Inform the funding community about potential areas of collaboration, particularly foundations that have sponsored scientific research, natural resource management, or conservation initiatives in Latin America and the Caribbean, such as the John D. and Catherine T. MacArthur Foundation, The Rockefeller Foundation, and the Ford Foundation.

Identify opportunities for Cuban scientists to attend courses, training and other educational programs in the United States. Facilitate access for Cuban scientists to the data and specimens from Cuba that are housed in collections at U.S. institutions.

We recommend that collaborative efforts be focused on the specific top priority areas identified by Cuban and U.S. scientists during this initiative:

- biodiversity research and preservation, including preservation of Cuba's scientific collections;
- oil spill prevention and control in the Gulf of Mexico and the Caribbean;
- management of coastal zones including the creation and management of protected marine areas and the preservation of coral reefs;
- meteorology and climatology; and
- the joint development of environmental indicators for monitoring shared natural resources.

We believe that this level of effort and involvement on the part of scientific institutions and associations is essential to achieve a meaningful level of collaboration between U.S. and Cuban scientists. The ad hoc scientist-to-scientist cooperation that exists

now, although worthy and important, cannot realize the full potential for collaboration or the benefits that it will bring to the Caribbean Region. Furthermore, although cooperation can take place through international and regional scientific institutions to which both Cuba and the United States belong, such as the Inter-American Institute for Global Change and the Intergovernmental Oceanographic Commission, we see no substitute for regular, direct, bilateral communication for achieving true collaboration.

The Electronic Exchange of Information

One key element to collaboration between U.S. and Cuban scientists and researchers is to make it easy for them to communicate with one another. Recent updates to the U.S. regulations allow the electronic exchange of information, but this opportunity has barely been realized in practice. The Dialogue invited Dr. Sheldon Annis, Director, Global Environment Facility, United Nations Development Program, to the conference in Havana to address this issue. In Annis' opinion, the ability to communicate electronically with Cuba, whether by e-mail or Internet, is critical to alerting scientists in the United States to the opportunities for scientific research in Cuba, and to enabling scientists from the two countries to work together on a regular basis.

At the Havana conference, Annis made the point that through electronic mail, scientists from both countries could develop and reinforce the level of trust and personal relationships necessary to support institutional affiliations and joint research. For example, on the Internet, Cubans could post opportunities for joint research on a "home page" that U.S. scientists could access. Annis identified some key obstacles to regularized electronic exchange with Cuba such as the availability of computer equipment in Cuba, the language barrier, and the need for enhanced technical training in Cuba. Other obstacles are Cuba's poor telephone system, which is both unreliable and accessible only to a minority of the population.

Recommendations on Promoting the Electronic Exchange of Information:

We recommend that universities, scientific institutes and national associations of scientists in the United States, such as the American Association for the Advancement of Science or the National Academy of Sciences:

Increase awareness in the U.S. scientific community of the ability to communicate and share data with Cuban scientists via the Internet.

We recommend that the Cuban Ministry of Science, Technology and the Environment:

As a matter of good science policy, broadly expand the reach of electronic data-sharing among Cuban scientists and technical institutions.

We recommend that U.S. and Cuban scientists currently working together:

Take the initiative to develop standards for data sharing via electronic transmission, including common taxonomies, compatible software and standard structure for shared databases, to facilitate the widespread use of the Internet for data sharing and regular communication by a large number of Cuban and U.S. scientists.

Exchange of Expertise in Environmental Law and Regulations

This is a pivotal time in the environmental history of Cuba because its government is demonstrating a renewed commitment to the sound management of the country's natural resources. The creation of the Ministry of Science, Technology, and Environment in 1994 established the institutional framework for the drafting and implementation of new environmental regulations. Lawyers at the Ministry are currently crafting a new, comprehensive framework law for Cuba that will govern the use and protection of natural resources. The law covers everything from establishing standards for the management of hazardous wastes and toxic chemicals to "eco-tourism." This is a profound opportunity for Cuba to shape the future of its environment and for the United States to participate by

sharing its experience in designing and implementing environmental laws. These efforts will have a lasting impact on the environment in and around Cuba.

Recognizing this opportunity for collaboration, the Dialogue added to the agenda of the Havana conference a discussion of the potential for an exchange of legislative and policymaking expertise between Cuba and the United States. The Dialogue invited two distinguished lawyers to prepare papers for the conference on the potential avenues for this type of collaboration: Professor Patrick Parenteau, Director of the Environmental Law Center at the Vermont Law School, and Dr. Orlando Rey Santos, Environmental Legislation Specialist at the Cuban Ministry of Science, Technology and the Environment. Dr. Rey is one of the architects of the initiative to craft the framework environmental law for Cuba.

Prior to the conference, Parenteau, Rey and other lawyers from the Cuban Ministry met in Havana to discuss the potential for collaboration and the status of Cuba's framework law. After these meetings, both Parenteau and Rey expressed the view that U S. experience in establishing a regulatory framework for environmental protection could be very helpful to Cuba at this time.

At the conference and in his paper, "Broadening Cooperation Between the United States and Cuba: Legislative Policies and the National Legal Framework," Rey identified specific areas where exchange of expertise in environmental law and regulations would be most fruitful. Conference participants adopted Rey's recommendations to base the exchange on the following topics: the regulation and control of land-based sources of marine pollution; establishing air quality standards; preserving biodiversity and designing a system for the equitable allocation of the benefits derived from the commercial development of diverse natural resources; the management of hazardous waste and toxic chemicals and their import and export; establishing a system of civil and criminal penalties for violations of environmental laws; and incorporating economic control mechanisms into environmental regulations.

In Rey's view, cooperation with the United States should take place on three levels: professional, academic and governmental. Rey welcomes the involvement of practicing lawyers and legal scholars from the United States, but he made the point at the conference that participation of U.S. federal government and state government officials who are involved in the design and implementation of environmental legislation is "most important to us because it is the level at which we can apply the lessons most directly." According to Rey, U.S. government policymakers and officials have the most to offer the collaboration because of their experience in drafting and implementing legislation, performing assessments, and enforcing laws.

Professor Parenteau suggested several areas where a sustained exchange between U.S. and Cuban environmental lawyers would be fruitful, including: the development of a set of protocols for dealing with oil spills and other pollution threats in the joint waters of the Gulf of Florida, and joint efforts to curtail the illegal trade in endangered wildlife protected under international conventions. Professor Parenteau also recommended that a series of professional exchanges and seminars be held on pollution prevention, industrial ecology, ecosystem management, and citizen enforcement.

Recommendations on Promoting the Exchange of Expertise in Environmental Law:

We recommend that the American Bar Association, state bar associations and their committees on environmental law, as well as other professional associations of environmental lawyers (such as the Environmental Law Institute), and members of the academic community specializing in environmental law:

Foster collaboration and exchange between the U.S. professional and academic legal community and the legal section of the Cuban Ministry of Science, Technology and the

Environment and the professional and academic legal community in Cuba.

Collaboration could entail:

- an exchange program to bring U.S. legal scholars and experts to Cuba now to participate in the Cuban initiative to draft a comprehensive framework law and create the infrastructure to sustain and enforce it, and to bring Cuban lawyers and scholars to the United States;
- the designation of "special advisors" from the United States to provide expertise on the specific areas of cooperation identified by the Cubans and identified in the "Scientific Cooperation" section of this policy brief;
- a series of roundtables or seminars on environmental law involving both the Cuban and U.S. legal communities;
- assistance in building and equipping environmental law libraries in Cuba; and
- some mechanism on the Internet (for example, a World Wide Web site, a discussion group, a "question and answer" bulletin board) by which information and expertise could be easily exchanged.

Create the circumstances for lasting collaboration:

- provide ongoing access for Cubans to U.S. articles and lectures about environmental law with a particular focus on implementation and enforcement;
- assist the growth of the environmental law profession in Cuba through providing opportunities for college and graduate student exchange.

Expand and deepen the collaboration over time; develop and formalize relationships between institutions and organizations (not just with individuals) to sustain cooperation and make it more systematic.

Secure the participation of current or former U.S. government officials responsible for the design, implementation and enforcement of environmental laws.

Cooperation Between U.S. and Cuban Non-Governmental Organizations (NGOs)

U.S. and Cuban participants agreed at the conference that non-governmental organizations have a potentially powerful role to play in advancing environmental cooperation between the United States and Cuba consistent with the laws of each country. NGO-to-NGO contact and joint initiatives can serve as a platform for a host of activities, including joint scientific research, preservation and identification of scientific collections, training, exchange of policy and scientific expertise, and information sharing. Furthermore, NGOs can have a significant influence on policy-making and play a central role in informing and educating the respective governments and the public. In this way, NGOs are in a position to garner support for U.S.-Cuban environmental cooperation from both the public and key policymakers as well as to lead cooperative activities, as permitted by the respective governments.

At the conference, the Cubans were the first to note the importance of NGOs to advancing cooperation on the environment. Roberto Acosta Moreno, the Deputy Director of the Environmental Policy Board [at the Ministry of Science, Technology and the Environment, CITMA], said in his opening remarks that "an important aspect of this dialogue is this bond [between U.S. and Cuban NGOs]." In their paper, "Frameworks for Cooperation: From the Realm of Possibility to Action," Acosta and Rey note that collaboration "at the level of non-governmental organizations . . . has great potential."

The reference to NGOs made by the Cuban participants at the Havana conference prompted questions from the U.S. participants about the nature of Cuban NGOs. U.S. participants expressed a general impression that NGOs in Cuba are not independent from the Cuban government and do not play the same role in independent advocacy and public debate as NGOs in the United States.

The reply of the Cubans was emphatic. Jorge Ramon Cuevas, the Vice President of

Pro-Naturaleza, a Cuban NGO, insisted that Cuban NGOs are independent from the government and "play an extremely important role [in Cuba]." He noted that Pro-Naturaleza receives no funding from the government and is supported completely by contributions from individuals.

According to Acosta, new NGOs are forming all the time in Cuba, including many with environmental concerns such as "Cuba-Solar" which advocates the use of solar energy, the Cuban Society of Ocean Sciences, and the Foundation for the Study of Man and Nature. María Elena Ibarra, Director of Cuba's Center for Marine Research and a member of the Pro-Naturaleza Board, asserted that Cuban NGOs are "taken seriously by government institutions" and Vívian Fernández of the legal section of the Cuban Ministry of Science, Technology and the Environment said that Cuban NGOs are a "highly valued activity in our society."

The comments of the Cuban participants suggest, however, that NGOs in Cuba may play a different role than NGOs in the United States. Many of the NGOs they describe sound more like professional societies of scientists, experts or technical personnel who, in Ibarra's words, "organize activities, lectures and awards." While Fernández made the point that a specialized society of jurists in Cuba was "helping to measure the actual efficacy of legislation" it is not clear to what extent these organizations are engaged in independent advocacy.

Uncertainty surrounding the nature of Cuban NGOs may pose a challenge to promoting contact and cooperation between U.S. and Cuban NGOs. Michael Smith of the Center for Marine Conservation expressed concern that U.S. NGOs will not accept Cuban technical organizations as "real NGOs." Sheldon Annis of the United Nations Development Program believes that funders will not support efforts to further collaboration between U.S. and Cuban NGOs if Cuban NGOs cannot be proven to be independent from the government and in a position to effect change.

It is the policy of the U.S. government to promote contact and exchange of information between the United States and Cuba, and to permit U.S. NGOs to maintain direct contact with their Cuban counterparts and to provide assistance in the form of money, expertise, and technology. We hope that both governments will allow NGOs to take advantage of these opportunities so long as they conform to the laws of each country.

Recommendations on Advancing Cooperation Between U.S. and Cuban NGOs:

We recommend that U.S. NGOs, in their respective areas of interest and activity, take the lead to:

Identify NGOs in Cuba and contact other NGOs in the United States which could make significant contributions to advancing cooperation in the priority areas identified in the "Scientific Cooperation" section of this policy brief.

Make these NGOs aware of the opportunities that exist for cooperative activities between the United States and Cuba in these areas, and the enhanced role that NGOs can play in leading these activities in light of the new US policy.

Facilitate contact and discussion between Cuban and U.S. NGOs. Assist in forming a "council of representatives" from these NGOs to manage and facilitate cooperative activities between U.S. and Cuban NGOs, identify sources of funding, involve other institutions over time, and expand activities to include public education.

We recommend that Cuban and U.S. NGOs work collaboratively to:

Establish formal partnerships and regularized contact; set up the basis for continued exchange and long-term joint initiatives.

Build awareness in the funding community of the importance of U.S.-Cuban NGO collaboration to the environment.

Gather and disseminate information about the activities of Cuban NGOs for the U.S. public, and the NGO and funding communities.

The Role of the Public

During the conference discussion in Havana, and for the first time in this dialogue, participants recognized that public opinion in both countries could play a key role in advancing collaborative efforts. In the United States, for example, there is reason to believe that the public would be receptive to cooperation with Cuba on environmental issues. As Michael Smith points out, there has been no objection from the U.S. public to the incremental changes made to the U.S. regulations over the past decade that have relaxed constraints on information exchange with Cuba. One can envision an informed U.S. public supporting environmental cooperation with Cuba and then being a force for change in the political environment in fostering cooperation.

To that end, it was agreed at the conference that an effort should be made to introduce the idea of cooperation into the public consciousness through credible, non-political vehicles. The goal of this effort is to make the Cuban and U.S. public aware of the pressing need for environmental cooperation, the immediate opportunities that exist, and the benefit to the environment that would result from cooperation.

Recommendations on the Role of the Public:
We recommend that the news media, including newspapers, television and radio, and in particular in the United States popular national science magazines such as Smithsonian, Discover, Natural History, and National Geographic:

Include coverage of the need for environmental cooperation between the two countries. Special emphasis should be given to making the U.S. public aware of the natural resources of Cuba and its islands, the quality of science in Cuba and the risks to the environment of foregoing cooperation.

Cooperation Between the U.S. and Cuban Governments

Perhaps support from the voting public will bring about one of the most crucial components for effectively managing the natural resources that the United States and Cuba share: bilateral cooperation between the two governments. There was no question among Cuban scientists and policymakers at the conference that "we must go to this level" and that "open, bilateral interaction between the two governments on these matters . . . is a fundamental goal."

We continue to believe that the United States should "de-link" its political position in relation to Cuba from its environmental policies in order to initiate an open, bilateral relationship with Cuba on environmental matters. The United States must recognize that it has a compelling interest in the health of Cuba's environment and of the natural resources the two countries share. The potential economic and environmental damage to the United States that could result from not cooperating with Cuba is too great a risk.

Recommendations for Advancing Bilateral Cooperation Between the U.S. and Cuban Governments on the Environment:
We recommend that the Inter-American Dialogue and the participants in this initiative:

Inform key decisionmakers in the U.S. and Cuban governments of the initiative's findings and the opportunities for environmental cooperation.

We recommend that the U.S. Government, including the Department of State, the Environmental Protection Agency, the Department of the Interior, the National Oceanographic and Atmospheric Administration, the U.S. Coast Guard, and the U.S. Meteorological Service:

Initiate bilateral discussions with the Cuban Ministry of Science, Technology and Environment on the top priority areas listed in the "Scientific Cooperation" section of this policy brief, including oil exploration in the Gulf of Mexico, collaborative biodiversity research in Cuba, and jointly preventing and addressing environmental accidents in the air and water space between the United States and Cuba.

Negotiate a comprehensive plan with Cuba governing the management of the marine and coastal resources in the Gulf of Mexico. Its elements could include: development of a joint plan for oil spill prevention and response; taking joint action to protect the coral reefs in the Gulf of Mexico and northern Caribbean Basin, including design of marine protected areas; joint management of fishing resources; and development of a plan of action for the management of marine garbage and waste.

Work with the Cuban government to implement, jointly and in their respective jurisdictions, the mandates of international conventions that both countries have ratified.[1]

Designate staff at the Environmental Protection Agency, the Department of the Interior, and the Department of Justice with expertise in writing and enforcing environmental laws to serve as advisors to Cuba's initiative to craft a comprehensive environmental law.

Negotiate a plan for coordinated action in the fields of meteorology and climatology, with emphasis on the regular exchange of predictive data and compatible technologies.

We recommend that the White House authorize:

Inviting Cuba to join the U.S.-led international Coral Reef Initiative to protect coral reefs around the world. The United States has involved many countries in this initiative, but has excluded Cuba.

Lifting the requirement of special licenses for U.S. researchers conducting work in Cuba. U.S. researchers would greatly benefit from a return to general licenses that do not require prior governmental review of their research in Cuba.

Allowing Cuban scientists to become affiliated with scientific societies in the United States and vice-versa.

We recommend that both the Cuban and U.S. governments:

Minimize procedures for licensing and issuing scientific visas in order to facilitate the conservation and study of Cuban scientific collections in both countries.

Conclusion

It is our hope that distribution of this policy brief by the Inter-American Dialogue will broaden discussion of the opportunities for environmental cooperation between the United States and Cuba beyond the group of distinguished scientists and policymakers who have participated in this two-year initiative. The scientific, policymaking, legal, and NGO communities as well as the general public must be convinced of the importance of this effort and become involved in bringing about regular and meaningful cooperation on the environment between the United States and Cuba.

[1] For an inventory of these conventions, see page 47.

Possibilities and Barriers for Direct Bilateral Scientific Exchange Between Cuba and the United States

Sergio Jorge Pastrana

Summary

As a result of the prevailing political dispute between Cuba and the United States since the 1960s, all types of exchange between the two countries were discontinued and, until now, little has been achieved in establishing links of any kind. Various initiatives have existed in the area of scientific research and several exchanges have taken place. These initiatives have mostly demonstrated the need for the free-flowing exchange of scientists and researchers, which will benefit joint research efforts on topics of common interest. This is particularly evident in the area of research related to weather, common seas, biodiversity and ecological studies, which, at the same time, are feasible at least if launched within the framework of existing regulations.

The current political strain has imposed barriers, which, although not insurmountable, tend to discourage U.S. researchers from working in Cuba. On the other hand, the disinformation that exists about scientific progress and research in Cuba keeps the United States ignorant about the possibilities of establishing links with their counterparts in this country. Although it is necessary to take advantage of every possible opportunity to establish ways through which the U.S. scientific community can learn about the reality of the scientific research sector in Cuba, it becomes imperative to work together to lift the politically based barriers—which in many cases are obsolete—in order to achieve a normal exchange of researchers from both countries. This paper will conclude with a number of practical options to meet these objectives.

Background

With the triumph of the Cuban Revolution in January 1959, the political climate between Cuba and the United States became increasingly rarefied, eventually leading to the partial economic embargo in 1960, the breaking of diplomatic relations in January 1961 and the imposition of a total economic embargo and the subsequent naval blockade in October 1962. The political events of that time, which led to the escalation of U.S. economic aggression toward Cuba, created a scenario in which Cuba came to be considered a national security threat of the first order by one U.S. administration after another. Without entering into a discussion of its basis or merits, this scenario *de facto* defined a status for Cuba that, with only a few modifications, endures to this day: in spite of being one of the United States' closest neighbors, Cuba is the most distant country in terms of political, economic and all other kinds of relations, and the current official U.S. foreign policy toward Cuba is comparable only, if at all, to U.S. policy toward a few countries in Africa or the Middle East.

The disappearance of the Soviet Union and the Socialist Bloc radically changed the political panorama of the world as well as the foreign policy of the United States toward the rest of the world, with the sole exception of Cuba. U.S. foreign policy toward Cuba remained in some sort of limbo. In recent years, extreme right groups have attempted to extricate U.S. foreign policy toward Cuba from this limbo, but only for the purpose of making U.S. policy even harsher and more detached from the general tendency toward a relaxation of tensions in the international arena.

Although it is not our objective at this moment to analyze this policy—how ill-conceived or objective it is—the policy is responsible for the environment in which scientific exchanges between the research communities of both countries have had to operate. As a result of events in the 1960s, the few links that existed in the past in this sector were discontinued. These links had become increasingly scarce insofar as Cuba was unable to deliver the conditions for developing its own research capabilities. Since then, however, the foundation has been laid in Cuba for the creation of a national capacity in science and technology, which today is an internationally recognized reality.

Although in the 1960s and the beginning of the 1970s there were some points of contact between Cuban and U.S. researchers, these were, in general, isolated and should actually be considered exceptional. It was not until 1977, in the middle of the Carter Administration, that the first exchange of an important group of researchers from prestigious institutions of the Smithsonian Institution occurred. The collaborative research programs established by these researchers with their Cuban counterparts lasted until 1981. As a result of these exchanges, joint specialized publications were produced, the study and review of collections from both countries by researchers from the counterpart country were made possible, and joint field work and data exchange programs were initiated.

When the Reagan Administration took office, all exchanges came to an end. Access to Cuba was limited to only U.S. researchers from the Smithsonian Institution. This situation lasted throughout the twelve years of Republican administrations. Contact between researchers once again became exceptional and only occurred occasionally, thereby frustrating the development of a free-flowing and continuous exchange, which is essential for joint scientific research studies.

Toward the end of the Bush Administration, contacts were again initiated on a more continuous and permanent basis between scientists from the American Museum of Natural History in New York and Cuban researchers. It is necessary to point out that this initiative paved the way for a growing interest among U.S. researchers and made it clear to other U.S. centers that it was possible to carry out research studies on Cuba-related topics. As a result of these first contacts, avenues were opened showing that the pursuit of joint research studies between Cuba and the United States, although difficult, was not impossible. It also demonstrated that these joint studies had the advantage of producing quite satisfactory results, both in terms of the relations between the parties as well as the actual results of the investigation. This collaboration has gradually but steadily increased in the last five years, although at a moderate pace. Increasingly, more common interests emerge and new possibilities open up. Unfortunately, this collaboration is not occurring without setbacks.

Main Difficulties for Scientific Collaboration

It is difficult to understand the context in which scientific collaboration between Cuba and the United States unfolds, since it is clouded by a multitude of regulations, which do not take research-related needs into account and with which all U.S. citizens endeavoring to conduct research in Cuba must comply. In the first place, the proposed study must be specific and proven to be researchable only in Cuba. To work in Cuba, any U.S. citizen must be furnished with full room and board as well as an invitation from a Cuban institution. In addition, a U.S. citizen may not spend more than US$100 per day in Cuba. It is necessary to remember that this cloud of regulations stemming from the U.S. embargo, which apply to all U.S. citizens, seeks to asphyxiate Cuba economically—scientific and research activities are not an exception to this rule even today.

The embargo is justified on the basis of the *Trading with the Enemy Act*, but is also complemented by specific regulations from the Departments of State, Commerce and the Treasury, and more recently by the Torricelli and Helms-Burton Laws. For a detailed analysis of the regulatory framework defined

by the embargo, see the book by Dr. Michael Krinski.

Until August 1994, scientists themselves could determine if their research proposal complied with the existing regulations and *a priori* decide if they would do their scientific research in Cuba. Afterward, the U.S. government would verify whether the research was in compliance or not with the regulations. Following the last set of regulations that was established following the August 1994 crisis, researchers must now apply .for a special license, which is processed very slowly by the U.S. Department of State, for each trip to Cuba. In turn, these difficulties are exacerbated by the lack of scheduled flights between the two countries and the complications associated with the diminished number of charter flights today. Traveling to Cuba from the United States, which should be a forty-minute flight, requires almost a full day and flying through a third country, which makes the trip long, uncomfortable and costly. Daily flights are not available and any change brought about by delays in processing the paperwork by the authorities implies a change of flights, which, in addition to altering the entire research schedule, typically entails additional costs to the traveler.

All of this is only a cursory look at one or two examples of the practical difficulties that currently exist in pursuing scientific work.

To this we can add that, according to the way scientific research is carried out in the United States, researchers, in general, work on projects that are financed by the National Science Foundation or a private entity. Although research projects that require travel to Cuba are not automatically rejected, the legal obstacles make proposals that include Cuba less attractive. Entities exist that have financed and continue to finance scientists who conduct research in Cuba, but only those people who are most interested and daring submit this type of research proposal. Only a very small group of entities is willing to finance these proposals, and always within very specific frameworks, in order to avoid conflicts with the laws currently in force.

Finally, there are also regulations on the Cuban side that we consider essential in order to achieve a healthy working climate given the difficult conditions that the U.S. government has imposed on our country. First, the U.S. researcher must have a Cuban institution to serve as a counterpart. The researcher must also inform the host institution of his or her research agenda in Cuba and receive its prior approval in order to obtain a visa supporting the research. Second, the researcher must adhere to his or her research agenda and to the objectives motivating the trip to Cuba. Finally, the researcher must comply in every sense with the regulations that protect the national patrimony and the other laws in force in Cuba.

Possibilities for Improving the Current Situation

Even though the opportunities and gaps in existing laws that regulate scientific exchange in both countries have not been fully exhausted, it is not possible to continue working exclusively on the basis of what is currently feasible, since we run the risk of establishing many initial contacts among colleagues from both countries that produce few specific results in the long term. The success of joint scientific research programs with long-term objectives requires continuity and consistency. This can only be achieved through more solid bases, unencumbered by the back and forth associated with short-term political considerations. The importance of establishing programs of bilateral scientific cooperation, especially in the areas of environmental research, has been made fully clear by researchers, specialists and political scientists from both countries. It is necessary to establish channels for the pursuit of long-range programs. The immediate priorities have already been put forward by the specialists. The task now is to look for a way to advance viable initiatives and to seek the support from the entities, individuals, and other sources that can advance proposals that set the foundation for their development.

The principal initiatives that have been presented are the following:

- *The establishment of research consortia within the frameworks of the Inter-American*

Institute for Research on Global Change(IAI), with the participation of scientists from Cuba, the United States and third countries to develop joint research activities.

The Inter-American Institute for Research on Global Change is the best example on this continent of what a collective research initiative can become. It should lay the groundwork for an effective scientific collaboration among all of the countries in the area on the items of the agreed scientific agenda. Regarding the Caribbean region, and Central, South and North America, Cuba is a necessary counterpart to the other participating countries, including the United States. Because both countries are full members of the IAI, they will be obligated to promote jointly the activities initiated by the research consortia that are organized within the framework of the IAI.

- *The establishment of an Institute for Seasonal and Inter-Annual Climatic Change that would offer similar possibilities.*

The government of the United States has submitted a second proposal to organize an international institute—in this case for the study of the "El Niño" Southern Oscillation phenomenon—which should involve more than forty states of the world, including Cuba. It is important to achieve the joint participation on this topic of scientists from both countries.

- *Granting special licenses for the conservation and study of Cuban collections in Cuba and the United States.*

- *Securing financing for the exchange of researchers from Cuba and the United States and for the study of these countries in the counterpart country.*

- *Granting doctoral and post-doctoral fellowships for Cuban researchers at U.S. universities. Welcoming U.S. university professors at institutes of graduate studies in Cuba.*

- *Lifting the obstacles related to the application for special licenses for U.S. researchers to study in Cuba.*

- *Allowing Cuban researchers to become affiliated with scientific societies in the United States and vice-versa.*

- *Expanding the participation of researchers from both countries in scientific events held in the counterpart country.*

- *Expanding the publication of research studies from both countries in scientific journals of the counterpart country.*

- *Holding bilateral scientific workshops on topics of mutual interest.*

All these initiatives have been proposed and advanced on several occasions. Each has achieved a certain level of maturity and realization. However, all are just beginning to blossom and all of us who are interested in bettering the climate in which scientific research between both countries takes place should work toward their fullest realization, unencumbered by the artificial barriers that are strangers to science.

It is necessary to make these realities known to the broadest sectors of the scientific community in the United States, to the directors of the institutions that finance scientific research, to congressional and executive officials and staff who are involved in the sciences, and to non-governmental organizations that have interests in these activities. The politization of this enterprise must be avoided; similar initiatives in the past have been frustrated at the hands of adverse, short-term political circumstances, and thus ultimately faltered as a result of this politization.

The more we manage to advance these objectives, the better equipped we will be to create the conditions for the implementation of the agreements by both countries regarding the scientific development of our continent and, ultimately, advance the national interests of both Cuba and the United States.

U.S.-Cuban Scientific Collaboration: Achieving Cooperation in an Atmosphere of Hostility[1]

Michael L. Smith

Summary

Natural scientists in Cuba and the United States have been able to conduct joint research and exchanges of information that are among the best examples of cooperation between the two countries. The factors that contribute to the success of this collaboration include (1) shared interest in the same natural phenomena, especially including trans-boundary ecosystems and shared plant and animal populations, (2) the relative parity of scientific personnel and institutions in natural science and some applied sciences, (3) the fact that regulations of the U.S. embargo allow basic research activities, and (4) the fact that the exchange of informational materials is relatively unhindered by either country.

Within the natural sciences, the successful interaction between Cuba and the United States is not a singular case. Natural scientists tend to operate in peer communities that are defined by a shared set of problems to which professional activities are directed and by shared approaches to problem solving. The commonality of scientific reasoning—and the unforgiving dictates of nature—frequently give rise to "epistemic communities" that are able to successfully achieve international concensus even when diplomatic relations among parties might seem to preclude cooperation.

An adequate appraisal of the U.S.-Cuban collaboration as an epistemic community has not taken place, although a scholarly review of this interaction might transform it from one of *ad hoc* cooperation to one with goals that are broadly shared by the two societies.

The successful components of the current interaction include joint research expeditions in the northern Caribbean Basin, scientist-to-scientist research projects and co-authored publications, exchange of published informational materials, and reciprocal institutional visits. This latter element includes collection-study visits which are of particular scientific importance. Although recent policy changes would allow improved exchange of data by electronic means, U.S. and Cuban scientists have been slow to develop the protocols and data standards that would be necessary in order to fully realize the scientific benefits of the new policy.

Barriers to cooperation include the small size of the collaborating community, the low level of acquaintance in the United States with Cuba's scientific infrastructure, limited sources of funds for U.S.-Cuban programs, and certain provisions of the U.S. embargo, especially those that inhibit the provision of supplies and equipment. It must be emphasized, nonetheless, that the embargo itself inhibits scientific collaboration only to a limited degree. A more effective barrier is created by the polemic atmosphere that surrounds the embargo and which creates the widespread but erroneous impression that collaboration is onerous or entirely illegal. Increased press coverage of the current exchange, especially in the popular natural science media, would help reduce each of these barriers.

Very few forms of direct cooperation between Cuba and the United States have survived the diplomatic hostility that has existed between the two countries for the last

three and a half decades. Cultural contacts of all forms, even including technical exchanges on the most basic topics, have been officially suppressed to a greater degree and for a longer period of time than in any other diplomatic schism that is currently extant within the Americas. The maintainance of this cultural impasse could hardly be more contrary to the mode of interaction that was envisoned during the period when the American states were gaining their national identities. In fact, the legal provisions of the U.S. embargo are derived from the Trading with the Enemy Act of 1917; they were originally promulgated as economic weapons to be applied against the former German Empire in time of war. It must be deemed a keen historical irony that such measures should be applied today by one American state against another, or that they should become institutionalized as a long standing feature of inter-American diplomacy.

One of the lines of contact that has survived in this atmosphere of hostility has been cooperation in the natural sciences. Although most institutional connections in this discipline were greatly reduced by the end of the 1960s, it has almost always been possible to maintain some level of unofficial contact and even to continue truly collaborative research. For the scientific community at large, collaboration was maintained through correspondence, but it appears that a few scientists were able to engage in direct joint research in nearly every year of the embargo and that there were small peaks of collaboration during diplomatic openings, such as during the Carter Administration. The amount of direct contact and the diversity of specialists taking part began to increase steadily in the mid and late 1980s. By that time, U.S. scientists working on regional Caribbean problems (most notably involving environmental and biodiversity issues) found it increasingly important to obtain data from Cuba. Several U.S. scientists were among the participants in scientific congresses in Havana that focussed on Caribbean-wide problems in the natural sciences. The meetings resulted in regional initiatives in the natural sciences that continue to form the backbone of U.S.-Cuban collaboration. For example, The Latin American Botanical Congress of 1989 resulted in the formation of a consortium to produce a flora of the Greater Antilles. The project is based at the New York Botanical Garden which maintains the largest and most historically important reference collections of Antillean plant specimens, but Cuban institutions—which have the leading botanical programs and instituions inside the Caribbean Basin—are the most numerous participants.

Several factors contribute to the success of U.S.-Cuban collaboration in natural science. First, there is an overriding dictate of nature: Cuba and the United States are irrevocably connected to each other by a number of natural systems. These include shared natural resources such as populations of coral reef organisms and fisheries, as well as currents that will carry one country's resources, or problems, to the other[2]. Both scientists and, to an increasing degree, policymakers recognize that failure to cooperate in managing these shared systems will result in direct damage to each society. Part of the damage will be immediate but temporary, as in the case of some forms of pollution. Other forms of damage, such as extinction of species or commercial extinction of fisheries, will be permanent and will forever impoverish the resource base of both countries. Many scientists on each side of the Straits of Florida have come to the view that cooperation on environmental topics is no longer deferrable, and they are thus highly motivated to collaborate to the greatest possible degree, given the existing barriers.

The second factor is sociological: the training and quality of Cuban and U.S. scientific personnel are very similar in the natural sciences, creating conditions that are favorable to collegial interaction. Within the Caribbean region, these are the two countries that most clearly share an appreciation for the value of basic research, with the result that they have both nurtured a significant scientific community and appropriate institutions to sustain it. As a consequence, Sergio Pastrana was able to state in the Inter-American Dialogue's first conference on environmental cooperation that "Cuba today is the best

counterpart that the United States has on the continent to undertake the necessary scientific research on environmental topics in the Caribbean area."[3] Although basic support for science in Cuba has been reduced during the current economic down-turn, there is nonetheless a high degree of parity in scientific culture. The two countries have developed peer communities with very similar scientific outlooks that make U.S.-Cuban collaboration highly natural and unstrained.

A third factor that contributes to scientific collaboration would be the most obvious to many analysts. It is the fact that the regulations that comprise the embargo include certain provisions for travel and other activities necessary for site-specific research. The license for professional research seems to be deeply rooted in U.S. policy, and it may be based in attitudes that predate the World Wars. (I do not know how the license became established in the provisions that allow particular embargos to be invoked.) Other provisions that allow scientific interchange are more recent. For example, the purchase and shipment of most informational materials was exempted from all embargos (not just the embargo of Cuba) in 1988, and the definition of informational materials was subsequently updated in the context of new computer-based technology for managing and sharing information. With few exceptions (such as encryption software), it is now possible to exchange informational materials in nearly all formats, including electronic transmission. From the point of view of U.S. natural scientists, the current regulations regarding informational materials must be considered to be fully conducive to routine collaboration. These legal provisions, both for research itself and for exchange of information, are the *sine qua non* of the successful collaboration in natural science.

Because of the importance of the license for professional research, it is likely that collaboration was depressed to some degree when the procedures for licensing were made more restrictive in August of 1994. During most of the period in which the embargo has been in effect, scientists were allowed to collaborate under the personal recognizance of a general license that required no specific prior approval. In 1994, the general license was replaced with a specific license that requires each U.S. scientist to demonstrate his or her personal qualifications and goals for research in advance. While the current procedure is certainly more cumbersome, it is probably not the procedures themselves that have reduced interaction. The more powerful effect of the policy change is that it has contributed to the atmosphere of hostility that chills U.S.-Cuban contact. As in other problems to be discussed during this conference, a partial remedy could lie in press coverage of U.S.-Cuban collaboration.

Role of the Natural Science Community in U.S.-Cuban Policy

Although scientists have the reputation of being preoccupied with arcane issues, it seems to be their nearly universal belief that their work makes an outstanding contribution to the larger society of which science is a part. It is therefore of considerable satisfaction to many that plain collaboration in natural history and environmental topics should become the basis for diplomatic discussions between countries whose relations are otherwise strained.

It is possible that the significance of the collaboration in natural science is nothing more than a consequence of the fact that nearly every other form of U.S.-Cuban contact is highly restricted. However, the successful collaboration of U.S. and Cuban scientists is not an unusual case. There is a growing recognition that the conditions that promote international cooperation often stem from knowledge-based communities rather than from national interest groups. Examples include the establishment of the Pacific Science Association, one of the few surviving international institutions of those that were founded between the World Wars and, perhaps, the International Whaling Commission.

The establishment of the Mediterranean Action Plan (Med Plan) as a regime for

controlling marine pollution has also been cited as a case in which a knowledge-based community contributed to the development of convergent state policies[4]. Although the Med Plan is now widely regarded as a success, there was considerable hostility to be overcome during its development because the costs and benefits of controlling pollution were not evenly distributed among the Mediterranean countries. The transformation to a cooperative international regime supported by all governments in the region has been attributed to a substantial degree to collaboration by "a community of ecologists and marine scientists."[5] Such groups that are delineated according to shared knowledge and modes of reasoning are usually thought to be influential (1) immediately after a crisis, (2) during periods when technical uncertainties are increasing, (3) in cases when decisionmakers are uninformed about the technical dimensions of a given problem, or (4) when the costs and benefits of international options are unclear. Under such conditions, evolving national policies and international order tend to reflect the outlook of a knowledge-based community.

The importance of networks of knowledge-based experts—or epistemic communities—as contributors to international relations is increasing in concert with the growing complexity of problems that are of global concern. Their influence is based partly on the assumption that states will seek to reduce uncertainty, particularly when dealing with systems that are complex or technical in nature. Environmental issues tend to provide many such situations because the components of ecosystems interact in a complex way, making it difficult for decisonmakers to predict the long-term or interactive outcome of particular measures that they may wish to apply to solve specific problems at hand. Such situations increasingly provide opportunities for epistemic communities to influence the development or coordination of international policy.[6]

The U.S.-Cuban collaboration has many of the characteristics of an epistemic community in that its members have shared patterns of reasoning, a shared commitment to the increase and diffusion of knowledge, and shared notions of validity. However, the collaboration was developed and is maintained primarily on an *ad hoc* basis. If the scientists involved also share the goal that their work should contribute as broadly as possible to the larger society, then it would be useful to analyze the collaboration with respect to its potential or actual effect as an epistemic community.

NOTES:

[1] I am grateful to James A. Beck for assistance in investigating the legal background of the U.S. embargo and international agreements signed by Cuba and the United States. Research was supported by the John D. and Catherine T. MacArthur Foundation.

[2] An overview of natural systems shared by Cuba and the United States is given in the report of the 1994 conference, *The Environment in U.S.-Cuban Relations: Opportunities for Cooperation* (Washington: Inter-American Dialogue, 1995). See especially the papers by Cuevas and Smith.

[3] Sergio Jorge Pastrana, in *Ibid.*

[4] Peter M. Haas, "Do regimes matter? Epistemic communities and Mediterranean pollution control," *International Organization* 43: 3 (1989).

[5] Ibid.

[6] The Winter 1992 issue of the journal *International Organization* is devoted to the topic of epistemic communties. A general orientation to the function and effects of such communities is given by Peter. M. Haas, "Introduction: epistemic communities and international policy coordination," *International Organization* 46: 1 (1992).

Frameworks for Cooperation: From the Realm of the Possible to Action

Roberto Acosta Moreno
Orlando Rey Santos

Introduction

The conference "The Environment in U.S.-Cuban Relations: Opportunities for Cooperation," which took place in New York on September 10-11, 1994, was undeniably an important milestone in defining possible courses of joint action and in fomenting cooperation in the environmental arena.

Nevertheless, on that occasion these aims and actions were addressed only in general terms as is customary when a topic is first introduced.

As we see it, the principal challenge now lies in taking these proposals for action to a higher level of concreteness—indeed to the highest level possible within the current socio-political climate and the means and capabilities of the group from the Dialogue.

The aim of this paper is to explore definitions that would make possible the shift from potentiality to action.

Reaffirming the Course Already Underway: Shared Resources, Shared Interests

An important point of consensus at the previous meeting was the conclusion that it would be mutually beneficial for both Cuba and the United States to work together in the management of their shared natural resources.

In this regard, it is clear that because of its geographic location, extraordinary natural resources and significant scientific achievements, Cuba is meant to play an essential role in the sustainable management of the natural resources of the Caribbean.

The geographic proximity of the two countries implies the existence of overlapping resources, mostly marine-based, as in the area within the confines of the Gulf of Mexico and the Straits of Florida. There is no doubt that a concerted effort is required to safeguard these resources appropriately and to respond in an effective and coordinated way to the dangers that the two countries might confront.

Special importance is given to biodiversity resources and the potential for Cuba to act as a monitoring site for natural phenomena such as tropical storms. With respect to the latter, it is clear that by cooperating with Cuba the United States can fortify its capacity to predict the severity of these phenomena and thus mitigate their adverse effects.

Regarding marine affairs, Cuba can also serve as an important point for data collection on the sources of ocean dumping, especially in the Gulf of Mexico and the Caribbean. Other possibilities for cooperation are opening in the area of fishing resources management and the exchange of information on migrating bird species.

One sphere of great environmental importance in which both countries have made progress is the development and use of renewable energy sources. In our opinion, joint collaboration in this field would be beneficial for scientists and technical experts. The Convention on Climate Change, ratified by both nations, calls for its signatories to pursue individual and joint actions that would promote energy sources that reduce emissions of greenhouse effect-producing gases.

Indeed, as it has already been acknowledged, there are several precedents for joint work and ventures in the realm of scientific collaboration between Cuba and the United States, even though these have been practically on hold in recent decades as a result of existing political differences.

In spite of the fact that their efforts remain unintegrated for reasons that are abundantly clear, it is also clear that both countries confer special importance on environmental issues. Their active participation in international meetings and accords attest to this.

These international conventions and accords, with their calls to joint action among the contracting parties and members, create a broad and flexible working platform. This platform allows the parties involved in this dialogue to sustain the determination to cooperate, which motivated them from the outset, especially because the agreements already include the most sought-after points of contact: biodiversity, marine pollution and global change, among others.

It should also be noted that these accords create not only a moral but also a legal basis for cooperation because, if we reason "inversely," non-cooperation means failing to fulfill the obligations assumed by agreeing to these legal accords, which to a large extent are binding.

Likewise the New York meeting made it evident that collaboration through international fora is a good starting point, although it is not a substitute for joint action between the two governments.

The most effective means to advance scientific work in environmental issues and in the management of shared natural resources is through joint efforts by both governments.

Cole and Domínguez clearly pointed out the inconsistencies within U.S. foreign policy and the U.S. inaction with respect to neighboring Cuba. They struck at the heart of the matter when they stated, "We propose that the United States consider 'delinking' its political position in relation to Cuba from its environmental policies. The environmental issues and concerns that the United States and Cuba share transcend the current political position. The United States has a direct interest in the health of Cuba's natural resources. We urge the United States to initiate an open, bilateral relationship with Cuba on environmental matters."

In our opinion, obtaining the endorsement of this position by broad sectors of the U.S. scientific community and government agencies responsible for environmental protection would be beneficial for the environment, both at the individual country level as well as on a regional and global scale.

Thus, the idea of making environmental concerns transcend current political disputes stands out as particularly important. It takes into account the boomerang effect that political measures toward Cuba might have on the environmental conditions of the United States itself and on the status of our shared resources, as well as the moral and legal reasons already pointed out, which are predetermined by the scope of the obligations of international accords.

The economic problems that Cuba has confronted since the beginning of this decade make cooperation all the more urgent. The aforementioned reasons clearly indicate that if these problems produce a deterioration of environmental conditions, the gravest impact would fall on our shared resources. The potential for useful cooperation between both parties would also be frustrated.

An example of this is the precarious state of Cuban scientific collections, brought about by the scarcity of funds and resources for their adequate preservation. The adverse consequences of this situation transcend mere national interests. It ought to be a cause for concern given that the gathering, management and preservation of this collection is indispensable for any endeavor related to the study, management and preservation of biodiversity.

It ought to be stressed that the United States can expect to benefit from its

collaboration with Cuba in this field. After all, that is how the terms for cooperation are proposed here—as a mutually beneficial exchange in which both have something to give and something to receive.

Regrettably, the context for this cooperation is narrow given the constraining political circumstances, but not altogether out of the question, and hence, the importance of a dialogue in this sphere.

An Agenda for Cooperation

It becomes necessary therefore to define various means of cooperation within the existing parameters, delineating as accurately as possible the areas in which we see the potential for action, the plausible courses of action to undertake, and the actors that are likely to play a role.

There is no doubt that the more multi-level the cooperation, the greater its range and the more fruitful its results. A priori we observe three possible levels: the scientific level, other non-governmental entities and the institutional (governmental) level.

Scientific Collaboration

In the first two lines of action, cooperation should include the universities, research centers, scientific societies, museums and libraries, professional and scientific associations, and non-governmental organizations.

The first link in the chain of actions for cooperation would be for the U.S. scientific community to indicate the possible areas of study in which there is room for interaction under the current circumstances.

In our opinion, the greatest prospects for cooperation are in the areas of: preservation and sustainable use of biodiversity; pollution control in the Gulf of Mexico and the Caribbean; the management of protected areas, especially marine areas; the preservation of certain ecosystems, such as coral regions; the management of coastal zones; the physical oceanography of the Florida Canal; the development of environmental indicators for the monitoring of the natural environment and the resources that both countries share; meteorology and climatology; and the development of renewable energy sources. This is not an exclusive list.

U.S. institutions of renowned prestige, some of which already participate in certain scientific activities in Cuba, should be invited to participate in this effort. We could mention by way of example: the Smithsonian Institution, the American Museum of Natural History, the National Science Foundation, the Center for Marine Conservation, the World Resources Institute, the MacArthur Foundation, and as many universities as can be included in this effort.

The possibility of engaging foundations that have sponsored multiple research projects in Latin American countries such as the Ford and Rockefeller Foundations, among others, should also be considered.

In order to more efficiently attain the objectives set forth, any collaboration and undertakings related to the conservation and sustainable use of the natural resources that we share should be based fundamentally on efforts at the level of institutions, with a preference for isolated exchanges between specialists.

To return to and expand on some practical alternatives of cooperation, we highlight the following:

- Development of roundtables, workshops and other forms of collective exchange. The 1992 Roundtable on Biodiversity set a good precedent in this area, which can serve as an example to be replicated in other possible areas of cooperation.

- Access for Cuban scientists to courses, training and doctoral programs in U.S. universities, and vice-versa.

- Participation of U.S. scientists at conferences and other events in Cuba, and vice-versa.

- Creation of stable forms of information exchange, including setting standards in the areas of geographic reference systems, databases, collection catalogues, uses of software and others. These are all components of an information exchange system. They require the establishment of norms and parameters to permit efficient data sharing, which should also be an intrinsic component of this collaboration.

- Access of Cuban scientists to the data and specimens from Cuba housed in collections at U.S. institutions.

These and other objectives should and can be reached through the establishment of regular and systemic work programs.

In all these spheres, the previously described cooperation between Cuban and U.S. scientists can take place through various international institutions. Among these institutions, the following are worth mentioning: the Union for the Conservation of Nature (IUCN), "Man and the Biosphere" prográm of UNESCO, the Intergovernmental Oceanographic Commission, the World Meteorological Organization, and the Inter-American Institute for Global Change.

Collaboration with Other Non-Governmental Entities

While there are certain precedents for collaboration in the scientific arena, this sort of contact has been less frequent at the level of non-governmental organizations.

With the recent emergence in Cuba of a series of non-governmental organizations that are environmentally concerned or include environmental issues in their agendas, as well as the existence of professional societies heavily involved in these endeavors, a new and thus far hardly explored path is open for joint actions. In the opinion of these authors, this has great potential.

In principle, the agenda for collaboration can be similar to the one for the previously mentioned scientific activity.

However, other possible areas of cooperation can also be introduced, such as cooperation of the sort that is called for by environmentally related national legislation and legal frameworks. This topic was independently treated at the second conference on "The Environment in U.S.-Cuban Relations."

Although the possible agendas for cooperation share many similarities, the participating actors and the ways of bringing cooperation about can be different. Thus, the following Cuban non-governmental organizations may play a role: Pro-Nature, the Man and Nature Foundation, the "Thomas Roig" Scientific Society, the Félix Varela Center, Cuba-Solar, the Society of Ocean Sciences, the Cuban Society of Sanitary Engineering, the Geography Society, the Zoology Society and the Meteorology Society, the Eco-lure Group of the Society of Constitutional Law and the OIKOS Group of the Cuban Society of International Law.

The identification of U.S. counterparts and the promotion of contacts with Cuban institutions might be an important outcome of this meeting.

Government-Level Collaboration

In the current climate, collaboration at the government level seems more difficult than at the other previously mentioned levels. Nonetheless, we deem it appropriate to indicate actions, which in our opinion should constitute priorities in this form of collaboration, since this ought to be the most effective means of protecting the environment shared by both countries. Striving to implement this collaboration should be a goal for all of us concerned about effective environmental protection, always maintaining the strictest respect between the parties.

Even though government-level collaboration could be broader, as our argument maintains, we propose that, at first, efforts be concentrated along two lines. Each line is a top priority for the safe environmental management of shared resources or environmental disaster prevention. Logically, this two-

pronged proposal does not imply a categorical withdrawal of support from other potential areas of joint action.

Our first proposal consists of promoting contacts with the National .Oceanic and Atmospheric Administration (NOAA), the Environmental Protection Agency (EPA), the U.S. Coast Guard Service, the National Park Service (NPS) and the Fish and Wildlife Service (FWS) on the issue of: *Management of Marine and Coastal Resources in the Gulf of Mexico.*

Along this line, we propose the following concrete actions:

- Organize a workshop with Cuban counterparts aimed at understanding the national situation of each country in this area and establishing a joint plan of action.

- Participate in a coordinated fashion in the development of a plan of action for the management of marine garbage and waste.

- Evaluate the possibilities of a joint program to respond to oil spills in the Florida Canal.

- Participate in combined actions to protect the coral regions in the Gulf of Mexico.

- Design jointly a protected marine areas system, which would take into account regional requirements.

- Coordinate the participation of specialists in activities that are designed for information exchange and to move beyond current experiences.

Our second proposal is the promotion of contacts with the NOAA, the U.S. Meteorological Service and its National Center for Hurricanes, in relation to the following topic: *Meteorology and Climatology in the Region.*

Within this framework we propose the following concrete actions:

- Establish stable, efficient and rapid mechanisms for data exchange and prediction methods.

- Undertake joint actions that ensure the use of appropriate technologies for relaying meteorological data.

- The mutual participation of specialists in activities that are designed for exchanging information and moving beyond what is already known about each country's systems.

Similar actions can be coordinated in other areas of significant relevance and mutual interest, such as conservation and the sustainable use of biodiversity, the management of fishing resources, etc.

Apart from issue-specific collaboration, a mutual familiarization and the exchange of information among environmentally related government institutions should be promoted.

A meeting between U.S. officials from the EPA and NOAA and the Ministry of Science, Technology and Environment is an ambitious objective, but not dismissible. It would be a great contribution to collaboration on behalf of more effective environmental protection within the areas that we share.

The Ministry of Science, Technology and Environment is the primary and foremost Cuban counterpart for scientific and governmental collaboration in the environmental area. This organization embodies the will of the state to protect the environment throughout the country.

Its principal environmentally related components are:

- The Board of Environmental Policy, in charge of designing Cuban environmental policy and its legal underpinnings.

- The Environmental Agency, in charge of implementing this policy. It is composed, in turn, of various centers, institutes and institutions. The agency was created to give the Cuban environmental program a more executive and decentralized character as well as stronger scientific backing.

The Environmental Agency emerges as an important actor in activities of cooperation. It

is the organ of the Ministry of Science, Technology and Environment that is responsible for the inspection, supervision, coordination and control of anything that has to do with the design of environmental policies and strategies. It is also responsible for ensuring the enforcement and implementation of environmental legislation.

At the same time, the Agency carries out, through its research institutes, basic and applied research as well as techno-scientific services in the natural sciences and meteorology, in areas related to environmental protection..

The following is a list of institutions that comprise the Agency and which are in charge of policy implementation within their respective fields of operation:

- The Center for Environmental Administration and Inspection
- The Center for Environmental Information, Dissemination and Education
- The Center for Protected Areas
- The Institute of Meteorology
- The Institute of Oceanology
- The Institute of Ecology and Systematics
- The Institute of Geography
- The Institute of Geophysics and Astronomy
- The National Zoo
- The National Aquarium
- The National Museum of Natural History

Among these, the Center for Environmental Administration and Inspection (CEGIA), stands out in terms of the principal parameters within which we will later frame suggested actions of governmental cooperation. The Center's role is to implement environmental policies and direct and control actions regarding the rational use of natural resources, the conservation of fragile ecosystems and the reduction of pollution, ensuring compliance with the environmental legislation currently in force.

Various sectors of the Agency's research institutes also participate in these actions, according to their respective areas of expertise, which include the following:

- The Institute of Meteorology—the protection of the atmosphere and climatic change
- The Institute of Oceanology—the protection of the coasts
- The Institute of Ecology and Systematics—biodiversity
- The Institute of Geography—Territorial Division

Another key component of the Environmental Agency is the Center of Environmental Information, Dissemination and Education, in charge of promoting environmental education and public awareness. To this end, it joins forces with various national organizations, relying closely on other parts of the Agency, such as the of Museum of Natural History, the Aquarium and the National Zoo. This line of work, together with the development and utilization of environmental indicators to generate effective environmental information, are possible areas of cooperation with U.S. institutions.

The Ministry has established a local office in each province of the country, called an Environmental Unit, to make its role as environmental policy supervisor more territorially encompassing. This office includes the officials who run environmental programs at the province level, and in many cases, environmental research and natural science groups. These local offices could also participate in cooperative activities with environmental management units at the various state levels of the Union.

Although the Ministry of Science, Technology and Environment is the natural counterpart in this possible environmental cooperation, it should not constitute the only one. Other organizations in Cuba also carry out specific environment-related work and research activities. Thus, they should also participate in future joint actions. An example is the Ministry of Transportation and the Ministry of Fishing Industries, which is responsible for the safe management of the resources that exploit and have an impact on a

sustainable coastal and marine program. Nevertheless, it should be noted that all these organizations carry out their work within the framework of the environmental policies and strategies set by the Ministry of Science, Technology and Environment.

Concluding Remarks

Clearly, the essential lines, the scope and the actors for environment-related cooperation are already determined in the first instance. Of course, their effective performance will be subject to modifications as warranted by practical exigencies.

As we indicated at the beginning, the goal now is to put the proposals into action. This requires a strong will and the development of concrete actions. Thus, it would be ideal to design a tentative work program and to formulate it with reasonable time frames.

Finally, we must continue to work together in earnest so that environmental cooperation transcends from this sphere into the realm of the governments—only in this way will cooperation achieve its full dimension.

Promoting Exchange of Environmental Law and Policymaking Experience: Some Observations on the Evolution of American Environmental Law

Patrick Parenteau

Introduction

The conference report of the workshop on environmental issues in U.S.-Cuban relations, held in New York City in September 1994, describes in rich detail and from a variety of perspectives the need for greater collaboration in the study and management of shared environmental resources. Whether it is keeping the waters of the Gulf of Mexico safe from oil spills, protecting the habitat of birds that migrate between Cuba and the United States, or maintaining healthy stocks of ocean fisheries, there are any number of issues that would benefit from a freer exchange of scientific information and policymaking experience. Cuba and the United States are signatories to many international treaties and conventions pledging their cooperation in efforts to conserve the global commons. In recent years, Cuba has created the Ministry of Science, Technology, and Environment and stepped up efforts to reduce pollution and conserve biological resources. These accomplishments are all the more remarkable given Cuba's limited financial resources.

With one of the highest levels of biodiversity of any Caribbean nation, Cuba represents an important source of biological wealth justifying increased U.S. attention and cooperative action. These resources are of economic as well as ecological value to Cuba, the United States, the region, and the world. Biotechnology, eco-tourism, and value-added wood products are just a few examples of sustainable economic opportunities.

Likewise, Cuba has a strong interest in what happens in the United States. For example, the United States is the largest contributor of "greenhouse gases," which many scientists believe are contributing to the global climate change phenomenon. The impacts of such climate change, depending upon its scale and rate, could be particularly severe for Cuba.

This paper is divided into three parts. The first part traces the evolution of environmental policy in the United States over the past twenty-five years. The second part looks ahead to where U.S. policy seems to be headed as we enter the Twenty-First century. The third part suggests some legal models and policy instruments that Cuba might consider in developing its environmental management programs.

The First Twenty-Five Years

Starting in 1970 with passage of the National Environmental Policy Act (NEPA), the United States has enacted a large body of national environmental laws dealing with such varied topics as environmental planning, pollution abatement, hazardous waste cleanup, wildlife protection, energy use, and public lands management. Frequently, these laws were enacted in response to some environmental event that sparked a public outcry—such as the blowout of an oil platform off the coast of California; the discovery of hazardous waste buried underneath a housing development in Love Canal, New York; or the oil spill from the *Exxon Valdez* supertanker in Alaska. These laws are not perfect. They are the product of incomplete information, political compromise, and in some cases, poorly defined goals and inadequate means. Over time, as

problems have surfaced, the laws have constantly been amended and tinkered with to respond to various complaints. While these laws have produced some great successes—improving air and water quality, preserving wilderness, saving endangered species—there have also been some failures. One of the most serious is the continued decline of ecosystems and the loss of biological diversity and productivity. With the benefit of twenty-five years of hindsight, some observations can be made about how well these laws have performed. For convenience, I will first discuss pollution abatement laws, then the laws dealing with natural resource conservation.

One major problem with American environmental law is that it tends to be compartmentalized. For example, pollution abatement laws such as the Clean Air Act and Clean Water Act are media-specific, meaning that pollution sources are separately regulated for air emissions, water discharges, and solid waste disposal to land. This creates problems because pollutants can move through several media. For example, airborne contaminants are a major source of water pollution in the Great Lakes. Another problem is that strict regulation of one medium—for example, discharges to rivers—may cause an industry to shift the polluting activity to another medium—for example, land disposal—which causes other problems like groundwater contamination. In some cases this media shift can create greater risks to public health than the original method of disposal.

Another problem with these statutes is that they focus almost exclusively on discrete "point sources"—a discharge pipe or smokestack—whereas many pollution problems stem from non-point sources such as contaminated runoff from agricultural lands or fugitive emissions from fuel handling operations.

Pollution prevention, as opposed to waste treatment, has become increasingly important as U.S. environmental law has matured. Early statutes emphasized installation of "best available technology" standards that applied "end-of-the-pipe" controls. In practice, these uniform, one-size-fits-all standards proved to be very costly and sometimes resulted in certain discharges being over-controlled while others were under-controlled. Eventually, businesses came to realize that it was often cheaper and easier to attack pollution problems at their source. Many firms, such as 3M, actually reduced their costs and increased profits by installing pollution prevention programs throughout their facilities. Simply by being more efficient in the use of chemicals, or recycling used materials, or finding nontoxic substitutes for manufacturing processes, firms are improving both their economic and environmental performance.

One of the most successful environmental laws is one that involves the least amount of regulation. It is Title III of the "Superfund" hazardous waste cleanup law. This law requires industry to report on the amount of toxic substances they release to the environment each year. This data is compiled by the Environmental Protection Agency (EPA) in the Toxic Release Inventory (TRI) and released to the public. When the initial reports were released, the public was stunned to learn that hundreds of millions of tons of toxic material were being dumped into the environment each year. Corporations were then put on the spot to reduce the volume of waste, and they have made significant progress; however, there is still a long way to go to reach the "zero discharge" goal for toxics.

American environmental law has relied heavily upon a "command and control" regulatory approach. Under this approach, the federal government sets the base level standards to protect public health and the environment, and the states are free to set more stringent standards. Permits are required for sources that discharge or emit pollutants, and violators can be penalized or even criminally prosecuted. This system requires very detailed, prescriptive rules covering a multitude of different industrial processes, and a large staff of governmental regulators to process permits, monitor compliance and take enforcement action.

As the size and complexity of this regulatory program has grown, businesses and property owners have complained loudly about the difficulty and expense of trying to comply with rules that seem to keep changing and new liabilities that in some cases require current owners to clean up contamination caused by their predecessors. This in turn has created a political backlash against governmental mandates, especially ones that restrict what people can do with their property. The U.S. Congress is now considering significant changes in many of these environmental laws that would weaken current standards, require governmental agencies to justify new rules on the basis of quantitative risk assessments and cost benefit analyses, and require that the government compensate landowners whenever environmental rules diminish the market value of their property by a specified amount.

Even before these ominous political winds began blowing, there was general recognition that the command-and-control regulatory regime was reaching its limits. Alternative approaches, some based on market measures such as tradeable pollution rights, others based on "green fees" such as effluent charges, and still others based on public-private partnerships were being tried at both the federal and state levels. Economic incentives are increasingly viewed as a necessary complement, and in some cases a preferable option, to the more coercive regulatory approach. However, economic approaches are not panaceas; they have problems of their own. To the extent they rely upon tax or fiscal policy, they run into opposition from those who want to curb government tax and spend policies. To the extent they rely upon the creation of complex "pollution markets," they run into practical problems of how to establish allowable levels of pollution that do not degrade the environment, and how to allocate and enforce these new rights and obligations.

Turning to laws dealing with natural resource conservation, there are several different models with different strengths and weaknesses. One is a planning model which requires detailed environmental assessments of the effects of projects, consideration of less damaging alternatives, mitigation of unavoidable impacts and public participation in the decisionmaking process. NEPA is the best example of this type of resource planning law. The Fish and Wildlife Coordination Act and National Historic Preservation Act are other laws with similar purposes and procedures. These laws are credited with reducing the impact of individual projects at specific locations, but they are criticized for lacking the muscle to really reform major infrastructure programs such as transportation, energy, and urban development. Legally, statutes like NEPA do not mandate a particular outcome; they merely require that detrimental impacts be disclosed and that environmentally preferable alternatives be considered.

The Endangered Species Act (ESA) represents a far more substantive and potent piece of legislation. The ESA *prohibits* federal actions that are likely to jeopardize threatened or endangered species. However, the jeopardy prohibition has rarely been invoked to stop projects. Nevertheless, the ESA is under ferocious political attack in the Congress by property rights groups and certain corporations (mostly extractive industries like mining and timber companies) who view it as a threat to their economic livelihood. The ESA is also under attack in the courts. A decision is expected in a case argued before the U.S. Supreme Court that will determine whether the ESA protects habitat on non-federal property; this is particularly crucial because over half of currently listed species occur *only* on non-federal land.

Even if the ESA were not in political hot water, it could not be considered a sufficient measure to protect biological diversity. Though the ESA provides vital protection for individual species, it does not do a good job of protecting entire ecosystems or of preventing endangerment in the first place. This is because the ESA takes a species-by-species approach and does not kick in until a species has declined to the point where conflicts between recovery efforts and economic development become very contentious. Also, the recovery provisions of the ESA have not been adequately funded.

Yet another model for resource protection is Section 404 of the Clean Water Act, which regulates the discharge of dredge or fill material into the "waters of the U.S.," a term that includes wetlands, both coastal and freshwater. Though Section 404 is called a wetland protection program, it is only partially successful. Section 404 only regulates certain types of activities that actually occur in wetlands; it does not, for example, regulate the drainage of wetlands that can be accomplished without a discharge *into* the wetland. Moreover, Section 404 does not prohibit wetland destruction, it simply requires a permit. Since 98% of all permit applications are granted, 404 is in effect a wetland mitigation program. Unfortunately, a high percentage of mitigation projects fail due to lack of monitoring and enforcement or poor design.

Some states, such as Oregon, have much more comprehensive wetland programs that link land use planning with wetland conservation on a watershed basis. This enables planners, regulators, and developers to make better decisions about which wetlands should be off limits to development and which ones can be developed subject to more effective mitigation requirements.

The last model of resource conservation laws I will mention is the "multiple use" concept that governs management of much of the publicly owned lands in the United States. The federal government owns and manages over a third of the nation's land base. Most of this land is located in the western states and Alaska. Several different agencies are responsible for managing these lands. The two primary agencies are the U.S. Forest Service in the Department of Agriculture and the Bureau of Land Management in the Department of the Interior. Together, these agencies are responsible for over three hundred million acres of forests, grasslands, deserts, lakes, rivers, mountain peaks, and estuaries. Most of these lands are managed under the principle of multiple use pioneered by Gifford Pinchot in the early Twentieth century. Under this principle, the public lands are expected to provide commodities such as timber, minerals, and forage, as well as amenities, such as wilderness, wildlife habitat and scenery. In practice, of course, these different values have come into conflict and ecological values have frequently lost out to more powerful market forces.

In sum, the past twenty-five years have seen the development of a remarkable body of environmental law in the U.S. These laws have brought about significant improvements in environmental quality. The grossest forms of pollution have been eliminated; the most destructive forestry and mining practices have been outlawed; and the massive dam and highway projects have been curtailed. But in many ways, the next set of environmental problems to be confronted are more difficult. Now the U.S. must deal with invisible contaminants measured in the parts per *trillion*, with entire ecosystems collapsing and unraveling, with the seemingly intractable problems of an economy that runs on high rates of resource consumption and waste disposal. And these are just examples of domestic problems. When global environmental challenges are factored in, the task becomes even more daunting—accelerating rates of extinction, climate change, degradation of the oceans, industrialization of the developing countries, population growth and so on.

U.S. Policy Into the Next Century

As Yogi Berra said, "predicting is hard, especially when you're talking about the future." Without trying to be too precise, it is possible to describe the general direction that U.S. environmental policy is likely to take on the domestic and international fronts.

First, although regulatory programs are not likely to grow substantially, they are not likely to disappear altogether. Rather, the effort will be to make these programs more cost effective, more flexible and more focussed on results than process. One way to do this is to have government concentrate on setting meaningful, measurable performance standards and allow corporations to choose the most efficient means to achieve the standards.

Risk analysis will play a greater role both in setting standards and in determining priorities for expenditures on environmental problems. However, there is no magic in risk assessment. It is only as good as the science and assumptions upon which it is based—both of which are frequently very poor—and it cannot measure the unmeasurable. Risk assessments do not provide answers to questions of value, and values are what most environmental issues are all about. Despite the current frenzy in Congress, and the near certainty that some type of risk legislation will emerge, I do not believe the U.S. public will support such legislation over the long haul if its purpose is to lessen environmental protection.

Ecosystem management is one of the buzz words of the 90's, and it can mean different things to different people, but it holds great promise as an organizing principle for carrying environmental management to a higher plateau in the next century. The philosophy underlying ecosystem management is respect for the interconnectedness of all things natural and human. It is a philosophy that recognizes the limits as well as the endurance of the natural systems that support all life and all human activity. Although there are problems drawing physical boundaries around ecosystems, these problems do not preclude adopting an ecosystem approach to making environmental decisions. For example, in deciding how to maintain water quality, it helps to look at the entire watershed. The quality of the river that drains a watershed is a reflection of everything that happens on the land within (and sometimes beyond) that watershed—forestry, agriculture, recreation, industrial activity, suburbanization, and so forth. The same would be true if the management objective was air quality, or wildlife habitat, or water supply. All the components of the system must be understood and their interrelationships respected in order to be effective managers (i.e., stewards).

Sustainable development is another term much in vogue that seeks to define a more productive relationship between people and their environment. Development that lifts people from poverty and provides good jobs at fair wages with the opportunity for betterment is obviously a high priority for many developing nations. The challenge comes in crafting laws and policies that promote the kind of development that is truly sustainable, which means the kind that sustains the ecological integrity of the place where the development takes place, whether it be a tropical rain forest, a semi-arid plain, or a coastal estuary. Effective policies and regulatory frameworks, in tandem with broad-based public support, are critical for the success of sustainable development activities. Processes that build participation and consensus and reflect the needs and interests of different constituents are especially necessary.

And speaking of process, another trend in environmental policy that had shown signs of taking hold, but which may suffer a setback in the wake of the bitter political fights now raging in Congress, is the broader use of alternative dispute resolution techniques and collaborative problem-solving among stakeholders. Everything from the relicensing of hydroelectric dams to the cleanup of weapons production facilities to the reauthorization of the Superfund law have been the subject of various forms of environmental mediation. Although litigation will continue to play an important role in shaping environmental policy as well as providing a remedy for citizens adversely affected by environmental degradation, its limitations in terms of cost, uncertainty and the perpetuation of adversarial relationships are well understood. Certainly, a more cooperative approach to resolving environmental issues is desirable but someone's willingness to cooperate often depends upon whether that person stands to gain or lose from cooperation. Since environmental law is often about change, and since change can be very threatening to those who benefit from the status quo, it is no surprise that consensus on environmental issues can be very difficult to achieve. Nevertheless, it makes a lot of sense to try for consensus and to negotiate disagreements rather than litigate them, whenever possible.

A number of other nonregulatory trends bear watching. One of these is the "greening" of the tax code. This involves shifting taxes from income to consumption and waste. This has both economic and environmental merit. Economically, it stimulates saving and productive investment. Environmentally, it creates an incentive to reduce waste. Although tax policy is politically controversial, it may become a more important tool for environmental progress in the future.

Another important development is the greening of the marketplace. As consumers become better informed, they demand more environmentally friendly goods and services, and manufacturers are quick to respond. Entrepreneurs see a competitive advantage in putting environmentally preferable products on the market. These trends could be assisted by environmental laws requiring that certain products be "taken back" by manufacturers, as is done in Germany, or that packaging be recyclable or have a prescribed recycled content, as is done in Oregon. Labelling requirements—for example, "dolphin-safe tuna"—can also be effective ways to inform consumer choices, and to market green products.

Industrial ecology is another term gaining currency. The concept is that industrial processes should mimic ecological processes, that is, they should "close the loop." In nature, nothing is wasted: everything cycles—water, nutrients, energy. The goal of industrial ecology is to design manufacturing systems as cycles rather than linear, input-output systems. One of the tools of industrial ecology is the life cycle assessment, which seeks to evaluate and quantify, where possible, all of the environmental effects of a product or process, throughout its entire life cycle—for example, the extraction of minerals through processing, manufacture and ultimate disposal. Industrial ecology is a systems approach to pollution prevention. For the most part, it occurs at the initiative of individual firms. It is in part a response to the cost of compliance with regulations and the stringent liability that attaches to waste disposal activity. There is some concern that the impetus to pursue industrial ecology may lessen if environmental laws are substantially weakened. There is also a need for some flexibility in the way that environmental regulations are applied so that they do not inhibit the development of technology that will improve industrial processes.

Policy Options with Potential Application to Cuba

In this section I will present some ideas that Cuban environmental leaders may wish to consider in developing environmental policies for their country. These ideas are drawn from my experience conducting environmental training programs in Central and Eastern Europe. The nations that were part of the former Soviet Union are facing enormous environmental and economic challenges as they build new political and governmental institutions. These nations face similar economic and institutional constraints as Cuba in terms of developing workable environmental programs. In suggesting these ideas, I do not presume to know what is best for Cuba. Rather they are simply "food for thought."

Establish Clear Environmental Goals and Measurable Indicators

The first step in designing any program, whether environmental or otherwise, is to establish goals. Too often environmental goals are expressed in the broadest terms, such as "protection of public health and the environment." While worthy, such goals do not provide much guidance for those who must implement or comply with them. Goals such as "fishable/swimmable" water, which is the minimum goal of the U.S. Clean Water Act, are better suited to measurement and management. In some cases a goal of "zero discharge," as for toxics, may be appropriate. In other cases, it might be preferable to set goals based on acceptable levels of risk. The U.S. EPA uses a risk range of one in 10,000 to one in 1,000,000 to set cleanup goals for hazardous waste sites under the "Superfund" law. Risk assessment is, of course, very controversial and involves process and

perception as much as science and fact. For example, those who are exposed to the threat of environmental contamination will legitimately claim a voice in deciding what is an "acceptable risk."

Goals can also be useful in reducing resource consumption, improving efficiency and preventing pollution. Environmental improvement does not happen overnight, even in the wealthier nations. Establishing a goal and a timetable with milestones can be an effective way to promote energy conservation, recycling and waste reduction, especially when coupled with some of the other policy instruments, such as fees or taxes, that are discussed below.

Along with establishing specific goals, it is important to establish indicators that can be used to measure progress towards achieving them. For example, if the goal is to maintain a healthy river or estuary, it will be necessary to pick aquatic organisms that can be monitored to keep track of biotic communities. Indicators for public health goals can also be used.

Involve the "Stakeholders" in Setting Environmental Goals and Choosing the Means to Achieve Them

Experience shows that environmental programs cannot succeed without the acceptance and active support of the people who are affected by them (the stakeholders). "Top-down" mandates do not succeed as well as "bottom-up" ownership in the environmental problem or opportunity that is at issue. People must have good information about the environmental condition in question, understand the goals, and be given an opportunity to comment on alternative ways of achieving those goals. Process is often as important as the substantive objective. Environmental issues present value choices, and people resist having values forced upon them. This is particularly true when values are expressed in the abstract, such as protecting "biodiversity." The average person does not know what biodiversity is, much less, why he or she should be concerned about protecting it.

Use Performance Standards Rather than Technology Standards Whenever Possible

Performance standards are based on desired ends, whereas technology standards are based on means. For example, if a water quality goal was to prevent algal blooms in a lake, a performance standard might limit the concentration of nutrients like nitrogen or phosphorous to so many parts per million. It would then be up to individual dischargers to that lake to decide *how* to meet that standard using the most cost-effective approach for each. By contrast, a technology standard would require all dischargers to use the same technology even if the overall reductions could be accomplished more cheaply through other means.

Due to scientific uncertainty, or to the nature of the environmental problem, it is not always possible to establish precise, numerical limits as performance standards. For example, it may be impossible to set a performance standard for aesthetics, or even for biodiversity, since numbers alone do not express the values that underlie these concepts. In such instances, other approaches will be required.

Use Environmental Assessments to Evaluate the Impacts of and Alternatives to Specific Projects and Broad Programs

The National Environmental Policy Act has had a major beneficial effect on development projects in the United States. The Environmental Impact Statement (EIS) has become a standard planning tool at all levels of government. NEPA is really the forerunner of the sustainable development concept, and the EIS is still a good tool for planning development in ways that respect nature, minimize negative impacts and consider long-term implications of resource consumption. It also provides a mechanism to involve communities in the process of deciding how its resources will be used.

Environmental assessments provide a systematic way to evaluate proposals and alternatives with respect to their immediate and long-range effects on the sustainability of healthy natural systems—air, water, land. They can be especially helpful in evaluating

alternatives to major infrastructure programs such as energy and transportation. When economic and environmental analyses are done properly, including considerations of long-term consequences, they point the way to more innovative approaches to these issues. For example, it is often cheaper to conserve energy than to produce it; and it is easier to maintain air quality with fewer miles traveled in cleaner vehicles. But it takes careful planning and wise investments to realize these benefits.

Provide Technical Assistance on Pollution Prevention and Waste Minimization

A relatively simple way to achieve more environmental quality is to provide technical assistance to industry to help identify ways of eliminating waste. A great deal of pollution is due to personnel that is poorly trained and motivated, equipment that is poorly maintained, and manufacturing processes that are wasteful. Experience has shown that a great deal of pollution can be prevented simply by better housekeeping, training, and motivation. These are all things that government officials can promote without a huge budget or staff. In fact, enlisting industry to help in the effort has other benefits.

Government offices can serve as information clearinghouses and technology exchange on pollution prevention. Awards programs can also be used as incentives for industries to improve environmental performance through voluntary action. Another idea is to create a "waste exchange" program which facilitates recycling of waste material from one industry to another.

Adopt a Watershed Approach to Managing Land and Water Resources

One of the more successful management tools being developed in the U.S. and elsewhere (perhaps in Cuba as well) is the consideration of entire watersheds in regulating activities and planning developments. Watersheds constitute an interconnected system that requires a holistic management approach. For example, forestry practices must be controlled to prevent erosion; dams must allow for fish passage; water withdrawals must be limited to provide life-sustaining flows; and pollutants must be regulated to avoid cumulative loadings that exceed the assimilative capacity of the water body.

Consider Effluent Charges and Other Fees to Discourage Pollution and to Generate Revenue to Support Environmental Management Programs

Effluent charges are widely used in Europe to achieve environmental objectives. Theoretically, these charges can be used to achieve water quality standards; however, it is very difficult to establish the precise charge that will produce the desired condition. In a more traditional context, these charges can generate revenue to support regulatory programs to issue permits, conduct monitoring and take enforcement actions.

Environmental assessments (taxes) can be used in a variety of contexts including charges for development of land that can be used to support habitat acquisition and conservation measures.

Conclusion

U.S. environmental law has evolved in response to new understanding of environmental conditions and a dynamic social and political landscape. It will continue to evolve as global issues become more urgent. The U.S. experience may provide some useful ideas as Cuba develops its own environmental policies and seeks cooperative agreements with other nations.

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Expanding Cooperation Between the United States and Cuba: Legislative Policies and the National Legal Framework

Orlando Rey Santos

Reasons for Cooperation

When considering the idea of promoting exchange in the area of environmental legislation and in the formulation of legislative policies, it may be necessary to ask from the outset to what extent this is an appropriate framework for cooperation between the United States and Cuba. Here we understand cooperation as a bi-univocal exercise that flows in both directions, thereby generating a mutually beneficial interrelationship.

When understood in this light, it may seem that the effects of designing national legislation and its legal-political framework do not transcend beyond the country of origin itself. If the design is correct, the country of origin will be better off; otherwise, only it will suffer the consequences.

However, this is not the case, or at least, not exactly, and even less so when we are dealing with environmental law. While in other fields of law it can be sustained with sufficient conviction that what is stipulated and legislated is applicable only to the parties to whom the norm is addressed, the same cannot be said about laws intended to regulate human relations with the environment.

There are many reasons for this statement. The most basic but relevant reason is that the environment has no borders. Each national legislative act has an impact on the environment—thus, none of us can escape its effects.

A poorly made legal decision, a faulty or ineffective norm, or even the non-adoption of a norm in the remotest place on earth can trigger the extinction of a species or sow the seed for a future ecological disaster. This would increase the negative balance on the tally sheet of adverse human-made impacts on the planet's environment.

In a more reduced geographic environment like the one that our countries share, this interdependence is all the more evident. Thus, in the future we should not only be concerned with what our governments decide with respect to the environment but also how our neighbors' legislative policies are working. If these policies are solid and well articulated, they will constitute a sort of protective shield of the environment that surrounds us, simultaneously giving rise to social, cultural and economic benefits.

On the other hand, it is impossible to implement international agreements without adequate national environmental legislation, which, in fact, is often enacted to comply with the obligations stemming from either binding or non-binding international environmental accords.

Thus, the Convention on Biological Diversity stipulates that each contracting party, to the extent possible and as is befitting, "will establish or maintain the necessary legislation and/or other regulatory dispositions for the protection of threatened species and populations" (Article B, subparagraph k); "...will enact legislative measures ... to share justly and equitably the results of research and development activities and the benefits derived from the commercial and other use of genetic resources with the contracting party

that provides these resources" (Article 15.7); "...will adopt legislative measures ... in order to assure the effective participation of the contracting parties, especially developing countries, in biotechnology research activities" (Article 19.1).

For its part, the Basel Convention on the Control of Transboundary Movement and Disposal of Hazardous Wastes stipulates that, "All parties shall adopt the legal, administrative and any other measures that may be necessary to implement and enforce the provisions of this Convention, including measures to prevent and repress those actions that contravene this Convention."

These conventions, of course, are just a few examples. Other clauses from the cited conventions and many other environment-related international legal instruments of which our countries are parties or signatories, call for actions that have constant repercussions on national legislation, demanding either the adoption of new rules or the modification of existing ones.

Consequently, an appropriate legal framework together with efficient implementation mechanisms will determine the capacity for correctly controlling and managing the environment-affecting actions. The negative consequence of not fulfilling such objectives will extend beyond national borders.

National Institutional Framework and Legislative Reach

The importance of increasing management and control mechanisms and incorporating environmental impact evaluations was already recognized at last year's conference. On that occasion, the shortcomings of the Cuban environmental program at the time, specifically regarding the lack or weakness of these mechanisms, were evident. Likewise, the United States was pointed out as having vast experience—both positive and negative—particularly in these areas. The evaluation of these experiences would be of mutual interest.

The creation of the Ministry of Science, Technology and Environment represents just the kind of institutional turn-around required to reverse the previously mentioned deficiencies in the Cuban environmental program. Although this organism was already in place at the time of the last conference (it was created by Decree-Law No. 147 on April 21, 1994), the fact is that back then, it still had not been internally structured nor begun to unfold its potential.

The process of institutional strengthening within the Ministry has been taking place gradually, acquiring particular momentum throughout 1995, mostly through the actions of two components of this organism: the Environmental Policy Board, which is responsible for the design of Cuban environmental policy and its legal underpinnings, and the Environmental Agency, which is the entity in charge of implementing this policy. The latter, in turn, is composed of various centers, institutes and institutions.

Given its mandate to design the national environmental legislative framework, including the preparation of a new Framework Law on the Environment that will replace the current Law No. 33 of January 10, 1981 "On Protecting the Environment and the Rational Use of Natural Resources," the Environmental Policy Board undoubtedly constitutes a significant link in the realm of cooperation.

Within the Environmental Agency, the Center for Environmental Management and Inspection plays a key role in enforcing environmental legislation. This center supervises and inspects the actions of other organizations and entities and is the state entity in charge of environmental inspections in all organizations, organs and territories. It also approves and controls the carrying out of environmental impact assessments and their results. In addition, it takes steps to ensure full compliance with all environmental legislation. In order to ensure that the entire array of previously described actions materialize, the Center provides methodological guidance to, and controls the actions of, the Environmental Units of each Provincial Delegation of the Ministry.

Although the Ministry of Science, Technology and Environment might seem to be the focal point, it is not the exclusive party in environmental legislation cooperation. Various other sectoral organizations such as the Ministry of Public Health, the Ministry of Transportation, the Ministry of Fishing Industries, among others, are also concerned with enforcing and formulating environmental legislation. It is important to note, however, that these organizations carry out their environmentally related legislative activities in accordance with the policies, strategies and legislative framework defined by the Ministry of Science, Technology and Environment.

Environmental legislation is in the process of expanding and deepening. The most recent example is the inclusion of environmental issues in the draft bill for a new law on foreign investment.

This inclusion contains key issues such as environmental impact evaluations prior to any investments and the subsequent entrusting of environmental authorities to carry out pertinent inspections and controls.

Thus, gradually and in coordination with organizations of the Central Administration of the State and other levels of government, the Ministry of Science, Technology and Environment has attempted to introduce environmental issues into a wide range of legislative bills that in one way or another relate to the environment. The recent Mining and Taxation System Laws, which also contain clauses to that regard, are examples.

At the same time, and as we have already indicated, the Ministry of Science, Technology and Environment is preparing a bill that in due course will replace the Cuban Framework Law on the Environment. The new text should reflect the most important national and international conceptual advances in this sphere as well as the institutional changes that have taken place in the country.

Preparing such an encompassing bill is likely to occupy all of 1995, and its circulation and conciliation are expected to take place by 1996.

Given that there are various actions whose legal instrumentation cannot wait for the approval and enactment of this bill, the Ministry of Science, Technology and Environment has scheduled for the following months the approval of an important set of ministerial resolutions. These resolutions include: environmental impact evaluations; state environmental inspection; regulations for areas designated for ecotourism; the functioning of the Designated National Authority for applying the information, and the previously established consent principle with respect to toxic chemical products; the instrumentation at the national level of the obligations stemming from the Basel Convention on the Control of Transboundary Movement and Disposal of Hazardous Wastes, and the environmentally rational management of this waste on a national scale; norms for the conservation and sustainable use of biological diversity; and the rational instrumentation of the obligations stemming from the Vienna Convention and the Montreal Protocol regarding the protection of the ozone layer, among other things.

Given that the adoption of these resolutions will permit the expeditious implementation of appropriate actions in key environmental protection spheres, it will also make it possible to analyze the viability and effectiveness of certain ideas and concepts. Thus, their practical instrumentation of these resolutions constitutes a channel for feedback for the preparation of an effective framework law.

The study of existing or forthcoming laws can be of interest to U.S. lawyers and legal scholars for two reasons. One reason is to analyze our environmental legal evolution. The second is that these laws could serve as important elements of knowledge and business consulting, especially in the event that future political changes open the doors for a wide range of business and investment activities related to the environment and the use of natural resources.

For their part, Cuban lawyers and legal scholars would be interested in the experience of implementing and enforcing what has been

legislated, as well as the difficulties and the practical results associated with this implementation.

Some U.S. laws to which this analysis applies include: the National Environmental Policy Act, the Resource Conservation and Recovery Act (Solid Waste Disposal Act), the Clean Air Act, the Clean Water Act, the Act to Prevent Pollution from Ships, the Marine Plastic Pollution Research and Control Act, among others.

Components of Cooperation

The aforementioned infrastructure and the legislative actions under way form the necessary basis for establishing the needed relations of cooperation.

It is worth noting that, as far as we can see, the largest and most suitable arena for cooperation is the positive and negative experiences of the United States in applying law-enforcing mechanisms, more than the mere process of formulating legal instruments.

This does not mean that the legislative experience per se fails to provide elements for cooperation, but rather that one should bear in mind the root differences of our legal codes. The U.S. system is fundamentally based on common law, from which it derives its institutions, whereas our legal code has Hispano-Roman roots. Thus, there are different angles from which to appreciate the law, its sources, its mechanisms for self-improvement and modification, among other aspects.

Although this is not an absolute truth, we can affirm without contradicting what we said before, that a "universal legal culture" ultimately exists, in which, through a secular process, concepts and institutions have been changed. This has resulted in an amalgam in which it is impossible to find "pure" systems and in which dissimilar legal codes provide each other with useful references for the development of comparative law systems, the analysis of areas that require legislative actions and their specific control mechanisms, among other possible lines of cooperation.

We reiterate then that we are only emphasizing the point that is simultaneously most in need of attention and ripe for cooperation, without disdaining other options.

Having made this premise clear, a first and essential step consists of identifying those U.S. institutions, with which, according to their profiles, it would be valid and advantageous to try to establish lines of cooperation in the mentioned directions.

We foresee cooperation occurring at different levels:

- the professional level, where lawyers and legal scholars interact through professional associations and other non-professional organizations dealing with environmental law.
- the academic level, which fundamentally encompasses universities and other research centers related to this issue; and
- the governmental level, which we deem to be the most important because it is the level where experiences regarding compliance with, and control of, environmental legislation can be applied most directly.

A second step is to try to express as accurately as possible the specific spheres of cooperation. As indicated at the beginning, although joint actions can be justified along multiple avenues given the nature of environmental law, it seems possible to focus on some areas that may be of particular interest. Some possibilities are suggested here:

- Marine pollution coming from land sources: regulation and control.
- Air pollution. Air quality control.
- The preservation, sustainable use and mechanisms for achieving a fair and equitable participation in the benefits derived from the use of biological diversity.
- The rational management of dangerous waste, both domestically as well as in its exportation and importation.
- The rational management of toxic chemical products, just as is suggested for dangerous waste.
- Penal, administrative and civil corrective mechanisms for conduct in the environmental sphere.

- Economic control mechanisms, the use of financial and fiscal instruments including their legal instrumentation.

As a third step, a rapid and cursory inventory indicates the following as possible actions of cooperation:

- The preparation, dissemination and publication, whenever necessary, of scientific and popular articles about environmental law, in general, and the mechanisms for its implementation and control, in particular.
- Exchanges of experience among lawyers and legal scholars from both countries, either bilaterally or through roundtables, workshops and other forms of collective exchange. The latter seem to be preferable because they afford a greater level of participation.
- Incorporation of legal-related data into computer networks, whether they be legislative, jurisprudential or doctrinal, or whether they be about norms from domestic or international environmental law.
- The pursuit of various educational activities, such as conferences and seminars, both for undergraduate and graduate students.
- Contracting services of consultants and advisors to analyze concrete issues that emerge in the daily legislative activities of both countries.

Concluding Remarks

Given the important role that environmental legislation ought to play in terms of protecting the environment that we share, U.S. and Cuban legal professionals and institutions of all types should join forces in order to establish, through mutual cooperation, a solid link of cooperation on the basis of the legislative policies in the environmental sphere and the legal frameworks that these generate.

International Treaties on the Environment: Cuba and the United States

Name of Treaty	Status	Cuba's Position	U.S. Position
Wildlife and Habitat			
Convention on nature protection and wildlife preservation in theWestern Hemisphere, with annex	Adopted 1940 Entered into Force 1942	No Action	Ratified
Antarctic treaty	Adopted 1959 Entered into Force 1961	Ratified	Ratified
Convention on wetlands of international importance, especially a waterfowl habitat. (Ramsar)	Adopted 1971 Entered into Force 1975	Ratified	No Action
Convention concerning the protection of the world cultural and natural heritage (World Heritage)	Adopted 1972 Entered into Force 1975	Ratified	Ratified
Convention on international trade in endangered species of wild fauna and flora, with appendices. (CITES)	Adopted 1973 Entered into Force 1975	Ratified	Ratified
Convention on the conservation of migratory species of wild animals	Adopted 1979	No Action	No Action
Convention on the conservation of Antarctic marine living resources, with annexes for an arbitral tribunal	Adopted 1980 Entered into Force 1982	No Action	Ratified
Convention on biological diversity. (Rio Treaty)	Adopted 1992 Entered into Force 1993	Ratified	Signed
Oceans			
International convention relating to intervention on the high seas in cases of oil pollution casualties, with annex	Adopted 1969 Entered into Force 1975	Ratified with declarations	Ratified
Treaty on the prohibition of the emplacement of nuclear weapons and other weapons of mass destruction on the seabed and the ocean floor and in the subsoil thereof.	Adopted 1971 Entered into Force 1972	Ratified	Ratified
Convention on the prevention of marine pollution by dumping of wastes and other matters, with annexes.	Adopted 1972 Entered into Force 1975	Ratified	Ratified

Convention on the future multilateral cooperation of fishing in the northwest Atlantic.	Adopted 1978 Entered into Force 1979	Ratified	Signed
Protocol of 1978 relating to the international convention for the prevention of pollution of ships, 1973, with annexes and protocols. (MARPOL)	Adopted 1978 Entered into Force 1983	Ratified	Ratified with declarations
International convention on oil pollution preparedness, response and cooperation.	Adopted 1990 Entered into Force 1995	No Action	Ratified
Convention on the future multilateral cooperation of fishing in the northeast Atlantic.	Adopted 1980 Entered into Force 1982	Ratified	No Action
United Nations convention on the Law of the Sea, with annexes.	Adopted 1982 Entered into Force 1994	Ratified	No Action
Atmosphere			
Convention for the protection of the ozone layer, with annexes. (Vienna)	Adopted 1985 Entered into Force 1988	Ratified	Ratified
Montreal protocol on substances that deplete the ozone layer, with annexes.	Adopted 1987 Entered into Force 1989	Ratified	Ratified
United Nations framework convention on climate change.	Adopted 1992 Entered into Force 1994	Ratified	Ratified
Hazardous Substances			
Convention on the prohibition of the development, production and stockpiling of bacteriological and toxin weapons and on their destruction.	Adopted 1972 Entered into Force 1975	Ratified	Ratified
Convention on early notification of nuclear accident	Adopted 1986 Entered into Force 1986	Signed	Ratified with declarations
Convention on assistance in the case of a nuclear accident or radiological emergency.	Adopted 1986 Entered into Force 1987	Ratified	Ratified with declarations
Hazardous Waste Movement	Adopted 1989 Not in Force	No Action	Signed
Regional Arrangements			
Convention for the protection and development of the marine environment of the wider Caribbean region, with annex.	Adopted 1983 Entered into Force 1986	Ratified	Ratified
Protocol concerning cooperation in combating oil spills in the wider Caribbean region, with annex.	Adopted 1983 Entered into Force 1986	Ratified	Ratified

Protocol concerning specially protected areas and wildlife to the convention for the protection and development of the marine environment of the wider Caribbean region.	Adopted 1991 Not in Force	Ratified	Signed
Miscellaneous			
Convention on the prohibition of military or any other hostile use of environmental modification techniques, with annex.	Adopted 1977 Entered into Force 1978	Ratified	Ratified
International convention for the conservation of Atlantic tunas	Adopted 1966 Entered into Force 1969	Ratified	Ratified
International Treaties of which Cuba is a member (unable to confirm U.S. position)			
Convención internacional de protección fitosanitaria	Adopted 1951 Entered into Force 1952	Ratified	Uncertain
Acuerdo relativo a la cooperación en materia de pesca maritaria	Adopted 1962 Entered into Force 1963	Ratified	Uncertain
Convención de Viena sobre responsabilidad civil por daños nucleares	Adopted 1963 Entered into Force 1977	Ratified	Uncertain
Convenio sobre la conservación de los recursos vivos del Atlántico suboriental	Adopted 1969 Entered into Force 1971	Ratified	No Action

List put together by the Inter-American Dialogue from the following sources:

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