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Biodiversity without Borders: Advancing U.S.-Cuba Cooperation through Environmental Research

Brian M. Boom

THE ever-increasing challenges to the biodiversity shared by Cuba and the United States provide the opportunity and the need for the two nations to take an enhanced collaborative, bilateral approach to addressing shared issues. Cuba lies a mere ninety miles south of the U.S. state of Florida, and the two countries' territorial waters meet in the Gulf of Mexico and the Straits of Florida. Cuba and the United States thus share much biodiversity—ranging from varied populations of organisms to diverse aquatic and terrestrial ecosystems. Native species migrate, exotic species invade, disease-causing species disperse, and rare species go extinct in the face of growing habitat modification. The living components of this shared environment are dynamically impacted, sometimes unpredictably so, by natural or man-made environmental disasters. Nature does not respect political boundaries nor do such potential disasters as oil spills, toxic releases, hurricanes, and tropical storms. Such events provide the *sine qua non* for greater bilateral cooperation.

Governments around the world routinely collaborate on shared environmental concerns bilaterally or multilaterally, depending on the situation being addressed. Environmental nongovernmental organizations (NGOs) from local to international levels often work in partnership with governments to solve environmental problems that extend beyond national boundaries. Such public/private arrangements work

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well in most circumstances, and there are many effective mechanisms in place to deal with challenges ranging from endangered species and ecosystems to oil and toxic waste spills.

However, a lack of formal diplomatic relations can limit desirable cooperation on shared environmental issues. The U.S. embargo on trade with Cuba—which was instituted in 1961 by the Kennedy administration in response to Cuba’s nationalization of U.S. businesses’ properties in Cuba during the Cuban Revolution—and subsequent regulations have thwarted the efforts of Cuban and U.S. scientists to collaborate on environmental or other professional and academic matters.¹ There is essentially no intergovernmental environmental interaction between the United States and Cuba. The shared biodiversity of these countries, and in some cases that of other nations in the Caribbean and Gulf of Mexico regions, suffers as a result.

Fortunately, some NGOs in the United States have had success over the years in working collaboratively with their Cuban counterparts on shared environmental issues. The experiences of such NGOs can inform a way forward in structuring an enhanced mechanism for bilateral cooperation. Also fortunately, on January 14, 2011, the Obama administration announced new rules that ease some restrictions on U.S. citizens’ travel and remittances to Cuba, which will collaterally encourage more bilateral environmental collaboration as well. While these steps have created some space, given the political realities, a targeted environmental agreement is required to facilitate further mutually beneficial study, monitoring, and protection of shared biodiversity.

Urgent, Shared Environmental Problems

The most urgent environmental problems requiring bilateral action are broadly classified as disasters—both those that occur naturally and those that are man-made. Hurricanes are the clearest examples of shared natural disasters. During the twentieth century, 167 hurricanes struck the U.S. mainland. Of these, 62 were major (categories 3, 4, or 5 on the Saffir-Simpson scale). During the same period, 36 hurricanes, half of which were major, made landfall over Cuba. Because many hurricanes—Katrina and Ike being twenty-first century examples—strike both countries, there exists a shared need after such disasters to respond to the negative effects, including environmental problems created by rain, wind, and storm surges.

Most major hurricanes occurring in the Caribbean during the past century have resulted in documented extensive perturbations of shallow-water marine ecosystems, particularly to coral reefs, seagrass beds, and coastal mangroves.² Aside from physical damage to such ecosystems from more turbulent water, hurricanes can also negatively impact water quality. On land, hurricane damage to ecosystems can be even more severe than in the ocean. For example, damaged native vegetation will possibly be more prone to colonization by exotic, noxious species such as Australian pine and Brazilian pepper.³ While Cuban and U.S.

scientists have shared motivation to assess, monitor, and remediate the marine and terrestrial ecosystems that are damaged by hurricanes, they currently cannot do so.

Man-made environmental disasters, such as oil and natural gas leaks, can likewise be of shared concern to the Cuban and U.S. governments. The Gulf of Mexico is a rich source of oil and gas and will remain so for decades to come. According to the National Oceanic and Atmospheric Administration (NOAA), there exist nearly 4,000 active oil and gas platforms in the Gulf of Mexico off the U.S. coastline. Cuba also has plans for new oil and gas platforms off its northern coast.⁴ Given the near- and long-term implications of gas, oil, and chemical dispersants on the Gulf of Mexico's biodiversity, it is imperative for the economic and ecological wellbeing of both Cuba and the United States that exploration is pursued with enhanced safeguards to avoid the mistakes of past disasters, such as the dramatic explosion of the Deepwater Horizon oil rig.

While Cuba and the United States are signatories to several international protocols for cooperation on containment of oil spills, there is scant cooperation between them on this front—although there were at least some low-level meetings between the countries after the Deepwater Horizon blowout.⁵ Given the potential of currents in the Gulf of Mexico to disperse spills from off the coast of one country to the waters and shores of the other, there were ongoing concerns about the possible reach of the disaster. Fortunately, relative to its potential, the Deepwater Horizon spill remained mostly contained.

However, with increased drilling in the area, including deep wells, more than luck will be needed to avert future disasters. Even if oil and gas leaks or spills are restricted to Cuban or U.S. waters, the negative environmental impacts can be important regionally. The two nations' shared marine ecosystem is the foundation for the mid Atlantic and Gulf Stream fisheries. Many important commercial and sport fish species breed and feed in Cuban waters. So destruction of Cuban mangroves and coral reefs will impact stocks of species such as snapper, grouper, and tuna, along with myriad other animals, plants, and microbes that spend different parts of their life cycles in the territorial waters of each country.⁶

Given that urgent environmental problems can arise rapidly and harm the economic and ecological health of the United States and Cuba, it is imperative that there should be a mechanism for rapid, joint response to these shared threats.

Emergent, Shared Environmental Problems

Thankfully, urgent, shared environmental problems involving the United States and Cuba are not everyday occurrences. Nonetheless, every day there are numerous environmental issues of concern to both countries that are of great importance in the medium to long term. Such problems center on the need to study, monitor,

and assess the status of organisms and ecosystems that functionally exist in both countries.

A complex mosaic of coral reefs, seagrass beds, and mangroves knit together the marine and coastal ecosystems. Some of the most extensive, best preserved coral reefs in the Wider Caribbean Region occur in Cuban waters, and extensive coral reefs parallel the Florida Keys in U.S. waters. Cuba has the largest extent of mangrove forests in the Caribbean, about 4,000 km², and Florida's southwestern coast supports mangrove forests comprising about half the extent of those in Cuba. Seagrass meadows occur in shallow waters of both countries, stabilizing sea bottom sediments that could otherwise threaten coral reefs and providing breeding, feeding, and shelter grounds for myriad marine animals, plants, and microbes.⁷

These ecosystems are threatened increasingly by habitat modification, the impact of tourism, overexploitation of marine fishes and other commercial seafood resources, the ramifications of climate change and rising sea levels, and pollution from land-based sources (e.g., unsustainable agricultural and forestry practices) and ocean-based sources (e.g., cruise ship waste). Increasing tourism especially threatens coral reefs. Despite some positive measures taken by the cruise industry in recent years, more cruise ships in the region still mean greater potential stresses to the marine and coastal environments. In addition to these and other shared ecosystems, many marine and terrestrial species are shared by Cuba and the United States. Examples include migratory, invasive, endangered, and disease vector species.

Migratory Species: Thousands of species of animals migrate between the two nations. Cuba provides key wintering habitats for 284 bird species that breed in the United States, such as black-and-white warblers. Many insects also migrate between the United States and Cuba, including the monarch butterfly. Fishes, such as the Atlantic bluefin tuna, swim through both Cuban and U.S. waters, while turtles, such as the hawksbill, share Cuban and U.S. marine habitats. Mammals, such as the Florida manatee, also swim between U.S. and Cuban waters.

Invasive Species: Cuba and the United States share many of these problem organisms, which are among the most significant threats to native species and to ecological and economic wellbeing. For example, *Hydrilla verticillata*, an aggressive waterweed native to the Old World, displaces native aquatic plants and seriously disrupts recreational uses of lakes and rivers in Cuba and the United States.⁸ Another example is the red lionfish, which is native to the Indian and Western Pacific Oceans but was released into the Atlantic Ocean from a home aquarium in Florida when Hurricane Andrew struck in 1992. Today, this venomous fish has spread along the U.S. Atlantic Coast as far north as New York and into the Caribbean, including Cuban waters, voraciously eating native fish and creating major disruptions to coral reef ecosystems.⁹

Endangered Species: Cuba and the United States share forty-nine animal species and eight plant species that are categorized as Globally Threatened by the International Union for the Conservation of Nature and Natural Resources (IUCN). Because only a small fraction of the world's plants and animals have been assessed by the IUCN criteria, the actual number of threatened species that are shared by Cuba and the United States is certainly much larger. Even with what is known already, there exists a strong imperative for the two countries to cooperate on monitoring and protecting the threatened species for which they are joint stewards, including the West Indian walnut, the American crocodile, and the West Indian whistling duck.

Disease Vector Species: A good example of a shared disease vector is the *Aedes aegypti* mosquito. This species is the principal vector for the viruses that cause dengue fever, a non-curable, sometimes fatal disease in humans. In the Western Hemisphere, the disease is known to occur throughout much of Latin America and the Caribbean, including Puerto Rico and the Virgin Islands, but so far not in Cuba, and only rarely in the continental United States. But this situation could change. According to the Centers for Disease Control and Prevention, there is evidence that this mosquito is constantly responding and adapting to environmental changes. Cuba has one of the world's best centers for dengue research with knowledge about how the island stays dengue free.¹⁰ Yet, Cuba and the United States are not working together on dengue, a shared and growing threat.

Both urgent natural and man-made problems, such as hurricanes and oil spills, as well as more gradual, less dramatic threats, such as habitat modification and pollution, threaten the native biodiversity shared by Cuba and the United States. These threats are exacerbated by the lack of active, ongoing bilateral scientific cooperation between Cuba and the United States in seeking solutions to such threats.

Current Situation of Environmental Cooperation

Both Cuban and U.S. environmental scientists are aware of the shared urgent and emerging environmental challenges outlined in the previous sections. However, many scientists on both sides of the Florida Straits remain frustrated that more cannot be done to identify, study, and solve these challenges in a collaborative fashion. On the other hand, there is increasingly a palpable sense among environmental scientists in both Cuba and the United States that the opportunities for bilateral collaboration are poised to expand. This was underscored by an April 2009 panel discussion on U.S.-Cuba relations concerning marine and coastal resources conservation hosted by the Brookings Institution and the Environmental Defense Fund (EDF). Among many notable elements of that event was the

participation of U.S. government representatives (NOAA and the Department of State), which was a real breakthrough in expanding this discussion in the United States beyond the NGO community.

A few months before the Brookings/EDF gathering, the American Council of Learned Societies/Social Science Research Council Working Group on Cuba and the Christopher Reynolds Foundation sponsored a two-day workshop. “Workshop on the Future of Environmental Collaboration between the United States and Cuba,” held in November 2008 in New York City, helped identify and define the issues that led to the Brookings/EDF event and to a number of others. This workshop was attended by thirty-two representatives of environmental NGOs and private philanthropic foundations. One of the outputs was a letter, dated December 11, 2008, which was signed by twelve CEOs of environmental NGOs, addressed to then President-elect Barack Obama urging him to “take action to increase scientific exchange and collaboration between the United States and Cuba.” The letter specifically suggested

- issuing U.S. visas to Cuban scientists and conservation professionals;
- directing the U.S. Department of the Treasury’s Office of Foreign Assets Control (OFAC) to grant licenses to U.S. scientists and conservation professionals planning to collaborate with their Cuban colleagues;
- giving OFAC licenses to U.S. entities to enable Cuban scientists and conservation professionals to travel to third countries when U.S. funds are used;
- directing federal agencies, such as NOAA, to encourage more collaboration between U.S. and Cuban scientists and academic and conservation professionals; and
- amending OFAC regulations that govern educational exchanges between the United States and Cuba to allow more flexibility.

Another major “barometer” for sensing a momentum in the direction of greater environmental collaboration is a series of meetings—four to date—of a group that has come to be known as the Trinational Initiative for Marine Science and Conservation in the Gulf of Mexico & Western Caribbean. The Trinational Initiative’s objective is to encourage increased collaborations between the “trinational”—Cuba, Mexico, and the United States—on marine research and conservation issues. Membership of the group currently includes eight Cuban organizations, ten Mexican organizations, and fourteen U.S.-based organizations.

Another recent example of improved environmental collaboration between Cuba and the United States was the “U.S.-Cuba Conference on Hurricane Cooperation,” sponsored by the Center for International Policy and held in December 2010 in Galveston, Texas. Participants from the U.S. private sector and policy makers and technical experts from both the United States and Cuba concluded that

communication concerning hurricane forecasting and early warning between the two countries is excellent. However, due to current government policies, there is no ready mechanism for either country to aid the other in hurricane damage remediation. Bilateral cooperation in other arenas, such as counternarcotics,¹¹ could provide some precedent for bilateral collaboration in hurricane recovery.

It is still too early to fully understand how OFAC will interpret the updated Cuba policy announced by the Obama administration on January 14, 2011, which eased travel restrictions in an attempt to increase interactions between Cubans and Americans. These changes should have salutary effects on environmental collaboration between Cuba and the United States. Already, a number of people-to-people OFAC-licensed programs have taken place or are being scheduled, and several of these are being conducted by organizations with an environmental focus. See, for example, advertisements for two programs being run by the American Museum of Natural History.¹²

Impediments to Enhanced Environmental Cooperation

Despite the success stories of various U.S.-based environmental NGOs, the realities of carrying out effective and timely collaborative projects between Cuban and U.S. researchers are nonetheless daunting for everyone concerned. The problems are especially acute for environmental NGOs that have little or no track record in working with Cuban counterparts and for U.S. government agencies with environmental responsibilities but without the authority to conduct joint projects with the Cuban government. Even U.S.-based NGOs licensed by OFAC to conduct environmental projects in Cuba with years of experience doing so are thwarted by administrative rules and procedures that limit the breadth and depth of collaborative initiatives working to address urgent and emerging shared environmental problems. These impediments emanate from both the Cuban and U.S. governments.

U.S. Impediments to Enhanced Environmental Cooperation

Licenses for People: OFAC is the U.S. government entity that grants licenses for U.S. citizens to travel to Cuba, as described in the fifty-one-page document *Comprehensive Guidelines for License Applications to Engage in Travel-Related Transactions Involving Cuba*. These guidelines are periodically revised to reflect new policy directives from the White House, as they were most recently on April 19, 2011, with respect to regulations and policies governing purposeful travel, non-family remittances, and U.S. airports supporting licensed charter flights to and from Cuba. Getting the appropriate license from OFAC is the first hurdle for U.S. citizens who wish to engage in environmental collaboration with Cuban colleagues, and it can be a very daunting process. While recent rule changes are very welcome and are improving

options for licenses for such activities, there are still ongoing issues with OFAC. First, the regulations and policies are interpreted unevenly. As a result, some NGOs are required to have a specific license, while others doing the same sort of activity are allowed to proceed with a general license. Second, the length of time required to get a decision on a license application is unpredictable and can range from one month to one year or more, which makes it difficult to arrange all the other aspects of conducting collaborative projects (e.g., obtaining Cuban visas, securing permits to conduct projects in Cuba, arranging for funding, and scheduling travel and time in Cuba to do the project).

Licenses for Equipment: Environmental research requires specialized equipment, ranging from handheld GPS units to deepwater submersibles. It is a complicated proposition to bring items into Cuba that are not carried in one's luggage, and even items in the luggage can be problematic, such as GPS units, which are not allowed. It is only possible for U.S.-based environmental NGOs to send permitted large items, such as natural history specimen cabinets, if they have a license from the U.S. Department of Commerce's Bureau of Industry and Security (BIS). BIS consults with the Department of Homeland Security and the Department of Defense before approving applications. In addition, BIS has approved the exports of aircraft or vessels on temporary visits to Cuba on a case-by-case basis, sometimes with additional authorizations needed (e.g., boats going into Cuban territorial waters from south Florida must get advance permission from the U.S. Coast Guard). While it is possible for established NGOs with solid partnerships with Cuban counterparts to export selected equipment for environmental research or monitoring purposes, it is by no means a speedy or certain process or one that includes selected critical items, such as GPS units. Impediments with respect to environmental equipment exports to Cuba are matters of both what is permitted and how expediently the shipment is approved. The current situation is inadequate for cases involving exports of equipment needed for responding to urgent environmental problems or for NGOs attempting to begin new projects.

Funding: Cuba has an excellent cadre of environmental professionals with a demonstrated capacity for conducting successful projects.¹³ Unfortunately, Cuba's investment to date has been limited, and there is a chronic shortage of funding for the infrastructure, research, training, monitoring, and dissemination of research results for Cuban environmental projects that would be of shared interest for the United States and Cuba. U.S. funds that could support such environmental initiatives are potentially considerable, but they are severely limited currently due to OFAC restrictions on the amount of private funds that can be expended in Cuba and the complete prohibition of U.S. government funds for such environmental projects. U.S.-based private foundations, including the John D. and Catherine T. MacArthur Foundation, the Christopher Reynolds Foundation, the Tinker

Foundation, Inc., and the Andrew W. Mellon Foundation, have taken the lead in funding OFAC-licensed environmental projects in Cuba. More funding is needed to provide modern infrastructure and information technology; vehicles, vessels, and gear for field studies; and travel options for Cuban scientists and students to participate in workshops and conferences and to pursue formal and informal studies and internships abroad.

Cuban Impediments to Enhanced Environmental Cooperation

Project Approvals: Environmental projects conducted in collaboration with Cuban organizations must be approved by an array of Cuban agencies—and at various levels within those agencies—depending on the nature of the project. This can be a daunting procedure for U.S.-based NGOs attempting to initiate collaborative activities in Cuba, but even NGOs experienced in the process of project approval can have delays and frustrations. Some of the impediments are related to technical problems (e.g., spotty Internet connections and difficulty transmitting large file attachments via email) or to changes in key administrative personnel at agencies. The most important Cuban agency for most projects is the Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA), but depending on the situation other entities must give high-level approval for environmental projects. For example, the Jardín Botánico Nacional (JBN) reports administratively to the Ministerio de Educación Superior, so projects with the JBN need to be approved by that ministry, in addition to CITMA.

Projects taking place in Cuba's numerous protected marine and terrestrial areas must be approved by the Centro Nacional de Áreas Protegidas (CNAP), which is part of CITMA. The major impediment with respect to conducting collaborative environmental projects in Cuba is what can be a complex, non-linear, and slow approval process.

Visas: Once an appropriate OFAC license is obtained, a U.S. citizen must also obtain the appropriate visa from Cuba to enter the country and conduct the approved activity. In some cases, for example to attend a professional conference, this can be accomplished with a tourist visa, which can be issued by airline companies for a modest fee. However, for a U.S. citizen to engage in research activities, a research visa is required from Cuba, and this needs to be arranged through the Cuban counterpart's organization, which can take up to thirty working days to process. The challenge here is that the collaborative activity for which the visa is sought must already have been approved by the Cuban counterpart organization, but that to get the approval it is usually necessary to meet with and explain the project concept and to work out the specifics in person, thus creating a "catch-22" situation.

Permits: Once projects are approved and research visas secured, the third category of impediment in Cuba for U.S.-based environmental researchers is to obtain the permits needed for implementing the project's specific activities. Probably the key permits pertain to the conduct of field expeditions in collaboration with Cuban counterparts. Such permits require information about the individuals who will be doing the field work and a detailed schedule of sites they will visit and on what dates. However, the time it takes to get a permit approved often can affect the specific details in the permit application. For example, illness or other external factors may affect an individual's availability (substitutions are not allowed) and natural events, such as hurricanes, may prohibit the expedition from going somewhere on the approved day. The high degree of specificity of information required, the relative inflexibility to modify what has been approved due to changing circumstances of personnel or weather, and the length of time to get the approvals of the permits impede research expeditions.

Enhancements to Environmental Cooperation

Nature knows no boundaries, and given the number and scale of environmental problems shared by Cuba and the United States, combined with the multitude of impediments to finding joint solutions to these problems, the best way to enhance environmental cooperation between the two countries would be through the establishment of a bilateral agreement on this theme.

The ecological stakes are too high for Cuba and the United States to rely on anything short of a government-to-government accord to formalize, catalyze, and facilitate cooperation on environmental problems of mutual concern. Various models for such an agreement exist: the United States has joint statements on environmental cooperation with Spain and Italy, an agreement on air quality with Canada, and a memorandum of understanding on environmental protection with India, among others.

Such a bilateral agreement could logically take advantage of the collective experiences of the U.S.-based environmental NGO community in conducting collaborative initiatives with Cuban counterparts over many years and, in some cases, decades. The focus of such a bilateral agreement should be on helping to facilitate the activities by NGOs that are currently underway and encouraging new initiatives by NGOs in consultation with and the approval of Cuban authorities. The elements of such an agreement should take into account the difficulties mentioned above and the following considerations:

- **Project Approvals:** Before cooperative projects can begin, one or more Cuban agencies need to approve. It would be ideal to have this process more clearly defined and streamlined to minimize delays in getting approvals.

- Visas: Research visas for representatives of NGOs conducting approved projects should be expedited and ideally approved for multiple entries into Cuba, perhaps renewable annually for the duration of the project.
- Permits: Permits for all the components of projects (e.g., to collect specimens, to enter and collect or monitor in protected areas, to import research equipment, to export biological specimens, etc.) should be expedited for approved projects.
- Licenses: The processes for obtaining the U.S. Department of the Treasury's OFAC specific licenses and the U.S. Department of Commerce's Bureau of Industry and Security licenses should be streamlined and more transparent.

Cuba's Ministerio de Relaciones Exteriores (MINREX) might logically take the lead on such a bilateral agreement. Any of several U.S. government entities could logically take the lead, such as the Department of State, NOAA, the Fish and Wildlife Service, or the Environmental Protection Agency. At the same time, efforts should continue unabated to promote the revision of U.S. government policies that currently impede greater bilateral environmental cooperation between the two countries.

Cuba and the United States have the potential to work around their differences to respond to the threats to their shared biodiversity. And no matter what the trajectory of future official relations between the two countries, initial mutually beneficial steps concerning the environment can provide an important opportunity to address real shared problems while also building links and trust between the two societies that can provide some bedrock for future relations. **SD**

Endnotes

1. Sergio Jorge Pastrana (Cuban Academy of Sciences) and Michael T. Clegg (U.S. National Academy of Sciences), "U.S.-Cuban Scientific Relations," *Science* 322, no. 5900 (2008): 345, <http://www.sciencemag.org/content/322/5900/345.summary>.
2. James T. Tilmant, Richard W. Curry, Ronald Jones, Alina Szmant, Joseph C. Zieman, Mark Flora, Michael B. Robblee, et al. "Hurricane Andrew's Effects on Marine Resources," *BioScience* 44, no. 4 (April 1994): 230-237. <http://www.jstor.org/stable/1312227>.
3. David W. Orr and John C. Ogden, "The Impact of Hurricane Andrew on the Ecosystems of South Florida," *Conservation Biology* 6, no. 4 (December 1992): 488-490. <http://www.jstor.org/stable/2386357>. Note: the Australian pine is *Casuarina* spp. and the Brazilian pepper is *Schinus terebinthifolius*.
4. Andrew E. Kramer, "Gazprom of Russia to Drill for Oil in Cuban Waters," *The New York Times*, November 15, 2010. <http://www.nytimes.com/2010/11/16/business/global/16oil.html>.
5. Clifford Krauss, "Drilling Plans Off Cuba Stir Fears of Impact on Gulf," *The New York Times*, September 29, 2010. <http://www.nytimes.com/2010/09/30/world/americas/30cuba.html>.
6. Environmental Defense Fund. *Cuba: What's at Stake*. <http://www.edf.org/oceans/cuba>.
7. UNEP, Caribbean Environment Program (CEP), *Wider Caribbean Region*. http://www.unep.org/regionalseas/programmes/unpro/caribbean/instruments/r_profile_car.pdf.
8. *Hydrilla verticillata*. Non-indigenous Aquatic Species. U.S. Geological Survey factsheet. <http://nas.er.usgs.gov/taxgroup/plants/fact%20sheets/Hydrilla%20verticillata.pdf>.

9. Mark A. Albins and Mark A. Hixon, "Invasive Indo-Pacific lionfish *Pterois volitans* reduce recruitment of Atlantic coral-reef fishes," *Marine Ecology Progress Series* 367 (2008): 233–238. http://content.imamu.edu.sa/Scholars/it/net/albins_hixon_2008_meps.pdf.
10. Maria G. Guzmán and Gustavo Kourí. "Dengue in Cuba: research strategy to support dengue control," *The Lancet* 374, no. 9702 (November 2009): 1660-1661. http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2809%2961975-9/fulltext?_eventId=login.
11. Country Reports - Croatia through Haiti, *2012 International Narcotics Control Strategy Report (INCSR)*, U.S. Department of State, March 7, 2012. <http://www.state.gov/j/inl/rls/nrcrpt/2012/vol1/184099.htm>.
12. *Discovering Cuba's Natural History: A People to People Educational Exchange Led by Museum Experts*. American Museum of Natural History. <http://www.amnhexpeditions.org/home/show/Programs%20to%20Cuba>.
13. For example, the Global Environment Facility (GEF) has allocated US\$4,350,000 for twenty projects on themes such as biodiversity, climate change, and land degradation. http://www.thegef.org/gef/gef_country_prg/CU.

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