

Environmental and scientific cooperation between Cuba and the United States: A Bridge over Troubled Waters¹

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Abstract

Scientists and other experts from the United States and Cuba have a long and rich history of working together, through good times and bad. The fruits of their labors have been many — discoveries of new species on land and in the water, advances in restoring and conserving soils impacted from decades of overuse, new approaches for managing pests and invasive species that threaten agricultural yields and biodiversity, improved methodologies for tracking hurricanes, reductions in overfishing, conservation and restoration of corals, and new protections for endangered species. Cooperation on environmental matters has been especially productive and has helped create political space for dialogue on more sensitive issues. Following the restoration of diplomatic relations in 2014, the two countries signed 22 bi-lateral agreements, the first two of which promised government-to-government cooperation on shared environmental and natural resource issues.

Though US-Cuba relations worsened during the Trump Administration and have only slightly improved in the Biden era, cooperation on science and the environment remains strong, particularly between non-governmental organizations in the United States and governmental and non-governmental actors in Cuba. Looking ahead, there are many opportunities to expand cooperation on issues such as climate change and clean energy that would be beneficial to people in both countries.

Keywords: *US-Cuba relations, science diplomacy, environmental cooperation*

Introduction

On April 20, 2010, an explosion on a British Petroleum (BP) oil rig off the coast of Louisiana resulted in the deaths of 11 people and the largest marine oil spill in history. For nearly three months, more than 200 million gallons of oil spilled freely into the Gulf of Mexico, wreaking havoc to marine life, ecosystems, and coastal communities far and wide. The spill spread out over 4,000 square miles and polluted roughly 200 miles of Gulf waters along the edge of the Cuban exclusive economic zone (EEZ), and posed a threat to beaches, reefs, mangrove swamps and towns along Cuba's northwestern coast. An international incident was prevented by the chance timing of the central Gulf Loop Current gyre formation, which interrupted the delivery of oil down current as far as Cuba and the Florida Keys.

The BP oil spill exposed major flaws in the oil industry's safety practices, the government's oversight of offshore drilling, and the emergency response plans for spills. It also revealed how utterly unprepared the US government was in addressing the threats posed to neighboring countries down current of the spill. Though Cuba has some of the best environmental laws on the books, its hands were tied when it came to protecting itself from pollution originating across the border. What made Cuba especially vulnerable was the lack of formal contact and coor-

1 This article includes excerpts from Crahan, M., editor, *US-Cuba Working Together Again: Lessons from Environmental Cooperation*, Columbia University, 2021, with the permission of the editors.

2 The author thanks Valeries Miller, director of the Cuba Program at EDF, and Eduardo Boné-Morón, Senior Manager of the Cuba Program at EDF, for their contributions to this article.

dination with the United States on pollution in shared waters, or on virtually any environmental matter. At that time, Cuban officials had no effective or efficient way to communicate with US counterparts about the spill's movement or to coordinate in responding and curbing its impacts. They couldn't simply call the US Coast Guard and ask for information or help. Likewise, in the event oil were to enter its waters, Cuba couldn't count on help from US government or from private sector resources in the states to help it contain the oil--US law prohibited response teams from entering Cuban waters.

Fortunately, a few US-based environmental groups with experience working in Cuba, including Environmental Defense Fund, were monitoring the spill and could act as unofficial channels of information between government officials in both countries throughout the crisis. It took more than 18 months until the two governments found a way to talk directly to each other about how to deal with future oil spills. And those talks, which ultimately produced a bi-lateral agreement on oil spill prevention and response in January 2017, might have never happened had people in Florida not woken up to the fact that Cuba had its own plans to drill for oil off its northern coast. They realized that an offshore spill in Cuba could have devastating impacts on Florida's Keys and much of the state's southeastern shorelines and cities. Cooperation to prevent future oil spills in Cuban waters was seen as essential to protect economic, social and environmental interests in south Florida and the east coast of the United States.

We're connected

It's never been any secret to Cuban and American scientists that our two countries are connected and that shared environmental problems require shared solutions. Scientists on both sides of the Florida straits have been finding ways to study and work together literally for centuries, through good times and bad. The fruits of their labors have been many — discoveries of new species on land and in the water, advances in restoring and conserving soils impacted from decades of overuse, new approaches for managing pests and invasive species that threaten agricultural yields and biodiversity, improved methodologies for tracking hurricanes, reductions in overfishing, conservation and restoration of corals and new protections for endangered species.

The list goes on and many are captured in the 2021 book *Cuba-US Working Together Again: Lessons from Environmental Cooperation*, published by Columbia University's Institute for Latin American Studies, with support from the Havana-based Fundación Antonio Núñez Jiménez, the American College of Environmental Lawyers, and the Environmental Defense Fund (EDF). The authors in that collection, released shortly after President Biden took office, made a strong case that the United States and Cuba should resume dialogue and cooperation on environmental matters and provided a proposed road map for doing so. Before providing a summary of more recent examples of collaboration below, it is worthwhile to recap some of the areas of cooperation explored in that 2021 volume.

A long history of environmental and scientific cooperation

Cuban historian Reinaldo Funes, in his *A Brief Historical Overview of Environmental Exchanges between the United States and Cuba*, explores the genesis of scientific and environmental collaborations over the years and what propelled them, the diversity of scientists, academics, government officials and businesspeople involved in them, and why such partnerships have proven to be so mutually beneficial. For example, Dr. Funes notes that in the late 19th and early 20th centuries, numerous American companies owned sugar plantations and mills in Cuba. With support from Tropical Plant Research Foundation and the United States Department of Agriculture, and with financial support from the Sugar Club of Cuba, Cuban and American scientists teamed up in the 1920s to classify Cuban soils and to better understand the role of soils in the cultivation of sugar. American scientist Hugh Hammond Bennett, who led the study and who is widely regarded as the father of soil conservation in the US, wrote in his book *The Soils of Cuba*, "There is probably nowhere else in the world where the influence of the soil is more important than in the sugar plantations of Cuba." At a meeting of the Cuban Society of Soil Science in Havana a few years back, a Cuban scientist told me that they still regarded Dr. Bennett (a fellow North Carolinian of mine) as a hero and that his work remains an important resource in Cuba to this day.

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Margarita Fernandez, president of the Caribbean Agro-ecology Institute, writes about more recent collaborations between academic scientists, farmers and conservationists around the intersection of agriculture and the environment. In her piece, *Grassroots Learning: Cuba-US Solidarity and Cooperation in Agro-ecology and Climate Change*, Dr. Fernandez notes that a diversity of new collaborations started in the early 1990s and has continued since then. "Over the past three decades, there have been hundreds of exchanges between Cuban and US farmers, alternative agriculture advocates, policy makers, and academics engaging in a variety of workshops and meetings on issues related to agriculture, food and more recently the climate crisis." As a result of the collapse of the Soviet Union in 1991, and the ensuing economic crisis in Cuba, the country began to move away from industrialized farming, dominated by sugar monoculture, toward agro-ecological and organic production systems and smaller farms that produced a broader range of crops. Collaborations since then have looked at the social, economic, and environmental benefits of Cuba's shift toward small-scale farming and agro-ecology and how those benefits can be sustained in the future. Partners from the United States also have been keenly interested in learning from Cuba's experience and in adapting lessons learned there to advance more environmentally sustainable farming practices in the U.S. For example, the Federation of Southern Cooperatives, a non-profit cooperative association of black farmers, landowners, and cooperatives in the United States, has longed worked with Cuba's National Small Farmers' Association (ANAP) to compare notes and share ideas on sustainable farming practices.

Immediately following the normalization in relations between the US and Cuba in December 2014, agricultural exchanges and collaborations became a top priority, both for NGOs and farmer organizations and for both governments. In 2015 the Cuba-US Agro-ecology Network (CUSAN) was established and since then has brought hundreds of US farmers to Cuba for trainings and learning exchanges around strategies for climate resilience, climate justice, agro ecology and food sovereignty. In 2016, the Cuban Ministry of Agriculture and US Department of Agriculture signed two memoranda of understanding aimed at expanding trade and increasing opportunities for collaborative research.

Liliana Nuñez, Patricia Gonzalez and Valerie Miller also focus their articles on productive environmental and scientific bi-lateral and multi-lateral collaborations since the 1990s. In her piece, *The Sea: a bridge that unites us*, Dr. Gonzalez, professor and former director of the Center for Marine Research at the University of Havana, argues that good policy and sustainable management depend upon sound science that is not artificially constrained to political borders. She examines collaborative research that has been critical to better understanding and addressing shared environmental problems, particularly around degradation to marine and coastal resources and the impacts of climate change. She observes that collaborations are especially effective when premised upon transparency, shared interests and mutual respect. Dr. Gonzalez is one of the leaders of the Tri-National Initiative on Marine Science and Conservation in the Gulf of Mexico, a research collaborative between Cuba, the US and Mexico that was established in 2007 and continues to the present day. This initiative, which includes six thematic areas, has been particularly effective in producing joint research to improve the management of migratory marine species and has led to tri-lateral efforts to establish a network of marine sanctuaries throughout the Gulf of Mexico. Dr. Gonzalez also cites the successful efforts of Cubans and Americans to convince the University of Miami's prestigious *Bulletin of Marine Sciences* to end its long-standing policy of not publishing Cuban authors. In 2018 the Bulletin published a special issue on Cuba, featuring articles jointly written by Cuban, American and Mexican experts, prompting the Miami Herald to run an article entitled, *U.S., Cuban marine biologists put an end to 'academic embargo.'*

Liliana Nuñez, president of the Cuban NGO Fundación Antonio Nuñez Jiménez, addresses the important role that her group and other civil society organizations play in collaborative research and education on a wide variety of topics. She emphasizes the social and cultural aspects of environmental protection, natural resources conservation and sustainable development and stresses the importance of stakeholder and community participation in policy making and management at the local, national and international levels. With the Environmental Defense



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Fund, Ms. Nuñez' group was one of the founding organizations in 2016 of the *Research Initiative for the Sustainable Development of Cuba (RISDoC)*, an international initiative focused on sustainability in several sectors of Cuba's economy, including energy, agriculture, tourism and others. That initiative has provided a forum for academics, civil society and governmental officials to come together to discuss how economic development can be achieved without compromising the country's commitment to environmental protection and sustainability.

In *Oceans of opportunity: Recent Cuba – U.S. marine collaboration and future possibilities*, Valerie Miller, director of the Cuba Program at Environmental Defense Fund (EDF), writes that past collaborations on overfishing and conservation of marine and coastal habitats have resulted in new working relationships among resource agencies, research centers, business enterprises and coastal communities around common interests and objectives. For example, Ms. Miller and Dr. Gonzalez both discuss the partnership between EDF, University of Havana's Center for Marine Research and the Cuban Center for Fisheries Research to develop a new training program for professionals from across the island working in fisheries-related fields. Training from this program has already resulted in tangible actions and policies, including new fishery management plans and a nation-wide ban on goliath grouper, a species that is especially vulnerable to overfishing. She also highlights Cuba's progressive plan to prioritize the conservation and management of sharks, developed with assistance from American and Mexican scientists, and *SOS Pesca*, a four-year community-based project to address overfishing, protect marine habitats, and provide alternative livelihoods in remote communities. These past partnerships provide a pathway for new cross-sector initiatives on marine conservation and climate change mitigation and adaptation.

Orlando Rey and Daimar Canovas also speak about the past as a foundation for the future. In *Back on the road: Cuba, US and environmental cooperation*, Mr. Rey, a former government lawyer at the Cuban Ministry of Science, Technology and Environment, draws upon his experiences in collaborating with US environmental lawyers and policy experts in the late 1990s and early 2000s. At that time the Cuban government had just recently established the first ever cabinet-level ministry for the environment and was in the process of developing a suite of new environmental laws and policies. Cuba invited legal and policy experts from the United States to work with them on crafting new measures on coastal zone management, environmental impact assessments, and biodiversity conservation, among others. He says that "at that time, the potential of the environment as a space for cooperation was already very clear, as an area of mutual interest to both the United States and Cuba." Mr. Rey goes on to say that it was no coincidence that in President Obama's speech on December 7, 2014, he chose environmental cooperation as one of the four areas of mutual interest between the US and Cuba. In fact, of the 22 bilateral agreements signed between November 2015 and January 2017, the first two dealt with environmental protection and resource conservation, and environmental matters were addressed in no fewer than 10 of the 22 pacts. Mr. Rey notes that *now* is the perfect time to broaden and deepen Cuba-US environmental cooperation, but rightly reminds us that the level of cooperation seen during the last two years of the Obama administration was short-lived and virtually vanished during the Trump administration. He cautions that for such cooperation to become more "resilient" and durable, it will take a more lasting change in US policy (e.g., a lifting of the US embargo) and strong commitment from both governments.

University of Havana Law School professor Daimar Canovas writes in *Conservation of biodiversity: a space for Cuba-US cooperation*, that global environmental challenges such as climate change and loss of biodiversity cannot be addressed unilaterally. He describes how both are included in the first two bi-lateral agreements signed between the two governments in November 2015. He notes that Cuba has made protecting the environment a top policy priority, even under extremely difficult economic circumstances, and that Cuban citizens now have a constitutional right to a clean environment. In 2017 the Cuban government adopted *Tarea Vida (or Project Life)*, a sweeping long-term plan climate change adaptation and mitigation. Professor Canovas maintains that cooperation between the US and Cuba is an "ethical imperative" and that cooperation must go beyond government-to-government accords and include the participation of NGOs, academics and other non-governmental actors. "The future," he says, "is in our hands."

Yordanka Castillo, a Cuban lawyer then associated with the Fundación Antonio Núñez Jiménez, writes about the usefulness of the memorandum of understanding (MOU) as a tool to guide cooperation between US and Cuban entities (governmental and nongovernmental alike). Though non-binding in nature, MOUs provide a measure of formality to collaborations and have proven to be efficient and effective instruments through which partnering organizations can align priorities and provide a pathway for carrying out joint activities in service of common or shared objectives.

Yociel Marrero, of the Fundación Antonio Núñez Jiménez, suggests that the 17 Sustainable Development Goals (SDGs) established by the United Nations in its 2030 Agenda could provide a “safe and diverse platform” for bi-lateral cooperation between Cuba and the United States at a time when all nations draw up plans and partnerships for achieving the goals. He recommends that dialogue take place right away between actors in both countries (governmental and non-governmental) to determine which of the SDGs should be prioritized for collaboration. To this end, he sets forth several specific actions to get the ball rolling. These include forming a regional network of academic institutions and research centers from the United States, Cuba and wider Caribbean around priority SDGs. Mr. Marrero also emphasizes the need for international financial institutions (including those that do not currently fund Cuba) to provide funding to multi-lateral projects associated with SDGs.

In his article, *Cuba-US: Strategies on Furthering Environmental Cooperation*, David Farer, a fellow and former president of the American College of Environmental Lawyers, discusses the work of the College’s International Pro Bono Committee and its partnership with Cuba’s Fundación Antonio Núñez Jiménez. He notes that COVID-19 resulted in a delay of planned activities in Cuba in 2020, but that partners on both sides of the Florida Straits have found ways to adapt and to continue dialogue and joint activities while waiting for travel to open up again. Mr. Farer also provides a summary of specific ideas for future collaborations suggested by several contributors to this book and by others who presented at the series of webinars on February 21, 2021 hosted by Columbia University. Key areas for collaboration include climate change adaptation and mitigation, clean and resilient energy, sustainable small-scale fisheries, and coastal resilience, just to name a few.

The authors concluded that it is undeniable that the United States and Cuba have a shared interest in environmental protection and sustainability and that suspending dialogue and cooperation until political differences are fully resolved undermines our national interests and is costly to both countries. In a December 11, 2020 letter to President-elect Biden, 15 leaders of US-based NGOs and academic institutions urged the new President to “set a new course, one firmly based on constructive engagement and the centuries old tradition of science diplomacy.” the letter’s authors argued that “[a] renewed policy of scientific engagement on environmental matters will advance the interests of the United States and those of the Cuban people in a way that ensures a clean and healthy environment and sustains the natural resources upon which our societies and economies depend. Engagement will also be fundamental to carrying out your agenda on promoting clean energy and addressing climate change in Latin America and the Caribbean.”

Cooperation in the Biden Era

Most of those who advocate for a US foreign policy of constructive engagement with Cuba have been disappointed with the Biden Administration’s timid record on Cuba and express regret at the missed opportunities. While President Biden never promised to fully restore the policies and approaches of the Obama era, he did indicate an intention to reverse President Trump’s most restrictive policies, to reengage diplomatically, and to make support for the Cuban people a priority. The Biden Administration has taken some steps to fulfill those pledges, but those steps have not led to the kind of meaningful reforms many had hoped for and expected. The Administration’s unwillingness to remove Cuba from the list of state sponsors of terrorism remains, perhaps, the single biggest obstacle to meaningful improvements in US-Cuba relations.

Nonetheless, President Biden maintained the bi-lateral agreements put in place by President Obama and left intact by Trump; in several instances, the Biden Administration reinitiated a dialogue and cooperation that

had languished during the Trump years. Discussions on environmental matters have resumed and, in 2023, the two governments renewed a memorandum of understanding on terrestrial protected areas that had expired. Furthermore, the State Department began issuing some non-immigration visas to Cuban scientists once again, enabling two-way professional and academic exchanges on a variety of issues, from climate change to coral reef conservation, to sustainable agriculture. These exchanges are vital to experts on both sides of the Florida Straits and help keep the door open for more cooperation in the future.

Below are some specific examples of recent cooperative research and other activities that illustrate the mutual benefits of continued collaboration and the potential for deepening scientific and environmental cooperation in the future.

Cuba's Historic Coral Reef Expedition

Cuba is home to four of the world's most climate-resilient coral reefs, making it an ideal location to study and collect data as we seek to preserve other reefs worldwide. Over the last few years, EDF and other US-based NGOs have continued to support Cuban experts and institutions in making important progress to protect these vital habitats, promote marine stewardship, and address overfishing.

In 2023, EDF and the New York-based Wildlife Conservation Society collaborated with Cuban scientists and 30 Cuban institutions to complete Cuba's Historic Coral Reef Expedition³ (Bojeo a Cuba) on-board the Oceans for Youth vessel, successfully circumnavigating the country to conduct critical research on the health of coastal coral reefs, fish and other marine life. The leading organizations from Cuba included Avalon-Marinas Marlin (Ministry of Tourism), the Center for Marine Research of the University of Havana, Naturaleza Secreta, and the Agency for the Environment within the Ministry of Science, Technology, and Environment. Initial data analysis from the groundbreaking expedition demonstrates both the resilience and fragility of Cuba's coral reefs.

Key findings indicate a high biomass of medium fish in 60 % of the areas sampled and a large presence of herbivorous fish across most sites, offering hope for how these fish species may withstand a changing climate. However, researchers also found coral bleaching, disease, and an invasive coral species. Now, Cuban and US partners are working to publish, share, and apply these results, which will help build new pathways forward for healthy oceans in Cuba and strengthen marine protected areas to help reach the global goal of 30 % of marine areas protected by 2030. Additionally, many young Cuban researchers are now using the data for thesis projects, highlighting how this historic expedition will continue to shape the future of marine resource management through its influence on up-and-coming ocean leaders.

El Bojeo became a powerful communications tool to reconnect Cuban communities across the island with their unique natural and cultural heritage. The research vessel stopped in coastal communities to connect residents to science and the marvels of Cuban waters. The expedition has become even more critical as ongoing marine heat waves unfold around the globe. This knowledge can lead to new management and conservation techniques to preserve and slow the degradation of reefs around the world.

Advancing Cuban Coral Reefs' nomination for UNESCO World Heritage Site, EDF and other US-based NGOs (Wildlife Conservation Society, The Oceans Foundation, Cresta Coastal Network) are working with Cuban partners to establish the "Cuban Caribbean Reef System" as a UNESCO World Heritage Site. Sites include Gardens of the Queen and Guanahacabibes National Parks, known as the crown jewels of the Caribbean for their healthy, resilient coral reefs. If selected, this recognition would elevate these parks to the global stage to support their ongoing protection, increase park visitation and recreation (e.g., fly-fishing, SCUBA diving, bird watching), and create more jobs for nearby coastal communities. Partners submitted a pre-proposal at the end of 2023, and, in July 2024 a team from the International Union for Conservation of Nature (IUCN) designated the pre-proposal as "very strong," allowing the nomination to move forward.

3 <https://vitalsigns.edf.org/story/historic-cuban-voyage-searches-clues-coral-reef-survival>

Fostering resilience through ecosystems-based adaptation

In December 2022, EDF, Wildlife Conservation Society and Cuban institutions launched a new ecosystems-based adaption project, primarily funded by the Caribbean Biodiversity Fund. This community-centered project focused on promoting community climate resilience in four coastal protected areas connected to Cuba's most important reef systems. Cuba's National Center for Protected Areas (CNAP) serves as the coordinating institution and identified the focus protected areas, where the project is engaging nine coastal communities and ten institutions on climate-resilient strategies to support fisheries, ecosystems, and livelihoods. Over the course of the project, partners have implemented initiatives for coral reef, sand dune and mangrove restoration and climate adaptation planning. EDF and Cuba's Center for Fisheries Research (CIP) co-led a series of trainings on Climate Resilient Fisheries and aquaculture for project participants to learn about marine resource management strategies and examine creative opportunities for alternative livelihoods. During the trainings, EDF and Cuban fisheries scientists have worked with fishermen and conservationists to interpret fisheries assessments and propose new management measures and cultivation options for oysters, fish, and seaweed for three of Cuba's four fishing zones. The success of this project is a result of a community-centered approach: Cuban scientists, fishermen, and protected area staff are now the ones leading the participatory trainings and have the technical and leadership skills needed to further scale sustainable fisheries management. Project partners are also creating community climate adaptation and resilience plans, restoring coastal and marine habitats, developing sustainable fishing plans, and identifying economic alternatives that support conservation.

The Ocean Foundation (TOF) is a US-based NGO that has collaborated with Cuban marine the University of Havana and other science-based institutions since 1999. In 2021, TOF also received a grant from Caribbean Biodiversity Fund Ecosystem based Adaptation Program. The three-year project focused on coastal enhancement activities in Cuba and the Dominican Republic, the two largest island countries of the Caribbean. The highly successful exchange was intended as a south-south collaboration whereby two developing countries shared experiences and technology collaboratively with the goal of assisting coastal communities to adapt to climate change.

In both countries, TOF and partners SECORE International and the *Fundación Dominicana de Estudios del Mar* (FUNDEMAR) worked with the University of Havana and CITMA to replant corals at three sites in both countries using new sexual propagation techniques that provide the genetic diversity needed to withstand bleaching and disease. Coral seeding, or larval propagation, refers to the collection of coral spawn (coral eggs and sperm, or gametes) that can fertilize in a laboratory. These larvae are then settled on special substrates that are later dispersed on the reef without need for mechanical attachment. Over 1.46 hectares of coral habitat was restored through the planting of 46,485 coral substrates.

The project also worked in both countries to transform nuisance *sargassum* into compost for use by agricultural communities -- removing the need for expensive petroleum-based fertilizers that contribute to nutrient pollution and degrade coastal ecosystems. Finally, the project, through the Cuban Agency for Environment (within CITMA) improved over 1,400 hectares of mangrove habitat in the Cuban provinces of Artemisa and Mayabeque and created the Caribbean School for Mangrove Ecology. Over 5,000 Cuban and Dominican nationals were engaged in the project.

Building a network of resilient coastal communities

In April 2022, Environmental Defense Fund (EDF), the Caribbean Agroecology Institute (CAI)(formerly VCI), and the Foundation of Antonio Nuñez Jiménez (FANJ) hosted the 4th Research Initiative for the Sustainable Development of Cuba (RISDoC) symposium. The 3-day symposium, *Sustainable Livelihoods and Resilience in Cuba's Coastal Communities*, brought together more than 70 participants from across Cuba with international specialists to develop new alliances and share best practices on policies, projects and strategies for climate adaptation and sustainable development in the coastal zone. In the year leading up to the symposium, we adapted to COVID-restrictions and forged new cross-sector partnerships by producing special report, *Sustainable livelihoods for coastal communities*:

Building climate resilience for energy, fisheries, agriculture, tourism, and communities, co-authored by 48 Cuban and international experts across diverse sectors which curates for the first time a vast compilation of experiences and visions for a more sustainable and resilient Cuba. Most co-authors participated in the 4th RISDoC symposium, and many presented on their activities and perspectives on coastal adaptation. This integrated approach is helping Cuba address its environmental, economic and food security goals.

In May 2023, EDF, the Caribbean Agro-ecology Institute and the Foundation of Antonio Nuñez Jiménez (FANJ) held the 5th International Seminar of our Research Initiative for the Sustainable Development of Cuba (RISDoC) focused on Urban Coastal Zone Resilience. More than 100 entrepreneurs, community leaders, and municipal government officials from across Cuba joined with coastal experts to advance equitable and just economic growth that builds climate resilience. Participants shared best practices from across the country as well as case studies from New Orleans, Puerto Rico, and Mexico that showcased how these coastal regions are navigating similar effects of climate change. The event amplified the voices of entrepreneurs who talked about the progress and challenges of innovative food production and included field visits to an aquaponics business and a coastal farm that restored mangroves and hosts learning exchanges. Since EDF and FANJ first started RISDoC in 2016, we have observed the myriad ways this event helps transform the country. Partners say they continue to hear “the echoes of RISDoC” in efforts to promote participatory processes across sectors — from local development planning to oyster production to clean energy. Participants share that the event serves as a growing force for optimism and possibility for partners across disciplines and throughout the country, recognizing it as a unique space to learn and build connections with people who would not otherwise come together. National institutions, NGOs, municipal government, and private sector stakeholders now collaborate in new ways, view each other as partners in local development, and openly discuss how to activate and engage with local communities.

Knowledge sharing and building capacity

Cuban scientists are highly trained and accomplish so much with relatively few resources. For example, Cuban climate scientists have designed sophisticated models to estimate sea level rise and project how climate change may impact coastal communities and ecosystems in the future. They are also experts on using nature-based infrastructure (like mangrove forests, sea grass beds and coral reefs) to mitigate the impacts of climate change. This expertise is central to the country’s efforts to adapt to climate change and has positioned Cuba to play an effective role in international climate change negotiations and agreements. Cuban botanists, marine ecologists, wildlife scientists and other experts are widely respected throughout Latin America and the Caribbean for their research, expertise, and an impressive track record in protecting natural areas and biodiversity; Cuban experts often provide technical assistance to other countries in the region.

EDF staff and other US-experts frequently collaborate with Cuban partners on peer-reviewed scientific and policy articles published in journals in the United States and other countries. In 2018, EDF and scholars from the Gund Institute in Vermont and the Center for Marine Research at the University of Havana collaborated on a special issue of the University of Miami’s *Bulletin of Marine Sciences*⁴ that featured 17 scholarly articles from teams of Cuban and American scientists, ending the journal’s policy to not publish work by Cuban authors.⁵ In 2025, the *Bulletin of Marine Sciences* will publish a second special issue on Cuba with at least 13 peer-reviewed articles, focusing on the results from *el Bojeo* (discussed above). EDF and Cuban scientists will serve as co-editors of that issue.

US-based NGOs have also secured visas and provided support for scientists, fishermen, community leaders, resource managers and officials to present their work and participate in conferences and exchanges around the world. This helps ensure that Cuba’s impressive progress informs the global community and that Cuban partners

4 <https://joeroman.com/wp-content/uploads/2018/04/roman-intro.pdf>

5 <https://www.miamiherald.com/news/nation-world/world/americas/cuba/article219965430.html>

have opportunities to learn from projects in other countries, particularly Mexico, Belize, The Bahamas, Chile, Puerto Rico, and the United States.

The Harte Research Institute (HRI) for Gulf of Mexico Studies at Texas A&M University-Corpus Christi has been particularly active in organizing capacity building opportunities around the Gulf of Mexico large marine ecosystem. Since 2010, HRI's *Gulf of Mexico Student Workshop on International Coastal and Marine Management (SWIMM)* has brought together graduate students from Mexico, Cuba, and the United States for peer-to-peer exchanges, shared learning, and intensive interactions with scientists, managers, and practitioners⁶.

Science Diplomacy

The American Association for the Advancement of Science (AAAS) has long pursued exchanges and collaborative activities on a wide range of topics with counterparts in Cuba. In 2014, AAAS and the Cuban Academy of Sciences signed an initial memorandum of understanding (MOU) that resulted in three workshops in Havana on neurosciences, cancer immunotherapy and mosquito-borne illnesses. In 2022, AAAS and the Cuban Academy signed a second MOU committing to scientific cooperation on environmental conservation, ocean and marine studies, health, public policy on science and other issues of mutual interest. In March 2023 AAAS organized a delegation of 15 government, academic and NGO experts to travel to Havana for a symposium on environmental and public health issues.⁷ In March 2024, AAAS organized a 20-person delegation to Havana for an exchange on aging and disaster management. That event included high level US government officials from the US National Oceanic and Atmospheric Administration (NOAA) in charge of marine conservation, fisheries management, and hurricane preparedness and response.⁸ Finally, in September 2024, AAAS organized meetings in Mexico with public health experts from Cuba, the United States and Mexico. AAAS' Center for Science Diplomacy has signaled its intent to continue making cooperation with Cuba a priority in the future.

Clean Energy and Climate Resilience

Shortly after taking office, President Biden made clear that fighting climate change would be a top priority. Upon signing an executive order on climate change on January 27, 2021, Biden said his was a "whole-of-government approach to put climate change at the center of our domestic, national security, and foreign policy." At the COP 26 in Glasgow, Scotland later in the year, the Biden Administration reasserted the United States' leadership on climate and, together with leaders from the European Union, launched the Global Methane Pledge, which aims to reduce global methane emissions by at least 30 percent from 2020 levels by 2030. Cuba signed the pledge shortly after the COP.

In April 2022, Vice President Harris announced the new U.S.-Caribbean Partnership to Address the Climate Crisis 2030 (PACC 2030) as the principal initiative for supporting Caribbean countries in climate adaptation and energy security.⁹ The PACC 2030 initiative has four pillars: 1) improving access to development financing, 2) facilitating clean energy project development and investment, 3) enhancing local capacity building, and 4) deepening collaboration between the U.S. and Caribbean partners. These pillars aim to address key concerns of Caribbean nations, and commitments and projects are outlined within the framework of these pillars.

Cuba's energy sector is at a crossroads. The country's mostly fossil fuel-fired energy system faces a number of longstanding and serious challenges, including breakdowns at aging power plants, decreasing fuel imports and fuel shortages, and the growing threat of climate change-related disruptions. In recent years, Cuba has seen frequent electric blackouts and brownouts that have affected residents, businesses, and government institutions island-wide. Like the rest of the Caribbean, Cuba is overly dependent upon expensive, imported fossil

6 <https://www.harteresearch.org/project/gulf-mexico-student-workshop-international-marine-management-swimm>

7 https://www.aaas.org/news/aaas-and-cuban-academy-sciences-reflect-future-us-cuba-scientific-cooperation?utm_label=AAAS-News

8 <https://www.aaas.org/news/aaas-and-cuban-academy-sciences-brainstorm-us-cuba-shared-challenges-and-opportunities-aging>

9 <https://www.state.gov/pacc2030/>

fuels, which seriously compromises the country's energy security and economic development, and its citizens well-being. Aging power plants and transmission lines are in serious need of repair, are not capable of providing reliable electricity to citizens, and are extremely vulnerable to hurricanes. The Cuban government has adopted ambitious clean/renewable energy goals: 37% by 2030; and increasingly there is a discussion around an "energy transition" in Cuba and setting a 100% goal for the future, in line with the direction many Caribbean Island nations are taking. This makes perfect sense—the cost of solar, wind and other renewable energy technologies has been decreasing, making transition the economically smart and sensible thing to do.

As pointed out in EDF's 2017 report on Cuba's electric grid,¹⁰ Cuba has more distributed energy generation than every other country in the world, except Denmark. The decentralized system provides resilience in the face of hurricanes. Though these "microgrids" are not mostly diesel generators, they can be converted to low carbon microgrids, powered by solar and other renewables. In 2024, EDF and Columbia University's Sabin Center for Climate Change Law published an update report on Cuba's energy situation.¹¹ The report provides detailed information on the current state of Cuba's electricity sector and recommends reforms to advance the transition to a lower emission, reliable, and more climate resilient system. The recommendations include possible changes to Cuban domestic policies to, among other things, encourage greater public and private investment in the country's energy transition. The report also explores how a bilateral dialogue between the U.S. and Cuban governments could help to drive renewable energy development in the island nation, in a manner that benefits the Cuban people as well as the interests of people throughout the region.

Looking ahead

At the time of this writing, the outcome of presidential election in the United States is still unknown. Unlike in 2008 and 2016, the issue of Cuba has barely registered in the campaigns of the two major candidates, and it seems unlikely that Cuba will be a foreign policy priority at the outset of the new administration in Washington, regardless of who wins. That said, conventional wisdom suggests that a President Harris would follow the Biden Administration's approach to Cuba, at least in the short run, while a President Trump would gradually chip away at the modest progress in policy and diplomatic relations made since 2021.

Over the longer term, there is some promise that a President Harris would craft her own, constructive approach to Cuba, within a broader Caribbean initiative.¹² As noted above, Harris led the U.S.-Caribbean Partnership to Address the Climate Crisis 2030 (PACC 2030) as the principal mechanism for supporting Caribbean countries in climate adaptation and energy security. A Harris Administration could build upon PACC 2030 by giving it a greater sense of urgency and more financial support and by explicitly including Cuba within the initiative. Such a move would be a logical next step, reflecting Harris' particular interest in the region, and would be an extremely positive one that could open the door to constructive engagement on other issues.

In either scenario, we can expect that some measure of dialogue and cooperation on science and the environment will continue because, as history has shown us, science and the environment know no borders.

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¹⁰ <https://www.edf.org/sites/default/files/cuban-electric-grid.pdf>

¹¹ https://scholarship.law.columbia.edu/sabin_climate_change/220/

¹² See e.g., <https://www.atlanticcouncil.org/blogs/new-atlanticist/what-kamala-harriss-record-in-central-america-and-the-caribbean-reveals-about-her-foreign-policy-approach/>

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