



GCFI73 Special Session Report¹

Recreational fisheries management in the Gulf of Mexico and the Caribbean: recent discoveries, current challenges, and future opportunities

GCFI73 Virtual Conference, November 3 – 6, 2020

Overview

Environmental Defense Fund (EDF) hosted a virtual special session on recreational fisheries issues and opportunities across five focus countries as part of the Gulf and Caribbean Fisheries Institute (GCFI)'s 73rd annual conference, hosted entirely online. The three-day special session brought together more than 30 panelists and workshop participants from Cuba, The Bahamas, the U.S., Mexico, and Belize and achieved the following outcomes:

- 1) Regional sharing of recent lessons learned regarding recreational fisheries governance, including effective management practices, data collection, and incorporation of recreational voices into the participatory process;
- 2) Improved understanding of the current needs and challenges of fisheries managers and stakeholders in specific countries and across the region;
- 3) Identification of opportunities for the GCFI network and the broader Gulf and Caribbean community to begin addressing the greatest needs and challenges.

In addition, the special session built a greater sense of community among the panelists and workshop participants around shared issues.

It is important to note that recreational fishing can be difficult to define. Therefore, at the start of the special session (and for the sake of this report), we reference [the FAO's definition](#): “the fishing of aquatic animals (mainly fish) that do not constitute the individual's primary resource to meet basic nutritional needs and are not generally sold or otherwise traded on export, domestic or black markets.”

Objective of this report

This special session was the result of collaboration across many countries, NGOs, government offices, scientific institutions, guiding businesses and guiding organizations. It is our hope that the information shared throughout this session, some of which is captured in this report, will be of service to recreational fisheries researchers, managers, guides and fishers around the world. As we heard throughout the special session, recreational fisheries provide a suite of socioeconomic and conservation benefits but can also have negative impacts on the environment and local communities if they are unmanaged or poorly managed. Therefore, we hope that these proceedings can also inspire commitments from institutions to better understand and manage the opportunities and risks of recreational fisheries around the region and the globe.

¹ Authors of this report and EDF session organizers: [Sepp Haukebo](#) (Senior Manager, Global Fisheries Initiatives) and [Eduardo Boné Morón](#) (Senior Manager Cuba Program) – www.edf.org/oceans.



Panel 1 (Tuesday November 3, 2020)

Panel 1 established a foundational understanding of recreational fisheries in the region. To kick off the special session, Prof. Potts, a recreational fisheries expert from Rhodes University, South Africa, provided a keynote presentation: *Effective governance of recreational fisheries recommendations from research and experience*.

Next, 12 representatives from The Bahamas, Belize, Cuba, Mexico and the U.S. presented on different themes including (i) ecological and socioeconomic regional connectivity of recreational fisheries species, (ii) organizing fishing guides to support conservation efforts, and (iii) recreational fisheries best governance practices. You can watch a recording on the GCFI YouTube channel [here](#).

Panel 2 (Wednesday November 4, 2020)

During Panel 2, speakers from Belize, The Bahamas, Cuba, Mexico, and the U.S. presented case studies, sharing recent efforts and challenges to recreational fisheries reform. Afterwards, a group discussion took place on opportunities for the GCFI community to address the challenges and needs identified in the first portion of this panel. Scientists, fishing guides, managers and NGOs from all five countries answered questions from the audience, applying their expertise from local communities and institutions to address broader, shared issues across recreational fishing.

The questions launched a lively discussion around regional collaboration to implement recreational fisheries reform, helping understand the current gaps in science and management, and evaluating the obstacles of stakeholders in the region to address priority challenges. The main gaps and obstacles identified included the need to improve monitoring efforts and catch data, better communicate best practices and regulations to different users, and the use of more science-based information to guide management. Thanks to the support of translators, the session was delivered in English and Spanish, streaming to more than 100 attendees on Zoom and YouTube Live. The recording is available [here](#).



Photo: Noel López



Photo: Noel López

Workshop (Friday November 6, 2020)

On the last day of the conference, organizers closed the special session with a workshop. Participating countries joined “break-out rooms,” tailored to assess and address the recreational fishing priorities of each country in a more intimate, free-form dialogue. Fishers, resource-users, decision-makers and other stakeholders convened to determine the next steps to advance sustainable recreational fisheries in their country or region. Facilitators in each room used the framework from Keynote Speaker Warren Potts’s “7

recommendations for a world class approach to recreational fisheries governance” to guide the conversation in prioritizing recreational fisheries research and management needs. Priorities ranged from monitoring and compliance to assessing the socio-ecological importance of the fisheries. Breakout-room facilitators then shared their region’s findings with the broader GCFI community on the last day, which can be viewed [in this recording](#).

Recommendations for a world-class approach to recreational fisheries governance

Potts et al., 2019



1 Assess & recognize the socio-ecological importance of recreational fisheries,

explicitly acknowledging them in fisheries policy and have a clear legal definition for the recreational sector that specifies whether sale of the catch is allowed and differentiates it from other fisheries.

2 Develop a policy statement which clearly articulates the plans & intentions relating to recreational fisheries.

This should outline the access to the resource, be developed in cooperation with all fisheries sectors, be informed by social context, cultural, economic, and ecological factors, and be responsive to change.

3 Cooperate with all relevant stakeholders to develop recreational fisheries management plans and encourage cooperative decision making.

4 Monitor biological, economic and social impacts of the recreational fishery, with clear responsibilities for data collection and incorporation of data into the management process.

5 Implement cost recovery strategies for recreational fisheries.

The user-pays mechanism appears to be the most viable method, especially where the funding generated is restricted to use for recreational fisheries and transparent reporting of the use of this funding is implemented.

6 Include a broad range of mechanisms to support compliance activities, as the successful implementation is dependent on compliance with fisheries regulations.

This should include education and awareness activities that promote compliance and encourage ethical behavior.

7 Frame governance in the context of a changing environment

that includes promoting adaptive planning, outlining contingency plans in case of stock collapse, incorporating shifting species into regulatory frameworks, and improving knowledge of climate change within the sector.

*GCFI Conference Recreational
Fisheries Workshop 2020*

Table 1. Names of the speakers and their presentations from day 1.

Country	Presenter	Presentation
The Bahamas	Dr. Krista Sherman	<i>Improving fisheries management in The Bahamas</i>
	Prescott Smith	<i>Flats fishing and guiding livelihoods in The Bahamas</i>
	Vanessa Haley-Benjamin	<i>Bonefish Beyond Borders: A shared resource in the Caribbean</i>
Belize	Dr. Addiel Ubandes Perez	<i>Recreational fisheries in Belize</i>
Cuba	Araceli Hernández	<i>The recreational fisheries sector in Cuba in light of the new fisheries law</i>
	Laura López	<i>Socioeconomic characterization of Cuban recreational fisheries</i>
	Tamara Figueredo and Dr. Fabián Pina Amargós	<i>Can recreational fisheries support protected areas and coastal livelihoods? A Cuban case study</i>
Mexico	Dr. Leopoldo Palomo Cortés	<i>Recreational fishing in Ascension Bay with a Socio-Ecological Systems approach</i>
South Africa	Dr. Warren Potts	<i>Effective governance of recreational fisheries: recommendations from research experience</i>
United States	Fernando Bretos and Katie Thompson	<i>Recreation fishing in Cuba: a sustainable, conservation-based, economic opportunity</i>
	Scott Hickman	<i>Organizing guides to improve fisheries conservation in the U.S. Gulf of Mexico</i>

Lessons learned from the keynote, panels, and the workshop

Keynote

Professor Warren Potts highlighted several overarching themes based on research and experience from the field.

- **Recreational fisheries participation and catch is growing around the world.** After conducting a global review of governance, Potts *et al.* found there is a wide degree of variability across developing and developed nations, but in general policies were not well established compared to contemporary commercial fisheries governance policies. Clear gaps were identified across several governance focus areas including social equity, climate change resilience and adaptive management. Generally, the majority of respondents surveyed in the study believed that recreational fisheries were not effectively managed in their country.
- **There is significant importance to estimating and recognizing economic impact in recreational fisheries, but it is also critical to identify sources of economic leakage** (i.e., revenues from economic activities that do not stay in the local economy or do not end up as income) to understand how much impact is benefitting the local community. Mechanisms to reduce leakage should be built into policy and a holistic approach is needed across sectors (tourism, agriculture, education) to upskill and empower locals, reduce sources of leakage and optimize benefits to local communities.
- **Compliance in recreational fisheries is important** and poor compliance has the potential to undermine management objectives of all fishing sectors. Managers need to first evaluate levels of compliance and the drivers of non-compliance to ultimately develop solutions.

- **Guides are seen as role models and stewards of the fishery**; they are highly influential with other anglers. Guides, including those in the Caribbean, are important educational partners to improve sustainability in recreational fisheries.
- **There is potential for angler self-reform**, in conjunction with effective management, to improve recreational fisheries. Informal institutions (e.g. social media groups) can play a key role.
- **Where are some key next steps?**
 - Managers should (1) develop cooperative relationships with scientists, guides and anglers; (2) identify governance gaps and engage with upper level-decision makers to close those gaps.
 - Scientists should (1) provide robust evidence (ecological and socioeconomic) to support managers as they seek improved recognition of recreational fisheries; (2) provide robust evidence to allow managers to make informed decisions; (3) provide information to guides and anglers about the status of the resource and best practices for sustainable fisheries (in collaboration with managers).
 - Guides should know that how they behave and what they tell anglers matters greatly. It is important that guides (1) familiarize themselves with the status of stocks, the biology and the movement of fishes to help educate anglers; (2) consult with scientists to learn best practices in sustainable methods (e.g. catch-and-release as well as boating practices).
 - Anglers and guides should consider organizing to facilitate engagement with scientists and managers.
 - Social pressure from anglers and guides to their peers can help combat poor behavior in the fishery.
 - Everyone should remember that recreational fisheries management is a collective effort. Everyone has a role to play and there is a great need to find ways to work together.

Belize

The breakout session for the Belize group was postponed during the Workshop on Friday Nov. 6th due to impacts from Hurricane Eta. Still, there were many learnings from the Belize panelists throughout the first two days of the special session. Participants helped to identify some of the main challenges for Belize. First, more information and research are needed to guide both science-based conservation and management efforts. Due in part to the lack of data, fisheries and marine protected areas management are concentrated mainly in artisanal lobster and conch fisheries, coral reef ecosystems and spawning aggregations areas. More data is needed to guide finfish fisheries. There is also a need to focus on mangroves and seagrass beds, where most of the recreational fishing occurs, since coral reef health depends largely on these two ecosystems. To improve livelihoods in Belize, this scientific knowledge should be applicable and digestible by affected stakeholders. Panelists also identified a lack of adequate enforcement and compliance mechanisms connected with management. Thus, sustainable recreational fisheries management and conservation practices will rely on a greater understanding of these challenges and a concerted, collaborative effort with key stakeholders including co-managers, government, fishermen and local communities.

Other external variables like coastal development present different challenges for the recreational fisheries sector. Multiple activities and interests compete for the same natural resources (including coastal property as well as aquatic and marine species) linked to popular fishing locations that also offer scenic landscapes. These activities include commercial artisanal fishing, recreational tourism, tourism development, mining, rural-urban development and agriculture activities. Furthermore, recreational fisheries have not had the same prestige or recognition in the past like other iconic fisheries, such as conch and lobster.

At the same time, managers recognize the importance of fostering practices that balance sustainability with development. There is a national and regional need for the scientific community, recreational fishing community and managers to devise holistic strategies that achieve recreational fisheries management and sustainable economic development goals. This approach must also address artisanal fisheries, which target the same inshore species (destined for consumption) and incidentally capture gamefish like bonefish and permit.

Currently, there are several examples of ongoing efforts. Education and outreach have increased in the last three years, fostering more communication between guide associations and management stakeholders. Quarterly meetings with community members are helping to guide decisions by using local knowledge since fishing guides are the ones spending more time on the water. Belize is also making headway on zoning certain areas for different activities based on habitat availability and which lands can sustain development. Belize's Integrated Coastal Zone Management Plan² is the result of years of work in this area, it is a publicly available document and serves as a good framework approach to address this issue in other countries.

Many of the Belizean participants highlighted the need to develop a strategy and a framework to help manage all non-commercial fishing sectors in Belize, including recreational and subsistence fishing. This framework should build upon the successes of the existing managed access program which defines fishing areas for commercial fishing and embraces the concept of community stewardship of the fisheries that local communities depend on for livelihoods. Currently, recreational fishing is largely unregulated in Belize and research is needed to understand how unregulated recreational fishing impacts fish populations as well as the commercial sector. One participant shared that many commercial fishers in Belize desire clearer delineation between the commercial and recreational sector to improve accountability and sustainability. This participant expressed the importance of advancing a recreational fisheries management strategy that builds upon the successes and lessons learned from the implementation of the managed access framework, with a key focus in advancing community driven stewardship.

Participants also shared the importance of funding mechanisms to support management and conservation needs (recommendation #5 from Potts *et al.*, 2019), including those outlined above. Based on experience in Belize, one participant shared that there are no one or two ways to co-create these mechanisms. A holistic approach is needed, which should start with a five-year management plan defining where funds come from, where the funds go, and who to include in the decision--making process. This approach should be supported by legislation to set the rules and define the process to balance the needs of stakeholders with differing points of view. For instance, if you have a user pay mechanism but users do not have any real input, they will likely become disenfranchised. Additionally, researchers may call for the need to collect data before management decisions are made. If those processes and structures are not clearly defined in the legislation, then those stakeholders will bump heads more often. Clear legislation and inclusion of stakeholder voices in the development of any plans help provide the transparency and accountability that will prevent larger issues down the road. These foundations also provide the necessary mechanisms to report progress towards specific goals that were initially outlined by stakeholders.

The Bahamas

During the panels we learned that the flats and offshore recreational fisheries in The Bahamas are well developed, each with an economic impact of more than USD 100 million/year. We also heard that the transition from small-scale fishing to guiding can provide economically viable livelihoods and maintain

² <https://www.coastalzonebelize.org/wp-content/uploads/2019/11/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf>

the community connection to the fishery, which helps cultivate local champions for conservation. Yet, panelists shared specific needs to improve the link between science and management, the processes to engage stakeholders and local communities, and recreational fisheries management overall. The flats fishing legislation of 2017 arose as a key area for improvement and participants underscored the importance of working together across the guiding industry and conservation community to advance key conservation measures from that legislation. While some disputes still exist, the need for conservation within the fishery transcends organizational and regional differences. Discussions around the legislation and Prof. Potts's presentation re-raised concerns about economic leakage in the recreational fishery, elevating questions of how much of the economic impact benefits local communities and how to mitigate sources of leakage. These conversations also brought up the need to elevate the voices of local fishers and guides in decision-making tied to the future of their fishery, including fishing regulations but also proposals like large-scale coastal developments and coastal mining operations.

Researchers shared several studies supporting the high connectivity of important fish stocks, especially bonefish, across the islands and international borders. This highlights the need to strengthen national and regional management plans for regionally important fish stocks and to form and strengthen agreements to increase capacity for research and enforcement of existing regulations, while helping mitigate risks from outside the fishery (e.g. limestone mining and oil and gas exploration). These studies also underscore the importance of restoring and conserving biological corridors and essential marine habitats, including spawning aggregation sites and nurseries. Researchers on the panels stressed the need for consistent, accurate and timely data reporting across all fishing sectors, as better data can help improve governance of shared resources across sectors and country borders.

During the workshop on the final day, The Bahamas breakout group identified that the greatest priority from the seven recommendations is a better understanding of ecological, economic and social impacts (recommendation #4 from Potts *et al.*, 2019), for flats *and* offshore species. This is needed to inform any future policy decisions and improve governance frameworks. One strategy to make gains in this area is to identify at least one focal representative from the government or the scientific community who can spearhead the next steps. Lead institutions could include the Department of Marine Resources, the Bahamas Agriculture and Marine Science Institute (BAMSI), or the Department of Environmental Planning and Protection. In this same vein, the group highlighted the need to improve understanding and information sharing of impacts from climate change (recommendation #7 from Potts *et al.*, 2019) as a high to medium priority. Acute and chronic risks from climate change have the potential to significantly impact fish stocks, essential fish habitat and associated fishing communities in The Bahamas.

The group also identified recommendation #2 as a top priority. Key next steps include facilitating stakeholder meetings to reach relevant stakeholders. This should be a collaborative effort across the guiding, research and management communities and the Ministry of Agriculture and Marine Resources (referred to as "the Ministry" in subsequent paragraphs) could play the lead role of bringing different stakeholders together. The group also agreed on the need for alignment/coordination between the flats and offshore recreational fishing regulations. One expert highlighted that while the value of sustainably managing the offshore recreational sector has been acknowledged by many stakeholders as a need, it has not been a high priority compared to the flats fishing sector – where there has been significant research, outreach and engagement from various government agencies, anglers, guides, NGOs and the public sector. Furthermore, there was a lack of representation from the offshore recreational sector in this breakout group, which emphasizes the need for inclusion of leaders from this industry in future meetings.

The group identified as a final top priority, the need for more coordinated mechanisms to support compliance activities (recommendation #6 from Potts *et al.*, 2019). The key next step should be a series of discussions with relevant stakeholders and with the Ministry to help guide this initiative. These discussions could include a series of case studies from the region that demonstrate mechanisms to increase compliance and support enforcement across sectors, not just the recreational fishery. One

participant mentioned that the Ministry can in theory train guides to be wardens and such a provision was included in the 2017 flats fishing legislation, but the language was too vague to provide robust direction and authority to managers. This structure was attempted in the Nassau grouper fishery, but the legal/policy framework was insufficiently established. Further testing and investigation by researchers, NGOs, and/or the Ministry is needed to determine a viable path for guides to be trained as wardens under this recommendation.

Participants discussed the need for funding mechanisms to support management and conservation (recommendation #5 from Potts *et al.*, 2019) as a medium priority. The current flats fishing regulations outline the establishment of a conservation fund, but this provision lacks implementation and an equivalent component is needed in the offshore fishery as well. Participants added that these sources of funding are highly needed and as the mechanisms for the funding become established, it is critical that management of those funds is transparent and accountable, with clear goals and priorities for use of the funds.

Overall, the group agreed that recreational fisheries in The Bahamas are incredibly important to provide economic opportunities and develop important champions for conservation. All stakeholders will need to make further efforts to ensure recreational fisheries management in The Bahamas is science-based, sustainable and inclusive of the voices and needs of local communities.

Cuba

Presenters described different features of Cuba's recreational fishing activities that offer many opportunities to further develop the sector. These attributes include healthy coastal marine habitats, high diversity of fish species and opportunities for culture and nature-based tourism. Cuba's new fisheries law, passed in 2019, calls for science-based assessments of all fisheries resources and provides a legal framework to develop and implement management measures that can ensure its sustainability. The panel helped to identify challenges, ongoing efforts and opportunities to achieve a thriving and sustainable recreational fisheries sector in Cuba.

The challenges included the need to clearly define the multiple users of the recreational sector and to understand the management trade-offs between sectors. Most of these users are local fishermen who live in numerous and isolated communities across the island, using a portion of the catch for domestic consumption, and do not necessarily belong to any organization. These and other factors make monitoring efforts and data collection difficult and one of the biggest challenges for the sector. There is also a lack of research specific to the sector since most of the available information is related only to commercial fisheries or the study of endangered species. The presenters also highlighted the need for greater outreach efforts to communicate best practices, the importance to comply with regulations, and current conservation actions to recreational fishing stakeholders. Commercial and recreational fisheries need to find common solutions to manage shared resources. Since the law was recently put into practice in 2020, different stakeholders still need to develop best practices and regulations for conservation and enforcement based on this new legal framework. The presenters also recommend increasing opportunities for scientists, recreational fishers and decision-makers to interact.

The session also highlighted current efforts. For instance, the Gardens of the Queen National Park is managed under scientific-based regulations and monitoring efforts that support conservation and local livelihoods simultaneously. According to the presenters, the park is considered within the 50 best sites worldwide for diving and recreational fishing, creating up to 170 jobs that benefit local coastal communities. At the same time, the panel presented studies that show how this high level of protection is resulting in healthier ecosystems, more biodiversity and abundance compared to non-protected areas in Cuba. A key factor for this success is the involvement of local fishers and multiple institutions, contributing to research, monitoring and patrolling efforts. This model, based on a combination of natural

resource conservation and tourism with a focus on recreational fishing, is inspiring similar initiatives in protected areas across the country (Ciénaga de Zapata, Cayo Largo del Sur, Isla de la Juventud and Cayo Cruz).

Speakers also presented recent studies conducted by Cuba's Center for Marine Research of the University of Havana (CIM-UH), which highlight sustainable economic alternatives related to this sector for fishers and coastal communities. These studies aim to characterize the sport-recreational fisheries in Cuba by collecting socio-economic and ecological information related to fishermen, habitats, priority species like tarpon, permit and bonefish, and fishing ports. In one study, researchers conducted three survey trips across 40 recreational fishing ports, interviewing over 180 fishermen to obtain indicators like catch levels and composition, fishing gears, market prices and norms. In general, the findings show a high heterogeneity of fishing ports characteristics, prices and rules, and demonstrate the need to improve catch data and to better estimate the economic impact of recreational fisheries across the entire island. The panel identified the need to conduct further surveys in the rest of the country, increase outreach efforts to educate fishermen about the value of conservation and sustainable fishing, and generate more business opportunities for coastal communities.

Cuba is taking important steps to tackle these challenges and build upon current efforts. The country's new fisheries law provides an opportunity to improve the connections between science and management. This legal framework calls for the development and implementation of science-based measures guided by dialogue and consultation through an already existing Fisheries Committee (Comisión Consultiva de Pesca). As part of these efforts, a group of scientific institutions created a working group in 2019 that focuses on theme-specific strategies and organizes workshops, trainings and awareness campaigns. The work of this group will help characterize the sector by understanding the different species and habitats associated with recreational fisheries activities.

During the workshop at the end of the session, participants highlighted a new national project led by Cuba's Center for Fisheries Research (CIP). Its goal is to establish a management system for recreational-sport fishing in Cuba based on sustainability principles. The three-year project will include interviews, monitoring, sampling and tagging activities to collect data on fishing effort and priority species. This data will help determine seasonal trends, ecosystem health, and connectivity patterns in order to propose management measures through a code of conduct for the sector. This initiative provides a timely opportunity to continue developing science-based regulations mandated by the new law, which will require strengthening and creation of alliances between state-run enterprises, the tourism sector, scientific institutions, local governments, protected areas managers, and most importantly, fishermen.

Regional (Bermuda, Mexico and the United States)

The panelists and participants representing several countries across the region revealed that there is a need to coordinate across borders, sharing best practices as well as toolsets and scientific articles. One participant from Mexico reminded everyone that local governance is a determining factor in sustainability. The development of skills and a sense of appropriation of resources are both foundational to local conservation. Another participant that works throughout the region provided a case study demonstrating the importance of fishery exchanges to develop a stronger sense of community and build momentum toward addressing shared issues. One of the fishing guides shared lessons learned from his experiences organizing fishing guides and advocating for improved management and data collection systems. He stressed the importance of guides working with scientists, managers and NGOs to advance the economic and conservation performance of recreational fisheries.

In the breakout group, a fishery manager working in Bermuda shared that the top priority in Bermuda's recreational fisheries is data-collection (recommendation #4 from Potts *et al.*, 2019). She also

characterized “compliance and encouraging ethical behavior” as another issue facing Bermuda, highlighting the need to balance implementing regulations for recreational fishing with maintaining a healthy tourism economy. Participants shared that a formal community of practice dedicated to recreational fisheries management could help practitioners around the Gulf and Caribbean, especially in countries with limited staff and resources dedicated to managing this sector. Participants also shared common barriers to accessing academic journals and scientific literature.

Next a researcher working in Belize, noted that many of the recommendations from Potts *et al.*, 2019 are priorities in Belize and he emphasized that these recommendations provide an important process for convening stakeholders to evaluate current needs and priorities within a fishery. He listed the development of clear policy, cooperation with relevant stakeholders to develop management plans, and identifying the socioecological importance of recreational fisheries in Belize as top priorities.

Lastly, a researcher working in Mexico shared that the priorities for that country include updating policy frameworks and recreational management plans, fostering cooperation among decision-makers and fishers, understanding and promoting the socioecological importance of recreational fisheries, and improving data collection on the biology of recreationally fished species. He also emphasized the importance of recognizing government institutions (such as CONANP and CONAPESCA) as stakeholders in all these processes.

Conclusion

Experts from Cuba, Belize, The Bahamas, the U.S. and Mexico shared insights, research and experiences about current challenges and best practices in recreational fisheries management while fostering a greater sense of community around shared challenges. We are encouraged by the high level of engagement by all the participants and we are hopeful that the session helped to create a stronger network for collaboration across the region. Overall, we believe the special session was a successful and much needed step to kick start momentum toward improving recreational fisheries management in the Gulf and Caribbean. We look forward to continuing this important work and to working with the GCFI team again.

Citations

Potts WM, Downey-Breedt N, Obregon P, Hyder K, Bealey R, Sauer WHH. What constitutes effective governance of recreational fisheries? A global review. *Fish Fish.* 2019; 21:91–103.

Acknowledgements

EDF wants to give special thanks to Fadilah Ali and Alejandro Acosta with GCFI for all of their time and energy to make this special session and the 73rd GCFI conference a reality. We also want to thank the GCFI board for this opportunity. Many thanks to Prof. Warren Potts for his keynote. And finally, we want to give a huge thanks to all the panelists and workshop participants for sharing their time and experience to help advance everyone’s understanding of such important issues. We look forward to future collaborations and opportunities to grow this body of knowledge for the sake of improving recreational fisheries management around the world.

Appendix: GCFI Panelist Biographies

1. Cuba
 1. [Aracely \(Yeyi\) Hernández](#), *CIP*
 2. [Dr. Fabián Pina Amargós](#), *CIM*
 3. [Tamara Figueredo](#), *CIM*
 4. [Laura López Castañeda](#), *CIM*
2. The Bahamas
 1. [Dr. Krista Sherman](#), *Perry Institute for Marine Science*
 2. [Prescott Smith](#), *Recreational Fishing Guide and BFFIA*
 3. [Vanessa Haley-Benjamin](#), *BSCA*
3. Belize
 1. [Dr. Addiel Ubandes Perez](#), *Bonefish Tarpon Trust*
 2. [Nicanor Nolasco Requena](#), *EDF*
 3. [Victor Sho](#), *CZMAI*
4. South Africa
 1. [Dr. Warren Potts](#), *Rhodes University* - **Keynote Speaker**
5. United States y México
 1. [Scott Hickman](#), *Fisher and Recreational Fishing Guide*
 2. [Dr. Leopoldo Palomo Cortés](#), *SEPASY*
 3. [Fernando Bretos](#), *The Oceans Foundation*
 4. [Katie Thompson](#), *The Ocean Foundation*



Aracely (Yeyi) Hernández

Center for Fisheries Research (CIP), Cuba

Yeyi studied marine biology at La Habana University, Center for Marine Research and she recently finished her master's degree focused on sea cucumber research and assessments. At CIP she is currently in charge of sea cucumber fishery data and sharks and rays. She is the lead researcher from CIP on the official sharks and rays projects; under this role she organizes the shark and ray scientific research projects and trainings on shark identification and conservation workshops for fishermen and port staff. Yeyi conducts the annual sea cucumber stock assessment and recommends catch limits for each of Cuba's four fishing zones.



Dr. Fabián Pina Amargós

Center for Marine Research (CIM), Cuba

Fabián is a Professor of Protected Areas at the Center for Marine Research of the University of Havana and an environmental consultant with Avalon Diving operations in Cuba. He earned a bachelor's degree in Biology (University of Havana), a master's degree in Marine Affairs (Dalhousie University, Canada), and

his PhD in Biological Sciences at the University of Havana. His research interests include fish community structure, marine protected areas (MPAs) design and performance, movement and MPA-spillover of fish, status of tropical ecosystems, integrated coastal zone management, hurricane impacts on tropical ecosystems, status of fisheries, environmental issues of recreational fishing and SCUBA diving, fish biodiversity, and environmental economics. He has published over 30 papers and book chapters in a variety of refereed scientific journals in ecology and economics. He has led many scientific projects in Cuba's iconic marine protected area, the Jardines de la Reina National Park. He has been involved in the declaration of marine reserves and protected areas in Cuba. He is the recipient of numerous awards including a Pew Fellowship in Marine Conservation (2012) and six Cuban Academy of Science Awards (2004, 2008, 2009, 2014).



Tamara Figueredo Martín

Center for Marine Research (CIM), Cuba

Tamara is a Professor of Economy and Environment at the Center for Marine Research of the University of Havana and an environmental consultant with Avalon Diving operations in Cuba. She has a bachelor's degree in Economics (University of Camaguey, Cuba) and a master's degree in Integrated Coastal Zone Management (University of Havana). Her research interests include natural resource and ecological economics, marine protected areas design and performance, integrated coastal zone management, status of fisheries, environmental issues of recreational fishing and SCUBA diving, socioeconomic issues and environmental planning. She has published papers in a variety of refereed scientific journals in economics and integrated coastal zone management. She has worked in many scientific projects in Cuba's iconic marine protected area, the Jardines de la Reina National Park. She has been involved in the declaration of marine reserves and protected areas in Cuba. She was awarded a grant to researchers coming from developing countries to participate in the Twelfth International BIOECON Conference in 2010 and a Cuban Academy of Science Award in 2014.



Laura López Castañeda

Center for Marine Research (CIM), Cuba

Laura holds a degree in economics from the University of Havana. She has a specialization in the branch investment project assessments, in which she gained experience during the first years of entering the workforce. Her subsequent postgraduate studies have been focused on the branches of the valuation of ecosystem goods and services, marine ecology and fisheries. She is currently a researcher at the Center for Marine Research (CIM) at the University of Havana within the Group for the Management and Conservation of Marine Resources. Her research topics include the economic valuation of ecosystem goods and services, sport-recreational fishing, economic and ecologically sustainable development alternatives for coastal communities, and local development. She has investigated the environmental, economic and social implications of anthropogenic effects, climate change and current regulations for the artisanal fishing sector. She has participated in National and International Research Projects whose results contribute to the search for economic alternatives for fishermen, local development and the economic valuation of ecosystem goods and services in protected areas. She has a special interest in the social implications of the use—or change of use—of fishing resources in fishing communities, as well as in estimating the weight that sport-recreational fishing has in the communities and for the country overall. Therefore, her work is currently focused on estimating the

economic value of recreational fisheries in fishing communities, their weight in the Cuban economy, and in studying the feasibility of creating fishing clubs in selected communities.



Dr. Krista Sherman

Perry Institute for Marine Science, Bahamas

Dr. Krista Sherman is a Bahamian marine scientist with more than a decade of research and conservation experience. She earned a PhD in Biological Sciences (University of Exeter), MRes in Ocean Science (University of Southampton) and BSc. (Hons) in Marine Science and minor in Spanish (Jacksonville University). Her PhD research assessed the status, population structure and dynamics of Nassau grouper spawning aggregations in The Bahamas to better support their conservation. Dr. Sherman is currently Senior Scientist for the Perry Institute for Marine Science with responsibility for the [Fisheries Research & Conservation Program](#).



Prescott Smith

Bahamas Fly Fishing Industry Association (BFFIA), Bahamas

Prescott Smith has been a fly fishing guide on the flats of the Bahamas for almost 30 years. He grew up with a passion for fishing and conservation, learning from his father and Bahamian Fly Fishing founder, “Crazy Charlie” Smith. Much of Prescott’s fishing life has been focused on bringing his father’s dream to fruition, to create a country-wide learning network focused on training Bahamians as stewards of their natural resources, to teach them fly fishing as a model for conservation and economic empowerment. Prescott served on the Bahamas National Trust Council from 2012-2017. Prescott led efforts with several local NGOS to successfully establish the West Side National Park on Andros, ensuring protection of the largest nursery system of mangroves (1.5 million acres) in The Bahamas.



Vanessa Haley-Benjamin

Bahamas Sportfishing Conservation Association (BSCA), Bahamas

Vanessa Haley-Benjamin is currently the Chief Scientist at the Bahamas Sportfishing Conservation Association where she oversees the development of ecosystem management policies and programs for the flyfishing industry. She once served as the Chief Scientist of the Baha Mar resort, CEO of Save The Bays and as the Director of Science and Policy at the Bahamas National Trust. Mrs. Haley-Benjamin received her Bachelor of Science in Marine Biology from The College of Charleston, her Master of Science in Biological Sciences from Florida International University and is currently a PhD student at the University of Auckland, NZ. Her master’s research studied the long-distance movements of bonefish (*Albula vulpes*.) and her doctorate research interests include using cellular agriculture as a technique for the long-term sustainability of Mollusca species.



Dr. Addiel Ubandes Perez

Bonefish Tarpon Trust, Belize

Addiel is a Ph.D. candidate in Ecology and Sustainable Development from Belize. He is studying connectivity produced by bonefish movement between a sub-tropical estuary and the Caribbean coast of Belize and Mexico. Addiel received an associate degree in marine science and a bachelor's in biology. After working for two years as the manager for South Water Caye Marine Reserve, he pursued a master's degree in natural resources and rural development with an orientation in management in Mexico. During his master's studies, he developed a technique called "mixed-methods approach," which is a combination of techniques such as traditional ecological knowledge, creel surveys, interviews, workshops, and ethnographic notes in coastal fishing communities, which is used to characterize the recreational-sport fishing of Belize. This similar approach is being used in Belize and Mexico to understand bonefish migration, local movements, pre-spawning sites and how environmental variables influence these. Addiel was born and raised in the small fishing community of Sarteneja, Belize, and serves as a board member of the Sarteneja Alliance for Conservation and Development, a non-profit organization that co-manages Corozal Bay Wildlife Sanctuary in Belize.



Nicanor Nolasco Requena

EDF, Belize

Nicanor is the Project Manager of EDF in Belize. Nic has more than 20 years of experience working in marine conservation and fisheries management in Belize and in the Mesoamerican reef region. He has participated in several projects related to fishing, both commercial and sport fishing. He has been an integral part of the national implementation of the rights-based fisheries management approach in Belize. Nic has participated directly in the establishment of three marine reserves in Belize and in the identification, monitoring and protection of 13 of the most important reef fish reproduction aggregation sites in Belize. He was recognized by The Nature Conservancy during the many years he worked in the management and protection of aggregation of reef fish spawning and in the establishment and management of marine reserves. He has done extensive work with local fishing communities, in the establishment of marine protected areas in Belize, the expansion of replacement areas (areas of non-extraction) and the revision of the National Fisheries Law of Belize. Nic has participated in various activities related to Cuba including an exchange between Cuba and Belize in April 2018.



Victor Sho

Coastal Zone Management Authority and Institute (CZMAI)

Victor Sho joined the Coastal Zone Management Authority and Institute (CZMAI) team in 2016 and has since served as the Sport Fishing Coordinator, working alongside key stakeholders to guide the sustainable development of the industry by improving the research, monitoring, outreach and enforcement activities around the habitats, species and people who serve as the foundation of the sport fishing industry in Belize. He earned his Bachelor of Science degree in Natural Resource Management at the University of Belize.



Dr. Warren Potts (Keynote Speaker)

Rhodes University, South Africa

Prof. Warren Potts is a researcher in the Department of Ichthyology and Fisheries Science at Rhodes University, South Africa. After working as a fishing guide in Angola for several years, Warren Potts became extremely interested in all aspects of recreational fisheries and particularly how they can benefit developing country economies, with different biological impacts than traditional fisheries. His research in this field includes economic evaluations of recreational fisheries, understanding the social dimensions of recreational fishery compliance, and optimizing the survival of released fishes. These findings are used to promote the strengthening of their governance (from policy to voluntary institutions) and employ a range of techniques to improve the environmental behavior of anglers and guides. Prof. Potts has published several articles recently that helped elevate the need for improved understanding and governance of recreational fisheries around the globe. He was the primary author on the 2019 paper, *What constitutes effective governance of recreational fisheries?—A global review*, which was the inspiration for the special session at this year's GCFI conference.



Scott Hickman, Captain

Fisher and Recreational Fishing Guide, United States

Captain Scott Hickman is a fishing guide, commercial fisher, and owner of Circle H Outfitters and Charters which specializes in fishing excursions in Texas. Captain Hickman is a founding member of the Charter Fisherman's Association and a former GCFI Gladding Memorial recipient. He serves on the Data Collection, Coral, and Red Snapper/Grouper-Tilefish IFQ advisory panels to the Gulf of Mexico Fishery Management Council. He is also the Chair of the Flower Garden Banks National Marine Sanctuary Advisory Council.



Dr. Leopoldo Palomo Cortés

Secretaría de Pesca y Acuicultura Sustentables de Yucatán (SEPASY), Mexico

With a degree in Biology from the Autonomous University of Yucatán, Leopoldo is an enthusiast of the interactions between coastal communities, ecosystem services and governance. He has worked with the NGO Pronatura Yucatán in programs for the protection and conservation of sea turtles on the coasts of Yucatán. He participated with the CINVESTAV-IPN Mérida in numerous projects on the dynamics of artisanal fishing over the main commercial species (grouper, lobster and octopus). Leopoldo also worked between 2008 and 2010 as Technical Forestry Advisor for the National Forestry Commission (CONAFOR), in the programs of Environmental Hydrological Services and Biodiversity in local communities. In 2011, he participated in the Project for the "Spatial distribution of small-scale vessel operations based on data from the Vessel Monitoring System in southeast Mexico." The problems faced by fishing communities and their livelihoods, drive his interests in the economic value of environmental resources, as a tool for the public management of ecosystem goods and services. He completed a master's degree in Aquaculture Business Administration (2011-2013), with studies on the acclimatization to the freshwater of the red drum (*Sciaenops ocellatus*), as a species of high value for aquaculture.

In 2014 he specialized in Geomatics and GIS, due to his interest in the use of tools for the management of territories and the environment. Subsequently, he completed a PhD in Science in Fisheries and Aquaculture Bioeconomy (2015-2019), where he conducts research on recreational fishing and the interactions of the socio-ecological systems of a coastal community in the south of Quintana Roo. Since 2018 he has been a part-time professor at the Marist University of Mérida, at the School of Natural Resources Administration. He is currently coordinator of Resources and Technological Development in the Aquaculture Directorate of the Secretariat of Sustainable Fisheries and Aquaculture of Yucatán; and participates in a Project on the socio-economic impact of the recreational flat fishing in the state of Quintana Roo.



Fernando Bretos

The Ocean Foundation, United States

Fernando is a conservation scientist who focuses on the restoration and health of tropical coastal and marine habitats and the study and conservation of marine migratory species. In 2008 he brought his project, CariMar to The Ocean Foundation's fiscal sponsorship program. CariMar engages the countries of the Caribbean Sea and Gulf of Mexico to work collaboratively in protected shared marine resources. He officially joined TOF in July 2019, becoming part of its portfolio in Latin American and the Caribbean. During 12 years at Frost Science Museum, he created Museum Volunteers for the Environment, which since 2007 has engaged over 10,000 Miami residents in restoring over 25 acres of mangrove, dune and coastal hammock. Currently he is leading a multinational effort to create a marine protected area network in the Gulf of Mexico called Red Golfo de Mexico. He oversees other projects to protect critical Caribbean habitats and endangered marine species such as elkhorn coral, sea turtles and sawfish. He holds a master's degree from the University of Miami's Rosenstiel School of Marine and Atmospheric Science and a bachelor's degree in biology from Oberlin College. Fernando is a Kinship Conservation Fellow and recently became a National Geographic Society Fellow.



Katie Thompson

The Ocean Foundation, United States

Katie is Program Manager of TOF's Caribbean Marine Research and Conservation Initiative. She is involved with TOF's work in the Wider Caribbean and Gulf of Mexico Region, which includes projects that bring countries together to conserve and study shared marine resources, restore marine and coastal habitats, develop national and regional environmental policies, support community-based alternative livelihoods, and protect endangered marine species. Katie has a Master's in Marine Affairs from University of Washington's School of Marine and Environmental Affairs where she specialized in community-based marine conservation strategies and non-profit management. She conducted her thesis on fisheries learning exchanges, which bring fisheries stakeholders together to share resource management best practices. Before graduate school, Katie was granted a Fulbright Fellowship in Costa Rica where she taught at the Universidad de Costa Rica and worked with sea turtle conservation organizations on the Caribbean coast. She holds a BA in Biology from Oberlin College.

The Ocean Foundation has conducted in-depth case studies on the recreational policies of countries around the world and is currently preparing an article to be submitted for publication by Summer 2021. This article will present the results of five Caribbean country case studies and include information on each

country's recreational fishing statistics, regulatory agencies, licensing systems, tournaments, and sustainable management practices. The goal of the paper is to compare policies across the region and to share lessons learned.