



DEVELOPING HARVEST STRATEGIES USING FISHPATH & USING ADAPTIVE IMPLEMENTABLE MANAGEMENT TO ACHIEVE HUMAN & ECOLOGICAL WELFARE OBJECTIVES

Sunday 5 November 2023, Nassau The Bahamas

Organizers: National Oceanic and Atmospheric Administration (NOAA), The Nature Conservancy, and Gulf Caribbean Fisheries Institute

Conveners: Josh Nowlis (NOAA Fisheries) and Jason Cope (NOAA Fisheries) and Williams Michaels

Scope of workshop

Fisheries managers often feel that inadequate data prevent them from actively managing their fisheries. This perception can manifest itself in lack of clarity to move forward, feelings of hopelessness and management paralysis. Although many data-limited methods exist, they were previously scattered through the literature and not clearly linked to data collection schemes and management measures. FishPath is a decision-support tool developed by The Nature Conservancy, NOAA Fisheries, and CSIRO Australia to guide managers through the full range of data-limited options for fisheries management. It helps identify fisheries-specific options for effective data collection, assessment models and indicators, and systems of management response to stock status. FishPath provides an objective and transparent tool to develop robust harvest strategies regardless of data and management impediments in order to make the most of available data and other resources. It also provides pathways for adaptive management and strategic thinking. The GCFI workshop will provide an overview of this powerful new tool, including hands-on exercises so that participants can explore the potential to improve their sustainable fisheries management practices.

Summary of GCFI 76th Conference Success

The Gulf of the Caribbean Fisheries Institute (GCFI) hosted its Seventy-Sixth Annual Conference from November 6-11, 2023, in Nassau, Bahamas. The conference gathered stakeholders from the fisheries, government, and academic communities from across the

Caribbean and the United States. The conference theme for 2023 was "*Linking science and society towards a vision for sustainable fisheries*".

During the meeting, we discussed issues related to ocean literacy, strengthening governance mechanisms, and developing inter- and transdisciplinary research. In keeping with the conference theme, we received 209 abstract submissions. A total of 124 oral presentations and 85 posters were presented on the following topics:

- Potential short-term and long-term impacts of climate change on fisheries and aquaculture sustainability including integrating knowledge on climate change into fisheries management and marine spatial plans (e.g., modelling and mapping tools, risk and vulnerability analyses, sea-use scenarios; ocean planning and management initiatives)
- Innovative strategies that support fishers and communities as they work to meet the sustainable fisheries goals.
- Social justice, equity, and fairness in marine fisheries and how these can be integrated into national and international fisheries management and science,
- Promoting research and training to build capacity and improve sustainability of local and regional fisheries.
- Integrating approaches to restore key species, communities, ecosystems, and ecological processes
- Aquaculture approaches address food insecurity and depleted stocks.

Four hundred fifty-five participants registered for the meeting. The meeting was also attended by a large number of elementary and high school students from the area.

On November 6th, Dr. Ana Spalding presented the keynote address "*A global tropics perspective on making ocean science and governance more equitable and effective.*" To influence a vision for more sustainable fisheries, Dr. Spalding discussed what was needed to create equitable and effective ocean futures for people and nature.

The honorable Philip Davis, Prime Minister of the Bahamas, presented the keynote address. During his remarks, Prime Minister Davis stressed the importance of addressing global challenges through educational partnerships, particularly for small island developing states. Mr. Vaughn P. Miller, Minister of the Environment, also delivered a keynote address. Minister Miller highlighted the importance of meetings like this to foster greater understanding and collaborative efforts in tackling global issues. He called for collective action in combating climate change, emphasizing the moral responsibility to commit to sustainable practices and policies that address the root causes of climate change."

The Bahamas National Trust's Executive Director, Mrs. Lakeshia Anderson-Rolle, addressed the conference's closing ceremony. She emphasized the important role

national parks play in sustaining fisheries, fostering eco-tourism, and nurturing blue economy opportunities while emphasizing the importance of collaboration between sectors and multidisciplinary agencies and closing by celebrating a long-standing partnership with GCFI, in uniting science and community for the sustainability of our oceans.

Overall, the 76th Gulf of Caribbean Fisheries Institute was a great success, bringing together diverse stakeholders to address Caribbean and global fisheries issues. At the conference, collaborative approaches, innovative solutions, and actionable outcomes were generated that pave the way to a more sustainable and resilient future for our oceans and our communities in the Bahamas.

Below provides details on the FishPath workshop held at the 76th Gulf and Caribbean Fisheries Institute (GCFI) Meeting. The workshop focused on **Developing Harvest Strategies Using FishPath & Adaptive Implementable Management to Achieve Human & Ecological Welfare Objectives.**

Through generous support from The Nature Conservancy, we were able to hold two significant FishPath-based engagements at the 2023 GCFI 76th Meeting.

1. **5 November:** *All day FishPath introductory workshop*

- a. *Workshop Description:* Fisheries managers often feel that inadequate data prevent them from actively managing their fisheries. This perception can manifest itself in lack of clarity to move forward, feelings of hopelessness and management paralysis. Although many data-limited methods exist, they were previously scattered through the literature and not clearly linked to data collection schemes and management measures. FishPath is a decision-support tool developed by The Nature Conservancy, NOAA Fisheries, and CSIRO Australia to guide managers through the full range of data-limited options for fisheries management. It helps identify fisheries-specific options for effective data collection, assessment models and indicators, and systems of management response to stock status. FishPath provides an objective and transparent tool to develop robust harvest strategies regardless of data and management impediments in order to make the most of available data and other resources. It also provides pathways for adaptive management and strategic thinking. This GCFI workshop will provide an overview of this powerful new tool, including hands-on exercises so that participants can explore the potential to improve their sustainable fisheries management practices.

2. **8 November:** *Special Session: A Vision for Advancing Fisheries Management in the Gulf and Caribbean Region: Navigating an Uncertain Future Using Adaptive Implementable Management (i.e., FishPath)*

Two FishPath-focused papers were given in this morning session:

Starting from somewhere: An example from Indonesia of developing a harvest strategy in a data- and capacity-limited fishery

Jason Cope (presenter), Josh Nowlis

Where to start when developing a system of data collection, stock assessment, and management measures can be daunting when resources and capacity are limited. We highlight how to overcome these challenges using the example of Anchovy (*Engraulis* spp.) in Raja Ampat, Indonesia. Anchovy is both a key subsistence fishery in the region, as well as a bait fishery supporting large-scale. Increasing pressure from the tuna fishing industries has adversely affected local community access to the anchovy, thus a particular need to assess the anchovy stock health and develop a strategy for equitable fishing. Given the paucity of initial available data and understanding of life history, a simple fishery sampling program was initiated to begin data collection of lengths taken in the major fishery. We detail how the data are used in developing a simple stock assessment, then an evaluation of potential immediately relevant management measures. Recently, this has led to the Provincial Government of West Papua developing an official Fishery Management Plan for anchovy. We believe similar steps can be taken to confront stock health and management challenges in other data- and capacity-limited fisheries.

Utilizing FishPath to support data limited fisheries in the Bahamas

Natalie Miaoulis and Felicity Burrows (presenters)

The Bahamas like many countries in the Caribbean has faced capacity deficits to manage their data limited fisheries. To combat this in the Bahamas, The Nature Conservancy has in partnership with The Bahamas Department of Marine Resources implemented the FishPath process and tool to inform management decisions for sustainable fisheries. Through the implementation process the Bahamas has been able to use the FishPath process to make informed regulatory decisions on some of its largest and most economically viable fisheries such as Queen Conch, snapper, and grouper species. The Bahamas now has created the first management plan for Queen Conch in the country. The use of fisher engagements, a first for the country to include fishers in the data collection process to inform management, has not only helped inform viable management efforts but has also driven compliance for management measures. The Bahamas is now

taking the success of the FishPath process for Queen Conch to help inform and refine regulations for multiple snapper and grouper species in the Bahamas.

Overall FishPath Workshop Success

The FishPath workshop was attended by approximately 20 individuals (*please see photograph below for most of them as others left before the end of the workshop*). There were some persons' who participated for half of the day. Our first activity was to get to know the attendees. Josh Nowlis led an activity where participants named their favorite marine species, then grouped themselves taxonomically. We also had them say their interests and what they hoped to achieve in the workshop.

Once introductions were completed, the objectives of the workshop were presented:

- To introduce the fisheries management context under which FishPath was developed, including the definition of a harvest strategy
- Introduce the potential of the FishPath tool to develop harvest strategies
- How to approach answering the questionnaire, emphasizing the inclusion of multiple voices, the use of bookmarks to revisit tough questions, and how to take notes
- How to understand FishPath outputs, revisit bookmarked questions, and how to use the influential answers to characterize the challenges in the fishery.
- How to narrow down the long list of options for each of the three sections. We covered interpreting criteria and caveats and using the narrowing options guidance. We also showed the summary PDF, how to connect each section of the harvest strategy and how to do multiple fisheries using the copying fishery function, as well as comparing results across multiple questionnaires.

We encouraged users to use the online FishPath training and pre-fill out the questionnaires, but most participants did not do those requests. However enough users did the pre-work which enabled them to use an example for each questionnaire (a total of 3) to complete all of the objectives.

The team was very pleased with the amount of material that was covered within the 8-hour day, but more importantly, we were able to engage participants the whole day with different activities.



FishPath presentations in the Wednesday session

Both presentations were excellent showcases for what FishPath can do in real examples. I heard positive reception from both, some of which came in the fisheries management discussion group that followed the talks. FishPath came up several times as a tool that could assist people where they currently found themselves, either eliciting information and engaging stakeholders or discovering viable options for the management challenges they faced. Below are pictures from each presentation and the group workshop following the talks. While there was some overlap with the Sunday FishPath workshop, there were many new folks that wished they would have attended the FishPath workshop.

Managing natural marine resources

- Preventing overfishing
- Rebuilding overfished stocks
- Increasing long-term economic and social benefits
- Ensuring a safe and sustainable supply of seafood

Setting catch limits? Provide opportunities

How do we achieve the above?

Dynamic systems

Measure something → In a good place? → React to status

FISHPATH The Nature Conservancy

FishPath

Setting Fisheries on the Path to Sustainability

The 76th Gulf and Caribbean Fisheries Institute Conference

By:
 Felicity Burrows
 Senior Fisheries Specialist
 Global Provide Food and Water Team
 The Nature Conservancy

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Accomplishments and lessons

FishPath Workshop

The team felt that all of the objectives put before the workshop participants were achieved, and provided additional time for questions and discussions. We were very pleased with what we accomplished, and several participants mentioned to us afterward how useful they see the tool in their own work and how they look forward to learning more about FishPath.

Additional feedback (collected by Felicity Burrows) from the FishPath meeting is provided below:

Overall, persons who attended the conference viewed it as an incredible learning and networking opportunity. They all took advantage of the chance to engage with different scientists, researchers, students and individuals from the Gulf and Caribbean regions that are working towards conserving and preserving our marine environment and other natural resources. Additionally they were excited to learn about the various projects taking place across various countries that align with their current work and interests including FishPath. The students were greatly appreciative as this was their first time attending a science conference. A key view that was commonly shared amongst all participants is how important stakeholder engagement and their active participation is when it comes to project/program planning, implementation, monitoring and decision making (including management) in order to achieve success.

As for the FishPath sessions, the fisheries officers from the Bahamas Department of Marine Resources (DMR) felt that the technical session was straight forward and much easier to follow given they went through the tool consistently as a group following their initial training back in November 2022 for the grouper and snapper species and; did a refresher using the online training platform prior to the conference. They felt that FishPath allowed for diverse key information to be gathered that can help DMR pinpoint key areas to tackle in order to improve management i.e. assessing what data exist to support the current management and legislation system. In general they liked that the session was interactive and that it catered to people who are at different levels of understanding and using the FishPath tool. They do recognize though that when first learning to use the tool, it can be very overwhelming and recommend that similar workshops (i.e. a series of workshops broken into sections) be held to help the user fully understand each section of the tool and how it can be applied to their work. They all wish to continue learning how to apply the tool and recommend other key coworkers do so as well. They stated there is an incredible need to develop a database system on key commercially sold species that gives a basic understanding of their stock and management status. Overall the fisheries officers feel that FishPath is a great process that can help countries sustain their fisheries.

As for the students, they felt that the FishPath session in general was very interesting and informative as this was their first time being exposed to FishPath. What they found most interesting is that the tool is not designed to provide a one size fits all solution to management but instead sets the foundation to start assessing your targeted fisheries and designing your specific work to meet your management objectives. One of the students is interested in learning more about FishPath and its use. The presentation on how FishPath was applied in The Bahamas gave them a greater understanding on how the tool and the results generated can be used to help determine what key activities should be carried out in order to move the needle towards improved management.

Some lessons from the workshop and the sessions talks are shown below:

- It is beneficial if participants in these workshops gain some familiarity with the FishPath tool before the workshop. This can be done via reading the 2023 FishPath paper (Dowling et al. 2023), taking the online training modules and/or answering the questionnaires before the workshop. This last suggestion helps expedite what can be done in the workshop (i.e., not using the precious time to answer questions, but instead get to interpretation, tool functionality, and narrowing options)
- FishPath is a tool not everyone realizes they need until they see it in action. There were several participants who mentioned how useful this would be for them now and how they wish they had it months to years ago. There is actually a new user who did not know about the tool or the workshop, but saw the talks, attended the

discussion group that followed, and is now using FishPath to provide critical guidance to fisheries managers as a multi-year project is ending. If they had FishPath at the beginning of the project, they would have made much more progress.

- The material is still a lot for a one day workshop. Again, many participants are just getting their start in the realm of fisheries management and dealing with data and resource limitations. This suggests the importance of some basic information on fisheries management and harvest strategies before the tool. While we provided such an introduction, it may still take some time for certain participants to assimilate the new information.
- People generally appreciate the hopeful message of FishPath. It is not an overpromise, but a positive attitude to find a way forward.
- While we had some participants jump at the idea of being part of the FishPath Network, I would expect more to do so. An easier entry point for those curious to engage more with FishPath should be contemplated.
- Multispecies fisheries continue to be a highly requested application of FishPath.

List of registered participants and affiliations. Each of the participants received a certificate of completion of the workshop (see example below).

Full Name	Affiliation
William Michaels	Michaels Eco Associates
Jennifer Rehage	Florida International University
Sophia Costa	Florida International University
Krista Sherman	Perry Institute for Marine Sciences
Liajay Rivera García	Caribbean Fishery Management Council
Sara Marriott	Knauss Fellow - USGS
Lia Guillot Illidge	Universidad de Cádiz, Colombia (International Student)
Chastidy Cash	The Bahamas Department of Marine Resources
Danielle de Kool	Public Entity of Bonaire
Alexandra Sinclair	Department of Marine Resources
L'Dina Pelecanos	The Bahamas Department of Marine Resources
Candice Webb-Russell	The Bahamas Department of Marine Resources
Skishnell Nairn	The Bahamas Department of Marine Resources
Danielle Knowles	The Bahamas Agriculture and Marine Science Institute (BAMSI student)
Kristin Wallace	Bahamas Agriculture and Marine Science Institute (BAMSI student)
Felicity Burrows	The Nature Conservancy, Global Provide Food and Water
Amdeep Sanghera	Marine Conservation Society
Makeba Felix	Department of Fisheries
Dana Grieco	Duke University (Student)
Ross Boucek	Bonefish Tarpon Trust
Myles Phillips	Wildlife Conservation Society
Kelly Kingon	University of Trinidad and Tobago/CHaPO
Manoj Shivilani	University of Miami, Professor/Researcher

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RARE

