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WESTERN CENTRAL ATLANTIC FISHERY COMMISSION (WECAFC)

Project GCP/SLC/223/EC – ***Improving ecosystem approach to fisheries by advancing fish spawning aggregation information gathering and increase of public engagement in the WECAFC region***

Report of the sixth meeting of the WECAFC Working Group on Spawning Aggregations

June 2024

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Puerto Rico, United States of America, 6–7 June 2024

DRAFT

Findings from RFSAMP pilot countries: Belize Country Report – Myles Phillips

1. Nassau grouper was once the most commercially important species in Belize. Aggregations of this species were known to be made up of 30 000 fish on average in the 1950s. One aggregation in Belize, known as Caye Glory or Emily, was the centre of the Nassau grouper fishery in Belize and was believed to comprise over 100 000 fish. By the 1980s, FSAs were already showing major signs of depletion, with Caye Glory down from 100 000 to less than 1 000 fish. Between 1980 and 2000, fisheries managers banned the use of fish traps at FSAs, drafted a Nassau grouper management plan and established several of the first marine reserves.
2. By the year 2000, Nassau grouper could only be found in numbers exceeding 1 000 at two of nine traditionally recognized FSA sites in Belize - Northeast Point at Glover's Reef Atoll and Sandbore at Lighthouse Reef Atoll. They were found in low numbers, or had been extirpated from, seven other sites, including Caye Glory.
3. Since the year 2000, there have been several developments with respect to the management of Nassau grouper, many of them driven forward by simultaneous national and regional projects. In 2001, a national Spawning Aggregation Working Group was formed, with participation from government, NGO and fisher representatives. In 2003 and 2009, legislation was enacted which resulted in the year-round closure of 13 multispecies FSA zones, and specific protections for Nassau grouper. These protections include a seasonal closure from December to March, size limits (upper and lower) to protect juveniles and large fecund females, a requirement for Nassau grouper to be landed whole, and a requirement for all filets must retain a skin patch for species identification purposes. More recently, in 2020, fisheries policy was updated with the Fisheries Resources Act. While it did not specifically address FSAs, it increased the fines for infractions, creating a deterrent for illegal fishing. In the same year, a regional project by MARFish/COBI assessed the status and management of FSAs in the Mesoamerican region. In 2022, an UNCTAD (United Nations Conference on Trade and Development) Project proposed guidelines for the development of a multispecies finfish management plan for Belize using the fishery basket approach. While the management plan has not yet been drafted, the guidelines make recommendations towards the management of Nassau grouper, mutton snapper, and other species that use FSAs.
4. Management of FSAs happens in the context of the national protected areas system. The country is aggressively pursuing 30x30 goals, with 20.5 percent MPA coverage in the EEZ, and plans to achieve 25 percent within the next few years. Replenishment zones, which prohibit commercial fishing, make up about half of the MPA coverage. Belize has also adopted an area-based management approach known as the "Managed Access Program" in an attempt to regulate fishing pressure and increase stewardship and has advisory councils for many protected areas which promote equity and inclusion of stakeholders in decision-making processes. Despite this, no national framework for evaluation of FSAs management effectiveness was identified. The

Government of Belize supports special patrols at spawning sites, which are conducted by Coast Guard with support from NGOs.

5. Mutton snapper has received considerably less attention than Nassau grouper in Belize. Mutton snapper is only regulated at Gladden Spit FSA, where it has been exploited since 1950, and there are no national size regulations or national seasonal closure. Since 2006, fishers require a special "traditional fishing" license to fish mutton snapper at Gladden Spit, and fishing is permitted 2 weeks each month from March-June.
6. In order to review national FSA management effectiveness, the focal point tried to identify a monitoring and evaluation framework, including targets, indicators and assumptions, reviewed monitoring baselines and programmes, modes of evaluation and reporting, and governance adaptations made over time. Belize was found to have a rich repository of baseline information, with the earliest material on FSAs and the Nassau grouper fishery published as early as the 1940s. Further documentation arose in the 1980s to 1990s and was centred around the ongoing decline of the species and the early management efforts. Between 2000 and 2010, there was a massive increase in the resources devoted to the study of known FSAs and the traditional knowledge of resource users. Finally, in 2022, three previously undocumented FSAs were confirmed in the Cayman Crown region of the Sapodilla Cayes Marine Reserve. While monitoring is widespread, no formal monitoring and evaluation framework was identified. It was proposed that the incumbent multispecies finfish management plan should include indicators which use fishery dependent, fishery independent, outreach and enforcement data to test assumptions and monitor against expected outcomes evaluate FSA management effectiveness.
7. Multiple types of fishery independent monitoring are conducted in Belize. The visual census method is conducted at the FSA during the spawning season from the third to eighth day after the full moon and yields abundance and size composition data from eight of the thirteen protected sites. This data was stored at the University of Belize Environmental Research Institute in a central repository. Unfortunately, due to funding constraints and obsolescence of the digital database, the information which had been recently recovered was fragmented. Data could also be sought from the organizations which collected them, but in some cases, it was not found to be clean or complete.
8. Laser callipers were used to measure total length of fish at the FSA, and short time series are available from three FSAs. Reef Survey data was collected across the country using the MBRS and AGRRA methodologies and was available from the Healthy Reefs Initiative and the organizations which had collected them. Healthy Reefs Initiative has data from 2006 to 2021 and could be used to look at densities in habitats across the country to see how management has affected the species. There was a caveat on the effectiveness on such a study: adult and mega spawners might not be well represented in fish survey data captured by SCUBA, which is usually done at less than 15 meters. Adults may live deeper than where these surveys occur according to preliminary analyses.
9. Belize does not have very much Fishery Dependent Data which can be used to describe FSAs or FSA species. Catch data (frequency in catch, total length, weight, gear) is available from Glover's Reef (2004–2019) and from Turneffe Atoll (2023). Surveys of finfish landings in six coastal communities conducted by WCS from 2017 to 2022 was the only other source identified and could be a robust data stream if such a programme was adopted nationally. The Belize government was working on instituting a catch log programme which, if successful, would provide the most comprehensive source of fishery dependent data in the country. However, at present, outside of the

data collected by NGOs, only low-resolution export data is collected on finfish, and domestic sales are not routinely recorded.

10. With respect to enforcement, Nassau grouper infractions are relatively rare in Belize, and stakeholders are well sensitized about regulations, fines and penalties through multifaceted outreach efforts by multiple organizations. Fishers are generally in support of efforts to protect these species but wish they could be more involved in the process and better informed. Night fishing by foreign vessels is a key threat to FSAs, and even locals have been known to fish illegally if there is no enforcement presence at the FSAs. Manpower is not considered to be the key problem – the cost of fuel is prohibitive to travelling to distant FSAs regularly.
11. Historical landings and trade data is mostly available in the form of reconstructed catches in peer-reviewed publications. There is a lot of data on Gladden Spit and Caye Glory, but this information does not exist for other FSAs. Another challenge is that historical trade data were not recorded at the species level.
12. The presenter separated sources of information into four categories:
    a. Intra-organizational reports include detailed information on monitoring activities within a specific year or short time period. They were often inaccessible or lost to institutional memory. Where accessible, they provide important context for interpretation of trends.
    b. Inter-organizational reports fell under two subcategories. Reports to donors had similar characteristics to intra-organizational reports. The annual reports and newsletters produced by the Spawning Aggregation working group, in contrast, were relatively accessible from members of the working group.
    c. Peer-reviewed publications were identified as the most accessible source of information, and highly effective at preserving information in posterity.
    d. Institutional reports enshrined information and key recommendations as outputs of past projects.
13. Staff turnover is a huge problem in Belize. Institutional memory is often lost when staff depart, and most written reports do not take long term meta-views of the information to date. Management of FSAs in Belize would benefit from the synthesis of short-term reports to provide context for intuitive adaptive management.
14. While much information has been collected and reported on, there have been no changes to FSA-specific regulations since 2009. While most of the regulatory best practices are already enshrined in law for Nassau grouper, there is very limited active regulation of other FSA species. An FSA specific Monitoring and Evaluation framework would highlight areas for adaptation.
15. An extensive analysis of strengths, weaknesses, opportunities and threats (SWOT) was produced in plenary with Belizean stakeholders. Key findings were extracted and are presented below. Notable was the fact that stakeholders saw more opportunities than threats. There is an abundance of information, political and institutional support for FSA management and a strong collaborative spirit among stakeholders.

Key strengths

- regulations are quite advanced;
- political will to support FSA conservation;
- positive outlook by fishing community on regulations;

- continuity of active management, enforcement and collaborative working group;
- fishers generally avoid landing Nassau grouper to avoid penalties; and
- an abundance of baseline information on FSA locations/species composition.

Key weaknesses

- inconsistent funding/resource availability;
- enforcement gaps;
- significant data gaps (especially fishery dependent);
- finfish management plan not operational, with limited attention given to other FSA species;
- no specific Monitoring and Evaluation framework/adaptive strategy for FSAs;
- limited local capacity/impetus for analysis/publication; and
- limited adaptation in management.

Key opportunities

- local conservation trusts prioritize financial support for FSA protection;
- adoption of new technologies and methods; and
- twenty years of information exists to inform adaptive management (national and regional), including a proposed finfish management plan, management recommendations from the MARFish project, and the WECAFC RFSAMP Pilot Project.
- Capacity building and outreach to community and resource user groups for:
    - greater participation in governance; and
    - adaptation of resource use practices.

Key threats

- transboundary illegal fishing;
- effects of climate change, coral-algae phase shift on reefs;
- impacts of coastal development; and
- stakeholder conflict.

Findings from RFSAMP pilot countries: **The Bahamas** Country Report – Krista Sherman

16. Ms Krista Sherman had been hired as the Bahamas focal point for Component 1 of the RFSAMP Pilot Project. Large quantities of data exist in the Bahamas, including 141 publications, reports, theses and books on FSA species. There are more than 40 publications and technical reports on Nassau grouper, but only three on mutton snapper. While there has been some work on Nassau grouper FSAs, no work has been done on mutton snapper FSAs. Data on Nassau include AGRRA surveys, FSA monitoring, acoustic telemetry, genetics and passive acoustic monitoring. Of the 74 known FSAs in the Bahamas, 40 host Nassau grouper FSAs and 20 host mutton snapper FSAs. 13

are confirmed to be multi species. Most of the Nassau grouper FSAs are greatly reduced in size from historical abundances.

17. Knowledge gaps for Nassau grouper include:
    a. status of FSAs;
    b. perceptions of Nassau grouper;
    c. catch assessments to engage fishers;
    d. identification of key nursery habitats and threats to habitats;
    e. movement patterns across FSAs;
    f. identification of multispecies FSAs;
    g. population connectivity;
    h. larval dispersal and genetic connectivity;
    i. geomorphology and oceanography of shelf in relation to FSA sites; and
    j. reproductive biology.
18. Knowledge gaps for mutton snapper include:
    a. increased fisher involvement with FSA research;
    b. FSA locations;
    c. changes over time;
    d. mapping FSAs – for potential inclusion within Bahamas National Protected Areas System;
    e. exploratory methods for locating FSAs; and
    f. impacts of climate change on the biology and ecology of FSA species.
19. Long-term, species-specific national landings data do not exist for most species although commercial landings data between 1994 and 2022 are available for Nassau grouper. These data show that Nassau grouper landings have declined by ~97 percent over the last 28 years from a peak of 514 tonnes (513 586 kg in 1997. Over the last seven years, commercial landings data have been reported for mutton snapper and these data show that total landings range from 1.9-9.1 tonnes with a mean value of 6.6 tonnes valued at USD 61 232.30.
20. As part of the data collection process, Sherman held workshops with stakeholders on FSA status in the Bahamas and led discussions on the 16 priority recommendations for Nassau grouper and mutton snapper conservation. Most of the participants in the workshops did not know about the FSAMP, and for most, this was their first exposure to the 16 actions. They were found to be mostly supportive except for the synchronization of closed seasons. It had taken a long time (1970–2015) to institute the existing seasonal closure (December-February) closure due to regular pushback from fishers. Extension to include March would be an unpopular proposal. There is no closure for mutton snapper, though there were discussions ongoing around implementation of a seasonal closure between 1 May and 30 June.
21. The group also suggested that in the national context, some long-term (within ten years) recommendations could be completed within the medium term (within five years) because of planned or ongoing efforts. The opposite was true for others. It was suggested that Action 3 (Define criteria to prioritize sites for management action/support) should be considered a medium-term activity at the least due to ongoing difficulties with obtaining research permits. Action 12 (non- extractive uses of FSAs) was considered not to be feasible in the context of the Bahamas, as the known FSAs were found in deep water with difficult ocean conditions, making them inappropriate

for tourism or casual visitation. Action 6 (collection of socioeconomic and trade data) was considered not to be a priority for the Bahamas.

22. The Bahamas faces several challenges with respect to management of FSAs. In terms of enforcement and compliance, technical capacity and resources are needed to address IUU fishing. There was also the need to strengthen awareness and enforcement of the Lacey Act, the Port States Measures Agreement, etc. An anonymous reporting system for violations would facilitate greater participation by fishers in enforcement activities. There was also the need for an improvement in strategic communications.
23. In terms of governance, there was a need to strengthen intra and interagency communication and cooperation, and to improve reporting and data management systems. A project is ongoing aiming to establish a spatial biodiversity information system, but it will be access restricted. For years, new regulations made it more difficult to obtain research permits. This posed an obstacle to monitoring and research activities, which needed to be resolved.
24. Threats to FSA management in the Bahamas include nursery habitat loss and/or fragmentation, the expansion of cruise ship ports, including in MPAs and near to FSAs. Finally, stony coral tissue loss disease and other diseases (such as the fish spinning disease observed in nearby Florida) had implications for long-term reef function, resilience and would undoubtedly impact FSA species and fisheries.
25. Funding was being sought to carry out more FSA related activities, including:
    a. strategic surveillance;
    b. sustained investments in training, enforcement;
    c. address research gaps;
    d. outreach to promote compliance with regulations and deter IUU fishing; and
    e. more targeted outreach materials for adult stakeholders.

Findings from RFSAMP pilot countries: **Cuba** – Myles Phillips

26. WCS Cuba has been working on FSA management in-country in collaboration with the Centre for Fisheries Research (CIP) and the Ministry of Food (MINAL). Cuba's distinct fisheries account for the following proportion of the catch:
    a. state owned "industrial" fishery (same vessels and fishing gear as artisanal fishery) – 23 percent;
    b. artisanal fishery – 66 percent;
    c. subsistence – 10 percent; and
    d. recreational – 1 percent.
27. A considerable part of the commercial catch includes reef-associated species including snappers, groupers, grunts, queen conch, oysters, sea cucumber and spiny lobster. Overfishing of several finfish species was already documented by the 1970s and 1980s. Despite several fishing regulations in the 1980s and overall reduction of fishing efforts in the early 1990s due to a major economic crisis, fishery landings and maximum size of commercially important reef fish species have declined over the last 40 years due to unsustainable fishing practices and high fishing pressure focused on spawning aggregations.
28. The Nassau grouper was a valuable fishery before the 1970s and was considered mostly overfished by the 1980s. Several snapper species, including the mutton snapper, have declined in abundance

but retain commercial importance into the present. Nassau groupers are captured near to shore, using galvanized wire pots. From 1975 to 1989 the resource was considered overexploited (catches less than 50 percent of the maximum historical catch). From 1990 to the present day, it is considered collapsed (catches less than 10 percent of the maximum historical catch).

29. Mutton snapper spawning aggregations have been identified in 13 of the 23 reported multispecies FSAs in Cuba, but their status is currently unknown.
30. CIP has compiled statistics on the catches of snappers by the state sector and the private sector. The analysis of these data showed a consistent decrease on catches since 1985 and overexploited fisheries on a downward trend into collapse. In consideration of results, CIP is proposing a new regulatory approach banning fisheries for mutton (*Lutjanus analis*), lane (*L. synagris*), cubera (*L. cyanoptera*), yellowtail (*Ocyurus chrysurus*), and grey (*L. griseus*) snapper during the reproductive season.
31. After the Law of Environment was passed in 1997, new MPAs were proposed to protect snappers and groupers, to manage fishing pressure and to promote ecosystem conservation. According to the National Centre of Protected Areas, 84 marine areas have been identified for a proposed MPAs system across the Cuban archipelago, 50 of which have already been legally declared. If all these MPAs were established and were adequately managed, they would protect ~ 25 percent of the Cuban shelf, including ~31 percent of coral reefs, ~24 percent of seagrass beds, and ~35 percent of mangrove forest. Most Cuban MPAs face management challenges including lack of infrastructure, staffing and resources to patrol and monitor.
32. There is no unified approach to the monitoring and management of FSAs, largely because fisheries management inside and outside of protected areas is conducted separately by different agencies. To date, 23 FSAs have been identified in Cuba. Eleven (11) fall within protected areas. In four protected areas, PA staff conduct or have conducted limited monitoring on FSAs. Other protected areas do not have a plan in place nor the capacity to monitor FSAs. The remaining 12 FSAs fall outside protected areas. Ten (10) are under the purview of MINAL, with only two being managed directly by CIP. There are several decades of research on aggregating species, with 70 publications exclusive to Cuba and over 100 publications from the Caribbean region and at the global scale that involve Cuba.
33. The management of grouper and snapper fisheries in Cuba is very complex. Many species with different productivity levels are caught simultaneously and several types of fishing gear with different yields are used. FSA fishing still occurs in Cuba, and efforts by Centre for Fisheries Research are underway to regulate grouper and snapper fisheries with aims to protect FSAs, allow the recovery of species, and foster longer-term prospects for sustainable fisheries.
34. Stakeholders reached a consensus for a total fishery ban on Nassau grouper during a 2024 meeting. This was rationalised by the critical state of its fishery. For other species, including the mutton, lane, cubera, yellowtail, and grey snapper, CIP is proposing a new regulatory approach including seasonal closures and fishing quotas. These proposals will be presented to the Fisheries Consultative Commission, the highest national fishery management body in Cuba, before 2025. CIP's efforts in leading crucial policies for the protection and sustainability of key grouper and snapper species—such as the permanent ban on Nassau grouper and proposals for temporary bans and quota settings for mutton and other snappers—create an unprecedented opportunity to enhance and expand FSA monitoring in the country. This initiative would require adequate funding and

coordinated efforts between CIP and protected areas that host FSAs to develop a comprehensive plan for monitoring and protecting FSAs in Cuba.

35. Enforcing national fishery regulations in Cuba is exceedingly difficult, due to extensive fishing grounds, insufficient funding, lack of staff and inadequate resources. These challenges are compounded by the comprehensive embargo imposed by the United States of America, which severely restricts access to crucial enforcement resources (e.g. fuel, boats, etc.). In this challenging context, the most viable strategy is to foster compliance through collaboration with state and private fishing enterprises, subsistence fishers, and coastal communities. CIP and other stakeholders are exploring the use of aquaculture initiatives and other sustainable or alternative livelihoods to decrease fishing pressure. However, this approach will necessitate mid to long-term investment support.
36. Funding is also needed for development and implementation of a comprehensive plan for monitoring and conserving FSAs. This plan should include sustained investments in research, capacity building for enforcement officers, "soft" compliance approaches, and the development of outreach materials to: (1) promote behaviour change; (2) improve compliance with national fishery regulations; and (3) reduce illegal, unreported, and unregulated (IUU) fishing. It will also be essential to strengthen collaboration between Centre for Fisheries Research, protected area staff and coastal communities to ensure effective management efforts.
37. Key FSA research needs in Cuba include:
    a. evaluation of the status of multispecies FSAs inside and outside protected areas;
    b. reconciling FSA research protocols and data gathering tools to standardize information and build long term datasets at the local and national levels, and following regional standards;
    c. identification of key nursery habitats and threats to habitats;
    d. movement patterns of Nassau grouper and mutton snapper across FSAs;
    e. reproductive biology of Nassau grouper and mutton snapper;
    f. population connectivity, especially between MPAs and fishing grounds; and
    g. larval dispersal and genetic connectivity.