13th SPC Heads of Fisheries Meeting
1–4 June 2021 – Virtual meeting

Original: English

Information Paper 7

Towards an ocean science research vessel for the Pacific

PCCOS and FAME Secretariat

Regional context

1. The Pacific region is increasingly playing a major role in integrated ocean/climate initiatives. The need to protect and sustainably manage ocean resources and their ecosystem are common to and shared across the Pacific basin.

2. In 2016, WCPFC members endorsed the ongoing programme of tuna tagging in the Pacific as a key input into the region's stock assessments and the basis for the decision making to maintain the positive status of the stocks and fisheries in the region.

3. In 2018, the members of the Pacific Community (SPC)'s CRGA governing body tasked SPC with ensuring that the SPC Fisheries, Aquaculture & Marine Ecosystem (FAME) Division maintained and enhanced its position as a scientific 'Centre of Excellence', anchoring the region's capability to be a global leader in Ocean Science.

4. In 2019, SPC established the Pacific Community Centre for Ocean Science (PCCOS) which is now fully operational. PCCOS will be a regional hub for Ocean Science and knowledge, both within SPC and for the Region.

5. In 2019 the WCPFC Resolution on Climate Change called for the development of science on the relationship between climate change and target stocks and the wider ecosystem.

6. There is therefore a growing regional need for consistent and basin-wide tuna and ecosystem data collection to support scientific advice on these existing and emerging issues.

Rationale

7. The key regional research organisation in the western Pacific region related to ocean environment and resource preservation and management is the SPC.

8. To achieve a productive ocean supporting sustainable food supplies and a sustainable ocean economy, it is necessary to apply scientific knowledge and information toward innovative solutions. Management decisions at an ocean scale, based on the best available scientific information, should be supported by the continuous use of an adaptable research vessel properly designed and committed for the purpose. Annex 1 provides a summary of the current research vessel needs for FAME and indicative schedule for the coming decade.

9. There is currently no suitable research vessel available in the region (and beyond). The main tuna tagging platform type[1] that SPC's Oceanic Fisheries Programme (OFP) has been utilizing to provide the fishery-independent data needed to inform the management of tuna stocks in the past 40 years - chartered commercial vessels - are disappearing. This presents a clear risk for SPC's research capacity and the advice that can be provided. To inform managers on the health of the broader ecosystem, the FAME Division is also facing a growing need for marine ecosystem monitoring; the availability

[1] The pole-and-line fishing technique is the only platform capable of the rapid capture, tagging and safe release of the large quantities of tuna necessary for FAME research projects.

of suitable oceanographic vessels is very limited in the region, and subject to applications that need to be planned years in advance.

10. This dynamic situation requires crucial adaptation and advocates for the acquisition of an adaptable research vessel dedicated to collecting the information needed to support SPC member countries' goals.

Project background

11. To evaluate the desirability of and options for the acquisition, operation and underwriting operational costs for an adaptable research vessel dedicated to SPC regional marine monitoring needs, a study has been implemented and completed in 2020 by external expert consulting firm F&S (http://fs-marine.fr/en/contact/).

12. The final report was submitted at end of November 2020. It includes a detailed analysis of best vessel flag choice, appropriate management scheme, operating costs, and risk assessment, in addition to a review of the 5 technical proposals received from the 23 shipyards invited to provided proposals.

13. Only 2 shipyards provided a design following the main requested particulars and coping with all the tasks the desired vessel could be used for. Due to its more versatile design, a "low noise hull" suitable for oceanographic data recording and the proximity of its Vietnamese boat building facilities, the French shipyard Piriou (https://www.piriou.com/en/) has been selected to reveal a viable vessel option design.

43-meter hull, diesel-electric propulsion; this adaptable platform's main objective will be directed to collect data on tuna species and their environment. Facilitating SPC members' capacity building will also be reflected in the vessel design.

Feasibility study main points

14. Design and construction cost estimated at 15 M Euros. Duration from approval to delivery of about 2 years.

15. Vessel flagged in the Pacific with the Republic of the Marshall Islands or Wallis & Futuna recommended as options that meet the quality and flexibility required for vessel operations.

16. It is recommended for SPC to be the shipowner on behalf of the members.

17. The vessel management should be delegated to a specific RV fleet management company.

18. Based on 200 days at sea, the vessel would have a direct operating cost of EUR 7,100/ day.

19. Risk analysis concluded that quality of *vessel management scheme* and *experience of selected shipyard* appear to be decisive points.

Project components and services to the region

Design capabilities	Service purpose
43-m size, long-range (>6,000 nm), limited draft (3.5m), ample accommodations (25p)	Adapted to region scale and operational limitations. Membership capacity building
Efficient tuna pole and line fishing platform	Provide fishery independent data for stock management optimisation
Multiple fishing gears facilitating pelagic fish capture	Enhance tuna and associated species biology knowledge to improve resource sustainability
Efficient wet and dry laboratory spaces to accommodate various research requirements	Optimum operation of the various tools used to collect ocean ecosystem parameters
Capacity to operate mid-water trawl nets	Collect information on plankton and tuna prey to have a better understanding of the food web and its answers to climate change
Capacity and equipment to collect essential physical oceanography parameters- ADCP, CTD, rosette	Validate/parameterize models to understand the link between tuna fisheries and its ecosystem- forecast changes in tuna linked to climate variability
Multibeam scientific echosounder. Biomass recording. Acoustic record studies facilitated with low radiant noise hull design	validate/parameterize models to understand the link between tuna fisheries and its ecosystem – forecast changes in tuna linked to climate variability Seafloor mapping, hydrography, FAD deployment location, seamount characterisation
Powerful hydraulic crane	Vessel operation autonomy. FAD and wave buoy deployment, carrying containers for specific scientific purposes or post-disaster reliefs.
Auxiliary boats	Diving surveys, coastal water surveys
Computer network and communication	Near and real time sharing and communicating research results.

We invite the HOF participants to provide guidance and comments on the 2021 workplan for project continuation

At this stage, the process has identified the feasibility and costs of an ocean science research vessel (RV) for the Pacific. Now that first-step information is available, FAME aims to fully engage with the membership to ensure this medium-term process is now member-driven. The governance and procedures needed to ensure this will be developed in the coming year and some notes are made in the table below. For HoF13 consideration, we are requesting:

- Support for the continuation of this process, including development and discussion of approaches through which member involvement can best be achieved;
- Participation in the development of documents for potential funding donors and events that might help support the funding of the vessel;
- Review of the proposed research areas and facilities and identify additional priorities and capacity/training needs;
- Consideration of a process through which the name of the vessel can be selected, potentially through regional community engagement.

Pacific RV project Workplan	**HoF 2021 considerations**	**Medium-term considerations**
Inform the members about the project	Establish a consultative group to communicate progress on workplan	
Scope opportunity for RV being a flagship for community engagement and to raise awareness in Pacific Ocean science		Suggestions for preferred process
Develop documents for key donors and events		Suggestions for financing strategy
Develop preferred governance arrangements for member endorsement		Discuss benefits of establishing an Advisory Committee of SPC members
Complete RV annual agenda	Identify capacity/ training needs and suggest other possible priorities	Identify capacity/ training needs and suggest other possible priorities
Find a vessel name	Suggest a process for vessel naming	

Annex 1. Research vessel needs and schedule

The table below describes the vessel and gear requirements to meet current FAME Research Needs

Objectives	Instruments / gear	Data/samples collected
Tagging	Pole and Line Live bait Freezer Surgery	Skipjack/yellowfin tag releases Biological samples
	Dangler Freezer Surgery	Bigeye/yellowfin tag releases Biological samples
	Longline Freezer Surgery	Bigeye/yellowfin tag releases Biological samples
	Larval net*	Bigeye/skipjack/yellowfin
Pelagic Ecosystem Physical oceanography	Hull Instruments/probes (e.g., ADCP) Instruments/probes lowered at depth (e.g., CTD)	Surface and at depth: temperature salinity currents
Chemistry	Instruments/probes lowered at depth (e.g., CTD) Water samplers lowered at depth (e.g., rosette)	Surface and at depth: oxygen pH nutrients (e.g., nitrates, nitrites, phosphates)
Biology of the base of the food web: phytoplankton/microbial loop	Water samplers lowered at depth (e.g., rosette)	Surface and at depth: primary production chlorophyll a pigment profiles species composition diversity particulate organic matter isotope characterisation…
Biology of the mid-trophic level of the food web: zooplankton and micronekton	Hull-mounted acoustic (e.g., EK60) Acoustic profilers (e.g., TAPS, WBAT)	Surface and at depth: acoustic estimates biomasses species composition

	Zooplankton net Micronekton net	diversity isotope characterisation contaminants fatty acids… tuna larvae sampling species barcoding
Biology of the top predators: tuna and others	Various fishing gears such as longlines, troll line*	Tuna and other predator specimens from which biological samples will be extracted to determine various parameters such as age, reproductive status, isotope levels, contaminants levels
Deep-sea Ecosystems Physical oceanography	Hull instruments/probes (e.g., ADCP) Instruments/probes lowered at depth (e.g., CTD)	Detailed bathymetry Surface and at depth: temperature salinity currents
Chemistry	Instruments/probes lowered at depth (e.g., CTD) Water samplers lowered at depth (e.g., rosette)	Surface and at depth: oxygen pH nutrients (e.g., nitrates, nitrites, phosphates)
Biology of the base of the food web: phytoplankton/microbial loop	Water samplers lowered at depth (e.g., rosette)	Surface and at depth: primary production chlorophyll a pigment profiles species composition diversity particulate organic matter isotope characterisation…
Deep-sea fish biology	Hull-mounted acoustic (e.g., EK60) In situ acoustic (e.g., WBAT) Baited camera Various fishing gears such as drop lines, vertical longline	Biomass acoustic estimates Spatial distribution acoustic estimate cpue Biological samples to determine various parameters such as age, reproductive status, isotope levels, fatty acids, contaminants levels Species composition Diversity

The Figure below describes FAME's planned research vessel schedule for 2021–2030 (note: hashing in this figure represents activity still requiring resources).