FINANCIAL REPORT FOR YEAR 1 (ENDING MARCH 31, 2021)

1. BACKGROUND

PICES member countries have significant resources for monitoring environmental conditions and fisheries in coastal waters. At the same time developing nations are far more limited in their capacity for collecting data needed to advance their management practices. Citizen-based monitoring is an approach designed to improve the efficiency and effectiveness of monitoring efforts when technical and financial resources are not sufficient. There are many successful examples of citizen-based monitoring in developed countries. However, this approach has not been widely applied yet to the collection of environmental and fisheries data in developing nations.

The overall goal of the PICES/MAFF project, entitled "*Building Local Warning Networks for the Detection and Human Dimension of Ciguatera Fish Poisoning in Indonesian Communities*" (acronym: Ciguatera; https://meetings.pices.int/projects/Ciguatera), is to build the capacity of local small-scale fishers and community members to monitor their coastal ecosystems and coastal fisheries. Creating community empowerment will benefit human health in Pacific Rim developing countries. As well, the project will create transferable knowledge for ocean communities with similar climate or environmental stresses. This 3-year (April 2020–March 2023) project is funded by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan, through the Fisheries Agency of Japan (JFA), from the Official Development Assistance (ODA) Fund.

The project's focus is to detect and monitor *Ciguatera Fish Poisoning* (CFP) in tropical reef fisheries, which globally has the most significant human health and economic impacts of any algal-based poisoning syndromes. CFP stems from the human consumption of fish containing toxins produced by benthic microalgae of the genus *Gambierdiscus* and *Fukuyoa*, dinoflagellates which are the initial sources of ciguatoxin. Ciguatoxin affects sodium transport channels in an organism by lowering the voltage-gated opening in their cells, thereby altering the nervous system in ways that negatively affect numerous aspects of fish and animal physiology. Ciguatoxin is lipophilic, meaning that it accumulates in fatty tissues and becomes concentrated up the food web. When present at sufficiently high concentrations in raw or cooked fish, ciguatoxin consumption leads to the onset of major CFP symptoms – vomiting, diarrhea, numbness of extremities, mouth and lips, reversal of the sensations of hot and cold, muscle and joint aches – within 1 to 3 hours of ingestion and may last for days, weeks or even months.

The impact of CFP on the human dimension extends far beyond the proximate health and economic outcomes. Chronically impacted communities tend to become fearful of local and other fish sources, and they transition from these traditional ways of life to one where all protein is imported from foreign sources.

Although CFP is recognized to occur in pristine environments, its emergence in new regions, and intensification in others, often is associated with anthropogenic pressures. There also is evidence that climate drivers may be expanding the geographic distribution of CFP. The primary concerns for local communities are first to identify reef regions where the causative organism is abundant and second, to manage their anthropogenic stressors to minimize increases in its presence.

The 2017–2020 PICES/MAFF project on "*Building Capacity for Coastal Monitoring by Local Small-scale Fishers*" (acronym FishGIS; https://meetings.pices.int/projects/FishGIS) has led to the development and implementation of smartphone-based tools for fisheries and environmental observations, such as water quality, phytoplankton, fish catch, floating garbage (plastics) and Illegal Unregulated and Unreported (IUU) fishing, by local small-scale fishers and community members in Indonesia. The new project aims to adapt and further refine these smartphone-based capabilities for measurement and automated reporting, with the addition of benthic toxic algae measurements, to empower Indonesian coastal communities to minimize their CFP

exposure in community-scale fisheries. The project strategy will comprise an "*Assess. Detect. Avoid!*" convention to protect communities against this emerging health concern.

- To ***Assess*** the state of the local coral reefs, a common ecosystem for ciguatoxic fish, community members will monitor some aspects of water quality (turbidity and water color) of the reef, and document the outbreaks of eel-grass or the expansion of the dead coral (all factors associated with increased CFP presence) using the smartphone-based tools and approach developed during the FishGIS project.
- To ***Detect*** the presence of the toxin-containing dinoflagellates in the reef environment, two approaches will be used: one that is developed within the project and is based on specialized smartphone-driven microscopes (Foldscopes) and community-appropriate protocols, and the other that employs a detection kit recently created by an international CFP working group (International Atomic Energy Agency (IAEA); https://www.iaea.org/; see also FAO and WHO (2020)) to determine the presence of *Gambierdiscus* and *Fukuyoa* in the water column and measure their abundance. These two technologies will meld well to help develop predictive indices for reef regions susceptible to CFP.
- To ***Avoid*** the transfer of contaminated fish from the damaged environment to the tables of families, the community will be trained to reduce risk – avoid eating fish from regions where *Gambierdiscus* and *Fukuyoa* numbers are high. This simple message will require an investment in socio-ecological scientists – a specialty of the MAFF mandate.

Consistent with the directives of the United Nations Decade of Ocean Sciences for Sustainable Development (UNDOS; https://www.oceandecade.org/), the project will focus on three major initiatives:

1. Coastal ecosystem monitoring activities by local small-scale fishers and other community members to detect ecosystem changes (*e.g*., changes in water quality and the presence and changes in the spatial distribution of dead coral and eel-grass benthic environments).
2. Detection of CFP toxin-containing dinoflagellates in the reef environment using smartphone-based observation tools developed during the FishGIS project, and new international standardized sampling protocols for toxic benthic algae.
3. Training of community members to employ these tools for generating citizen-science data streams to be used in local decision-making on coastal fisheries regions to avoid a health risk associated with fishing until the presence of CFP toxin-containing dinoflagellates is minimized.

These three initiatives will be supported by a series of capacity building workshops led by scientists from PICES member countries. The purpose of the workshops is to work with local communities to increase the sustainability of their fishing resources by providing them with CFP information. It is expected that the combination of training and citizen-science contributions in the project will: (1) generate the needed capacity for monitoring CFP hotspots in Indonesian waters, (2) provide valuable datasets for the study of *Gambierdiscus* and *Fukuyoa* and the factors controlling their abundance in reef systems, and (3) increase human wellness by identifying fishing regions where the health of community members is at risk.

In addition to the primary initiatives, early steps will be taken to explore two secondary initiatives: modifying the FishGIS application to incorporate (1) artificial intelligence-based assessment of fish stocks from the collective catch data reported by the local fishers, and (2) a tsunami early warning notification for remote fishing communities, with the goal of laying the foundation for future full development of these capabilities.

Indonesia was chosen as a developing Pacific Rim country to implement the project. The importance of having more effective fisheries management practices is widely recognized in Indonesia, and this leads to support by the federal government and the willingness of stakeholders to consider new approaches such as the development and implementation of a citizen/fisher-based observation system linked with fisheries scientists and managers. The project foundation would be the strong collaboration PICES scientists have with the Indonesian Agency for the Assessment and Application of Technology (BPPT) and the Indonesian Institute of Sciences (LIPI) developed over previous PICES/MAFF projects – "*Development of the prevention systems for harmful organisms' expansion in the Pacific Rim*" (2007–2012), "*Marine ecosystem health and human well-being*" (2012–2017), and "*Building capacity for coastal monitoring by local small-scale fishers* (2017–2020).

The longer-term intent of this work is to transfer the knowledge gained and technology developed to other developing regions. In conjunction with the UNDOS, there is substantial interest within PICES in sharing knowledge with other southern hemisphere locations, particularly in under-represented nations.

In accordance with the organizational principles agreed to by MAFF/JFA and PICES (Project Principle 3), the project is being directed by a Project Science Team (PST), co-chaired by Drs. Mitsutaku Makino (Atmosphere and Ocean Research Institute, The University of Tokyo, Japan; mmakino@aori.u-tokyo.ac.jp) and Mark Wells (School of Marine Sciences, University of Maine, USA; mlwells@marine.edu). The PST Co-Chairmen are responsible for the detailed planning and execution of the project, and annual reporting on scientific progress to MAFF/JFA (within 90 days after the close of each project year ending March 31) and to PICES Science Board through the Human Dimension Committee. Within PICES, Science Board takes the responsibility for reporting to Governing Council on the progress and achievements of the project. The Year 1 progress report will be provided simultaneously with this financial report.

2. FINANCIAL PRINCIPLES

The following financial principles (Project Principle 4), agreed to by MAFF/JFA and PICES, apply to the project:

- A separate bank account shall be established to deposit the remitted funds.
- The PICES Executive Secretary or a Project Coordinator designated by the Executive Secretary is responsible for the management of the fund and for the annual reporting on its disposition to MAFF/JFA (within 90 days after the close of each project year ending March 31) and to the PICES Finance and Administration Committee. Dr. Alexander Bychkov was appointed to serve as the Project Coordinator. Within PICES, the Finance and Administration Committee takes the responsibility for reporting to Governing Council on the financial and management aspects of the project.
- The main elements of the budget are organized into the following categories:
  - Travel and meetings – this category covers travel costs associated with project activities such as field studies, organizational trips, project meetings, workshops, scientific sessions and public events.
  - Contracts – this category covers grants/fees to be paid to consultants and experts employed to implement the project. Tasks and deliverables for contractors are to be determined by the PST Co-Chairmen. To support the objectives of the project and to ensure that its activities have minimal impact on the workload of the existing staff of the PICES Secretariat, the Project Coordinator can employ additional staff as required.
  - Publications – this category covers costs associated with publishing findings of the project in special issues of peer-reviewed journals, reports and brochures, and dissemination of these materials.
  - Equipment – this category covers purchases and shipment of equipment for laboratory/field data/sampling processing/analysis, computer hardware/software for the development of database(s) and the project website.
  - Miscellaneous – this category covers expenses associated with the project (mail and phone charges, bank charges, *etc*.) and includes contingencies such as fluctuations in currency exchange rates.
- Transfers of up to 10% of allocations between the budget categories are allowed based solely on the decision by the PICES Executive Secretary or the Projects Coordinator. In special cases, transfers up to 20% between the budget categories can be authorized by JFA. All transfers shall be reported at the end of the fiscal year.
- A 13% overhead on the annual budget shall be retained by PICES to offset expenses related to the Secretariat's involvement in the project.
- The interest earned by the fund shall be credited to the project and used in consultation with JFA.
- Any funds remaining after the completion of every fiscal year of the project shall be reported and disposed of in consultation with JFA.

3. PROJECT BANK ACCOUNT

The special account for the project was established at the bank used by PICES:

Bank name:	TD Canada Trust
Bank number:	004
Branch number:	99000
Branch address:	1080 Douglas Street, Victoria, B.C., Canada. V8W 2C3
SWIFT Code:	TDOMCATTTOR
Account number:	5313568
Account holder:	North Pacific Marine Science Organization (PICES)
Account holder address:	9860 West Saanich Road, Sidney, B.C., Canada, V8L 4B2

4. BUDGET EXECUTION FOR FISCAL YEAR 1

The set of documents requesting funding for Year 1 (April 1, 2020 – March 31, 2021) was sent to MAFF/JFA, through the Consulate General of Japan in Vancouver, on June 29, 2020. Due to the COVID-19 situation, modifications to the original workplan plan and budget were recommended and allowed by the Japanese authorities, and the revised set of documents was submitted to MAFF/JFA, again through the Consulate General of Japan in Vancouver, on September 21, 2020. Funds in the amount of $99,861 were transferred to the PICES/MAFF bank account on October 30, 2020. The initial and modified budget breakdowns for Year 1 are shown in Table 1.

A virtual meeting, involving PST Co-Chairmen, Project Coordinator and Dr. Shion Takemura, was held January 12, 2021, to discuss problems with implementing even the modified Year 1 project workplan because of the uncertainties surrounding the global COVID-19 outbreak. This meeting was followed by communication with Dr. Nobuaki Suzuki (MAFF/JFA) and by another virtual meeting on February 2, 2021. The outcome from these discussions was the final budget breakdown presented in Table 1. This table also includes actual expenses for each budget category. More details on expenses for specific activities are provided in Table 2.

Table 1 Allocations and expenses for Year 1 (April 1, 2020 – March 31, 2021)

Category	Initial allocations[1]	Modified allocation[2]	Final allocation[3]	Expenses	Difference
Travel and meetings	35,000	20,000	10,500		10,500
Contracts	45,000	58,000	65,000	64,454	546
Equipment and supplies	5,500	7,500	10,000	10,000	
Miscellaneous	1,379	1,379	1,379	357	1,022
Overhead	12,982	12,982	12,982	12,982	
Total	**99,861**	**99,861**	**99,861**	**87,793**	**12,068**
Interest on the account					21
Year-end account balance					**12,089**

[1] Initial budget breakdown submitted to MAFF/JFA on June 29, 2020
[2] Modified budget breakdown submitted to MAFF/JFA on September 21, 2020
[3] Final budget breakdown agreed to by PST Co-Chairmen and Project Coordinator in January/February 2021

Table 2 Expenses for various budget categories for Year 1

Activities	Allocations
Contracts	**64,454**
▪ Modification and refinement of the smartphone-based FishGIS monitoring application; supporting major or minor updates of operating systems; building a cloud database server, including programs for data accumulation and data synchronization system from Indonesia to Japan	45,000
▪ Maintaining database servers in Indonesia and Japan for Year 2 & Year 3 of the project	15,000
▪ Project coordination and fund management	4,454
Equipment and supplies	**10,000**
▪ Purchasing tablets/smartphones/sim cards for core community members, and fabricating CFP sampling devices	10,000
Miscellaneous (mailing/communication, bank fees)	**357**
Overhead to PICES	**12,982**
Total	**87,793**

5. ACCOUNT AUDIT

For the period prior to December 31, 2020, the status of the MAFF (Ciguatera) account was assessed during the regular external audit for PICES' FY 2020 (January 1 – December 31, 2020). In the auditor's opinion, "*the financial statements present fairly, in all material respects, the financial position of the North Pacific Marine Science Organization as at December 31, 2020, and the results of its operations and changes in fund balances for the year then ended.*" The financial statements for the rest of Year 1 (January 1 – March 31, 2021) will be evaluated during the regular audit for PICES' FY 2021 (January 1 – December 31, 2021).