



PacMAN
Pacific Islands Marine
Bioinvasions Alert Network

First session of the IODE Steering
Group for PacMAN
(PacMAN Advisory Board)
SG-PacMAN-I

Online
14 September 2021

UNESCO



Group picture of the first PacMAN Advisory Board/IODE steering group for PacMAN, 14 Sept 2021

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1. Executive Summary

The PacMAN (Pacific Islands Marine Bioinvasions Alert Network) project is a 3-year project started in August 2020, which aims to build a routine monitoring program for marine invasive species for small Island developing states utilizing eDNA analyses. The first session of the IODE steering group for PacMAN (i.e. PacMAN advisory board) brought together the PacMAN coordinating team with major local stakeholders, representatives of the donor (Flanders Government) and international scientific experts, to adopt the monitoring plan, and discuss the development of the project across the next two years. During the two hour online meeting the work plan including the marine invasive species monitoring plan was introduced, discussed and adopted.

After a prayer from Mr Joape Ginigini, the meeting was opened by Ward Appeltans and a round of introductions of all participants. Dr Ann-Katrien Leskrauwaet, representative of the Government of Flanders introduced the Trust Fund, its objectives and its view for the PacMAN project and its impacts in the region. Mrs Senivasa Waqairamasi, the representative of the Government of Fiji expressed her gratitude on behalf of Fiji for the opportunities that the funding from Flanders has made possible.

Mr. Joape Ginigini discussed the workplan for PacMAN, explaining some delays due to the ongoing COVID19 pandemic. He introduced the strategy that the PacMAN monitoring plan will take in the next two years. Dr. Saara Suominen then gave a brief overview of the monitoring plan including the sampling strategy, sampling sites, and data management plans. The steering group provided a few more recommendations for further improving the monitoring plan, and the need for an environmental impact assessment (EIA) for the sampling was raised by the representative of the Ministry of Waterways and Environment. The steering group accepted the PacMAN monitoring plan taking into account that it still needs to go through the EIA process.

Recommendations for the development of the PacMAN project in the next two years were reviewed. These included recommendations for the addition of a control site, as well as keeping initial water samples for controls against laboratory contamination in the future. The importance of replicating and consistent time-series as well testing qPCR assays with local species, and sharing the protocols in global databases was highlighted. For the future, the SG-PacMAN recommended to look into collaboration with Flemish ports that are active in biosecurity work, the possible inclusion of citizen science work, surveying also prokaryotic pathogens, and building links with biosecurity authorities in Australia and New Zealand.

The terms of reference and the membership of the steering group were introduced and Ms. Sandeep K. Singh from the ministry of Waterways and Environment was appointed as the chair. The next annual session for the steering group meeting will be held on the 13 September 2022. Finally, Dr. Pier Luigi Buttigieg provided some closing remarks, highlighting that PacMAN is an example pioneering project for combining monitoring with novel methods to support management actions, while closely involving the users of the data products throughout the lifecycle of the project.

2. Welcome and adoption of agenda

Mr Ward Appeltans, general coordinator of the PacMAN project opened the meeting and introduced the meeting goals and agenda. He informed the board that all the information and documents of this meeting are available on IOC's OceanExpert database via the following link: <https://oceanexpert.org/event/3265>. He then invited one person per organization to briefly present themselves and their team members. A group picture was taken.

Dr Ann-Katrien Leskrauwaet, representative of the Government of Flanders welcomed everyone and said that it is an honour today to welcome you on behalf of the Government of Flanders. Flanders, in the kingdom of Belgium, has since long been a great supporter of international cooperation in ocean science, and to the Intergovernmental Oceanographic Commission (IOC) of UNESCO, in particular to the International Oceanographic Data and Information Exchange (IODE) Programme, of which the office is hosted in Flanders. In 1999, UNESCO and Flanders established an agreement to set up the Flanders UNESCO Trust Fund (FUST) for the support of UNESCO's activities in the field of Science, through five-year agreements. FUST provides resources to UNESCO to deliver on its strategic programme objectives. The Trust Fund focuses specifically on:

- Strengthening science, technology and innovation systems and policies – and that is nationally, regionally and globally
- Promoting international scientific cooperation on critical challenges to sustainable development

Since then, FUST has supported the Man and Biosphere Programme (MAB), the International Hydrological Programme (IHP) and the programmes of the IOC. The PacMAN project is one of the projects awarded under the current 5th phase of FUST, and is managed by the UNESCO/IOC Project Office for IODE.

She said that the PacMAN project objectives are fully in line with the strategic objectives of FUST and UNESCO because of its strong potential contribution to international cooperation and science capacity development, the use of innovative technologies and practical applications of science for sustainable development, and the protection of natural resources and biosecurity. It is with great interest that we look towards the outcomes of the PacMAN project, and together with our colleagues at the Flanders Marine Institute (VLIZ), who are actively engaged in the PacMAN project and support the exchange with other/similar projects), we see great potential of replicability of the PacMAN approach in other contexts and regions.

Flanders has since long invested in ocean data management and data infrastructures, and we are convinced that these systems need to be developed together with users and user communities. Because that is the pathway to an effective cooperation, and one that ensures

strong embedding in local and regional policy and management. It is also the best guarantee that FUST can help build impact on the long term. The cooperation between local scientific expertise and local authorities to develop and embed monitoring in the long-term is cornerstone in this context. We therefore express special thanks to the University of the South Pacific for their support and strong commitment to PacMAN. And it is with great interest that we are looking together with you to the implementation of the second year, which marks the start of the field monitoring.

Mrs Senivasa Waqairamasi, the representative of the Government of Fiji welcomed addressed Dr Ann-Katrien Leskrauwaet, the PacMAN scientific experts, fellow government representatives from different ministries and departments in Fiji, representatives from the different statutory bodies and NGO's in Fiji and the regional organizations as well as the PacMAN coordination team and thanked the government of Flanders firstly for choosing Fiji and secondly for funding this development initiative. She thanked Dr. Ann-Katrien Leskrauwaet for the welcome address and introduction, as well as all the guests and colleagues for their time and the PacMAN coordination team for organizing and facilitating this important event. She highlighted the importance of invasive species management as crucial to appropriately engage in conservation and rehabilitation efforts effectively as a country. She said that the government of Fiji is elated that PacMAN will be able to address existing gaps in sciences, in human and technological capacities as well as contribute to policy recommendations. She said that the government of Fiji believes that such initiatives will greatly benefit and complement the work and efforts made towards meeting some of Fiji's prior efforts in invasive species management. The Fiji government again pledged its support towards the implementation of PacMAN and hoped that this is the first step towards more collaboration with the Flanders government.

The PacMAN advisory board adopted the agenda without modification.

3. PacMAN work plan

Mr Joape Ginigini (local PacMAN project manager) provided an overview of the PacMAN work plan and the status of the implementation (table, **green = on track**; **orange = delayed** and **grey = not yet started**).

		year 1 (Sept 2020 - Aug 2021)		year 2 (Sept 2021 - Aug 2022)		year 3 (Sept 2022 - Aug 2023)	
Activity	subactivity	S1	S2	S3	S4	S5	S6

Coordination and advisory board meetings							
	1st advisory board meeting						
	2nd advisory board meeting						
	3rd advisory board meeting						
Stakeholder forum, communication and outreach							
	Website, flyer, video						
	mailing list						
Evaluation							
Development of monitoring plan							
	review technology						
	review sampling and sampling processing protocols						
	select species						
	data management plan						
	data policy						
	design sampling campaigns						
	costing overview						
Scientific training							
	capacity assessment						
	development of training content						
	training course for scientists						
	training course for stakeholders						
Field and lab work							
	test phase						
	operational phase						
Development of infrastructure, bioinformatics pipeline and reference database							
	Development of a bioinformatics pipeline to calculate amplicon sequence variants (ASVs) from raw reads generated by next-generation sequencing (NGS) platforms, and package these together with standardized metadata into Darwin Core Archives.						

	Development of sequence reference databases and/or enhancement of existing reference databases and alignment with the World Register of Marine Species (WoRMS).						
Development of decision support tool							
	Development and evaluation of habitat suitability models based on OBIS occurrences of potentially invasive species.						
	Development of risk assessment algorithms to inform policy of species that are likely to establish themselves and become invasive in a particular location.						
	Development of a dashboard application and alerting system to display and disseminate information produced by the risk assessment component.						

4. PacMAN monitoring plan

The PacMAN monitoring plan is the output of one year of work and consultations with scientists and local stakeholders. It presents the sampling and data processing activities for the next two years of the project. Dr Saara Suominen, PacMAN scientific officer, provided a summary of the plan. The draft monitoring plan was shared with the members of the board and introduction videos were made on the topics listed below, in order to provide enough time to review and provide input. The introduction videos can be viewed via the following YouTube links:

- Introduction of the objectives: <https://youtu.be/9aTdTynjM00>
- Target species: <https://youtu.be/Ppcvqr-3F5Q>
- Sampling design/protocols: <https://youtu.be/opVnw5X7pfo>
- Data management plan: <https://youtu.be/lt3vJbrBUC8>
- Synergies and its Utility: <https://youtu.be/loTkpj1TnJQ>

The final version of the monitoring plan can be downloaded [here](#).

The PacMAN advisory board welcomed the PacMAN monitoring plan and fully endorsed the execution of the activities, taking into account that the project still needs to go through the process of requesting an EIA approval.

5. PacMAN advisory board Terms of Reference, membership and Chair

Mr Ward Appeltans introduced this agenda item. Because this is the first meeting of the full PacMAN advisory board, the Terms of Reference, membership and chair of the board have been discussed and approved.

Mr Appeltans reminded the group that being an IODE project, the advisory board is officially called the IODE Steering Group for PacMAN (SG-PacMAN).

The SG-PacMAN proposed the following Terms of Reference:

1. The SG-PacMAN will act as the project advisory body, i.e.
 - a. Provide advice to the PacMAN work plan, the monitoring plan as well as the decision-support tool and,
 - b. Help raise awareness of the outcomes and support the uptake of the PacMAN services at local and regional level.

The membership of the SG-PacMAN is composed of:

- 1) SG-PacMAN chair
- 2) Project coordinator
- 3) Local project manager
- 4) Systems engineer
- 5) Scientific experts
- 6) Representatives of major stakeholders/users from national, regional and international organizations and
- 7) Representatives of the donor.

We received the following nomination for chair of the PacMAN advisory board: Ms. Sandeep K. Singh, Director Environment of the Fiji Ministry of Waterways and Environment. Ms. Sandeep kindly accepted the nomination.

The SG-PacMAN adopted the terms of reference and membership and welcomed the appointment of Ms. Sandeep K. Singh as the chair.

6. Recommendations

The PacMAN advisory board proposed the following recommendations and action items for consideration by the project team:

- The IOC Assembly (June 2021) requested a number of IOC projects, including PacMAN, to be registered as a UN Ocean Decade action. **The SG-PacMAN recommended submitting the UN Ocean Decade action application as soon as possible for endorsement by the UN Ocean Decade Advisory Board.**
- **The SG-PacMAN recommended that when possible, additional sampling sites should be considered including areas with high recreational boating activity. In addition, the SG-PacMAN highlighted the importance of having a site distant from port activity as a control for positive detections (i.e. an indication of background biodiversity). Also it was recommended that initial water samples be kept to control for possible lab contamination in the future.**
- **The SG-PacMAN recommended that the PacMAN team conduct a survey for known pathogenic prokaryotes that could be of concern to the local community, and if these could also be monitored from PacMAN DNA samples in the future.**
- The importance of validating qPCR assays with local species was emphasised by members of the SG-PacMAN.
- **The SG-PacMAN commented that building consistent time-series and replication with the sampling methods will be key for long-term monitoring and collecting reliable baseline information.**
- **The SG-PacMAN requested that the PacMAN project team submits an application for environmental impact assessment on the sampling activities (takes approximately 10-12 days).**
- **The SG-PacMAN recommended the establishment of a collaboration with Flanders ports (e.g., port of Antwerp) that are very proactive on ship biosecurity issues, and it was pointed out that there is an interesting student exchange program in place at Port of Antwerp that could be useful in the future of PacMAN.**
- It was suggested that PacMAN could look into involving citizen scientists into the work in the future.
- The PacMAN project team was reminded of the importance of sharing of monitoring plans and sampling protocols with the larger international community. This is done by

publishing the monitoring plan and through our open GitHub repository (<https://github.com/iobis/PacMAN-pipeline>).

- **The SG-PacMAN recommended the local stakeholders to build formal links with Australian and New Zealand biosecurity agencies.**

7. Date and place of next session

The next PacMAN advisory board (SG-PacMAN) meeting will take place on 13 September 2022 and will be held face-to-face or online depending on the Covid-19 situation and travel restrictions. It was recommended that if a face-to-face meeting is possible to hold the meeting in Suva (Fiji) and have the opportunity for all the SG-PacMAN members to meet the local stakeholders.

8. Any other business

No other items were raised.

9. Closing of the session

Dr Pier-Luigi Buttigieg provided a closing statement expressing his appreciation for the focus of PacMAN and especially for the efforts of bringing in the stakeholders that will need to consume and act on the data produced by this project. He was encouraged especially because the data products will be flowing into stable systems that will be around for a long time after the project ends. He thinks that PacMAN can set a new standard for how things are done, especially at the regional scale, to solve problems, and that PacMAN will help promote technologies and biodiversity data in general in decision making.

The first session of the IODE Steering Group for PacMAN (PacMAN advisory board) concluded on 14 September 2021 at 08:45 PM Fiji Standard Time.

Annex 1: Agenda and Time Table

Fiji Standard Time (GMT +12)

7:00 PM - 7:40 PM	Welcome and adoption of agenda
7:40 PM - 7:50 PM	PacMAN work plan
7:50 PM - 8:20 PM	PacMAN monitoring plan
8:20 PM - 8:35 PM	PacMAN advisory board Terms of Reference, membership and Chair
8:35 PM - 8:50 PM	Recommendations
8:50 PM - 8:55 PM	Date and place of next session
8:55 PM - 9:00 PM	Any other business
9:00 PM	Closing of the session

Annex 2: List of participants

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