

Appendix C.

Science, Monitoring, and Evaluation: Operationalizing the PNMS Policies

The Palau National Marine Sanctuary (PNMS) legislation establishes 80% of Palau’s exclusive economic zone to be a no-take area, new fishing zones, and new export rules and taxes; expands the mandates of the Ministry of Natural Resources, Environment & Tourism, the Palau International Coral Reef Center, and the Ministry of Justice; and establishes the Pristine Paradise Palau Fee. On January 1, 2020, the PNMS will fully enter into force with closure of the 80%. Science, Monitoring, and Evaluation will be essential to supporting the implementation and operationalization of the PNMS. The goal of Monitoring and Evaluation (M & E) is to take the ‘pulse’ of programs, policies, and projects and to determine whether desired impacts are being achieved. Further development and application of the scientific research and monitoring framework presented below, will enable tracking of the social, economic, and ecological effects of the PNMS.

M & E is key to delivering the overall goals of the PNMS. M & E uses multiple, context appropriate, participatory and non-participatory methods and collects both quantitative and qualitative information. Further, it is about fostering self-reflection within governance and management institutions and staff and creating opportunities for dialogue between PICRC and MNRET staff and stakeholder groups. While M & E focuses on collecting information, it is ultimately about bringing people together to assess implementation,

learn, and adapt management accordingly.

A range of M & E approaches have been developed and applied in conservation management, international development and other fields, leading to many practical examples and a range of approaches^[1]. For example, status assessment, management reviews, and performance measurements are well established processes in many projects and programs. These tend to focus on the assessment of management measures as input variables (i.e. financing), activity variables (i.e. meetings), and output variables (i.e. reports). While this has value and is relatively easy to track, impact and outcome evaluation is more effective for informing management and ensuring that implementation is on track. Assessing results of near-term implementation effects (impact) is the interim step to understanding the longer-term effects (outcome). Focusing on whether a program is effective in meeting its overall goals, this approach allows management authorities to enhance positive and minimize negative effects. Importantly, an impact and outcome process can be sensitive to cultural norms and values when the M & E plan is co-designed by local stakeholders, as indigenous knowledge is instrumental for selection of culturally and institutionally appropriate process indicators.

This document is a component of the report titled *“Palau’s National Marine Sanctuary: Managing Ocean Change and Supporting Food Security; Report of an Expert Working Group Convened by PICRC and COS.”*

For further information please see <http://picrc.org/picrcpage/palau-national-marine-sanctuary> and <https://oceansolutions.stanford.edu/pnms-report>

Key to M & E best practice is adherence to the principle of adaptive management,^{[2],[3]}. This ensures that insights and lessons are systematically used to steer management actions towards improvement. This can include resetting targets and/or indicators in light of new data and information, or evolving organizational capacity to address new or emerging issues.

Getting Started

Advancing M & E from principle to practice and enabling the PNMS implementation to be tracked necessitates initial groundwork. The following five steps, which may overlap in sequence, represent a roadmap for initiating a plan:

1. Review existing institutional capacity for M & E in Palau, identify the coordinating organization, and engage in evaluation training as required
2. Link M & E directly to the PNMS Science Plan as a source of data and information, (bearing in mind that some data may need to be generated, for example, through expert solicitation)
3. Identify the participants and facilitate a process in line with principles of good environmental governance (reference the heading for process indicators below)
4. Take an iterative approach to updating the PNMS strategic plan and application of theory of change
5. Identify core and peripheral process and outcome indicators (see the examples below)

There is existing capacity in the Office of Project Management in the Ministry of Finance and the Palau Conservation Society that can be leveraged to facilitate the development of an M & E System for the PNMS.

Considerations for Indicator Selection

An indicator is a unit of information measured over time that documents changes in a specific condition. A given goal, objective, or additional information needs can have multiple indicators. A good indicator meets the following criteria:

- **Measurable:** able to be recorded and analyzed in quantitative or qualitative terms
- **Precise:** defined the same way by all people
- **Consistent:** not changing over time so that it always measures the same thing
- **Sensitive:** changing proportionately in response to actual changes in the condition or item being measured

Indicator selection should follow from a clearly developed theory of change and results framework and include both process and outcomes indicators. The theory of change and results framework should be co-developed with stakeholders and allow for meaningful participation and input from a broad representation of the public and private sector. Outcome indicators will measure how well PNMS implementation is tracking against core long-term goals, while process indicators will determine whether adequate enabling conditions are in place to achieve those goals.

Indicators may encompass a mix of quantitative metrics that allow for comparison within sites (and potentially across sites as needed), as well as qualitative information that allows for deeper understanding of what is happening and why, and in particular unveiling the feedbacks between human actions, environmental health, and human health. There is too often a focus on monetary economy-based indicators (e.g., GDP) for evaluating success, principally because these are often easier to measure. However, this approach ignores important dimensions of wellbeing (e.g., connections to place, preservation of local knowledge and language) and does not necessarily include coupled measures about whether the growth is sustainable and equitable.

Careful consideration should be given to the development of culturally appropriate indicators, based on inputs from a range of knowledge and diversity of sources. Such an approach should begin with a locally grounded understanding of priorities and needs that

inform public interactions with, and management of, natural resources. It should also account for the availability of existing data and/or feasibility to collect new data. Using participatory methods, such as community-led visioning, co-design of workshops, or other locally/culturally informed engagement methods, ensures that the metrics are culturally relevant, are monitored in a respectful way, and target local decision-making needs. High levels of non-compliance with rules are routinely documented where people do not feel like their interests and values are represented. Furthermore, selecting locally appropriate indicators, including from civil society, can support local empowerment, cross-scale planning and evidence-based sustainability initiatives and avoid unintended negative impacts.^[4] Engaging local stakeholders throughout M & E is essential for local buy-in and ultimately, improved environmental and social outcomes.

Resources for Example Indicators:

A suite of resources that may help inform indicator development for the PNMS M & E plan are presented below. While these resources provide example indicators that may be of interest for monitoring process and outcomes of the PNMS, it is still recommended that a Palauan-led participatory process be undertaken to review existing indicators and identify other indicators relevant to local circumstances.

- Measures of success: designing, managing, and monitoring conservation and development projects. Island Press. Salafsky, N. and Margoluis, R.A., 1998.
- *How is your MPA Doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness*
- *Vanuatu National Sustainable Development Plan Monitoring and Evaluation Framework*
- *Toolkit for the Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes*
- *Indicators Relevant for Indigenous Peoples: A Resource Book*
- *Large-scale Marine Protected Areas: Guidelines for Design and Management*

- *Monitoring and Evaluation Framework: Improving food security and reducing poverty through intra-regional fish trade in Sub-Saharan Africa*

Extracted from the literature and expert opinion, the following list of process and outcome indicators represents a potential starting point which a Palauan-led group could draw upon to best meet local needs and values. A guiding principle is balancing comprehensiveness with feasibility in defining the final list of indicators.

Process Indicators

Process indicators evaluate the circumstances and practices underlying the development of outcomes. Assessing governance, administrative, and management processes can shed light on challenges limiting progress, mechanisms for proactively resolving them, and the system's capacity for resilience. More specifically, examining transparency in decision making, constituency engagement, and consultative processes facilitates positive outcomes. Because such conditions are highly specific to local cultural and political dimensions, the sample process indicators listed below are **only suggestions**, and not built into a draft plan by the Working Group. Development and prioritization of the most relevant process indicators and the methods to measure them should be an in-country, facilitated process, undertaken as part of broader stakeholder engagement and outreach plans.

Box 1. Sample Process Indicators

Participatory Engagement

- Proportion of different sectors and stakeholder groups actively participating
- Management objectives reflect local concerns and issues
- Evidence of inclusion of input from various stakeholders and sectors, to ensure diverse representation from multiple sectors of society (e.g., including diversity in gender, race, religion), of contributions to management processes/decisions
- Evidence of inclusion of traditional leaders in Sanctuary management decisions

Equity and Fairness

- Perceptions of equity in distribution of management costs and benefits (e.g., across demographic groups, inter-generations)
- Fairness in access to distribution of resource benefits
- Fairness in access to participatory processes (i.e. a meaningful seat at the table)

Appropriate Sanctions

- Frequency and effectiveness of monitoring, control, and surveillance
- Proportion of offenses that are adequately punished

Conflict Resolution

- Existence of forum or means to settle disputes
- Perception that conflict resolution is handled fairly and in a culturally appropriate way

Adaptive Management

- Monitoring information is regularly and effectively communicated to decision makers
- Decision makers use relevant information to adapt management measures
- Adaptations to rules consider present and future uncertainty regarding threats and processes

Inclusion of Different Knowledge Systems

- Evidence of inclusion of diverse knowledge systems (social and natural science and traditional and indigenous knowledge) in informing management decisions

Institutions and Institutional Capacity

- Clear institutional roles and mandates
- Complementary and nested institutional roles
- Management actions and monitoring is carried out by individuals who report to a coordinating body
- Consistency in goals and motivations across government institutions and economic sectors in achieving management outcomes
- Consistency of mandate through changes in political leadership
- Clear links between government decision-making process, civil society, and traditional institutions

Transparency

- Transparency in the decision-making process
- A documented and publicly available process

Outcome Indicators

Outcome indicators measure the effects of management activities on biophysical and socioeconomic dimensions. Unlike process indicators, they are more standard and broadly applicable to a diversity of contexts. The sample outcome indicators provided (Box 2) are likely to be refined by the PNMS strategic planning process, and accelerated by the forthcoming UNDP GEF 7 initiative. The next step in developing outcome indicators will involve inputs from multiple sectors (e.g. fisheries, tourism, food, health). A coordinating in-country body to facilitate the inputs will be an important aspect of capacity building. Core and optional indicators may be identified and prioritized, according to capacity, and may be expanded as institutional capacity grows over time.

A draft PNMS Science Plan (oceansolutions.stanford.edu/pnms-report) aligned with the following natural and social science subgoals has been prepared by this Working Group as a foundation for monitoring and evaluating outcomes of PNMS implementation. The draft plan is a compilation of questions, associated methodological information and connections to Sustainable Development Goals (SDGs),¹ addressing the most pressing PNMS research questions put forth by PNMS decision makers and stakeholders. The draft Science Plan will need to be reviewed by stakeholders in Palau to ensure research questions are appropriate for the needs and capacity of those conducting the monitoring. Recommendations for coordination amongst agencies and entities in Palau, the region, and internationally are included but not exhaustive. These initial suggestions are likely to change and be adapted through the GEF process and internal stakeholder and decision maker processes.

1. Healthy Ocean Populations and Ecosystems for Palau: Sustaining pelagic marine resources that benefit Palauan livelihoods and drive the Palauan economy

- **Subgoal 1:** Foster Palauan societal connection to and appreciation for Palau's offshore environments and resources; create the next generation of Palauan leadership to manage Palau's open ocean resources
- **Subgoal 2:** Protect pelagic populations and preserve marine biodiversity in Palau's waters
- **Subgoal 3:** Support sustainable fisheries

2. Food Security for Palau: Ensuring sustained and nutritious supply of food for Palauan residents

- **Subgoal 1:** Increase the availability of and access to domestic pelagic fish according to standard guidelines for health and nutrition for all Palauan residents
- **Subgoal 2:** Reduce fishing pressure on reef fish for the sustained cultural benefit to Palauans

3. Sustainable Development for Palau: Developing a domestic pelagic fishing industry and supporting existing sustainable tourism initiatives

- **Subgoal 1:** Develop a domestic pelagic fishery
- **Subgoal 2:** Support Palau's brand as an ecotourism destination
- **Subgoal 3:** Support long-term health and well-being for Palauan residents
- **Subgoal 4:** Support long-term economic sustainability in Palau

1 In addition to Palau's national goals for the PNMS, the PNMS exemplifies global progress towards the United Nations Sustainable Development Goals (SDGs). The PNMS is inherently a contribution to conserving marine areas (SDG 14.5) as well as other ocean targets. However, it also contributes to many of the other 16 SDGs, including food security (SDG 2), human health (SDG 4), decent work (SDG 8), industry and innovation (SDG 9), sustainable communities (SDG 11), sustainable consumption (SDG 12), climate action (SDG 13), and strong institutions (SDG 16). Palau is thus a leader not only in SDG 14, but also in how to leverage its policies to achieve goals across sectors.

Box 2. Sample Outcome Indicators²

Ecological – sustainability of the marine ecosystem

- Healthy pelagic fish stocks
- Healthy reefs and reef fish stocks

Economic – conversion and diversification of economic activities

- Percent economic gain in tourism, evidence that (eco)tourists visit because of the PNMS
- Percent economic loss in fisheries
- Income by community
- Total fishery landings
- Provision of employment and training opportunities for Palauans in the 20%
- Ratio of fishery exports to imports
- Number of vessels in the domestic pelagic fleet

Food Security – Ensuring sustained nutritious and safe supply of food for Palauan residents

- Availability of and access to domestic pelagic fish according to standard and safe guidelines for health and nutrition for all Palauans
- Per capita domestic pelagic fish consumption, distribution of pelagic fish consumption (by geographic, socioeconomic status, and age/gender demographics), pelagic fish supply and demand dynamics, fish consumption and preferences for key groups (tourists, residents, children)
- Human health indicators (obesity and non-communicable disease in Palau)
- Reliance on imported and/or processed foods
- Domestic agriculture production, supply and demand

Geographic – changes in land use or sea patterns

- Mapping of tourism dollars
- Mapping of fishery landings
- Ratio of offshore / nearshore fishery landings

Political – impacts on power relations, perceptions of the state

- Survey results on the success of the political system supporting to PNMS
- Changes in power dynamics

Institutional / Legal – impacts on tenure, legal rights

- New legislation enabling wellbeing, economic opportunity
- New legislation inhibiting wellbeing, economic opportunity
- Fishery compliance & observer coverage within Palau's waters

Community – social division, tension, hostility

- Social network analysis within and among communities (e.g. more connectivity due to PNMS or less)
- Evidence of management efforts changing the attitudes and behaviors of area users and the full range of diverse stakeholders

² These examples are high-level indicators – a Palauan M & E development process will need to locally define how to collect information (e.g., what does “fair” look like, what constitutes “inclusion”, etc., as well as design a process to collect and analyze the information).

Conclusion

A major challenge of developing and operationalizing an M & E framework for science, monitoring, and evaluation of the PNMS is that it must be systematic and rigorous enough to effectively assess the complexity of differing activities and practices. At the same time, it must be simple enough to be easily understood with succinctly communicated results based on real evidence via scientific research of natural and social systems. The methodology also must be repeatable to form a trackable baseline. Designing such a plan is a significant undertaking. Yet a practical, culturally meaningful M & E Plan will allow Palau to tell the grounded story of the measures taken to achieve positive outcomes of the PNMS for current and future generations.

Resources

- [1] Stem, R. Margoluis, N. Salafsky, and M. Brown, "Monitoring and evaluation in conservation: a Review of trends and approaches," *Conserv. Biol.*, vol. 19, no. 2, pp. 295–309, Apr. 2005.
- [2] C. Folke, "Social-ecological systems and adaptive governance of the commons," *Ecol. Res.*, vol. 22, no. 1, pp. 14–15, 2007.
- [3] Preiser, R. Biggs, A. De Vos, and C. Folke, "Social-ecological systems as complex adaptive systems: organizing principles for advancing research methods and approaches," *Ecol. Soc.*, vol. 23, no. 4, p. art46, 2018.
- [4] E. J. Sterling et al., "Biocultural approaches to well-being and sustainability indicators across scales," *Nat. Ecol. Evol.*, vol. 1, no. 12, pp. 1798–1806, Dec. 2017.



Photo courtesy of J. Tamelander