Planning for the Future: Constraints and Opportunities for Long-Term Monitoring of Marine Turtles in Western Australia

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The long-term monitoring of biological resources or assets is key to any adaptive management and conservation program. This is particularly true for long-lived species or species and habitats where lags may occur between the time of any impact and changes detected to a responding parameter. For the purposes of this paper, monitoring refers to the collection of time series data on key parameters as opposed to research which focuses on specific questions and is generally short in time scale. Indicators are usually selected key parameters that alert the manager of important changes that may be occurring to a species or habitat, which are considered the assets in a management context.

Funding for biological monitoring is usually allocated over short to mid-term periods with additional monitoring occurring irregularly or opportunistically during other targeted research activities. For the rare cases of long term monitoring plans, fluctuating funding availability can modify the activities and methodology over the course of the monitoring period.

The monitoring of marine turtles in Western Australia over the past 20 years has been highly influenced by various factors but dominated by funding cycles. The challenges related to long term monitoring (such as consistency in data collection and coverage across species, locations and life stages) can be improved by a more coordinated effort across the diversity of stakeholder groups that conduct monitoring.

Starting around 2000 several main stakeholder groups have emerged outside the Department of Parks and Wildlife who conduct marine turtle monitoring in Western Australia. They each have different drivers, funding sources, goals and capacities. The monitoring programs of these stakeholder groups were also influenced by the binding and non-binding requirements placed upon them by legislation and regulators through WA Department of Parks and Wildlife, Department of Fisheries, Marine Parks and Reserves Authority (MPRA), Environmental Protection Agency, Commonwealth Department of the Environment and the Commonwealth National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

The Department of Fisheries have specific needs in relation to turtle monitoring that are mostly centred around bycatch from trawl fisheries. Since a national mandate to install bycatch exclusion devices in 2003, the bycatch of turtles has markedly diminished and there are long-term programs in place that collect these data (Travaille et al. 2015)

The Department of Parks and Wildlife has a legislative responsibility for the conservation of wildlife under the *Wildlife Conservation Act 1950* and for the protection of key assets within protected areas under the CALM Act 1984 administered through the MPRA. Generally, core funding for marine monitoring within Parks and Wildlife is low. In addition to this core function, Parks and Wildlife also receive funds to deliver Environmental Offsets related to industry development projects.

Industries, including oil and gas, mining and urban expansion projects, often have their project approvals based upon conditions that require them to conduct research and monitoring around key assets that may be impacted during the life of the development. The monitoring can be of short or long time scales. Industry may also negotiate to self-deliver any of the environmental offsets required by these conditions. The largest marine fauna related offset from recent years is the Gorgon Gas North West Shelf Flatback Turtle Conservation Program (NWSFTCP) that is specific to improving conservation status of the region's flatback turtle management unit. Technically this is termed an Additional Undertaking, but operates much the same as other environmental offsets.

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) requires the oil and gas industry to collect marine biological information that is relevant in the event of an oil spill. This information needs to be sufficient to guide mitigation activities during an oil spill event

(Field 2015) and provide enough baseline information to measure impact and guide rehabilitation after an oil spill event.

Indigenous ranger programs have developed across northern Australia since the early 1990s. Coastal ranger groups have cultural obligations to look after turtles and many have begun monitoring nesting turtles. The capacity of these groups is expanding but long-term funding is uncertain. Non-government or community-based conservation groups have periodically started marine turtle monitoring in Western Australia. These have been driven by internal organisation goals rather than any external requirement. In many cases they have initiated good projects that have then been continued on by other organisations in the longer term. The Ningaloo Turtle Program is a good example of a project that begun as a three way partnership between Cape Conservation, WWF Australia and the Department of Parks and Wildlife (then CALM) (Coote and Lalor 2013). The Care for Hedland Program (Howlett 2015) is a great example of a longer term monitoring program, but there are few community NGO organisations that have the capacity to conduct decadal monitoring projects.

Private stakeholders provide useful information about marine turtles, often filling knowledge gaps and starting monitoring programs (Hattingh et al. 2013). Often these programs are related to refinement of their own business models to include conservation objectives. However, few have the capacity for decadal monitoring.

Universities generally do not run long-term monitoring projects and often do not have the required databases to span across projects and the tenure of individual researchers. University projects are often research based over short time scales and are mostly driven by academic outputs, measured in peer reviewed papers. Monitoring projects generally do not have high academic output compared to innovative and short term research projects.

Way forward

To manage long-lived, wide ranging species such as marine turtles, a coordinated effort among stakeholder groups is the most efficient and effective means of providing consistent, continuous, accessible data with adequate spatial and temporal coverage. A cooperative effort among stakeholder groups can deliver effective and efficient monitoring statewide which cannot be achieved by any single stakeholder group alone.

The Department of Parks and Wildlife will coordinate long-term monitoring of marine turtles across Western Australia and will finalise a draft statewide plan that closely fits the framework of the Commonwealth recovery plan.

Parks and Wildlife will continue to train volunteers and field staff, become a repository and archive of tagging and monitoring data that currently are isolated within Parks and Wildlife districts, synthesise grey literature of environmental monitoring reports to industry, and strive to align and standardise monitoring data collection across organisations.

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Table 1. Biological monitoring of marine turtles is delivered by different stakeholder groups in Western Australia. Summaries within stakeholder groups have been made that may not reflect all organisations within the group.

Stakeholder	Collecting monitoring data	Drivers for monitoring	Time scale of munding	Size of funding	Spatial scale of operation	Operational capacity (staffing logistics)	Data accessibility (management)
Department of Parks and Wildlife	Yes	CALM and Wildlife Conservation Acts	Long	Small	Large	Good	Good
	Yes	Administering of Environmental Offsets	Long, Mixed	Large	Mixed	Good	Good
Industry – compliance monitoring	Yes	Approvals and Compliance	Mixed	Large	Small	Good	Poor
	Sometimes	Administering of Environmental Offsets	Mixed	Large	Mostly small	Good	Poor
	Baseline only	NOPSEMA conditions	Mostly short	Mixed	Mixed	Good	Poor
Indigenous ranger groups	Yes	Cultural obligations to look after country, local employment	Mixed	Mixed	Mixed	Good	Mixed
Non-government agencies	Sometimes	Various conservation and business objectives	Short	Small	Small	Mixed	Mixed
Department of Fisheries	Yes	Ecosystem based management and bycatch monitoring	Long	Small	Large	Small	Good
Private (eg Gnaraloo Station	Yes	Various conservation and business objectives	Short or uncertain	Small	Small	Small	Mixed
Universities	No	No driver	Short	Mixed	Small	Small	Mixed

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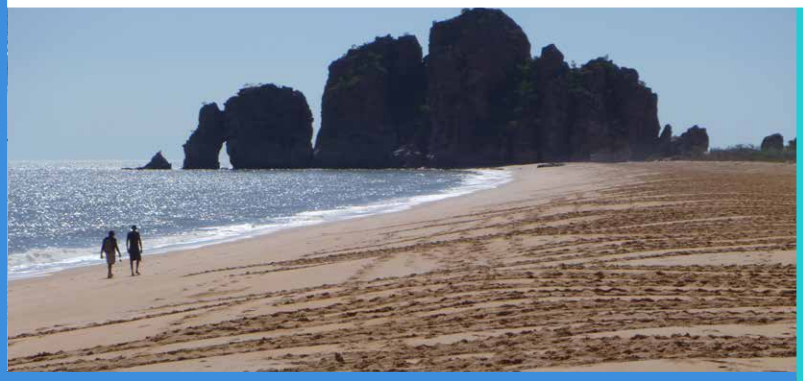
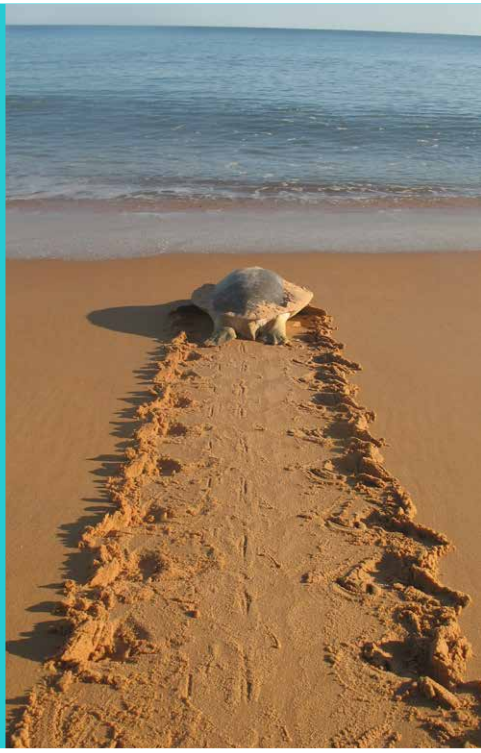


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