Department of
Primary Industries and
Regional Development

GOVERNMENT OF
WESTERN AUSTRALIA

Standard advice for designers of programs to monitor introduced marine pests in Western Australia -- January 2013

This advice should be followed by designers who are developing introduced marine pest (IMP) monitoring programs for projects within WA State waters, subject to marine pest ministerial conditions under the *Environmental Protection Act 1986*. At present these requirements are:

Prior to any non-trading vessel or immersible equipment entering the area to be protected, the proponent shall prepare an Introduced Marine Pests Monitoring Program to the satisfaction of the CEO of the Environmental Protection Authority in consultation with the Department that:

1. is consistent with monitoring design, implementation and reporting standards as set out in the National System for the Prevention and Management of Marine Pest Incursions (Marine Intergovernmental Agreement, April 2005);

2. includes a minimum monitoring frequency of once per year; and

3. requires opportunistic sampling and analysis of specimens removed during port, vessel and immersible equipment monitoring activities.

It is recommended that designers discuss their programs in detail with the Department prior to submission to the EPA to help ensure the programs meet the required standards.

The Department recommends that monitoring programs align with the National System[1] and use the Monitoring Design Excel Template (MDET) available from the Invasive Marine Species Program, Department of Agriculture, Fisheries and Forestry (DAFF).

Please note, the Department recommends all IMP program design reports are submitted to DAFF for approval by the Monitoring Design Assessment Panel (MDAP), therefore becoming nationally accredited designs. The advantages of doing so include national recognition of the design, development of a design that is peer reviewed and hence has been through a recognised quality control process. It also means that the design ensures…"monitoring data is collected using rigorous, consistent methods and is of a suitable quality for informed and scientifically-sound decision making" (National System 2010, p8).

This process usually only takes about a month and the resulting high-quality data will encourage companies to follow more environmentally sound practices.

General advice

1. Rather than sampling the entire proposed project area, it is recommended that a number of smaller sub-locations are used. However, the use and choice of sub-locations should be clearly justified within the IMP program design report and meet the below requirements to the satisfaction of the Department.

2. Choice of sub-locations should include:

    2.1. Possible vectors: wharves, anchorages, channels, tug/pilot base, boat ramps and slipways. Note that one sub-location can include more than one vector. For example a sub-location may include part of a wharf and a boat ramp.

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[1] For more information about the National System W: www.marinepests.gov.au/national_system

2.2. All habitat types that are present within the proposed project area must have some representation in at least one of the sub-locations. See National System (2010) Table 7 for the possible habitats that, if present, should be included in the design.

2.3. Consideration of prevailing currents and larval pooling areas.

2.4. Representative natural i.e. undisturbed area(s) adjacent to the project area. In particular habitat types that are not represented in the proposed project areas sub-locations, as they occur outside of the project area, are a priority.

2.5. A table providing the areal extent of the five MDET habitat types (1. Hard horizontal/vertical; 2. Soft substrate Epifauna; 3. Soft substrate Infauna; 4. Pelagic horizontal/vertical and; 5. Planktonic horizontal/vertical) for the sub-locations and the whole project area for comparison must be included in the IMP program design report.

Technical advice

MDET

1. Exclusion of species based on temperature and/or salinity intolerances should be checked and after considering local knowledge and circumstances the appropriateness of the exclusion commented on. Although the threshold values in MDET are based on current, published knowledge, they may not be exact. They may also only be exceeded in the monitoring location during a season that the affected species life stage is not present, meaning that the particular species could actually complete its life cycle during the remaining seasons. Species found to have been inappropriately excluded from MDET have to be added manually into the 'Choices' worksheet.

1.1. The Department recommends that a buffer zone of +/-3°C be applied to a species maximum and minimum temperature tolerance used in MDET.

1.2. The Department requires recommends that a buffer zone of +/-3 ppt be applied to a species maximum and minimum salinity tolerances used in MDET.

1.3. A table should be provided in the IMP program design report to show the species excluded by MDET, including the reason, and which species were manually re-included once the above buffers were applied.

2. When using the 'Adjust_sample_size' worksheet the resultant new sensitivity should be maintained above 60 %. Sample sizes that are adjusted should be clearly justified within the IMP program design report including the resultant new sensitivity (%).

Advice received from MDAP 20/04/2009:

3. Dinoflagellate cysts should be collected with cores; infaunal dredges are **not** a suitable sampling method.

3.1. Ensure that within the 'Species_data' worksheet of MDET the target population (i.e. Pop_size) for the seven species with a 'cyst' life stage is 10,000,000 (i.e. 10 million).

4. MDET may suggest intertidal sampling methods for sub-tidal habitats in cases where the area contains both intertidal and sub-tidal habitats. In this instance, choosing intertidal methods will only be appropriate for the intertidal proportion of an area, restricting the sampling to only a minor proportion of the total area to be sampled, which will be inappropriate for species found in sub-tidal habitats. If this happens, both intertidal and sub-tidal methods should be selected separately for that area. Designers should not select intertidal sampling methods for sub-tidal areas. The procedure to follow in this instance is as follows:

4.1. Choose both an intertidal and sub-tidal method in the 'Working' MDET worksheet. Then reduce the calculated sample sizes proportionally for both the intertidal and sub-tidal areas. The new costs can still be estimated using the 'adjust_sample_size' worksheet.

4.1.1. For example if the original methods chosen in MDET calculated the following:
Walk_visual: sample_size = 10 (i.e. intertidal method)
Diver_visual: sample_size = 20 (i.e. sub-tidal method)

But the sub-location area is 60% intertidal and 40% sub-tidal, then the adjusted sample sizes will be:
Walk_visual: sample_size = 6 (i.e. 10 x 0.6)
Diver_visual: sample_size = 8 (i.e. 20 x 0.4)

Following this procedure will maintain the sensitivity at 80%.

4.2. The adjusted sample sizes should be rounded up and added to the 'Choices' worksheet as described in the MDET user guide version1c. Designers need to use sound judgment when applying this solution and explain their approach in the IMP program design report.

5. *Beroe ovata* and *Mnemiopsis leidyi* (i.e. ctenophores or sea jellies) should be targeted with zooplankton trawls not diver visual searches. These calculations will need to be done outside MDET following as follows:

5.1. To calculate manual zooplankton trawls for jellies ONLY:

$$\text{Sample size} = \frac{-subLocArea*\log(0.2)}{Pop\ size*samArea*Eff}$$

where:

- subLocArea (sub location area) = sub tidal area/vol (MDET column H in 'Location_data' worksheet for the appropriate sub location)

- pop size (species population size) = pop_size (MDET column T in the 'Species_data' worksheet for the species and lifestage of interest)

- samArea (sample method area) = Sample_area/vol for zooplankton (MDET column G in 'Method_data' worksheet)

- Eff = 1-Pr_flee_noprep (MDET column J in the 'Species_data' worksheet for the species and lifestage of interest).

6. A temperature range of 0-30℃ for *Balanus improvisus* (synonym: *Amphibalanus improvisus*), as listed on the National Introduced Marine Pest Information System (NIMPIS) website must be used. The MDET temperatures are incorrect[2].

References

National System for the Prevention and Management of Marine Pest Incursions (National System), (2010). *Australian Marine Pest Monitoring Manual: Version 2.0* available from the Department of Agriculture, Fisheries and Forestry website. http://www.marinepests.gov.au/national_system/how-it-works/monitoring

Monitoring Design Excel Template (MDET) User Guide, Version 1C. Contact the Invasive Marine Species Program at the Department of Agriculture, Fisheries and Forestry to obtain a copy. Email: IMS-Program@daff.gov.au

[2] Advice received from DAFF 18/12/2012