Northern Territory Aquarium Fishery – Harvest Strategy

NORTHERN TERRITORY GOVERNMENT

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Contact details	Department Industry, Tourism and Trade
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Acronyms	Full form
ERA	Ecological Risk Assessment
NDF	Non-detrimental Finding
NT	Northern Territory
SoC	Species of Concern

Disclaimer

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1. Introduction

The Northern Territory (NT) Aquarium Fishery has been regulated since the 1970's under the NT *Fisheries Act 1988*, the NT *Fisheries Regulations* 1992, and associated Aquarium Fishery licence conditions. To enable the best possible management of the Aquarium Fishery a contemporary management framework is being developed, and once that process is finalised, the harvest strategy detailed in this document will be a key component of the new management framework. The NT *Fisheries Act 1988*, provide the high level objectives that guide the management arrangements for the Aquarium Fishery, which include;

- To manage the aquatic resources of the Territory in accordance with the principles of ecologically sustainable development.
- To maintain a stewardship of aquatic resources that promotes fairness, equity and access to aquatic resources by all stakeholder groups, including:
  - (i) Aboriginal people
  - (ii) commercial fishing, aquaculture and fishing tourism industries
  - (iii) amateur fishers
  - (iv) others with an interest in the aquatic resources of the Territory.
- To promote the optimum utilisation of aquatic resources to the benefit of the community.

2. Harvest Strategy

This Harvest Strategy has been developed in line with the *NT Harvest Strategy Policy*, and provides a structured framework for decision making to ensure the goals identified in this Framework are achieved. This strategy provides certainty to users and promotes the long-term sustainable use of resources associated with the Aquarium Fishery.

Application of the Harvest Strategy involves two key steps to be undertaken each year:

1. Use performance indicators (and reference points) to measure and assess fishery performance with respect to an operational objective (or multiple objectives where appropriate); and
2. Utilise pre-determined decision rules to initiate the appropriate management actions that will ensure operational objectives are achieved if reference points are hit.

The operational objectives, reference points and decision rules in this Harvest Strategy aim to mitigate risks identified in the ERA completed in 2019 and are in line with the long-term fishery goals for the Aquarium Fishery.

2.1. Harvest Strategy groupings

The Aquarium Fishery harvests a number of different species depending on the time of the year, market demands or gear type used by individual fishers. The Harvest Strategy has been designed to accommodate this variation through a number of groupings that include:

- Hard corals
- Soft corals
- Giant Clams
- Anemones
- Live rock
- Other retained species

Hard and soft coral groupings are further refined into Tier 1 and Tier 2 subgroups. These subgroups were created to classify priority species for monitoring in the Harvest Strategy.

Tier 1 hard corals includes the Species of Concern (identified by the CITES Scientific Authority) and all other hard corals harvested at or over 80% of their non-detriment finding harvest limits determined by the Wildlife Trade Office, Australian Government Department of Climate Change, Energy, the Environment and Water.

Initial determination of Tier 1 hard corals harvested at or over 80% will be made from a baseline period between 2015-16 and 2019-20. All other hard corals will be classified as Tier 2 upon commencement of the Harvest Strategy.

Tier 2 hard corals will not be included as part of the annual Harvest Strategy assessment, but a Tier 2 hard coral can be elevated to Tier 1 under the following scenarios:

- A Tier 2 hard coral species is classified as a Species of Concern (SoC); or
- A Tier 2 hard coral species' mean annual harvest amount over three consecutive years is greater than or equal to 80% of the harvest limit.

A Tier 1 hard coral species can be down-graded to Tier 2 if it is no longer classified as a Species of Concern, and its mean annual harvest amount over three consecutive years is less than 80% of the harvest limit.

Tier 1 soft corals includes species that comprise more than 5% of the total annual soft coral catch composition (excluding corallimorphs and zoanthids). All other soft corals will be classified as Tier 2 and will not be included as a part of the annual Harvest Strategy assessment.

2.2. Operational Objectives

Operational objectives have been developed by the Department in consultation with stakeholders, and are designed to ensure the fishery is working towards achieving the long-term fishery goals. The operational objectives directly relate to harvest and ecosystem impacts of the fishery. The operational objectives are linked to performance indicators and reference points and are contained within the Harvest Strategy (Table 2).

2.3. Performance Indicators and Reference Points

Performance indicators have been established for each operational objective and will be used to measure fishery performance with respect to achieving the objectives (by comparing where the indicator sits in relation to a linked reference point). The performance indicators vary according to which species and ecosystem effect is being monitored.

The following reference points are used to assess fishery performance in this Harvest Strategy in accordance with the *NT Fisheries Harvest Strategy Policy:*

1. **Target Reference Points (Target)** define the values of the performance indicator for a stock or management unit that are desirable or ideal and at which management should aim.
2. **Trigger Reference Point (Trigger)** define the value of a performance indicator for a stock or fisheries management unit at which a change in the management is considered or adopted. Trigger reference points can be used to determine staged management responses to different stock levels or to define when a stock or management unit is transitional-depleting or transitional-recovering.

3. **Limit Reference Points (limit)** define the value performance indicator for a stock or management unit that are considered unacceptable from a sustainability perspective. For example, when a stock or management unit has become recruitment overfished or environmentally limited.

The performance indicators and their target, trigger and limit reference points used in this Harvest Strategy are described in Table 1.

Table 1. Performance indicators and reference points used in the Harvest Strategy.

Performance Indicator	Reference Points
Total annual catch of hard corals (Tier 1), live rock and giant clams.	Target: Harvest limit.
	Trigger: A reduction of 25% or more compared to the mean of the previous three years for Species of Concern (SoC). A reduction of 50% or more compared to the mean of the previous three years for all other hard corals (Tier 1), live rock and giant clams.
	Limit: NA
Annual catch trend for hard corals (Tier 1), live rock, giant clams, soft corals (Tier 1), and anemones.	Target: Positive or zero gradient in the trend of catch over the previous three years.
	Trigger: Negative gradient in the trend of catch over the previous three years.
	Limit: NA
Risk ratings derived from an Ecological Risk Assessment for all other retained species, habitat and ecological processes.	Target: Low risk
	Trigger: Medium risk
	Limit: High risk

2.4. Decision rules

The decision rules used in this Harvest Strategy provide direction for the pre-determined management actions to achieve the operational objectives. For each performance indicator and reference point, an accompanying decision rule directs the management needed to achieve the operational objectives (Table 2). These decision rules are designed to maintain the performance of the indicator above the trigger point (i.e. within the target range), or rebuild it where it has fallen below the trigger (undesirable) or the limit (unacceptable) points.

2.4.1. Application of the decision rules

The Fisheries Division will undertake an assessment of each performance indicator in accordance with the method and review period defined in the Harvest Strategy and described in the Monitoring and Research Plan. If the assessment finds that a performance indicator has breached a reference point then the process of applying the decision rules will depend on the review period on the chosen performance indicator:

- Indicators with annual review periods will have decision rules that follow the Decision Rule Flowchart (see below) to help inform whether the pre-determined management actions are necessary and require consideration by the Advisory Group.

- Indicators with longer review periods will have decision rules that specify pre-determined management actions which require consideration by the Advisory Group.

Performance indicators reviewed on an annual basis will be assessed based on the calendar year (1 January to 31 December). This will provide sufficient time for the Advisory Group develop its advice and provide a recommendation to the Director of Fisheries between February and April each year. The Director of Fisheries will then consider the recommendation and make a decision prior to the start of the next fishing season (1 July).

In developing its advice the Advisory Group will be required to review all available evidence associated with performance of the indicator and help determine the extent of the management action taken, increasing in line with an increasing risk to the resource.

Extraneous circumstances will be taken into consideration when assessing the performance of indicators.

2.4.1.1. Decision Rule Flowchart

Non-detrimental finding (NDF) harvest limits by definition are prescribed such that if fully utilized there is no impact on the ability of a population to persist and grow. However, the Aquarium Fishery operates within a capricious environment whereby catch rates can be highly variable and confounded as consequence of a complex mix of seasonal effort and access, volatile market demand, all within a region subjected to extreme climatic and environmental events. The volatile nature of the fishery and its markets could mean that declines in harvest or harvest rates are not necessarily driven by stock abundance, and in the event a harvest strategy trigger is breached there is a need to investigate and identify the potential causal and contributing factors.

The decision rule based flow chart identifying significant factors influencing catch and effort variance will help inform whether a management action is required for any species that breaches a trigger point under the application of the Harvest Strategy (Figure 1). The flow chart is a tool, not exhaustive, and is continuously reviewed by the Fisheries Division, in collaboration with licence holders and expert stakeholders.

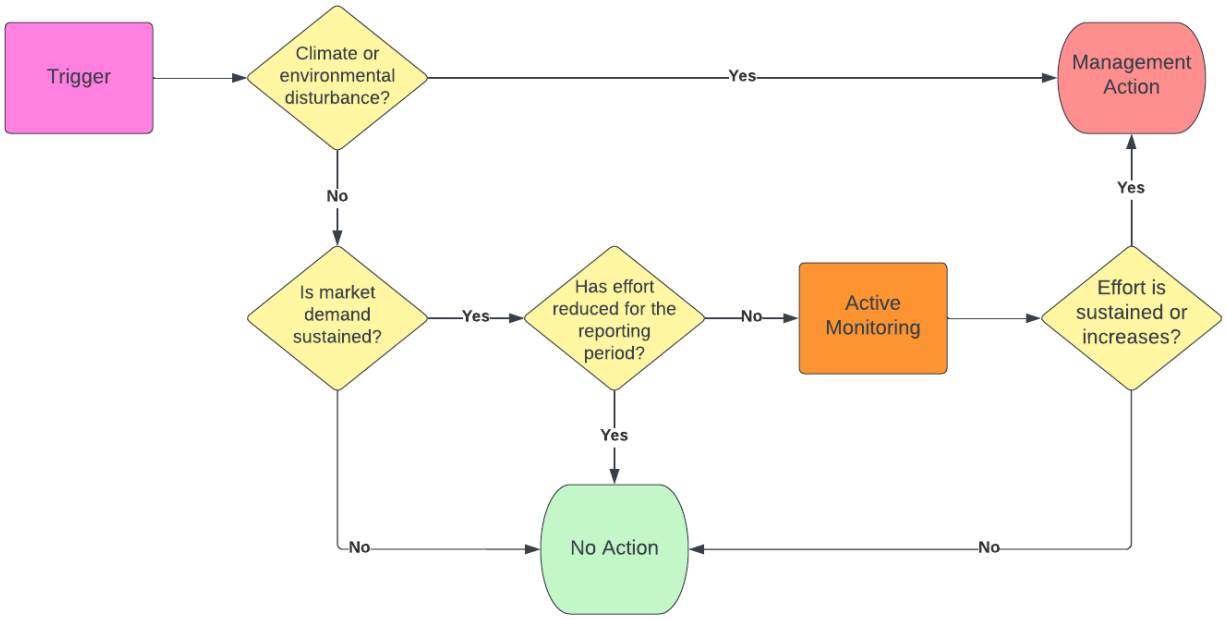

Figure 1. Decision rule flowchart

2.4.2. Recovery Plan

In the event that a species does not show evidence of recovery under the application of the decision rules (i.e. the performance indicator remains below the limit reference point for an unacceptable timeframe) the Advisory Group will be tasked with developing a recovery plan for the species.

Table 2. Harvest Strategy performance indicators, reference points and decision rules for the Aquarium Fishery.

Hard Corals (Tier 1), Live Rock and Giant Clams					
Long-term fishery goal	**Operational objective**	**Performance Indicator**	**Method / review period**	**Reference Points**	**Decision Rules**
Maintain the harvest of marine and freshwater Aquarium Fishery stocks within sustainable levels taking into account natural variation.	Maintain the harvest of hard corals, live rock and giant clams at non-detriment findings	Total catch	Total catch reviewed on an annual basis	**Target:** 100% of harvest limit.	Continue management aimed at achieving long-term fishery goals and if at Target for three consecutive years then consider investigating a possible increase in non-detriment finding for relevant species.
				Trigger: > 25% reduction from the previous three years mean for SoC. > 50% reduction from the previous three years mean for giant clams, live rock and all other Tier 1 hard corals.	If below Trigger then investigate reasons for reduced harvest by following the Decision Rule Flowchart. If management action is required then conduct spatial analysis of fishing effort and catch to determine appropriate management action. Management action may include: • spatial management • reduction in harvest limits • conducting research and monitoring for the affected species.
Maintain the harvest of marine and freshwater Aquarium Fishery stocks within sustainable levels taking into account natural variation.	Maintain the catch trend of hard corals, live rock and giant clams at positive or zero gradient trends	Catch trend	Trend of catch reviewed on an annual basis	**Target:** Positive or zero gradient in trend of catch over previous three years.	Continue management aimed at achieving long-term fishery goals and if at Target for three consecutive years then consider investigating a possible increase in non-detriment finding for relevant species.
				Trigger: Negative gradient in trend of catch over previous three years.	If below Trigger then investigate reasons for reduced harvest by following the Decision Rule Flowchart. If management action is required then conduct spatial analysis of fishing effort and catch to determine appropriate management action. Management action may include: • spatial management • reduction in harvest limits • conducting research and monitoring for the affected species.

Soft Corals (Tier 1) and Anemones					
Long-term fishery goal	**Operational objective**	**Performance Indicator**	**Method / review period**	**Reference Points**	**Decision Rules**
Maintain the harvest of marine and freshwater Aquarium Fishery stocks within sustainable levels taking into account natural variation.	Maintain the catch trend of soft corals, and anemones at positive or zero gradient trends.	Catch trend	Trend of catch reviewed on an annual basis	**Target:** Positive or zero gradient in trend of catch over previous three years.	Continue management aimed at achieving long-term fishery goals.
				Trigger: Negative gradient in trend of catch over previous three years.	If below Trigger then investigate reasons for reduced harvest by following the Decision Rule Flowchart. If management action is required then conduct spatial analysis of fishing effort and catch to determine appropriate management action. Management action may include: • spatial management • reduction in harvest limits • conducting research and monitoring for the affected species.

Other retained species					
Long-term fishery goal	**Operational objective**	**Performance Indicator**	**Method /review period**	**Reference Points**	**Decision Rules**
Maintain the harvest of marine and freshwater Aquarium Fishery stocks within sustainable levels taking into account natural variation.	Maintain a negligible or low risk to all other retained species	Risk of fishing impact to all other retained species	Ecological risk assessment conducted every 5 years.	**Target:** Low risk	Continue management aimed at achieving long-term fishery goals.
				Trigger: Medium risk	Investigate options to reduce the risk and implement appropriate management actions and/or monitoring required to enable a return to Target.
				Limit: High risk	Investigate options to reduce the risk and implement increased or additional management actions and monitoring required to enable a return to Target.

Ecological impacts					
Long-term fishery goal	**Operational objective**	**Performance Indicator**	**Method /review period**	**Reference Points**	**Decision Rules**
Mitigate the risk of causing serious or irreversible harm to habitat structure and function.	Maintain a negligible or low risk to habitat structure and function.	Risk of fishing impact to habitat structure and function.	Ecological risk assessment conducted every 5 years.	**Target:** Low risk	Continue management aimed at achieving long-term fishery goals.
				Trigger: Medium risk	Investigate options to reduce the risk and implement appropriate management actions and/or monitoring required to enable a return to Target.
				Limit: High risk	Investigate options to reduce the risk and implement increased or additional management actions and monitoring required to enable a return to Target.
Mitigate the risk of causing serious or irreversible harm to ecological processes.	Maintain a negligible or low risk to ecological processes.	Risk of fishing impact to ecological processes.	Ecological risk assessment conducted every 5 years.	**Target:** Low risk	Continue management aimed at achieving long-term fishery goals.
				Trigger: Medium risk	Investigate options to reduce the risk and implement appropriate management actions and/or monitoring required to enable a return to Target.
				Limit: High risk	Investigate options to reduce the risk and implement increased or additional management actions and monitoring required to enable a return to Target.

2.5. Review of the Harvest Strategy

It is proposed that a review of the Harvest Strategy will be conducted after the first year of its implementation to ensure it is operating as intended. A comprehensive review of the Framework.