

**Fish Habitat Management Operational Policy FHMOP 005
(2002)**

**Mitigation and Compensation
for Works or Activities Causing
Marine Fish Habitat Loss**

Departmental procedures

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DPI

Other publications in the QDPI Fish Habitat Management Operational Policy Series:

FHMOP 001: Fish Habitat Management Operational Policy for the Management and Protection of Marine Plants: Departmental Assessment Procedures and Policy Position.

FHMOP 002: Departmental Procedures for Permit Applications Assessments and Approvals to Perform Works or Related Activity in a declared Fish Habitat Area.

FHMOP 003: Departmental Procedures for Permit Applications Assessments and Approvals for Insect Pest Control in Coastal Wetlands.

FHMOP 004: Dredging, Extraction and Spoil Disposal Activities: Departmental Procedures for Provision of Fisheries Comments.

FHMOP 006: Fish Habitat Area Declaration and Review: Departmental Consultation Procedures.

FHMOP 007: (draft) Fish Habitat Area Selection and Assessment: Departmental Procedures.

FHMOP 008: Waterway Barrier Works Approvals and Fishway Assessments: Departmental Procedures

FHMOP 009: Restoration Notices for Fish Habitats - Formulation and Implementation: Departmental Procedures

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See also the Fish Habitat Guideline Series and Fish Habitat Code of Practice Series.

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Contents

Foreword	IV
1. Purpose	1
2. Scope	1
3. Objectives of the Fisheries Act	1
4. Introduction	2
5. Policy objectives	3
6. Policy principles	4
7. Overview of mitigation and compensation assessment stages	8
8. Requirements for mitigation and compensation	9
9. Policy performance criteria and review	12
10. Glossary	13
11. References	15
Appendix 1 No nett loss of marine fish habitat	19
Appendix 2 Supporting background information	20
Marine fish habitat management	20
Mitigation	21
Appendix 3 Performance indicators	23
Appendix 4 Mitigation/ compensation assessment information for permit applications	24
Appendix 5 Fish habitat management publications	25
Appendix 6 Selected statutory instruments linked to fish habitat management	27

Figures

Figure 1 Mitigation and compensation assessment stages	8
Figure 2 Assessment flow chart for permit applications	24

Tables

Table 1 Guideline for minimum requirements for authorisation of loss of marine fish habitat - new works (public or private) on tidal land	11
Table 2 Guideline for minimum permit requirements for authorisation of loss of marine fish habitat - maintenance works (public or private structures) on tidal land	12

Foreword

This Policy provides information on Queensland Fisheries Service requirements for mitigation and compensation where fish habitat loss is proposed. To be reviewed after a period of twelve (12) months in light of feedback from staff, this document should be used as a guide only and is not intended to be used for specific legal or legislative information. Queensland Fisheries Service has made all attempts to provide accurate information. However information contained within this document may be subject to change at any time. Amendments will be made where necessary and practical.

Any comments on the adequacy or otherwise of the content should be forwarded to

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1. Purpose

This Policy assists and guides decision-making (permit assessment) and negotiation of proposals to achieve mitigation of impacts through avoidance and minimisation of impacts (on-site), and compensation for marine fish habitat losses (off-site), which are likely to result from authorities granted under the Queensland *Fisheries Act 1994*.

The Policy also applies when providing comments to other government agencies and when assessing proposals subject to referral coordination or impact assessment. This Policy has been prepared for use by staff of Queensland Fisheries Service (QFS) of the Department of Primary Industries (DPI).

2. Scope

This Policy applies to all works proposed for approval under Section 51 of the *Fisheries Act 1994*, where marine fish habitats (including marine plants and lands within declared Fish Habitat Areas (FHA)) are to be permanently or temporarily lost, or otherwise modified, causing loss of fisheries resources and fish habitats.

A range of options for mitigation is recognised by the Policy, allowing integration of projects of varying scale within the one strategy for Queensland. Concerns about local losses of habitat or habitat function may be addressed through local mitigation projects. However the concept of a 'Statewide Compensation Program' is outlined to enable large scale compensation projects, situated outside impacted sites, to address and enhance fish habitats degraded elsewhere, if required. Compensation programs may also seek to achieve preservation of existing pristine habitats by removing development threats to prime fish habitats in order to gain long term fisheries benefits.

This Policy *does not* cover rehabilitation of sites and/or removal of impacts following unauthorised fish habitat disturbance. In these situations, a direction to restore fish habitat may be imposed by the Chief Executive in the form of a Restoration Notice.

3. Objectives of the Fisheries Act

The *Fisheries Act 1994* is an Act for the management, use, development and protection of fisheries resources and fish habitats and the management of aquaculture activities, and for related purposes. This Policy will support decisions required by fisheries legislation.

Main Purpose of Fisheries Act (extract from Section 3 (1) and (2) of the Fisheries Act 1994)

(1) The main purpose of this Act is to provide for the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to –

- (a) apply and balance the principles of ecologically sustainable development; and*
- (b) promote ecologically sustainable development.*

(2) In balancing the principles, each principle is to be given the relative emphasis appropriate in the circumstances.

How purpose is to be primarily achieved

The main purpose of this Act is to be primarily achieved by –

(a) giving the chief executive appropriate powers to perform the chief executive's functions under this Act; and

(b) providing for the following –

(i) the management and protection of fish habitats

(ii) the management of commercial, recreational and indigenous fishing

(iii) the prevention, control and eradication of disease in fish

(iv) the management of aquaculture

4. Introduction

A requirement for 'mitigation of impacts' and 'compensation for losses' is a key component of assessment and decision-making undertaken by QFS, of DPI, in its management of marine fish habitats in Queensland. This approach is supported by a Queensland Government Policy of preventing further loss of marine and coastal habitat, and to implement policies aimed at ensuring no nett loss of mangroves in the coastal zone.

In response, QFS has developed a No Nett Loss of Marine Fish Habitat Policy (refer to Appendix 1), with an objective to ensure the total area, quality or access to fish habitat in the coastal zone are maintained or improved so that the natural productive capacity of fish habitats for Queensland fisheries resources to benefit present and future users may be maintained.

Planning decisions need to consider implications for management and protection of fish habitat and fisheries resources. The direct and indirect input to fish habitat planning processes and decisions made by other approval and management agencies may affect progress towards sustainable fisheries and fish habitats. The implementation of both short and long term strategies to maintain sustainable fish habitats is presently in place through fisheries legislation and habitat management strategies of QFS.

Queensland Fisheries Service uses the principal framework of protection and management of fish habitat provided by fisheries legislation in its day to day fisheries management (information on marine fish habitat management is provided in Appendix 2.) The *Fisheries Act 1994* limits the disturbance of fish habitats through a statutory requirement to obtain prior approval. In assessing proposed disturbance to marine fish habitat, QFS may consider a level of mitigation or compensation for the resultant impacts as an element of the assessment process. The offer of monetary or other compensation does not secure the issue of a permit. Permit applications are assessed in consideration of all the information provided, and agreement with mitigation and compensation options forms part of the assessment process.

Mitigation or compensation measures are short term management responses to lessen impacts of a proposed disturbance/ loss of fish habitats through a reduction in impacts, or to offset the level of impact. However the benefits derived from these measures extend to long term management goals, and monitoring of the performance of strategies should be considered by QFS to ensure the development of sustainable fisheries resources in the longer term.

Mitigating or compensating actions can include:

- best practice methodologies;
- habitat productivity enhancement;
- restoration or replacement of fish habitat;
- fisheries resource research and education support;
- the payment of bonds (held towards ensuring that impacts are minimal);
- fish habitat creation;
- fish habitat acquisition/ exchange (relinquishment of private tenure); or
- fisheries stock enhancement.

Mitigation and compensation to offset fisheries resource losses are considered only after it is accepted that the proposed loss is justifiable, unavoidable and acceptable under departmental legislation and policy. Further supporting background information on mitigation is provided in Appendix 2.

5. Policy objectives

The objectives of this Policy are:

- to maintain fisheries values, including fish habitat values;
- to seek to ensure the costs associated with fish habitat losses attributed to public or private works are matched with, or are less than, a level of mitigation and/ or compensation appropriate to the disturbance of fish habitat;
- to promote maintenance of marine fish habitats through implementation of mitigation or compensation to meet the objective of No Nett Loss of Marine Fish Habitat Policy;
- to recognise the natural capital of fish habitats; and
- to create public awareness of the value of fish habitats.

6. Policy principles

The following policy principles (PP) apply to mitigation (on-site) or compensation (off-site) associated with marine fish habitat loss and relate to decisions made Statewide. Reference should also be made to principles outlined in all QFS fish habitat management operational policies.

PP1

QFS supports the proper management, use and protection of Queensland's fisheries resources. The granting of approvals and/or provision of comments for disturbance of habitat used by marine fisheries resources is to be in accordance with the principles of Ecologically Sustainable Development (ESD).

As highlighted in Section 3 of this Policy the main purpose of the *Fisheries Act 1994* includes applying and balancing the principles of ESD and promoting ESD. The meaning and nine (9) principles of 'ecologically sustainable development' are defined in the *Fisheries Act 1994* (under Section 3 (3) of the Act) and are listed in Section 10 of this Policy.

The many functions provided by marine fish habitats to the community are assets or natural capital. Because of their key value as natural capital, the protection of these habitats and their assets has been promoted (e.g. Costanza *et al*, 1997, and Gray, 1998) with an emphasis on the need to assess the true cost associated with replacement of such habitats where their removal is proposed. This policy principle provides broad recognition of the need to balance any losses associated with development of fisheries assets. Opportunities to incorporate enhancement and/or protection of existing assets, rather than developing or changing these habitats for other uses, should always be explored as a first/ preferred option. Compensation and mitigation should seek to reflect actual asset replacement cost.

PP2

QFS decisions made in relation to mitigation and compensation are to have regard to other marine fish habitat management and protection policies.

The QFS approach to accepting mitigation (on-site) or compensation (off-site) for marine fish habitat disturbance or removal (temporary or permanent) is to be consistent with other marine fish habitat management operational policies. When an approval is required, a staged approach to decision making applies, and consideration is firstly given to mitigation through 'avoidance' and 'minimisation' of proposed disturbances. Mitigation or compensation of losses must be considered as part of the approval process and appropriate measures are to be determined for each proposal.

Compensation for unavoidable losses is to be explored when avoidance and minimisation options have been exhausted. The appropriate measures are to be determined on a case-by-case basis for each proposal to achieve other fisheries resources benefits (see Figure 1 for further information).

PP3

QFS decisions made in relation to authorisation of medium and large losses of marine fish habitat, where options for on-site mitigation of those losses do not exist, are to consider alternative off-site compensation.

In some instances, proposed losses may not be fully matched with an appropriate level of mitigation, and compensation should therefore be considered to ensure that the costs to the community of disturbing and/ or removing fish habitats are considered against the potential benefits of the proposal.

Compensation measures include support, in-kind and financial, for:

- research projects;
- community based initiatives (e.g. Seagrass Watch);
- restoration/ rehabilitation projects; and
- signage or educational materials for marine fish habitat information/ management; or to enhance fishing access for the community (fishing platforms).

Compensation options may usually be carried out 'off-site' or may be part of a 'Statewide Compensation Program'. These options may be considered in order to achieve other fish habitat or fisheries resource related benefits for communities.

Further off-site compensation options may involve land-exchange where landholders may choose to relinquish critical fish habitats to the State, and in some cases, for these habitats to be included within declared Fish Habitat Areas.

A Statewide Compensation Program may consider projects including:

- undertaking/ funding restoration projects across the State, where outcomes have a Statewide application;
- initiating community awareness projects (educational signage, provision of facilities for public fishing activities); or
- contributing credits before debits are used (mitigation banking concept).

In some situations a combination of mitigation and a compensation program may be required.

Further, as stipulated in FHMOP 001 (2002), where whole-of-government support has been given to large-scale developments, QFS will pursue mitigation and compensation for any impacts on, or losses of, marine plants and other fish habitats.

As mentioned in Section 4 of this Policy the offer of monetary or other compensation does *not* secure the issue of an authority under the provisions of the *Fisheries Act 1994*. Authorities are issued/ refused in consideration of all the information provided, and agreement with mitigation and compensation options forms part of the assessment process.

PP4

In circumstances where either mitigation or compensation (or a combination of both) is considered an acceptable component of an approved application, formal mitigation or compensation agreements will be a requirement of authorities issued. Authorities will be extended to apply to mitigation/compensation agreements accepted for off-site locations.

Mitigation or compensation agreements will be recognised as a condition of the authority granted, and monitoring will be required to document the success of the measures adopted. The timing of any agreement is to be considered, and authorisation of fish habitat loss should only be granted after the terms of an agreement are finalised.

PP5

Where mitigation or compensation programs have been accepted, any performance indicators to be met within a specified time frame will be outlined within the granted authority.

Projects for rehabilitation/ enhancement of degraded habitats accepted as compensation require close monitoring and evaluation of performance. Standard performance criteria will apply to rehabilitation and enhancement projects that have been developed as compensation measures. Examples of performance indicators are outlined within Appendix 3.

PP6

Land exchange proposals may be considered where permanent loss of marine fish habitat is proposed.

A government (State or local) managed land exchange or land acquisition program or proposals that allow the inclusion of tenured land to be managed as declared FHA, may be supported by QFS, to offset the loss of marine fish habitat, provided:

- the lands proposed for exchange are tidal and can be relinquished and assigned to meet the objectives of the acquisition program, or managed within a declared FHA;
- the area of lands proposed for exchange is greater in size than the area proposed to be lost;
- the lands proposed for exchange support marine fish habitat communities equivalent to those (i.e. similar species composition) which may be removed or provide critical or important fish habitat functions;
- the proposal seeks no nett loss of fisheries productivity; and
- community support exists for the proposed land exchange.

Where land exchange proposals involve excision of lands from within a declared FHA, revocation procedures will apply.

PP7

QFS does not support replacement of existing (naturally occurring) marine fish habitats with different communities.

The values of existing fish habitats should not be compromised by an objective that would change or remove those values, e.g. placement of dredged spoil on mud flats for creation of mangrove habitats.

PP8

Funding for research, as a form of compensation for loss of marine fish habitats, is to be dedicated to fisheries related projects agreed to by QFS and the proponent, in consultation with other stakeholders (local government, other relevant management agencies, industry representatives or associations and research organisations).

Research proposals should be encouraged to link to themes identified in the Marine Fish Habitat Research Strategic Plan (Kirkwood, 2000) as follows:

- Habitat utilisation
- Habitat status
- Habitat production
- Ecological processes
- Human impacts
- Habitat rehabilitation

Research agreements should clearly stipulate the terms of use of all research findings and distribution of information. Intellectual property rights such as use and publication of research findings must be addressed where agreements are signed. Any funds provided for research purposes would be paid into the Fisheries Research Fund as per Section 117 of the *Fisheries Act 1994*.

7. Overview of mitigation and compensation assessment stages

The following schematic (Figure 1) illustrates mitigation and compensation assessment stages for loss of marine fish habitat, and is used to satisfy requirements of the no nett loss of marine fish habitat objective and to minimise all impacts. These mitigation and compensation assessment stages are in addition to assessment stages for applications using FHMOP 001 and FHMOP 002:

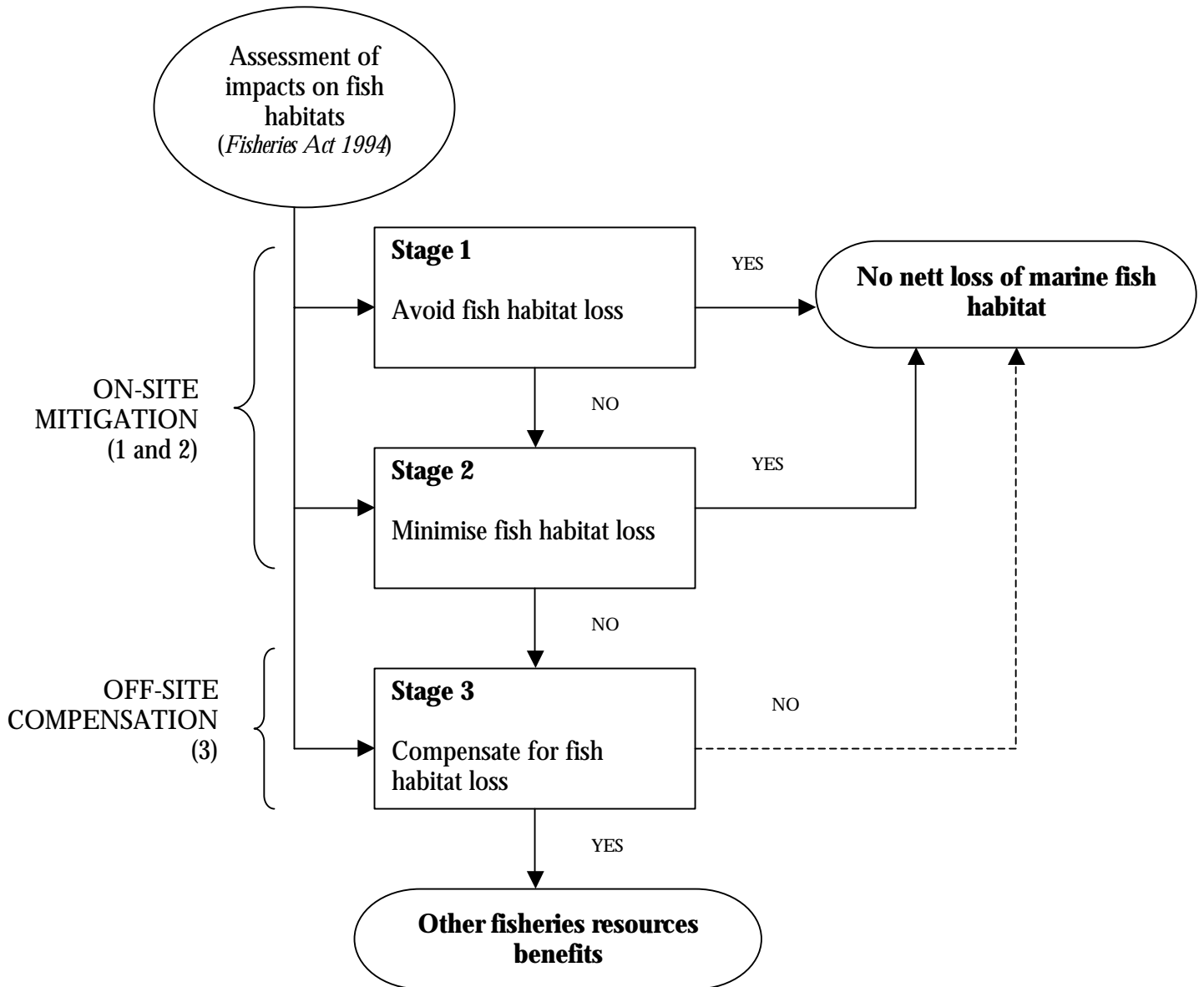


Figure 1 Mitigation and compensation assessment stages

Note that Stages 1 and 2 are based on on-site resolution of impacts whereas Stage 3 aims for agreed off-site compensation.

- Stage 1:** Mitigate impacts through avoiding fish habitat loss **on-site** (Proposed outcome is for works/ structure to be relocated away from fish habitats/ marine plants and therefore no impacts would arise).
- Stage 2 :** Mitigate impacts through minimising impacts on fish habitats of the proposal **on-site**. (Proposed outcome is for works/ structure to be redesigned/ revised to reduce the extent of footprint and ongoing impacts (e.g. shading).
- Stage 3:** Where mitigation cannot be agreed or implemented **on-site**, compensation for the loss of fish habitats through an **off-site** 'compensation program' should be sought (if the proposed outcome involves no scope to avoid impacts on-site, and off-site compensation may be agreed as an alternative).

Stages 1 and 2 should satisfy an objective that supports the policy of no nett loss of marine fish habitat. **Stage 3** would not achieve 'no nett loss' and an approach to offset the loss of fish habitats through a 'compensation program' would apply in lieu of the proposed loss. It is acknowledged that any compensation programs agreed to, after Stages 1 and 2 have been explored or are not able to be satisfied, are most likely to be undertaken 'off-site'. The agreed program/s should be designed to achieve 'other fisheries resource benefits' (e.g. contributions to research or other community-run fisheries initiatives or off-site restoration work).

8. Requirements for mitigation and compensation

CONSIDER TYPE OF IMPACT

Impacts associated with new works that may cause alteration/loss of marine fish habitat and fisheries resources, and therefore require consideration of mitigation (avoidance or minimisation) or compensation options, include but are not limited to:

- reclamation of tidal land and spoil disposal;
- removal of yabby banks, crab communities;
- changes to water quality and hydraulics (e.g. removal of tidal influence);
- exposure of acid sulfate soils and acid leachate in waterways;
- physical changes to natural substrates which will impede marine plant colonisation (revetments);
- loss of marine plants; and
- works within declared Fish Habitat Areas.

CONSIDER SIZE OF AREA APPLIED FOR

Reasonable and relevant conditions may be imposed on authorities* for marine fish habitat loss issued under the *Fisheries Act 1994* (Section 61). The presence of marine plants or a declared Fish Habitat Area triggers the need for an assessment of the potential impacts in relation to the issue or refusal of a fisheries approval to which conditions would attach. Table 1 outlines reasonable and relevant (zero or minimum) mitigation (on-site) and compensation (off-site) requirements in respect of the size of the area applied for, where this contributes to fish habitat loss/disturbance.

Scales of 'small', 'medium' and 'large' apply to the area applied for as given in Table 1.

For *small areas*, the options for mitigation (avoidance or minimisation) are outlined.

For *medium and large scale areas*, mitigation (on-site) *and* compensation (off-site) options are outlined.

The preferred outcome to balance loss of fish habitat is to mitigate *all* impacts on-site. Where mitigation for medium and large scale areas cannot be achieved, other compensation for losses, e.g. contribution to a Statewide Compensation Program, would apply.

***REFER TO FHMOP 001 AND FHMOP 002 TO DETERMINE PERMITTED ACTIVITIES**

Table 1 Guideline for minimum requirements for authorisation of loss of marine fish habitat - New Works (public or private) on tidal land

AREA APPLIED FOR	MITIGATION OF IMPACTS (ON-SITE)	COMPENSATION (OFF-SITE)
<p>Small</p> <ul style="list-style-type: none"> ➤ < 10m² (0.001 ha) <u>vegetated or unvegetated tidal land</u> ➤ Mitigation is required 	<p>Modification of work methods to reduce impacts</p> <p>Examples:</p> <ul style="list-style-type: none"> ➤ avoidance through relocation/ redesign ➤ selective pruning instead of removal of mangroves ➤ best environmental management practice 	
<p>Medium</p> <ul style="list-style-type: none"> ➤ 10m² - 500m² (0.001ha - 0.05 ha) <u>vegetated or unvegetated tidal land</u> ➤ A combination of mitigation and compensation options MAY be required 	<p>Modification of work methods to minimise impacts</p> <p>Examples:</p> <ul style="list-style-type: none"> ➤ avoidance through relocation/ redesign ➤ selective pruning instead of removal of mangroves ➤ best environmental management practice <p>Other strategies:</p> <ul style="list-style-type: none"> ➤ undertake restorative or rehabilitative works within an agreed plan ➤ proposal will provide community fisheries benefits (e.g. boat ramp, fishing platform) 	<ul style="list-style-type: none"> ➤ contribution to a Statewide Compensation Program (to fund research or extension on fish habitats)
<p>Large</p> <ul style="list-style-type: none"> ➤ >500m² (>0.05 ha) <u>vegetated or unvegetated tidal land</u> ➤ A combination of mitigation and compensation options MAY be required 	<p>Modification of work methods to minimise impacts</p> <p>Examples:</p> <ul style="list-style-type: none"> ➤ avoidance through relocation/ redesign ➤ selective pruning instead of removal of mangroves ➤ best environmental management practice ➤ timing of works to accommodate least disruption to fisheries resources e.g. fish passage/ or use of area (spawning and migration), seagrass flowering, mangrove settlement periods ➤ providing buffers between works and fish habitat <p>Other strategies</p> <ul style="list-style-type: none"> ➤ undertaking restorative or rehabilitative works within an agreed plan ➤ proposal will provide community fisheries benefits (e.g. boat ramp, fishing platform) 	<ul style="list-style-type: none"> ➤ seek to offset losses through Land exchange or Land acquisition of productive wetlands (links should be made to FHA program and/ or Acquisition Program) ➤ creation of replacement/ alternate fish habitat and monitoring of the effectiveness of habitat <p align="center">and/ or</p> <ul style="list-style-type: none"> ➤ contribution to a Statewide Compensation Program (to fund research or extension on fish habitats)

Note: Exemption from compensation requirements applies to:

- works which involve small areas as defined in Table 1; or
- works to maintain existing private or public structures (refer Table 2).

For both exemptions, all works must **mitigate** impacts on fish habitats.

Table 2 Guideline for minimum permit requirements for authorisation of loss of marine fish habitat - Maintenance works (public or private structures) on tidal land

SECTOR	MITIGATION OF IMPACTS (ON-SITE)	COMPENSATION (OFF-SITE)
<p>Public works or private works</p> <p>➤ Mitigation is required</p>	<p>Modification of work methods to reduce impacts</p> <p>Examples:</p> <ul style="list-style-type: none"> ➤ best environmental management practice (Codes of Practice) ➤ timing of works to accommodate least disruption to fisheries resources e.g. fish passage/ or use of area (spawning and migration), seagrass flowering, mangrove settlement periods 	

9. Policy performance criteria and review

The following performance criteria are to be used to monitor effectiveness of the policy:

- Establish and maintain a database to store and collate information about all marine fish habitat mitigation and compensation projects across Queensland;
- Annual monitoring of approved mitigation projects will assess outcomes of the policy e.g. increase in habitats that support fisheries, through offsetting the associated authorised losses;
- All approvals will require, mitigation (avoidance or minimisation) or compensation and this will be reflected within permit conditions;
- An inventory of fish habitats and their relative values (including existing level of disturbance) is to be investigated – this will give an indication of potential sites where mitigation could/ should be applied; and
- A list of degraded fish habitat sites is to be developed by QFS to catalogue possible rehabilitation projects.

The Policy will be reviewed within 12 months of its adoption.

10. Glossary

avoidance	No impact on fish habitat is incurred from proposed development.
biodiversity	Diversity of plant and animal life on earth at the genetic, species and ecosystem levels.
compensation	<p>Measures carried out off-site (e.g. habitat exchange) to offset adverse impacts on marine plants, tidal lands, fish habitats, etc.</p> <p><i>Compensation</i> Implies the trade-off of an unavoidable ecological loss for an ecological improvement, e.g. the enhancement and dedication of privately owned land of high quality marine fish habitat area to declared Fish Habitat Area status (land swap) or contribution to Statewide Compensation Program (from Clark 1979).</p>
DPI	Department of Primary Industries
ecologically sustainable development (ESD)	<p>Means using, conserving and enhancing the community's fisheries resources and fish habitats so that-</p> <ul style="list-style-type: none"> a) the ecological processes on which life depends are maintained; and b) the total quality of life, both now and in the future, can be improved. <p>'principles of ecologically sustainable development' means the following principles-</p> <ul style="list-style-type: none"> a) enhancing individual and community wellbeing through economic development that safeguards the wellbeing of future generations; b) providing fairness within and between generations; c) protecting biological diversity, ecological processes and life-support systems; d) in making decisions, effectively integrating fairness and short and long term economic, environmental and social considerations; e) considering the global dimension of environmental impacts of actions and policies; f) considering the need to maintain and enhance competition, in an environmentally sound way; g) considering the need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection; h) that decisions and actions should provide for broad community involvement on issues affecting them; i) the precautionary principle. <p>(Section 3 (3), <i>Fisheries Act 1994</i>)</p>

Policy for Mitigation and Compensation (Fish Habitat Loss)

enhancement	A form of mitigation that implies improvement of an ecosystem, e.g., improving or restoring water circulation or species habitat (Clark 1979).
fish habitat	Includes land, waters and plants associated with the life cycle of fish, and includes land and waters not presently occupied by fisheries resources.
Fish Habitat Area (FHA)	An area declared under the <i>Fisheries Act 1994</i> to be a fish habitat area.
fish habitat values	The different functions and services provided by fish habitats, which include spawning, nursery, feeding, and shelter areas for fish, and primary productivity for fisheries resources. Where fish habitats are afforded protection and management these values may be provided on an ongoing basis. (Also see 'fisheries values').
fisheries resources	Includes fish and marine plants.
fisheries values	The natural capital (fisheries resources and fish habitats) on which commercial, recreational and indigenous fishing activities depend.
marine plant	See Section 8 of the <i>Fisheries Act 1994</i>
minimisation	A form of mitigation that implies unavoidable ecological damage from development activity and seeks to reduce it to a minimum, e.g. preventing the spread of silt from dredging (Clark 1979).
mitigation measures	Measures to reduce the overall impact to fisheries resources and fish habitats on-site (e.g. work methods).
QFS	Queensland Fisheries Service
performance indicators	Observations or measures of particular aspects of a site used to determine if mitigation or compensation measures are meeting the agreed objectives.
PP	Policy Principle
precautionary principle	Means the principle that, if there is a threat of serious or irreversible environmental damage, lack of scientific certainty should not be used as a reason to postpone measures to prevent environment degradation, or possible environmental degradation, because of the threat. (Section 3 (3), <i>Fisheries Act 1994</i>)
rehabilitation	Returning a site to a state where natural succession can continue the recovery process and allow fisheries values of the site to be returned (no time-frame).
replacement	Exchange of a particular resource for another of the same type, e.g. 1 hectare of new saltmarsh habitat to replace 1 hectare lost to reclamation.
restoration	Returning a site to an agreed pre-existing condition - implies a final objective to return all aspects of the previous system (in a specific time frame).

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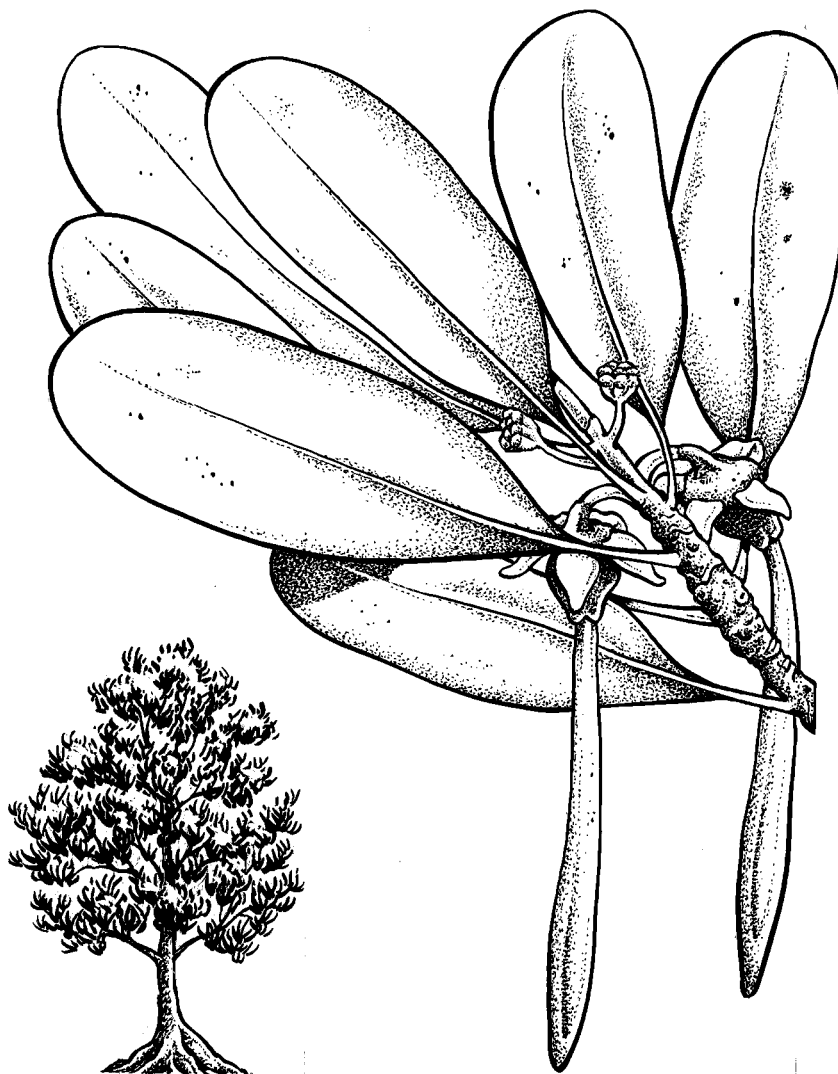
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Appendices



Yellow Mangrove

Ceriops species

Appendix 1 No Nett Loss of Marine Fish Habitat

Core Policy Objective of No Nett Loss of Marine Fish Habitat Policy:

Maintain the natural productive capacity of marine fish habitats for Queensland fisheries resources to benefit present and future users

Strategies to implement the No Nett Loss Policy include the incorporation of measures to offset fish habitat losses:

- use of best practice methodologies, namely Environmental Management Plans, including monitoring
- habitat productivity enhancement
- allocation of funds for research or extension/ education on fish habitats
- fisheries stock enhancement
- restoration or replacement of fish habitat
- use of bonds (to ensure compliance with permit requirements)
- mitigation/ compensation program (funds held in trust towards wetland creation/ restoration)
- fish habitat (relinquishment of private tenure over wetlands)
- fish habitat acquisition

Appendix 2 Supporting background information

Coastal lands comprise 1.6% of Queensland's area, and form major inshore fish habitats. Queensland has approximately 307 estuaries and enclosed waters (Zeller 1998) and key areas are managed as declared Fish Habitat Areas (representing approximately 700,000 hectares of tidal habitats).

Fisheries species use fish habitats for spawning, breeding, migration, feeding, growth and shelter. However, most habitat types support only one subset of these functions. Species habitat requirements can change with life history stage, abundance of the species, competition from other species, seasonality and other environmental variables. The healthy maintenance and accessibility of a broad range of habitat types, attributes and functions are therefore critical to local and regional fisheries species productivity.

As with FHAs, marine plants (including seagrasses, saltmarsh vegetation, mangroves and other associates such as *Melaleuca* spp. are protected and managed in accordance with the *Fisheries Act 1994* and *Fisheries Regulation 1995*.

MARINE FISH HABITAT MANAGEMENT

Planning and regulatory decisions concerning the management and protection of fish habitat and fisheries resources in Queensland rest with QFS, DPI. QFS uses the legislative framework of the *Fisheries Act 1994* to determine these decisions.

The *Fisheries Act 1994* provides several mechanisms for managing and protecting Queensland's fisheries resources and fish habitats:

1. Certain areas are managed as declared Fish Habitat Areas (approximately 700,000 hectares of inshore and estuarine habitats) to protect core areas of high productivity from the effects of development.
2. Marine plants found in tidally influenced coastal habitats and that form the basis of coastal fisheries productivity, are also protected. Marine plants include seagrasses, saltmarsh vegetation species, mangroves and other associates such as *Melaleuca* spp.
3. The construction of barriers to fish migration requires authorisation.
4. The Chief Executive can order the restoration of damaged fish habitats.

QFS also uses a range of departmental policies, codes of practice and guidelines linked to the fisheries legislation to provide guidance in day to day decision making.

QFS operational policies apply to:

- Marine plants;
- Declared Fish Habitat Areas;
- Marine insect pest control;
- Dredging, extraction and spoil disposal;
- Declaration and review of Fish Habitat Areas;

- Fish Habitat Area selection and assessment (draft);
- Waterway barrier works approvals; and
- Restoration Notices.

Fish Habitat Codes of Practice have been developed for specific stakeholders including:

- Local Government;
- Canegrowers; and
- Electricity supply corporations.

Fish Habitat Guidelines have been prepared for:

- Design of stream crossings to assist fish passage;
- Restoration of marine fish habitats;
- Buffers for fish habitat; and
- Marine plant nursery construction, propagation and planting.

(See Appendix 5 for a detailed list of policies, codes and guidelines.)

Mapping of Queensland's fish habitats and fisheries resources and reporting on conditions and trends are undertaken by QFS. This critical information assists planning decisions and further protection of fish habitats, using inshore fish habitat mapping information to support the current Departmental program for declared Fish Habitat Areas.

In addition to the provisions for fish habitat management within the *Fisheries Act 1994*, other State and Commonwealth legislation applicable to coastal protection and maintenance of environmental values is also linked to fish habitat management (Appendix 6 refers).

MITIGATION

'Mitigation' refers to a class of actions which have the purpose of counter acting the effects of disruptions, on the natural environment and on renewable resources, associated with new physical structures and/ or construction activities and/or for new management objectives and practices (US Dept of Agriculture, 1979).

Policies supporting mitigation of impacts typically recognise that various steps are to be taken when considering proposed disturbance or loss of habitat, and Jahn (1979) has defined mitigation to include:

1. Avoiding the adverse impact by taking a certain action or parts of an action (preventative);
2. Minimising impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
5. Compensating for the impact by replacing or providing substitute resources or environments.

The 'sequencing' of such measures, also described by Race and Fonseca (1996), reflects the current QFS approach to assessments and application of mitigation measures where marine fish habitats are concerned (as summarised in Figure 1 of Section 7, Decision-making, of this Policy).

Race and Fonseca (1996) have reviewed the practice of United States based mitigation programs and report that compensatory mitigation for wetland losses falls short of the goal of no nett loss, and that the variation in local, state and federal agencies with overlapping jurisdictions in wetlands contributes to inconsistencies with planning and permitting compensatory mitigation projects.

Compensatory mitigation relies on required actions that are intended to compensate for environmental damage or loss of fish habitat through replacement of functions, values or acreage of wetlands proposed for destruction (Race and Fonseca 1996).

QFS has adopted a policy of seeking mitigation (avoidance and minimisation) of impacts associated with activities that may contribute to marine fish habitat loss. Requirements for mitigation are assessed prior to permit issue as a formal step in the consideration of permit issue or refusal. All mitigation options are discussed with the applicant and addressed accordingly, depending on the type and level of disturbance proposed. There is scope to monitor mitigation compliance during the life of a permit.

A review performed by Race and Fonseca (1996) advocated restoration and /or mitigation on-site and in-kind as these offer the greatest potential to minimise disruption of remaining ecological functions where significant ecological functions still exist and may be enhanced. They highlighted that in highly disturbed settings, e.g. urbanised areas where substantial habitat fragmentation has already occurred, alternatives such as 'mitigation banks' may be a more realistic solution.

Wetland mitigation banks strive to establish contiguous wetland areas that can be used to mitigate for the cumulative loss of a number of independent impacts (Stein and Tababtai 2000). The US Fish and Wildlife policy for mitigation banking was assessed by Short (1988) with a summary of risks and advantages presented. Short (1988) stated that mitigation banks have their greatest potential application where no mitigation would occur (small projects) or where there is no possibility of on-site mitigation and the applicant will support off-site mitigation. Her overview highlighted a number of minimum requirements for eligibility of projects to use mitigation banks for debiting project impacts including the public benefit outweighing losses, the 'water dependency' of the project, that the project is the least damaging alternative, where impacts are unavoidable, and where on-site mitigation falls short of the project mitigation needs.

A hybrid mitigation bank/Program concept is discussed in this Policy, extending the mitigation bank concept to encompass other options such as research funding etc.

Appendix 3 Performance Indicators

Performance indicators will vary in accordance with the type and scale of project (e.g. restoration projects). For restoration projects, specific factors, such as changed hydrology at a site, may be the most important component to address in a project. Where mangrove habitat is involved, assisting natural recovery should only be considered if recruitment is not occurring (Lewis and Streever 2000). Performance indicators should be developed to suit both the site and the objectives of the mitigation or compensation project.

Some examples of performance indicators in 'wetland creation' projects include:

- Setting requirements for survival of planted stock (where necessary to plant);
e.g. 50% survival of planted trees 3 years after which natural regeneration is relied upon -

saplings (*Avicennia*) planted at 10,000 per hectare may result in initial high mortality, but a survival rate of 50% should be expected. In comparison typical forest density of mature mangroves is about 1,000 trees per hectare (1 tree per 10m²) (Lewis and Streever, 2000).
- Setting requirements for plant density or percent cover by plants;
- Setting requirements that are staged over time so that different performance indicators must be met as the wetland/ fish habitat matures;
- Relying on a natural reference wetland/ fish habitat (control) or other sites as a benchmark; and
- Setting requirements specifically limiting occurrence of exotic and nuisance plant species.

Adapted from:

Streever, B. (1999) Examples of performance standards for wetland creation and restoration in Section 404 Permits and an approach to developing performance standards. WRP Technical Notes Collection (TN WRP WG-RS-3.3). U.S. Army Engineer and Development Centre, Vicksburg, MS. www.wes.army.millell/wrp

With additional advice from:

Lewis, R. R. and Streever, B (2000) Restoration of mangrove habitat. WRP Technical Notes Collection (ERDC TN-WRP-VN-RS-3.2), U.S. Army Engineer Research and Development Centre, Vicksburg, MS. www.wes.army.millell/wrp

Refer to FHG 002 for more information on monitoring and performance indicators where projects involve restoration in marine areas.

Appendix 4 Mitigation/ Compensation assessment information for permit applications (for proponents)

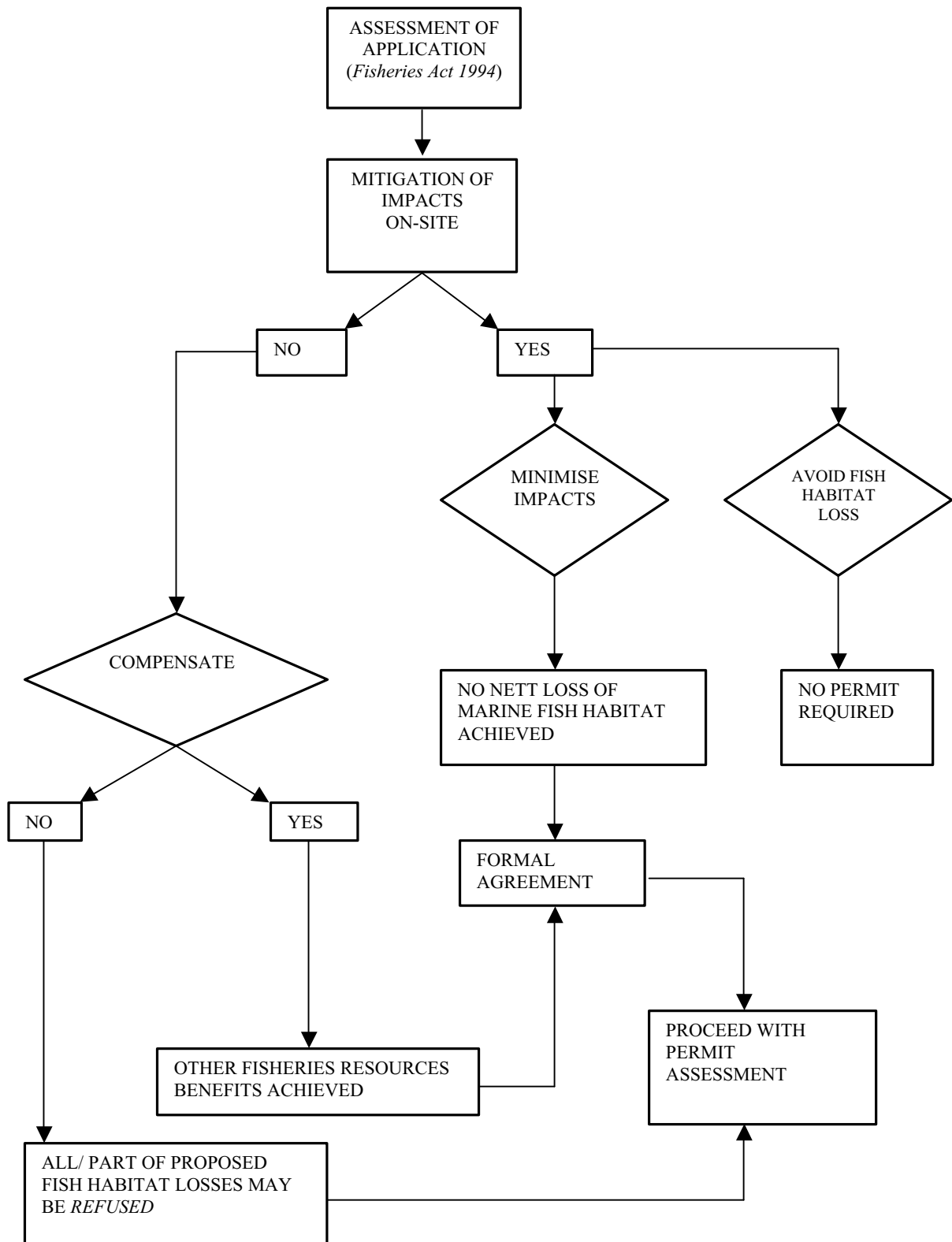


Figure 2 Assessment flow chart for permit applications

Appendix 5 Fish Habitat Management Publications

QDPI Fish Habitat Management Operational Policies

FHMOP 001

Couchman, D. and Beumer, J. (2002) Fish Habitat Management Operational Policy for the Management and Protection of Marine Plants: Departmental Assessment Procedures and Policy Position, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 001, 40pp.

FHMOP 002

Zeller, B. and Beumer, J. (1996) *Departmental Procedures for Permit Applications Assessments and Approvals to Perform Works or Related Activity in a declared Fish Habitat Area*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 002, 88pp.

FHMOP 003

White, M. and Beumer, J. (1996) *Departmental Procedures for Permit Applications Assessments and Approvals for Insect Pest Control in Coastal Wetlands*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 003, 56pp

FHMOP 004

Hopkins, E. and White, M. (1998) *Dredging, Extraction and Spoil Disposal Activities: Departmental Procedures for Provision of Fisheries Comments*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 004, 79pp.

FHMOP 005

Dixon, M. and Beumer, J. (2002) *Mitigation and Compensation for Activities and Works Causing Marine Fish Habitat Loss: Departmental Procedures*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 005, 27pp.

FHMOP 006

McKinnon, S. and Sheppard, R. (2001) *Fish Habitat Area Declaration and Review: Departmental Consultation Procedures*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 006, 27pp.

FHMOP 007

McKinnon, S., Sheppard, R. and Beumer, J. (Draft 2002) *Fish Habitat Area Selection and Assessment: Departmental Procedures*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 007.

FHMOP 008

Peterken, C. (2001) *Waterway Barrier Works Approvals and Fishway Assessments: Departmental Procedures*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 008, 47pp.

FHMOP 009

Mackenzie, J. and Dixon, M. (2002) *Restoration Notices for Fish Habitats - Formulation and Implementation: Departmental Procedures*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 009, 49pp.

QDPI Fish Habitat Guidelines

FHG 001

Cotterell, E.J. (1998) *Fish Passage in Streams: Fisheries Guidelines for Design of Stream Crossings*, Queensland Department of Primary Industries, Fish Habitat Guideline FHG 001, 37pp.

FHG 002

Hopkins, E., White, M. and Clarke, A. (1998) *Restoration of Fish Habitats: Fisheries Guidelines for Marine Areas*, Queensland Department of Primary Industries, Fish Habitat Guideline FHG 002, 44pp.

FHG 003

Bavins, M., Couchman, D. and Beumer, J. (2000) *Fish Habitat Buffer Zones: Fisheries Guidelines*. Queensland Department of Primary Industries, Fish Habitat Guideline FHG 003, 39pp.

FHG 004

Clarke, A and Johns, L. (2002) *Mangrove Nurseries: Construction, Propagation and Planting: Fisheries Guidelines*, Queensland Department of Primary Industries, Fish Habitat Guideline FHG 004, 32pp.

QDPI Fish Habitat Codes of Practice

FHC 001

Owtrim, A. and Dixon, M. (2001) *Local Government Runnelling Works for Saltmarsh Mosquito Control: Fish Habitat Code of Practice for use with Strategic Permits issued under Section 51 of the Fisheries Act 1994*, Queensland Department of Primary Industries, Queensland, Fish Habitat Code of Practice FHC 001, 28pp.

FHC 002

Mayer, D., McKinnon, S. and White, M. (2000) *Local Government Works for Public Infrastructure Maintenance: Fish Habitat Code of Practice for use with Strategic Permits issued under Section 51 of the Fisheries Act 1994*, Queensland Department of Primary Industries, Fish Habitat Code of Practice FHC 002, 34pp.

FHC 003

Tapsall, S., Couchman, D., Beumer, J. and Marohasy, J. (2000) *Cane Growers On-Farm Maintenance of Drains with Marine Plants: Fish Habitat Code of Practice for use with Strategic Permits issued under Section 51 of the Fisheries Act 1994*, Queensland Department of Primary Industries, Fish Habitat Code of Practice FHC 003, 36pp.

FHC 004

McKinnon, S. and Mayer, D. (2000) *Maintenance of Powerlines and Associated Infrastructure: Fish Habitat Code of Practice for use with Strategic Permits issued under Section 51 of the Fisheries Act 1994*, Queensland Department of Primary Industries, Fish Habitat Code of Practice FHC 004, 31pp.

FHC 005

Quinn, R., Mayer, D. and Dixon, M. (Draft 2001) *Maintenance of Transport Infrastructure: Fish Habitat Code of Practice for use with Strategic Permits issued under Section 51 of the Fisheries Act 1994*, Queensland Department of Primary Industries.

Appendix 6 Selected statutory instruments linked to fish habitat management

Beach Protection Act 1968

Coastal Protection and Management Act 1995

Environmental Protection Act 1994

Environment Protection and Biodiversity Conservation Act 1999

Environment Protection (Sea Dumping) Act 1981

Integrated Planning Act 1997

Harbours Act 1955 (Transport Infrastructure Act 1994)

Marine Parks Act 1982

River Improvement Trust Act 1940

State Development & Public Works Organization Act 1971

State Coastal Management Plan 2001

Water Resources Act 1989

Water Act 2000