Guide to using IDAS development application forms

Guide 22–Addressing fish movement across waterway barriers
v1.2 February 2009

This guide has been prepared to assist in making an application for operational works relating to building or raising waterway barriers.

Further information is available by contacting the Department of Employment, Economic Development and Innovation (DEEDI) call centre on 132523.

The Fisheries Act

Under section 76G of the *Fisheries Act 1994* (Fisheries Act), a person may not construct or raise waterway barrier works without addressing the need for fish movement across the barrier.

For the purposes of the Fisheries Act, waterway barriers include dams, weirs or other barriers which are constructed across waterways. Definition of other barriers includes culverts, road crossings, fords, causeways, silt curtains, trash racks and any other structures which will or potentially will block or obstruct movement of fish upstream or downstream of these barriers. Where movement of fish is important along the waterways, it may be necessary to construct a fish way.

Addressing fish movement

Fish movement can be provided for in the following ways–

- incorporation of a suitable fishway to enable fish passage
- short-term installation of temporary waterway barriers
- structure design ensures the barrier drowns-out sufficiently frequently and of sufficient duration to allow fish passage.

Alternatively the applicant may–

- provide information that demonstrates fish movement across the works in not necessary or desirable and obtain a “Fish Movement Exemption Notice” for the site of the proposed works.

Fish Movement Exemption Notice

Section 76E of the Fisheries Act provides for a Fish Movement Exemption Notice to be given if it can be established that a proposed water way barrier for the movement of fish is neither necessary, nor desirable for the best management, use, development or protection of fisheries resources or fish habitat.

These applications are not part of the integrated development application system (IDAS) development application.

These applications are lodged with DEEDI on the prescribed application form which can be obtained from your closest DEEDI office or through the DEEDI website, www.dpi.qld.gov.au. Contact details for these offices are provided at the end of this guide

If applicable, a Fish Movement Exemption Notice should be obtained before applying for the IDAS development approval.

Making an IDAS development application for waterway barrier works

When making an IDAS development application for waterway barrier works assessable against the Fisheries Act, IDAS Application Form 1, Part o_3 is required to be completed.

Question 1 on Part o_3 requires the applicant to address the need for fish movement across the proposed barrier.

If there is a valid Fish Movement Exemption Notice, a copy of the notice is required to be attached to the form. Otherwise the applicant is required to identify which of the following applies–
A. fish movement is not necessary
B. the waterway barrier works are temporary only
C. the waterway barrier has drownout characteristics
D. the waterway barrier works incorporate fishway/s.

A. Fish movement is not necessary or desirable

DEEDI strongly advises that applicants who consider fish movement at the site is not necessary or desirable should apply for a Fish Movement Exemption Notice, prior to lodging their development application. This will allow an assessment to be made outside of the IDAS process rather than risk DEEDI refusing the development application.

If a Fish Movement Exemption Notice is not applied for, it will be necessary to provide details to justify why fish movement across the waterway barrier works is not necessary.

Some examples of where fish movement may not be necessary include–
1. Where there are no fish located in the area (i.e. there are no fish either at the works site or that will move through the site during or following flow events, seasonal triggers, etc.).

In this instance it will be necessary to provide fish survey data and analysis that demonstrates and explains why there are no fish located in the area. Data on fish in the area should be from sampling that has been undertaken–
- using gear that will sample the whole fish community (species and life stages) e.g. a variety of net/trap types and mesh sizes
- seasonally to demonstrate the absence of fish at any time of year
- at different hydrological conditions and flow events
- over more than one year of sampling or records, particularly in ephemeral systems.

It is important to note that the types of fishing apparatus (nets, traps, etc.) that can be used in Queensland freshwaters are restricted under the Fisheries (Freshwater) Management Plan 1999. For further information on permit requirements, please contact the Senior Fisheries Scientist (Freshwater) through DEEDI Business Information Centre on 13 25 23.

2. It is not necessary for the fish located in the area to access the fish habitat upstream of the area (i.e. fish at the site and downstream of the site do not need to utilise fish habitats upstream of the site).

In this instance it will be necessary to provide evidence that demonstrates why fish located in the area do not need to access fish habitat upstream of the area. This should include–

- fish survey data (see above for sampling protocols) to identify the species of fish in the area (at the site and downstream of the site) and their seasonal occurrence
- information on the biology of those species and their movement requirements
- habitat survey data to identify the different fish habitats upstream
- an evaluation of the quality of upstream fish habitats
- the importance of upstream of the site and downstream of the site to fish, given all of the above information.

3. There are other barriers adjacent to the works site that prevent the movement of fish located in the area (i.e. there are natural barriers just upstream or just downstream that do not allow fish passage and that will drown out after or concurrently with the proposed barrier). This does not apply to existing artificial barriers located in the area as these are considered to have the potential for future fish passage rehabilitation.

In this instance it will be necessary to provide–

- data that enables comparison of the drown-out characteristics of the identified natural barriers and the proposed waterway barrier works
- data that will demonstrate that fish passage across the upstream or downstream barrier is not possible until after the proposed waterway barrier works have drowned-out.

B. Temporary works only

Where waterway barrier works are temporary and will be removed within weeks or months with restoration of the site back to its original profile and flow patterns, separate provision for fish movement may not be necessary. The DEEDI Fisheries assessing officers need to determine whether the effect of the barrier on fish passage and fish communities at the site is significant enough to require provision for fish passage or not.

The following information about the temporary waterway barrier works will be needed in order for the assessment to be made–

- when the works will be commenced (what month)
- how long the works will be in place for
- what will be done to remove the works and restore the site to its original profile and stability
- flow data showing seasonal flow patterns and volume of flows at the site; a graph showing frequency of flow events (flow volumes) at the site over time
- adopted middle thread distance (AMTD) of the site and whether or not it is under tidal influence
- if this is part of a planned series of temporary barriers on the same waterway, then information about the whole works program for that waterway.

C. Drown-out characteristics

It is generally assumed that fish are able to bypass instream structures following drown-out, providing velocities at the structure are not too high. From a fish passage viewpoint, DEEDI Fisheries considers that drown-out occurs when the headwater level (the water level upstream of the structure) and tailwater level (water level downstream of the structure) equalise and the water level across the barrier is at least 0.5m above crest level.

The following drown-out characteristics of a waterway barrier, relevant to fish, are required:

- frequency of drown-out (how many days per year and how many times per year)
- duration of drown-out (number of consecutive days drown-out is reached)
- timing of drown-out (which months during the year drown-out occurs)
- flow characteristics of drown out (on what flows i.e. volume and frequency of reoccurrence or average recurrence interval (ARI) does the structure drown-out)
- a flow duration curve for the site.

The source of this information (i.e. how the drown-out figures were calculated) will also need to be submitted for assessment.

DEEDI has developed a drawn-out modelling program which predicts whether the proposed barrier will be sufficiently drowned-out to allow fish passage and if so under what circumstances, eg drown-out frequency, duration of each drown-out event, etc. It is strongly advised that proponents who believe their proposed waterway barrier would be drowned-out should contact DEEDI for further advice.

D. Fishways

For permanent or long-term temporary waterway barrier works, where fish movement is required and where the drown-out characteristics of the structure are insufficient to cater for those requirements, inclusion of one or more fishways may be necessary.

If your answer to Question 1 on IDAS Application Form 1, Part O_3 is no, DEEDI strongly recommends that a pre-lodgement meeting be held with officers of the department prior to lodging the application and before going beyond a concept design stage for the waterway barrier works.

Pre-lodgement meetings can be arranged by contacting the nearest regional DEEDI Fisheries office. Contact details for these offices are provided at the end of this Guide.

If a pre-lodgement meeting is not held with DEEDI Fisheries, the IDAS application will need to contain details of the fishway design and proposed operation. This will enable an assessment to be made of the fishways' suitability. The appropriate type of fishway for the proposed works and site will also need to be selected.

Fishway designs relevant to eastern Australia can be found in "Fish Passage and Fishways in New South Wales: A Status Report" G. Thorncraft and J. Harris. Cooperative Research Centre for Freshwater Ecology. May 2000. The document is available at www.freshwater.canberra.edu.au or phone (02) 6201 5168.

Once the appropriate fishway design has been determined, the information that must be submitted should include scaled drawings that show–

1. All fishways–

- location of the fishway on the barrier
- alignment of the fishway in relation to the waterway barrier works
- location of the entrance(s) and exit(s) of the fishway in relation to the bank, weir crest, weir apron, outlet works and any attraction flow releases
- stream bed contours at the site and up to 50 metres upstream and downstream of the site
- crest levels (height above stream bed) across the width of the crest/spillway
- location and capacity of downstream outlet works of the dam or weir
- location in relation to the fishway exit of any offtake tower or pumping facilities for taking water out of the impoundment
- the gradient of the fishway
- type of fishway
- a flood hydrograph/flood peak duration curve for the site
- a flow duration curve for the site
- details of the proposed operation of the weir or dam once works are completed including
  - full supply level
  - preferred operating level/range
  - minimum operating level
  - dead storage level.

2. Vertical slot fishways–

- cell dimensions
- location and dimensions of resting pools
- slot widths
- head difference between cells
- details of the entrance and exit including gates, heights
- details of the baffles and baffle returns
- maximum velocity through the slot
- maximum turbulence in the cell
- fishway gradient
- tailwater conditions over the flow curve/at a range of flows for the site (include tidal levels for barrages, eg mean low water and mean high water springs)
- expected headwater conditions over the flow curve/at a range of flows for the site
- operating range for entrance and exit slot(s)
- details of trash control
- associated on-site structures for monitoring fishway (eg. lifting mechanisms for traps, attachment points for PIT tag readers).

3. Rock ramp–

- detail of ridge and pool including distance between ridges, pool size, depth of pool rock dimensions
- whether the fishway is a full-width or partial-width design
- alignment at weir crest of ridge rocks
- demonstrate that the exit of the fishway traverses the lowest point of the crest
- gradient of fishway
- length of fishway
- method for securing the crest and toe of fishway
- method for retaining water in the fishway (eg. use of geofabric, clay core etc)
- the headwater operating range of the fishway in metres above waterway barrier crest height (assuming the fishway ceases to operate when the crest rocks are completely submerged)
- tailwater levels over the range of operating flows

- entrance conditions over the range of operating flows (eg. chart the progressive drown-out of cells up the fishway).

4. Fishlock (vertical chamber)–

- entrance channel
- holding chamber
- diffuser setup and screens
- entrance and exits (including associated gates)
- entrance and exit in relation to headwater and tailwater (eg. full supply level)
- vertical chamber dimensions
- provision of attraction flow
- exit channel(s)
- followers (if applicable)
- tailwater conditions over the flow curve/at a range of flows for the site
- include tidal levels for barrages (eg mean low water and mean high water springs)
- headwater conditions over the flow curve/at a range of flows for the site
- full supply level
- minimum storage level
- operating range for entrance(s) and exit(s)
- proposed cycle times
- provision of adequate light levels
- details of trash control
- associated on-site structures for monitoring fishway (eg. lifting mechanisms for traps, attachment points for PIT tag readers, proposed trap dimensions and construction material).

5. Other fishways

The three fishway types above are the only designs that have been proven in Queensland. If it is proposed to incorporate an alternative fishway type, this would be considered experimental until it has been demonstrated to suit Queensland conditions and fish. Such design should be discussed in a pre-lodgement meeting with DEEDI Fisheries. To arrange a pre-lodgement meeting please contact the nearest regional Fisheries office.

Pre-lodgement meetings

Where there is an intention of incorporating a fishway in the proposed waterway barrier works it is strongly recommended that a pre-lodgement meeting with DEEDI Fisheries staff be conducted before the development application is lodged.

A pre-lodgement meeting may also be arranged to discuss fish movement matters (i.e. drown-out characteristics, short-term temporary structure). This meeting can provide feedback on whether the proposal and/or information are likely to meet DEEDI Fisheries' requirements.

Northern region
(north of Sarina, inclusive Northern Fisheries Centre)
PO Box 5396
Cairns Qld 4870

Phone: (07) 4035 0100
Fax: (07) 4035 1401

Southern region
(south of Sarina, exclusive Southern Fisheries Centre)
PO Box 76
Deception Bay Qld 4508

Phone: (07) 3817 9500
Fax: (07) 3817 9522

DEEDI phone: 13 25 23

www.dpi.qld.gov.au/fishweb