Terms of Licence under section 220ZW of the Fisheries Management Act, 1994 to harm threatened fish species during undertaking of forestry related activities.

Eden Region

15 December 1999

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Summary

This summary is provided as a guide only and does not form part of the conditions of this licence.

This licence implements exclusion zones around all aquatic habitats where forestry operations may impact on threatened species or their habitat (condition 7).

No 'specified forestry activities' may be undertaken within an exclusion zone except road construction, road re-opening and extraction within certain exclusion zones of watercourses.

A pre-logging and pre-roading aquatic habitat assessment must be undertaken, incorporating information from topographic maps and the harvest plan.

Where a road, road re-opening or extraction activity will necessarily take place in the exclusion zone of any watercourse, then an assessment of the aquatic habitat of the watercourse must be undertaken. This assessment draws information from threatened fish species databases, potential habitat descriptions and an on-ground habitat survey to verify the pre-logging/pre-roading aquatic habitat assessment outcome.

The aquatic habitat is classified depending on the potential for threatened fish species to be impacted. Protocols for works within the different habitat classes are implemented, (condition 8). The conditions make allowance for adoption of an approved road management plan in lieu of certain conditions of the licence.

If an alternative design or management technique is desired in potential threatened fish species habitat, then approval is required from NSW Fisheries. NSW Fisheries will not consider approval of an alternative protocol unless the proposal is fully documented, and a targeted survey of threatened fish species has been conducted in the vicinity of the site.

Authority

This licence authorises the carrying out of forestry operations as described in the Integrated Forestry Operations Approval of which this licence forms part and that are likely to result in one or more of the following:

a) harm to a threatened species, population or ecological community,
b) damage to critical habitat
c) damage to habitat of a threatened species, population or ecological community.

The authority conferred by this licence is subject to the conditions and restrictions set out in this licence.

Licensee

Any person carrying out forestry operations is taken to hold, and is bound by, this licence issued under Part 7A of the Fisheries Management Act, 1994. The licence has effect for all purposes (subject to the Forestry and National Park Estate Act 1998), as a licence under the Fisheries Management Act, 1994.

Land area to which this licence applies

The area of the State described in clause 4 of the Integrated Forestry Operations Approval of which this licence forms part.

Commencement and Duration

The commencement date and duration of this licence are the same as that for the Integrated Forestry Operations Approval of which this licence forms part, subject to condition 2 of this licence.

Condition 1. Definitions and Abbreviations

Approval: Integrated Forestry Operations Approval (IFOA)

Aquatic habitat: Any area occupied, or periodically or occasionally occupied, by fish or marine vegetation (or both), and includes any biotic or abiotic component. Note: aquatic habitat includes, but is not limited to; any river or creek, lake, lagoon, pond, dam, reservoir, canal, channel, wetland or waterway.

Blading off: means the removal of surface soil from an extraction track or road in wet conditions in order to expose a drier or firmer surface for use by machinery.

Buffer zone: An area where harvesting activity may be conducted in accordance with the relevant conditions.

C*hannel source:* The most upstream extent of an integrated, contiguous channel network where the bed and banks of the stream completely lose definition at a headcut, nickzone, seepage zone, boulder or log jam, waterfall, mass movement or similar landform.

Class 1 aquatic habitat: As determined according to condition 7 of this licence.

Class 2 aquatic habitat: As determined according to condition 7 of this licence.

Compartment: An area of forest designated for forestry management purposes, principally for the cutting and removal of timber. In this licence, the term applies to both a formally designated compartment identified by a compartment number and/or a State Forest name, and any other tract of land (to which the Approval applies) managed for forestry purposes.

Critical habitat: As defined in Part 7A of the FM Act

Crossing: Any structure established to allow the crossing of a watercourse.

Drainage line: A channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or a combination of the following features which distinguish them from drainage depressions:

- evidence of active erosion or deposition - eg., gravel, pebble, rock, sand bed, scour hole, knick points; or
- an incised channel of more than 30 centimetres depth with defined bed and banks.

Endangered populations: As defined in Part 7A of the FM Act

Exclusion Zone: An area where specified forestry activities are prohibited, unless specifically allowed, under the terms of this licence

Earthworks: Mechanical soil movement and disturbance. This may include the construction, upgrading and maintenance of log dumps, roads, drainage feature crossings and extraction tracks.

Environment Protection Licence: As defined in the *Protection of the Environment Operations Act 1997*.

Extraction: The transport of logs from the point of felling to the log dump or log landing, either by forwarding or snigging.

Extraction track: A track along which forwarding and/or snigging machinery travels.

Fish: Any marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history (whether alive or dead) indigenous to New South Wales and includes; oysters and other aquatic molluscs, crustacea, echinoderms, beachworms and other aquatic polychaetes, but does not include; any species of whales, marine mammals, reptiles, birds or amphibians.

Floodplain: The land adjacent to but outside the defined banks of a watercourse that is periodically subject to flooding from the watercourse.

Floodplain level flow: A level of flow in a watercourse where water breaks out of the defined banks and enters the floodplain.

FM Act: Fisheries Management Act 1994

Forwarding: The carrying of logs by vehicles from the point of felling to the log dump in such a manner that the logs are fully supported off the ground.

FT: Forest type as defined by SFNSW Research Note number 17

Groundcover: Material which covers the ground surface and has the effect of reducing erosion. Groundcover may include existing vegetation, leaf litter, tree debris, gravel, rock, straw, mulch, geotextiles, erosion control mats, jute mesh and coconut mesh.

Hazard reduction work: Has the same meaning as "bush fire hazard reduction work" as defined in the *Rural Fires Act 1997*

Harvesting activity: The cutting and removal of timber or the taking of forest products (as defined in the *Forestry Act 1916*).

Haulage operations: The removal and transport of timber products from the point of loading within the compartment, age class or roading area by machinery or truck along a road.

In stream works: Any activity being carried out within the incised channel or, where there is no defined bank, between the apparent edges of any watercourse.

Machinery: All mechanical equipment used in the forest except chainsaws.

Miscellaneous Forestry Activities: Felling of timber for the construction of causeways and/or bridges for the purposes of forestry management, or cutting of posts for neighbour boundary fencing where the operation involves felling less than five trees per hectare over an area less than 50 hectares (a maximum of 250 trees).

AMEND-MENT 6 1 March 2013 *Definition of 'Monthly Advice' added*

"M*onthly Advice*: means the written advice prepared, or required to be prepared, each month by FCNSW, on forestry operations, as referred to in the non-licence provisions of the IFOA (including Schedule 1, Parts A, B and C of the IFOA).

Net logging area: The gross area of a compartment less Preferred Management Priority or subsequent Forest Management Zone exclusion areas, Riparian Exclusion Zones, Ridge and Headwater Habitat Corridor exclusion zones, Rainforest exclusion zones, High Conservation Value Old Growth Forest exclusion zones and Rare Non-commercial Forest Type exclusion zones.

NSWF: New South Wales Fisheries

Permanent extraction track: An extraction track that is left in place after use (see *road).*

Primary access road: As described in Attachment 3: 'State Forests of New South Wales Forest Road and Fire Trail Classification".

Record: means in relation to a threatened species:

- Any record on the NSWF database collected in the period 20 years prior to the approval of the Harvesting Plan by the relevant SFNSW Regional Manager, unless SFNSW and NSWF jointly agree the record is invalid.
- Any record agreed to between NSWF and SFNSW;
- Any record recorded by SFNSW during pre-logging and pre-roading surveys (as required in Condition 9 of this licence), during harvesting operations, and any other reliable record (as described in i. above) held on SFNSW files; and
- Any other record verified by an agreed independent expert.

A record includes an observation of a live or dead individual of a species.

Region: The relevant forest region the subject of this approval.

Road: Any route used for the vehicular access to, and/or the transport of logs from, the point of loading within the compartment, age class or roading area, or a permanent extraction track.

Saturated soil: The physical condition of a soil in which no more moisture can be absorbed or accepted. Saturated soils are subjected to compaction, rutting or displacement by machinery and vehicles.

Secondary access road: As described in Attachment 3: 'State Forests of New South Wales Forest Road and Fire Trail Classification".

SEPP 14: State Environmental Planning Policy No. 14 - Wetlands.

SFNSW: State Forests of New South Wales which is the trading name of Forestry Commission

SFO: Supervising Forest Officer, appointed as such by SFNSW.

Snag: Whole trees, limbs or root masses that have fallen or been washed into a waterway and are now partly or wholly submerged by water. Rocks and rock bars are also considered to be snags.

Snigging: The pulling of logs, either wholly on the ground or partly supported from the point of felling to the log dump. Wheeled or tracked vehicles are used for this purpose.

Specified forestry activities:

- Timber felling (including the cutting of posts), other than timber felling classified as miscellaneous forestry activities, according to this licence,
- Construction and operation of log dumps,
- Extraction,
- Road and track construction or upgrade (NB. routine road and track maintenance are not specified forestry activities unless otherwise stated),
- Road or track re-opening (ie. the clearing, scraping or treating of an existing revegetated road or track where there has been no logging operations in the compartment or area accessed by the road or track for 15 years or more),
- Commercial collection of firewood,
- Gravel extraction from new or existing quarries, where that gravel is to be used in conjunction with the undertaking of other specified forestry activities.
- Harvesting of tea tree oil,
- Bush fire hazard reduction work that is not undertaken in accordance with the statutory requirements of the *Rural Fires Act 1997*,

Streams: Streams as shown on the relevant topographic map as published by the Central Mapping Authority at a scale of 1:25 000. A first order stream is defined as that part of a stream between its point of origin and the first junction with another stream, whereupon it becomes a second or higher order stream. A third order stream commences at the junction of two second order streams. A fourth order stream commences at the junction of two third order streams.

Temporary extraction track: An extraction track that is not a permanent extraction track and that has had some form of machinery preparation prior to use, ranging from removal of leaf litter to the benching in of tracks around steep groundslopes, but is reinstated after use.

Temporary extraction track crossing: A watercourse crossing on a temporary extraction track where no structure is built and the bed of the watercourse remains at approximately the same level as existed prior to the crossing being established. Some earthworks may be required at the entry and exit points from the watercourse bed. The crossing is reinstated at the completion of harvesting in the area of forest accessed by the crossing.

Threatened species: Any species of fish or marine vegetation specified in Schedule 4 Parts 1, 2 or 3 (endangered species, populations and ecological communities), Part 4 (presumed extinct) and Schedule 5 (vulnerable species) of the FM Act.

Walk-over: Timber extraction without removing or unduly disturbing the existing natural groundcover, that is, where no extraction track construction or blading is required or performed.

Watercourse: Any stream or drainage line.

Condition 2. Notification, Implementation and Reviews

2.1 Notification

a) Where a Condition of this licence requires a matter to be notified to NSWF, approved by NSWF, or some other action by NSWF, then NSWF means the Principal Manager (Threatened Species) of NSWF or his or her delegate unless stated otherwise. The relevant counterpart in SFNSW is the General Manager, Native Forests Division, or his or her delegate, unless stated otherwise.

2.2 Implementation

a) Exemption from compliance with all or part of conditions 8.2, 8.3, 8.4 and 8.6 may be granted by NSWF following implementation of **Road and Fire Trail Management Plan(s)** required under Part 6 of the Approval. Such exemption may be conditional and must be in the form of a written notice issued by NSWF.

(refer also to condition 6.2 of this licence)

2.3 Reviews

a) Where the application of these conditions results in twenty percent or more of the net logging area being made unavailable because of exclusion zones, then SFNSW may request that NSWF review the conditions applying to the compartment.

b) At the end of six months of the initial implementation of this licence, SFNSW may request that NSWF participate in a joint review of the efficiency and effectiveness of the licence in meeting the Government goals and policies, with the aim of amending licence provisions if and where required.

Condition 3. Planning Documentation

a) SFNSW must prepare planning documentation that demonstrates that operational planning has taken account of the requirements of the Conditions of this licence. This must include showing all exclusion zones and buffer zones on the relevant harvesting plan operational map, except where the scale of the map does not allow small area features to be adequately represented, in which case the approximate location of zones should be adequately indicated.

b) The Harvesting or Operational Plan and any relevant planning documentation must be kept on file at the relevant SFNSW Regional Office.

c) All the requirements of this condition, including any variations approved by NSWF, must be met prior to specified forestry activities commencing in the compartment.

Condition 4. Reporting and Information Requirements

a) Where a condition of this licence requires SFNSW to maintain records, those records are to be kept at the relevant SFNSW Regional Office, and must be provided to NSWF upon written request.

AMENDMENT 6
1 March 2013
Condition 4(b) replaced

b) FCNSW must, when providing DPI (Fisheries) with an operational map and location map, also provide DPI (Fisheries) with records suitable for DPI (Fisheries) database purposes of all threatened fish species recorded on State forest. These must be forwarded by agreed electronic means to the DPI (Fisheries) Threatened Species Unit (Port Stephens).

c) If requested by NSWF, within 10 working days of such request, SFNSW must provide NSWF with:

Harvesting Plans, Operational Plans, Pre-logging and Pre-roading Survey Reports and maps showing exclusion zones, approved by the relevant SFNSW Regional Manager or his or her delegate.

d) Compliance Register

i. Each SFNSW Regional Office within the region must keep a register of every incident of non-compliance with the conditions of this licence of which SFNSW becomes aware.

ii. The register must include such of the following details of which SFNSW is aware:

- the date, time and duration of the non-compliance;
- the date upon which SFNSW became aware of the non-compliance;
- the exact location of the non-compliance, either marked on the operational map or in the form of Australian Map Grid co-ordinates;
- the name of the person who caused the non-compliance;
- the nature of the non-compliance;
- the reasons for the non-compliance;
- whether the non-compliance resulted in any damage to Class 1 or Class 2 aquatic habitat;
- any remedial action taken by SFNSW or any other person in relation to the non-compliance and the dates upon which it was taken;
- any disciplinary action taken by SFNSW against any of its contractors, employees, licensees or agents and the dates upon which it was taken; and
- any measure taken or proposed to be taken to prevent or mitigate the recurrence of such a non-compliance.

iii. The register must be filled in within 14 days of SFNSW becoming aware of the non-compliance.

iv. The register is to be maintained as a record according to condition 4 a) of this licence.

AMENDMENT 6
1 March 2013
Condition 4.1 added

4.1 Monthly advice

a) FCNSW must give the monthly advice to EPA and DPI (Fisheries) in accordance with the requirements set out in clause 9A of the non-licence provisions of the IFOA and must undertake operations in compliance with the obligations in clause 9A of the non-licence provisions.

b) For the avoidance of doubt, full compliance with the obligations in clause 9A of the non-licence provisions of the IFOA is an essential condition of this licence.

c) FCNSW is only required to, and may only, submit one monthly return in satisfaction of this clause and any other requirements to submit a monthly return under any other clause in the IFOA. Any monthly advice received by EPA or DPI (Fisheries) for any given month will be taken to be the monthly advice for the purpose of this clause and any other clause under the IFOA requiring the submission of a monthly return.

Condition 5. Threatened Fish Species

5.1 Threatened Species Schedules of the FM Act.

The threatened species, populations and ecological communities of fish that occur in NSW are listed in the schedules 4 and 5 of the FM Act, as current.

NSWF will provide to SFNSW;

i. maps, in appropriate digital format, of potential distribution,
ii. a database of records, and
iii. a written summary of distribution, species description and habitat preferences (as appropriate)

for each of the species, populations or ecological communities listed on schedules 4 or 5 of the FM Act.

Condition 6. Development of Management Plans and On-Ground Trials

6.1 Grazing Management Plans

a) Grazing Management Plans required to be developed under Part 5 of the Approval must consider the habitat requirements of threatened species and include appropriate management actions to minimise grazing impact.

c) The areal extent of grazing authorities issued by SFNSW must not be extended in any compartment where there is no physical barrier to prevent cattle from entering exclusion zones and buffer zones implemented under the conditions of this licence, except where covered by an approved Grazing Management Plan is in effect, or except where they fulfil SFNSW responsibilities under the *Rural Fires Act 1997*.

6.2 Road and Fire Trail Management Plans

a) The road and fire trail management plan(s) required to be developed under Part 6 of the Approval must address the practical measures to be taken in relation to the protection of threatened species and their habitat.

b) The plan must be consistent with the requirements of condition 8 of this licence.

c) The plan must include a strategy for the identification, assessment, upgrade (if required) and maintenance of all watercourse crossing structures for all state forests and crown timber lands subject of the Approval where such structures may adversely impact on threatened species.

6.3 Research into Alternative Management of Exclusion Zones (filter strips)

a) SFNSW may develop a research program to assess the impacts of altered management practices within and adjacent to exclusion zones, on the effectiveness of exclusion zones.

b) The exclusion zone research program specified in condition 6.3 a) must be undertaken according proposals contained in a document titled: "An assessment on the effectiveness of filter strips subject to altered management practices within and adjacent to filter strips" as approved by the Environment Protection Authority.

c) Site-specific locations identified in the document specified in condition 6.3 b) will be exempt from conditions 7.1 a) i, 7.1 a) iii and 7.3 a) of this licence. No exemptions to these licence conditions will apply to other areas within the compartment which are outside the exclusion zones identified in the document specified in condition 6.3 b).

d) No exemption will apply to any exclusion zone in class 1 aquatic habitat, as defined in condition 7 of this licence.

e) Any timber harvested from exclusion zones included in the research program is available to SFNSW.

f) A copy of the document, as approved by the Environment Protection Authority, specified in condition 6.3 b) must be provided to NSWF prior to commencement of the research program. Copies of all other relevant documentation related to the research program, including a report on the results of the research program, must be provided to NSWF within two weeks of the documents being prepared.

Condition 7. General Aquatic Habitat Protection Conditions

This condition applies to all specified forestry activities not yet commenced in the region at the date of this approval.

AMENDMENT 6
1 March 2013
Condition 7 Definition of 'Class 1 aquatic habitat' modified

Class 1 aquatic habitat is defined as a watercourse, wetland or other water body where the pre-logging and pre-roading assessment has determined that potential habitat of threatened species does occur within 2km upstream or 5km downstream of the site of the proposed works, or any aquatic habitat within 10km of critical habitat.

AMENDMENT 6
1 March 2013
Condition 7 Definition of 'Class 2 aquatic habitat' modified

Class 2 aquatic habitat is defined as a watercourse, wetland or other water body where the pre-logging and pre-roading assessment has determined that potential habitat of threatened species does not occur within 2km upstream or 5km downstream of the site of the proposed works, but where the pre-logging and pre-roading assessment has determined that potential habitat of threatened species does occur within 100km downstream of the site of the proposed works, provided that the threatened species in question is likely to permanently, periodically or occasionally be present in fresh or estuarine waters.

The part of a watercourse, wetland or other water body referred to in the definitions of class 1 and class 2 aquatic habitat must be within the same catchment (drainage system) as the potential or critical habitat referred to in those definitions.

A catchment or drainage system is defined as that area determined by topographic features within which rainfall will contribute to runoff at a particular point under consideration.

7.1 Operational Requirements

a) For all exclusion zones implemented under the following conditions the following must apply (except where indicated otherwise):

   i. All specified forestry activities, other than those permitted by condition 7.3, must be excluded from exclusion zones.

   ii. Machinery must not enter exclusion zones except in connection with activities permitted by condition 7.3.

   iii. Trees must not be felled into exclusion zones. Where a tree is felled into an exclusion zone, then no part of that tree is to be removed from the exclusion zone.

   (Note: NSWF does not intend to take proceedings where SFNSW can demonstrate that a tree was accidentally felled into the exclusion zone. The tree will not be considered to have been accidentally felled if the felling is a result of poor judgement on the part of the faller.)

b) Buffer zones must be managed in accordance with the relevant conditions in this licence.

c) All distances must be measured on the ground.

AMENDMENT 6
1 March 2013
Condition 7.1 (d) replaced

d) .FCNSW must maintain accurate GIS data recording exclusion zone and buffer zone boundaries and must supply this data to contractors and supervising officers before harvest operations. The GIS data will be based on records of aquatic habitat.

Note: This amendment removes the requirement to physically mark the boundaries of riparian protection boundaries in the field, in the same way that the environment protection licences that do not require stream protection markup. The amendment requires FCNSW to provide contractors and supervising officers with accurate GIS data recording exclusion zone and buffer zone boundaries.

7.2 Riparian Exclusion Zones and Buffer Zones

a) For all watercourses in either class 1 or class 2 aquatic habitat the following conditions apply.

b) Drainage lines:

i. Exclusion zones at least 10 metres wide must be implemented on both sides of all drainage lines covered by an Environment Protection Licence.

ii. Where there is no Environment Protection Licence coverage, exclusion zones at least 10 m wide must be implemented on both sides of all drainage lines contiguous with a mapped first order stream. Exclusion zones must start at the channel source of the drainage line and extend downstream.

iii. Where there is no Environment Protection Licence coverage, a buffer zone at least 5 m wide must be maintained upstream of the channel source to the up-slope extent of channelised flow.

iv. Where there is no Environment Protection Licence coverage, no exclusion or buffer zones are required in areas of episodic sheet flow.

b) Exclusion zones at least 10 metres wide must be implemented on both sides of all first order streams.

c) Exclusion zones at least 20 metres wide must be implemented on both sides of all second order streams.

d) Exclusion zones at least 30 metres wide must be implemented on both sides of all third and higher order streams.

e) A buffer zone at least 20 metres wide must be implemented on the external sides of all exclusion zones implemented on third and higher order streams, in accordance with condition 7.2 d), above.

f) Riparian exclusion zones must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel.

7.3 Activities Within Riparian Exclusion Zones and Buffer Zones

a) Specified forestry activities, with the exception of; road construction, road maintenance, road re-opening and extraction where there is no other practical means of access, must be excluded from exclusion zones implemented in accordance with 7.2 a), b), c) and d).

b) Specified forestry activities permitted within exclusion zones by conditions 7.3 a) must not be undertaken except in accordance with Condition 8 of this licence.

c) Machinery operating in buffer zones implemented in accordance with 7.2 e) must not operate except in accordance with Condition 8.5 of this licence.

d) Earthworks must not be undertaken within the buffer zones established in accordance with 7.2 e) for any purpose with the exception of road construction, road maintenance, road re-opening and extraction.

(Clarification note: specified forestry activities, except earthworks as qualified in condition 7.3 d) above, are not excluded from buffer zones established in accordance with condition 7.2 e). Condition 8.5 qualifies the mode of machinery operation in buffer zones established in accordance with condition 7.2 e).)

7.4 Wetland Exclusion Zones

a) Wetlands are defined as a vegetated depression with a permanent, seasonal or intermittent water table at or slightly above the floor of the depression. The vegetation type in a wetland typically indicates a wetter micro-environment than the surrounding country. Wetlands also include, but may not be limited to, all areas of SEPP 14 wetlands and all areas of SFNSW Research Note 17 forest typed swamp mahogany (FT 30), paperbark (FT 31), swamp oak (FT 32), mangrove (FT 33), swamp (FT 231), and water surfaces (FT 235).

b) For all wetlands in either class 1 or class 2 aquatic habitat the following conditions apply.

c) Exclusion zones at least ten metres wide must be implemented around all wetlands between 2m x 2m to 0.5 hectare (approx. 70m x 70m) surface area.

d) Exclusion zones at least 20 metres wide must be implemented around all wetlands between 0.5 hectare (approx. 70m x 70m) and 2.0 hectares (approx. 150m x 150m) surface area.

e) Exclusion zones at least 40 metres wide must be implemented around all SEPP 14 wetlands irrespective of size, and other wetlands greater than 2.0 hectares surface area.

f) Exclusion zones must be measured from the edge of the wetland.

g) Wetlands less than 0.5 hectare surface area must be marked in the field for protection and recorded as accurately as possible on harvest planning documents.

7.5 Other Water Bodies - Exclusion Zones

a) An exclusion zone at least 10 metres wide must be implemented around any pond or dam (as separate from streams and wetlands detailed in other conditions) in either class 1 or class 2 aquatic habitat. All practical precautions must be taken to avoid felling trees into this buffer zone.

b) Machinery, with the exception of fire fighting equipment, must not enter the exclusion zone implemented in accordance with 7.5 a).

7.6 Miscellaneous Forestry Activities

When conducting and/or supervising miscellaneous forestry activities (as defined in Condition 1) in class 1 or Class 2 aquatic habitat, SFNSW must apply all general requirements of Conditions 8.4, 8.5 and 8.6 in areas where these operations are conducted.

SFNSW is exempted from the other conditions in this licence when conducting miscellaneous forestry activities, except within areas of habitat identified as class 1 aquatic habitat.

Condition 8. Conditions for Works Within Exclusion Zones and Buffer Zones

8.1 Procedure For In-Stream Works In Classified Aquatic Habitat

a) SFNSW must not undertake any in-stream works in class 1 aquatic habitat unless those works are undertaken according to Condition 8.2, 8.4, 8.5 and 8.6, as applicable.

b) SFNSW must not undertake any in-stream works in class 2 aquatic habitat unless those works are undertaken according to Condition 8.3, 8.4, 8.5 and 8.6, as applicable.

8.2 Conditions for In-Stream Works in Class 1 Aquatic Habitat

a) Machinery must not enter class 1 aquatic habitat except for the purposes of construction and maintenance of a crossing or to cross the watercourse via a crossing.

b) New and replacement crossings in class 1 aquatic habitat must conform to the following conditions unless otherwise approved in writing by NSWF.

(Note: The minimum information required by NSWF to assess proposals for in-stream works in aquatic habitats is outline in Attachment 1.)

c) SFNSW must notify NSWF in writing at least one calendar month prior to any construction works commencing in class 1 aquatic habitat. Such notification must include detailed information relating to:

i. the habitat assessment procedures undertaken to classify the habitat;
ii. the necessity of providing a crossing at the location; and
iii. the design and construction of the structure.

d) In the case of new roads in class 1 aquatic habitat SF must develop means of controlling access where requested by NSWF.

8.2.1 Design

a) All new and replacement crossings in class 1 aquatic habitat must be designed, constructed and maintained so that:

   i. flows up to and including a peak flow from a 1:5 year storm event or a floodplain level flow, whichever is the lesser, are conveyed underneath the road formation without water flowing over the road surface and without more than a 10% increase in flow velocity at the discharge point of the structure above that velocity that would have occurred had the crossing structure not been in place. The determination of flow and velocity must be carried out in accordance with Attachment 2.

   ii. the total width of the structure (excluding piers and/or abutments), measured parallel to the watercourse, does not exceed 3 times the minimum internal height of the opening underneath the structure, measured from bed level of the watercourse underneath the structure.

   iii. all parts of the structure, including road surface materials, are securely fixed such that displacement of material is unlikely to occur during use of the structure and flow events in the watercourse up to and including a 1:10 year peak flow.

   iv. road surfaces within 30m either side of the watercourse are sealed with concrete, suitable bitumen product or other material such that displacement of road material is unlikely to occur during use of the road and rainfall events up to and including a 1:10 year 1 hour duration storm at the location of the crossing.

8.2.2 Construction and Maintenance

a) The existing morphology of the bed of the watercourse must not be disturbed or modified in any way except where necessary for the placement of piers, pylons or other support members of the structure.

b) The existing morphology of the banks of the watercourse must not be disturbed or modified in any way except where necessary for the construction of approaches, abutments and erosion protection works associated with the structure.

c) Snags within class 1 aquatic habitat must not be disturbed for any reason except for the realignment or relocation of a snag which materially affects the passage of water underneath a crossing structure.

d) SFNSW must approve snag management decisions and document the approval and the reasons why it was necessary. This documentation must be maintained as a record according to condition 4 of this licence.

8.2.3 Inspection

a) All crossings and associated works within class 1 aquatic habitat must be inspected according to the following regime:

   i. All crossings on all roads whenever harvesting activity, haulage operations or road construction operations are taking place within any area of the compartment accessed via the crossing,

   - whenever the SFO visits the work crew and no less than twice per week unless all harvesting activity, haulage operations or road construction operations within areas of the compartment accessed via the crossing are suspended, and
   - where reasonably practicable, and in any case prior to resumption of haulage operations, within 2 days following the cessation of any rain event which causes harvesting activity, haulage operations or road construction operations to be suspended within any area or the compartment accessed via the crossing.

   i. At all other times, at least once in any 12 month period.

b) Details of inspections must be recorded, including;

   i. name and position of person carrying out inspection,
   ii. location of crossing,
   iii. date of inspection,
   iv. assessment of stability of, damage to or degradation of the crossing and associated works,
   v. maintenance required.

Inspection records must be maintained according to condition 4.

8.3 Conditions for In-Stream Works in Class 2 Aquatic Habitat

a) All new and replacement causeways in class 2 aquatic habitat must be designed, constructed and maintained such that:

   i. all parts of the causeway consist of stable, erosion resistant and dispersion resistant material, either naturally occurring or imported to the site.

   ii. where the approaches to the causeway are constructed in dispersible soils, the road surface, batters and table drains within 20m either side of the watercourse must be covered with a stable, non-dispersible surface no more than 5 days after completion of causeway construction.

c) Causeways in class 2 aquatic habitat must be inspected whenever the SFO visits a work crew and no less than twice per week whenever haulage operations are taking place using the causeway. This inspection must be undertaken while a heavy vehicle crosses the causeway. If the inspection indicates that appreciable turbidity is being generated due the vehicle movement, or non-elastic deformation of the causeway surface takes place, then, within 24 hours of the inspection the causeway must either be closed or reconstructed such that it complies with the conditions of this licence.

8.4 General Conditions for In-Stream Works

a) All permitted works within either class 1 or class 2 habitat must comply with the following conditions unless expressly permitted or required otherwise by another condition of this licence.

8.4.1 Design

a) In-stream works must be designed and constructed in a manner which prevents changes in sediment transport and stream siltation, disturbance to the bed and banks of the stream and to maintain natural flow to the greatest extent reasonably practicable.

b) The location and type of any crossing must be approved by SFNSW and marked in the field prior to crossing construction.

8.4.2 Erosion and Sediment Control

a) Soil erosion and sediment control measures must be employed and maintained during in-stream works that take more than one day to complete. Soil erosion and sediment control measures must be :

i. properly installed, constructed and maintained;
ii. prevent to the greatest extent reasonably practicable the flow from the road entering the disturbed areas; and
iii. prevent to the greatest extent reasonably practicable the deposition of spoil into the stream bed.

b) Soil stabilisation must be undertaken to all disturbed areas within 20 metres either side of in-stream structures. This does not include the road surface or road drainage structures within 20 metres either side of the stream. Soil stabilisation must be completed within five days of construction, upgrading and maintenance operations.

c) Soil stabilisation measures must be used to protect bridge embankments from table drain discharge. This must be completed within five days of construction, upgrading and maintenance operations at that structure.

d) Where soil or gravel is used as the pavement for a bridge or culvert surface, structures must be installed to prevent soil or gravel from entering the stream. Soil or gravel deposited within the stream must be removed. Removal of soil or gravel must be undertaken in a manner which prevents disturbance to the bed and bank of the stream to the greatest extent reasonably practicable.

e) Fill material, including soil or gravel, placed on pipes and used as the crossing surface must not be placed upstream of the culvert inlet or in the downstream flowpath of the culvert outlet.

f) Soil stabilisation measures must be used to protect the upstream and downstream fill batters surrounding the culvert pipe(s). This must be completed within five days of crossing construction and maintenance operations.

g) Pipe outlets must discharge onto a stable surfaces capable of handling concentrated water flow. Scouring at the pipe outlet must not undermine the crossing structure or initiate gully erosion.

8.4.3 Bed and Bank Disturbance

a) Clearing associated with in-stream works must be undertaken at, or as close as reasonably practicable to, right angles to the water flow unless an angled approach reduces ground and soil disturbance.

b) Disturbed areas resulting from in-stream works must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

c) Disturbance of vegetation and groundcover in the exclusion zone must be restricted to a maximum length of 3 metres upstream and downstream of the crossing when undertaking in-stream works. Where clearing beyond 3 metres is necessary during in-stream works, SFNSW may approve additional clearing and document the approval and the reasons why it was necessary. This documentation must be maintained as a record according to condition 4 of this licence.

d) Culvert recovery and removal of associated soil fill must be undertaken in a manner which prevents disturbance to the bed and banks of the stream to the greatest extent reasonably practicable.

e) Where a culvert is removed, the disturbed areas within the stream must be re-shaped and soil stabilisation measures put in place within five days to achieve a stable cross section, unless the soil is saturated. Where the soil is saturated, machinery must not enter the disturbed area and temporary soil stabilisation and sediment control measures must be implemented within the five days. Permanent soil stabilisation measures must be put in place as soon as the soil is not saturated.

8.5 Machinery Operation Within Buffer Zones

a) Machinery operating in buffer zones implemented in accordance with 7.2 e) must not operate when the soil is saturated.

b) Machinery operating in buffer zones implemented in accordance with 7.2 e) must:

i. use walkover techniques to the greatest extent reasonably practicable;

ii. prevent to the greatest extent reasonably practicable skewing of machine tracks; and

iii. operate with blade up at all times except when conducting earthworks in accordance with 7.3 d).

8.6 Snigging and Forwarding Operations within Exclusion Zones

a) To the greatest extent reasonably practicable, all extraction within exclusion zones must adopt the following approach, in order of priority:

i. forwarding using walk-over techniques;
ii. forwarding, using a temporary extraction track;
iii. snigging using walk-over techniques;
iv. snigging using a temporary extraction track;
v. forwarding using a permanent extraction track;
vi. snigging using a permanent extraction track.

(Note: a permanent extraction track is, by the definitions contained in this licence, a road and must be constructed according to the requirements provided elsewhere in condition 8)

b) Notwithstanding condition 8.6 a), extraction operations conducted in exclusion zones must prevent to the greatest extent reasonably practicable; clearing of vegetation within the exclusion zone, and disturbance to the bed and banks of any watercourse.

c) Temporary extraction tracks must:
i. cross at, or as close as reasonably practicable to, right angles to the watercourse unless an angled approach reduces ground and soil disturbance, and/or clearing;
ii. not be used when there is runoff from the surface of the track;
iii. not prevent the free flow of water in the watercourse;
iv. not be used if water is flowing in the watercourse at any point on the track crossing.

d) The bed and banks of temporary extraction track crossings must be immediately reinstated at the completion of their use. Reinstatement, for the purposes of this condition, includes but is not limited to; the re-shaping of the bed and banks of the watercourse to the approximate profile that existed prior to track construction, establishment of ground cover, and removal of any material from the bed of the watercourse that was caused to be in the bed of the watercourse due to extraction operations.

e) The location of all walk-over points and temporary extraction track crossings on a watercourse must be approved by SFNSW and marked in the field prior to machinery entering the adjacent exclusion zone.

f) Temporary extraction tracks within an exclusion zone must not be bladed off.

Condition 9. Pre-Logging And Pre-Roading Aquatic Habitat Assessments

9.1 General Requirements

a) Specified forestry activities must not be undertaken in any compartment unless a pre-logging and pre-roading aquatic habitat assessment has been conducted. This condition applies to all harvest operation planning not yet commenced.

b) A pre-logging and pre-roading aquatic habitat assessment consists of a field inspection aimed at fulfilling the requirements of condition 9.4.

c) The purpose of the pre-logging and pre-roading aquatic habitat assessments, relevant to this licence, is to establish if there is a requirement for a road to be constructed or re-opened or extraction operations to take place within the exclusion zone of a watercourse, and then to classify the aquatic habitat at the relevant site as class 1 or class 2, pursuant to condition 7.

9.2 Desktop Review of Proposed Operation(s):

a) A desktop review of proposed operations must be conducted prior to pre-logging and pre-roading aquatic habitat assessments. The following information must be collated and provided to persons conducting aquatic habitat assessments:

b) **Data to Record:**

i. Date of review.
ii. Management Area, State Forest name, compartment number.
iii. Name of person(s) conducting review.
iv. Results of a database search for threatened fish records within 5km of the compartment boundary and 100km downstream of the proposed work site. The most up to date NSWF database must be used and its date given. Information from other sources such as National Parks and Wildlife Service, Australian Museum, Royal Botanic Gardens, Universities and consultants may also be used to assist in compiling the list.
v. Results of a check of SFNSW records for threatened species recorded within 5km of the compartment boundary and 100km downstream of the proposed work site, and any other records readily available.
vi. A summary of those threatened species records collated in parts iv. and v. of this section, including species name (both common and scientific), location (AMG), date of record, type of record (eg. observed, trapped), observer's name, and source of record where this information is available.
vii. Maps of potential habitat of those species requiring consideration. These maps are to assist the assessor in locating potential habitat.

9.3 Known And Potential Habitat

a) Pre-logging/pre-roading aquatic habitat assessments must be conducted in the vicinity of any location where specified forestry activities are to be conducted within an exclusion zone that is known or potential habitat of species listed in schedules 4 or 5 of the FM Act.

b) "Known habitat" for the purposes of pre-logging and pre-roading aquatic habitat assessments is defined as the aquatic habitat within a five kilometre stream length of a recorded sighting.

c) "Potential habitat" for the purposes of pre-logging / pre-roading aquatic habitat assessments is defined as aquatic habitat having those characteristics described as preferred habitat and within the potential distribution of the species under consideration, as presented in documentation provided to SFNSW by NSWF pursuant to condition 5.1 of this licence.

d) Notwithstanding the above, if previous reliable surveys or assessments in similar habitat in adjacent compartments in the previous ten years have recorded the species, then a aquatic habitat assessment within the compartment is required for those species listed in schedules 4 or 5 of the FM Act. If such surveys or assessments have not recorded the species, a aquatic habitat assessment is not required for that species. Reliable surveys or assessments are defined as being surveys or assessments equal to or better than the aquatic habitat assessment requirements set out in this condition with respect to methodology, sampling techniques and effort, sample placement and distribution, season of survey or assessment and weather conditions. The Aquatic Habitat Assessment Report must document all such previous reliable surveys or assessments used in place of conducting aquatic habitat assessments. This documentation must also include the following details on the previous survey or assessment: methodology, sampling techniques and effort, sample placement and distribution, season and weather conditions.

e) Where no previous reliable surveys or assessments for those species listed in schedules 4 or 5 of the FM Act have been conducted in similar habitat in adjacent compartments in the previous ten years, aquatic habitat assessments of known or potential habitat must be conducted within the compartment.

9.4 Assessment Documentation And Reporting

a) Aquatic habitat assessment results must be documented as per the following:

A pre-logging/pre-roading Aquatic Habitat Assessment Report must be prepared. For each location surveyed the following information must be recorded in the format provided in attachment 4 - ‘Aquatic Habitat Assessment Record’ or other format agreed to by NSWF:

i. Management Area, State Forest name, compartment number, logging plan identification.
ii. Date of assessment.
iii. Site location including Australian Map Grid reference or latitude and longitude to nearest 100m.
iv. Site elevation in metres.

v. Locality description (name of waterbody, name and distance from nearest road, track, etc).
vi. Habitat description, eg. stream morphology, in-stream and riparian vegetation, water quality and flow characteristics.
vii. Threatened species being targeted.
viii. Name of surveyor.

b) As well as the information prescribed above, the report must include:

i. Assessment site clearly marked on 1:25,000 forest type map.
ii. All raw data sheets.
iii. For each site assessed, an explanation of the way in which surveyor(s) meet the experience criteria specified in Section 9.5 below. Once this information has been supplied for a particular person it need not be supplied to NSWF again, unless specifically required by NSWF.
iv. The Aquatic Habitat Assessment Report must document all details of previous reliable surveys or assessments as specified in section 9.3 d, above.
v. The Aquatic Habitat Assessment Report must be forwarded to the NSW Fisheries within ten days of NSW Fisheries requesting the report.

9.5 Surveyor Experience

a) In order to conduct efficient and effective pre-logging and pre-roading aquatic habitat assessments the surveyor must be suitably experienced and trained in the appropriate field. Suitable experience and training is defined as:

i. Experience with aquatic habitat survey work and also familiarity with the types of habitat in which locally occurring threatened fish species occur.
ii. Tertiary biological or ecological qualifications are preferable but not essential if the above criterion is met.

b) Surveyors conducting targeted fish species surveys as required by condition 9.6, must also possess the following suitable experience and/or training:

i. Extensive experience with capture, handling and identification of aquatic species in the field. Surveyors must be able to identify the threatened fish species, relevant to the region, as well as similar species that those listed may be confused with. Surveyors must also be familiar with the types of habitat in which these species occur.
ii. Tertiary biological or ecological qualifications are preferable but not essential if the above criterion is met.

c) Proof that the surveyor(s) undertaking targeted fish species surveys holds all necessary permits, licences or approvals required to undertake the survey. Such instruments may relate to, but are not necessarily limited to, authority to take and possess threatened fish species, and animal ethics issues.

9.6 Targeted Fish Species Surveys

a) Targeted surveys are required for threatened fish species listed in schedules 4 or 5 of the FM Act prior to approval of any in-stream works in a class 1 aquatic habitat, other than works undertaken according to the conditions contained in condition 8.2. Targeted Fish Surveys must be conducted in potential habitat (as defined in section 9.3 above). Targeted Fish Surveys must be conducted within the affected stream for a distance of 2km upstream and 5km downstream of the site of the proposed works. Surveys should be focused in the area of the proposed works.

(Note: depending on the methods adopted, certain permits may be required from NSW Fisheries to undertake targeted surveys of fish species.)

b) Any variations to the requirements set out below for Targeted Fish Surveys must be approved in writing by NSWF prior to surveys being conducted.

c) **Data to Record:**

For each survey technique/method used the following information must be recorded:

i. Management Area, State Forest name, compartment number.
ii. Type of survey (including details of methodology used).
iii. Date of survey.
iv. Name, experience and qualifications of surveyor(s).
v. Survey location including Australian Map Grid reference or latitude and longitude to nearest 100m.
vi. Locality description (name of waterbody, name and distance from nearest road, track, etc).
vii. Survey point or transect clearly marked on 1:25,000 forest type map.
viii. Habitat description, eg. stream morphology, in-stream and riparian vegetation, water quality and flow characteristics
ix. Survey start time and finish time.
x. Threatened species being targeted.
xi. Threatened species recorded, including descriptors, eg size, weight, age, sex etc.
xii. Record observation type, eg. species observed, caught etc.
xiii. For each day of survey, on arriving at the survey location the following is to be recorded:

- Air and water temperature (degrees Celsius).
- Wind: 0 = calm; 1 = light, leaves rustle; 2 = moderate, moves branches; 3 = strong, impedes progress.
- Rain: 0 = rain during survey; 1 = evidence of rain in last 24 hours; 2 = no evidence of rain in last 24 hours.
- Date and time these measurements were made.

ATTACHMENT 1: Elements Comprising Assessment Of Proposals For In-Stream Works In Aquatic Habitats

When applying for approval to undertake in-stream works in Class 1 aquatic habitat, SFNSW must provide NSWF with a report addressing the following:

- Clear documentation that there are no other practical means of access;
- The reasons why the works must be undertaken;
- The mitigative and ameliorative measures to be applied; and
- Results of the field assessment which must be undertaken and must include:
    a) A description of the proposed works, including dimensions of area to be affected (road footprint, run offs etc), method of construction including any cutting, filling and bed disturbance that may be involved, and full design details.
    b) An assessment and description of any threatened fish species or potential habitat that will or is likely to be directly or indirectly affected by construction, the likelihood of the road to create a barrier to movement of threatened fish species, or is otherwise likely to increase the threats to threatened fish species.
    c) An assessment of any aquatic habitat features that will or are likely to be directly or indirectly affected by the construction.
    d) An assessment of past disturbance in the proposed construction area.

ATTACHMENT 2: Design Methods For Crossing And Drainage Structures

1. Design of Bridges, Culverts And Causeways

Design calculations used to determine the peak discharge for the specified recurrence intervals relating to the design of bridges, causeways or culverts, must be undertaken in accordance with the "Modified McArthur rational method" as specified in the SFNSW's roading manual (Forestry Commission, 1983). This design methodology must only be applied to catchments less than 1000 hectares.
Where SFNSW chooses to use an alternative method for calculating the peak discharge for the specified recurrence intervals required by this licence for bridges, causeways or culverts, SFNSW must have the prior written approval of NSWF.

2. Determination of Stream Velocity

For the purposes of condition 8.2.1 of this licence, change in stream velocity is taken to be indirectly proportional to change in cross-sectional area of flow (A) at any given point.

Change in A is equal to the difference between A at the location of the structure as determined for the undisturbed watercourse and for the watercourse with the structure in place.

Design calculations used to determine the change in A for the specified recurrence interval relating to the design of bridges, causeways or culverts, must be undertaken in accordance with "Manning's Equation":

$$Q = 1/n.A.R^{3/2}.S^{1/2}$$

Where:-

Q = Flow (m^3/s); derived from 1. above.

n = Roughness coefficient; derived from acceptable published tables.

A = Cross-sectional area of flow (m^2)

R = A/P

P = Wetted perimeter of watercourse for given flow (m)

S = Average grade of bed of watercourse determined over a minimum length of 10 x bed width (at location of structure) by either interpolation from the relevant 1:25,000 topographic map or on-ground spot levels.

Where SFNSW chooses to use an alternative method for calculating the flow velocity required by this licence for in stream structures, SFNSW must have the prior written approval of NSWF.

ATTACHMENT 3: SFNSW Road And Firetrail Classification

FUNCTIONAL NAME	FORMATION WIDTH (m) Actual width depends on log truck intensity and topography	LAND INFORMATION CENTRE (LIC) Standard road system classification used on maps		FUNCTIONAL DESCRIPTION	
				NATIVE FORESTS	PLANTATIONS
Primary Access Road	5.5 to 7.3 native forest 9.2 to 11.0 plantations	All weather road, unsealed, two lanes	LIC Class III	A forest road serving as main carrier for traffic between the forest and the relevant industrial centre. Generally 2 lane all weather surface. Usually serves a forest > 15,000ha	A plantation road serving as a main carrier for traffic between the plantation and the relevant industrial centre. Generally 2 lane all weather access. Usually serves an area > 15,000ha. Primary access to areas under 15,000 ha are provided with at least an all-weather surface. Road density 0.5km - 1.5km/1,000ha. Timber carrying capacity between 150,000-300,000 tonnes/year.
Secondary Access Road	4.2 to 5.5 native forest 7.3 plantations	All weather road, unsealed, one lane; and dry weather road, loose surface	LIC Class IV and Class V	A branch forest road, joining a Primary Access Road, that serves major sections of the forest (usually >5,000 ha) or provides specific purpose access, eg, to a lookout. These are generally all-weather access roads.	A branch plantation road joining a Primary Access route that serves major sections of the plantation comprising one to four age classes in conifer plantations with areas between 300 and 1200 hectares. Road density 2.0km/1,000 hectares. Timber carrying capacity between 40,000-80,000 tonnes/year.
Feeder Road	3.7 to 4.2 native forest 4.2 to 5.5 plantations	All weather road, unsealed, one lane; and dry weather track, loose surface	LIC Class V	A forest road along which the harvested timber is collected (directly at roadside log dumps and/or by harvesting roads) and feeds into the system of Secondary and Primary Access Roads. Generally serve a forest area > 1,000 ha.	A plantation road along which the harvested timber is collected (directly from off road log landings and or log harvesting roads) and feeds into the Secondary and Primary access roads. Generally serves an area between 150 and 400 ha. Road density 2.0-5.0km/1,000 ha. Timber carrying capacity between 20,000-30,000 tonnes/year.
Harvesting Road Compartment, Plantation Establishment Road	3.7 to 4.2 native forest 4.2 to 5.5 plantations	Dry weather track, loose surface	LIC Class V	Generally, a dry weather temporary access track serving a small area of productive forest for timber harvest. Harvesting Roads fed into the higher order forest road system.	A plantation road separating individual compartments in a plantation age class along which harvested timber is collected and which links with higher order roads. Generally serves an area between 10 and 60 hectares. Road density 15.0-25.0km/1,000 ha. Timber carrying capacity up to 8,000 tonnes/year. Roads constructed at plantation establishment may be upgraded to higher order roads prior to harvesting where required.
Link Road Boundary Road (or Track)	3.7 to 4.2 native forest 4.2 plantations	Dry weather track, loose surface	LIC Class V	A forest road (or track) linking points in the pattern of higher order roads to facilitate access for general management and protection of the forest. Link Roads may include boundary roads around the perimeter of forests.	A plantation road or track around the perimeter of a section of plantation used for fire protection and timber extraction. Similar road densities to Harvest Roads.
Fire Trail Service Trail	3.7 to 4.2 native forest 4.2 plantations	four wheel drive track	LIC Class VI	Permanent tracks provided for forest protection. Generally allow dry weather access only and suitable for 4 wheel drive vehicles only, including external fire trails forming part of the forest protection system.	Permanent tracks provided for plantation protection. Generally allow dry weather access only for suitable 4 wheel drive vehicles. Trail within plantation compartments may be unformed.

ATTACHMENT 4: FOLLOWING PAGE - Aquatic Habitat Assessment - Data Recording Sheet

APPENDIX C – EDEN REGION

Aquatic Habitat Assessment

NSW Fisheries

Date of assessment d m y | Dominant FT

Management Area | Harvest Plan I.D.

State Forest Name | Compartment No.

Site name | Drainage basin | Map No. | Grid Ref.

Stream name | Nearest road | OR Lat. | Long. 1 | Altitude m

SITE

GRADE
Abundant
Frequent
Occasional
Rare

SUBSTRATE Grade
- Bedrock
- Boulder
- Cobble
- Gravel
- Sand
- Mud/silt
- Clay
- Unknown

PLANTS Grade
- Native trees
- Exotic trees
- Shrubs
- Terrestrial grass
- Rushes, sedges
- Littoral grasses
- Floating macrophytes
- Submerged m'phytes
- Algae

COVER Grade
- Rock
- Timber
- Undercuts
- Plant litter

LEVEL
- Rising
- Steady
- Falling
- Unknown

TURBIDITY
- High
- Mod.
- Low
- Clear

MIGRATION BARRIERS
- ☐ above site by .....km
- ☐ below site by .....km

SECCHI DEPTH m

ENVIRONMENTAL DATA PROFILE

Depth	Temp.	D.O.	pH	Cond.	Turb.
	°C	(mg/l)		(µS/cm)	(FTU)
surface					
1m					
2m					
3m					
4m					
5m					
6m					
7m					
8m					
9m					
10m					
Bottom Depth		m			

STREAMS

FLOW
- High
- Mod.
- Low

TYPE
- Stream
- Channel
- Floodplain

VELOCITY
- Fast >0.5m/s
- Moderate
- Slow<0.1m/s

HABITAT Grade
- Pool
- Run
- Riffle
- Rapid

TIDAL ☐

AV. DEPTH m

AV. BED GRADIENT %

AV. WIDTH m

OR

STILL WATER

TYPE
- Lake
- Storage
- Farm dam
- Billabong

LEVEL
- High
- Moderate
- Low

MAX. DEPTH m

Possible threatened species:

- **Trout cod** ☐
- **Eastern freshwater cod** ☐
- **Oxleyan pygmy perch** ☐
- **Other** ☐

Surveyor Name: _____

Signed: _____

Provide Comments & sketch plan of location (nearby roads, tracks etc.) overleaf.