

Sampling fish communities using fyke nets

1. Purpose and scope

This document describes the basic use of a fyke net. As use of a fyke net alone may not provide a representative sample of a fish community, users should consider using a fyke net as one component of a suite of different fishing gear types.

2. Associated documents

Sampling design and preparation:

- *Permits and approvals*
- *Record keeping, including taking field photographs and videos*

Biological Assessment:

- *Background to fish sampling and index calculation*
- *Fish holding, identification and measurement of length and weight*

3. Health and safety

Before following the methods contained in this document, a detailed risk management process (identification, assessment, control and review of the hazards and risks) must be undertaken. All work carried out must comply with the Queensland Work Health and Safety legislative obligations.

4. Permits and approvals

A general fisheries permit is required for all work that involves 'fish' as defined in the *Fisheries Act 1994*. Note that early life stages such as eggs, spat or spawn of fish are considered as fish under the Act. Under the *Animal Care and Protection Act 2001*, prior approval in writing from an Animal Ethics Committee is required for the use of animals for scientific purposes. All work carried out must comply with Australian Code for the Care and Use of Animals for Scientific Purposes (National Health and Medical Research Council 2013).

Permits and approvals may be required to conduct activities involving animals, plants and/or in protected areas (for example National Park/Regional Park, State Forest or State Marine Park).

See *Permits and approvals* document for more information on requirements.

5. Skills, training and experience

Skills, training and/or experience required to understand and or undertake this method include:

- ability to identify fish to species level
- prior experience in the use of fyke nets.

6. Equipment

See Appendix 1 for example equipment checklist.

7. Procedure

7.1 Preparation for sampling

- Ensure mesh size, hoop size, length, number of wings etc. to be used are suitable for the fishing conditions, target species and objectives of the fishing.
- Select and combine different fyke net types and/or replicates as required to target a range of different fish, e.g. single-winged fyke nets for smaller bodied fish along shallow waterhole margins and large double-winged fyke nets for larger pelagic species in deeper water.

Note: Fyke netting is a passive technique (i.e. fish swim into the net and are not actively targeted). Therefore, some species may not be represented in the sample. For example, some species which are common at the site may be poorly sampled and rare species that move in schools may appear more abundant than they actually are.

7.2 Deployment of nets

1. Select a suitable location in the stream for deployment. Avoid locations with high flow, poor accessibility, and the presence of significant amounts of floating and submerged debris. Depth should be considered in terms of health and safety, the potential stranding of trapped fish (in tidal areas) and target species.
2. Deploy net facing either downstream or upstream depending on sampling objectives. Fyke nets can be deployed by boat or by wading.
3. Fix tail-end (cod-end) to a stake or structure such as a tree or rock on the bank or within the water (Figure 1). Care should be taken to always maintain an air space in the cod-end to allow captured mammals and reptiles to breathe, either by tethering the net above the water surface or placing a float inside the net.
4. Extend fyke wings out one at a time, spreading out hoops and pulling wings taught, and secure to a stake or other available structure such as a tree (Figure 1). Securing one of the wings to the bank will maximise the possibility of catching fish species migrating along waterway margins. The degree of 'spread' of the wings will depend on the characteristics of the location and the aims of sampling. The distance between the end of the wings (distal ends) should be recorded to assist in providing a quantitative measure of sampling effort.
5. Ensure funnels within the hoops are at least partially submerged to allow entry of fish.
6. Record deployment time.

Note: Fyke nets are typically deployed overnight, but if there is a risk of by-catch or target animals being hurt, a shorter time must be considered. If deployed overnight, cod ends **must** be out of the water.

7.3 Retrieval of nets

1. Record retrieval time to assist in calculation of effort measures.
2. Bring wing/s in to first hoop then elevate first hoop clear of the water and shake, ensuring that any captured animals fall down into the next hoop.
3. Continue to shake each further hoop in turn until all animals have been collected into the cod-end of the net.
4. Untie the cod-end and deposit fish catch into a large container with aerated stream water.
5. Complete a comprehensive check of wings and hoops to ensure no animals lodged within any part of the net are missed.

7.4 Catch processing

Complete processing as quickly as possible to minimise stress. In situations where catch volumes are very high it may be necessary to subsample from the total catch in order to avoid long processing times and possible fish mortality. See *Fish holding, identification and measurement of length and weight* document for further information.

7.5 Cleaning and maintenance of nets

- Rinse, clean and dry fyke net as soon as practical before leaving an assessment site to prevent transfer of pathogens and pest plant and animal species to other locations.
- Ensure net is maintained free of debris and holes.
- Clean/repair as necessary before storage or redeployment.



Figure 1: Fyke net set (photo credit: Hydrobiology Pty Ltd)

8. References and additional reading

Gehrke, PC, Brown, P, Schiller, CB, Moffatt, DB, Bruce, A 1995, *River regulation and fish communities in the Murray-Darling river system, Australia*, Regulated Rivers: Research and Management, 11, 363-375.

Gilligan, D, Schiller, C 2003, *Downstream transport of larval and juvenile fish in the Murray River*, NSW Fisheries Final Report Series No. 50, NSW Fisheries, Narrandera.

Marshall, J, Steward, A, McGregor, G, Marshall, C, Negus, P, Johnson, D, Lobegeiger, J, Davies, P, Harch, B, Winning, M, Choy, S, Cockayne, B 2003, *Condamine-Balonne Integrated Monitoring Pilot Project: Methods*, Aquatic Ecosystems Technical Report No. 41, Department of Natural Resources and Mines, Brisbane.

Sternberg, D, Cockayne, B, Schmarr, D, Duguid, A, Mathwin, R, McNeil, D 2014, *Lake Eyre Basin Rivers Assessment (LEBRA) 2012/13 Monitoring Report*, A report to the Department of the Environment, Canberra, ACT.

Appendix 1

Table 1: Equipment checklist

Equipment	✓
Fyke net/s (number and size specifications depend upon sampling design)	
Net mending kit (including extra net mesh)	
Boat & outboard (for setting nets in deeper water)	
Coarse & fine strainers	
Large holding containers (e.g. Nally® bins)	
Portable aerator (with spare batteries) with air hose and stone	
Gloves for handling fish (optional)	
Fisheries permit signs	
Fish measuring and sample processing equipment	
Fish identification field guide	
Field data sheets	
Waterproof marker, pens and pencils	

Note: Equipment numbers/amount to be determined by the study design.