

## Fish holding, identification and measurement of length and weight

### 1 Purpose and scope

This document describes how to hold, identify and measure the length and weight of fish after they have been collected from nets/traps.

### 2 Associated documents

*Sampling design and preparation:*

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

### 3 Health and safety

Before following the methods contained in this document, a detailed risk management (identification, assessment, control and review of hazards and risks) must be undertaken. All work carried out must comply with 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 measurement of fish.

### 6 Equipment

See Appendix 1 for example equipment checklist.

## 7 Procedure

### 7.1 Temporary holding of fish

1. Place captured fish into a holding container (e.g. Nally® bin). This container is to be filled with water sourced from the site. If the fish catch is large, change water often during processing.
2. Attach a suitable aerator to the container if required, placing the air stone into the water to ensure water is adequately oxygenated. More than one aerator may be required for large volumes of fish and/or in warmer temperatures. Wherever possible, keep the holding container in the shade and/or partially resting within the waterway to take advantage of the thermal mass of the larger water body.
3. Undertake all processing immediately in order to minimise stress to fish.

**Note:**

- Utilise coarse and/or fine sieves as required to rinse debris from small fish when processing fish from a holding container containing large amounts of detritus.
- Ensure captured fish are monitored continuously for signs of stress and oxygen depletion (e.g. loss of equilibrium or air gulping) and rectify by partial water changes or release of the fish.

### 7.2 Identifying and measuring fish

1. Wet hands prior to touching fish to avoid damaging sensitive mucous layers. Handling should be minimised to avoid unnecessary stress and/or mortality.
2. Begin processing by removing larger individual fish first. These are easier to retrieve and removal will reduce stress on smaller fish in the holding container.
3. Remove the fish from the holding container and identify. Record the species in a notebook or equivalent. Supporting resources such as keys, books, photographs may be used. If unable to identify a species, preservation of specimens may be required after the individual has been measured (see Section 7.4).
4. Place the fish on the measuring board, with the snout positioned at 0cm. Measure either standard length, total length or fork length (as described below) in millimetres. Record the length in a notebook or equivalent.

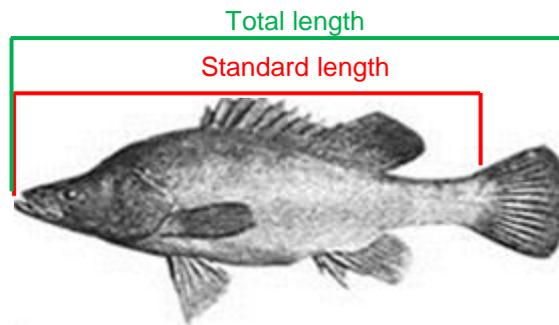
**Note:** The most important factor in measurement is consistency; i.e. if standard length was used at the site in the past to measure a golden perch, then it must be consistently used as the length measure for that species. Being consistent ensures that measurements are comparable over time.

  - **Standard length** is the length from snout to the tail-end of the vertebral column (the hypural crease) (Figure 1). The hypural crease can be located by holding the fish against a flat surface and gently bending the tail upwards and forward such that a crease (the hypural crease) becomes visible. Standard length provides the most reliable length measurement because tail fins (caudal fins) are often damaged, making it difficult to determine total or fork length.
  - **Total length** is the measurement taken from the tip of the snout to the end of the caudal fin (Figure 1).
  - **Fork length** is the measurement taken from the tip of the snout to the centre of a concave tail (Figure 2).
5. Weigh the individual fish following the manufacturer's instructions for the scales in use.
6. Place the scales in a stable, sheltered location. If required place the fish into a tray, ensuring the scales read zero prior to the fish being placed on the scales.
7. Remove as much excess water from individual fish as practicable.
8. Place fish on the scale and measure in grams. Record the fish weight in a notebook or equivalent.
9. Return fish to the water as quickly as possible once measurements and recordings have been made.

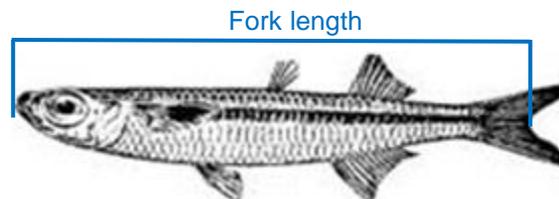
**Note:**

- When processing fish, one person should be dedicated to identifying and measuring fish and another person should be dedicated to taking accurate notes on appropriate data sheets and assisting where required.
- Where catch volumes are very high, it may be necessary to subsample from the total catch in order to avoid

long processing times and reduce fish stress and/or mortality. The number of individuals sub-sampled will depend on the aims of the particular study. For example, Kennard et al. (2011) suggest a sub-sample of 30 individuals from each species.



**Figure 1: Golden perch (*Macquaria ambigua*): standard length is measured from snout to the tail-end of the vertebral column. Total length is measured from tip of snout to tip of convex tail.**



**Figure 2: Hardyhead (*Atherinosoma microstoma*): fork length is measured from tip of snout to centre of concave tail.**

### 7.3 Releasing fish

1. Release all native fish back into the water they came from. If fish cannot be identified, representative specimens may be preserved for later identification (as outlined below).
2. Euthanize noxious fish as required by the General Fisheries Permit and Animal Ethics approval and dispose of appropriately. Consult the Queensland fisheries website for the latest information on policies and legislation regarding the release of noxious fish.

### 7.4 Preserving fish

1. If fish are to be taken from site (for identification or further analysis), euthanize fish in accordance with your General Fisheries Permit and Animal Ethics Approval.
2. Store the fish in an appropriate container (if preserving in liquid) or double-lined zip-locked bags (if freezing). Label these with details including site, fishing method, identification and preservation type. Examples of preservation include 70% ethanol or 10% formalin for identification and freezing for contaminant analysis. Record any fish collected in a notebook or equivalent.

## 8 References and additional reading

Allen, GR, Midgley, SH and Allen, M 2002, *Field guide to the freshwater fishes of Australia*, Western Australia Museum, Perth, 394 pp.

Jearld, Jr A 1983, Active Fish Capture Methods, in LA Nielsen and DL Johnson (eds), *Fisheries Techniques*, American Fisheries Society, Southern Printing Company Inc. Blacksburg, Virginia.

Kennard, MJ, Pusey, BJ, Allsop, Q, Perna, C, Burrows, D and Douglas, M 2011, *Field manual – Including protocols for quantitative sampling of fish assemblages, habitat, water quality and sample preservation*, Australian Rivers Institute, Griffith University, Queensland.

Pusey, B, Kennard, M and Arthington, A 2004, *Freshwater fishes of north-eastern Australia*, CSIRO Publishing, Collingwood, Victoria.

## Appendix 1

**Table 1 Equipment checklist**

Equipment	✓
Waterproof notebook or data sheets for fish sampling and processing	
Clipboard	
Labels	
Permanent marker	
Pencils	
Measuring board, ruler, callipers and/or other measuring devices	
Scales	
Coarse (1cm) and fine (250µm) sieves	
Holding tank (e.g. buckets, Nally® bin or other suitable container)	
Portable aerator (with spare batteries) with air hose and air stone	
Vials/containers for storing fish specimens	
Preservative (e.g. 70% ethanol)	
Fridge/freezer (if required for preserving fish specimens)	
White sorting trays	
AQUI-S®, ice or other euthanasia equipment	