

**Australian Crayfish Project &  
Australian Aquatic Biodiversity Survey**

**Code of Practice 2014  
for Collecting Freshwater Aquatic Fauna in Victoria**

**Purpose of collecting**

The Australian Crayfish Project (ACP) and the Australian Aquatic Biodiversity Survey (AABS) involves full biological studies of freshwater habitats across Victoria, Australia; no specific locations can be given until after collection has occurred. Every effort will be made to investigate as much of the whole of, Victoria as possible. We will attempt to capture freshwater species from every creek, stream, river, swamp, paddock and mountain in Victoria. The Project is primarily focused on Freshwater Crayfish (ACP) but any shrimp, other crustaceans, molluscs, fish or macroinvertebrates captured during the project will also be catalogued and vouchered as part of the AABS collection. All crustaceans, molluscs, gastropods and macroinvertebrates collected will be vouchered at the collection site.

1. Specimens will be photographed (alive).
2. Specimens will be preliminarily identified.
3. Specimens will be weighed.
4. Specimens will be measured.
5. Specimens will be euthanized by freezing (12-24 hours @ -19°C).
6. Specimens will be vouchered in 100% ethanol.

All other fish species will be anesthetised with clove oil and vouchered at the collection site.

1. Specimens will be photographed (alive).
2. Specimens will be preliminarily identified.
3. Fish specimens are placed in an immersion bath, mixture of AQUI-S and water or Clove oil and water. Concentration of 20-30 mg/L Clove oil or 100 mg/L AQUI-S will anesthetise the fish reducing the metabolic rate to the extent that breathing stops and the fish is euthanized.
4. Fish are immersed in the mixture for 5-10 minutes whilst the site record is completed.
5. Specimens will be vouchered in 100% ethanol.

The collection of all samples by project collectors from natural populations for preservation is essential for:

1. the recording of biotic diversity, over time and/or in different habitats;
2. the establishment and maintenance of taxonomic reference material essential to understanding the evolution and phylogenetic relationships of crustaceans;
3. for environmental status reports and impact studies.

Correct identification of the animals that are being studied is crucial to research and conservation programs. Incorrect or unresolved identifications can lead to misleading or incomplete conclusions. Taxonomy derived from studies of collections proved the identification basis for most types of biological research that is being conducted (physiological, anatomical, biochemical, behavioural or some other aspect of the animal's biology), whether it occurs in the field or the laboratory. Conservation needs

are impossible to assess without the ability to recognise and differentiate species. Thus, identification although often taken for granted, is fundamental to any animal-based study and particularly important when studying native animals. Collections allow identification to be checked subsequent to the initial study, thus permitting verification or, if required, correction. In addition, extension and elaboration of studies based on those specimens are possible when new questions arise and/or new analytical techniques become available. An important element of collections is the retention of voucher specimens, which allow problems to be addressed that cannot be resolved in the field, particularly when there is no other means to verify identification and where the taxonomy of a group is undergoing or expected to undergo change. Voucher specimens permit confirmation of the distribution and occurrence of a species at a certain place at a certain time. Preserved collections enable multiple uses of specimens thus often reducing the need for repetitive collecting. A researcher wanting to study the anatomy, genetics, taxonomy, reproductive biology or feeding habits of a particular species, can use specimens in the collection. Availability of specimens in collections saves the time, expense and avoids conservation issues associated with capturing fresh specimens. Once studied and returned to the collection the bank of knowledge for a particular specimen or specimens increases the value of that specimen and the collection as a whole. Where possible the ACP Collectors will attempt to cover the range of variation in animal structure, life history, form, and distribution for as many species as possible in Victoria.

## **General Principles**

This code of Practice is consistent with other codes of practices developed for collecting animals. For example the WORLDWIDE DRAGONFLY ASSOCIATION recognises the following 4 principles:

1. To respect life, in the form of species, communities and habitats.
2. To comply with existing regulations
3. To respect the need for scientific rigour
4. To show, and expect to receive, tolerance of differing attitudes towards collecting biological material.

Those principles are broadly accepted here and expanded to include the following:

1. Collection procedures are planned to avoid or minimise distress to the freshwater crustaceans targeted and other by-catch fauna and will always be conducted so as to attempt to leave the habitat and other species as undisturbed as possible consistent with sound research design.
2. Collecting is targeted to fill biogeographical gaps, identify distribution and answer defined research questions.
3. The ACP collector/s must have knowledge of all regulations pertaining to the crustaceans under study (ie. threatened or endangered species) and the proposed areas of collection, and must ensure all Victorian permits necessary for carrying out collections are current. Collecting will be avoided in extremely public areas and conducted inconspicuously to avoid observation/interaction with the general public.

4. ACP collectors must have an understanding of the Animal Care & Ethics protocol with relation to freshwater aquatic fauna and all specimens will be treated with care and consideration ensuring no undue stress or injury.
5. Collecting is planned with respect to the abundance of the species and the life-history stage involved so that numbers of individuals collected will not constitute a significant percentage of the population of any species in any bioregion. A total maximum of 6 specimens of any species/location is the limit, and generally only 1 or 2/site will be retained.
6. Where possible, collecting individuals of endangered or threatened taxa should be avoided. This can be accomplished by appropriate selection of areas (habitats) and sampling methods.
7. When positive identifications can be made in the field and it is not necessary to retain all or part of the collection, live specimens can be released at the original site of capture.

## **Methods**

Collection methods are chosen with consideration of the above principles.

Methods used by ACP collectors are listed below:

Scoop and plankton nets, traps, meat on string, hand collecting.

### **Scoop nets**

ACP collectors use hand held scoop nets. These nets are 6mm mesh and approximately 320mm diameter on a wooden handle.

PLUS – They are hand held and only utilized in a selected area. Larger mesh nets (6mm) can allow selective capture without by catch. When non selective capture is utilised non targeted by-catch species captured can be returned without injury.

MINUS – Non targeted species may be captured accidentally;

INDICATED – For capture of small crustaceans in weedy or muddy areas (cannot be captured by other means).

CONTRAINDICATED – Only for capture of specimens greater than 6 mm. Smaller specimens will not be captured

RECOMMENDED – Ensure all scoop nets are repaired without holes.

### **Plankton nets**

ACP collectors use hand held scoop and plankton nets. These nets are 100micron approximately 320mm diameter on a wooden handle.

PLUS – They are hand held and only utilized in a selected area. Once used they are non-selective – catches everything in the selected arm reach scoop area with selection by size, rather than taxon. Enables capture of larvae and small juveniles.

These suffer extremely high natural mortality and are very abundant, so capture of large numbers of larvae or juveniles has negligible impact on populations of adults. Non target species can be returned with acceptable injury or mortality.

MINUS – With 100 micron mesh it is not possible to target particular tax; there will be a by-catch of non targeted fish and invertebrate zooplankton; as these are hand held nets most of the delicate fish larvae will survive capture by the plankton net and can be returned, however some injury and mortality will occur to small delicate animals.

INDICATED – For capture of larvae and small juveniles (cannot be captured by other means).

CONTRAINDICATED – For capture of small live specimens in difficult habitat region Areas with uneven bottoms (like sharp rocks) or with snags/branches.

RECOMMENDED – No recommendations.

## **Traps**

ACP collectors use a mixture of small box traps and opera house traps for freshwater collecting. They are baited and left for a designated period of time.

PLUS – Passive collecting – may be set in areas difficult to sample by other methods and samples invertebrates that are difficult to sample by other methods. May be left while other tasks are performed or overnight. Animals are caught alive and can be returned to the water. No habitat disturbance.

MINUS – If left too long animals can be dead upon retrieval. Ghost fishing possible if trap not recovered. Possible capture of snakes or other air-breathing aquatic animals with associated drowning if animals can fit through the 85mm steel ring entrance.

INDICATED – Streams, rivers and swamps.

CONTRAINDICATED – Where large numbers of small air-breathing aquatic animals maybe subject to capture.

RECOMMENDED – Ensure all traps are repaired without holes. Only bait with fresh fish. When traps are set ensure that a corner or top is above water to allow any air breathing animals that enter to survive.

## **Meat on String**

Capture of freshwater crustaceans by meat or fish on string is an accepted practice of recreational fishers and the preferred method for ACP collectors.

PLUS – Meat on String only capture the target species. Individual specimens that take the meat can be selected or rejected without stress to the animal. Can be used to capture medium to large freshwater crayfishes and shrimps that are often not collected using other techniques. Little weight involved in carrying materials long distances to remote locations.

MINUS – Non selective. Fish and eels may be attracted to the bait.

INDICATED – Can be used in any aquatic habitat, including those with poor visibility, macrophyte cover, snags etc.

CONTRAINDICATED – Not suitable for terrestrial crayfish habitats. (Engaeus species)

RECOMMENDED – Only use fresh fish, and exchange every 4 hours.

### **Hand collecting**

Hand collecting is used for smaller juvenile crayfish, molluscs and gastropods, etc. (generally small species).

PLUS – Sampling is very selective and only the target habitat or species is collected. Another preferred method for ACP collectors as valuable information on habitat and burrows is also accumulated.

MINUS – Requires high level of fitness and increase the danger from injury from non-target species (spiders snakes) also as with closer interaction with freshwater crayfish allows greater chance for injury to collector by targeted species. Habitat disturbance.

INDICATED – Can potentially be used in any suitable aquatic habitat.

CONTRAINDICATED – Difficult to use in areas with large rock and large water flows.

RECOMMENDED – Utilization of light rubber gloves reduces the chance of injury.

### **Conclusion.**

The ACP & AABS involves collection of every species of freshwater crayfish, fish, gastropod and mollusc, etc. in Australia. The project has multiple aspects that all revolve around the increase in the knowledge base of Australian freshwater fauna. One of the key aspects of this project is identification of species as there has been some confusion in the past and new species are being identified every year. It involves the photography of every species to give a full colour high resolution image of every species. The project also involves full DNA testing of every crayfish species in Australia, which will ultimately produce a full DNA database of all the crayfish species in Australia. Information collected on habitats, behaviour and distribution of species will be invaluable in the future. Specimens are lodged into the AABio collection, Australian Museum Collection, Carnegie Museum Collection, Queensland Museum Collection and Victorian Museum Collection. This is a major project with offshoots like the Field Guides, scientific papers and general articles adding to the long list of benefits.

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