

Salvage and Release Protocols for accidental exposure of Narracan Burrowing Crayfish (*Engaeus phyllocercus*)

The success of long-term outcomes of salvage translocation is often poor and is generally not considered an appropriate mitigation or compensation from an adverse impact. The requirement and implementation of salvage and release protocols will be determined by the referring authority and will be assessed on a case by case basis.

Salvage and release protocols are based on those developed for Tasmanian threatened burrowing crayfish (Devonport City Council 2013, Department of State Growth 2014) and the S.E. Victorian Hairy Burrowing Crayfish, (*Engaeus sericatus*) (Van Praagh 2013).

Translocation of crayfish may be to receptor sites elsewhere on the existing activity site or to a new site that includes habitat protection, improvement or habitat creation. The following procedures should be conducted by personnel trained in the correct handling and release protocols or with relevant ecological expertise.

1. A trained person should be onsite when the relevant soil excavation activities are being conducted.
2. Soil should be removed in layers and each layer inspected for crayfish burrows. Suspect burrows can be excavated by hand, bait pump or excavator. Excavated soil should also be inspected for individuals.
3. When a NBC is discovered, all reasonable effort must be made to safely excavate or remove the crayfish from within the works footprint.
4. Each crayfish should be assessed for damage. Crayfish with loss of claws, legs or damage to the tail fan can be released as the animals can regenerate these. However, damage such as crushing to the carapace (front section of shell) or tail is likely to be fatal and will require euthanization (see Euthanasia section).
5. If crayfish can be immediately returned *in situ* or into nearby habitat, then individuals should be released as close to the point of capture as possible as follows:
 - An existing, unoccupied (no signs of recent activity) NBC crayfish burrow by placing tail first into an existing burrow opening, or preferably,
 - Create an artificial burrow by using a crowbar or similar to make a hole at least 25 mm wide and at least 15 cm deep but preferably to the water table and release the crayfish as above. Any juvenile (<15 mm) should be placed in holes that go into the ground diagonally to give them some support. Site should

support wet clay soil or filled with dechlorinated water. Dechlorinated water is water left in a vented container for 72 hours.

- If crayfish are released in summer or under very dry conditions, once an animal is released into a created burrow, the entrance should be blocked with stone, wood etc and marked (e.g. with flag).

 - Created burrows should be no closer than 30 cm from another burrow
6. If the crayfish cannot be released immediately and needs to be held for a period of time, wash off any dirt using onsite water or dechlorinated portable water and check for damage. Place the animal in a clean container (e.g. clear takeaway container) with small amount of clean water (10 mm). Adults should be kept in separate containers but several juveniles (less than 15 mm) can be placed together. Containers should be placed in an insulated cooler/esky with a small amount of ice and held on site.
- If works are completed within the same day, animals can be released into suitable habitat as close to their site of excavation as possible.
7. If works are not completed within the same day, animals should be held in insulated cooler and released when works are completed as described in step 5.

Information on number of crayfish collected, released and/or euthanized and where animals were released should be recorded and submitted to the referring authority.

Euthanasia

Excavated animals that have been fatally damaged should be euthanized in the following manner:

Place animal in separate container in an insulated cooler with ice or a refrigerator for 2 hours to chill them so they are immobile. Animals can then be placed in the freezer or an ice-slurry for 30 minutes. They should then be placed in 70% alcohol and deposited at Museum Victoria.



Plate 1 ADULT Narracan Burrowing Crayfish showing red-purple colouration and berried female.



Plate 2 ABOVE -Typical leaf-like uropods (Tail) of Narracan Burrowing Crayfish
BELOW- rounded uropods of other burrowing crayfish found in the area.

REFERENCES

Davenport City Council. 2013 Piping of Open Drain & Translocation of Burrowing Crayfish at Sheffield Road, Devonport, Tasmania (EPBC 2011/6095) Annual Compliance Report Environment Protection Biodiversity Conservation Act 1999

Department of State Growth 2014. A guide to managing threatened burrowing crayfish in the Department of State Growth road reserves. Department of State Growth, Hobart.

Van Praagh, B.D. 2013 Capture and relocation of burrowing crayfish in areas impacted by construction of an access road at Marengo Basin, Apollo Bay WTP. Unpublished report to Barwon Water Alliance, Geelong, Victoria