State of crayfish conservation: threats and future directions

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A 'Future Directions' open forum was held on 9 August 2000, as part of the thirteenth biennial symposium of the International Association of Astacology (IAA 13) in Perth, Western Australia. The open forum led to consensus amongst astacologists from many disciplines, including science, aquaculture, trade and conservation, on a range of issues related to biodiversity and methods of combating potential extinction of crayfish species.

Astacologists at IAA 13 noted the following points, which were instrumental in shaping the resolutions that follow:

1. The concepts of "maintenance of biodiversity" and "sustainability" are central to conservation of crayfish species.

2. Maintenance of biodiversity in the case of endangered crayfish species (e.g. *Astacopsis gouldii*) can be equated with prevention of extinction, whereas in the case of invasive crayfish species (e.g. *Procambarus clarkii*) prevention of indiscriminate dispersal is most important.

3. Crayfish producers seek the greatest return on their investments, and often this is obtained by exporting their crayfish live to national and international markets. There is strong opposition to a ban on translocations from the *Cherax tenuimanus, Cherax destructor* and *Cherax quadricarinatus* producers as well as from persons undertaking research on introduced species as potential aquaculture or experimental animals. Although many want to continue their crayfish translocation activities, there was an appreciation amongst astacologists that biodiversity should be maintained and not threatened by non-native crayfish trade or projects.

4. Adoption of *Astacopsis gouldii* as a flagship species (a species indicative of a good and important wildlife habitat) has greatly assisted in obtaining media and State attention on habitat reduction (Walsh 2000). From this attention, finance and awareness has been generated, which has aided prevention of species' extinction.

5. Species Action Plans are effective communication documents for conserving threatened crayfish species. These have been produced in Britain (Holdich and Rogers 1995; Environment Agency 1995), Sweden (Söderbäck and Edsman 1998), Norway (Taugbøl and Skurdal 1998), Finland (Mannonen and Halonen 2000), Estonia (Tuusti *et al*. 1998) and Lithuania (Taugbøl *et al*. 1998). Germany (Lukowicz 1999) and

Austria (Pöckl 1999) do not have nationwide Species Action Plans due to decentralised organisation of conservation bodies in these republics but they do have action plans for certain areas which are similar to Species Action Plans. Action plans in the US are developing rapidly in some individual states, but a national policy has not been developed (the US was not a signatory to the Rio Convention); Lodge *et al*. (2000a,b) describe the frustration of conservationists in the US.

6. Indiscriminate intercontinental translocation of crayfish is known to have had adverse effects on biodiversity (Gherardi and Holdich 1999), but local translocation can also be devastating. It has been demonstrated that local translocation has resulted in significant reduction in the gene pool of *Cherax tenuimanus* (Nguyen *et al*. 2002).

7. World Trade Organisation (WTO) member countries must base measures to reduce adverse risks associated with trade in animals and their products on international standards developed by the Office International des Epizooties. When there are no international standards (as in the case of freshwater crayfish), or if these standards do not meet the appropriate level of protection (ALOP) of the member, measures must be determined in a standardised import risk analysis process (e.g. AQIS 2001) to ensure that they are consistent with that member's ALOP (i.e. the level of risk that is accepted when importing all other products). In other words, if members wanted to ban the import of live crayfish they would require a scientifically robust risk analysis document showing that this measure was consistent with their ALOP, otherwise they would be at risk of a WTO-mediated dispute with members wishing to export live crayfish to them.

Two resolutions were passed at IAA 13:

1. **IAA supports causes that are concurrent with maintenance of biodiversity.**
2. **IAA supports promotion of crayfish as a flagship species.**

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