



## Freshwater crayfish harvesting and population management

Regular harvesting is one of the most important management strategies for attaining higher levels of production from freshwater crayfish ponds. This is true for all pond types from farm dams to the most intensive pond facilities. Regular harvesting activities will permit the grower to control the population structure and numbers of crayfish within ponds. There are a number of reasons why population management is so vital:

- Most importantly crayfish growth rates are density dependant, with optimal growth rates being achieved at low densities. By removing some crays you will be effectively reducing the population density and increasing the growth rates of the remaining stock.
- All *Cherax* crayfish form strong size/dominance hierarchies, in which the presence of larger, more dominant, individuals actively inhibits the growth of the smaller individuals. A large part of this growth inhibition results from direct aggressive interactions and competition for limiting resources, such as food and shelter. To a lesser degree growth reduction appears to also be mediated through less direct pathways; perhaps through the very presence of a larger crayfish causing subordinate crays to become stressed, or possibly even through a means of chemical communication. The formation of such hierarchies is one of the important factors attributing to the extremely variable growth rates amongst crayfish populations. Regardless of the causes, the important point is that by removing the largest crays, the top of the hierarchy is broken down and a new set of dominant animals will rapidly grow to replace the ones that have been removed.
- For yabbies and redclaw, both of which have been described as "sexually precocious", it is important to remember, that after the crayfish reach reproductive maturity (approximately 20 to 30 grams depending on conditions), a large proportion of the energy that had previously been used for growth will be put into breeding. Consequentially, growth rates will slow dramatically (particularly for females) and large numbers of juveniles will be produced, leading to a greater potential for overcrowding problems. Not only will growth rate decline after maturity, but the percentage of tail meat to body weight (particularly for males), will also decrease.
- Every pond has a particular "carrying capacity", meaning that it will only have resources capable of supporting a certain biomass (weight) of crayfish per unit area. Taking an arbitrary example, it does not much matter whether this biomass is made up of one 300 gram crayfish per square meter or six 50 gram crays. However, production economics must be considered, as there is much more time, labour, food and risk involved in producing one large crayfish than in producing half a dozen smaller ones.

In order to maximise productivity, all farm management programs must recognise and attempt to reduce the counterproductive influences outlined above. The best method for actually implementing this will depend upon your own particular type of operation. In all instances, growers should carefully consider both the production economics and marketability, of different crayfish sizes. Growers can then determine the optimal harvest size and should endeavour to remove crayfish as they reach the target size. It is necessary to have a market outlet even for crayfish of below target size, as unacceptably slow growers, or over crowded ponds, will sometimes have to be culled. For these reasons it is very important for both growers and retailers to actively pursue and develop markets for smaller crayfish sizes.

Crayfish populations can best be managed by a combination of trapping with baited traps and drain (or pump down) harvest. Even in the more intensive, drainable systems, baited traps are still very useful because they tend to select for the larger more dominant crayfish (this is particularly true for funnel entrance traps). This selectiveness allows for the larger crayfish to be regularly removed from grow-out ponds as they reach market size and by doing so, will increase the growth rate of the remaining animals.

In a farm dam situation, trapping is usually the only method of harvesting and population control. As trapping is never one hundred percent effective, and most farm dams are visited relatively infrequently, overcrowding is likely to be a major problem. In this situation it is usually best to harvest and remove a large quantity and broad size range of crayfish on each of the periodic trapping sessions. This practise of trapping dams very hard, but only occasionally, will allow the crayfish population to recover during the period between trappings, so that the grower can expect a greater return per unit of effort. Dams are usually fed immediately after trapping to help promote the rapid crayfish growth that is achieved after a big reduction in population numbers. Traps with a slotted-roof-entrances are often useful as they tend to catch a boarder size range of crayfish than do funnel entrance traps. Where it is feasible, a grower may choose to use a seine net. Seine netting is more stressful to the crayfish and will cause some damage, particularly to soft or moulting individuals.

When ponds are constructed so as to readily facilitate a drain down harvest, the grower will have a great deal more control over the entire population, allowing for many more management options. Crayfish can be stocked at a known density, sorted for size or sex, specific ponds can be allocated to either breeding or grow-out and particular traits (such as rapid growth), can be identified and selectively bred for. Regular drain down, incorporating a period of sun drying (possibly scarifying and when acidic, liming), will also assist greatly in maintaining a healthy, productive pond environment. For this reason particularly, even when constructing farm dams, growers should give some consideration to the possibility of incorporating drain harvesting procedures. It is often feasible to construct two small dams rather than a single larger dam, so that one can be pumped into the other, allowing for both a higher degree of control and the maintenance of adequate water for livestock.

Crayfish farming is like agriculture, in that the more controlled the system, and the harder it is worked, the greater the productivity will be.

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