

# MANAGING FRESHWATER FISH HABITAT

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## Issues/Problems

There are many factors that may influence freshwater fish habitat quantity and/or quality, including:

- water abstraction:
  - agriculture;
  - industry;
  - power generation;
- impacts on habitat—(direct or indirect):
  - mining;
  - industry;
  - forestry—chemicals, physical changes;
  - agriculture—clearing, chemicals;
  - power generation—temperature, discharge;
  - government—waste disposal;
  - catchment management;
  - stream ‘improvement’;
  - fauna translocations.

This list can essentially be viewed as a list of groups to deal with in user-conflict situations. Nowadays one should also certainly add conservation groups.

In trying to look after fish habitat interests in these conflicts, managers are immediately confronted by lack of information.

What exactly is the problem?

- Is the fish habitat being affected directly or indirectly?
- Is the effect lethal or sub-lethal?
- Is the process reversible in the short or long term?

The ability to positively influence fish populations via their habitat requires knowledge of the relationships between a fish species and its habitat and the effects of outside influences on that habitat.

Decisions are invariably made in the absence of sufficient information. For example what is the shortage of a particular fish species really due to? Is it overfishing, habitat degradation, a combination of both, or even over-expectation? The latter is a common problem in recreational fisheries.

The present situation is that regular conflicts are arising between users of freshwater habitat, and resolutions are required immediately. Unfortunately there is always going to be insufficient information on fish habitat requirements. It is nevertheless a distinct disadvantage in the negotiating process that we are usually unable to categorically define the link between fish and habitat and rarely able to define links quantitatively.

Environmental flow assessment methodologies provide some hope for informed input to the habitat allocation process but further refine-

ment is required. In some Australian States there is still no legal requirement or basis for consideration of an environmental allocation in any case.

## Management options

### *Amelioration*

There are certain categories of actions that could best be described as amelioration. These are usually designed to limit certain influences following laboratory and field evaluation of particular processes. Guidelines or management plans should be developed, preferably with the involvement of those responsible for the problems.

Examples in freshwater in Tasmania:

- pesticide use in agriculture and forestry—develop guidelines for safe use;
- toxicity studies on paper mill effluents—provide feedback to treatment plant design;
- instream flow evaluation—develop environmental flow parameters;
- effects of forestry operations on freshwater—provide feedback to Forest Practices Code;
- storage discharge problems—develop operational guidelines for power stations;
- lakewater level fluctuations—evaluate conditions to achieve balance.

### *Enhancement*

Can the present habitat or fish numbers themselves be supplemented in some way? Ideally this requires detailed knowledge of the relationship between a fish species and its habitat. If this is known then how can this knowledge be used? Processes usually involve manipulation of a particular part of the habitat.

Examples in freshwater in Tasmania:

- spawning habitat enhancement or control for trout;

- provision of artificial substrates for whitebait spawning;
- construction of artificial stream barriers to prevent migration of predatory fish to conserve particular species;
- controlled stocking for recreational species;
- fish passes to allow access to additional habitat;
- water level management to promote macrophyte growth.

### *Conservation*

Would a reserve actually help a certain species? This raises a series of questions as well as actions.

Again, knowledge of the relationship between the species and its habitat is essential. Should we be looking at single species or at general habitat conservation? What are we trying to conserve?

There may be a need to conserve particular elements of habitat for certain life history stages of a species:

- spawning habitat:
  - estuarine marshes for whitebait;
  - instream snags for river blackfish;
- nursery habitat:
  - lake, river and estuarine marshes for some species;
  - marginal vegetation in lakes;
- adult habitat.

Obviously there is a lower limit to the area of habitat that must be conserved for various reasons. For example, in terms of security a small reserve may only serve to focus attention.

In terms of effectiveness is habitat conservation the answer?

- for a migratory species;
- for an overexploited species.

Detailed knowledge of the life history of the species is therefore essential.

In conclusion, there are no general solutions. There are no universal critical factors; they vary with species, with time and with area. Each individual case will require a specific course of action which must include a monitoring program.

The level of resources available will not influence the best option but, in practice they certainly influence the effectiveness of any action.

## **Education**

Community consultation and education is the most powerful means of effecting change although it can take time. It also requires considerable effort on behalf of managers to ensure that these groups are well supplied with information. It is also the best way of influencing politicians.

A good recent example is the Landcare program through which many community groups have obtained funding to rehabilitate certain lands. In Tasmania this has been widely used to fund willow removal and re-vegetation of stream banks.

This area is the most powerful means of bringing about the climate for habitat protection. However, it requires good information generated through specific applied research.