

CHAIRPERSON'S INTRODUCTION: KEY FACTORS LINKING FISH AND THEIR HABITAT

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If we define the habitat of a fish simply as that subset of the environment where it makes its living, it is intuitively obvious that fish populations are inextricably linked to the habitat they call "home." People change fish habitat but still want a healthy resource. Therefore, identifying and measuring the key factors linking fish and habitat becomes the cornerstone of management for sustainability (eg, through research direction, monitoring, regulation and public education).

This conceptually simple linkage process is complicated by (amongst other issues):

- the multivariate nature of both the dependent and independent variables (ie, community, fish population, habitat);
- uncontrollable variability in both the habitat and resource;
- multiple, often unidentified human influences (treatments);
- time-treatment interactions;
- the reactive (as opposed to proactive) nature of monitoring-based assessment;
- a lack of clear societal vision/definition of the desired goal (eg, do we want sustainability of stocks at 50% of natural levels, 25% with some extinctions, 95% with no extinctions?) for most fish stocks/communities;

- the fact that we are already dealing with a modified system (initiated experiment) in most cases; and
- limited funding and resources.

While limited research has been undertaken on specific factors, the relative importance of each has not generally been evaluated. Ryder and Kerr (1989) have attempted a first approximation by erecting four over-riding determinants at the environmental level:

- dissolved oxygen
- water temperature
- subsurface light
- dissolved nutrients

The usefulness of these in non-salmonid communities has yet to be evaluated at a community or ecosystem level to predict the impacts of anthropogenic habitat change.

Postscript to the workshop

We might have expected a conceptually simple series of outcomes from this session: tentative key factors by biotope together with a list of useful methods. In reality, discussions were disparate with no clear "take home message." Only well after the workshop have summary threads come together in my mind. I offer the following personal observations:

- While there appeared to be consensus going into the workshop that habitat was critical to fish, it is clear that in no system (freshwater, marine, or estuarine) have we even begun to understand or even closely examine the linkages which must support the associated resources. Put another way, there is a lack of evidence to strongly reject the null hypothesis of no linkage between fish and habitat.
- While we are good at listing general factors which are likely involved in such presumed linkage, quantification of most is lacking nationally and globally. To me it was surprising that relatively few biologists held strong views as to what the key factors were in their chosen ecosystem. Apparently this research issue is far from the focus of their thinking.
- Human habitat impacts appear, based on current knowledge, to have the greatest treatment effect in limited freshwater systems with progressively less influence through estuarine systems to coastal and finally pelagic oceanic ecosystems.
- Little consensus exists as to "best" methods for this research arena. Multivariate analysis appears the most rigorous and efficient, particularly where treatments can be manipulated in real systems (eg, Walters 1986; Spellerberg 1992). However, much of the specific information discussed during and after the session fell into the category of "observations" resulting in mental "correlations."

Awakening in a cold sweat some days after the workshop, I had a vision of old Chris Columbus pointing an accusing finger at me and calling me a "flat earth biologist" who still insisted that the world rotates around fish, rather than waking up to the reality that fish rotate around their habitat. Perhaps the current fisheries legislation throughout Australia which focuses primarily on harvest control rather than habitat control is symptomatic of a similar para-

digm. Decline trends in many world fisheries and particularly inland systems seem to indicate that the current treatments aren't particularly successful. However, as with other paradigm shifts, habitat/fish linkage may not become evident until we refocus on habitat management as the cornerstone of resource sustainability, for example, as the European Economic Community is initiating (Mader 1991).

References

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