

Feedback

'Sexed up' fish data

Dear *Feedback*,

As the author of the Artificial Reefs and Reef Fish in Hong Kong I must respond to the comments made in Andy Cornish's review of this book in the April 2003 *Porcupine!*. The first printing of this book involved the production of a limited number of books, which have already sold out. For the second edition, which is currently in preparation, we are attending to any errors identified and are taking the opportunity to update the book. An erratum for the first has been prepared and will be posted on AFCD artificial reef web pages. I am grateful to the reviewer for his helpful fish identification comments. The reviewer's comments regarding the making of unsubstantiated claims regarding spawning observations in the book are, however, entirely unjustified. It appears we are being accused of 'sexing up' our data in much the same way the BBC have alleged that Tony Blair's Government overstated the case to the British Parliament for war in Iraq based on a "sexed up" intelligence dossier. Fortunately I can dispel such allegations in relation to AFCD's AR and Reef Fish Book since we have good evidence of 'weapons of mass destruction' in the form of spawning fishes, including groupers. The main purpose of the book was to provide an account of the artificial reef programme and also provide summary information for our fish observations on artificial reefs. For each species we provide summary details of its interaction with artificial reefs and its abundance status. This information has been obtained from more than 400 quantitative fish monitoring dives on artificial reefs.

Andy comments that we have made unsubstantiated claims about ARs in Hong Kong in the book. In particular he singles out Coral trout spawning aggregation on one of the ARs as "unlikely". Our book states on page 155 that spawning groups of Coral trout, *Plectropomus leopardus* occur on an artificial reef. Andy has made assumptions about our data that he is not entitled to make since he does not have possession of our data. A fairer criticism would have been to remark that we have not provided clear definitions or criteria for our use of the term 'spawning group'. Andy refers to Australian research concerning the growth rate of *Plectropomus leopardus* in the mistaken belief that the book states the Coral trout grew and developed into adult fish on the artificial reef by the year 2000. The book does not state this. We have simply reported what we have observed and further more we have posted video, on AFCD's web pages, of groups of adult Coral trout (16"-20") interacting with each other on a Hong Kong artificial reef. One sequence shows a group of at least eight sizable adults all in view at the same time. Coral trouts are solitary in behaviour away from spawning aggregation sites and will defend their reef territory from intrusions by other coral trout. We have observed densities of Coral trout building up towards new moons and gravid females with highly

swollen bellies have been observed. We have also observed many large adult fish tussling for territory at the artificial reef aggregation and noted courtship behaviour, including fin and tail flicking towards dusk. For these reasons we reported the presence of a spawning group of Coral trout. During new moons on 31st May 2003 and 30th June 2003, 35-50, mostly 16"-22", Coral trouts were again counted within a small area at the aggregation site (which is the same artificial reef site each year) and a male spawning rush was observed. We also pointed out on page 43 that recruitment of juvenile Coral trout has dramatically improved since 2000 when we first observed spawning groups on an artificial reef. Following the publication of the book we have also filmed pairs of Red groupers, *Epinephelus akaara* spawning at the same aggregation site.

Reef fishes are especially vulnerable during spawning aggregation periods. Despite its status as a Marine Park there is no statutory protection for Yan Chau Tong's spawning groupers from licensed fishers. The artificial reef in question has developed into a primary aggregation site for spawning reef fishes in Hong Kong and concerted efforts should be made to protect the site, especially during May and June new moons. AFCD is reviewing the current voluntary 'no-take' agreement at artificial reef sites and may change the fishing licence conditions to ensure statutory protection.

The Consultancy report conducted by MSE Ltd. reported, "artificial reefs support higher numbers of medium and high value fish than both rocky shore and mud bottom controls." Andy takes the academics line and states that a control site should be similar in every practical way to the "treatment" site. In view of the fact that there is no rocky habitat in Hoi Ha Wan and Yan Chau Tong Marine Parks at the 12-16 m depths, where the artificial reefs were deployed, it is not possible to select ideal control sites. We selected rocky shore controls at the deepest reef locations within the marine park. If rocky habitat had occurred in the open expanses of deeper water throughout the Yan Chau Tong and Hoi Ha Wan Marine Parks then the parks would not have been considered habitat limited and would not have been subjected to regular trawling. Moreover, we would not have considered the parks as high priority areas for deployment of artificial reefs. Andy is confusing research with the practical implementation of a fisheries management programme. We did not embark on an academic exercise to support a null hypothesis, we implemented an artificial reef programme to protect these two marine parks from the damaging impacts of trawling and to enhance fisheries in a habitat limited area. Since no trawling now occurs in these parks the artificial reefs deployed have achieved their principal objective and are fully justified. When we report that there are more high value fish on the artificial reefs than the natural rocky shores or open mud in these parks we are simply reporting the facts. If there are more fish on the artificial reefs than rocky shores it makes sense to increase our efforts to manage artificial reefs so small-scale fishers do not fish them, permitting the full benefits of artificial reefs to be realised. They are certainly not meaningless comparisons. Yes, if there were complex hard bottom habitat in these marine parks at depth, they too would no doubt support high

numbers of valuable reef fish, but the reality is there is no such habitat in these parks, hence the deployment of artificial reefs and our comparison with the habitat that is actually there.

Andy's final comment regarding the flimsiness of some of the evidence to justify this 100 million dollar programme is another entirely unwarranted allegation. The artificial reef programme has achieved its objectives since they are protecting and enhancing important fish spawning and nursery grounds by physically preventing bottom trawling and providing complex three-dimensional habitat. In making his remarks Andy fails to take note of the ecosystem modelling reported on pages 9 and 51. We appointed arguably the foremost ecosystem modelling fisheries biologists from the Fisheries Centre University of British Columbia comprising a team headed by Fisheries Centre Director, with additional inputs from Drs. Daniel Pauly, Carl Walters, Villy Christensen and Reg Watson. In addition to ecosystem modelling, bio-economic and game theoretic modelling of cooperative and non-cooperative ('cheating') scenarios were performed by Drs. Rashid Sumaila and Gordon Munro. The modelling and cost benefit analysis conducted by these eminent biologists indicated that the greatest economic fisheries benefits could be achieved by the imposition of a territory-wide trawl ban with artificial reefs and not by the establishment of 20% 'no-take' fisheries as advocated by some fisheries biologists. As part of Phase II of the project artificial reefs have been deployed at Long Harbour and Port Shelter in locations where trawling is legally permitted but now cannot take place. The modelling supports our management strategy that reduction of trawling pressure through the use of artificial reefs will bring significant benefits to the local fishery. Another interesting prediction by the game theory modelling is that the greatest benefits are realized only with fishers' cooperation with or without artificial reefs. Designating Marine Reserves, which permit no hunting and are often fiercely objected to by local fishers, is a strategy that many Green groups are now beginning to question (see *New Scientist* June 21st, A Greyer Shade of Green).

Apart from the ecosystem modelling and monitoring of the natural habitats where the artificial reefs were deployed, plus the monitoring of the artificial reefs themselves, I fail to see what more we could have done, that is practical, to gather data on the potential impacts and actual effects of the artificial reefs. In this context I would welcome any suggestions for improving future monitoring of artificial reefs but I can see few constructive comments in this review. The new book provides an overview of artificial reefs in Hong Kong and catalogues the fish life that has been found interacting with them. It was produced in a spirit of openness as part of an ongoing programme of fisheries protection and enhancement, which has a majority of support from the fishing community.

Keith Wilson

Hong Kong

wilsonhk@hk.super.net

(Co-editor comment: Mr. Wilson has been invited to present his material on fish spawning and recent progress in fishery legislation at DEB and will visit us on Friday, October 10, 2003.)

Dear Feedback,

In reply to Keith Wilson's response to my review of his book, *Artificial Reefs and Reef Fish in Hong Kong* (see above) I should firstly say that I enjoyed it enough to buy a copy. However, precious little data have been released on the success of the AR programme as a fisheries enhancement tool since the reefs were deployed in 1998, other than species lists and consultant's reports which are not available to most. This book provides the best summary of the AR programme to date and so I took the opportunity to critically evaluate various aspects of it. In response to Keith's comments:

1. With regard to Coral trout spawning, the information provided by Keith in his letter is more convincing than that previously reported by A.F.C.D. or their consultants' report but is still indirect evidence according to Society for the Conservation of Reef Fish Aggregation guidelines (see www.scrfa.org/doc/Database.pdf). Direct evidence includes observations of actual spawning (i.e. release of sperm and eggs), or histological examination revealing hydrated eggs or postovulatory follicles. If Coral trout and other fishes are spawning on the artificial reefs that is great, I am only advocating caution where the evidence is equivocal.

2. For \$100 million the public expects more from the artificial reefs than simply a list of species and a "sleeping policeman" role in preventing trawling, particularly in marine parks where trawling is already prohibited. The ecosystem modeling mentioned, while providing some predictive justification for the AR programme, is still just modeling. The onus is on A.F.C.D. to show fisheries enhancement in the real world as predicted, and to use science to do it. If "control" sites are not such then the term should not be used.

3. While this is not the place for an in-depth discussion about appropriate methodology, I believe monitoring of catches from Hong Kong waters before and after deployment of the artificial reefs should be an essential part of demonstrating fisheries enhancement.

Andy Cornish

