

# A FAD of a Different Function

Kim Holland

*FADs play a critical role in recreational and commercial fishing by attracting target species to known locations—but this rather simple function may soon be augmented with a new class of FADs that have capabilities especially useful for fisheries researchers and managers. Two projects have been funded for 2003 to investigate the viability and potential of FADs equipped with electronic monitoring devices. The devices presently contemplated are sonar, to track the nearby movement of schools and individual fish, and dedicated receivers, to record the presence and perhaps even the prior activity of tagged fish. One project has been funded by the University of Hawai'i Pelagic Fisheries Research Program, and the other by the European Union.*

FADs have assumed a tremendously important role in the world's tuna fisheries, but many questions remain regarding the dynamics of FAD-associated tuna aggregations and the biology underlying these aggregations. Sonic tracking studies have provided some insights into the FAD-related behavior of individual fish, but the dynamics that drive the ebb and flow of entire schools of tuna are still largely a mystery. For instance, it is not known if different tuna species use FADs in different ways, or if oceanographic conditions influence the coming and going of schools associated with FADs.

In fact, these tuna/FAD uncertainties are only a subset of a general paucity of knowledge about the entire pelagic ecosystem, from diurnally migrating plankton to tuna, sharks and other species at the top levels of the pelagic food chain. Furthermore, the traditional method of investigating the pelagic realm—using large oceanographic research vessels—is extremely expensive and labor intensive.

## Researchers Inspire a New FAD

Against this backdrop, we are proposing the development and deployment of “smart FADS” to serve as autonomous observatories of the pelagic ecosystem. These anchored or drifting buoys would act as platforms for an array of instruments that would monitor the comings and goings of the various pelagic species. The smart FADs would be biological equivalents to the instrumented buoys used for decades by oceanographers to obtain data regarding the physical processes of the oceans. Not only would smart FADs acquire basic data on the pelagic ecosystem in general, but their primary focus on the dynamics of tuna aggregations would immediately improve our ability to wisely harvest this extremely important resource.

The primary tool on smart FADs will be an active sonar system that will monitor a 360 degree “halo” extending laterally several hundred meters around the FAD, from near the surface to

approximately 100 meters deep. In its final form, we hope this scanning sonar will not only provide data about the temporal dynamics of the biomass associated with the FAD, but also be able to identify the species and size of individuals that

comprise the aggregation. Later, it is intended that the FADs also be equipped with downward-looking sonar tuned specifically to monitor the behavior of the vertically migrating mesopelagic community that is so vital to pelagic trophic systems.

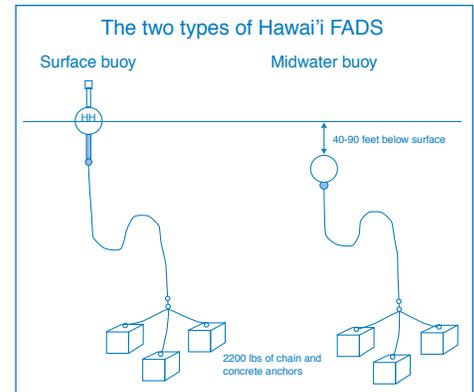
Smart FADs will also carry data loggers to detect the presence of tunas and other species carrying electronic tags. These loggers could detect tags that range in capability from basic sonic pingers that simply say “I’m here” to sophisticated tags that telemeter data concerning the physiological condition of the animal, or relay information to the data logger about the previous movement patterns of a tagged animal. An important subpart of the smart FAD project is to investigate the feasibility of developing new types of electronic tags.

## Fortuitous Funding for FADs

The PFRP has decided to fund the development of prototype FADs beginning in 2003; work will be carried out in Hawai'i in close coordination with the State's FAD program. The first step will be to design and develop a 360-degree sonar system and the databases required to accurately identify the various species known to be found around FADs. These identifications will probably be based on a combination of target strength and school behavior data. Development of this sonar system will be the primary responsibility of Dr. Jules Jaffe, a biophysicist with the Scripps Institution of Oceanography, who will work with Project PIs to develop and test the prototype.

Fortunately, the PIs have also received funding from the European Union to develop a similar smart FAD. This project, which will primarily involve European collaborators, leaves the PIs with the enviable task of integrating two well-funded projects that are focused on achieving the same goal, namely: the development of affordable, automated pelagic observatories that could mark a major advance in our understanding and management of pelagic ecosystems.

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## PrepCon3 Moves MHLF Forward

*John Sibert*

The Third Preparatory Conference of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific (WCPFC) opened on a positive note with the first participation by Japan in the PrepCon process. The opening statement from that nation cited a number of “fundamental problems” that are obstacles to ratification, but Japan indicated that it has decided to participate for three reasons:

- to help address perceived declines in major stocks;
- to help act decisively against illegal, unregulated and unreported (IUU) fishing; and,
- to help clarify measures for monitoring, control and surveillance (MCS).

Japan presented a paper describing its efforts to document the extent of IUU fishing in large-scale tuna longlining.

Most countries expressed concerns in their opening statements about specific issues. The Forum Fisheries Agency (FFA) countries in particular asserted consistently that the Commission should financially support participation by small island developing states (PINs) in all aspects of Commission activities. This support is envisaged to consist of assistance in human resource development as well as the costs of participating in Commission meetings. In addition, France and New Zealand raised concerns about participation by territories, while FSM announced that it will soon ratify the Convention, and France that it will soon ratify the UNIA. Finally, the PrepCon Chair announced his intention to decide on the site of the WCPFC headquarters.

Much of the work of the PrepCon is conducted by its working groups: WGI, chaired by Lucy Bogari, PNG; WGII, chaired by John Kalish, Australia, and WGIII, chaired by Bill Gibbons-Fly, USA. All working groups made substantial progress at PrepCon3.

### WGI: Organizational Structure, Budget and Financial Contributions

WGI considered that, in general, the Secretariat would comprise a staff of about 17 people with an annual budget of slightly more than US\$1,300,000. Anticipated costs of scientific and MCS services would push the total commission budget to just under US\$2,500,000. However, it was not resolved whether to use the pay scales of the UN or the Council of Regional Organizations of the Pacific.

The FFA countries pushed strongly for the costs of PIN participation to be included in the Commission budget as an assessed (non-voluntary) contribution. Although there seemed to be considerable support for this viewpoint, some Distant-water Fishing Nations were opposed, and the administrative mechanisms required to implement such a fund are not yet fully developed. A draft set of rules and procedures for participation by territories was tabled but not considered in detail because of time constraints.

### WGII: Scientific Structure and Provision of Interim Scientific Advice

The deliberations of WGII were surprisingly contentious, but some progress was made. Dr. Yuji Uozumi of Japan was approved as Chair of the Scientific Coordinating Group (SCG), and the date and venue of the second SCG meeting were set for July 17–19, 2003, immediately following SCTB16 in Mooloolaba, Australia. WGII generally endorsed the first report of the SCG, including its assessment of the status of stocks, and the steps that should be taken to reduce uncertainty in assessments. WGII also received the report “Review of data standards, technical capabilities and data sharing policies for the Western and Central Pacific Region,” but felt that the report needed revision with respect to whether it dealt only with the interim period or whether it also considered operation of the Commission after the treaty enters into force. The WGII report from PrepCon2, which envisioned a preliminary organizational model, provoked the most discussion. Specific concerns included:

- the closeness of the link between the stock assessment and data management functions;
- provision of alternative stock assessments from member states and fishing entities; and,
- the extent to which science functions should be conducted by existing regional organizations.

These issues were surprisingly contentious, and WGII agreed to work between sessions toward agreement on the Commission’s scientific structure.

### WGIII: Monitoring, Control and Surveillance

WGIII focused largely on issues surrounding boarding and inspections, such as use of force, intent of inspections, and liability. WGIII requested its Chair, with assistance from the Secretariat and in consultation with interested delegations, to prepare a draft outline of procedures for boarding and inspection. It was agreed that the MCS component of the WCPFC’s observer program should be developed in cooperation with the science working group. Japan stressed the importance of the work of WGIII in addressing the problem of IUU fishing in the WCPO.

### Home for Headquarters

PrepCon3 devoted one full session and part of a second to resolving the question of the WCPFC headquarters. Six different countries had submitted bids: the FSM, PNG and Tonga before the September 1, 2001 deadline, and Samoa, Fiji and the Philippines after the deadline. By simple majority vote, the Conference rejected the motion by Samoa to waive the deadline, and therefore only FSM, PNG and Tonga were considered. The Chair determined the issue to be a matter of substance requiring a three-fourths majority vote and the use of secret ballots. PNG was eliminated on the

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second round of voting. The voting was deadlocked after 5 rounds, and the matter was deferred until the following morning. On the seventh round, the FSM was selected as the site of the Commission headquarters by a vote of 19 to 6.

### Special Fund for PINs

Article 30 of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean recognizes the special requirements of developing states, and FFA members presented a proposal to address these requirements. The proposal called for a "Special Requirement Fund" of US\$300,000 to cover the costs of travel and development of national expertise within PINs. FFA members were consistent on this issue throughout PrepCon3, and the issue certainly will be raised again at PrepCon4. Reaction from fishing nations was mixed; though many were supportive, it is unclear how this fund can be funded without raising issues of development assistance.

### Controlling IUU

Delegates to PrepCon3 supported a resolution on IUU fishing and the growth of tuna fishing effort that:

- urged all states and other concerned entities to take measures promptly to limit expansion of tuna fishing effort in the region and to apply the precautionary approach forthwith;
- urged all States and other concerned entities to take every appropriate measure, in conformity with applicable IPOAs<sup>1</sup>

<sup>1</sup>International Plan of Action. The Food and Agricultural Organization of the United Nations has established an IPOA on IUU fishing; see <http://www.fao.org/DOCREP/003/y1224e/y1224e00.HTM>.

and other relevant international instruments, to prevent, deter and eliminate IUU tuna fishing in the Convention Area;

- decided to exchange information on the activities of fishing vessels that might jeopardize the effectiveness of the resolution, including IUU tuna fishing vessels; and,
- agreed to disseminate this resolution widely.

### Conclusions

PrepCon3 was definitely a working session, enjoying progress on most outstanding issues. It appears that the cooperative attitude established during PrepCon2 in Madang was continued in Manila and transformed into a determination to establish a functioning Commission. Deciding on the location of the Commission headquarters cleared the agenda for future sessions, and further progress is expected in 2003. The return of Japan to the process, and the generally constructive attitude of the Japanese delegates, are very encouraging. However, the effectiveness of the Commission in conserving stocks will depend on the willingness of participants to adequately finance Commission activities.

All of the PrepCon working papers and reports can be obtained from the WCPFC web site, at <http://www.ocean-affairs.com/DocListing.html>

PrepCon4 will be held in May 2003, and though the site was not confirmed, reliable scuttlebutt indicated New Caledonia. PrepCon5 will be held in late September or October in the Cook Islands.

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## Compendium—Fisheries Research in Brief

### CITES Goes Commercial

In November, the 160 signatories to the Convention on International Trade in Endangered Species (CITES) agreed to broaden the organization's active monitoring to include whale and basking sharks, as well as trade in several "commercial" species of plants and animals such as seahorses.

Until the just-concluded conference in Santiago Chile, CITES focused mainly on trade in rare plants and animals, offering little attention to species that are economically significant. CITES' deputy secretary general Jim Armstrong said the broadening of coverage is "quite a watershed" in the organization's attitude toward conservation. While timber and fisheries traditionally have been regulated by national governments and bodies such as the United Nations' FAO, CITES now will contribute its assessments to efforts to control large-scale species exploitation.

In a potential harbinger for marine life, all 32 species of seahorse, prized for aquariums and traditional medicines, were listed on Appendix II. The listing requires each exporting state to ensure that all exports are sustainable and covered by CITES permits; the main exporters are Indonesia, the Philippines and Brazil.

"It's a tremendous outcome," says Callum Roberts, a conservation biologist at the University of York, UK, who noted that conservationists worked with traders to convince them that regulation would protect their livelihoods, rather than destroy them. The next CITES conference will be in Thailand in late 2004 or early 2005.

*(adapted from Nature News Service, © Macmillan Magazines Ltd., 19 November 2002)*

### You Lie like a Dog(fish)

Of course, a more academic headline would be "Bias Inherent in Fishermen's Reports," but there it is nonetheless: recent research reveals that the worse catch an angler has, the more he or she tends to "exaggerate" success in surveys.

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The implication for fisheries management? “Exaggeration creates the appearance that a fishery isn’t declining as fast as it really is, then all of a sudden there’s a collapse,” says principal researcher Michael Sullivan, of the Alberta Fish and Wildlife Service; Sullivan goes so far as to advocate emergency action as soon as reports show any hint of decline.

A less drastic response, explained by ecologist John Post, of the University of Calgary, would be to develop a reliable statistical predictor of this “fishermen’s fib factor,” and incorporate it into mathematical models used to monitor stocks and set catches.

That may be a tall order. “As an angler, I know that there’s a tendency to promote your prowess,” says Sullivan. “You don’t want to admit that your neighbor caught a fish and you didn’t. Now I’ve measured that tendency, and it’s huge.”

*(adapted from Nature News Service, © Macmillan Magazines Ltd., 20 November 2002. For details, see: Sullivan, M. Exaggeration of walleye catches by Alberta anglers. North American Journal of Fisheries Management, in press, 2002.)*

### Climate as Population Driver

A 2,200-year record of Alaskan salmon populations has revealed centuries-long fluctuations in stock numbers, with the biggest, quickest changes seeming to mirror climate shifts seen around western North America. The record shows salmon populations were scarce between 100 BC and 800 AD, then grew until around 1200 and stayed high until about 1900, when commercial fishing began to take its toll.

Project biologist Irene Gregory-Eaves, of Queen’s University in Ontario, Canada, says the long lean period was worse than any decline or perceived shortage seen in the modern era. “Salmon populations can be very depressed for hundreds of years, and then ramp up for hundreds of years.” The gyrations are influenced by climate through its effect on the migrating fish’s staple food: plankton. Low pressure far out in the North Pacific reduces mixing of coastal waters, keeping plankton in the sunlit upper ocean and boosting its abundance, and therefore that of the salmon.

The salmon record confirms that climate alone can induce massive changes in species populations. But the record’s significance also lies in the fact that, as one strand in the web of connections that bind climate to life on a global scale, the record may be representative or indicative of the condition of concurrent species. “These patterns affect many species at once,” says oceanographer John Dower of the University of Victoria, Canada. “There are really big ecosystem-level links.”

*(adapted from Nature News Service, © Macmillan Magazines Ltd., 18 April 2002. For details, see: Finney, B.P., Gregory-Eaves, I., Douglas, M.S.V. & Smol, J.P. Fisheries productivity in the northeastern Pacific Ocean over the past 2,200 years. Nature, 416, 729–733. For another perspective on short- and long-term variations in species population, see Ravier and Fromentin’s “Trends in NE Atlantic and Mediterranean Bluefin Abundance,” in PFRP volume 6, number 4.)*

## Upcoming Events

### 54th IATTC/NMFS Tuna Conference

May 13–16, 2003

*Back to Basics in Pelagic Fisheries Research*

The 54th Tuna Conference sponsored by the IATTC and NMFS will be held at the University of California’s Lake Arrowhead Conference Center. Presentations are welcome on any subject, but participants are encouraged to share research on topics such as new technologies for reducing uncertainty in biological parameters, fishery data collection, fleet behavior and dynamics, and incorporating single-species uncertainty into ecosystem-level analyses. Abstracts must be received by March 28, 2003. For more information, contact conference chair Shelton Harley at (858) 546-7022, Fax (858) 546-7133, e-mail [tunaconf@iattc.org](mailto:tunaconf@iattc.org). Or visit the Tuna Conference’s home page at <http://swfsc.ucsd.edu/tunaconf.html>.

### IATTC and AIDCP Meetings

- February 3, 2003  
*Working Group on Vessel Assessment and Financing*, La Jolla, California
  - February 4, 2003  
*Working Group to promote and publicize the AIDCP dolphin safe tuna certification system*, La Jolla
  - February 5, 2003  
*12th Meeting of the Permanent Working Group on Tuna Tracking*, La Jolla
  - February 6–7, 2003  
*32nd Meeting of the International Review Panel*, La Jolla
  - March 18–23, 2003  
*10th Meeting of the Working Group on the IATTC Convention*, La Jolla
  - May 19–21, 2003  
*Meeting of the Working Group on Stock Assessment*, La Jolla, California
  - June 17–28, 2003  
*IATTC/AIDCP Meetings*, Antigua, Guatemala
- For more information, go to <http://www.iattc.org/MeetingsENG.htm>.

### Western Pacific Regional Fisheries Management Council Meetings

- January 28–30, 2003: *82nd SSC Meeting*, in WPRFMC Offices, Honolulu, Hawai’i USA
- February 10–14, 2003: *117th Council Meeting*, in the Commonwealth of the Northern Marianas (Dates are tentative; for details, go to <http://www.wpcouncil.org/events.htm>)



PFRP researchers and guests gathered in Honolulu in December to discuss the findings and status of projects at the annual principal investigators' meeting. Look for a review of the meeting in the next issue of this newsletter in April.



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