

## ■ THE FISHING CAPACITY OF LONGLINE AND POLE-AND-LINE FLEETS IN THE WESTERN AND CENTRAL PACIFIC OCEAN

The control of fishing capacity continues to be one of the most significant challenges facing national fishery managers and administrators, as well as the various tuna regional fisheries management organisations (RFMOs) around the globe. In some fora, the level of analysis that has been undertaken to develop capacity controls is relatively involved and complete. In others, data are not yet available from all the required sources for quantitative assessment of national and regional capacities of the relevant fishing fleets. Highly migratory species (HMS) fisheries in the western and central Pacific Ocean (WCPO) fall into the latter category. This study complements a 2003 report on purse seine capacity in the WCPO. To date there have been no published reports documenting the num-

ber, much less the fishing capacity, of longline or pole-and-line fleets in the WCPO.

To augment that previous study on the fishing capacity of the longline and pole-and-line fleets, the consultancy firm Gillett, Preston and Associates (GPA) was contracted in June 2006 by the US National Marine Fisheries Service Pacific Islands Regional Office to review the fishing capacity of these two fleets. Work on the review began in early July 2006 and was completed four months later.

The difficulties of measuring fishing capacity should not be under-estimated. In a review of global longline fishing capacity, Miyake<sup>1</sup> states it is 'very hard to define and furthermore, almost impossible to quantify at present'. Because the survey was an

initial attempt to estimate a fairly elusive subject in the WCPFC area, a relatively simple input measure of capacity is used: the number of vessels in the various fleets. More specifically, capacity is defined as the number of vessels having at least some participation in tuna longline or tuna pole-and-line fishing in the WCPFC area in 2005.

The results of the study were presented in Apia in December 2006 at the annual meeting of the Western and Central Pacific Fisheries Commission. The following are the main findings of the study.

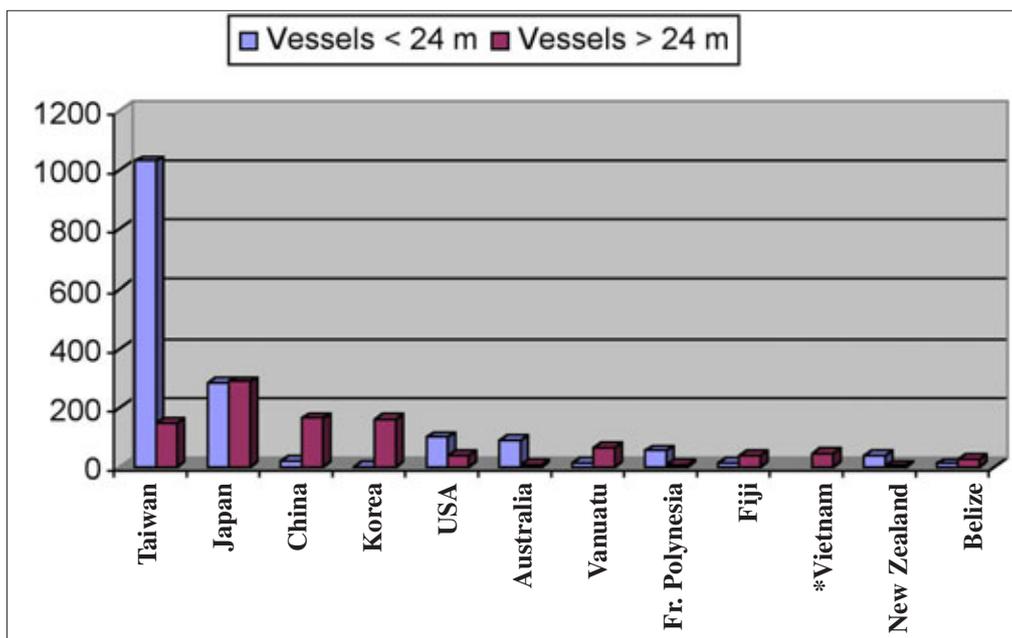
<b>Major constraint</b>	The lack of detailed vessel information from Japan and Taiwan was the study's greatest constraint to obtaining an accurate assessment of fishing capacity in the region.
<b>Fleet activity</b>	According to data collected during this study, the longline and pole-and-line vessels of at least 29 nations were active in the WCPFC area in 2005. The largest longline fleets were those of Japan and Taiwan. The largest pole-and-line fleets were those of Japan and Indonesia.
<b>Estimate of the number of longline vessels</b>	Taking the national longline fleets for which the study's database has good coverage (25 countries, 1,021 vessels) and adding to it the estimates from other sources for the vessels of Japan, Taiwan, Indonesia, and Vietnam (3493 vessels) results in the study's best estimate of the number of longliners 14 meters and above: 4514 vessels.
<b>Estimate of the number of pole-and-line vessels</b>	Taking the national pole-and-line fleets for which the study's database has good coverage (7 countries, 138 vessels) and adding to it the estimates from other sources for the vessels of Japan (215 vessels) results in the study's best estimate of the number of pole-and-line 14 meters and above: 353 vessels.
<b>Limitations and gaps of the databases</b>	Numerous limitations and gaps in data must be acknowledged. Vessel size, transliteration of the Chinese language into Taiwanese, and the Pacific Islands Forum Fisheries Agency's Regional Register are particularly important and require special attention.
<b>Improving the estimates of vessel numbers</b>	Estimates of vessel numbers could be improved considerably by obtaining the full cooperation of Japan and Taiwan, gaining a greater understanding of longliners based in Indonesia and Vietnam, and altering the WCPFC vessel reporting requirements.
<b>Obtaining an output-oriented estimate of fishing capacity</b>	Going beyond fleet sizes to obtain an output-oriented estimate of fishing capacity (potential annual catch) appears possible. More information on vessel characteristics and catch rates are required, but this could be obtained, or at least estimated, through a combination of available data and fleet experience.

<sup>1</sup> Miyake, P. 2004. A review of the fishing capacity of the longline fleets of the world. p. 157-170. In: Bayliff W.H., de Leiva Moreno J.I. and Majkowski J. (eds). Management of tuna fishing capacity: Conservation and socio-economics. Second meeting of the Technical Advisory Committee, FAO Fisheries Proceedings Number 2, Rome.

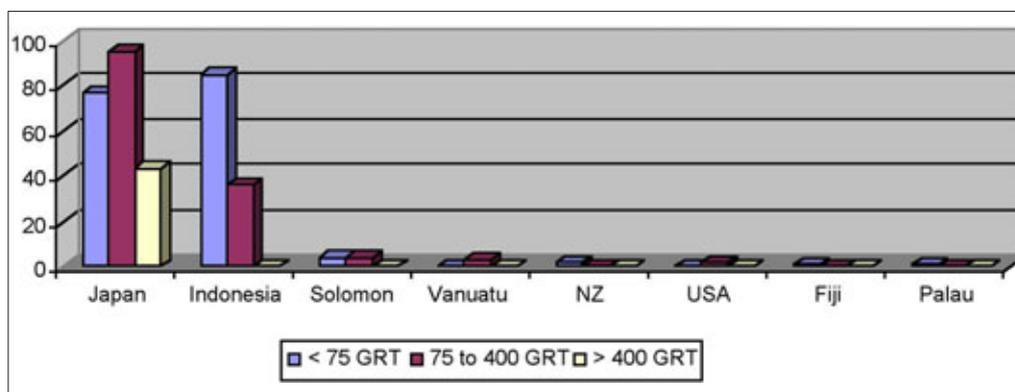
The number of longline and pole-and-line vessels estimated by the study are shown in the figures below.

A copy of the full study in electronic form is available from Gillett, Preston and Associates (gillett@connect.com.fj)

(Source: Gillett R. and McCoy M.A. November 2006. Gillett, Preston and Associates)



**Major WCPFC area longline fleets**  
 (\* As many or most of the small longline vessels in Vietnam operate only part time, only the large Vietnamese longliners are shown here)



**Pole-and-line vessels over 14 meters**

## ■ SPEARFISHING IN THE PACIFIC ISLANDS: CAN IT BE MANAGED?

Spearfishing is growing in importance in the Pacific Islands. It was almost insignificant in the region prior to the introduction of diving goggles in the middle of the twentieth century. Now the fishing method is one of the

major components of inshore fishing in the Pacific Islands. Spearfishing is also a major contributor to what is arguably the greatest fishery problem in the Pacific Islands: excess inshore fishing effort and associated

resource declines. On the positive side, spearfishing produces much of the local marine food available to Pacific Islanders.

A recent SPC/FAO study reviewed spearfishing in select-

ed Pacific Island countries. The report of the study identified the important species caught, ascertained the major difficulties caused by spearfishing,

explored interventions to mitigate the problems, and considered the assistance likely to be required by Pacific Island countries in the management of their spearfisheries.

The major spearfishing issues in the five countries of the study were identified as:

<b>Important spearfishing issues in Fiji</b>	<p>Commercial spearfisheries depleting fishery resources in areas that may be quite important for village food supplies.</p> <p>The low priority given to enforcing legislation related to spearfishing.</p> <p>The exclusion of 'spearing' from commercial fishing activities that require a license, and the exclusion of 'spearing' by outsiders from activities that can be regulated by traditional authorities under the Fisheries Act.</p> <p>The difficulty of collecting evidence required for a successful prosecution of fishing with scuba gear.</p> <p>The difficulty of villagers enforcing rules on fisheries activities that mainly occur at</p> <p>The incompatibility of marine-oriented tourism and spearfishing, or at least commercial spearfishing.</p> <p>The health risks of scuba to untrained divers.</p> <p>The use of large 'fish collection vessels' in conjunction with spearfishing.</p> <p>The targeting of fish spawning aggregations by spearfishers.</p>
<b>Important issues in Tonga</b>	<p>In Tonga's open-access regime there is some concern that nothing practical can be done about the excessive fishing effort, a major element of which is spearfishing.</p> <p>There are very few controls on spearfishing, and very lax enforcement of ones that do exist.</p> <p>Although the use of scuba for spearfishing appears to be contained, there is some worry that the situation may change if the beche-de-mer fishery and associated scuba use recommence.</p> <p>It is difficult or impractical to collect the evidence required for a successful prosecution of using scuba for spearfishing.</p> <p>Some individuals are concerned about the long-term impacts of visits by industrial-scale spearfishing operations to Tonga's isolated reef areas.</p> <p>Spearfishing inside the fish fences for fish, which other people considered have already been 'caught' is growing.</p>
<b>Important issues in Samoa</b>	<p>Balancing the need to protect Samoa's inshore fisheries from the deleterious effects of spearfishing with the political directive to allow the existing group of spearfishers to continue.</p> <p>Reconciling the village by-laws (which may ban scuba spearfishing) with the national level de-facto permission granted to a group of scuba spearfishers.</p> <p>The difficulty of reducing fishing effort from a variety of inshore fishing techniques, the most important of which is spearfishing.</p> <p>Whether the export of inshore fisheries resources (an important component of which is the catch from spearfishing), is justified.</p>
<b>Important issues in Tuvalu</b>	<p>There is sometimes conflict between spearfishing and other gear; the contention that spearing reduces the amount of fish available for line fishing.</p> <p>The complexity of reducing Funafuti inshore fishing effort</p> <p>The concept that there are limits to inshore fisheries production is new to many Tuvaluans.</p> <p>The perception by some government officials that any controls placed on inshore fishing (including spearfishing) by the Fisheries Department could be thought by the general public as being contradictory to the Fisheries Department's development efforts.</p> <p>The increased algal growth in the lagoon area around the populated centre of Funafuti could be, at least partially, as a result of the removal of herbivorous fish by spearfishing.</p>
<b>Important issues in the Solomon Islands</b>	<p>Fishing is an important component of inshore fishing effort and, even in areas away from the urban centres, there is the perception that inshore resource are declining due to fishing pressure.</p> <p>Night-time spearfishing with flashlights is having a major impact on parrotfish and spawning aggregations of groupers.</p> <p>There is considerable concern about coral damage while spearfishing.</p> <p>At least some fisheries officers feel that spearfishing is wasteful because of the damage to fish flesh and because a spear hole results in faster bacterial decomposition.</p>

The 10 most important spearfishing difficulties from the five country visits, a review of the literature, and discussions with fishers appear to be:

- The contribution of spearfishing to inshore over-fishing
- The use of scuba in spearfishing
- Night spearfishing
- Industrial spearfishing
- Negative interaction with line fishing
- Poaching and difficulties of surveillance
- Devastation of certain species
- Devastation of spawning aggregations
- Incompatibility of spearfishing with marine tourism
- Increased algal growth due to the removal of herbivores.

The table on page 32 summarizes these difficulties and lists some successes and failures in their mitigation.

The SPC/FAO study indicates that spearfishing is important in

Pacific Island inshore fishing. The visits to five countries during the present study show that there are very large differences between countries, and between locations within a single country, in the level and type of spearfishing activities. A common feature in each area is that spearfishing is a major contributor to inshore over-fishing. In all but the most traditional places there are difficulties with enforcing spearfishing management measures.

A few generalisations on spearfishing management can be made:

- For several reasons, a complete and effective ban of scuba spearfishing and effective enforcement is the single most important spearfishing management measure. Expressed in crude terms, 'If a country does nothing else right in spearfishing management, ban the use of scuba'.
- Spearfishing effort must be managed along with other forms of inshore fishing. Attempts at restricting just spearfishing are not likely to be successful, as fishing effort may be easily transferred to other small-scale fishing methods.

- In the management of inshore fisheries, including that of spearfishing, only a few measures are likely to be successfully implemented at the national level. Most interventions must be formulated, initiated, and enforced at the local level, preferably with some assistance from the national level.

In the management of Pacific Island inshore fisheries, no single measure is likely to be effective in addressing all the present and future concerns at a particular site. The relative success of the various possible interventions is likely to change over time as conditions evolve. It therefore seems that an effective community-level strategy would be to have a marine protected area along with other interventions such as limits on commercial species, seasonal bans, and prohibition of night spearfishing ('MPA plus').

A full copy of the report of the SPC/FAO spearfishing study is available on the FAO website:

<http://www.fao.org/docrep/009/a0774e/a0774e00.htm>



## Spearfishing difficulties and considerations of mitigation measures

Spearfishing Difficulties	Considerations	What has not worked at addressing issue; What may have been over-looked	What has enjoyed at least some success at addressing issue
<b>Spearfishing is a major contributor to inshore over-fishing</b>	Excess inshore fishing effort and associated resource declines are arguably the greatest fishery problem in the region  The problem of inshore over-fishing is complex and there are no easy solutions	National level legislation by itself  Management interventions dealing with spearfishing alone are unlikely to be effective at addressing inshore over-fishing  All attempts at controlling effort in open access situations	Spearfishing must be treated as one of many fishing methods that contribute to the problem.  Providing information/assistance/encouragement to communities for them to address issue
<b>Use of scuba</b>	Reduces fish populations to low levels  Diminishes/eliminates reserves for fish in deep water  Inevitable use of scuba gear by unqualified and/or careless people and accompanying injury and death	Simply banning the use of scuba for spearfishing or all fishing, because of difficulties of obtaining evidence for court prosecution Research on the issue is no guarantee that a ban on scuba will follow (Guam)	Banning at the national level the possession of scuba and fishing gear in same boat or car  Awareness raising: In rural areas, social pressure to avoid what is considered an unsustainable practice seems more effective than government regulations Using dive tourism operators to promote/enforce bans
<b>Night spearfishing</b>	Reduces fish populations to low levels	Attempts to legislate on the national level	Bans at the community level
<b>Industrial spearfishing</b>	Past or present operations in Fiji, Tonga, Solomons, and Northern Marianas use large vessels and many divers  Sequential devastation of fish populations to the detriment of adjacent villages under the guise of development	Assuming that cash provided to villages adequately compensates for resource depletion	Providing information to national authorities on experiences in these operations (e.g. southern Lau in late 1980s)
<b>Negative interaction with hook/line fishing</b>	Traditional fishers often feel that spearing reduces the amount of fish available for line fishing, either by reducing the abundance of fish or by making them wary of all fishing gear.  Although could be dismissed as not being important, it appears to be perceived to be a significant issue in many traditional areas	Ignoring the generational aspect to the spear/line conflict - old men, who mostly fish with lines, disapproving of spearfishing, mostly done by much younger males.	Communities banning spearfishing in certain areas (e.g. inside lagoon)
<b>Poaching and difficulties of surveillance</b>	Because spearfishing occurs at underwater and often at night, enforcement of any management rules can be difficult and expensive.	Suggestions that national governments should provide boats and fuel to communities for policing usually do not come to fruition, nor do they seem sustainable	Sensitisation of communities by outside partners as to the value of their coastal resources and the harm done to the resources by poachers.  Sanctions on both boat owners and on spearfishers
<b>Devastating certain species</b>	The humphead parrotfish ( <i>Bolbometopon muricatum</i> ) and the humphead wrasse ( <i>Cheilinus undulatus</i> ) seem to be especially unfortunate as they are both high value species and inherently not very resilient to fishing pressure	National level legislation banning commercialisation of certain species without significant follow up is not effective even in a capital city	Local-level bans on night spearfishing  An externally funded marketing project refusing to buy these species
<b>Devastating spawning aggregations</b>	The large numbers of fish taken at some spawning aggregations give the impression that the species is abundant. This can hide the less obvious possibility that, for some species, one or a few large aggregations may represent all the adults in a population (Y. Sadovy, per.com., November 2005).	National level legislation by itself	Creation of an awareness at both the fisheries officer and the community levels of the importance of spawning aggregations and associated protection  Community involvement in establishing marine protected areas that encompass spawning aggregations
<b>Incompatibility of spearfishing and marine tourism</b>	Spearfishing, whether traditional or modern, catch many of the same fish that are most visible/valued by tourist divers Even at sustainable levels of fishing effort, spearfishing can have considerable effects on tourism prospects	Attempting to 'win a war with a village'	Community involvement in establishing marine protected areas that are close to resorts  An economically powerful tourism industry leading initiatives to ban spearfishing entirely, or commercial spearfishing, or by non-residents (some Caribbean and Indian Ocean countries).
<b>Increased algal growth with the removal of herbivores</b>	The removal of scarids, acanthurids, and siganids by spearfishing is thought to result in increased abundance of algae	An increase of ciguatera-producing organisms could possibly result	Some Funafuti, Tuvalu spearfishers report an increase in siganids at some distance from a large MPA

## ■ URGENT BAN TO PROTECT 7 SPECIES

An emergency five-month suspension of all bottomfishing in the main Hawaiian Islands resulted from new research that seven species of bottomfish are being overfished and that immediate steps are needed to protect them.

The closure, which will start in six weeks, needs to be enacted by US National Oceanic and Atmospheric Administration Fisheries Service and the state Department of Land and Natural Resources, but both agencies have indicated they are prepared to do so.

The new closed season, which is to be established in both state and federal waters around all the main Hawaiian Islands, will be in place 1 May–30 September. The closed season replaces a previous plan to close federal waters only at Penguin Banks of Moloka'i and Middle Bank, between Kaua'i and Nihoa.

The more aggressive regulation is because the newest fisheries data suggest bottomfish stocks are more threatened than scientists had realized, said Ed Ebisui, a member of the Western Pacific Regional Fishery Management Council.

Prized Hawaiian eating fish — the **onaga**, **'ehu**, **gindai**, **'opaka-paka**, **kalekale**, **lehi** and **hapu'upu'u** — are covered by the closed season. The closure will mean the only Hawaiian bottomfish on local markets during those months will be from the Northwestern Hawaiian Islands, which federal regulators say is not being overfished.

The closure will affect his business, but something clearly needed to be done to protect the fishery, said Brooks Takenaka of United Fishing Agency, which operates a fish auction in Honolulu.

'It's all of our collective responsibility to realize what is happening. We've got to be careful of the utilization of our resources,' he said. But he also said he hopes regulators keep open minds and continue looking at data to find ways to manage the fishery that least affects the community and the fishing industry.

'I'm getting calls from fishermen and wholesalers that weren't aware of this. For the full-time commercial fishing guys, this is a knock. They can't just go and do other types of fishing. It takes different equipment. And it's not like they can just go somewhere else,' Takenaka said.

He said some fish will continue coming in from the Northwestern Hawaiian Islands until a fishing ban takes place in four years within the Papahānaumokuākea National Marine Monument. And local consumers will also find more fish coming in from the Indian Ocean and the South Pacific — generally from areas not carefully managed to protect resources, he said.

'People are going to be eating fish from someone else's backyard,' he said.

The Western Pacific Regional Fishery Management Council responded with the closed season after receiving NOAA Fisheries' latest estimate, based on fishery data through 2005, that says local bottomfish stocks are at risk unless the take is reduced by 24 percent.

Federal waters beyond three miles and out to 200 miles from shore are covered by the new ban. The state is committed to enacting a nearly identical closed season as well, said Alton Miyasaka, an aquatic biologist with the state Division of Aquatic Resources. But he said

the state has not yet laid out a timetable for getting the new closed season rules enacted.

'Our hope is to manage it together. We're all pulling together,' Ebisui said.

During the first year of the closed season, NOAA Fisheries and state fisheries officials will be aggressively gathering data, and trying to expand the information they now collect about the fishery. Within the next year, they expect to establish a fishery managed like some Alaskan and West Coast fisheries, in which a total allowable annual catch is established and daily catches are monitored. When Hawai'i anglers have caught the total allowable catch, the season immediately closes until the following year.

One problem: Commercial anglers report their catch, but recreational fishing boats don't have to.

Recreational bottomfishers by the start of the 2008 season will be required to report their catch daily, as will commercial anglers. Both would also be required to provide detailed locations on where they catch their bottomfish. One benefit for recreational anglers is that bag limits will be removed.

'This year's five-month closure is kind of a buffer. We still don't have a handle on the recreational take,' Ebisui said.

Source: Honolulu Advertiser, 20 March 2007  
<http://www.honoluluadvertiser.com>



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- Environmental influences
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- Clinical treatment and folk remedies
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- Ciguateric fish species
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