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A REVIEW OF THE WPYRG OBJECTIVES

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BACKGROUND

The Western Pacific Yellowfin Tuna Research Group (WPYRG) was organized in 1990 as an informal organization of interested scientists and fisheries officers engaged in research on the population biology of yellowfin tuna and in monitoring of the fisheries exploiting this species in the central and western Pacific Ocean. Membership in the Group is voluntary and requires no prerequisite except adherence to the Group's objectives and work procedures.

The objectives of the Group were developed in 1990 through a process that involved discussion of issues facing tuna fisheries managers in the central-western Pacific region at that time and consideration of the interests of the Group members, i.e., biologically oriented. The result was three objectives for the near-term in the form of questions (WPYRG1 report):

1. How much yellowfin tuna can be harvested in individual EEZs?

2. Can the yellowfin stock(s) be locally managed (or depleted)?

3. What will be the impacts of one fishery on another?

These questions were later refined and generalized (WPYRG2 report) as:

1. What is the safe level of yield and exploitation for the stock?

2. What factors contribute to local depletion?

3. What is the level of interaction among the different fisheries?

Since 1990, the tropical tuna fisheries in the central-western Pacific have undergone significant expansion and new management issues have emerged. Research on yellowfin tuna has also advanced resulting in more and better information about the biology and productivity of the stock. Because of these events, it appears appropriate that the WPYRG objectives be reviewed during the third meeting of the Group. Outlined in this paper is a summary of recent research findings of significance to the Group's objectives and notes on some management issues that have recently surfaced. The outline is not intended to be comprehensive, but a starting point for discussion.

SOME SIGNIFICANT RESEARCH FINDINGS

Objective 1: What is the safe level of yield and exploitation for the stock?

Significant research findings, on productivity and exploitation of the yellowfin tuna stock of the western Pacific are emerging from the yellowfin tuna tagging program of the Tuna and Billfish Assessment Programme of the South Pacific Commission (SPC). Findings (Hampton 1992) so far indicate that:

Natural mortality rate = 0.08 to 0.10/month
Fishing mortality rate = 0.013 to 0.022/month
Standing stock biomass = 1.4 to 2.1 million metric tons (t)
Recruitment rate = 150,000 to 220,000 t/month

These findings, although preliminary, indicate that the productivity of the yellowfin stock in the western Pacific Ocean is considerable, and current exploitation is low despite an annual catch in excess of 350,000 t. Analyses indicate that catch would have to double before there is a significant reduction in the equilibrium population size from current levels.

Another significant research finding is from the eastern tropical Pacific. The finding provides guidance with respect to safe level of fishing to minimize recruitment overfishing. Since 1986, the eastern tropical Pacific yellowfin tuna fishery has been experiencing exceptionally high annual production, averaging more than 270,000 t, and a high level of CPUE in the range of 14.5 to 15.4 t/day's fishing for large purse seiners (IATTC 1992). At this high level of yield, the spawning biomass has been at its highest level (approximately 317,000 t) since monitoring of the stock began in the mid-1960s. This contrasts to the low spawning biomass of about 91,000 t in 1982 when the stock was being overfished and CPUE was at its lowest level (4.8 t/day's fishing) for the fishery. These results indicated that spawning biomass should be maintained above 29% of the maximum spawning biomass in order to reduce the risk of recruitment overfishing.

Findings such as these indicate that objective 1 has been achieved for the most part, and perhaps it should be modified or revised. The revision should take into consideration current fisheries management needs.

Objective 2: What factors contribute to local depletion?

This is a broad objective that has many facets. A recent study by Kleiber and Hampton (MS) addresses this objective in an inverse way by investigating how fish aggregating devices (FADs) contribute to improved fishing by purse-seine vessels in the Solomon Islands EEZ. Their results indicate that anchored FADs enhance the productivity of the vessels by attracting and concentrating fish. The beneficial effects appear to level off at about five or six FADs in a 55 x 55 km area.

Further research is needed to achieve this objective. However, the research could benefit if the objective was more focused. A first step might be to return to the objective as stated in 1990, i.e., Can the yellowfin stock(s) be locally managed (or depleted)?

Objective 3: What is the level of interaction among the different fisheries?

At the First FAO Expert Consultation on Interactions of Pacific Tuna Fisheries held during December 3-11, 1991, participants concluded, inter alia, that tuna fishery interactions are difficult to quantify and each has unique specifications and considerations. This finding suggests that objective 3 is unlikely to be achieved in the near term. It appears to be too broad as an objective and a more focused one would be more appropriate.

An example of a focused fisheries interaction objective is the study by Kleiber and Hampton (MS, 1992) of the interaction between pole-and-line and purse-seine fisheries in the Solomon Islands. This study is on-going, but preliminary results indicate that the interaction is being mitigated by the presence of FADs, islands and the geographical separation of the fisheries.

Similar focused approach to fisheries interactions issues would be more easily handled by the Group, particularly if the Group wishes to provide timely advice to managers.

EMERGING MANAGEMENT ISSUES

A management issue that surfaced recently emerged from the low prices offered fishermen for skipjack and yellowfin tuna destined for the canning industry. The root cause of the low prices, of course, is due to excessive supply in the face of sluggish consumption. However, some fishermen have pointed out that the excessive supply is the result of large amounts of small fish, smaller than 40 cm (approximately 1.2 kg), being caught and landed and a minimum size regulation would reduce the supply. These fishermen claim that mortality of small fish, including the discarding at sea dead of very small fish, results in reduced escapement and reduced potential future yields for the fishery.

Preliminary analysis of the biological impact of this concern was undertaken by the SPC (MS) and Coan, Kleiber and Prescott (1993). Both studies indicated that with fishing mortality rate at current low levels and typical values for population parameters for the stocks, yield-per-recruit of yellowfin tuna is low (approximately 1 kg) owing to capture at small sizes. However, by restricting the catch of small yellowfin tuna below about 45 cm long (approximately 1.8 kg), there is only marginal gain in yield-per-recruit of yellowfin tuna. Similarly, by restricting the catch of small skipjack tuna below 40 cm, no gain would result in yield-per-recruit of skipjack tuna. These studies also point out that the precise impact is difficult to assess given that representative data on sizes of fish being caught, as well as data on discards at sea of small fish by the majority of the fleets (e.g., more than 50% of the purse seine fishery), are not available. Furthermore, because both skipjack tuna and yellowfin tuna are caught together in mixed species schools by purse seiners, restrictions on one species will have an impact on the other.

This issue is likely to continue to be important to managers especially as exploitation increases. The Group, therefore, might wish to prepare to address this issue in the near term.

Another emerging management issue is the appropriate level and mixture of surface fishing effort and longline fishing effort for maintaining a balance between high, sustained production from the resource and a reasonable CPUE level for profitable fishing operations. This is an optimization problem with economic factors as major components. Nonetheless, biological factors need to be evaluated and incorporated in-tandem with the economic factors. This is another emerging issue that the Group might wish to address and play a role in evaluating alternative solutions.

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