THE PRECAUTIONARY APPROACH – A CANADIAN INFORMATION PAPER

The Western and Central Pacific Fisheries Commission (WCPFC) Convention commits members to apply the Precautionary Approach (PA) when establishing conservation and management measures for highly migratory species in the Convention Area.

How to incorporate the precautionary approach into fisheries management decision-making

When making decisions regarding fisheries management, it is important that biological reference points take into account the need for the PA.

In general, the PA in fisheries management is about being cautious when scientific knowledge is uncertain, and not using the absence of adequate scientific information as a reason to postpone or fail to take action to avoid serious harm to fish stocks or their ecosystem. This approach is widely accepted as an essential part of sustainable fisheries management.

Applying the PA framework requires the establishment of a harvest strategy that:

- identifies three stock status zones – healthy, cautious, and critical – according to upper stock and limit reference points (Figure 1);

- sets the removal rate at which fish may be harvested within each stock status zone;

- adjusts the removal rate according to fish stock status variations (i.e., spawning stock biomass or another index/metric relevant to population productivity), based on pre-agreed decision rules.

The **upper stock reference point** marks the boundary between the healthy and cautious zones. When a fish stock level falls below this point, the removal rate at which the fish are harvested must be progressively reduced in order to avoid serious harm to the stock. The upper stock reference point can also be established as if it was a target reference point that is determined by productivity objectives for the stock, broader biological considerations, and social and economic objectives for the fishery. The USR, at minimum, must be set at an appropriate distance above the LRP to provide sufficient opportunity for the management system to recognize a declining stock status and sufficient time for management actions to have effect.

The **limit reference point** marks the boundary between the cautious and critical zones. When a fish stock level falls below this point, there is a high probability that its productivity will be so impaired that serious harm will occur. The limit reference point is established based on the best available scientific information.

The **removal reference** establishes the maximum removal rate of fish stocks in each of the zones; progressively decreasing from the healthy to the critical zones. The removal

reference is less than or equal to the maximum sustainable yield (MSY) at which a fish stock can be harvested. This harvest rate must include removals of the stock from all methods (i.e., target, by-catch and other incidental mortality in other fisheries).

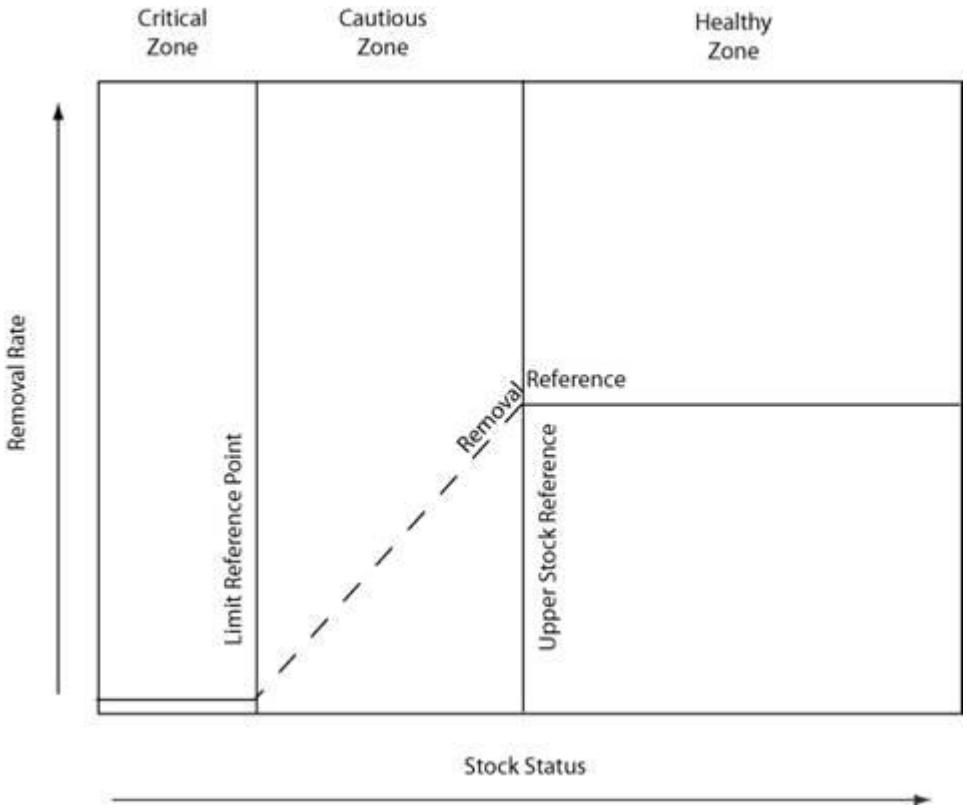

Figure 1: The key components of the Precautionary Approach Framework.

Pre-agreed, risk-based actions guide management decisions on harvest rates under various stock status conditions. In the **healthy zone**, the fish stock status is good, and fisheries management decisions and harvest strategies are designed to maintain fish stocks within this zone. In the **cautious zone**, decisions and strategies promote stock rebuilding to the healthy zone. In the **critical zone**, stock growth is promoted and removals are kept to the lowest possible level.

How is this framework being implemented in Canada's fisheries?

Progress has already been made to implement the precautionary approach within the management plans for a number of fisheries in Canada. Full implementation is done in a phased and progressive manner over a number of years. A full description of Fisheries and Oceans Canada's PA framework is available using the following link: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm.

What is the current situation with Pacific Albacore tuna?

- The ISC-Albacore Working Group (ALBWG) has estimated fishing mortality rates (F) for a suite of potential limit reference points (using stock spawning biomass or SSB) to ensure that SSB remains within the range of historically observed values. The goal is to ensure a sufficient reaction time for management action to prevent the possibility of recruitment overfishing, i.e., an adult population fished so heavily that the number and size of the spawning portion is reduced to the point that the remaining reproductive capacity is not sufficient to replenish the stock.

- Candidate LRP values include the minimum 'observed', lower 10th percentile, lower 25th percentile, and median (50th percentile). As an example, SSB10% reference point means that 10% of historically observed spawning biomass values are below this level, which was estimated to be approximately 72,500 t by the 2006 stock assessment.

- The ALBWG recommended either the 10th percentile or 25th percentile of 'observed' SSB over the historical time series would be appropriate choices for a limit reference point. The absolute minimum observed SSB was not recommended because it is not a statistically robust estimator and because of the substantial uncertainty of current biological parameter estimates (e.g., fecundity, natural mortality rate) and recruitment (ISC 2008).

- The NC established an interim management objective at its 2008 meeting to maintain SSB above the average level of its ten historically lowest points (ATHL – which was estimated to be about 71,600 t based on 2006 stock assessment results) with a probability greater than 50%. Operationally, this has been translated by the ALBWG into a fishing mortality rate in which the probability of SSB exceeding the ATHL in one or more years during a 25-yr projection period is 50%. If this objective is interpreted as a limit reference point, then a precautionary approach would use a probability of 95% that SSB would be greater than ATHL, i.e., a 5% chance that SSB will be less than ATHL in one or more years of the 25-yr projection period.

What could be done to allow further progress in the establishment of more sustainable and precautionary management practices for Pacific albacore tuna?

- The ALBWG estimated that the F value associated with SSB_{ATHL} is 0.75 yr^{-1}, which is similar to the last estimate of current fishing mortality ($F_{2002\text{-}2004}$) = 0.75 yr^{-1}.

- Although the ALBWG has interpreted SSB_{ATHL} as a limit reference point, it has requested clarification on this point because the NC did not specify how it interprets the interim management objective. Further consideration of the probability and the specification of the objective may be needed.

- The ALBWG provides F-based estimates for a suite of potential target reference points based on several MSY proxy variables. Selection of an appropriate reference

point for use as a USR is desirable. A combination of biological, management and socio-economic factors will influence the identification of the USR and of the precise risk tolerance level that could be associated to it (e.g. moderate risk level such as probability of 50%).