COMMERCIAL PRAWN TRAP FISHERY

CONSERVATION, SUSTAINABILITY AND IMPROVED MANAGEMENT MEASURES SINCE 1995

The recent history of the management of the commercial prawn fishery is one of incremental steps to improve conservation of the resource and sustainability of the associated commercial, recreational and First Nations' fisheries. Although these changes are individually more or less important, collectively they represent a significant and sustained effort to improve management and stock assessment.

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1. PRECAUTIONARY PRINCIPLE

Prawn fishery managers and biologists meet weekly by teleconference call during the commercial prawn fishery. The precautionary principle is applied to the decision making process. If the data is ambiguous about the status of a local area stock, and if there is no reasonable expectation of getting additional information within a short time frame (est. 1 week maximum), then the default decision is that the area will close so that any decision errors are made on behalf of the resource. This practice also applies to the situation where 2 or more fishery or stock assessment managers or biologists have differing opinions with respect to the likely impact of continued fishing. If agreement is not achieved through discussion, then the default decision is to close the area.

This type of decision rule may close the commercial fishing in an area earlier than necessary. For example, if the prawns have recently entered a molting stage in the area, then the abundance may appear to be reduced as the prawns hide out waiting for their exoskeletons to regain protective strength. Biological sampling at this time may suggest reduced abundance where no such reduction exists, and this will lead to a closure decision. Prawn management and stock assessment personnel are prepared to accept criticism for early closures, on the basis that inadequate data is an insufficient reason for continuation of the fishing and that where ambiguity exists, decisions must be made in favour of the resource.

2. INCREASED IN-SEASON SAMPLING OF THE SPAWNER INDEX.

The primary conservation and sustainability tool in this fishery is the biological sampling of the prawn spawner index. The index is a measure of the number of female and transitional prawns which will bear eggs the following winter. The "baseline index" is the set of target values initially adopted in 1979, considered necessary and sufficient to ensure conservation of breeding stocks and long term sustainability of the fisheries on those stocks.

Prior to 1995, the season was 230 days long. Within that period, up to 100 strings of gear were sampled annually for spawner index. The season has since been reduced to about 80 days annually, with approximately 1200 strings of gear sampled within that period. Sampling is now more intense and comprehensive and a great deal more data is available upon which to make closure decisions in a timely manner. As well, sampling to be extended throughout the coast in all areas that are fished. Conversely, fishing is no longer continued in areas where sampling cannot be provided or is deemed to be insufficient.

3. ASSESSMENT OF FISHERS' SKILL IN DATA ASSESSMENT

With the increased effort at in-season biological sampling, it became apparent by 1999 that it was equally important to consider the fishers' experience that could affect sampling results. For example, a fisher who knows an area from years of experience will have catches that provide a more reliable indication of prawn abundance than that of fishers who are new entrants to the fishery, or are new to the area of fishing. In addition, the comments of experienced long term fishers regarding local patterns of abundance is given more credence than that of fishers with limited experience in an area. The Department has found that long term experienced fishers in this fishery often have a well-developed conservation ethic.

4. TIMELINESS OF CLOSURES

In the early '90's, prawn closures were decided once the spawner index had been achieved, and then announced to take effect 7 to 10 days later. This scenario allowed for up to 15 days of additional fishing pressure to occur following biological sampling on the fishing grounds. By the late '90's, Stock Assessment personnel were inspecting incoming sampling data and assessing data trends. Stock Assessment now advises Fishery Management if the trends appear to indicate that the spawner index will be achieved before the next sampling can occur. Managers will plan closures based on the forecast pattern of declining spawner index. The net result is that closures are timed to take place in anticipation of achieving the index, rather than some time after index has been achieved.

4.1. TIMELINESS OF CLOSURES, PART 2.

Until the mid '90's, the biological spawner index data was assessed based on the upper 75% confidence interval of the index data. The former practice essentially meant that 1 trap of above average index catch would compensate for 3 traps of equally reduced index catch in the calculation of overall index for the sample string. The data analysis was then changed to one

based on the true mean. The change essentially meant that at least 2 traps of above index catch are required to offset 2 traps of reduced index catch. This shifts the burden of proof in the direction of increasing the data requirements for an area to remain open to fishing.

4.2. TIMELINESS OF CLOSURES, PART 3.

Prior to the mid '90's, closures were announced with a 7 to 10 day lead time. By the late '90's, primarily 7 day announcements are used. In some special areas, or where there appears to be a need for increased urgency, closures within a 48 - 96 hour period may be announced.

5. BASELINE INDEX + 10% OR 25%

The spawner index is a set of stock assessment and management action levels which signal when the commercial fishery must be closed to achieve conservation and sustainability. Beginning in the mid '90's, the target index for Saanich Inlet was set 10% higher than the baseline index used in all other coastal areas, in recognition of the increasing recreational fishing effort in this area and the expressions of concern for the health of the local prawn stocks by First Nations. Subsequently, in the last 5 years, the target index was raised in all other important recreational fishing grounds by 10%, then the target for all of these areas was raised to 25% greater than the original baseline index. This leaves more female prawns in the water to spawn. Based on work done in Howe Sound by Jim Boutillier of DFO's Stock Assessment Division at the Pacific Biological Station, this management action is expected to result in a greater abundance of harvestable prawns for all fishing sectors.

6. TRAP LIMITS.

Introduced in 1995, commercial trap limits have reduced gear inventory by 10% to 20%. Gear inventory prior to 1995 was reported to be in excess of 80,000 traps coast wide, and may have exceeded 100,000 traps. The trap limit capped gear at 78,000 traps and requires each trap to carry a trap tag registered with the Department. In practice, the allowance for licence stacking with a penalty (2 licences fished from one vessel), and the fact that some fishers do not fish their full trap allowance has resulted in an average of less than 73,000 traps fished during each season since 1995.

7. SINGLE HAUL

Fishing practices changed following introduction of trap limits in 1995. Previously, fishers would deploy the number of traps which they could fish in one or two days. In some extreme cases this amounted to 1000 or more traps for a single vessel. Trap limits reduced this to an equal allocation of 300 traps per licence, with an opportunity to fish 2 licences on a single vessel although the number of traps which could be fished by that vessel was reduced by a 100 to 150 trap penalty. The fishers' response to trap limits was to begin to haul their gear more often during a day. By 1999, the majority of fishers were hauling all of their gear twice a day, and some were hauling an additional portion of their gear three times a day.

Limiting fishing effort to a single daily gear haul was first tested as a management measure in inshore southern waters in 2000. The intent of the single haul measure is to ensure that traps remain on the bottom for longer periods, which allows the larger prawns to move into the traps and aggressively displace the smaller prawns from the gear before hauling. Self-sorting on the bottom is preferable to sorting of the catch at the surface, as it reduces handling mortality.

This is a difficult management measure from an enforcement perspective. Industry representatives were unanimous in requesting testing of the single haul measure in 2000, and in having it extended coast wide in 2001. Industry voluntarily provided "mobilization funding" for the use of enforcement personnel in 2000, allowing Fishery Officers to get out to the grounds to check on single haul related compliance. Industry voluntarily increased enforcement support funding levels in 2001 and again in 2002, in support of the single haul management measure.

8. DAILY FISHING TIME LIMITS

Prior to 1999, commercial fishing was permitted from .5 hr. before sunrise to .5 hr. after sunset. With the introduction of the single haul management measure pilot in 1999, fishing hours in southern waters were limited from 7:00 a.m. to 7:00 p.m.. This limited the time available for fishers to engage in multiple hauling and it improved the enforceability of the single haul management measure. Fishing effort was limited to times when Fishery Officers would have improved opportunity to inspect fishing operations. Although not directly a conservation or sustainability measure of itself, the improved enforceability promotes compliance with other conservation and sustainability control measures. A secondary effect of this condition is that fishers are working less time in a 24 hour period, which appears to have had some benefit in terms of health and safety. There are fewer reports of fishers falling asleep at the wheel running at night, in the past 2 years.

9. INCREASED SIZE LIMITS

The original size limit for the commercial fishery was 30 mm. carapace length which is the distance from the posterior margin of the eye orbit to the posterior mid line dorsal limit of the carapace, the external exoskeleton covering the head and thorax. In 1997 the commercial industry requested that the size limit be raised to 32 mm, and then to 33 mm. in 1998. This reduced "growth overfishing", the harvest of prawns in advance of molting which increases length and weight. On each molt, prawns will add 10% in length. Because of the length/weight relationship, this adds 30% in weight.

One of the outcomes of the increased size limit is that there should always be medium sized prawns available on the prawn grounds for harvest by recreational and First Nations' fishers. If recreational or First Nations' harvesters are only catching medium sized prawns (30 to 33 mm. carapace length), this may be an indicator of reduced large prawn abundance because of commercial fishing pressure. However, as there are several molts across summer, large prawns will re-appear in the population 2 to 4 weeks after the commercial fishery closes. Note that prawns will segregate by size class. The larger more aggressive prawns will chase smaller prawns out of the preferred habitat. If recreational or First Nations' fishers are only catching

smaller prawns, the gear may not be set at right depth, or may not be set on the optimum coral and hard bottom habitat.

If recreational and First Nations' fishers are unable to catch any prawns at all, then this signals a problem unrelated to commercial fishing effects as the smaller prawns should still be present. If entirely absent, either the prawns have been eliminated by some other effect such as disease or an inadvertent trawl across the prawn grounds, or the prawns may have relocated to deeper or shallower depths. Changing the depth of fishing usually resolves this concern.

10. LATER SEASON OPENING

Formerly, the commercial prawn fishing season commenced April 1. At that time, there are still egg bearing females present in some coastal areas that are just completing the egg incubation period prior to larval release. In the past 5 years the commercial fishery has adopted an opening date no earlier than May 1 when there are almost no egg bearing females remaining on the fishing grounds. Still, there is a great deal of coastal variability from place to place and year to year. Accordingly, another new measure adopted since 1995 requires egg bearing prawns to be sorted out of the catch and returned to the water immediately, as each trap comes on board.

11. IMMEDIATE RELEASE OF FEMALE PRAWNS

At the same time as later season openings were introduced, a requirement was established for commercial fishers to release female prawns carrying eggs at any time they are encountered until the end of June. On the recreational fishery side, it is now common to recommend that berried prawns should be released during winter fishing.

12. IMMEDIATE RELEASE OF UNDERSIZED PRAWNS

Simultaneous with the introduction of conditions of licence requirements for the immediate release of female prawns carrying eggs, a condition was introduced which also requires immediate sorting of catch and release of undersized prawns as each trap comes on board. This was done in recognition that handling mortality will increase as prawns remain longer on board. It is preferable to return prawns as close to their point of origin as possible, to provide a greater chance that they will be returned to their preferred habitat.

13. ADOPTION OF ELECTRONIC DATA DELIVERY MEASURES

Funding arrangements in the commercial fishery changed in 2000. The outcome was increased responsibility of commercial fishers to pay for delivery of in-season information to the Department. An electronic data delivery system was developed to receive information about fishing vessel locations, vessel inspections, non-compliance incidents and more timely delivery of spawner index biological sample information. Much of this is delivered through the internet. An unanticipated benefit has been to put this information more readily at hand for the timely use of fishery managers and stock assessment personnel coast wide, for in-season decision making.

BUT THE BOTTOM LINE REMAINS

Prawns are a short lived species with individual year classes subject to variable stock strength. Variations in stock strength are strongly influenced by larval survival. Larval survival is subject to a wide range of environmental effects. For example, stock strength reductions in the Gulf of Georgia in the late 90's followed several years when there was high rainfall and low surface water salinity in the Gulf during the spring. Prawn larvae move into surface waters at night and mortality may be significantly increased by low salinity conditions.

Also note that the prawn larval population is in the water column for 2 or 3 months before settling to the bottom. During that time tides and wind driven currents control and direct the distribution of the larvae. Consequently, local areas may have reduced prawn abundance or increased prawn abundance depending on the distribution of larvae when they settle – and this is guaranteed to change from year to year. Further it means that although one specific area may experience reduced adult abundance prior to spawning, as long as the overall adult prawn abundance in the general region is maintained, larval dispersion is an intrinsic biological factor that restores populations. The only areas where this requires additional management attention, is in inlets where the local abundance may be more representative of local spawning and recruitment patterns of abundance.

The long and short of it is that there is no such thing as an average condition of abundance for short lived species. With highly variable recruitment patterns, the average is just something that the population cycles past from periods of low abundance to high abundance and back to low abundance. And in biological cycles, what goes up will inevitably come down.

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