SHARKS, SKATES AND RAYS: DISCUSSION

Over the past two decades a tremendous amount of fishing pressure has focused on elasmobranchs. Reported catches world-wide exceed 600,000 tons annually. Just 15 years ago sharks, skates and rays were considered one of California's most underutilized resources. But commercial and recreational fisheries targeting California's elasmobranch resources have experienced dramatic growth during this short period, and the growth has made a significant impact on portions of that resource.

The value of these fisheries grew in response to public acceptance of shark as a wholesome and enjoyable alternative to traditional meat products. Led by landings of the common thresher shark in the early 1980's, California's elasmobranch fisheries peaked in 1981 and 1982 at over four million pounds. Landings continued high into the late-1980's, led by the Pacific angel and shortfin mako shark fisheries. The value of shark meat (ex-vessel price) averaged a dollar, or more, per pound for most species throughout this period. Common uses of shark products other than for human consumption include fins, skin, teeth, squalene, liver oil and medical products. The fins, while taken extensively on the east coast for oriental markets, have not developed into a sizeable market in California.

The importance of shark fishing to recreational anglers has also grown rapidly in recent years. Shark fishing trips for shortfin mako and blue sharks on charter vessels are available nightly throughout southern California. Shark derbies have become increasingly popular and angler effort directed at sharks and skates is estimated at a half a million trips annually.

Sharks, skates and rays have existed and adapted to their environment for over 400 million years. Generally, the pelagic species evolved into apex predators while inshore and bottom-dwelling species either approximated apex status or, like the pelagic species, had few natural predators. Elasmobranch reproductive strategy is simple but efficient. They produce a few well developed, strong individuals whose survival is assured because of their advanced development. All elasmobranchs have a slow growth rate, mature relatively late (30-50% of their life span), have a long gestation period or lay large, slowly maturing egg cases. Brood sizes are generally small. Annual production averages two to eight for ovoviviparous species, 20 to 40 for viviparous and perhaps a hundred or more egg cases in the oviparous species.

While this reproductive strategy has served them well in the past, it makes them quite vulnerable to modern day commercial and recreational fishing pressure. Clearly in a population where each mature female produces only a small number of young in each breeding cycle, recruitment is highly dependent on the number of mature females in that population. As Holden pointed out in the mid-1970's, success in establishing a sustained fishery on such a resource is dependent on maintaining a large population of mature individuals. This has not been the case in most fisheries targeting California's sharks. While many of these pelagic species may be found Pacific- or even world-wide, local stocks have experienced a high degree of exploitation. The Southern California Bight (SCB) is, at least in part, a nursery area for several species including the common

thresher, shortfin mako and blue sharks. Nearly all sharks taken within this area are immature. Removing a large segment of juveniles from the population may create a reduced adult population in later years when those exploited juveniles would have become adults and begun reproducing themselves. The ability of local stocks to recover from over-exploitation depends not only on reducing fishing effort, but also on the size of the virgin stock, natural mortality, and migration rates. Also important to certain skates, rays and shallow water sharks is preserving breeding habitat and water quality.

We have learned much about biology and stock structure of many of California's elasmobranch species but there are still no stock size estimates available. Species distributions are poorly understood or known only from fishery dependent data. Many species have contiguous distributions into Mexican and adjacent state waters where they are also subject to fisheries. We have seen much variability in the apparent abundance of shortfin mako, blue, pelagic and bigeye threshers; still others like the Pacific angel and common thresher show a steady decline in apparent abundance. There is no direct evidence that skates and rays have experienced abundance declines, but if a major fishery were to develop or a loss of nursery habitat were to occur through coastal development, pollution, or increased recreational use, they, too, might suffer.

Specific Management Recommendations

Management of California's elasmobranch resources should be a high priority task for fishery managers in the 1990's. This stewardship will not be an easy task. Regulations enacted by special interest groups to benefit only one segment of the resource, combined with the lack of biological information, can only slow progress toward achieving rational management for sustained harvests. Coast-wide and stock-wide data gathering agreements are necessary for stock assessments. Only through decisive action by fishery managers and through public education can these resources be maintained at healthy levels.

Specific recommendations include:

1) Develop a coast-wide fishery management regime that recognizes and address the low reproductive capacity of California's elasmobranchs. A major objective is to develop a coast-wide management plan to prevent over-fishing and wastage, while maintaining healthy stocks. This is especially important for the common thresher, shortfin mako, blue, leopard and Pacific angel sharks. A conservative approach is recommended where actual species-specific fishery and biological data are lacking.

2) Continue to monitor current fisheries through skipper logs, landing receipts and port samplers with increased emphasis on coverage rates and data quality. On-board observers should be employed when appropriate.

3) Initiate a special monitoring or reporting system for shark derbies and on commercial passenger vessel trips targeting mako and blue sharks.

4) Begin efforts immediately to conduct a cooperative California-Mexico assessment of transboundary shark populations, including the collection of data from Mexico's Pacific shark fisheries.

5) Develop educational programs to elevate the public's perception of sharks and to promote a conservation attitude towards them.

6) Expand existing CDFG tagging programs to provide critically lacking life history information. This should include taking advantage of tagging opportunities provided by shark derbies, and aboard party boats, private anglers and commercial shark vessels.

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