

A Short Review of Existing Scientific Justification of the Fisheries Benefits of Mexico's Fifty Mile and Core Area Conservation Zones.

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Introduction

Between 1984 and 1987 Mexico established reserve areas extending fifty miles from the nation's coast and two larger "core area" conservation zones (off Cabo San Lucas and Salina Cruz) in which the commercial utilization of certain species of fish (sailfish, striped marlin, blue marlin, black marlin, swordfish, dolphinfish, roosterfish and tarpon) was prohibited. These areas were established to provide extra protection to these fish species upon which Mexico's sport fishing industry is heavily dependent. In recent months controversy over proposed regulation of longline and drift gillnet gear proposed in a new shark management plan (Norma 029), has called into question the justification for maintaining these zones. In this short report we review the history of longline exploitation of the pelagic apex predator fishes off Mexico's west coast and existing research which is relevant to the biological implications of increasing commercial fishing effort in the conservation zones.

History of exploitation

The use of high seas longline gear began with the expansion of Japanese distant waters fleets beginning in the early 1950s. Japanese longliners began accessing resources off the west coast of Mexico in 1964 and continued fishing within 200 miles of the coast until the late 1980s, with fishing effort continuing beyond 200 miles through the present. Attachment 1 shows the historical catch-per-unit-effort (CPUE) for tunas and billfishes of the Japanese high seas longline fleet over this period. CPUE off Mexico's Pacific coast peaked in the early 1960s at rates of 3-4 tuna and billfish per 100 hooks and recent years have seen catches within 600 miles of the coast at rates of 1-2 fish per 100 hooks. This data is consistent with the overall observed reductions in CPUE for tunas, billfish and sharks in the larger sub-Tropical Pacific on the order of approximately 50% to 90% (Figure 1) (Myers and Worm 2003). Landings data from the IATTC for blue and black marlin show similar declines over the last decade (Figure 2 and 3). United Nations Food and Agricultural Organization catch data from this period also document the significant reductions in billfish catch across this time (FAO 2003)

This long history of exploitation and the apparent reduction in CPUE over this period of time lent support to Mexico's efforts in the 1980s to end the cooperative

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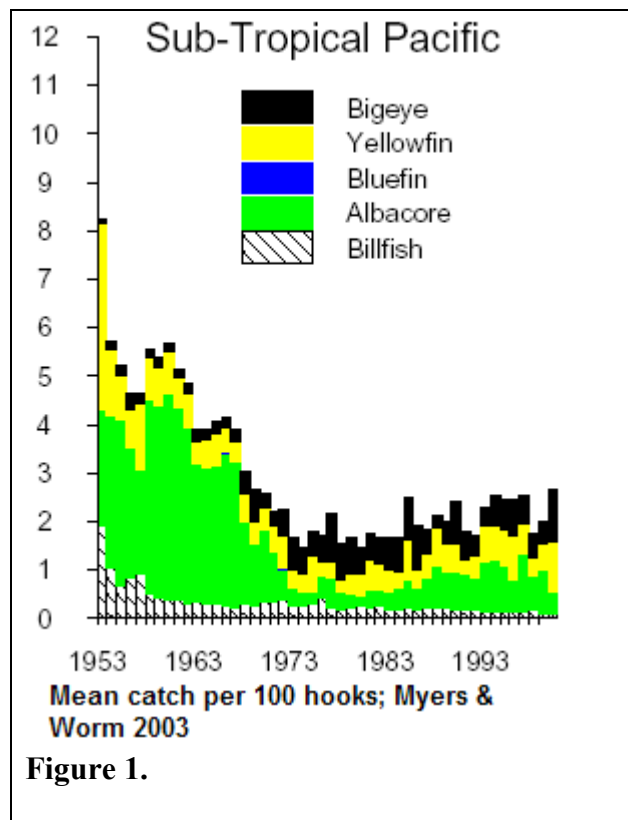
fishing agreement which allowed Japan to fish within the 200 mile Exclusive Economic Zone (EEZ). Squires and Au (1988) studied the effects of this Japanese fishing effort on catch rates of the Cabo San Lucas based sports fishing fleets. They concluded that the longline effort was causing a localized depletion of striped marlin in the Pacific Ocean off the coast of Baja and Baja California Sur, and that this depletion was the source of reduced catch rates by the Cabo sports fleet. The results of this unique study were used to support the establishment of the Core Area Conservation Zones. The marlin resources of the Mexican Pacific have been subject to a long history of longline fishing with commiserate declines in stocks. The only significant conservation regulations in place for these fishes are the 50 mile protected zone and the Core Area closures.

Unfortunately an adequate and accurate time series of Mexican commercial or recreational catch statistics does not exist (Ramirez 1988; Sala *et al* 2004) from which to analyze the effects of fishing on a finer scale. However, anecdotal interview data taken from sport fishing captains and commercial fishers (SEAWATCH 2004) show opinions consistent with overall reductions of apex predator species (marlins, swordfish, tunas, sharks) in the waters of the Baja Pacific and Gulf of California on the order of the 50% to 90% reported by Myers and Worm for the entire sub-Tropical Pacific.

Status of striped marlin

As of this writing there exists no definitive assessment of the status of striped marlin stocks in the eastern Pacific. Recent assessment work by staff of the Inter-American Tropical Tuna Commission indicates that information is needed to define the geographic distribution of this

species in the eastern Pacific (Robin Lewis 2003). If a single striped marlin stock exists models indicate that the stock biomass is approximately that which will sustain Maximum Sustainable Yield (MSY). If separate stocks exist north and south of the Equator the southern stock is fully exploited and the northern stock is seriously overfished and has been reduced to about 50% of the level that will support MSY. At present ongoing genetics research and tagging efforts are being undertaken to address this question. Stock status of striped marlin is uncertain, but the majority of the data indicates that at best, the species is fully



exploited, at worst seriously overfished, and additional fishing effort and mortality on the species is not warranted.

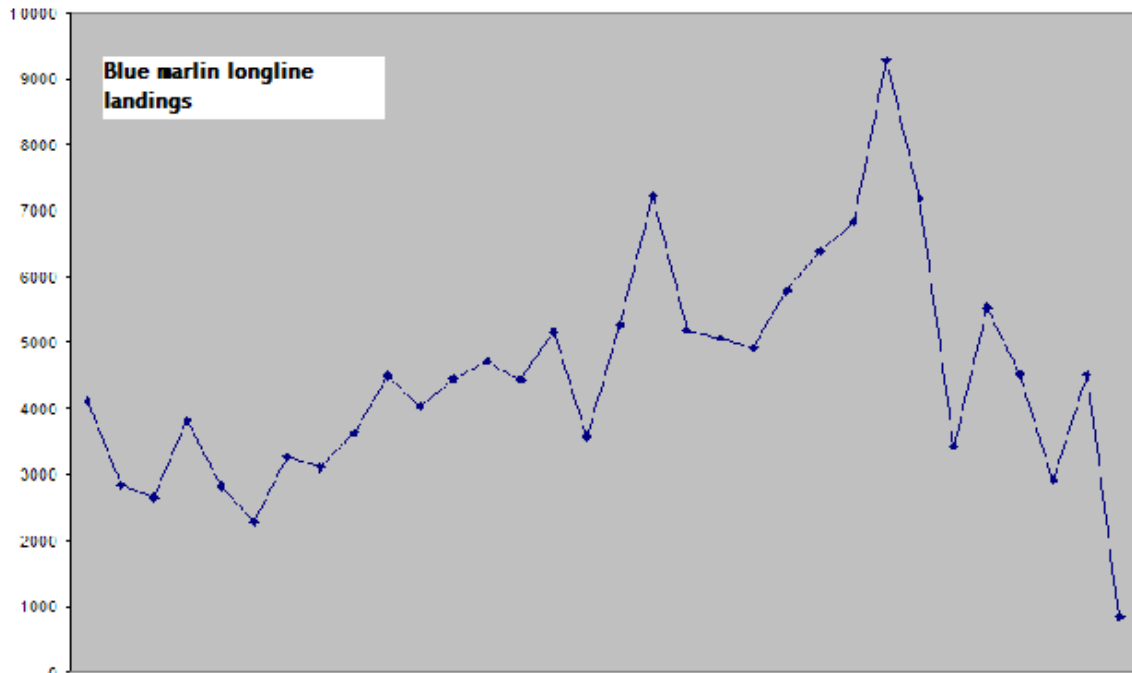


Figure 2. Blue marlin longline landings (metric tons) in tropical eastern Pacific; 1970 – 2003; Source: IATTC

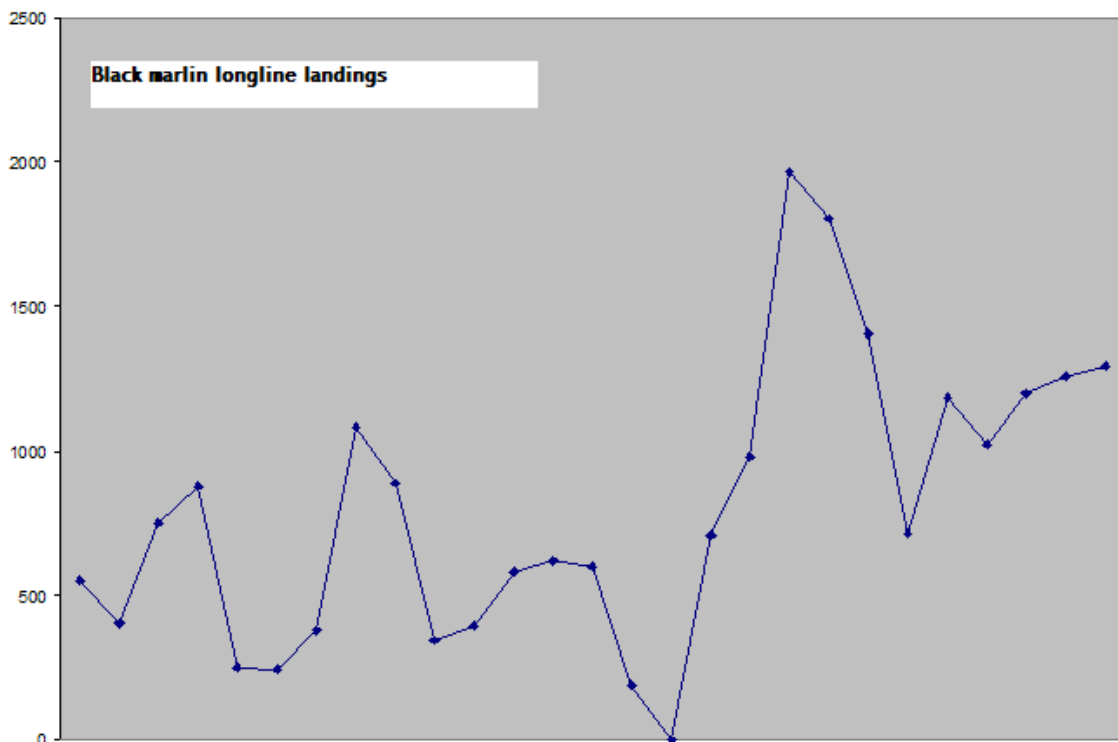


Figure 2. Black marlin longline landings (metric tons) in tropical eastern Pacific; 1970 – 2003; Source: IATTC

Two ongoing research efforts are yielding information which is useful in considering the management needs of striped marlin in Mexico. Southern California U.S.A. marks the northern limit for the species in the eastern Pacific. The striped marlin which migrate to that area in the late summer months are believed to come from Mexico. CPUE in the recreational fishery in southern California has declined consistently over the last 30 years (Nelson 2004). Figure 4 shows these historical trends from long term data sets maintained by angling clubs and a striped marlin tournament in southern California. All three data sets indicate a decline in numbers. Weight data taken from the Avalon Tuna Club shows a similar decline in annual average weight and the frequency of large (> 200 pounds) fish over the same 30 year period (Nelson 2004). Such declines in abundance and mean size of fish are singularly accurate indicators of overfishing (Dayton *et al* 2002).

Over the past three years detachable satellite transmitting tags have been placed on 146 striped marlin in the Pacific, with 115 of these placed on fish taken at Bahia Magdalena (Domeir 2004). These tags are programmed to remain attached to a fish for a predetermined period of time and then to release. Upon release the tags float to the surface and transmit via satellite information on the geographic and depth movements of the fish while tagged. Figure 5 shows the area

in which all 115 striped marlin tagged off Baja traveled during 1 to 289 days at liberty. The majority of the fish were at large for more than 90 days. No fish traveled further south than the Guatemala border. The fact that no fish were

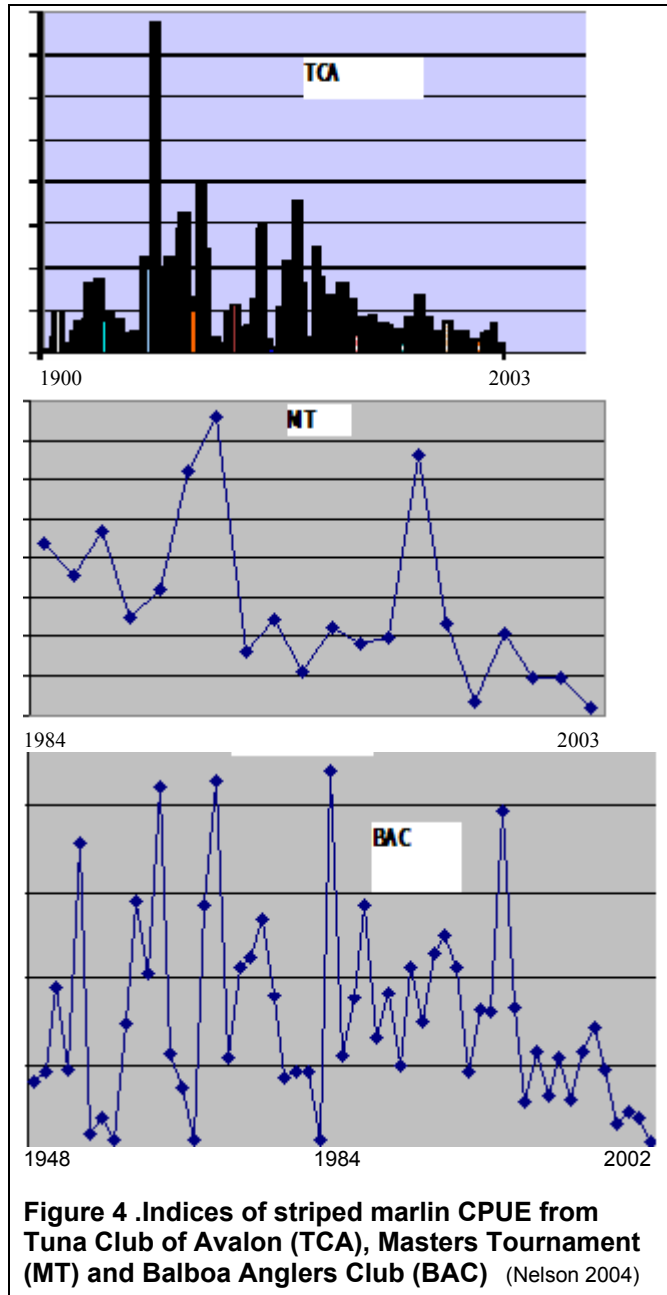


Figure 4 .Indices of striped marlin CPUE from Tuna Club of Avalon (TCA), Masters Tournament (MT) and Balboa Anglers Club (BAC) (Nelson 2004)

observed moving north to southern California is likely an artifact of the November and December tagging effort. Of five striped marlin tagged in Ecuador and one in Costa Rica no northward movement has been observed into the area utilized by the fish tagged off Mexico. Other tagging efforts in the western Pacific similarly reveal that striped marlin seem to generally form localized groups or stocks associated with major land masses (Domeir 2004).

We can conclude a few things from these two new pieces of information. The declining CPUE in southern California would be consistent with preliminary IATTC modeling results indicating an overfished northern stock of striped marlin in the eastern Pacific. The tagging data also seems to support the fact that there is a discreet stock of fish remaining north of Central America. While not absolutely conclusive this information does also support a cautious approach to managing striped marlin.

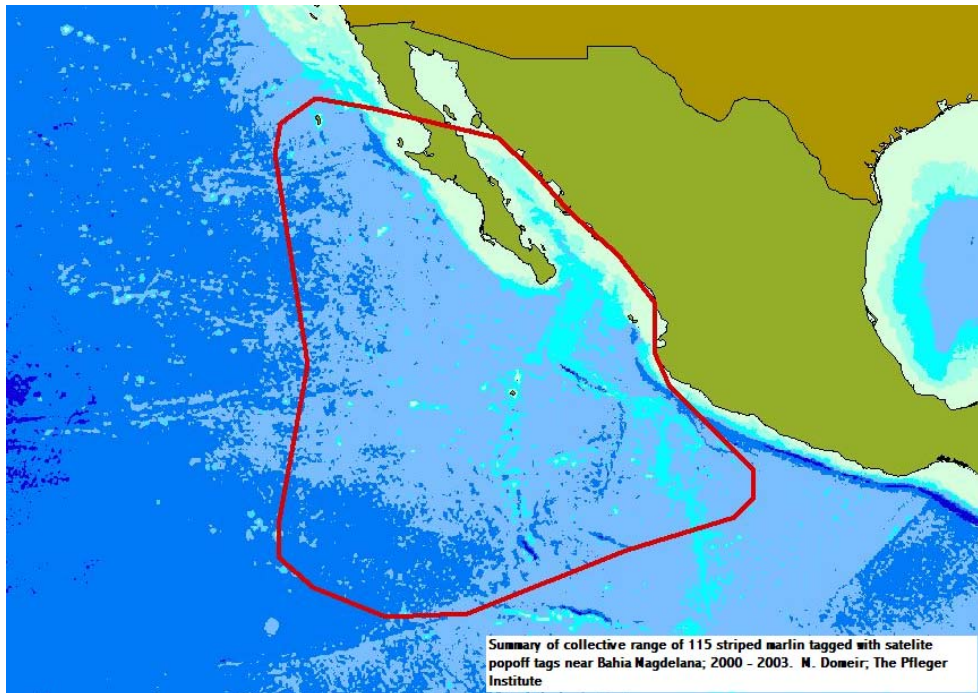


Figure 5.

The satellite tagging data is clearly conclusive of one point. The striped marlin which support Mexico's sport fisheries are almost entirely under the control of Mexican management. The fish do move far offshore, but seem to maintain a consistent latitudinal affinity with Mexico's northern and southern borders. Even the present 50 mile conservation zone serves to protect striped marlin in only a narrow part of their range off Mexico. Clearly the actions taken by Mexico will have the paramount impacts on the abundance of this group or stock of fish. The future health of this resource lies in Mexico's hands.

Status of the fisheries of the Sea of Cortez

Recently Sala *et al* (2004) have documented the shift in fisheries within the Sea of Cortez from large, long-live pelagic and demersal species to lower food web species of lesser commercial value (Figure 6). The declines they documented resulted from dramatic increases in fishing effort in the 1970s and early 1980s.

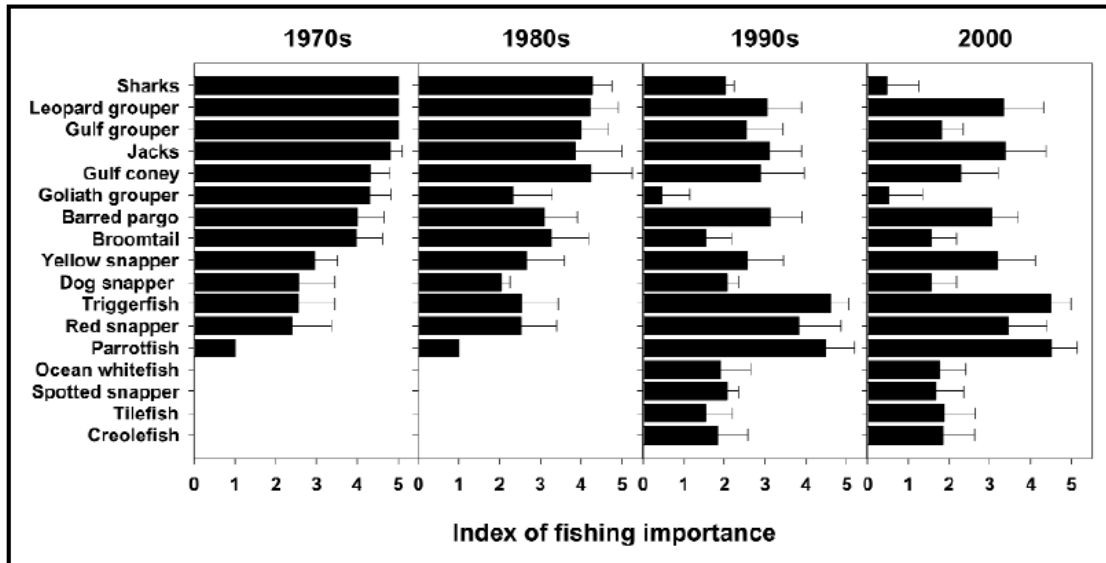
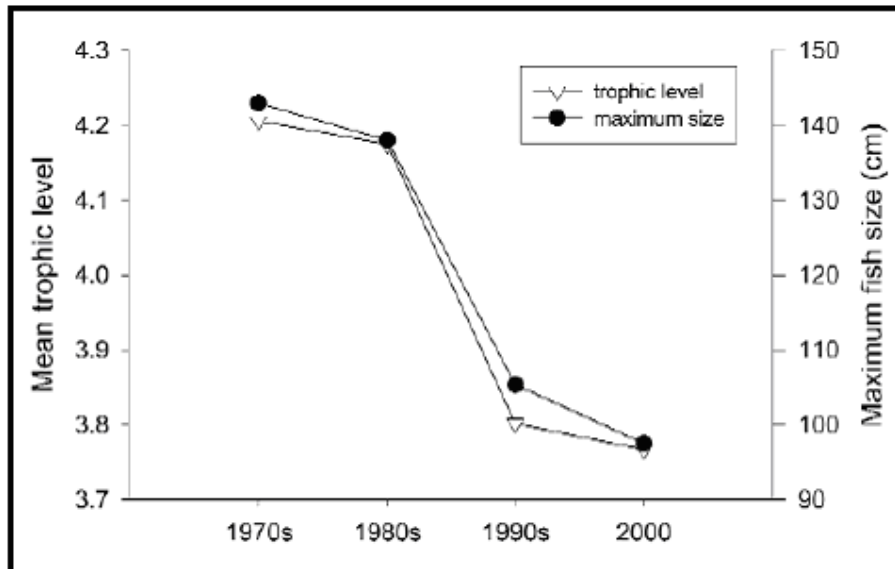


Figure 6. Shifts in Sea of Cortez catches from predator species to lower food web species. From Sala *et al* 2004.



Temporal changes in mean trophic level and maximum fish size of coastal fisheries landings in the southern Gulf of California.

Figure 7.

Figure 7 shows the shifts in catches by trophic level and size between 1970 and the present. This fishing down the food web phenomena has been described for other overfished ocean ecosystems around the world (Pauly *et al* 1998).

In documenting the general decline in trophic level and mean size in these fisheries the authors conclude: “*The overall patterns of species shifts, and decline of CPUE and mean trophic level indicate that coastal fisheries in the southern Gulf of California are unsustainable.*” The authors contend that immediate reductions in fishing effort and increased enforcement of existing regulations are needed to restore these stocks to sustainable levels. The trend in stock abundance seen here is the same as that seen for the previously described fisheries for marlin and other apex predators.

Conclusions

Although a lack of adequate fisheries dependent data precludes the use of most quantitative assessment techniques for the species of concern in Mexican Pacific waters, the overriding conclusion that can be drawn from the limited existing data is that further increases in fishing effort are ill advised. Further, if Mexico is to support sustainable production of commercial and sport fisheries in these waters, reductions in effort and fishing mortality will be necessary.

Clearly any actions taken to increase effort and mortality on these stocks will have negative consequences for the future of Mexico’s sport fishing fleets and the production of food. An expansion of effort within the historically protected 50 mile zones and Core Areas will increase the risk of collapse of these valuable resources.

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Attachment 1 follows: from R. Myers, Dalhousie University: A historical mapping of Japanese longline CPUE for billfish and tunas.