

Thoughts and notes on the Sea of Cortez Prepared for Sea Watch

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The Sea remains outwardly beautiful, fundamentally productive and under optimal management should be capable of providing ample harvests for domestic seafood consumption while maintaining very attractive opportunities for sport fishing and other ecotourism activities. However, as in other places around the world, the Sea of Cortez has been seriously overfished as increasing effort and gear efficiency have attempted to achieve maximum harvests in the face of stock biomass declines with little regard for future sustainability.

The escalation of gear types – from small pangas fishing handlines with multiple hooks or using spearguns to gill nets, trawls and longlines has been repeated in the U.S., the Caribbean and other insular ecosystems with productive reef or reef-like fisheries. As stocks decline in abundance and the distribution of fishes becomes sparse, fishers move to more efficient gears that can be deployed on larger scales of space and time. The impact of this race to efficiency is generally to stimulate further reductions in stock size, accelerate the use of more gear (longer lines or nets or ultimately fish traps) which fish broader areas over longer time periods and continue to push stocks to biomass lows from which recovery can be only achieved over very long time frames (if at all).

The reef fish complex

Abundant and healthy stocks of lutjanids, sparids and serranids (snappers, porgies, groupers) support healthy fisheries using minimal (i.e. hook-and-line type) gears. The evolution of most of the species in this complex has produced fishes that depend on long life spans and decades

of egg production to assure persistence in a fairly stable system subject to relatively little fluctuation and environmental perturbation. The introduction of high rates of fishing mortality into this system is a substantial perturbation and generally has been seen to cause fairly rapid (over periods of years) reductions in total standing stocks, switches in species dominance and - more importantly - the loss of larger fish (older age classes) which have evolved to supply the vast majority of the reproductive potential in the stock. For most of the species in this complex fishing mortality rates in excess of 8% to 18% annually are excessive and will ultimately cause stocks to decline to levels that will not produce maximum sustainable yields.

Given my cursory observations and discussions with persons who have a long history of experience in the Sea of Cortez, it appears to me that the extraction of reef fish stocks has produced dangerous, but perhaps not irreversible, levels of stock declines. Certainly the abundance of the larger reef predator (big snappers, groupers, jacks) has declined to levels that are unlikely to generate strong interest from sport fishing and tourists.

It is encouraging to note that, for a variety of factors, reef fish harvest has not yet begun to focus on the second-order predators and omnivores (small *serranids*, *haemulids*, *chaetodonts*, *pomacentrids*, *labrids*, *scarids*, etc.) like butterfly fish, damselfish, parrot fish, and other smaller species which provide much of the species diversity and which generate strong interest from diving tourists because of their visual appeal. In other reef systems around the world following the depletion of the larger, more valuable fishes harvests have ultimately shifted to these smaller species and have irreparably damaged both the aesthetic value of reefs to diving tourists and the functional integrity of the reef ecosystem long after the production of desirable fish species has approached zero.

The keynote gear introduction associated with harvest at this terminal level consists of fish traps and submerged

gillnets (or alternatively explosives and water-soluble poisons). This gear fishes 24 hours a day indiscriminately and is subject to loss and subsequent “ghost-fishing” for long periods of time. **Although banned in most managed reef fish fisheries, the use of scuba or hookah gear in conjunction with spearfishing can continue well into the terminal exploitation level as divers, often working at night, crop off the remaining larger omnivores, such as parrotfish. The introduction of fish traps or gillnets in the reef fish fishery of the Sea of Cortez would likely be final stage in a serial depletion which would leave the ecosystem with little appeal to tourism and little to offer in terms of sustainable fish production for domestic consumption.**

Pelagic fish stocks

The apex predators of the Sea of Cortez ecosystem appear to have declined to very low levels. The directed harvest and extraction of sharks has probably severely reduced these stocks in the Sea and a recovery program would require substantial reductions in fishing mortality over a period of decades.

The highly migratory species (marlin, sailfish, tunas) stock declines are likely more the product of indirect loss to pelagic gill net and longline gear deployed both within and around the Sea. **Current levels of abundance appear capable of supporting only a second-rate sport fishery within the Sea.** It is likely that bycatch mortality of these species has seriously reduced local abundance, but it is possible that stock reserves in the eastern tropical Pacific are sufficient to restore the abundance of these species within the Sea with more modest management efforts. **The most troubling aspect of the apparent change in these stocks is the apparent loss of larger fish from the population.**

If current Mexican regulations that establish a 50 mile sport fishing conservation zone and prevent the commercial harvest and sale of billfish were effectively enforced, and the use of longline and gill net gear in these waters was reduced substantially, the recovery of billfish and other non-shark highly migratory species stocks in the Sea could be seen within a time frame of a decade.

Continued excessive mortality – either direct or indirect – on the large pelagic predators could have substantial and possibly irreversible effects on the structure and functional capabilities of the Sea of Cortez ecosystem. Ultimately the loss of a major portion of this apex predator biomass could trigger a broad expansion in the biomass of ctenophores, jellyfishes, squid and small pelagic fishes (sardines, anchovies, etc.). A shift in the biomass dominance to these largely planktivorous (including fish eggs and larvae) species could effectively preclude any recovery to a state

which was similar to that of the Sea of Cortez thirty years ago.

Recommendations

1. Effective utilization of the potential productive potential of the Sea of Cortez should concentrate on low to moderate harvest levels for domestic consumption and an attempt to maximize the attractiveness of the Sea to low harvest level and non-consumptive sportfishing, diving and other ecotourism activities. Such an approach should maximize the total economic returns of the Sea to Mexico and the residents of Baja del Norte, Baja Del Sur, Sinaloa and Sonora. The Sea can likely not survive high levels of commercial effort and fishing mortality associated with the use of longlines, gill nets and large purse seines.
2. Effective management will require effort reduction (limited entry programs) and gear restrictions in all the commercial fisheries. These measures will be socially unpopular and have short-term negative economic consequences. However, the potential long-term economic and social advantages are substantial.
3. The careful development of recreational fishing, diving, whale watching, bird watching and other low ecosystem impact activities can be used to create a new economic base and ameliorate the impacts of restrictions in commercial fishing necessary to achieve recoveries of fish stocks to high levels of abundance. Conversion of current commercial harvesting resources to use in the ecotourism industry should be a priority.
4. **I would strongly suggest that the use of fish traps, gillnets and scuba or hookah assisted spearfishing be prohibited in the Sea of Cortez (if not all of Mexico) now.** Such action now would generate relatively little negative social or economic impact and will prevent a tragic problem from

arising. After fish trap fisheries developed in Florida, The U.S. South Atlantic and Gulf of Mexico EEZ, Bermuda and other jurisdictions action was required to prohibit them.

5. The Loreto National Marine Park might provide an effective portion of an overall fisheries management strategy, but at present it's effectiveness is questionable. A comprehensive review of the goals and objectives of the Park in the context of current management regulations and standards should be undertaken. The problem of enforcement in the Park (as elsewhere in Mexico's marine waters) needs to be addressed and effectiveness improved. The enforcement of recreational bag limits seems minimal and needs to be improved. Regulations should be reviewed to attempt to achieve maximum compliance and enforceability. Ultimately the use of marine parks will not compensate for a lack of effective conservation and management in the surrounding waters.
6. Effective management needs good data. Current information on catch and effort by area and gear type is very limited. A program for collecting and analyzing such data from both the recreational and commercial sectors is needed.
7. Licensing of recreational anglers and securing a permit to visit and use the Loreto Marine Park is a complicated and byzantine process that can consume the most part of a day. Mexico should look to simplifying this process. In my opinion there is a great loss of revenue to Mexico from anglers who either choose to fish without a license or decide not to visit and fish in Mexico because of the difficulty in obtaining a fishing license. The use of telephone or online website licensing services should be adopted. Funds derived from these licenses would be maximized if it were simple an easy for a tourist to order and receive a license prior to entering Mexico.

Moving towards these recommendations

1. Develop public educational materials (video, write, etc) which clearly show (and magnify) the negative consequences of the use of large scale longline and gill net gear on marine life.
2. **Seek legislation or regulations prohibiting fish traps, gill nets and air assisted spearfishing. Be careful not to allow any “experimental” permitting of such gear after a ban is in place**
3. Attempt to develop an accurate inventory of commercial vessels and gear types fishing in the Sea. This should involve the use of official PESCO permit and license databases as well as attempts to do independent surveys of vessels at the numerous ports, villages and fish camps surrounding the Sea. This data would be invaluable for use in detailing the problems associated with effort expansion and overfishing.
4. Compile an historical review of the scientific and popular work and descriptive literature on the Sea of Cortez. Such written information dates back at least 50 years. This could serve to show that there has been a consistent history of concern over the potential impacts of expanded commercial fishing and that these concerns have been proven accurate by the history that followed.
5. Support a substantive effort to develop policy and management strategies for utilizing the Sea of Cortez in a fashion that will both provide sound economic benefits to Mexico and provide for a healthy and sustainable ecosystem. Such action

might be initiated at the state level (i.e. Baja California Sur).

6. Use the results of this policy initiative to develop a “model fisheries management plan” for the Sea. Utilize this plan to persuade PESCO, Congress, etc. that there is a better way to use the Sea of Cortez.
7. Attempt to increase the political recognition of the importance of sport fishing, ecotourism, etc. to Mexico’s growing tourism economy. Seek to forge alliances outside the traditional fisheries and conservation realms with tourism (Mexico’s Secretary of Tourism) and Chamber of Commerce-type entities.

The single most important effort to achieve recovery of fish stocks and a general conservation plan for the Sea of Cortez will be to continue to try to document and publicize the problems facing this **Mexican national treasure**. Current Sea Watch efforts in this regard must continue and will ultimately serve as the foundation for unified efforts to restore the Sea to its original state.