Tidal Fisheries Advisory Commission
March 17, 2011
By-Catch and Fisheries Habitat

The Terrapin Institute requests guidance and support from the Tidal Fisheries Advisory Commission in mitigating fisheries by-catch mortality and shoreline habitat destruction. Most of the following reference materials relate to diamondback terrapins, but transfer to the broader conservation context, other species and the industry. Considering the expertise within the TFAC, we felt it would be unnecessary to present the historical reference, photographs and scientific data as evidence of the problem. Rather, in order to allow sufficient time for counsel from the Commissioners, our remarks are limited to a brief overview, a few cases to illustrate our concerns, and some suggestions to inspire feed back and further consideration. Unless otherwise referenced, the information presented is based on first hand experience and may not reflect the entire fishing industry in Maryland. Please forgive and correct any information that may be incomplete or inaccurate. The reports and other documents referenced herein are available. We hope to leave with a commitment from the TFAC and a motion to adopt a strategy of resolving by-catch and habitat destruction. We would also appreciate your opinion on the future of terrapin conservation in the fisheries management context.

By-catch Mortality

The impact of fishing gear on aquatic resources and non-targeted species is undeniable. Unattended submerged fishing gears such as fyke nets and crab pots are lethal to air-breathing animals. Pound nets and bank traps are not fully submerged, but hold aquatic species in concentrated conditions for extended periods. If not tended frequently, animals trapped in these gears feed off each other, die from heat stress, and succumb to low oxygen levels. According to a 2009 DNR Wildlife and Heritage Service Progress Report to the U. S. Fish and Wildlife Service[1], the primary conservation issue for terrapins is "bycatch in commercial and recreational fishing gear". Another report entitled RECOMMENDATIONS OF THE MD DIAMONDBACK TERRAPIN WORK GROUP TO MD DNR CONCERNING TERRAPIN BYCATCH FROM COMMERCIAL & RECREATIONAL FISHERIES[2] March 2009 describes the range of by-catch sources and offers methods to mitigate mortality. By-catch mortality is clearly an obligation of the DNR and within the purview of the Fisheries Service and TFAC.[3] Since 2007 DNR has appointed the Wildlife and Heritage as the lead agency for terrapins, but has assured that both Fisheries and Wildlife will work together.[4] In the last ten years, over $1.5 million in State and Federal funds[5] have been allocated to study terrapins and educate the public about terrapins, yet the primary conservation issue, i.e. by-catch, has not been addressed.

Crab Pots – The scientific literature is replete with documentation of by-catch mortality caused by crab pots. Maryland recognized by-catch in crab pots in the 1940s and has partially addressed the problem by limiting commercial pots to deeper areas of the Bay. Since 1999, crab pots used by waterfront residents are required to have by-catch reduction devices. These devices are attached to the entry funnels and may actually improve crab retention, but do not exclude all terrapins. Where commercial pots are used in shallow waters along the Bay proper and in the sounds, terrapins and other air-breathing species are vulnerable and no doubt a nuisance to crabbers. When pots become full of dead terrapins, they literally float away. Enforcement of the by-catch reduction measures and area limits is challenging, but DNR police citations demonstrate continued monitoring of crab pot use. The actual fishing pressure from non-commercial crab pots appears to be unknown and therefore difficult to factor in crab harvest forecasts. **In light of unstable blue crab populations and lack of compliance by waterfront owners, it may be best to prohibit the use of crab pots for non-commercial purposes and thereby address both by-catch and latent effort in the crab fishery.[6] The establishment of "gear free" sanctuaries could also be implemented as a trade off for additional oyster areas.**

Fyke Nets – According to a 1903 New York Times report,[7] the fyke net was invented by the terrapin industry and warned that terrapins drown in fyke nets, particularly in warm months. Earlier industry

reports indicate that fyke nets were used in Eastern, Western and Great Lakes fisheries. Fyke nets remain a traditional gear used commercially to harvest turtles and finfish and in research to collect various aquatic species. In research these nets typically include floats to provide air space and are emptied frequently, but depending on the rate and weight of capture may sink. Fyke nets used for commercial fisheries in navigable waters rest on the bottom and are set fully submerged, held open with anchors at both ends and marked with surface buoys. Adding floats to commercial fyke nets would not resolve by-catch mortality. There are three science-based papers documenting fyke net by-catch mortality,[8] one of which suggests a means by which non-targeted species could be excluded from entering the net.

Despite the closure of Maryland's terrapin fishery in 2007, the primary gear once used to harvest terrapins[9] continues to be used to harvest snapping turtles and finfish. Obviously, if fyke nets are set near terrapin populations when terrapins are active they will trap terrapins. The greater concern may be a general lack of awareness and understanding of the fyke net fishery by researchers and managers, which may impede adequate or acceptable management measures.[10]

There are accounts, typically in the Spring, of hundreds of dead terrapins floating at the surface.[11] On occasion, these animals have washed ashore causing fears of disease or some other ecological hazard.[12] Given the timing and the condition of the animals, these fleeting events of mass terrapin die-off are attributed to drowning and are easily explained.[13] Fyke nets can be difficult to reach in winter and buoys can be lost in ice flow, but harvesters drag to recover the nets. During the colder months, terrapins and other aquatic species may be capable of surviving in submerged nets. As waters warm above 42 degrees, terrapins become active and need to breath. If not released in time, they die and sink. As temperatures increase, dead terrapins decompose and float briefly on the surface. A bloated carcass expands to the point of breaking the shell leaving only a collection of bone fragments to sink again. Except for those that wash ashore, there are few witnesses and little verification of the number of terrapins that drown as by-catch and discards.

An incident in April 2006 provided graphic evidence of the mortality caused in poorly tended fyke nets and should have inspired further regulations.[14] The U.S. Fish and Wildlife Service discovered four fyke nets floating and crammed with over 200 dead terrapins and snapping turtles. The incident was reported to the DNR police and in the local paper, but the only citation that could be issued was failure to properly identify the nets. As reported in the press account,[15] this incident was deemed an accident and failure to monitor or remove the nets was not a violation. It is possible that such unfortunate accidents occur elsewhere and are not documented. In 2006, terrapins were fair game and apparently the waste was considered insignificant because the turtles would have been killed anyway once harvested. However, if a similar situation were discovered today, it is unclear what penalties would be assigned. Terrapins are listed as a Protected Species in the Fisheries Point System, but there appears to be no requirement for proper tending of fyke nets and few limits to where or when these nets may be set.

Laws and regulations governing fyke nets are difficult to interpret, i.e. may not be used to harvest blue crabs and are restricted in certain yellow perch tributaries. However, DNR harvest data indicates that fyke nets are used year round and throughout the tidewater. Clearly, this creates a management dilemma and enforcement problems. Anecdotal information suggests that crab harvesters may be resorting to fyke nets or fish pots in tidal tributaries as a means to circumvent the crab pot prohibition. Additional requirements are necessary for these nets to be monitored, properly tended, or removed. This may be the rationale behind the 2011 House Bill 111 requested by DNR. Any regulations proposed must consider the full slate of unintended consequence. Apparently, while crab harvesters are prohibited from harvesting the blue crab by-catch caught in fyke nets, they are allowed to harvest up to two bushels per day of the blue crab by-catch caught in pound nets. Such an allowance only shifts the by-catch from one gear to another and creates another unfair advantage to crabbers in areas where pound nets are prohibited. **As soon as possible, DNR must adopt regulations for proper use, monitoring intervals, and time restrictions of fyke nets. If harvesters cannot check these nets frequently, then they should not be set.**

Bank Traps – Poorly tended bank traps filled with dead or dying animals may be the main reason this gear is restricted to a few areas. Where they are permitted, bank traps are set close to the shore in prime terrapin habitat and trap terrapins and other air-breathing animals. If not tended daily, particularly during periods of high water temperatures, the non-targeted species trapped in bank traps become exhausted and are eaten alive by the blue crabs, thus creating a self-baiting device.

Pound Nets – Pound nets are indiscriminate, but reasonably innocuous as a means of harvesting when properly tended. They have been known to capture sea turtles and seabirds and were a primary gear in harvesting terrapins. In 2003, residents observed an unattended pound net in which over three hundred terrapins remained trapped during nesting season. Over a three-week period the owner of the net remained unaccountable while the net continued to capture birds, blue crabs, horseshoe crabs, and fish. Apparently, there were no laws or regulations in place to allow for emptying or removal of the net. This type of situation could have escalated in conflicts between the net owner and the adjacent property owner. Given the potential for conflict, preventive measures should be considered. **Regulations should be adopted that would provide lower escape vents as required in the Potomac River. Other measures should be considered to allow for unattended nets to be opened by proper authorities after a 48 hour time period and/or removed after 72 hours.**

Power Dredging – Dredging was a traditional means of harvesting terrapins in the winter. The terrapin drag is similar to an oyster dredge, but without the teeth.[16] By 1998, there were only a few terrapin harvesters that used this method. Through legislative measures, power dredging for oysters was reinstituted in certain areas and has expanded steadily from 2001 displacing hand tong (75% in 1990) as the primary oyster gear.[17] From 2006 to 2010, power dredge permits doubled to over 660 and the majority (59%) of the oyster harvest was by power dredge, 29% from patent tong, and 4% from hand tong.

The correlation between expanded power dredging and terrapin, crab, and other by-catch has not been proven to the satisfaction of authorities. However, in 2003/2004/2005 as the expansion of power dredging grew, terrapins were readily available on the market during winter months. In January, terrapins are typically dormant somewhere on the bottom of tidal tributaries and would not be swimming into nets. It seems reasonable to suggest that once power dredging became widespread, terrapins and other bottom dwelling species may have become a casualty.[18]

Now that the terrapin fishery has been closed, there is no incentive for power dredgers to collect the by-catch. However, it is possible that terrapin hibernation sites continue to be impacted in the process of power dredging. According to Wildlife regulations 08.03.11.09, adopted in 2010, **"B. A person may not destroy or alter dens, burrows, basking sites, nests, hibernating sites, or other places of refuge of reptiles and amphibians."** If fully implemented, this regulation could have implications for both the oyster industry and shoreline property owners. Although a Florida study confirmed that terrapins utilize oyster beds[19], the extent to which terrapins in Maryland hibernate near oyster beds is unknown. The recently expanded oyster sanctuaries may provide additional protection for terrapins. **At the very least, efforts to enhance oyster populations, such as bar-cleaning and aquaculture should consider the larger ecosystem of submerged lands. The re-suspension of sediments may have consequences for other aquatic organisms and water quality. Shell materials from other shellfish, i.e. clams, provide a vital source of hard structure and calcium and may be an alternative component in restoring oyster substrate and maintaining shorelines.**

Shoreline Habitat Destruction

Land development and habitat destruction is cited as the primary cause for the degradation of our fisheries resources and demise of the commercial fishing industry. The 2009 DNR Progress Report to the U.S. Fish and Wildlife Service states that *"habitat loss, degradation, and fragmentation by shoreline development activities"* is the second most crucial conservation issue for diamondback terrapins. Property rights being what they are, the extent to which the TFAC can address growth and

land development is inherently limited. However, given the State's heightened commitment to preserve its fishing heritage, we believe the TFAC would have significant influence in limiting encroachment into the public domain and displacement of essential fish habitat in the Chesapeake Bay and tidewater tributaries.

Almost every permit issued to control shoreline erosion on private land requires a forfeiture of the public domain and fishable area.[20] Waterfront property owners are eligible to encroach up to 35 feet channel-ward. More extensive encroachments are considered by management authorities and typically referred to the Board of Public Works for further review. With each encroachment into the channel, the public and those who once harvested these areas are pushed further off shore.

In the attached photographs from 2005[21], the property owner was permitted to encroach 270 feet into the channel and by ***de facto*** adverse possession acquired additional waterfront property. As an immediate consequence, the navigation channel is reduced and fisheries habitat is eliminated. The stone required to encompass the area precludes public access, displaces shallow water habitat, and presents a by-catch hazard in the voids between the stone. The secondary consequences are less obvious and may not appear for several years later. One possibility is that the shoreline silts that once maintained the beaches across the embayment are no longer available and the relative stability or equilibrium of this subsystem is forever changed.

In another example, not yet approved, neighboring property owners have presented compelling evidence that the property is not eroding and does not require the degree of protection proposed by the new owner. Up until 2008, there were virtually no fees assigned to property owners for encroachments into the public domain. Delegate Ron George reintroduced the Wetlands Fee Bill, which was adopted and has since contributed several million dollars to the State. Unfortunately, fees are not assessed for all encroachments, such as those designed as "living shorelines". **As a means to protect against continued encroachment and adverse possession of the public domain, the TFAC could respond to such proposals on a case-by-case basis and/or seek remedy through the legislature to limit such encroachments.**

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[1] Progress report 2009
[2] Draft By-Catch Report March 2009
[3] Title 4, Fish and Fisheries, 4-903 and website information on ecosystem based fishery management
[4] Letters from John Griffin and Kristin Saunders 2010
[5] Partial accounting of federal and state funds from USACE, USGS, DNR
[6] Recommendation of the Terrapin Workgroup and suggestion to Fisheries Service
[7] Copy of NYT article
[8] Reports on Fyke Net By-Catch
[9] DNR commissioned report 1987 - 1990
[10] Recommendations from researchers, DNR 2009 by-catch report
[11] from a terrapin harvester, 1998
[12] recovered terrapins 1999 - 2001
[13] according to commercial fishery participants in Eastern Bay
[14] USFWS photographs
[15] article from Star Democrat, 2006
[16] Photo of terrapin drag
[17] DNR report % of Oyster Harvest by Gear Type
[18] photos of harvested terrapins, 2004/2005
[19] Florida Study
[20] Mind Over Matter, 2002
[21] Shoreline shuffle


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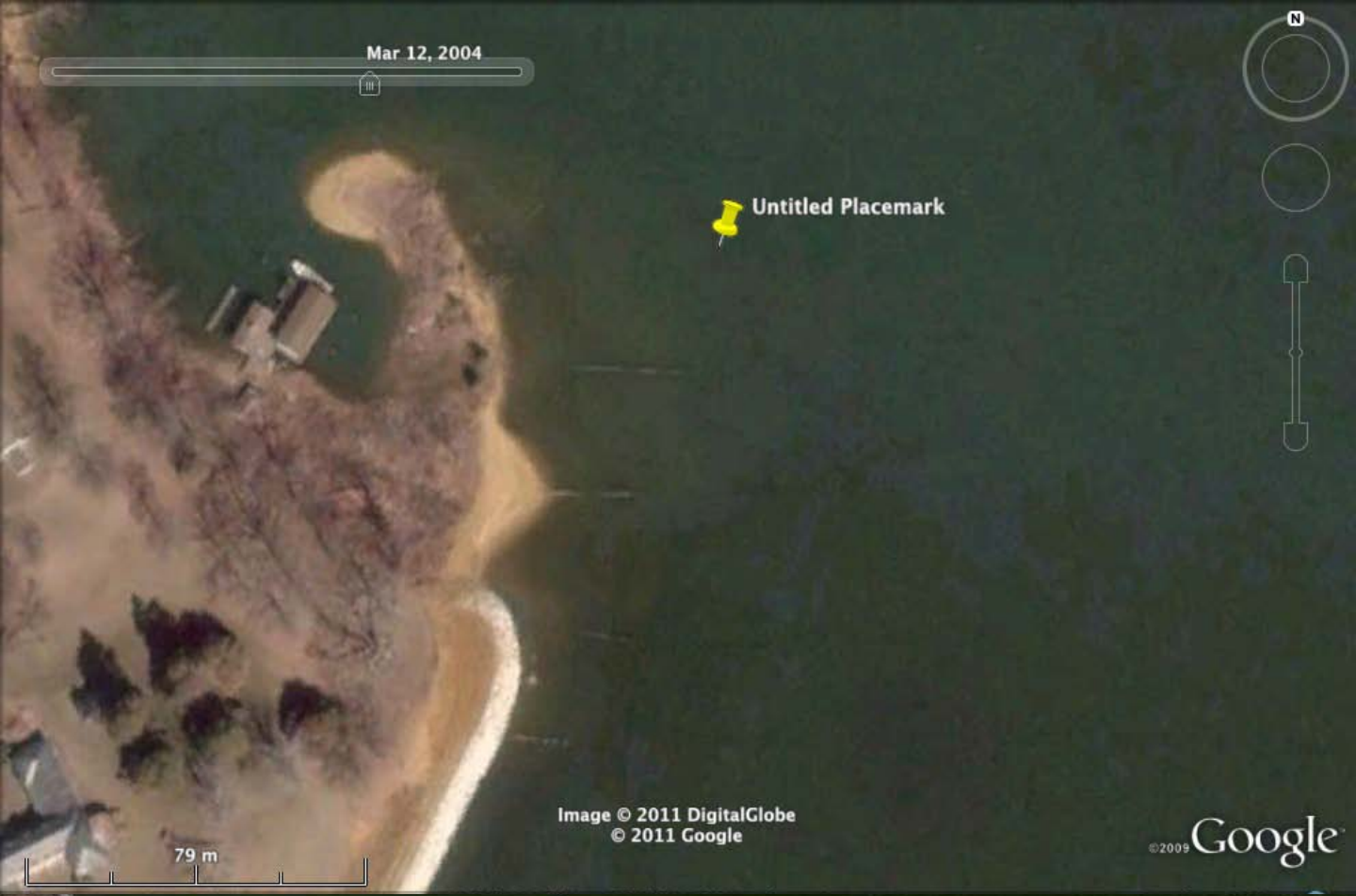
Mar 12, 2004
Untitled Placemark
Image © 2011 DigitalGlobe
© 2011 Google
79 m
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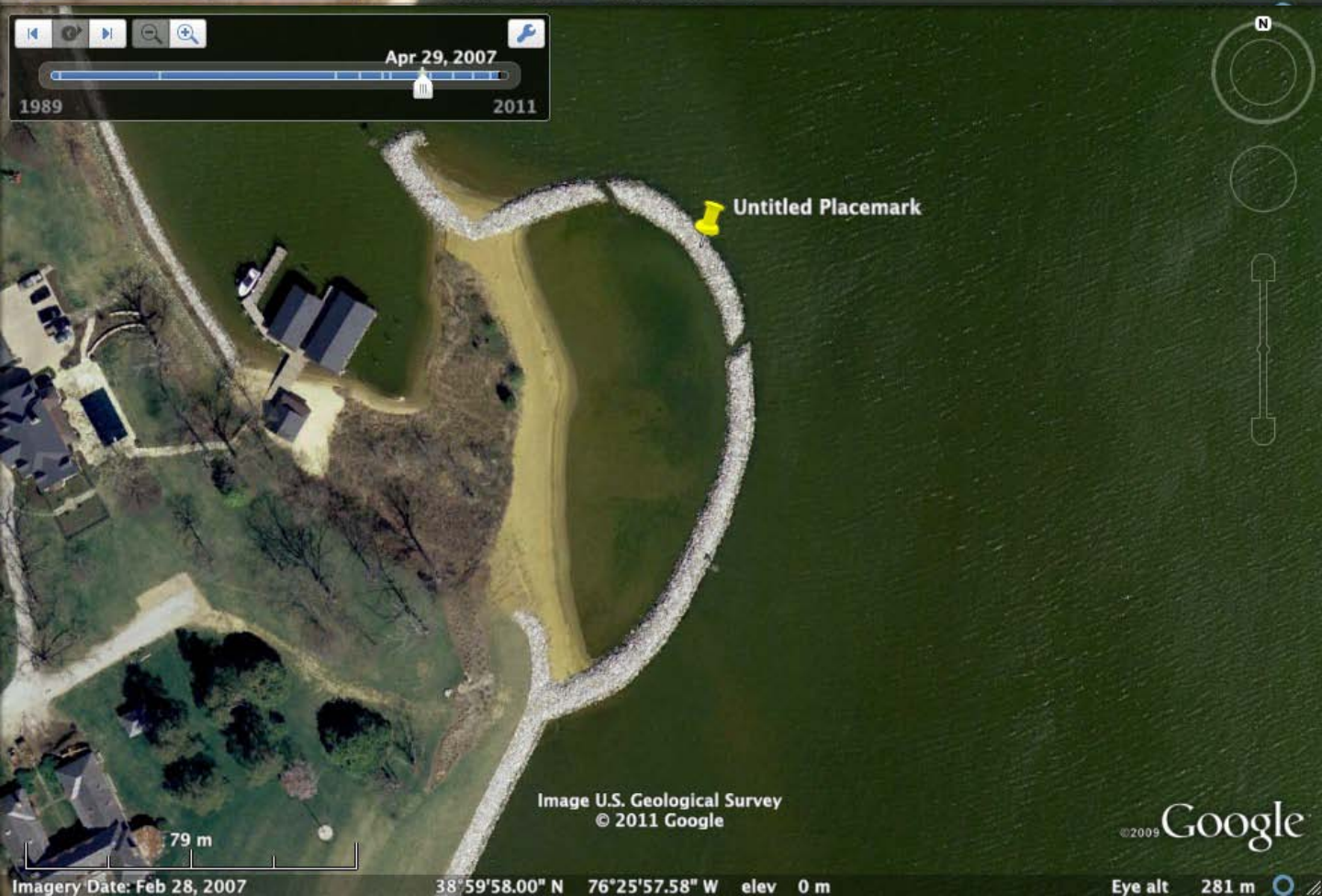
Apr 29, 2007
1989
2011
Untitled Placemark
Image U.S. Geological Survey
© 2011 Google
79 m
©2009 Google
Imagery Date: Feb 28, 2007
38°59'58.00" N
76°25'57.58" W
elev 0 m
Eye alt 281 m


Mar 12, 2004
N
Whitehall Rd
Sharps Point Rd
Holly Beach Farm Rd
305 m
© 2011 Google
Image © 2011 DigitalGlobe
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N
Whitehall Rd
Sharps Point Rd
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© 2011 Google
©2009 Google
Imagery Date: Aug 30, 2010
39°00'02.08" N
76°25'45.22" W
elev 0 m
Eye alt 1.07 km

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- Statute: TITLE 4. Fish and Fisheries.
- 4-101. Definitions. (j) Fish.-“Fish” means finfish, crustaceans, mollusks, and amphibians and reptiles which spend the majority of their life cycle in water and any, egg, offspring, or dead body of any of these species.
- 4-402 Responsibility of Secretary – In General. The Secretary is responsible for conservation management of the fish, fisheries, fish resources and aquatic life within the State.
- 4-903 Regulations pertaining to diamondback terrapin conservation. The Department shall adopt regulations governing the conservation of diamondback terrapin.
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- Regulation: TITLE 08 Department of Natural Resources, Subtitle 02 Fisheries Service.
- Specific Fisheries regulations pertaining to diamondback terrapin 08.02.06.02 repealed June 28, 2010. Reference to terrapin remain under Fisheries regulations 08.02.01.02, 08.02.03.07, 08.02.09.01
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- Mission: The mission of the Fisheries Service is to:
- Develop a management framework for the conservation and equitable use of fishery resources
- Manage fisheries in balance with the ecosystem for present and future generations
- Monitor and assess the status and trends of fisheries resources
- Provide high quality, diverse, accessible fishing opportunities
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- Policy: Ecosystem Based Fisheries Management: “will also identify and quantify key predator and prey relationships and interactions to the extent possible. Interactions include estimates of total removals by commercial, recreational, and charter boat fisheries (including bycatch and discards).”