
Atlantic and Gulf of Mexico Coastal Pelagic Fisheries



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Unit 7

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INTRODUCTION

Coastal pelagic species of the U.S. Atlantic Ocean and Gulf of Mexico include king mackerel, Spanish mackerel, dolphinfish, cobia, and cero. The mackerels typically occur in tropical, subtropical, and temperate waters at depths from 20 to 150 feet. King mackerel are distributed throughout the western Atlantic from New England south to Brazil, while Spanish mackerel are generally found north of the Yucatan peninsula in Mexico. Cobia and dolphinfish are broadly distributed in tropical to warm-temperate waters of the Atlantic, Pacific and Indian Oceans. In the western North Atlantic, cobia range from Nova Scotia south to Argentina, including the Caribbean Sea. Dolphinfish share a similar distribution from New England south to Brazil. During autumn and winter months, cobia

migrate southward and offshore, seeking warmer waters. In early spring, the population moves northward and inshore along the U.S. Atlantic coast.

Coastal pelagic species share a suite of typical adaptations. They are generally fast-swimming predatory fishes that school, feed voraciously, grow rapidly, mature early, and spawn over an extended period of several months.

Most coastal pelagic species are highly valued and sought-after gamefish. During 1984–2006, recreational fishermen landed between 7,200 and 19,000 metric tons (t) of coastal pelagics each year (Figure 7-1). Annually, king and Spanish mackerel accounted for 36–61% of all coastal pelagic recreational harvests. In addition to king and Spanish mackerel, dolphinfish and cobia contributed significantly to the total recreational yield of coastal pelagics.

Photo above:
Retrieving a dolphinfish
hooked on a recreational
squid jig.

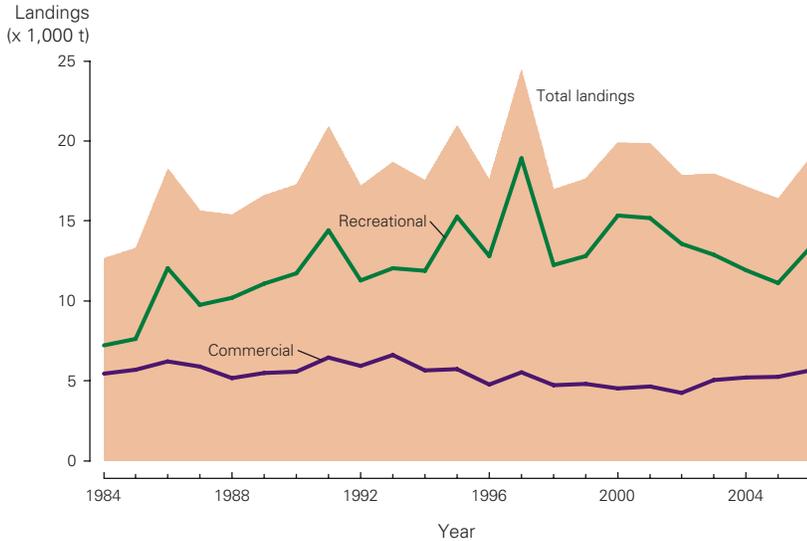


Figure 7-1
Total landings in metric tons (t) by fisheries sector of coastal pelagic stocks, 1984–2006.

Commercial landings of coastal pelagic species oscillated between 4,200 and 6,600 t per year during 1984–2006 (Figure 7-1). Landings were primarily of king and Spanish mackerels (80% on average). Cobia are caught incidentally on some commercial trips targeting mackerels, but these landings are restricted to two fish per trip. Cero are of minor commercial importance since they are typically non-schooling and are difficult to target in commercially relevant densities.

Coastal pelagic species under the Coastal Migratory Pelagic Resources Fishery Management Plan (FMP) are co-managed by the South Atlantic Fishery Management Council (SAFMC) and the Gulf of Mexico Fishery Management

Council (GMFMC). Management regulations have included annual total allowable catches (TAC's), minimum size restrictions, and creel limits. For king and Spanish mackerel, the Councils recognize two separate migratory groups: the Gulf of Mexico group managed by the GMFMC, and the Atlantic group managed by the SAFMC. The management process begins with SouthEast Data, Assessment, and Review (SEDAR) assessments that recommend Acceptable Biological Catches (ABC's) for each migratory group. The Councils then choose annual TAC's, with separate commercial and recreational allocations. The TAC set for the Gulf migratory group is further divided into separate sub-regions within the Gulf (e.g. eastern and western). Quota management of coastal pelagic species began in 1985. Presently, both commercial and charter boat operators must hold current Federal fishing permits for king mackerel, Spanish mackerel, and other coastal pelagic species. In addition to quota limits, commercial catches must comply with minimum size restrictions; daily landing limits and/or trip limits in Florida and North Carolina may also apply. Since 1998, NMFS requires mandatory reporting through logbooks for all commercial king mackerel fishing trips.

SPECIES AND STATUS

Some species in the coastal pelagics group are currently being fished near or at the maximum sustainable yield (MSY) production levels (Table 7-1). The Gulf king mackerel stock was considered

Table 7-1
Productivity in metric tons (t) and status of coastal pelagic fishes in the U.S. Atlantic Ocean and Gulf of Mexico.

Species/stock	Recent average yield (RAY) ¹	Current yield (CY)	Sustainable yield (MSY)	Stock level relative to B_{MSY}	Harvest rate	Stock status
Cobia	1,097	972	659 (Gulf)	Unknown	Not overfishing	Not overfished
Dolphinfish	5,451	5,770	Unknown	Unknown	Not overfishing	Not overfished
King mackerel						
Atlantic group	2,415	2,676	2,308	Near	Not overfishing	Not overfished
Gulf group ²	4,434	5,301	5,183	Below	Not overfishing	Rebuilding
Spanish mackerel						
Atlantic group	2,313	2,250	Unknown	Unknown	Not overfishing	Not overfished
Gulf group	1,772	1,990	Unknown	Unknown	Not overfishing	Not overfished
Total	17,482	18,959				

¹2004–06 average. Includes recreational landings.

²Stock status is classified as rebuilding because in the most recent stock assessment (2004), the stock abundance was above the overfished threshold but still had not reached the target biomass level of MSY.

overfished until recently because of prior overexploitation and has been under a rebuilding program since 1985. According to the most recent stock assessment in 2004, MSY was estimated at 5,183 t for the Gulf king mackerel stock and 2,308 t for the Atlantic king mackerel stock. Current yields (2006) were above the MSY estimates, 5,301 t in the Gulf and 2.676 t in the Atlantic.

The king mackerel stocks of the Gulf of Mexico and Atlantic migratory groups are managed using 1) a maximum fishing mortality threshold (MFMT) of $F_{30\%} \text{SPR}^1$ and 2) a minimum spawning stock threshold (MSST) of 80% of B_{MSY} . By definition, overfishing is occurring if the current median estimated harvesting rate (F) is above MFMT, and the stock is considered overfished if the current biomass is below the MSST levels. According to the 2004 assessment, the king and Spanish mackerel stocks are not experiencing overfishing. The Councils have also defined target (MSY) and optimal yield (OY) levels for these stocks. In the case of Atlantic king mackerel, OY is defined as the yield at $F_{40\%} \text{SPR}$, while a value of yield at 85% F_{MSY} is used for Gulf king mackerel.

Spanish Mackerel

Both U.S. and Mexican fishermen have commercially exploited Spanish mackerel since the 1850's. Initially, the U.S. fishery was located off the northeastern United States, but over time, it shifted southward to the U.S. South Atlantic and Gulf of Mexico. By 2006, over 70% of the commercial catch was landed off Florida. During the early years, most Spanish mackerel were harvested using hook-and-line gear. Later, gillnets became the dominant gear, and accounted for the majority of the landings. However, in 1996 gillnets were banned in Florida state waters which substantially reduced the total commercial catch of Spanish and king mackerel, particularly on the West Florida coast where state waters extend up to 9 n.mi. offshore.

Spanish mackerel are highly valued recreational

¹The spawning potential ratio (SPR) is the amount of reproductive output produced by an average recruit in a fished stock, divided by the reproductive output produced by an average recruit in an unfished stock. $F_{30\%}$ is the fishing mortality rate expected to produce 30% SPR.

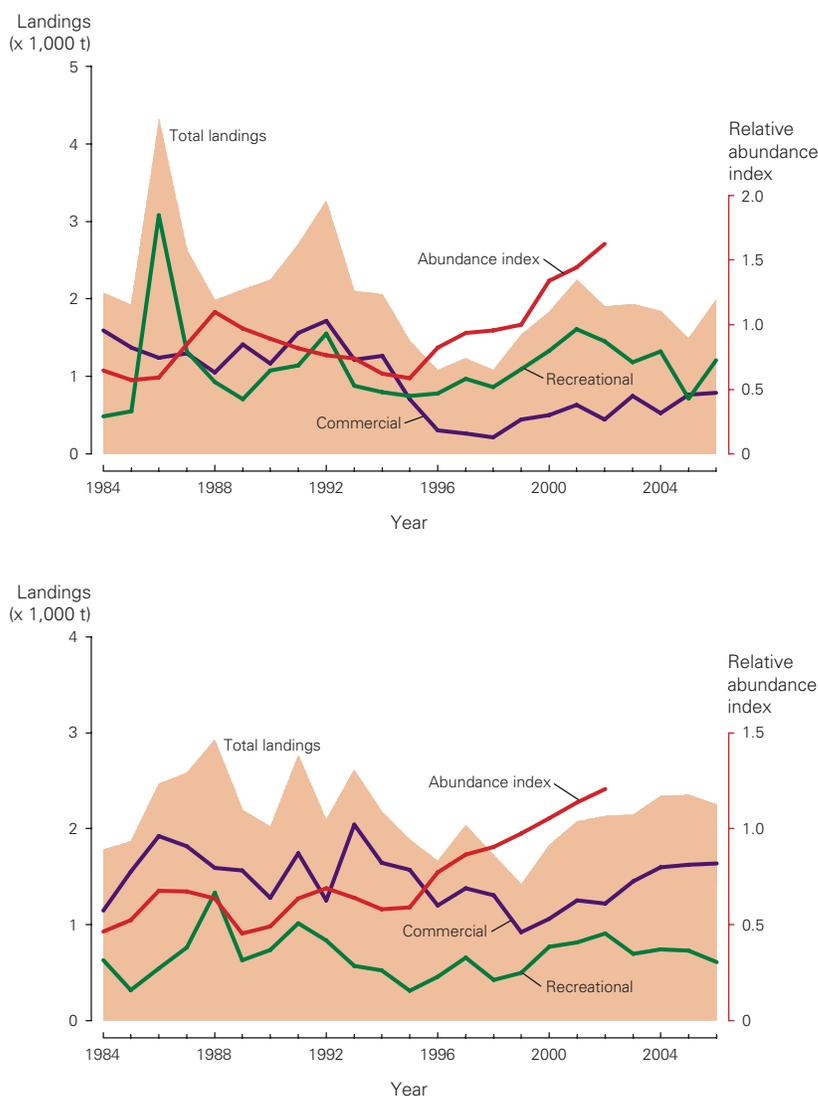


Figure 7-2

Landings in metric tons (t) and relative spawning stock size of Spanish mackerel, 1984–2006. Top, Gulf of Mexico group; bottom, South Atlantic group.

gamefish throughout their range. Since the 1990's, the proportion of Spanish mackerel landed by recreational fishermen has increased in the Gulf of Mexico. Currently, about 30% of the landings of the Atlantic stock and 70% of the landings of the Gulf stock are taken by recreational anglers (Figure 7-2).

Atlantic Spanish mackerel are considered to be at or near their full maximum fishery potential. The 2003 stock assessment suggested that the stock was not overfished. However, fishing mortality on Spanish mackerel from the Atlantic shrimp fishery is believed to be greater than had been assumed. Similar uncertainty exists for other coastal pelagic species caught incidentally by the shrimp fishery,

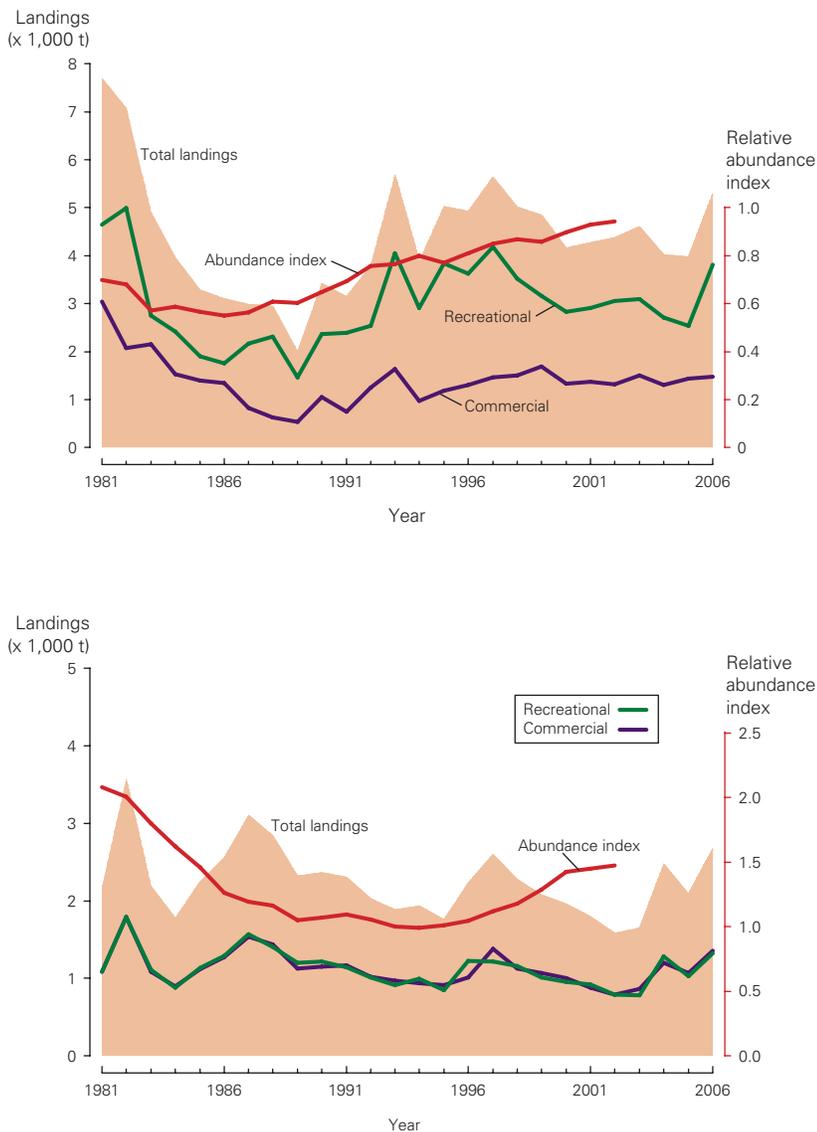


Figure 7-3
Landings in metric tons (t) and relative spawning stock size of king mackerel, 1981–2007 (data for 2007 are not final). Top, Gulf of Mexico group; bottom, South Atlantic group.

and additional information is needed to better quantify this source of mortality. A new assessment of the Atlantic stock of Spanish mackerel is underway and will be completed in 2008.

Gulf Spanish mackerel successfully recovered from an overfished status in 1995, following management regulations that began in 1987. The 2003 stock assessment of Gulf Spanish mackerel indicated that current fishing mortality on this stock is less than MFMT ($F_{30\%SPR}$), although there is also high uncertainty regarding the mortality associated with the Gulf shrimp fishery.

King Mackerel

The U.S. commercial fishery for king mackerel began in the 1880's off Chesapeake Bay and has since moved southward. There are four major production areas: 1) off North Carolina, 2) the Florida east coast (Cape Canaveral to Palm Beach), 3) the Florida Keys, and 4) off Grand Isle, Louisiana. The Louisiana fishery began in the early 1980's; this area harbors larger and older king mackerel (mainly females). Unrestricted high fishing mortality on these fishes from the late 1970's through the early 1980's quickly reduced the overall Gulf stock. Landings reached a peak of 7,600 t in 1981 in the Gulf, and 3,600 t in 1982 in the Atlantic (Figure 7-3). Since then, Gulf landings decreased to a minimum of 2,000 t in 1989, then recovered during the 1990's to about 4,500 t. In the Atlantic, landings decreased to a minimum of 1,600 t in 2002, then recovered to 2,600 t by 2006. King mackerel landings have been under a Federal quota management system since 1985.

Historically, the commercial king mackerel fisheries have utilized gillnets, troll lines, handlines, purse seines, otter trawls, and pound nets. In 1989, purse seines and drift gillnets were prohibited, and in 1996, all gillnets were prohibited in Florida state waters. Commercial yields remained unregulated until the mid 1980's. Recreational fisheries for king mackerel have been very popular in the Gulf and South Atlantic, with several tournaments targeting king mackerel since the 1960's. In fact, since 1981 recreational landings have consistently been greater than commercial landings. Recreational landings experienced large reductions during the 1980's, likely as a consequence of the expansion of the commercial runaround gillnets fishery during the 1970's and a driftnet fishery that operated off southeast Florida during the late 1980's. By 2006, recreational landings accounted for 70% of the total landings of king mackerel in the Gulf.

The Gulf king mackerel stock is believed to have a large MSY, but the stock was severely depleted until recent years (Figure 7-3, upper graph). According to the last stock assessment (2004), average annual production in the early 2000's was estimated at approximately 62% of the MSY level. It is believed that the major stock reductions during the late 1980's and early 1990's were due

to excessive harvests in the late 1970's and early 1980's. Results from the 2004 stock assessment indicated that the Gulf stock had recovered and that overfishing was not occurring. However, these results should be viewed with caution. During the most recent years, recruitment was estimated to be higher than average, particularly for the 1999 and 2001 year-classes. As these year-classes move out of the fishery, future stock biomass levels could decline.

The Atlantic king mackerel stock is thought to be at or near its MSY. Catches have oscillated between 1,500 and 3,000 t since 1981 (Figure 7-3, lower graph); however, annual TAC's have not been reached in most recent years. Commercial and recreational landings show a similar degree of annual variability. Bycatch of Atlantic king mackerel in shrimp fisheries is assumed to be low, but it is recognized that the actual level has not been determined with either accuracy or precision. The results of the 2004 stock assessment of Atlantic king mackerel indicated that current harvest rates were below the MFMT, thus overfishing was not occurring. Spawning stock biomass was above the spawning biomass at MSY in 2003, indicating that the population was not overfished at that time. The next assessment of king mackerel stocks is scheduled to be finished by the end of 2008 (SEDAR 16).

Cobia

Cobia is primarily targeted by recreational anglers; commercial landings are on average 13% of the total annual landings (Figure 7-4). Current management regulations for cobia include minimum size, individual bag limits, and commercial trip limits (2 cobia per trip). For management and assessment purposes, it is assumed that two separate stock units of cobia exist: one in the Gulf of Mexico and another in the U.S. Atlantic. During 1981–2006, annual yields of Atlantic cobia have ranged from 13 to 700 t. Gulf cobia yields are generally larger, ranging from 300 to 1,110 t annually since 1981. Fishing mortality is assumed to be low for the Atlantic group, while in the Gulf, cobia are believed to be more heavily exploited.

The data needed to assess the population dynamics and stock status of cobia are scarce and lim-

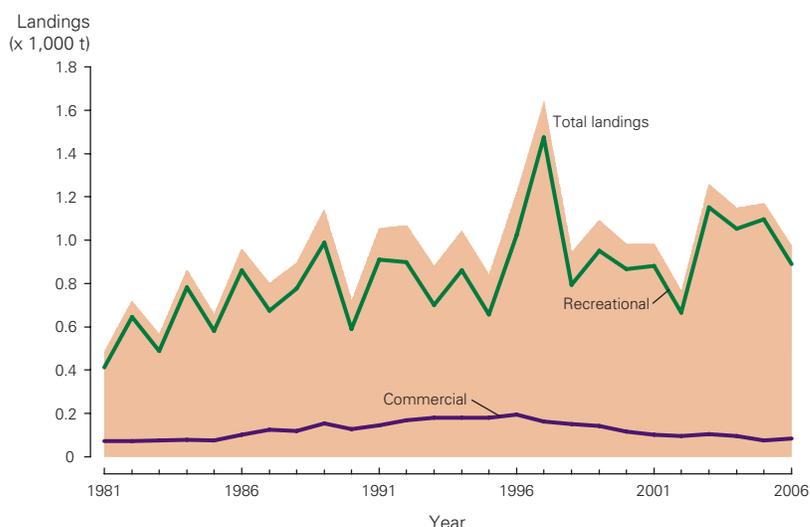


Figure 7-4
Landings in metric tons (t) of cobia, 1981–2006.

ited. Therefore, the status of cobia stocks remains uncertain. The 1993–94 assessment estimated that the spawning stock biomass per recruit (SBR)² for Gulf cobia was between 20% and 45% of the maximum possible SBR, while, for the Atlantic group, SBR was estimated to be above 30% with low fishing mortality rates. The last stock assessment for Gulf cobia (2001) indicated that the population had increased since the 1980's, and that the Gulf stock was not overfished. The sustainable yield for Gulf cobia was set at 659 t.

More information on biology and fisheries data are needed to assess the population structure and stock status of cobia in the Gulf and the Atlantic. This can be accomplished by increasing biological sampling of fish landed by the recreational and commercial fisheries, updating available reproductive information, and estimating the bycatch of cobia in other fisheries. In addition, more precise estimates of the natural mortality rate would improve assessment estimates of stock levels and maximum sustainable yield.

Dolphinfish

Dolphinfish are primarily landed by recreational anglers in the southeastern United States.

²SBR is the expected lifetime contribution to the spawning stock biomass for the average recruit, calculated by assuming that fishing mortality, natural mortality, and growth are constant over the lifespan of a year-class.

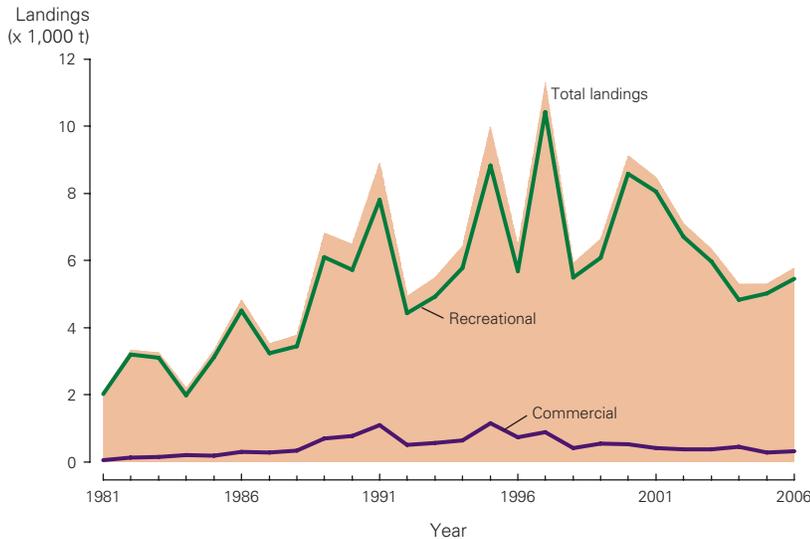


Figure 7-5
Landings in metric tons (t) of dolphinfish, 1981–2006.

During 1998–2006, recreational anglers landed, on average, 6,240 t (94%) while commercial fishermen landed 415 t (6%) of dolphinfish. Total landings increased from 2,100 t in 1981 to a peak of 11,300 t in 1997; by 2006 landings decreased to 5,800 t (Figure 7-5). The available information supports the hypothesis of a single stock across the Gulf of Mexico and the U.S. South Atlantic. Current stock status is difficult to quantify because comprehensive information for the total U.S. stock is limited. Stock assessment results in 2000 suggested some increase in stock size relative to previous estimates. Uncertainties in stock structure, the need to corroborate abundance trends, and the lack of mortality rates in recent years make it difficult to estimate the true current status of U.S. dolphinfish stocks. Research efforts should be focused on these areas. Also, because of the transnational migratory movements of this species, international cooperation between scientists is needed to further refine information on stock status.



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Fishermen with their catch of king and Spanish mackerel from a charter boat trip out of Watson Island near Miami, Florida.

ISSUES

Stock Separation and Mixing Rates of King Mackerel

The stocks of Atlantic and Gulf king mackerel overlap during the winter months in the southeast Florida and Florida Keys region. Recent studies suggest that there is considerable mixing, but the

proportion of effective emigration/immigration between stocks, and the contribution of each stock to regional landings during the mixing period, are still uncertain. Additional sampling and research are needed to better quantify the stock composition of king mackerel landed in the mixing region.

Transboundary Stocks

Effective management of migratory coastal pelagic species will continue to require the coordination of Federal and state regulatory agencies. Furthermore, king mackerel (and to some degree Spanish mackerel) in the western Gulf of Mexico migrate between Mexico and U.S. territorial waters. Assessing the magnitude of mixing between these transboundary stocks merits increased research efforts.

FOR FURTHER READING

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