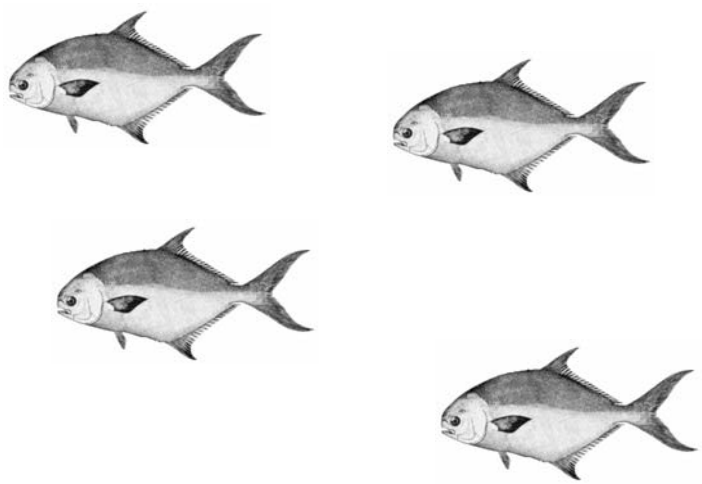
A stock assessment for pompano, *Trachinotus carolinus*, in Florida waters through 2005



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Executive Summary

This assessment uses information on the fisheries catch and effort for Florida pompano, changes in relative abundance, and growth and reproduction to assess the condition of its populations found along the Atlantic and gulf coasts of Florida. Data used in this assessment were complete through 2005, though sector-specific landings and effort are given through 2006.

Historical landings data show that the commercial fishery was well-developed in the early 20th century with landings exceeding 750,000 pounds statewide in 1902. Atlantic coast landings peaked in the 1960's at 590,000 pounds and have averaged only 112,000 pounds during 2001-2005. Gulf coast commercial landings showed two decades of rapid increase before peaking at more than 1.2 million pounds in 1974. Landings during 2001-2005 averaged only 193,000 pounds. Commercial landings on both coast showed short-lived increases during 1997 and 1998 with the development of a fishery in Federal waters.

Recreational landings estimates were generally more imprecise and lower during the earliest years of available data (1981-1996) than afterward. Atlantic coast landings peaked at 714,000 pounds (374,000 fish) during 2003 and gulf coast landings peaked at 462,000 pounds (266,000 fish) during 2001.

The assessment of the status of Florida pompano was investigated using a variety of techniques. Of these, the stock reduction analysis and non-equilibrium stock production model were deemed most reliable. The former is a new exploratory analysis that helps put more recent landings in perspective with, sometimes larger, historic landings. The stock production model has been applied to Florida pompano since the 2001 FWC-FWRI assessment and uses catch and effort data to infer the population's productivity and abundance. Both techniques allow for estimation of maximum sustainable yield.

On both coasts of Florida, fishing mortality rates for Florida pompano showed a declining trend from the mid 1980's until 1996, then a sharp increase in 1997, reaching a peak in 2000. This was followed by fluctuations then an increase between 2002 and 2005 on the Atlantic coast and by a decline through 2004 on the gulf coast.

Estimated abundance or biomass of Florida pompano on the Atlantic coast showed an increase during the mid 1990's before fluctuating without trend through 2005. Gulf coast estimates of vulnerable biomass were much steadier since the later 1980's. Recent trends since 2003 reflect the changes in fishing mortality with a decrease in biomass on the Atlantic coast and an increase on the gulf coast.

The average 2005 Florida pompano population biomass estimates for the Atlantic and gulf coasts generally exceeded the estimated minimum stock size threshold so it is unlikely they are currently overfished. The certainty of this status determination is less on the Atlantic coast where one estimate of vulnerable biomass in 2005 is slightly lower than the threshold. There, the stock reduction analysis suggested that fishing is too high contrary to the surplus production model which showed fishing rates below the overfishing threshold. The highly uncertain but low estimate of static spawning potential ratio for the Atlantic coast in 2005 (25%) seemingly supports an overfishing status designation there. On the gulf coast, it is clearer that overfishing was not occurring for Florida pompano in 2005.

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1.0 Introduction

Florida pompano (*Trachinotus carolinus*) is a valuable commercial species and a popular target with recreational anglers. Pompano command the highest price in Florida for a food fish with a statewide average ex-vessel price per pound of $4.78 in 2005. Florida accounts for more than 90% of the U.S. landings. This report follows the Standard Stock Assessment Report format recommended by the Atlantic States Marine Fisheries Commission (2005)

1.1 Management Unit Definition

The Florida Fish and Wildlife Conservation Commission manage Florida pompano within the state and adjacent federal waters off Florida. The management unit is defined as all fish in these waters. In this assessment, we have provided separate Atlantic and gulf coast assessments because there are differing levels of exploitation on each coast and some apparent differences in life history. Genetic studies indicate mixing between these groups but the amount of interchange between the gulf and Atlantic is unknown (see 2.5 Genetic Information)

1.2 Regulatory History

Regulations specific to the Florida pompano fishery have been in place since 1881 when it was deemed unlawful to catch them exclusively for the purpose of making oil, fertilizer, or compost. In 1925, the Florida Legislature enacted a prohibition against any person, firm or corporation to take or possess, buy, sell, or offer for sale at any time, or unnecessarily destroy any pompano of less than nine inches from tip of the nose to the fork in the tail (fork length, FL). In 1953, the minimum size limit for pompano was increased to ten inches fork length. By this time, the State Board of Conservation (created in 1933) had taken over the management of saltwater fishing laws. In 1969, the Legislature reduced the pompano minimum size limit to nine and one-half inches fork length. This action coincided with a major governmental reorganization that abolished the State Board of Conservation and created a new Department of Natural Resources (DNR), which became responsible for managing saltwater fishing laws. Soon thereafter, in 1971, the Legislature amended this provision to establish the measurement as being from the tip of nose to tip of tail, essentially reducing the minimum size limit by almost 2 inches. Two years later, in 1973, the Legislature took its final action on pompano by further amending the legal way to measure a fish as from tip of nose to rear center edge of tail (FL).

In 1988, the Florida Marine Fisheries Commission adopted the only documented management goal for Florida pompano[1]: "Pompano are to be managed for maximum sustainable stock abundance and utilization while insuring that neither growth nor recruitment overfishing shall occur. Management shall maximize the economic potential of the commercial fishery while maintaining the best possible opportunity for recreational fishing."

Florida pompano are currently managed under Chapter 68B-35 of the Florida Administrative Code. On July 1, 1989, the current minimum size limit (10 inches FL) was established. In addition, the sale of Florida pompano larger than 20 inches FL was prohibited. Pompano larger than 20 inches are rarely encountered but occasionally permit, which get much larger, are mistaken for pompano and this provision was designed to prevent their sale. Other provisions include that fish must be landed whole and multiple hooks and snatch hooking are

[1] FWC Division of Marine Fisheries Management. 2003(Draft). Fishery Strategic Plan: Florida pompano (*Trachinotus carolinensis*), permit (*Trachinotus falcatus*), and African pompano (*Alectis ciliaris*). Tallahassee, FL.

prohibited. In July 1995, Article X, Section 16 of the Florida Constitution was enacted which effected the commercial pompano fishery by prohibiting the use of entangling nets within 9 miles of the gulf coast and 3 miles of the Atlantic coast. In January 1996, the Commission implemented a recreational 10-fish aggregate bag limit for Florida pompano, permit (*Trachinotus falcatus*), and African pompano (*Alectis ciliaris*), with the allowance of one fish over 20 inches. In November 2001, the Commission addressed the expanding offshore commercial fishery by allowing qualified fishermen to harvest pompano with gill nets in specified federal waters adjacent to state waters under certain conditions, which included a pompano endorsement or special activity license, vessel length, net specification, and landings requirements; allows eligible fishermen to possess a gill net and pompano in specified state and adjacent federal waters; provides that commercial fishermen who do not possess a restricted species endorsement but not a pompano endorsement or special activity license will be subject to existing gear limitations, as well as a daily harvest, possession and sale limit of 250 fish caught per vessel in state waters; and allows a bycatch of 100 pompano in legal nets targeting other legal species in federal waters. In January 2004, the Commission raised the minimum size from 10 inches to 11 inches for all harvesters, reduced the aggregate recreational bag limit from 10 fish to 6 fish for pompano and permit, applied the 250 fish per commercial vessel limit to fish caught in federal waters as well as state waters, and eliminated the special activity license program. In July 2005, the Commission established a vessel possession limit of two permit and pompano larger than 20 in fork length in state and federal waters.

1.3 Assessment History

FWC has developed three previous stock assessments for Florida pompano (Murphy *et al.* 1996; Nelson and Murphy 2001; Muller *et al*. 2002) using a variety of population models. The 1996 assessment used a tuned Virtual Population Assessment model (ADAPT) and found pompano to be growth overfished on both coasts during 1989-1995, more so on the gulf coast, and expressed concern that after the 1995 ban on the use of entangling gear in state waters, the recreational fishery could expand to harvest the fish that the gill net fishery previously had been catching. There was very little age-composition data on which to base this analysis and, in retrospect, was insufficient to establish credible estimates of fishing mortalities or abundance. Nelson and Murphy (2001) recognized this data shortfall and introduced the use of a surplus production model (ASPIC) instead of an age-structured model. This assessment found a short-lived drop in fishing mortality rates on both coast between 1995 and 1996, followed by a rebound to levels higher than needed to harvest maximum sustainable yield during 1997-1999 rates. This assessment utilized only data from 1986 onward and may have lacked enough contrast in the landings and effort to accurately estimate maximum sustainable yield. Muller et al. (2002) extended the time frame to include data starting in 1982. This assessment switched to an Excel-spreadsheet-based non-equilibrium surplus production that added flexibility to the structure the model to reflect changes in the data, e.g., the analysis of multiple, fishery specific changes in catchability. They found that fishing mortality rates in 2000 were higher than required to harvest maximum sustainable yield on either coast but especially on the Atlantic coast. The current assessment mostly uses landings data from 1981 through 2005 from both the commercial and recreational fisheries. Population models employed in this assessment include the Excel-spreadsheet-based non-equilibrium surplus production model, a modified DeLury analysis, an untuned virtual population analysis, and a new stochastic stock reduction analysis. The stock reduction analysis utilized historical landings for pompano in Florida back to 1889

and provides a better long-term context for evaluating the sustainability of harvest of Florida pompano than do the models based on the shorter time frame.

2.0 Life History

2.1 Age

A preliminary age and growth study of commercially caught adult pompano was conducted by FWC/FWRI staff during 1992-1994. The number of annuli observed in thin-sectioned otoliths ranged from 0 to 7 (*n*=1,771). Spearman rank order correlation coefficients indicated a strong positive correlation between the number of annuli and fork length (FL). Marginal increment analysis suggested that annuli were laid down predominately between March and May. Median values of marginal increments for age-1 and age-2 fish were highest from January to April (0.12 mm for age 1 and 0.07 mm for age 2) and lowest in May (0.04 mm for age 1 and 0.01 mm for age 2). The oldest pompano examined was 7 years old and was 22.3 inches (567 mm FL). Most (85%) of the pompano examined were age 1.

FWC/FWRI personnel sampled pompano with trammel nets in Tampa Bay and adjacent nearshore gulf waters (within a mile of the beach) during 2000-2002 and caught 1,758 pompano. To ensure consistency with aging, 50 otoliths from the earlier study were chosen to represent all ages and months of the year and the new readers had 85% exact agreement and 100% agreement of reads within one year. As with the earlier study, female pompano grew faster and reached larger sizes than did males (Fig. 2.1.1). The oldest female was seven years old and the largest female was 18.9 inches FL (481 mm, 4 years old) while the oldest male was six years old and the largest male was 16.1 inches FL (410 mm, 5 years old).

2.2 Growth

Growth of juvenile pompano has been estimated from length frequency data. Resulting growth rates generally range between 0.8-1.2 inches/month (Fields 1962; Finucane 1969; Iverson and Berry 1969), although Bellinger and Avault (1970) reported growth rates of up to 1.9 inches/month.

Pompano grew rapidly and attained a mean length of approximately 11 inches FL after one year. The maximum reported size for pompano was 25 inches total length (TL [longest measure with tail compressed], 635 mm) and eight pounds (3.6 kg, Fields 1962). Moe *et al.* (1968) estimated that the size of pompano at age 1 was nine inches standard length (SL [tip of nose to end of vertebral column], 230 mm) and one pound (0.45 kg) with a maximum life span of 3-4 years. Von Bertalanffy growth equations, weighted for 1/(number of fish at each age), were fitted to 1992-94 commercial pompano age (years) and fork length (mm) data by coast and sex. Symbolically, the growth equation is: $mm\ FL = L_\infty(1-\exp(-K(age - t_o)))$. Parameters (asymptotic standard error) for the Atlantic coast were:

	L_∞	K	t_o	N
Females	461 (46)	0.27 (0.08)	-2.4 (0.6)	435
Males	466 (98)	0.13 (0.08)	-5.6 (1.7)	195
Combined	389 (16)	0.28 (0.05)	-3.5 (0.5)	636

and for the gulf coast:

	L_∞	K	t_o	N

Females	390 (7)	0.55 (0.06)	-1.2 (0.2)	588
Males	364 (10)	0.37 (0.06)	-2.6 (0.4)	477
Combined	399 (6)	0.41 (0.04)	-1.7 (0.2)	1,131

Von Bertalanffy growth equations were fit to the ages (years) and fork lengths (mm) from the 2000-02 study on the gulf coast using the same procedure as described above and estimated the following parameters (asymptotic standard error) :

	L_∞	K	t_o	N
Females	379 (3.01)	0.63 (0.047)	-1.38 (0.115)	951
Males	325 (2.18)	0.69 (0.052)	-1.56 (0.122)	802
Combined	337 (1.43)	0.91 (0.054)	-1.14 (0.075)	1,753

Both females and males had the same age distribution (Kolmogorov-Smirnov two-sample test, $n_1 = 951$ and $n_2 = 802$, $P > 0.05$; Fig. 2.2.1) and there were no apparent differences in growth between sexes (randomization test that the growth curves by sex were equal, $P > 0.05$; Figs. 2.1.1 and 2.2.1). Because these fish were collected as part of a fishery independent study, the range of fish lengths was from 4.0 in FL (103 mm) to 18.9 in FL (481 mm) and should more accurately reflect the sizes and ages of pompano on the gulf coast than the sampling from the commercial harvest with the minimum size limit of 11 in FL (279 mm).

Standard length (SL), fork length (FL), and total length (TL, with tail compressed) relationships for 2,013 Florida pompano collected along the gulf Coast of Florida during 2000-2002 that ranged between 79 to 481 mm FL (3.16 to 19.24 inches) are as follows (Guindon *et al.* FWRI unpublished manuscript):

$$TL = 1.1843\ FL + 3.9905 \quad (r^2 = 0.989)$$
$$TL = 1.2479\ SL + 17.535 \quad (r^2 = 0.970)$$
$$FL = 1.0563\ SL + 10.765 \quad (r^2 = 0.985)$$
$$FL = 0.8354\ TL - 0.2323 \quad (r^2 = 0.989)$$
$$SL = 0.9329\ FL - 6.173 \quad (r^2 = 0.985)$$
$$SL = 0.7775\ TL - 5.7385 \quad (r^2 = 0.970)$$

The weight-fork length (mm) relationships for these same Florida pompano are:

for females: $\text{Weight (g)} = 3 \times 10^{-5}\ \text{Fork Length}^{2.935}$, $n = 1{,}032$, $r^2 = 0.964$
for males: $\text{Weight (g)} = 3 \times 10^{-5}\ \text{Fork Length}^{2.956}$, $n = 854$, $r^2 = 0.936$

No significant differences in the length–weight relationships were observed between males and females so the composite (pooled for sex and includes immature fish) regression is:

$$\text{Weight (g)} = 3 \times 10^{-5}\ \text{Fork Length}^{2.9342}\ (n=1{,}984,\ r^2=0.983).$$

The sex-specific, weight-fork length relationships for pompano sampled from Atlantic coast commercial landings during 1994-95 are (Hood *et al.*, FWRI unpublished manuscript):

for females; $\text{Weight (g)} = 3.47 \times 10^{-4}\ \text{Fork Length}^{2.53}$, $n = 471$, $r^2 = 0.86$, and

for males; Weight (g) = 6.46×10^{-5} Fork Length$^{2.82}$, n = 218, $r^2 = 0.86$.

The weight-length relationships for pompano sampled from gulf coast commercial landings during 1992-94 are:

for females; Weight (g) = 3.39×10^{-5} Fork Length$^{2.94}$, n = 785, $r^2 = 0.92$, and
for males; Weight (g) = 8.71×10^{-5} Fork Length$^{2.77}$, n = 603, $r^2 = 0.87$.

2.3 Reproduction

Pompano appear to spawn offshore over a protracted period. FWC/FWRI Pompano Reproductive seasonality of Atlantic- and gulf-coast-caught pompano was investigated by staging gonad development, the examination of gonad microstructure, and calculating a gonadosomatic index (gonad weight/body weight * 100) for each fish. Microscopic examination of pompano gonads suggested that spawning occurs during the spring and summer. Advanced ovaries (those with 1^o and 2^o yolk-stage oocytes [Hunter and Macewicz 1985]) occurred from January through August on the Atlantic coast. Females with advanced yolked oocytes have been collected on the gulf coast in October and December as well as in the spring (K. Guindon, FWRI, personal communication). Ripe males were found year round; however, post-spawned males were found only in the summer and fall months. Gonadosomatic indices were highest during February-April (> 1% in females) suggesting that peak spawning occurred at this time.

Seasonal spawning patterns seen in adults are verified in temporal patterns of juvenile abundance. In the Gulf of Mexico, juvenile abundance suggests peak spawning occurs during spring and fall (Finucane 1969). Off the Atlantic coast of Florida, juvenile abundance patterns indicate that spawning occurs from February to September with a peak in April and May (Fields 1962, Berry and Iverson 1967).

Florida pompano mature before reaching 14 inches total length (TL, Finucane 1969). Female pompano have similar maturity schedules on both coasts of Florida. Females reach 50% maturity at age 1 (11.8-12.8 inches FL), and 100% maturity between ages 2 and 3 (14.8-15.7 inches FL). Maturity schedules were difficult to assess in males because all individuals had tailed sperm in the testes, indicating that they were mature. Most males probably mature during their first year.

Fecundity has been estimated to range from 133,000 to 800,000 eggs per season (Finucane 1969, 1970, Moe *et al.* 1968, Hoff *et al.* 1972, FWC/FWRI unpublished data). Fecundity estimates for three pompano, 10.7-10.8 inches FL, ranged from 133,400-205,500 oocytes per female. These estimates are lower than previously published estimates, which ranged from 400,000 to 800,000 eggs per season (Finucane 1969, 1970, Moe *et al.* 1968, Hoff *et al*. 1972). It is difficult to compare FWC/FMRI estimates with published estimates because earlier authors did not include methods or sizes of fish used for calculations. The diameter of hydrated eggs for pompano ranges from 900-1400 μm in diameter (Hoff *et al.* 1972).

2.4 Stock definitions

Florida pompano are found in Western Atlantic coastal waters from Cape Cod Massachusetts to northern Argentina (Gilbert and Parsons 1986; Martin Diaz de Astarloa 2000) In U.S. waters, they are uncommon north of Chesapeake Bay. Pompano are found year-round in Florida but move north and south in response to the 15^oC isotherm in near shore waters (Berry and Iverson 1966). The Florida Fish and Wildlife Conservation Commission has promulgated

statewide size and bag limits on anglers catching pompano, implying management of Florida pompano as one stock in Florida. However, their migration northward during the warm months when peak spawning occurs suggests geographic isolation between the Atlantic and gulf spawning stocks each year. In this assessment, we continue to provide coast-specific assessments that assume the population dynamics for Florida pompano are driven mostly by coast-specific processes.

2.5 Genetic Information

Though exact movements of pompano off Florida are unknown and fishing practices differ by coast, genetic data show that Florida pompano are a homogenous stock for the entire continental U.S. from NC to TX. FWC-FWRI scientists have conducted a genetic investigation of population structure of 350 Florida pompano specimens collected from U.S. coastal waters. Sample locations included Brownsville, TX (and nearby waters of Mexico), Apalachicola FL, Tampa Bay FL, Stuart FL, and Bogue Sound NC. The investigation was based on genotype data from 13 polymorphic microsatellite DNA markers (Seyoum *et al.* 2006). All results were consistent with the null hypothesis that Florida pompano comprise a single, randomly mating genetic stock within coastal U.S. waters. There was no evidence of separate gulf and Atlantic stocks or an isolation-by-distance pattern of gene flow (Wright 1943) often observed for other coastal-pelagic and reef fishes in this region. The high degree of genetic divergence previously reported between Florida pompano specimens from Tampa Bay and Puerto Rico (Tringali *et al.* 2006) was also present between Puerto Rican specimens and those from the other coastal U.S. locations. In this assessment, we assume that this genetic homogeneity is maintained by the exchange of relatively few fish between the Atlantic and gulf coasts of Florida (or adjacent areas outside of Florida), having little impact on the coast-specific population dynamics.

2.6 Natural Mortality

Previous FWC-FWRI assessments of pompano used a constant instantaneous natural mortality rate (M) of 0.40 per year across all age groups. This rate was originally taken from a bluefish assessment (Crecco *et al.* 1987 using Hoenig (1983) relation: ln(M)=1.46-1.01(ln[max. age]) and is consistent with a maximum life span found for bluefish of about 11 years. The recent FWC-FWRI fishery-independent study on Florida's gulf coast aged 1,753 Florida pompano and found one female fish age-7 and a previous study of 1,969 fish purchased from fish houses on both coasts found one fish age-8. Here, we assume that if Florida pompano were allowed to revert to an unfished state that their maximum life span would be similar to that observed for bluefish. Therefore, we continue to use a constant natural mortality rate of 0.40 per year.

3.0 Fishery Description

3.1 Brief overview of the fisheries

Historically, commercial fishers caught Florida pompano inshore, using gill nets. However with the elimination on entangling gear from state waters in July 1995, commercial fishers explored alternative methods and areas and found that they could catch pompano beyond state waters. As mentioned in the next section, FWC implemented many restrictions on the offshore commercial fishery such that now the commercial fishery only accounts for a small portion of the harvest. Although there had been a small recreational fishery for pompano since

at least 1981, the recreational harvest increased sharply after 1995 and now anglers are the primary harvesters of pompano (Tables 3.1.1 and 6.2.1.1).

3.2 Current status

The current (2005) status of the fishery shows a continued dominance of the recreational fishery on the Atlantic coast. The fisheries for Florida pompano continue to come under stricter regulations with a recent larger minimum size (January 1, 2004 increase to 11 inches FL), the lower recreational aggregate bag limit (from ten down to six), and the extension of the state water's 250-fish trip limit into federal waters.

4.0 Habitat Distribution

4.1 Brief Overview of Habitat Requirements

Spawning is thought to occur in offshore waters where pelagic eggs and larvae have been collected (Fields 1962; Finucane 1969). Fields (1962) collected two larval pompano 0.28 and 0.43 inches SL off north Florida in the Gulf Stream near the 200 m (656 feet) depth contour. Finucane (1969) reported that two small *Trachinotus* spp. larvae were collected 5-15 miles off Tampa Bay. Larval pompano are not found in the exposed sandy beach habitats that are the principal juvenile habitat for the species (Ruple 1984).

Juveniles (0.43-0.79 inch SL) recruit to the surf zone along exposed sandy beaches from the late spring through fall (Springer and Woodburn 1960; Fields 1962; Iverson and Berry 1969; Bellinger and Avault 1970, Finucane 1970, Naughton and Saloman 1978, Modde and Ross 1983; Peters and Nelson 1987). In the Gulf of Mexico, most recruitment occurs during April - May, followed by a smaller, secondary period of recruitment during August - September (Bellinger and Avault 1970; Modde 1980). In the Tampa Bay area along the central gulf coast, monthly waves of new recruits were observed arriving at and growing in the surf zone habitat from late April through October with peak numbers arriving in June and early July (Guindon and Gillette, FWC-FWRI unpublished data). Immature, juvenile pompano stay in this habitat until obtaining an average size of 135 mm (5.4 inches) FL (Guindon *et al.*, FWC-FWRI unpublished manuscript). Along the Atlantic coast, the most recruitment occurs during April - May in Florida and Georgia, June - July in North Carolina and South Carolina, and July-August in Delaware (Fields 1962; Tagatz and Dudley 1961; de Sylva *et al.* 1962; Cupka 1972; Anderson *et al.* 1977; Peters and Nelson 1987).

Adults are generally found in schools along sandy beaches, near inlets, and in brackish bays and estuaries (Berry and Smith-Vaniz 1977). In the Tampa Bay area, adult pompano distribution varies seasonally where adults are commonly encountered in gulf waters from March through August (Guindon *et al.*, FWRI unpublished manuscript). Highest numbers of adult and sub-adult pompano are found inside estuarine waters during the late summer and fall (July to October), and in winter (late November to January) they can be found near warm water areas.

Along the Atlantic seaboard of the United States, adults are reported to move north in the summer (Fields 1962; Berry and Smith-Vaniz 1977), however exact movement patterns remain relatively unknown for pompano in Florida from both Atlantic and gulf waters (Bellinger and Avault 1970). Berry and Iverson (1966) reported that 45 pompano were tagged in Florida from 1962-1964 and three were recaptured; one did not move, one traveled north 45 miles and the other south 164 miles. Juvenile (1.6 to 5.4 inches) Florida pompano tagged at

three NC beaches showed these fish exhibit high site fidelity to their surf zone nursery habitats as only 8 fish moved from their original tagging sites (Ross and Lancaster 2002). Additionally, a tagging study of a *Trachinotus* species (the swallowtail dart) found in Australian waters indicated that sub-adult and adults (4.8 to 14.8 inches) also exhibited movement patterns that define these fish as a more ranging species rather than a migratory species (McPhee *et al.* 1999). Most (49.3%) fish were recaptured less than 1.6 miles from their release site. Few went further than 40 miles and the farthest moving fish went approximately 165 miles. Based on these results it seems plausible that Florida's pompano may not roam too far from Florida's coastal waters.

Although juveniles and adults are generally found in coastal, sub-tropical waters, they are able to tolerate a wide range of environmental variables. Finucane (1969) reported that juveniles seemed to prefer temperatures between 17^{o} and 32 ^{o}C and salinities greater than 32 ‰. Experimentally, juvenile and adult pompano have been shown to tolerate temperatures as low as 10 ^{o}C, dissolved oxygen levels down to 2.5 ppm, *p*H levels between 4 and 12, and were not visibly effected by salinity drops down to 0 ‰ provided that the drop was gradual (days; Moe *et al.* 1968). Anderson *et al.* (1977) found that the presence of juvenile pompano off South Carolina beaches was correlated with water temperature.

While no studies have been done on feeding habits of larval pompano, small invertebrate plankton are the food items found in the earliest juvenile stages. Pompano are generalized benthic feeders that utilize large and well-developed pharyngeal plates to crush hard-shelled prey (Bellinger and Avault 1971). They have very long and thick-walled intestines and small stomachs. Juveniles undergo an ontogenetic shift in feeding. In Tampa Bay, small juvenile pompano (0.6-1.7 inches SL) shift from amphipods, dipteran larvae, and *Donax* (coquina clams) to larger crustaceans, mollusks, and occasionally fishes as they grow larger (2.0-3.9 inches SL, Finucane 1969). Bellinger and Avault (1971) reported that as size increased, the diet of juvenile pompano from Louisiana waters changed from primarily copepods, to polychaetes, amphipods, gastropod larvae, and insects, and then to clams and post- larval shrimp. Modde and Ross (1983) reported that juvenile pompano from Mississippi waters fed primarily on calanoid copepods when < 1.2 inches SL, *Donax* siphons and calanoid copepods when between 1.2-1.6 inches SL, and on *Emerita* (mole crabs), small shrimp, and small fishes when greater than 1.6 inches SL. Similarly, it was found in three northern gulf estuaries from west Florida, Alabama, and Mississippi that juveniles are opportunistic feeders that feed on resources readily available where they are foraging (Wheeler *et al.* 2003). Diets of adult pompano from the Indian River Lagoon are comprised primarily of infaunal bivalves (Armitage and Alevizon 1980). In Tampa Bay, diets of adults consist primarily of mussels and penaeid shrimp (Finucane 1969). Hoff *et al.* (1978a) found that food consumption was highest between 20-25^{o}C for cage-reared pompano. In the lab, juvenile pompano feeding displayed a distinct circadian rhythm and demand was highest during the morning daylight hours of 0600-0800 (Heilman and Spieler, 1999).

5.0 Data sources

5.1 Commercial

Commercial harvest information was obtained from the FWC's Marine Fisheries Information System and from Fisheries Statistics Division of the National Marine Fisheries Service (NMFS) for the years 1950-2005. These data include annual landings tallied from

monthly dealer reports collected by the NMFS during the period 1950-85[2] and trip-specific commercial landings reported within the FWC trip ticket program during the period 1986-2005. Trip tickets included edited batches 1 – 944, which closed December 29, 2006, insuring that all data through 2005 were edited and final. Historic coast-specific commercial landings data (sporadic during 1889-1949) were also gathered from various reports of the U.S. Commissioner of Fisheries and subsequent agencies (Table 5.1.2). Commercially landed Florida pompano are routinely monitored for data on the size, weight, and sex by samplers conducting the Trip Interview Program.

5.1.1 Data Collection Methods

5.1.1.1 Survey Methods

Commercial landings came from a variety of sources (Reports of U.S. Fish Commissioner, various years 1889-1924; U. S. Bureau of Fisheries, 1925-37; State Board of Conservation Biennial Reports, 1941-50; National Marine Fisheries Service's website: http://www.st.nmfs.gov/st1/commerical/index.html, 1950-2005; Florida Marine Resources Information System, 1985-2005). Previous assessments looked at the fishery only in recent years but concerns about changing baselines (Pauly 1995) has prompted assessment analysts to include historical landings to provide a context for evaluating more recent landings. On a wider geographical scale, a scan of the United Nations Food and Agriculture Organization's fishery statistics data base (global production 1950-2004) showed that the United States is the only country reporting landings of Florida pompano and Florida accounts for more than 90% of the US pompano landings. Therefore, this assessment focused solely on Florida's pompano fishery.

Beginning in 1986, information on fishing effort, what is landed, and who is fishing in Florida's commercial fisheries was collected under the FWC's Marine Resources Information System, commonly known as the trip-ticket program. Wholesale dealers are required to use trip tickets to report their purchase of saltwater products from commercial fishers. Conversely, commercial fishers must have Saltwater Products Licenses to sell saltwater products to licensed wholesale dealers. In addition, Florida pompano became a "restricted species" in July 1996 so only fishers who have Restricted Species Endorsements on their Saltwater Products Licenses qualify to sell Florida pompano. Each trip ticket includes the Saltwater Products License number, wholesale dealer license number, date of the sale, fishing gear used, trip duration (time away from the dock), area fished, depth fished, number of traps or number of sets where applicable, species landed, quantity landed, and price paid per pound.

Biostatistics samplers charged with monitoring Florida's commercial landings of marine resources routinely sample Florida pompano beginning in 1988 on the gulf coast and 1991 on the Atlantic coast. These samples are generally taken when animals are available and at the convenience of fish house operators.

The FWC's Fish and Wildlife Research Institute initiated on-board surveys of the pompano catch in 1999 to confirm that vessels were able to capture pompano with gill nets offshore in federal waters. This was conducted as a prelude to setting up areas where it would be legal for fishing vessels that carried gill nets to transit through state waters.

[2] See http://www.st.nmfs.gov/st1/commercial/index.html.

5.1.1.2 Sampling Intensity

The commercial landings were based on monthly dealer reports prior to 1985 that came from a subset of dealers that included all the large wholesale dealers operating in Florida. The FWC trip ticket program greatly expanded the coverage of the fishery to include all wholesale dealers operating in Florida and to include all transactions where marine resource products are purchased from a licensed commercial fisher. During 2005, the numbers of trips reporting Florida pompano landings was about 4,200 trips on the Atlantic coast and 1,500 trips on the gulf coast, with most catches reported from state waters (Table 3.1.1).

Information on the lengths of landed pompano was taken from the Trip Interview Program (TIP) data files from 1988 through 2005. A total of 922 interviews were conducted statewide and samplers measured 26,217 pompano (Table 5.1.1.2.1). Length sampling on the gulf coast began in 1988 and over the time period samplers conducted 383 interviews and measured a total 16,614 pompano. Sampling on the Atlantic coast began in 1992 and through 2005 those samplers conducted 539 interviews and measured a total 9,603 fish. We excluded those length measurements that lacked gear or were sorted by size category such that a statewide total of 24,866 fish were used in our analyses.

5.1.1.3 Biases

In the Trip Interview Program, there is a field on the interview record that indicates whether the sample was considered representative or whether the sample was biased. Potential biases included a sorted box of fish and dealer restrictions on amounts and sizes of fish they would buy. We only included measurements from interviews that indicated no bias. The accepted samples could be biased in other ways for which we do not have good controls such as non-representative sampling with regards to fishing locations, seasons, or gears.

5.1.1.4 Biological Sampling

FWC-FWRI does not currently have a directed program designed to collect either hard parts for aging or gonad tissues for histological studies for Florida pompano. During 1992-94, Florida pompano landed in the Atlantic or gulf coast commercial fisheries were purchased as part of a life history study; these were sampled for lengths, weight, gonad tissue and hard parts used to determine age (P. Hood, FWC-FWRI unpublished data). During 2000-02, a fishery independent sampling program was conducted using trammel nets to collect additional life history information from Florida pompano in the Tampa Bay area along the gulf coast (K. Guindon, FWC-FWRI unpublished data).

5.1.1.5 Aging Methods

Florida pompano are moderately difficult to age as are many carangid species. FWC-FWRI has had success determining the age of pompano using thin-sections of sagittae (otoliths) where the contrast in the banding pattern is enhanced using Sanderson's rapid bone stain. The otoliths are sectioned with a low-speed saw, mounted with epoxy resin, and the annuli counted with a dissecting microscope under reflected light. A reference set of otoliths from the 1992-94 study were read by the readers of the 2000-02 processed otoliths and they obtained an 85% agreement on all reads and 100% agreement to within one year. This indicates a fairly high precision in age determination for Florida pompano.

5.1.1.6 Development of Estimates

The Trip Interview Program (TIP) had 15,569 length measurements with gear from interviews made beginning in 1991 on the Atlantic coast and 1988 on the gulf coast. We developed catch-at-length tables from the annual length frequencies by coast and gear (Table 5.1.1.6.1). The gears were cast net, gill net including trammel nets, hook-and-line gear, and a grouped category of other infrequently used gear: seines, traps, and trawls. To fill years with sparse or no sampling, we used the composite average number of measurements per inch class from the appropriate period. There were three regulatory periods: prior to the 10-inch minimum size (1989 and earlier), the years with the 10-inch minimum size (1990-2003), and the years with the 11-inch minimum size (2004 and later). The 1990-2003 regulatory period was further broken down into two adequately sampled periods, 1990-95 and 1996-2003, creating four composite length frequency periods (Table 5.1.1.6.2). The length-weight equations by coast were used to calculate the sample weights which, in turn, were used to convert landed weight to the number of fish landed (Tables 5.1.1.6.3). The catch-at-length merely pro-rated the estimated number of fish landed into length categories using the proportions at length. We converted catch-at-length to catch-at-age using age-length keys. Unfortunately, we only have limited age information for Florida pompano. On the Atlantic coast, we used the age-length information from the 1992-94 study for the 1981-1995 time period and added the 37 fish from the 2000-02 study for a separate age-length key to apply to the catch-at-length from 1996-2005. On the gulf coast, we used the age-length key from the 1992-94 study for the 1981-1995 time period and another age-length key from the 2000-02 study for the 1996-2005 catch-at-length. Because of the many "holes" in the data, we did not seriously pursue the use of age-structured models at this time (though an untuned virtual population analysis is presented); therefore, none of the age-length key or estimated age composition data are included in any tables or figures in this document. If managers need age-structured information to formulate their regulations then FWC needs to commit to sampling pompano for age before we can use those higher resolution population dynamics models in the future.

5.1.2 Commercial Landings

The historical landings were not reported every year but reported landings for pompano began in 1889 on the Atlantic coast and 1902 on the gulf coast. Statewide landings in 1902 exceeded 750,000 lb which is about twice the average 2000-05 commercial landings (Table 3.1.2, Fig. 5.1.2.1). Commercial landings reached their peak on the Atlantic coast in the late 1960's at about 590,000 pounds and then leveled off at a level of approximately 300,000 pounds through the 1980's. After 1990, the landings decreased steadily through 2001, except for a short-lived increase due to expansion of the fishery into federal waters in 1997 and 1998 (Table 3.1.1). Landings hit a modern era low of about 75,000 pounds in 2001 before increasing during the early 2000's. Commercial landings on the gulf coast first appeared in 1902 and fluctuated around 400,000 pounds until the mid 1950's when they began two decades of rapid increase, reaching their peak of more than 1.2 million pounds in 1974. Landings decreased rather steadily since then with a major decline during 1996 after the implementation of the ban on the use of entangling gear. From the 1996 level of about 152,000 pounds, landings increased due to expansion of the fishery into federal waters, reaching over 505,000 pounds in 1998 before declining through the rest of the 1990's and early 2000's.

The commercial fishery changed after the elimination of entangling gears from Florida waters with the passage of the Constitutional amendment (Article X, Section 16). For example,

in the three years prior to that regulation being implemented in July 1995, annual gill or trammel nets catches accounted for most commercial Florida pompano landings, an average of 69% each year on the Atlantic coast and 78% on the gulf coast (Table 5.1.2.1). To illustrate the effectiveness of that regulation, the average annual landings from gill nets during 2003-2005 were 2% on the Atlantic coast and 21% on the gulf coast. Gill nets still account for some Florida pompano landings because fishers with a pompano endorsement can land pompano caught with gill nets deployed in federal waters.

Only a few commercial fishers fish for pompano in Florida. On the Atlantic coast in 2005, there were 430 Saltwater Products License (SPL) holders that reported pompano landings, and 40 of those SPL holders accounted for more than 50% of the landings. The fishery was more concentrated on the gulf coast with eight SPL holders accounting for 50% of the landings.

The commercial pompano fishery varies seasonally suggesting either a change in availability with season or an annual pattern of movements with the seasons. On the Atlantic coast, landings (and often trips) were higher during December-January with a secondary peak in April (Table 5.1.2.2, Fig. 5.1.2.2). The pattern is less clear on the gulf coast because of the expansion of the fishery into offshore, federal waters but there are early spring and fall peaks observed in both the numbers of trips taken and the number of pounds landed. On the Atlantic coast in 2003-05, 80% of the landings come from Volusia-Martin Counties followed by 15% in the Southeast region (Palm Beach - Miami-Dade Counties) while on the gulf coast, 66% come from the southwest region (Sarasota-Collier Counties) and 20% from the Tampa Bay region (Pinellas-Manatee Counties, Fig. 5.1.2.3).

5.1.3 Commercial Discards/Bycatch

We do not have any estimates of the commercial discards at this time. Given the high value of the fish and the use of entangling gear designed to catch legal-sized fish, it is assumed that discards were minimal prior to 1996. Since then, it is possible that bycatch from lines and cast nets have become more significant.

5.1.4 Commercial Catch Rates

Commercial catch rates were developed using a general linear model with the log-transformed pounds per trip as the response variable and year, month, region, days away from the dock and gear type as explanatory variables (significant, $P<0.05$, on both coasts). The purpose of the standardization procedure was to adjust for the trends seen in catch rate associated with these explanatory variables, setting to average levels. In theory, this should allow the data to reveal the true trends in relative abundance of Florida pompano. Because gear was only included on the trip tickets beginning in 1991, the gear on the early years was specified as 'Unknown' even though gill nets were the dominant gear used in the fishery. There were three regions on the Atlantic coast: Nassau-Flagler counties, Volusia-Martin counties, and Palm Beach - Miami-Dade counties and five regions on the gulf coast: Monroe county, Collier-Sarasota counties, Manatee-Pinellas counties, Pasco-Franklin counties, and Gulf- Escambia counties. More than 91% of the trips were one-day trips but we included the other trips by trip-duration categories: 1 day, 2 days, 3-5 days, 6-9 days, and 10 or more days.

The standardized catch rates were steady and similar in magnitude on both coasts until 1995 before they increased to different catch levels. Standardized commercial catch rates showed a marked increase in 1996 that corresponded to fishers using other gears besides gill nets in state waters and beginning to expansion into federal waters with gill nets (Table 5.1.4.1,

Fig. 5.1.4.1). The standardization process statistically accounted for a sharp change in the type of gear used and location of the fishery after 1995. The comparison of the raw means and the back-transformed standard catch rates shows how the more recent low observed catch rates are adjusted upward in the standardization, especially on the Atlantic coast

5.1.5 Commercial Catch-at-Age

As noted above in Section 5.1.1.6, we sampled for ages of commercially landed Florida pompano only during 1992-94. Other ages obtained from pompano were collected during 2000-02 from the gulf coast where they were collected as part of a fishery-independent study. There have been length samples collected by commercial gear types for the last decade and so we can develop catches-at-length that can be converted to catch-at-age with the age-length keys but these keys are not annual and may lack the resolution needed to determine recruitment variation adequately. These very imprecise 1986-2005 catches-at-age estimates by coast are given in Table 5.1.5.1.

5.2 Recreational

Information on the recreational fishery for pompano comes from the NMFS Marine Recreational Fisheries Statistics Survey (MRFSS). Since 1998, the angler interview information has been collected by FWC under contract from the Gulf States Marine Fisheries Commission. This survey began in 1979 but when NMFS re-calculated the estimates in 1995, the data from the first two years, 1979 and 1980, were inadequate for the revised methods so the data used in this stock assessment were from March 1981 through 2005.

5.2.1 Data Collection Methods

5.2.1.1 Survey Methods

The NMFS Marine Recreational Fisheries Statistics Survey has two parts: a telephone survey to estimate the number of angler trips by stratum and a creel survey to identify what is being caught and the size of the fish being caught. The estimated number of fish caught, kept, and released alive by stratum is the product of the number of trips times the average catch rate. The strata are: sub-region which in Florida corresponds to the Atlantic and Gulf of Mexico coasts, state, year, two-month time period called waves, and mode of fishing (shore, charterboat, and private or rental boats). Information on whether anglers fish in bays, nearshore, or offshore comes from responses in the creel survey. Angling from headboats is not included in MRFSS but rather is estimated from the NMFS Headboat Survey managed by the Beaufort Laboratory. However, headboats rarely catch Florida pompano (less than 100 fish in the 25-year time series) and will not be considered further in this assessment.

Everglades National Park has conducted a creel survey at the Flamingo boat ramp since 1975 and the Everglades City dock since 1979. The park service kindly provides FWC-FWRI with their measurements and the catch information. We acknowledge this assistance in the assessment of Florida pompano.

5.2.1.2 Sampling Intensity

The number of MRFSS interviews in the creel survey conducted in Florida by coast increased during the period 1981-2005, most noticeably beginning in 1998 when the FWC-FWRI began conducting the interview portion of the survey (Table 5.2.1.2.1).

5.2.1.3 Biases

The primary bias of MRFSS for Florida arises from using only two broad geographic strata, each coast. For example, the coastline on the gulf coast of Florida encompasses beaches and barrier islands along the Panhandle, salt marshes along the Big Bend area, extensive estuaries such as Tampa Bay or Charlotte Harbor, beaches and barrier islands along the southwest coast, and the mangrove islands and tidal creeks of the Everglades. All of these habitats are lumped into a single stratum. This concern is because Florida pompano availability changes seasonally along each coast. While NMFS-MRFSS personnel have been sympathetic to this, sample interviews still are drawn from either the Atlantic coast or the gulf coast fishing site registries. Many additional potential biases have been have been identified, e.g., lack of sampling of private access or night fishermen, sampling allocation, and incomplete telephone or fisherman sampling frames (NRC 2006).

5.2.1.4 Biological Sampling

Samplers for MRFSS measure fish that anglers land and volunteer for the survey. On the Atlantic coast, samplers measured between 5 and 151 pompano per year during 1981-2005 and between 1 and 213 pompano on the Gulf coast during the same time frame (Table 5.2.1.4.1). Everglades National Park measures an additional 0 to 78 pompano annually in their creel survey which we included with the gulf samples.

5.2.1.5 Aging Methods

At this time, FWC does not have a program collecting pompano otoliths from the recreational fishery. To get a rough idea of the recreational catch-at-age, we used the same age-length keys that were used for the commercial landings.

5.2.1.6 Development of Estimates

Samplers for MRFSS measure the fish that anglers keep if the angler permits. All measurements are fork length in millimeters. Similar to commercial biostatistics sampling, there were more measurements taken per year after 1993 on the Atlantic coast and after 1991 on the gulf coast. As with the commercial estimation process, we averaged the number of fish by size for the three regulatory periods: prior to 1989 when there was a 9 1/2“ minimum size, the years with the 10-inch minimum size (1990-2003), and the recent years with the 11-inch minimum size (2004 and later). If there were less than 20 measurements made during a given year then we used the average number within each length class from the appropriate management period to determine the relative length composition of the recreational harvest.

Catch per unit effort was estimated from MRFSS angler-intercept interview data. We used all interviews where the anglers either indicated they were fishing for pompano or had caught Florida pompano. Generally, we only use intercept data collected since 1991 to estimate catch per trip, because this is when it became possible to definitively link together all anglers participating in a fishing trip. However, to lengthen the time series of catch-rates for pompano, we have used all single-contributor-only fishing trips to calculate annual standardized catch rates during 1981-2005. A comparison of the mean annual catch-rate estimates from these two datasets (single-contributor and full-party trips) showed that there was little difference in trends over time. We standardized the annual predicted catch-rate estimates using a generalized linear model with a Poisson distributed error fit to the data using a sequential process of including

each explanatory variable, evaluated to improve the model fit with a reduction in deviance of at least 0.5% of the null model deviance. Only main effects were used in the generalized linear model for: year, wave, mode of fishing, county, number of hours fished and avidity (number of days fisher fished in the last two months). Given the highly variable MRFSS angler interview data, certain selections where made to stabilize the catch rate estimates: only shore and private/rental boat fishing modes were used and interviews from Palm Beach County were excluded from the Atlantic coast datasets and interviews from Citrus, Hernando, Monroe, and Wakulla Counties were excluded from the gulf coast dataset. We believe this is justified because of the highly seasonal variability in the catch rates in these areas.

The Marine Recreational Fisheries Statistics Survey (MRFSS) had 2,659 length measurements taken during the period 1981-2005 on the Atlantic coast and gulf coasts. Everglades National Park contributed another 470 lengths to the gulf coast dataset. We developed total-harvest-at-length tables from the annual length frequencies by coast (Table 5.2.1.6.1). These included estimates of the released-alive fish that died, based on the annual estimated number of alive releases (Type B2), a 15% release mortality rate (as in bluefish (Crecco *et al*. 1987), and the composite length composition data samples taken before July 1, 1989 when the 10-inch minimum size limit was enacted. To fill years with sparse or no sampling, we used the composite average number of measurements per inch class from the appropriate regulatory period. There were three regulatory periods: prior to the 10-inch minimum size (1989 and earlier), the years with the 10-inch minimum size (1990-2003), and the 11-inch minimum size (2004 and later). The catch-at-length merely pro-rated the estimated number of fish harvested by the proportions at length. We converted catch-at-length to catch-at-age using age-length keys. Unfortunately, we only have limited age information for pompano. On the Atlantic coast, we used the age-length information from the 1992-1994 study for the 1981-1995 time period and added the 37 fish from the 2000-2002 study for a separate age-length key to apply to the catch-at-length from 1996-2005. On the gulf coast, we used the age-length key from the 1992-1994 study for the 1981-1995 time period and another age-length key from the 2000-2002 study for the 1996-2005 catch-at-length.

5.2.2 Recreational Landings

Florida pompano recreational landings estimates were fairly imprecise during the 1980's, with proportional standard errors averaging over 30%, but this precision improved over time reaching an average of about 15% by the late 1990's. On the Atlantic coast, landings averaged about 145,100 fish during the early 1980's before decreasing to low and relatively imprecise levels generally below 75,000 fish during the period 1985-1994. After this, Florida pompano Atlantic coast landings have varied around an increasing trend (though not significant, Student's *t* test of slope=0, t=1.95, 9 d.f., $P>0.05$) reaching nearly 376,000 fish during 2003 before decreasing to a median of about 225,400 fish in 2005 (Fig. 5.2.2.1). On the gulf coast, a similar pattern of landings occurred: from low and relatively imprecise landings estimates prior to 1998 followed by an increase to a peak of 266,200 fish during 2001 before a decline back to a median of about 160,200 fish by 2005.

The total harvest (including those released alive that subsequently died) is taken mostly by anglers fishing from shore on the Atlantic coast and more evenly divided between shore and boat (both charter and private/rental boats) modes on the gulf coast. On the Atlantic coast, about 86 percent of the average 2004-2005 total harvest was taken by anglers fishing from shore. On the gulf coast during these years, this average was about 54%.

The fishing effort directed at Florida pompano harvest has followed similar trends as seen in total harvest and generally increased since the mid 1990's (Fig. 5.2.2.2). On the Atlantic coast, the estimated number of trips directed at catching pompano dropped to low levels during the late 1980's and early 1990's before increasing rapidly from less than 67,000 trips during 1993 to over 400,000 trips made during 2004 (Table 5.2.2.2). The same trend on the gulf coast showed an increase from about 35,500 trips made during 1990 to nearly 455,000 trips made during 2001. During 2005, the number of fishing trips directed at Florida pompano reached about 380,000 trips on the Atlantic coast and about 250,000 trips on the gulf coast.

5.2.3 Recreational Discards

Samplers for MRFSS ask anglers whether they caught any fish that are not available to show the sampler. Of those unavailable fish, anglers are asked how many fish did they release alive. In the MRFSS jargon, the number of fish released alive are termed Type B2 fish and these are routinely estimated by stratum. For 2004-05, the average percent of pompano released alive was 52% on both coast (Table 5.2.2.1, Fig. 5.2.3.1). There are no direct estimates of the mortality rate associated with capturing and releasing a Florida pompano, so we applied an average value of 15% for release mortality based on bluefish, *Pomatomus saltatrix* (Crecco *et al.* 1987). Recent release mortalities account for approximately 14% of the recreational Florida pompano kill on either coast.

5.2.4 Recreational Catch Rates

Angler catch rates for Florida pompano are generally quite low. The median total catch rates for anglers who were fishing for pompano and were interviewed by the MRFSS was zero in all years where at least five interviews were conducted (Table 5.2.4.1). Despite this, there are apparent year-to-year patterns in the raw mean and standardized total-catch rates that indicate a general upward trend on the Atlantic coast (Student's *t* test of slope=0, $t>2.9$, d.f.=23, $P<0.05$) during 1981-2005 for both raw and standardized catch rates (Figs. 5.2.4.1 and 5.2.4.2). On the gulf coast, the linear trend over this period was not significantly different from a flat line ($P>0.05$).

The raw data showed more dynamic range and higher averages than do the standardized catch rate data, especially on the gulf coast. This is a general characteristic of the highly skewed (lognormal) raw catch rate data that has a median value at zero but includes infrequent high catches. The back-transformed predicted mean estimates from the standardization process (Poisson error distribution in a Generalized Linear Model) are analytically comparable to the median catch rates for the raw data. Also, the standardization process ascribes some of the variability in catch rates to the impacts of differences in sample characteristics each year, e.g., fishing modes, waves or counties. For the Atlantic coast, nearly 24% of the mean deviance (a measure of lack of fit between the model and the data) of the null model (catch rates equal a constant) was explained by factors that effected the catch rates (Table 5.2.4.2). On the gulf coast, the final model's explained deviance relative to the null was less at about 21%.

5.2.5 Recreational Catch-at-Age

As noted above in Section 5.1.1.6, we only have age sampling for landed pompano from one time periods: 1992-94 but those samples were from the commercial fishery and not gear-specific. Also, 2000-02 samples of ages were taken from Florida pompano from the gulf coast as part of a fishery-independent study. Despite these restrictions and the sparse length

composition data gathered by the MRFSS it is possible to converted total harvest length estimates to catch-at-age using the age-length keys (Table 5.2.5.1).

5.3 Fishery-Independent Survey Data

Fishery-independent-survey-based trends for young-of-the-year (defined as Florida pompano less than or equal to 180 mm fork length, K Guindon, FWC-FWRI pers. comm.) were derived from data collected by the FWC's Fishery Independent Monitoring program's stratified random survey conducted along the gulf coast of Florida, in Apalachicola Bay, near the Cedar Keys, Tampa Bay, and Charlotte Harbor; and along the Atlantic coast of Florida in the southern and northern Indian River Lagoon and in the lower St. Johns River area.

5.3.1 Data Collection Methods

5.3.1.1 Survey Methods

The FWC's Fishery Independent Monitoring (FIM) program uses a stratified, random design to collect abundance and size-structure information from animal populations. Strata are primarily defined by depth, shore type (overhanging or not), and bottom vegetation (sea grass or not). Young-of-the-year Florida pompano indices were based on mean annual coast-specific catch rates for young-of-the-year fish (< 181 mm FL) calculated using all available monitoring data collected during the period 1998-2005 using any gears that had been used to successfully capture pompano young-of-the-year. These gears were the 70' bag seine, 600' haul seine, and purse seine.

5.3.1.2 Sampling Intensity

Florida pompano are infrequently encountered by the fishery-independent monitoring program because much of the juvenile habitat for pompano occurs along the sandy ocean-front beaches that are not part of the monitoring survey's sampling frame. On either coast, less than 1% of the gear sets during the survey recorded catches of Florida pompano, averaging 0.6% on the Atlantic coast and 0.5% on the gulf coast (Table 5.3.1.2.1). The number of gear deployments increased from about 900 sets per year during 1998-2000 on the Atlantic coast to about 2,300 set per year in 2005. Sampling intensity also increased on the gulf coast from 2,865 sets made in 1998 to 4,632 sets made in 2005.

5.3.1.3 Biases

The fishery-independent stratified random survey is designed to sample animals randomly within strata so bias should be minimal. There has been an expansion of the program over the years to include new times of the year and new areas and this may affect the coast wide average catch rates because there are likely to be seasonal or spatial differences in pompano density along the coast within each year. The sparseness of the data made the use of statistical techniques that "adjust" for these factors, e.g. GLM, impractical. Another issue, especially for small pompano, is the difficulty in distinguishing them from small permit, though QA/QC steps are in place in the survey to address this issue (R. Matheson, FWC-FWRI, personal comm.).

5.3.1.4 Biological Sampling

Routine fishery-independent survey protocol calls for measuring a whole sample or a random subsample of 20 fish captured during each set and releasing these fish alive. Florida

pompano were measured as part of this work, though few lengths were recorded prior to 1998 when larger collecting gears (600' haul seine and purse seine) were first used (Table 5.3.1.4.1). In general, two size-classes of Florida pompano were collected; young-of-the-year ranging 2-5 inches fork length and adult fish larger than 10 inches long.

As part of a special life history study, FWC-FWRI personnel captured Florida pompano using trammel nets targeting schools occurring in Tampa Bay and adjacent nearshore gulf waters (within a mile of the beach) during 2000-2002. Of the 782 fish successfully aged, most were 9-14 inches fork length, with a group of pompano 4 and 5 inches long collected during 2001 (Table 5.3.1.4.2).

5.3.1.5 Aging Methods

The technique used to determine age for Florida pompano is discussed in Section 5.1.1.5. Florida pompano collected during stratified random sampling are routinely sampled for mercury contamination, lengths, weight, sex, and aging part. The age of young-of-the-year used in this assessment was inferred from fork length, <181 mm, based on age and growth work conducted on Florida pompano sampled from the commercial fisheries landings and from fish taken in directed life history study sampling.

5.3.1.6 Development of Estimates

Catch rates for young-of-the-year Florida pompano were estimated as simple coast-specific arithmetic means of the total count of small (<181 mm FL) fish that were available in stratified random samples collected each year. The monthly pattern of catch during 1998-2005 shows that recruitment of Florida pompano peaks in May on the Atlantic coast and during July on the gulf coast (Fig. 5.3.1.6.1). Young-of-the-year are also present in samples through October or November on the Atlantic and gulf coasts, respectively, either as a reflection of growth within the age-0 age class or a protracted spawning season.

5.3.2 Catch rates

Fishery-independent catch rates for Florida pompano are very imprecise and very low. On the Atlantic coast, there appears to have been an increase in the abundance of recruits during the period 2002-2004 but these estimates were highly imprecise and based on positive catches from 20 or fewer sets made each year (out of about 2,000 sets made each year, Table 5.3.1.2.1, Fig. 5.3.2.1). On the gulf coast, there was no significant trend though recent levels of recruitment appear to be lower than those measured during the period 1998-2001.

5.3.3 Length/Weight/Catch-at-Age

Only the fishery-independent monitoring data for young-of-the-year Florida pompano are used in this assessment. They are assumed to be age-0 when less than 181 mm fork length and this has been confirmed using ages determined using otolith ring structures.

5.3.4 Abundance Indices

Indices of abundance were calculated as the mean annual catch rates for young-of-the-year Florida pompano captured during fishery-independent monitoring on each Florida coast. The log values of these indices are assumed to be linearly related to the abundance of age-0 pompano.

5.3.5 Biomass Indices

There are no fishery-independent biomass indices for Florida pompano at this time though they could be developed by applying the length – weight relationships (see Section 2.2 Growth) to the size frequency information for the pompano captured in the fishery-independent survey.

5.4 Uncertainties/precision estimates

The estimated precision of the mean catch rates for young-of-the-year pompano is somewhat greater on the gulf coast than on the Atlantic coast. The coefficient of variation for the mean annual catch rates on the gulf coast ranged from 35 to 50% (45% mean, Table 5.3.1.2.1). On the Atlantic coast the range was 28-44% (37%).

6.0 Methods

6.1 Models

The stock condition of Florida pompano was evaluated through a suite of methods. The population dynamics models, arranged in order of data needs, ranged from non-equilibrium surplus production and modified DeLury to stock reduction analysis and untuned virtual population analysis. We intended to develop statistical catch-at-age models but the length and age samples were inadequate for this data-intensive approach. For example, on the Atlantic coast, less than half of the year-gear combinations had 20 or more lengths (50 out of 105). While we describe and report the findings from all of these models below, those models for which we have the most robust input data are the surplus production, stock reduction analysis, and to a lesser extent, the modified DeLury.

6.1.1 Surplus production

We developed a non-equilibrium, surplus production model in Microsoft Excel based on the discussion presented in Hilborn and Walters (1992) and Prager (1994). As Nelson and Murphy (2001) noted in a previous pompano assessment, the intention of surplus production models is to describe biomass changes over time. There are two simple equations for the model, the first equation relates the biomass at a particular time (t) to the biomass at a future time (t+1):

$$B_{t+1} = B_t + rB_t(1 - B_t / K) - \sum_{f=1}^{fleets} C_{f,t} \qquad (1)$$

where B_t is the biomass at time t, r is a dimensionless net rate of growth in biomass, K is the carrying capacity (biomass) of the environment and $C_{f,t}$ is the catch for fishing fleet f during time t. The second equation relates the catch to the biomass:

$$\hat{C}_{f,t} = q_f E_{f,t} B_t \qquad (2)$$

Where q_f is the catchability coefficient (per unit effort) for fleet f which links effort by time and sector (fleet) to biomass, and $E_{f,t}$ is the effort expended by that fleet during time t. This is an approximation since catch is actually a function of the average biomass during the year not the

biomass at the beginning of the year. The final objective function minimized during the fitting process was:

$$Obj.Func. = \frac{n}{2} \sum_{f=1}^{fleets} \sum_{t=1}^{years} \ln(C_{f,t} / \hat{C}_{f,t})^2$$

where *n* is the total number of years of catch by each fleet used in the model. A penalty function was used to enforce the assumption that the biomass at the beginning of the first year was less than the carrying capacity.

Separate production models were developed for each coast using catch and effort data for the years 1981 through 2005. In these models, we used the annual reported commercial and estimated recreational landings (pounds), annual number of reported commercial trips, and the estimated number of recreational trips. Pounds of pompano harvested in the recreational fishery were MRFSS's total weight estimates of landed fish. Pounds of pompano lost due to hooking and handling (release mortality) were estimated by taking 15% of the estimated weight of fish that were released alive (Type B2, Murphy *et al.* 1996). Weight for these released fish was estimated by multiplying the average weight of fish kept by the number of fish released. If there were landings in a stratum but no average weight, then the average weight was calculated as the average of the previous and following waves. Annual commercial effort was calculated for the period 1981-1984 as the annual reported catch each year divided by the average 1985-1987 catch per unit effort. While this allows us to report the estimated commercial fishing effort for these years, the model-predicted catches for these years are not used in the objective function used to evaluate the model fit to the data. Although inshore versus offshore landings for the commercial sector were presented earlier, not all trip tickets contained information on the location of fishing on the trip and so we decided to use different time-period-specific catchability coefficients to capture the change in fishing practices by fishers instead of trying to fit offshore data separately from inshore data as was done by Nelson and Murphy (2001).

6.1.2 Modified DeLury

A modified DeLury model (Rosenberg *et al.* 1990) was used to estimate population sizes and fishing mortality rates each year. The modified DeLury model uses information from the numbers caught over time and the fishing effort to estimate parameters representing the initial number in the population, N_o, the catchability coefficients by sector and time period, and the number of recruits entering the fishery each year. In other DeLury models that we have developed such as for stone crab (Muller and Bert 2001), we assumed that recruitment occurred during a particular season but with the overlap of ages in pompano, we used a continuous recruitment model developed by Carl Walters of the University of British Columbia. Walters's model stems from the simple idea that recruits increase the number of fish and mortality decreases it. Expressed mathematically,

$$\frac{dN}{dt} = R - ZN$$

Where *dN/dt* is the change in numbers with time, *R* is the number of fish entering the exploited portion of the population, Z_t is the total instantaneous mortality rate, and *N* is the number of fish

in the population. Solving the differential equation (3) gives an expression for the number of fish at time *t+1* from time *t*:

$$N_{t+1} = \frac{R_t}{Z_t} + (N_t - \frac{R_t}{Z_t})e^{-Z_t}$$

And the predicted catch for a given sector *f* and time *t* is:

$$\hat{C}_{f,t} = q_f E_{f,t} Nbar_t$$

where $Nbar_t$ is the average number in the population during the time step *t*; R_t is the recruitment in numbers at time *t*; N_t is the number in the population at the beginning of time *t*; $C_{f,t}$ is the catch during time *t* for fleet *f*; q_f is the catchability coefficient that relates the mortality expended by one unit of effort by fleet *f*; and $E_{f,t}$ is the effort expended by a fleet during time *t*. With continuous recruitment, $Nbar_t$ is also modified to:

$$Nbar_t = R_t + (N_t - \frac{R_t}{Z_t})\frac{(1 - e^{-Z_t})}{Z_t}.$$

We used a natural mortality rate (*M*) of 0.40 yr^{-1}based on a maximum age for pompano of 10 years and derived the fishing mortality rate ($F_{f,t}$) using the relation for instantaneous rates,

$$\sum_{f=1}^{fleets} F_{f,t} = Z_t - M .$$

The parameters that maximized the sum of the partial and full log likelihood functions included in the objective function:

$$Obj.Func. = \sum_{f=1}^{fleets} (n_f(\ln(\sigma_{c_f}) + \frac{\ln(2\pi)}{2}) + \sum_{t=1}^{years} \ln(C_{f,t} / \hat{C}_{f,t})^2 / 2\sigma_{c_f}^2) + \sum_{t=1}^{years} \frac{(a_t - 1)^2}{\sigma_a^2},$$

were used to calculate abundance and fishing mortality. The full likelihoods for the $\log_e$ catch deviations included terms for the observed standard deviation and variance, σ_{c_f} and $\sigma_{c_f}^2$, for the $\log_e$ catch across years for each fleet *f* and the number of years of catch data for each fleet, n_f. The partial log likelihood for the multiplicative recruitment deviations, *a*-1, included an assigned variance term set equal to 0.25. The model that we used treated the harvests from recreational and inshore and offshore commercial fisheries separately and also allowed for a change in catchability after 1995 in the commercial fishery.

6.1.3 Untuned Virtual Population Analysis

A sequential population analysis using Gulland's cohort analysis approach was applied to the catch-at-age data estimated for the Florida pompano recreational and commercial harvest.

This analysis assumes that the catch-at-age is known without error and a terminal (oldest age) fishing mortality is known. In order to estimate fishing mortality for the oldest observed age in incomplete cohorts (those that have not finished their lives within the fishery), a partial recruitment vector containing all 1.0's was used. This meant that the fishing mortalities for all ages present in the last year were assumed known. This analysis uses the relation:

$$N_{t,a} = \frac{C_{t,a} Z_{t,a}}{F_{t,a}(1 - e^{(-Z_{t,a})})},$$

to estimate the abundance, $N_{t,a}$, for a given age, a, at the beginning of year t. By iteratively solving for the previous year's and age's $F_{t-1,a-1}$ that satisfies:

$$\frac{Z_{t-1,a} - 1e^{(-Z_{t-1,a-1})}}{F_{t-1,a-1}(1 - e^{(-Z_{t-1,a-1})})} - \frac{N_{t,a}}{C_{t-1,a-1}} = 0$$

and sequentially solving for a given year's and age's N and previous year's and age's F, a complete set of year- and age-specific N's and F's can be generated.

6.1.4 Stock reduction analysis

Stock reduction analysis (SRA) reconstructs the historical fishery extending as far back as possible. We used a version of the stock reduction analysis called StochasticSRA developed by Dr. Carl Williams and his students at the University of British Columbia for the recent red grouper stock assessment conducted by NMFS's Southeast Fisheries Science Center (SEDAR 12). Unlike earlier versions that estimated uncertainty for recruitment compensation (recK) and unfished population recruitment (R_0), this version estimates the uncertainty about population dynamic parameters that are of interest to managers, i.e. maximum sustainable yield (*MSY*) and the fishing mortality associated with this level of yield (F_{MSY} but expressed as an exploitation rate, U_{MSY}). Martell *et al.* (2007) derive the analytical solutions that identify the stock-recruit relationship for any combination of *MSY* and F_{MSY}. This method first, randomly chooses values of *MSY* and U_{MSY} then calculates the parameters for the spawner-recruit equation:

$$R_t = \frac{recK(R_0 / E_0)E_t}{1 + \frac{(recK - 1)}{E_0} E_t},$$

using age-composition summary information on eggs per recruit for an unfished population, $EPR_{F=0}$, eggs per recruit for a population fished at the chosen U_{MSY}, $EPR_{Fmsy,}$ and vulnerable biomass per recruit for a population fished at the chosen U_{MSY}, BPR_{Fmsy}. Parameters in the spawner-recruit equation are R_0 and E_0, the unfished population recruitment and egg production; and *recK*, the compensation ratio. The compensation ratio can be calculated as:

$$recK = \frac{EPR_{F=0}}{EPR_{Fmsy}} - U_{MSY} BPR_{Fmsy} \frac{\dfrac{\sum_{a=1}^{a=ages} Fec_a \, dl_a/da}{EPR_{F=0}}}{\left(\dfrac{EPR_{F=0}}{EPR_{Fmsy}}\right)^2 (BPR_{Fmsy} + U_{MSY} \sum_{a=1}^{a=ages} W_a v_a \, dl_a/da)},$$

where Fec_a, W_a, and v_a are the fecundity, weight, and vulnerability at age a, respectively, and dl_a/da is the change in survival at age a with respect to age under the rate of fishing, U_{MSY}. The estimate for R_0 follows given the choice of MSY and U_{MSY} as:

$$R_0 = MSY/(U_{MSY} \, BPR_{Fmsy}) \left(\frac{recK - 1}{(recK - 1) EPR_{F=0}/EPR_{Fmsy}} \right),$$

and E_0 can be determined using the unfished eggs per recruit ratio:

$$E_0 = R_0 EPR_{F=0}$$

Given a spawner-recruit relation, an initial population age structure, and a lognormal set of recruitment anomalies, an age-structured population model can be used to project abundance of the population each year, given the observed catch is removed. This is repeated many, many times so that a set of U_{MSY} and MSY pairs are determined that do not lead the population to extinction over the course of the projection, while supporting the observed annual catches and fitting a series of recent abundance indices. An importance-resampling algorithm is employed so that the choice of each new pair of U_{MSY} and MSY values is effected by the likelihood that these values will result in a fit to the abundance indices series (as measured in all earlier trials). This way the relative distribution of these "accepted" pairs describe the likelihood profiles for U_{MSY} and MSY.

6.2 Model Calibration

The inputs used to calibrate the surplus production model were annual series of catch and effort data from the commercial and recreational fisheries; configured within time frames that mirror different management phases of the fishery. Because eliminating entangling nets after June 30, 1995 likely changed the effectiveness of a commercial fishing trip, we used different catchability coefficients for the periods 1981-1995 and 1996-2005. There were no changes to the recreational fishery that would have changed the efficiency of angler gear so only one catchability coefficient was used for the recreational sector. Thus, the model reduces to solving for a biomass to start the series, B_1, and then the six parameters mentioned above: r, K, $q_{rec\ 81\text{-}05}$, $q_{com\ 85\text{-}95}$, and $q_{com\ 96\text{-}00}$ by minimizing the differences between the $\log_e$ values of the observed and predicted catches by sector. Following Prager's recommendation, we added a penalty to the sum of squared residuals if the initial biomass exceeded the carrying capacity as the squared difference between the $\log_e$ values for carrying capacity and the initial biomass. In practice, it is difficult to determine the absolute estimates of fishing mortality or population biomass from a surplus production model unless the original population biomass is known.

Also, it has been shown that the ratios of fishing mortality and biomass to their respective estimates at maximum sustainable yield (*MSY*) are much more accurately estimated than the actual values and are valid indicators of the status of the stock (Prager 1994).

The modified DeLury model utilized data similar to that used in the surplus production model but used the quantities for numbers of fish rather than weight and included a recent index of young-of-the-year abundance to indicate trends in recruitment. Landings reported by the offshore commercial fishery in more recent years (Atlantic, 1990-2005; gulf, 1991, 1994-2005) was also separated from the annual commercial landings (1985-2005) and related to only the offshore fishing effort. The recreational landings and effort data were available for 1981-2005. The model was calibrated using reported commercial trips, estimated recreational trips, and fishery-independent survey (1998-2005) estimates of relative abundance.

The untuned virtual population analysis requires a series of catch-at-age data, a selectivity vector for the last year and an estimate of the instantaneous fishing mortality on the oldest (terminal) age group, F_{term}. These analyses were conducted for each coast for the combined fisheries catches made during 1981-2005. In the analyses, catch-at-age were used for ages 0 through an age 6^+ group, the instantaneous natural mortality rate (M) was set at 0.40 yr^{-1}, and F_{term} was varied between 0.1 and 1.0 by 0.1 units. The final year partial recruitment vector used 1.0's across all ages, except for 0.1 for age-0 on the gulf coast.

The SRA model uses the annual landings in biomass, a tuning index reflecting relative abundance, and various descriptors of growth and maturity. In the case of Florida pompano, we assumed that the early commercial landings were all Florida pompano. Landings for pompano for 1889 on the Atlantic coast were reported in the 1890 report of the U.S. Fish Commission while the earliest reported landings on the Gulf coast were from 1902. Landings were not estimated every year, so we filled in the landings for the missing years with the average of the previous reported landings and the next reported landings. Recreational landings began in 1981, so we had to account for some level of removals by anglers for the earlier years. In the absence of information about the recreational harvest of pompano, we used a linear extrapolation from 1981 back to 1945 realizing that anglers existed prior to then but, angler removals were believed to be at low levels given that Florida's population in 1945 was only about 14% of today's population (2.45 million vs. 17.7 million).

6.2.1 Tuning Indices

Tuning indices or measures of relative abundance over time were needed for the modified DeLury model and for the stochastic stock reduction model (SRA). The modified DeLury model utilized indices of relative abundance developed from the fishery-independent survey catch rates for young-of-the-year (defined as <180 mm FL) Florida pompano (see Section 5.3.3). The mean annual catch rates during 1998-2005 were assumed to be linearly related to the beginning-of-that-year's abundance of young-of-the-year Florida pompano.

The tuning index (assumed linearly related to vulnerable biomass) used in the SRA were the median standardized total catch rates for anglers generated from the available angler catch data available during 1981-2005 (Table 5.2.4.1).

6.2.2 Input Parameters and Specifications

The surplus production model was run using catch and effort data available or estimated for the years 1981-2005. The solution to the surplus production model on the Atlantic coast required an assumption that the intrinsic rate of increase was equal to 0.75 yr^{-1}, similar to the

estimate made for the gulf coast. A penalty inhibiting the starting biomass estimate to exceed the carrying capacity estimate was used but had a final value of zero when the best estimated model was found on each coast.

The modified DeLury model required an input parameter estimate for instantaneous natural mortality (M) of 0.40 yr^{-1} and an assumption that the annual recruitment deviations from the original equilibrium recruitment estimate (R_0) are lognormally distributed across years with recruitment anomalies have a mean of 1.0 and a variance of 0.25 $fish^2$. This model was run using catch and effort data for both the commercial and recreational fisheries during 1981-2005 on each coast. The commercial fishery was divided into the traditional inshore fishery and the more recently developed offshore fishery.

The untuned VPA required input parameters estimates for M (0.40 yr^{-1}), terminal F, and last year combined-sector selectivity across age. This analysis was run for each coast for the period 1981-2005.

The stochastic stock reduction analysis required a variety of life history information and assumptions about variability of recruitment and growth, and vulnerability to the fishery. The growth of Florida pompano was assumed follow a von Bertalanffy growth equation with parameters (L_∞, K, and t_0): 409 mm FL, 0.309 yr^{-1}, and -1.78 years on the Atlantic coast and 393 mm FL, 0.401 yr^{-1}, and -2.47 years on the gulf coast (Figure 6.2.2.1). Fisheries vulnerability at age (selectivity) was taken as the average selectivity estimated from the untuned VPA runs for two periods on each coast: 1988 and earlier and 1989-2005. These selectivities were for ages 0-4 on the Atlantic coast and ages 0-3 on the gulf coast, with the oldest age selectivity repeated for ages out to age 10. Other input parameters that were common to both coasts: survival from natural mortality, 0.67; the coefficient of variation for length at age, 0.15; the standard deviation for recruitment anomalies, 0.5 fish with no autocorrelation among recruitment estimates (Table 6.2.2.1). The theoretical weight at 100 cm and length at maturity inputs were determined by minimizing the differences between model estimated weight-at-age and the observed weight-at-age and the model estimated fecundity schedules and the observed maturity schedule.

7.0 Outputs/Results

7.1 Goodness of Fit of Models Used

The fit between the observed and predicted fisheries catches used in the surplus production model were good, with only slight patterns seen in residuals. On the Atlantic coast, the recent (1998-2005) commercial catches were slightly over-estimated while most of the recent recreational catches were under-estimated (Fig. 7.1.1). Residuals for both fisheries were normally distributed with a mean close to zero. On the gulf coast, there were no obvious trends in the residuals, though the 1986 predicted recreational catch was much lower than the observed value (considered an outlier in DeLury analysis below).

The modified DeLury analysis uses observed fisheries catch data and an index of abundance to estimate abundance and fishing mortality. On the Atlantic coast, the inshore commercial fishery catches were fit well but the offshore catches were underestimated during 1996-2001 (Fig. 7.1.2). The recreational catches were fit well, though the 1986 data point was not used in the analysis because it was considered an outlier (greater than ten standardized deviations from the mean). The young-of-the-year index used for the Atlantic coast began in 1998 and was not fit well with this model; the model-predicted young-of-the-year abundance was much less dynamic than were the observed indices. This was somewhat controlled during

the modeling process with a chosen input value for the expected standard deviation of recruitment anomalies, coefficient of variation equals 0.25. On the gulf coast, there was an apparent slight underestimation of the commercial and recreational catches in recent years. The offshore commercial catch residuals were peaked and highly skewed to the right, with most residuals lying within one standard deviation of the mean. The young-of-the-year index was fit better on the gulf coast than on the Atlantic coast, probably due to the very limited range of the index values on the gulf coast.

The virtual population analysis is deterministic once the terminal F and last-year partial recruitment vectors are chosen. Therefore, there are not goodness-of-fit observations or statistics for this analysis.

The stochastic stock reduction analysis is essentially an exploratory tool used to derive likely estimates of importance management parameters, e.g. U_{MSY} and *MSY*, given the observed persistence of the exploited population through time. The estimated trends in vulnerable biomass are contrasted with the available recreational fishery total catch rates to help estimate the likely management parameters. For both coasts, these observed data were available for the period 1981-2005 and overall fits to the trends in estimated vulnerable biomass was good (Fig. 7.1.3). The estimated trends in biomass on the Atlantic coast were somewhat smoother than the observed biomass trend data, which showed sharp swings in abundance year-to-year. On the gulf coast, the observed indices showed less year-to-year variability (except for extremes in 1983 and 1990) and were fit more closely by the model.

7.2 Parameter Estimates

7.2.1 Exploitation Rates

All estimated trajectories for instantaneous fishing mortality over time showed a declining trend from the mid 1980's until 1996, then a sharp increase in 1997. On the Atlantic coast, all three models used to estimate fishing mortality (surplus production, modified DeLury, and stock reduction analysis) showed an increase between 1996 and 1998, followed by fluctuations ending in an increase during 2002-05 (Fig. 7.2.1.1). The Atlantic coast instantaneous fishing mortality declined from about 0.4 yr^{-1} in 1993 to less than 0.2 yr^{-1} in 1996 (Table 7.2.1.1). After 1996, all models showed a rapid increase in F through 1998 to about 0.5 yr^{-1}. Fishing mortality then fluctuated without trend until it increased again either in 2003 or 2004, reaching an average of about 0.6 yr^{-1} during 2004 and 2005. On the gulf coast, the magnitude of F was much less certain than on the Atlantic coast throughout the time frame examined, 1981-2005, though all models showed a consistent pattern of a decline in fishing mortality during 1992-1996 followed by an increase through 1998. From 1998 through 2002, the instantaneous fishing mortality fluctuated without trend averaging between about 0.2 yr^{-1} and 0.7 yr^{-1} (Table 7.2.1.1 and Fig. 7.2.1.1). This declined during 2003 and 2004 reaching a low that ranged from about 0.1 yr^{-1} to 0.3 yr^{-1}. During 2005, the estimated F ranged from 0.1 yr^{-1} to 0.4 yr^{-1}.

7.2.2 Abundance Estimates

The estimated average annual abundance or biomass estimates varied widely on each coast but was in a similar broad range between coasts, about 1.0 to 4.0 million exploitable-sized fish weighing about 0.3-1.2 million pounds. On the Atlantic coast, estimated exploitable biomass consistently showed peaks in 1997 and 2003, though the SRA estimated a higher

biomass than did the surplus production model (Table 7.2.2.1 and Fig. 7.2.2.1). Estimated biomass declined from 1.3-1.8 million pounds in 1997 to about 1.1 million pounds in 2001 then increased to about 1.2-2.2 million pounds in 2003. The range of estimates for 2005 was about 0.8-1.3 million pounds of exploitable-sized Florida pompano. The average exploitable abundance, as estimated by the DeLury model, showed similar peaks in 1997 and 2003 as seen in the biomass estimates. Peak abundance estimate were about 0.8 million fish in 1997 and 0.7 million fish in 2003, with a 2005 estimate of about 0.63 million exploitable-sized pompano.

On the gulf coast, there was a general increasing trend in abundance or biomass through about 1990 then a more steady level through 2005. The SRA showed large fluctuation in estimated vulnerable biomass during the 1980's that damped down to lower amplitude fluctuations during the 1990's and 2000's (Fig. 7.2.2.1). Both models providing estimates of exploitable biomass, surplus production and SRA, showed an increase to about 3.5 million pounds in 1992 which increased only slightly to an average of 3.8 million pounds by 2005. Results of the modified DeLury model indicate that this represents an average exploitable population size averaging about 0.7 million fish. This estimate of abundance appears to be low considering it implies an average size of pompano in the exploited stock of about 5 pounds, much larger than is likely to occur in nature.

7.2.3 Precision of Parameter Estimates

Some indication for the precision of vulnerable biomass and fishing mortality can be inferred from the spread of the estimates from the various modeling techniques. The stochastic stock reduction analysis provides estimates of the likely distribution of average stock biomass. If the three modeling technique's estimates of instantaneous fishing mortality are taken as random observations of F each year, their annual coefficients of variation (CV) should be some indication of the precision of the estimates. On the Atlantic coast, the coefficients of variation for F range from lows of less than 10% in 1982, 1992-93, and 1998 to nearly 50% in 1984; generally average about 17% during the 2000's (Table 7.2.1.1). On the gulf coast, the apparent precision was much lower; averaging about 69% during the 1980's and 1990's then just under 60% during the 2000's. Average exploited biomass estimates from the surplus production model and the SRA suggested coefficients of variation on the Atlantic coast that around 40% recently (Table 7.2.2.1). On the gulf coast, CV's were less than 20% after 1987. The distribution of the vulnerable biomass estimates from the stock reduction analysis (Fig. 7.2.3.1) support the between-model-estimated levels of CV's for the Atlantic coast after 1989 but suggest much lower CV's during the period 1983-89. On the gulf coast, the stock reduction analysis distribution of vulnerable biomass suggested much lower CV's than estimated between models, approximately 70% lower.

7.3 Projection Estimates

No projections were attempted within the framework of the modified DeLury, non-equilibrium surplus production, untuned VPA models or the SRA model.

7.4 Sensitivity Analyses

The use of various models was designed to understand model estimate precision. There was no explicit sensitivity analyses conducted within each modeling framework.

7.4.1 Sensitivity to Model Configuration

This was not explicitly determined.

7.4.2 Sensitivity to Input Data

This was not explicitly determined.

7.5 Retrospective Analyses

The non-equilibrium stock production model has been used since the 2001 FWC-FWRI assessment of Florida pompano (Nelson and Murphy 2001). A retrospective analysis of the current and past estimated fishing mortality rates and biomasses from this modeling approach provides a typical retrospective analysis, which is an evaluation of how the addition of new data have effected the assessment findings. However, we also incorporate differences between the analysts' catch and effort compilation, model structure, the choice of initial model year, and assumptions about starting conditions and parameter penalties when we compare estimates made during each assessment cycle. The input data for these models have been refined over the years and while most data are fairly stable, there have been large changes in our input data on recreational fishing effort. Our understanding of how recreational trips can be fully reconstructed changed between this assessment and Muller *et al.* (2002), with the most obvious differences occurring on the gulf coast (Fig. 7.5.1) where the retrospective patterns were the greatest. Other differences between the current assessment's surplus production model run and that of Muller *et al.* (2002) were: 1) a single catchability coefficient estimate for the gulf (current assessment) compared to two catchability coefficient used in Muller *et al.* (2002); 2) the intrinsic rate of increase, *r*, for the Atlantic coast was assumed equal to 0.75 here whereas Muller *et al*. estimated it; and 3) the data was assumed lognormal in this assessment but were assumed Poisson (square-root transformed) in the last assessment. All changes made this year are considered improvements to the analysis and, by extension, any differences between past and current results are judged to show the amount of bias in past assessments.

There is a retrospective pattern with regards to the estimate of fishing mortality where the most recent estimate is revised downward with each new assessment. The reduction in the terminal year's estimate when a new year's data were included was 20-22% on the Atlantic coast and 54-58% on the gulf coast (Fig. 7.5.1). The estimated biomass shows the opposite trend with an upward revision with the inclusion of another year's data, increasing 21-67% on the Atlantic coast and 80-231% on the gulf coast. The retrospective patterns tend to indicate that past status determinations were often more pessimistic than they should have been.

7.6 Selectivity

There was little confidence that the available age-structure information was adequate to describe the age structure of the catch. However accepting this uncertainty, the results of the untuned VPA may provide some indication of the relative selectivity of Florida pompano for a fisheries-aggregated catch (Fig. 7.6.1). On both coasts, selectivity appeared to peak with maximum retention at age 2, though the shape of the selectivity pattern changed after 1988. The recreational fishery appears to capture larger Florida pompano than the gill-net oriented commercial fishery. On the Atlantic coast, where the recreational fishery is larger, the selectivities are low for all ages except age 2 and age 3. On the gulf coast where the highly selective commercial fishery has been more dominant until recently, selectivity is higher for ages 1 and 2 and falls to relatively lower levels for ages 3 and 4.

8.0 Biological Reference Points

8.1 Overfishing Definition

There is currently no clear definition of overfishing for Florida pompano in Florida. The management goal enacted in 1988 by the Marine Fisheries Commission defined a goal to manage for "maximum sustainable abundance and utilization". Though these two concepts, maximum abundance and maximum utilization, are contrary goals, we interpret the goal as management for maximum sustainable yield (MSY). The previous pompano stock assessments have assumed that maximum sustainable yield is the reference point against which the Florida pompano status is determined (Muller *et al.* 2002). In this assessment, we also utilize a definition for judging if the stock is overfished (biomass too small) that accommodates the resilience associated with fish like pompano that have high natural mortality (M) rates and few age classes in the population (Restrepo and Powers 1999). This definition states that the biomass threshold is reached if the stock's biomass is reduced to 1-M times (=60%) the biomass expected at MSY.

8.2 Stock Recruitment Analysis

Recruitment data is available from the modified DeLury analysis though this model was configured under the assumption that recruitment varied without any underlying relation with spawning stock size. This generally provided smaller population and recruitment estimates than seen from the other analyses and higher fishing mortality rates so it was not considered as realistic for the stock recruitment analysis. The stochastic stock reduction analysis provides estimate distributions for the most likely stock-recruit relationship parameters R_0 (unfished recruitment level) and *recK*, the recruitment compensation ratio but not the unfished spawning stock biomass level (S_0). The yield-per-recruit analysis was used to estimate the unfished spawning-stock-biomass-per-recruit ratio and from this multiplied by R_0, we inferred S_0. The spawner-recruit parameters provide spawner-recruit relationships that suggest that Florida pompano recruitment on the Atlantic coast is on the portion of the relationship where density-dependent effects limit any increases in recruitment (Fig. 8.2.1). Likewise, on the gulf coast spawning stock biomass is approaching the level where recruitment is on the flat part of the asymptotic curve. It appears that on neither coast are the current levels of spawning stock biomass at levels that severely depress recruitment.

8.3 Yield and SSB per Recruit

Without reliable age-composition data to support the accurate estimation of fishery-selectivity-at-age, it was difficult to provide a yield-per-recruit or spawning stock biomass-per-recruit analysis. The partial recruitment vector (selectivities) and fully recruited F needed for the analyses were derived from a simple separable virtual population analysis (Pope and Shepherd 1982). This analysis used the estimated age composition of the catch, rough estimates of F in the last year and the likely selectivity of the oldest age in the catch data. The analyses were also split into two time frames, 1981-1988 and 1989-2005, corresponding to periods of constant size limit. Using these estimates and the necessary life history information suggests that maximum yield-per-recruit occurs at much higher fishing mortality rates than currently seen on either coast. The current 2005 F was much slightly higher than the yield-per-recruit metric $F_{0.1}$ (often used as a measure of overfishing) on the Atlantic coast and less than the $F_{0.1}$ on the gulf coast (Fig. 8.3.1). Additionally, at current fishing mortalities the estimated spawning potential ratio is

relatively low on the Atlantic coast, 26%, and higher on the gulf coast, 35%. The current impact of fishing (shape of the yield curve in Fig. 7.6.1) on both yield per recruit and spawning stock biomass per recruit was similar on both coasts because of similarities in growth and selectivity across ages.

8.4 Stock Production Model

The biological reference points available through stock production modeling include estimates of maximum sustainable yield and the stock biomass and fishing mortality associated with maximum sustainable yield. The estimated MSY for Florida pompano was 550,578 pounds on the Atlantic coast and 881,687 pounds on the gulf coast (Table 8.4.1). The combined-fisheries landings (Table 6.2.1.1) rarely exceeded MSY on the Atlantic coast prior to 1997 but since then have exceeded this level in all but 1998, 2000, and 2003-05. On the gulf coast, the combined fisheries catches have remained below the estimated MSY level during the entire 1981-2005 period, except in 1986.

Stochastic stock reduction analysis also estimates a distribution for MSY, though these are not output from the program. Interpreting the values for MSY from their graphical representation, the Atlantic coast estimates is about 585,000 pounds and the gulf coast estimate is about 795,000 pounds. Compared to estimates of MSY from the surplus production modeling, the SRA estimates are similar but slightly higher than the Atlantic coast estimate and somewhat lower than the gulf coast estimate.

The production-model-estimated stock biomass associated with MSY (B_{MSY}) was about 1.5 million pounds on the Atlantic coast and 2.3 million pounds on the gulf coast. At these biomass levels, the MSY would be taken at similar fishing mortalies (F_{MSY}) of 0.38 yr^{-1} on each coast (Table 8.4.1). For the stock reduction analysis, the B_{MSY} was estimated at a similar 1.5 million pounds on the Atlantic coast and a much smaller 0.9 million pounds on the gulf coast. The reasons for the differences in the estimates on the gulf coast can be attributed to differences in input data. The SRA utilizes catch data from a much longer expanse of time than does the surplus production model. On the gulf coast, these catches showed a very strong and sustained peak during the 1970's implying that pompano there can be productive enough to sustain a viable population even when a high level of exploitation reduces the stock biomass significantly. The Atlantic coast catch history does not show any strong, sustained increase in catches during its history. It appears that the SRA has inferred from the gulf data that the maximum sustainable yield of pompano on the gulf coast could be taken from a relatively small, but productive, vulnerable biomass.

From the graphically determined U_{MSY}'s, the instantaneous fishing mortalities at MSY (F_{MSY}) would be 1.2 yr^{-1} on the Atlantic coast and 2.0 yr^{-1} on the gulf coast, both considerably higher than estimated using the surplus production model.

8.5 Results

8.5.1 Overfishing Definition

We have used F_{MSY} to define the fishing mortality level above which the fishery is overfishing the Florida pompano stock. With sparse age-composition data, other potential metrics for overfishing, e.g. yield-per-recruit-based $F_{0.1}$ or F_{max} or spawning stock biomass-based $F_{20\%}$ estimates, cannot be estimated very reliably.

8.5.2 Overfished Definition

The primary metric we have used for determining if the Florida pompano stock is overfished is a portion of the biomass of the stock needed to allow for the harvest of maximum sustainable yield. The threshold to an overfished status, commonly used for determining the status of U.S. federal fisheries resources, is the B_{MSY} level reduced by a factor associated with the natural mortality rate [$(1\text{-}M)B_{MSY}$, Restrepo and Powers 1999]. The use of this lower biomass level is intended to recognize that a stock fished at F_{MSY} may fluctuate about its B_{MSY}, and this fluctuation can be scaled in relation to M. Using this definition avoids determining an overfished status when the stock is simply showing inter-annual variations in abundance around B_{MSY}.

8.5.3 Control Rule

At this time, there are no agreed-upon control rules for Florida pompano. Control rules would need to be defined by the Commission and may include definitions for both thresholds (limits) and goals for the fishing mortality rate and biomass and the trajectories necessary for stock recovery.

9.0 Recommendations and Findings

9.1 Evaluation of current status based on biological reference points

The status of Florida pompano, based on MSY criteria similar to those employed by the Federal fisheries management system, on the Atlantic coast was probably not overfished in 2005. More clearly, Florida pompano on the gulf coast were not overfished. The level of the most recent landings suggests that this stock status probably did not changed on either coast in 2006. Using the findings from the surplus production model and the minimum stock size threshold definition of $(1\text{-}M)B_{MSY}$, Florida pompano would be considered overfished when the biomass of the stock was below about 0.9 million pounds on the Atlantic coast and 0.5-1.4 million pounds on the gulf coast (Table 8.4.1, Fig. 9.1.1). For the Atlantic coast's Florida pompano stock, estimates of stock size relative to the threshold have generally been higher since 1995 (with the exception of the surplus-production-based 2005 estimate). On the gulf coast, the estimated stock size has been greater than the threshold since at least 1981.

The status determination for whether a stock is undergoing overfishing is usually determined as the current estimate of fishing mortality relative to the estimated fishing mortality required to harvest MSY. Since 1998, most surplus production estimates for F/F_{MSY} for the Atlantic coast have exceeded the maximum fishing mortality threshold (MFMT) but the SRA-based ratios only exceeded this threshold during the period 1998-2000 (Fig. 9.1.2). Therefore, there is much uncertainty as to the overfishing status on the Atlantic coast. On the gulf coast, neither model's annual estimates of F were higher than MFMT since 1981. Therefore, it appears likely that overfishing for Florida pompano is not occurring currently on the gulf coast.

9.2 Research Recommendations

As was noted by Muller *et al.* (2002), "the major impediment to a full assessment of the impact of fishing on pompano is the lack of adequate age composition data for all sectors in the fishery". The recommendation for sampling the landings directly for age has not been heeded and it is clear that the use of age-structured stock assessment techniques will not be available for Florida pompano for the foreseeable future. Given the difficulties collecting representative age

samples and the current management goal that appears to emphasize MSY, we recommend against further work targeted at sampling of Florida pompano catches for ages. Regardless, work on the life history of pompano should continue so that we have a better understanding of reproductive maturity schedules, fecundity, and growth (especially growth on the Atlantic coast). Research on growth should also include the development and application of analytical techniques to determine the biological growth of Florida pompano, reducing the fishery-induced biases included in current growth models, as evidenced by the negative von Bertalanffy equation's t_o values. If non-age-specific assessment techniques can provide what managers need, further work on collecting and refining commercial and recreational landings and effort information should be continued.

10.0 Minority Opinion

Not applicable at this time.

10.1 Description of opinions

None.

10.2 Justification on why not adopted

Not applicable at this time.

11.0 Literature Cited

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12.0 Tables

Table 3.1.1. Numbers of commercial fishing trips with reported landings of Florida pompano and the annual total pompano landings for these trips on each coast of Florida during 1985-2006. These were tallied by reported water body: unknown, state, and federal and for all areas.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_land.xls

		Area unknown		State waters		Federal waters		Total	
Coast	Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
Atlantic	1985	3,226	161,002	1,422	64,512			4,648	225,514
	1986	2,824	115,124	2,950	127,732			5,774	242,856
	1987	3,225	140,053	3,183	194,132			6,408	334,185
	1988	3,175	149,024	2,777	156,419			5,952	305,443
	1989	3,469	180,313	2,063	160,742			5,532	341,055
	1990	3,603	197,797	2,987	205,249	1	1,040	6,591	404,086
	1991	3,926	145,028	2,917	126,928	13	65	6,856	272,021
	1992	2,858	132,266	2,755	108,939	7	560	5,620	241,765
	1993	1,970	64,302	2,799	126,835	14	159	4,783	191,296
	1994	2,080	72,413	2,846	133,151	110	9,614	5,036	215,178
	1995	964	33,043	2,637	97,985	68	2,652	3,669	133,680
	1996	67	3,278	1,544	56,291	345	59,382	1,956	118,951
	1997			2,211	71,721	543	148,672	2,754	220,393
	1998	1	31	2,469	77,653	499	143,516	2,969	221,200
	1999			2,173	55,937	314	47,063	2,487	103,000
	2000	1	1	2,263	70,920	154	33,156	2,418	104,077
	2001	9	448	2,175	57,648	172	17,022	2,356	75,118
	2002	1	12	2,918	88,335	96	6,144	3,015	94,491
	2003	1	17	4,113	106,704	70	1,839	4,184	108,560
	2004	2	160	4,899	150,570	105	1,512	5,006	152,242
	2005	1	63	4,033	125,042	165	6,788	4,199	131,893
	2006	1	47	4,617	139,225	196	5,518	4,814	144,790
Gulf	1985	3,418	247,086	3,497	166,522			6,915	413,608
	1986	4,423	279,398	3,867	150,751			8,290	430,149
	1987	5,033	296,027	3,756	140,219			8,789	436,246
	1988	4,945	270,293	3,704	165,364			8,649	435,657
	1989	4,462	285,531	2,908	122,818			7,370	408,349
	1990	5,871	369,023	3,280	193,564			9,151	562,587
	1991	4,352	209,919	4,328	154,087	23	413	8,703	364,419
	1992	3,913	201,286	4,729	181,931	56	2,446	8,698	385,663
	1993	3,245	184,913	4,104	154,681	49	2,607	7,398	342,201
	1994	3,420	237,823	3,408	138,583	44	9,118	6,872	385,524
	1995	1,675	99,914	2,511	132,257	67	21,780	4,253	253,951
	1996	83	5,838	993	68,013	294	78,048	1,370	151,899
	1997	15	6,631	1,674	141,431	801	329,168	2,490	477,230
	1998	5	271	2,581	254,978	1,091	251,488	3,677	506,737
	1999	2	47	1,722	101,663	734	207,310	2,458	309,020
	2000	3	60	1,979	173,870	696	210,076	2,678	384,006
	2001	4	156	1,522	152,229	340	83,380	1,866	235,765
	2002	1	46	1,549	130,858	375	75,491	1,925	206,395
	2003	3	248	1,488	122,313	238	47,018	1,729	169,579
	2004			910	120,939	87	39,695	997	160,634
	2005	1	142	1,388	165,377	113	26,710	1,502	192,229
	2006	1	373	1,221	120,597	187	188,975	1,409	309,945

Table 5.1.2. Annual commercial landings (pounds) of pompano on the Atlantic and gulf coast of Florida during 1889-1984 as gathered by various reports to the U.S. Commissioner of Fisheries and subsequent federal agencies. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_land.xls

Year	Atlantic	Gulf	Statewide	Year	Atlantic	Gulf	Statewide
1889	12,000			1937			
1890	30,000			1938			873,485
1891				1939			936,106
1892				1940			947,583
1893				1941			
1894				1942			454,167
1895				1943			449,345
1896				1944			502,567
1897				1945			780,683
1898				1946			831,282
1899	196,344			1947			1,011,874
1900				1948			825,366
1901				1949			860,617
1902	265,231	487,099	752,330	1950	407,100	408,100	815,200
1903				1951	485,000	477,400	962,400
1904				1952	477,300	495,700	973,000
1905				1953	294,800	308,900	603,700
1906				1954	178,500	465,500	644,000
1907				1955	189,100	266,300	455,400
1908	276,000	363,083	639,083	1956	266,200	253,800	520,000
1909				1957	335,900	382,500	718,400
1910				1958	213,400	518,300	731,700
1911				1959	115,600	410,500	526,100
1912				1960	154,900	528,900	683,800
1913				1961	165,500	528,000	693,500
1914				1962	211,200	600,400	811,600
1915				1963	183,200	592,600	775,800
1916				1964	139,700	624,900	764,600
1917				1965	250,800	582,100	832,900
1918	133,419	239,067	372,486	1966	401,400	604,400	1,005,800
1919				1967	548,800	723,000	1,271,800
1920				1968	587,100	731,400	1,318,500
1921				1969	332,800	651,100	983,900
1922				1970	243,400	851,600	1,095,000
1923	60,650	281,403	342,053	1971	123,100	831,900	955,000
1924				1972	156,300	1,098,500	1,254,800
1925				1973	332,400	919,000	1,251,400
1926				1974	228,000	1,204,700	1,432,700
1927	218,950	427,871	646,821	1975	195,500	1,132,700	1,328,200
1928	199,551	419,066	618,617	1976	444,200	947,900	1,392,100
1929	180,151	301,907	482,058	1977	444,400	915,100	1,359,500
1930	135,726	437,627	573,353	1978	210,144	670,862	881,006
1931	186,189	371,350	557,539	1979	140,877	590,254	731,131
1932	253,978	327,285	581,263	1980	207,630	544,973	752,603
1933				1981	347,810	479,473	827,283
1934			437,500	1982	219,871	660,171	880,042
1935				1983	269,262	502,284	771,546
1936	259,600	454,100	713,700	1984	143,520	444,537	588,057

Table 5.1.1.2.1. Number of interviews conducted and number of Florida pompano measured during the Trip Interview Program's survey of the commercial fisheries on Florida's Atlantic and gulf coasts during 1988-2005.
taken from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\TIP_sampling.xls

	Atlantic		Gulf	
year	Interviews	Fish Measured	Interviews	Fish Measured
1988	.	.	4	302
1989	.	.	7	528
1990	.	.	13	690
1991	1	17	23	1,085
1992	53	1,576	29	1,609
1993	24	872	16	634
1994	22	249	8	168
1995	13	240	13	357
1996	20	477	24	1,362
1997	40	413	23	750
1998	51	778	36	1,771
1999	44	697	26	793
2000	64	802	49	1,701
2001	45	531	22	387
2002	43	836	31	1,125
2003	42	729	24	1,526
2004	41	698	15	400
2005	36	688	20	1,426
	539	9,603	383	16,614

Table 5.1.1.6.1. Fork length frequencies for Florida pompano sampled from the commercial landings reported as caught off the Atlantic coast of Florida using cast nets or gill nets during 1988-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\tip_size_freq_rev2.xls

Cast Net

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7																		
8																		
9											5				9			
10											57				138		2	
11											61	6	4		146		12	
12											20	4		1	77		16	
13											6	1	1	1	39		7	
14											2				19		3	
15															4		5	
16													1		1			
17													1					
18																		
19																		
Total	0	0	0	0	0	0	0	0	0	0	151	11	7	2	433	0	45	0

Gill Net

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7																		
8					3		3											
9					4	6	3		5									
10					8	3	16	7	18		4			1				
11				8	78	2	60	16	107		26		10	29				
12				8	46	1	23	5	74		10		36	46				
13				1	13		4		26		1		14	25				
14					6		1		12		2		5	15				
15									1					4				
16					1		1											
17							1											
18																		
19																		
Total	0	0	0	17	159	12	112	28	243	0	43	0	65	120	0	0	0	0

Table 5.1.1.6.1. (con't) Fork length frequencies for Florida pompano sampled from the commercial landings reported as caught off the Atlantic coast of Florida using lines or 'other' gear during 1988-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\tip_size_freq_rev2.xls

Lines

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7																		
8									2	9	1	2		1		5	2	
9					5				5	16	17		45	3	19	78		1
10					17		1	1	4	36	96	22	86	16	92	130	42	3
11					21		3	1	4	68	145	71	136	67	270	220	138	11
12					25				2	60	76	64	128	61	135	126	76	4
13					11				2	41	29	28	50	25	47	41	18	1
14					2					15	10	20	22	10	41	11	5	1
15					2					6	7	14	14	4	32	3	3	1
16					1							2	5	2	6			
17											1		1		5			
18															1			
19																		
Total	0	0	0	0	84	0	4	2	19	251	382	223	487	189	648	614	284	22

Other

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7								1										
8					7			2										
9					63	2		1				2				1		
10					124	20		16				3				1		1
11					93	28	5	38		2		14		1		7	4	9
12					31	9	2	25		2		14		2		14	9	19
13					9			6		2		1				3	4	7
14					2		1	2		2		1						2
15					5									1		1	2	2
16					5							1	1					
17																		
18																		
19																		
Total	0	0	0	0	339	59	8	91	0	8	0	36	1	4	0	27	19	40

Table 5.1.1.6.1. (con't) Fork length frequencies for Florida pompano sampled from the commercial landings reported as caught off the gulf coast of Florida using cast nets or gill nets during 1988-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\tip_size_freq_rev2.xls

Cast Net

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7																		
8																		
9											5				9			
10											57				138		2	
11											61	6	4		146		12	
12											20	4		1	77		16	
13											6	1	1	1	39		7	
14											2				19		3	
15															4		5	
16													1		1			
17													1					
18																		
19																		
20																		
Total	0	0	0	0	0	0	0	0	0	0	151	11	7	2	433	0	45	0

Gill Net

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7					29											2		
8			1		4	1	3						2			7		
9		13	41	6	54	26	3				3	6	14		14	7		
10	19	74	220	92	202	81		1	8		27	211	181	38	115	71	7	17
11	94	163	146	178	159	60		28	64		116	175	334	81	118	221	114	155
12	69	72		70	114	58		30	7		142	19	140	35	82	174	97	101
13	17	19		41	33	13		6	13		33	2	40	15	35	75	25	53
14	10	3		13	15	7		1	8		10		15	4	6	34	13	22
15	6	2		8	2	1			1		1		3	1		10		3
16	1			3							1		3	1		4		1
17				1	1	1										1		1
18																		
19																		
20																		
Total	216	346	408	412	613	248	6	66	101	0	333	413	732	175	370	606	256	353

Table 5.1.1.6.1. (con't) Fork length frequencies for Florida pompano sampled from the commercial landings reported as caught off the gulf coast of Florida using lines or 'other' gear during 1988-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\tip_size_freq_rev2.xls

Lines

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7																		
8										1								
9									3	31			2	8	2	19	1	
10					2		4	4	4	48	24	8	97	20	14	22	1	1
11					5	7	17	23	7	124	94	24	248	45	31	21	9	31
12					4	7	10	19	12	178	132	43	181	54	38	18	11	56
13					1	4	6	7	24	113	94	20	86	25	27	13	19	24
14						1	1	3	10	36	34	19	34	11	14	7	7	26
15								3	4	21	14	5	11	3	3	6	3	12
16								1		3	5	6	2		4	4	5	3
17									1		1			1		3		1
18												1				1		1
19																		
20																		
Total	0	0	0	0	12	19	38	60	65	555	398	126	661	167	133	114	56	155

Other

Inch	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7																		
8					36													
9				18	66	1	3	3					1		7	22		
10				116	62	11	24	7			6		5		14	282	2	5
11				133	47	50	15	3			32		16	18	30	214	18	78
12				17	16	43	1	1			31		19	16		66	16	121
13				6	4	14		1			27		3			31	5	30
14				3	1	2					9		1			11	1	13
15					2	1					1					12		3
16											1		1			3		2
17													1			2	1	1
18																2		
19																7		
20																9		
Total	0	0	0	293	234	122	43	15	0	0	107	0	47	34	51	661	43	253

Table 5.1.1.6.2. Average predicted weight (lbs) for each length class during each of two time frames, reflecting the 1992-94 and 2000-02 life history study findings (see Section 2.2 Growth). Also shown are the composite fork length frequencies from the Trip Interview Program sampling used to represent the relative length frequency structure of the gear-specific commercial catch in years when annual sample sizes were inadequate. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\tip_size_freq_rev2.xls

Atlantic

	Ave. Wt (lbs)		Cast Net				Gill Net				Lines				Other			
Inch	81-95	96-05	81-89	90-95	96-03	04-05	81-89	90-95	96-03	04-05	81-89	90-95	96-03	04-05	81-89	90-95	96-03	04-05
7	0.416	0.372	0	0	0	26	0	0	0	0	0	0	0	0	0	1	0	0
8	0.582	0.543	0	0	1	1	0	6	0	0	0	0	20	2	0	9	0	0
9	0.784	0.761	0	0	4	3	0	13	5	0	0	5	183	1	0	66	3	0
10	1.025	1.030	0	0	15	8	0	34	23	0	0	19	482	45	0	160	4	1
11	1.308	1.357	0	1	27	15	0	164	172	0	0	25	981	149	0	164	24	13
12	1.635	1.748	0	0	22	14	0	83	166	0	0	25	652	80	0	67	32	28
13	2.009	2.207	0	0	10	6	0	18	66	0	0	11	263	19	0	15	6	11
14	2.433	2.740	0	0	5	2	0	7	34	0	0	2	129	6	0	5	3	2
15	2.908	3.354	0	0	3	0	0	0	5	0	0	2	80	4	0	5	2	4
16	3.439	4.053	0	0	0	0	0	2	0	0	0	1	15	0	0	5	2	0
17	4.026	4.845	0	0	1	0	0	1	0	0	0	0	7	0	0	0	0	0
18	4.672	5.733	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
19	5.379	6.725	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total				1	88	75	0	328	471	0	0	90	2,813	306	0	497	76	59

Gulf

	Ave. Wt (lbs)		Cast Net				Gill Net				Lines				Other			
Inch	81-95	96-05	81-89	90-95	96-03	04-05	81-89	90-95	96-03	04-05	81-89	90-95	96-03	04-05	81-89	90-95	96-03	04-05
7	0.389	0.372	0	0	0	0	0	29	2	0	0	0	0	0	0	0	0	0
8	0.556	0.536	0	0	0	0	0	9	9	0	0	0	1	0	0	36	0	0
9	0.764	0.741	0	0	14	0	13	130	44	0	0	0	65	1	0	91	30	0
10	1.018	0.993	0	0	195	2	93	596	651	24	0	10	237	2	0	220	307	7
11	1.320	1.295	0	0	217	12	257	571	1,109	269	0	52	594	40	0	248	310	96
12	1.676	1.652	0	0	102	16	141	272	599	198	0	40	656	67	0	78	132	137
13	2.089	2.068	0	0	48	7	36	93	213	78	0	18	402	43	0	25	61	35
14	2.563	2.547	0	0	21	3	13	36	77	35	0	5	165	33	0	6	21	14
15	3.101	3.095	0	0	4	5	8	11	16	3	0	3	67	15	0	3	13	3
16	3.709	3.715	0	0	2	0	1	3	9	1	0	1	24	8	0	0	5	2
17	4.388	4.411	0	0	1	0	0	3	1	1	0	0	6	1	0	0	3	2
18	5.144	5.187	0	0	0	0	0	0	0	0	0	0	2	1	0	0	2	0
19	5.981	6.049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0
20	6.900	6.999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
Total			0	0	604	45	562	1,753	2,730	609	0	129	2,219	211	0	707	900	296

Table 5.1.1.6.3. Number and weight of Florida pompano in samples used to estimate the average weight of pompano in the commercial landings that were reported made by cast net or gill net on the Atlantic and gulf coasts of Florida during 1981-2005. The reported landings in pounds and the estimated landings in numbers are given. For an explanation of the sample groupings of Florida pompano samples made during 1981-2005 see text Section 5.1.1.6.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\ tip_size_freq_rev2.xls

Atlantic

	Cast Net				Gill Net			
	Sample		Landings		Sample		Landings	
Year	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
1981	89	136.67	0		328	462.73	0	
1982	89	136.67	0		328	462.73	0	
1983	89	136.67	0		328	462.73	0	
1984	89	136.67	0		328	462.73	0	
1985	89	136.67	0		328	462.73	0	
1986	89	136.67	0		328	462.73	0	
1987	89	136.67	0		328	462.73	0	
1988	89	136.67	0		328	462.73	0	
1989	89	136.67	0		328	462.73	0	
1990	89	136.67	0		328	462.73	27	38
1991	89	136.67	45	69	328	462.73	31,658	44,664
1992	89	136.67	67	103	159	234.42	83,505	123,115
1993	89	136.67	297	456	328	462.73	92,015	129,816
1994	89	136.67	367	563	112	154.48	118,171	162,992
1995	89	136.67	1,855	2,848	28	36.27	66,982	86,762
1996	18	25.72	6,608	9,442	243	390.54	43,681	70,204
1997	41	62.92	10,853	16,656	471	806.68	84,720	145,104
1998	88	144.82	10,632	17,497	43	64.58	96,470	144,888
1999	88	144.82	3,993	6,571	471	806.68	24,373	41,745
2000	88	144.82	6,225	10,245	65	121.09	15,859	29,543
2001	88	144.82	5,856	9,638	120	230.48	7,717	14,822
2002	88	144.82	10,561	17,380	471	806.68	3,054	5,231
2003	88	144.82	14,389	23,680	471	806.68	403	690
2004	73	81.18	25,313	28,150	471	806.68	450	771
2005	75	84.28	16,359	18,384	471	806.68	3,101	5,312

Table 5.1.1.6.3 (con't). Number and weight of Florida pompano in samples used to estimate the average weight of pompano in the commercial landings that were reported made by cast net or gill net on the Atlantic and gulf coasts of Florida during 1981-2005. The reported landings in pounds and the estimated landings in numbers are given for each gear and for coastwide totals. For an explanation of the grouping of Florida pompano samples made during 1981-2005 see text Section 5.1.1.6.

from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\ tip_size_freq_rev2.xls

Atlantic

	Lines				Other					
	Sample		Landings		Sample		Landings		Totals	
Year	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
1981	90	133.17	0		497	619.35	268,754	347,810	268,754	347,810
1982	90	133.17	0		497	619.35	176,433	219,871	169,895	219,871
1983	90	133.17	0		497	619.35	216,067	269,262	208,060	269,262
1984	90	133.17	0		497	619.35	115,166	143,520	110,898	143,520
1985	90	133.17	0		497	619.35	180,961	225,514	174,255	225,514
1986	90	133.17	0		497	619.35	194,877	242,856	187,656	242,856
1987	90	133.17	0		497	619.35	268,163	334,185	258,226	334,185
1988	90	133.17	0		497	619.35	245,100	305,443	236,017	305,443
1989	90	133.17	0		497	619.35	273,676	341,055	263,534	341,055
1990	90	133.17	0		497	619.35	324,224	404,048	312,234	404,086
1991	90	133.17	7,389	10,933	497	619.35	173,612	216,355	203,960	272,021
1992	84	125.89	17,597	26,372	339	407.49	76,681	92,175	177,850	241,765
1993	90	133.17	16,538	24,470	59	73.39	29,387	36,554	131,516	191,296
1994	90	133.17	16,832	24,906	497	619.35	21,439	26,717	156,035	215,178
1995	90	133.17	21,627	32,000	91	126.23	8,701	12,070	99,191	133,680
1996	19	22.35	32,971	38,787	76	131.18	300	518	83,643	118,951
1997	251	403.03	35,693	57,313	76	131.18	765	1,320	137,088	220,393
1998	382	561.77	39,115	57,524	76	131.18	748	1,291	147,192	221,200
1999	223	403.64	29,390	53,199	36	57.09	936	1,485	60,095	103,000
2000	487	773.86	39,597	62,923	76	131.18	791	1,366	62,703	104,077
2001	189	320.96	29,395	49,920	76	131.18	429	740	43,526	75,119
2002	648	1,089.37	40,154	67,506	76	131.18	2,533	4,373	57,198	94,490
2003	614	845.55	59,912	82,507	27	45.74	994	1,683	75,749	108,560
2004	284	428.00	79,180	119,331	19	36.69	2,066	3,991	107,035	152,242
2005	22	34.08	66,838	103,529	40	74.09	2,520	4,668	88,996	131,893

Table 5.1.1.6.3 (con't). Number and weight of Florida pompano in samples used to estimate the average weight of pompano in the commercial landings that were reported made by cast net or gill net on the Atlantic and gulf coasts of Florida during 1981-2005. The reported landings in pounds and the estimated landings in numbers are given. For an explanation of the sample groupings of Florida pompano samples made during 1981-2005 see text Section 5.1.1.6.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\ tip_size_freq_rev2.xls

Gulf

	Cast Net				Gill Net			
	Sample		Landings		Sample		Landings	
Year	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
1981	604	844.99	0	0	562	817.33	0	0
1982	604	844.99	0	0	562	817.33	0	0
1983	604	844.99	0	0	562	817.33	0	0
1984	604	844.99	0	0	562	817.33	0	0
1985	604	844.99	0	0	562	817.33	0	0
1986	604	844.99	0	0	562	817.33	0	0
1987	604	844.99	0	0	562	817.33	0	0
1988	604	844.99	0	0	216	342.57	31	49
1989	604	844.99	0	0	346	474.76	0	0
1990	604	844.99	0	0	408	448.63	1,082	1,190
1991	604	844.99	0	0	412	609.89	72,238	106,937
1992	604	844.99	6	8	613	779.40	195,244	248,248
1993	604	844.99	38	53	248	331.91	196,142	262,513
1994	604	844.99	38	53	1,753	2,277.16	241,535	313,762
1995	604	844.99	5,306	7,423	66	103.37	122,710	192,195
1996	604	830.48	14,883	20,464	101	152.74	58,769	88,878
1997	604	830.48	64,278	88,383	2,730	3,834.17	225,765	317,084
1998	151	189.84	110,669	139,138	333	514.33	164,566	254,186
1999	604	830.48	32,871	45,198	413	476.11	169,831	195,787
2000	604	830.48	81,074	111,477	732	996.32	151,086	205,646
2001	604	830.48	34,953	48,060	175	248.46	36,587	51,947
2002	433	605.11	87,083	121,699	370	500.49	28,496	38,547
2003	604	830.48	41,330	56,829	606	945.72	23,027	35,937
2004	45	81.55	30,064	54,482	256	399.62	28,959	45,206
2005	45	81.55	45,150	81,820	353	567.49	16,241	26,110

Table 5.1.1.6.3 (con't). Number and weight of Florida pompano in samples used to estimate the average weight of pompano in the commercial landings that were reported made by cast net or gill net on the Atlantic and gulf coasts of Florida during 1981-2005. The reported landings in pounds and the estimated landings in numbers are given for each gear and for coastwide totals. For an explanation of the grouping of Florida pompano samples made during 1981-2005 see text Section 5.1.1.6.

from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\ tip_size_freq_rev2.xls

Gulf

	Lines				Other					
	Sample		Landings		Sample		Landings		Totals	
Year	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
1981	129	209.31	0	0	707	848.65	399,436	479,473	399,436	479,473
1982	129	209.31	0	0	707	848.65	549,971	660,171	549,971	660,171
1983	129	209.31	0	0	707	848.65	418,439	502,284	418,439	502,284
1984	129	209.31	0	0	707	848.65	370,332	444,537	370,332	444,537
1985	129	209.31	0	0	707	848.65	344,566	413,608	344,566	413,608
1986	129	209.31	0	0	707	848.65	358,346	430,149	358,346	430,149
1987	129	209.31	0	0	707	848.65	363,425	436,246	363,425	436,246
1988	129	209.31	0	0	707	848.65	362,893	435,608	362,924	435,657
1989	129	209.31	0	0	707	848.65	340,185	408,349	340,185	408,349
1990	129	209.31	706	1,145	707	848.65	466,731	560,252	468,519	562,587
1991	129	209.31	5,311	8,617	293	356.18	204,719	248,865	282,267	364,419
1992	129	209.31	15,570	25,265	234	239.59	109,523	112,142	320,343	385,663
1993	19	31.89	13,998	23,499	122	187.53	36,519	56,136	246,698	342,201
1994	129	209.31	19,679	31,932	707	848.65	33,137	39,777	294,389	385,524
1995	60	101.61	13,857	23,468	15	17.15	27,002	30,865	168,875	253,951
1996	65	126.98	12,917	25,234	900	1,313.96	11,865	17,323	98,434	151,899
1997	555	927.30	20,339	33,984	900	1,313.96	25,876	37,779	336,259	477,230
1998	398	710.91	21,660	38,689	107	184.17	43,412	74,724	340,306	506,737
1999	126	242.76	17,169	33,080	900	1,313.96	23,942	34,955	243,813	309,020
2000	661	1,023.86	24,746	38,332	47	74.69	17,966	28,551	274,873	384,006
2001	167	266.68	45,399	72,498	34	49.74	43,242	63,260	160,181	235,765
2002	133	233.94	14,163	24,913	51	57.94	18,691	21,235	148,434	206,394
2003	114	189.42	12,698	21,099	661	947.42	38,870	55,714	115,925	169,579
2004	56	116.54	8,904	18,529	43	69.02	26,425	42,418	94,351	160,634
2005	155	307.38	9,149	18,143	253	422.12	39,649	66,154	110,189	192,229

Table 5.1.2.1. Number of trips reporting Florida pompano landings and annual landings (pounds) on each coast and statewide within four general gear categories, an 'unknown' category, and a total. Annual totals are for catches reportedly made within Florida State waters, within U.S. Federal waters, and combined during 1985-2005.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_land_gear_rev.xls

Atlantic, Florida State waters

	Unknown		Lines		Gill Nets		Cast Nets		Other		All Gears	
Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
1985	4,648	225,514									4,648	225,514
1986	5,774	242,856									5,774	242,856
1987	6,408	334,185									6,408	334,185
1988	5,952	305,443									5,952	305,443
1989	5,532	341,055									5,532	341,055
1990	6,589	403,008			1	38					6,590	403,046
1991	5,090	209,512	531	10,932	956	44,650	5	69	261	6,793	6,843	271,956
1992	737	37,318	1,400	26,361	2,551	122,624	41	103	884	54,799	5,613	241,205
1993	144	4,557	1,151	24,333	2,495	129,801	79	456	900	31,990	4,769	191,137
1994	39	2,603	1,092	24,002	3,003	154,283	106	563	686	24,113	4,926	205,564
1995	25	650	1,165	31,510	1,889	84,941	185	2,727	337	11,200	3,601	131,028
1996	14	385	1,073	37,038	45	12,995	464	9,056	15	95	1,611	59,569
1997	34	870	1,623	51,891	6	2,472	530	16,356	18	132	2,211	71,721
1998	23	615	1,928	54,390	6	5,306	500	17,307	13	66	2,470	77,684
1999	21	591	1,842	49,001			299	6,098	11	247	2,173	55,937
2000	19	587	1,896	60,938			312	8,839	37	557	2,264	70,921
2001	11	227	1,830	49,576			313	7,947	30	347	2,184	58,097
2002			2,269	66,596			585	17,380	65	4,370	2,919	88,347
2003			2,777	81,532			1,268	23,508	69	1,682	4,114	106,721
2004			3,636	118,421	3	376	1,188	28,060	74	3,873	4,901	150,730
2005			3,047	102,376	1	1	920	18,224	66	4,504	4,034	125,105

Atlantic, U.S. Federal waters

	Unknown		Lines		Gill Nets		Cast Nets		Other		All Gears	
Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
1985											0	0
1986											0	0
1987											0	0
1988											0	0
1989											0	0
1990	1	1,040									1	1,040
1991	3	22	1	1	2	14			7	28	13	65
1992			2	11	3	491			2	58	7	560
1993			10	137	3	15			1	7	14	159
1994			8	904	101	8,709			1	1	110	9,614
1995			18	490	45	1,821	3	121	2	220	68	2,652
1996			54	1,749	269	57,209	7	386	15	38	345	59,382
1997	2	198	79	5,422	437	142,632	3	300	22	120	543	148,672
1998	2	378	59	3,134	419	139,582	6	190	13	232	499	143,516
1999	1	372	35	4,198	267	41,745	5	473	6	275	314	47,063
2000	1	11	40	1,985	100	29,543	7	1,406	6	210	154	33,156
2001			27	344	133	14,822	7	1,691	5	166	172	17,022
2002			37	910	58	5,231			1	3	96	6,144
2003			45	976	16	690	8	172	1	1	70	1,839
2004			35	910	47	395	16	90	7	118	105	1,512
2005			58	1,153	93	5,311	12	160	2	164	165	6,788

Table 5.1.2.1. (con't.) Number of trips reporting Florida pompano landings and annual landings (pounds) on each coast and statewide within four general gear categories, an 'unknown' category, and a total. Annual totals are for catches reportedly made within Florida State waters, within U.S. Federal waters, and combined during 1985-2005.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_land_gear_rev.xls

Gulf, Florida State waters

	Unknown		Lines		Gill Nets		Cast Nets		Other		All Gears	
Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
1985	6,915	413,608									6,915	413,608
1986	8,290	430,149									8,290	430,149
1987	8,789	436,246									8,789	436,246
1988	8,648	435,608			1	49					8,649	435,657
1989	7,370	408,349									7,370	408,349
1990	9,144	560,252	2	1,145	5	1,190					9,151	562,587
1991	5,389	206,622	277	8,459	2,338	106,873			676	42,052	8,680	364,006
1992	1,045	49,057	692	24,908	5,989	246,570	4	8	912	62,674	8,642	383,217
1993	141	4,598	607	23,186	5,753	260,270	25	53	823	51,487	7,349	339,594
1994	75	3,448	464	31,925	5,442	305,842	31	52	816	35,139	6,828	376,406
1995	107	6,868	514	20,855	2,837	174,640	116	7,423	612	22,385	4,186	232,171
1996	3	294	505	24,509	149	18,482	326	20,076	93	10,490	1,076	73,851
1997	13	3,165	653	31,955	36	13,121	863	79,809	124	20,012	1,689	148,062
1998	37	2,950	709	36,295	59	14,196	1,253	133,119	528	68,689	2,586	255,249
1999	30	2,015	661	28,161			634	43,603	399	27,931	1,724	101,710
2000	17	1,404	834	35,605			871	111,477	260	25,445	1,982	173,930
2001	4	127	855	67,427			433	33,604	234	51,227	1,526	152,384
2002			602	22,452	1	681	756	88,041	191	19,728	1,550	130,903
2003			564	19,796	9	1,344	514	47,913	404	53,508	1,491	122,561
2004			376	16,833	19	10,964	298	51,884	217	41,259	910	120,939
2005			420	16,813	9	4,024	461	78,586	499	66,095	1,389	165,519

Gulf, U.S. Federal waters

	Unknown		Lines		Gill Nets		Cast Nets		Other		All Gears	
Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
1985											0	0
1986											0	0
1987											0	0
1988											0	0
1989											0	0
1990											0	0
1991	11	116	3	158	7	64			2	75	23	413
1992			7	357	39	1,678			10	411	56	2,446
1993	1	32	10	313	37	2,243			1	19	49	2,607
1994	1	1	1	7	38	7,920	1	1	3	1,189	44	9,118
1995			8	2,613	52	17,555			7	1,612	67	21,780
1996			13	725	250	70,396	5	388	26	6,539	294	78,048
1997	1	164	28	2,029	694	303,963	33	8,574	45	14,438	801	329,168
1998			42	2,394	1,011	239,990	19	6,019	19	3,085	1,091	251,488
1999	4	461	50	4,919	649	195,787	7	1,595	24	4,548	734	207,310
2000	2	164	84	2,727	598	205,646			12	1,539	696	210,076
2001			33	5,071	246	51,947	29	14,456	32	11,907	340	83,380
2002			35	2,460	167	37,866	154	33,658	19	1,507	375	75,491
2003			25	1,303	136	34,593	61	8,917	16	2,206	238	47,018
2004			11	1,697	59	34,242	10	2,598	7	1,159	87	39,695
2005			14	1,331	82	22,086	15	3,234	2	59	113	26,710

Table 5.1.2.1. (con't.) Number of trips reporting Florida pompano landings and annual landings (pounds) on each coast and statewide within four general gear categories, an 'unknown' category, and a total. Annual totals are for catches reportedly made within Florida State waters, within U.S. Federal waters, and combined during 1985-2005.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_land_gear_rev.xls

Atlantic, All waters

	Unknown		Lines		Gill Nets		Cast Nets		Other		All Gears	
Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
1985	4,648	225,514	0	0	0	0	0	0	0	0	4,648	225,514
1986	5,774	242,856	0	0	0	0	0	0	0	0	5,774	242,856
1987	6,408	334,185	0	0	0	0	0	0	0	0	6,408	334,185
1988	5,952	305,443	0	0	0	0	0	0	0	0	5,952	305,443
1989	5,532	341,055	0	0	0	0	0	0	0	0	5,532	341,055
1990	6,590	404,048	0	0	1	38	0	0	0	0	6,591	404,086
1991	5,093	209,534	532	10,933	958	44,664	5	69	268	6,821	6,856	272,021
1992	737	37,318	1,402	26,372	2,554	123,115	41	103	886	54,857	5,620	241,765
1993	144	4,557	1,161	24,470	2,498	129,816	79	456	901	31,997	4,783	191,296
1994	39	2,603	1,100	24,906	3,104	162,992	106	563	687	24,114	5,036	215,178
1995	25	650	1,183	32,000	1,934	86,762	188	2,848	339	11,420	3,669	133,680
1996	14	385	1,127	38,787	314	70,204	471	9,442	30	133	1,956	118,951
1997	36	1,068	1,702	57,313	443	145,104	533	16,656	40	252	2,754	220,393
1998	25	993	1,987	57,524	425	144,888	506	17,497	26	298	2,969	221,200
1999	22	963	1,877	53,199	267	41,745	304	6,571	17	522	2,487	103,000
2000	20	598	1,936	62,923	100	29,543	319	10,245	43	768	2,418	104,077
2001	11	227	1,857	49,920	133	14,822	320	9,638	35	513	2,356	75,119
2002	0	0	2,306	67,506	58	5,231	585	17,380	66	4,373	3,015	94,490
2003	0	0	2,822	82,507	16	690	1,276	23,680	70	1,683	4,184	108,560
2004	0	0	3,671	119,331	50	771	1,204	28,150	81	3,991	5,006	152,242
2005	0	0	3,105	103,529	94	5,312	932	18,384	68	4,668	4,199	131,893

Gulf, All waters

	Unknown		Lines		Gill Nets		Cast Nets		Other		All Gears	
Year	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds	Trips	Pounds
1985	6,915	413,608	0	0	0	0	0	0	0	0	6,915	413,608
1986	8,290	430,149	0	0	0	0	0	0	0	0	8,290	430,149
1987	8,789	436,246	0	0	0	0	0	0	0	0	8,789	436,246
1988	8,648	435,608	0	0	1	49	0	0	0	0	8,649	435,657
1989	7,370	408,349	0	0	0	0	0	0	0	0	7,370	408,349
1990	9,144	560,252	2	1,145	5	1,190	0	0	0	0	9,151	562,587
1991	5,400	206,738	280	8,617	2,345	106,937	0	0	678	42,127	8,703	364,419
1992	1,045	49,057	699	25,265	6,028	248,248	4	8	922	63,085	8,698	385,663
1993	142	4,630	617	23,499	5,790	262,513	25	53	824	51,506	7,398	342,201
1994	76	3,449	465	31,932	5,480	313,762	32	53	819	36,328	6,872	385,524
1995	107	6,868	522	23,468	2,889	192,195	116	7,423	619	23,997	4,253	253,951
1996	3	294	518	25,234	399	88,878	331	20,464	119	17,029	1,370	151,899
1997	14	3,329	681	33,984	730	317,084	896	88,383	169	34,450	2,490	477,230
1998	37	2,950	751	38,689	1,070	254,186	1,272	139,138	547	71,774	3,677	506,737
1999	34	2,476	711	33,080	649	195,787	641	45,198	423	32,479	2,458	309,020
2000	19	1,568	918	38,332	598	205,646	871	111,477	272	26,983	2,678	384,006
2001	4	127	888	72,498	246	51,947	462	48,060	266	63,134	1,866	235,765
2002	0	0	637	24,913	168	38,547	910	121,699	210	21,235	1,925	206,394
2003	0	0	589	21,099	145	35,937	575	56,829	420	55,714	1,729	169,579
2004	0	0	387	18,529	78	45,206	308	54,482	224	42,418	997	160,634
2005	0	0	434	18,143	91	26,110	476	81,820	501	66,154	1,502	192,229

Table 5.1.2.2. Monthly commercial fishing trips and landings of Florida pompano on the Atlantic and gulf coast of Florida during 2000-2005, their annual averages and coefficients of variation. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_land_rev2.xls

Atlantic coast

	2000		2001		2002		2003		2004		2005		Ave 2000-05			
Month	Trips	Pound	Trips	Pound	Trips	Pound	Trips	Pound	Trips	Pound	Trips	Pound	Trips	CV	Pound	CV
Jan	376	13,552	344	17,524	346	9,914	325	8,382	945	35,011	459	15,588	399	60.0%	14,282	67.3%
Feb	329	10,223	301	11,199	284	9,989	320	8,910	623	16,886	299	8,384	308	42.3%	9,370	32.9%
Mar	364	15,820	238	8,641	356	10,127	345	7,846	561	14,335	489	13,554	336	34.2%	10,046	32.7%
Apr	238	10,857	231	7,129	330	14,178	393	10,441	615	21,479	592	20,951	343	49.3%	12,148	48.5%
May	194	5,613	159	7,441	165	6,219	304	5,678	459	14,055	421	14,502	243	54.5%	7,644	55.0%
Jun	51	1,361	128	3,855	172	5,123	251	5,444	251	6,508	221	4,379	153	51.5%	3,810	46.3%
Jul	55	5,258	109	3,018	87	1,854	179	3,410	191	4,456	130	3,112	107	49.1%	3,015	39.5%
Aug	87	4,688	74	942	79	3,692	336	8,155	275	7,970	152	4,906	143	78.5%	4,336	62.8%
Sep	68	2,049	46	581	67	1,466	202	7,041	42	712	126	4,451	79	78.5%	2,329	109.1
Oct	97	8,552	132	3,430	116	2,843	249	4,918	140	2,434	151	4,042	126	42.1%	3,746	59.5%
Nov	286	13,348	296	4,983	410	11,036	493	13,138	392	12,330	489	15,229	338	26.6%	10,009	35.5%
Dec	273	12,757	298	6,376	603	18,050	787	25,198	512	16,066	670	22,795	449	45.7%	14,463	47.3%
Totals		104,07		75,119		94,491		108,56		152,24		131,89				

Gulf coast

	2000		2001		2002		2003		2004		2005		Ave 2000-05			
Month	Trips	Pound	Trips	Pound	Trips	Pound	Trips	Pound	Trips	Pound	Trips	Pound	Trips	CV	Pound	CV
Jan	287	59,151	72	729	55	951	111	2,753	29	802	48	529	86	111.1	9,274	255.5
Feb	403	91,615	133	7,525	130	7,626	61	6,499	50	5,449	39	1,198	117	117.5	17,130	205.3
Mar	426	61,863	155	13,474	129	8,399	254	39,554	136	20,843	134	17,790	176	66.8%	23,132	87.0%
Apr	312	22,536	276	14,707	286	17,267	220	10,827	172	11,688	167	11,682	205	30.1%	12,672	35.5%
May	217	17,132	228	12,366	165	18,737	147	7,900	82	7,202	117	10,012	137	41.4%	10,478	45.8%
Jun	138	11,418	102	13,160	145	19,707	96	10,415	72	7,979	70	10,080	89	35.8%	10,394	39.3%
Jul	132	12,216	110	17,192	158	23,615	162	22,392	54	8,134	101	20,308	102	39.5%	14,837	41.0%
Aug	183	18,209	164	36,574	220	24,570	185	20,821	57	23,430	143	25,961	136	41.1%	21,366	29.7%
Sep	138	26,709	155	31,152	167	22,108	150	20,441	27	5,892	175	32,535	116	47.1%	19,834	48.9%
Oct	178	32,012	229	52,226	216	43,364	154	14,333	116	24,865	201	37,123	156	27.0%	29,132	46.2%
Nov	149	24,855	130	24,245	114	13,676	114	12,391	120	30,838	134	15,959	109	12.5%	17,423	42.4%
Dec	115	6,291	112	12,414	140	6,374	75	1,254	82	13,514	173	9,051	100	36.7%	6,985	64.6%
Totals		384,00		235,76		206,39		169,58		160,63		192,22				

Table 5.1.4.1. Number of trips, average commercial landings rates and their standard error and median for commercial fishing trips reporting Florida pompano landings during 1986-2005. The median standardized landings rates and the percentiles for their distribution are also given (see text Section5.1.4 for details).from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\comm_cpue.xls

Atlantic

		Arithmetic Scale Statistics			Back-transformed Least Squares Mean Distribution				
Year	N	mean	SE	median	2.5th	25th	median	75th	97.5th
1986	5,101	43.54	1.811	12	6.87	7.47	7.76	8.08	8.72
1987	5,591	54.67	1.713	16	8.31	9.00	9.34	9.69	10.44
1988	5,286	53.58	1.947	14	7.58	8.14	8.48	8.79	9.47
1989	5,078	62.53	2.519	12	7.04	7.57	7.85	8.17	8.84
1990	5,591	61.75	2.437	11	7.15	7.72	8.00	8.33	8.95
1991	6,265	39.55	1.088	12	7.60	8.10	8.38	8.69	9.28
1992	5,379	42.62	2.364	11	7.34	7.81	8.09	8.37	8.98
1993	4,737	40.12	1.681	10	7.01	7.52	7.80	8.07	8.68
1994	5,003	42.32	1.378	12	8.14	8.65	8.98	9.29	9.94
1995	3,651	36.42	1.032	14	9.24	9.91	10.27	10.67	11.49
1996	1,950	60.90	4.498	14	14.24	15.21	15.84	16.49	17.65
1997	2,747	80.05	4.076	16	16.13	17.36	17.97	18.68	20.11
1998	2,948	74.84	5.004	14	14.88	15.92	16.50	17.14	18.43
1999	2,471	41.52	2.486	13	12.40	13.41	13.94	14.45	15.54
2000	2,417	43.03	2.811	15	15.02	16.12	16.75	17.45	18.74
2001	2,356	31.88	1.686	12.25	12.78	13.89	14.40	14.91	16.03
2002	3,015	31.34	1.195	14	14.81	15.85	16.43	17.09	18.37
2003	4,184	25.95	0.640	14	17.01	18.16	18.81	19.51	20.86
2004	5,006	30.41	0.592	17	18.97	20.36	21.07	21.88	23.45
2005	4,199	31.41	0.795	15.3	17.03	18.25	18.88	19.61	21.04

Gulf

		Arithmetic Scale Statistics			Back-transformed Least Squares Mean Distribution				
Year	N	mean	SE	median	2.5th	25th	median	75th	97.5th
1986	7,138	47.75	1.500	13	7.02	7.42	7.61	7.82	8.22
1987	8,563	46.88	1.211	13	7.63	8.03	8.23	8.42	8.84
1988	8,698	49.66	2.343	12	7.31	7.66	7.86	8.05	8.45
1989	7,428	56.14	1.704	13	7.82	8.20	8.40	8.62	9.08
1990	9,472	60.33	1.472	15	8.75	9.19	9.41	9.65	10.11
1991	9,153	41.39	1.033	11	7.56	7.86	8.02	8.19	8.52
1992	8,911	45.27	1.568	12	8.03	8.33	8.50	8.67	9.04
1993	7,947	47.39	1.254	15	8.96	9.35	9.55	9.75	10.18
1994	7,370	56.39	1.705	17	9.54	9.90	10.13	10.34	10.77
1995	4,768	56.51	1.774	17	11.89	12.44	12.73	13.04	13.67
1996	1,753	92.98	4.410	30	22.71	23.92	24.68	25.48	26.87
1997	3,067	163.01	7.153	47	35.30	37.15	38.05	39.07	41.10
1998	4,201	124.58	3.554	55	44.81	46.80	47.87	49.05	51.40
1999	2,847	113.67	5.421	31	31.20	32.92	33.81	34.66	36.43
2000	3,044	132.07	5.197	40	46.77	49.07	50.36	51.77	54.34
2001	2,168	114.96	5.967	27.7	35.34	37.61	38.65	39.66	41.87
2002	2,442	94.33	3.226	44	48.76	51.30	52.68	54.26	57.29
2003	2,346	81.19	2.968	37	38.21	40.21	41.32	42.52	44.78
2004	1,782	103.86	5.234	41.5	38.07	40.47	41.70	43.08	45.77
2005	2,443	93.05	3.164	43	39.08	41.23	42.32	43.57	46.01

Table 5.1.5.1. Estimated age composition of the commercial landings of Florida pompano landed on the Atlantic and gulf coasts of Florida during 1986-2005. Estimates are available beginning in 1981 and are available upon request. These data were used as part of the landings used in the statewide untuned virtual population analysis, though there is uncertainty about their accuracy.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\caa.xls

Atlantic

Age	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0	3,921	5,396	4,932	5,507	6,524	4,073	3,160	1,687	3,601	308	3,471	1,545	223	309	71	222	120	120	120	5,889
1	125,943	173,306	158,400	176,868	209,550	132,199	99,986	74,961	86,169	57,062	20,371	16,970	22,181	6,386	11,136	5,149	8,904	8,904	8,904	14,398
2	52,231	71,873	65,692	73,351	86,909	60,976	56,594	49,884	54,086	35,537	49,950	91,593	105,746	41,197	41,067	30,214	37,816	37,816	37,816	56,788
3	7,115	9,791	8,949	9,993	11,840	9,156	11,654	8,238	7,926	4,427	9,765	21,914	18,678	10,630	9,899	7,613	8,937	8,937	8,937	11,743
4	3,461	4,762	4,353	4,860	5,758	3,853	4,124	2,142	2,219	1,425	4	10	106	164	279	190	403	403	403	0
5	245	337	308	344	408	329	466	296	290	143	0	0	32	6	22	10	61	61	61	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	62	62	0
Unaged	1,961	2,698	2,466	2,753	3,262	2,119	1,866	1,029	2,517	261	0	0	0	0	0	0	0	0	0	0
Total	194,877	268,163	245,100	273,676	324,251	212,704	177,850	138,237	156,809	99,164	83,560	132,031	146,965	58,693	62,473	43,396	56,303	56,303	56,303	88,819

Gulf

Age	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0	6,372	6,463	6,453	6,049	8,301	86	15,580	395	5,111	35	412	2,666	1,821	1,556	1,816	864	1,231	1,210	286	327
1	226,046	229,250	228,927	214,590	295,477	167,670	193,721	132,289	168,046	71,208	50,478	185,152	178,702	147,056	153,363	85,332	83,100	63,709	43,550	49,090
2	113,747	115,359	115,206	107,982	148,783	101,585	96,134	97,189	104,644	85,450	34,567	111,632	117,736	75,841	90,845	54,894	48,537	37,085	34,825	41,577
3	8,319	8,436	8,426	7,897	10,893	8,062	9,653	10,831	10,389	8,351	8,690	25,165	28,987	13,302	19,894	13,198	10,787	8,637	10,563	13,165
4	2,485	2,520	2,517	2,359	3,261	3,469	3,589	4,241	4,396	2,537	3,038	7,786	8,547	4,368	6,260	3,912	3,379	3,183	3,468	4,074
5	1,377	1,397	1,395	1,307	1,804	1,396	1,665	1,754	1,803	1,294	741	2,332	3,058	875	1,853	1,354	954	805	1,139	1,314
6	0	0	0	0	0	0	0	0	0	0	271	896	1,204	335	707	511	383	309	440	539
7	0	0	0	0	0	0	0	0	0	0	26	170	251	55	136	116	62	47	80	103
Unaged	0	0	0	0	0	0	0	0	0	0	211	460	0	426	0	0	0	941	0	0
Total	358,346	363,425	362,924	340,185	468,519	282,267	320,343	246,698	294,389	168,875	98,434	336,259	340,306	243,813	274,873	160,181	148,434	115,925	94,351	110,189

Table 5.2.1.2.1. Sampling intensity of the NMFS Marine Recreational Fisheries Statistics Survey, number of interviews and number of trips (1991 forward only) interviewed with anglers catching or targeting Florida pompano, and estimated number of total angler fishing trips taken in Florida and the number of trips taken that targeted Florida pompano during 1981-2006 on the Atlantic and gulf coasts of Florida.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\MRFSS_ints&trips.xls

Gulf

	Interviews			Estimated Effort	
Year	Total	Pompano	Targeted	Total	Pompano
1981	3,151	21		9,520,481	50,041
1982	4,806	34		8,807,769	82,250
1983	3,219	33		14,521,381	173,836
1984	3,694	21		16,521,499	147,527
1985	4,150	21		11,583,246	63,703
1986	5,468	29		14,367,176	106,779
1987	7,961	25		12,321,111	40,954
1988	9,124	55		11,215,425	90,510
1989	6,203	43		12,031,576	115,898
1990	5,166	19		9,922,602	35,474
1991	5,514	39	16	14,261,115	112,492
1992	13,078	93	44	13,007,459	124,808
1993	14,370	67	38	12,928,092	63,452
1994	16,347	104	64	13,166,982	91,983
1995	14,718	111	69	12,396,870	101,793
1996	14,832	80	48	12,331,873	83,624
1997	15,723	135	79	13,384,436	143,135
1998	20,005	243	122	12,234,580	191,345
1999	28,975	368	203	11,296,851	201,329
2000	27,147	386	259	15,086,213	390,199
2001	27,404	400	300	16,388,611	453,184
2002	28,643	339	237	14,418,275	282,448
2003	29,555	280	182	16,008,974	233,965
2004	30,880	208	102	16,615,573	192,971
2005	27,432	289	147	16,079,716	248,102
2006	24,500	326	216	19,062,855	420,887

Atlantic

	Interviews			Estimated Effort	
Year	Total	Pompano	Targeted	Total	Pompano
1981	1,766	28		5,543,684	133,425
1982	4,496	89		8,239,592	295,977
1983	4,884	75		8,234,151	125,689
1984	5,820	123		9,016,197	213,972
1985	4,733	108		9,926,707	192,979
1986	4,907	26		9,840,146	95,253
1987	4,659	9		10,686,778	25,389
1988	6,082	42		9,025,846	107,845
1989	5,381	39		10,805,929	97,962
1990	5,057	70		8,067,598	151,869
1991	6,018	41	28	11,086,638	123,403
1992	11,434	69	41	9,820,446	73,255
1993	13,395	85	53	9,630,114	66,769
1994	15,144	192	132	11,815,061	141,017
1995	14,039	201	137	11,617,801	157,159
1996	11,753	90	62	10,525,857	108,254
1997	12,225	152	92	11,298,958	164,691
1998	13,680	308	166	10,089,808	297,119
1999	18,029	412	260	8,194,167	200,216
2000	17,058	384	270	11,479,305	334,120
2001	19,728	312	215	12,464,111	319,696
2002	22,191	297	202	10,303,392	199,110
2003	19,833	425	280	11,443,784	316,252
2004	16,218	389	255	10,587,960	400,990
2005	16,697	354	228	12,199,909	381,689
2006	18,916	377	264	15,652,939	496,778

Table 5.2.1.4.1. Fork length frequencies for Florida pompano sampled from the recreational landings made on the Atlantic or gulf coasts of Florida during 1981-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_lengths.xls

Atlantic

Inch	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
5			1	2									
6			8	3									
7													
8	1	3			1								
9	35	4	1	2	4	5		3	3	1		1	1
10	7	2	1	4		5			1	1		1	
11	4	3	20	2				2	1	3	1	3	1
12	7	10	13	3	3	1		3	2	1	3	2	1
13	1	5	7	2	2	1	2	3	3	3		2	2
14	5	3	6	1	3		1	1	1	1	1	1	1
15			1			1	1				1		
16													1
17									1		1		
18								1				1	
19													
20							1						1
21	1												
22													
Total	61	30	58	19	13	13	5	13	12	10	7	11	8

Inch	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5												
6	1			6								
7	1			2								
8		1			1				1	2		
9	8	5			2	1		1	15	4		
10	1	3	2	3	14	10	10	8	11	26	2	4
11	14	11	8	14	42	32	35	21	15	25	19	27
12	15	16	14	23	35	62	48	20	19	37	20	35
13	8	12	4	13	20	24	30	10	8	20	4	9
14	2	3	1	3	19	10	16	4	3	8	1	5
15	1			1	7	8	7	5	1	3		2
16	1				4	2	3	1	1	1	1	2
17	1			2		1	2	2	2	1		1
18	1				1	1			1	1		
19								1				
20								1				
21												
22								1				
Total	54	51	29	67	145	151	151	75	77	128	47	85

Table 5.2.1.4.1 (cont.). Fork length frequencies for Florida pompano sampled from the recreational landings made on the Atlantic or gulf coasts of Florida during 1981-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_lengths.xls

Gulf

Inch	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
5	1						2						
6			1		1		6						1
7	1		1										
8				3	1							1	
9			1	3				1				3	3
10		2			2		2	1	2		3	11	3
11	1		5		1		1	3	1	1	3	14	7
12	2	3	7		2	2	2	6	3		1	10	12
13	2	2	2	1			2	2			8	3	3
14	2		2			1		1	1		2	2	1
15			2					1				5	
16											1	1	
17													
18													
19													
Total	9	7	21	7	7	3	15	15	7	1	18	50	30

Inch	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
5													
6													
7													
8					1	1	1	1	1				
9	1	3		6	7	7	2	4	4	1			
10	1	7	5	23	8	22	19	29	21	7	7	7	
11	3	4	8	15	29	40	36	42	29	15	19	31	
12	5	15	5	12	44	66	23	30	30	20	18	31	
13	4	10	9	7	18	45	21	15	15	16	18	13	
14		4	5	6	17	14	7	10	17	7	2	14	
15	1	2	5	3	4	10	7	8	10	4	2	5	
16		1		1		3	2	1	1	2	3	2	
17	1					3			1		1	1	
18					1	2				1			
19									1				
Total	16	46	37	73	129	213	118	140	130	73	70	104	

Table 5.2.1.4.1 (con't). Fork length frequencies for Florida pompano sampled from the recreational landings made on the Everglades National Park, Flamingo boat ramp during 1981-2005. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_lengths.xls

ENP

Inch	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
8								1					
9													2
10							3				6	6	7
11		1						1	1	1	10	9	8
12		2	2	1							15	10	8
13		2					2	1			5	5	4
14		1	1	1	1		2				2	2	3
15									1		1	1	2
16								1			2	1	2
17								1					
18												1	
19							1						
20													
21								1					
Total	0	6	3	2	1	0	8	6	2	1	41	35	36

Inch	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
8													
9		3						2	1				
10		1	2	3		4	2	9	11	3	2	1	
11	3	3	2	1		4	7	16	20	7	11	7	
12	10	3	4	5		7	8	22	10	8	5	6	
13	1	1		1		2	4	17	6	1	6	5	
14	4		1	2		5	3	9	1	1	2	2	
15	2		3			1	1		2	2	3	2	
16				1		1		3	1				
17			1							1			
18	1	1									3		
19											1		
20													
21													
Total	21	12	13	13	0	24	25	78	52	23	33	23	

Table 5.2.1.6.1. Length frequencies (fork length) for Florida pompano landed, dead after being released alive, and total removals by the recreational fisheries operating on the Atlantic or gulf coasts of Florida during 1986-2005. (1981-1985 length frequencies available upon request)
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_lengths.xls

Atlantic - Landings (Type A+B1)

Inch	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5	484	107	542	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1,773	392	1,987	244	517	689	272	233	1,073	0	0	16,365	0	0	0	0	0	0	0	0
7	0	0	0	104	221	295	117	100	1,073	0	0	5,455	0	0	0	0	0	0	0	0
8	806	178	903	174	369	492	195	166	0	2,969	0	0	1,812	0	0	0	1,827	5,849	0	0
9	9,188	2,031	10,296	1,358	2,879	3,838	1,518	1,297	8,584	14,847	0	0	3,623	1,101	0	1,886	27,405	11,698	0	0
10	3,224	713	3,613	3,134	6,645	8,857	3,503	2,992	1,073	8,908	3,108	8,183	25,364	11,008	16,058	15,087	20,097	76,036	11,765	10,467
11	5,158	1,140	5,780	7,836	16,611	22,144	8,757	7,481	15,022	32,663	12,431	38,186	76,092	35,224	56,202	39,603	27,405	73,112	111,767	70,655
12	6,770	1,497	7,587	10,308	21,853	29,131	11,520	9,841	16,095	47,510	21,754	62,733	63,410	68,247	77,077	37,717	34,713	108,205	117,649	91,590
13	4,191	926	4,697	5,433	11,517	15,353	6,071	5,187	8,584	35,632	6,215	35,458	36,234	26,418	48,173	18,858	14,616	58,489	23,530	23,552
14	3,385	748	3,793	2,542	5,390	7,184	2,841	2,427	2,146	8,908	1,554	8,183	34,423	11,008	25,692	7,543	5,481	23,396	5,882	13,084
15	484	107	542	1,184	2,510	3,346	1,323	1,130	1,073	0	0	2,728	12,682	8,806	11,240	9,429	1,827	8,773	0	5,234
16	0	0	0	488	1,034	1,378	545	465	1,073	0	0	0	7,247	2,202	4,817	1,886	1,827	2,924	5,882	5,234
17	161	36	181	418	886	1,181	467	399	1,073	0	0	5,455	0	1,101	3,212	3,772	3,654	2,924	0	2,617
18	161	36	181	209	443	590	234	199	1,073	0	0	0	1,812	1,101	0	0	1,827	2,924	0	0
19	0	0	0	35	74	98	39	33	0	0	0	0	0	0	0	1,886	0	0	0	0
20	161	36	181	70	148	197	78	66	0	0	0	0	0	0	0	1,886	0	0	0	0
21	161	36	181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	35	74	98	39	33	0	0	0	0	0	0	0	1,886	0	0	0	0
Total	36,108	7,982	40,463	33,571	71,171	94,873	37,517	32,051	57,942	151,438	45,061	182,745	262,700	166,215	242,471	141,438	140,681	374,332	276,476	222,432

Atlantic - Mortalities After Live Release (15% of Type B2)

Inch	Sizes	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5	0.0134	56	0	29	51	267	64	79	89	154	136	104	289	366	302	169	471	351	615	690	434
6	0.0491	207	0	106	189	978	236	290	325	566	498	382	1,060	1,342	1,109	619	1,725	1,286	2,255	2,529	1,591
7	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0.0223	94	0	48	86	445	107	132	148	257	226	173	482	610	504	281	784	585	1,025	1,149	723
9	0.2545	1,071	0	550	978	5,068	1,225	1,502	1,684	2,932	2,581	1,977	5,491	6,955	5,747	3,207	8,940	6,665	11,687	13,104	8,245
10	0.0893	376	0	193	343	1,778	430	527	591	1,029	906	694	1,927	2,440	2,017	1,125	3,137	2,339	4,101	4,598	2,893
11	0.1429	601	0	309	549	2,845	688	843	945	1,646	1,449	1,110	3,083	3,904	3,227	1,801	5,019	3,742	6,561	7,357	4,629
12	0.1875	789	0	405	720	3,734	903	1,106	1,241	2,161	1,902	1,457	4,046	5,124	4,235	2,363	6,587	4,911	8,611	9,656	6,075
13	0.1161	489	0	251	446	2,312	559	685	768	1,338	1,177	902	2,505	3,172	2,622	1,463	4,078	3,040	5,331	5,977	3,761
14	0.0938	395	0	203	360	1,867	451	553	620	1,080	951	729	2,023	2,562	2,117	1,182	3,294	2,456	4,306	4,828	3,038
15	0.0134	56	0	29	51	267	64	79	89	154	136	104	289	366	302	169	471	351	615	690	434
16	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0.0045	19	0	10	17	89	21	26	30	51	45	35	96	122	101	56	157	117	205	230	145
18	0.0045	19	0	10	17	89	21	26	30	51	45	35	96	122	101	56	157	117	205	230	145
19	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0.0045	19	0	10	17	89	21	26	30	51	45	35	96	122	101	56	157	117	205	230	145
21	0.0045	19	0	10	17	89	21	26	30	51	45	35	96	122	101	56	157	117	205	230	145
22	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		4,210	0	2,161	3,842	19,915	4,815	5,901	6,617	11,524	10,142	7,771	21,578	27,330	22,586	12,604	35,133	26,193	45,928	51,496	32,401

Table 5.2.1.6.1 (con't.). Length frequencies (fork length) for Florida pompano landed, dead after being released alive, and total removals by the recreational fisheries operating on the Atlantic or gulf coasts of Florida during 1986-2005. (1981-1985 length frequencies available upon request)
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\MRFSS_lengths.xls

Atlantic - Total Removals (Type A+B1+0.15B2)

Inch	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5	540	107	571	51	267	64	79	89	154	136	104	289	366	302	169	471	351	615	690	434
6	1,980	392	2,093	432	1,495	925	562	558	1,639	498	382	17,425	1,342	1,109	619	1,725	1,286	2,255	2,529	1,591
7	0	0	0	104	221	295	117	100	1,073	0	0	5,455	0	0	0	0	0	0	0	0
8	900	178	951	260	814	600	326	314	257	3,196	173	482	2,422	504	281	784	2,412	6,874	1,149	723
9	10,260	2,031	10,846	2,336	7,947	5,063	3,019	2,981	11,516	17,428	1,977	5,491	10,578	6,848	3,207	10,826	34,071	23,385	13,104	8,245
10	3,600	713	3,806	3,477	8,423	9,287	4,030	3,583	2,102	9,814	3,801	10,109	27,804	13,024	17,183	18,224	22,436	80,137	16,363	13,360
11	5,760	1,140	6,089	8,384	19,456	22,831	9,600	8,426	16,668	34,112	13,541	41,268	79,997	38,451	58,002	44,622	31,147	79,673	119,124	75,284
12	7,560	1,497	7,992	11,029	25,587	30,034	12,626	11,082	18,256	49,412	23,211	66,779	68,535	72,482	79,440	44,304	39,625	116,817	127,305	97,665
13	4,680	926	4,947	5,879	13,829	15,912	6,756	5,955	9,922	36,810	7,117	37,963	39,407	29,040	49,636	22,936	17,656	63,820	29,507	27,312
14	3,780	748	3,996	2,902	7,257	7,636	3,394	3,047	3,226	9,859	2,282	10,206	36,985	13,125	26,874	10,837	7,937	27,701	10,710	16,122
15	540	107	571	1,235	2,777	3,411	1,402	1,219	1,227	136	104	3,017	13,048	9,109	11,409	9,900	2,178	9,389	690	5,668
16	0	0	0	488	1,034	1,378	545	465	1,073	0	0	0	7,247	2,202	4,817	1,886	1,827	2,924	5,882	5,234
17	180	36	190	435	975	1,202	493	429	1,124	45	35	5,551	122	1,202	3,268	3,929	3,771	3,130	230	2,761
18	180	36	190	226	532	612	260	229	1,124	45	35	96	1,934	1,202	56	157	1,944	3,130	230	145
19	0	0	0	35	74	98	39	33	0	0	0	0	0	0	0	1,886	0	0	0	0
20	180	36	190	87	237	218	104	96	51	45	35	96	122	101	56	2,043	117	205	230	145
21	180	36	190	17	89	21	26	30	51	45	35	96	122	101	56	157	117	205	230	145
22	0	0	0	35	74	98	39	33	0	0	0	0	0	0	0	1,886	0	0	0	0
Total	40,318	7,982	42,624	37,413	91,086	99,688	43,418	38,668	69,466	161,580	52,832	204,323	290,030	188,801	255,075	176,571	166,874	420,260	327,972	254,833

Gulf - Landings (Type A+B1)

Inch	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5	6,221	3,256	2,231	1,151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	16,588	9,769	5,950	3,070	0	0	0	1,157	0	0	0	0	0	0	0	0	0	0	0	0
7	4,147	0	1,487	767	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	10,368	0	3,719	1,919	0	0	1,372	0	0	0	0	0	1,172	637	1,177	1,220	965	0	0	0
9	10,368	0	3,719	1,919	0	0	4,117	5,786	917	8,119	0	6,927	8,204	4,461	2,354	7,320	4,827	1,288	0	0
10	20,735	8,141	7,437	3,837	0	9,503	23,328	11,571	917	10,826	6,027	30,017	9,376	16,570	24,722	46,360	30,892	12,883	7,112	9,951
11	26,956	1,628	9,669	4,988	13,446	13,726	31,562	17,357	5,504	9,473	8,610	18,472	33,986	28,042	50,621	70,761	47,304	28,342	23,708	47,270
12	60,132	3,256	21,568	11,128	0	16,894	27,445	23,142	13,761	24,358	7,749	19,627	51,565	46,524	36,494	63,440	38,616	36,072	18,176	46,026
13	33,176	6,513	11,900	6,140	0	13,726	10,978	8,100	4,587	14,885	7,749	9,236	21,095	29,954	29,431	39,040	20,273	21,901	18,966	22,391
14	24,882	3,256	8,925	4,605	0	4,223	5,489	4,628	3,670	5,413	5,166	9,236	19,923	12,109	11,772	23,180	17,377	10,306	3,161	19,903
15	6,221	0	2,231	1,151	0	1,056	8,234	2,314	2,752	2,706	6,888	3,464	4,688	7,010	9,418	9,760	11,585	7,730	3,951	8,708
16	2,074	0	744	384	0	3,168	2,745	2,314	0	1,353	0	2,309	0	2,549	2,354	4,880	1,931	2,577	2,371	2,488
17	2,074	0	744	384	0	0	0	0	917	0	861	0	0	1,912	0	0	965	1,288	790	1,244
18	0	0	0	0	0	0	1,372	0	917	1,353	0	0	1,172	1,275	0	0	0	1,288	2,371	0
19	2,074	1,628	744	384	0	0	0	0	0	0	0	0	0	0	0	0	965	0	790	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	2,074	0	744	384	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	228,087	37,447	81,811	42,210	13,446	62,296	116,642	76,370	33,944	78,487	43,049	99,287	151,180	151,044	168,343	265,962	175,701	123,674	81,397	157,980

Table 5.2.1.6.1 (con't'.). Length frequencies (fork length) for Florida pompano landed, dead after being released alive, and total removals by the recreational fisheries operating on the Atlantic or gulf coasts of Florida during 1986-2005. (1981-1985 length frequencies available upon request)
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\MRFSS_lengths.xls

Gulf - Mortalities After Live Release (0.15 x Type B2)

Inch	Sizes	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5	0.0268	241	83	93	359	201	1,089	184	156	214	84	128	407	398	454	545	573	403	435	521	476
6	0.0714	642	222	247	957	535	2,905	490	415	570	224	342	1,086	1,060	1,210	1,452	1,527	1,074	1,159	1,388	1,269
7	0.0179	160	55	62	239	134	726	123	104	143	56	85	272	265	302	363	382	268	290	347	317
8	0.0446	401	139	154	598	334	1,816	306	260	356	140	214	679	663	756	908	955	671	724	868	793
9	0.0446	401	139	154	598	334	1,816	306	260	356	140	214	679	663	756	908	955	671	724	868	793
10	0.0893	802	277	309	1,197	669	3,631	613	519	713	280	427	1,358	1,325	1,512	1,815	1,909	1,342	1,449	1,735	1,586
11	0.1250	1,123	388	433	1,675	936	5,084	858	727	998	392	598	1,901	1,855	2,117	2,542	2,673	1,879	2,028	2,429	2,220
12	0.2589	2,326	804	896	3,470	1,939	10,530	1,777	1,506	2,066	813	1,238	3,938	3,843	4,386	5,265	5,536	3,892	4,201	5,032	4,599
13	0.1429	1,283	443	494	1,914	1,070	5,810	981	831	1,140	448	683	2,173	2,121	2,420	2,905	3,054	2,147	2,318	2,776	2,537
14	0.1071	962	333	371	1,436	802	4,357	735	623	855	336	512	1,629	1,590	1,815	2,179	2,291	1,611	1,739	2,082	1,903
15	0.0357	321	111	124	479	267	1,452	245	208	285	112	171	543	530	605	726	764	537	580	694	634
16	0.0089	80	28	31	120	67	363	61	52	71	28	43	136	133	151	182	191	134	145	174	159
17	0.0089	80	28	31	120	67	363	61	52	71	28	43	136	133	151	182	191	134	145	174	159
18	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0.0089	80	28	31	120	67	363	61	52	71	28	43	136	133	151	182	191	134	145	174	159
20	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0.0089	80	28	31	120	67	363	61	52	71	28	43	136	133	151	182	191	134	145	174	159
Total		8,982	3,104	3,461	13,401	7,487	40,669	6,864	5,816	7,981	3,139	4,783	15,208	14,844	16,938	20,333	21,381	15,032	16,226	19,433	17,761

Gulf - Total Removals (Type A+B1+0.15B2)

Inch	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
5	6,461	3,339	2,324	1,510	201	1,089	184	156	214	84	128	407	398	454	545	573	403	435	521	476
6	17,230	9,991	6,197	4,027	535	2,905	490	1,573	570	224	342	1,086	1,060	1,210	1,452	1,527	1,074	1,159	1,388	1,269
7	4,307	55	1,549	1,007	134	726	123	104	143	56	85	272	265	302	363	382	268	290	347	317
8	10,769	139	3,873	2,517	334	1,816	1,679	260	356	140	214	679	1,835	1,393	2,085	2,175	1,636	724	868	793
9	10,769	139	3,873	2,517	334	1,816	4,423	6,045	1,274	8,259	214	7,606	8,866	5,217	3,262	8,275	5,498	2,013	868	793
10	21,537	8,418	7,746	5,034	669	13,134	23,941	12,091	1,630	11,106	6,454	31,375	10,701	18,083	26,537	48,269	32,235	14,331	8,847	11,537
11	28,078	2,016	10,101	6,664	14,382	18,810	32,420	18,084	6,502	9,865	9,208	20,373	35,842	30,159	53,162	73,433	49,183	30,370	26,137	49,490
12	62,458	4,060	22,464	14,598	1,939	27,424	29,222	24,648	15,827	25,171	8,987	23,564	55,409	50,910	41,759	68,977	42,508	40,273	23,208	50,625
13	34,459	6,956	12,394	8,054	1,070	19,536	11,959	8,931	5,727	15,334	8,432	11,409	23,215	32,374	32,335	42,095	22,421	24,219	21,742	24,928
14	25,845	3,589	9,296	6,041	802	8,581	6,224	5,252	4,525	5,749	5,678	10,865	21,513	13,924	13,951	25,471	18,988	12,045	5,243	21,806
15	6,541	111	2,355	1,630	267	2,508	8,479	2,522	3,037	2,819	7,059	4,007	5,218	7,615	10,144	10,524	12,122	8,309	4,645	9,342
16	2,154	28	775	503	67	3,531	2,806	2,366	71	1,381	43	2,445	133	2,700	2,536	5,071	2,065	2,721	2,544	2,646
17	2,154	28	775	503	67	363	61	52	989	28	904	136	133	2,063	182	191	1,100	1,433	964	1,403
18	0	0	0	0	0	0	1,372	0	917	1,353	0	0	1,172	1,275	0	0	0	1,288	2,371	0
19	2,154	1,656	775	503	67	363	61	52	71	28	43	136	133	151	182	191	1,100	145	964	159
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	2,154	28	775	503	67	363	61	52	71	28	43	136	133	151	182	191	134	145	174	159
Total	237,069	40,551	85,272	55,611	20,933	102,965	123,506	82,186	41,925	81,626	47,832	114,495	166,024	167,982	188,676	287,343	190,733	139,900	100,830	175,741

Table 5.2.2.1. Estimates of seen harvest (Type A), unseen harvest (Type B1), numbers of pompano released alive (Type B2), and the total harvest weight (Landings (lb)) taken by anglers fishing on the Atlantic coast of Florida during 1981-2006. Quantities derived from these estimates include total catch (numbers), directed landings (numbers), average weight (lb), the portion of total catch released alive, the number of pompano that died after being released alive, given a 15% release mortality rate, and the total number harvested. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_land.xls

Atlantic coast

	Type A	Type B1	Type B2	Total Catch	Directed Landings	% Rel. Alive	15% Rel.Mort	Harvest Dir+Rel. Mort	Landings (lb)	Ave Wgt
1981	167,641	2,300	621,582	791,523	169,941	79%	93,237	263,178	335,023	1.97
1982	99,185	62,621	71,061	232,867	161,806	31%	10,659	172,465	255,293	1.58
1983	113,201	22,032	76,288	211,521	135,233	36%	11,443	146,676	210,210	1.55
1984	44,802	61,379	97,262	203,443	106,181	48%	14,589	120,770	170,444	1.61
1985	29,624	7,913	213,183	250,720	37,537	85%	31,977	69,514	98,106	2.61
1986	34,412	1,696	28,067	64,175	36,108	44%	4,210	40,318	56,901	1.58
1987	7,982	0	0	7,982	7,982	0%	0	7,982	11,265	1.41
1988	30,911	9,552	14,404	54,867	40,463	26%	2,161	42,624	60,155	1.49
1989	29,588	3,983	25,615	59,186	33,571	43%	3,842	37,413	62,778	1.87
1990	34,547	36,624	132,766	203,937	71,171	65%	19,915	91,086	149,700	2.10
1991	18,842	76,031	32,098	126,971	94,873	25%	4,815	99,688	168,883	1.78
1992	25,423	12,094	39,342	76,859	37,517	51%	5,901	43,418	72,425	1.93
1993	14,505	17,546	44,115	76,166	32,051	58%	6,617	38,668	64,097	2.00
1994	47,901	10,041	76,827	134,769	57,942	57%	11,524	69,466	109,405	1.89
1995	113,861	37,577	67,613	219,051	151,438	31%	10,142	161,580	250,440	1.65
1996	31,803	13,258	51,805	96,866	45,061	53%	7,771	52,832	87,831	1.95
1997	105,526	77,219	143,855	326,600	182,745	44%	21,578	204,323	344,786	1.89
1998	166,188	96,512	182,202	444,902	262,700	41%	27,330	290,030	541,949	2.06
1999	141,471	24,744	150,572	316,787	166,215	48%	22,586	188,801	352,025	2.12
2000	181,356	61,115	84,028	326,499	242,471	26%	12,604	255,075	496,122	2.05
2001	112,307	29,131	234,219	375,657	141,438	62%	35,133	176,571	356,670	2.52
2002	79,690	60,991	174,620	315,301	140,681	55%	26,193	166,874	269,057	1.91
2003	223,278	151,054	306,184	680,516	374,332	45%	45,928	420,260	713,703	1.91
2004	143,845	132,631	343,309	619,785	276,476	55%	51,496	327,972	539,300	1.95
2005	163,485	58,947	216,008	438,440	222,432	49%	32,401	254,833	455,089	2.05
2006	122,515	53,027	125,306	300,848	175,542	42%	18,796	194,338	293,064	1.67

Table 5.2.2.1 (con't.). Estimates of seen harvest (Type A), unseen harvest (Type B1), numbers of pompano released alive (Type B2), and the total harvest weight (Landings (lb)) taken by anglers fishing on the gulf coast of Florida during 1981-2006. Quantities derived from these estimates include total catch (numbers), directed landings (numbers), average weight (lb), the portion of total catch released alive, the number of pompano that died after being released alive, given a 15% release mortality rate, and the total number harvested. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_land.xls

Gulf coast

	Type A	Type B1	Type B2	Total Catch	Directed Landings	% Rel. Alive	15% Rel.Mort	Harvest Dir+Rel. Mort	Landings (lb)	Ave Wgt
1981	11,539	7,001	5,567	24,107	18,540	23%	835	19,375	32,136	1.73
1982	25,197	4,276	23,989	53,462	29,473	45%	3,598	33,071	54,854	1.86
1983	91,047	9,004	41,212	141,263	100,051	29%	6,182	106,233	181,875	1.82
1984	35,466	6,780	19,674	61,920	42,246	32%	2,951	45,197	74,966	1.77
1985	15,086	9,493	4,964	29,543	24,579	17%	745	25,324	42,003	1.71
1986	35,302	192,785	59,880	287,967	228,087	21%	8,982	237,069	393,215	1.72
1987	17,791	19,656	20,694	58,141	37,447	36%	3,104	40,551	63,506	1.70
1988	71,571	10,240	23,070	104,881	81,811	22%	3,461	85,272	141,436	1.73
1989	14,477	27,733	89,343	131,553	42,210	68%	13,401	55,611	92,240	2.19
1990	2,397	11,049	49,916	63,362	13,446	79%	7,487	20,933	35,426	2.63
1991	55,308	6,988	271,129	333,425	62,296	81%	40,669	102,965	180,900	2.90
1992	90,588	26,054	45,760	162,402	116,642	28%	6,864	123,506	204,245	1.75
1993	66,950	9,420	38,776	115,146	76,370	34%	5,816	82,186	141,727	1.86
1994	21,851	12,093	53,204	87,148	33,944	61%	7,981	41,925	73,252	2.16
1995	55,294	23,193	20,928	99,415	78,487	21%	3,139	81,626	149,586	1.91
1996	41,429	1,620	31,884	74,933	43,049	43%	4,783	47,832	88,623	2.06
1997	84,538	14,749	101,387	200,674	99,287	51%	15,208	114,495	182,269	1.84
1998	115,977	35,203	98,958	250,138	151,180	40%	14,844	166,024	284,776	1.88
1999	118,240	32,804	112,918	263,962	151,044	43%	16,938	167,982	297,450	1.97
2000	136,620	31,723	135,554	303,897	168,343	45%	20,333	188,676	305,477	1.81
2001	225,954	40,008	142,539	408,501	265,962	35%	21,381	287,343	462,069	1.74
2002	154,145	21,556	100,214	275,915	175,701	36%	15,032	190,733	352,141	2.00
2003	98,794	24,880	108,176	231,850	123,674	47%	16,226	139,900	255,503	2.07
2004	62,409	18,988	129,550	210,947	81,397	61%	19,433	100,830	177,644	2.18
2005	128,690	29,290	118,407	276,387	157,980	43%	17,761	175,741	314,973	1.99
2006	107,273	15,482	187,395	310,150	122,755	60%	28,109	150,864	231,422	1.89

Table 5.2.2.2. Estimates of the total number of recreational fishing trips taken each year on each coast of Florida during 1981-2005 and the estimated the number of these trips directed at harvesting Florida pompano. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_land.xls

	Atlantic			Gulf		
Year	Total trips	Pompano trips	%	Total trips	Pompano trips	%
1981	5,543,684	133,425	2.4	9,520,481	50,041	0.5
1982	8,239,592	295,977	3.6	8,807,769	82,250	0.9
1983	8,234,151	125,689	1.5	14,521,381	173,836	1.2
1984	9,016,197	213,972	2.4	16,521,499	147,527	0.9
1985	9,926,707	192,979	1.9	11,583,246	63,703	0.5
1986	9,840,146	95,253	1.0	14,367,176	106,779	0.7
1987	10,686,778	25,389	0.2	12,321,111	40,954	0.3
1988	9,025,846	107,845	1.2	11,215,425	90,510	0.8
1989	10,805,929	97,962	0.9	12,031,576	115,898	1.0
1990	8,067,598	151,869	1.9	9,922,602	35,474	0.4
1991	11,086,638	123,403	1.1	14,261,115	112,492	0.8
1992	9,820,446	73,255	0.7	13,007,459	124,808	1.0
1993	9,630,114	66,769	0.7	12,928,092	63,452	0.5
1994	11,815,061	141,017	1.2	13,166,982	91,983	0.7
1995	11,617,801	157,159	1.4	12,396,870	101,793	0.8
1996	10,525,857	108,254	1.0	12,331,873	83,624	0.7
1997	11,298,958	164,691	1.5	13,384,436	143,135	1.1
1998	10,089,808	297,119	2.9	12,234,580	191,345	1.6
1999	8,194,167	200,216	2.4	11,296,851	201,329	1.8
2000	11,479,305	334,120	2.9	15,086,213	390,199	2.6
2001	12,464,111	319,696	2.6	16,388,611	453,184	2.8
2002	10,303,392	199,110	1.9	14,418,275	282,448	2.0
2003	11,443,784	316,252	2.8	16,008,974	233,965	1.5
2004	10,587,960	400,990	3.8	16,615,573	192,971	1.2
2005	12,199,909	381,689	3.1	16,079,716	248,102	1.5

Table 5.2.4.1. Number of trips, average recreational total catch rates and their standard error and median for recreational fishing trips targeting or catching Florida pompano landings during 1986-2005. The median standardized landings rates and the percentiles for their distribution are also given (see text Section5.1.4 for details).
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_cpue_rev2.xls

Atlantic

	Arithmetic Scale Statistics				Back-transformed Least Squares Mean Distribution				
Year	N	mean	SE	median	2.5th	25th	median	75th	97.5th
1981	4	0.50	0.433	2.00	0.13	0.36	0.58	0.96	2.45
1982	67	0.42	0.146	0.00	0.25	0.33	0.38	0.43	0.56
1983	39	0.82	0.266	0.00	0.42	0.53	0.61	0.69	0.89
1984	95	0.24	0.077	0.00	0.12	0.16	0.19	0.22	0.30
1985	77	0.08	0.031	0.00	0.03	0.06	0.08	0.10	0.17
1986	14	0.50	0.242	0.00	0.14	0.22	0.28	0.36	0.58
1987	7	0.29	0.265	0.00	0.04	0.10	0.16	0.25	0.67
1988	29	0.21	0.113	0.00	0.07	0.13	0.17	0.22	0.39
1989	24	0.25	0.122	0.00	0.09	0.15	0.20	0.26	0.44
1990	47	0.87	0.251	0.00	0.40	0.50	0.56	0.63	0.81
1991	26	0.62	0.204	0.00	0.17	0.23	0.27	0.33	0.45
1992	39	0.72	0.379	0.00	0.27	0.36	0.41	0.47	0.62
1993	52	0.31	0.107	0.00	0.11	0.15	0.18	0.22	0.31
1994	129	0.68	0.198	0.00	0.44	0.53	0.58	0.63	0.75
1995	134	1.02	0.279	0.00	0.76	0.88	0.95	1.03	1.19
1996	61	0.49	0.150	0.00	0.37	0.49	0.56	0.63	0.81
1997	85	1.89	0.486	0.00	0.85	0.97	1.03	1.12	1.28
1998	153	1.22	0.266	0.00	0.65	0.74	0.79	0.85	0.96
1999	221	0.78	0.168	0.00	0.51	0.59	0.63	0.68	0.77
2000	252	0.51	0.088	0.00	0.34	0.39	0.42	0.45	0.52
2001	197	0.43	0.091	0.00	0.31	0.37	0.40	0.44	0.51
2002	194	1.47	0.391	0.00	0.81	0.91	0.97	1.03	1.16
2003	265	1.98	0.330	0.00	1.12	1.25	1.32	1.39	1.54
2004	243	0.92	0.156	0.00	0.61	0.71	0.75	0.80	0.91
2005	218	0.51	0.089	0.00	0.40	0.46	0.49	0.53	0.61

Gulf

	Arithmetic Scale Statistics				Back-transformed Least Squares Mean Distribution				
Year	N	mean	SE	median	2.5th	25th	median	75th	97.5th
1981	11	0.36	0.194	0.00	0.03	0.06	0.09	0.13	0.25
1982	17	0.06	0.057	0.00	0.00	0.01	0.02	0.03	0.12
1983	16	1.25	1.088	0.00	0.40	0.54	0.65	0.76	1.05
1984	13	0.31	0.228	0.00	0.03	0.05	0.08	0.11	0.22
1985	12	0.42	0.219	0.00	0.05	0.10	0.13	0.18	0.32
1986	8	0.25	0.234	0.00	0.02	0.05	0.08	0.12	0.30
1987	5	0.40	0.219	0.00	0.01	0.02	0.03	0.05	0.15
1988	28	0.96	0.545	0.00	0.12	0.17	0.19	0.22	0.30
1989	18	0.17	0.118	0.00	0.02	0.04	0.05	0.08	0.17
1990	10	2.00	1.132	0.00	0.27	0.37	0.44	0.53	0.75
1991	17	0.88	0.380	0.00	0.06	0.08	0.10	0.13	0.18
1992	48	0.40	0.150	0.00	0.07	0.09	0.11	0.13	0.17
1993	37	0.35	0.172	0.00	0.05	0.07	0.08	0.10	0.14
1994	64	0.63	0.275	0.00	0.13	0.16	0.18	0.21	0.26
1995	67	0.61	0.202	0.00	0.12	0.15	0.17	0.19	0.25
1996	48	0.35	0.160	0.00	0.06	0.09	0.11	0.13	0.18
1997	75	0.65	0.286	0.00	0.07	0.09	0.10	0.12	0.16
1998	122	0.43	0.118	0.00	0.07	0.08	0.09	0.10	0.12
1999	201	0.97	0.161	0.00	0.20	0.23	0.25	0.27	0.32
2000	256	0.31	0.078	0.00	0.07	0.08	0.09	0.10	0.12
2001	289	0.67	0.127	0.00	0.15	0.18	0.19	0.21	0.24
2002	223	0.58	0.124	0.00	0.11	0.13	0.14	0.16	0.18
2003	180	0.41	0.089	0.00	0.08	0.09	0.10	0.11	0.14
2004	108	0.69	0.205	0.00	0.13	0.16	0.17	0.19	0.24
2005	143	0.61	0.200	0.00	0.11	0.13	0.14	0.15	0.18

Table 5.2.4.2. Sequential selection of appropriate generalized linear model used to standardize angler catch per trip data collected along the Atlantic coast of Florida during 1981-2005. Statistics show the null model deviance and the relative reduction in the deviance (% change) associated with adding explanatory variables to the model, the cumulative reduction in deviance from the null model, log-likelihood statistics and significance levels for each factor (Prob H_o). Highlighted lines show the explanatory variable included in the next sequential expansion of the model.

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Atlantic coast

Source	Df	Deviance	Mean Dev	Diff. Mean Dev	% change	Cum %	Log like	D log like	-2 D log like	df	Prob Ho
Null	2,671	9,475.7	3.5476				-2,651.4				
Year	2,647	8,632.8	3.2613	0.2863	8.07%		-2,229.9	-421.474	842.9482	24	1.7E-162
Wave	2,666	9,109.8	3.417	0.1306	3.68%		-2,468.4	-182.973	365.9456	5	6.45E-77
Mode_fx	2,670	9,187.4	3.441	0.1066	3.00%		-2,507.2	-144.138	288.2758	1	1.18E-64
Cnty	2,661	9,122.7	3.4283	0.1193	3.36%		-2,474.9	-176.51	353.0204	10	9.11E-70
Num_hrsf	2,662	8,637.3	3.2447	0.3029	8.54%	8.54%	-2,232.2	-419.217	838.4334	9	1.1E-174
Avidity	2,661	9,153.2	3.4398	0.1078	3.04%		-2,490.1	-161.258	322.5156	10	2.68E-63
With Num_hrsf											
Year	2,638	7,825.5	2.9664	0.2783	7.84%	16.38%	-1,826.3	-405.894	811.7874	24	6.7E-156
Wave	2,657	8,260.4	3.1089	0.1358	3.83%		-2,043.7	-188.449	376.8986	5	2.82E-79
Mode_fx	2,661	8,426.2	3.1665	0.0782	2.20%		-2,126.6	-105.543	211.0854	1	7.96E-48
Cnty	2,652	8,296.3	3.1283	0.1164	3.28%		-2,061.7	-170.501	341.0014	10	3.23E-67
Avidity	2,652	8,362.5	3.1533	0.0914	2.58%		-2,094.8	-137.395	274.789	10	3.27E-53
With num_hrsf and year											
Wave	2,633	7,541.8	2.8643	0.1021	2.88%	19.26%	-1,684.4	-141.835	283.6708	5	3.24E-59
Mode_fx	2,637	7,705.4	2.922	0.0444	1.25%		-1,766.2	-60.05	120.1	1	6.02E-28
Cnty	2,628	7,564.0	2.8782	0.0882	2.49%		-1,695.5	-130.762	261.5242	10	2.04E-50
Avidity	2,628	7,564.2	2.8783	0.0881	2.48%		-1,695.6	-130.648	261.2958	10	2.28E-50
With num_hrsf, year, and wave											
Mode_fx	2,632	7,458.8	2.8339	0.0304	0.86%		-1,643.0	-41.4813	82.9626	1	8.36E-20
Cnty	2,623	7,326.4	2.7931	0.0712	2.01%		-1,576.7	-107.722	215.4434	10	9.6E-41
Avidity	2,623	7,320.1	2.7907	0.0736	2.07%	21.34%	-1,573.6	-110.86	221.719	10	4.67E-42
With num_hrsf, year, wave, and avidity											
Mode_fx	2,622	7,229.1	2.7571	0.0336	0.95%		-1,528.1	-45.4864	90.9728	1	1.46E-21
Cnty	2,613	7,131.9	2.7294	0.0613	1.73%	23.06%	-1,479.5	-94.0946	188.1892	10	4.66E-35
With num_hrsf, year, wave, avidity, and cnty											
Mode_fx	2,612	7,051.8	2.6998	0.0296	0.83%	23.90%	-1,439.4	-40.0533	80.1066	1	3.55E-19

Table 5.2.4.2 (con't). Sequential selection of appropriate generalized linear model used to standardize angler catch per trip data collected along the Gulf coast of Florida during 1981-2005. Statistics show the null model deviance and the relative reduction in the deviance (% change) associated with adding explanatory variables to the model, the cumulative reduction in deviance from the null model, log-likelihood statistics and significance levels for each factor (Prob H_o). Highlighted lines show the explanatory variable included in the next sequential expansion of the model.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_cpue_rev2.xls

Gulf coast

Source	Df	Deviance	Mean Dev	Diff. Mean Dev	% change	Cum %	Log like	D log like	-2 D log like	df	Prob Ho
Null	2,015	4,783.6	2.374				-1,803.9				
Year	1,991	4,602.0	2.3114	0.0626	2.64%		-1,713.1	-90.8188	181.6376	24	3.56E-26
Wave	2,010	4,651.2	2.314	0.06	2.53%		-1,737.7	-66.192	132.384	5	7.42E-27
Mode_fx	2,014	4,540.8	2.2546	0.1194	5.03%		-1,682.5	-121.398	242.7968	1	9.66E-55
Cnty	2,001	4,460.3	2.229	0.145	6.11%		-1,642.2	-161.657	323.3134	14	1.6E-60
Num_hrsf	2,004	4,396.7	2.1939	0.1801	7.59%	7.59%	-1,636.0	-167.865	335.7292	11	2.53E-65
Avidity	2,005	4,732.4	2.3603	0.0137	0.58%		-1,778.3	-25.5908	51.1816	10	1.62E-07
With Num_hrsf											
Year	1,980	4,205.0	2.1237	0.0702	2.96%		-1,540.2	-95.8431	191.6862	24	4.21E-28
Wave	1,999	4,292.9	2.1475	0.0464	1.95%		-1,584.1	-51.8746	103.7492	5	8.56E-21
Mode_fx	2,003	4,216.8	2.1052	0.0887	3.74%		-1,546.1	-89.9269	179.8538	1	5.22E-41
Cnty	1,990	4,049.2	2.0348	0.1591	6.70%	14.29%	-1,462.3	-173.714	347.4278	14	1.43E-65
Avidity	1,994	4,346.7	2.1799	0.014	0.59%		-1,611.0	-24.9836	49.9672	10	2.71E-07
With Num_hrsf and Cnty											
Year	1,966	3,882.4	1.9748	0.06	2.53%	16.82%	-1,378.9	-83.419	166.838	24	2.32E-23
Wave	1,985	4,000.1	2.0152	0.0196	0.83%		-1,437.8	-24.5443	49.0886	5	2.13E-09
Mode_fx	1,989	3,956.0	1.9889	0.0459	1.93%		-1,415.7	-46.6088	93.2176	1	4.68E-22
Avidity	1,980	3,994.5	2.0174	0.0174	0.73%		-1,434.9	-27.3618	54.7236	10	3.56E-08
With Num_hrsf, Cnty, and Year											
Wave	1,961	3,828.7	1.9524	0.0224	0.94%		-1,352.1	-26.8259	53.6518	5	2.47E-10
Mode_fx	1,965	3,769.2	1.9182	0.0566	2.38%	19.20%	-1,322.3	-56.5955	113.191	1	1.96E-26
Avidity	1,956	3,826.3	1.9562	0.0186	0.78%		-1,350.9	-28.0195	56.039	10	2.02E-08
With Num_hrsf, Cnty, Year, and Mode_fx											
Wave	1,960	3,722.2	1.8991	0.0191	0.80%		-1,298.8	-23.4994	46.9988	5	5.68E-09
Avidity	1,955	3,700.8	1.893	0.0252	1.06%	20.26%	-1,288.1	-34.2036	68.4072	10	8.99E-11
With Num_hrsf, Cnty, Year, Mode_fx, and Avidity											
Wave	1,950	3,660.3	1.8771	0.0159	0.67%	20.93%	-1,267.9	-20.2303	40.4606	5	1.21E-07

Table 5.2.5.1. Estimated age composition of the recreational total harvest of Florida pompano on the Atlantic and gulf coasts of Florida during 1986-2005. Estimates are available beginning in 1981 and are available upon request. These data were used as part of the landings used in the statewide untuned virtual population analysis, though there is uncertainty about their accuracy.
from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\caa.xls

Atlantic

Age	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0	2,520	499	2,664	588	1,983	1,285	758	746	2,866	634	659	23,651	4,130	1,916	1,069	2,980	4,049	9,745	4,368	2,748
1	20,352	4,029	21,516	14,482	36,643	37,876	16,996	15,315	30,109	67,433	6,569	21,458	39,937	22,472	26,516	28,718	51,692	82,942	39,439	27,842
2	9,522	1,885	10,066	12,687	29,677	34,428	14,558	12,809	21,178	56,582	37,247	121,506	182,245	125,292	168,142	104,964	84,399	255,046	231,203	175,044
3	5,111	1,012	5,403	5,920	14,043	15,965	6,820	6,026	9,378	28,922	8,233	34,248	57,848	35,930	54,903	30,592	21,488	65,737	49,200	44,570
4	2,053	406	2,170	3,028	7,019	8,250	3,466	3,041	4,133	6,333	15	2,379	3,676	1,616	3,809	2,627	2,530	2,803	3,040	3,800
5	221	44	233	307	715	835	352	309	574	1,540	5	793	17	172	467	561	539	447	33	394
6	180	36	190	226	532	612	260	229	1,124	45	35	96	1,934	1,202	56	157	1,944	3,130	230	145
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	35	74	98	39	33	0	0	0	0	0	0	0	0	0	0	0	0
Unaged	360	71	381	139	399	338	169	159	103	91	69	193	244	202	113	5,971	234	410	460	289
Total	40,318	7,982	42,624	37,413	91,086	99,688	43,418	38,668	69,466	161,580	52,832	204,323	290,030	188,801	255,075	176,571	166,874	420,260	327,972	254,833

Gulf

Age	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0	31,656	13,432	11,386	7,399	983	5,337	1,384	1,957	1,053	463	840	3,449	4,198	3,886	4,450	5,572	3,853	2,953	3,125	3,057
1	74,066	11,191	26,640	17,359	8,699	35,116	52,174	33,673	11,517	32,479	18,662	56,860	73,515	72,471	86,775	135,344	87,721	59,267	42,166	74,085
2	86,289	9,365	31,038	20,253	9,532	42,677	49,689	34,255	19,344	33,906	18,125	37,343	59,251	59,343	66,643	100,448	66,733	50,094	34,382	65,246
3	22,456	3,037	8,078	5,284	904	9,635	9,567	6,142	4,764	7,587	6,872	11,001	18,888	19,998	20,602	30,479	21,072	17,055	11,375	21,888
4	13,800	1,323	4,964	3,243	501	7,637	6,714	4,785	3,058	4,262	2,459	3,953	7,073	8,634	6,986	10,584	7,319	7,548	6,762	7,865
5	4,495	518	1,617	1,068	181	1,837	3,856	1,270	2,046	2,873	571	1,018	1,856	2,308	1,915	2,954	1,868	1,828	1,303	2,181
6	0	0	0	0	0	0	0	0	0	0	196	541	844	917	841	1,413	831	768	524	980
7	0	0	0	0	0	0	0	0	0	0	22	57	134	123	101	166	102	97	56	122
Unaged	4,307	1,684	1,549	1,007	134	726	123	104	143	56	85	272	265	302	363	382	1,234	290	1,137	317
Total	237,069	40,551	85,272	55,611	20,933	102,965	123,506	82,186	41,925	81,626	47,832	114,495	166,024	167,982	188,676	287,343	190,733	139,900	100,830	175,741

Table 5.3.1.2.1. Number of young-of-the-year (YOY) Florida pompano captured each year during fishery-independent surveys conducted on the Atlantic and gulf coast of Florida during 1998-2005. Also given are the number of gear deployments or sets, the overall mean catch rate and its standard error (SE). from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\fim_cpue.xls

Atlantic coast

Year	No. sets	Sets w/ pompano	No. YOY	Mean catch	SE	CV of mean
1998	910	4	4	0.0044	0.00219	49.9
1999	893	4	4	0.0045	0.00224	49.9
2000	914	5	7	0.0077	0.00362	47.3
2001	1,669	6	34	0.0204	0.00875	43.0
2002	1,996	15	252	0.1263	0.04449	35.2
2003	1,996	16	137	0.0686	0.02777	40.5
2004	2,072	20	345	0.1665	0.07583	45.5
2005	2,291	11	60	0.0262	0.01264	48.3

Gulf coast

Year	No. sets		No. YOY	Mean catch	SE	
1998	2,865	26	116	0.0405	0.01141	28.2
1999	3,310	19	116	0.0350	0.01322	37.7
2000	3,424	25	139	0.0406	0.01492	36.7
2001	4,175	21	152	0.0364	0.01326	36.4
2002	4,001	18	63	0.0157	0.00640	40.7
2003	4,017	13	40	0.0100	0.00376	37.7
2004	4,636	19	170	0.0367	0.01203	32.8
2005	4,632	13	70	0.0151	0.00657	43.5

Table 5.3.1.4.1. Annual fork length frequencies (inches) for all Florida pompano captured and measured during the fishery-independent monitoring programs operating on the Atlantic and gulf coasts of Florida during 1989-2005. A subset of these data were used in the catch rate analysis. from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\fimlfs.lst

Atlantic

FL"	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1		0	0	0	0	0	0	0	0	1	0	0	1	7	9	8	3
2		0	0	0	4	1	0	0	0	1	3	4	15	66	48	94	14
3		0	0	0	0	1	0	0	0	0	1	0	6	30	16	31	22
4		0	0	0	0	0	0	0	1	0	0	1	4	9	5	3	4
5		0	0	0	0	0	0	0	7	1	0	1	0	14	0	0	1
6		0	0	0	0	0	0	0	0	1	0	0	3	8	2	1	1
7		0	0	0	0	0	0	0	0	0	0	0	8	5	0	0	0
8		0	0	0	0	0	0	0	2	0	0	0	1	4	2	2	3
9		0	0	0	0	0	0	1	2	1	0	0	0	4	3	1	4
10		0	0	0	0	0	0	0	3	9	0	1	0	1	3	2	0
11		1	0	0	0	0	1	0	1	7	1	7	3	1	3	3	16
12		1	0	0	0	0	0	2	5	2	4	3	0	2	3	2	17
13		0	0	0	0	0	0	3	3	5	4	1	1	1	3	5	14
14		0	0	0	0	0	0	2	1	1	6	5	1	1	1	1	7
15		0	0	0	0	0	0	0	0	2	0	4	0	1	1	2	4
16		0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3
17		0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1
18		0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
32		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Total		2	0	0	4	2	1	8	25	32	21	28	44	156	100	155	114

Gulf

FL"	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	0	0	0	0	0	0	0	10	2	13	3	4	0	6	0	1	7
2	0	0	0	0	0	0	0	2	0	22	10	9	11	18	3	21	19
3	0	0	0	0	1	0	0	1	0	28	39	55	60	19	11	53	6
4	0	0	0	0	5	0	0	4	0	13	20	21	37	6	14	53	18
5	0	0	0	0	0	0	0	0	0	25	15	10	15	2	7	5	7
6	0	0	0	0	0	0	0	0	0	5	5	8	2	2	1	7	2
7	0	0	0	0	0	0	0	0	1	1	6	5	1	1	0	1	1
8	0	0	1	0	0	0	0	0	1	1	4	11	0	3	0	1	0
9	1	0	0	0	0	0	2	0	4	1	6	4	1	4	2	1	0
10	0	0	0	1	1	0	1	0	3	1	2	9	4	6	8	4	0
11	0	3	1	2	0	0	0	0	4	9	12	13	2	6	8	3	0
12	2	0	0	1	2	0	2	0	9	7	12	13	2	7	13	3	6
13	0	0	0	4	0	2	2	0	3	9	5	5	3	1	5	2	4
14	0	0	0	0	0	0	0	0	1	5	4	4	3	5	3	4	3
15	1	1	0	0	1	0	0	1	1	0	2	1	2	0	0	2	2
16	0	0	0	0	0	0	0	0	2	0	0	1	2	2	2	0	0
17	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
19	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Total	4	4	2	8	10	2	7	19	31	140	146	173	146	88	77	162	75

Table 5.3.1.4.2. Length frequencies of pompano sampled during a directed study of their life history in Tampa Bay during 2000-2002. from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\kathy_lfs.lst

FL inch	2000	2001	2002
4		29	
5	2	49	
6		14	
7	1	4	
8	4	6	1
9	7	42	7
10	22	99	11
11	42	125	46
12	41	64	41
13	14	30	21
14	9	13	10
15	1	7	7
16		3	5
17		2	2
18			1
Totals	143	487	152

Table 6.2.1.1. Sector-specific Florida pompano landings (lbs) and fishing effort (trips), commercial-effort equivalents (Comm-EQ), and the sector-combined landings, trips, and landings per unit effort rate for each year during 1981-2005 on the Atlantic and gulf coasts of Florida. Also shown are 2006 trips and landings. from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\sur_prod_mdm.xls

Atlantic

	Commercial		Recreational		Comm-EQ		Totals	
Year	Landings	Trips	Landings	Trips	Trips	Landings	Trips	CPUE
1981	347,810	7,311	335,023	133,425	2,422	682,833	9,733	70.16
1982	219,871	4,621	255,293	295,977	5,374	475,164	9,995	47.54
1983	269,262	5,660	210,210	125,689	2,282	479,472	7,942	60.38
1984	143,520	3,017	170,444	213,972	3,885	313,964	6,901	45.49
1985	225,514	4,648	98,106	192,979	3,504	323,620	8,152	39.70
1986	242,856	5,774	56,901	95,253	1,729	299,757	7,503	39.95
1987	334,185	6,408	11,265	25,389	461	345,450	6,869	50.29
1988	305,443	5,952	60,155	107,845	1,958	365,598	7,910	46.22
1989	341,055	5,532	62,778	97,962	1,779	403,833	7,311	55.24
1990	404,086	6,591	149,700	151,869	2,757	553,786	9,348	59.24
1991	272,021	6,856	168,883	123,403	2,240	440,904	9,096	48.47
1992	241,765	5,620	72,425	73,255	1,330	314,190	6,950	45.21
1993	191,296	4,783	64,097	66,769	1,212	255,393	5,995	42.60
1994	215,178	5,036	109,405	141,017	2,560	324,583	7,596	42.73
1995	133,680	3,669	250,440	157,159	2,853	384,120	6,522	58.89
1996	118,951	1,956	87,831	108,254	3,658	206,782	5,614	36.83
1997	220,393	2,754	344,786	164,691	5,565	565,179	8,319	67.94
1998	221,200	2,969	541,949	297,119	10,040	763,149	13,009	58.66
1999	103,000	2,487	352,025	200,216	6,766	455,025	9,253	49.18
2000	104,077	2,418	496,122	334,120	11,290	600,199	13,708	43.78
2001	75,118	2,356	356,670	319,696	10,803	431,788	13,159	32.81
2002	94,491	3,015	269,057	199,110	6,728	363,548	9,743	37.31
2003	108,560	4,184	713,703	316,252	10,687	822,263	14,871	55.29
2004	152,242	5,006	539,300	400,990	13,550	691,542	18,556	37.27
2005	131,893	4,199	455,089	381,689	12,898	586,982	17,097	34.33
2006	144,790	4,814	293,064	496,778	-	473,854	-	-

Table 6.2.1.1 (con't.). Sector-specific Florida pompano landings (lbs) and fishing effort (trips), commercial-effort equivalents (Comm-EQ), and the sector-combined landings, trips, and landings per unit effort rate for each year during 1981-2005 on the Atlantic and gulf coasts of Florida. Also shown are 2006 trips and landings. from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\sur_prod_mdm.xls

Gulf

	Commercial		Recreational		Comm-EQ	Totals		
Year	Landings	Trips	Landings	Trips	Trips	Landings	Trips	CPUE
1981	479,473	8,916	32,136	50,041	1,135	511,609	10,050	50.91
1982	660,171	12,276	54,854	82,250	1,865	715,025	14,141	50.57
1983	502,284	9,340	181,875	173,836	3,941	684,159	13,281	51.51
1984	444,537	8,266	74,966	147,527	3,345	519,503	11,611	44.74
1985	413,608	6,915	42,003	63,703	1,444	455,611	8,359	54.50
1986	430,149	8,290	393,215	106,779	2,421	823,364	10,711	76.87
1987	436,246	8,789	63,506	40,954	929	499,752	9,718	51.43
1988	435,657	8,649	141,436	90,510	2,052	577,093	10,701	53.93
1989	408,349	7,370	92,240	115,898	2,628	500,589	9,998	50.07
1990	562,587	9,151	35,426	35,474	804	598,013	9,955	60.07
1991	364,419	8,703	180,900	112,492	2,551	545,319	11,254	48.46
1992	385,663	8,698	204,245	124,808	2,830	589,908	11,528	51.17
1993	342,201	7,398	141,727	63,452	1,439	483,928	8,837	54.76
1994	385,524	6,872	73,252	91,983	2,086	458,776	8,958	51.22
1995	253,951	4,253	149,586	101,793	2,308	403,537	6,561	61.51
1996	151,899	1,370	88,623	83,624	702	240,522	2,072	116.09
1997	477,230	2,490	182,269	143,135	1,201	659,499	3,691	178.67
1998	506,737	3,677	284,776	191,345	1,606	791,513	5,283	149.83
1999	309,020	2,458	297,450	201,329	1,690	606,470	4,148	146.22
2000	384,006	2,678	305,477	390,199	3,275	689,483	5,953	115.83
2001	235,765	1,866	462,069	453,184	3,803	697,834	5,669	123.09
2002	206,395	1,925	352,141	282,448	2,370	558,536	4,295	130.03
2003	169,579	1,729	255,503	233,965	1,964	425,082	3,693	115.12
2004	160,634	997	177,644	192,971	1,620	338,278	2,617	129.29
2005	192,229	1,502	314,973	248,102	2,082	507,202	3,584	141.51
2006	309,945	1,409	231,422	420,887	-	541,367	-	-

Table 6.2.2.1. Input parameters needed to run the stochastic stock reduction analysis. All lengths are in centimeters and all weights are in kilograms.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\SRA\bestfit_Atl.xls and bestfit_gulf.xls

Parameter	**Atlantic Coast**	**Gulf Coast**
Recruitment: standard deviation	0.5	0.5
Recruitment: correlation	0	0
VB Growth: K	0.309	0.401
VB Growth: L_∞	40.9	39.3
VB Growth: t_o	-2.47	-1.78
Growth: CV length at age	0.15	0.15
Length at maturity	15.26	12.68
Weight at 100 cm	23.27	23.29
N (2005)	500,000	500,000
N (2005) standard deviation	1,000,000	1,000,000
U (2005)	0.64	0.40
U (2005) standard deviation	10	0.20
Future TAC	0	0
Future U	0.2	0.2
MSY: minimum	100,000	100,000
MSY: maximum	700,000	700,000
U: minimum	0.1	0.1
U: maximum	0.9	0.7
Survival (no fishing): minimum	0.61	0.61
Survival (no fishing): maximum	0.75	0.74
Weight scalar	1.0	0.5

Table 7.2.1.1. Estimates of instantaneous fishing mortality (F yr^{-1}) from the three modeling approaches used to estimate fishing mortality for Florida pompano from the Atlantic coast of Florida. The coefficient of variation (CV) is calculated for each year during 1981-2005.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\SRA\Fs.xls

Atlantic

Year	Surplus Production	Modified DeLury	Stock Reduction Analysis	CV
1970			0.29	
1971			0.22	
1972			0.24	
1973			0.42	
1974			0.29	
1975			0.30	
1976			0.53	
1977			0.65	
1978			0.47	
1979			0.37	
1980			0.51	
1981	0.67	0.63	0.81	13.4
1982	0.70	0.64	0.64	5.1
1983	0.55	0.51	0.88	31.4
1984	0.48	0.44	1.01	49.3
1985	0.57	0.52	1.01	38.8
1986	0.52	0.48	0.98	42.2
1987	0.47	0.45	1.45	72.3
1988	0.55	0.51	1.56	68.2
1989	0.5	0.47	1.29	61.8
1990	0.65	0.60	1.01	29.6
1991	0.63	0.59	0.80	16.4
1992	0.48	0.45	0.54	9.8
1993	0.41	0.39	0.38	4.1
1994	0.53	0.49	0.33	23.7
1995	0.45	0.42	0.27	25.7
1996	0.22	0.19	0.12	28.3
1997	0.32	0.29	0.34	8.3
1998	0.50	0.44	0.54	10.6
1999	0.36	0.31	0.40	12.7
2000	0.53	0.46	0.69	21.3
2001	0.51	0.44	0.41	11.5
2002	0.37	0.32	0.22	25.8
2003	0.57	0.48	0.43	14.3
2004	0.71	0.60	0.49	17.9
2005	0.66	0.56	0.55	10.1

Table 7.2.1.1 (con't.). Estimates of instantaneous fishing mortality (F yr^{-1}) from the three modeling approaches used to estimate fishing mortality for Florida pompano from the gulf coast of Florida. The coefficient of variation (CV) is calculated for each year during 1981-2005.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\SRA\Fs.xls

Gulf

Year	Surplus Production	Modified DeLury	Stock Reduction Analysis	CV
1970			0.52	
1971			0.42	
1972			0.67	
1973			0.58	
1974			0.87	
1975			0.92	
1976			0.90	
1977			0.95	
1978			0.69	
1979			0.59	
1980			0.56	
1981	0.15	0.72	0.63	61.3
1982	0.21	1.00	5.30	62.4
1983	0.19	0.88	0.36	75.7
1984	0.17	0.78	0.19	90.8
1985	0.12	0.57	0.34	65.8
1986	0.16	0.71	1.05	70.2
1987	0.14	0.67	0.73	63.3
1988	0.16	0.72	0.48	62.0
1989	0.15	0.66	0.26	75.1
1990	0.15	0.69	0.27	76.1
1991	0.16	0.75	0.26	80.8
1992	0.17	0.76	0.42	66.1
1993	0.13	0.60	0.32	67.4
1994	0.13	0.60	0.22	78.3
1995	0.10	0.43	0.18	72.7
1996	0.08	0.27	0.13	60.8
1997	0.13	0.52	0.44	56.7
1998	0.19	0.72	0.46	57.9
1999	0.15	0.57	0.29	63.1
2000	0.22	0.79	0.38	63.6
2001	0.21	0.73	0.36	62.0
2002	0.16	0.55	0.28	60.4
2003	0.14	0.46	0.23	59.7
2004	0.10	0.32	0.17	56.5
2005	0.13	0.43	0.30	52.4

Table 7.2.2.1. Estimates of average exploitable biomass (B, in pounds) or abundance (N) for Florida pompano from the Atlantic coast of Florida derived using three modeling approaches. The surplus production model and the SRA provide average biomass in pounds. The modified DeLury method provides estimate of average abundance using an instantaneous natural mortality rate of $0.4yr^{-1}$. Also presented is the coefficient of variation (CV) for the exploited biomass levels.

from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\est_abund.xls and bestfit_Atl.xls

Atlantic

Year	Surplus Prod (B)	Mod. DeLury (N)	Stock Reduction Analysis (B)	CV (B)
1970			1,552,526	
1971			1,404,667	
1972			1,404,667	
1973			1,330,737	
1974			1,330,737	
1975			1,330,737	
1976			1,404,667	
1977			1,330,737	
1978			1,182,877	
1979			1,108,947	
1980			1,256,807	
1981	929,755	512,654	1,182,877	16.9
1982	723,448	521,681	961,088	20.0
1983	657,192	548,470	813,228	15.0
1984	560,301	566,877	517,509	5.6
1985	586,379	549,379	369,649	32.1
1986	614,721	535,448	443,579	22.9
1987	679,489	549,399	443,579	29.7
1988	725,730	561,606	443,579	34.1
1989	769,908	587,456	517,509	27.7
1990	792,108	580,476	813,228	1.9
1991	672,148	536,743	739,298	6.7
1992	619,963	529,854	665,368	5.0
1993	672,576	555,224	739,298	6.7
1994	806,076	566,558	1,108,947	22.4
1995	920,093	596,345	1,552,526	36.2
1996	1,009,817	703,731	1,700,386	36.0
1997	1,299,945	787,907	1,848,246	24.6
1998	1,278,112	715,405	1,700,386	20.0
1999	1,056,311	646,104	1,330,737	16.3
2000	1,108,531	610,887	1,108,947	0.0
2001	1,025,868	591,713	1,182,877	10.1
2002	1,094,682	676,080	1,774,316	33.5
2003	1,246,077	716,634	2,217,895	39.7
2004	961,789	679,190	1,700,386	39.2
2005	755,322	625,927	1,330,737	39.0

Table 7.2.2.1 (con't.). Estimates of average exploitable biomass (B, in pounds) or abundance (N) for Florida pompano from the gulf coast of Florida derived using three modeling approaches. The surplus production model and the SRA provide average biomass in pounds. The modified DeLury method provides estimate of average abundance using an instantaneous natural mortality rate of $0.4yr^{-1}$. Also presented is the coefficient of variation (CV) for the exploited biomass levels.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\est_abund.xls and bestfit_gulf.xls

Gulf

Year	Surplus Prod (B)	Mod. DeLury (N)	Stock Reduction Analysis (B)	CV (B)
1970			3,670,094	
1971			3,433,314	
1972			3,551,704	
1973			3,314,924	
1974			3,670,094	
1975			3,078,143	
1976			2,959,753	
1977			2,604,583	
1978			2,249,413	
1979			2,249,413	
1980			2,486,193	
1981	1,893,812	492,422	2,131,022	8.3
1982	2,233,749	441,835	1,539,072	26.0
1983	2,399,098	425,802	4,262,045	39.6
1984	2,595,689	430,803	5,564,336	51.4
1985	2,945,763	509,067	2,959,753	0.3
1986	3,308,573	580,659	2,367,803	23.4
1987	3,208,370	618,819	1,657,462	45.1
1988	3,462,385	605,258	2,722,973	16.9
1989	3,555,089	574,909	3,906,874	6.7
1990	3,688,400	561,816	4,735,605	17.6
1991	3,667,747	545,198	4,380,435	12.5
1992	3,708,927	574,521	3,314,924	7.9
1993	3,687,158	597,627	3,196,534	10.1
1994	3,781,144	571,563	4,143,655	6.5
1995	3,856,969	575,528	4,498,825	10.9
1996	3,950,986	642,509	3,670,094	5.2
1997	4,159,476	679,389	3,551,704	11.1
1998	3,831,040	671,668	3,788,484	0.8
1999	3,549,961	670,883	4,380,435	14.8
2000	3,579,451	655,823	4,262,045	12.3
2001	3,513,969	655,709	4,380,435	15.5
2002	3,466,304	599,682	4,143,655	12.6
2003	3,576,103	501,722	3,788,484	4.1
2004	3,776,395	627,865	3,906,874	2.4
2005	3,974,976	677,488	3,670,094	5.6

Table 7.2.3.1. Estimated vulnerable biomass of Florida pompano on the Atlantic coast during 1981-2005. The distribution of the stochastic SRA estimates are shown with the deterministic mean estimate for the surplus production model.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\\SRA\Final\wtscale10\Pop_Atl_dist_1.xls

	Stock Reduction Analysis					Surplus Production
	2.5th	25th	median	75th	97.5th	Mean
1981	817,502	1,027,187	1,153,099	1,297,342	1,652,753	929,755
1982	635,995	815,942	920,167	1,035,013	1,327,944	723,448
1983	598,163	716,414	789,952	871,681	1,097,744	657,192
1984	315,078	404,870	458,905	511,717	687,362	560,301
1985	234,371	307,880	337,369	366,857	512,739	586,379
1986	307,477	394,105	445,042	505,045	658,452	614,721
1987	302,786	366,391	414,946	476,872	641,081	679,489
1988	309,231	392,063	441,558	509,189	698,302	725,730
1989	377,358	452,949	510,126	582,245	782,632	769,908
1990	602,655	728,192	812,438	915,644	1,178,892	792,108
1991	522,843	667,609	759,537	868,780	1,158,351	672,148
1992	455,623	596,526	683,469	786,851	1,054,205	619,963
1993	520,074	668,484	762,558	873,093	1,169,541	672,576
1994	795,237	1,000,465	1,129,360	1,278,444	1,676,135	806,076
1995	1,108,998	1,382,885	1,559,565	1,764,440	2,307,602	920,093
1996	1,218,581	1,529,623	1,728,293	1,961,733	2,582,277	1,009,817
1997	1,421,287	1,720,703	1,917,232	2,148,202	2,762,818	1,299,945
1998	1,270,223	1,561,611	1,743,418	1,957,315	2,517,013	1,278,112
1999	908,296	1,159,496	1,315,806	1,496,979	1,985,505	1,056,311
2000	815,438	1,027,880	1,164,222	1,324,006	1,756,159	1,108,531
2001	846,862	1,078,698	1,226,969	1,400,019	1,860,774	1,025,868
2002	1,291,823	1,593,690	1,785,805	2,008,655	2,599,130	1,094,682
2003	1,662,624	2,040,638	2,278,549	2,548,721	3,276,052	1,246,077
2004	1,259,928	1,554,620	1,744,109	1,970,986	2,572,190	961,789
2005	919,742	1,174,919	1,341,131	1,536,441	2,049,420	755,322

Table 7.2.3.1. Estimated vulnerable biomass of Florida pompano on the gulf coast during 1981-2005. The distribution of the stochastic SRA estimates are shown with the deterministic mean estimate for the surplus production model.
from G:\DATA\SPECIES\POMPANO\Pompan06\Murphy\\SRA\Final\wtscale10\Pop_Atl_dist_1.xls

	Stock Reduction Analysis					Surplus Production
	2.5th	25th	median	75th	97.5th	Mean
1981	1,436,483	1,816,472	2,063,742	2,336,787	2,972,441	1,893,812
1982	1,315,229	1,427,738	1,510,875	1,641,338	2,085,910	2,233,749
1983	3,104,582	3,869,233	4,359,377	4,925,906	6,273,572	2,399,098
1984	3,682,159	4,887,001	5,646,296	6,508,769	8,537,187	2,595,689
1985	2,110,486	2,635,356	2,994,944	3,412,851	4,395,921	2,945,763
1986	1,695,599	2,121,182	2,425,220	2,784,906	3,638,504	3,308,573
1987	1,082,014	1,477,717	1,757,205	2,084,458	2,830,225	3,208,370
1988	1,880,184	2,436,242	2,796,313	3,211,823	4,162,375	3,462,385
1989	2,465,770	3,343,387	3,946,290	4,644,222	6,220,855	3,555,089
1990	3,417,026	4,320,828	4,899,079	5,575,636	7,183,339	3,688,400
1991	3,040,486	3,969,325	4,560,576	5,247,983	6,951,331	3,667,747
1992	2,253,539	2,922,651	3,349,715	3,831,747	4,960,590	3,708,927
1993	2,152,984	2,841,443	3,276,656	3,787,257	4,985,188	3,687,158
1994	3,030,147	3,847,699	4,381,425	5,012,130	6,471,411	3,781,144
1995	3,187,792	4,093,876	4,688,725	5,376,393	7,011,818	3,856,969
1996	2,551,753	3,262,722	3,730,397	4,261,301	5,551,650	3,950,986
1997	2,429,615	3,090,423	3,517,502	3,996,428	5,130,168	4,159,476
1998	2,634,747	3,450,016	3,975,085	4,575,836	5,947,831	3,831,040
1999	3,048,844	3,957,312	4,538,557	5,211,065	6,797,916	3,549,961
2000	2,807,756	3,702,880	4,268,533	4,940,295	6,486,231	3,579,451
2001	3,143,159	3,978,170	4,511,797	5,111,215	6,533,684	3,513,969
2002	2,942,226	3,801,544	4,357,315	4,981,958	6,456,413	3,466,304
2003	2,683,633	3,444,262	3,920,903	4,463,141	5,708,313	3,576,103
2004	2,854,357	3,568,122	4,023,242	4,540,943	5,698,561	3,776,395
2005	2,682,410	3,336,929	3,726,089	4,139,386	4,995,123	3,974,976

Table 8.4.1. The average 2004-2005 stock biomass (lbs) and instantaneous fishing mortality (F yr^{-1}) estimates from the non-equilibrium stock production model and the stock reduction analysis and the biological benchmark levels, estimated within these models, with regards to maximum sustainable yield (MSY); stock biomass at MSY (B_{MSY}), minimum stock biomass threshold ([1-M]B_{MSY}) and fishing mortality at MSY (F_{MSY}). All harvest and biomass units are in pounds.
from G:\DATA\SPECIES\POMPANO\Pompan06\murphy\sur_prod_mdm.xls

Atlantic

	Biomass	F	Harvest
Surplus production Model			
2004-2005 Averages	858,555	0.684	639,262
B_{MSY}	1,468,208		
(1-M)B_{MSY}	880,925		
F_{MSY}		0.375	
MSY			550,578
Stock Reduction Analysis			
2004-2005 Averages	1,515,561	0.524	639,262
B_{MSY}	1,520,662		
(1-M)B_{MSY}	909,337		
F_{MSY}		1.19	
MSY			585,063

Gulf

	Biomass	F	Harvest
Surplus production Model			
2004-2005 Averages	3,875,685	0.115	422,740
B_{MSY}	2,323,392		
(1-M)B_{MSY}	1,394,035		
F_{MSY}		0.379	
MSY			881,687
Stock Reduction Analysis			
2004-2005 Averages	3,788,484	0.238	422,740
B_{MSY}	913,600		
(1-M)B_{MSY}	548,168		
F_{MSY}		2.00	
MSY			794,900

13.0 Figures

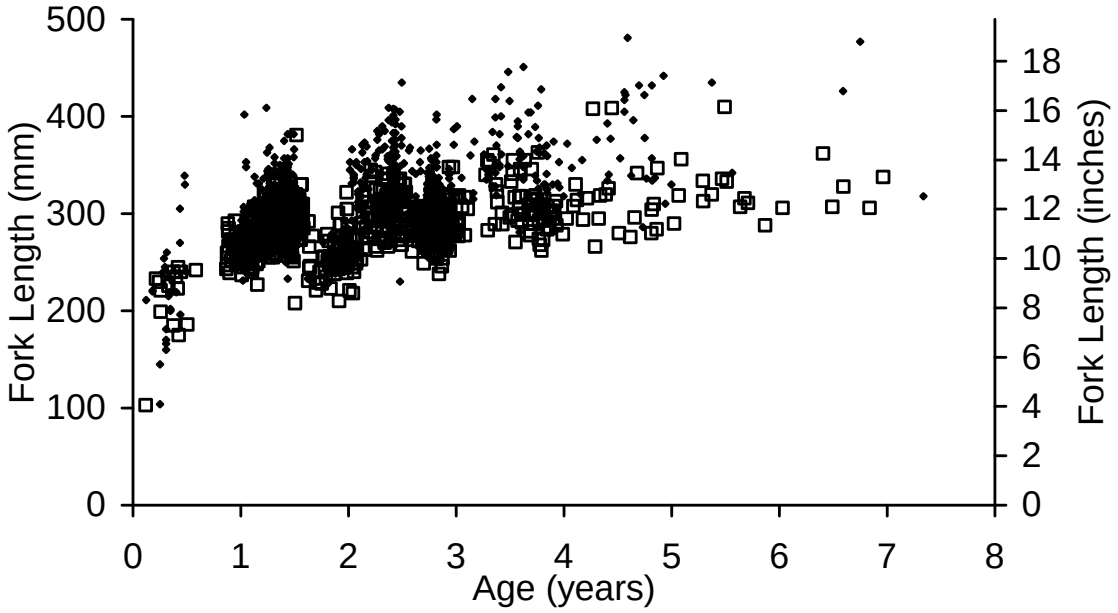

Figure 2.1.1. Observed lengths and ages of male (open squares) and females (diamonds) Florida pompano sampled from the Tampa Bay area during 2000-2002. Within-year age was assigned assuming a June 20 hatch date each year.
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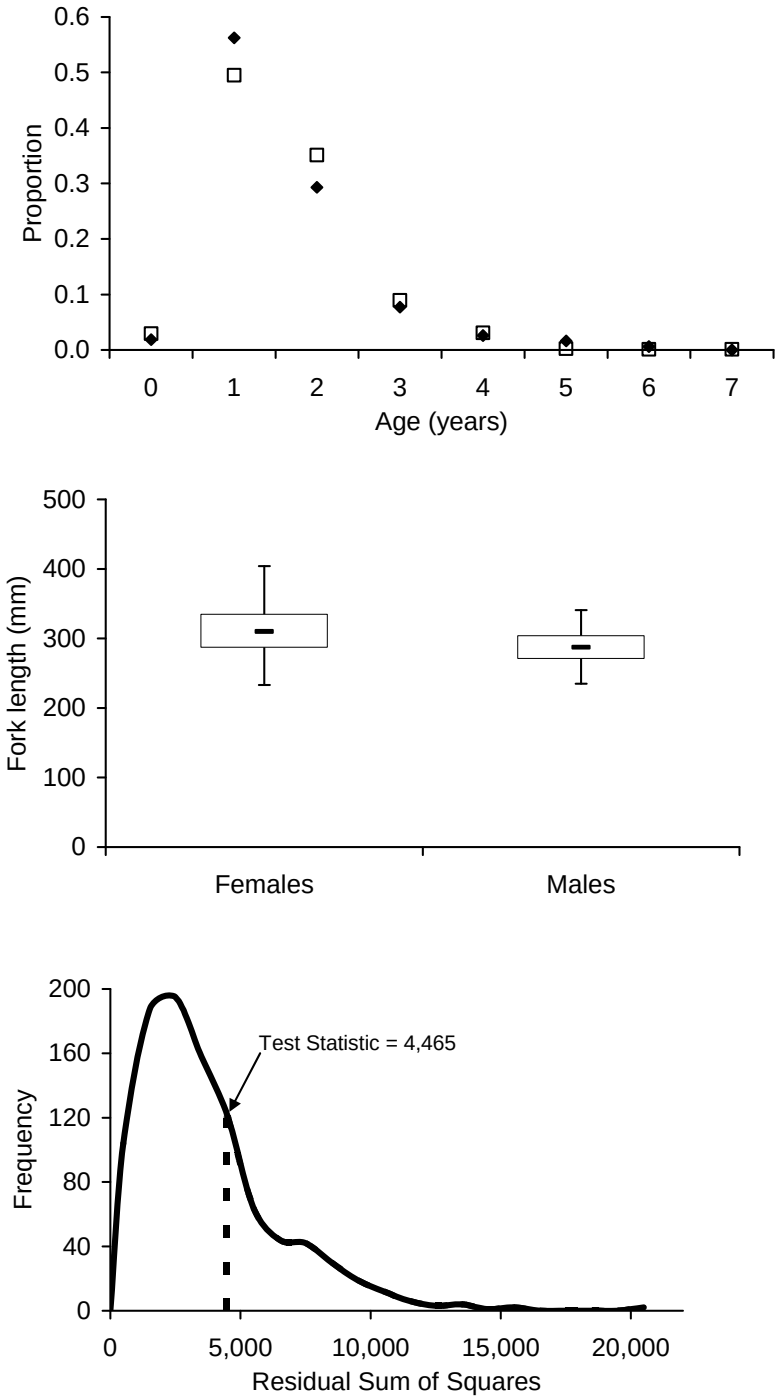

Figure 2.2.1. Distribution of ages (top) for females (diamonds) and males (open squares), descriptive statistics of their fork lengths distributions (middle), and position of randomization test statistic within the distribution of residual sum of squares for the fit of the von Bertalanffy equation to 1,000 random subsets of the data for Florida pompano collected in and near Tampa Bay, Florida during 2000-2002. The box-and-whisker plots show the 2.5th and 97.5th quantiles (whiskers), the 25th and 75th quartile (box) and the median (dash).
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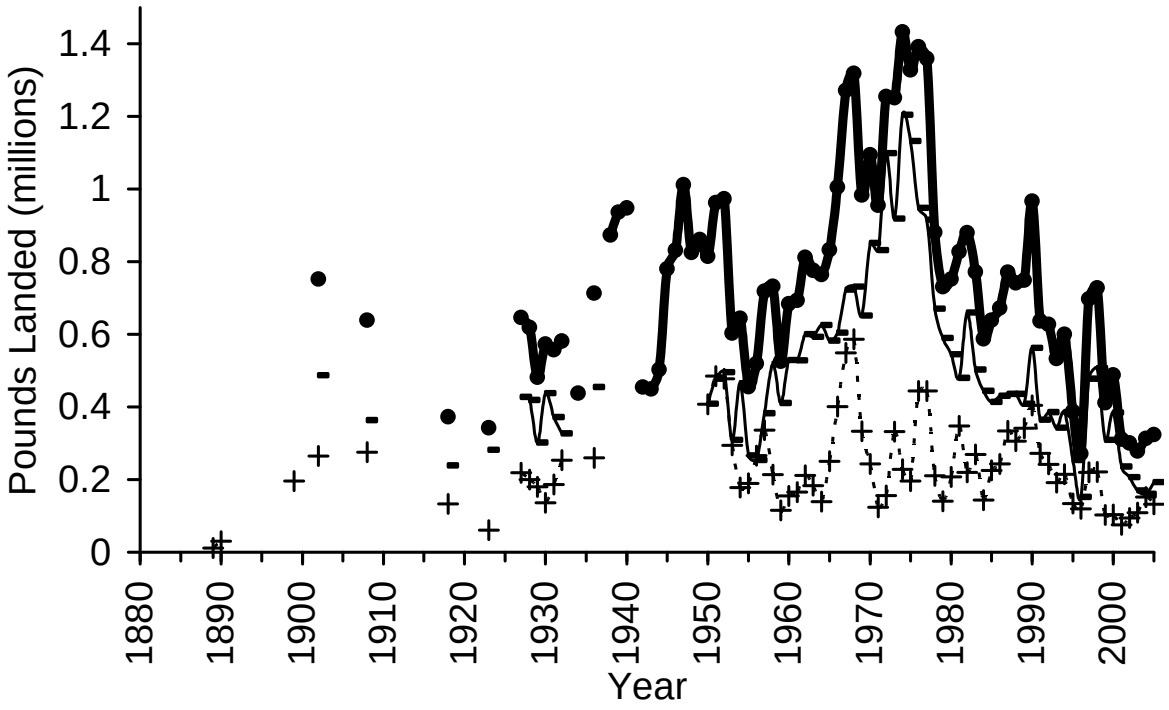

Figure 5.1.2.1. Reported commercial landings (pounds) of Florida pompano made on the Atlantic coast of Florida (dashed line and plus symbol), on the gulf coast (solid line and dash symbol), and statewide (heavy solid line and filled circles).
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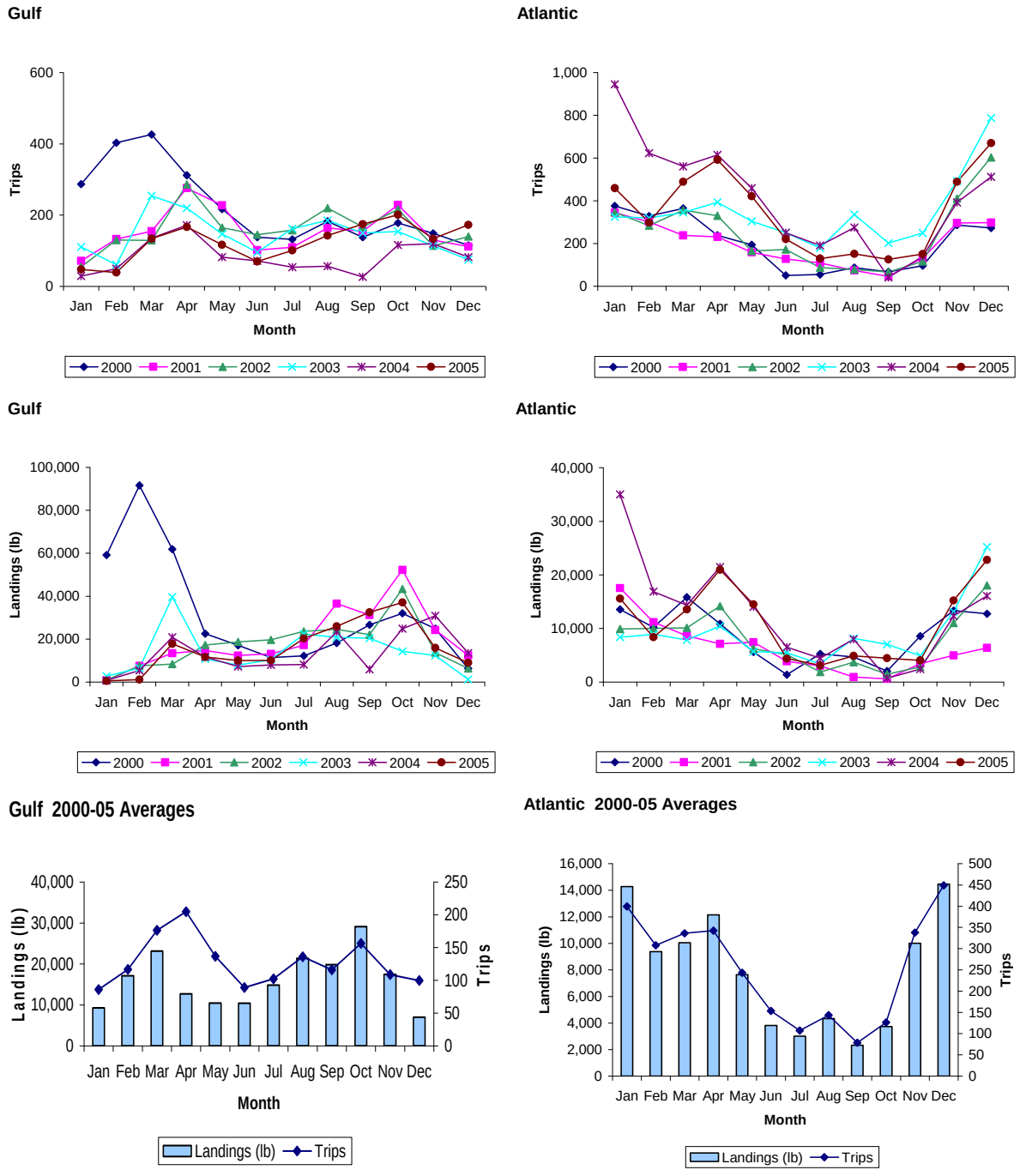

Figure 5.1.2.2. Monthly number of trips landing Florida pompano and monthly landings made on each coast of Florida during 2000-2005 and averages during this period (bottom graphs).
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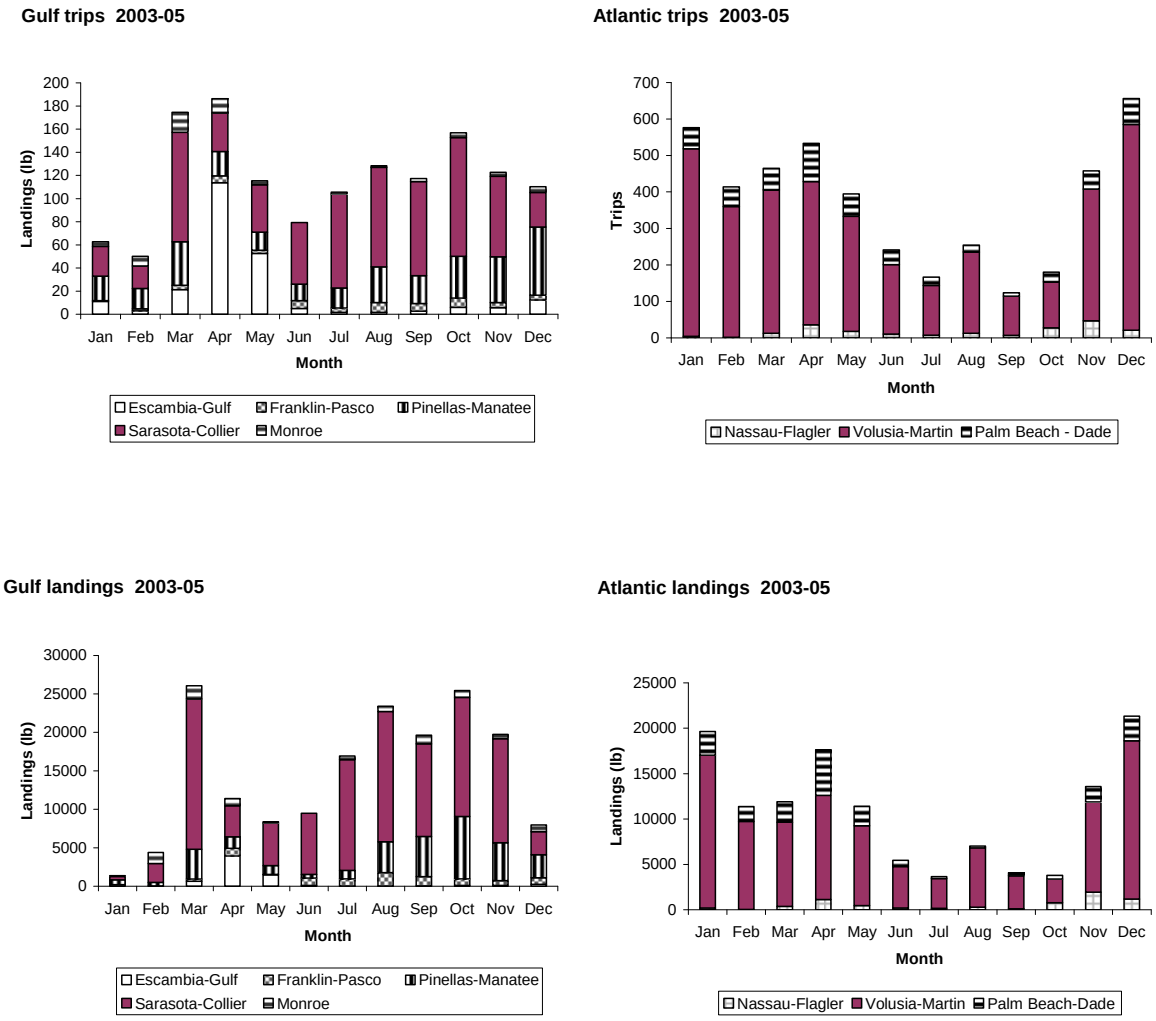

Figure 5.1.2.3. Average monthly number of trips and landings of Florida pompano by groupings of Counties.
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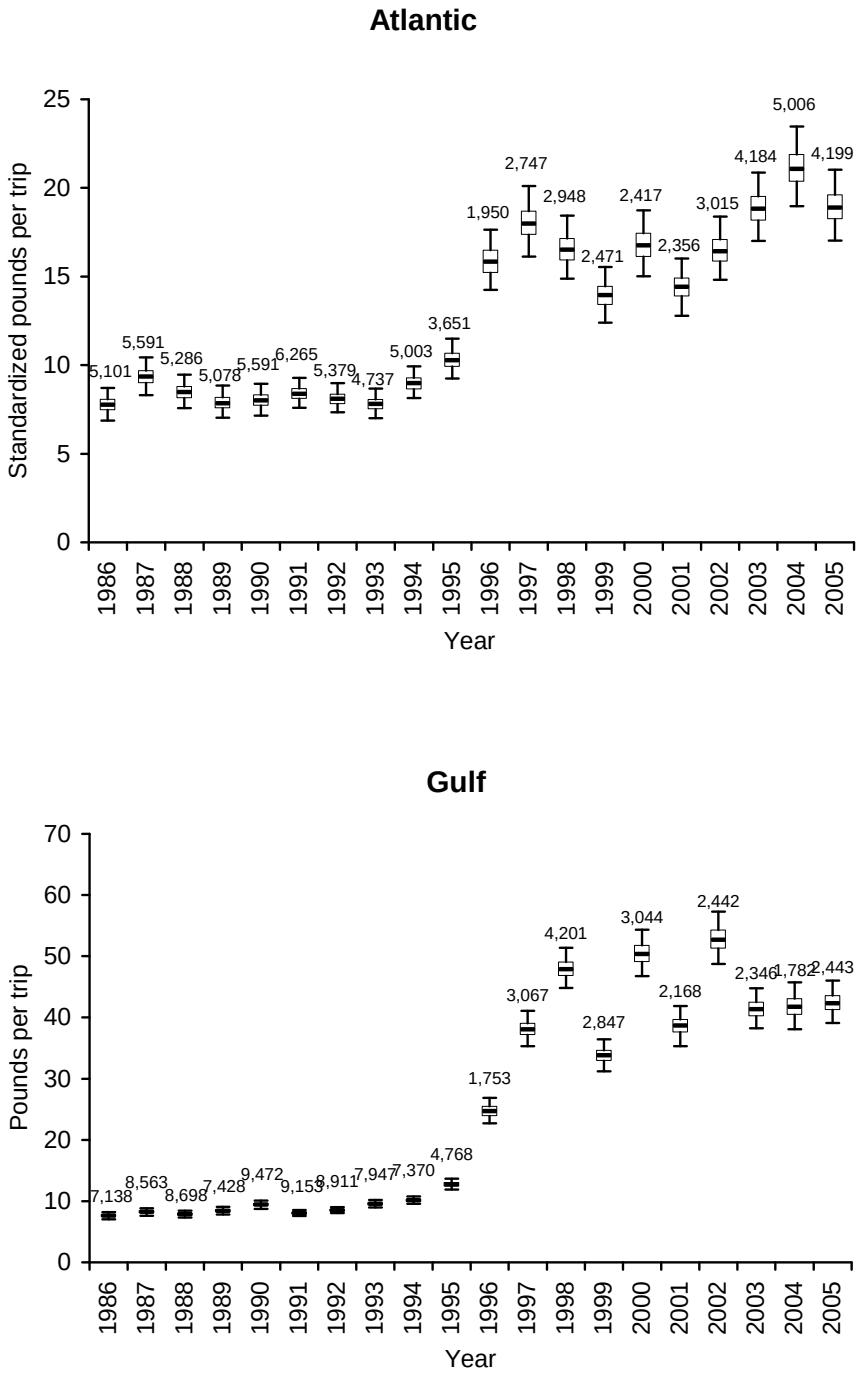

Figure 5.1.4.1 Standardized commercial landings rates for fishermen landing Florida pompano on the Atlantic and gulf coasts during 1986-2005. The number of trips is given, the whiskers represent the 2.5th and 97.5th quantiles, the box represents the interquartile range and the horizontal dash represents the median.
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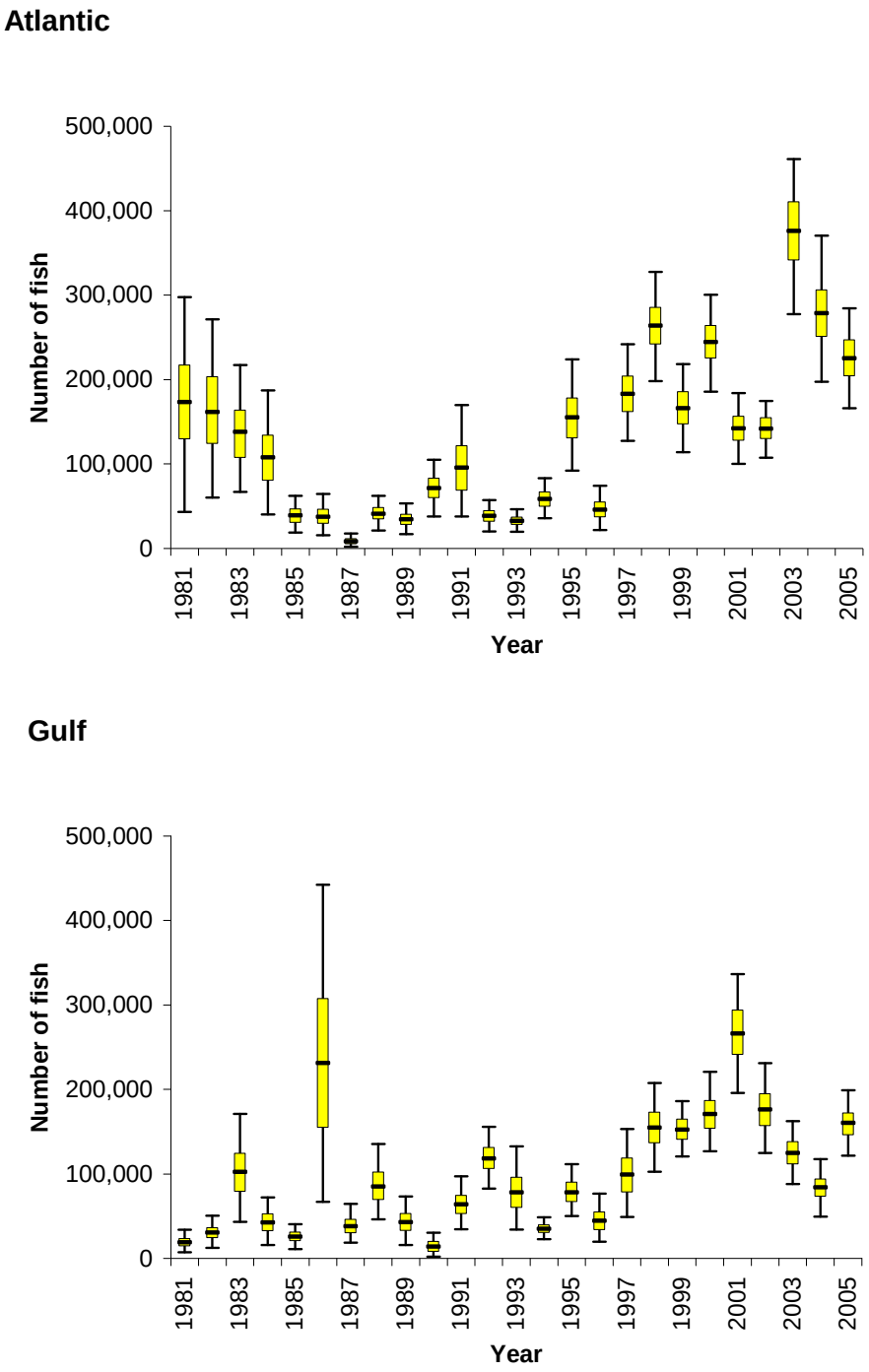

Figure 5.2.2.1. Estimated annual recreational landings of Florida pompano on the Atlantic and gulf coasts of Florida during 1981-2005. Symbols show the estimated median (horizontal line) interquartile (box), and 2.5th and 97.5th percentiles (whiskers).
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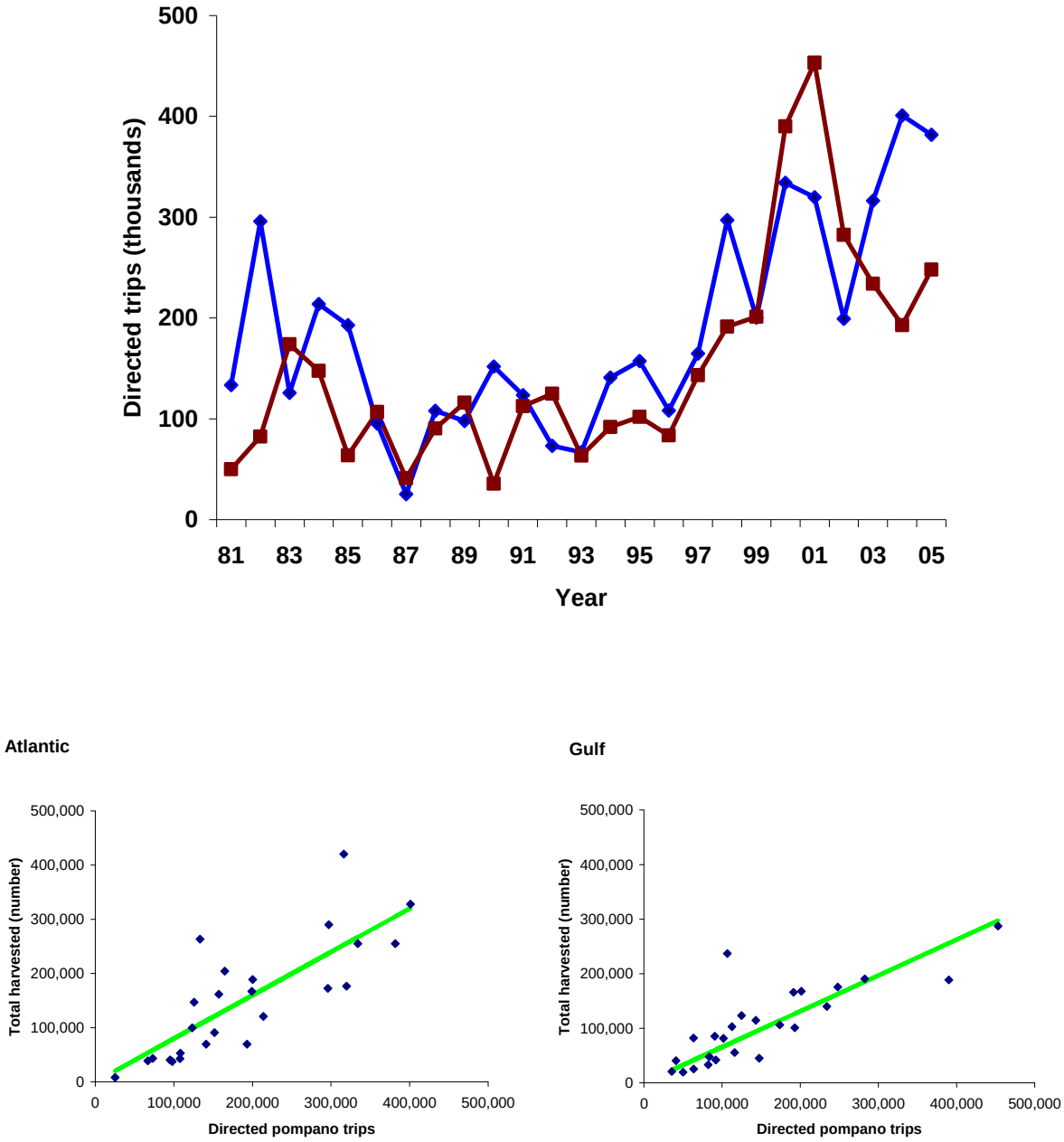

Figure 5.2.2.2. Estimates of the number of angler fishing trips directed at the harvest of Florida pompano each year, showing the trends seen over time (top) on the Atlantic (diamond) and gulf coasts (square) and the linear relationship between directed effort and total harvest on each coast (bottom). from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_land.xls

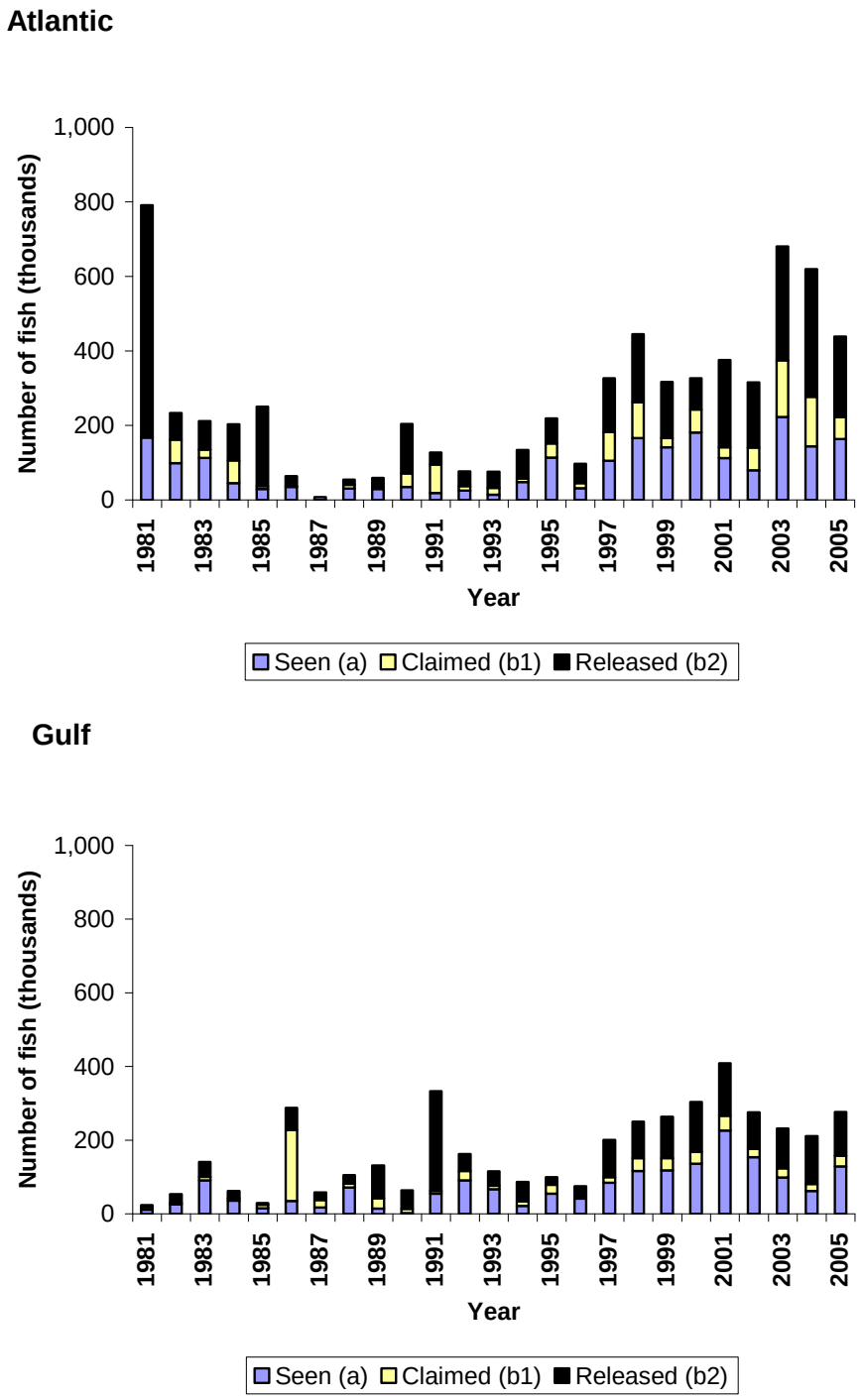

Figure 5.2.3.1. Estimates of the seen, claimed (unseen but claimed dead), and released alive (unseen but claimed released alive) Florida pompano captured by anglers fishing on the Atlantic or gulf coasts of Florida during 1981-2005.
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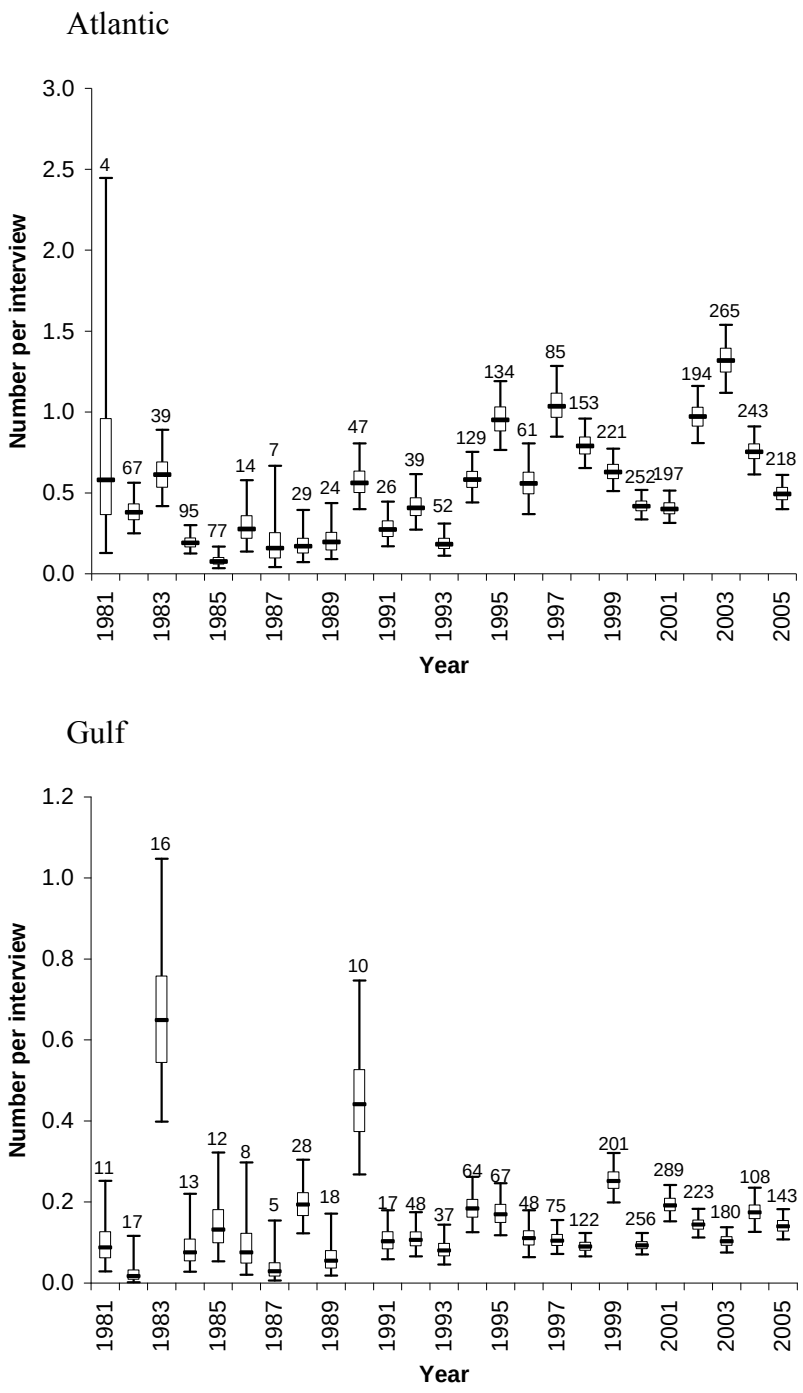

Figure 5.2.4.1. Standardized angler total-catch rates for Florida pompano caught along the Atlantic and gulf coasts of Florida during 1981-2005. Box-and-whiskers indicate the median, interquartiles, and the 2.5th and 97.5th % -iles for the 1000 estimates of the Monte Carlo simulation designed to estimate the precision of each standardized estimate. Sample sizes for each year are given. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\mrfss_cpue.xls

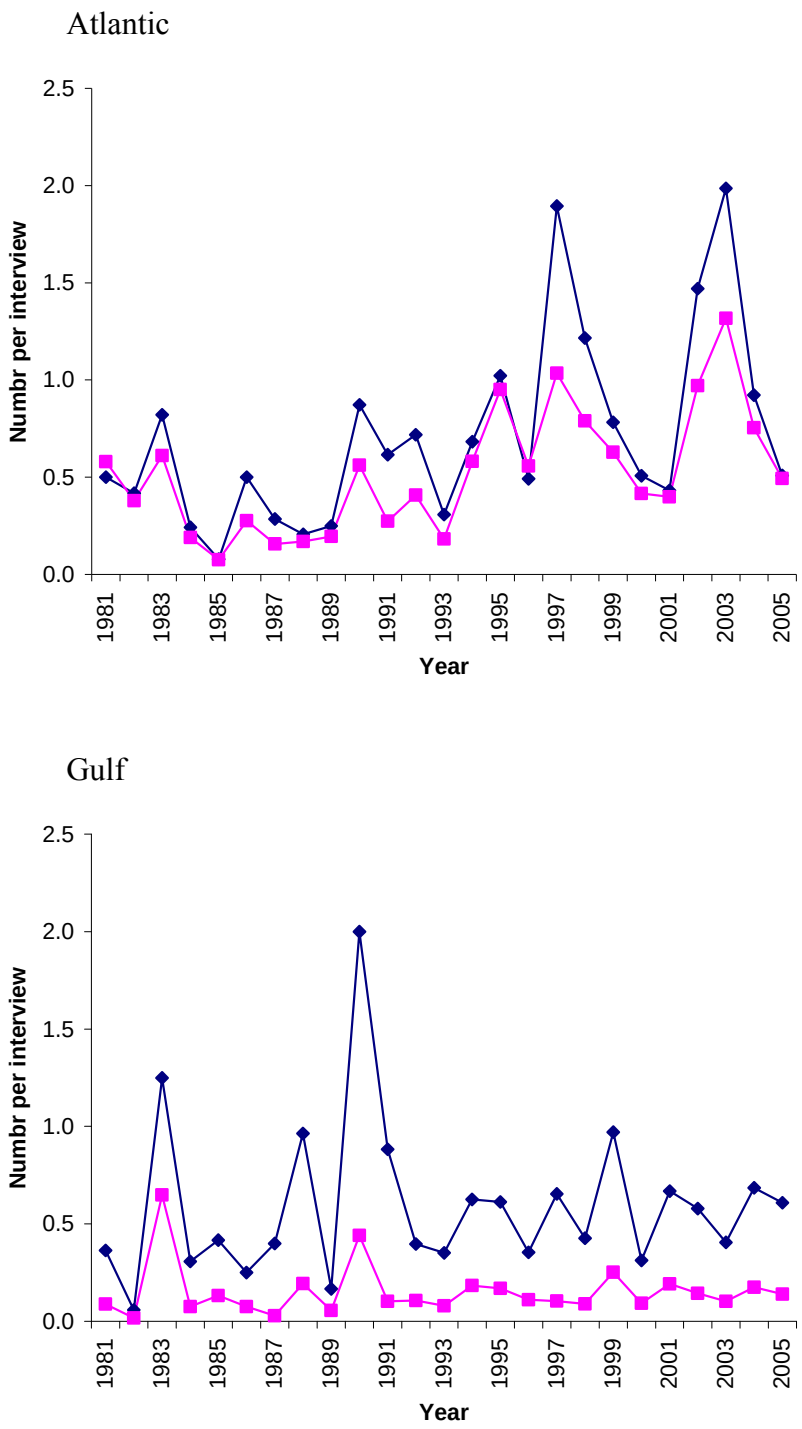

Figure 5.2.4.2. Comparison of raw mean catch rates (diamonds) and back-transformed medians for standardized catch rates for anglers fishing for Florida pompano along the Atlantic and gulf coasts of Florida during 1981-2005.
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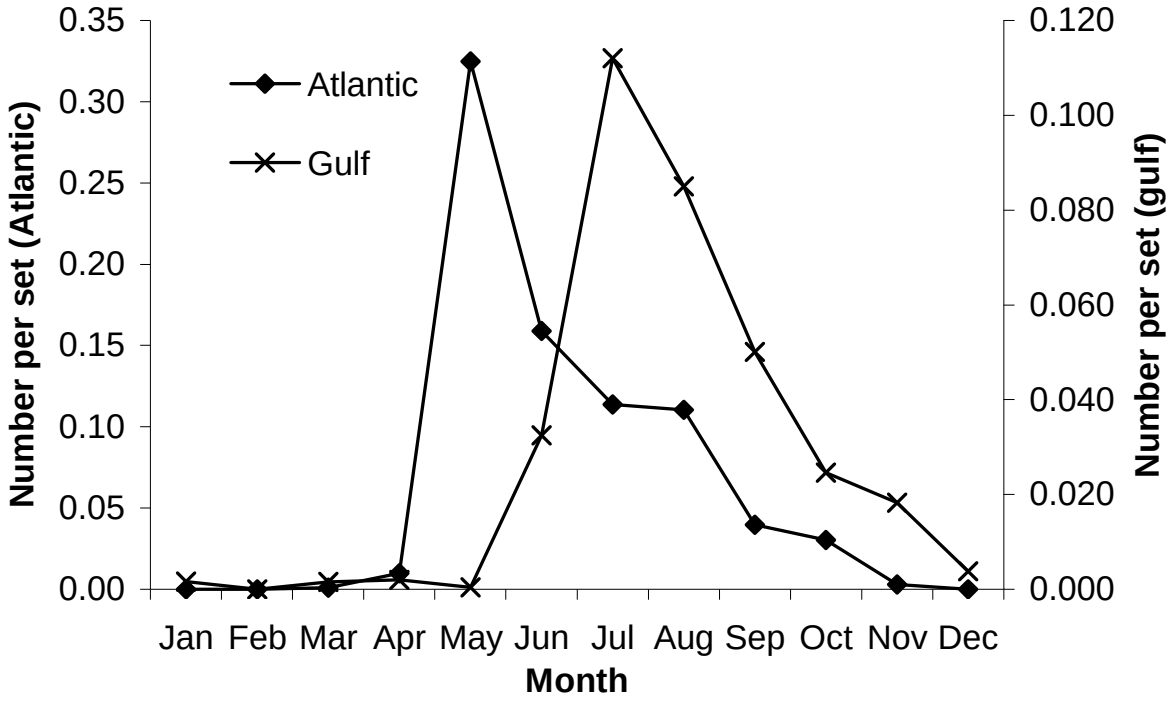
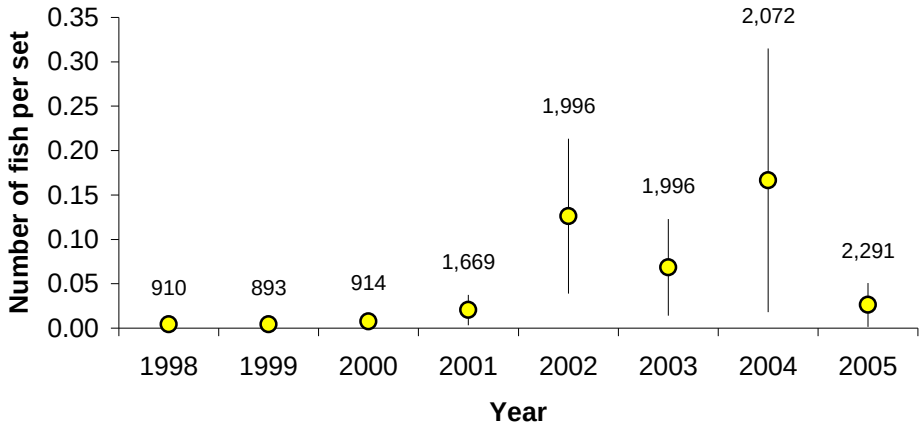


Figure 5.3.1.6.1. Average numbers of young-of-the-year Florida pompano caught during fishery-independent monitoring sets made each month during 1998-2005 on the Atlantic or gulf coasts of Florida. from G:\DATA\SPECIES\POMPANO\Pompan06\Spreadsheets\fim_cpue.xls

Atlantic



Gulf

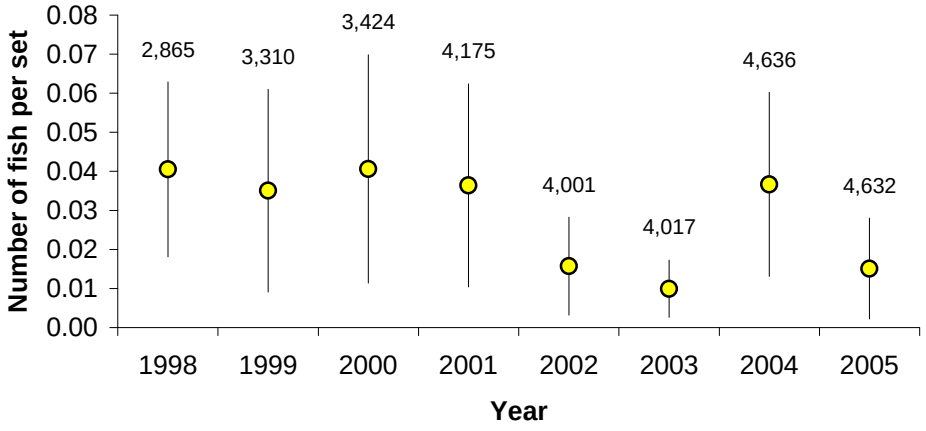


Figure 5.3.2.1. Average and their 95% confidence intervals for numbers of young-of-the-year Florida pompano caught during fishery-independent monitoring sets made each year during 1998-2005 on the Atlantic or gulf coasts of Florida.
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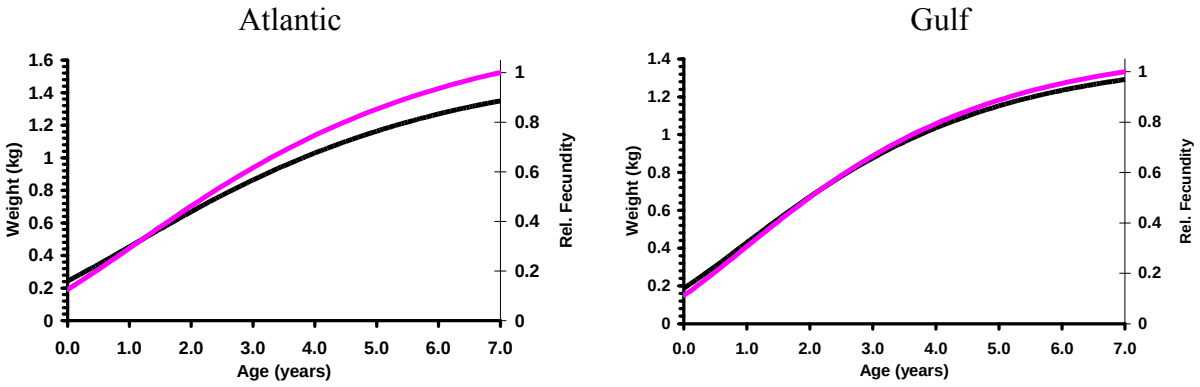
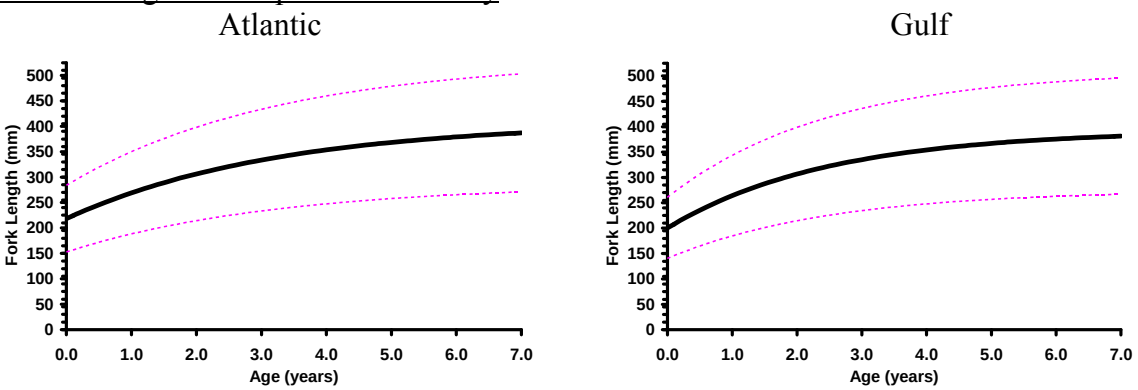
Growth in weight (dark), relative fecundity



Growth in length and expected variability



Vulnerability prior to 1989 (dark) and 1989 and later (light)

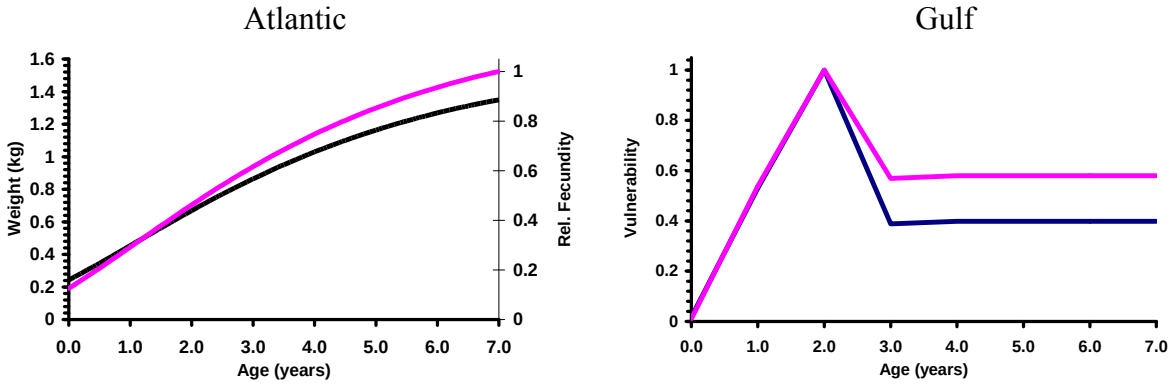


Figure 6.2.2.1. Graphic representation of the assumed growth of Florida pompano, relative fecundity and overall fisheries vulnerability on the Atlantic coast and gulf coasts of Florida. These traits were used in the stochastic stock reduction analysis for the years 1889-2005 on Atlantic and 1902-2005 on gulf coast.
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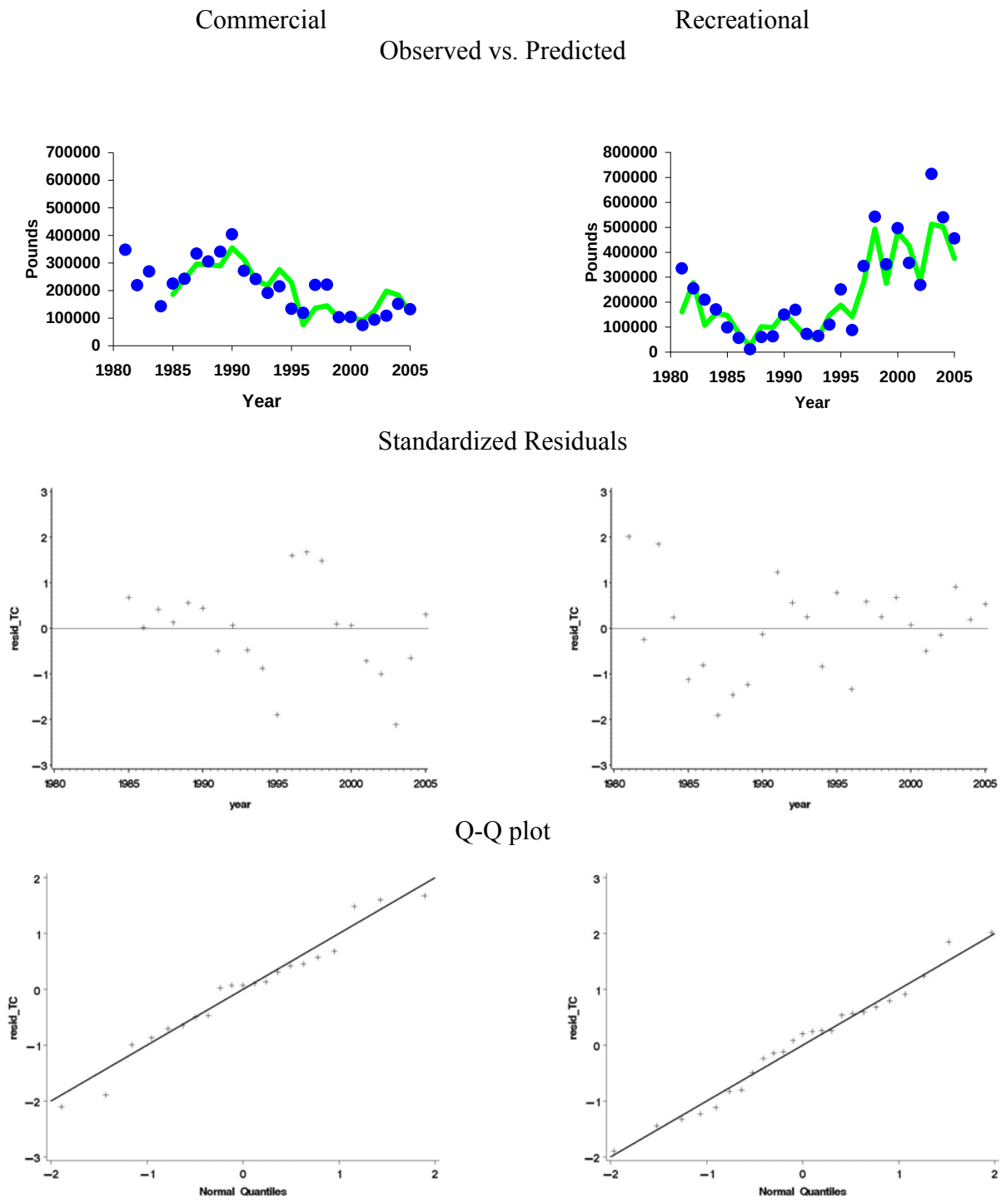

Figure 7.1.1. Fits and diagnostics for the Atlantic coast surplus production model to the observed commercial and recreational catches of Florida pompano. Top plots show the observed (dots) and model-predicted (line) total catches; the middle plots shows the differences in $\log_e$-space relative to the residual standard deviation (standardized); and the bottom show the distribution of residuals with respect to the Normal(0,1) curve.
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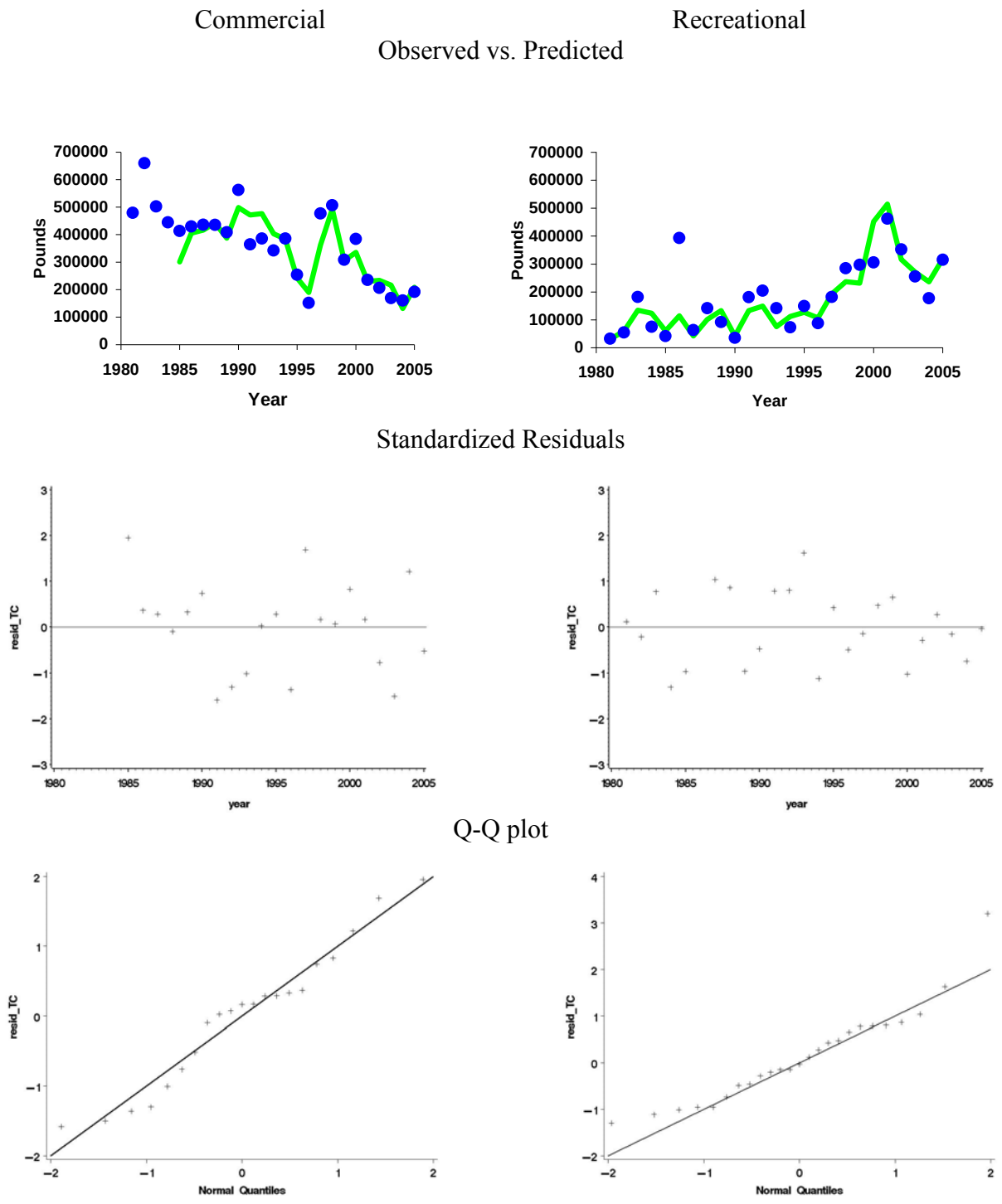

Figure 7.1.1 (con't.). Fits and diagnostics for the gulf coast surplus production model to the observed commercial and recreational catches of Florida pompano. Top plots show the observed (dots) and model-predicted (line) total catches; the middle plots shows the differences in $\log_e$-space relative to the residual standard deviation (standardized); and the bottom show the distribution of residuals with respect to the Normal(0,1) curve. The 1986 recreational data point is not shown in the diagnostics because it is >10 standard deviations larger than the predicted value.
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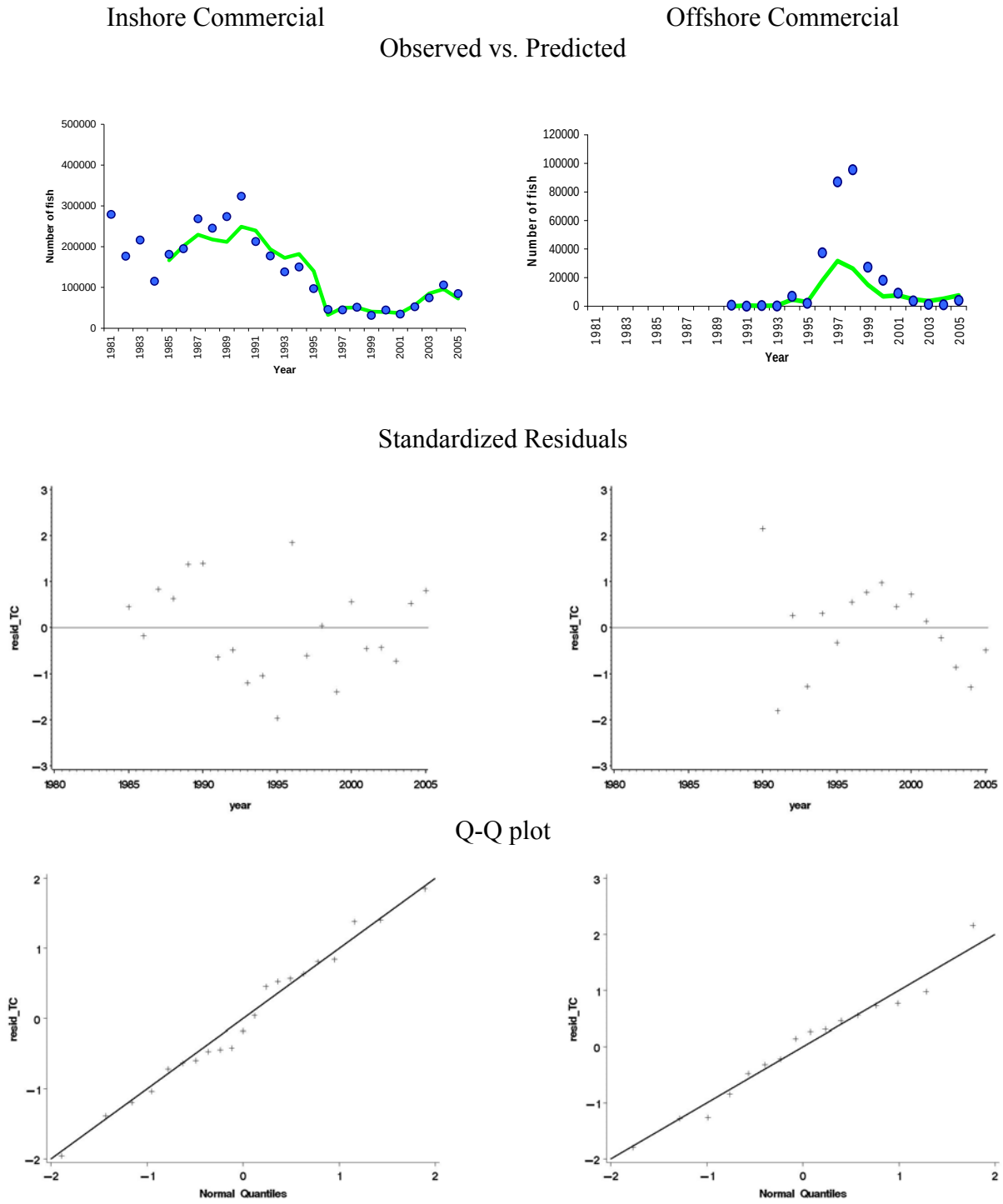

Figure 7.1.2. Fits and diagnostics for the Atlantic coast modified DeLury model to the observed inshore commercial, offshore commercial, and recreational catches and fishery-independent young-of-the-year indices for Florida pompano. Top plots show the observed (dots) and model-predicted (line) total catches; the middle plots shows the differences in total catch in $\log_e$-space relative to the residual standard deviation (standardized); and the bottom show the distribution of these residuals with respect to the Normal(0,1) curve.
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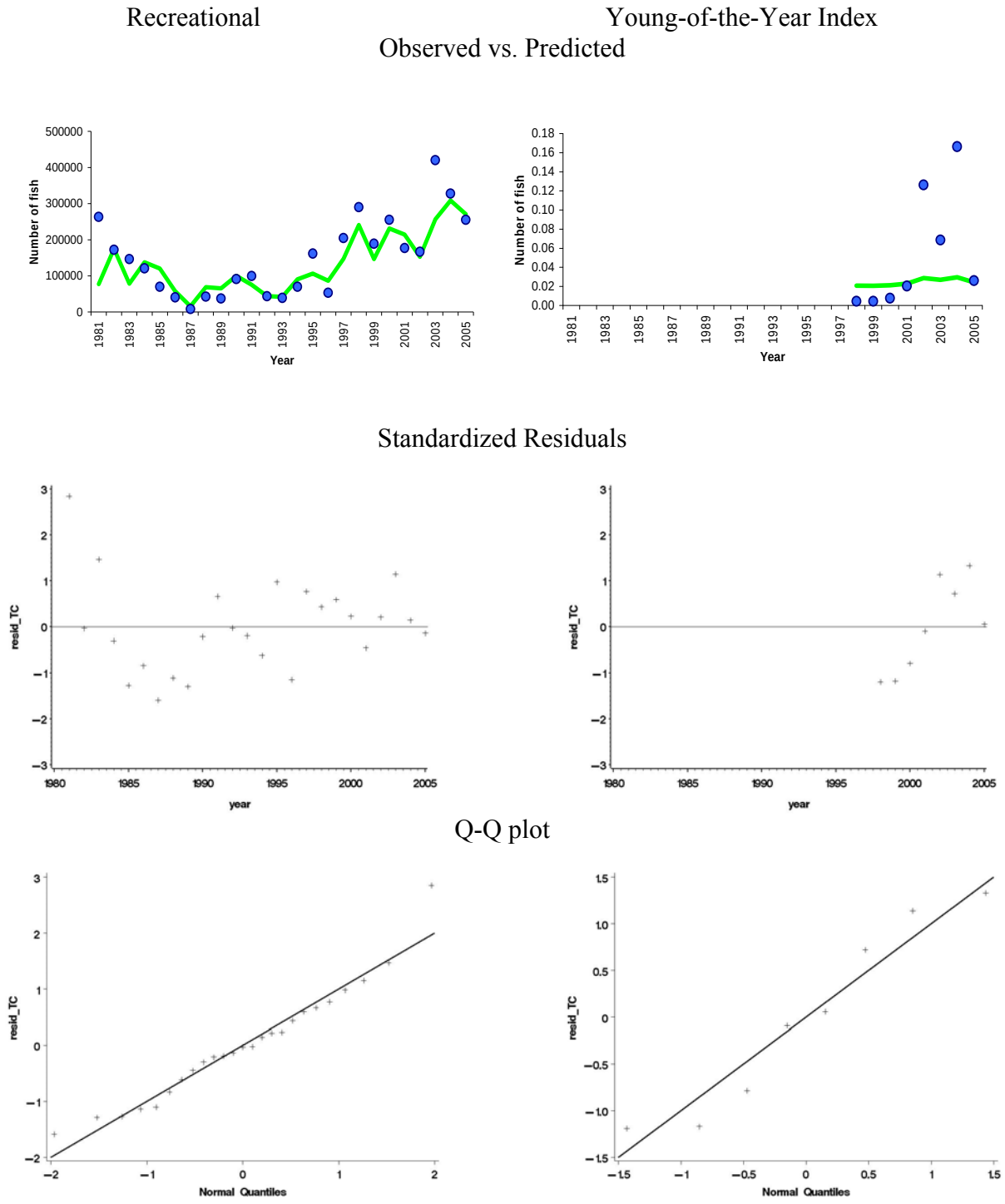

Figure 7.1.2 (con't.). Fits and diagnostics for the Atlantic coast modified DeLury model to the observed inshore commercial, offshore commercial, and recreational catches and fishery-independent young-of-the-year indices for Florida pompano. Top plots show the observed (dots) and model-predicted (line) total catches; the middle plots shows the differences in total catch in $\log_e$-space relative to the residual standard deviation (standardized); and the bottom show the distribution of these residuals with respect to the Normal(0,1) curve.
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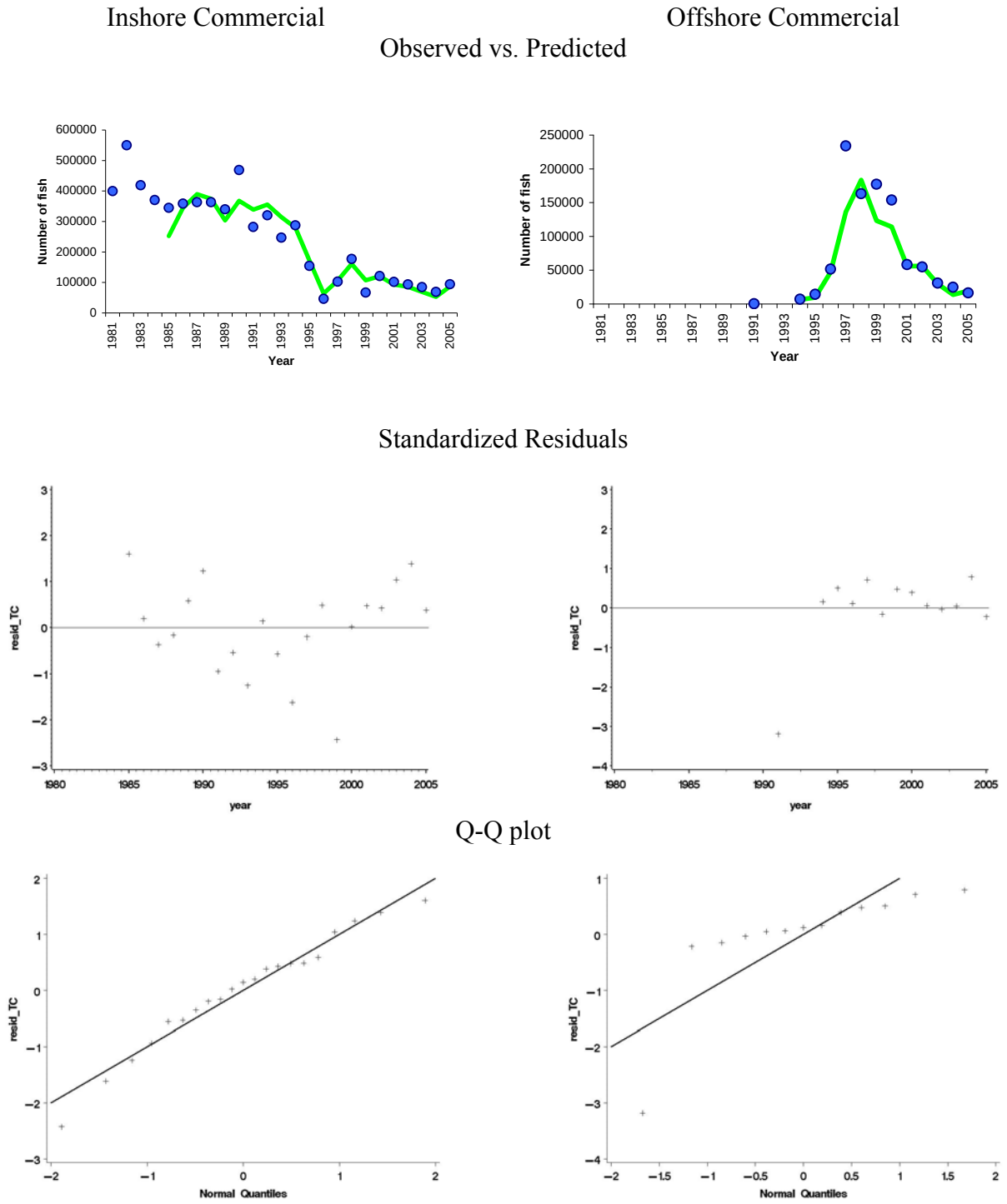

Figure 7.1.2 (con't.). Fits and diagnostics for the gulf coast modified DeLury model to the observed inshore commercial, offshore commercial, and recreational catches and fishery-independent young-of-the-year indices for Florida pompano. Top plots show the observed (dots) and model-predicted (line) total catches; the middle plots shows the differences in total catch in $\log_e$-space relative to the residual standard deviation (standardized); and the bottom show the distribution of these residuals with respect to the Normal(0,1) curve.
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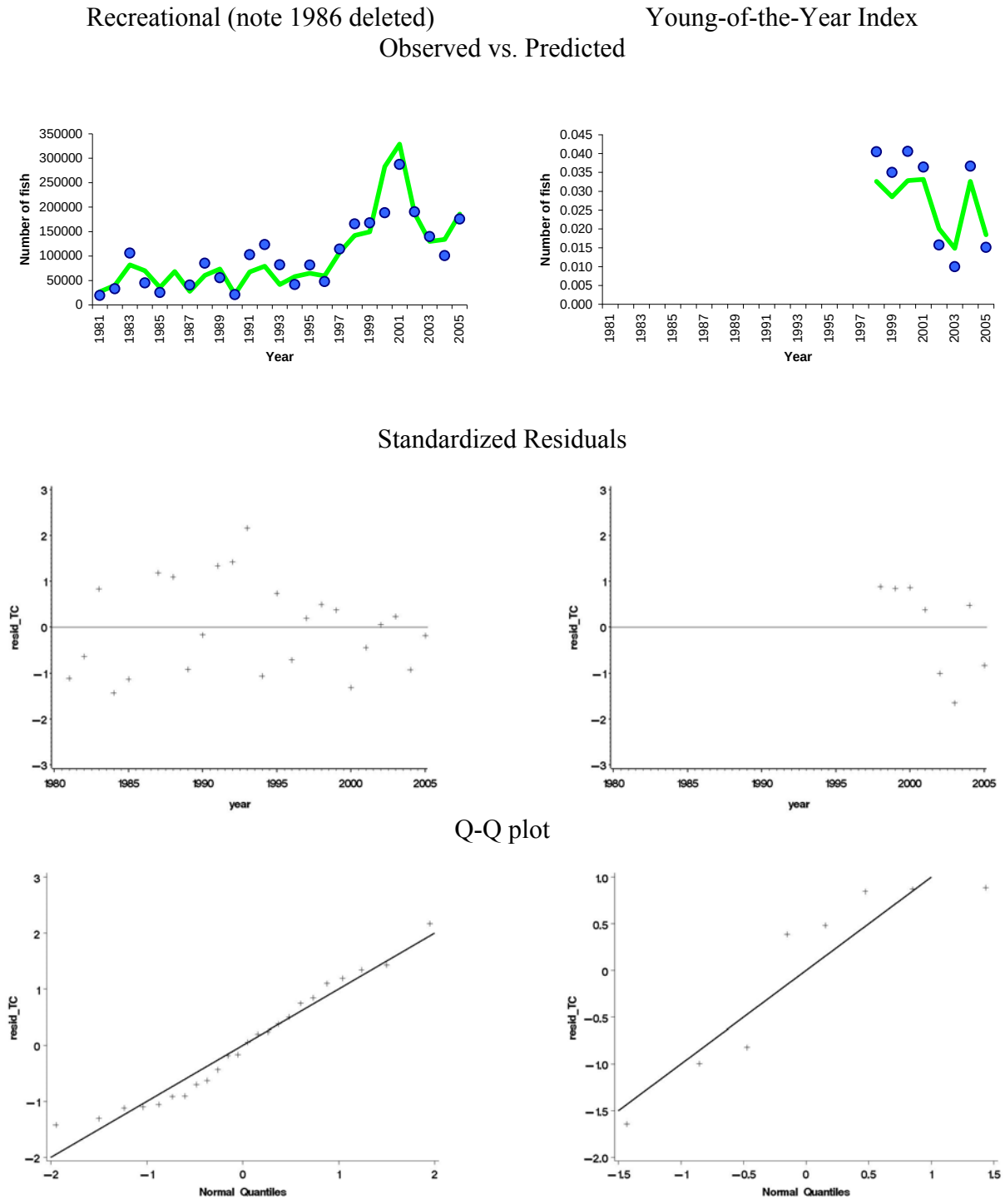

Figure 7.1.2 (con't.). Fits and diagnostics for the gulf coast modified DeLury model to the observed inshore commercial, offshore commercial, and recreational catches and fishery-independent young-of-the-year indices for Florida pompano. Top plots show the observed (dots) and model-predicted (line) total catches; the middle plots shows the differences in total catch in $\log_e$-space relative to the residual standard deviation (standardized); and the bottom show the distribution of these residuals with respect to the Normal(0,1) curve.
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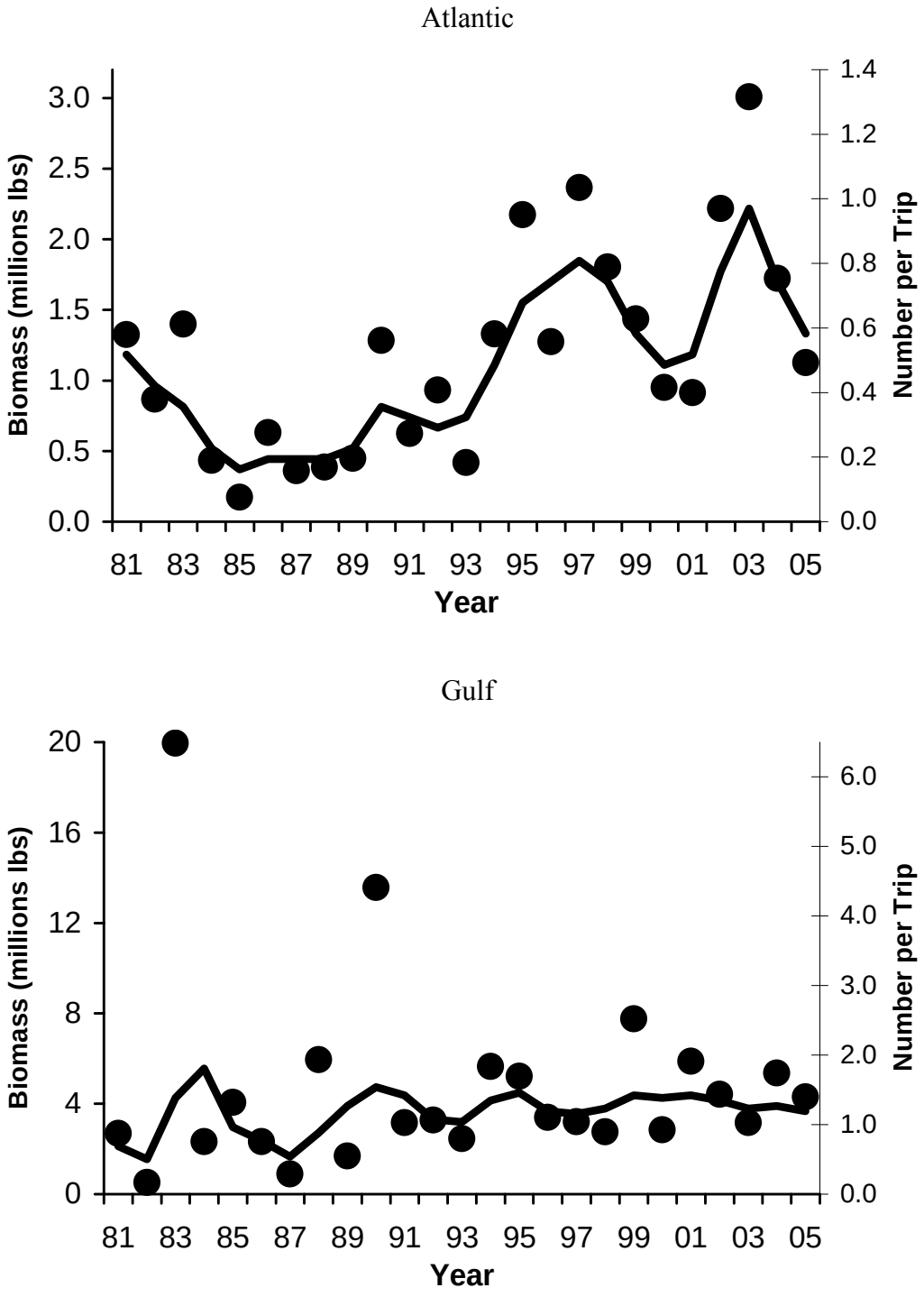

Figure 7.1.3. The modal estimated vulnerable biomass (line) of Florida pompano from the stochastic stock reduction analysis on the Atlantic and gulf coasts of Florida during 1981-2005. The median standardized angler total-catch rates available for 1981-2005 were used as an index of the changes in vulnerable biomass.
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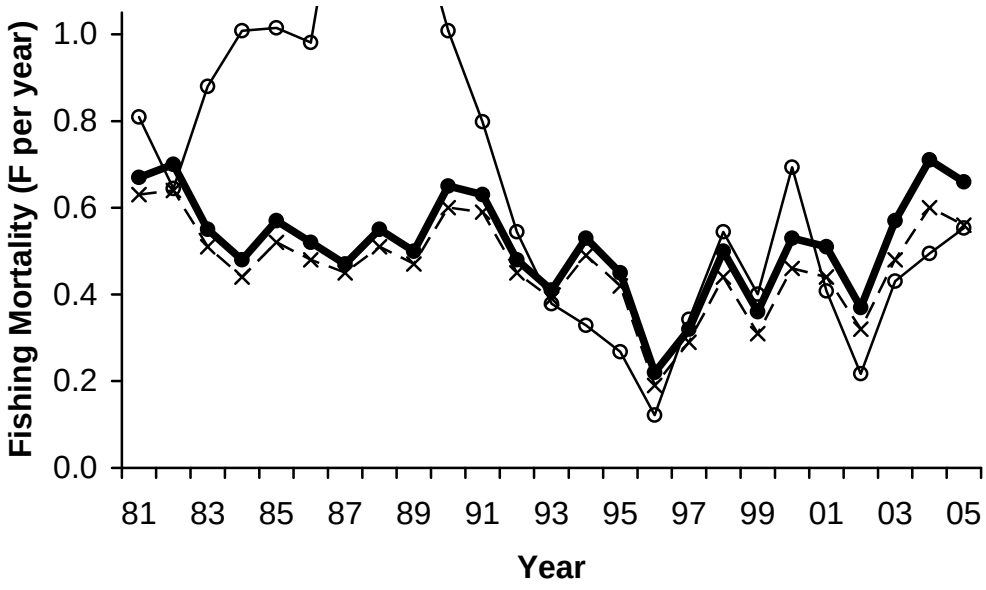
Atlantic



Gulf

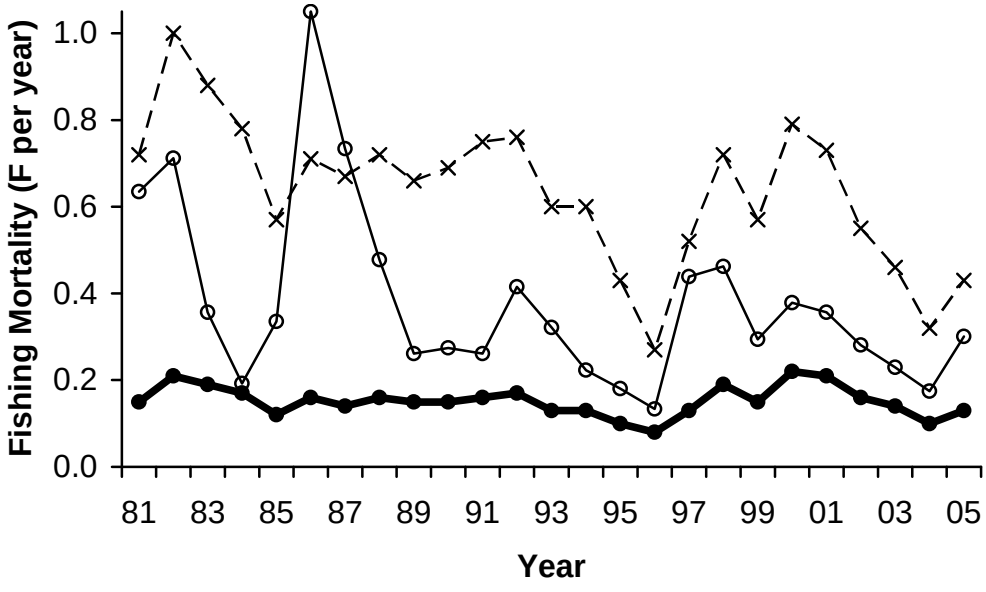


Figure 7.2.1.1. Estimated instantaneous fishing mortality rates from three different analyses; non-equilibrium surplus production (heavy line), modified DeLury analysis (dashed with X's), and stock reduction analysis (open circles), for the Atlantic and gulf coasts during 1981-2005. The high SRA estimated F's for the Atlantic coast during 1987-89 are not shown to expand scale for later years.
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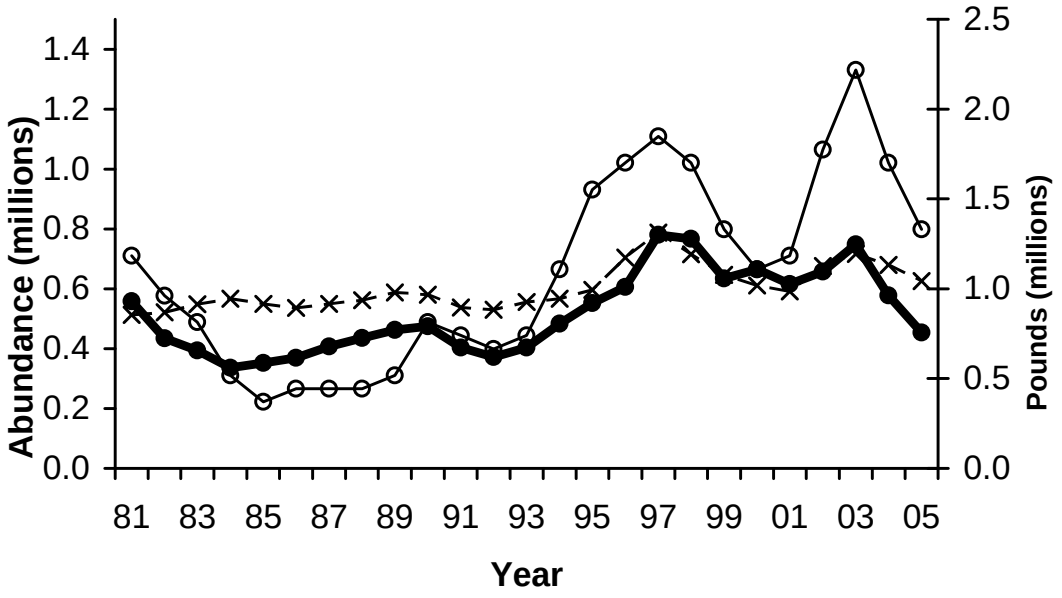
Atlantic



Gulf

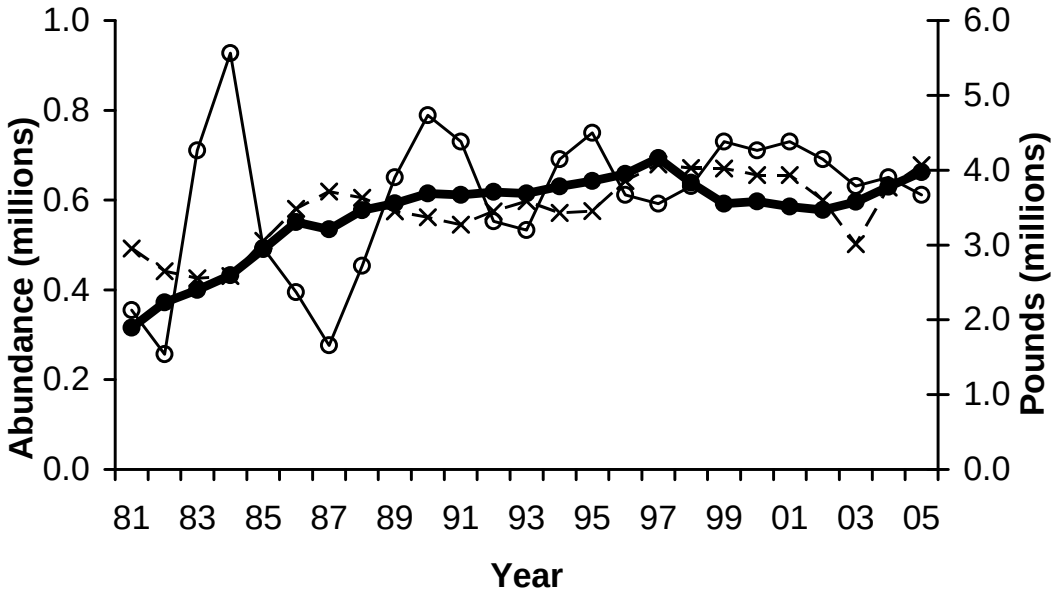


Figure 7.2.2.1. Estimated average vulnerable abundance or biomass from three different analyses; average abundance from the modified DeLury analysis (dashed with X's) and average biomass from the non-equilibrium surplus production (heavy line) and stock reduction analysis (open circles), for the Atlantic and gulf coasts during 1981-2005.
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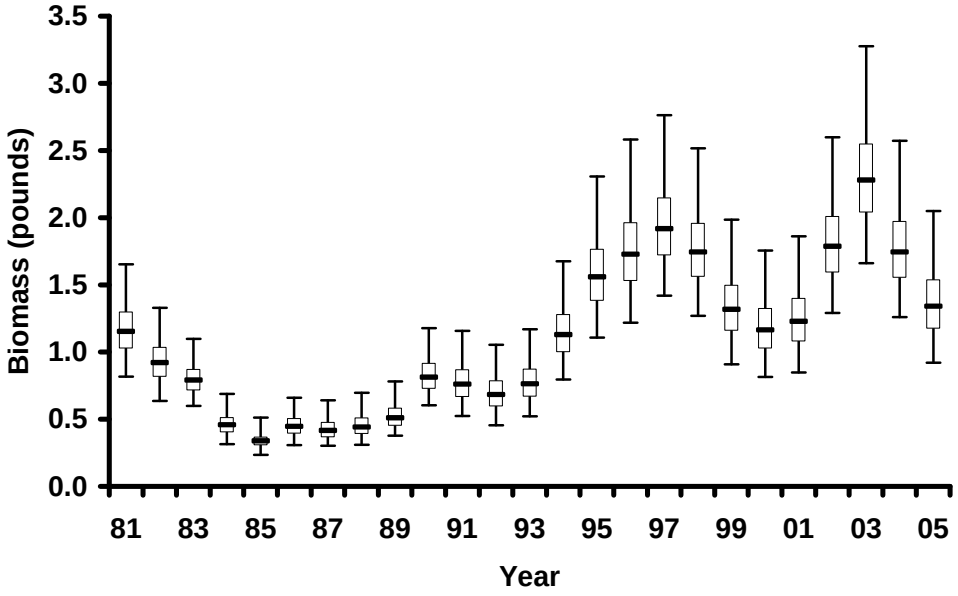
Atlantic



Gulf

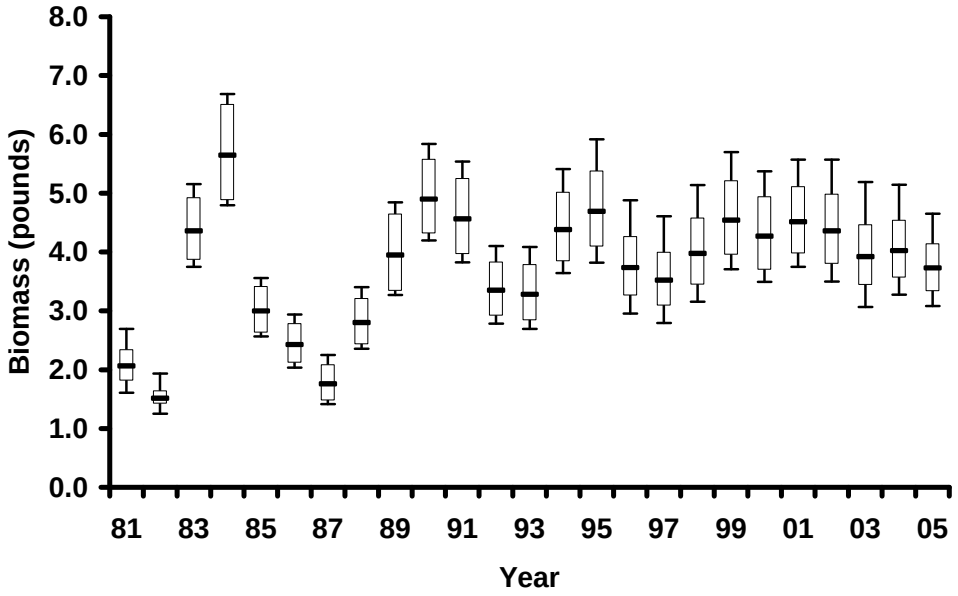
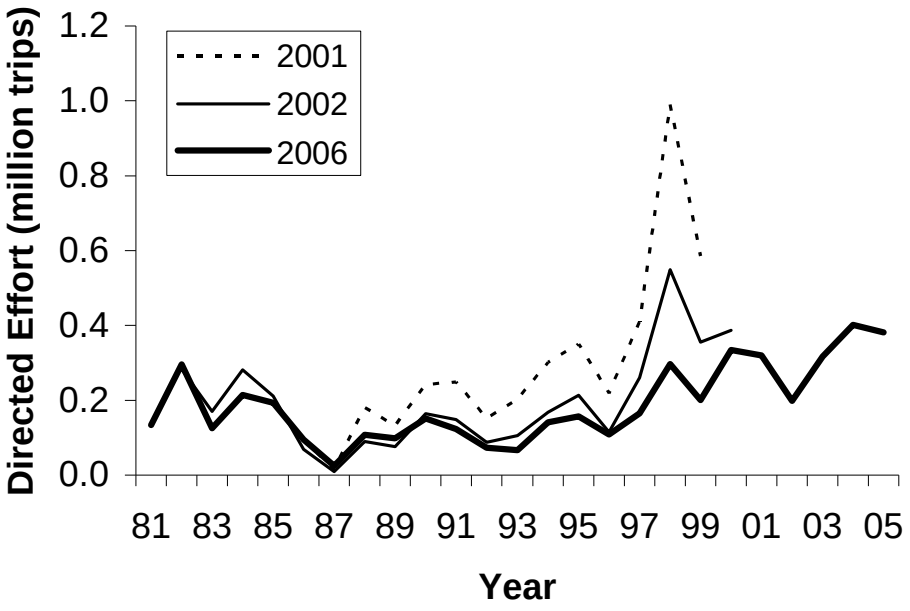


Figure 7.2.3.1. Estimated average annual vulnerable biomass for Florida pompano on the Atlantic and gulf coasts of Florida during 1981-2005. Symbols show the percentiles of the estimate distribution as follows: 2.5th, lower whisker; 25th, lower box edge; median, horizontal line; 75th, upper box edge; and 97.5th, upper whisker.

Atlantic



Gulf

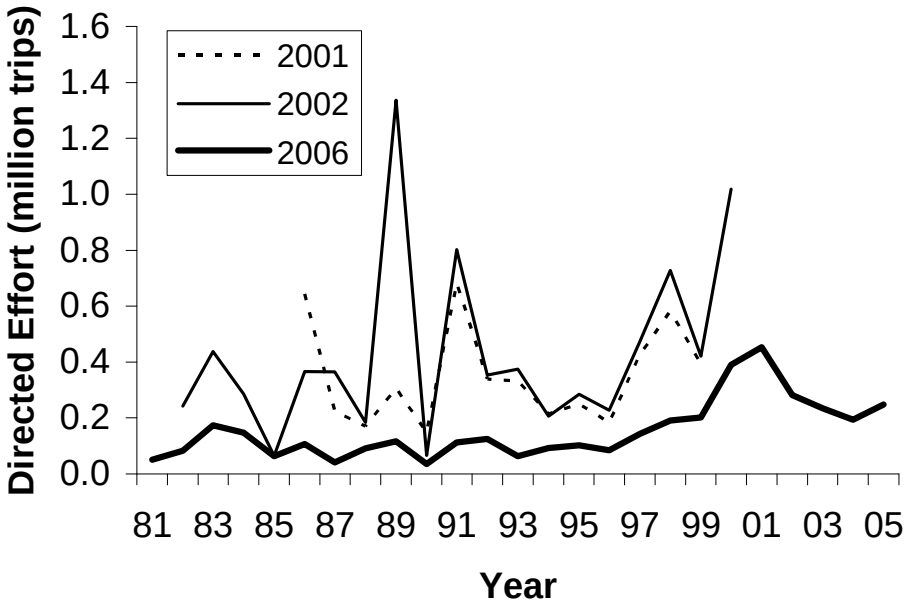


Figure 7.5.1. Estimated number of fishing trips taken to capture Florida pompano each year on the Atlantic or gulf coast of Florida during the period 1981-2005. Estimates were made independently during three separate assessments conducted by FWC-FWRI during labeled years. Major differences in estimation techniques resulted in different levels of effort, with the the current assessment effort estimated thought to be the most accurate.

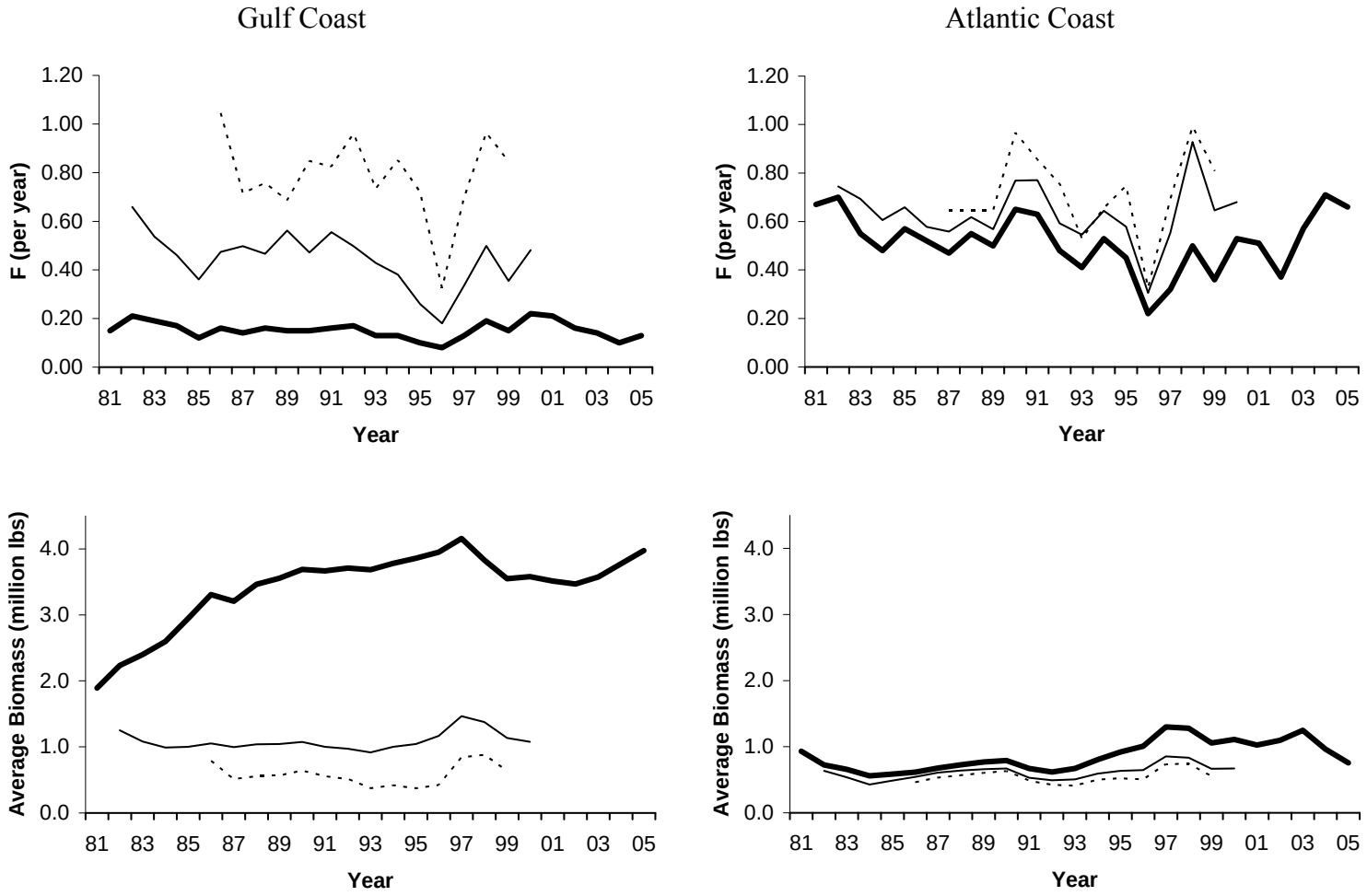


Figure 7.5.2. Estimates of instantaneous fishing mortality (top) and average vulnerable biomass (bottom) for Florida pompano made using a non-equilibrium surplus production analysis. The heavy lines represent estimates made using the present analysis (2007), the thin solid line represents the estimates made during the Muller *et al.* (2002) analysis, and the dashed line for those made during the Nelson and Murphy (2001) analysis.
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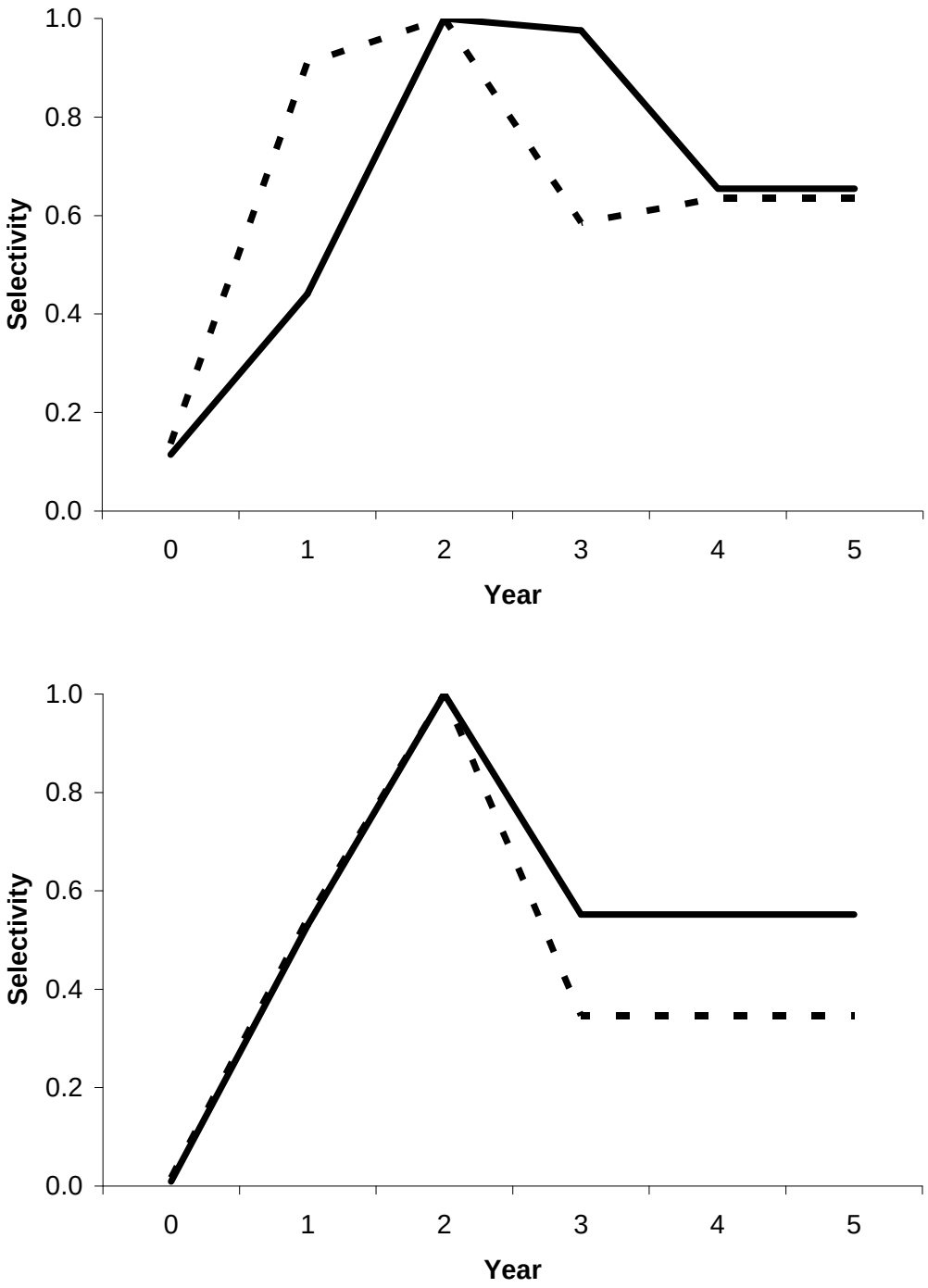

Figure 7.6.1. Patterns of selectivity for the combined fisheries for Florida pompano during the periods 1981-88 (dashed line) and 1989-2005 (solid line) on the Atlantic (top) and gulf (bottom coasts of Florida. Lines represent average results across years from untuned VPA runs using different terminal F values ranging from 0.1 to 1.0 yr^{-1}. Estimates were used through age 4 on the Atlantic coast and age 3 on the gulf coast then repeated at older ages.
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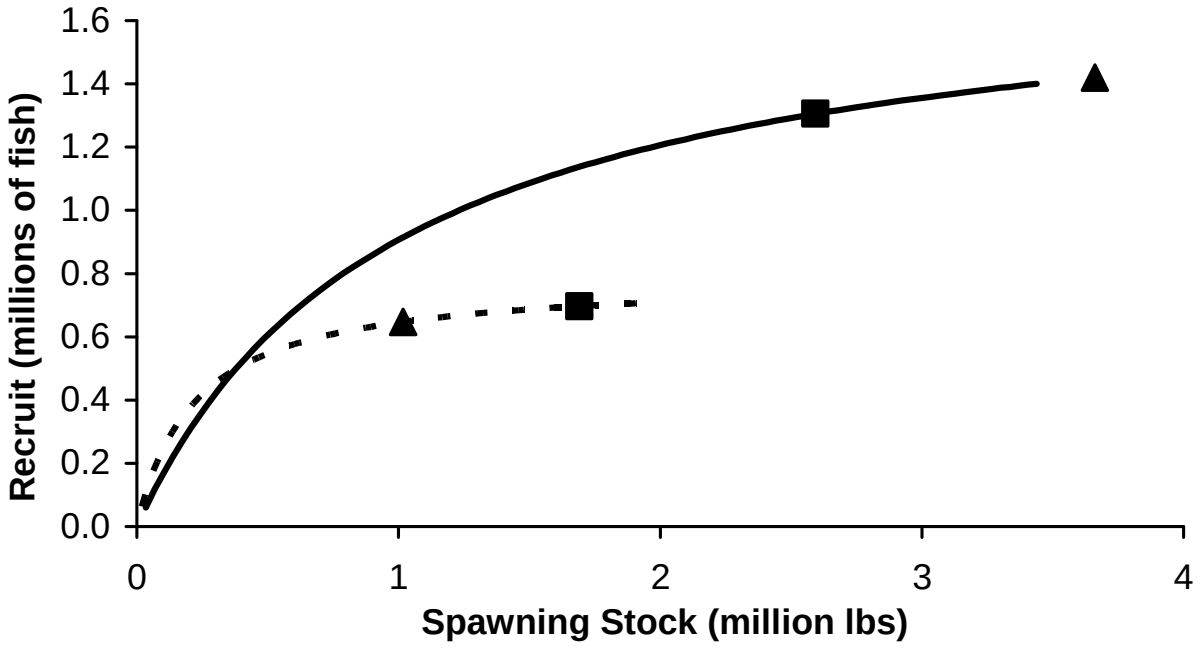

Figure 8.2.1. Average spawner-recruit relationship estimated by the stochastic stock reduction analysis of Florida pompano on the Atlantic (dashed line) and gulf (solid line) coasts of Florida. Each curve extends to the estimated average virgin spawning stock size. Estimated recent (2001-2005) spawning stock biomass from the SRA (large solid squares) and the non-equilibrium stock production model (solid triangle) estimated spawning stock biomass are show on the spawner-recruit curves. The steepness estimates were 0.71 on the Atlanitc coast and 0.53 on the gulf coast.
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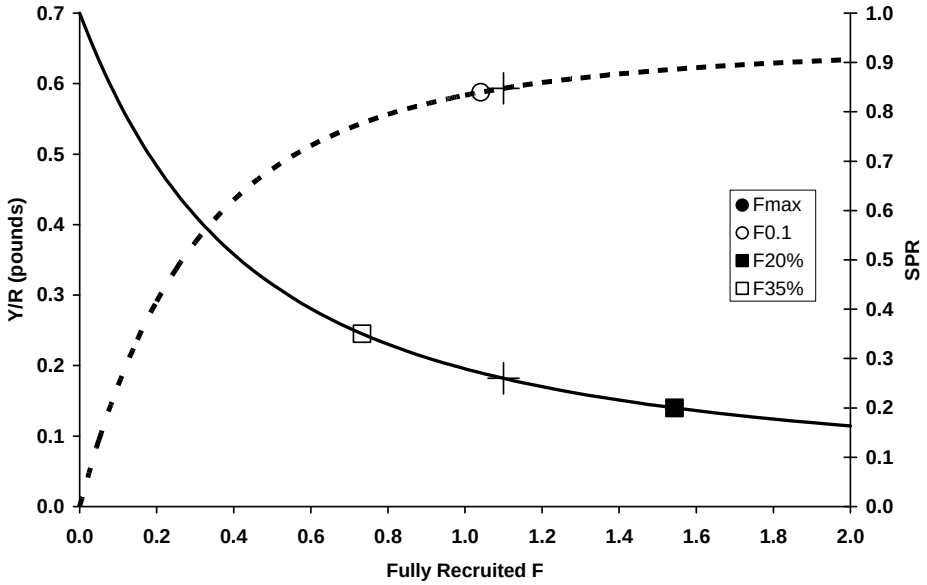
Atlantic



Gulf

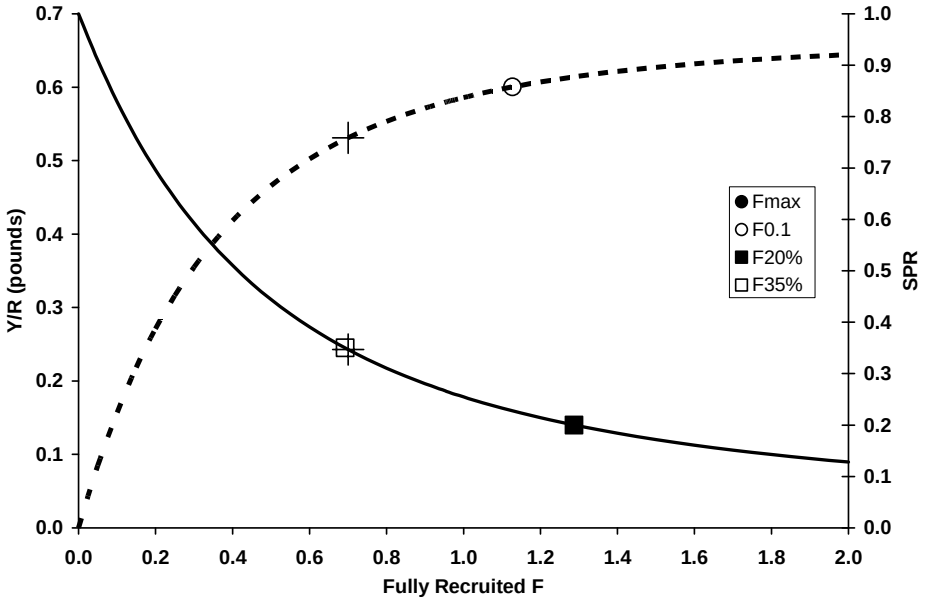


Figure 8.3.1. Yield per recruit (lbs, dashed line) and static spawning potential ratio (solid line) for Florida pompano on the Atlantic and gulf coast of Florida. Other benchmarks shown include the current levels for each on each coast (plus symbol determined as fully recruited F from separable VPA), the yield-per-recruit benchmarks of $F_{0.1}$ (open circle) and maximum (solid circle), and the SPR benchmarks at $F_{35\%}$ (open square) and $F_{20\%}$ (solid square). Some benchmarks occur at higher F's than is graphed: Atlantic, F_{max} =6.43; Gulf, F_{max} = 6.75.
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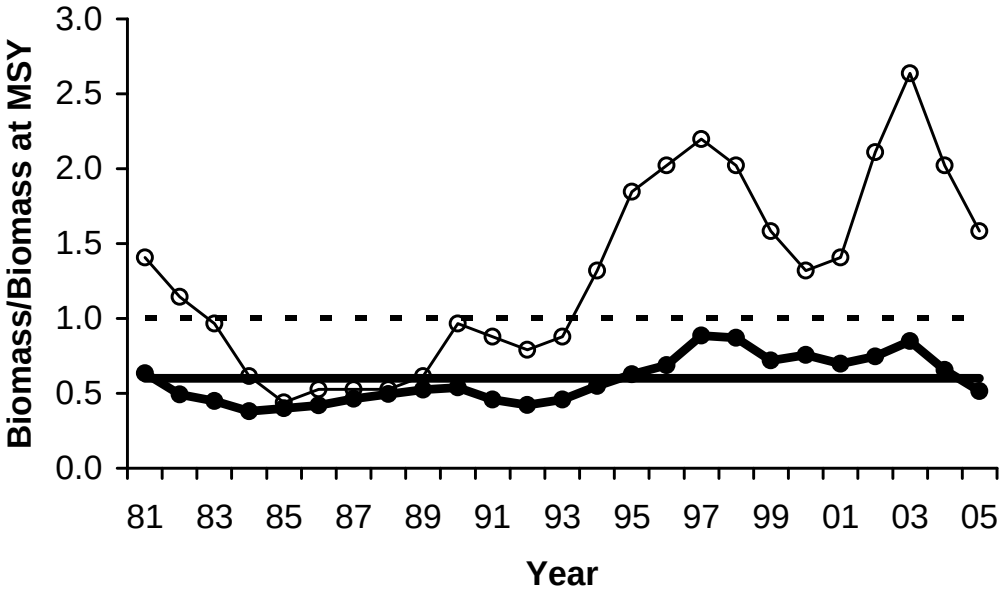
Atlantic



Gulf

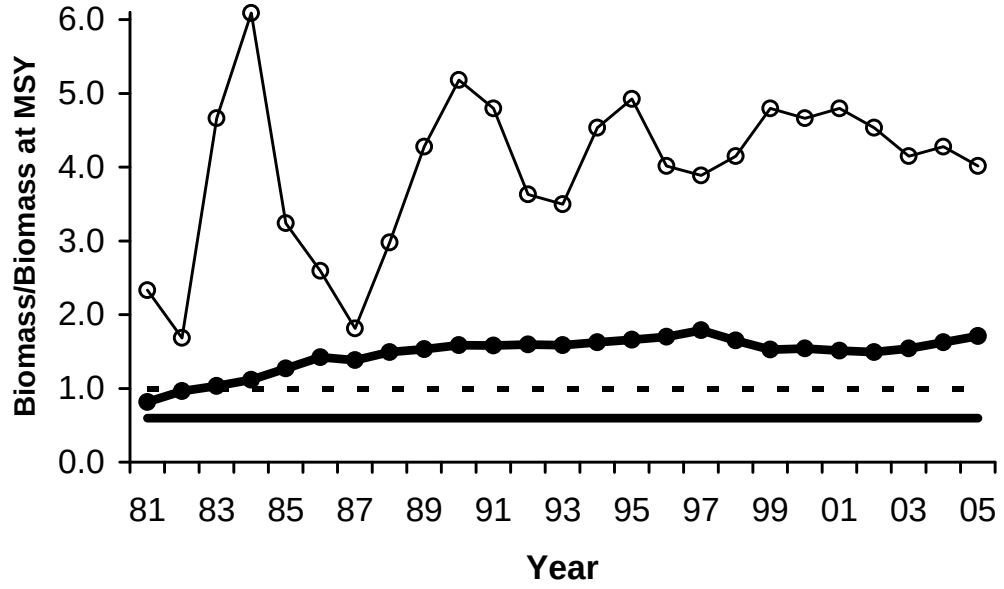
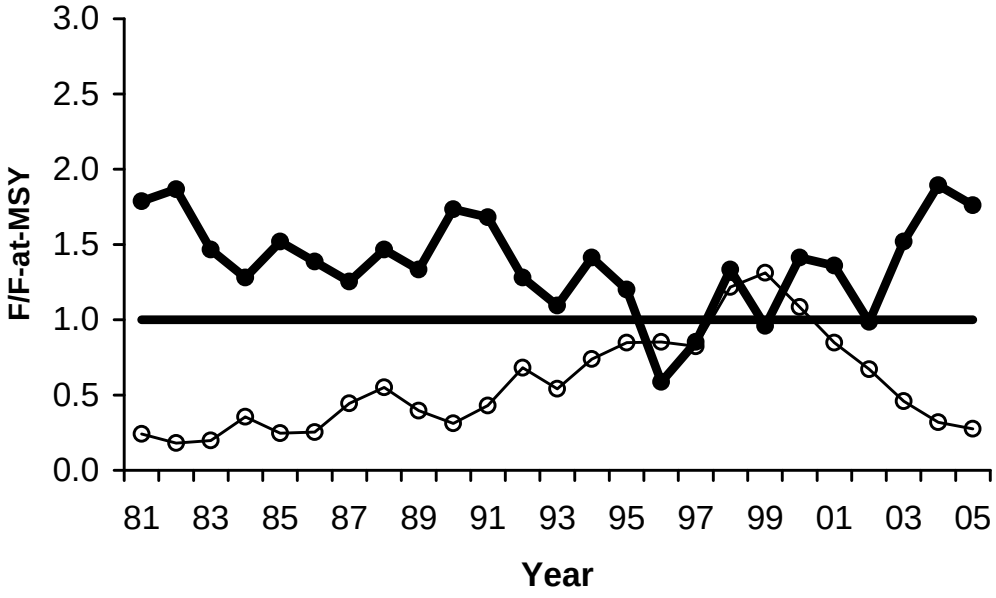


Figure 9.1.1. Estimated ratios of annual estimated average vulnerable stock biomass to the biomass associated with maximum sustainable yield for the surplus production model (filled circles) and stock reduction model (open circles) for Florida pompano on the Atlantic and gulf coasts of Florida during 1981-2005. The biomass-at-MSY ratio is given by the dashed horizontal line at 1.0 and the minimum stock size threshold (defined as $[1\text{-}M]B_{MSY}$) by the solid horizontal line at 0.6. from G:\DATA\SPECIES\POMPANO\Pompan06\murphy\est_abund.xls

Atlantic



Gulf

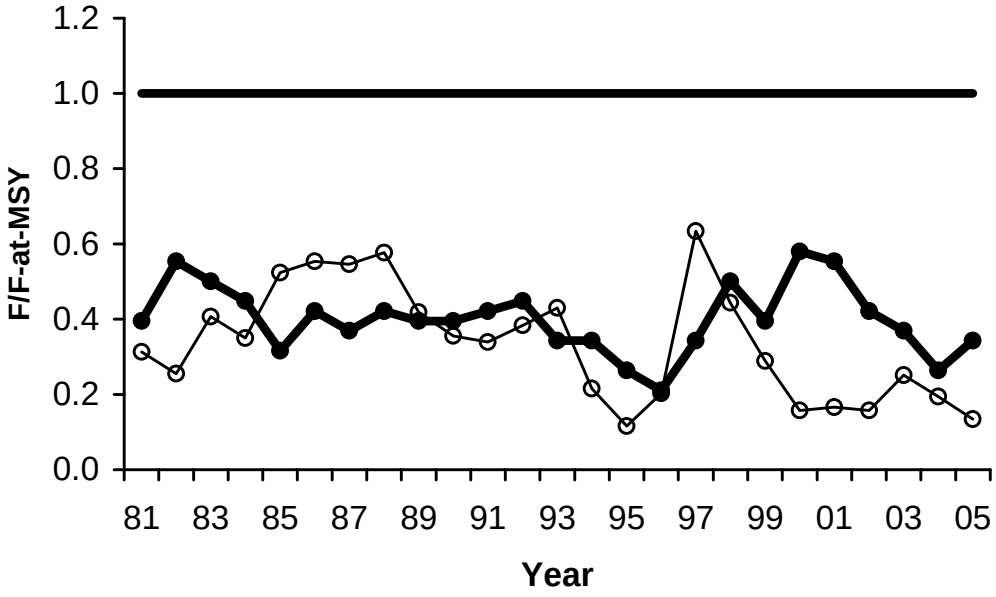


Figure 9.1.2. Annual estimates of the ratio of fishing mortality (F) to the fishing mortality at maximum sustainable yield for the surplus production model (filled circles) and the stock reduction model (open circles) for Florida pompano on the Atlantic and gulf coasts of Florida during 1981-2005.
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