REVISED EDITION: BACK-CALCULATION OF RECREATIONAL LANDINGS OF KING MACKEREL FROM 1930 TO 1980

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SUMMARY

- Recreational landings of king mackerel were reconstructed from 1900 for the Mixing and Atlantic zones and 1930 for the Gulf to the beginning of the collection of recreational data (1980) by season, mixing zone (Gulf, Mixing zone and Atlantic) and mode using a combination of 4 methods:

*- **Method 1:** a simple but naïve approach which linearly extrapolates the mean of the 1981-1995 effort back to zero in 1930 for each mode, season and zone and multiplies this effort by a vector of CPUE. This vector of CPUE is derived from extrapolating the mean 1981-1985 catch divided by effort or 1986-90 (for charterboats) back in time from 1980 to 1977 with a value equal to the average of the five highest CPUEs for entire catch/effort time series and continuing this value back in time to either 1900 or 1930.*

*- **Method 2:** uses coastal county census data to predict effort and multiplies this effort by CPUE obtained as in Method 1.*

*- **Method 3:** used for headboats and charterboats uses literature-derived estimates of effort multiplied by 1986-1990 CPUE.*

- The two most critical assumptions that need to be address by the working group are as follows:

a) is there any evidence that historical recreational landings were as high or higher than during the time period 1981-2007?".

b) are CPUE values derived from MRFSS catch/effort estimates 1981-85 or 1986-90 appropriate to use as CPUE estimates for 1930-1980?

*- **Method 4**: for Texas only, linearly interpolate the mean 1981-1985 catch back to a value of zero in 1930.*

- To account for the effect of World War II, catch during the time period 1940-1945 was reduced to 10% of the predicted values.

KEY WORDS

Catch/effort, historical, recreational fisheries, king mackerel

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1. INTRODUCTION

Time series of commercial landings for king mackerel *Scomberomorus cavalla* extend until at least 1930, however formal time series of recreational landings for most marine species began only in 1981 coincident with the initiation of the Marine Recreational Fisheries Statistics Survey (MFRSS). Currently recreational landings of king mackerel represent approximately 2/3 if of the total landings. King mackerel have historically been an extremely important species to all modes of the recreational fishery and there is ample evidence that recreational landings were also quite important historically from the inception of saltwater recreational fisheries (Moe 1963, Browder et al. 1977).

Thus it is imperative to extend time series backwards from the start of the formalized MFRSS survey (1981) to the inception of the recreational fishery, likely sometime in the early 1900's though, at present, this date is unknown. Scott (2004) began the recreational fishery for red snapper and Walter (2006) began fisheries for red grouper in 1945, post-World War II, a sensible start date given the increase in US population, recreational spending and leisure time that occurred in the years following the WWII. There is, however, evidence that recreational fishing, particularly for king mackerel occurred prior to this date so we have back-calculated landings to 1900 in the Atlantic and 1930 in the Gulf of Mexico.

This paper presents four methods of back-calculating recreational landings of South Atlantic and Gulf of Mexico king mackerel *Scomberomorus cavalla* for the years from 1930 to 1980. The first method involves a simple linear extrapolation of the average effort for the first five years of recorded effort back to a value of zero in 1930 multiplied by a vector of estimated catch per unit effort (CPUE). CPUE is obtained by extrapolating the average CPUE for the first five years of recorded catch and effort from 1980 back to a value in 1977 equal to mean of the five highest CPUE values for the recorded period. The second method uses a linear regression of fishing effort versus human population numbers from Gulf of Mexico and South Atlantic coastal counties to predict fishing effort multiplied by estimated CPUE. The third method is applied only to headboat and charterboat landings and uses literature-derived estimates of headboat effort multiplied by CPUE. The last method, used for Texas only was to linearly interpolate the mean 1981-1985 catch back to a value of zero in 1930.

2. MATERIALS AND METHODS

2.1 Data sources

Note that both catch and effort is based on latest estimates provided to the Review workshop and based on the new repartitioning of Florida and on decisions regarding what data for Texas should be used. Recreational catch and effort data for Gulf of Mexico and South Atlantic king mackerel was available from MRFSS (http://www.st.nmfs.gov/st1/recreational/overview/overview.html) and NMFS headboat survey for the years 1981-2007 (Table 1). Only catch was available from Texas Parks and Wildlife. Landings and effort were split into four modes, private, shore, charter and headboat. As recreational live releases (B2) amounted to less than 1% of the total recreational landings from 1981 to 1984, and because no size or bag limits were in place prior to 1981 we did not include any B2 numbers in the back-calculations.

All effort is in angler trips except for headboat effort which is in angler days but as CPUE is also in angler days the different units does not matter for this analysis. To provide data that matches the requirements for the current analyses we split catch and effort into three regions and four seasons, corresponding as closely as possible to the requirements for the Atlantic, Mixing and Gulf zones (Table 2, Figure 1). After the SEDAR 16 Data workshop the Florida catch and effort was broken into finer-scale resolution that permitted separation of the Atlantic, Mixing and Gulf zones with all catch and effort from Florida waters from Volusia to the Collier-Monroe border including the Florida Keys being assigned to the Mixing Zone. As no MRFSS catch and effort exists for Wave 1 in 1981, catch and effort was reconstructed using by multiplying the average ratio of Wave 1 to Waves 2-6 catch and effort for 1982-1986 by 1981Wave 2-6 catch and effort.

As a proxy for fishing effort we obtained data on Gulf and Atlantic coast county population census numbers for 1900-1990 from: http://www.census.gov/population/ www/censusdata/cencounts.html) and

numbers for 2000 from: http://www.factfinder.census.gov/ (Table 3). We also explored several other proxies such as total number of boats owned nationwide, nationwide retail boating expenditures and total numbers of fishing licenses nationwide (United States Fish and Wildlife Service license database[2]). However, as no other proxy except census numbers extended back until 1930, we decided only to use census numbers.

2.3 CPUE estimation

During the data workshop concerns were raised that 1981-1985 CPUE values were likely underestimates of 1930-1980 CPUEs due to low relative abundance of king mackerel during this time. It was decided that the mean of the highest 5 CPUE values for the period of 1981-2006 should be used and linearly interpolated from 1977 downwards to the CPUE in 1981. Rather than used a single datapoint for the start of the time series (1980), we used the average of the first five years of total catch divided by total effort by mode, zone and season (Table 4, Figures 2) to obtain CPUE for 1980. This was generally years 1981-1985 for private boats and 1986-1990 for headboats and charterboats as they were combined together during years 1981-1985. For shore effort, as most CPUEs were zero for the first five years, we averaged the first five non-zero CPUE estimates. Otherwise shore landings would have been zero extending back in time and this appears to be an underestimate, given the observed large shore catches in later years. There is evidence from historical records from fishing piers (see http://www.fishing-nc.com/nc-fishing-piers.php for links to pier histories) that shore fishing for king mackerel occurred prior to the 1980's and allowing the first five, non-zero catches accounts for this. Similarly the CPUE values were obtained (Table 5, Figures 3,4) as the mean of the highest five catch/effort values. The vector of CPUE was obtained by linearly extrapolating the mean CPUE for 1980 back to the high value in 1977 and maintaining this value back to 1900 (Tables 6-8).

2.4 Effort prediction

2.4.1. Method 1: Linear extrapolation of effort

This method simply linearly extrapolates the mean of the 1981-1995 or 1986-90 (for charterboats) effort back to zero in 1930 for each mode, season and zone. This approach assumes that effort was less prior to 1981 and that it linearly increased from zero in 1930. This naïve approach is used when either of the, more-informative and preferable, Methods 2 or 3 cannot be used.

2.4.2. Method 2: predicting effort with census proxy

As fishing effort likely correlates with human population size, census numbers from coastal counties represents a proxy to back-calculate effort. We developed regressions of the total number of MRFSS private, shore and charter trips and headboat angler days for each season, mode and zone against coastal county population size for each of the three zones (Figures 5-8, Table 9). Note that the regressions were fit with an intercept and were not forced through zero in 1930 so some effort could have been predicted at this point. In addition when the regressions predicted negative effort, we replaced these with zero.

2.4.3. Method 3. Empirical estimates of effort

Historical estimates of fishing effort were available for several of the fishing modes and zones from surveys conducted of fishing activity (Moe, 1963, Ellis et al., 1958 and Ditton et al.1992). Ellis conducted a comprehensive survey of fishing effort in Florida by compiling county-specific numbers of private, charterboat, headboat and shore angler trips with the average number of trips per year, numbers of fishermen per trip and trip duration (for headboat and charterboats) also recorded. Moe (1963) and Ditton et al. 1992 provide estimates of the numbers of head or charterboats operating by region or county and with estimates of the numbers of anglers per trip, and trips per year from Ellis et al, we obtained estimates of total trips for some fishing modes and zones for the years 1955, 1960 and 1985 (the years of each individual survey) (Table 10). Any estimates for the Atlantic and the Gulf are likely moderate to severe underestimates because both Moe (1963) and Ellis et al. (1958) only included data from the state of Florida.

[2] USFWS, http:// federalaid.fws.gov/.

To construct a seasonal effort series from the point estimates we calculated the mean seasonal fraction of effort for the complete 1981-2006 time series (Table 11) and partitioned total annual effort accordingly. We then linearly interpolated a line from the mean of the first five years of recorded effort data to the mean of the 1960 and/or 1955 data and then down to a value of zero in 1930 (Figures 8-11). These estimates were only used for charterboats and headboats as most estimates did not include all effort for the entire mode and region. These estimates are useful, however, as rough checks on the other methods of back-calculation of effort.

2.3.4 Method 4: Linear extrapolation of catch, Texas only.

Since effort data was unavailable for Texas it was only possible to linearly back extrapolate catches from the average by mode and season for 1981-1985, back in time to a value of zero in 1930. These values were then added to the rest of the Gulf landings

2.5. Selection of estimation method

We used the following criteria to select the method of effort back-calculation:

1) if a significant regression ($p<0.05$) and positive slope was obtained, use Method 2: census prediction of effort. (In some cases we rejected this Method 2 and used empirical estimates as they seemed more likely)

2) if >2 empirical estimates of effort were available use Method 3: empirical estimates (Gulf and Mixing Zone headboats and charterboats).

3) Otherwise use Method 1, linear interpolation of effort backwards, or linear interpolation of catch

2.6. Accounting for the effect of World War II.

In the data workshop the working group decided to reduce catch (really effort but catch has the same effect) to 10% of the otherwise predicted values for the time period 1940-1945 to account for the reduction in fishing effort that would have occurred during World War II.

3. RESULTS AND DISCUSSION

The major changes between this version and the previous back-calculations are due to:

1) extending the Atlantic time series to 1900
2) use of the five highest CPUE values
3) repartitioning of Florida Catch and effort into the three zones
4) Removal of Texas Effort and use of only the SEDAR Data workshop version of Texas catch.
5) Reduction of landings to 10% of predicted during WWII
6) All charterboat effort was back calculated from empirical point estimates rather than linear extrapolations of census predictions

These resulting changes produced higher Atlantic and Mixing zone landings for the historical time period and very similar Gulf of Mexico landings (Figure 19). This was primarily due to increases in the Atlantic and Mixing Zone CPUEs (Figures 4 and 20). In the Gulf of Mexico, CPUEs increased however, this was offset by a dramatic reduction in Gulf of Mexico effort due to the removal of Texas effort estimates from 1981-1985 which were very high and subsequently deemed by the data workshop not to be appropriate to use. When the revised Texas catch was used it resulted in slightly lower overall Gulf landings for some years. In general the main differences between the two landings trajectories are substantially higher landings during the time period 1920-60 (minus WWII) than the previous backcalculations.

The consensus of the recreational working group was to use the five highest CPUE values based on evidence that, as early as the 1970's declining CPUE of king mackerel was cited as a substantial problem by a majority of headboat and a large fraction of charter boat operators in Florida (Browder et al 1981). A minor issue with the previous version of this paper dealt with zero catch values resulting in zero CPUE values during the 1981-85 time period. This was dealt with by extending the time window of CPUE selection to include at least 5 non-zero values. This remains an assumption but is of only minor impact as it applies only for a very short time period (1977-1980). Comparison of the previous CPUE values (Figure 20) with the new high five indicates that much higher CPUEs.

The second assumption of starting the Atlantic fishery in 1900 was based upon the working group decision and also on evidence from a document describing the beginnings of an offshore headboat recreational fishery in Little River, South Carolina in the early 1920's (Burrell 2000), the beginning of the first charter fishing operation in Hatteras, NC in 1937 (Cleveland 1984) and the construction of the oldest fishing pier on the Atlantic Coast, the Kure Beach Pier in 1923[3]. These developments suggest an earlier start date than 1945 used for red grouper and likely this may be due to the earlier development of the Atlantic coast as opposed to the Gulf coast. Note that that the predictions of fishing effort based on census data do not necessarily equal zero in 1930 so that some fishing effort is predicted for certain modes even at the inception of the fishery, though the effort and landings were minimal.

Back-calculation of charterboat effort from empirical estimates is likely more appropriate than either linear extrapolations or census predictions (Figure 10). Census prediction usually did not correlate with know effort or predicted very low values (Figure 10, Gulf, charterboat, spring) that were implausible (zero, in 1977) based upon empirical data. For both the Mixing and Gulf zones the effort predictions do not differ greatly between the linear and the empirical though they are very different for the Atlantic. This may be due to an underestimation of Atlantic Charter boat empirical effort particularly for charter boats in the NC-GA region.

[Note to reader: the following is essentially the same as the previous version of this paper, only updated with current information] A total of 56 separate time series of effort and landings were constructed which were the product of three zones, four modes and four seasons plus four seasons and four modes for Texas (Tables 12-19, Figure 12-14). Sixteen (16) of the time series were constructed using method 1, linear interpolation of effort, due to either a non-significant or negative relationship between effort and census numbers or the absence of any empirical estimates of effort. Sixteen time series used predictions of effort from census numbers and 24 were constructed from point estimates of effort. Total landings and effort by zone (Figure 15a, b) and total landings by mode and zone (Figure 16a-d) and season (Figure 17a-d) indicate generally steadily increasing landings from 1900 to 1977 and a decrease until recorded landings in 1981. Given limitations of the methods of back-calculation no interannual variability in landings is predicted, however if time series of CPUEs existed they could be used to allow for variability. In general we feel that effort is easier to predict than landings, as actual fishing capacity is less likely to vary from year to year.

The three strongest assumptions of this method of back-calculating landings are:

1) effort was less historically than now and it follows population levels.
2) CPUE derived from the five highest values for 1981-2007 reflect historical catch rates
3) recreational effort for king mackerel essentially begins in 1900 or 1930 in the Gulf

Secondary assumptions are that there are negligible recreational releases (B2) in the historic time period, though this appears to be a minor issue.

The first assumption appears generally true as only 12 of the 48 regressions of effort with population size (which increases over time) indicate decreasing effort, and of these many are not significant. In contrast, mixing zone headboats for which substantial effort existed well prior to 1980 (Ellis et al 1958) and Gulf shore effort appear to have decreased. In instances where effort was historically higher it was necessary to use literature-derived estimates of the numbers of headboats, numbers of passengers, average trips, etc

[3] http://www.kurebeachfishingpier.com/kure_pier_history.htm

(Ellis et al 1958, Moe 1963 and Ditton et al. 1992, Dixon and Huntsman 2003) to reconstruct effort. However we did not obtain similar estimates for shore fishing effort in the Gulf though perhaps a listing of historical fishing piers could be constructed to provide estimates. In the absence of this, we have used Method 1 to back-calculate shore fishing effort.

Of the three methods of back-calculating landings Method 3 is most preferable when data exists, and Method 2 is preferable to Method 1, linear extrapolation of effort. Method 3 is the only one which allows for the potential that effort was higher historically than in the recorded time period. Back-calculated effort using either method 1 of 2 is pre-ordained to be lower than in the time period of standard data collection. By using the mean of the five highest CPUE values back-calculated landings are higher (and highest in 1977) than in the 1981-2007 time period. This is a function of the generally increasing trend in effort coupled with the using the mean of the 5 highest CPUE values.

Fishing effort for all modes, zones and seasons was not consistently correlated with population levels nor were the correlations particularly strong. For most modes, zones and seasons, effort appears to have increased over time, however, even in some instances of a significant slope, the fits of the regressions were rather poor with r^2 values that ranged from 0.005-0.765 (mean 0.276). For some modes, particularly Mixing zone headboats and Gulf shore, the slopes of the regressions were negative, implying that effort had declined in recent years (Figs. 6 and 7). While the census predictions of effort could be used to predict higher effort in the past (Figure 6, headboat effort), there is no logical explanation for the negative correlation between headboat effort and population size and it one would have to constrain the prediction to a value of zero at some time. Empirical estimates of headboat effort indicated that effort was, in fact, higher in earlier years, necessitating the use of historical point estimates to obtain effort. Valid point estimates could not be obtained for the entire Gulf, however the single estimates for Florida in 1955 derived from Ellis et al. 1958 (Figure 10,11) indicate that at least Florida effort alone was not higher than the linearly interpolated effort. Typically the West coast and panhandle of Florida accounted for approximately 60% of total shore effort so it is likely that, if a little over half of the effort was accounted for by the point estimates, they would fall close to the linear line.

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Table 1. Description of data sources for catch and effort data. Note that both catch and effort is based on latest estimates provided to the Review workshop and based on the new repartitioning of Florida and on decisions regarding what data for Texas should be used.

Survey	Area	Timeframe	Mode*
MRFSS	1. TX (not all modes/waves) 2. ME-VA 3. NC-LA	1. 1981-1985 2. 1981-present (except 1981, wave 1) 3. 1981-present (except 1981, wave 1)	1. SH, HB/CH, PR 2. SH, HB/CH, PR 3. SH, CH, PR
Headboat	1. NC-FLE (incl. Keys) 2. FLW-TX	1. 1981- present 2. 1986-present	1. HB 2. HB
TPWD	TX (no effort available)	1983-present	CH, PR

* No effort or catch estimates were made for LA in 2004-2005. In 2006 there were effort estimates generated but no catch estimates.
* Note that Texas effort is in angler hours and was converted to angler days by dividing total angler hours by 8.
* Headboat effort is in angler-days whereas effort for other modes is angler trips

Table 2. Description of zones and seasons

	Effort, based on re-partitioning of Florida	**Catch, based on based on re-partitioning of Florida**
ZONE		
Atlantic	Florida from Flagler north-VA: state= VA,NC,SC,GA	Florida from Flagler north -North Carolina: VA (211) - GA (329)
Mixing zone	Florida Volusia, south to Monroe-Collier border	Florida Volusia, south to Monroe-Collier border)
Gulf of Mexico	Florida West Coast Collier Escambia, Alabama to Texas	Florida West Coast Collier Escambia, Alabama to Texas
SEASONS	**based on sampling wave, wave 2 (March, April) divided equally in half. For heaboats, based on month**	**based on sampling wave, wave 2 (March, April) divided equally in half. For heaboats, based on month**
Spring	April, May, June	April, May, June
Summer	July, August, September, October	July, August, September, October
Winter	November, December	November, December
Fall	January, February, March	January, February, March

Table 3. Proxies to predict fishing effort.

Year	NMMA Estimated Retail Expenditures on Boating (billion $'s) multiply by 10^9, adjusted for CPI in 2007 dollars	NMMA Total registered and nonregistered water craft, (million)	USFWS Licenses, total US (million)	Atlantic coastal counties population	Gulf coastal counties population	Mixing zone coastal counties population
	http://www.nmma.org/facts/boatingstats/2002/files/retailexpenditures.asp, http://www.nmma.org/facts/boatingstats/2005/files/Abstract.pdf , http://data.bls.gov/cgi-bin/cpicalc.pl	http://www.nmma.org/facts/boatingstats/2001/files/boatsowned.asp, http://www.nmma.org/facts/boatingstats/2005/files/Abstract.pdf	http://federalaid.fws.gov/	US census. This data was obtained for the period from 1900-1990 (http://www.census.gov/population/www/censusdata/cencounts.html) and data for the 2000 census was obtained at http://www.factfinder.census.gov/.		
1900	NA	NA	NA	NA	NA	NA
1901	NA	NA	NA	531,797	765,200	96,674
1902	NA	0.400	NA	NA	NA	NA
1903	NA	NA	NA	572,318	1,018,185	163,271
1904	NA	1.500	NA	627,632	1,705,151	492,289
1905	NA	1.518	NA	635,218	1,731,972	515,505
1906	NA	1.537	NA	642,803	1,758,793	538,721
1907	NA	1.555	NA	650,389	1,785,615	561,937
1908	NA	1.573	NA	657,975	1,812,436	585,153
1909	NA	1.591	NA	665,560	1,839,257	608,369
1910	NA	1.610	NA	673,146	1,866,078	631,586
1911	NA	1.628	NA	680,731	1,892,899	654,802
1912	NA	1.646	NA	688,317	1,919,720	678,018
1913	NA	1.665	NA	695,903	1,946,542	701,234
1914	NA	1.683	NA	711,074	2,000,184	747,666
1915	NA	NA	NA	531,797	96,674	96,674
1916	NA	NA	NA	535,481	180,448	102,728
1917	NA	NA	NA	539,164	264,221	108,783
1918	NA	NA	NA	542,848	347,995	114,837
1919	NA	NA	NA	546,532	431,769	120,891
1920	NA	NA	NA	550,216	515,543	126,945
1921	NA	NA	NA	553,899	599,316	133,000
1922	NA	NA	NA	557,583	683,090	139,054
1923	NA	NA	NA	561,267	766,864	145,108
1924	NA	NA	NA	564,951	850,638	151,162
1925	NA	NA	NA	572,318	1,018,185	163,271
1926	NA	NA	NA	577,347	1,040,066	172,632
1927	NA	NA	NA	582,375	1,061,948	181,993
1928	NA	NA	NA	587,404	1,083,829	191,353
1929	NA	NA	NA	592,432	1,105,711	200,714
1930	NA	NA	NA	597,461	1,127,592	210,075
1931	NA	NA	NA	602,489	1,149,474	219,436
1932	NA	NA	NA	607,518	1,171,355	228,797
1933	NA	NA	NA	612,546	1,193,237	238,158
1934	NA	NA	NA	617,575	1,215,118	247,518
1935	NA	NA	NA	627632	1258881	266240
1936	NA	NA	NA	627632	1299451	286789.9091
1937	NA	NA	NA	627632	1340021	307339.8182
1938	NA	NA	NA	627632	1380591	327889.7273
1939	NA	NA	NA	627632	1421161	348439.6364
1941	NA	1.865	NA	726,850	2,069,527	789,978
1942	NA	2.048	NA	742,625	2,138,871	832,290
1943	NA	2.231	NA	758,401	2,208,214	874,601
1944	NA	2.414	NA	774,176	2,277,557	916,913
1945	NA	2.596	NA	789,952	2,346,901	959,225
1946	NA	2.779	NA	805,727	2,416,244	1,001,537
1947	NA	2.962	NA	821,503	2,485,588	1,043,849
1948	NA	3.145	NA	837,278	2,554,931	1,086,161
1949	NA	3.327	NA	853,054	2,624,274	1,128,472
1950	NA	3.510	NA	884,605	2,762,961	1,213,096
1951	NA	3.843	NA	903,269	2,874,571	1,319,747
1952	NA	4.176	NA	921,933	2,986,182	1,426,399
1953	NA	4.510	NA	940,598	3,097,792	1,533,050
1954	NA	4.843	NA	959,262	3,209,402	1,639,702
1955	8.963	5.176	NA	977,926	3,321,013	1,746,353
1956	10.691	5.509	NA	996,590	3,432,623	1,853,005
1957	12.149	5.842	NA	1,015,254	3,544,234	1,959,656
1958	13.563	6.175	1.371	1,033,918	3,655,844	2,066,308
1959	15.208	6.509	1.374	1,052,583	3,767,454	2,172,959
1960	16.660	6.842	1.425	1,089,911	3,990,675	2,386,262
1961	17.094	7.175	1.446	1,097,911	4,061,586	2,480,811
1962	17.512	7.357	1.437	1,105,910	4,132,497	2,575,360
1963	17.871	7.539	1.505	1,113,910	4,203,409	2,669,908
1964	18.213	7.721	1.709	1,121,910	4,274,320	2,764,457
1965	18.495	7.903	1.412	1,129,910	4,345,231	2,859,006
1966	18.529	8.086	1.652	1,137,909	4,416,142	2,953,555
1967	18.513	8.268	1.892	1,145,909	4,487,053	3,048,104
1968	18.279	8.450	1.983	1,153,909	4,557,964	3,142,653
1969	17.822	8.632	2.074	1,161,909	4,628,876	3,237,201
1970	17.315	8.814	2.091	1,177,908	4,770,698	3,426,299
1971	17.939	9.116	2.107	1,197,935	4,902,112	3,549,265
1972	18.689	9.418	2.213	1,217,961	5,033,525	3,672,232
1973	18.826	9.719	2.319	1,237,988	5,164,939	3,795,198
1974	18.064	10.021	2.326	1,258,015	5,296,352	3,918,164
1975	17.425	10.323	2.241	1,278,042	5,427,766	4,041,131
1976	18.397	10.625	2.267	1,298,068	5,559,179	4,164,097
1977	19.821	10.927	2.292	1,318,095	5,690,593	4,287,064
1978	20.819	11.228	2.160	1,338,122	5,822,006	4,410,030
1979	20.961	11.530	2.170	1,358,149	5,953,420	4,532,996
1980	18.148	11.832	2.179	1,398,202	6,216,247	4,778,929
1981	18.415	12.221	2.303	1,422,250	6,315,131	4,910,539
1982	18.080	12.610	2.428	1,446,298	6,414,016	5,042,148
1983	19.712	13.000	2.497	1,470,346	6,512,900	5,173,758
1984	24.098	13.389	2.487	1,494,394	6,611,784	5,305,367
1985	25.050	13.778	2.477	1,518,442	6,710,669	5,436,977

Table 3. continued.

Year	NMMA Estimated Retail Expenditures on Boating (billion $'s) multiply by 10^9, adjusted for CPI in 2007 dollars	NMMA Total registered and nonregistered water craft, (million)	USFWS Licenses, total US (million)	Atlantic coastal counties population	Gulf coastal counties population	Mixing zone coastal counties population
1986	26.805	14.147	2.440	1,542,489	6,809,553	5,568,586
1987	29.471	14.515	2.403	1,566,537	6,908,438	5,700,196
1988	30.747	15.093	2.440	1,590,585	7,007,322	5,831,805
1989	28.051	15.658	2.536	1,614,633	7,106,206	5,963,415
1990	21.316	15.987	2.681	1,662,729	7,303,975	6,226,634
1991	15.737	16.262	2.590	1,688,775	7,402,560	6,394,695
1992	14.920	16.262	2.615	1,714,822	7,501,144	6,562,757
1993	15.802	16.212	2.633	1,740,868	7,599,729	6,730,818
1994	19.265	16.239	2.557	1,766,914	7,698,314	6,898,879
1995	22.934	15.375	2.474	1,792,961	7,796,898	7,066,940
1996	22.958	15.830	2.579	1,819,007	7,895,483	7,235,002
1997	24.454	16.230	2.783	1,845,054	7,994,067	7,403,063
1998	23.835	16.824	2.781	1,871,100	8,092,652	7,571,124
1999	26.472	16.791	2.640	1,897,146	8,191,237	7,739,185
2000	32.807	16.991	2.575	1,949,239	8,388,406	8,075,308
2001	32.676	16.999	NA	NA	NA	NA
2002	34.184	17.340	NA	NA	NA	NA
2003	33.311	17.400	NA	NA	NA	NA
2004	35.392	17.610	NA	NA	NA	NA
2005	38.772	17.950	NA	NA	NA	NA
2006	NA	17.730	NA	NA	NA	NA
2007	NA	NA	NA	NA	NA	NA

Table 4. Table of annual CPUE and mean CPUE used for prediction of landings.

	year	fall raw	fall mean	raw spring	spring mean	raw summer	summer mean	raw winter	winter mean
ATLPrivCPUE.1	1981	0.000	0.025	0.045	0.044	0.037	0.066	0.000	0.020
ATLPrivCPUE.2	1982	0.000	0.025	0.052	0.044	0.052	0.066	0.037	0.020
ATLPrivCPUE.3	1983	0.000	0.025	0.045	0.044	0.082	0.066	0.000	0.020
ATLPrivCPUE.4	1984	0.000	0.025	0.044	0.044	0.077	0.066	0.010	0.020
ATLPrivCPUE.5	1985	0.009	0.025	0.036	0.044	0.081	0.066	0.025	0.020
mixPrivCPUE.1	1981	0.034	0.024	0.062	0.039	0.035	0.100	0.068	0.024
mixPrivCPUE.2	1982	0.008	0.024	0.060	0.039	0.213	0.100	0.010	0.024
mixPrivCPUE.3	1983	0.019	0.024	0.025	0.039	0.140	0.100	0.004	0.024
mixPrivCPUE.4	1984	0.052	0.024	0.037	0.039	0.060	0.100	0.035	0.024
mixPrivCPUE.5	1985	0.008	0.024	0.012	0.039	0.051	0.100	0.004	0.024
GulfPrivCPUE.1	1981	0.000	0.015	0.000	0.008	0.023	0.087	0.000	0.003
GulfPrivCPUE.2	1982	0.017	0.015	0.018	0.008	0.251	0.087	0.003	0.003
GulfPrivCPUE.3	1983	0.000	0.015	0.005	0.008	0.064	0.087	0.001	0.003
GulfPrivCPUE.4	1984	0.004	0.015	0.000	0.008	0.079	0.087	0.000	0.003
GulfPrivCPUE.5	1985	0.000	0.015	0.014	0.008	0.016	0.087	0.009	0.003
ATLShoreCPUE.1	1981	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.003
ATLShoreCPUE.2	1982	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.003
ATLShoreCPUE.3	1983	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.003
ATLShoreCPUE.4	1984	0.000	0.000	0.000	0.001	0.001	0.003	0.000	0.003
ATLShoreCPUE.5	1985	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.003
mixShoreCPUE.1	1981	0.000	0.010	0.000	0.002	0.000	0.002	0.000	0.001
mixShoreCPUE.2	1982	0.000	0.010	0.000	0.002	0.000	0.002	0.000	0.001
mixShoreCPUE.3	1983	0.000	0.010	0.000	0.002	0.000	0.002	0.000	0.001
mixShoreCPUE.4	1984	0.000	0.010	0.000	0.002	0.000	0.002	0.000	0.001
mixShoreCPUE.5	1985	0.000	0.010	0.000	0.002	0.000	0.002	0.000	0.001
GulfShoreCPUE.1	1981	0.000	0.004	0.000	0.011	0.002	0.005	0.000	0.002
GulfShoreCPUE.2	1982	0.000	0.004	0.002	0.011	0.007	0.005	0.000	0.002
GulfShoreCPUE.3	1983	0.000	0.004	0.000	0.011	0.005	0.005	0.000	0.002
GulfShoreCPUE.4	1984	0.000	0.004	0.000	0.011	0.000	0.005	0.000	0.002
GulfShoreCPUE.5	1985	0.000	0.004	0.000	0.011	0.000	0.005	0.000	0.002
ATLCharterCPUE.1	1986	0.497	1.074	0.470	0.471	0.460	0.465	0.158	0.513
ATLCharterCPUE.2	1987	0.552	1.074	0.782	0.471	0.457	0.465	0.913	0.513
ATLCharterCPUE.3	1988	0.000	1.074	0.493	0.471	0.554	0.465	0.105	0.513
ATLCharterCPUE.4	1989	0.599	1.074	0.352	0.471	0.353	0.465	0.516	0.513
ATLCharterCPUE.5	1990	2.713	1.074	0.258	0.471	0.501	0.465	0.871	0.513
mixCharterCPUE.1	1986	0.068	0.119	0.057	0.118	0.021	0.117	0.017	0.136
mixCharterCPUE.2	1987	0.155	0.119	0.092	0.118	0.107	0.117	0.166	0.136
mixCharterCPUE.3	1988	0.158	0.119	0.179	0.118	0.031	0.117	0.040	0.136
mixCharterCPUE.4	1989	0.057	0.119	0.137	0.118	0.180	0.117	0.071	0.136
mixCharterCPUE.5	1990	0.156	0.119	0.122	0.118	0.247	0.117	0.384	0.136
GulfCharterCPUE.1	1986	0.040	0.091	0.030	0.106	0.115	0.232	0.011	0.088
GulfCharterCPUE.2	1987	0.000	0.091	0.192	0.106	0.221	0.232	0.029	0.088
GulfCharterCPUE.3	1988	0.000	0.091	0.004	0.106	0.270	0.232	0.000	0.088
GulfCharterCPUE.4	1989	0.059	0.091	0.143	0.106	0.149	0.232	0.013	0.088
GulfCharterCPUE.5	1990	0.000	0.091	0.161	0.106	0.402	0.232	0.175	0.088
ATLHBCPUE.1	1986	NA	0.107	0.016	0.024	0.019	0.022	NA	0.020
ATLHBCPUE.2	1987	NA	0.107	0.022	0.024	0.031	0.022	NA	0.020
ATLHBCPUE.3	1988	NA	0.107	0.029	0.024	0.024	0.022	NA	0.020
ATLHBCPUE.4	1989	NA	0.107	0.035	0.024	0.015	0.022	NA	0.020
ATLHBCPUE.5	1990	NA	0.107	0.017	0.024	0.022	0.022	NA	0.020
mixHBCPUE.1	1986	0.255	0.308	0.130	0.123	0.145	0.131	0.117	0.253
mixHBCPUE.2	1987	0.256	0.308	0.156	0.123	0.111	0.131	0.770	0.253
mixHBCPUE.3	1988	0.086	0.308	0.113	0.123	0.098	0.131	0.019	0.253
mixHBCPUE.4	1989	0.413	0.308	0.074	0.123	0.166	0.131	0.075	0.253
mixHBCPUE.5	1990	0.531	0.308	0.140	0.123	0.136	0.131	0.283	0.253
GulfHBCPUE.1	1986	0.001	0.001	0.001	0.002	0.003	0.006	0.000	0.002
GulfHBCPUE.2	1987	0.001	0.001	0.002	0.002	0.008	0.006	0.000	0.002
GulfHBCPUE.3	1988	0.000	0.001	0.000	0.002	0.010	0.006	0.000	0.002
GulfHBCPUE.4	1989	0.002	0.001	0.001	0.002	0.003	0.006	0.000	0.002
GulfHBCPUE.5	1990	0.001	0.001	0.004	0.002	0.004	0.006	0.008	0.002

Table 5. Table of highest 5 CPUE values

	year	fall raw	fall mean	raw spring	spring mean	raw summer	summer mean	raw winter	winter mean
ATL_PR_CPUE_TS.1	1986	0.077	0.049	0.079	0.055	0.092	0.084	0.071	0.033
ATL_PR_CPUE_TS.2	1991	0.064	0.049	0.052	0.055	0.086	0.084	0.037	0.033
ATL_PR_CPUE_TS.3	2002	0.041	0.049	0.051	0.055	0.082	0.084	0.025	0.033
ATL_PR_CPUE_TS.4	1995	0.035	0.049	0.047	0.055	0.081	0.084	0.020	0.033
ATL_PR_CPUE_TS.5	1994	0.027	0.049	0.045	0.055	0.077	0.084	0.011	0.033
MIX_PR_CPUE_TS.1	1990	0.154	0.081	0.067	0.062	0.213	0.108	0.078	0.057
MIX_PR_CPUE_TS.2	1997	0.068	0.081	0.067	0.062	0.140	0.108	0.068	0.057
MIX_PR_CPUE_TS.3	2002	0.066	0.081	0.062	0.062	0.069	0.108	0.050	0.057
MIX_PR_CPUE_TS.4	1998	0.064	0.081	0.060	0.062	0.060	0.108	0.047	0.057
MIX_PR_CPUE_TS.5	1984	0.052	0.081	0.056	0.062	0.060	0.108	0.040	0.057
GULF_PR_CPUE_TS.1	1989	0.037	0.026	0.049	0.030	0.251	0.099	0.014	0.011
GULF_PR_CPUE_TS.2	2000	0.035	0.026	0.031	0.030	0.079	0.099	0.013	0.011
GULF_PR_CPUE_TS.3	2001	0.021	0.026	0.026	0.030	0.064	0.099	0.011	0.011
GULF_PR_CPUE_TS.4	1999	0.018	0.026	0.025	0.030	0.060	0.099	0.009	0.011
GULF_PR_CPUE_TS.5	1982	0.017	0.026	0.020	0.030	0.040	0.099	0.007	0.011
ATL_SH_CPUE_TS.1	1981	0.000	0.000	0.000	0.010	0.000	0.005	0.000	0.003
ATL_SH_CPUE_TS.2	1982	0.000	0.000	0.000	0.010	0.000	0.005	0.000	0.003
ATL_SH_CPUE_TS.3	1983	0.000	0.000	0.000	0.010	0.000	0.005	0.000	0.003
ATL_SH_CPUE_TS.4	1984	0.000	0.000	0.000	0.010	0.001	0.005	0.000	0.003
ATL_SH_CPUE_TS.5	1985	0.000	0.000	0.000	0.010	0.000	0.005	0.000	0.003
MIX_SH_CPUE_TS.1	1981	0.000	0.012	0.000	0.002	0.000	0.003	0.000	0.001
MIX_SH_CPUE_TS.2	1982	0.000	0.012	0.000	0.002	0.000	0.003	0.000	0.001
MIX_SH_CPUE_TS.3	1983	0.000	0.012	0.000	0.002	0.000	0.003	0.000	0.001
MIX_SH_CPUE_TS.4	1984	0.000	0.012	0.000	0.002	0.000	0.003	0.000	0.001
MIX_SH_CPUE_TS.5	1985	0.000	0.012	0.000	0.002	0.000	0.003	0.000	0.001
GULF_SH_CPUE_TS.1	1981	0.000	0.004	0.000	0.020	0.002	0.021	0.000	0.004
GULF_SH_CPUE_TS.2	1982	0.000	0.004	0.002	0.020	0.007	0.021	0.000	0.004
GULF_SH_CPUE_TS.3	1983	0.000	0.004	0.000	0.020	0.005	0.021	0.000	0.004
GULF_SH_CPUE_TS.4	1984	0.000	0.004	0.000	0.020	0.000	0.021	0.000	0.004
GULF_SH_CPUE_TS.5	1985	0.000	0.004	0.000	0.020	0.000	0.021	0.000	0.004
ATL_CB_CPUE_TS.1	1990	2.713	1.481	0.782	0.584	1.053	0.717	1.230	0.787
ATL_CB_CPUE_TS.2	1993	1.815	1.481	0.644	0.584	0.950	0.717	0.913	0.787
ATL_CB_CPUE_TS.3	1992	1.189	1.481	0.532	0.584	0.554	0.717	0.871	0.787
ATL_CB_CPUE_TS.4	1991	1.008	1.481	0.493	0.584	0.529	0.717	0.516	0.787
ATL_CB_CPUE_TS.5	1995	0.681	1.481	0.470	0.584	0.501	0.717	0.405	0.787
MIX_CB_CPUE_TS.1	1994	0.619	0.560	0.318	0.298	0.510	0.429	0.727	0.557
MIX_CB_CPUE_TS.2	1992	0.605	0.560	0.318	0.298	0.465	0.429	0.551	0.557
MIX_CB_CPUE_TS.3	1997	0.588	0.560	0.290	0.298	0.427	0.429	0.533	0.557
MIX_CB_CPUE_TS.4	1996	0.534	0.560	0.287	0.298	0.421	0.429	0.494	0.557
MIX_CB_CPUE_TS.5	1999	0.454	0.560	0.276	0.298	0.324	0.429	0.477	0.557
GULF_CB_CPUE_TS.1	1993	0.277	0.171	0.415	0.275	0.611	0.378	0.321	0.229
GULF_CB_CPUE_TS.2	1999	0.170	0.171	0.356	0.275	0.402	0.378	0.260	0.229
GULF_CB_CPUE_TS.3	2001	0.154	0.171	0.219	0.275	0.325	0.378	0.214	0.229
GULF_CB_CPUE_TS.4	2004	0.138	0.171	0.195	0.275	0.282	0.378	0.175	0.229
GULF_CB_CPUE_TS.5	2000	0.114	0.171	0.192	0.275	0.270	0.378	0.175	0.229
ATL_HB_CPUE_TS.1	2005	0.419	0.236	0.055	0.043	0.080	0.054	0.045	0.024
ATL_HB_CPUE_TS.2	2004	0.275	0.236	0.053	0.043	0.058	0.054	0.036	0.024
ATL_HB_CPUE_TS.3	2006	0.201	0.236	0.040	0.043	0.051	0.054	0.014	0.024
ATL_HB_CPUE_TS.4	2000	0.169	0.236	0.035	0.043	0.049	0.054	0.013	0.024
ATL_HB_CPUE_TS.5	2002	0.118	0.236	0.032	0.043	0.033	0.054	0.012	0.024
MIX_HB_CPUE_TS.1	1996	0.887	0.629	0.279	0.195	0.415	0.313	0.770	0.519
MIX_HB_CPUE_TS.2	1997	0.586	0.629	0.192	0.195	0.342	0.313	0.513	0.519
MIX_HB_CPUE_TS.3	1993	0.578	0.629	0.191	0.195	0.291	0.313	0.496	0.519
MIX_HB_CPUE_TS.4	1991	0.562	0.629	0.157	0.195	0.286	0.313	0.419	0.519
MIX_HB_CPUE_TS.5	1990	0.531	0.629	0.156	0.195	0.229	0.313	0.399	0.519
GULF_HB_CPUE_TS.1	1996	0.029	0.015	0.012	0.011	0.021	0.018	0.008	0.004
GULF_HB_CPUE_TS.2	2001	0.020	0.015	0.011	0.011	0.018	0.018	0.007	0.004
GULF_HB_CPUE_TS.3	1997	0.013	0.015	0.010	0.011	0.017	0.018	0.002	0.004
GULF_HB_CPUE_TS.4	2006	0.007	0.015	0.010	0.011	0.017	0.018	0.001	0.004
GULF_HB_CPUE_TS.5	1998	0.006	0.015	0.010	0.011	0.016	0.018	0.001	0.004

Table 6. Vector of Atlantic CPUE.

Zone	Atlantic															
Mode	*Private boat*				*Shore*				*Charterboat*				*Headboat*			
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1900	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1901	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1902	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1903	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1904	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1905	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1906	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1907	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1908	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1909	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1910	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1911	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1912	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1913	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1914	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1915	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1916	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1917	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1918	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1919	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1920	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1921	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1922	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1923	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1924	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1925	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1926	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1927	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1928	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1929	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1930	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1931	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
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1946	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1947	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
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1956	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1957	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1958	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1959	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1960	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1961	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1962	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1963	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1964	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1965	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1966	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1967	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1968	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1969	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1970	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1971	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1972	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1973	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1974	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1975	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1976	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1977	0.049	0.055	0.084	0.033	0.000	0.010	0.005	0.003	1.481	0.584	0.717	0.787	0.236	0.043	0.054	0.024
1978	0.043	0.052	0.079	0.030	0.000	0.008	0.004	0.003	1.436	0.571	0.689	0.757	0.222	0.041	0.051	0.024
1979	0.037	0.049	0.075	0.026	0.000	0.006	0.004	0.003	1.391	0.559	0.661	0.726	0.207	0.039	0.047	0.023
1980	0.031	0.047	0.071	0.023	0.000	0.004	0.004	0.003	1.345	0.546	0.633	0.696	0.193	0.037	0.044	0.023

1981	0.025	0.044	0.066	0.020	0.000	0.001	0.003	0.003	1.300	0.534	0.605	0.665	0.179	0.035	0.040	0.022

Table 7. Vector of mixing zone CPUE.

Zone	Atlantic															
Mode	*Private boat*				*Shore*				*Charterboat*				*Headboat*			
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1900	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1901	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1902	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1903	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1904	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1905	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1906	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1907	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1908	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1909	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1910	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1911	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1912	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1913	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1914	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1915	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1916	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1917	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1918	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
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1949	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1950	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1951	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
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1969	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1970	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1971	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1972	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1973	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1974	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1975	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1976	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1977	0.081	0.062	0.108	0.057	0.012	0.002	0.003	0.001	0.560	0.298	0.429	0.557	0.629	0.195	0.313	0.519
1978	0.067	0.057	0.106	0.048	0.012	0.002	0.003	0.001	0.511	0.278	0.395	0.510	0.593	0.187	0.293	0.490
1979	0.053	0.051	0.104	0.040	0.011	0.002	0.003	0.001	0.462	0.258	0.360	0.463	0.557	0.179	0.272	0.460

1980	0.039	0.045	0.102	0.032	0.011	0.002	0.002	0.001	0.413	0.238	0.325	0.416	0.522	0.171	0.252	0.430
1981	0.024	0.039	0.100	0.024	0.010	0.002	0.002	0.001	0.364	0.218	0.291	0.369	0.486	0.163	0.232	0.401

Table 8. Vector of Gulf CPUE.

Zone	Gulf															
Mode	*Private boat*				*Shore*				*Charterboat*				*Headboat*			
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1930	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1931	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1932	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1933	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1934	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1935	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1936	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1937	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1938	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1939	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1940	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1941	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1942	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1943	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1944	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1945	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1946	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1947	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1948	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1949	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
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1967	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1968	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1969	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1970	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1971	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1972	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1973	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1974	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1975	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1976	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1977	0.026	0.030	0.099	0.011	0.004	0.020	0.021	0.004	0.171	0.275	0.378	0.229	0.015	0.011	0.018	0.004
1978	0.023	0.025	0.096	0.009	0.004	0.018	0.017	0.003	0.162	0.257	0.362	0.213	0.014	0.010	0.016	0.004
1979	0.020	0.019	0.093	0.007	0.004	0.015	0.013	0.003	0.153	0.238	0.346	0.197	0.012	0.009	0.015	0.003
1980	0.017	0.014	0.090	0.005	0.004	0.013	0.009	0.002	0.144	0.219	0.329	0.182	0.010	0.008	0.014	0.003
1981	0.015	0.008	0.087	0.003	0.004	0.011	0.005	0.002	0.135	0.200	0.313	0.166	0.009	0.007	0.013	0.003

Table 9. Description of method of back-calculation of effort for each zone, mode and season combination.

Zone, mode, season				Regression parameters				
Zone	Mode	Season	method	slope	intercept	p-value	r^2	comments
Atlantic	private recreational	fall	(2) Census pred effort x cpue	844,521	-814,439	0.001	0.449	
Atlantic	private recreational	spring	(2) Census pred effort x cpue	1,284,745	-644,600	0.002	0.421	
Atlantic	private recreational	summer	(1) Linear extrap eff x cpue	1,816,395	-503,644	0.006	0.351	1.2 mil trips in 1900?
Atlantic	private recreational	winter	(1) Linear extrap eff x cpue	297,188	-140,615	0.063	0.179	
Atlantic	shore	fall	(1) Linear extrap eff x cpue	474,614	-112,772	0.172	0.101	
Atlantic	shore	spring	(1) Linear extrap eff x cpue	251,316	1,280,532	0.502	0.025	
Atlantic	shore	summer	(1) Linear extrap eff x cpue	900,507	1,430,971	0.326	0.054	
Atlantic	shore	winter	(1) Linear extrap eff x cpue	-444,045	1,262,966	0.185	0.096	
Atlantic	charter	fall	(3) empirical effort x CPUE	49,109	-68,127	0.013	0.386	
Atlantic	charter	spring	(3) empirical effort x CPUE	136,401	-12,799	0.610	0.021	
Atlantic	charter	summer	(3) empirical effort x CPUE	63,574	122,857	0.709	0.011	
Atlantic	charter	winter	(3) empirical effort x CPUE	74,727	-84,198	0.134	0.164	
Atlantic	headboat	fall	(3) empirical effort x CPUE	1,525	215	0.883	0.014	
Atlantic	headboat	spring	(3) empirical effort x CPUE	8,816	22,141	0.340	0.051	
Atlantic	headboat	summer	(3) empirical effort x CPUE	-12,710	79,807	0.347	0.049	
Atlantic	headboat	winter	(3) empirical effort x CPUE	-14,654	30,657	0.227	0.598	
Mixing zone	private recreational	fall	(1) Linear extrap eff x cpue	1,524	562,840	0.975	0	
Mixing zone	private recreational	spring	(1) Linear extrap eff x cpue	144,747	247,119	0.057	0.186	
Mixing zone	private recreational	summer	(2) Census pred effort x cpue	304,746	-493,088	0.000	0.611	
Mixing zone	private recreational	winter	(1) Linear extrap eff x cpue	-32,557	1,257,837	0.658	0.011	
Mixing zone	shore	fall	(1) Linear extrap eff x cpue	66,046	211,858	0.141	0.116	
Mixing zone	shore	spring	(2) Census pred effort x cpue	161,255	22,629	0.008	0.327	
Mixing zone	shore	summer	(1) Linear extrap eff x cpue	126,386	625,450	0.209	0.086	
Mixing zone	shore	winter	(1) Linear extrap eff x cpue	-65,820	1,677,105	0.482	0.028	
Mixing zone	charter	fall	(3) empirical effort x CPUE	-25,863	254,442	0.111	0.183	
Mixing zone	charter	spring	(3) empirical effort x CPUE	34,203	-78,166	0.110	0.184	
Mixing zone	charter	summer	(3) empirical effort x CPUE	-4,844	180,892	0.758	0.008	
Mixing zone	charter	winter	(3) empirical effort x CPUE	46,028	-175,918	0.034	0.302	
Mixing zone	headboat	fall	(3) empirical effort x CPUE	-1,473	26,275	0.036	0.221	
Mixing zone	headboat	spring	(3) empirical effort x CPUE	-19,492	194,986	0.000	0.721	
Mixing zone	headboat	summer	(3) empirical effort x CPUE	-17,574	182,266	0.000	0.676	
Mixing zone	headboat	winter	(3) empirical effort x CPUE	-4,070	57,076	0.002	0.415	
Gulf	private recreational	fall	(2) Census pred effort x cpue	336,518	-1,402,925	0.000	0.504	
Gulf	private recreational	spring	(2) Census pred effort x cpue	729,749	-3,163,066	0.000	0.642	
Gulf	private recreational	summer	(2) Census pred effort x cpue	464,106	-252,154	0.034	0.227	
Gulf	private recreational	winter	(2) Census pred effort x cpue	487,979	-2,017,911	0.000	0.604	
Gulf	shore	fall	(1) Linear extrap eff x cpue	-25,274	1,043,919	0.860	0.002	
Gulf	shore	spring	(1) Linear extrap eff x cpue	-70,805	2,505,569	0.667	0.011	
Gulf	shore	summer	(1) Linear extrap eff x cpue	-595,814	7,199,460	0.127	0.125	
Gulf	shore	winter	(1) Linear extrap eff x cpue	-59,864	1,882,278	0.639	0.012	
Gulf	charter	fall	(3) empirical effort x CPUE	17,587	-76,210	0.129	0.168	
Gulf	charter	spring	(3) empirical effort x CPUE	111,740	-648,536	0.005	0.471	
Gulf	charter	summer	(3) empirical effort x CPUE	16,203	83,682	0.600	0.022	
Gulf	charter	winter	(3) empirical effort x CPUE	59,398	-383,766	0.000	0.687	
Gulf	headboat	fall	(3) empirical effort x CPUE	6,315	-21,851	0.043	0.208	
Gulf	headboat	spring	(3) empirical effort x CPUE	40,001	-203,590	0.009	0.323	
Gulf	headboat	summer	(3) empirical effort x CPUE	49,139	-257,193	0.008	0.332	
Gulf	headboat	winter	(3) empirical effort x CPUE	19,203	-86,731	0.001	0.475	

significant $p < 0.05$

Table 10. Empirical estimates of recreational effort.

year	mode	Atlantic	Mixing zone	Gulf	source
1955	private recreational	232,022	228,638	403,196	Ellis et al (1955)
1960	private recreational	NA	NA	NA	Moe (1963)
1985	private recreational	NA	NA	NA	Ditton et al (1992)
1955	charter	2,231	271,802	139,912	Ellis et al (1955)
1960	charter	21,199	169,486	110,867	Moe (1963)
1985	charter	NA	NA	NA	Ditton et al (1992)
1955	shore	2,326,966	1,239,655	2,534,594	Ellis et al (1955)
1960	shore	NA	NA	NA	Moe (1963)
1985	shore	NA	NA	NA	Ditton et al (1992)
1955	headboat	7,296	264,210	230,337	Ellis et al (1955)
1960	headboat	14,592	232,241	229,771	Moe (1963)
1985	headboat	NA	NA	326,586	Ditton et al (1992)

Table 11. Seasonal allocation of effort by mode.

mode	season	Atlantic	Mixing zone	Gulf
private recreational	fall	1.1%	9.1%	8.8%
private recreational	spring	37.9%	36.7%	33.2%
private recreational	summer	60.0%	36.6%	38.0%
private recreational	winter	1.0%	17.6%	20.0%
charter	fall	7.9%	20.6%	12.4%
charter	spring	34.4%	25.1%	29.0%
charter	summer	49.3%	29.7%	36.4%
charter	winter	8.4%	24.6%	22.2%
shore	fall	11.6%	14.4%	12.0%
shore	spring	29.2%	26.6%	29.1%
shore	summer	53.8%	34.3%	37.6%
shore	winter	5.4%	24.7%	21.2%
headboat	fall	12.3%	14.4%	13.3%
headboat	spring	30.4%	28.4%	28.4%
headboat	summer	53.0%	34.1%	38.5%
headboat	winter	4.3%	23.0%	19.8%

Table 12. Predicted (italics) and estimated (post-1980) Atlantic recreational landings.

Zone	Atlantic															
Mode	*Private boat*				*Shore*				*Charterboat*				*Headboat*			
Method	2	2	1	1	1	1	1	1	3	3	3	3	3	3	3	3
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1900	0	2,114	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1901	0	2,373	2,143	90	0	218	175	18	12	54	68	14	1	3	6	0
1902	0	2,632	4,286	180	0	435	349	35	23	107	137	29	1	7	13	0
1903	0	2,891	6,429	270	0	653	524	53	35	161	205	43	2	10	19	0
1904	0	3,150	8,572	359	0	870	699	70	46	214	273	57	2	13	26	0
1905	0	3,409	10,715	449	0	1,088	873	88	58	268	342	72	3	16	32	0
1906	0	3,668	12,858	539	0	1,305	1,048	105	69	322	410	86	3	20	39	0
1907	0	3,927	15,001	629	0	1,523	1,223	123	81	375	478	100	4	23	45	0
1908	0	4,186	17,144	719	0	1,741	1,397	141	92	429	547	115	4	26	52	0
1909	0	4,445	19,287	809	0	1,958	1,572	158	104	482	615	129	5	29	58	0
1910	0	4,964	21,430	898	0	2,176	1,747	176	115	536	683	143	5	33	65	0
1911	0	5,317	23,573	988	0	2,393	1,921	193	127	590	752	158	6	36	71	1
1912	0	5,671	25,716	1,078	0	2,611	2,096	211	138	643	820	172	6	39	78	1
1913	0	6,024	27,859	1,168	0	2,829	2,271	228	150	697	888	186	7	42	84	1
1914	0	6,378	30,002	1,258	0	3,046	2,445	246	161	750	957	201	7	46	91	1
1915	0	6,732	32,145	1,348	0	3,264	2,620	264	173	804	1,025	215	8	49	97	1
1916	0	7,085	34,288	1,437	0	3,481	2,795	281	184	858	1,093	229	8	52	104	1
1917	0	7,439	36,431	1,527	0	3,699	2,969	299	196	911	1,161	244	9	55	110	1
1918	0	7,792	38,574	1,617	0	3,916	3,144	316	207	965	1,230	258	9	59	117	1
1919	0	8,146	40,717	1,707	0	4,134	3,319	334	219	1,018	1,298	272	10	62	123	1
1920	0	8,853	42,860	1,797	0	4,352	3,493	351	230	1,072	1,366	287	10	65	129	1
1921	0	8,853	45,003	1,887	0	4,569	3,668	369	242	1,126	1,435	301	11	68	136	1
1922	0	8,853	47,146	1,977	0	4,787	3,843	387	253	1,179	1,503	315	11	72	142	1
1923	0	8,853	49,289	2,066	0	5,004	4,017	404	265	1,233	1,571	330	12	75	149	1
1924	0	8,853	51,432	2,156	0	5,222	4,192	422	276	1,286	1,640	344	12	78	155	1
1925	0	8,853	53,575	2,246	0	5,440	4,367	439	288	1,340	1,708	358	13	81	162	1
1926	0	8,853	55,718	2,336	0	5,657	4,541	457	299	1,394	1,776	373	13	85	168	1
1927	0	8,853	57,861	2,426	0	5,875	4,716	474	311	1,447	1,845	387	14	88	175	1
1928	0	8,853	60,005	2,516	0	6,092	4,891	492	322	1,501	1,913	401	14	91	181	1
1929	0	8,853	62,148	2,605	0	6,310	5,065	510	334	1,554	1,981	416	15	94	188	1
1930	0	8,853	64,291	2,695	0	6,527	5,240	527	345	1,608	2,050	430	15	98	194	1
1931	0	9,387	66,434	2,785	0	6,745	5,415	545	357	1,662	2,118	444	16	101	201	2
1932	0	9,920	68,577	2,875	0	6,963	5,589	562	369	1,715	2,186	459	16	104	207	2
1933	0	10,453	70,720	2,965	0	7,180	5,764	580	380	1,769	2,255	473	17	107	214	2
1934	0	10,987	72,863	3,055	0	7,398	5,939	597	392	1,822	2,323	487	17	111	220	2
1935	0	11,520	75,006	3,145	0	7,615	6,113	615	403	1,876	2,391	502	18	114	227	2
1936	0	12,054	77,149	3,234	0	7,833	6,288	633	415	1,930	2,460	516	18	117	233	2
1937	0	12,587	79,292	3,324	0	8,050	6,463	650	426	1,983	2,528	530	19	120	240	2
1938	0	13,121	81,435	3,414	0	8,268	6,637	668	438	2,037	2,596	545	19	124	246	2
1939	0	13,654	83,578	3,504	0	8,486	6,812	685	449	2,090	2,665	559	20	127	252	2
1940	0	1,472	8,572	359	0	870	699	70	46	214	273	57	2	13	26	0
1941	0	1,583	8,786	368	0	892	716	72	47	220	280	59	2	13	27	0
1942	0	1,694	9,001	377	0	914	734	74	48	225	287	60	2	14	27	0
1943	0	1,805	9,215	386	0	936	751	76	50	230	294	62	2	14	28	0
1944	0	1,916	9,429	395	0	957	769	77	51	236	301	63	2	14	28	0
1945	0	2,027	9,644	404	0	979	786	79	52	241	307	64	2	15	29	0
1946	0	21,377	98,579	4,133	0	10,009	8,035	808	530	2,466	3,143	659	24	150	298	2
1947	0	22,486	100,722	4,223	0	10,226	8,209	826	541	2,519	3,211	674	24	153	304	2
1948	0	23,596	102,865	4,312	0	10,444	8,384	843	553	2,573	3,279	688	25	156	311	2
1949	0	24,705	105,008	4,402	0	10,661	8,559	861	564	2,626	3,348	702	25	159	317	2
1950	0	26,924	107,151	4,492	0	10,879	8,733	879	576	2,680	3,416	717	26	163	324	2
1951	0	28,236	109,294	4,582	0	11,097	8,908	896	587	2,734	3,484	731	26	166	330	2
1952	0	29,549	111,437	4,672	0	11,314	9,083	914	599	2,787	3,553	745	27	169	337	3
1953	0	30,861	113,580	4,762	0	11,532	9,257	931	610	2,841	3,621	760	27	173	343	3
1954	0	32,174	115,723	4,852	0	11,749	9,432	949	622	2,894	3,689	774	28	176	350	3
1955	558	33,486	117,866	4,941	0	11,967	9,607	967	633	2,948	3,758	788	28	179	356	3
1956	1,328	34,798	120,009	5,031	0	12,185	9,781	984	633	2,948	3,758	788	28	179	356	3
1957	2,097	36,111	122,152	5,121	0	12,402	9,956	1,002	633	2,948	3,758	788	28	179	356	3
1958	2,866	37,423	124,295	5,211	0	12,620	10,131	1,019	633	2,948	3,758	788	28	179	356	3
1959	3,636	38,736	126,438	5,301	0	12,837	10,305	1,037	633	2,948	3,758	788	28	179	356	3
1960	5,174	41,361	128,581	5,391	0	13,055	10,480	1,054	633	2,948	3,758	788	28	179	356	3
1961	5,504	41,923	130,724	5,480	0	13,272	10,655	1,072	1,284	8,346	11,010	1,946	27	232	478	3
1962	5,834	42,486	132,867	5,570	0	13,490	10,829	1,090	1,935	13,744	18,261	3,104	25	286	599	2
1963	6,163	43,048	135,010	5,660	0	13,708	11,004	1,107	2,585	19,142	25,513	4,262	24	339	721	2
1964	6,493	43,611	137,153	5,750	0	13,925	11,179	1,125	3,236	24,540	32,765	5,420	23	392	843	2
1965	6,823	44,174	139,296	5,840	0	14,143	11,353	1,142	3,886	29,938	40,017	6,578	21	446	964	2
1966	7,153	44,736	141,439	5,930	0	14,360	11,528	1,160	4,537	35,336	47,269	7,736	20	499	1,086	2
1967	7,482	45,299	143,582	6,020	0	14,578	11,703	1,177	5,188	40,734	54,521	8,893	19	553	1,208	2
1968	7,812	45,861	145,725	6,109	0	14,795	11,877	1,195	5,838	46,132	61,772	10,051	17	606	1,329	2
1969	8,142	46,424	147,868	6,199	0	15,013	12,052	1,213	6,489	51,530	69,024	11,209	16	659	1,451	2
1970	8,801	47,549	150,011	6,289	0	15,231	12,227	1,230	7,139	56,929	76,276	12,367	15	713	1,572	1
1971	9,627	48,957	152,154	6,379	0	15,448	12,401	1,248	7,790	62,327	83,528	13,525	13	766	1,694	1
1972	10,452	50,365	154,297	6,469	0	15,666	12,576	1,265	8,441	67,725	90,780	14,683	12	819	1,816	1
1973	11,278	51,774	156,440	6,559	0	15,883	12,751	1,283	9,091	73,123	98,032	15,841	11	873	1,937	1
1974	12,103	53,182	158,583	6,648	0	16,101	12,925	1,300	9,742	78,521	105,283	16,999	9	926	2,059	1
1975	12,929	54,590	160,726	6,738	0	16,319	13,100	1,318	10,393	83,919	112,535	18,157	8	979	2,181	1
1976	13,754	55,999	162,869	6,828	0	16,536	13,275	1,336	11,043	89,317	119,787	19,315	7	1,033	2,302	1
1977	14,579	57,407	165,012	6,918	0	16,754	13,449	1,353	11,694	94,715	127,039	20,472	5	1,086	2,424	1
1978	13,534	55,955	158,322	6,320	0	13,274	12,440	1,371	11,967	97,958	129,040	20,792	4	1,083	2,379	0
1979	12,288	54,367	151,405	5,704	0	9,700	11,400	1,388	12,201	100,969	130,473	21,022	2	1,074	2,317	0
1980	11,366	53,844	144,262	5,071	0	6,031	10,330	1,406	12,395	103,747	131,340	21,163	1	1,060	2,240	0
1981	0	29,670	58,500	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	53,326	84,568	9,826	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	69,306	176,362	0	0	0	0	0	0	0	0	0	0	0	0	0

1984	0	49,192	249,099	3,080	0	0	2,814	0	0	0	0	0	0	0	0	0
1985	5,075	58,514	146,329	7,682	0	0	0	0	0	0	0	0	0	0	0	0
1986	32,745	53,034	243,775	9,227	0	0	23,233	0	2,041	239,389	56,365	4,908	0	568	1,224	0
1987	8,251	114,424	173,786	2,450	0	0	1,570	0	5,096	110,920	72,016	42,231	0	895	2,243	0
1988	5,722	80,375	130,819	4,789	0	3,302	5,171	0	0	56,470	199,847	3,816	0	1,307	1,792	0
1989	9,916	22,517	64,282	769	0	1,474	3,721	0	6,748	49,773	98,734	19,904	0	1,440	877	0
1990	10,576	44,982	87,883	23,286	0	1,558	15,151	642	19,383	22,774	83,575	6,305	0	716	1,301	0
1991	50,908	92,055	104,868	1,426	0	2,080	6,777	0	15,302	55,942	190,286	1,746	0	1,357	3,797	0
1992	5,658	61,162	207,469	3,092	0	1,261	361	0	6,969	87,596	193,033	47,820	0	1,470	3,373	0
1993	2,840	33,115	67,361	0	0	475	1,854	0	16,406	32,416	43,445	6,445	0	1,267	1,495	0
1994	20,976	32,826	58,698	655	0	7,187	1,562	1,672	7,359	34,952	52,194	23,939	0	881	1,404	0
1995	24,090	20,760	47,422	3,492	0	0	2,871	0	24,764	23,111	88,416	5,164	0	825	1,626	0
1996	1,799	30,567	28,612	4,947	0	391	0	0	11,076	40,410	51,613	5,185	0	691	885	0
1997	5,571	22,855	89,125	3,064	0	8,375	324	0	8,844	77,741	142,229	32,959	245	867	2,951	20
1998	11,891	23,595	34,114	2,297	0	73,667	391	0	10,009	58,160	43,006	25,303	261	2,114	1,664	38
1999	14,253	16,645	43,316	1,187	0	0	604	0	7,467	22,949	17,765	6,243	313	956	1,405	5
2000	13,865	62,774	122,470	2,316	0	506	373	0	9,215	16,500	45,860	5,114	496	1,494	3,297	111
2001	9,782	47,682	67,210	2,260	0	290	4,576	0	1,768	35,492	27,477	6,245	215	958	1,492	99
2002	34,273	15,108	29,270	497	0	0	8,554	0	173	7,819	9,194	2,137	228	533	899	2
2003	20,928	30,159	83,466	2,600	0	522	622	0	444	15,968	14,580	1,307	55	642	607	2
2004	15,798	31,267	50,899	2,928	0	0	3,670	0	3,807	21,817	21,392	3,780	972	639	1,092	10
2005	12,148	40,820	86,249	1,216	0	0	0	0	2,130	9,630	32,212	83	753	782	1,268	34
2006	1,910	39,470	63,268	3,293	0	0	0	0	4,745	24,548	8,075	2,157	553	943	1,515	22

Table 13. Predicted (italics) and estimated (post-1980) Mixing zone recreational landings.

Zone	Mixing zone															
Mode	*Private boat*				*Shore*				*Charterboat*				*Headboat*			
Method	1	1	2	1	1	2	1	1	3	3	3	3	3	3	3	3
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1900	0	0	0	0	0	90	0	0	0	0	0	0	0	0	0	0
1901	560	803	0	735	72	92	48	15	333	370	473	597	257	323	517	412
1902	1,120	1,606	0	1,470	144	95	96	29	667	739	947	1,194	515	645	1,034	824
1903	1,680	2,410	0	2,205	216	97	144	44	1,000	1,109	1,420	1,791	772	968	1,551	1,235
1904	2,240	3,213	0	2,940	288	99	193	59	1,334	1,479	1,894	2,388	1,030	1,290	2,068	1,647
1905	2,800	4,016	0	3,675	360	102	241	74	1,667	1,848	2,367	2,985	1,287	1,613	2,585	2,059
1906	3,360	4,819	0	4,410	432	104	289	88	2,001	2,218	2,841	3,582	1,544	1,936	3,102	2,471
1907	3,920	5,622	0	5,145	504	106	337	103	2,334	2,587	3,314	4,179	1,802	2,258	3,619	2,883
1908	4,480	6,426	0	5,880	576	109	385	118	2,668	2,957	3,788	4,776	2,059	2,581	4,136	3,294
1909	5,040	7,229	0	6,615	648	111	433	132	3,001	3,327	4,261	5,373	2,317	2,904	4,654	3,706
1910	5,599	8,032	0	7,350	720	115	482	147	3,335	3,696	4,735	5,970	2,574	3,226	5,171	4,118
1911	6,159	8,835	0	8,086	792	119	530	162	3,668	4,066	5,208	6,567	2,832	3,549	5,688	4,530
1912	6,719	9,639	0	8,821	864	123	578	176	4,002	4,436	5,682	7,164	3,089	3,871	6,205	4,942
1913	7,279	10,442	0	9,556	936	126	626	191	4,335	4,805	6,155	7,761	3,346	4,194	6,722	5,353
1914	7,839	11,245	0	10,291	1,008	130	674	206	4,669	5,175	6,629	8,358	3,604	4,517	7,239	5,765
1915	8,399	12,048	0	11,026	1,080	133	722	221	5,002	5,544	7,102	8,954	3,861	4,839	7,756	6,177
1916	8,959	12,851	0	11,761	1,152	137	771	235	5,336	5,914	7,575	9,551	4,119	5,162	8,273	6,589
1917	9,519	13,655	0	12,496	1,224	140	819	250	5,669	6,284	8,049	10,148	4,376	5,484	8,790	7,000
1918	10,079	14,458	0	13,231	1,296	144	867	265	6,003	6,653	8,522	10,745	4,633	5,807	9,307	7,412
1919	10,639	15,261	0	13,966	1,368	148	915	279	6,336	7,023	8,996	11,342	4,891	6,130	9,824	7,824
1920	11,199	16,064	0	14,701	1,440	155	963	294	6,670	7,393	9,469	11,939	5,148	6,452	10,341	8,236
1921	11,759	16,867	0	15,436	1,512	162	1,011	309	7,003	7,762	9,943	12,536	5,406	6,775	10,858	8,648
1922	12,319	17,671	0	16,171	1,583	170	1,060	324	7,337	8,132	10,416	13,133	5,663	7,097	11,375	9,059
1923	12,879	18,474	0	16,906	1,655	178	1,108	338	7,670	8,501	10,890	13,730	5,921	7,420	11,892	9,471
1924	13,439	19,277	0	17,641	1,727	186	1,156	353	8,004	8,871	11,363	14,327	6,178	7,743	12,409	9,883
1925	13,999	20,080	0	18,376	1,799	194	1,204	368	8,337	9,241	11,837	14,924	6,435	8,065	12,926	10,295
1926	14,559	20,883	0	19,111	1,871	202	1,252	382	8,671	9,610	12,310	15,521	6,693	8,388	13,444	10,707
1927	15,119	21,687	0	19,846	1,943	209	1,300	397	9,004	9,980	12,784	16,118	6,950	8,711	13,961	11,118
1928	15,678	22,490	0	20,581	2,015	217	1,349	412	9,338	10,350	13,257	16,715	7,208	9,033	14,478	11,530
1929	16,238	23,293	0	21,316	2,087	225	1,397	426	9,671	10,719	13,730	17,312	7,465	9,356	14,995	11,942
1930	16,798	24,096	0	22,051	2,159	241	1,445	441	10,005	11,089	14,204	17,909	7,722	9,678	15,512	12,354
1931	17,358	24,899	0	22,786	2,231	249	1,493	456	10,338	11,458	14,677	18,506	7,980	10,001	16,029	12,766
1932	17,918	25,703	0	23,522	2,303	258	1,541	471	10,672	11,828	15,151	19,103	8,237	10,324	16,546	13,177
1933	18,478	26,506	0	24,257	2,375	267	1,589	485	11,005	12,198	15,624	19,700	8,495	10,646	17,063	13,589
1934	19,038	27,309	0	24,992	2,447	276	1,638	500	11,339	12,567	16,098	20,297	8,752	10,969	17,580	14,001
1935	19,598	28,112	0	25,727	2,519	285	1,686	515	11,672	12,937	16,571	20,894	9,009	11,291	18,097	14,413
1936	20,158	28,916	0	26,462	2,591	294	1,734	529	12,006	13,307	17,045	21,491	9,267	11,614	18,614	14,825
1937	20,718	29,719	0	27,197	2,663	302	1,782	544	12,339	13,676	17,518	22,088	9,524	11,937	19,131	15,236
1938	21,278	30,522	0	27,932	2,735	311	1,830	559	12,673	14,046	17,992	22,685	9,782	12,259	19,648	15,648
1939	21,838	31,325	0	28,667	2,807	320	1,878	573	13,006	14,415	18,465	23,282	10,039	12,582	20,165	16,060
1940	2,240	3,213	0	2,940	288	34	193	59	1,334	1,479	1,894	2,388	1,030	1,290	2,068	1,647
1941	2,296	3,293	0	3,014	295	35	197	60	1,367	1,515	1,941	2,448	1,055	1,323	2,120	1,688
1942	2,352	3,373	0	3,087	302	37	202	62	1,401	1,552	1,989	2,507	1,081	1,355	2,172	1,730
1943	2,408	3,454	0	3,161	309	39	207	63	1,434	1,589	2,036	2,567	1,107	1,387	2,223	1,771
1944	2,464	3,534	0	3,234	317	40	212	65	1,467	1,626	2,083	2,627	1,133	1,419	2,275	1,812
1945	2,520	3,614	0	3,308	324	42	217	66	1,501	1,663	2,131	2,686	1,158	1,452	2,327	1,853
1946	25,758	36,948	0	33,812	3,311	434	2,215	676	15,340	17,003	21,779	27,460	11,841	14,840	23,785	18,942
1947	26,317	37,751	0	34,547	3,383	450	2,264	691	15,674	17,372	22,253	28,057	12,098	15,163	24,302	19,354
1948	26,877	38,554	0	35,282	3,455	467	2,312	706	16,007	17,742	22,726	28,654	12,356	15,485	24,819	19,766
1949	27,437	39,357	0	36,017	3,527	483	2,360	721	16,341	18,112	23,200	29,251	12,613	15,808	25,336	20,178
1950	27,997	40,160	0	36,752	3,599	515	2,408	735	16,674	18,481	23,673	29,848	12,871	16,131	25,853	20,590
1951	28,557	40,964	0	37,487	3,671	555	2,456	750	17,008	18,851	24,147	30,445	13,128	16,453	26,370	21,001
1952	29,117	41,767	0	38,222	3,743	596	2,504	765	17,341	19,221	24,620	31,042	13,386	16,776	26,887	21,413
1953	29,677	42,570	0	38,957	3,815	637	2,553	779	17,675	19,590	25,094	31,639	13,643	17,098	27,404	21,825
1954	30,237	43,373	716	39,693	3,887	677	2,601	794	18,008	19,960	25,567	32,236	13,900	17,421	27,921	22,237
1955	30,797	44,177	4,238	40,428	3,959	718	2,649	809	18,342	20,329	26,041	32,833	14,158	17,744	28,438	22,649
1956	31,357	44,980	7,760	41,163	4,031	758	2,697	823	18,342	20,329	26,041	32,833	14,158	17,744	28,438	22,649
1957	31,917	45,783	11,282	41,898	4,103	799	2,745	838	18,342	20,329	26,041	32,833	14,158	17,744	28,438	22,649
1958	32,477	46,586	14,805	42,633	4,175	839	2,793	853	18,342	20,329	26,041	32,833	14,158	17,744	28,438	22,649

1959	33,037	47,389	18,327	43,368	4,247	880	2,842	868	18,342	20,329	26,041	32,833	14,158	17,744	28,438	22,649
1960	33,597	48,193	25,371	44,103	4,319	961	2,890	882	18,342	20,329	26,041	32,833	14,158	17,744	28,438	22,649
1961	34,157	48,996	28,494	44,838	4,391	997	2,938	897	20,493	20,878	27,967	33,016	14,039	17,679	28,273	22,461
1962	34,717	49,799	31,616	45,573	4,463	1,033	2,986	912	22,644	21,426	29,893	33,200	13,919	17,615	28,109	22,273
1963	35,277	50,602	34,739	46,308	4,535	1,069	3,034	926	24,796	21,974	31,820	33,383	13,800	17,550	27,944	22,086
1964	35,837	51,405	37,861	47,043	4,606	1,105	3,082	941	26,947	22,522	33,746	33,566	13,681	17,485	27,779	21,898
1965	36,397	52,209	40,984	47,778	4,678	1,141	3,131	956	29,098	23,070	35,673	33,750	13,562	17,421	27,614	21,710
1966	36,956	53,012	44,106	48,513	4,750	1,177	3,179	971	31,249	23,618	37,599	33,933	13,443	17,356	27,450	21,523
1967	37,516	53,815	47,229	49,248	4,822	1,213	3,227	985	33,401	24,166	39,525	34,116	13,324	17,292	27,285	21,335
1968	38,076	54,618	50,351	49,983	4,894	1,249	3,275	1,000	35,552	24,714	41,452	34,300	13,204	17,227	27,120	21,148
1969	38,636	55,421	53,474	50,718	4,966	1,285	3,323	1,015	37,703	25,262	43,378	34,483	13,085	17,163	26,955	20,960
1970	39,196	56,225	59,719	51,453	5,038	1,357	3,371	1,029	39,854	25,810	45,305	34,666	12,966	17,098	26,791	20,772
1971	39,756	57,028	63,780	52,188	5,110	1,404	3,420	1,044	42,006	26,358	47,231	34,850	12,847	17,033	26,626	20,585
1972	40,316	57,831	67,841	52,923	5,182	1,450	3,468	1,059	44,157	26,906	49,157	35,033	12,728	16,969	26,461	20,397
1973	40,876	58,634	71,902	53,658	5,254	1,497	3,516	1,073	46,308	27,454	51,084	35,216	12,609	16,904	26,296	20,209
1974	41,436	59,437	75,963	54,393	5,326	1,544	3,564	1,088	48,459	28,002	53,010	35,400	12,490	16,840	26,132	20,022
1975	41,996	60,241	80,024	55,129	5,398	1,591	3,612	1,103	50,611	28,550	54,936	35,583	12,370	16,775	25,967	19,834
1976	42,556	61,044	84,085	55,864	5,470	1,637	3,660	1,118	52,762	29,098	56,863	35,766	12,251	16,711	25,802	19,646
1977	43,116	61,847	88,146	56,599	5,542	1,684	3,708	1,132	54,913	29,646	58,789	35,950	12,132	16,646	25,637	19,459
1978	36,037	56,877	90,416	49,123	5,388	1,710	3,442	1,114	52,070	28,164	55,809	33,097	11,333	15,900	23,831	18,172
1979	28,762	51,759	92,530	41,437	5,229	1,735	3,167	1,094	48,851	26,608	52,517	30,213	10,547	15,159	22,046	16,906
1980	21,291	46,494	98,309	33,540	5,063	1,804	2,884	1,074	45,255	24,978	48,913	27,298	9,774	14,423	20,282	15,662
1981	13,098	113,460	28,263	122,156	0	0	0	0	0	0	0	0	0	0	0	0
1982	5,314	52,940	202,943	5,960	0	0	0	0	0	0	0	0	0	0	0	0
1983	7,130	26,817	146,772	3,302	0	0	0	0	0	0	0	0	0	0	0	0
1984	57,052	22,987	84,040	21,717	0	0	0	0	0	0	0	0	0	0	0	0
1985	2,534	10,192	48,818	5,433	0	0	0	0	0	0	0	0	0	0	0	0
1986	23,535	37,544	68,712	24,782	0	0	0	0	6,378	8,815	2,605	1,002	4,659	11,587	14,808	3,770
1987	19,031	31,148	19,318	51,946	0	0	0	0	12,719	15,507	15,920	11,948	3,971	15,885	10,405	30,634
1988	46,859	20,929	70,703	4,784	0	0	0	0	37,047	11,382	6,236	2,078	1,703	10,106	8,867	480
1989	20,837	40,896	43,483	31,446	0	0	0	0	6,252	11,841	27,315	5,543	7,286	6,820	14,885	2,746
1990	66,279	43,947	58,589	15,073	27,731	0	6,459	0	7,428	7,562	36,147	25,925	11,062	13,318	12,530	10,575
1991	16,014	38,973	116,750	49,434	0	3,243	0	0	4,004	10,358	17,916	21,146	10,390	12,369	23,773	7,425
1992	18,090	25,243	94,934	19,094	1,113	0	0	0	45,659	5,841	22,348	21,293	6,246	6,943	11,389	5,994
1993	20,130	32,037	59,187	38,814	830	0	721	1,222	22,548	17,108	35,527	105,722	7,191	5,819	13,076	11,705
1994	13,317	30,140	46,589	21,719	0	0	0	685	43,363	36,155	50,030	94,300	5,482	9,349	13,456	10,956
1995	32,099	81,295	48,339	29,225	888	635	0	635	21,838	63,702	98,583	153,831	3,636	7,786	8,471	9,717
1996	25,321	51,628	61,742	19,164	0	1,423	0	0	39,987	62,298	52,525	109,843	12,282	9,635	20,396	7,274
1997	45,159	62,512	47,856	62,535	0	1,138	0	0	51,091	41,729	51,615	116,020	9,234	8,524	6,101	11,141
1998	35,576	75,325	46,726	32,720	1,304	0	0	0	13,880	50,747	38,761	89,313	5,790	5,046	7,232	10,765
1999	11,464	77,327	64,152	40,147	0	0	2,276	526	33,240	40,442	25,377	37,585	5,705	3,757	13,586	3,485
2000	7,408	63,720	126,504	35,340	0	0	1,529	0	10,170	24,377	38,571	18,525	4,084	5,655	8,984	7,062
2001	9,354	69,820	41,160	27,262	0	0	0	0	8,376	16,853	28,044	36,220	2,017	3,676	6,114	5,025
2002	55,974	64,473	53,652	19,469	5,891	4,838	2,421	0	7,380	23,714	22,867	31,281	2,161	3,693	6,315	2,317
2003	24,523	112,830	100,206	104,598	0	0	1,052	0	17,325	36,808	19,854	53,772	3,036	1,721	6,072	2,841
2004	16,676	52,461	96,231	31,686	0	0	0	1,815	9,558	38,002	21,604	21,311	3,592	3,762	7,157	3,006
2005	21,167	51,402	60,898	28,360	884	0	2,145	1,360	12,486	37,267	30,646	32,915	6,460	7,089	11,762	9,555
2006	36,836	103,152	97,802	46,469	4,086	1,381	9,104	0	10,312	29,993	31,896	24,538	3,127	4,938	9,474	10,812

Table 14. Predicted (italics) and estimated (post-1980) Gulf recreational landings.

Zone	Gulf															
Mode	*Private boat*				*Shore*				*Charter boat*				*Headboat*			
Method	2	2	2	2	1	1	1	1	3	3	3	3	3	3	3	3
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1930	0	0	53,269	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	54,499	0	51	894	1,445	106	86	526	720	160	12	33	62	7
1932	0	0	55,729	0	101	1,788	2,891	213	172	1,052	1,439	319	25	66	125	14
1933	0	0	56,958	0	152	2,682	4,336	319	258	1,578	2,159	479	37	99	187	21
1934	0	0	58,188	0	202	3,576	5,781	426	344	2,104	2,878	638	49	132	249	28
1935	0	0	59,418	0	253	4,470	7,227	532	430	2,631	3,598	798	62	165	311	35
1936	0	0	60,648	0	303	5,364	8,672	639	516	3,157	4,318	957	74	198	374	42
1937	0	0	61,877	0	354	6,259	10,118	745	602	3,683	5,037	1,117	86	231	436	49
1938	0	0	63,107	0	405	7,153	11,563	852	689	4,209	5,757	1,277	98	264	498	55
1939	0	0	64,337	0	455	8,047	13,008	958	775	4,735	6,477	1,436	111	297	560	62
1940	0	0	6,680	0	51	894	1,445	106	86	526	720	160	12	33	62	7
1941	0	0	6,998	0	56	983	1,590	117	95	579	792	176	14	36	69	8
1942	0	0	7,315	0	61	1,073	1,734	128	103	631	864	191	15	40	75	8
1943	0	0	7,633	0	66	1,162	1,879	138	112	684	936	207	16	43	81	9
1944	0	0	7,951	0	71	1,252	2,024	149	120	737	1,007	223	17	46	87	10
1945	0	0	8,269	0	76	1,341	2,168	160	129	789	1,079	239	18	50	93	10
1946	0	0	85,872	0	809	14,305	23,126	1,703	1,377	8,418	11,514	2,553	197	529	996	111
1947	0	0	89,051	0	860	15,199	24,571	1,809	1,463	8,944	12,234	2,713	209	562	1,059	118
1948	0	0	92,231	0	910	16,093	26,016	1,916	1,549	9,470	12,953	2,872	222	595	1,121	125
1949	0	0	95,410	0	961	16,987	27,462	2,022	1,635	9,996	13,673	3,032	234	628	1,183	132
1950	0	0	101,769	0	1,011	17,881	28,907	2,129	1,721	10,522	14,392	3,192	246	661	1,246	139
1951	0	0	106,886	0	1,062	18,776	30,353	2,235	1,807	11,048	15,112	3,351	258	694	1,308	146
1952	0	0	112,003	0	1,113	19,670	31,798	2,342	1,894	11,574	15,832	3,511	271	727	1,370	153
1953	0	0	117,120	0	1,163	20,564	33,243	2,448	1,980	12,100	16,551	3,670	283	760	1,432	160
1954	0	0	122,238	0	1,214	21,458	34,689	2,555	2,066	12,627	17,271	3,830	295	793	1,495	166
1955	0	0	127,355	0	1,264	22,352	36,134	2,661	2,152	13,153	17,991	3,990	308	826	1,557	173
1956	0	0	132,472	0	1,315	23,246	37,579	2,767	2,152	13,153	17,991	3,990	308	826	1,557	173
1957	0	0	137,589	0	1,365	24,140	39,025	2,874	2,152	13,153	17,991	3,990	308	826	1,557	173
1958	0	0	142,706	0	1,416	25,034	40,470	2,980	2,152	13,153	17,991	3,990	308	826	1,557	173
1959	0	0	147,824	0	1,467	25,928	41,915	3,087	2,152	13,153	17,991	3,990	308	826	1,557	173
1960	0	0	158,058	0	1,517	26,822	43,361	3,193	2,152	13,153	17,991	3,990	308	826	1,557	173
1961	0	0	161,309	0	1,568	27,716	44,806	3,300	2,420	14,330	20,871	4,245	317	850	1,602	177
1962	0	0	164,561	0	1,618	28,610	46,251	3,406	2,688	15,506	23,752	4,500	327	874	1,647	180
1963	298	0	167,812	358	1,669	29,504	47,697	3,513	2,956	16,683	26,633	4,755	336	897	1,693	184
1964	910	0	171,063	731	1,719	30,398	49,142	3,619	3,224	17,860	29,514	5,010	346	921	1,738	187
1965	1,523	238	174,314	1,104	1,770	31,293	50,588	3,725	3,492	19,037	32,394	5,265	355	945	1,783	191

1966	2,136	1,802	177,565	1,477	1,821	32,187	52,033	3,832	3,760	20,214	35,275	5,520	365	969	1,829	194
1967	2,748	3,367	180,817	1,850	1,871	33,081	53,478	3,938	4,029	21,391	38,156	5,775	374	993	1,874	198
1968	3,361	4,931	184,068	2,223	1,922	33,975	54,924	4,045	4,297	22,568	41,037	6,030	384	1,016	1,919	201
1969	3,973	6,495	187,319	2,596	1,972	34,869	56,369	4,151	4,565	23,745	43,917	6,285	393	1,040	1,964	204
1970	5,199	9,624	193,821	3,341	2,023	35,763	57,814	4,258	4,833	24,922	46,798	6,540	403	1,064	2,010	208
1971	6,334	12,524	199,847	4,032	2,073	36,657	59,260	4,364	5,101	26,099	49,679	6,795	412	1,088	2,055	211
1972	7,469	15,423	205,872	4,723	2,124	37,551	60,705	4,470	5,369	27,276	52,560	7,050	421	1,112	2,100	215
1973	8,605	18,322	211,897	5,414	2,174	38,445	62,150	4,577	5,637	28,453	55,440	7,305	431	1,135	2,145	218
1974	9,740	21,221	217,922	6,105	2,225	39,339	63,596	4,683	5,905	29,630	58,321	7,560	440	1,159	2,191	222
1975	10,875	24,121	223,947	6,796	2,276	40,233	65,041	4,790	6,173	30,807	61,202	7,815	450	1,183	2,236	225
1976	12,010	27,020	229,972	7,487	2,326	41,127	66,486	4,896	6,441	31,983	64,083	8,070	459	1,207	2,281	229
1977	13,146	29,919	235,998	8,178	2,377	42,021	67,932	5,003	6,710	33,160	66,964	8,325	469	1,230	2,327	232
1978	12,752	26,799	234,624	7,274	2,427	38,153	56,328	4,499	6,616	31,990	66,836	7,993	429	1,136	2,196	221
1979	12,115	22,614	232,882	6,122	2,478	34,085	44,180	3,971	6,495	30,658	66,461	7,627	387	1,037	2,058	210
1980	12,006	18,670	236,244	5,039	2,528	29,820	31,489	3,417	6,345	29,166	65,838	7,226	343	933	1,914	198
1981	0	0	45,139	0	0	428	4,550	0	0	0	0	0	0	0	0	0
1982	9,000	20,501	611,155	2,598	0	4,712	18,329	0	0	0	0	0	0	0	0	0
1983	0	6,051	167,224	1,743	0	0	30,065	0	0	0	0	0	0	0	0	0
1984	2,804	322	241,284	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	15,333	51,429	12,288	0	0	0	0	0	0	0	0	0	0	0	0
1986	1,067	7,359	78,787	1,343	5,863	0	0	0	1,301	5,065	22,985	311	38	164	514	13
1987	17,149	99,286	89,728	1,185	0	28,894	13,930	0	0	25,139	47,977	933	46	305	1,234	20
1988	0	8,852	180,618	859	0	1,221	22,618	0	0	551	77,811	0	5	1	1,350	0
1989	41,327	18,305	107,534	2,596	0	0	9,868	0	4,005	18,247	32,771	502	52	102	493	17
1990	0	58,697	74,426	20,899	0	43,424	45,004	1,695	0	21,136	45,557	10,363	30	414	569	596
1991	1,373	20,368	204,088	5,346	0	17,046	109,640	0	0	32,251	77,699	3,672	34	109	2,654	2
1992	5,161	38,987	101,728	4,587	0	37,399	15,454	0	37	8,402	41,979	1,417	12	263	2,193	7
1993	8,274	30,247	107,349	1,569	0	24,021	37,722	0	16,266	38,061	35,028	15,401	130	700	2,302	98
1994	14,281	44,223	68,662	11,551	0	14,047	50,337	2,399	4,200	39,648	70,144	14,423	152	1,429	2,694	425
1995	2,432	69,368	29,192	26,688	0	9,218	6,054	340	5,668	58,779	32,009	27,808	8	1,311	1,637	13
1996	5,182	44,535	50,886	17,110	0	3,564	2,228	2,245	0	126,767	66,119	357	642	1,086	1,625	4
1997	6,494	42,739	93,619	9,534	0	1,297	8,007	4,920	5,550	56,924	57,111	13,686	371	875	1,975	54
1998	15,795	31,194	35,661	5,272	0	0	5,200	0	11,003	27,551	44,645	9,077	185	682	1,401	70
1999	19,507	53,098	23,463	14,409	0	17,151	7,064	512	9,150	24,576	38,448	15,507	146	904	1,782	25
2000	47,222	39,115	68,443	11,455	0	3,283	28,232	517	5,043	51,078	50,239	7,276	57	1,112	1,135	56
2001	30,537	32,109	58,520	16,737	1,817	12,096	35,547	2,411	6,943	23,599	39,068	2,724	449	576	556	23
2002	3,285	66,147	71,128	9,800	3,943	33,079	12,235	834	2,471	28,001	40,944	7,215	54	736	929	23
2003	18,943	43,941	82,022	7,122	7,322	4,568	19,995	0	1,286	28,211	25,346	5,876	127	524	920	69
2004	15,159	68,583	70,216	9,734	0	7,028	13,062	0	6,515	25,240	29,561	6,530	59	495	576	31
2005	7,353	56,196	45,939	5,958	0	27,763	3,961	6,535	409	28,205	14,084	3,291	16	552	384	16
2006	9,778	108,165	111,482	8,436	0	37,662	27,021	12,698	7,652	37,620	52,575	10,107	125	618	1,253	21

Table 15. Predicted (italics) and estimated (post-1980) Texas recreational landings

Zone	Texas															
Mode	*Private boat*				*Shore*				*Charter boat*				*Headboat*			
Method	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	95	469	1	0	0	11	0	0	23	275	0	3	38	121	18
1932	1	189	938	1	0	0	22	0	0	46	550	0	5	75	242	35
1933	1	284	1,408	2	0	0	33	0	1	69	825	0	8	113	364	53
1934	1	378	1,877	3	0	0	44	0	1	93	1,100	0	10	151	485	70
1935	2	473	2,346	3	0	0	55	0	1	116	1,375	0	13	188	606	88
1936	2	567	2,815	4	0	0	66	0	1	139	1,650	0	16	226	727	105
1937	2	662	3,285	5	0	0	77	0	2	162	1,925	0	18	264	848	123
1938	2	756	3,754	5	0	0	89	0	2	185	2,201	0	21	301	970	140
1939	3	851	4,223	6	0	0	100	0	2	208	2,476	0	23	339	1,091	158
1940	0	95	469	1	0	0	11	0	0	23	275	0	3	38	121	18
1941	0	104	516	1	0	0	12	0	0	25	303	0	3	41	133	19
1942	0	113	563	1	0	0	13	0	0	28	330	0	3	45	145	21
1943	0	123	610	1	0	0	14	0	0	30	358	0	3	49	158	23
1944	0	132	657	1	0	0	15	0	0	32	385	0	4	53	170	25
1945	0	142	704	1	0	0	17	0	0	35	413	0	4	56	182	26
1946	5	1,512	7,508	11	0	0	177	0	4	371	4,401	0	41	602	1,939	280
1947	5	1,607	7,977	12	0	0	188	0	4	394	4,676	0	44	640	2,060	298
1948	5	1,702	8,446	12	0	0	199	0	4	417	4,951	0	47	678	2,182	315
1949	6	1,796	8,915	13	0	0	210	0	4	440	5,226	0	49	715	2,303	333
1950	6	1,891	9,385	14	0	0	221	0	5	463	5,501	0	52	753	2,424	350
1951	6	1,985	9,854	14	0	0	232	0	5	486	5,776	0	54	791	2,545	368
1952	7	2,080	10,323	15	0	0	244	0	5	510	6,052	0	57	828	2,666	385
1953	7	2,174	10,792	16	0	0	255	0	5	533	6,327	0	59	866	2,788	403
1954	7	2,269	11,261	16	0	0	266	0	6	556	6,602	0	62	904	2,909	420
1955	8	2,363	11,731	17	0	0	277	0	6	579	6,877	0	65	941	3,030	438
1956	8	2,458	12,200	18	0	0	288	0	6	602	7,152	0	67	979	3,151	455
1957	8	2,552	12,669	18	0	0	299	0	6	625	7,427	0	70	1,016	3,272	473
1958	8	2,647	13,138	19	0	0	310	0	6	649	7,702	0	72	1,054	3,393	490
1959	9	2,741	13,608	20	0	0	321	0	7	672	7,977	0	75	1,092	3,515	508
1960	9	2,836	14,077	20	0	0	332	0	7	695	8,252	0	78	1,129	3,636	525
1961	9	2,930	14,546	21	0	0	343	0	7	718	8,527	0	80	1,167	3,757	543
1962	10	3,025	15,015	22	0	0	354	0	7	741	8,802	0	83	1,205	3,878	560
1963	10	3,119	15,485	22	0	0	365	0	8	764	9,077	0	85	1,242	3,999	578
1964	10	3,214	15,954	23	0	0	376	0	8	788	9,352	0	88	1,280	4,121	595
1965	11	3,309	16,423	24	0	0	387	0	8	811	9,627	0	91	1,318	4,242	613
1966	11	3,403	16,892	24	0	0	399	0	8	834	9,903	0	93	1,355	4,363	630
1967	11	3,498	17,361	25	0	0	410	0	9	857	10,178	0	96	1,393	4,484	648
1968	12	3,592	17,831	26	0	0	421	0	9	880	10,453	0	98	1,431	4,605	666
1969	12	3,687	18,300	26	0	0	432	0	9	903	10,728	0	101	1,468	4,727	683
1970	12	3,781	18,769	27	0	0	443	0	9	927	11,003	0	103	1,506	4,848	701

1971	12	3,876	19,238	28	0	0	454	0	9	950	11,278	0	106	1,544	4,969	718
1972	13	3,970	19,708	28	0	0	465	0	10	973	11,553	0	109	1,581	5,090	736
1973	13	4,065	20,177	29	0	0	476	0	10	996	11,828	0	111	1,619	5,211	753
1974	13	4,159	20,646	30	0	0	487	0	10	1,019	12,103	0	114	1,656	5,333	771
1975	14	4,254	21,115	30	0	0	498	0	10	1,042	12,378	0	116	1,694	5,454	788
1976	14	4,348	21,584	31	0	0	509	0	11	1,066	12,653	0	119	1,732	5,575	806
1977	14	4,443	22,054	32	0	0	520	0	11	1,089	12,928	0	122	1,769	5,696	823
1978	15	4,537	22,523	33	0	0	531	0	11	1,112	13,203	0	124	1,807	5,817	841
1979	15	4,632	22,992	33	0	0	542	0	11	1,135	13,478	0	127	1,845	5,939	858
1980	15	4,726	23,461	34	0	0	554	0	12	1,158	13,754	0	129	1,882	6,060	876
1981	0	4,913	24,387	0	0	0	0	0	0	2,151	25,548	0	0	1,920	6,181	0
1982	0	4,867	24,159	0	0	0	0	0	0	1,670	19,825	0	0	1,920	6,181	0
1983	0	2,633	24,197	0	0	0	1,995	0	0	1,125	15,020	0	0	1,920	6,181	0
1984	0	4,390	27,931	0	0	0	0	0	0	375	6,201	0	0	1,920	6,181	0
1985	0	7,302	18,979	0	0	0	828	0	0	586	3,549	0	0	1,920	6,181	0
1986	0	3,792	12,002	0	0	0	0	0	0	804	947	0	0	2,616	5,489	0
1987	0	3,352	10,169	0	0	0	0	0	0	498	4,591	0	0	1,739	6,299	0
1988	0	1,976	8,683	0	0	0	0	0	0	399	4,245	0	0	1,383	6,744	0
1989	0	1,108	7,821	0	0	0	0	0	0	210	1,142	0	0	1,214	8,578	0
1990	45	1,661	9,099	0	0	0	0	0	0	1,134	2,035	0	0	1,124	8,522	0
1991	0	792	19,482	0	0	0	0	0	0	540	1,244	0	0	444	9,617	0
1992	0	4,174	15,795	0	0	0	0	0	0	55	321	0	0	3,045	12,408	0
1993	0	1,023	11,837	0	0	0	0	0	0	399	1,797	0	0	2,454	9,569	0
1994	25	3,577	12,302	0	0	0	0	0	69	593	2,195	0	0	4,541	10,174	0
1995	0	3,004	25,668	0	0	0	0	0	0	243	1,150	0	0	5,028	13,730	0
1996	21	7,856	23,625	0	0	0	0	0	0	426	4,371	0	0	4,087	12,376	0
1997	0	5,837	23,596	91	0	0	0	0	0	1,163	4,254	0	278	4,581	11,649	1,675
1998	0	830	16,400	136	0	0	0	0	0	3,003	8,651	0	498	3,440	7,425	957
1999	0	3,212	18,646	0	0	0	0	0	0	1,833	8,080	0	455	3,636	11,880	586
2000	0	1,336	14,409	0	0	0	0	0	0	71	2,742	0	605	2,708	8,563	1,993
2001	0	3,999	6,899	0	0	0	0	0	0	434	3,302	0	252	1,855	8,878	656
2002	0	3,273	8,399	0	0	0	0	0	0	761	3,127	0	886	2,661	8,838	526
2003	0	8,574	5,936	0	0	0	0	0	0	571	3,466	0	679	6,580	8,724	3,918
2004	78	3,386	10,357	0	0	0	0	0	0	296	826	0	328	1,871	12,902	1,236
2005	450	2,547	10,178	0	0	0	0	0	0	119	1,015	0	367	4,331	10,940	2,013
2006	0	9,896	14,797	66	0	0	0	0	0	412	3,349	0	932	5,857	9,773	5,132

Table 16. Predicted (italics) and estimated (post-1980) Atlantic recreational effort.

Zone	Atlantic															
Mode	*Private boat*				*Shore*				*Charter boat*				*Headboat*			
Method	2	2	1	1	1	1	1	1	3	3	3	3	3	3	3	3
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1900	0	38,623	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1901	0	43,356	25,570	2,725	6,441	20,899	36,091	6,706	8	92	95	18	2	75	119	2
1902	0	48,089	51,140	5,450	12,881	41,797	72,181	13,412	16	184	190	36	4	151	239	4
1903	0	52,821	76,709	8,175	19,322	62,696	108,272	20,118	23	275	286	55	6	226	358	6
1904	0	57,554	102,279	10,899	25,763	83,594	144,362	26,824	31	367	381	73	9	302	477	8
1905	0	62,287	127,849	13,624	32,203	104,493	180,453	33,530	39	459	476	91	11	377	597	10
1906	0	67,019	153,419	16,349	38,644	125,392	216,543	40,236	47	551	571	109	13	453	716	12
1907	0	71,752	178,989	19,074	45,085	146,290	252,634	46,941	54	642	667	127	15	528	835	14
1908	0	76,485	204,558	21,799	51,525	167,189	288,724	53,647	62	734	762	146	17	604	955	16
1909	0	81,217	230,128	24,524	57,966	188,088	324,815	60,353	70	826	857	164	19	679	1,074	18
1910	0	90,683	255,698	27,249	64,407	208,986	360,906	67,059	78	918	952	182	22	754	1,193	20
1911	0	97,143	281,268	29,973	70,847	229,885	396,996	73,765	86	1,010	1,048	200	24	830	1,313	22
1912	0	103,603	306,838	32,698	77,288	250,783	433,087	80,471	93	1,101	1,143	218	26	905	1,432	24
1913	0	110,064	332,407	35,423	83,729	271,682	469,177	87,177	101	1,193	1,238	237	28	981	1,551	26
1914	0	116,524	357,977	38,148	90,169	292,581	505,268	93,883	109	1,285	1,333	255	30	1,056	1,671	28
1915	0	122,985	383,547	40,873	96,610	313,479	541,358	100,589	117	1,377	1,429	273	32	1,132	1,790	31
1916	0	129,445	409,117	43,598	103,051	334,378	577,449	107,295	124	1,469	1,524	291	35	1,207	1,909	33
1917	0	135,905	434,687	46,323	109,491	355,276	613,539	114,001	132	1,560	1,619	310	37	1,283	2,029	35
1918	0	142,366	460,256	49,048	115,932	376,175	649,630	120,707	140	1,652	1,714	328	39	1,358	2,148	37
1919	0	148,826	485,826	51,772	122,373	397,074	685,721	127,413	148	1,744	1,809	346	41	1,433	2,267	39
1920	0	161,747	511,396	54,497	128,813	417,972	721,811	134,119	155	1,836	1,905	364	43	1,509	2,387	41
1921	0	161,747	536,966	57,222	135,254	438,871	757,902	140,824	163	1,927	2,000	382	45	1,584	2,506	43
1922	0	161,747	562,536	59,947	141,695	459,769	793,992	147,530	171	2,019	2,095	401	48	1,660	2,625	45
1923	0	161,747	588,106	62,672	148,135	480,668	830,083	154,236	179	2,111	2,190	419	50	1,735	2,745	47
1924	0	161,747	613,675	65,397	154,576	501,567	866,173	160,942	187	2,203	2,286	437	52	1,811	2,864	49
1925	0	161,747	639,245	68,122	161,017	522,465	902,264	167,648	194	2,295	2,381	455	54	1,886	2,983	51
1926	0	161,747	664,815	70,846	167,457	543,364	938,355	174,354	202	2,386	2,476	473	56	1,962	3,103	53
1927	0	161,747	690,385	73,571	173,898	564,263	974,445	181,060	210	2,478	2,571	492	58	2,037	3,222	55
1928	0	161,747	715,955	76,296	180,339	585,161	1,010,536	187,766	218	2,570	2,667	510	61	2,112	3,341	57
1929	0	161,747	741,524	79,021	186,779	606,060	1,046,626	194,472	225	2,662	2,762	528	63	2,188	3,461	59
1930	0	161,747	767,094	81,746	193,220	626,958	1,082,717	201,178	233	2,754	2,857	546	65	2,263	3,580	61
1931	0	171,493	792,664	84,471	199,661	647,857	1,118,807	207,884	241	2,845	2,952	564	67	2,339	3,699	63
1932	0	181,238	818,234	87,196	206,101	668,756	1,154,898	214,590	249	2,937	3,048	583	69	2,414	3,819	65
1933	0	190,984	843,804	89,920	212,542	689,654	1,190,988	221,296	257	3,029	3,143	601	71	2,490	3,938	67
1934	0	200,729	869,373	92,645	218,983	710,553	1,227,079	228,002	264	3,121	3,238	619	74	2,565	4,057	69
1935	0	210,475	894,943	95,370	225,423	731,451	1,263,170	234,707	272	3,212	3,333	637	76	2,641	4,177	71
1936	0	220,221	920,513	98,095	231,864	752,350	1,299,260	241,413	280	3,304	3,428	655	78	2,716	4,296	73
1937	0	229,966	946,083	100,820	238,305	773,249	1,335,351	248,119	288	3,396	3,524	674	80	2,791	4,415	75
1938	0	239,712	971,653	103,545	244,745	794,147	1,371,441	254,825	295	3,488	3,619	692	82	2,867	4,535	77
1939	0	249,457	997,222	106,270	251,186	815,046	1,407,532	261,531	303	3,580	3,714	710	84	2,942	4,654	79
1940	0	26,895	102,279	10,899	25,763	83,594	144,362	26,824	31	367	381	73	9	302	477	8
1941	0	28,922	104,836	11,172	26,407	85,684	147,971	27,494	32	376	390	75	9	309	489	8
1942	0	30,948	107,393	11,444	27,051	87,774	151,580	28,165	33	385	400	76	9	317	501	9
1943	0	32,975	109,950	11,717	27,695	89,864	155,189	28,835	33	395	410	78	9	324	513	9
1944	0	35,002	112,507	11,989	28,339	91,954	158,798	29,506	34	404	419	80	10	332	525	9
1945	0	37,029	115,064	12,262	28,983	94,044	162,408	30,177	35	413	429	82	10	339	537	9
1946	0	390,554	1,176,211	125,344	296,271	961,336	1,660,166	308,473	358	4,222	4,381	837	100	3,470	5,490	94
1947	0	410,822	1,201,781	128,069	302,711	982,235	1,696,256	315,179	365	4,314	4,476	856	102	3,546	5,609	96
1948	0	431,089	1,227,351	130,793	309,152	1,003,133	1,732,347	321,885	373	4,406	4,571	874	104	3,621	5,728	98
1949	0	451,357	1,252,920	133,518	315,593	1,024,032	1,768,437	328,590	381	4,497	4,666	892	106	3,697	5,848	100
1950	0	491,892	1,278,490	136,243	322,033	1,044,931	1,804,528	335,296	389	4,589	4,762	910	108	3,772	5,967	102
1951	0	515,870	1,304,060	138,968	328,474	1,065,829	1,840,618	342,002	397	4,681	4,857	929	110	3,848	6,086	104
1952	0	539,849	1,329,630	141,693	334,915	1,086,728	1,876,709	348,708	404	4,773	4,952	947	113	3,923	6,206	106
1953	0	563,828	1,355,200	144,418	341,355	1,107,627	1,912,800	355,414	412	4,865	5,047	965	115	3,999	6,325	108
1954	0	587,807	1,380,769	147,143	347,796	1,128,525	1,948,890	362,120	420	4,956	5,143	983	117	4,074	6,444	110
1955	11,440	611,785	1,406,339	149,867	354,237	1,149,424	1,984,981	368,826	428	5,048	5,238	1,001	119	4,149	6,564	112
1956	27,202	635,764	1,431,909	152,592	360,677	1,170,322	2,021,071	375,532	428	5,048	5,238	1,001	119	4,149	6,564	112
1957	42,965	659,743	1,457,479	155,317	367,118	1,191,221	2,057,162	382,238	428	5,048	5,238	1,001	119	4,149	6,564	112
1958	58,727	683,721	1,483,049	158,042	373,559	1,212,120	2,093,252	388,944	428	5,048	5,238	1,001	119	4,149	6,564	112
1959	74,489	707,700	1,508,618	160,767	379,999	1,233,018	2,129,343	395,650	428	5,048	5,238	1,001	119	4,149	6,564	112
1960	106,014	755,658	1,534,188	163,492	386,440	1,253,917	2,165,434	402,356	428	5,048	5,238	1,001	119	4,149	6,564	112
1961	112,770	765,935	1,559,758	166,217	392,881	1,274,815	2,201,524	409,062	867	14,291	15,346	2,472	113	5,386	8,806	107
1962	119,526	776,213	1,585,328	168,941	399,321	1,295,714	2,237,615	415,767	1,306	23,535	25,455	3,943	108	6,623	11,048	101
1963	126,282	786,490	1,610,898	171,666	405,762	1,316,613	2,273,705	422,473	1,745	32,778	35,563	5,414	102	7,860	13,291	96
1964	133,038	796,768	1,636,468	174,391	412,203	1,337,511	2,309,796	429,179	2,185	42,021	45,671	6,885	96	9,096	15,533	91
1965	139,794	807,046	1,662,037	177,116	418,643	1,358,410	2,345,886	435,885	2,624	51,265	55,780	8,356	91	10,333	17,775	85
1966	146,550	817,323	1,687,607	179,841	425,084	1,379,308	2,381,977	442,591	3,063	60,508	65,888	9,827	85	11,570	20,018	80
1967	153,305	827,601	1,713,177	182,566	431,525	1,400,207	2,418,067	449,297	3,502	69,751	75,996	11,298	79	12,807	22,260	75
1968	160,061	837,878	1,738,747	185,291	437,965	1,421,106	2,454,158	456,003	3,942	78,995	86,105	12,769	74	14,043	24,503	69
1969	166,817	848,156	1,764,317	188,016	444,406	1,442,004	2,490,249	462,709	4,381	88,238	96,213	14,240	68	15,280	26,745	64
1970	180,329	868,711	1,789,886	190,740	450,847	1,462,903	2,526,339	469,415	4,820	97,481	106,321	15,711	62	16,517	28,987	59
1971	197,242	894,441	1,815,456	193,465	457,287	1,483,802	2,562,430	476,121	5,259	106,725	116,430	17,182	57	17,754	31,230	53
1972	214,155	920,170	1,841,026	196,190	463,728	1,504,700	2,598,520	482,827	5,699	115,968	126,538	18,653	51	18,990	33,472	48
1973	231,068	945,899	1,866,596	198,915	470,169	1,525,599	2,634,611	489,533	6,138	125,211	136,646	20,124	45	20,227	35,714	43
1974	247,981	971,628	1,892,166	201,640	476,610	1,546,497	2,670,701	496,239	6,577	134,455	146,755	21,595	40	21,464	37,957	37
1975	264,894	997,357	1,917,735	204,365	483,050	1,567,396	2,706,792	502,945	7,016	143,698	156,863	23,066	34	22,701	40,199	32
1976	281,807	1,023,087	1,943,305	207,090	489,491	1,588,295	2,742,882	509,650	7,456	152,941	166,971	24,537	28	23,937	42,442	27
1977	298,720	1,048,816	1,968,875	209,814	495,932	1,609,193	2,778,973	516,356	7,895	162,185	177,080	26,008	23	25,174	44,684	21
1978	315,633	1,074,545	1,994,445	212,539	502,372	1,630,092	2,815,064	523,062	8,334	171,428	187,188	27,479	17	26,411	46,926	16
1979	332,546	1,100,274	2,020,015	215,264	508,813	1,650,990	2,851,154	529,768	8,773	180,671	197,296	28,950	11	27,648	49,169	11
1980	366,372	1,151,733	2,045,584	217,989	515,254	1,671,889	2,887,245	536,474	9,212	189,915	207,405	30,421	6	28,884	51,411	5
1981	90,008	666,508	1,572,111	44,362	144,091	1,468,123	2,044,018	46,360	NA	NA	NA	NA	NA	29,193	49,211	NA
1982	480,651	1,027,248	1,623,802	265,220	272,917	1,753,674	2,497,333	731,441	NA	NA	NA	NA	NA	32,363	62,115	NA
1983	431,090	1,553,377	2,138,862	191,638	720,653	1,620,493	4,492,709	395,175	NA	NA	NA	NA	NA	28,956	60,607	NA

1984	356,312	1,123,039	3,225,540	296,851	937,189	2,166,729	2,770,446	477,828	NA	NA	NA	NA	NA	37,056	59,123	NA
1985	567,182	1,643,681	1,795,455	305,499	533,621	1,454,919	2,812,171	1,065,096	NA	NA	NA	NA	NA	23,037	37,211	NA
1986	426,458	1,521,963	2,654,086	460,082	536,851	2,020,775	2,111,950	877,360	4,111	509,658	122,638	31,098	NA	35,385	63,029	NA
1987	788,944	1,453,834	2,721,347	326,269	788,524	1,810,548	2,776,318	789,186	9,230	141,872	157,443	46,260	NA	41,405	72,662	NA
1988	762,258	1,573,693	2,802,724	496,207	1,020,688	1,286,027	3,290,469	591,325	16,515	114,640	360,922	36,297	NA	44,914	73,975	NA
1989	455,356	1,187,578	2,108,029	507,464	430,025	1,563,251	2,280,877	689,822	11,259	141,491	279,759	38,572	NA	41,378	60,008	NA
1990	515,554	1,483,769	2,560,778	326,346	482,879	1,233,713	2,285,992	343,226	7,144	88,128	166,805	7,235	NA	41,091	59,300	NA
1991	795,183	1,943,422	2,639,918	451,911	990,417	2,067,995	3,175,491	677,143	15,179	105,174	180,775	8,239	NA	43,034	65,884	NA
1992	516,592	1,438,659	2,411,844	409,836	818,112	1,376,980	2,857,080	402,351	5,861	136,030	203,112	38,869	NA	36,968	65,998	NA
1993	624,770	1,457,206	2,442,030	280,196	741,038	1,580,942	3,132,113	428,153	9,038	175,958	236,563	48,085	NA	42,222	65,021	NA
1994	786,035	1,938,875	2,978,671	461,128	1,026,016	1,765,885	3,418,964	496,074	27,221	256,664	270,200	60,567	NA	38,571	61,836	NA
1995	682,252	1,604,657	2,390,270	429,404	881,003	1,834,371	3,624,116	438,530	36,383	289,319	310,933	73,730	NA	45,692	59,556	NA
1996	527,290	1,451,028	2,771,685	439,503	701,284	1,784,904	3,027,489	449,015	26,614	335,113	373,521	76,209	NA	42,211	50,544	NA
1997	894,440	1,523,446	3,268,315	410,928	731,799	1,793,471	3,558,650	484,463	22,421	376,921	268,705	81,371	2,414	34,202	59,620	4,009
1998	599,318	1,932,006	2,662,375	367,560	590,052	1,865,643	2,686,641	290,729	17,795	305,599	231,513	71,405	3,804	39,609	54,113	3,217
1999	687,200	1,633,467	2,569,735	277,063	532,001	1,644,957	2,187,735	278,350	32,515	221,937	177,302	40,800	3,231	33,166	50,208	2,107
2000	943,652	1,879,768	3,283,620	370,648	724,429	1,914,858	3,678,920	470,130	16,733	164,508	159,595	25,889	2,941	26,959	41,422	2,472
2001	933,286	2,108,583	3,706,060	382,145	874,124	2,341,353	3,900,169	632,135	14,155	166,469	182,716	36,186	2,144	30,887	47,636	2,714
2002	831,207	2,018,544	2,610,643	336,688	514,779	2,155,955	3,050,003	531,263	13,043	179,011	173,218	29,070	1,936	26,015	41,782	2,607
2003	949,305	1,838,763	3,426,259	402,020	688,226	2,008,211	4,176,322	478,057	18,946	171,902	147,414	22,842	1,311	23,293	35,235	1,141
2004	1,038,237	2,201,653	3,297,805	642,151	773,929	2,347,010	4,028,249	602,831	25,499	218,988	175,827	61,360	3,540	30,142	42,214	1,821
2005	1,065,249	1,905,000	3,558,471	532,354	751,180	2,256,931	4,035,316	569,306	17,026	136,291	178,380	15,486	1,799	24,958	37,961	2,652
2006	1,152,876	2,418,587	3,351,828	582,704	812,288	2,364,406	4,568,728	622,875	22,069	117,680	159,679	13,971	2,756	29,131	50,251	1,590

Table 17. Predicted (italics) and estimated (post-1980) mixing zone recreational effort.

Zone	Mixing															
Mode	*Private boat*				*Shore*				*Charter boat*				*Headboat*			
Method	1	1	2	1	1	2	1	1	3	3	3	3	3	3	3	3
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1900	0	0	0	0	0	38,218	0	0	0	0	0	0	0	0	0	0
1901	6,906	12,853	0	13,004	5,762	39,195	15,531	16,115	595	1,241	1,103	1,073	409	1,657	1,654	793
1902	13,812	25,706	0	26,008	11,524	40,171	31,061	32,229	1,191	2,482	2,205	2,145	819	3,314	3,307	1,586
1903	20,718	38,559	0	39,013	17,286	41,147	46,592	48,344	1,786	3,723	3,308	3,218	1,228	4,972	4,961	2,379
1904	27,624	51,412	0	52,017	23,048	42,123	62,123	64,458	2,382	4,964	4,410	4,291	1,638	6,629	6,614	3,172
1905	34,530	64,265	0	65,021	28,810	43,100	77,654	80,573	2,977	6,205	5,513	5,363	2,047	8,286	8,268	3,965
1906	41,436	77,118	0	78,025	34,572	44,076	93,184	96,687	3,573	7,446	6,616	6,436	2,457	9,943	9,921	4,758
1907	48,342	89,971	0	91,030	40,334	45,052	108,715	112,802	4,168	8,687	7,718	7,508	2,866	11,600	11,575	5,551
1908	55,248	102,824	0	104,034	46,096	46,029	124,246	128,916	4,764	9,928	8,821	8,581	3,276	13,258	13,228	6,344
1909	62,154	115,677	0	117,038	51,858	47,005	139,777	145,031	5,359	11,169	9,923	9,654	3,685	14,915	14,882	7,137
1910	69,060	128,530	0	130,042	57,620	48,957	155,307	161,145	5,955	12,410	11,026	10,726	4,095	16,572	16,535	7,930
1911	75,967	141,383	0	143,047	63,382	50,467	170,838	177,260	6,550	13,651	12,129	11,799	4,504	18,229	18,189	8,723
1912	82,873	154,236	0	156,051	69,145	51,976	186,369	193,374	7,145	14,892	13,231	12,872	4,914	19,886	19,842	9,516
1913	89,779	167,089	0	169,055	74,907	53,486	201,900	209,489	7,741	16,133	14,334	13,944	5,323	21,544	21,496	10,309
1914	96,685	179,942	0	182,059	80,669	54,995	217,430	225,603	8,336	17,374	15,436	15,017	5,733	23,201	23,149	11,102
1915	103,591	192,795	0	195,064	86,431	56,505	232,961	241,718	8,932	18,615	16,539	16,089	6,142	24,858	24,803	11,895
1916	110,497	205,648	0	208,068	92,193	58,014	248,492	257,833	9,527	19,856	17,642	17,162	6,551	26,515	26,456	12,688
1917	117,403	218,501	0	221,072	97,955	59,524	264,022	273,947	10,123	21,097	18,744	18,235	6,961	28,172	28,110	13,481
1918	124,309	231,354	0	234,076	103,717	61,033	279,553	290,062	10,718	22,338	19,847	19,307	7,370	29,830	29,763	14,274
1919	131,215	244,207	0	247,081	109,479	62,543	295,084	306,176	11,314	23,580	20,949	20,380	7,780	31,487	31,417	15,067
1920	138,121	257,060	0	260,085	115,241	65,562	310,615	322,291	11,909	24,821	22,052	21,453	8,189	33,144	33,070	15,860
1921	145,027	269,913	0	273,089	121,003	68,875	326,145	338,405	12,504	26,062	23,155	22,525	8,599	34,801	34,724	16,653
1922	151,933	282,766	0	286,093	126,765	72,189	341,676	354,520	13,100	27,303	24,257	23,598	9,008	36,458	36,377	17,446
1923	158,839	295,619	0	299,098	132,527	75,503	357,207	370,634	13,695	28,544	25,360	24,670	9,418	38,116	38,031	18,239
1924	165,745	308,472	0	312,102	138,289	78,817	372,738	386,749	14,291	29,785	26,462	25,743	9,827	39,773	39,684	19,032
1925	172,651	321,325	0	325,106	144,051	82,131	388,268	402,863	14,886	31,026	27,565	26,816	10,237	41,430	41,338	19,825
1926	179,557	334,178	0	338,110	149,813	85,444	403,799	418,978	15,482	32,267	28,668	27,888	10,646	43,087	42,991	20,618
1927	186,463	347,031	0	351,115	155,575	88,758	419,330	435,092	16,077	33,508	29,770	28,961	11,056	44,744	44,645	21,411
1928	193,369	359,884	0	364,119	161,337	92,072	434,861	451,207	16,673	34,749	30,873	30,034	11,465	46,402	46,298	22,204
1929	200,275	372,737	0	377,123	167,099	95,386	450,391	467,321	17,268	35,990	31,975	31,106	11,875	48,059	47,952	22,997
1930	207,181	385,590	0	390,127	172,861	102,013	465,922	483,436	17,864	37,231	33,078	32,179	12,284	49,716	49,605	23,790
1931	214,087	398,443	0	403,132	178,623	105,757	481,453	499,551	18,459	38,472	34,181	33,252	12,693	51,373	51,259	24,583
1932	220,993	411,296	0	416,136	184,385	109,501	496,984	515,665	19,054	39,713	35,283	34,324	13,103	53,030	52,913	25,376
1933	227,900	424,149	0	429,140	190,147	113,244	512,514	531,780	19,650	40,954	36,386	35,397	13,512	54,688	54,566	26,169
1934	234,806	437,002	0	442,144	195,909	116,988	528,045	547,894	20,245	42,195	37,488	36,469	13,922	56,345	56,220	26,962
1935	241,712	449,855	0	455,148	201,672	120,732	543,576	564,009	20,841	43,436	38,591	37,542	14,331	58,002	57,873	27,755
1936	248,618	462,708	0	468,153	207,434	124,475	559,106	580,123	21,436	44,677	39,694	38,615	14,741	59,659	59,527	28,548
1937	255,524	475,561	0	481,157	213,196	128,219	574,637	596,238	22,032	45,918	40,796	39,687	15,150	61,316	61,180	29,341
1938	262,430	488,414	0	494,161	218,958	131,963	590,168	612,352	22,627	47,159	41,899	40,760	15,560	62,974	62,834	30,134
1939	269,336	501,267	0	507,165	224,720	135,707	605,699	628,467	23,223	48,400	43,001	41,833	15,969	64,631	64,487	30,927
1940	27,624	51,412	0	52,017	23,048	14,319	62,123	64,458	2,382	4,964	4,410	4,291	1,638	6,629	6,614	3,172
1941	28,315	52,697	0	53,317	23,624	15,002	63,676	66,070	2,441	5,088	4,521	4,398	1,679	6,795	6,779	3,251
1942	29,005	53,983	0	54,618	24,201	15,684	65,229	67,681	2,501	5,212	4,631	4,505	1,720	6,960	6,945	3,331
1943	29,696	55,268	0	55,918	24,777	16,366	66,782	69,292	2,560	5,336	4,741	4,612	1,761	7,126	7,110	3,410
1944	30,387	56,553	0	57,219	25,353	17,049	68,335	70,904	2,620	5,461	4,851	4,720	1,802	7,292	7,275	3,489
1945	31,077	57,838	0	58,519	25,929	17,731	69,888	72,515	2,680	5,585	4,962	4,827	1,843	7,457	7,441	3,569
1946	317,678	591,238	0	598,195	265,054	184,132	714,414	741,269	27,391	57,087	50,720	49,341	18,836	76,231	76,062	36,478
1947	324,584	604,091	0	611,199	270,816	190,955	729,945	757,383	27,986	58,328	51,822	50,414	19,245	77,888	77,715	37,271
1948	331,490	616,944	0	624,204	276,578	197,778	745,475	773,498	28,582	59,569	52,925	51,486	19,654	79,546	79,369	38,064
1949	338,396	629,797	0	637,208	282,340	204,601	761,006	789,612	29,177	60,810	54,027	52,559	20,064	81,203	81,022	38,857
1950	345,302	642,650	0	650,212	288,102	218,247	776,537	805,727	29,773	62,051	55,130	53,631	20,473	82,860	82,676	39,650
1951	352,208	655,503	0	663,216	293,864	235,445	792,067	821,841	30,368	63,292	56,233	54,704	20,883	84,517	84,329	40,443
1952	359,114	668,356	0	676,221	299,626	252,643	807,598	837,956	30,963	64,533	57,335	55,777	21,292	86,175	85,983	41,236
1953	366,020	681,209	0	689,225	305,388	269,841	823,129	854,070	31,559	65,774	58,438	56,849	21,702	87,832	87,636	42,029
1954	372,927	694,062	6,605	702,229	311,150	287,039	838,660	870,185	32,154	67,015	59,541	57,922	22,111	89,489	89,290	42,822
1955	379,833	706,915	39,106	715,233	316,912	304,237	854,190	886,299	32,750	68,256	60,643	58,995	22,521	91,146	90,943	43,615
1956	386,739	719,768	71,608	728,238	322,674	321,435	869,721	902,414	32,750	68,256	60,643	58,995	22,521	91,146	90,943	43,615
1957	393,645	732,621	104,109	741,242	328,436	338,634	885,252	918,528	32,750	68,256	60,643	58,995	22,521	91,146	90,943	43,615
1958	400,551	745,474	136,611	754,246	334,199	355,832	900,783	934,643	32,750	68,256	60,643	58,995	22,521	91,146	90,943	43,615
1959	407,457	758,327	169,113	767,250	339,961	373,030	916,313	950,757	32,750	68,256	60,643	58,995	22,521	91,146	90,943	43,615
1960	414,363	771,180	234,116	780,255	345,723	407,426	931,844	966,872	32,750	68,256	60,643	58,995	22,521	91,146	90,943	43,615
1961	421,269	784,033	262,929	793,259	351,485	422,672	947,375	982,987	36,591	70,096	65,129	59,324	22,331	90,814	90,416	43,254
1962	428,175	796,886	291,743	806,263	357,247	437,919	962,906	999,101	40,432	71,936	69,615	59,653	22,142	90,483	89,890	42,893
1963	435,081	809,739	320,556	819,267	363,009	453,165	978,436	1,015,216	44,273	73,776	74,102	59,983	21,952	90,151	89,363	42,531
1964	441,987	822,592	349,369	832,271	368,771	468,412	993,967	1,031,330	48,114	75,616	78,588	60,312	21,763	89,819	88,836	42,170
1965	448,893	835,445	378,183	845,276	374,533	483,658	1,009,498	1,047,445	51,955	77,456	83,074	60,642	21,573	89,488	88,309	41,809
1966	455,799	848,298	406,996	858,280	380,295	498,905	1,025,029	1,063,559	55,797	79,296	87,560	60,971	21,383	89,156	87,782	41,447
1967	462,705	861,151	435,809	871,284	386,057	514,151	1,040,559	1,079,674	59,638	81,136	92,046	61,300	21,194	88,824	87,255	41,086
1968	469,611	874,004	464,623	884,288	391,819	529,398	1,056,090	1,095,788	63,479	82,976	96,532	61,630	21,004	88,493	86,728	40,725
1969	476,517	886,857	493,436	897,293	397,581	544,644	1,071,621	1,111,903	67,320	84,816	101,019	61,959	20,815	88,161	86,201	40,363
1970	483,423	899,710	551,063	910,297	403,343	575,137	1,087,151	1,128,017	71,161	86,656	105,505	62,289	20,625	87,829	85,674	40,002
1971	490,329	912,563	588,536	923,301	409,105	594,966	1,102,682	1,144,132	75,002	88,496	109,991	62,618	20,436	87,498	85,147	39,640
1972	497,235	925,416	626,010	936,305	414,867	614,795	1,118,213	1,160,246	78,843	90,336	114,477	62,948	20,246	87,166	84,621	39,279
1973	504,141	938,269	663,483	949,310	420,629	634,624	1,133,744	1,176,361	82,684	92,176	118,963	63,277	20,057	86,834	84,094	38,918
1974	511,047	951,122	700,957	962,314	426,391	654,453	1,149,274	1,192,475	86,525	94,016	123,449	63,606	19,867	86,503	83,567	38,556
1975	517,954	963,975	738,430	975,318	432,153	674,282	1,164,805	1,208,590	90,367	95,856	127,936	63,936	19,677	86,171	83,040	38,195
1976	524,860	976,828	775,904	988,322	437,915	694,111	1,180,336	1,224,705	94,208	97,696	132,422	64,265	19,488	85,839	82,513	37,834
1977	531,766	989,681	813,377	1,001,327	443,677	713,940	1,195,867	1,240,819	98,049	99,536	136,908	64,595	19,298	85,508	81,986	37,472
1978	538,672	1,002,534	850,851	1,014,331	449,439	733,769	1,211,397	1,256,934	101,890	101,376	141,394	64,924	19,109	85,176	81,459	37,111
1979	545,578	1,015,387	888,324	1,027,335	455,201	753,597	1,226,928	1,273,048	105,731	103,216	145,880	65,253	18,919	84,844	80,932	36,750
1980	552,484	1,028,240	963,271	1,040,339	460,963	793,255	1,242,459	1,289,163	109,572	105,056	150,367	65,583	18,730	84,513	80,405	36,388
1981	389,382	1,818,493	799,464	1,806,481	564,735	1,193,888	872,787	1,234,774	NA	NA	NA	NA	25,439	80,919	82,571	38,245

1982	631,606	882,667	952,520	582,762	306,289	994,945	1,626,135	809,297	NA	NA	NA	NA	20,573	80,985	74,296	45,665
1983	368,088	1,059,527	1,050,257	843,266	497,859	813,523	1,129,284	2,442,016	NA	NA	NA	NA	14,787	83,338	82,186	32,831
1984	1,087,953	616,067	1,394,673	618,292	703,097	671,349	1,848,284	885,162	NA	NA	NA	NA	16,936	86,909	82,176	31,659
1985	319,919	828,710	950,665	1,415,917	261,648	825,151	813,458	1,155,136	NA	NA	NA	NA	14,966	88,754	78,163	31,735
1986	551,344	677,315	1,185,641	995,790	402,355	670,038	927,550	1,027,594	94,475	154,908	125,779	60,449	18,296	88,964	102,011	32,343
1987	724,626	1,123,045	1,168,979	1,422,753	718,666	614,455	872,561	1,747,449	81,816	167,885	148,655	71,901	15,498	102,093	93,491	39,785
1988	910,817	812,784	1,617,048	994,249	868,491	1,041,291	1,812,107	1,051,590	234,213	63,438	201,445	52,159	19,729	89,451	90,436	25,518
1989	414,878	1,439,741	1,160,227	1,466,601	664,434	941,894	1,223,724	1,718,598	108,968	86,329	151,858	77,545	17,626	92,061	89,595	36,582
1990	429,861	863,249	1,291,214	780,990	589,927	767,068	1,339,574	782,029	47,593	61,919	146,526	67,508	20,840	94,962	92,043	37,395
1991	371,107	1,142,825	1,686,146	1,046,567	566,001	1,102,239	1,900,753	1,521,463	27,235	124,935	109,424	109,289	18,478	78,964	83,158	32,276
1992	590,494	1,151,561	1,887,454	773,317	815,901	1,149,369	1,804,620	1,252,243	75,457	87,955	91,747	132,108	13,954	75,872	76,368	31,659
1993	473,273	1,153,504	1,551,310	979,807	952,646	1,088,287	1,744,835	1,280,054	73,330	176,165	118,829	221,845	12,448	65,153	64,304	23,609
1994	667,054	1,216,508	1,760,935	930,874	782,163	1,448,767	2,054,412	1,299,409	70,083	179,166	167,858	197,528	16,745	68,371	65,977	27,493
1995	677,492	1,670,159	1,620,733	1,033,482	823,761	1,554,867	1,679,262	1,211,162	49,808	260,396	231,114	211,469	14,608	59,134	50,829	25,614
1996	540,454	1,332,219	1,790,213	1,102,496	620,029	1,371,215	1,493,560	1,245,140	74,846	214,957	207,642	206,040	13,848	50,307	49,151	25,046
1997	660,750	1,530,458	1,878,391	1,253,397	803,870	1,239,358	1,431,220	1,086,702	86,846	249,562	192,197	234,749	15,769	30,590	41,386	26,563
1998	555,392	1,426,669	1,387,000	989,517	625,272	1,357,514	1,067,378	1,413,259	59,916	188,867	131,474	162,228	15,239	34,370	33,129	20,996
1999	387,741	1,151,815	1,396,474	1,050,415	407,644	857,452	949,100	973,797	73,232	146,516	108,106	109,136	15,352	36,925	39,699	28,438
2000	697,809	1,404,324	2,262,009	940,320	639,505	1,203,043	1,948,826	1,056,843	47,458	117,983	91,602	94,680	17,502	39,261	45,296	31,810
2001	655,988	1,772,881	1,457,374	1,430,736	790,498	1,593,836	1,806,993	1,434,314	47,108	123,466	86,600	97,591	11,902	37,528	38,690	27,611
2002	843,295	1,340,474	1,387,699	1,332,460	774,554	816,629	1,283,105	1,020,345	42,552	126,221	85,868	94,310	9,178	31,269	34,576	26,347
2003	726,395	1,682,586	2,058,929	1,336,606	687,125	1,177,844	1,845,417	996,489	40,272	115,662	64,064	113,788	8,390	33,767	35,060	23,824
2004	587,423	1,478,807	1,616,144	1,226,859	607,784	1,397,675	1,358,458	1,221,553	40,485	137,495	80,973	105,539	16,652	42,441	39,548	26,741
2005	1,063,630	1,486,914	1,829,911	1,174,984	704,273	1,476,464	1,541,174	1,289,291	35,589	117,234	60,073	96,279	12,972	37,124	40,393	29,804
2006	846,483	1,845,366	1,890,587	1,417,584	929,791	1,420,276	1,818,227	1,329,060	30,826	104,552	68,530	81,634	9,844	40,014	41,325	29,743

Table 18. Predicted (italics) and estimated (post-1980) Gulf of Mexico recreational effort.

Zone	Gulf															
Mode	*Private boat*				*Shore*				*Charter boat*				*Headboat*			
Method	2	2	2	2	1	1	1	1	3	3	3	3	3	3	3	3
Season	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter	fall	spring	summer	winter
1930	0	0	539,217	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	551,665	0	12,977	45,315	69,130	28,765	504	1,910	1,903	698	811	3,051	3,498	1,842
1932	0	0	564,113	0	25,953	90,631	138,259	57,530	1,009	3,820	3,807	1,396	1,623	6,103	6,995	3,683
1933	0	0	576,561	0	38,930	135,946	207,389	86,295	1,513	5,730	5,710	2,094	2,434	9,154	10,493	5,525
1934	0	0	589,008	0	51,907	181,261	276,519	115,061	2,018	7,639	7,614	2,791	3,246	12,206	13,991	7,367
1935	0	0	601,456	0	64,883	226,576	345,648	143,826	2,522	9,549	9,517	3,489	4,057	15,257	17,489	9,208
1936	0	0	613,904	0	77,860	271,892	414,778	172,591	3,027	11,459	11,421	4,187	4,869	18,308	20,986	11,050
1937	0	0	626,352	0	90,836	317,207	483,908	201,356	3,531	13,369	13,324	4,885	5,680	21,360	24,484	12,891
1938	0	0	638,800	0	103,813	362,522	553,037	230,121	4,036	15,279	15,227	5,583	6,491	24,411	27,982	14,733
1939	0	0	651,248	0	116,790	407,837	622,167	258,886	4,540	17,189	17,131	6,281	7,303	27,462	31,479	16,575
1940	0	0	67,614	0	12,977	45,315	69,130	28,765	504	1,910	1,903	698	811	3,051	3,498	1,842
1941	0	0	70,833	0	14,274	49,847	76,043	31,642	555	2,101	2,094	768	893	3,357	3,847	2,026
1942	0	0	74,051	0	15,572	54,378	82,956	34,518	605	2,292	2,284	837	974	3,662	4,197	2,210
1943	0	0	77,269	0	16,870	58,910	89,869	37,395	656	2,483	2,474	907	1,055	3,967	4,547	2,394
1944	0	0	80,487	0	18,167	63,441	96,782	40,271	706	2,674	2,665	977	1,136	4,272	4,897	2,578
1945	0	0	83,706	0	19,465	67,973	103,694	43,148	757	2,865	2,855	1,047	1,217	4,577	5,247	2,762
1946	0	0	869,240	0	207,626	725,044	1,106,074	460,242	8,071	30,558	30,455	11,166	12,983	48,822	55,963	29,466
1947	0	0	901,422	0	220,603	770,360	1,175,204	489,007	8,576	32,467	32,358	11,864	13,794	51,874	59,461	31,308
1948	0	0	933,605	0	233,579	815,675	1,244,334	517,773	9,080	34,377	34,262	12,561	14,606	54,925	62,959	33,149
1949	0	0	965,788	0	246,556	860,990	1,313,463	546,538	9,584	36,287	36,165	13,259	15,417	57,976	66,457	34,991
1950	0	0	1,030,153	0	259,533	906,305	1,382,593	575,303	10,089	38,197	38,069	13,957	16,228	61,028	69,954	36,833
1951	0	0	1,081,952	0	272,509	951,621	1,451,723	604,068	10,593	40,107	39,972	14,655	17,040	64,079	73,452	38,674
1952	0	0	1,133,751	0	285,486	996,936	1,520,852	632,833	11,098	42,017	41,875	15,353	17,851	67,131	76,950	40,516
1953	0	0	1,185,550	0	298,463	1,042,251	1,589,982	661,598	11,602	43,926	43,779	16,051	18,663	70,182	80,447	42,358
1954	0	0	1,237,349	0	311,439	1,087,567	1,659,111	690,364	12,107	45,836	45,682	16,749	19,474	73,233	83,945	44,199
1955	0	0	1,289,148	0	324,416	1,132,882	1,728,241	719,129	12,611	47,746	47,586	17,447	20,286	76,285	87,443	46,041
1956	0	0	1,340,947	0	337,393	1,178,197	1,797,371	747,894	12,611	47,746	47,586	17,447	20,286	76,285	87,443	46,041
1957	0	0	1,392,746	0	350,369	1,223,512	1,866,500	776,659	12,611	47,746	47,586	17,447	20,286	76,285	87,443	46,041
1958	0	0	1,444,545	0	363,346	1,268,828	1,935,630	805,424	12,611	47,746	47,586	17,447	20,286	76,285	87,443	46,041
1959	0	0	1,496,344	0	376,322	1,314,143	2,004,760	834,189	12,611	47,746	47,586	17,447	20,286	76,285	87,443	46,041
1960	0	0	1,599,942	0	389,299	1,359,458	2,073,889	862,954	12,611	47,746	47,586	17,447	20,286	76,285	87,443	46,041
1961	0	0	1,632,853	0	402,276	1,404,773	2,143,019	891,720	14,182	52,019	55,205	18,562	20,911	78,482	89,986	46,957
1962	0	0	1,665,763	0	415,252	1,450,089	2,212,149	920,485	15,754	56,291	62,825	19,677	21,536	80,679	92,528	47,873
1963	11,599	0	1,698,673	33,266	428,229	1,495,404	2,281,278	949,250	17,325	60,563	70,445	20,792	22,161	82,876	95,071	48,789
1964	35,462	0	1,731,584	67,869	441,206	1,540,719	2,350,408	978,015	18,896	64,836	78,065	21,907	22,786	85,073	97,614	49,706
1965	59,324	7,861	1,764,494	102,472	454,182	1,586,035	2,419,538	1,006,780	20,468	69,108	85,684	23,022	23,411	87,270	100,157	50,622
1966	83,187	59,609	1,797,404	137,076	467,159	1,631,350	2,488,667	1,035,545	22,039	73,381	93,304	24,137	24,037	89,467	102,700	51,538
1967	107,050	111,356	1,830,315	171,679	480,136	1,676,665	2,557,797	1,064,310	23,610	77,653	100,924	25,253	24,662	91,664	105,242	52,454
1968	130,913	163,103	1,863,225	206,282	493,112	1,721,980	2,626,926	1,093,076	25,182	81,926	108,544	26,368	25,287	93,861	107,785	53,370
1969	154,776	214,851	1,896,135	240,885	506,089	1,767,296	2,696,056	1,121,841	26,753	86,198	116,163	27,483	25,912	96,058	110,328	54,287
1970	202,502	318,345	1,961,956	310,092	519,065	1,812,611	2,765,186	1,150,606	28,324	90,471	123,783	28,598	26,537	98,255	112,871	55,203
1971	246,725	414,244	2,022,946	374,219	532,042	1,857,926	2,834,315	1,179,371	29,896	94,743	131,403	29,713	27,162	100,452	115,414	56,119
1972	290,948	510,143	2,083,936	438,346	545,019	1,903,241	2,903,445	1,208,136	31,467	99,015	139,023	30,828	27,787	102,649	117,956	57,035
1973	335,171	606,042	2,144,925	502,473	557,995	1,948,557	2,972,575	1,236,901	33,038	103,288	146,642	31,943	28,413	104,846	120,499	57,951
1974	379,394	701,941	2,205,915	566,600	570,972	1,993,872	3,041,704	1,265,666	34,610	107,560	154,262	33,059	29,038	107,043	123,042	58,867
1975	423,617	797,840	2,266,905	630,727	583,949	2,039,187	3,110,834	1,294,432	36,181	111,833	161,882	34,174	29,663	109,240	125,585	59,784
1976	467,840	893,739	2,327,895	694,854	596,925	2,084,503	3,179,964	1,323,197	37,752	116,105	169,502	35,289	30,288	111,437	128,127	60,700
1977	512,063	989,638	2,388,885	758,981	609,902	2,129,818	3,249,093	1,351,962	39,324	120,378	177,121	36,404	30,913	113,634	130,670	61,616
1978	556,286	1,085,536	2,449,874	823,108	622,879	2,175,133	3,318,223	1,380,727	40,895	124,650	184,741	37,519	31,538	115,831	133,213	62,532
1979	600,509	1,181,435	2,510,864	887,235	635,855	2,220,448	3,387,353	1,409,492	42,466	128,923	192,361	38,634	32,163	118,028	135,756	63,448
1980	688,956	1,373,233	2,632,844	1,015,490	648,832	2,265,764	3,456,482	1,438,257	44,038	133,195	199,981	39,749	32,789	120,225	138,299	64,365
1981	487,607	1,762,599	1,928,300	908,712	428,224	1,693,769	1,972,012	1,091,453	NA	NA	NA	NA	12,626	18,197	15,874	25,012
1982	517,090	1,125,274	2,433,435	809,975	1,059,742	2,053,356	2,807,646	792,916	NA	NA	NA	NA	10,223	19,506	14,918	26,967
1983	861,596	1,324,218	2,613,262	1,287,574	713,586	2,021,233	6,371,169	1,604,341	NA	NA	NA	NA	9,992	15,035	14,612	25,082
1984	680,015	1,618,562	3,051,141	965,875	357,825	3,255,804	4,189,123	1,887,013	NA	NA	NA	NA	11,042	17,877	14,541	27,854
1985	657,741	1,087,644	3,230,787	1,407,062	749,665	2,531,232	2,288,110	1,959,390	NA	NA	NA	NA	11,069	17,234	11,893	27,031
1986	816,118	2,324,180	3,563,056	1,141,210	2,133,985	2,413,423	3,937,994	1,667,532	32,296	169,765	200,022	29,252	31,767	130,515	149,384	66,314
1987	1,258,489	2,008,314	2,783,208	1,824,778	700,805	1,272,604	2,426,090	1,468,338	55,859	131,248	216,704	32,716	37,436	125,408	146,667	59,437
1988	1,544,894	2,711,823	4,511,486	1,584,600	1,318,838	1,884,480	3,431,212	1,440,162	40,649	127,601	288,087	43,768	31,742	124,607	136,972	57,355
1989	1,119,298	2,410,360	2,717,297	1,973,199	611,698	1,494,579	1,659,934	2,190,011	68,269	127,597	219,931	39,233	34,420	113,327	141,193	66,641
1990	1,023,628	1,893,511	2,182,966	1,547,944	823,695	1,499,637	1,618,162	1,238,799	30,973	131,127	113,258	59,355	31,704	118,251	129,991	76,657
1991	979,173	2,095,392	3,418,868	1,519,506	996,695	1,960,835	3,321,441	1,162,445	59,105	90,489	127,212	17,197	25,946	95,672	128,111	58,071
1992	1,384,793	2,326,420	3,237,494	1,600,401	1,097,453	1,976,950	2,801,380	1,581,990	37,870	118,982	129,181	19,624	27,491	112,493	136,322	61,295
1993	1,148,770	2,149,160	3,351,608	1,490,724	782,381	1,677,130	2,743,012	1,521,577	58,699	224,714	172,809	59,232	27,375	124,488	155,175	64,479
1994	1,315,819	2,305,103	3,373,017	1,599,175	834,427	1,881,426	2,738,671	1,192,113	53,787	236,321	248,520	82,594	29,345	136,406	156,464	59,486
1995	1,136,868	2,747,252	3,003,311	2,009,507	667,178	1,899,391	2,245,124	1,457,289	79,224	268,183	257,647	86,734	25,499	127,952	132,404	54,832
1996	1,131,353	2,418,148	3,490,578	1,536,084	777,760	1,835,080	2,394,040	952,914	63,331	305,221	256,860	111,197	22,072	122,388	129,881	42,233
1997	1,382,687	2,676,063	3,504,555	1,783,977	883,728	1,879,614	2,647,266	1,329,367	63,811	364,597	230,199	117,017	27,533	85,182	114,862	69,139
1998	1,264,051	2,446,577	3,228,176	1,591,230	530,711	2,100,841	2,275,388	1,482,564	114,497	199,690	198,210	92,608	30,803	100,331	115,917	73,389
1999	1,108,045	2,679,405	2,949,742	2,045,593	616,435	1,885,414	1,961,626	1,208,054	53,922	218,741	179,401	104,938	28,756	84,685	100,063	70,655
2000	1,342,787	3,362,096	4,265,008	2,386,760	1,096,959	2,538,567	3,015,722	1,661,498	44,127	262,077	259,402	101,387	19,711	89,158	97,961	62,076
2001	1,436,286	3,712,392	4,561,722	2,357,776	1,386,748	3,072,643	3,068,116	1,866,894	45,151	224,073	216,861	108,500	22,230	89,013	99,034	53,870
2002	1,702,255	3,387,360	4,227,593	2,138,066	731,456	2,533,791	2,446,150	1,391,886	41,158	240,203	208,985	102,003	19,082	85,941	102,102	55,783
2003	1,954,681	3,578,793	5,641,169	2,545,596	1,192,590	2,096,887	3,092,091	1,546,428	53,345	185,004	220,396	94,027	24,545	84,757	110,484	48,037
2004	1,958,117	4,290,476	4,769,544	2,783,367	1,340,330	3,311,928	2,764,406	1,818,826	47,119	253,750	237,153	105,252	23,505	89,712	100,884	57,638
2005	1,381,352	3,937,542	4,458,474	2,740,680	1,011,383	2,764,418	2,556,294	2,079,924	46,033	266,151	184,235	97,461	18,595	86,563	86,260	49,457
2006	2,018,747	4,215,433	4,971,965	2,429,086	1,201,693	2,739,248	3,478,801	1,741,761	77,727	272,565	238,178	110,287	17,662	87,394	96,852	50,613

Table 19. Total predicted (italics) and estimated recreational landings. Note that the estimated landings for 1981-1985 are incomplete and should be obtained from other documents.

year	Total	Atlantic	Mix	Gulf
1900	2,204	2,114	90	0
1901	10,782	5,174	5,608	0
1902	19,359	8,234	11,126	0
1903	27,937	11,293	16,643	0
1904	36,514	14,353	22,161	0
1905	45,092	17,413	27,679	0
1906	53,670	20,473	33,197	0
1907	62,247	23,533	38,715	0
1908	70,825	26,592	44,232	0
1909	79,402	29,652	49,750	0
1910	88,241	32,971	55,270	0
1911	96,915	36,125	60,789	0
1912	105,588	39,280	66,308	0
1913	114,261	42,434	71,827	0
1914	122,935	45,588	77,346	0
1915	131,608	48,743	82,865	0
1916	140,281	51,897	88,384	0
1917	148,955	55,051	93,903	0
1918	157,628	58,206	99,422	0
1919	166,302	61,360	104,941	0
1920	175,332	64,868	110,464	0
1921	183,656	67,669	115,987	0
1922	191,980	70,470	121,511	0
1923	200,304	73,270	127,034	0
1924	208,628	76,071	132,557	0
1925	216,952	78,872	138,081	0
1926	225,276	81,673	143,604	0
1927	233,600	84,473	149,127	0
1928	241,924	87,274	154,650	0
1929	250,248	90,075	160,174	0
1930	311,849	92,875	165,705	53,269
1931	327,093	96,210	171,229	59,654
1932	342,337	99,544	176,753	66,040
1933	357,581	102,878	182,278	72,425
1934	372,825	106,212	187,802	78,810
1935	388,068	109,546	193,326	85,196
1936	403,312	112,881	198,851	91,581
1937	418,556	116,215	204,375	97,966
1938	433,800	119,549	209,899	104,352
1939	449,044	122,883	215,423	110,737
1940	46,606	12,675	22,096	11,835
1941	48,384	13,066	22,649	12,669
1942	50,161	13,457	23,202	13,502
1943	51,939	13,848	23,755	14,336
1944	53,717	14,239	24,308	15,169
1945	55,494	14,630	24,861	16,003
1946	572,719	150,211	254,146	168,362
1947	590,495	154,121	259,678	176,697
1948	608,272	158,031	265,209	185,031
1949	626,048	161,941	270,741	193,366
1950	648,130	166,961	276,288	204,881
1951	668,072	171,074	281,844	215,153
1952	688,014	175,187	287,400	225,426
1953	707,956	179,300	292,957	235,699
1954	728,614	183,414	299,228	245,972
1955	752,636	188,085	308,307	256,245
1956	771,824	192,810	314,102	264,912
1957	791,011	197,534	319,898	273,578
1958	810,198	202,259	325,694	282,245
1959	829,385	206,983	331,490	290,912
1960	859,334	213,789	340,848	304,696
1961	898,629	231,956	350,513	316,160
1962	937,924	250,123	360,177	327,624
1963	977,875	268,290	369,841	339,743
1964	1,018,155	286,457	379,506	352,193
1965	1,058,673	304,624	389,170	364,879
1966	1,100,518	322,791	398,835	378,893
1967	1,142,363	340,957	408,499	392,907
1968	1,184,208	359,124	418,163	406,920
1969	1,226,053	377,291	427,828	420,934
1970	1,277,749	396,350	440,651	440,748
1971	1,326,835	415,859	451,264	459,712
1972	1,375,920	435,367	461,878	478,675
1973	1,425,005	454,875	472,492	497,638
1974	1,474,090	474,384	483,105	516,601
1975	1,523,176	493,892	493,719	535,564
1976	1,572,261	513,400	504,333	554,528
1977	1,621,346	532,909	514,946	573,491
1978	1,557,747	524,438	482,481	550,828
1979	1,487,856	514,311	448,557	524,988
1980	1,425,135	504,255	417,044	503,836
1981	480,364	88,170	276,977	115,217
1982	1,139,794	147,720	267,157	724,917
1983	687,843	245,668	184,021	258,154
1984	781,389	304,185	185,796	291,408
1985	402,972	217,600	66,977	118,395

year	Total	Atlantic	Mix	Gulf
1986	1,025,166	666,509	208,197	150,460
1987	1,124,788	533,882	238,432	352,474
1988	1,031,900	493,410	221,174	317,316
1989	755,397	280,155	219,350	255,892
1990	1,007,187	318,132	342,625	346,430
1991	1,364,740	526,544	331,795	506,401
1992	1,196,875	619,264	284,187	293,424
1993	923,003	207,119	371,637	344,247
1994	991,937	244,305	375,541	372,091
1995	1,122,569	242,541	560,680	319,348
1996	1,024,806	176,176	473,518	375,112
1997	1,266,105	395,170	514,655	356,280
1998	928,771	286,510	413,185	229,076
1999	766,247	133,108	359,069	274,070
2000	983,010	284,391	351,929	346,690
2001	749,454	205,546	253,921	289,987
2002	724,428	108,687	306,446	309,295
2003	941,260	171,902	484,638	284,720
2004	749,001	158,071	306,861	284,069
2005	734,343	187,325	314,396	232,622
2006	1,049,846	150,499	423,920	475,427

Figure 1. Map showing three zones used to partition the times series of catch and effort.

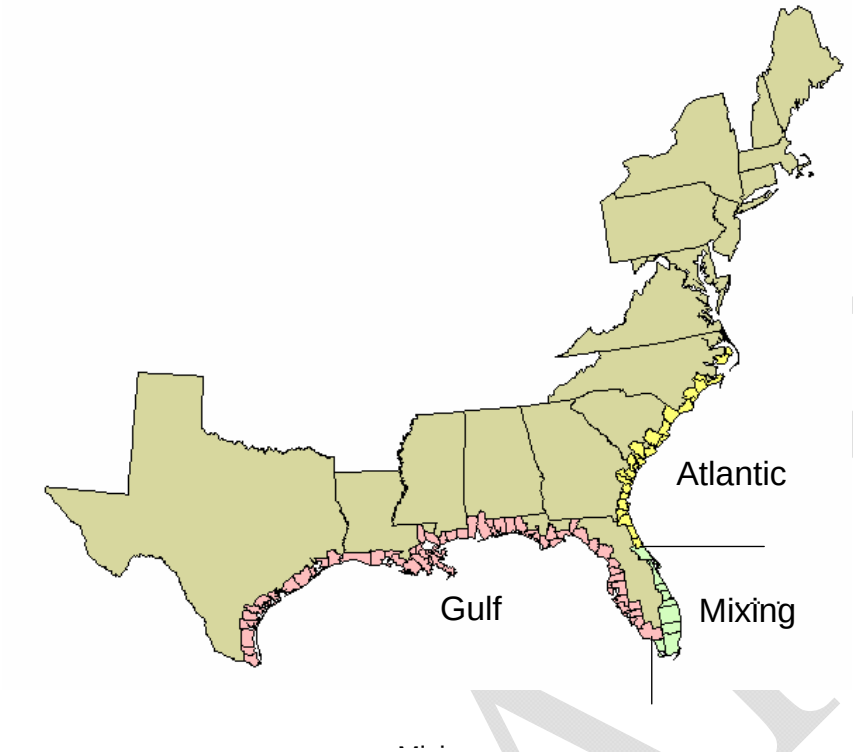


Figure 2. Mean CPUE by zone and season. Horizonatal bars are the mean values used for back calculations. These mean values were generally from the years 1981-1985 unless the time series started in 1986 as for charter CPUE. Mean values were obtained from the years that the lines span.

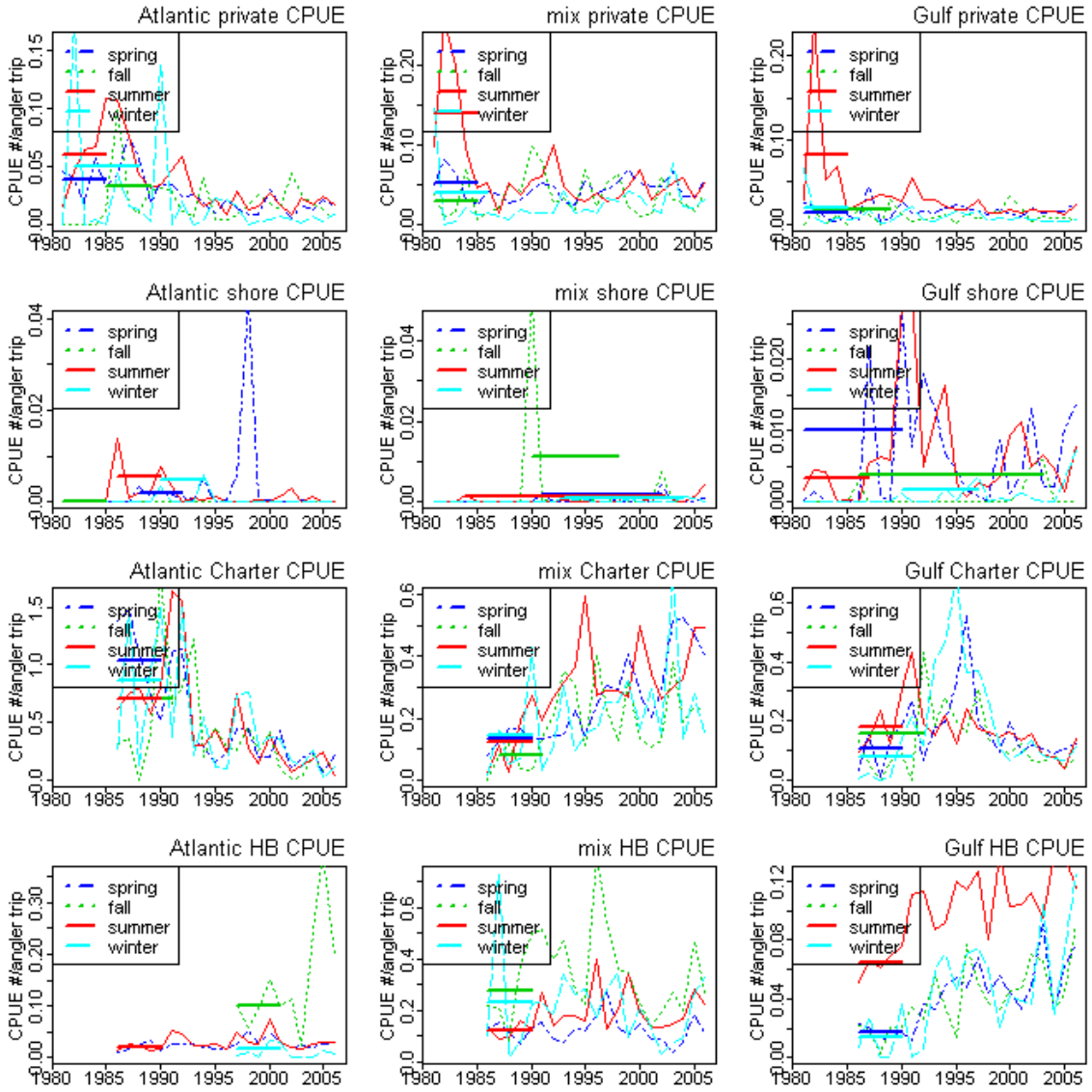


Figure 3. Highest five CPUE values by zone and season. Horizontal bars are the mean of the highest five CPUE for the time period. Mean values were obtained from the range of years that the lines span.

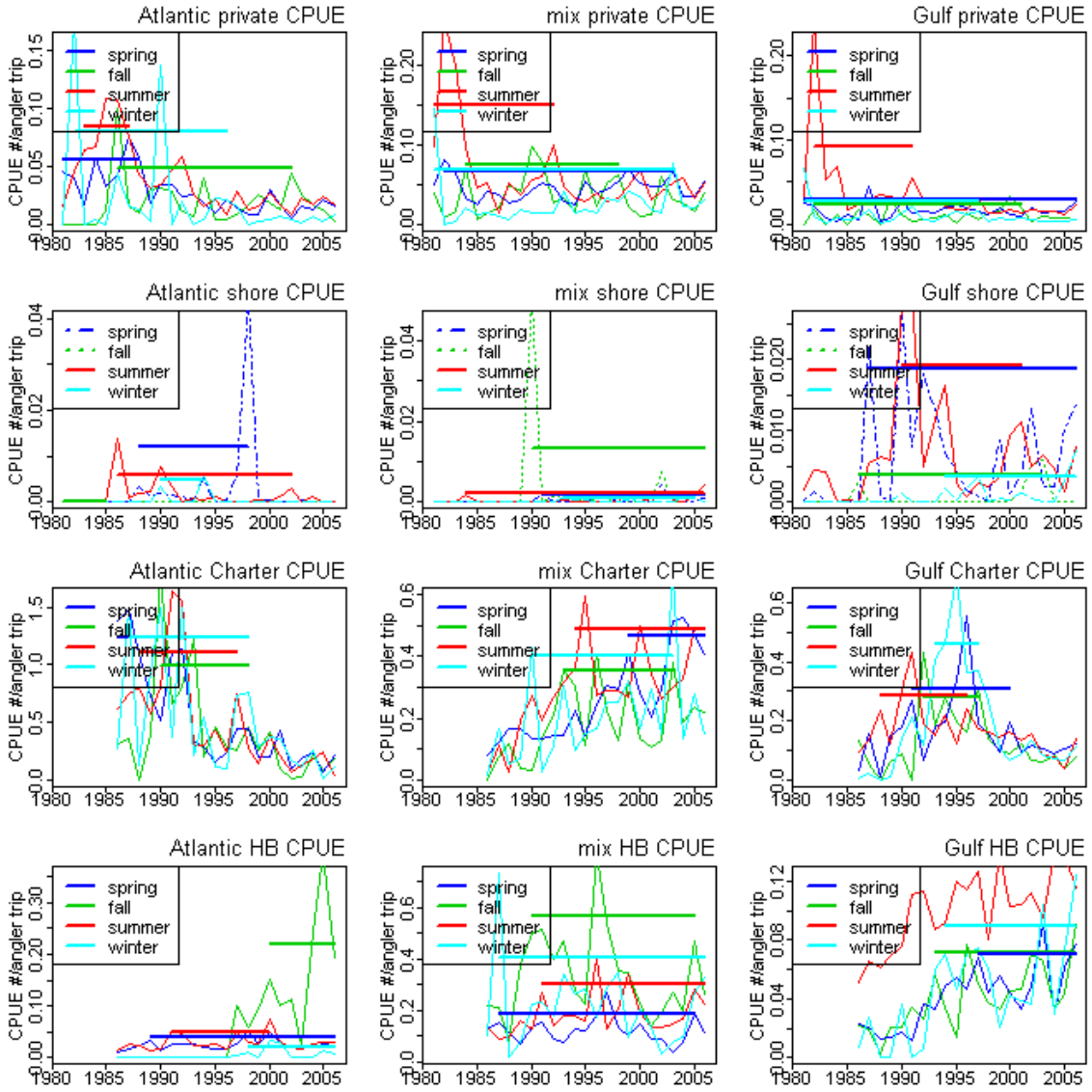


Figure 4. Highest five CPUE by zone, mode and season.

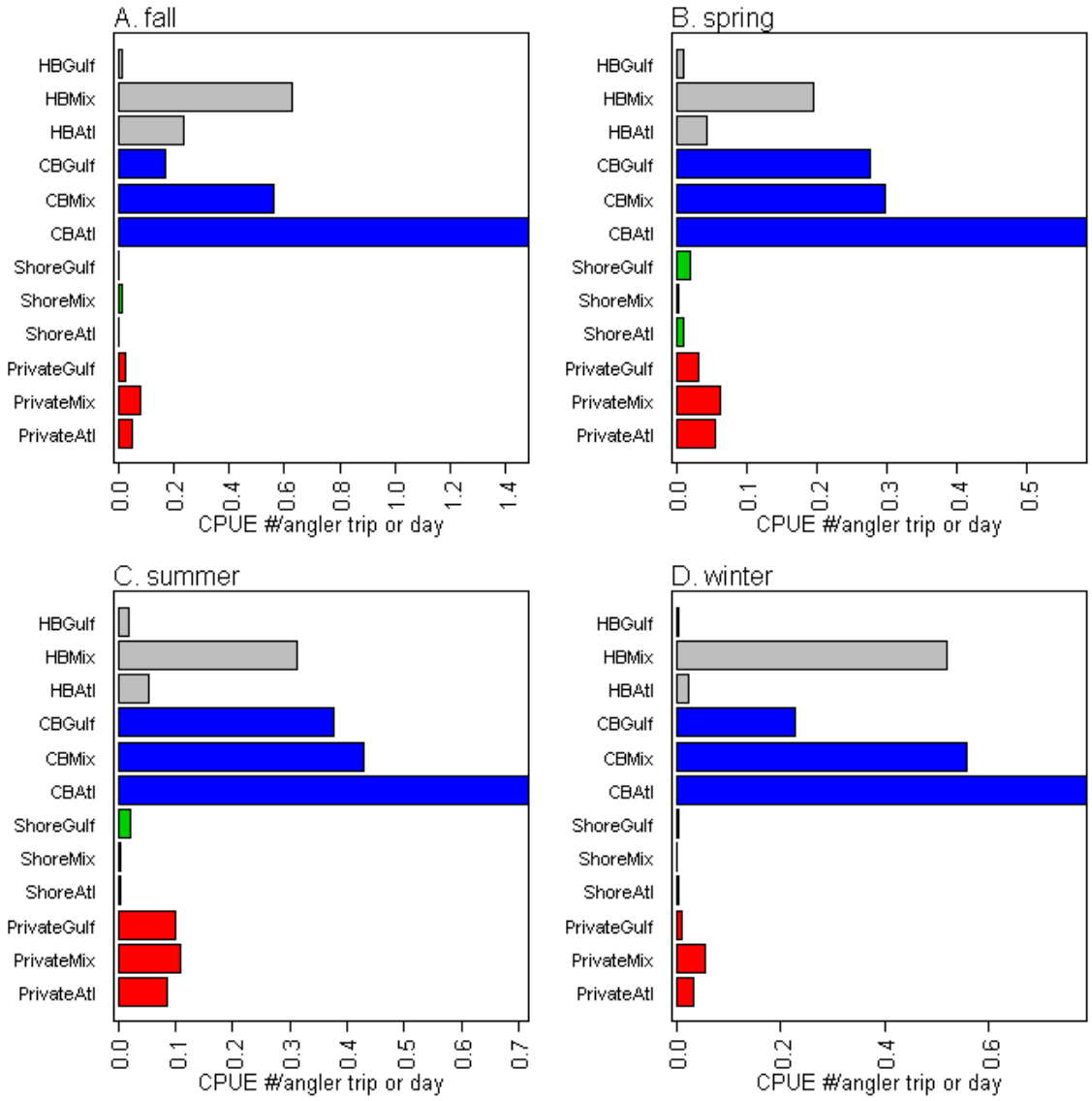


Figure 5. Predictions of fishing effort in angler trips or angler days (headboats) from coastal county population numbers for the Atlantic for private boat trips, shore, headboat and charterboats.

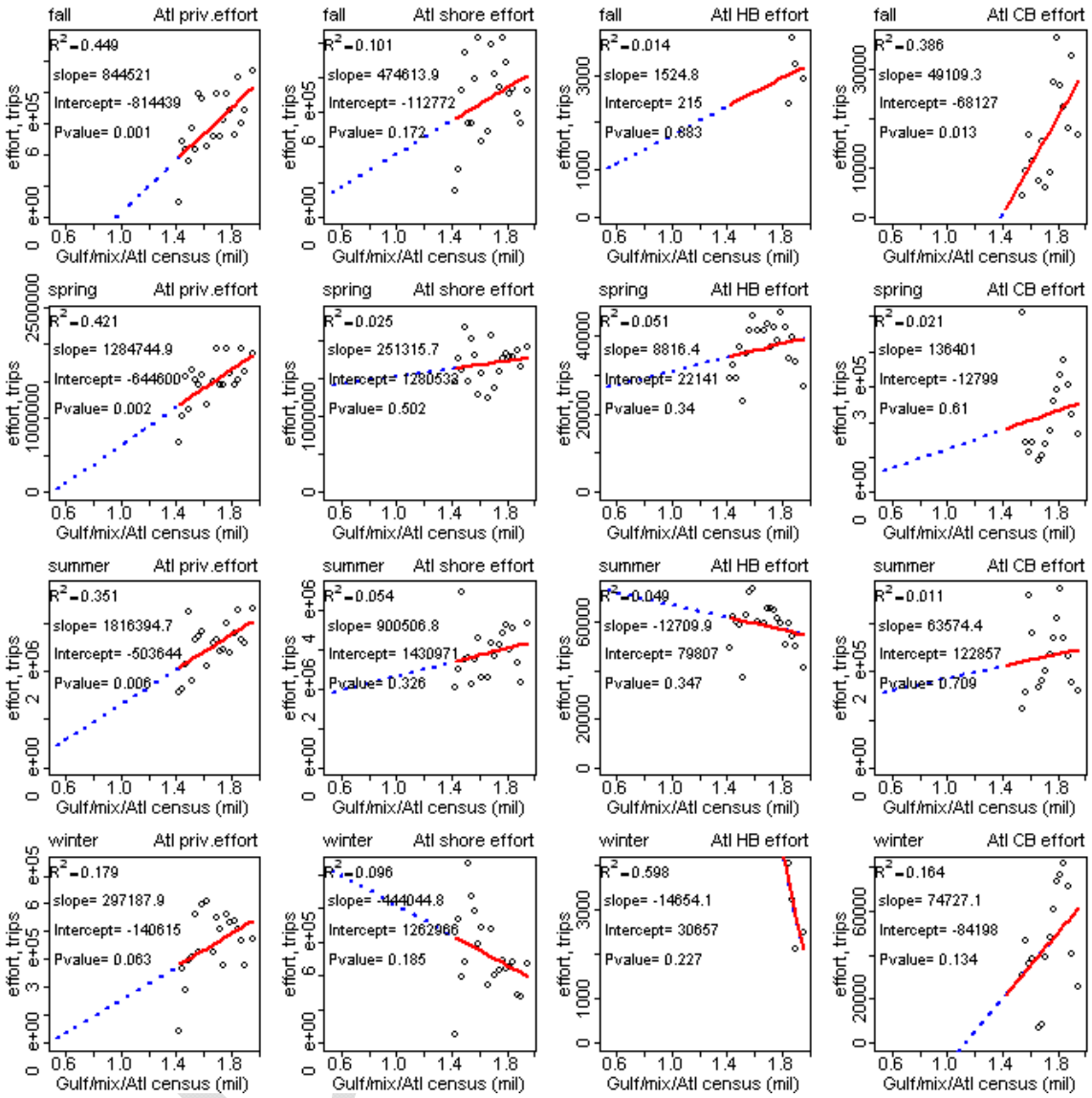


Figure 6. Predictions of fishing effort in angler trips from coastal county population numbers for the mixing zone for private boat trips, shore, headboat and charterboats.

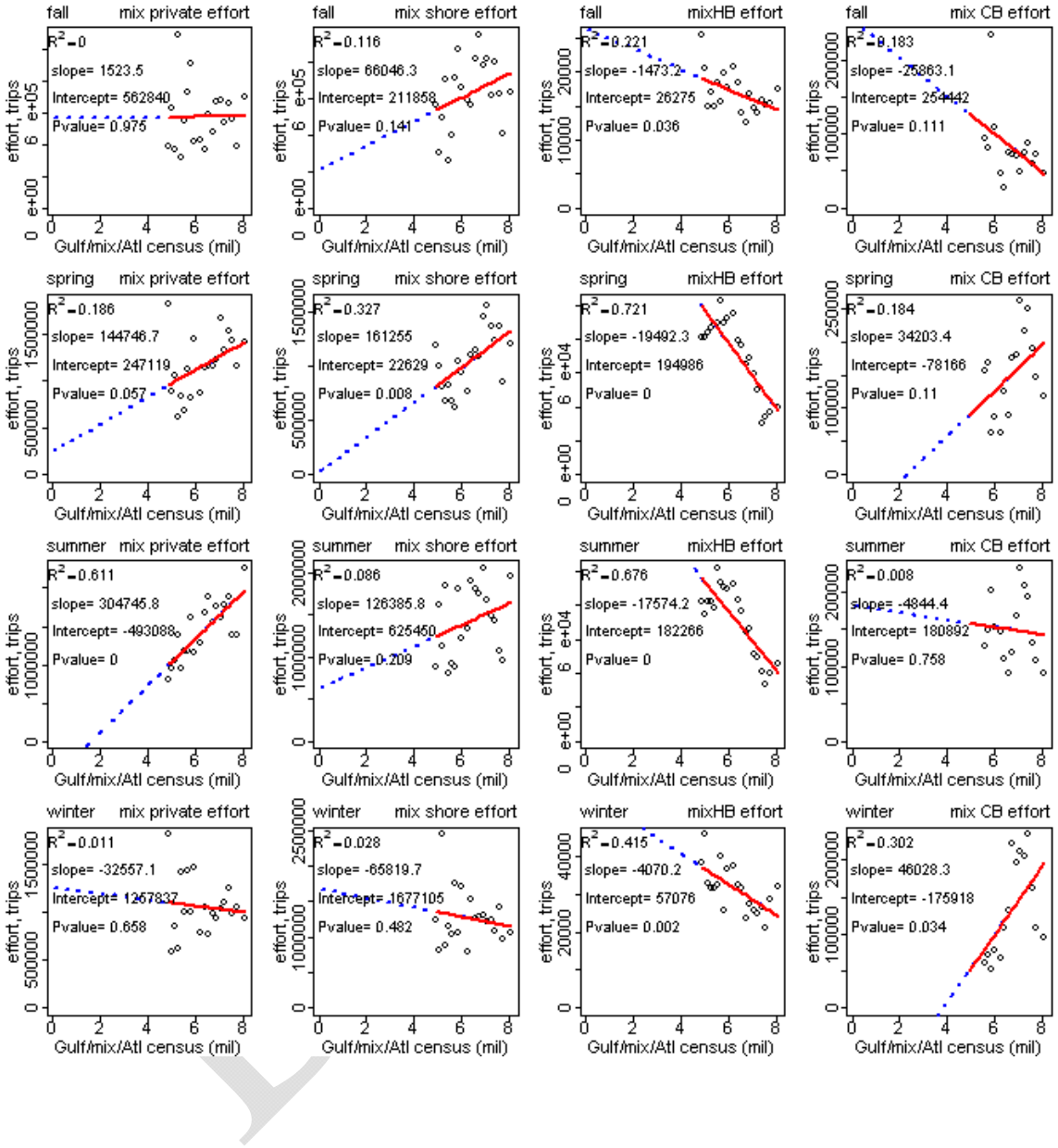


Figure 7. Predictions of fishing effort in angler trips or angler days (headboats) from coastal county population numbers for the Gulf of Mexico for private boat trips, shore, headboat and charterboats.

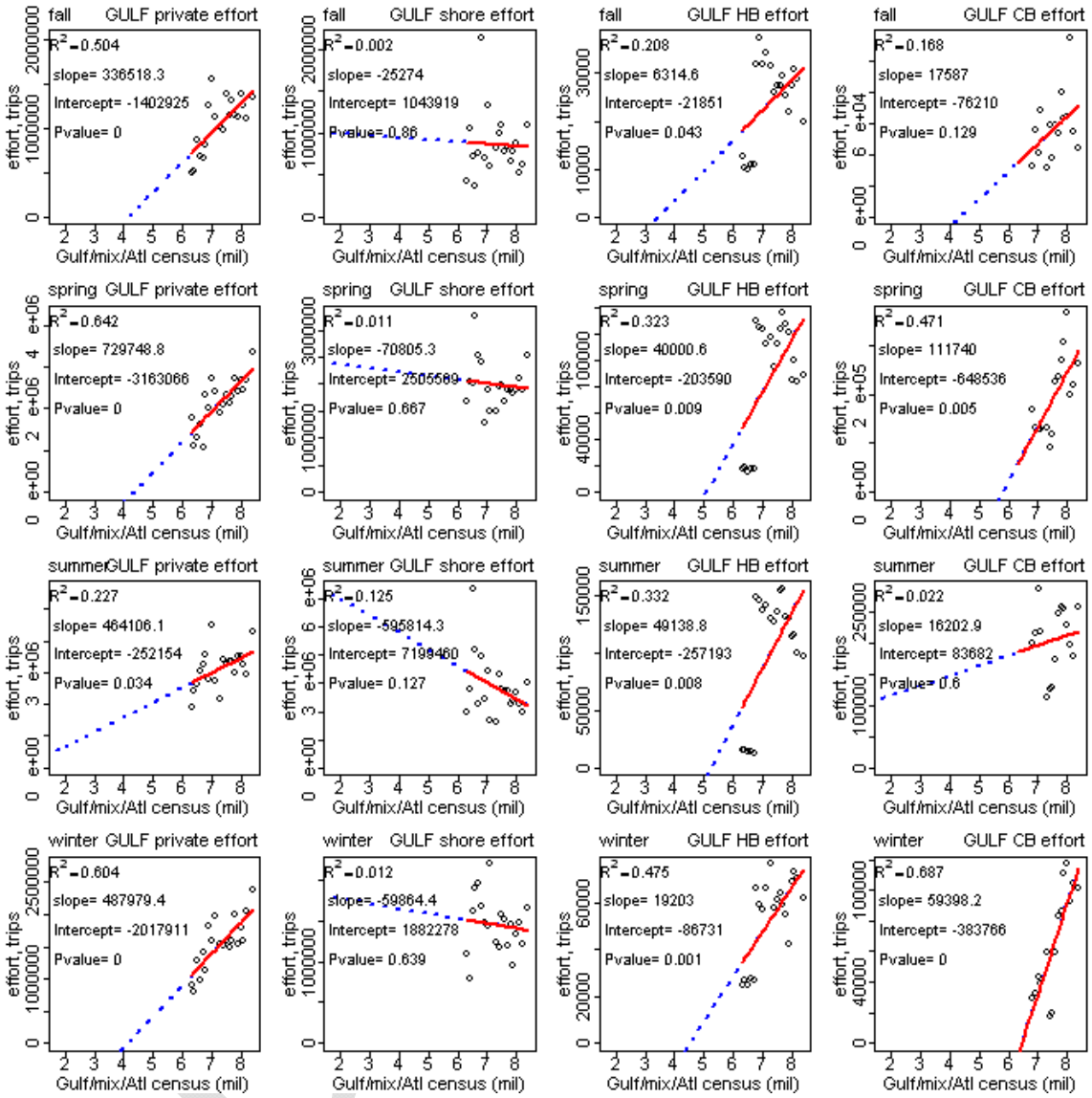


Figure 8. Predictions of private fishing effort (angler trips or angler-days for headboats) by zone and season based Method 1: linear extrapolation of mean effort (blue dashed lines), Method 2: census predictions and Method 3: linear interpolation through point estimates derived from Ellis et al (1958).

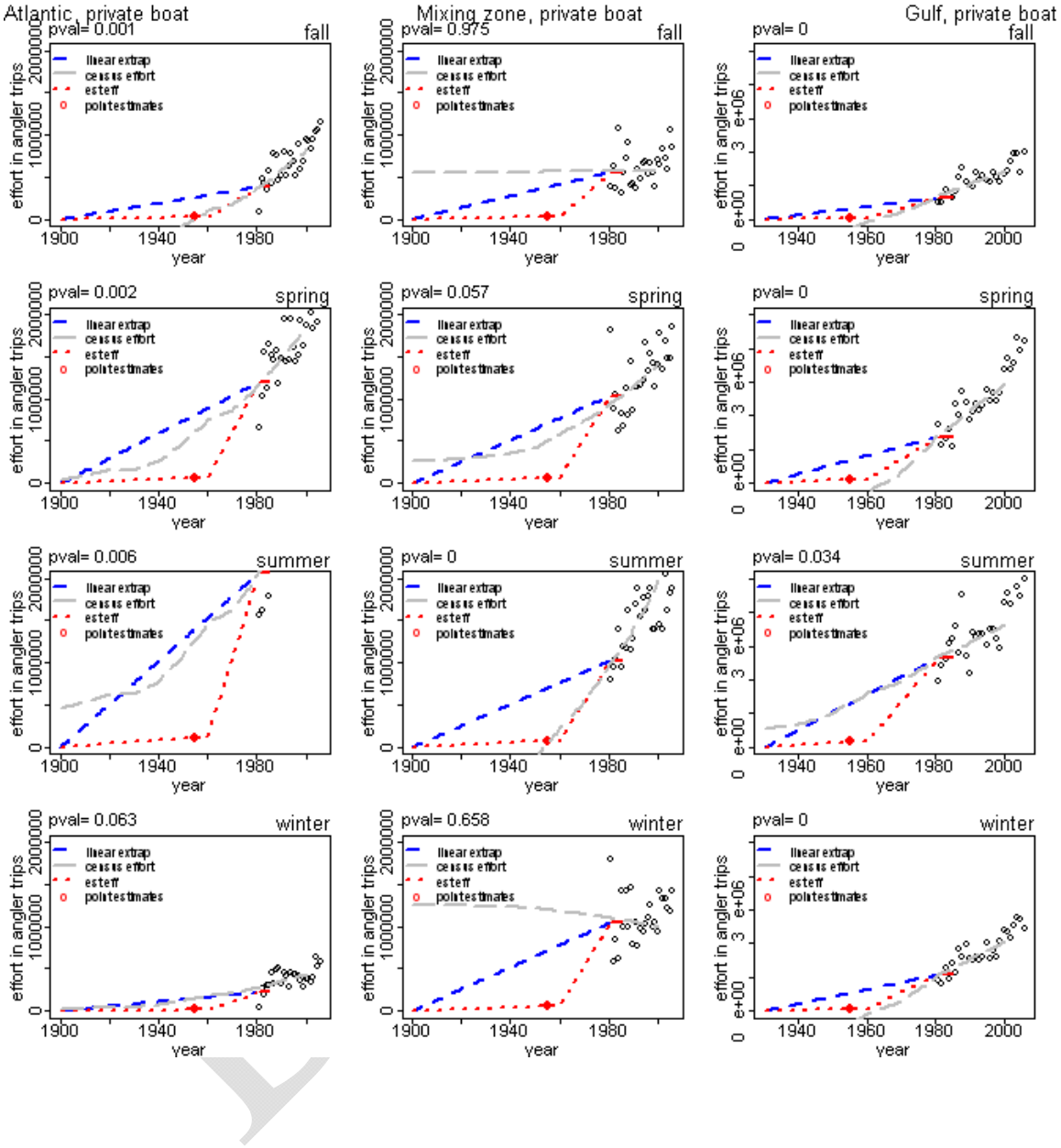


Figure 9. Predictions of shore fishing effort (angler trips or angler-days for headboats) by zone and season based Method 1: linear extrapolation of mean effort (blue dashed lines), Method 2: census predictions and Method 3: linear interpolation through point estimates derived from Ellis et al (1958).

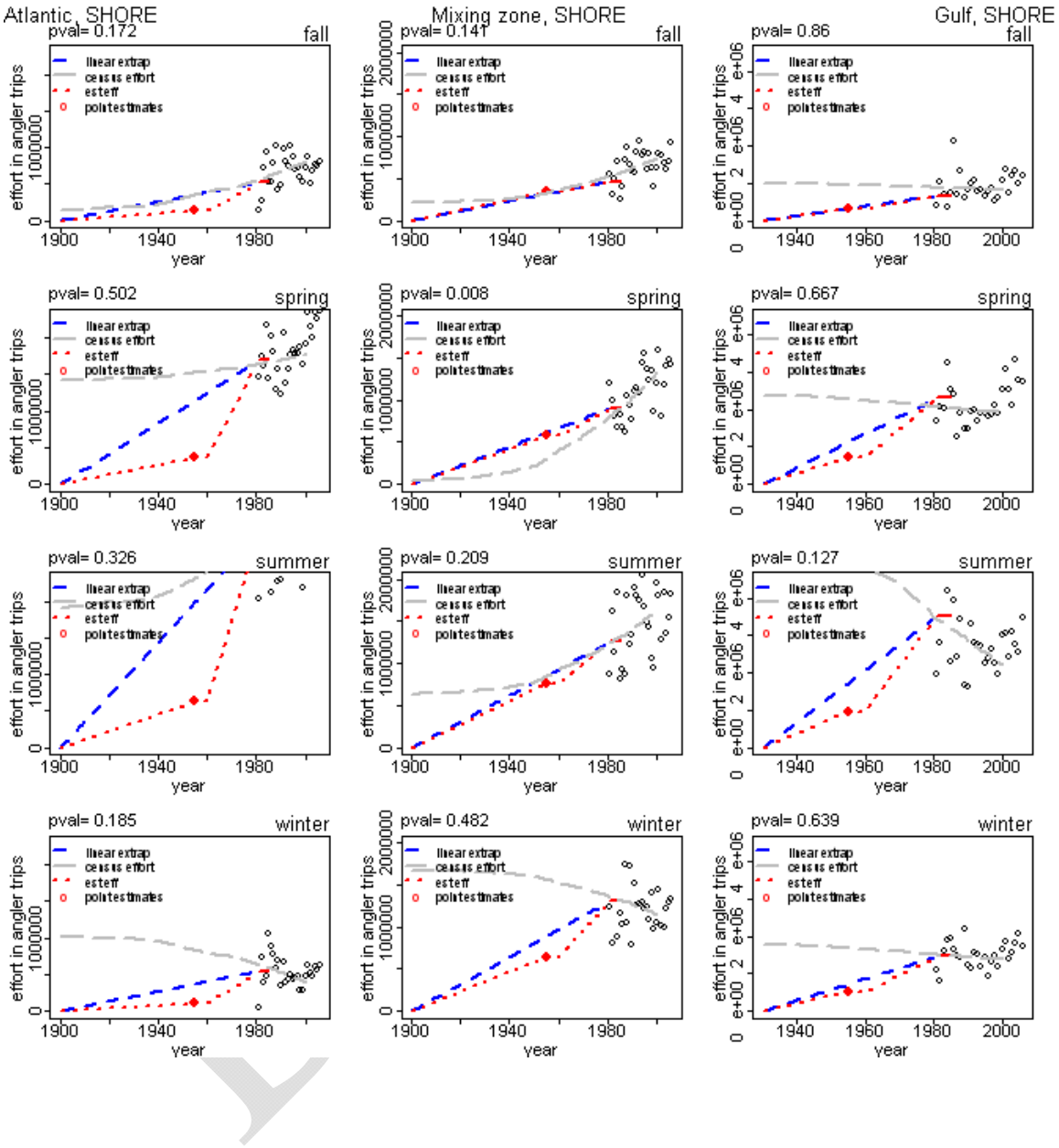


Figure 10. Predictions of charterboat fishing effort (angler trips or angler-days for headboats) by zone and season based Method 1: linear extrapolation of mean effort (blue dashed lines), Method 2: census predictions and Method 3: linear interpolation through point estimates derived from either Moe (1963) or Ellis et al (1958). Charterboat-specific data begins in 1985.

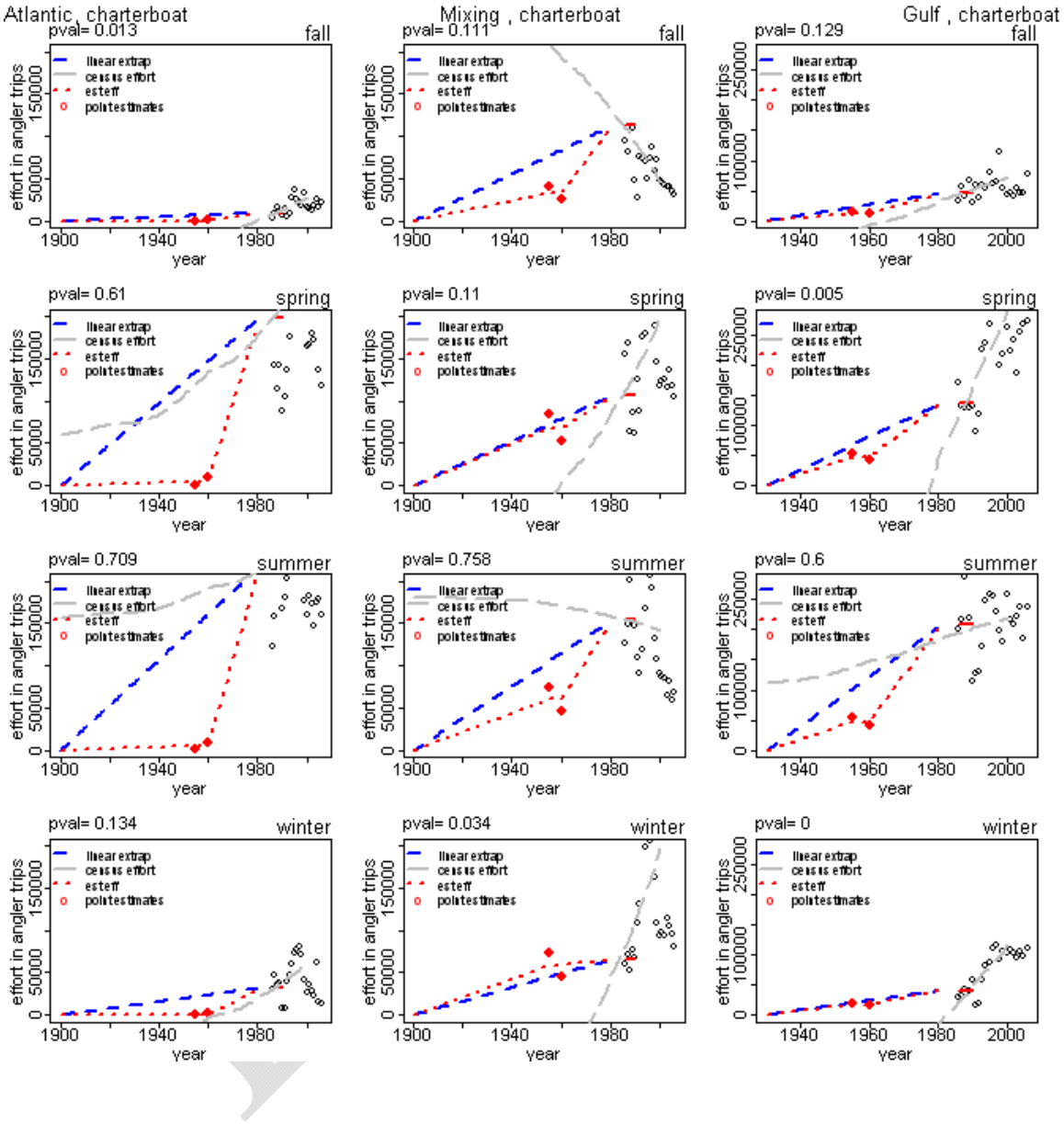


Figure 11. Predictions of headboat fishing effort (angler trips or angler-days for headboats) by zone and season based Method 1: linear extrapolation of mean effort (blue dashed lines), Method 2: census predictions and Method 3: linear interpolation through point estimates derived from either Moe (1963), Ellis et al. (1958) or Ditton et al. (1992). Note that Gulf headboat data estimates use years 1985-89 because prior to this these landings and effort were included as chater/headboat.

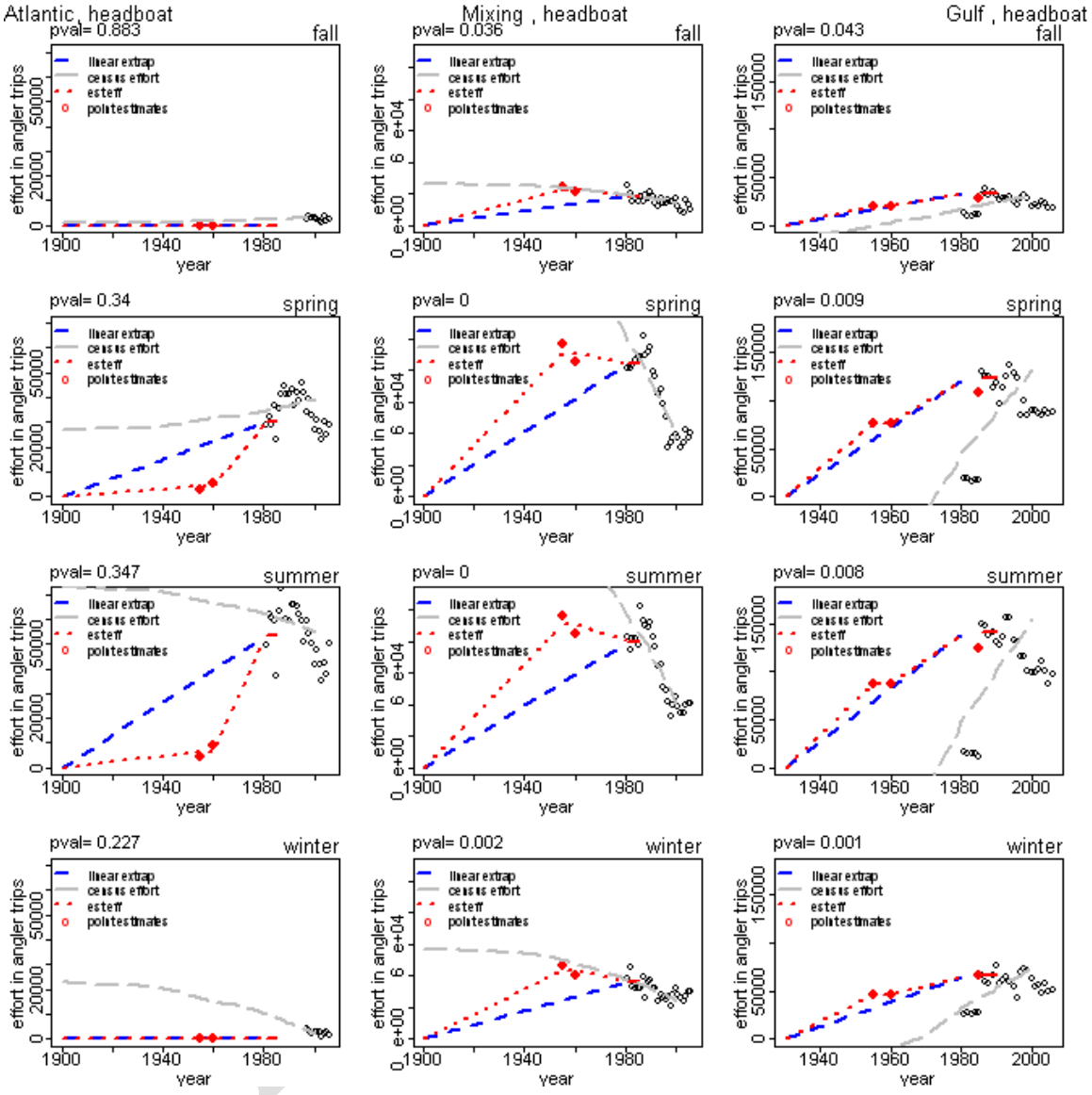


Figure 12. Predictions of Atlantic recreational landings of king mackerel by mode and season based on Method 1: linear extrapolation of effort back to zero in 1930 multiplied by CPUE (gray dashed lines), Method 2: census predictions of effort multiplied by mean catch rates (black dotted lines), and Method 3. interpolations through empirical estimates (blue lines). The chosen method is highlighted in red.

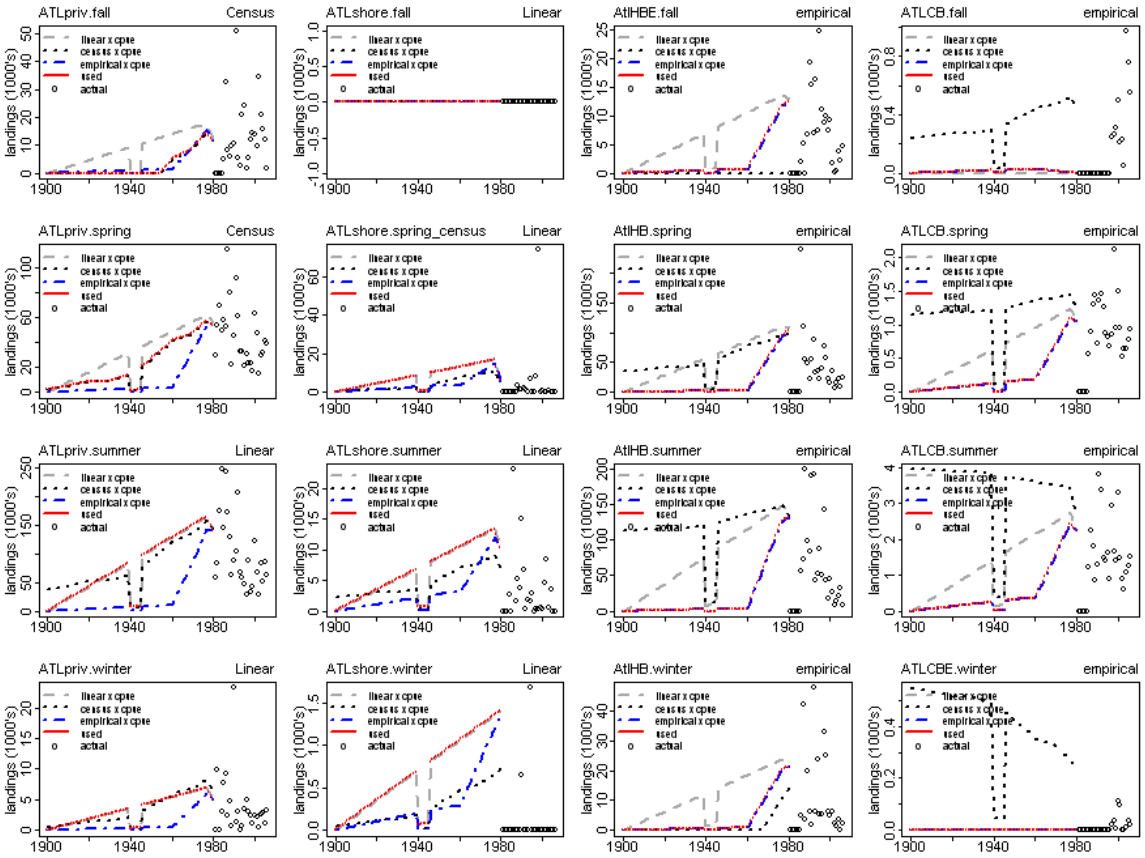


Figure 13. Predictions of Mixing zone recreational landings of king mackerel by mode and season based on Method 1: linear extrapolation of effort back to zero in 1930 multiplied by CPUE (gray dashed lines), Method 2: census predictions of effort multiplied by mean catch rates (black dotted lines), and Method 3. interpolations through empirical estimates (blue lines). The chosen method is highlighted in red.

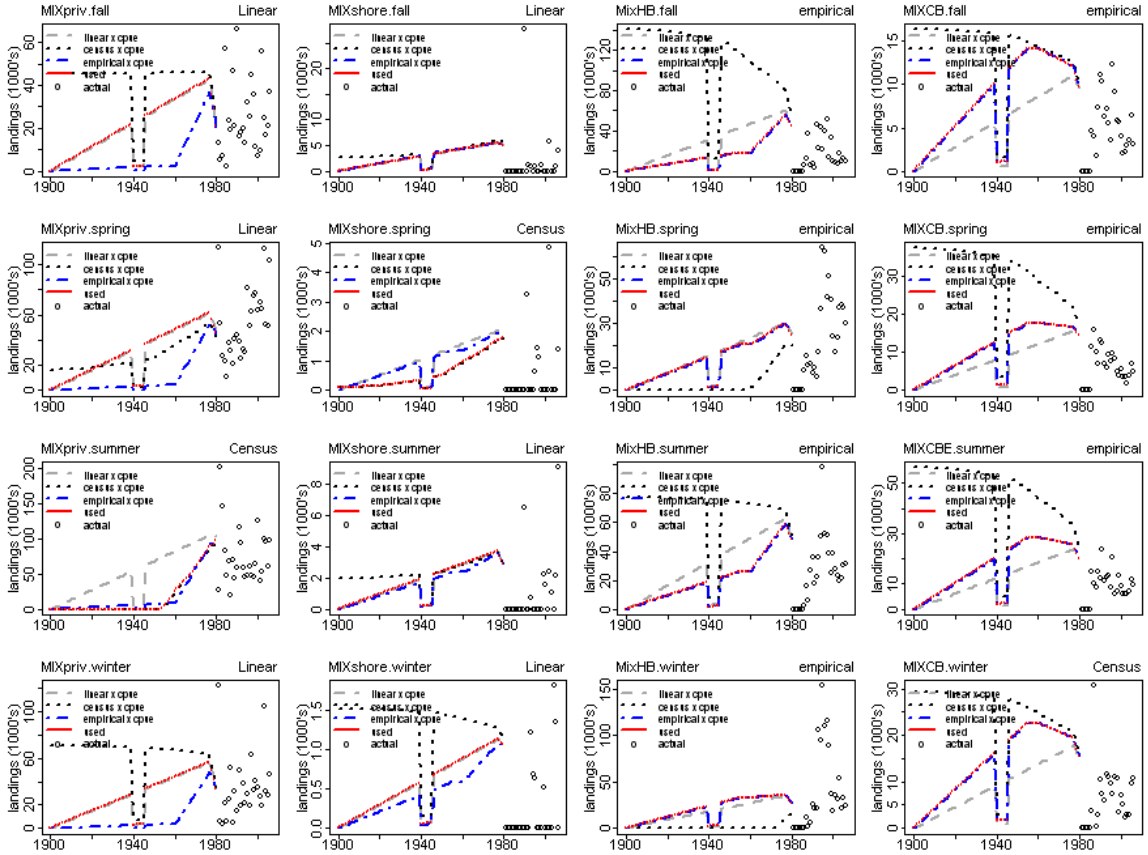


Figure 14. Predictions of Gulf zone recreational landings of king mackerel by mode and season based on Method 1: linear extrapolation of effort back to zero in 1930 multiplied by CPUE (gray dashed lines), Method 2: census predictions of effort multiplied by mean catch rates (black dotted lines), and Method 3. interpolations through empirical estimates (blue lines). The chosen method is highlighted in red. Note that these exclude Texas

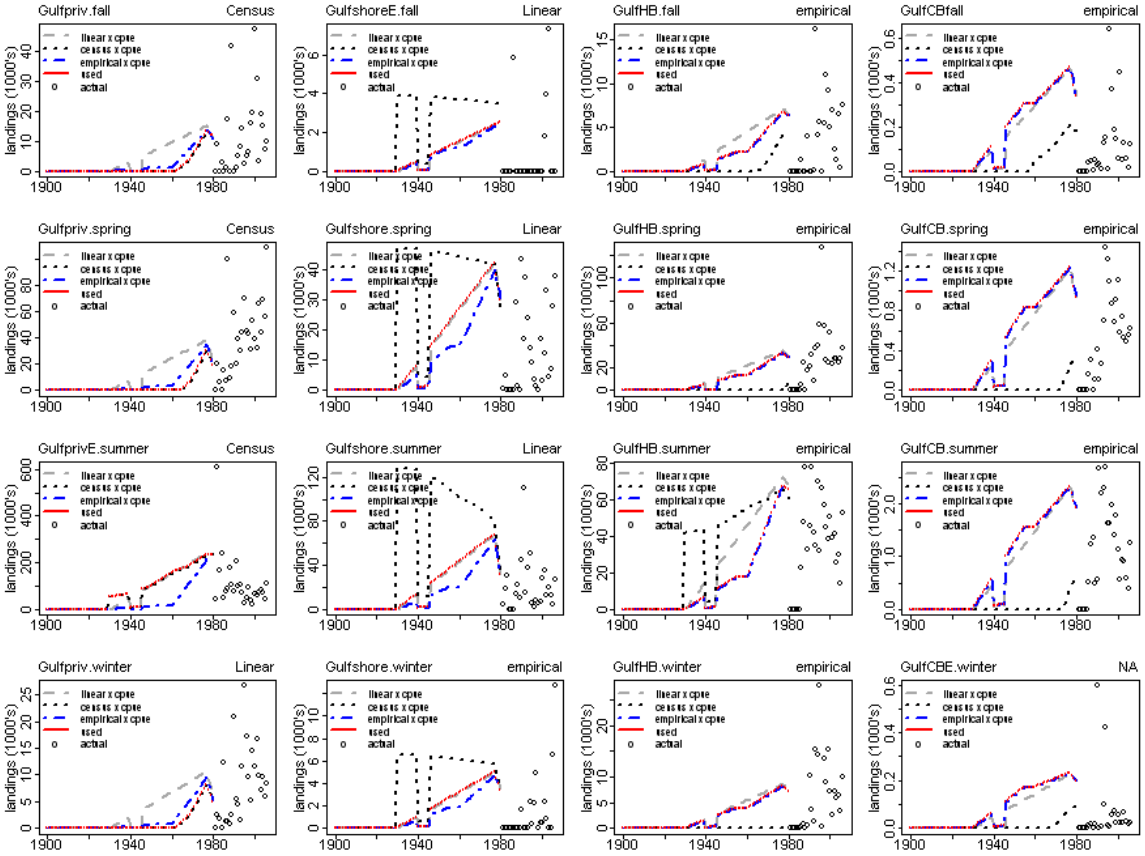
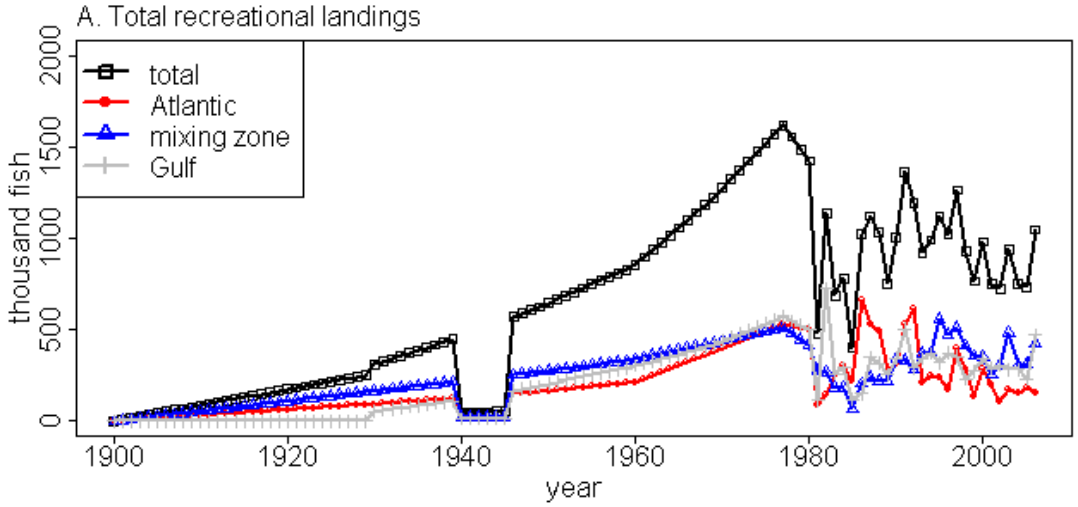


Figure 15. Total predicted and estimated recreational landings (A) and effort (B) by zone 1930-2006. Note that the drop in 1981-85 is a result of incomplete data as it does not include the combined charter/headboat category. These are picked up as separate modes from 1986 onward in the time series.



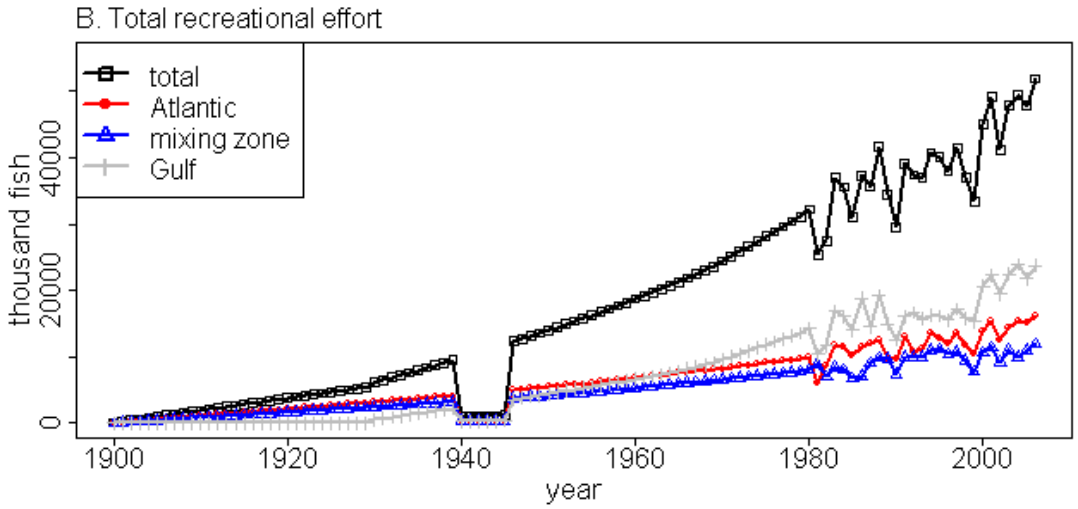


Figure 16. Total predicted and estimated recreational landings by mode and zone. The same caveat as in figure 14 applies for charter and headboats in 1981-85.

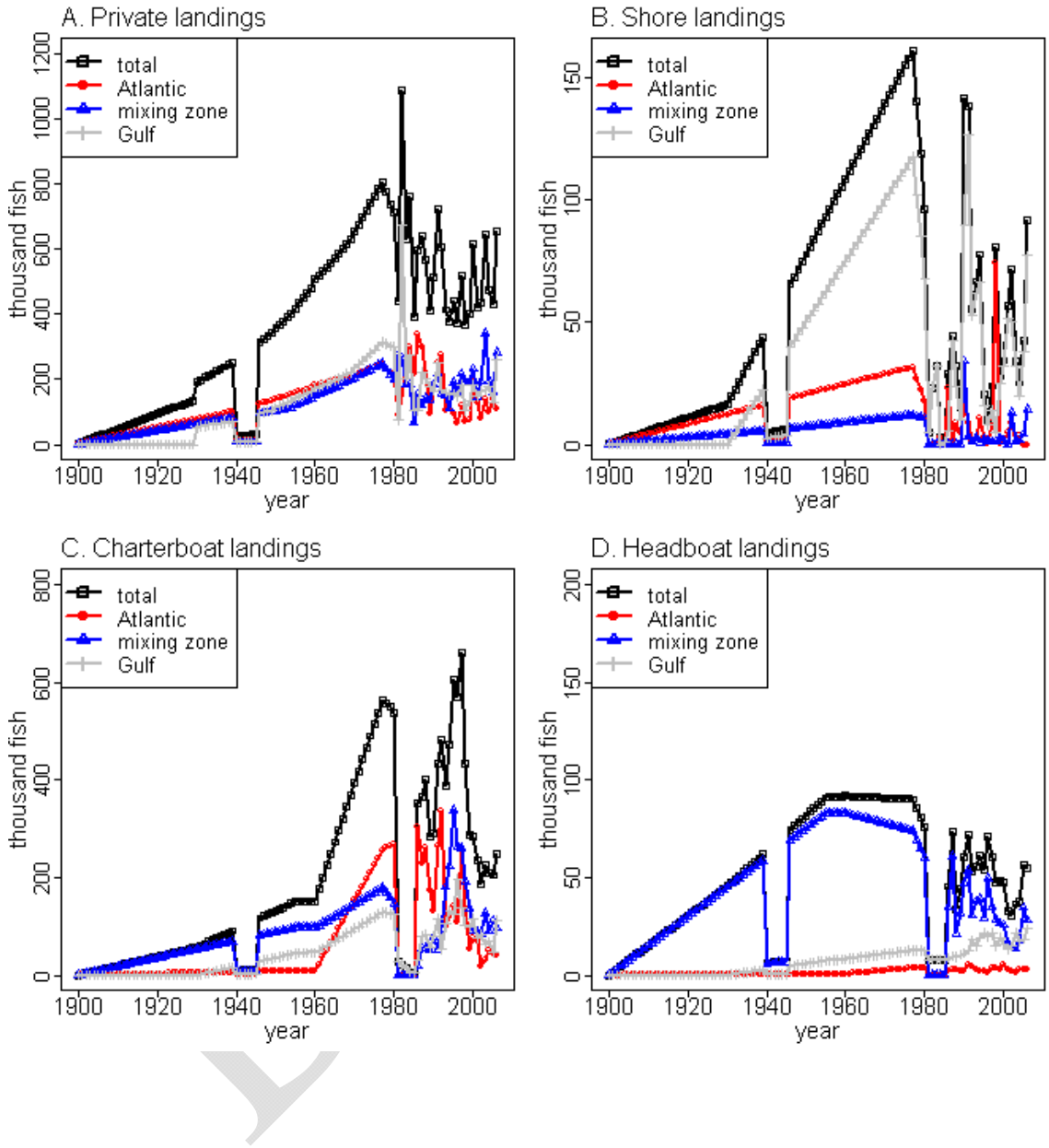


Figure 17. Total predicted and estimated recreational effort by zone and season. The same caveat as in figure 15 applies for charter and headboats in 1981-85.

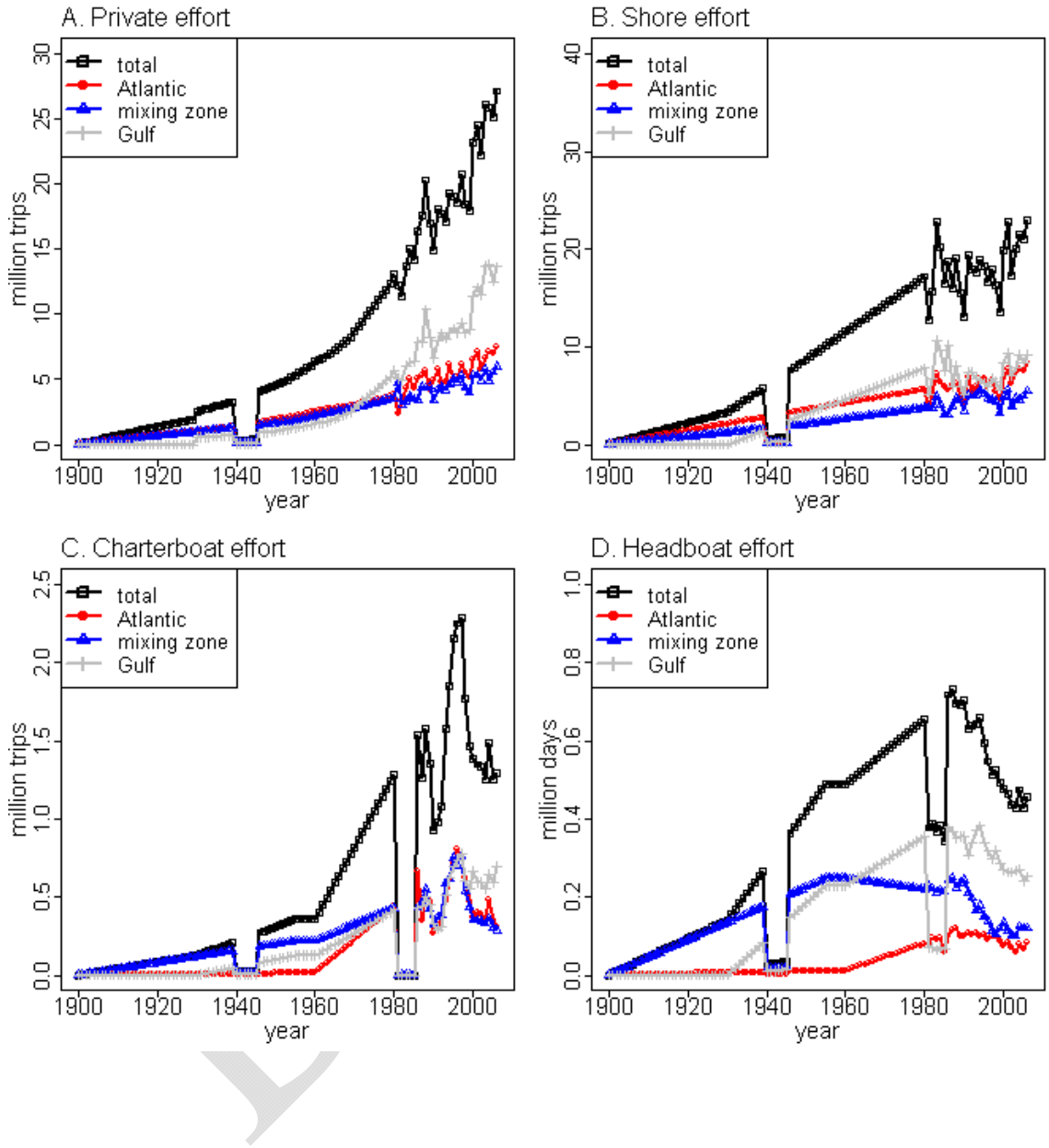


Figure 18. Total predicted and estimated recreational landings by zone and season. The same caveat as in figure 15 applies for charter and headboats in 1981-85.

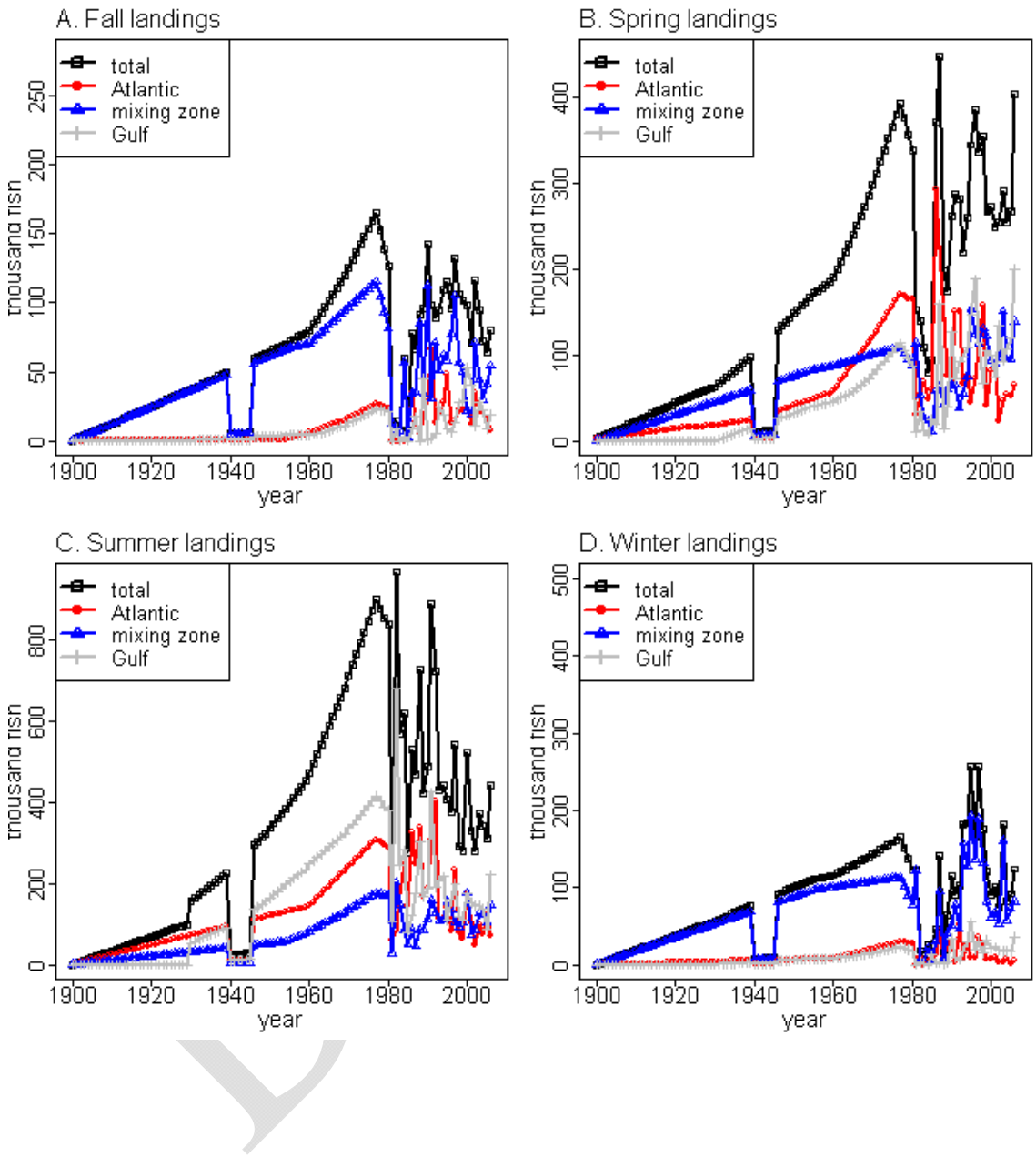


Figure 19. Comparison of new and old (SEDAR DW report) landings. Note that old landings from 1981-2006 were incorrect.

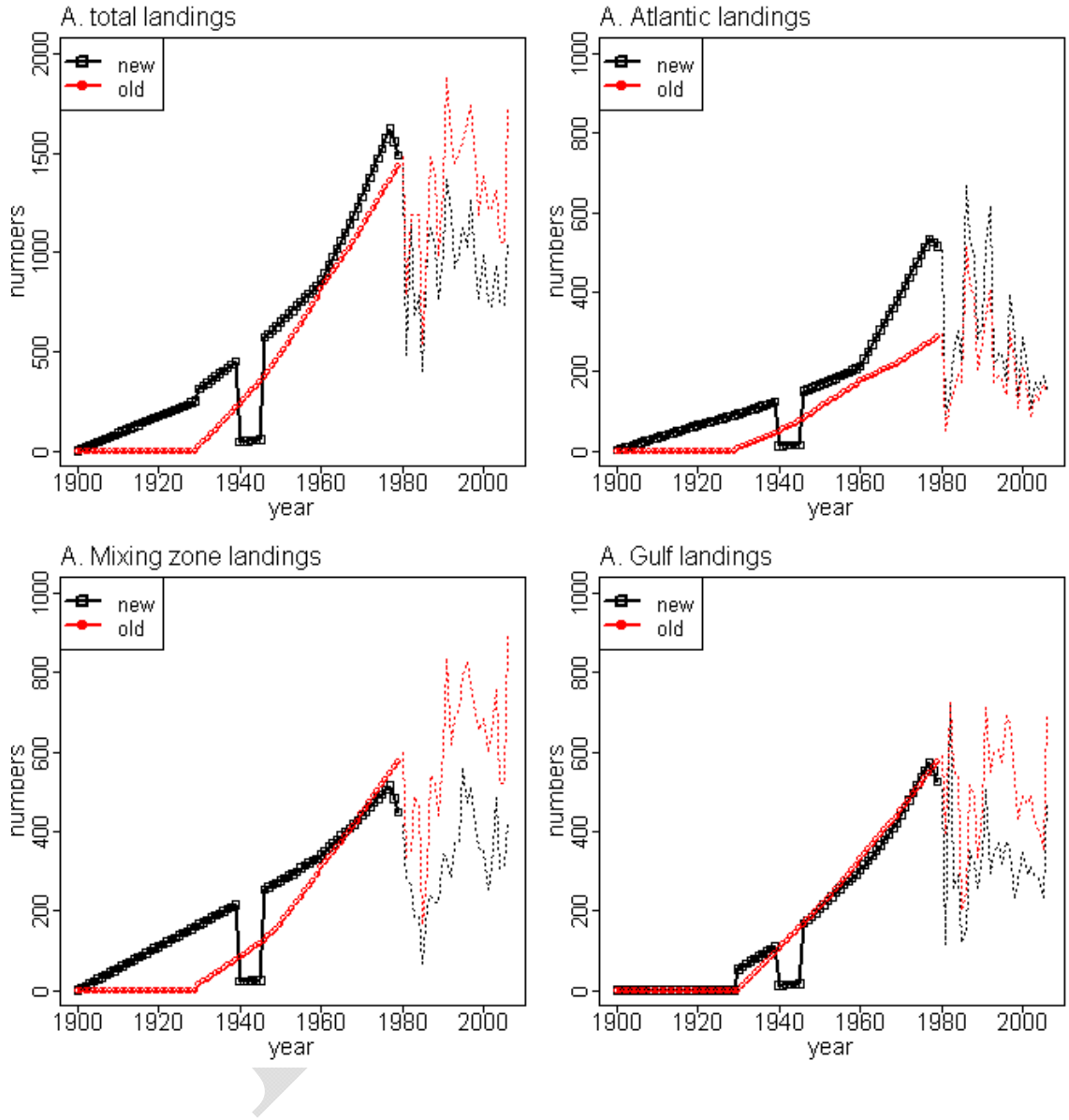


Figure 20. CPUE values used for 1980 and used for the previous version of this paper. Average CPUE by zone, mode and season. These mean values were generally from the years 1981-1985 unless the time series started in 1986 as for charter CPUE.resu