THE 1965 SALT-WATER ANGLING SURVEY

United States Department of the Interior
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife

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By David G. Deuel and John R. Clark

Published by
Bureau of Sport Fisheries and Wildlife
Washington, D.C. • July 1968
Resource Publication 67

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 40 cents

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In 1960, when the Bureau of Sport Fisheries and Wildlife initiated a program of research on migratory marine game fishes, there were no statistics on salt-water fish catches for the Nation as a whole. Without a good measure of resource use it was difficult to pinpoint problem areas and to plan a sound program of research for marine fishes.

Sport fish surveys so far conducted by State conservation agencies have usually dealt with selected segments of the fishery during part of the year or in a part of the State. California is the only State which has collected statistics regularly (for its party boat fishery) and only recently have the surveys been broadened to include (at irregular intervals) private boat, shoreline, and pier and jetty fishing for the entire State (Pinkas, Thomas and Hanson, 1967).

Since there were no adequate statistics we arranged with the Bureau of Census for a national survey of salt-water angling in 1960. The results, published as The 1960 Salt-Water Angling Survey (Clark, 1962), were useful for many purposes but inadequacies were noted. The 1960 survey was followed by another in 1965 to provide comparative data for judging the reliability and consistency of catch data collected in this way; i.e., using a general population survey to obtain estimates from recall at the end of a complete year of fishing. The second survey, The 1965 Salt-Water Angling Survey, is the subject of this report.

We would have preferred to make a continuous collection of detailed sport fish statistics rather than to conduct a recall survey. However, obtaining such detailed records for the whole country would be a complex undertaking because sport fishing occurs 24 hours a day, 7 days a week, 12 months of the year in coastal rivers, sounds, bays and the ocean. Anglers fish from private boats, party and charter boats, rented boats, shore, and from man-made structures such as piers, bridges and jetties. Obtaining data on catches of the entire marine sport fishery for a year, even within a small geographical area, would have been a costly and time consuming process.

We gratefully acknowledge the many individuals and agencies that assisted us with The 1965 Salt-Water Angling Survey. We contacted the conservation agencies of all coastal States and received helpful suggestions from many of them. Colleagues in the Bureau of Sport Fisheries and Wildlife, Gerald B. Talbot and James L. Squire, Jr., of the Tiburon Marine Laboratory and Norman G. Vick of the Eastern Gulf Marine Laboratory, assisted with many aspects of the survey, including design of the interview forms, preparation of the common name index, and review of the manuscript. We are grateful to Lionel A. Walford, Laboratory Director, whose advice has been most helpful and to Bruce L. Freeman for review and criticism of the manuscript. We also wish to thank Earle J. Gerson of the Bureau of Census for many helpful suggestions and for reviewing the manuscript. Susan E. Smith assisted with compilation of the data and preparation of the report.

SECTION 1. - THE SURVEY

The U.S. Bureau of Census conducted The 1965 Salt-Water Angling Survey as an adjunct to a survey of all fishing and hunting activity in the United States, the 1965 National Survey of Fishing and Hunting (U.S. Bureau of Sport Fisheries and Wildlife, 1966). This survey consisted of household interviews of approximately 43,500 persons in 16,000 households drawn by area probability sampling to represent the total population of persons 12 years of age and older in the United States, excluding members of the armed forces and persons in institutions. This sample was based on a sub-sample of persons previously selected for the Current Population Survey conducted by the Bureau of Census. Those persons contacted in the National Survey of Fishing and Hunting identified as salt-water anglers were later interviewed for The 1965 Salt-Water Angling Survey (hereafter identified as the 1965 Angling Survey).

The number of geographical divisions for reporting the catches of the 1965 Angling Survey was limited to seven which were chosen to coincide where possible with biogeographical areas rather than with political divisions. The regions used for the 1965 Angling Survey are listed in Section 2. It was not possible to include Hawaii because its small population size would not allow for reliable catch estimates for this State alone and because its unique fish fauna made it impossible to include Hawaii with any other region of the survey.

Each salt-water angler interviewed was asked to report the total number and average weight of fish he had caught during 1965 by species, geographical region, and principal area and method of fishing. Completed interview records were obtained from 1,566 persons or about 95 percent of those originally identified as salt-water anglers. This information was used to estimate the total catch of the 8,236,000 salt-water anglers in the United States classified by the Bureau of Census as "substantial participants". A detailed description of survey methods is given in Section 2.

The catches of the 1965 Angling Survey were compiled by 76 species groups. A detailed discussion of species grouping is presented in Section 2 and a description of the content of each species group in Section 4. All fish names agree with the names in A List of Common and Scientific Names of Fishes from the United States and Canada (American Fisheries Society, 1960). A list of the common names of all species of fish which may be included in any of the species groups is given in Section 5.

Detailed tables of results are included in Section 2. A summary of catch estimates is given in Table 1. Although the number of anglers shows a substantial increase from 1960 to 1965 (33 percent for all regions combined), the number of fish caught increased only 16 percent, from an estimated 633 million to 737 million. The weight of fish caught increased 7 percent, from an estimated 1.38 billion pounds to 1.47 billion pounds.

SECTION 2. - U.S. BUREAU OF CENSUS REPORT OF THE 1965 SALT-WATER ANGLING SURVEY[1/]

Results of the Survey

The detailed results of the 1965 Angling Survey conducted by the Bureau of Census, are shown in Tables 2 through 6. These catch estimates are for the 8,236,000 anglers classified as "substantial participants" fishing in U.S. waters during 1965. A summary of the catches for each principal area and method of fishing is presented in Table 2 for each region of the survey. The number of fish caught, the number of anglers, and the weight of fish caught is given by species groups for each region of the survey in Tables 3 through 5 respectively. The composition of each species group is shown in Section 4, Classification of Species Groups. The number of fish caught by species groups for each principal area and method of fishing for each region of the survey is given in Table 6.

1/This section was originally prepared by the Demographic Surveys Division, U.S. Bureau of Census, under the direction of Earle J. Gerson. Some explanatory statements have been added and some editorial changes made.

Table 1.--Estimated number of salt-water anglers and their catches in the United States in 1960 and 1965, by survey regions.

Region	Number of anglers (in thousands)		Number of fish caught (in thousands)		Weight of fish caught (in thousands of pounds)	
	1960	1965	1960	1965	1960	1965
NORTH ATLANTIC (New England and New York)	1,160	1,530	97,383	172,660	183,740	316,360
MIDDLE ATLANTIC (New Jersey to Cape Hatteras)	1,344	1,375	114,502	92,126	178,000	128,288
SOUTH ATLANTIC (Cape Hatteras to Florida Keys)	1,024	1,720	156,942	190,802	370,112	391,833
GULF OF MEXICO[1] (Florida West Coast to Texas)	1,412	--	184,582	--	411,110	--
EAST GULF OF MEXICO (Florida West Coast to Mississippi River)	--	1,234	--	104,551	--	187,957
WEST GULF OF MEXICO (Mississippi River to Texas)	--	738	--	89,550	--	187,618
SOUTH PACIFIC (Pt. Conception South)	687	978	50,064	48,542	154,120	176,828
NORTH PACIFIC (Pt. Conception North)	714	999	29,399	38,508	83,219	85,469
ALL REGIONS	6,198[2]	8,236[2]	632,872	736,739	1,380,301	1,474,353

[1] The Gulf of Mexico was not separated into East and West sampling regions for the 1960 Angling Survey.

[2] These figures are less than the sum of anglers for the individual regions because some anglers fished in more than one region.

Table 2.--Salt-water fishermen and their catches[1/] in 1965 by regions and principal area and method of fishing (In thousands).

Region	Principal area of fishing		Principal method of fishing			
	Ocean	Sounds, rivers, and bays	Private or rented boat	Party or charter boat	Bridge, pier, or jetty	Beach or bank
I. North Atlantic:						
Number of fishermen....	692	912	729	279	432	268
Number of fish caught..	77,462	95,198	94,785	11,817	32,742	33,316
Total weight.....	215,278	101,082	193,618	36,378	54,010	32,354
II. Middle Atlantic:						
Number of fishermen....	555	844	522	356	305	350
Number of fish caught..	33,060	59,066	41,785	15,659	8,959	25,723
Total weight.....	55,478	72,810	53,300	27,117	8,698	39,173
III. South Atlantic:						
Number of fishermen....	983	692	502	269	545	435
Number of fish caught..	105,674	85,128	101,220	8,616	67,792	13,174
Total weight.....	252,544	139,289	230,744	38,460	103,615	19,014
IV. East Gulf:						
Number of fishermen....	597	682	508	263	332	209
Number of fish caught..	27,343	77,208	74,122	13,355	10,821	6,253
Total weight.....	65,675	122,282	128,837	37,715	13,631	7,774
V. West Gulf:						
Number of fishermen....	262	497	329	115	215	129
Number of fish caught..	31,653	57,897	51,533	3,945	28,873	5,199
Total weight.....	93,648	93,970	126,804	14,741	39,897	6,176
VI. South Pacific:						
Number of fishermen....	763	154	270	298	296	167
Number of fish caught..	45,313	3,229	24,757	11,541	9,724	2,520
Total weight.....	167,130	9,698	100,474	51,199	20,323	4,832
VII. North Pacific:						
Number of fishermen....	502	454	451	225	177	130
Number of fish caught..	15,560	22,948	10,830	2,190	18,110	7,378
Total weight.....	30,324	55,145	39,796	11,997	26,396	7,280
All Regions:						
Number of fishermen....	4,210	4,132	3,253	1,736	2,276	1,620
Number of fish caught..	336,065	400,674	399,032	67,123	177,021	93,563
Total weight.....	880,077	594,276	873,573	217,607	266,570	116,603

[1/] The number of fish caught and the weight of fish caught in the two principal areas of fishing are equal to the total catch for a particular region and the number and weight caught by the four methods of fishing are equal to the total catch for a particular region. However, the number of anglers is not additive as some anglers fished in both areas and by more than one method for certain species groups in a particular region.

Table 3.--Number of fish caught by U.S. salt-water anglers in 1965, by species and by regions.
(In thousands)

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
1. Barracudas	--	--	--	16	99	3,081	--	3,196
2. Bass, black sea	1,121	5,326	1,043	--	--	--	--	7,490
3. Basses, Pacific	--	--	--	--	--	6,749	--	6,749
4. Bluefish	15,501	6,269	8,070	115	570	--	--	30,525
5. Bonitos	--	20	20	8	--	12,929	--	12,977
6. Cabezon and Pacific sculpins	--	--	--	--	--	884	1,038	1,922
7. California corbina	--	--	--	--	--	660	--	660
8. California sheephead	--	--	--	--	--	379	--	379
9. Catfishes	--	5,893	13,282	19,869	2,695	--	--	41,739
10. Cobia	--	--	--	108	108	--	--	216
11. Cods, Atlantic	4,970	62	--	--	--	--	--	5,032
12. Cods, Pacific	--	--	--	--	--	--	432	432
13. Croakers	--	5,880	14,469	10,741	16,075	3,681	288	51,134
14. Cunner	1,076	--	--	--	--	--	--	1,076
15. Dolphins	--	61	166	255	209	--	--	691
16. Drum, black	--	--	3,753	440	1,483	--	--	5,676
17. Drum, red	--	196	4,099	3,251	3,649	--	--	11,195
18. Eel, American	3,502	616	--	--	--	--	--	4,118
19. Flatfishes, Pacific	--	--	--	--	--	1,185	2,725	3,910
20. Flounder, summer	12,283	3,619	2,756	4,075	2,064	--	--	24,797
21. Flounder, winter	20,007	3,628	--	--	--	--	--	23,635
22. Groupers	--	--	6,905	1,691	462	--	--	9,058
23. Grunts	--	--	23,878	1,636	804	--	--	26,318
24. Haddock	5,995	--	--	--	--	--	--	5,995
25. Hake, silver	5,975	1,816	--	--	--	--	--	7,791

Table 3.--Number of fish caught by U.S. salt-water anglers in 1965, by species and by regions—Continued.

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	A Reg
26. Hake, squirrel	440	286	--	--	--	--	--	
27. Halibut, California	--	--	--	--	--	2,228	75	2
28. Herrings, Atlantic	393	--	--	--	--	--	--	
29. Jacks	--	--	672	152	162	--	--	
30. Jack mackerel	--	--	--	--	--	1,099	61	1
31. Kingfishes	292	1,141	6,313	2,370	3,006	--	--	13
32. Ladyfish	--	--	128	1,187	--	--	--	1
33. Lingcod	--	--	--	--	--	--	724	
34. Mackerels, Atlantic	21,809	936	--	--	--	--	--	22
35. Mackerel, king	--	27	6,639	1,137	588	--	--	8
36. Mackerel, Pacific	--	--	--	--	--	2,875	--	2
37. Mackerels, Spanish	--	278	7,548	1,187	521	--	--	9
38. Mullets	--	--	14,903	714	2,831	--	--	18
39. Ocean whitefish	--	--	--	--	--	156	--	
40. Opaleye	--	--	--	--	--	813	--	
41. Perch, white	171	11,960	--	1,485	6,588	--	--	20
42. Perch, yellow	7	4,663	--	--	--	--	--	4
43. Pollock	3,756	--	--	--	--	--	--	3
44. Pompanos	--	--	1,764	1,055	218	--	--	3
45. Porgies	10,819	3,047	13,337	8,137	1,223	--	--	36
46. Puffers	20,426	17,795	4,474	17	--	--	--	42
47. Rockfishes	--	--	--	--	--	4,777	8,642	13
48. Sablefish	--	--	--	--	--	--	77	
49. Salmon, chinook	--	--	--	--	--	--	856	
50. Salmon, coho	--	--	--	--	--	--	1,384	

Table 3.--Number of fish caught by U.S. salt-water anglers in 1965, by species and by regions—Continued.

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
51. Salmon, pink	--	--	--	--	--	--	155	155
52. Seabass, white	--	--	--	--	--	362	--	362
53. Searobins	2,291	1,724	--	--	--	--	--	4,015
54. Seatrout, sand	--	--	--	4,763	15,185	--	--	19,948
55. Seatrout, spotted	--	--	12,559	34,092	21,016	--	--	67,667
56. Shad, American	523	1,457	--	--	--	--	30	2,010
57. Sharks	256	--	40	68	38	79	--	481
58. Sharks, dogfish	96	16	220	68	1,747	--	2,199	4,346
59. Smelts	16,367	--	--	--	--	1,120	10,700	28,187
60. Snappers	--	--	1,116	--	5,675	--	--	6,791
61. Snappers, red	--	--	598	4,434	--	--	--	5,032
62. Snapper, yellowtail	--	--	19,686	135	--	--	--	19,821
63. Snook	--	--	2,196	532	--	--	--	2,728
64. Spadefish, Atlantic	--	--	--	--	248	--	--	248
65. Spot	--	8,174	13,330	--	--	--	--	21,504
66. Steelhead	--	--	--	--	--	--	427	427
67. Striped bass	13,199	2,783	736	--	--	--	1,533	18,251
68. Surfperches	--	--	--	--	--	2,953	4,160	7,113
69. Tarpon	--	--	232	433	--	--	--	665
70. Tautog	3,848	107	--	--	--	--	--	3,955
71. Trout, cutthroat	--	--	--	--	--	--	488	488
72. Trout, Dolly Varden	--	--	--	--	--	--	282	282
73. Tunas	159	4	121	--	--	869	--	1,153
74. Weakfish	332	1,467	--	--	--	--	--	1,799
75. Yellowtail, California	--	--	--	--	--	359	--	359
76. Miscellaneous	7,046	2,875	5,749	380	2,286	1,304	2,232	21,872
Total	172,660	92,126	190,802	104,551	89,550	48,542	38,508	736,739

Table 4.--Number of U.S. salt-water anglers in 1965, by species caught and by regions.

(In thousands)

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
1. Barracudas	--	--	--	12	12	249	--	273
2. Bass, black sea	82	267	40	--	--	--	--	389
3. Basses, Pacific	--	--	--	--	--	295	--	295
4. Bluefish	335	330	232	23	35	--	--	955
5. Bonitos	--	4	8	8	--	490	--	510
6. Cabezon and Pacific sculpins	--	--	--	--	--	129	38	167
7. California corbina	--	--	--	--	--	116	--	116
8. California sheephead	--	--	--	--	--	74	--	74
9. Catfishes	--	86	290	234	69	--	--	679
10. Cobia	--	--	--	23	19	--	--	42
11. Cods, Atlantic	188	16	--	--	--	--	--	204
12. Cods, Pacific	--	--	--	--	--	--	61	61
13. Croakers	--	123	321	311	317	112	16	1,200
14. Cunner	66	--	--	--	--	--	--	66
15. Dolphins	--	4	49	16	15	--	--	84
16. Drum, black	--	--	136	87	95	--	--	318
17. Drum, red	--	68	151	285	273	--	--	777
18. Eel, American	278	48	--	--	--	--	--	326
19. Flatfishes, Pacific	--	--	--	--	--	91	171	262
20. Flounder, summer	426	256	180	226	224	--	--	1,312
21. Flounder, winter	579	277	--	--	--	--	--	856
22. Groupers	--	--	310	191	31	--	--	532
23. Grunts	--	--	301	95	15	--	--	411
24. Haddock	95	--	--	--	--	--	--	95
25. Hake, silver	61	40	--	--	--	--	--	101

Table 4.--Number of U.S. salt-water anglers in 1965, by species caught and by regions—Continued.

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
26. Hake, squirrel	4	36	--	--	--	--	--	40
27. Halibut, California	--	--	--	--	--	273	31	304
28. Herrings, Atlantic	20	--	--	--	--	--	--	20
29. Jacks	--	--	38	9	20	--	--	67
30. Jack mackerel	--	--	--	--	--	97	16	113
31. Kingfishes	42	64	338	149	91	--	--	684
32. Ladyfish	--	--	30	124	--	--	--	154
33. Lingcod	--	--	--	--	--	--	113	113
34. Mackerels, Atlantic	193	27	--	--	--	--	--	220
35. Mackerel, king	--	15	228	132	64	--	--	439
36. Mackerel, Pacific	--	--	--	--	--	156	--	156
37. Mackerels, Spanish	--	8	202	121	46	--	--	377
38. Mullets	--	--	201	12	45	--	--	258
39. Ocean whitefish	--	--	--	--	--	15	--	15
40. Opaleye	--	--	--	--	--	62	--	62
41. Perch, white	28	311	--	26	40	--	--	405
42. Perch, yellow	4	91	--	--	--	--	--	95
43. Pollock	99	--	--	--	--	--	--	99
44. Pompanos	--	--	182	28	11	--	--	221
45. Porgies	280	167	231	404	146	--	--	1,228
46. Puffers	439	454	155	17	--	--	--	1,065
47. Rockfishes	--	--	--	--	--	220	226	446
48. Sablefish	--	--	--	--	--	--	26	26
49. Salmon, chinook	--	--	--	--	--	--	186	186
50. Salmon, coho	--	--	--	--	--	--	305	305

Table 4.--Number of U.S. salt-water anglers in 1965, by species caught and by regions—Continued.

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
51. Salmon, pink	--	--	--	--	--	--	53	53
52. Seabass, white	--	--	--	--	--	88	--	88
53. Searobins	134	95	--	--	--	--	--	229
54. Seatrout, sand	--	--	--	27	37	--	--	64
55. Seatrout, spotted	--	--	365	591	395	--	--	1,351
56. Shad, American	21	83	--	--	--	--	4	108
57. Sharks	41	--	20	8	11	40	--	120
58. Sharks, dogfish	16	8	22	32	25	--	76	179
59. Smelts	31	--	--	--	--	98	91	220
60. Snappers	--	--	49	--	156	--	--	205
61. Snappers, red	--	--	86	205	--	--	--	291
62. Snapper, yellowtail	--	--	264	34	--	--	--	298
63. Snook	--	--	100	89	--	--	--	189
64. Spadefish, Atlantic	--	--	--	--	12	--	--	12
65. Spot	--	219	266	--	--	--	--	485
66. Steelhead	--	--	--	--	--	--	38	38
67. Striped bass	318	295	108	--	--	--	145	866
68. Surfperches	--	--	--	--	--	216	153	369
69. Tarpon	--	--	40	20	--	--	--	60
70. Tautog	198	27	--	--	--	--	--	225
71. Trout, cutthroat	--	--	--	--	--	--	53	53
72. Trout, Dolly Varden	--	--	--	--	--	--	19	19
73. Tunas	15	4	16	--	--	103	--	138
74. Weakfish	46	132	--	--	--	--	--	178
75. Yellowtail, California	--	--	--	--	--	79	--	79
76. Miscellaneous	161	132	251	73	77	99	43	836

Table 5.--Estimated weights of salt-water anglers' catches in 1955, by species and regions.

(In thousands of pounds)

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
1. Barracudas	--	--	--	217	420	15,848	--	16,485
2. Bass, black sea	2,110	7,088	1,690	--	--	--	--	10,888
3. Basses, Pacific	--	--	--	--	--	16,361	--	16,361
4. Bluefish	63,303	15,914	11,292	308	2,392	--	--	93,209
5. Bonitos	--	81	88	91	--	64,997	--	65,257
6. Cabezon and Pacific sculpins	--	--	--	--	--	1,880	524	2,404
7. California corbina	--	--	--	--	--	1,596	--	1,596
8. California sheephead	--	--	--	--	--	2,018	--	2,018
9. Catfishes	--	20,571	9,386	18,465	2,176	--	--	50,598
10. Cobia	--	--	--	1,586	443	--	--	2,029
11. Cods, Atlantic	28,978	928	--	--	--	--	--	29,906
12. Cods, Pacific	--	--	--	--	--	--	370	370
13. Croakers	--	4,744	8,918	8,608	10,845	5,944	233	39,292
14. Cunner	533	--	--	--	--	--	--	533
15. Dolphins	--	430	1,118	623	250	--	--	2,421
16. Drum, black	--	--	14,477	1,271	22,609	--	--	38,357
17. Drum, red	--	1,281	15,171	9,934	18,354	--	--	44,740
18. Eel, American	3,293	780	--	--	--	--	--	4,073
19. Flatfishes, Pacific	--	--	--	--	--	1,353	2,350	3,703
20. Flounder, summer	19,128	10,485	5,177	6,923	3,930	--	--	45,643
21. Flounder, winter	21,838	6,935	--	--	--	--	--	28,773
22. Groupers	--	--	54,581	9,648	6,265	--	--	70,494
23. Grunts	--	--	18,034	1,165	337	--	--	19,536
24. Haddock	21,390	--	--	--	--	--	--	21,390
25. Hake, silver	4,193	1,796	--	--	--	--	--	5,989

Table 5.--Estimated weights of salt-water anglers' catches in 1965, by species and regions—Continued.

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
26. Hake, squirrel	881	518	--	--	--	--	--	1,399
27. Halibut, California	--	--	--	--	--	7,789	309	8,098
28. Herrings, Atlantic	300	--	--	--	--	--	--	300
29. Jacks	--	--	1,504	152	572	--	--	2,228
30. Jack mackerel	--	--	--	--	--	2,520	137	2,657
31. Kingfishes	237	1,337	5,904	2,498	3,664	--	--	13,640
32. Ladyfish	--	--	273	2,523	--	--	--	2,796
33. Lingcod	--	--	--	--	--	--	2,483	2,483
34. Mackerels, Atlantic	18,006	919	--	--	--	--	--	18,925
35. Mackerel, king	--	247	74,132	8,652	7,647	--	--	90,678
36. Mackerel, Pacific	--	--	--	--	--	6,053	--	6,053
37. Mackerels, Spanish	--	167	18,186	2,984	1,299	--	--	22,636
38. Mullets	--	--	19,150	1,209	1,741	--	--	22,100
39. Ocean whitefish	--	--	--	--	--	1,524	--	1,524
40. Opaleye	--	--	--	--	--	859	--	859
41. Perch, white	142	10,256	--	913	6,562	--	--	17,873
42. Perch, yellow	7	4,369	--	--	--	--	--	4,376
43. Pollock	9,348	--	--	--	--	--	--	9,348
44. Pompanos	--	--	2,470	1,551	634	--	--	4,655
45. Porgies	10,150	4,244	23,213	6,898	2,299	--	--	46,804
46. Puffers	12,941	10,855	2,076	9	--	--	--	25,881
47. Rockfishes	--	--	--	--	--	20,144	8,019	28,163
48. Sablefish	--	--	--	--	--	--	196	196
49. Salmon, chinook	--	--	--	--	--	--	11,276	11,276
50. Salmon, coho	--	--	--	--	--	--	12,167	12,167

Table 5.--Estimated weights of salt-water anglers' catches in 1965, by species and regions—Continued.

Species group	Region I North Atlantic	II Middle Atlantic	III South Atlantic	IV East Gulf	V West Gulf	VI South Pacific	VII North Pacific	All Regions
51. Salmon, pink	--	--	--	--	--	--	1,030	1,030
52. Seabass, white	--	--	--	--	--	1,572	--	1,572
53. Searobins	1,843	1,729	--	--	--	--	--	3,572
54. Seatrout, sand	--	--	--	4,566	22,801	--	--	27,367
55. Seatrout, spotted	--	--	18,209	49,114	40,723	--	--	108,046
56. Shad, American	1,447	3,254	--	--	--	--	91	4,792
57. Sharks	2,187	--	1,127	1,176	1,293	455	--	6,238
58. Sharks, dogfish	386	20	1,017	168	3,494	--	4,402	9,487
59. Smelts	4,984	--	--	--	--	1,640	17,573	24,197
60. Snappers	--	--	3,673	--	25,166	--	--	28,839
61. Snappers, red	--	--	1,938	18,288	--	--	--	20,226
62. Snapper, yellowtail	--	--	25,400	135	--	--	--	25,535
63. Snook	--	--	25,935	2,680	--	--	--	28,615
64. Spadefish, Atlantic	--	--	--	--	248	--	--	248
65. Spot	--	4,882	8,499	--	--	--	--	13,381
66. Steelhead	--	--	--	--	--	--	1,614	1,614
67. Striped bass	47,999	7,351	1,503	--	--	--	14,138	70,991
68. Surfperches	--	--	--	--	--	2,729	6,344	9,073
69. Tarpon	--	--	6,219	24,026	--	--	--	30,245
70. Tautog	11,053	151	--	--	--	--	--	11,204
71. Trout, cutthroat	--	--	--	--	--	--	359	359
72. Trout, Dolly Varden	--	--	--	--	--	--	466	466
73. Tunas	1,004	49	973	--	--	13,977	--	16,003
74. Weakfish	452	1,813	--	--	--	--	--	2,265
75. Yellowtail, California	--	--	--	--	--	5,530	--	5,530
76. Miscellaneous	28,227	5,094	10,500	1,576	1,454	2,039	1,388	50,278
Total	316,360	128,288	391,833	187,957	187,618	176,828	85,469	1,474,353

Table 6.--Number of fish caught[1/] by U.S. salt-water anglers in 1965, by regions and by species and by principal area and method of fishing.

(In thousands)

Region and species group	Principal area of fishing		Principal method of fishing			
	Ocean	Sounds, rivers, and bays	Private or rented boat	Party or charter boat	Bridge, pier, or jetty	Beach or bank
REGION I, NORTH ATLANTIC:						
2. Bass, black sea.....	819	302	578	474	58	11
4. Bluefish.....	12,136	3,365	7,166	2,256	762	5,317
11. Cods, Atlantic.....	4,054	916	3,733	943	294	--
14. Cunner.....	287	789	706	58	254	58
18. Eel, American.....	1,547	1,955	1,059	138	864	1,441
20. Flounder, summer.....	1,744	10,539	9,068	676	2,328	211
21. Flounder, winter.....	4,352	15,655	14,906	962	1,572	2,567
24. Haddock.....	5,906	89	5,470	336	189	--
25. Hake, silver.....	789	5,186	430	358	5,126	61
26. Hake, squirrel.....	440	--	440	--	--	--
28. Herrings, Atlantic.....	--	393	151	--	39	203
31. Kingfishes.....	71	221	241	--	7	44
34. Mackerels, Atlantic.....	17,749	4,060	17,885	1,787	258	1,879
41. Perch, white.....	4	167	60	--	--	111
42. Perch, yellow.....	7	--	--	--	--	7
43. Pollock.....	2,334	1,422	2,916	258	264	318
45. Porgies.....	4,095	6,724	6,883	2,249	1,584	103
46. Puffers.....	2,832	17,594	11,784	513	3,332	4,797
53. Searobins.....	508	1,783	2,033	46	149	63
56. Shad, American.....	445	78	479	--	--	44
57. Sharks.....	235	21	256	--	--	--
58. Sharks, dogfish.....	96	--	12	53	27	4
59. Smelts.....	1,477	14,890	448	--	713	15,206
67. Striped bass.....	11,627	1,572	1,410	269	11,133	387
70. Tautog.....	3,213	635	3,205	322	226	95
73. Tunas.....	151	8	59	100	--	--
74. Weakfish.....	--	332	291	--	--	41
76. Miscellaneous.....	544	6,502	3,116	19	3,563	348
Total.....	77,462	95,198	94,785	11,817	32,742	33,316
REGION II, MIDDLE ATLANTIC:						
2. Bass, black sea.....	4,432	894	1,663	3,303	288	72
4. Bluefish.....	4,358	1,911	3,857	1,578	399	435
5. Bonitos.....	20	--	--	20	--	--
9. Catfishes.....	73	5,820	1,451	--	73	4,369
11. Cods, Atlantic.....	62	--	20	42	--	--
13. Croakers.....	2,902	2,978	4,210	305	1,241	124
15. Dolphins.....	61	--	--	61	--	--
17. Drum, red.....	24	172	7	35	126	28
18. Eel, American.....	27	589	538	27	8	43
20. Flounder, summer.....	1,465	2,154	3,037	320	172	90

Table 6.--Number of fish caught[1/] by U.S. salt-water anglers in 1965, by regions and by species and by principal area and method of fishing—Continued.

Region and species group	Principal area of fishing		Principal method of fishing			
	Ocean	Sounds, rivers, and bays	Private or rented boat	Party or charter boat	Bridge, pier, or jetty	Beach or bank
21. Flounder, winter.....	1,081	2,547	1,408	540	127	1,553
25. Hake, silver.....	1,816	--	786	642	266	122
26. Hake, squirrel.....	222	64	--	178	44	64
31. Kingfishes.....	590	551	939	36	8	158
34. Mackerels, Atlantic.....	794	142	404	390	--	142
35. Mackerel, king.....	23	4	4	19	--	4
37. Mackerels, Spanish.....	278	--	29	249	--	--
41. Perch, white.....	1,139	10,821	3,458	1,038	268	7,196
42. Perch, yellow.....	--	4,663	796	--	26	3,841
45. Porgies.....	2,608	439	1,143	1,702	56	146
46. Puffers.....	6,052	11,743	9,671	1,600	3,741	2,783
53. Searobins.....	720	1,004	1,250	77	8	389
56. Shad, American.....	--	1,457	331	22	50	1,054
58. Sharks, dogfish.....	--	16	--	--	16	--
65. Spot.....	2,121	6,053	3,457	2,318	1,572	827
67. Striped bass.....	547	2,236	1,998	538	46	201
70. Tautog.....	95	12	53	32	22	--
74. Weakfish.....	539	928	1,110	225	15	117
76. Miscellaneous.....	1,011	1,868	165	362	387	1,965
Total.....	33,060	59,066	41,785	15,659	8,959	25,723
REGION III, SOUTH ATLANTIC:						
2. Bass, black sea.....	365	678	887	137	11	8
4. Bluefish.....	4,744	3,326	2,575	786	3,104	1,605
5. Bonitos.....	20	--	--	20	--	--

15. Dolphins.....	166	--	87	79	--	--
16. Drum, black.....	2,854	899	486	229	2,654	384
17. Drum, red.....	2,436	1,663	1,497	235	1,965	402
20. Flounder, summer.....	2,127	629	359	108	1,854	435
22. Groupers.....	6,541	364	5,375	1,313	148	69
23. Grunts.....	19,943	3,935	11,456	484	10,947	991
29. Jacks.....	672	--	4	4	664	--
31. Kingfishes.....	3,797	2,516	1,874	79	2,843	1,517
32. Ladyfish.....	22	106	--	--	30	98
35. Mackerel, king.....	6,615	24	5,230	883	463	63
37. Mackerels, Spanish.....	3,796	3,752	4,880	1,149	1,424	95
38. Mullets.....	8,131	6,772	5,723	--	7,917	1,263
44. Pompanos.....	1,415	349	331	85	956	392
45. Porgies.....	1,518	11,819	2,519	11	9,537	1,270
46. Puffers.....	3,275	1,199	2,625	--	771	1,078

Table 6.--Number of fish caught[1/] by U.S. salt-water anglers in 1965, by regions and by species and by principal area and method of fishing—Continued.

Region and species group	Principal area of fishing		Principal method of fishing			
	Ocean	Sounds, rivers, and bays	Private or rented boat	Party or charter boat	Bridge, pier, or jetty	Beach or bank
55. Seatrout, spotted.....	2,343	10,216	10,173	180	1,412	794
57. Sharks.....	36	4	32	8	--	--
58. Sharks, dogfish.....	212	8	8	--	--	212
60. Snappers.....	1,002	114	419	--	673	24
61. Snappers, red.....	500	98	150	213	235	--
62. Snapper, yellowtail.....	15,836	3,850	13,611	855	4,887	333
63. Snook.....	107	2,089	1,384	32	716	64
65. Spot.....	8,775	4,555	4,091	1,100	7,352	787
67. Striped bass.....	199	537	532	148	56	--
69. Tarpon.....	81	151	45	118	69	--
73. Tunas.....	121	--	--	121	--	--
76. Miscellaneous.....	1,231	4,518	4,350	147	877	375
Total.....	105,674	85,128	101,220	8,616	67,792	13,174
REGION IV, EAST GULF:						
1. Barracudas.....	16	--	--	16	--	--
4. Bluefish.....	81	34	100	--	--	15
5. Bonitos.....	8	--	--	8	--	--
9. Catfishes.....	5,469	14,400	12,494	4,730	1,575	1,070
10. Cobia.....	108	--	42	62	4	--
13. Croakers.....	2,138	8,603	7,983	29	1,667	1,062
15. Dolphins.....	255	--	239	16	--	--
16. Drum, black.....	163	277	179	65	136	60
17. Drum, red.....	656	2,595	2,087	682	268	214
20. Flounder, summer.....	282	3,793	3,678	69	95	233
22. Groupers.....	875	816	839	734	61	57
23. Grunts.....	480	1,156	253	147	1,142	94
29. Jacks.....	--	152	152	--	--	--
31. Kingfishes.....	1,502	868	953	--	1,018	399
32. Ladyfish.....	727	460	762	--	195	230
35. Mackerel, king.....	944	143	683	366	88	--
37. Mackerels, Spanish.....	1,098	89	566	328	244	49
38. Mullets.....	--	714	690	--	--	24
41. Perch, white.....	--	1,485	1,485	--	--	--
44. Pompanos.....	--	1,055	1,055	--	--	--
45. Porgies.....	1,698	6,439	5,006	125	2,237	769
46. Puffers.....	--	17	17	--	--	--
54. Seatrout, sand.....	--	4,763	4,503	--	126	134
55. Seatrout, spotted.....	5,835	28,257	28,572	2,322	1,732	1,466
57. Sharks.....	68	--	68	--	--	--

Table 6.--Number of fish caught[1/] by U.S. salt-water anglers in 1965, by regions and by species and by principal area and method of fishing—Continued.

Region and species group	Principal area of fishing: Ocean	Principal area of fishing: Sounds, rivers, and bays	Principal method of fishing: Private or rented boat	Principal method of fishing: Party or charter boat	Principal method of fishing: Bridge, pier, or jetty	Principal method of fishing: Beach or bank
58. Sharks, dogfish.....	68	--	31	25	--	12
61. Snappers, red.....	4,184	250	926	3,485	19	4
62. Snapper, yellowtail.....	55	80	41	24	70	--
63. Snook.....	323	209	224	23	44	241
69. Tarpon.....	114	319	319	64	50	--
76. Miscellaneous.....	146	234	175	35	50	120
Total.....	27,343	77,208	74,122	13,355	10,821	6,253
REGION V, WEST GULF:						
1. Barracudas.....	99	--	75	24	--	--
4. Bluefish.....	440	130	440	--	130	--
9. Catfishes.....	59	2,636	1,099	72	1,452	72
10. Cobia.....	23	85	19	4	--	85
13. Croakers.....	4,173	11,902	3,015	247	11,086	1,727
15. Dolphins.....	209	--	201	8	--	--
16. Drum, black.....	511	972	1,100	--	297	86
17. Drum, red.....	676	2,973	2,754	87	622	186
20. Flounder, summer.....	424	1,640	1,171	73	423	397
22. Groupers.....	425	37	301	44	117	--
23. Grunts.....	185	619	--	--	481	323
29. Jacks.....	45	117	104	--	--	58
31. Kingfishes.....	1,534	1,472	755	44	1,922	285
35. Mackerel, king.....	549	39	493	95	--	--
37. Mackerels, Spanish.....	463	58	367	73	81	--
38. Mullets.....	126	2,705	2,675	--	135	21
41. Perch, white.....	37	6,551	3,991	--	2,597	--
44. Pompanos.....	218	--	211	--	--	7
45. Porgies.....	357	866	565	126	441	91
54. Seatrout, sand.....	14,164	1,021	14,347	--	838	--
55. Seatrout, spotted.....	2,762	18,254	12,673	126	6,593	1,624
57. Sharks.....	11	27	11	27	--	--
58. Sharks, dogfish.....	12	1,735	1,735	--	--	12
60. Snappers.....	3,761	1,914	2,947	2,647	--	81
64. Spadefish, Atlantic.....	248	--	--	248	--	--
76. Miscellaneous.....	142	2,144	484	--	1,658	144
Total.....	31,653	57,897	51,533	3,945	28,873	5,199
REGION VI, SOUTH PACIFIC:						
1. Barracudas.....	3,004	77	1,137	1,836	86	22
3. Basses, Pacific.....	6,495	254	4,015	2,084	453	197
5. Bonitos.....	12,746	183	6,700	4,059	2,086	84
6. Cabezon and Pacific sculpins.....	844	--	582	183	119	--
7. California corbina.....	353	307	130	211	144	175

Table 6.--Number of fish caught[1/] by U.S. salt-water anglers in 1965, by regions and by species and by principal area and method of fishing—Continued.

Region and species group	Principal area of fishing		Principal method of fishing			
	Ocean	Sounds, rivers, and bays	Private or rented boat	Party or charter boat	Bridge, pier, or jetty	Beach or bank
8. California sheephead.....	379	--	197	34	148	--
13. Croakers.....	2,890	791	2,746	4	847	84
19. Flatfishes, Pacific.....	808	377	833	155	52	145
27. Halibut, California.....	1,966	262	1,167	494	511	56
30. Jack mackerel.....	1,099	--	749	140	118	92
36. Mackerel, Pacific.....	2,742	133	1,276	359	1,119	121
39. Ocean whitefish.....	156	--	24	132	--	--
40. Opaleye.....	588	225	102	--	700	11
47. Rockfishes.....	4,770	7	3,295	857	618	7
52. Seabass, white.....	330	32	122	92	144	4
57. Sharks.....	71	8	36	21	18	4
59. Smelts.....	1,073	47	566	226	328	--
68. Surfperches.....	2,953	--	251	47	1,502	1,153
73. Tunas.....	846	23	501	353	15	--
75. Yellowtail, California...	355	4	153	206	--	--
76. Miscellaneous.....	805	499	175	48	716	365
Total.....	45,313	3,229	24,757	11,541	9,724	2,520
REGION VII, NORTH PACIFIC:						
6. Cabezon and Pacific sculpins.....	30	1,008	321	--	705	12
12. Cods, Pacific.....	350	82	78	85	269	--
13. Croakers.....	288	--	83	--	--	205
19. Flatfishes, Pacific.....	1,271	1,454	1,545	173	885	122
27. Halibut, California.....	68	7	54	21	--	--
30. Jack mackerel.....	49	12	20	41	--	--
33. Lingcod.....	520	204	240	126	333	25
47. Rockfishes.....	7,280	1,362	1,826	719	3,927	2,170
48. Sablefish.....	43	34	50	23	4	--
49. Salmon, chinook.....	434	422	528	269	59	--
50. Salmon, coho.....	852	532	949	410	--	25
51. Salmon, pink.....	60	95	120	31	--	4
56. Shad, American.....	--	30	30	--	--	--
58. Sharks, dogfish.....	17	2,182	2,199	--	--	--
59. Smelts.....	2,409	8,291	--	47	7,540	3,113
66. Steelhead.....	181	246	43	4	75	305
67. Striped bass.....	443	1,090	1,156	185	--	192
68. Surfperches.....	1,125	3,035	263	49	2,907	941
71. Trout, cutthroat.....	--	488	389	--	46	53
72. Trout, Dolly Varden.....	117	165	7	--	99	176
76. Miscellaneous.....	23	2,209	929	7	1,261	35
Total.....	15,560	22,948	10,830	2,190	18,110	7,378

1/ The number of fish caught in the two principal areas of fishing is equal to the total catch for a species group in a region and the number of fish caught by the four methods of fishing is equal to the total catch for a species group in a region.

Methods Employed in the Survey

At the request of the Bureau of Sport Fisheries and Wildlife of the U.S. Department of the Interior, the U.S. Bureau of Census, conducted The 1965 National Survey of Fishing and Hunting early in 1966 to obtain a wide range of information on the number and characteristics of fishing and hunting participants in 1965, the extent and types of participation and the detailed expenditures for these activities (U.S. Bureau of Sport Fisheries and Wildlife, 1966).

The 1965 Angling Survey was conducted as a special supplement to the National Survey of Fishing and Hunting. For the 1965 Angling Survey a series of supplementary questions was asked directly of those identified as marine sport fishermen. The questions were designed to ascertain the geographical region in which salt-water fishing took place, the number, type and average weight of marine species caught, and the chief method used to catch each species.

The Regions

The number of geographical divisions for reporting the catches was limited to seven by the design of the survey method. For the 1960 Angling Survey and the 1965 Angling Survey, the Atlantic coast was divided into three regions and the Pacific coast into two regions. But the Gulf of Mexico, which was taken as one sampling region in the 1960 Angling Survey, was divided into East Gulf and West Gulf of Mexico for the 1965 Angling Survey, with the Mississippi River as the boundary. The regions were chosen to coincide where possible with biogeographical areas rather than with political divisions. The regions used for the 1965 Angling Survey were:

Region I, North Atlantic: Atlantic coast from Maine to and including New York.

Region II, Middle Atlantic: Atlantic coast from New Jersey to Cape Hatteras, North Carolina.

Region III, South Atlantic: Atlantic coast from Cape Hatteras, North Carolina to Southern Florida including the Florida Keys.

Region IV, East Gulf of Mexico: Gulf coast from the Florida Keys to and including the Mississippi River delta.

Region V, West Gulf of Mexico: Gulf coast from the Mississippi delta to the Mexican Border.

Region VI, South Pacific: Pacific coast from the Mexican Border to Point Conception, California.

Region VII, North Pacific: Pacific coast from Point Conception, California north to Washington and including Alaska.

The Sample

In order to provide as accurate a cross section of the population as possible, the sample for the National Survey of Fishing and Hunting and for the additional series of questions on salt-water fishing was related to another nationwide survey conducted monthly by the Bureau of Census. As a result, the sample used was based on a sub-sample of persons previously selected for the Bureau's Current Population Survey. This survey is used to collect the official government statistics on total employment and unemployment. It is an area probability sample distributed over 357 Primary Sampling Units (PSU's), each being a county or group of counties, in total comprising 701 counties and independent cities in the 50 States and the District of Columbia. 2/

Within each of the 357 PSU's, the sample consists of clusters of addresses averaging 6 households per cluster. In determining sample size within each sample PSU, a ratio rather than a fixed quota is employed. The sample is thus self-weighting; that is, each person has the same probability of being selected for the survey. This technique is also self-adjusting for changes in the size and distribution of the population.

2/ The sampling plan for the Current Population Survey is described in Current Population Reports, Series P-23, Number 22, June 1967, issued by the Bureau of Census.

The Interviewing

Approximately 16,000 households containing about 43,500 persons of 12 years of age and older were included in the sample for the 1965 National Survey of Fishing and Hunting. Information was obtained in January, 1966, in each household from a responsible adult as to whether each person in that household has fished or hunted during 1965.

A sample of those identified as fishermen or hunters at the first stage, in January 1966, was selected for personal interview at a later visit. These visits, made in February 1966, yielded interviews with about 6,400 fishermen and hunters, or about 93 percent of those selected for the detailed interviewing. The remainder had moved, were not at home after repeated calls, or were otherwise not available.

The results relate to persons 12 years of age and older who were represented in the civilian non-institutional populations of the continental United States (excluding Hawaii) as of December 1965. Only those who actually engaged in salt-water sport fishing during the year 1965 were interviewed concerning the extent of their activity. The data refer to those anglers who were the more substantial participants in terms of frequency of participation and expenditure. The results exclude many, if not most, highly incidental participants--those who engaged in this pastime on a very incidental basis, perhaps only once or twice during the year and with little or no expenditure for these purposes. Commercial fishermen, and their catch, also are excluded from the results. It was made clear to the interviewees that they should include only fish caught primarily for recreation and not those caught for profit.

Following the completion of the interviewing for the National Survey of Fishing and Hunting, additional questions were asked of those persons who had indicated they had engaged in salt-water fishing at some time during 1965, in answer to the basic interview. Specifically, each salt-water fisherman, so identified, was asked to indicate the geographical regions in which he had engaged in salt-water fishing, the different species caught during 1965 in each of the regions, the total catch and average weight of each species caught, and the principal area and method of fishing used to catch each species. Completed interview forms were provided by 1,566 persons, about 95 percent of those originally identified as salt-water fishermen. The proportion of the total number of anglers who were interviewed varied between sampling regions, but for the country as a whole, each person interviewed represented about 5,260 anglers.

This information was used to obtain estimates of the total catch of all salt-water anglers in the United States for 1965. The resulting data are for the 8,236,000 salt-water anglers in U.S. waters classified as substantial participants. Included in the 8,236,000 anglers were an estimated 973,000 anglers who fished but caught nothing. In addition to the above anglers, there were an estimated 3,000,000 "incidental participants". These incidental participants fished less than 3 days and spent less than 5 dollars each during 1965 for salt-water angling and together represent less than 5 percent of the total angling activity. The number of salt-water fishermen in institutions or the military services or under 12 years of age was not estimated.

The personnel used for the various phases of the survey were the experienced interviewers employed on the Current Population Survey and other regular programs of the Bureau of the Census. Field supervisors and interviewers received detailed personal training on the content of the survey. Interviewers also were provided complete manuals of instruction, both for training purposes and for assistance while interviewing. In order to assist the sportsman in recall, interviewers used calendars, lists of equipment items, and booklets and license types. Because of the methodical step-by-step interviewing procedure required for maximum stimulation of recall, the average interview for the National Survey of Fishing and Hunting and the 1965 Angling Survey lasted about 45 minutes. As each group of households was completed, the results were checked carefully, both for completeness and consistency. The same high degree of quality control was maintained in processing the results and preparing the data.

Interview Form Design

The interview form design is a critical part of a personal interview survey. For both the 1960 Angling Survey and the 1965 Angling Survey, the same basic format was used for the interview form (see fig. 1 for a sample interview form used for the 1965 Angling Survey). The major changes made on the 1965 interview form were the addition of a column for the average weight of the catch and a revised section on principal area and method of fishing. It was assumed that these changes would not result in any bias in the reporting of the catches. It was also assumed that the relative position of a species group name in the list of 20 species for each region would not affect the reporting of the catches of a species group. However, some changes were made in the regional species group lists for the 1965 Angling Survey and the inclusion or exclusion from the list may have affected the reporting of catches for certain species groups differentially in 1960 and 1965.

For those species groups with over 10 million fish reported in 1960 and 1965 (see Table 8) there were few major differences in the number of fish caught. However, there were minor differences in these species groups as listed on the interview form in 1960 and 1965. These differences may have resulted in some bias in the relative reporting of catches of jacks, mullets and puffers. The only species group for which there was a substantial decrease in both the number of anglers and the number of fish caught was jacks. This appeared to have resulted from our exclusion of this species group name from the interview form for the South Atlantic Region in 1965. In 1960, in the South Atlantic, 8,241,000 jacks were reported while only 672,000 were reported in 1965. Mullets and puffers appeared on the interview form for 1965 in two regions in which they did not appear in 1960. The total catch of mullets was about the same for 1960 and 1965, although about three times as many anglers reported catching mullets. For puffers, the total catch increased four times with about three times as many anglers catching puffers. The presence of a species group name on the interview form may have resulted in increased reporting of catches of the species group, or may represent an increased angling effort or greater availability of the species group.

For the other species groups not included in Table 8, the reported catch may have been influenced by a difference in the species group lists on the interview form for 1960 and 1965. However, as most of these species groups are lower catch groups, the differences in the reported catches are difficult to evaluate.

On the 1965 interview forms a suggested list of two or three other species appeared after the 20th species group for each region except the North Pacific. These species were selected to serve as a guide to non-listed species which the interviewee might have caught. In most cases, there appeared to be slightly increased reporting of these species in 1965 compared with 1960. The presence of a species group name on the interview form appeared to act as a reminder and usually resulted in at least some fish being reported.

Species Grouping

A difficult problem in designing the interview procedure and in analyzing the survey results arose from lack of uniformity in the names which anglers use for fishes. For example, the species Cynoscion regalis is known as squeteague in New England, weakfish along the middle Atlantic coast and seatrout or trout along the southern Atlantic coast. Seatrout may refer also to Cynoscion nebulosus, a related species, or equally well to one of the sea-run fresh-water trouts, or on the Pacific coast to the white seabass; and the white seabass in turn may be called weakfish.

Anglers often identify fishes only in broad categories such as "flounder", "shark" or "rockfish". They also often use such catch-all designations as "shiner" or "perch" or any of a number of local names; for example, snowshoe flounder is used in Rhode Island for larger winter flounder (Pseudopleuronectes americanus).

Because of the limitations of the interview procedure and processing of the data, only 20 species or groups of species could be listed on the interview form for each region (fig. 1).

Please enter the desired information for each of the areas in which YOU did SALT-WATER fishing in 1965. If you do not have exact figures, a careful estimate will be accepted. If you do not recall some of the information, please enter "Don't know" in the appropriate column.

C. AREA 3 – CAPE HATTERAS, NORTH CAROLINA TO FLORIDA KEYS

1. Please check the kinds of salt-water fish you caught in 1965	Check	2. Total number caught in 1965	3. Average weight of fish caught in 1965	4. Principal area of fishing (Check only one)		5. Principal type of fishing (Check only one)			
				Sounds, rivers, bays	Ocean	Party or charter boat	Private or rented boat	Bridge, pier, jetty	Beach or bank
Grouper (Sea Bass, Hind, etc.)	01			1	2	1	2	3	4
Grunt (Margate, Pigfish, etc.)	02			1	2	1	2	3	4
Striped Bass (Rockfish)	03			1	2	1	2	3	4
Pinfish (Bream)	04			1	2	1	2	3	4
Whiting (King Whiting)	05			1	2	1	2	3	4
Spanish Mackerel	06			1	2	1	2	3	4
King Mackerel (Kingfish)	07			1	2	1	2	3	4
Mullet	08			1	2	1	2	3	4
Speckled Trout (Spotted Sea Trout)	09			1	2	1	2	3	4
Snook	10			1	2	1	2	3	4
Black Drum	11			1	2	1	2	3	4
Redfish (Red Drum, Channel Bass)	12			1	2	1	2	3	4
Bluefish	13			1	2	1	2	3	4
Spot	14			1	2	1	2	3	4
Croaker	15			1	2	1	2	3	4
Sea Catfish	16			1	2	1	2	3	4
Bluefin Tuna	17			1	2	1	2	3	4
Tarpon	18			1	2	1	2	3	4
Yellowtail Snapper	19			1	2	1	2	3	4
Pompano	20			1	2	1	2	3	4
Any others – For example Blowfish, Flounder, Swordfish, etc. (Specify)				1	2	1	2	3	4
				1	2	1	2	3	4
				1	2	1	2	3	4
				1	2	1	2	3	4

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Figure 1.--Sample page of the interview form used for the 1965 Angling Survey.

It appeared not practicable to confine the listings to uniform taxonomic levels. Thus the categories used for reporting catches, termed "species groups", consist of orders, families, genera and species. Some categories represent only part of a taxonomic grouping, e.g., several genera within a family. All closely related fishes which fishermen do not readily recognize as separate species were usually combined into a single species group. For each species group listed for a region, the fish name was selected that appeared to be in the most common usage for that region and synonyms were added for clarification when appropriate. However, in preparing the tables for this report we used the standard names listed in A List of Common and Scientific Names of Fishes from the United States and Canada (American Fisheries Society, 1960).

In preparing the species list for each region, an attempt was made to list in sequence species groups which were taxonomically similar or had similar common names so that the comparison was immediately obvious to the respondent. For example, in the Middle Atlantic Region the following species groups appeared in order on the 1965 interview list:

06 Whiting (Silver Hake)
07 Kingfish (King Whiting)
08 King Mackerel
09 Spanish Mackerel
10 Atlantic Mackerel

Anglers using other names of limited local usage would usually be familiar with one of the listed common names for that species and thereby identify it with the appropriate group. In order to minimize problems of misidentification within certain groups of fishes such as groupers, grunts, and rockfishes, we did not list species separately.

The decision as to which species groups to include on the interview list for each region was based primarily on the catches reported in the 1960 Angling Survey and the desirability of obtaining the catches of certain other species groups. The selections of species groups were made separately for each region and each decision was based primarily upon special circumstances affecting that region. For all regions except the North Pacific, it was necessary to shorten the list by combining fishes into categories of closely related species or eliminating species of minor importance. In some cases individual species which were included in a species group for the 1960 Angling Survey appeared separately on the 1965 list. Species groups with high catches in the 1960 Angling Survey which did not appear on the list for 1960, were added to the list for 1965 for that particular region. Likewise, species groups with low catches which did not appear on the 1960 list, were not included on the 1965 list. Several anadromous species which did not appear in 1960 were included on the list for the 1965 Angling Survey. The final arrangement was based upon a judgement as to which species groups would result in the most useful information and would facilitate comparisons with the 1960 Angling Survey, between regions of the survey and for the nation as a whole.

If an interviewee could not associate his catch with a species group listed, he was instructed to enter his catch with the name he did use in one of the blank spaces below the species list. In most cases, it was possible to identify these entries and include them in a species group. If not, or if the interviewee did not know any name for the species caught, it was entered in the miscellaneous category. Also included in the miscellaneous category were species groups for which the reported catches were too low to be tabulated separately.

Definition of Salt-Water Fishing

Salt-water fishing was defined for the purposes of the 1965 Angling Survey as all fishing in the ocean and in bays, estuaries and tidal parts of rivers. Included were catches of river-spawning salt-water species such as river herring, Atlantic salmon, steelhead, smelt, striped bass, king salmon, silver salmon, shad and Pacific herring when caught in fresh waters. Fresh-water fishing, excluded from this survey, was defined as all fishing in any inland stream, lake or reservoir and fishing above tidal limits for fresh water species.

Area and Method of Fishing

The following categories were used for principal area of fishing and method of fishing for each species group reported in the survey:

Area of fishing

1. Ocean
2. Sounds, rivers, or bays

Method of fishing

1. Private or rented boat
2. Party or charter boat
3. Bridge, pier or jetty
4. Beach or bank

Some species groups may have been caught in both areas and by more than one method of fishing by one person. Each respondent was instructed to indicate the area most frequently fished and the method of fishing chiefly used for that species group during 1965.

This represents a change from the 1960 Angling Survey for which the area and method of fishing was recorded as follows:

1. Still fishing from boats
2. Motion fishing from boats
3. Still fishing from shore
4. Motion fishing from shore

Weight of the Catch

Space was provided on the interview form for the 1965 Angling Survey for the average weight of the fish caught. Each interviewee was asked to record the total number and the average weight for each species group caught. These average weight data were used to compute the total weight of fish caught in 1965. This method differed from the 1960 Angling Survey, wherein information on average weights was not obtained from the anglers interviewed. Weight of the catch was estimated from average weight data supplied for each species group for each region of the survey by various State conservation agencies, other organizations and knowledgeable individuals.

The total weight of the catch in 1960 and 1965 is included in Table 1, although the source of the average weight data was different for the two surveys. For 1960, based on average weight data supplied by various conservation agencies and knowledgeable individuals, the total weight for the catch was estimated to be 1,380,301,000 pounds. For 1965, from average weight data supplied by the interviewees, the estimated weight of the catch was 1,474,353,000 pounds. As anglers may tend to overestimate the weight of their catch, it might have been expected that the average weight for most species groups reported in 1965 would exceed those for 1960. Although there were some differences in the species groups and in the catches in the 1960 Angling Survey and the 1965 Angling Survey, the overall average weight per fish caught decreased from 2.2 pounds in 1960 to 2.0 pounds in 1965.

SECTION 3. - SURVEY CRITIQUE

In evaluating the results of the 1965 Angling Survey we considered two principal sources of error: 1) sampling error, which arises from the sampling method, and 2) response error, which arises from the interviewee's failure to provide accurate accounts of their fishing activity. Both types of error are involved in the survey results and the possible effects of each are considered below.

Sampling Errors

The 1965 National Survey of Fishing and Hunting and the 1965 Angling Survey were supplements to the Current Population Survey of the Bureau of Census, which is designed to obtain data on a broad spectrum of social and economic subjects. The 1965 National Survey of Fishing and Hunting was designed specifically to obtain information on the number of fishermen and hunters in the United States and on their activities and expenditures, but not to obtain data on their catches. For the specific purpose of estimating salt-water fish catches, a different sampling design of the same size might have resulted in more reliable data, but this would have been too expensive. The number of salt-water anglers interviewed was determined primarily by the sample size for the National Survey of Fishing and Hunting. The sampling procedure was discussed in detail in Section 2.

Since the catch figures are estimates based upon a sample of the country's salt-water anglers, the results are subject to sampling error; that is, they may differ from the figures that would have been obtained if a complete census had been taken using the same forms, instructions, and enumerators. Since 95 percent of persons identified as salt-water anglers in the National Survey of Fishing and Hunting were subsequently interviewed, it is assumed that no bias was introduced by omission of those anglers who were not interviewed.

The extent of the sampling error is indicated by the standard error, a measure of sampling variability. The range of probable sampling error of any estimate is defined by the limits of the standard errors, which are shown in Table 7. The chances are about 95 in 100 that a sampling estimate would differ from a complete census by less than two standard errors. For example, a catch estimate of 10,000,000 fish has an approximate standard error of 3,900,000 fish, indicating that the true figure lies within the range 2,200,000 to 17,800,000 fish in 95 of 100 cases. Sampling error is lower where the reported catch is higher.

For the purpose of comparing catches in 1960 and 1965 we have listed, in Table 8, catch estimates for the 18 leading species categories, comprising about 76 percent of the estimated catch for each year. Because of the large sampling error for the smaller catches, we have listed only those for which the catch in both 1960 and 1965 was 10 million fish or greater. For the species categories at the higher catch levels there is close agreement between the 1960 and 1965 estimates. For several of those at the lower catch levels there are considerable differences between 1960 and 1965, but none was significant (at the 95 percent level[3/]). Although the number of anglers shows an increase in 14 of 18 categories, only those reporting catches of puffers increased significantly from 1960 to 1965.

3/The following formula was used to compute the standard error of the difference: $\sqrt{\sigma_1^2 + \sigma_2^2}$, where σ_1 and σ_2 are the estimated standard errors of the numbers being compared.

Response Errors

In a survey which depends upon response of a segment of the public, there are errors introduced by omissions or inaccuracies of the responses. Abramson (1963) stated that: "Response error reflects the difference between a characteristic's true value and that reported by a respondent." Atwood (1956) concluded that: "Response errors are the result of respondent's mental factors and are not removed or diminished by increasing the size of the sample." Although we are able to recognize various response errors associated with the 1965 Angling Survey, we cannot determine the magnitude of any particular response error. Nor can we find in the literature any study applicable to our problem of estimating fish catches.

Prestige-bias errors are those resulting from exaggeration, or as expressed by Deming (1950), they are errors of overstatement of a respondent's success, resulting from pride. Intentional exaggeration of the number of fish caught is certainly suspected to be a major source of error in the 1965 Angling Survey, as it was in the 1960 Angling Survey (Clark, 1962).

Memory-bias errors are those associated with guessing made necessary through lack of records (Deming, 1950). One type of memory-bias error recognizable in the 1965 Angling Survey is "rounding off", or digit-bias error. Examination of the raw data for the 1965 Angling Survey (the actual number of fish reported before statistical weighting) shows the effects of rounding off to digits that are multiples of 5, 10, and 12 (Table 9). Of the total of 4,704 reported catches of all species groups in all regions by the 1,566 respondents, 46.4 percent were in multiples of 5 or 10; and 11.0 percent were in multiples of 12 (6, 12, 18, 24, 36, and 48; 60 was included with digits ending in zero).

Rounding off to multiples of five appears significant to 45, above which most catches reported in fives are also multiples of 25. For example, the reported catches of 75 fish appear to represent a bias for a multiple of 25 rather than for a multiple of five. Likewise, reporting of catches in multiples of 10 is prominent from 10 to 80, but most reported catches over 80 are

Table 7.--Approximate standard errors of number of fishermen and number of fish caught (the table provides an estimate of the standard error rather than the precise standard error for any specific item; these estimated standard errors are based on standard error calculations for certain characteristics and have been obtained from a regression function fitted to these characteristics)

Number of fishermen (In thousands)		Number of fish caught (In thousands)	
Estimated number	Approximate standard error	Estimated number	Approximate standard error
50	40	1,000	820
100	50	5,000	2,500
250	75	10,000	3,900
500	100	20,000	6,400
750	125	30,000	8,400
1,000	140	50,000	12,000
2,000	190	75,000	15,800
5,000	310	100,000	19,000
8,000	400	200,000	30,000
		400,000	50,000
		600,000	67,000

Table 8.--Number of salt-water anglers and number of fish caught in 1960 and 1965 for species categories with over 10 million fish caught in both years

(In thousands)

Species Category [1]	Number of anglers [2]		Number of fish caught	
	1960	1965	1960	1965
Seatrouts (54, 55, 74)	1,269	1,593	83,836	89,414
Flatfishes (19, 20, 21, 27)	2,271	2,734	50,646	54,645
Croakers (13)	933	1,200	45,577	51,134
Porgies (45)	983	1,228	37,189	36,563
Catfishes (9)	803	679	32,695	41,739
Spot (65)	541	485	30,229	21,504
Kingfishes (31)	718	684	29,621	13,122
Bluefish (4)	899	955	23,814	30,525
Grunts (23)	391	411	21,617	26,318
Mullets (38)	92	258	19,240	18,448
Snappers (60, 61, 62)	461	794	16,098	31,644
White perch (41)	287	405	15,714	20,204
Red drum (17)	639	777	15,277	11,195
Bonitos (5)	493	510	12,729	12,977
Spanish mackerels (35, 37)	432	816	12,529	17,925
Striped bass (67)	687	866	12,402	18,251
Atlantic mackerels (34)	235	220	10,847	22,745
Puffers (46)	346	1,065 [3]	10,711	42,712
TOTAL			480,771	561,065

[1] The numbers in parentheses following the species categories refer to the species groups as used in the 1965 Angling Survey. (See Section 4 for species included in each species group.) For comparison purposes, it was necessary to combine several species groups from both 1960 and 1965.

[2] For species categories in which more than one species group is included, the number of anglers for each group is greater than the actual number for that group, as some anglers may have caught more than one species group in that category.

[3] Difference between years significant (at 95 percent level)

Table 9.--Frequency distribution of reported catches[1/] in the 1965 Angling Survey for all species groups and regions combined

Number of fish caught	Number of angler reports	Number of fish caught	Number of angler reports	Number of fish caught	Number of angler report
1	519	40	71	144	2
2	484	41	1	146	1
3	370	42	1	147	1
4	261	43	1	150	35
5	343	44	1	160	4
6	254	45	14	175	2
7	78	46	1	180	3
8	135	47	1	200	35
9	32	48	5	210	2
10	386	49	1	212	1
11	15	50	176	225	3
12	195	52	2	230	1
13	8	53	3	240	1
14	16	54	3	250	7
15	196	55	2	275	5
16	20	56	1	300	22
17	5	57	2	333	1
18	19	60	42	350	2
19	2	61	1	360	2
20	244	63	1	400	9
21	3	64	1	450	3
22	3	65	3	500	23
23	5	70	12	600	2
24	34	74	1	630	1
25	147	75	32	700	3
26	2	80	13	730	1
27	3	85	2	800	2
28	4	90	4	1000	13
30	111	100	140	1200	1
31	1	102	1	1500	1
32	4	105	1	2000	2
33	2	110	2	3500	1
34	1	120	5		
35	40	125	5		
36	9	130	1		4,704
37	3	135	1		
39	2	140	2		

1/ The 4,704 catches were reported for all species groups by anglers interviewed for the survey. From the 1,566 completed interview forms, 1,371 anglers reported catches of at least one species group. The zero catch was not obtained as reports of unsuccessful fishing were not required.

either associated with multiples of 25 or 100. Digit-bias associated with multiples of 12 is strong up to 48. The reported catches of 60 may indicate a bias for 12 as well as for 10. Above 60 the only evidence of digit-bias associated with 12 is two reported catches of 144.

Atwood (1956) found digit-bias error closely associated with prestige-bias although operating independently of the prestige-bias error. He determined that a psoitive error resulted from digit-bias; therefore, respondents more frequently rounded off to a higher favored digit (positive digit-bias) than to a lower one (negative digit-bias). Digit-bias errors probably contributed to the total response error in the 1965 Angling Survey.

Atwood (1956) reported another type of positive memory-bias error related to the frequency distribution of the actual number of birds killed per hunter and the frequency distribution of kills reported by the hunters. Atwood noted that the range of the reported number killed per hunter exceeded that of the actual number killed per hunter; the total number of individual frequency classes within which kills were reported by the hunters exceeded the actual number; and the number of hunters reporting kills in the lower frequency classes was less than actual, while the number of hunters reporting in the remaining classes was higher than actual. From these forms of error, Atwood concluded that hunter reports from recall were less biased for smaller seasonal kills and that the percentage of error increased as the seasonal kill increased. We presume that such errors also occur in the 1965 Angling Survey and, moreover, in the marine sport fishery where catches are numerically higher than are the bags in waterfowl hunting, this bias would result in considerable positive error.

The frequency distribution (unweighted) of the number of fish for all the different species groups reported in the 1965 Angling Survey is shown in Figure 2 (the zero catch was not obtained because reports of unsuccessful fishing for particular species were not required). This distribution is comparable to other catch frequency distributions (Calhoun, 1950) in which most anglers reported low catches of each species. The excessive length of the distribution results from a few anglers reporting catches of large numbers of small or schooling fishes such as smelts and puffers. Because the frequency distribution of the number of fish reported by the interviewees is positively skewed, the mean number of fish caught (31) is greater than the median number caught (10).

Although we are unable to determine the magnitude of any of the response errors, the preceding discussion shows that most errors are positive and tend toward overestimation of catches. Although there may be some response errors having a negative biasing effect, such as omission of catches or negative digit-bias, these probably do not outweigh those resulting in positive bias.

Comparison With Other Surveys

In the only other attempt to obtain the total U.S. salt-water sport fish catch that we have been able to locate, a total of 0.6 billion pounds was reported for 1960 by the Outdoor Recreation Resources Review Commission (U.S. Bureau of Sport Fisheries and Wildlife, 1962). However, this reported catch was not obtained by a systematic survey but was based upon an estimated catch in pounds per man-day of fishing supplied by conservation officials of the coastal States and upon an estimated number of recreation days spent salt-water fishing. Stroud and Jenkins (1962) and McHugh (1966) concluded that 0.6 billion pounds was a more reasonable estimate than 1.4 billion pounds reported in our 1960 Angling Survey. However, with no basis for comparing or even measuring errors, it cannot be asserted that an estimate of 0.6 billion pounds is closer to the true catch than one of 1.4 billion pounds.

We have a basis for direct comparison for one region of our survey; namely, Region VI (South Pacific). The California Department of Fish and Game has for many years sampled party boat catches in California in an effort to estimate the total yearly catch of this part of the fishery. The Department has also attempted in recent years to sample other segments of the sport fishery (Pinkas, et al., 1967). The

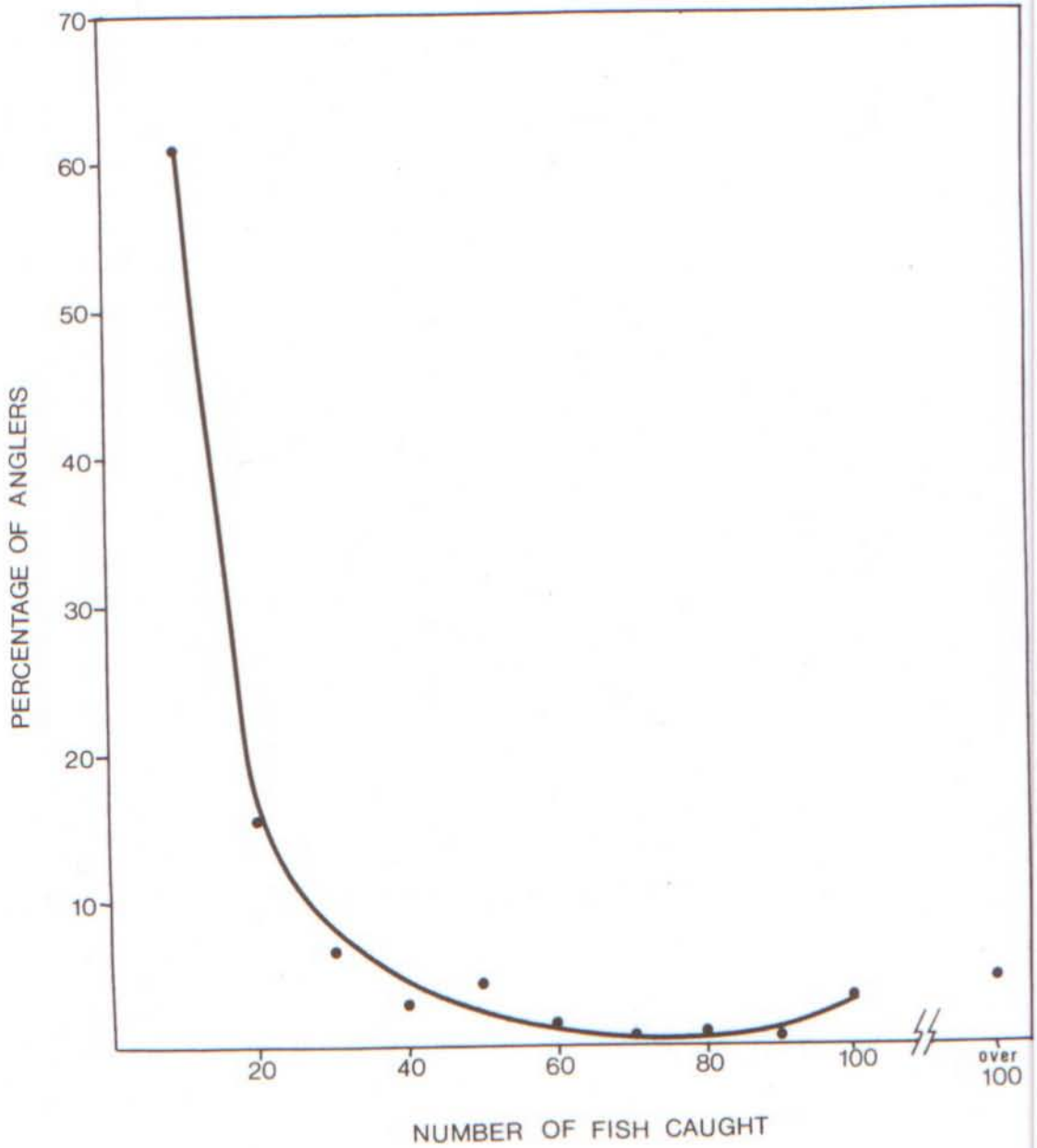

Figure 2.--Frequency of catch of all species groups reported by interviewees in the 1965 Angling Survey. There were 4,704 reported catches for all species groups, 210 of which were more than 100 fish. The maximum catch reported was 3,500 fish.

estimates of the 1965 Angling Survey differ widely from those based upon a composite of the California Department of Fish and Game estimates indicating serious error in one or both methods of estimate.

Table 10 presents the 1965 Angling Survey results for Region VI and catch estimates for the same area furnished us by the California Department of Fish and Game for various recent years (data collected in 1963, 1964, and 1965). The California Department of Fish and Game estimates give a much lower total salt-water catch than the 1965 Angling Survey. However, in examining the two sets of figures, it can be seen that the difference is least for party boats, the category for which the Department of Fish and Game has the greatest experience and upon which the greatest reliance can be placed. Party fishing boats are registered, and thus known to the Department, and the captains are required by law to file reports of their catches, thus greatly simplifying the process of statistics collection. The estimated catches for skiffs and yachts, piers and jetties and shoreline were obtained by a creel census using a probability sampling plan (Pinkas et al., 1967). Sampling the catch of these segments of the fishery is more difficult and the catch estimates more subject to error than the party boat catches, particularly for the private boat segment, listed under "skiffs and yachts".

The difference between the estimates could result from both overestimation by U.S. Bureau of Census and underestimation by the California Department of Fish and Game. The difference between the two estimates for the party boat category (a factor of 3.1) might be near the minimum to be expected for any comparison of direction collection and recall methods of estimating catches.

Discussion

The number of salt-water anglers obtained by the 1965 Angling Survey is an accurate estimate of those fishing in United States waters during 1965. However, estimates of their catches appear to be higher than actual because of survey response errors, although the magnitude of these errors could not be determined. The low number of anglers interviewed by the Bureau of Census limited the accuracy of the catch estimates, resulting in higher standard errors than would have resulted from sampling a greater number of anglers, but sampling errors should be non-directional and therefore non-biasing. However, bias from response errors in the catch estimates would not be eliminated by increasing the sample size of anglers interviewed.

The 1960 Angling Survey and the 1965 Angling Survey provide the only available estimates of the number of salt-water anglers and their catches by geographical regions for the entire United States. The catch data of both surveys appear to be affected by various response errors. However, as approximately the same number of anglers were interviewed using the same survey method in both 1960 and 1965, the response errors should have the same biasing effect on the catch data of both surveys.

The essential statistical need in conservation studies of salt-water species is continuous collection of accurate catch statistics by species for small geographical areas along all coasts of the United States. Present methods are inadequate to meet this need. Therefore, new methods must be developed for collection and analysis of sport fish catch statistics.

Table 10.--1965 Angling Survey and California Department of Fish and Game sport fish catch estimates by fishing methods for Region VI, South Pacific (Point Conception to the Mexican Border)

Source of Estimate	Number of Fish Caught, by Fishing Methods[1/]				
	Party boats	Skiffs and Yachts	Pier and Jetty	Shoreline	Total
1965 Angling Survey	11,541,000	24,757,000	9,724,000	2,520,000	48,542,000
California Department of Fish and Game[2/]	3,782,628	957,119	1,885,493	501,557	7,096,797
Factor of difference	3.1	25.9	5.2	5.0	6.8

1/ These four fishing methods are those used in the California surveys. Comparable categories for the 1965 Angling Survey are: party or charter boat; private or rented boat; bridge, pier or jetty; and beach or bank.

2/ The California surveys for party boats and shoreline were conducted in 1965, the skiff and yacht survey in 1964, and the pier and jetty survey in 1963.

SECTION 4--CLASSIFICATION OF SPECIES GROUPS [4]

The 1965 Angling Survey catches were categorized into the 76 species groups listed below. The common and scientific names listed agree with the standard names in A List of Common and Scientific Names of Fishes from the United States and Canada (American Fisheries Society, 1960). For a list of other common names used for fish included in these categories, see Section 5 - Common Name Index.

The numbers preceding each species group correspond with those used in Tables 3, 4, 5, 6, and 8 of this report, and also with those listed in Section 5.

1. Barracudas.....Includes members of the family Sphyraenidae, the barracudas.

2. Bass, black sea.....Includes only the species Centropristes striatus.

3. Basses, Pacific.....Includes members of the genus Paralabrax, rock basses.

4. Bluefish.....Includes only the species Pomatomus saltatrix.

5. Bonitos.....Includes members of the genus, Sarda, the bonitos.

6. Cabezon and Pacific sculpins.....Includes the species Scorpaenichthys marmoratus, and probably other members of the family Cottidae.

7. California corbina.....Includes only the species Menticirrhus undulatus.

8. California sheephead.....Includes only the species Pimelometopon pulchrum.

9. Catfishes.....Includes members of the family Ariidae, sea catfishes; and some members of the family Ictaluridae, the fresh-water catfishes such as Ictalurus nebulosus, brown bullhead (which appear in Region VII catches).

10. Cobia.....Includes only the species Rachycentron canadum.

11. Cods, Atlantic.....Includes only the species Gadus morhua, Atlantic cod, and Microgadus tomcod, Atlantic tomcod.

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[4] A detailed discussion of species grouping is included in Section 2.

12. Cods, Pacific.....Includes the species Gadus macrocephalus, Pacific cod, Microgadus proximus, Pacific tomcod, and Theragra chalcogrammus, walleye pollock.

13. Croakers.....Includes those members of the drum family Sciaenidae, which are commonly known as croakers.

14. Cunner.....Includes only the species Tautogolabrus adspersus.

15. Dolphins.....Includes members of the family Coryphaenidae, the dolphins.

16. Drum, black.....Includes only the species Pogonias cromis.

17. Drum, red.....Includes only the species Sciaenops ocellata.

18. Eel, American.....Includes only the species Anguilla rostrata.

19. Flatfishes, Pacific.....Includes members of the order Pleuronectiformes, the flounders occuring on the Pacific coast, except Paralichthys californicus, California halibut, which is listed separately.

20. Flounder, summer.....Includes primarily the species Paralichthys dentatus, the summer flounder, in Regions I and II; and the species P. albigutta, the Gulf flounder, and P. lethostigma the southern flounder in Regions III, IV, and V. Other members of the family Bothidae, left-eye flounders, may be included in any region.

21. Flounder, winter.....Includes primarily the species Pseudopleuronectes americanus, the winter flounder; but may include other members of the family Pleuronectidae, the right-eye flounders.

22. Groupers.....Includes those Atlantic members of the sea bass family Serranidae, which are commonly known as groupers.

23. Grunts.....Includes members of the family Pomadasyidae, the grunts.

24. Haddock.....Includes only the species Melanogrammus aeglefinus.

25. Hake, silver.....Includes only the species Merluccius bilinearis.

26. Hake, squirrel.....Includes only the species Urophycis chuss.

27. Halibut, California.....Includes only the species Paralichthys californicus.

28. Herrings, Atlantic.....Includes members of the family Clupeidae the herrings, except Alosa sapidissima, the American shad, which is listed separately.

29. Jacks.....Includes those Atlantic members of the family Carangidae known as the crevalles, runners, jacks, and amberjacks; particularly of the genera Caranx and Seriola. The members of the genus Trachinotus, known as pompanos are listed separately.

30. Jack mackerel.....Includes only the species Trachurus symmetricus.

31. Kingfishes.....Includes Atlantic members of the genus Menticirrhus.

32. Ladyfish.....Includes only the species Elops saurus.

33. Lingcod.....Includes only the species Ophiodon elongatus.

34. Mackerels, Atlantic.....Includes only the species Scomber scombrus, the Atlantic mackerel, and Scomber colias, the chub mackerel.

35. Mackerel, king.....Includes only the species Scomberomorus cavalla.

36. Mackerel, Pacific.....Includes only the species Scomber japonicus.

37. Mackerels, Spanish.....Includes the species Scomberomorus maculatus, the Spanish mackerel, and Scomberomorus regalis, the cero.

38. Mullets.....Includes members of the genus Mugil, the mullets.

39. Ocean whitefish.....Includes only the species Caulolatilus princeps.

40. Opaleye.....Includes only the species Girella nigricans.

41. Perch, white.....Includes only the species Roccus americanus.

42. Perch, yellow.....Includes only the species Perca flavescens.

43. Pollock.....Includes only the species Pollachius virens.

44. Pompanos.....Includes members of the genus Trachinotus, the pompanos.

45. Porgies.....Includes those members of the family Sparidae which are commonly known as porgies.

46. Puffers.....Includes members of the families Tetraodontidæ, the puffers; and Diodontidae, the porcupine fishes.

47. Rockfishes.....Includes Pacific members of the family Scorpaenidae, the rockfishes and scorpion - fishes.

48. Sablefish.....Includes only the species Anoplopoma fimbria.

49. Salmon, chinook.....Includes only the species Oncorhynchus tshawytscha.

50. Salmon, coho.....Includes only the species Oncorhynchus kisutch.

51. Salmon, pink.....Includes only the species Oncorhynchus gorbuscha.

52. Seabass, white.....Includes only the species Cynoscion nobilis.

53. Searobins.....Includes members of the family Triglidae.

54. Seatrout, sand.....Includes only the species Cynoscion arenarius.

55. Seatrout, spotted.....Includes only the species Cynoscion nebulosus.

56. Shad, American.....Includes only the species Alosa sapidissima.

57. Sharks.....Includes members of the order Squaliformes weighing over 5 pounds. Individuals weighing 5 pounds or less were assumed to be primarily Mustelus canis, the smooth dogfish, and Squalus acanthias, the spiny dogfish, and are listed separately.

58. Sharks, dogfish.....Includes primarily the species Mustelus canis, the smooth dogfish, and Squalus acanthias the spiny dogfish; although may include other small sharks weighing less than 5 pounds.

59. Smelts.....Includes members of the family Osmeridae, the smelts, and Pacific members of the family Atherinidae, the silversides.

60. Snappers.....Includes members of the family Lutjanidae, the snappers; except the two species Lutjanus blackfordi, and L. campechanus, the red snappers, and Ocyurus chrysurus the yellowtail snapper which are listed separately.

61. Snappers, red.....Includes only the species Lutjanus blackfordi, the red snapper, and L. campechanus, the Caribbean red snapper.

62. Snapper, yellowtail.....Includes only the species Ocyurus chrysurus.

63. Snook.....Includes only the species Centropomus undecimalis.

64. Spadefish, Atlantic.....Includes only the species Chaetodipterus faber.

65. Spot.....Includes only the species Leiostomus xanthurus.

66. Steelhead.....Includes only the species Salmo gairdneri, primarily a fresh-water species and usually called rainbow trout, but called steelhead when sea run.

67. Striped bass.....Includes only the species Roccus saxatilis.

68. Surfperches.....Includes members of the family Embiotocidae, the surfperches and seaperches.

69. Tarpon.....Includes only the species Megalops atlantica.

70. Tautog.....Includes only the species Tautoga onitis.

71. Trout, cutthroat.....Includes only the species Salmo clarki.

72. Trout, Dolly Varden.....Includes only the species Salvelinus malma.

73. Tunas.....Includes all members of the genus Thunnus, the tunas, and members of the genus Euthynnus.

74. Weakfish.....Includes only the species Cynoscion regalis.

75. Yellowtail, California.....Includes only the species Seriola dorsalis.

76. Miscellaneous.....Includes fish of doubtful identity and species of which too few were reported to be tabulated separately.

SECTION 5. - COMMON NAME INDEX

This index is based upon common fish names used by anglers and is meant to be used in locating the species group in which the catch of any fish would appear if reported. We have listed only those fishes which occurred or are likely to have occurred under one of the species groups shown in Section 4. Individual common names are included in the index only where needed to locate them in the appropriate species group. Thus, all the true rockfishes are shown to be in species group 47 (Scorpaenidae) and those whose name contains "rockfish" are not listed individually.

The number following each name indicates the species group in which it would most probably be reported in the survey. For example, we do not know whether catches of arrowtooth flounder specifically are included in the reported category of "flatfishes" in Regions VI and VII; but if taken they will occur in species group 19, which includes all Pacific Ocean flatfishes with the exception of California halibut, which is listed separately. On the other hand, since bergall is a synonym only for cunner, a single-species group, one may ascertain definitely the reported catch of that species by referring to species group 14, cunner.

Sometimes confusion arises when one common name refers to two or more species groups. For example, "bluefish", which is the generally accepted common name for Pomatomus saltatrix, (species group 4), is sometimes used in referring to the blue rockfish and also the black sea bass. It would be listed as follows:

Bluefish, 4
for black sea bass, 2
for rockfishes, 47

Those species such as "swordfishes", where the catch was too low to be compiled separately, have been included under the miscellaneous category and do not appear on this list. Also there are a few of the more well-known species such as Pacific sargo that are not listed since none of the fishermen interviewed reported catching any. Therefore, if a fish is not listed below, it was either included in the miscellaneous category or was not reported at all.

The numbers given in the following listing refer to the numbers of the species groups defined in Section 4, Classification of Species Groups.

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* U.S. GOVERNMENT PRINTING OFFICE : 1968 O—313-506

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