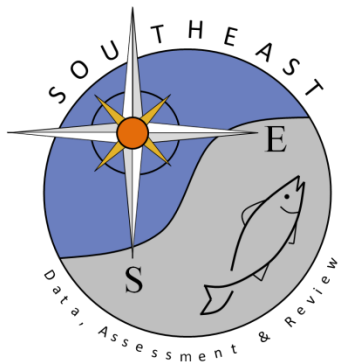


Brief Summary of SEAMAP Data Collected in the Caribbean Sea from 1975 to 2002

G. Walter Ingram, Jr.

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Description of Data

Caribbean SEAMAP data consists of two sources. The first source of data was collected from 1646 stations from 1975 to 1984. Sampling methodologies differed greatly both between and within cruises (Table 1). Most stations were conducted using longline sampling. However, the lack of knowledge of longling gear standardization (i.e., the number of hooks per set) precludes any meaningful analyses at this time. If one assumes a common number of hooks per set, then the longline-collected portion of this early data could possibly yield useful information, and should be the focus of future analyses of the Caribbean SEAMAP database.

Only the second source of data was used for analyses in this summary. It consisted of data collected from 6432 stations around Puerto Rico and the Virgin Islands. The sampling methods for the majority of these stations consisted of either fish traps and/or handlines (Table 2). The data was analyzed separately for each area (i.e., Puerto Rico or the Virgin Islands) and each of the aforementioned sampling methods (i.e., fish traps or handlines).

Catch rates

Overall catch rates were calculated for each area-method combination (i.e., Puerto Rico, handline; Puerto Rico, fish trap; Virgin Islands, handline; or Virgin Islands, fish trap). This was accomplished by standardizing catch at each station by time fished. The assumption made was that handline and fish trap methods between and within surveys were standardized. Also, the assumption was made that all samples taken were done so randomly. Tables 3-6 list the 20 species with highest catch rates plus any of the species of management interest not already included in the top 20. This was done for each area-method combination.

Regardless of area or collection method, except for fish traps in the Virgin Islands, red hind, *Epinephelus guttatus*, and coney, *E. fulvus*, had the highest catch rates. Of the species of management interest the sand tilefish, *Malacanthus plumieri*, had the highest catch rates, in fish

traps around Puerto Rico. Silk snapper, *Lutjanus vivanus*, and blackfin snapper, *L. buccanella*, had higher catch rates with handlines than in fish traps. Queen snapper, *Etelis oculatus*, and blackline tilefish, *Caulolatilus cyanops*, had consistently low catch rates.

Yearly catch rates were estimated for red hind, coney, graysby (*Epinephelus cruentatus*), and sand tilefish for all area-method combinations (Figures 1-8). Due to low occurrences in the Virgin Islands, yearly catch rates for silk and blackfin snappers were only estimated for Puerto Rico (Figures 9-10).

Length Frequencies of Selected Species

The majority of sand tilefish were collected using handlines. Therefore, length frequency graphs were made for those collected by handlines in each area (Figure 11). A comparison between the two areas indicates that sand tilefish collected by handlines in the Virgin Islands tend to be larger than those collected by handlines in Puerto Rico.

The majority of the silk and blackfin snappers were collected in Puerto Rico. Therefore, length frequency graphs were made for each species collected by each method around Puerto Rico (Figures 12-13). For both species, larger specimens tend to be collected with handlines than with fish traps.

Table 1. Caribbean SEAMAP data collection efforts from 1975 to 1984 (1646 stations). Cruise description indicates vessel/cruise number, the timeframe, and name of the cruise. Questionable gear codes indicated by “?”.

Cruise Description	Gear Type Used	Number of Stations
28/857	BOTTOM LONGLINE	49
09/22/1975 - 10/30/1975 US Reeffish Survey	MISCELLANEOUS?	11
	OFF-BOTTOM LONGLINE	48
	SHRIMP TRAWL	3
	FISH TRAP	60
04/097	BOTTOM LONGLINE	59
06/13/1979 - 08/03/1979 US Reeffish Habitat/Miami Swordfish	HAND LINE	29
	FISH TRAP	4
	TRAP VIDEO	270
04/108	BOTTOM LONGLINE	105
06/17/1980 - 07/24/1980 US Caribbean Reeffish Survey	CG?	1
	EG?	23
	HAND LINE	23
	SURFACE LONGLINE	1
	FISH TRAP	13
04/119	BOTTOM LONGLINE	13
07/13/1981 - 08/28/1981 US Caribbean Reeffish Survey	HAND LINE	1
	FISH TRAP	1
21/824	CTD	17
06/14/1982 - 07/16/1982 East Coast Cooperative	BOTTOM LONGLINE	28
	IT?	1
	SHRIMP TRAWL	17
	TUMBLER DREDGE	110
	FISH TRAP	4
04/129	BOTTOM LONGLINE	111
09/01/1982 - 09/30/1982 US Deepwater Snapper/Grouper	HAND LINE	4
	OFF-BOTTOM LONGLINE	111
	FISH TRAP	18
04/132	SURFACE LONGLINE	21
01/13/1983 - 02/11/1983 US Deepwater Snapper/Grouper		
21/836	BB?	1
05/25/1983 - 07/20/1983 US Deepwater Snapper/Grouper	BOTTOM LONGLINE	139
	OFF-BOTTOM LONGLINE	138
	PLANKTON, BONGOS	16
	FISH TRAP	12
21/844	BOTTOM LONGLINE	90
04/10/1984 - 05/14/1984 US Deepwater Snapper/Grouper	FA?	2
	HAND LINE	1
	OFF-BOTTOM LONGLINE	90
	FISH TRAP	1

Table 2. Caribbean SEAMAP data collection efforts from 1991 to 2002 (6432 stations). Cruise description indicates vessel/cruise number, the timeframe, and name of the cruise. Gear types used were coded as follows: HL, handline; TR, fish trap; and TRHL, a combination.

Cruise Description	Gear Type Used	Number of Stations
56/911	HL	78
9/17/91 - 12/19/91 PR Caribbean Survey	TR	339
56/921	HL	158
1/22/92 - 6/24/92 PR Caribbean Survey - Part 1	TR	442
56/922	HL	129
6/24/92 - 10/1/92 PR Caribbean Survey - Part 2	TR	518
56/931	HL	108
3/2/93 - 8/5/93 PR Caribbean Survey - Part 1	TR	492
56/932	HL	95
8/5/93 - 12/22/93 PR Caribbean Survey - Part 2	TR	468
56/941	HL	50
1/18/94 - 2/22/94 PR Caribbean Survey	TR	120
57/912	HL	15
9/17/91 - 9/25/91 PR Caribbean Survey	TR	87
57/922	HL	66
9/8/92 - 11/16/92 PR Caribbean Survey	TR	24
57/932	HL	84
3/16/93 - 5/25/93 PR Caribbean Survey - Part 1	TR	415
57/933	HL	103
5/25/93 - 11/10/93 PR Caribbean Survey - Part 2	TR	458
60/932	HL	6
12/14/93 - 12/24/93 PR Caribbean Survey - Part 3	TR	18
57/942	HL	98
3/3/94 - 6/22/94 PR Caribbean Survey - Part 1	TR	401
57/943	HL	202
6/23/94 - 12/22/94 PR Caribbean Survey - Part 2	TR	393
57/952	HL	82
1/11/95 - 3/30/95 PR Caribbean Survey	TR	268
58/922	HL	15
10/27/92 - 12/1/92 VI Reefish Survey	TR	48
58/931	HL	3
9/21/93 - 9/21/93 VI Reefish Survey	TR	12
59/922	HL	4
10/21/92 - 10/21/92 VI Reefish Survey	TR	12
59/932	HL	6
9/23/93 - 12/15/93 VI Reefish Survey	TR	24
59/941	HL	17
1/18/94 - 3/4/94 VI Reefish Survey	TR	72
60/001	TRHL	127
1/13/00 - 4/4/00 VI Winter/Spring Reefish		
60/941	HL	7
1/3/94 - 2/11/94 VI Reefish Survey	TR	27
60/991	TRHL	86
8/31/99 - 10/14/99 VI Summer Reefish Survey		
70/021	TRHL	149
1/29/02 - 7/9/02 VI Summer Reefish Survey St.Croix		

Table 3. List of top 20 species with highest catch rates (number per 1000 hours fished) collected using hand lines during surveys around Puerto Rico (1271 stations). Species of management interest were also included with this list if not already in the top 20 species. Species of management interest are shown in bold.

Species	Common Name	Mean Catch Rate	Standard Error
<i>Epinephelus guttatus</i>	red hind	1032.31	41.30
<i>Epinephelus fulvus</i>	coney	560.18	24.90
<i>Malacanthus plumieri</i>	sand tilefish	140.86	7.19
<i>Holocentrus adscensionis</i>	squirrelfish	48.34	3.36
<i>Epinephelus cruentatus</i>	graysby	38.46	3.74
<i>Holocentrus rufus</i>	longspine squirrelfish	20.83	2.06
<i>Lutjanus vivanus</i>	silk snapper	20.25	3.28
<i>Lutjanus buccanella</i>	blackfin snapper	16.95	2.44
<i>Rhoboplites aurorubens</i>	vermilion snapper	16.09	3.82
<i>Caranx lugubris</i>	black jack	13.32	1.75
<i>Melichthys niger</i>	black durgon	12.72	2.14
<i>Calamus pennatula</i>	pluma	11.10	1.46
<i>Canthidermis sufflamen</i>	ocean triggerfish	10.55	2.06
<i>Seriola rivoliana</i>	almaco jack	6.09	1.06
<i>Balistes vetula</i>	queen triggerfish	6.09	1.11
<i>Caranx crysos</i>	blue runner	5.14	0.95
<i>Apsilus dentatus</i>	black snapper	5.03	1.68
<i>Caranx latus</i>	horse-eye jack	4.39	1.08
<i>Sphyraena barracuda</i>	great barracuda	3.39	0.75
<i>Lutjanus synagris</i>	lane snapper	3.17	0.76
<i>Caulolatilus cyanops</i>	blackline tilefish	0.26	0.26
<i>Etelis oculatus</i>	queen snapper	0.17	0.17

Table 4. List of top 20 species with highest catch rates (number per 1000 hours fished) collected using fish traps during surveys around Puerto Rico (4442 stations). Species of management interest were also included with this list if not already in the top 20 species. Species of management interest are shown in bold.

Species	Common Name	Mean Catch Rate	Standard Error
<i>Epinephelus guttatus</i>	red hind	36.40	2.40
<i>Epinephelus fulvus</i>	coney	19.43	1.18
<i>Chaetodon striatus</i>	banded butterflyfish	12.27	0.99
<i>Balistes vetula</i>	queen triggerfish	6.63	0.73
<i>Holocentrus adscensionis</i>	squirrelfish	3.85	0.56
<i>Chaetodon capistratus</i>	foureye butterflyfish	3.35	0.60
<i>Holocentrus rufus</i>	longspine squirrelfish	3.29	0.43
<i>Acanthurus bahianus</i>	ocean surgeonfish	2.09	0.42
<i>Scarus taeniopterus</i>	princess parrotfish	1.92	0.48
<i>Rhoboplites aurorubens</i>	vermilion snapper	1.51	0.76
<i>Lutjanus vivanus</i>	silk snapper	1.44	0.66
<i>Pseudupeneus maculatus</i>	spotted goatfish	1.43	0.43
<i>Ocyurus chrysurus</i>	yellowtail snapper	1.39	0.30
<i>Haemulon plumieri</i>	white grunt	1.34	0.27
<i>Lutjanus buccanella</i>	blackfin snapper	1.27	0.71
<i>Calamus pennatula</i>	pluma	1.26	0.34
<i>Epinephelus cruentatus</i>	graysby	0.88	0.23
<i>Lutjanus apodus</i>	schoolmaster	0.83	0.79
<i>Cantherhines macrocerus</i>	whitespotted filefish	0.80	0.20
<i>Chaetodon ocellatus</i>	spotfin butterflyfish	0.59	0.17
<i>Malacanthus plumieri</i>	sand tilefish	0.30	0.14
<i>Caulolatilus cyanops</i>	blackline tilefish	0.00	
<i>Etelis oculatus</i>	queen snapper	0.00	

Table 5. List of top 20 species with highest catch rates (number per 1000 hours fished) collected using handlines during surveys around the Virgin Islands (104 stations). Species of management interest were also included with this list if not already in the top 20 species. Species of management interest are shown in bold.

Species	Common Name	Mean Catch Rate	Standard Error
<i>Epinephelus fulvus</i>	coney	1079.32	213.85
<i>Epinephelus guttatus</i>	red hind	212.07	33.88
<i>Malacanthus plumieri</i>	sand tilefish	153.91	37.89
<i>Caranx crysos</i>	blue runner	105.51	30.60
<i>Lutjanus vivanus</i>	silk snapper	56.09	56.09
<i>Balistes vetula</i>	queen triggerfish	51.46	16.36
<i>Epinephelus cruentatus</i>	graysby	33.54	13.01
<i>Holocentrus rufus</i>	longspine squirrelfish	24.29	9.20
<i>Holocentrus sp.</i>	squirrelfishes	19.21	15.58
<i>Canthidermis sufflamen</i>	ocean triggerfish	15.95	8.22
<i>Chaetodon sedentarius</i>	reef butterflyfish	7.73	7.73
<i>Remora remora</i>	remora	7.64	5.45
<i>Alectis ciliaris</i>	African pompano	5.95	4.20
<i>Ocyurus chrysurus</i>	yellowtail snapper	5.90	4.22
<i>Calamus calamus</i>	saucereye porgy	5.27	3.02
<i>Halichoeres poeyi</i>	blackear wrasse	4.98	3.59
<i>Aluterus monoceros</i>	unicorn filefish	4.81	4.81
<i>Haemulon plumieri</i>	white grunt	4.07	2.90
<i>Gymnothorax moringa</i>	spotted moray	3.85	3.85
<i>Melichthys niger</i>	black durgon	3.67	2.59
<i>Lutjanus buccanella</i>	blackfin snapper	1.91	1.91
<i>Caulolatilus cyanops</i>	blackline tilefish	0.00	
<i>Etelis oculatus</i>	queen snapper	0.00	

Table 6. List of top 20 species with highest catch rates (number per 1000 hours fished) collected using fish traps during surveys around the Virgin Islands (503 stations). Species of management interest were also included with this list if not already in the top 20 species. Species of management interest are shown in bold.

Species	Common Name	Mean Catch Rate	Standard Error
<i>Epinephelus fulvus</i>	coney	130.48	19.64
<i>Chaetodon capistratus</i>	foureye butterflyfish	34.59	7.58
<i>Balistes vetula</i>	queen triggerfish	30.72	6.79
<i>Epinephelus guttatus</i>	red hind	24.29	3.24
<i>Haemulon flavolineatum</i>	french grunt	17.35	5.94
<i>Ocyurus chrysurus</i>	yellowtail snapper	13.89	4.27
<i>Chaetodon striatus</i>	banded butterflyfish	13.47	3.38
<i>Holocentrus rufus</i>	longspine squirrelfish	12.68	4.51
<i>Holocentrus adscensionis</i>	squirrelfish	8.54	3.56
<i>Acanthurus bahianus</i>	ocean surgeonfish	7.66	3.47
<i>Acanthurus coeruleus</i>	blue tang	7.46	2.61
<i>Malacanthus plumieri</i>	sand tilefish	6.31	6.31
<i>Pseudupeneus maculatus</i>	spotted goatfish	5.16	2.04
<i>Scarus taeniopterus</i>	princess parrotfish	4.72	1.55
<i>Epinephelus cruentatus</i>	graysby	4.51	1.70
<i>Acanthurus chirurgus</i>	doctorfish	4.27	1.76
<i>Chaetodon sedentarius</i>	reef butterflyfish	3.23	1.51
<i>Calamus calamus</i>	saucereye porgy	3.05	1.21
<i>Mycteroperca venenosa</i>	yellowfin grouper	2.71	0.96
<i>Pomacanthus arcuatus</i>	gray angelfish	1.66	1.10
<i>Lutjanus buccanella</i>	blackfin snapper	1.57	1.02
<i>Caulolatilus cyanops</i>	blackline tilefish	0.00	
<i>Etelis oculatus</i>	queen snapper	0.00	
<i>Lutjanus vivanus</i>	silk snapper	0.00	

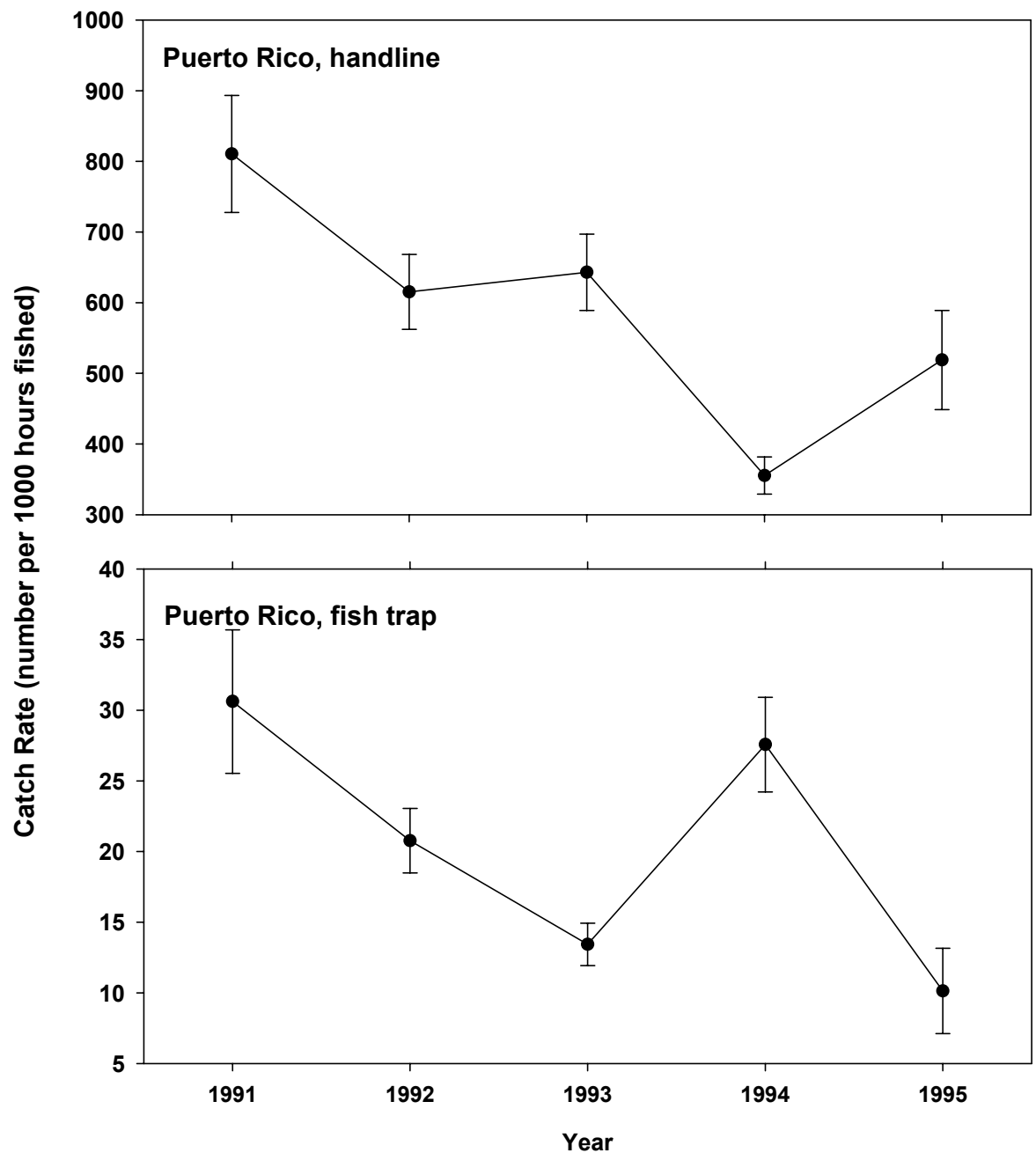


Figure 1. Yearly catch rates for coney collected in Puerto Rico. Error bars represent one standard error.

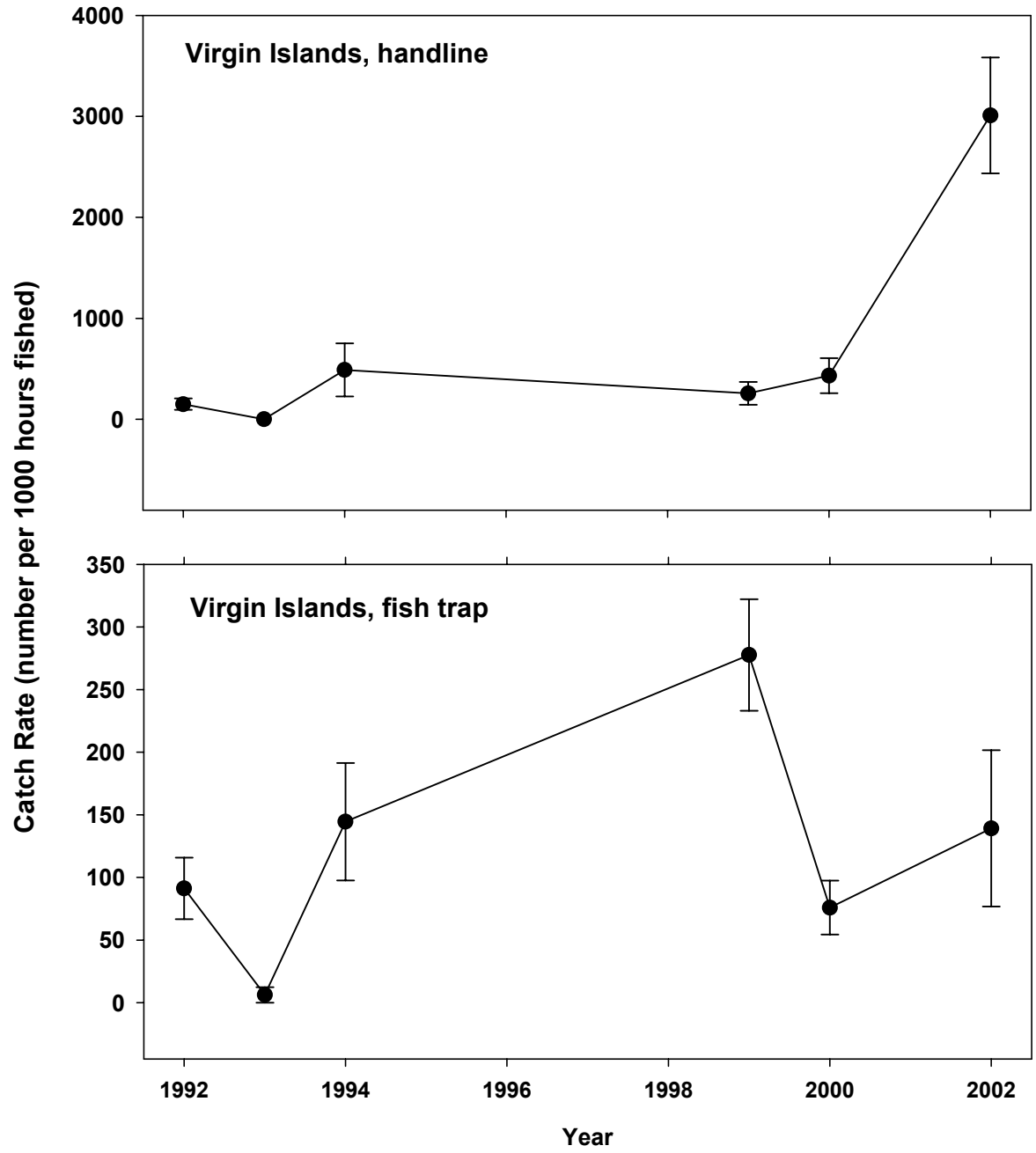


Figure 2. Yearly catch rates for coney collected in the Virgin Islands. Error bars represent one standard error.

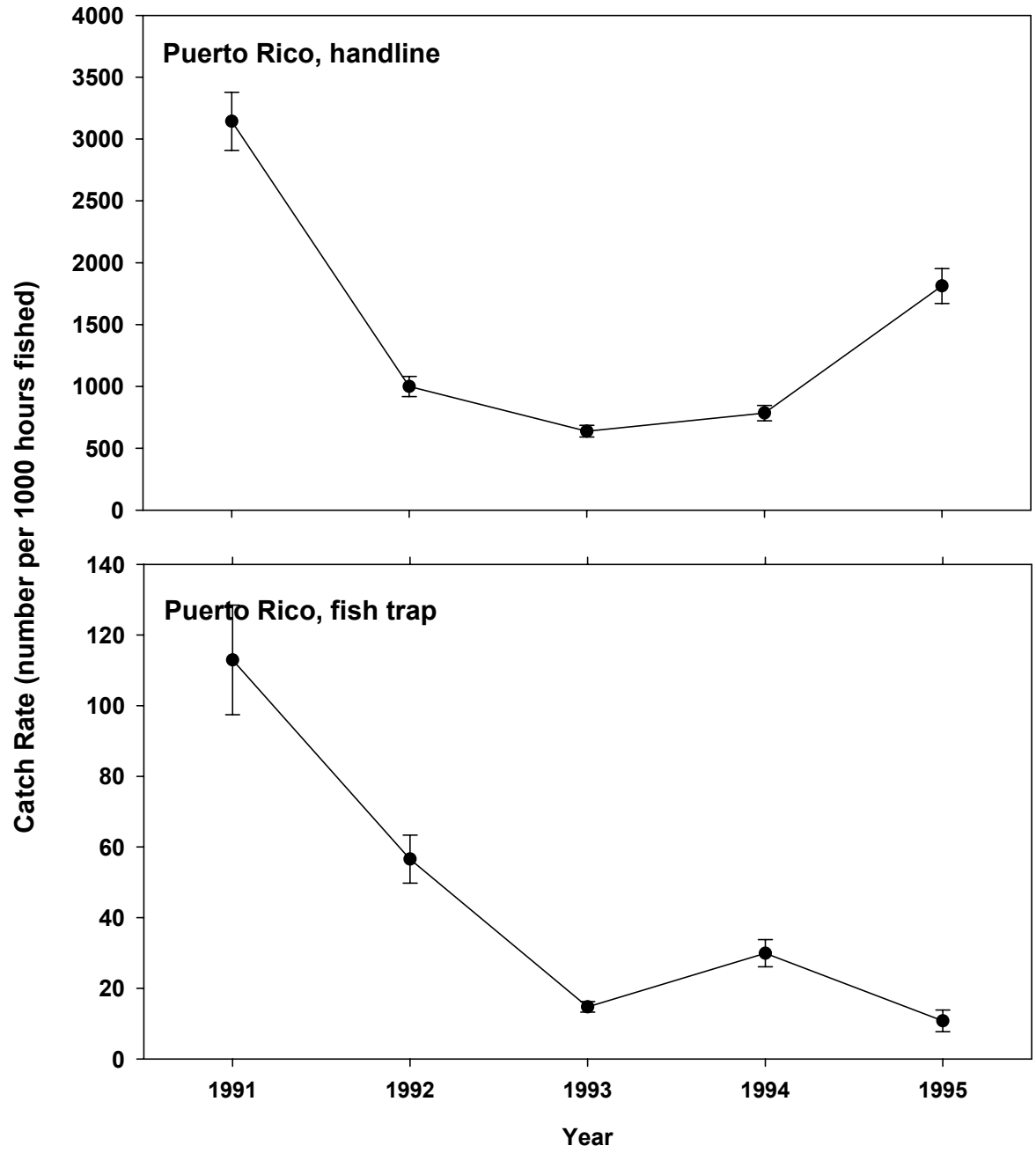


Figure 3. Yearly catch rates for red hind collected in Puerto Rico. Error bars represent one standard error.

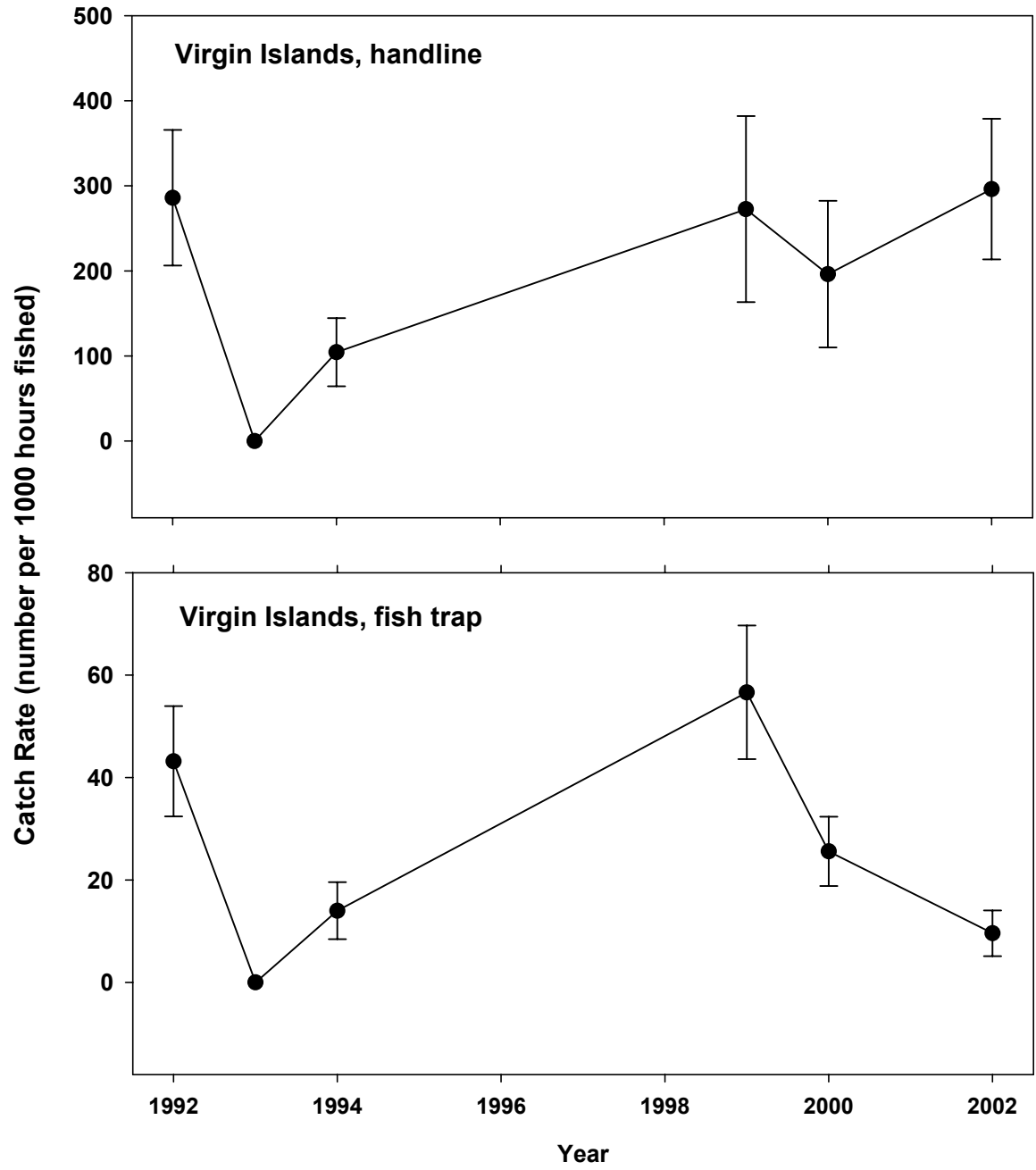


Figure 4. Yearly catch rates for red hind collected in the Virgin Islands. Error bars represent one standard error.

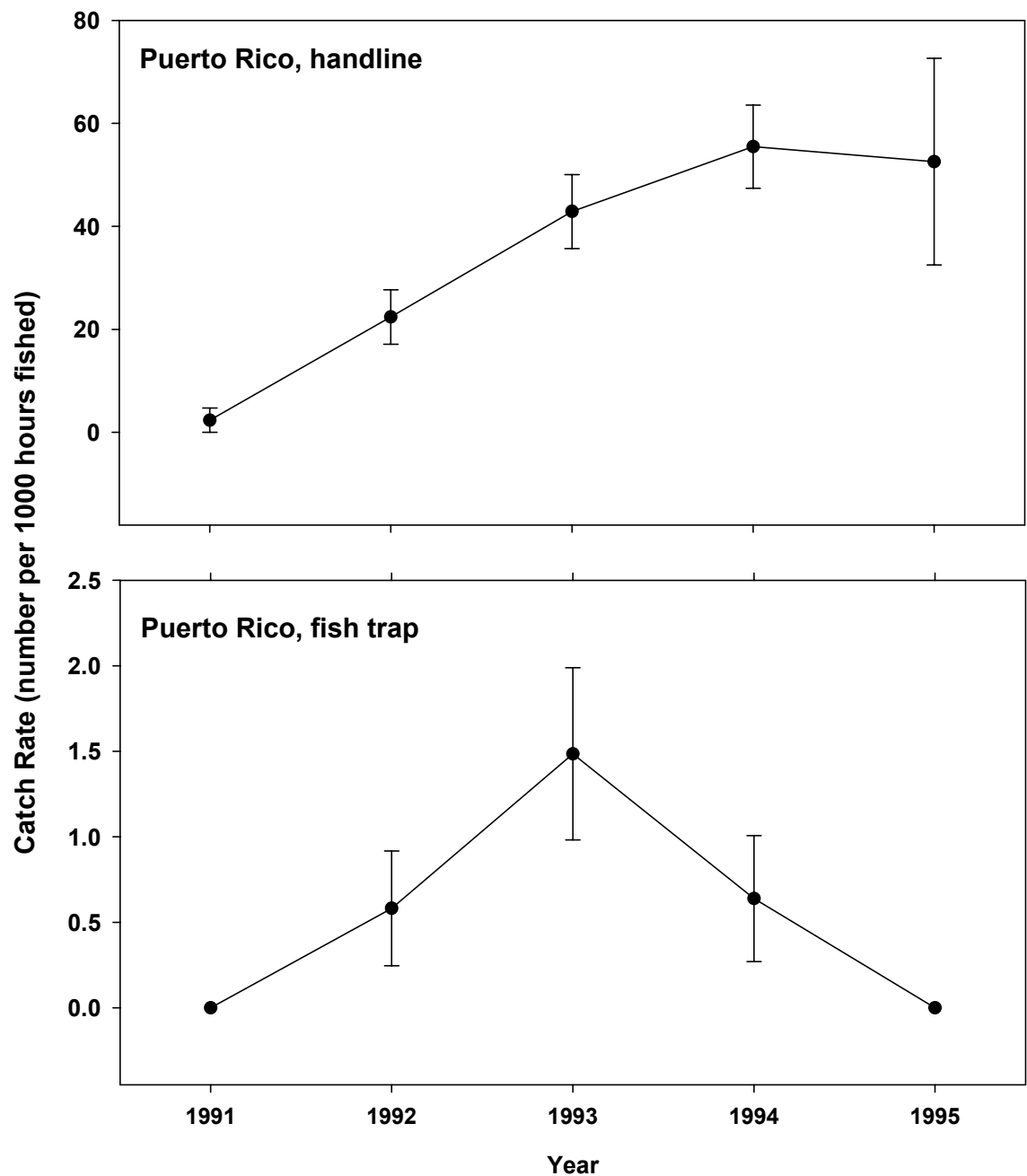


Figure 5. Yearly catch rates for graysby collected in Puerto Rico. Error bars represent one standard error.

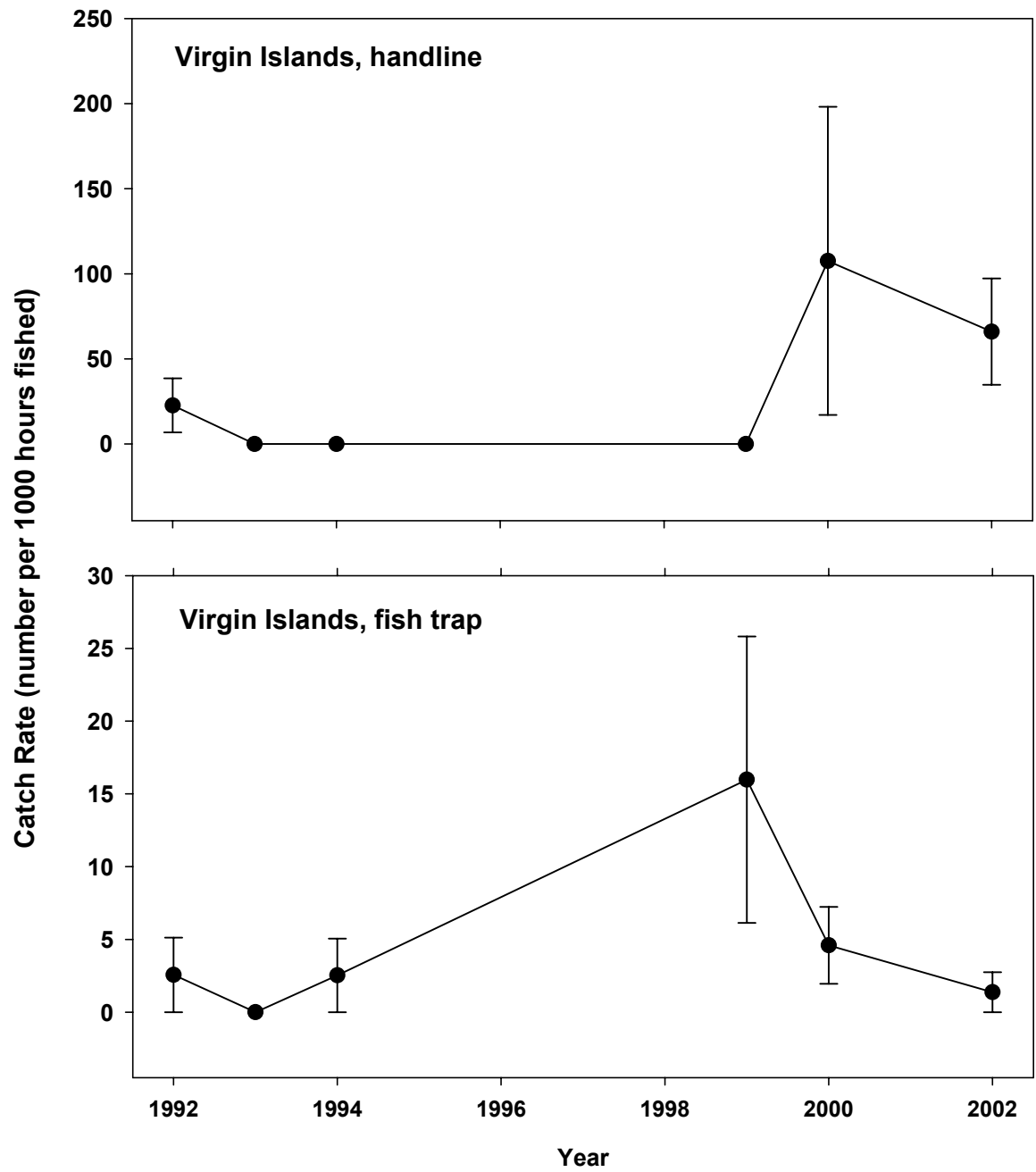


Figure 5. Yearly catch rates for graysby collected in the Virgin Islands. Error bars represent one standard error.

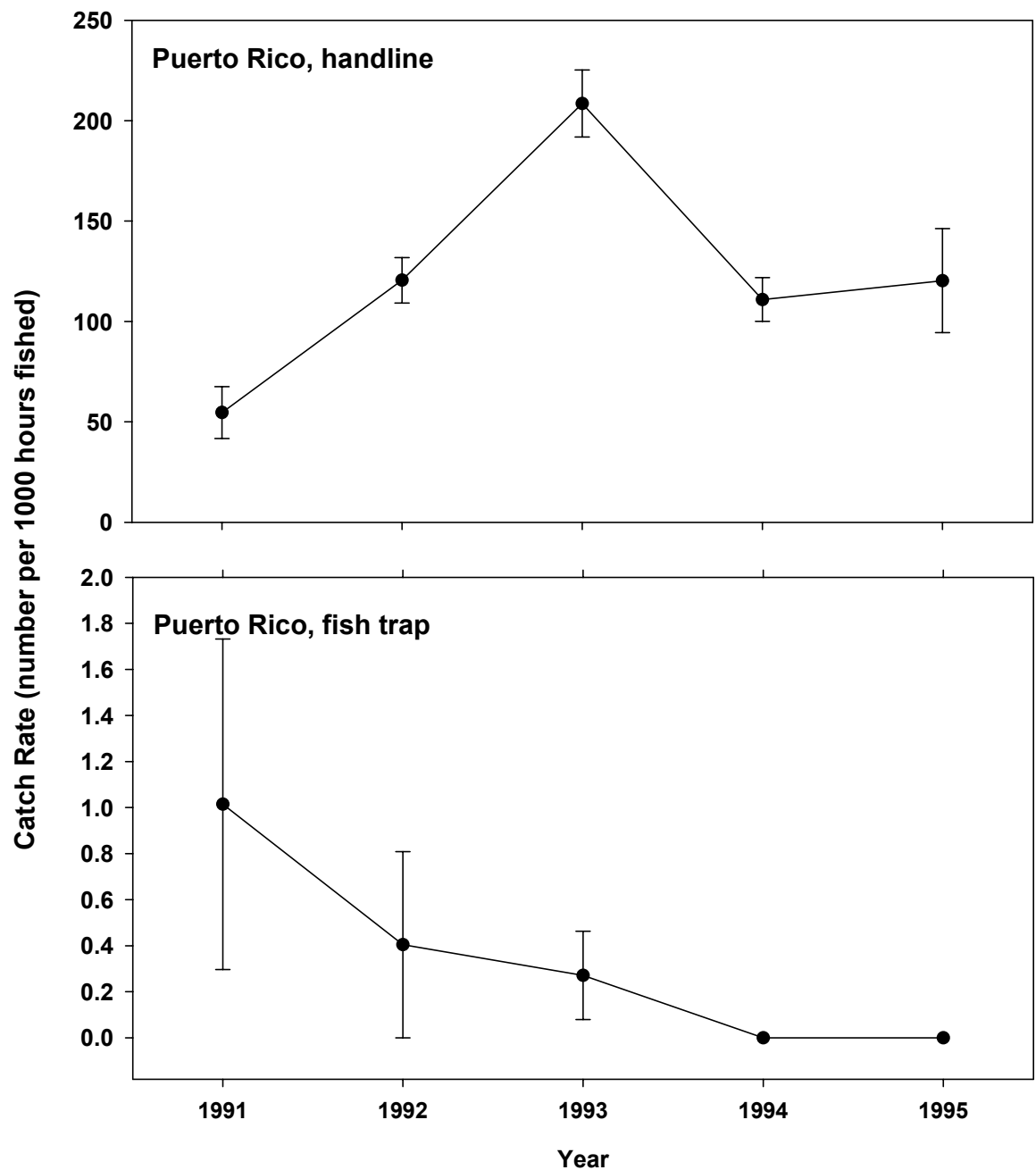


Figure 7. Yearly catch rates for sand tilefish collected in Puerto Rico. Error bars represent one standard error.

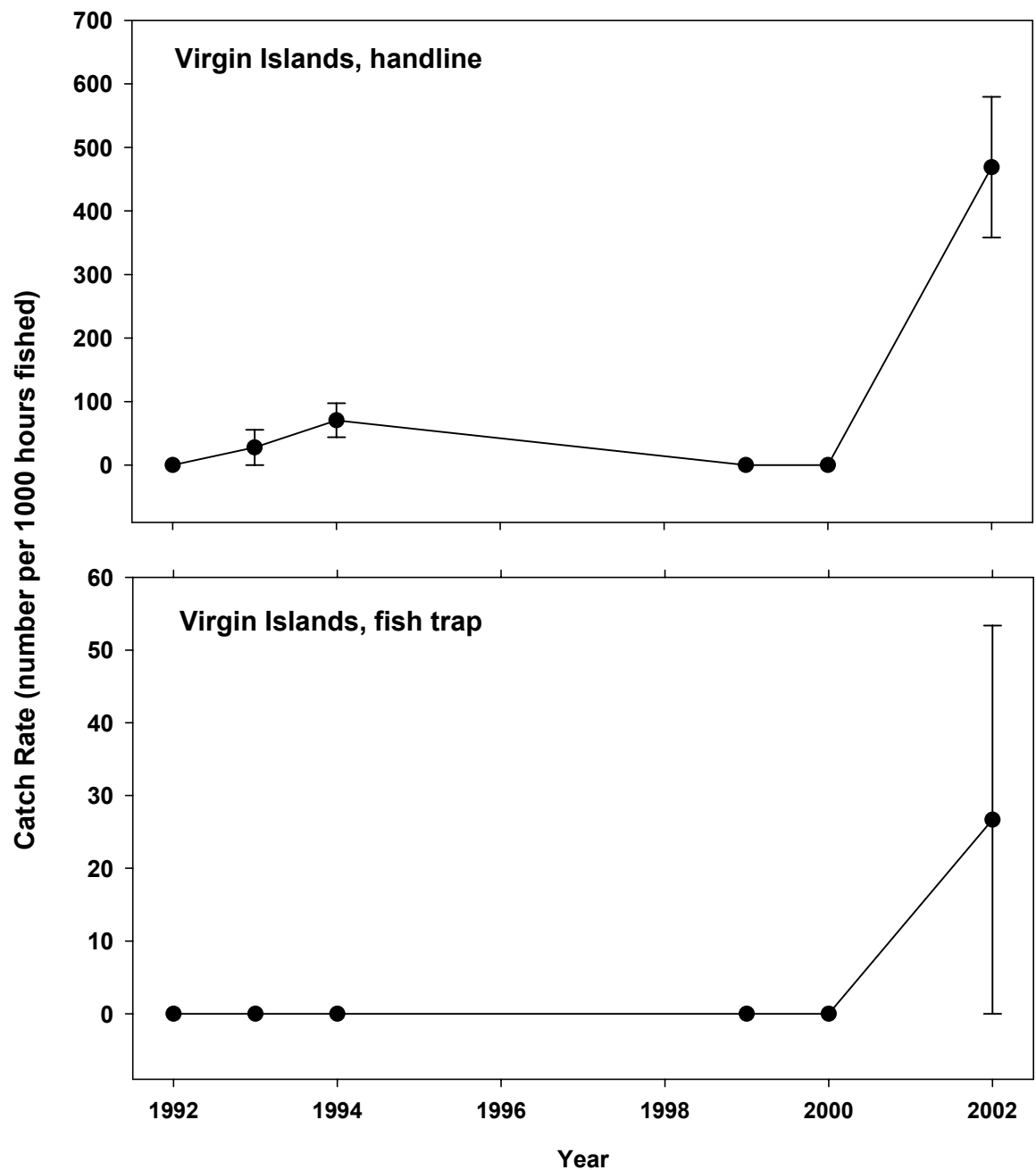


Figure 8. Yearly catch rates for sand tilefish collected in the Virgin Islands. Error bars represent one standard error.

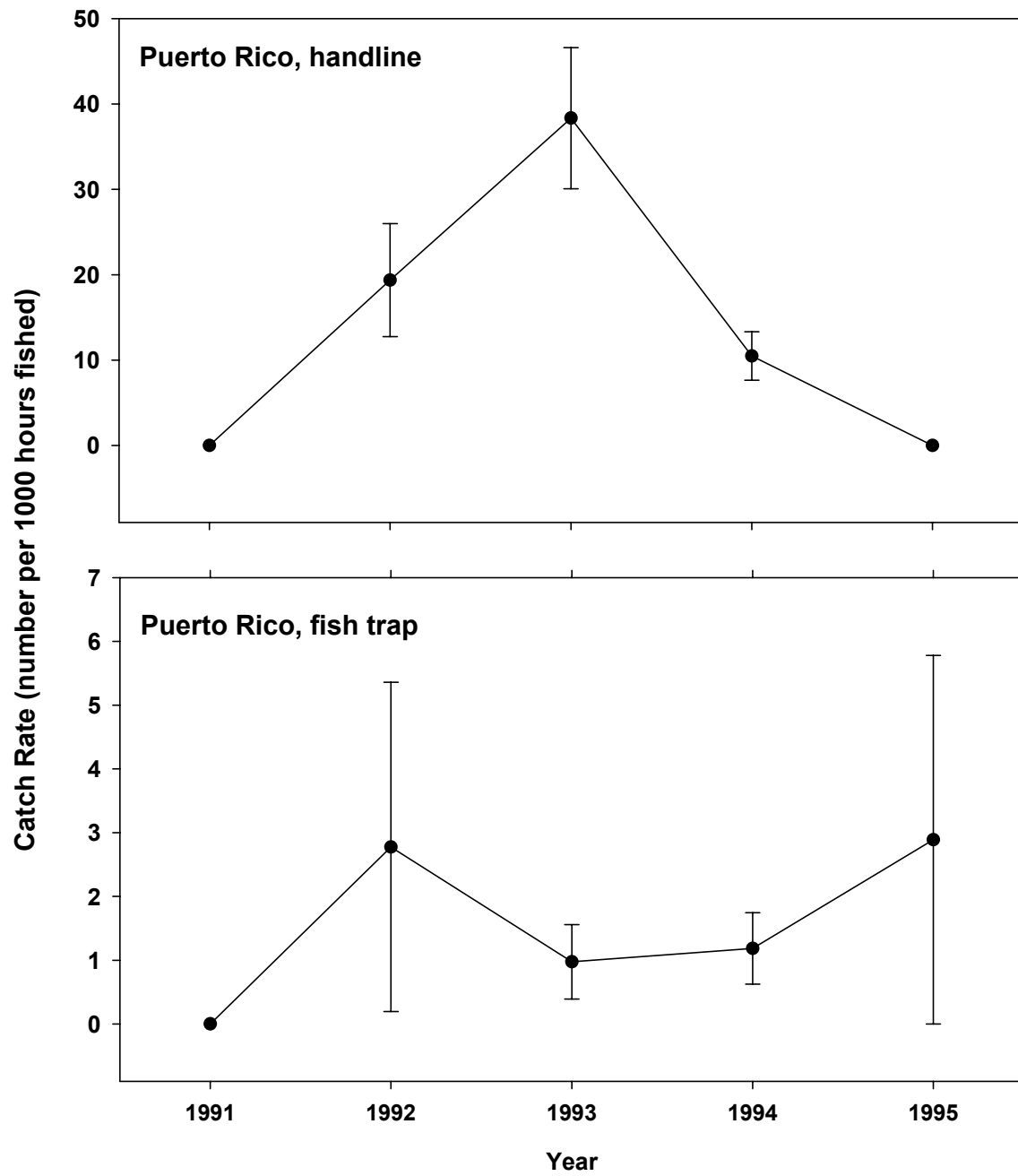


Figure 9. Yearly catch rates for silk snapper collected in Puerto Rico. Error bars represent one standard error.

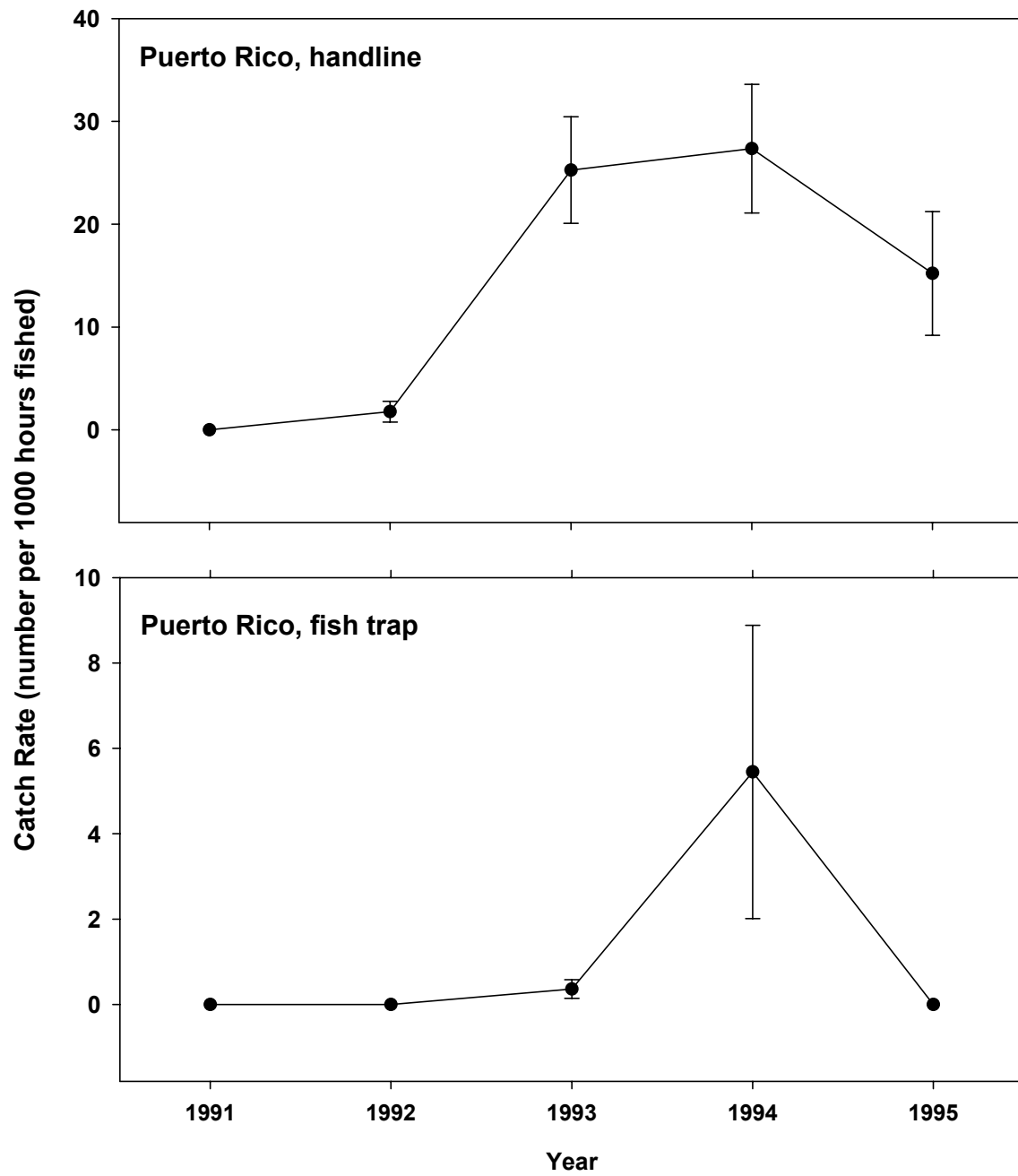


Figure 10. Yearly catch rates for blackfin snapper collected in Puerto Rico. Error bars represent one standard error.

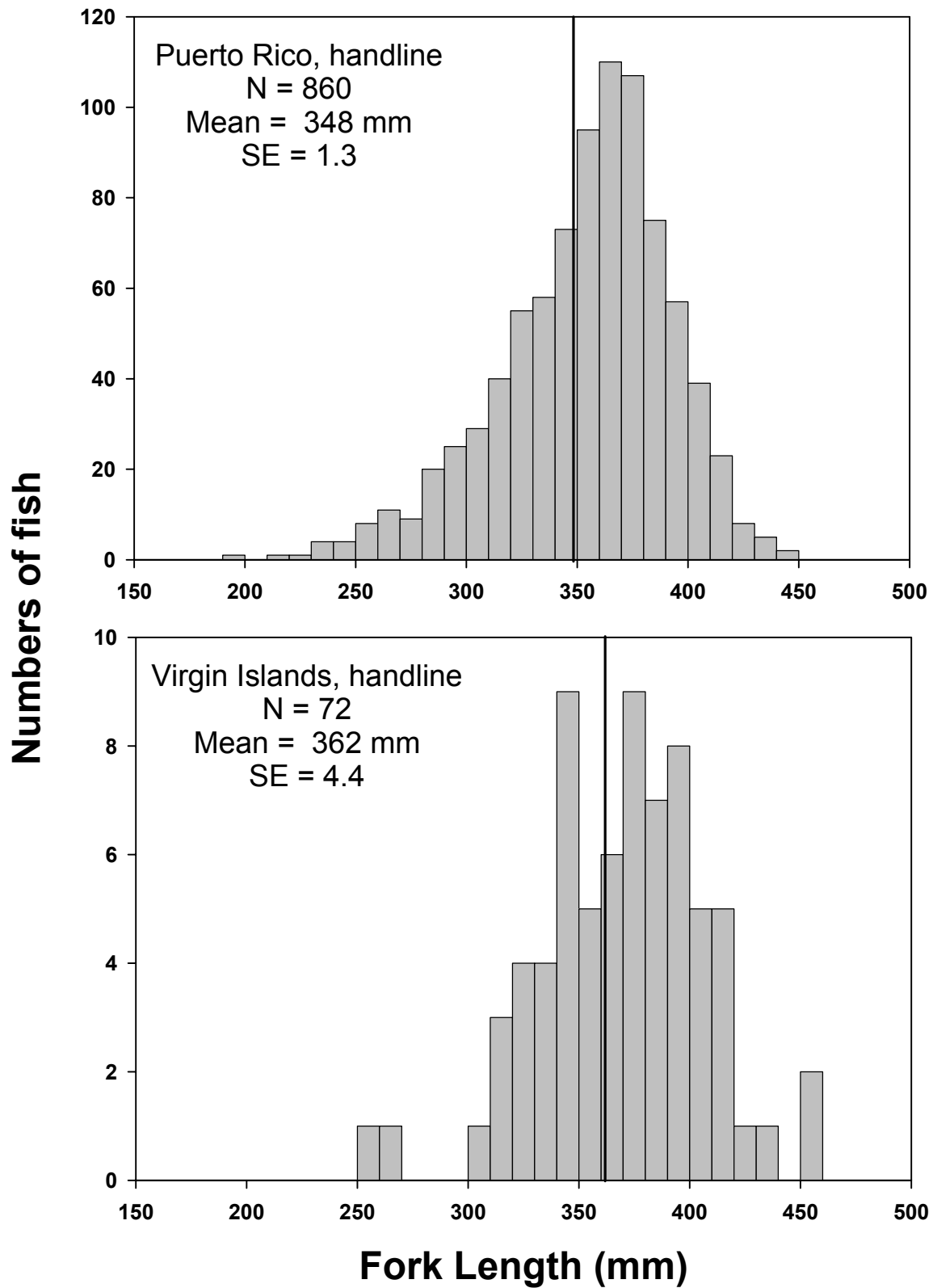


Figure 11. Length frequency distribution of sand tilefish collected by handlines around Puerto Rico and the Virgin Islands. Vertical lines indicate mean fork lengths.

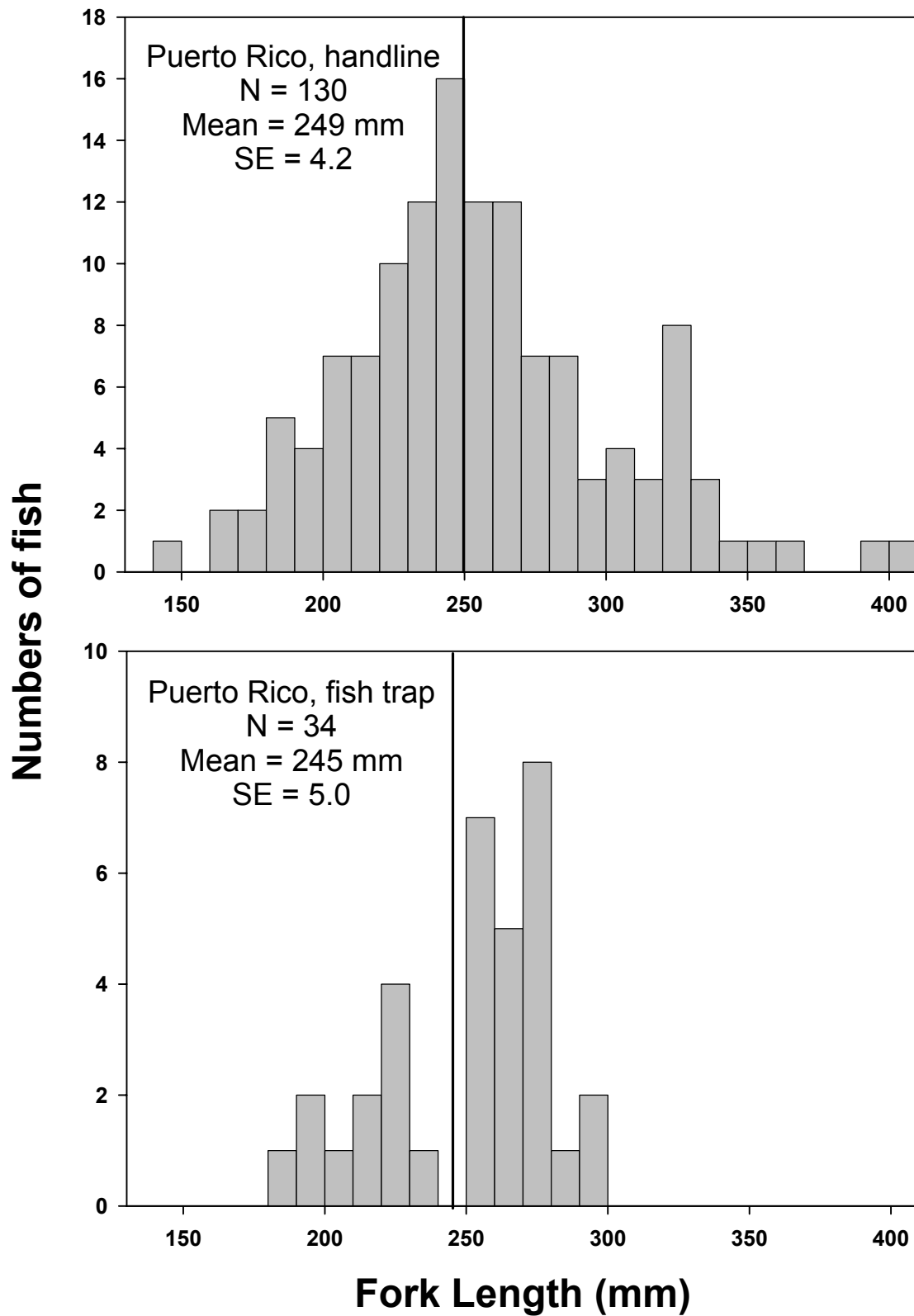


Figure 12. Length frequency distribution of silk snapper collected by handlines and fish traps around Puerto Rico. Vertical lines indicate mean fork lengths.

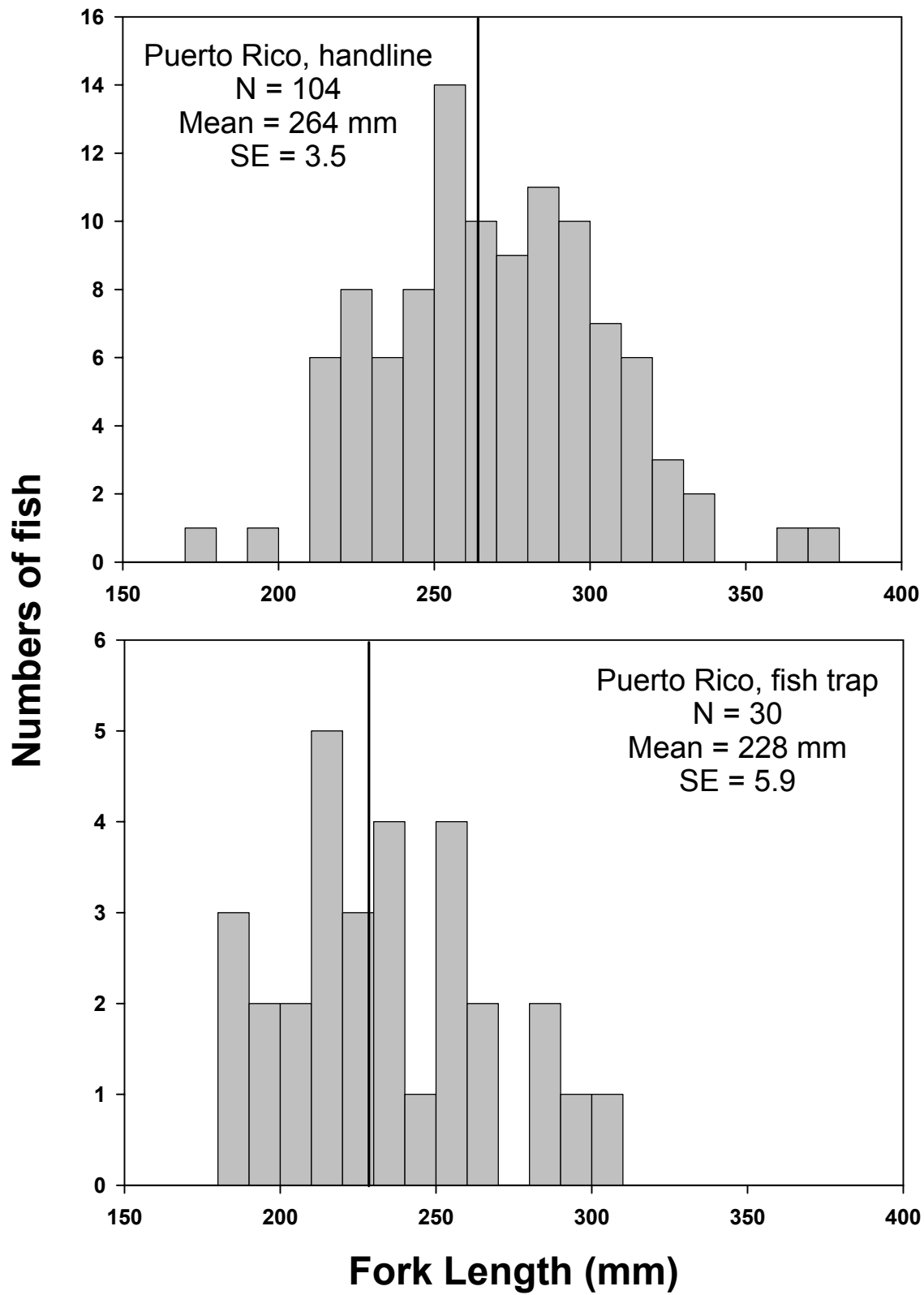


Figure 13. Length frequency distribution of blackfin snapper collected by handlines and fish traps around Puerto Rico. Vertical lines indicate mean fork lengths.