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Preliminary information on the size composition of yellowtail snapper in the Puerto Rico commercial fisheries from 1983-2003.

by

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Introduction and Purpose

Since the mid 1980's samples of individual length and weight have been routinely collected from the Puerto Rico commercial fisherman landings. These collection programs have been supported by the Puerto Rico Department of Natural and Environmental Resources (DNER), Fisheries Statistics Program (FSP) and also through ongoing state-federal cooperative statistical (SF-CSP) grants with the National Marine Fisheries Service (NMFS), Southeast Fisheries Center (SEFC) Miami Laboratory. For the most part the sampling protocol has followed that recommended by the NMFS, Trip Interview Program (TIP) which aims to collect random samples of size from commercial fishing trips. Details regarding the NMFS, TIP sampling program are provided at the NOAA, NMFS website (www.sefsc.noaa.gov and <http://www.sefsc.noaa.gov/tip.jsp> . Nowlis (SEDAR8-DW-Doc-10) presented preliminary information on yellowtail snapper sampled in the US Virgin Islands commercial catches. Similar information for Puerto Rico is provided in this document for yellowtail snapper sampled in the Puerto Rico commercial fisheries.

Bennett (2004, SEDAR8-DW-06) presented summary information regarding these data collections at the SEDAR8 Data Workshop meeting held December 2004. During the SEDAR8 Data Workshop participants addressed important concerns of the data sets as regards missing data and the presence of outliers in the data, the latter thought to be mainly from coding inconsistencies. Information presented in this report is preliminary and subject to change as edits of the Puerto Rico size frequency data are ongoing.

Results

Annual distributions of yellowtail snapper sampled from commercial fisheries of Puerto Rico are presented in Figure 1a-1d by the major and minor gears used to harvest this species in Puerto Rico (hook and lines, pots/traps, nets, dive gear, surface and bottom longlines, and seines) identified in Cummings and Matos-Caraballo (2004, SEDAR8-DW-Doc08). For these preliminary reviews only annual distributions for each gear are shown here. Landings of yellowtail snapper in Puerto Rico are dominated by hook and lines and pots/traps and as expected sampling fractions for these gears are higher. Partitioning the samples by gear was considered important for purposes of evaluating gear selectivity at least on a crude level. In addition stratification of the available samples spatially was considered important as the quantity of landings varied spatially. Table 1 presents summary information on the number of samples and the mean size by year and major area (north, east, south, and west coast as defined by Matos-Caraballo, 2002). Additional statistics (e.g., range, variance of the sample) are available from the author in addition to intra year summaries of samples (year- month, gear, region strata). This table indicates that during the 21 year time period, 1983-2003, all regions have been sampled in all years with the east region being the highest ranking, followed by the north, west and then south. Tables 2-5 provide a similar breakdown for each region by major and minor gears.

This basic information provide guidance also as to the available number of samples for use in establishing the catch size composition for each major fishery region and gear. The tabled data reveal many individual strata with no samples. Further examination of the landings by

individual year, region, and gear is needed to identify suitable substitutions if determination of catch at size by year, gear, and region is needed. As a starting point it is recommended to use the pooled length compositions (across all regions) by gear to evaluate size composition changes by year and major gear for yellowtail snapper in Puerto Rico. In addition, the tabled data (Table 6) indicate that sufficient samples exist may exist for only the hook and line, pot, and net strata and quite possibly only for island-wide summations as regional breakdowns of the data indicated many strata without samples. Samples of yellowtail snapper from other gears (long lines (surface and bottom), dive, net, and seines were present but for the most part are considered minor sources of removals for this species in Puerto Rico. The primary gears used to harvest yellowtail snapper in Puerto Rico are lines followed by pots and traps.

Further examination of the individual catch size composition samples is suggested. Examination of size distributions within each year is also suggested to determine whether pooling samples across season is justified. In addition, distributions within the minor gears should be examined to determine if pooling is supported across gears. All of these type analyses should be done subsequent to the final editing of the data.

From Table 6 one can get an idea of the trends of yellowtail snapper sizes having been caught by the major and minor gears in Puerto Rico. The basic size composition data have not been raised to the total catch so these summaries represent unadjusted mean fork length. It is suggested that additional effort be made to weight the individual size samples by the landings data in order to provide as accurate as possible information on size changes. In 1985, a federal size limit of 8 inches TL (6.5 inch FL) was implemented in 1985 with the regulation increasing by one inch each year till 12 inch TL (9 inches FL or 22.9 cm FL) was reached in 1989. Table 6 indicates the mean size of yellowtail snapper caught by the major gears (lines, Pots/traps) ranged from 25 cm FL to 32 cm FL over the time period. The overall unadjusted mean size has been above the minimum size (12 inches TL, 9 inches FL, 22.9 cm FL) in all years of the time series. Figuerola et al. (1998) reported that the 50% size of maturation for yellowtail snapper was 22.4 cm FL (males) and 25 cm (females). Tables 1 indicates that some differences exist in mean size with region and suggests that further review of the size composition samples by region is warranted. Table 1 indicates that yellowtail snapper sampled on the south and the west coasts of Puerto Rico were smaller than in other regions in nearly all years. Further analyses are needed to identify the exact reasons for these observed differences (in mean length). It is suggested that within region size composition samples be evaluated temporally and by gear. Figure 1d indicates that the unadjusted overall mean size of yellowtail snapper caught by lines has been about 30 cm FL (12 inch FL) since 2000 while the average size for pots/traps has been about 27 cm FL (10.6 inches FL) since 2000. These data also show that average sizes caught by pots/traps varied more than with line gear over the 21 year time period.

Literature Cited

Cummings, N. J. and D. Matos-Caraballo. 2004. The commercial reef fish fishery in Puerto Rico with emphasis on yellowtail snapper, *Ocyurus chrysurus*: landings, nominal fishing effort, and catch per unit of effort from 1983 through 2003. US Dept. Commerce, NOAA, NMFS, SEFSC SFD Doc. No. 2004-046 and SEDAR8-DW-Doc. 8, 83p.

Bennett, J. 2004a. Status of NOAA Fisheries Commercial Landings and bio-statistical data for Puerto Rico, 1983-present. US Dept. Commerce, NOAA, NMFS, SEFSC SEDAR8-DW-Doc. 6, 19pp.

Figuerola, M., D. Matos-Caraballo and W. Torres. 1998. "Maturation and Reproductive Seasonality of Four Reef Fish Species in Puerto Rico." *Proc. Gulf Carib. Fish. Inst.* 50: 938-968.

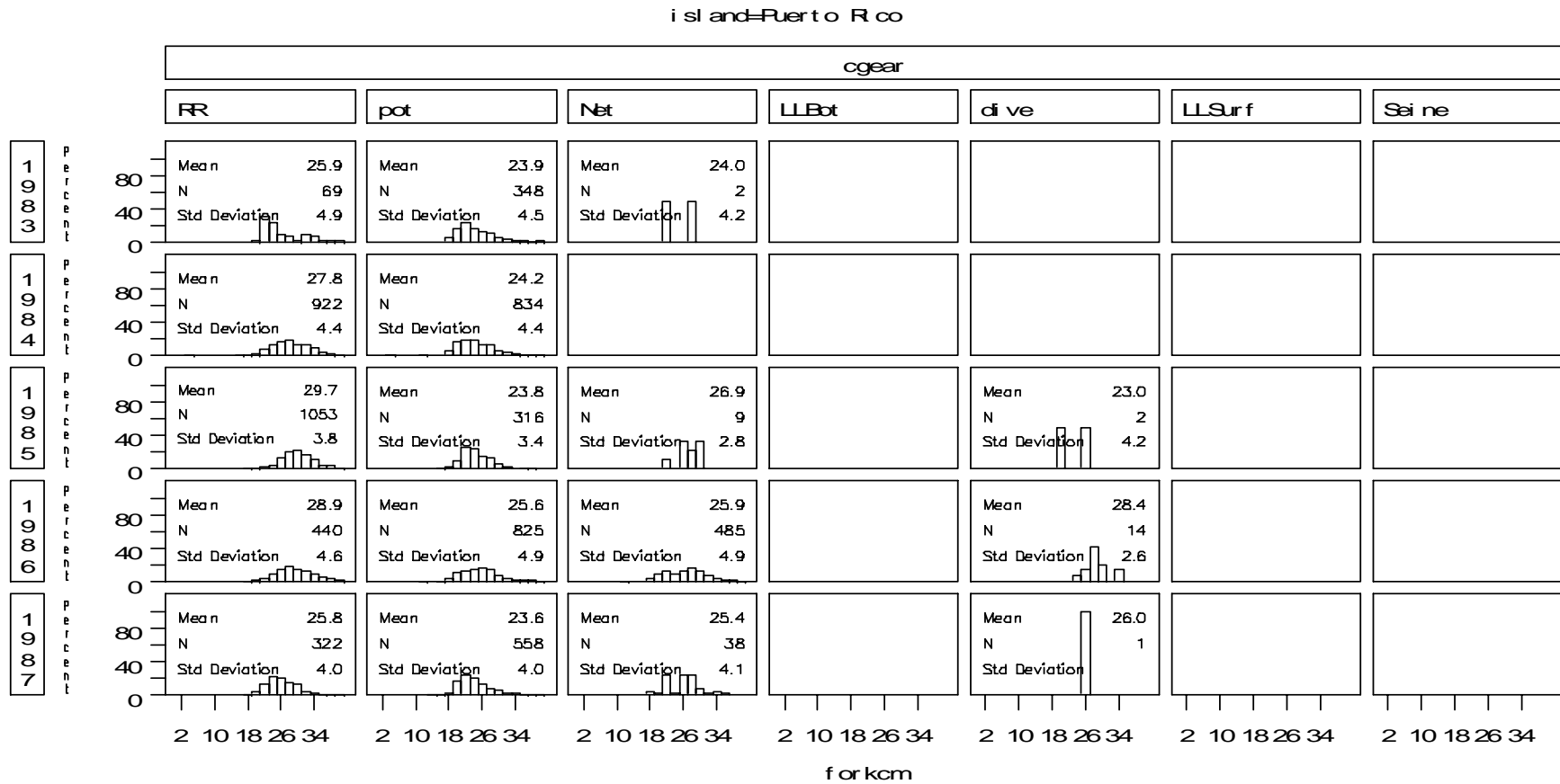


Figure 1a. Distribution of yellowtail snapper commercial catch size frequency samples in Puerto Rico 1983-1987. Federal minimum size rule of 8 inches TL (6.5 inches FL, 16.4 cm FL) enacted 1985 increasing by one inch to 12 inches TL (9 inches FL, 22.9 cm FL) in 1989.

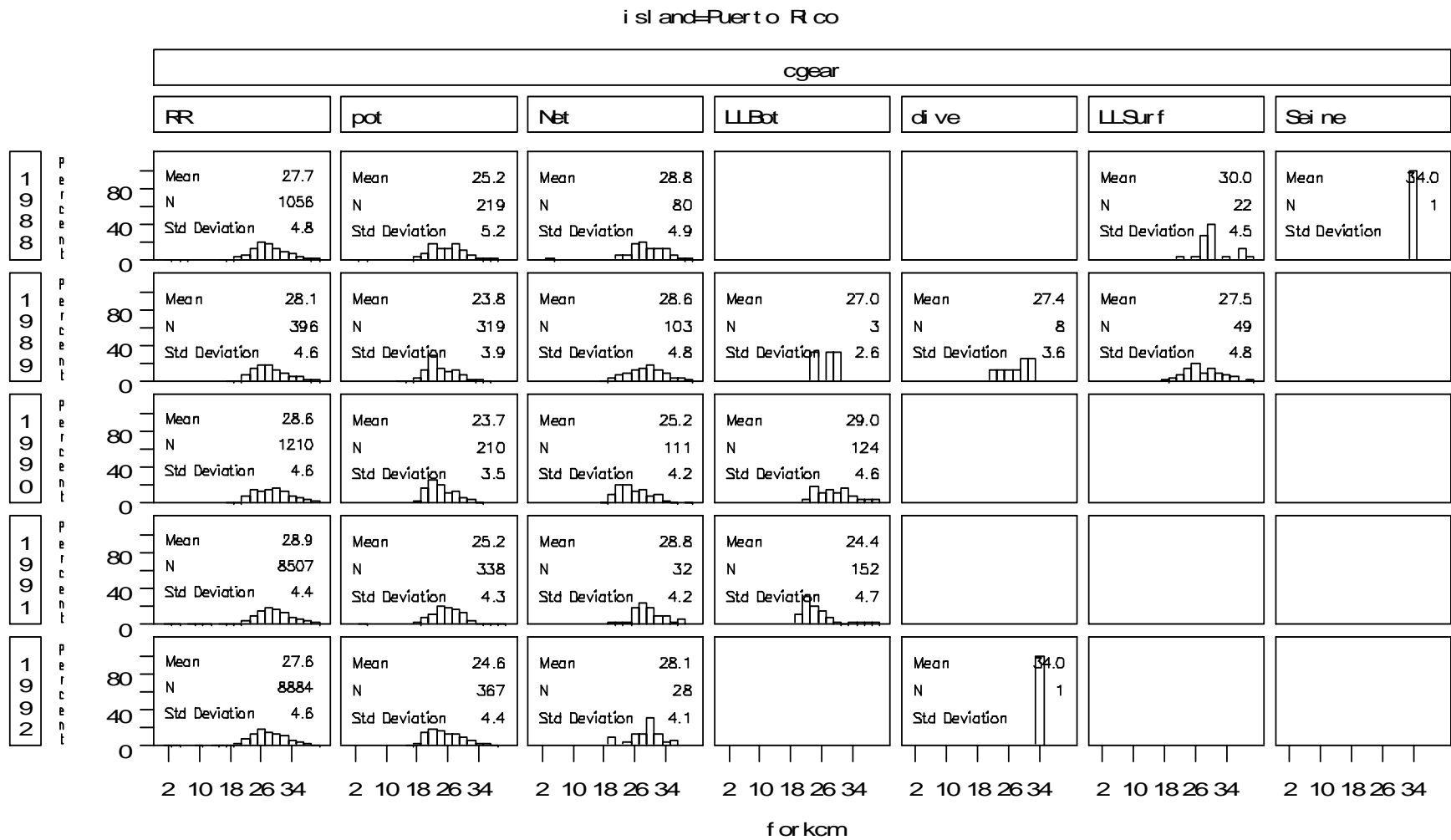


Figure 1b. Distribution of yellowtail snapper commercial catch size frequency samples in Puerto Rico 1988-1992. Federal minimum size rule of 8 inches TL (6.5 inches FL, 16.4 cm FL) enacted 1985 increasing by one inch to 12 inches TL (9 inches FL, 22.9 cm FL) in 1989.

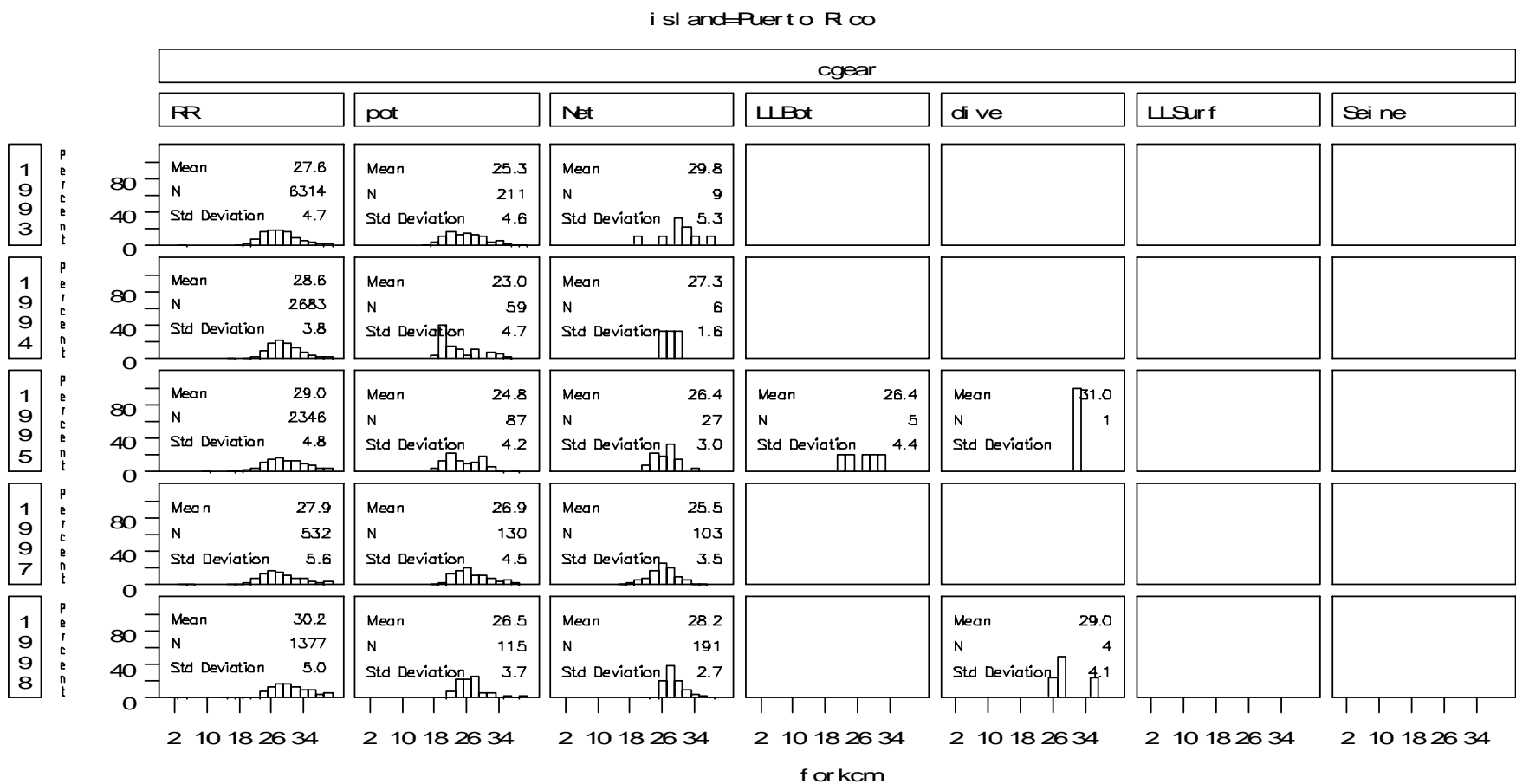


Figure 1c. Distribution of yellowtail snapper catch size frequency samples in Puerto Rico 1993-1998. Federal minimum size rule of 8 inches TL (6.5 inches FL, 16.4 cm FL) enacted 1985 increasing by one inch to 12 inches TL (9 inches FL, 22.9 cm FL) in 1989.

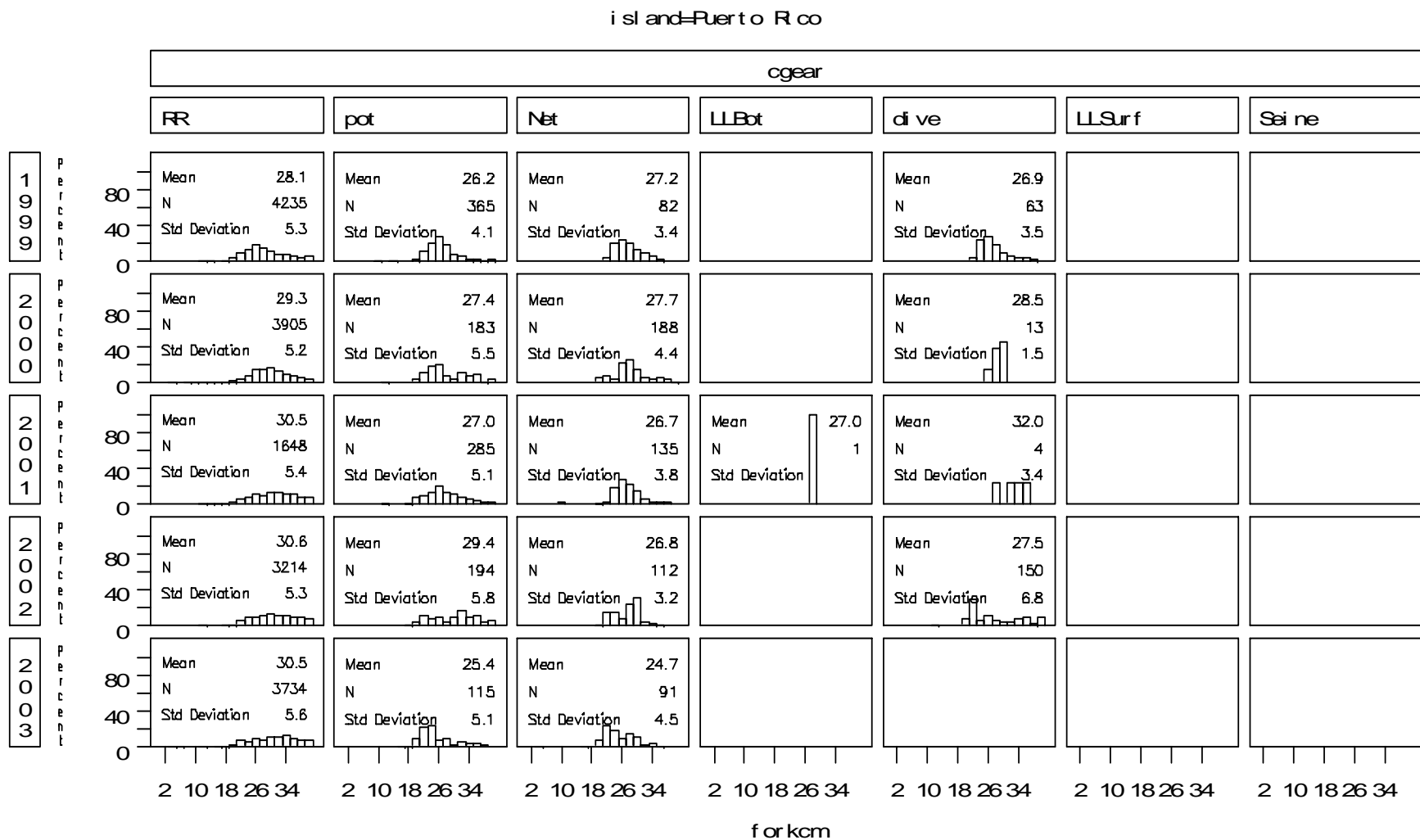


Figure 1d. Distribution of yellowtail snapper catch size frequency samples in Puerto Rico 1998-2003. Federal minimum size rule of 8 inches TL (6.5 inches FL, 16.4 cm FL) enacted 1985 increasing by one inch to 12 inches TL (9 inches FL, 22.9 cm FL) in 1989.

Table 1. Number of commercial catch size frequency observations for yellowtail snapper in Puerto Rico by major region from 1983-2003 (North = Isabela-Luquillo, East=Fajardo-Vieques, South=Patillas-Lajas, West=Cabo Rojo-Aguadila).

y	region											
	PR East		PR North		PR South		PR Unknown		PR West		All	
	forkcm		forkcm		forkcm		forkcm		forkcm		forkcm	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
1983	209	24	37	28	118	26			97	23	461	25
1984	473	24	806	28	242	25	1	27	243	26	1765	26
1985	829	30	308	29	133	27	65	3	164	25	1499	27
1986	890	29	20	32	757	25			848	23	2515	26
1987	418	26			376	24			192	23	986	25
1988	1029	28	306	29	97	26			52	29	1484	28
1989	359	26	85	32	258	25	5	22	345	28	1052	27
1990	846	28	127	32	277	25			871	27	2121	27
1991	976	30	7855	29	110	24	47	37	356	28	9344	29
1992	699	27	7753	28	555	26	91	27	807	26	9905	28
1993	795	30	5497	28	116	23			456	24	6864	28
1994	492	31	3324	29	212	25			162	25	4190	29
1995	1115	29	2326	30	85	25			20	25	3546	30
1996	284	27	219	29	45	25			133	27	681	28
1997	596	29	73	34	78	24			75	25	838	28
1998	1382	33	67	32	165	27	255	34	335	31	2204	32
1999	4505	30	194	26	157	25	20	32	664	29	5540	29
2000	3229	31	605	26	121	28			920	30	4875	30
2001	1577	33	221	28	312	26	5	25	1193	27	3308	30
2002	2989	31	244	30	83	26	80	27	1247	30	4643	31
2003	2725	35	1360	28	165	27	1	38	1097	30	5348	32
All	26417	30	31427	29	4462	25	586	28	10277	28	73169	29

Table 2. Number of commercial catch size frequency observations for yellowtail snapper in Puerto Rico for the east region from 1983--2003 (North = Isabela-Luquillo, East=Fajardo-Vieques, South=Patillas-Lajas, West=Cabo Rojo-Aguadila).

----- astate=Puerto Rico region=PR East -----

y	cgear													
	Net		RR		Seine		dive		other		pot		All	
	forkcm		forkcm		forkcm		forkcm		forkcm		forkcm		forkcm	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
1983			33	25							176	24	209	24
1984			29	26							444	24	473	24
1985			681	31							148	23	829	30
1986	168	25	441	30			14	28			267	30	890	29
1987	1	35	279	25							138	27	418	26
1988	60	29	767	28	1	34					133	25	961	27
1989	45	30	147	27			7	28			160	24	359	26
1990	38	25	777	28							31	25	846	28
1991			802	30							172	27	974	30
1992	4	27	654	27							41	30	699	27
1993			713	30							82	29	795	30
1994			360	31							7	30	367	31
1995	10	24	752	29							38	26	800	29
1997	7	25	507	29							82	28	596	29
1998	3	34	1278	33							80	28	1361	33
1999			4198	30			60	27			247	28	4505	30
2000			3132	31							97	30	3229	31
2001			1333	33			7	37			232	28	1572	33
2002			2667	32			162	29	46	26	114	33	2989	31
2003			2688	35							37	31	2725	35
All	336	26	22E3	31	1	34	250	29	46	26	2726	27	26E3	30

Table 3. Number of commercial catch size frequency observations for yellowtail snapper in Puerto Rico for the north region from 1983--2003 (North = Isabela-Luquillo, East=Fajardo-Vieques, South=Patillas-Lajas, West=Cabo Rojo-Aguadila).

----- astate=Puerto Rico region=PR North -----

i y	cgear											All	
	LLBot		Net		RR		other		pot		All		
	forkcm		forkcm		forkcm		forkcm		forkcm		forkcm		
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	
1983					37	28					37	28	
1984					805	28			1	26	806	28	
1985					308	29					308	29	
1986					20	32					20	32	
1988					304	29			2	35	306	29	
1989					84	32			1	35	85	32	
1990					127	32					127	32	
1991	1	44	3	33	7819	29	32	25			7855	29	
1992					7753	28					7753	28	
1993					5497	28					5497	28	
1994					2266	29					2266	29	
1995					1701	30					1701	30	
1997					67	34			6	30	73	34	
1998					61	33			6	26	67	32	
1999					194	26					194	26	
2000					604	26			1	27	605	26	
2001	1	27			220	28					221	28	
2002					237	30			7	24	244	30	
2003			6	27	1341	28			13	27	1360	28	
All	2	36	9	29	29E3	28	32	25	37	27	3E4	28	

Table 4. Number of commercial catch size frequency observations for yellowtail snapper in Puerto Rico for the south region from 1983--2003 (North = Isabela-Luquillo, East=Fajardo-Vieques, South=Patillas-Lajas, West=Cabo Rojo-Aguadila).

----- astate=Puerto Rico region=PR South -----

y	cgear																
	LLBot		LLSurf		Net		RR		di ve		other		pot		Al l		
	forkcm		forkcm		forkcm		forkcm		forkcm		forkcm		forkcm		forkcm		
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	
1983					2	24								80	25	82	25
1984							84	25						158	25	242	25
1985					4	27	44	30	2	23				83	25	133	27
1986					261	26	1	27						114	26	376	26
1987					33	25	47	30						239	23	319	24
1988					15	30	2	21			1	27		79	26	97	26
1989			6	28	32	28	84	26	1	24				135	24	258	25
1990					52	24	108	27			1	29		116	24	277	25
1991					12	26	7	24						91	24	110	24
1992					3	21	259	28	1	34				279	24	542	26
1993					2	25	1	32						113	23	116	23
1994							107	27						46	21	153	25
1995	6	29			8	26			1	31				46	23	61	24
1997					53	24								25	24	78	24
1998					117	28			2	31				33	25	152	28
1999					23	25			2	26				132	25	157	25
2000					6	26	41	34	1	43				73	25	121	28
2001					131	27	116	26						65	26	312	26
2002					21	26	21	28	3	34				37	25	82	26
2003					46	23	49	34						70	23	165	27
Al l	6	29	6	28	821	26	971	28	13	30	2	28	2014	24	3833	26	

Table 5. Number of commercial catch size frequency observations for yellowtail snapper in Puerto Rico for the west region from 1983--2003 (North = Isabela-Luquillo, East=Fajardo-Vieques, South=Patillas-Lajas, West=Cabo Rojo-Aguadila).

----- astate=Puerto Rico region=PR West -----

cgear															
LLBot		LLSurf		Net		RR		di ve		pot		Al l			
forkcm		forkcm		forkcm		forkcm		forkcm		forkcm		forkcm			
N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean		

1983														97	23	97	23
1984								9	41					234	25	243	26
1985					5	27	60	30						86	24	151	27
1986					63	29	1	19						470	24	534	25
1987					4	30	1	37		1	26			186	23	192	23
1988			24	31	5	28	14	29						9	26	52	29
1989	3	27	46	28	28	29	95	32						20	24	192	30
1990	126	29			21	29	231	31						65	23	443	29
1991	153	25			18	31	105	33						80	28	356	28
1992					22	30	304	29						49	25	375	28
1993					7	31	208	26						17	26	232	26
1994					6	27								6	28	12	28
1995					9	29								3	28	12	29
1997					44	28	3	24						1	26	48	27
1998					71	28	103	31	3	102						177	31
1999					61	29	164	33	1	33				5	37	231	32
2000					183	28	538	33	13	28				29	33	763	31
2001					5	28	226	35								231	35
2002					91	27	612	34						62	32	765	33
2003					39	26	419	37								458	36
All	282	27	70	29	682	28	3093	33	18	41	1419	25	5564	30			

Table 6. Number of size frequency observations and mean length (FL cm) by year and major gear for yellowtail snapper in Puerto Rico commercial fisheries, 1983-2003. Federal minimum size rule of 8 inches TL (6.5 inches FL, 16.4 cm FL) enacted 1985 increasing by one inch to 12 inches TL (9 inches FL, 22.9 cm FL) in 1989.

----- astate=Puerto Rico island=Puerto Rico -----

i y	cgear																			
	LLBot		LLSurf		Net		RR		Sei ne		di ve		other		pot		All			
	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm	forkcm		
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
1983					2	24	70	26												
1984							927	28												
1985					9	27	1093	30			2	23								
1986					492	26	463	30			14	28								
1987					38	25	327	26			1	26								
1988			24	31	80	29	1087	28	1	34			1	27						
1989	3	27	52	28	105	29	410	29			8	27								
1990	126	29			111	25	1243	29												
1991	154	25			33	29	8780	29												
1992					29	29	9060	28			1	34								
1993					9	30	6419	28												
1994					6	27	2733	29												
1995	6	29			27	26	2453	30			1	31								

1997					104	26	577	29						130	27	811	29	
1998					191	28	1697	33			5	73		119	27	2012	32	
1999					84	28	4576	30			63	27		384	27	5107	29	
2000					189	28	4315	31			14	30		200	29	4718	31	
2001	1	27			136	27	1900	33			7	37		297	28	2341	32	
2002					112	27	3537	32			165	29	46	26	220	31	4080	32
2003					91	25	4498	33						120	26	4709	33	
All	290	27	76	29	1848	27	56E3	30	1	34	281	29	80	26	6219	25	65E3	29