

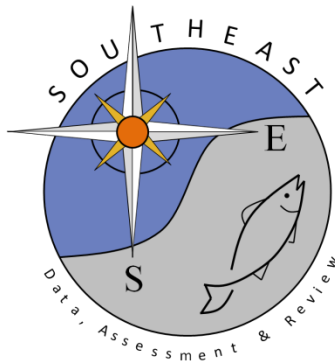
Hogfish (*Lachnolaimus maximus*) Lengths Sampled in the Biscayne National Park Creel Survey, 1993-2024

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Hogfish (*Lachnolaimus maximus*) Lengths Sampled in the Biscayne National Park Creel Survey, 1993-2024

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Introduction

Biscayne National Park (BNP), located in southeastern Florida just south of Miami and north of Key Largo (Figure 1), lies adjacent to the Florida Keys National Marine Sanctuary. Since 1976, BNP personnel and volunteers have conducted dockside creel surveys of recreational anglers using standardized data collection methods, although the survey was paused between 1988 and 1991 (Harper et al. 2000).

Dockside interviews collected detailed trip-level and angler-specific data, including: date of trip, trip duration, number of anglers per vessel, hours fished, species and numbers of fish harvested and released, sizes of retained fish, targeted species, angler residence, trip origin, and party composition. Biological sampling involved recording fork lengths and counts of retained fish by species.

While these data can be useful for understanding catch rates, the spatial scale of the BNP creel survey is limited. Moreover, this area is also included in the fishery-independent Reef Visual Census (RVC). As such, the creel survey is not suitable as an abundance index (Muller 2023; SEDAR 79). However, retained lengths of hogfish captured through this survey may help address data gaps, particularly those associated with retained lengths in the private fishing mode.

Results

Creel survey records from 1993–2024 were filtered to include only hogfish. After excluding one record with an implausible fork length of 1 cm, a total of 3,244 valid length records remained.

Gear group classification was inferred from party composition. A combined 'Spear/Diving' group was created by merging 'Spear' and 'Diving' party compositions. All remaining compositions (Skilled, Food, Family, Novice, Other, Unknown) were grouped as 'Other/Unknown.'

Fork lengths of retained hogfish ranged from 12 to 69 cm, with an interquartile range of 30–35 cm, a mean of 33.5 cm, and a median of 32 cm. Table 1 presents the number of fork length

measurements by year and gear group. Since 2018 sample sizes have been very low and there were no hogfish sampled in 2019 and 2020.

The cumulative distribution functions (CDFs) of fork lengths (Figure 2) reveal strong similarity between gear groups and a two-sided Kolmogorov-Smirnov test suggests that gear-specific lengths belong to the same distribution ($p=0.12$). These CDFs also show that relatively few hogfish were sampled above the 16-inch (40.6 cm) minimum size limit, which was implemented by the South Atlantic Fishery Management Council (SAFMC) and the state of Florida in August 2017.

Histograms of sampled lengths by year (Figure 3) and by year and gear group (Figure 4) show moderate interannual variation. In several years, at least half of the sampled hogfish were at or below the minimum size limit. However, hogfish sampled below the 12-inch (30.5 cm) size limit (enacted in 1994) have been relatively uncommon since 2013.

Comparison to MRIP-Sampled Lengths

Hogfish sampled during Marine Recreational Information Program (MRIP) dockside interviews were generally larger than those sampled during BNP interviews (Figure 5). However, restricting MRIP samples to Miami-Dade County yields fork lengths that are more comparable to BNP data, particularly when examined by year (Figures 6 and 7). Two-sided Kolmogorov-Smirnov tests of lengths sampled in Miami-Dade County by year suggest that program-specific lengths belong to the same distribution in 21 out of 29 overlapping years ($p > 0.01$).

Discussion

BNP creel survey data provide useful information on retained hogfish lengths in the private fishing mode and may help address existing data gaps. The similarity of length distributions across gear groups (Figure 2; KS test, $p = 0.12$) suggests that gear type does not strongly bias retained size.

The key challenge lies in integrating BNP data with MRIP and headboat samples without disproportionately weighting Biscayne Bay observations if spatial differences in retained lengths exist. If combined, BNP length data should be aligned with MRIP interviews conducted in close geographic proximity to BNP to ensure appropriate representation.

References

Harper, D.E., Bohnsack, J.A., and B.R. Lockwood. 2000. Recreational fisheries in Biscayne National Park, Florida, 1976-1991. *Marine Fisheries Review* 62(1):8-26.

Muller, Robert. 2023. Biscayne National Park Creel Survey index, 1978-2022. SEDAR79-DW-15. SEDAR, North Charleston, SC. 19 pp.

SEDAR 79. 2024. Stock assessment report, SEDAR 79 South Atlantic and Gulf of Mexico Mutton Snapper, 526 pp. Available at <https://sedarweb.org/assessments/sedar-79/>

Tables

Table 1. Number of fork length measurements per year and gear group for the BNP creel survey.

	Gear		Total
	Other/Unk	Spear/Dive	
1993	31	164	195
1994	31	412	443
1995	21	105	126
1996	15	195	210
1997	15	96	111
1998	33	114	147
2000	5	31	36
2001	11	26	37
2002	134	129	263
2003	193	151	344
2004	16	33	49
2005	20	29	49
2006	10	36	46
2007	20	25	45
2008	39	42	81
2009	46	101	147
2010	43	153	196
2011	50	100	150
2012	17	85	102
2013	7	31	38
2014	14	15	29
2015	21	109	130
2016	1	97	98
2017	45	83	128
2018	4	5	9
2021	6	8	14
2022	1	4	5
2023	1	4	5
2024	7	4	11
Total	857	2387	3244

Figures

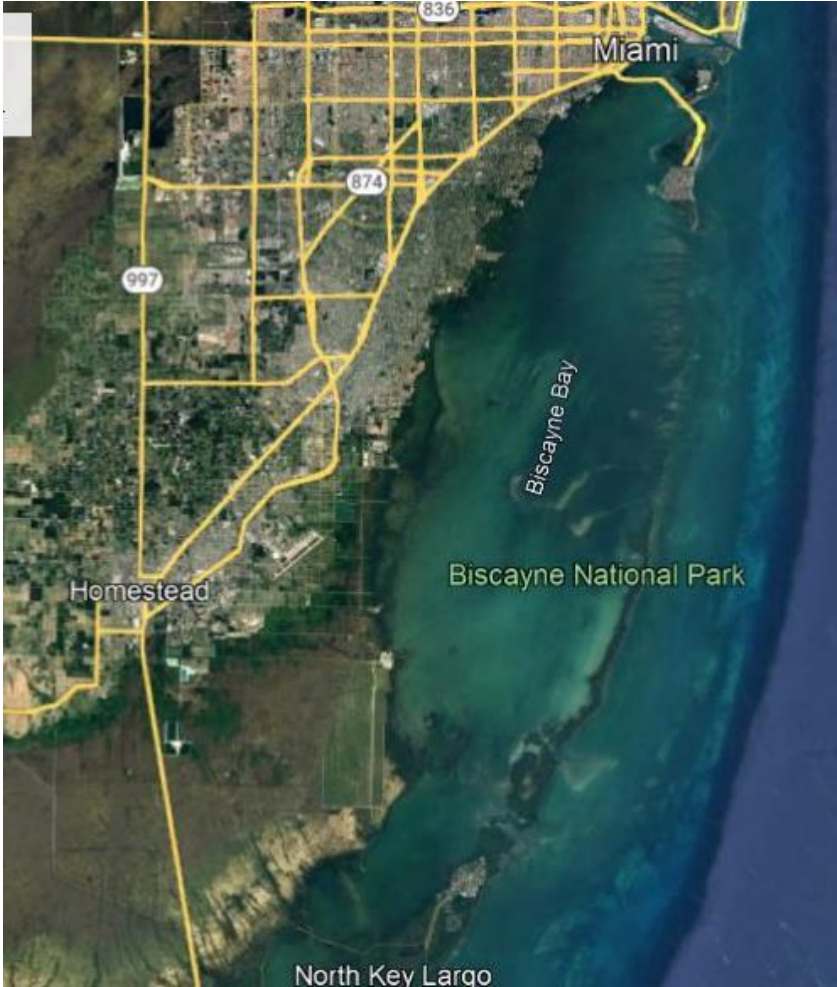


Figure 1. Map of Biscayne National Park (Google Earth image).

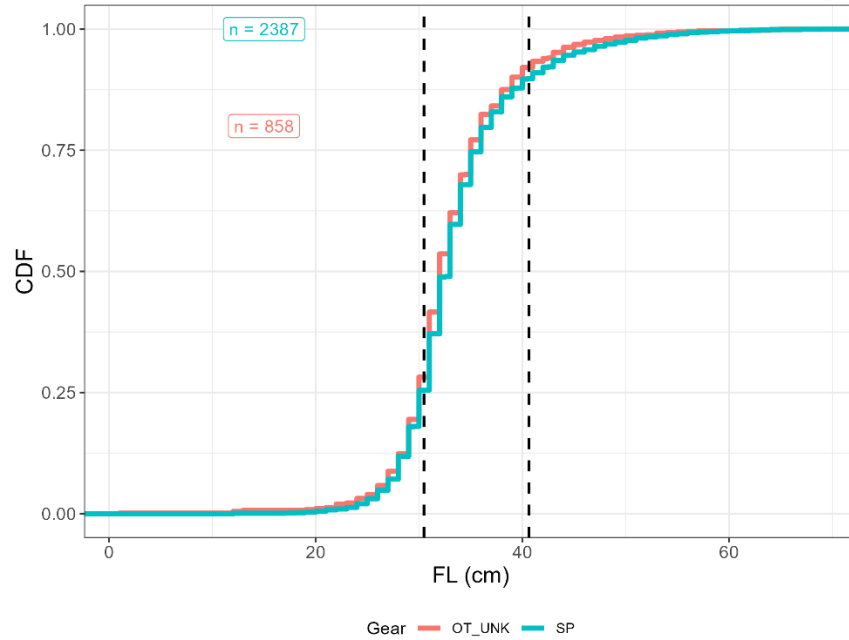


Figure 2. Cumulative distribution function (CDF) of sampled fork lengths [FL] in cm of landed hogfish in Biscayne NP Creel Survey. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2017 (black dashed lines).

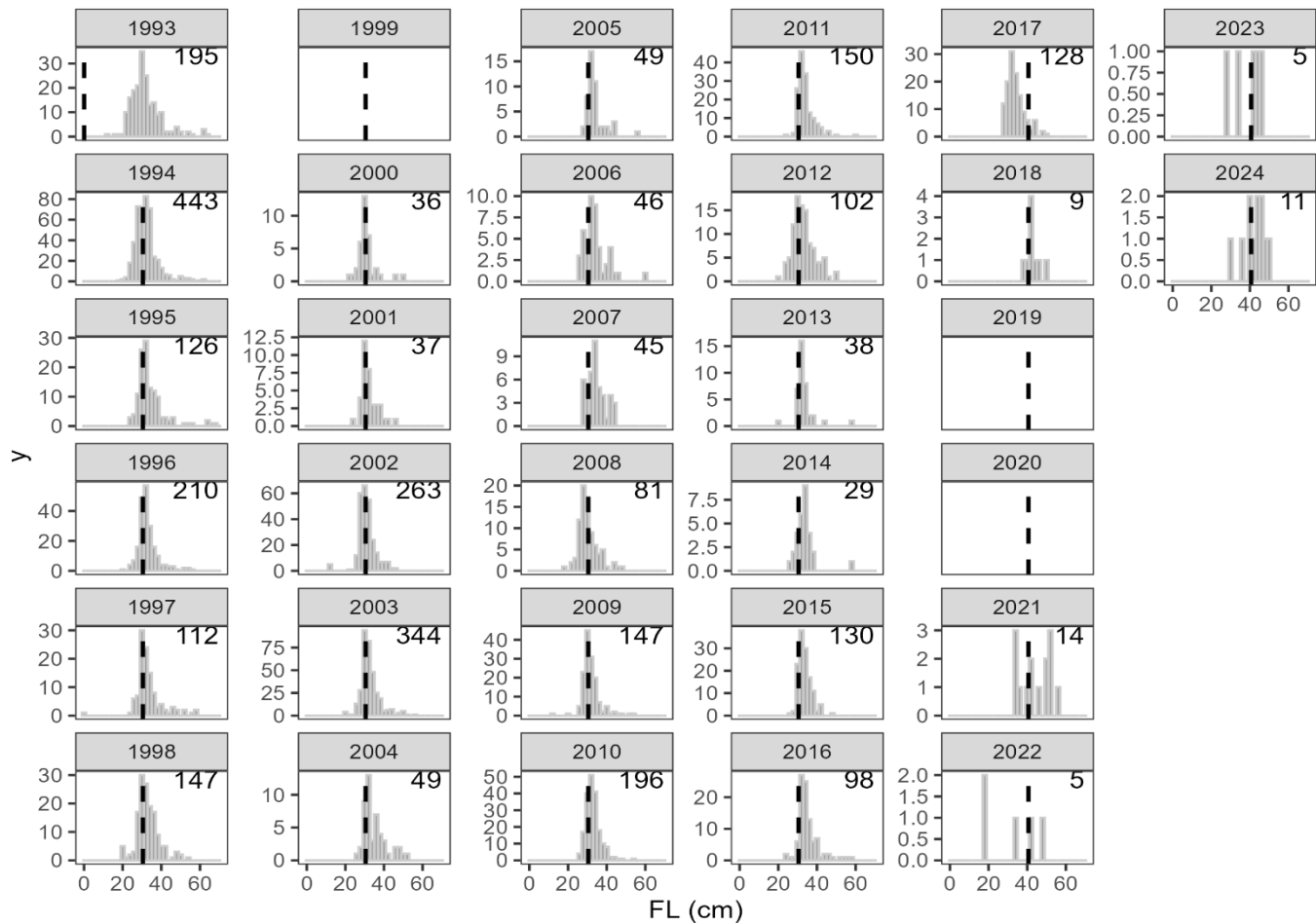


Figure 3. Sampled fork lengths [FL] in cm of landed Hogfish in the Biscayne NP Creel Survey by year. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2017 (black dashed line). Minimum size limits (in fork length) in federal waters of the South Atlantic (SAFMC) enacted in 1/1995 and 8/2017 were 12 in. and 16 in, respectively.

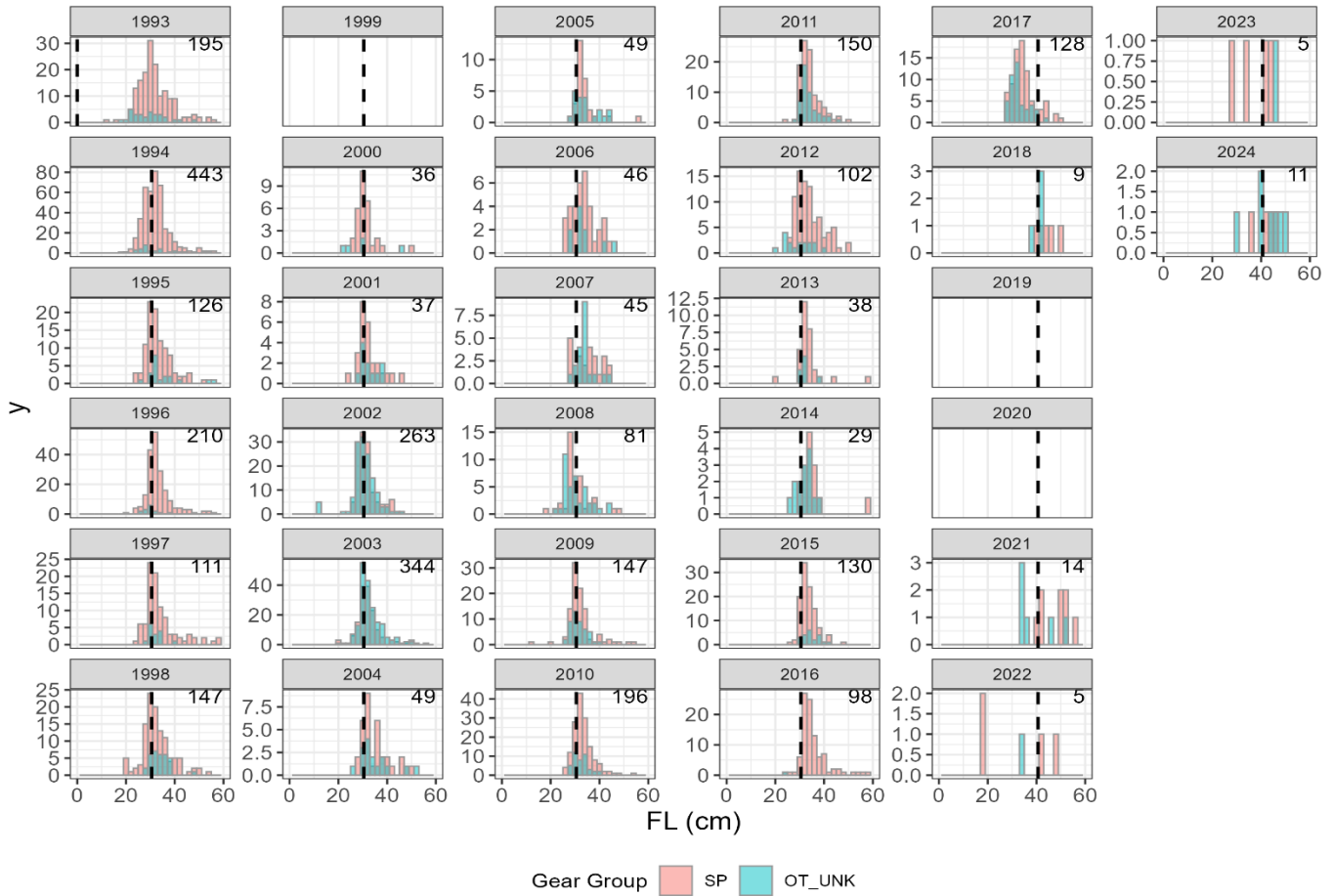


Figure 4. Sampled fork lengths [FL] in cm of landed Hogfish in the Biscayne NP Creel Survey by year and gear group. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2017 (black dashed line). Minimum size limits (in fork length) in federal waters of the South Atlantic (SAFMC) enacted in 1/1995 and 8/2017 were 12 in. and 16 in, respectively.

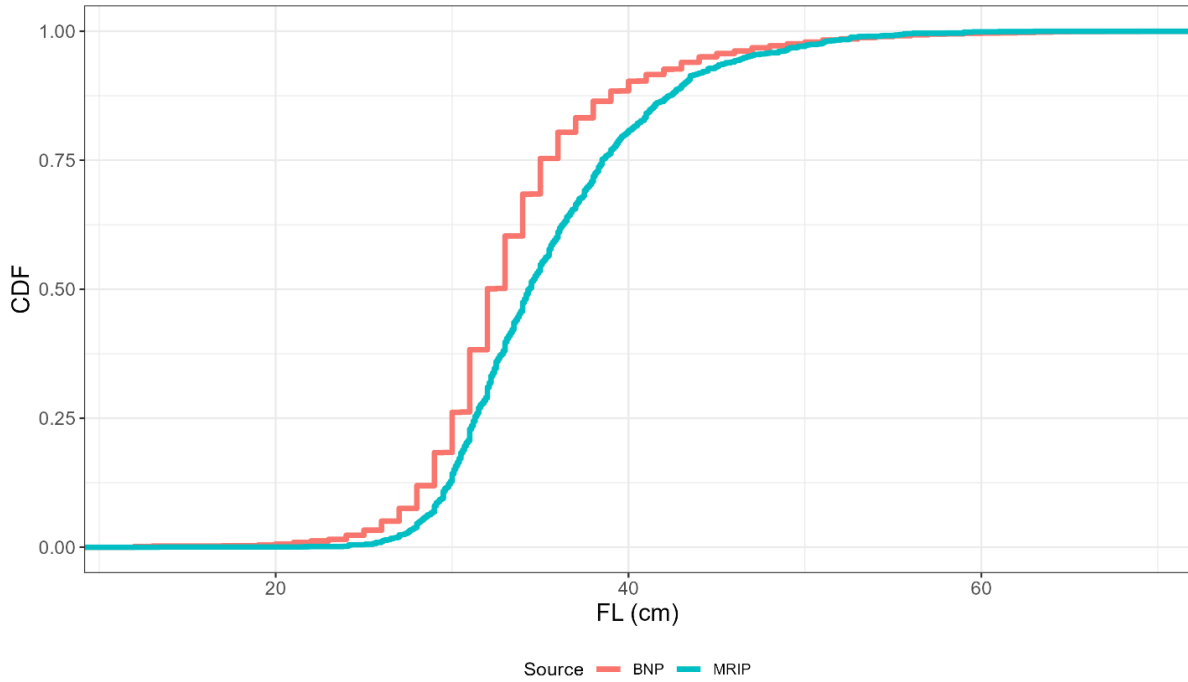


Figure 5. Cumulative distribution function (CDF) of sampled fork lengths [FL] in cm of landed hogfish in Biscayne NP Creel Survey (BNP) and MRIP.

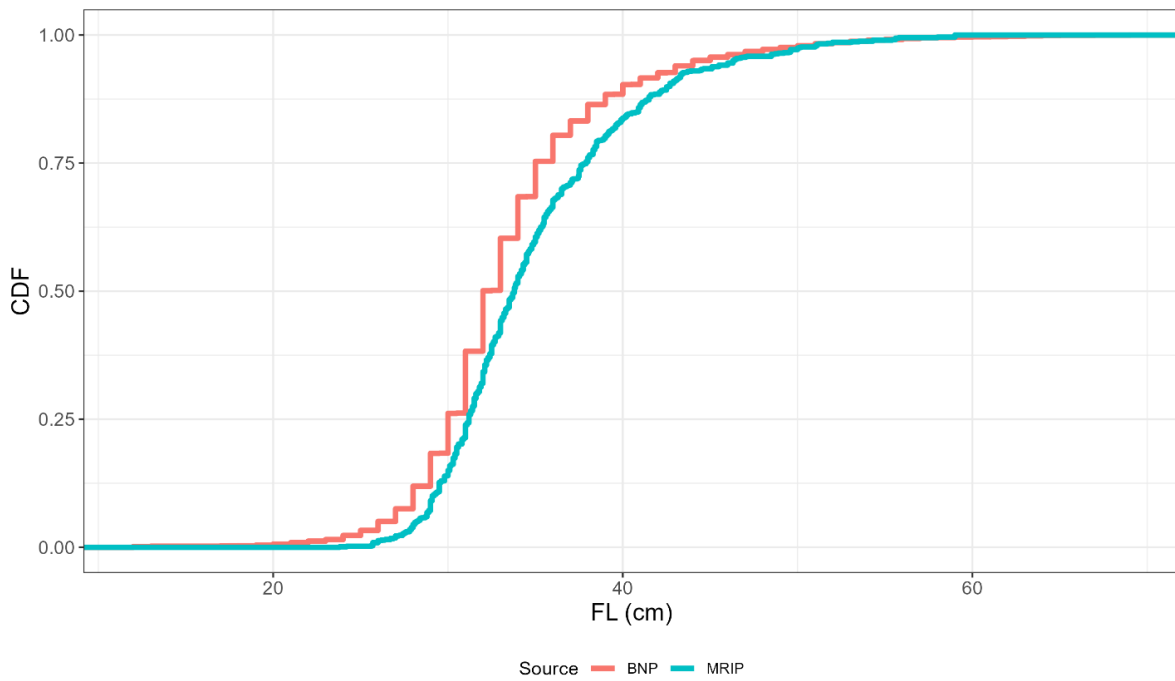


Figure 6. Cumulative distribution function (CDF) of sampled fork lengths [FL] in cm of landed hogfish in Biscayne NP and Miami-Dade County in MRIP interviews.

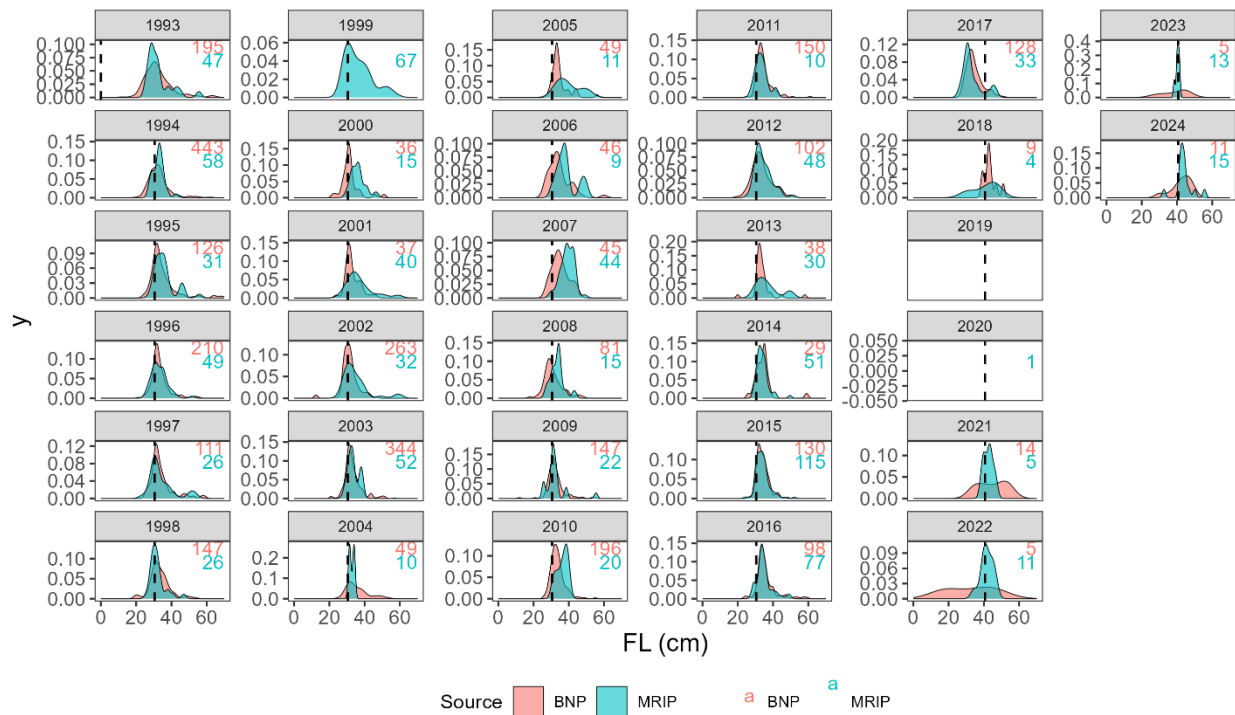


Figure 7. Density plots of sampled fork lengths [FL] in cm of landed Hogfish in the Biscayne NP Creel Survey and Miami-Dade County (MRIP) by year. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2017 (black dashed line). Minimum size limits (in fork length) in federal waters of the South Atlantic (SAFMC) enacted in 1/1995 and 8/2017 were 12 in. and 16 in, respectively.