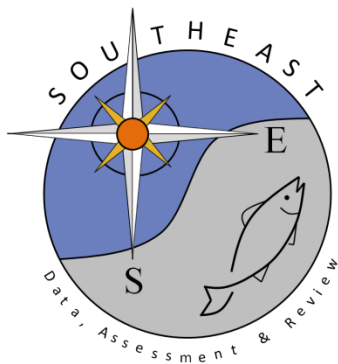


Hogfish (*Lachnolaimus maximus*) Lengths Sampled in the Biscayne National Park Creel Survey, 1993-2022

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Hogfish (*Lachnolaimus maximus*) Lengths Sampled in the Biscayne National Park Creel Survey, 1993-2022

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Introduction

Biscayne National Park (BNP), located in southeastern Florida just south of Miami and north of Key Largo (Fig. 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. The region is also included in the fishery-independent Reef Visual Census (RVC). Consequently, 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 1993–2022 were filtered to include only hogfish. After excluding one record with a missing length, two with implausible fork lengths of 1 cm, and six with missing dates, a total of 4,691 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 33.4 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 ($p=0.19$). 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) in August 2017 and by the state of Florida in 2018.

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 2012.

Discussion

Hogfish lengths sampled in the Biscayne National Park Creel Survey may address data gaps in retained hogfish lengths in the private fishing mode. The challenge, however, will be combining these lengths with MRIP and headboat lengths without overrepresenting Biscayne Bay lengths if there are spatial differences in retained lengths. CDF plots and a two-sided Kolmogorov-Smirnov test suggest that gear-specific lengths belong to the same distribution.

References

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

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

Year	Gear		Total
	Other/Unk	Spear/Dive	
1993	163	177	340
1994	175	476	651
1995	21	105	126
1996	15	195	210
1997	15	96	111
1998	33	114	147
2000	44	31	75
2001	79	27	106
2002	570	226	796
2003	563	221	784
2004	45	33	78
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
Total	2067	2624	4691

Figures

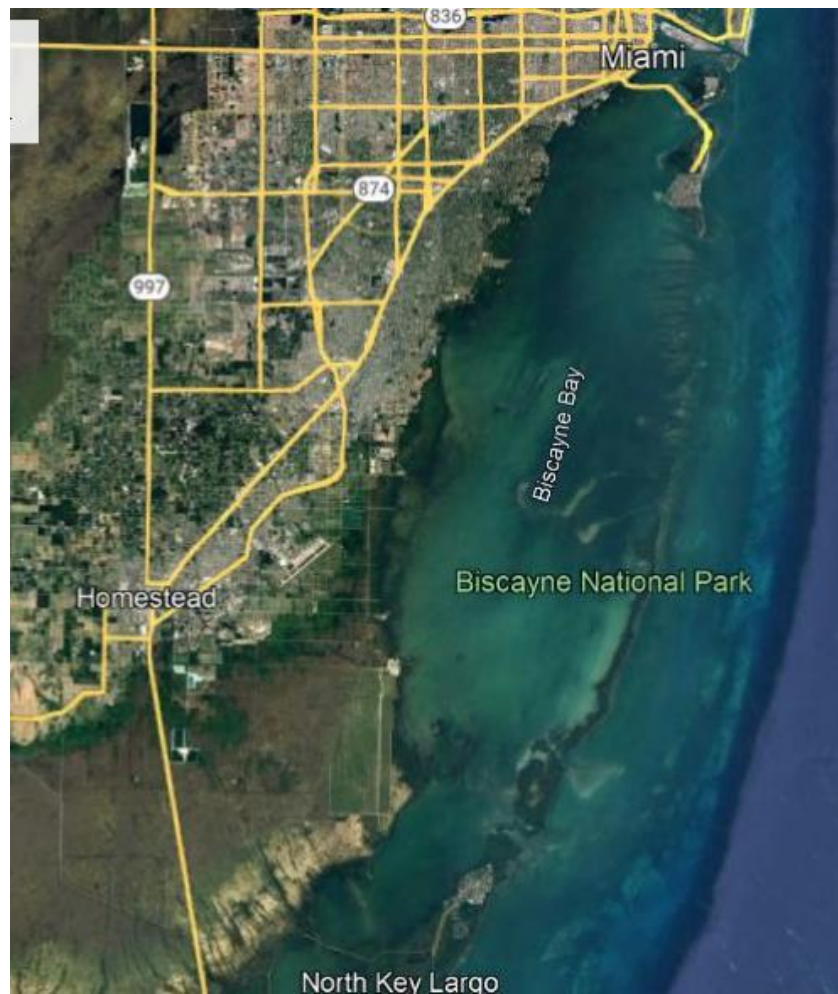


Figure 1. Map of Biscayne National Park (Google Earth image).

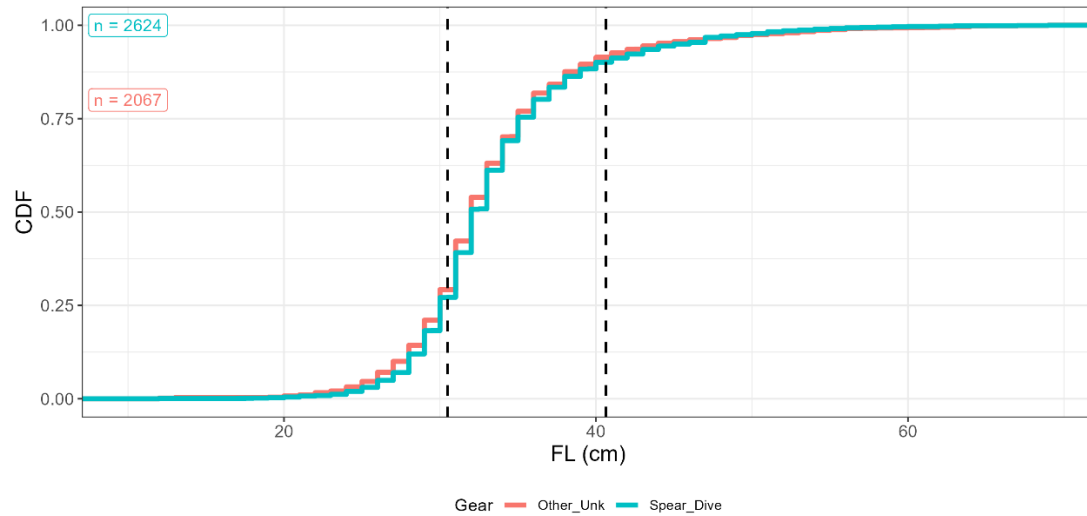


Figure 2. Cumulative distribution function (CDF) of sampled fork lengths [FL] in cm of landed hogfish in Biscayne NP Creel Survey. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2018 (black dashed lines).

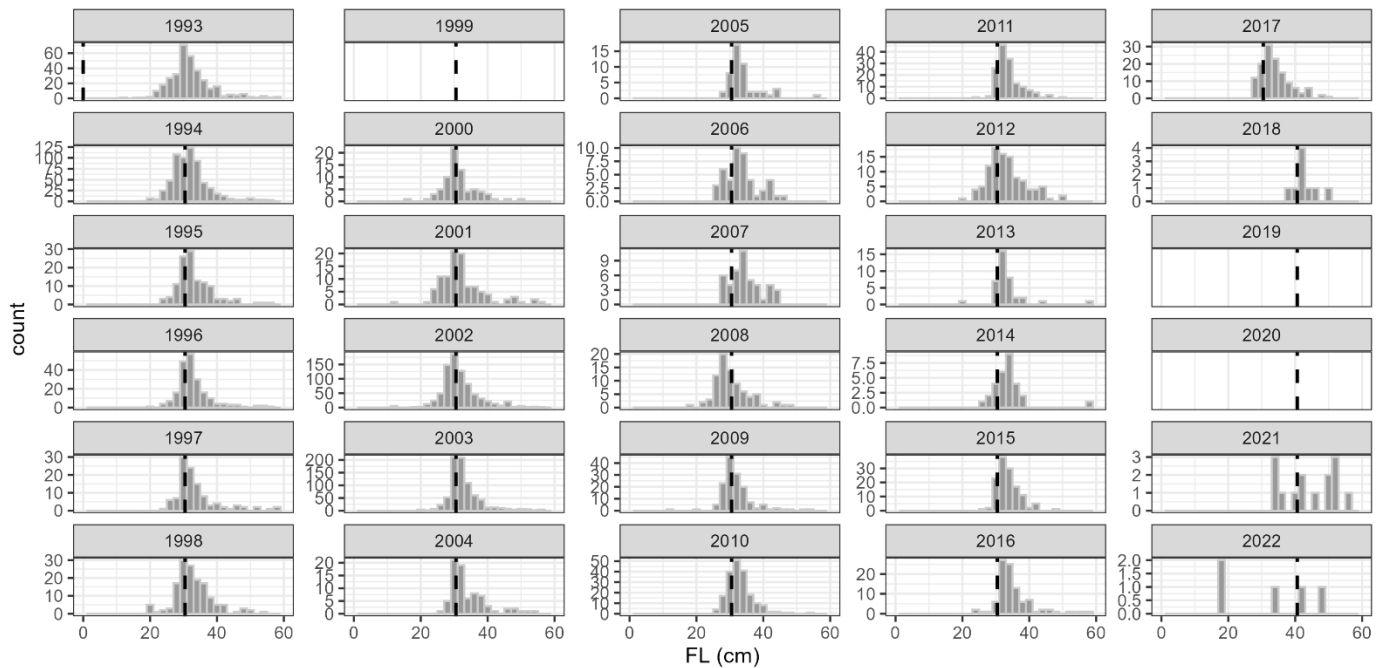


Figure 3. Sampled fork lengths [FL] in cm of landed Hogfish in the Biscayne NP Creel Survey by year. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2018 (black dashed line). Minimum size limits (in fork length) in federal waters of the South Atlantic (SAFMC) enacted in 1/1995 and 8/2017 were 12 in. and 16 in, respectively.

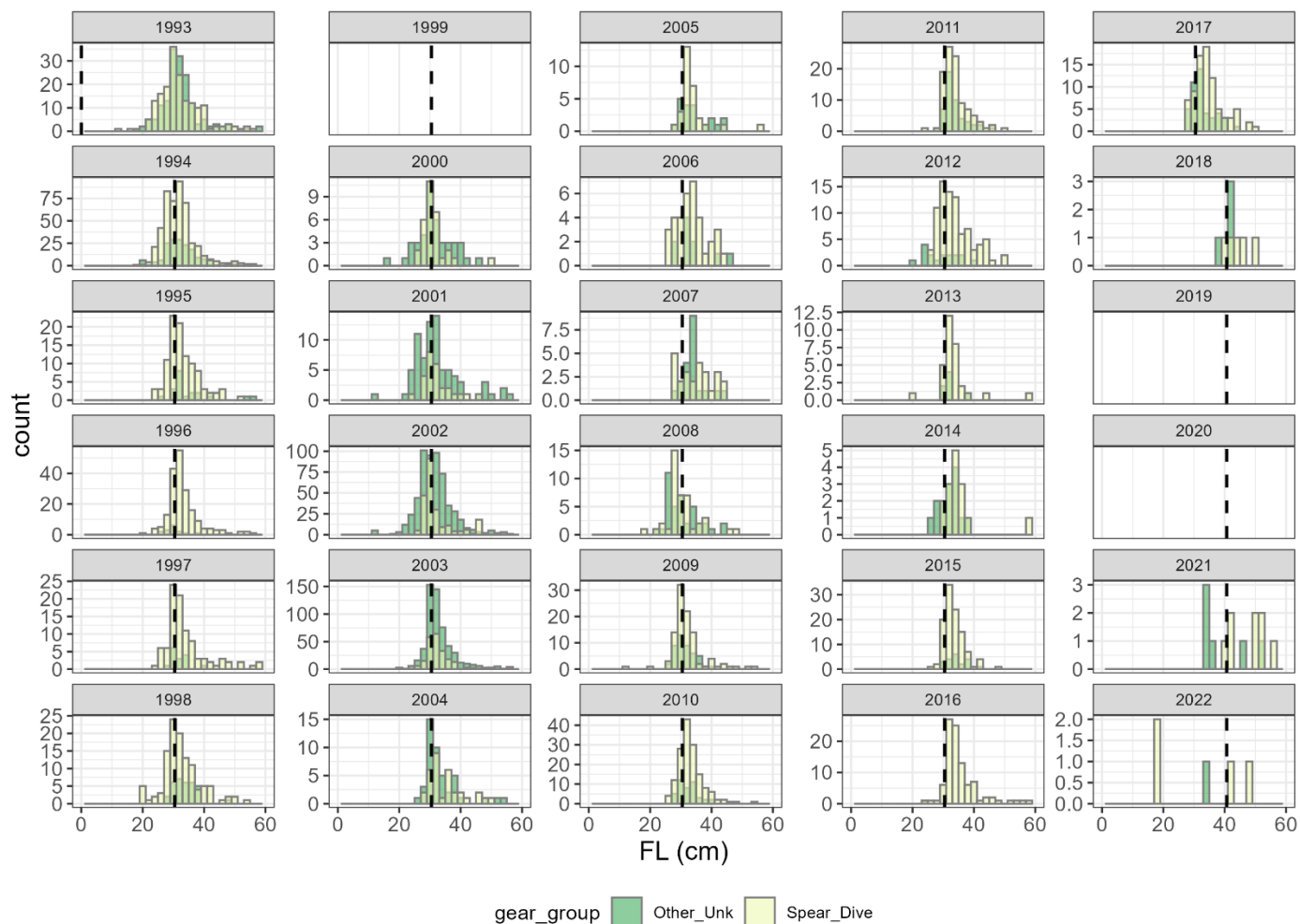


Figure 4. Sampled fork lengths [FL] in cm of landed Hogfish in the Biscayne NP Creel Survey by year and gear group. The state of Florida enacted a 12-inch (30.5 cm) minimum size limit (in fork length) in 1994 and a 16 inch (40.6 cm) minimum size limit in 2018 (black dashed line). Minimum size limits (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.