MEMORANDUM

TO: **Coastal Pelagics Management Board**

FROM: **Cobia Technical Committee**

DATE: **September 29, 2023**

SUBJECT: **Recommendation for 2024 State Recreational Management Measures for Cobia and September 2023 Technical Committee Report on Recent Trends in Cobia Harvest**

The Cobia Technical Committee (TC) met via webinar on September 9 and September 19, 2023, to discuss 2021-2022 state recreational harvest target evaluations, the impacts of keeping status quo recreational management measures in 2024, and recent trends in state and regional recreational cobia landings.

<u>TC Members in Attendance</u>: Angela Giuliano (Chair, MD), Nichole Ares (RI), Brian Neilan (NJ), Somers Smott (VA), Josh McGilly (VA), Lee Paramore (NC), Justin Yost (SC), Chris Kalinowsky (GA),

<u>ASMFC Staff</u>: Chelsea Tuohy, Toni Kerns, Patrick Campfield

<u>Others in Attendance</u>: Shanna Madsen (VA, Board Proxy), Chris Batsavage (NC, Board Proxy), Alan Bianchi, Will Poston

2021-2022 Harvest Target Evaluations

Amendment 1 to the Interstate Fishery Management Plan for Atlantic Migratory Group Cobia (Cobia FMP) requires non-*de minimis* states to consider changes to state recreational management measures each time a new total harvest quota is set through the specifications process. In August 2023, the Coastal Pelagics Management Board (Board) approved a total harvest quota of 80,112 fish for the 2024-2026 fishing seasons, resulting in a commercial quota of 73,116 pounds and a recreational quota of 76,908 fish. The recreational quota is divided into state-specific soft targets based on historical landings between 2006-2015, with 50% based on harvest data from 2006-2015 and 50% based on harvest data from 2011-2015.

Once a new total harvest quota is set, Amendment 1 to the Cobia FMP requires each non-*de minimis* state to evaluate recent landings as an average of years with the same recreational management measures against state-specific soft targets. If a state's average landings exceeded the recreational soft target, the state must restrict measures to reduce future harvest to levels at or below the soft target. If a state's harvest over a minimum of two consecutive years fell

below the soft target, the state would have the option to leave measures status quo or liberalize measures to achieve the soft target. The timeframe for harvest target evaluations used to set 2024-2026 recreational management measures is 2021-2022, as a result of North Carolina and Virginia implementing updated recreational management measures in 2021 following the change in quota allocation implemented with Addendum I.

De minimis states are exempt from completing harvest target evaluations and can choose to implement the standard *de minimis* measures of 1 fish per vessel per trip with a minimum size of 33 inches fork length or match the nearest non-*de minimis* state's recreational management measures. As of 2023, all *de minimis* states have implemented the standard *de minimis* management measures, except for Maryland and the Potomac River Fisheries Commission (PRFC), which adopt the same measures as Virginia, their nearest non-*de minimis* state. If Virginia implements new recreational management measures for Atlantic cobia for the 2024-2026 fishing years, Maryland and PRFC must adjust recreational management measures accordingly.

In August 2023, the Board tasked the Cobia TC to evaluate the impact of status quo recreational management measures in 2024, leaving the TC with two options for setting 2024 recreational management measures: Option 1) Continue the standard way of setting recreational management measures where states evaluate recent landings against state-specific soft targets to determine needed reductions and options for liberalizations and Option 2) States make no changes to recreational management measures in 2024.

Technical Committee Recommendation for 2024 Recreational Management Measures
In September 2023, the TC reviewed averaged 2021-2022 harvest data, preliminary 2023 harvest data through wave 3, and historic harvest data through wave 3 compared to final harvest estimates to make a recommendation to the Board regarding 2024 recreational management measures. The TC also discussed multiple avenues of uncertainty present in the recreational cobia fishery, including the potential for changes to catch and effort estimates in 2026 following the upcoming Marine Recreational Information Program (MRIP) Fishing Effort Survey (FES) follow-up study and incorporation of Covid years in 2021-2022 harvest target evaluations.

After evaluating state harvest target performance during 2021-2022, the TC noted Georgia's and Virginia's two-year average harvest exceeded each state's respective soft target while North Carolina's and South Carolina's averaged and single-year harvests in 2021 and 2022 fell below their respective soft target levels (Table 1). Using the typical recreational management measures setting process, these values would allow North Carolina and South Carolina the option to remain status quo or liberalize recreational management measures, while Virginia and Georgia would need to restrict recreational management measures to fall at or below their respective soft targets for the 2024-2026 fishing seasons.

TC members from North Carolina and South Carolina indicated that neither state intended to liberalize recreational management measures for the 2024 fishing year. While the 2024

landings cannot be predicted, the TC discussed that if all states were to remain status quo, there is reasonable probability suggesting the coastwide recreational quota would not be exceeded due to underharvesting states balancing out the effects of overharvesting states.

To further examine the potential for exceeding the coastwide recreational quota, the TC queried preliminary 2023 landings for waves 1-3 and explored whether it was possible to estimate what 2023 landings would be based on the current harvest estimates. Starting with the coastwide landings, the 1982-2022 landings for waves 1-3 were plotted against the annual landings estimate for the same years. Similar plots were made for each non-*de minimis* state. Linear regressions were used to evaluate the relationship between the partial-year landings (waves 1-3) and the full-year landings (waves 1-6). The R^2 value was used to evaluate how much of the variability in the annual landings could be explained by the waves 1-3 harvest. This analysis could not be completed for the *de minimis* states as their fisheries typically occur later in the year and are highly variable.

The 2023 annual harvest for non-*de minimis* states was then estimated using the waves 1-3 harvest as the predictor for either the coastwide harvest or the individual non-*de minimis* state harvest. As the coastwide R^2 was not very high (R^2=0.66) and the relationship did not seem as certain, most of the analysis focused on the non-*de minimis* state predictions. One data point (1996), which appeared to be an outlier having a low waves 1-3 harvest estimate and high final estimate, was removed from the South Carolina analysis. With the removal of this point, both the Georgia and South Carolina regressions had high R^2 values (>0.9). Lower R^2 values were observed for North Carolina (R^2=0.89) and Virginia (R^2=0.69). To account for the potential variability, a range of values were calculated as potential 2023 annual landings estimates for these two states. These ranges included: the annual harvest estimated from the linear regression based on the waves 1-3 harvest; the annual harvest assuming an increase in harvest based on the average increase in harvest observed in the past five years in waves 4-6; the annual harvest assuming an increase in harvest based on the maximum increase in harvest observed in the past five years in waves 4-6; and the annual harvest assuming an increase in harvest based on the minimum increase in harvest observed in the past five years in waves 4-6.

The sum of non-*de minimis* state-specific minimum, maximum, mean, and point estimates was compared to the recreational soft target for the non-*de minimis* states to evaluate the potential risk of 2023 landings falling above the soft target (Table 2). All estimates were below the non-*de minimis* soft target value of 76,139 fish, with the exception of the maximum estimate, which fell above the soft target value by 10,749 fish. Additionally, some non-*de minimis* states indicated harvest may decline in wave 4 based on observations of poor fishing conditions due to poor weather. *De minimis* state harvest could not be estimated and thus was not included in the evaluation, but it is important to note *de minimis* state harvest has fallen well above the *de minimis* soft target value of 769 fish in recent years.

Ultimately, the TC recommended status quo recreational management measures be continued in 2024 and concluded there was a reasonably low probability of exceeding the coastwide recreational quota as a result of status quo measures.

If the Board chooses not to implement status quo measures in 2024, North Carolina and South Carolina will have the option to keep measures status quo or liberalize their measures to account for an additional 17,652 fish and 1,383 fish, respectively. Virginia and Georgia will need to restrict measures to achieve a minimum reduction of 18,100 fish and 347 fish, respectively.

Technical Considerations for Atlantic Cobia: Trends in State Landings and Tagging Evidence
In August 2023, the Board tasked the Cobia TC to develop a fishery review that characterizes recent trends in state and regional landings compared to harvest targets. Over the course of two meetings in September 2023, the TC discussed trends in Cobia harvest at length, reviewing available MRIP data between 1981 and 2022 at the state, regional, and coastwide levels. The TC also discussed various cobia tagging projects in Virginia, North Carolina, South Carolina, and Georgia to better understand how Atlantic cobia move up and down the coast based on tags and recaptures.

Coastwide cobia harvest has remained well above the time series average of 40,074 fish in recent years (Figure 1). Similarly, catch has remained steadily high, hitting a peak in 2018 (Figure 2). At the regional level, the TC examined three proposed regional break points. First, the group defined North Carolina, South Carolina, and Georgia as a southern region and Virginia through Maine as a northern region. However, the TC decided to remove this proposed regional break from the analysis as observations from tagging data and observations on the water suggest cobia in North Carolina and Virginia represent the same body of fish and thus should be considered in the same region. Next, the TC broke down regions where South Carolina and Georgia represented the southern region and North Carolina through Maine represented the northern region (Figures 3-5). Finally, the TC broke down regions where South Carolina and Georgia represented a southern region, North Carolina and Virginia represented a middle region, and the *de minimis* states represented a northern region (Figures 5-8).

Based on the regional harvest analysis, the southern region (South Carolina and Georgia) has seen relatively stable harvest over the time series, with some spikes in harvest in 1996, 2003, 2012, and 2015 and a time series average of 9,469 fish. In the two-region split analysis where North Carolina through Maine represents a northern region, harvest has remained above the region's time series average of 30,836 fish since 2013, reaching a peak in 2018. For the final regional analysis, where North Carolina and Virginia represent a middle region and the *de minimis* states represent a northern region, North Carolina and Virginia represent a bulk of the landings with a time series average of 29,742 fish and higher than average landings in recent years. The *de minimis* states show variable landings, with most years having minimal to no landings and a time series average of 2,136 fish. However, *de minimis* landings have occurred every year since 2020, ranging from 1,579 fish to 5,334 fish. TC members noted although cobia landings have increased in some Mid-Atlantic and *de minimis* states, landings remain relatively stable in southern states, indicating a possible range expansion as opposed to a stock shift.

In addition to reviewing MRIP harvest and catch data, the TC also discussed cobia tagging programs as another tool to determine how the stock is moving. The TC's review of tagging data prompted a discussion about new tools available in 2023 that were not available during the

previous stock ID workshop in 2018, when the Georgia-Florida boundary line was implemented as the management boundary separating management jurisdiction between Atlantic migratory group cobia and the Gulf of Mexico migratory group (Gulf stock). The TC discussed the results of the 2018 stock ID workshop and expressed interest in re-evaluating the boundary between the two stocks, acknowledging northern Florida as a likely mixing zone between stocks. The TC supported additional stock ID efforts and preferred these efforts to precede the 2025 cobia stock assessment, or at a minimum occur as an initial step in the assessment process. While the tagging data discussed by the TC in September 2023 was primarily conventional tagging data, the TC noted satellite and acoustic tagging information would enhance our understanding of movement patterns. The results of each state's tagging programs are detailed in length below.

Virginia
The Virginia Game Fish Tagging Program (VGFTP) has 7,511 cobia tagging records and 1,145 cobia recapture records since 1995. There has been a decline in the number of tagged and recaptured cobia reported by VGFTP since 2019. Peak tagging effort took place in 2019 (n=1,036 tags) with peak recaptures as well (n=194 recaptures). From the recaptures, there are two unknown recapture sites, one in 2012 and one in 2018, which have both been dropped for the purposes of this report.

From 2010 to 2016, there were 192 cobia recaptures. The largest number of these recaptures occurred in VA (82%) and NC (15%), with the final 3% coming from FL, GA, MD, and NY (Figure 9). From 2017-2023, there were 798 recaptures. The largest number of these recaptures occurred in VA (88%) and NC (7%), with the final 5% coming from FL, MD, NH, NJ, NY, RI, and SC (Figure 10). This suggests more fish are being recaptured in VA, as well as heading up past VA to New Jersey and the New England states.

Data was divided by proportion outside of Virginia to try to characterize further trends in cobia movement along the coast. From 2010-2016, there were 32 recaptures south of Virginia. The largest number of these recaptures occurred in NC (91%) and FL (6%), with the final 3% coming from GA (Figure 11). From 2017-2023, there were 70 recaptures south of Virginia. The largest number of these recaptures occurred in NC (76%) and FL (20%), with the final 4% coming from GA and SC (Figure 12).

From 2010-2016, there were 2 recaptures north of Virginia: one in MD and one in NY (Figure 13). From 2017-2023, there were 23 recaptures north of Virginia. The largest number of these recaptures occurred in MD (48%), NY (26%), and NJ (17%), with the final 9% coming from RI and DE (Figure 14).

North Carolina
North Carolina tagging for cobia began in May of 2017. Cobia have been tagged each year since using both volunteer anglers and Division of Marine Fisheries (DMF) staff throughout the state's coastal waters, along with some tags released in the Chesapeake Bay. All cobia receive an external red high-reward shoulder tag ($100 reward) to maximize returns. Tagging of cobia informs migration patterns and could potentially be used for exploitation rates. Tagging of

cobia has occurred along the coast, ranging from Wilmington to the Chesapeake Bay (Figure 15). The total number tagged between 2017 and 2022 is 547 cobia, and has resulted in 97 recaptures. The time series average was 406 days at large, with an average distance traveled of 123 miles (Table 3). Most recaptures occur within the states of North Carolina and Virginia as cobia tend to migrate north in the spring along the North Carolina coast, with movement into the Chesapeake Bay common during the summer months. The maximum distance traveled was 696 miles for a cobia tagged north of the Chesapeake Bay Bridge in August of 2019 and recaptured 564 days later in February of 2021 off Fort Pierce, Florida (Figure 16). The maximum days between release and recapture was 1,558 days, or just over 4 years (Table 3). Table 4 provides the recapture location for cobia tagged specifically in North Carolina by month and state of recapture. Of these, only 4 cobia were recaptured south of NC, while the majority of fish migrated north to Virginia and Chesapeake Bay, being recaptured from May through September.

South Carolina
The South Carolina Marine Game Fish Tagging Program (MGFTP) began in 1974, with cobia-specific tagging beginning in the early 1990s. To date, 1,572 cobia have been tagged, mostly in South Carolina, with small numbers of fish tagged in Georgia and Florida. This tagging effort has seen 217 recaptures, mostly occurring within the original state of tagging, with the longest at large being 2371 days (Table 5).

In 2016, the South Carolina Department of Natural Resources received a Cooperative Research Program (CRP) grant to examine cobia migratory patterns along the East Coast using acoustic telemetry. In 2018, an additional CRP grant was awarded using a combination of acoustic and satellite tags to track movement outside existing acoustic arrays. There have been 273 acoustic tags and 29 satellite tags deployed to date between North Carolina and Florida. Results from the acoustic study including additional tags deployed in North Carolina and Virginia not related to the CRP grant were provided to the Cobia TC from a paper currently under review and not yet available to the public. Satellite tagging information showed no defined trends, likely due to limited sample size, but does demonstrate how cobia travel throughout the year. Due to battery issues and no reporting tags, only 22 satellite tags were usable. The final CRP reports can be provided upon request.

Georgia
Georgia recently participated as a cooperative partner in a cobia acoustic tagging study along the Atlantic coast. Unfortunately, data from the study are not yet available as study results have yet to be published. However, Gray's Reef National Marine Sanctuary (Gray's Sanctuary) in Georgia recently released a technical bulletin summarizing information on acoustically tagged fish detected within the Gray's Sanctuary array. At that time, there were 22 cobia that had been detected by the array. Of those fish, 20 were tagged in coastal Georgia and South Carolina waters by South Carolina Department of Natural Resources (SCDNR) staff, and 2 were tagged off St. Lucie, Florida by Florida Fish and Wildlife Conservation Commission (FWC) staff. Fish were detected periodically at Gray's Sanctuary across spring, summer, and fall, but not winter.

The sanctuary noted that Cobia tagged in Georgia and South Carolina were detected in spring, summer, and fall, while Florida tagged cobia were only detected in spring and fall months.

While these acoustic detections are interesting, it is unlikely they tell the whole story for cobia in the southern region. Acoustic tracking requires fish to be present in areas where receivers are deployed. This seems to work well during some months of the cobia migration, for example, Gray's Sanctuary during spring, summer, and fall. However, the absence of detections in winter months at Gray's Sanctuary would lead one to conclude that cobia were not present in Georgia waters during the winter. Fortunately, a small number of fish were satellite-tagged in addition to having acoustic tags. Due to the high cost and the reputation of being prone to failure (fall off or quit transmitting), only a small portion of cobia were selected for satellite tagging. One of these fish was tagged by Georgia Department of Natural Resources (GA DNR) staff in Georgia waters (offshore of Brunswick). The satellite tag transmitted for over 200 days and provided an interesting track across multiple seasons (Figure 17).

This fish was tagged in December 2020, approximately 40 miles offshore of Cumberland Island, Georgia. After tagging, this fish made its way further offshore of Georgia (approximately 80 mi.), where it seemed to overwinter along the bottom habitat near the Gulf Stream's edge. While it spent most of its time offshore of Georgia, it did make a slight move further south in January 2021, into waters offshore (approximately 75 mi.) off Jacksonville, Florida. After a brief stay there, it moved back into Georgia waters in February 2021. It remained offshore of Georgia until early April, when it ultimately left to begin its northward migration. Due to the absence of acoustic receivers in the deeper offshore waters off Georgia and Florida, this fish was never detected by any acoustic arrays during the winter months. However, because it was tagged with a satellite transmitter, we can follow it overwinter track and residency during those months. After departing Georgia waters, this fish began a rather direct northward migration through South Carolina, North Carolina, and into Virginia waters in June of 2021, where it remained until the tag released from the fish and quit transmitting in July 2021.

In addition to the satellite and acoustic tagging efforts, there have been four cobia tagged by recreational anglers in Georgia waters, with one recapture in Ponte Verda, Florida. The recaptured fish was originally tagged in October 2018 and was recaptured in July 2021.

Based on recent trends in state, regional, and coastwide harvest and cobia tagging data, the TC recommends the Board take action to address recreational reallocation for Atlantic cobia. However, the timing of Board action should consider the timing of the upcoming MRIP FES follow-up study and how the impacts of the study on pulse fisheries like Atlantic cobia are unknown. Board action timing should also consider the potential for a reexamination of the cobia management boundary to be completed before or alongside the upcoming stock assessment.

Tables

Table 1. Non-*de minimis* state 2021-2022 soft target performance. Red text indicates values above associated soft targets.

State	Soft Target	2021 Landings	2022 Landings	2-Year Average	2024-2026 Options
Georgia	7,229	8,510	6,641	7,575.5	Restriction (347 fish)
South Carolina	9,306	8,858	6,988	7,923	Status Quo or Liberalization
North Carolina	29,302	10,970	12,330	11,650	Status Quo or Liberalization
Virginia	30,302	57,135	39,668	48,401.5	Restriction (18,100 fish)
De minimis	769	5,334	4,173	4,753.5	N/A
Total	76,908	90,807	69,800	80,303.5	N/A

Table 2. Estimated 2023 total harvest based on 2023 preliminary landings in waves 1-3 and historic waves 1-3 estimates compared to total harvest.

	Harvest Estimate (Number of Fish)	Difference from Soft Target (Number of Fish)
2023 Point Estimate	64,958	-11,181
2023 Minimum Estimate	59,722	-16,417
2023 Mean Estimate	75,835	-304
2023 Maximum Estimate	86,888	10,749
2023 Soft Target GA-VA	76,139	N/A

Table 3: Summary of cobia tagged as part of the NCDMF multi-species tagging program, 2017-2022.

Year Tagged	Total Fish Tagged (#)	Total Fish Recaptured (#)	Average Days Out	Max Days Out	Average Distance Traveled (miles)	Max Distance Traveled (miles)
2017	81	24	501	1,198	157	681
2018	214	49	434	1,558	109	370
2019	134	19	279	777	140	696
2020	29	1	357	357	3	3
2021	48	4	119	353	40	157
2022	41	0	-	-	-	-

Table 4: Recapture location by state and month for 87 cobia returns for cobia tagged in North Carolina waters (additional recaptures from table 3 were for Chesapeake Bay tagged fish).

State													
	1	2	3	4	5	6	7	8	9	10	11	12	Total
DE								1					1
MD						1			1				2
VA					5	25	17	7	8				62
NC					3	10	5						18
SC					1								1
GA					1								1
FL						1	1						2

Table 5: South Carolina Marine Game Fish Tagging Program tagged cobia showing state where cobia was tagged (left column) and state where cobia was recaptured (top row).

State	AL	FL	GA	MS	NC	NJ	SC	VA	Grand Total
FL	1	8		1		1	1		12
GA					2				2
SC		20	4		4		168	7	203
Grand Total	1	28	4	1	6	1	169	7	217

Figures
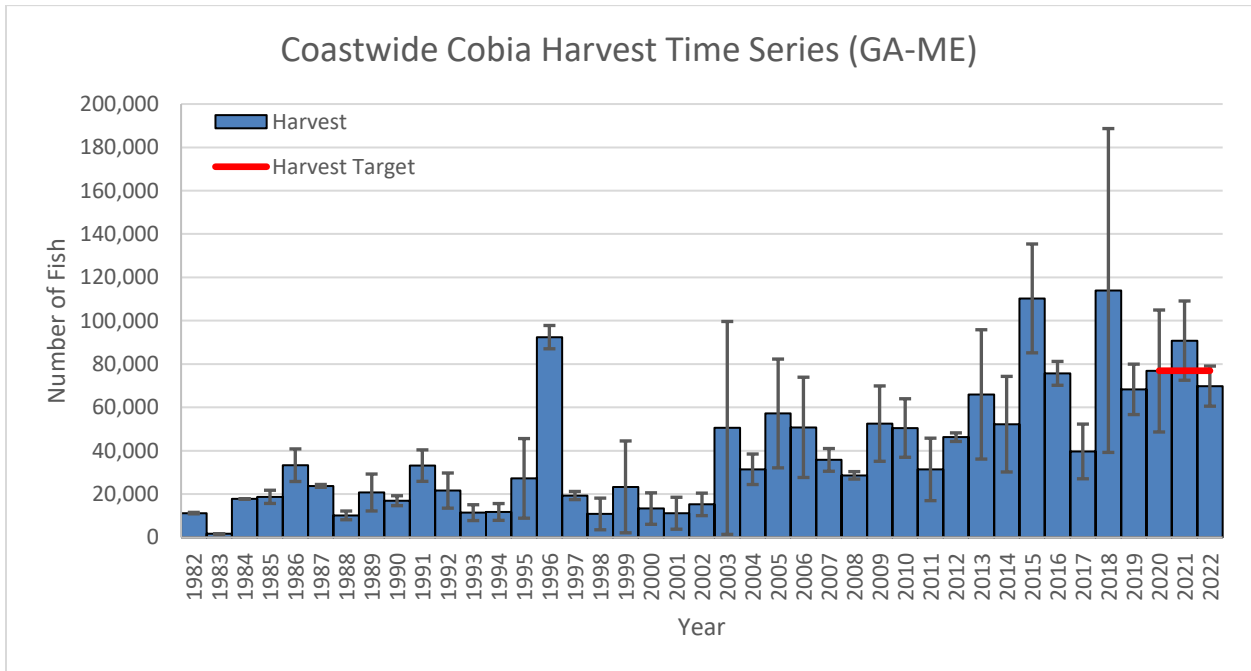
Figure 1: Coastwide cobia harvest since 1982 shown in numbers of fish. Error bars represent the 95% confidence interval around harvest estimates.
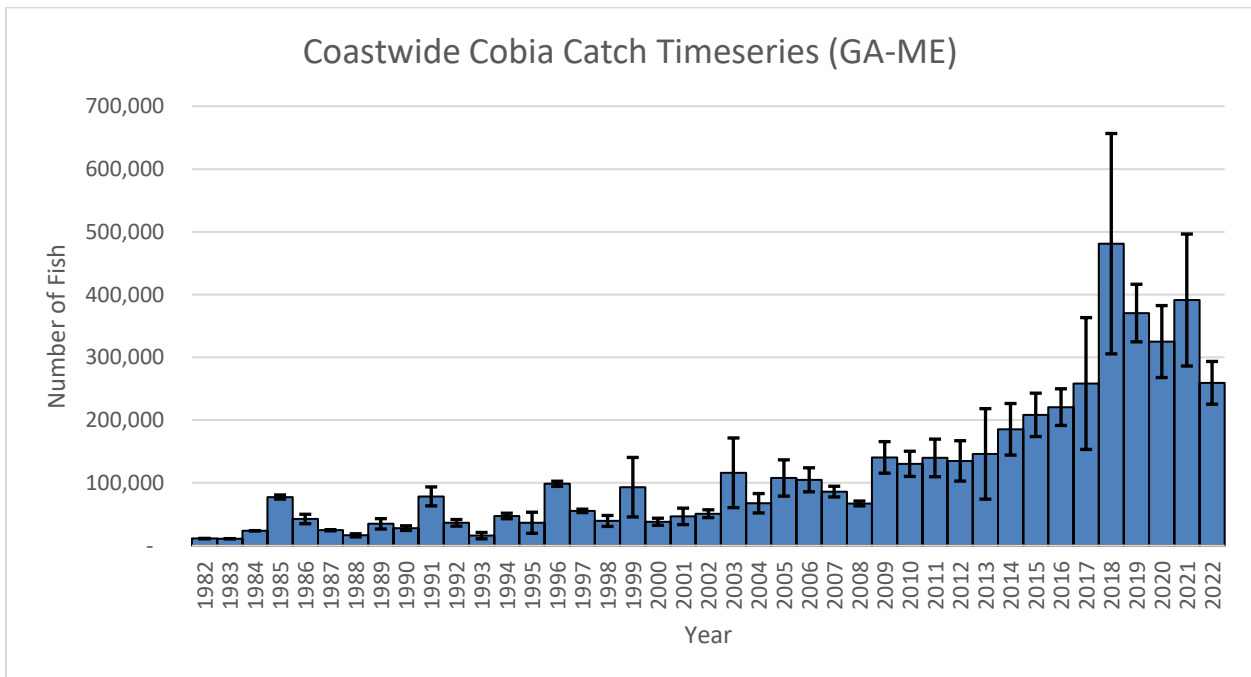
Figure 2: Coastwide cobia catch since 1982 shown in numbers of fish. Error bars represent the 95% confidence interval around catch estimates.
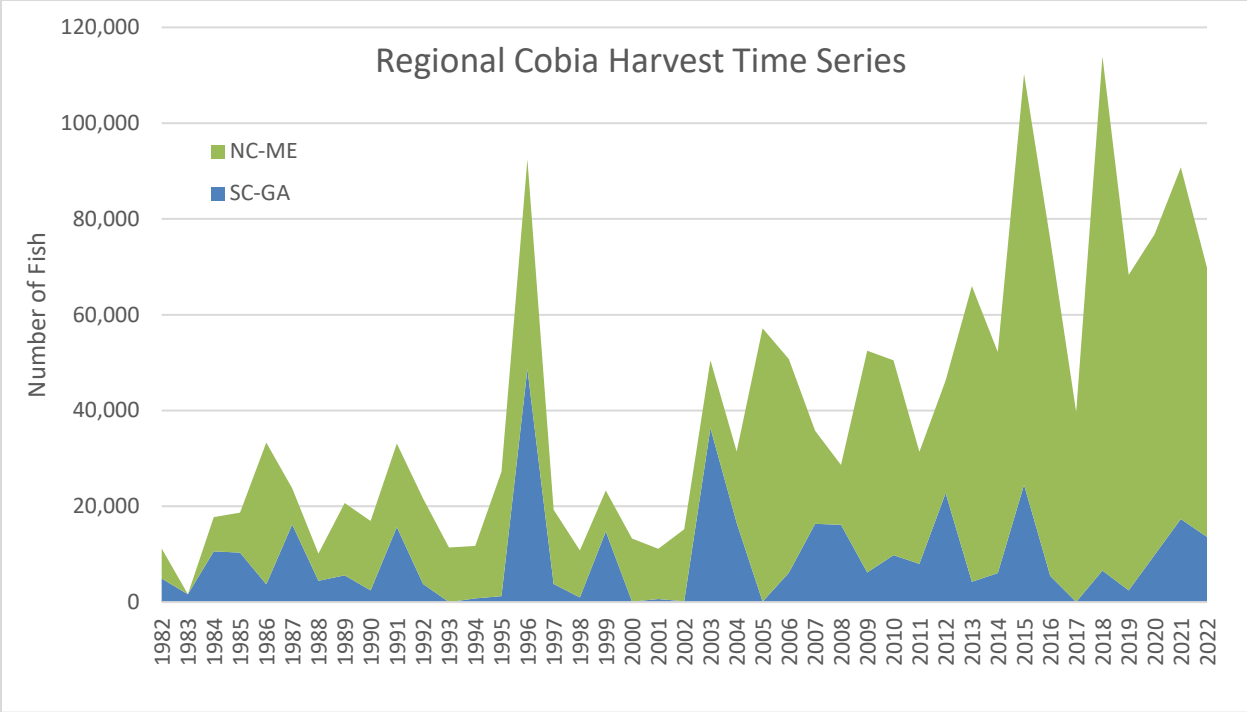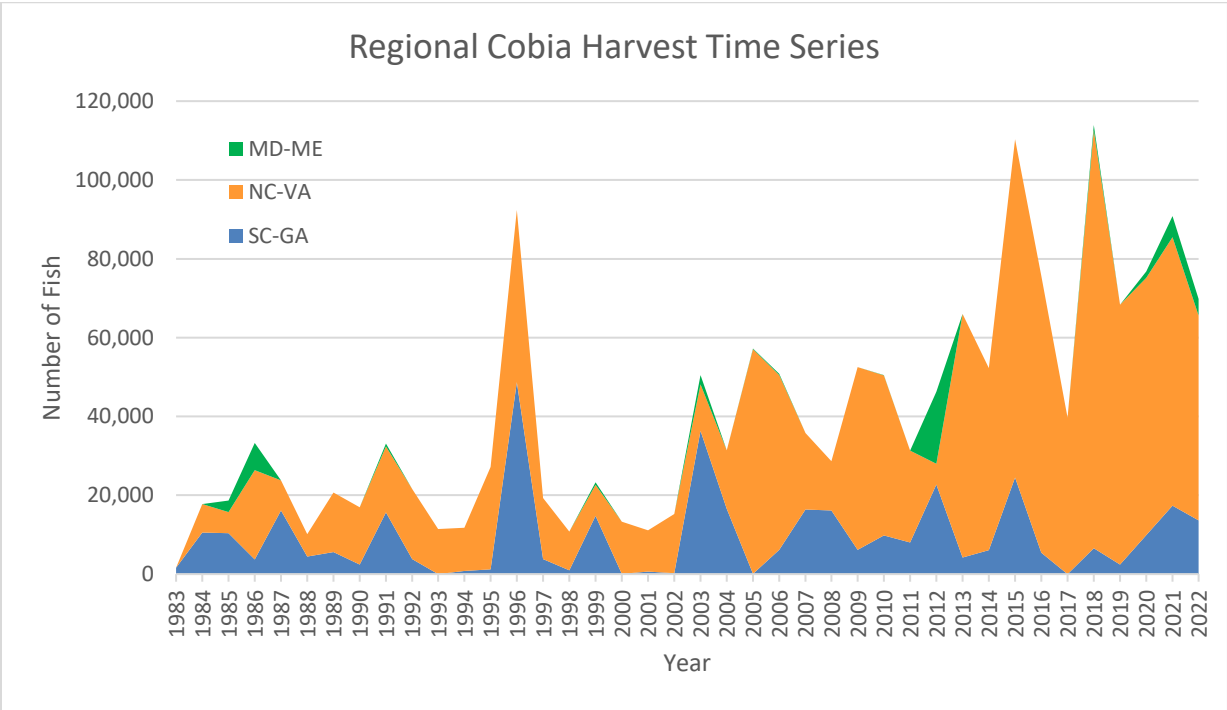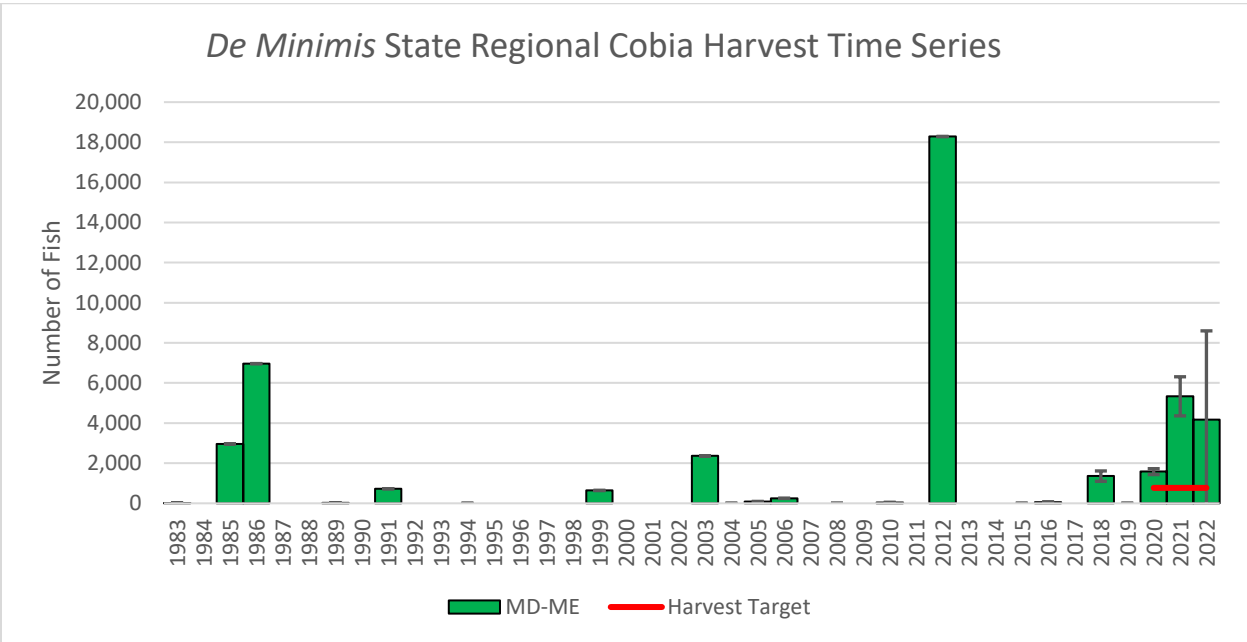
Figure 3: Regional cobia harvest time series with harvest shown as numbers of fish. South Carolina and Georgia represent the southern region while North Carolina through Maine represent the northern region.
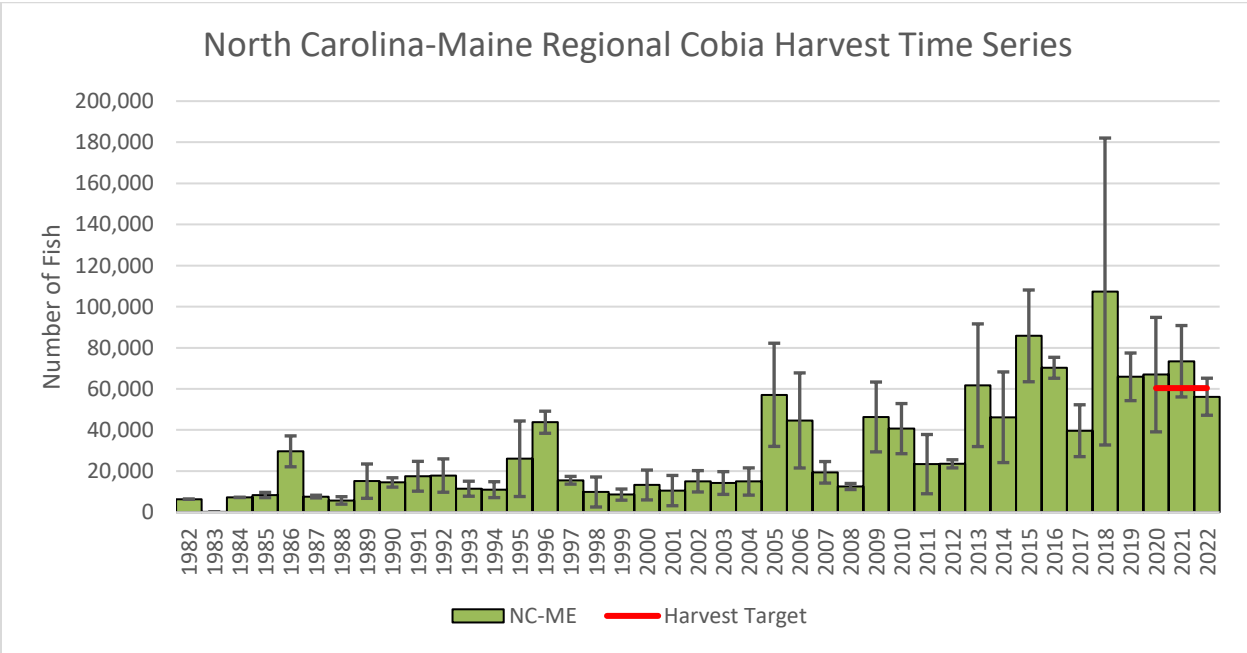
Figure 4: Proposed northern region (North Carolina-Maine) cobia harvest time series with harvest shown as numbers of fish. Error bars represent the 95% confidence interval around harvest estimates.
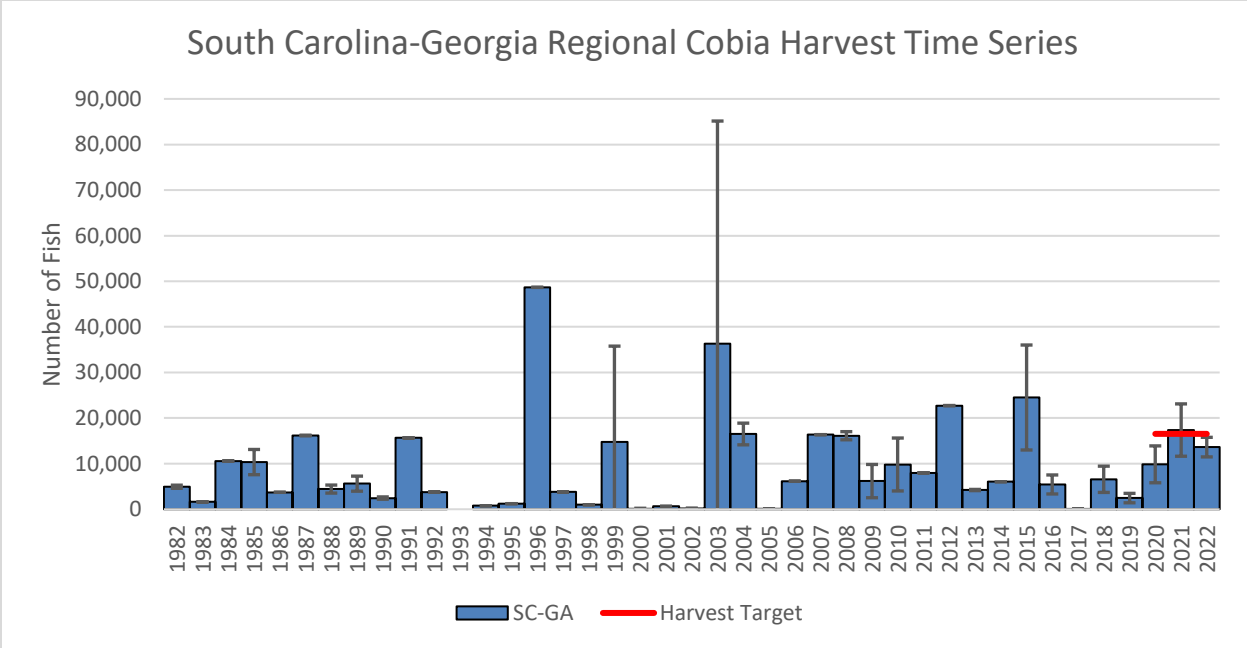
Figure 5: Proposed southern region (South Carolina and Georgia) cobia harvest time series with harvest shown as numbers of fish. Error bars represent the 95% confidence interval around harvest estimates.

Figure 6: Regional cobia harvest time series with harvest shown as numbers of fish. South Carolina and Georgia represent the southern region, North Carolina and Virginia represent a middle region, and the *de minimis* states represent a northern region.

North Carolina-Virginia Regional Cobia Harvest Time Series
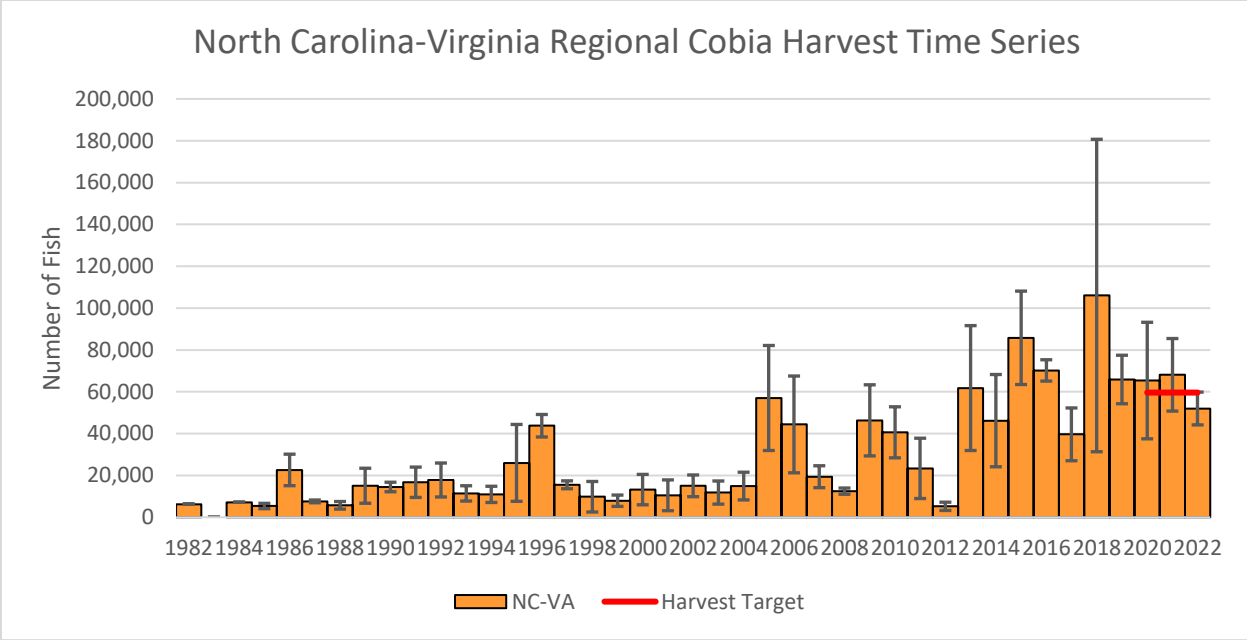
Figure 7: Proposed middle region (North Carolina and Virginia) cobia harvest time series with harvest shown as numbers of fish. Error bars represent the 95% confidence interval around harvest estimates.

De Minimis State Regional Cobia Harvest Time Series

Figure 8: Proposed second northern region (*de minimis* states) cobia harvest time series with harvest shown as numbers of fish. Error bars represent the 95% confidence interval around harvest estimates.
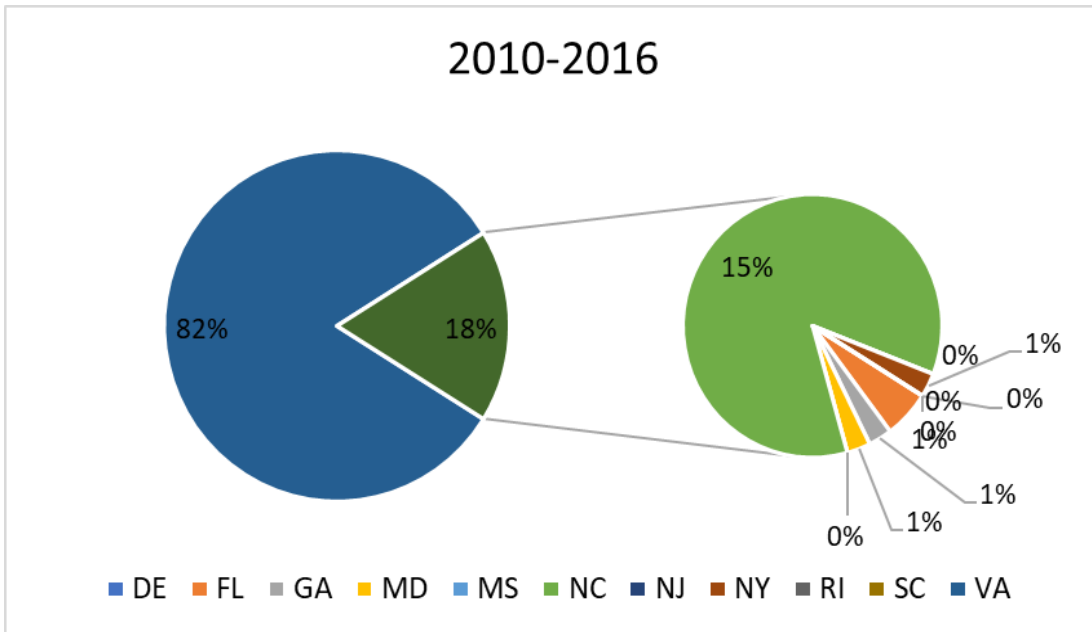
Figure 9: Virginia tagged cobia recaptures from 2010-2016 by state.
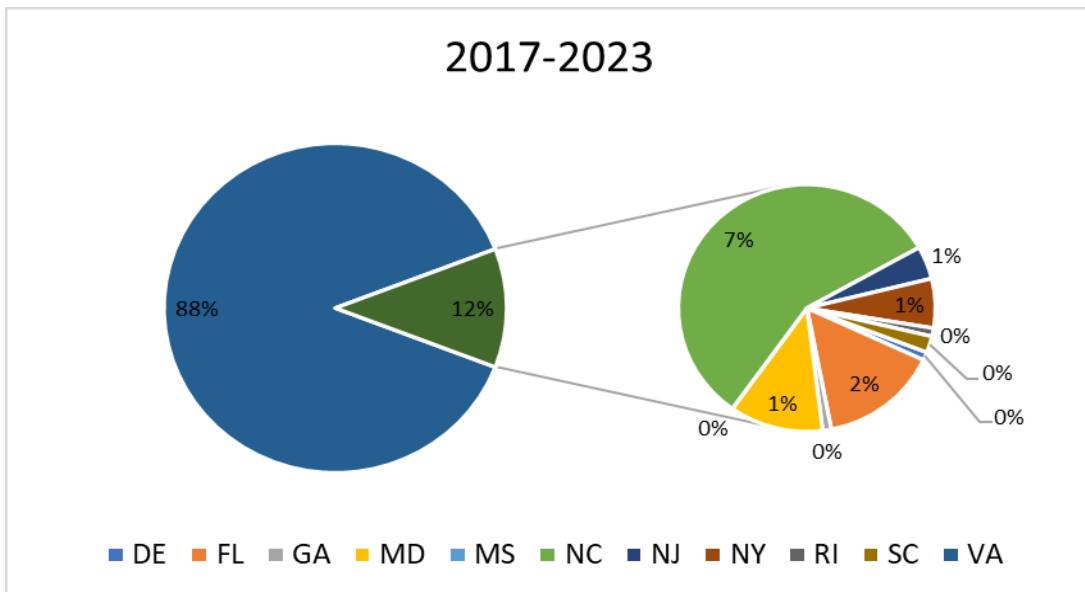
Figure 10: Virginia tagged cobia recaptures from 2017-2023 by state.
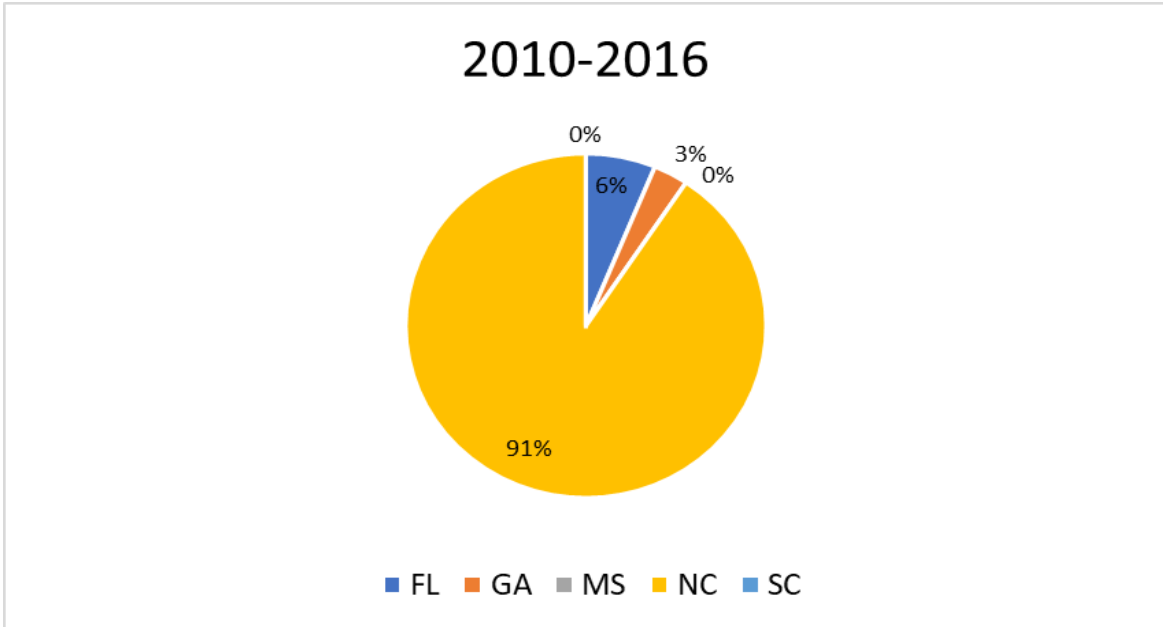
Figure 11: Virginia tagged cobia recaptures south of Virginia from 2010-2016 by state.
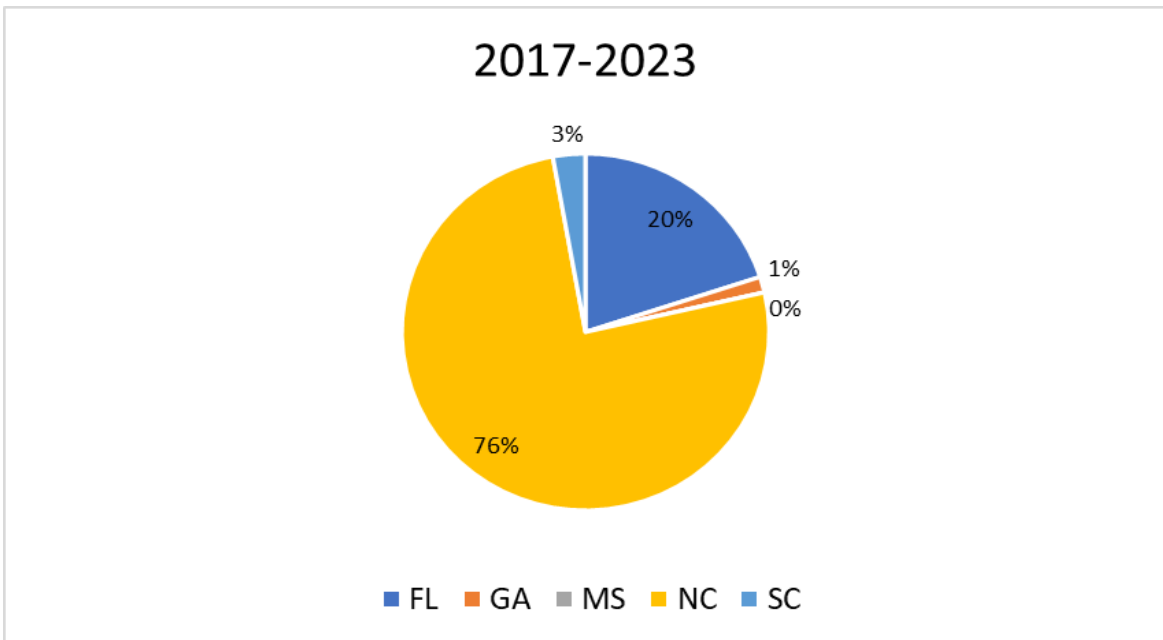
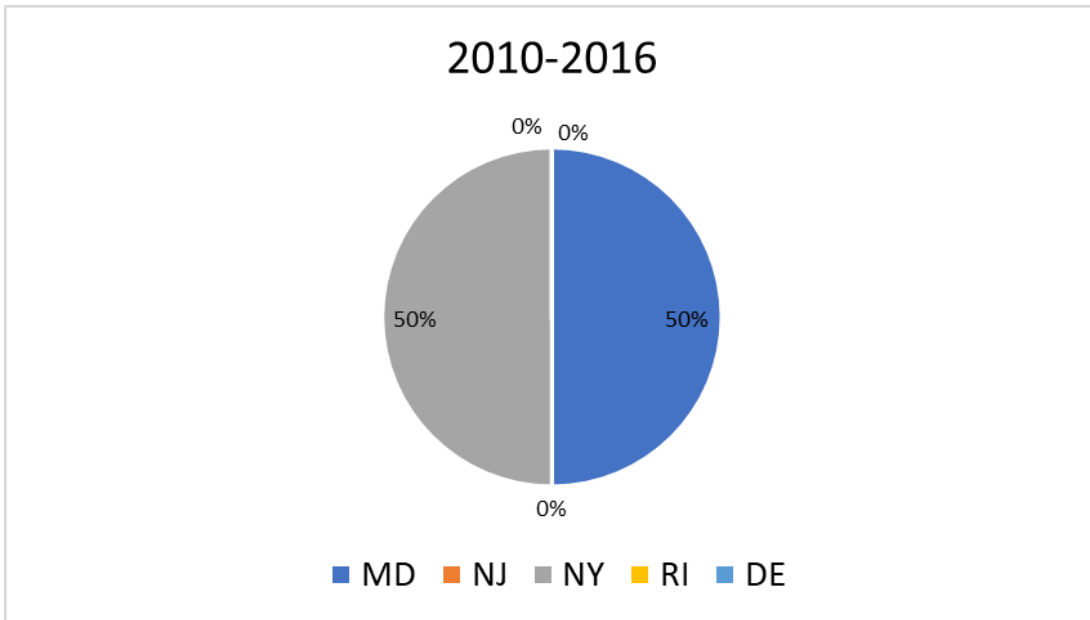Figure 12: Virginia tagged cobia recaptures south of Virginia from 2017-2023 by state.

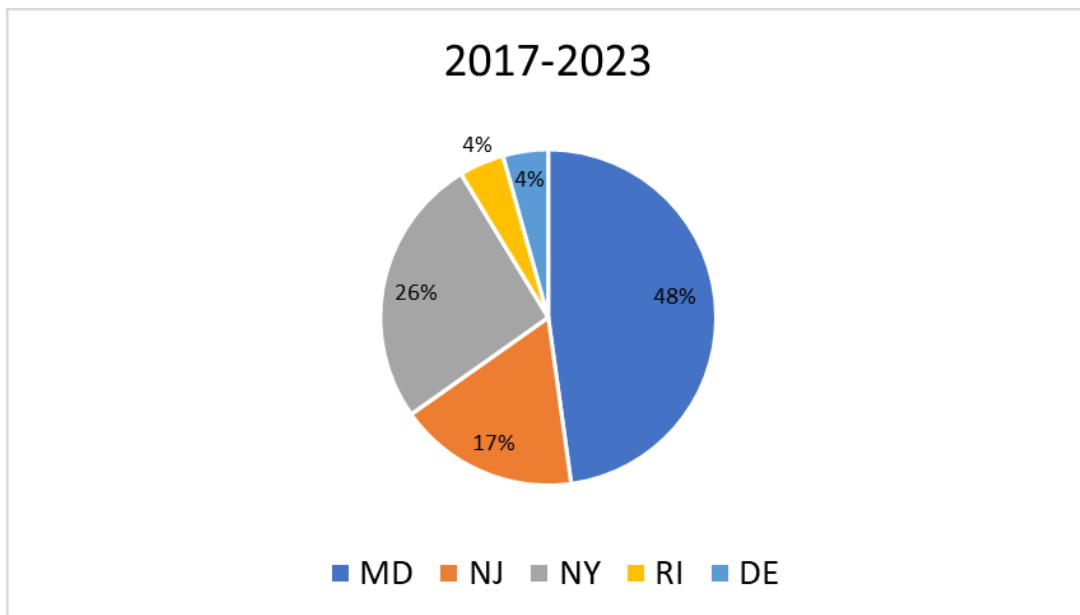Figure 13: Virginia tagged cobia recaptures north of Virginia from 2010-2016 by state.

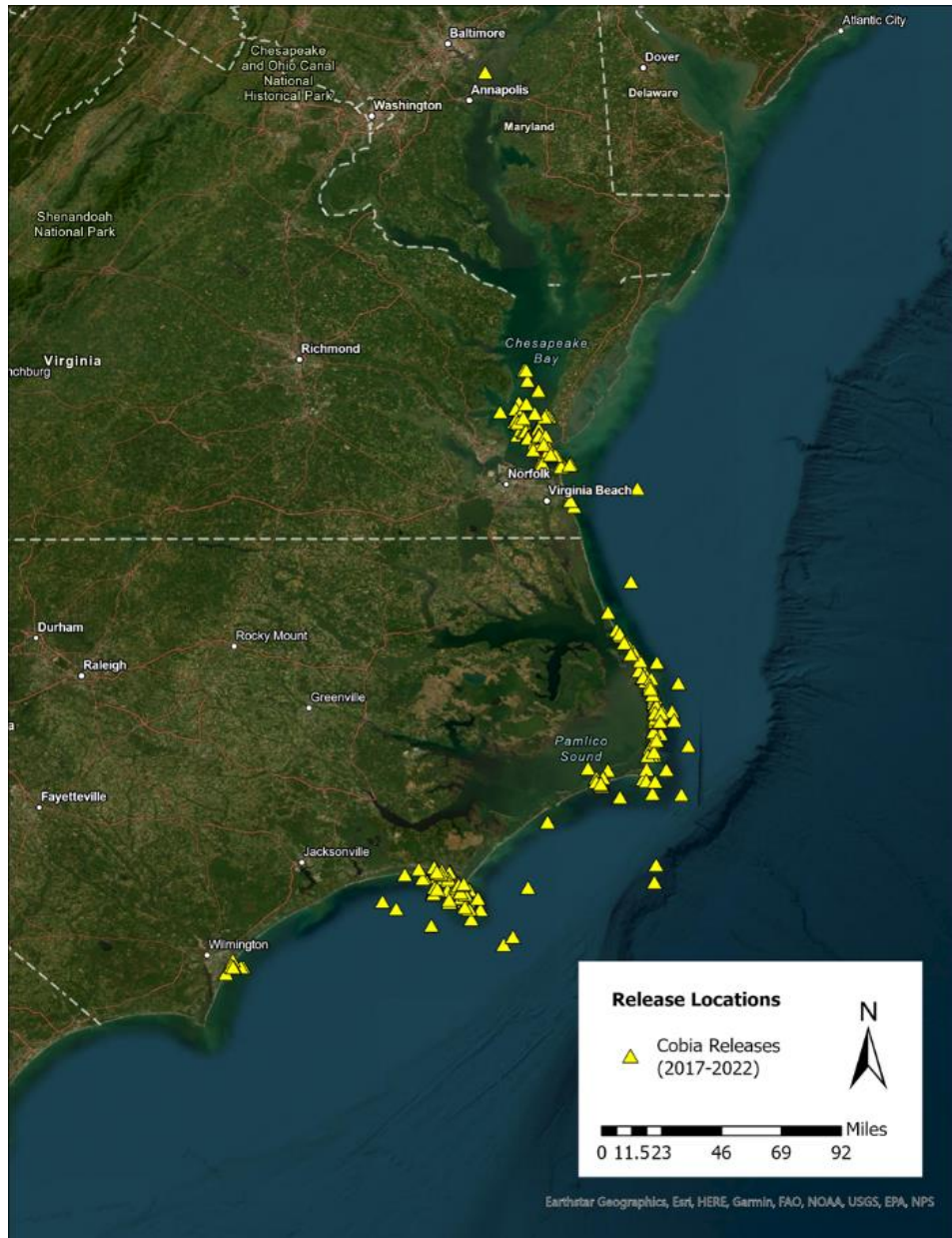Figure 14: Virginia tagged cobia recaptures north of Virginia from 2017-2023 by state.

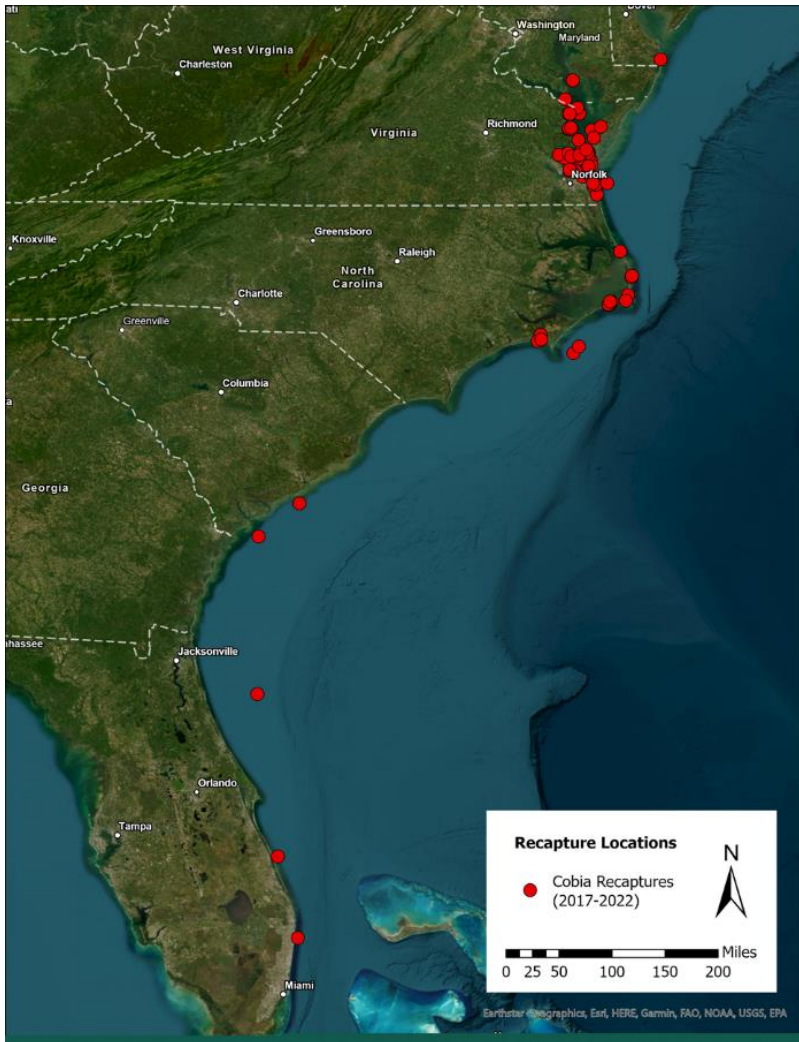Figure 15: NCDMF cobia tagging release locations 2017-2022.

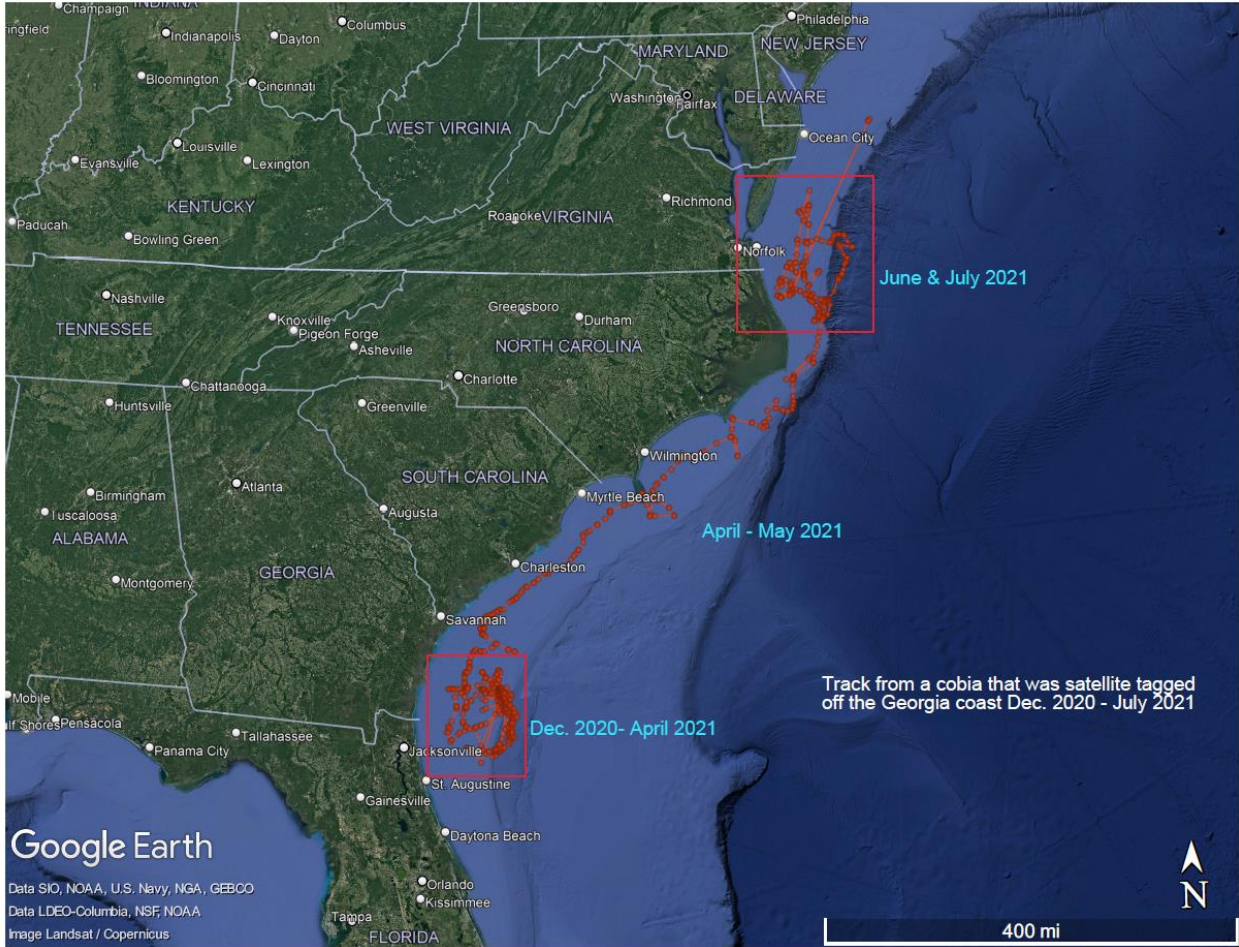Figure 16: NCDMF cobia tagged recapture locations 2017-2022.

Figure 17: Track of cobia satellite tagged off Georgia (December 2020-July 2021).