

Atlantic States Marine Fisheries Commission

**ADDENDUM VII TO THE AMERICAN EEL
INTERSTATE FISHERY MANAGEMENT PLAN**

Commercial Yellow Eel Management and Monitoring Requirements



Approved May 2024



Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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1.0 Introduction

The Atlantic States Marine Fisheries Commission (Commission) has coordinated interstate management of American eel (*Anguilla rostrata*) from 0-3 miles offshore since 2000. American eel is currently managed under the Interstate Fishery Management Plan (FMP) and Addenda I-V to the FMP. Management authority in the exclusive economic zone (EEZ) from 3-200 miles from shore lies with NOAA Fisheries. The management unit is defined as the portion of the American eel population occurring in the territorial seas and inland waters along the Atlantic coast from Maine to Florida.

The Commission's American Eel Management Board (Board) approved the following motion on August 1, 2023:

Move to draft an addendum to consider using I_{TARGET} to recommend various catch caps, but not use I_{TARGET} to set biological reference points or stock status.

The objective of Addendum VII is to set the coastwide cap using the I_{TARGET} tool from the stock assessment based on abundance indices and catch to reduce coastwide landings of yellow eel. This Addendum establishes a new coastwide commercial landings cap for yellow eel using I_{TARGET} , and also modifies the biological sampling requirements of the annual young-of-the-year (YOY) survey and the *de minimis* policy.

2.0 Overview

2.1 Statement of Problem

The Commission established the FMP for American Eel in November 1999, which has since been modified through five addenda. The FMP goal and objectives highlight the conservation, protection, and enhancement of American eel abundance in its current range as priorities for management. In response to the 2012 American Eel Benchmark Stock Assessment recommendation to reduce mortality on all life stages, the Board adopted Addendum IV. Addendum IV (2014) established a coastwide harvest cap of 907,671 pounds of yellow eel, reduced Maine's glass eel quota to 9,688 pounds, and allowed for the continuation of New York's silver eel weir fishery in the Delaware River. Addendum V was approved in 2018, which increased the yellow eel coastwide cap to 916,473 pounds starting in 2019 to reflect a correction in the historical harvest data. It also adjusted the process for reducing total landings to the coastwide cap when the cap has been exceeded.

The coastwide cap was intended to control fishing mortality on the coastwide population of eel at the yellow eel life stage. Because the assessment could not establish biological reference points for American eel, historical harvest was used as the basis for setting the coastwide cap. The cap was set at a level equivalent to the average annual harvest between 1998 and 2010. The selected cap was greater than the Technical Committee's recommendation at the time, which was to establish a cap equivalent to a 12% reduction from the 1998-2010 average landings.

Despite these management changes, the 2023 benchmark stock assessment found that the yellow eel population remains depleted, and was at lower levels than the previous assessment. The assessment and peer review recommend reducing fishing mortality on the yellow eel life stage, while also recognizing that stock status is affected by other factors including historical overfishing, habitat loss due to damming mainstems and tributaries of rivers, mortality from passing through hydroelectric turbines, pollution, possibly parasites and disease, climate change, and other unexplained factors at sea. Similar to previous assessments, a statistical model could not be developed for the species to determine stock status or give management advice. However, the assessment explored several index-based methods and recommended a new tool called I_{TARGET} for management use to provide advice on coastwide catch. I_{TARGET} is an index-based method that needs only catch and abundance data to provide management advice on coastwide landings.

2.2 Background

Since its implementation in 2000, the Commission's FMP for American Eel has aimed to conserve and protect the American eel resource to ensure its continued role in its ecosystems while providing the opportunity for commercial, recreational, scientific, and educational uses. The FMP requires all states and jurisdictions to implement an annual young-of-year (YOY) abundance survey to monitor annual recruitment of each year's cohort. In addition, the FMP requires a minimum recreational size and possession limit and a state license for recreational harvesters to sell eels. The FMP requires that states and jurisdictions maintain existing or more conservative American eel commercial fishery regulations for all life stages, including minimum size limits. Each state is responsible for implementing management measures within its jurisdiction to ensure the sustainability of its American eel population.

Because of the unique life history of American eel, separate management measures have been developed to address fisheries targeting each life state (i.e., glass eel, yellow eel, and silver eel). Management measures for yellow eel, which is the primary life stage harvested by commercial and recreational fishermen, have been modified through Addendum I (2006), Addendum III (2013), Addendum IV (2013), and Addendum V (2018). Addendum I established a mandatory catch and effort monitoring program for American eel, requiring trip-level landing and effort data by state. Addendum III made changes to the commercial yellow eel fishery, specifically increasing the yellow eel size limit from 6 to 9 inches, and requiring a ½-by-½ minimum mesh size in commercial yellow eel pots. Responding to the 2012 Benchmark American Eel Stock Assessment, which found the American eel population in U.S. waters to be depleted, Addendum IV set goals of reducing overall mortality and maximizing the conservation benefit for American eel stocks (ASMFC 2014). The Addendum established a coastwide commercial harvest cap for yellow eel of 907,671 pounds to limit fishing mortality. The coastwide cap was implemented starting in the 2015 fishing year and established two management triggers: (1) if the coastwide cap is exceeded by more than 10% in a given year, or (2) the coastwide cap is exceeded for two consecutive years regardless of the percent overage. If either trigger were met, states would implement state-specific allocations based on average landings from 1998-2010 with allocation percentages derived from 2011-2013.

Following the implementation of Addendum IV states expressed some concerns about the management program, including 1) the lack of information available to determine what changes in landings would be necessary to affect fishing mortality rates and spawning stock status, 2) the administrative burden on the states associated with moving to state-specific quotas, and 3) the difficulty of achieving an equitable allocation of this resource given the variation in availability and market demand for eels along the Atlantic coast. To address concerns about state allocations the Board approved Addendum V, which established a new commercial coastwide landings cap for the yellow eel fishery based on corrected landings data, developed new management triggers, and modified the allocation process that would occur if the coastwide cap were exceeded by more than 10% of the coastwide cap for two consecutive years (ASMFC 2018).

Mandatory trip-level catch-per-unit-effort (CPUE) monitoring for commercial eel fisheries established by Addendum I was intended to provide data that could be used as indices of relative abundance in stock assessments to inform management decisions. For American eel, CPUE data have not been used in the stock assessment because they are not considered indicative of trends in the stock as a whole (ASMFC 2023), therefore the draft version of this addendum considered an option that would change the mandatory collection of CPUE data to voluntary. In the Board's deliberations and public comments, it was noted that while CPUE indices may not be useful for assessing trends in the coastwide stock, individual states have indicated they can be useful for understanding fishery trends within each state. Consequently, the Board maintained the mandatory collection of CPUE data requirement.

2.3 Status of the Stock

The 2023 Benchmark Stock Assessment and Peer Review indicates the American eel stock remains depleted at or near historically low levels due to a combination of historical overfishing, habitat loss, food web alterations, predation, turbine mortality, environmental changes, toxins and contaminants, and disease (ASMFC 2023), consistent with the results of the 2012 and 2017 stock assessments. Despite the large number of surveys and studies available for use, the American eel stock is still considered data-poor. Additionally, eels have an extremely complex life history that is difficult to describe using traditional stock assessment models. The 2023 assessment explored additional approaches for assessing American eel that were suggested in past stock assessments including a delay-difference model, traffic light analysis and surplus production models, and developing an egg-per-recruit model, but overfished and overfishing determinations still could not be made due to data limitations. However, the 2023 stock assessment found that the yellow eel population has declined since the previous assessment (2017), and recommended reducing yellow eel harvest. Unlike previous assessments, the 2023 assessment and peer review identified an index-based tool to provide management advice without requiring an assessment model, which is being considered for management use through this draft addendum.

The Commission's assessments only consider the portion of the stock residing in US coastal waters, but there have been efforts to characterize the stock in other regions. In 2003, declarations from the International Eel Symposium (AFS 2003, Quebec City, Quebec, Canada)

and the Great Lakes Fisheries Commission (GLFC) highlighted concerns regarding the health of eel stocks worldwide. In 2010, Fisheries and Oceans Canada (DFO) conducted a stock assessment on American eels in Canadian waters and found that region-specific status indices showed abundance is very low in comparison to levels in the 1980s for the Lake Ontario and upper St. Lawrence River stock, and is either unchanged or increasing in the Atlantic Provinces.

2.4 Description of the Yellow Eel Fishery

2.4.1 Coastwide Description

Yellow eel fisheries exist in all Atlantic Coast states and jurisdictions with the exception of Pennsylvania and the District of Columbia. American eels are harvested for food, bait, and export markets. Yellow eel landings have varied considerably over the years due to a combination of market trends and availability. These fluctuations are evident both within states and jurisdictions, as well as at a regional level. American eel landings ranged from over 3 million pounds in the 1970s to early 1980s to around 1 million pounds or less since the late 1990s (Figure 1). Since 2014, when the coastwide cap for yellow eel was adopted under Addendum IV, total coastwide landings have generally experienced a steady decline to a time series low of 263,892 pounds in 2020. Landings in 2021 and 2022 increased slightly, but still remain near all-time low levels.

Fishery participants have noted that recent declines in landings have primarily been related to market demand; demand for wild-caught American eel from the US for European food markets has decreased in recent years due to increased aquaculture in Europe. Additionally, demand for domestic bait in 2020 was negatively impacted by COVID-19 restrictions. A smaller proportion of US yellow eel landings typically goes to the domestic bait market, and landings are not expected to increase significantly from current levels in the near future.

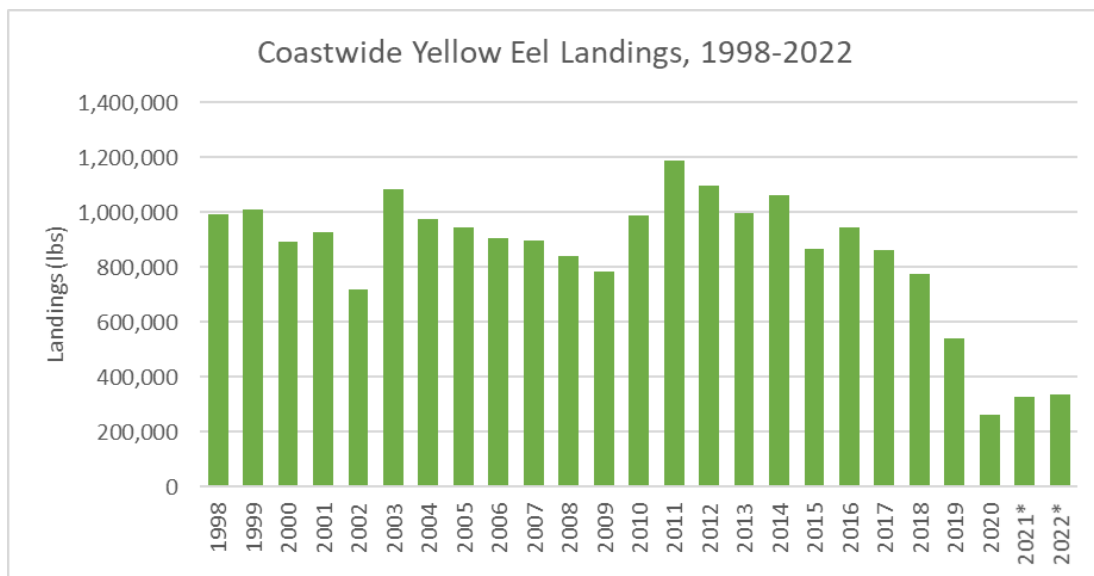


Figure 1. Yellow Eel Coastwide Landings 1998-2022. *2021 and 2022 data are considered preliminary.

Table 1. State-by-state Yellow Eel Landings: 2014-2023. Source: Atlantic Coastal Cooperative Statistics Program, 2023, and state compliance reports. *2021 and 2022 data are considered preliminary.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
2014	7,578	Time series average < 400 pounds	3,903	2,353	1,390	38,143	91,225	62,388	619,935	49,293	109,537	60,755	Time series average < 400 pounds	Time series average < 400 pounds	14,092	1,060,725
2015	4,142		2,213	1,538	2,271	50,194	88,828	44,708	493,043	31,588	86,715	57,791			5,632	868,663
2016	6,811		1,705	2,651	2,445	36,371	67,422	44,558	583,578	58,223	96,336	39,911			6,034	946,045
2017	6,358		592	2,968	905	41,732	77,499	29,945	541,270	33,555	97,328	24,752			7,456	864,360
2018	2,832		375	3,988	3,268	39,218	69,679	31,378	514,226	31,151	57,281	18,058			4,659	776,112
2019	2,567		1,577	4,056	5,275	33,039	76,241	13,628	331,878	27,111	34,247	8,140			1,542	539,301
2020	7,012		84	1,425	2,783	16,411	23,742	1,942	159,816	24,971	21,916	3,291			499	263,892
2021*	457		C	1,863	3,255	16,097	26,273	4,433	204,701	10,439	46,345	5,705			9,050	328,618
2022*	877		0	605	3,755	16,570	52,585	2,967	187,810	12,814	36,525	4,202			6,073	317,456

2.4.2 State-by-state Descriptions

All states are subject to the FMP requirements for a yellow eel minimum size limit of 9 inches and a ½-by-½ inch minimum mesh size in commercial yellow eel pots. The yellow eel fishery in Maine occurs in both inland and tidal waters. Yellow eel fisheries in southern Maine are primarily coastal pot fisheries managed under a license requirement, minimum size limit, and gear and mesh size restrictions. Yellow eels are taken by a very small number of harvesters (four to five annually) for use as bait. Reported landings have been under 10,000 pounds annually since 2013, and were below 1,000 pounds in 2022.

The New Hampshire fishery has diminished significantly since the early 2000s. Commercial harvest of yellow eel in Massachusetts occurs only in coastal waters; commercial permitting for inland harvest was eliminated in 2013. Massachusetts allows eel harvest by nets, pots, spears, or angling. The commercial fishery is now mainly conducted using baited pots with over 200 permits issued and reported harvest under 2,000 pounds since 2015. Reporting of activity under commercial permits is mandatory, however, underreporting of eels harvested for commercial striped bass fishing bait is expected.

Small-scale, commercial eel fisheries occur in Rhode Island and are mainly conducted in coastal rivers and embayments with pots during May through November. Connecticut has a similar small-scale, seasonal pot fishery for yellow eel in the tidal portions of the Connecticut and Housatonic rivers. All New England states presently require commercial fishing licenses to harvest eels and maintain trip-level reporting.

Licensed eel fishing in New York occurs primarily in the Hudson River, the upper Delaware River (Blake 1982), and in the coastal marine district. A slot limit (greater than 9 inches and less than 14 inches to limit PCB exposure) exists for eels fished in the tidal Hudson River, strictly for use as bait or for sale as bait only. Due to PCB contamination of the main stem, commercial fisheries have been closed on the freshwater portions of the Hudson River and its tributaries since 1976. The fishery in the New York portion of the Delaware River consists primarily of silver eels collected in a weir fishery. New Jersey fishery regulations require a commercial license when using more than two pots or selling catch. Mandatory trip level reporting is required for every month of the year a license is possessed, even if no fishing occurs. Eel pot diameter may not exceed 16 inches if cylindrical or 201 square inches in cross section if any other configuration.

The Delaware eel commercial fishery exclusively uses baited pots equipped with ½-by-½ inch mesh. Delaware mandated catch reporting in 1999 and more detailed effort reporting in 2007. The fishery occurs primarily in the tidal tributaries of Delaware Bay although a small proportion of annual harvest may occur in the Atlantic coastal or “Inland Bays” in some years. American eels are sold for both food and bait, dependent upon market demand. Historically, total annual landings in Delaware were consistently greater than 100,000 pounds and ranked in the top three in value for the State among all Delaware commercial fisheries. A suite of variables (bait supply, market demand, aging out of the most knowledgeable eel fishers) has contributed to recent low annual landings for Delaware.

Maryland, Virginia, and Potomac River Fisheries Commission primarily have pot fisheries for American eels in the Chesapeake Bay. Maryland required eel fisherman to be licensed in 1981 and effort reporting began in 1990. Over 99% of all eel harvest in Maryland occurs with the use of eel pots, and all harvest occurs in tidal waters. Average annual landings and effort have declined 50% and 60%, respectively, from 2018 levels. However, catch per unit effort (CPUE, pounds per pot) in recent years is at the highest levels since effort reporting began in 1990.

Large eels are generally exported whereas small eels are used for bait in the crab trotline fishery, except in Virginia. Almost all of the eel harvest in Virginia is done using eel pots as the main gear. Virginia formerly had a voluntary buyer reporting system that was replaced by a mandatory harvester reporting system for all species in 1993. Most of Virginia's American eel are sold locally for bait with no harvest being exported for sale in recent years. Eel harvesters can sell their eels directly to consumers or to businesses with a VMRC issued eel self-market permit. Some eel harvesters also buy and sell eels from other harvesters and are required to have a seafood buyer permit and an eel buyer permit; monthly reporting of the weights of any purchased eels is required. The Potomac River Fisheries Commission has had harvester reporting since 1964, and has collected eel pot effort since 1988.

North Carolina has a coastal pot fishery with fluctuating effort depending on market demands. While a standard commercial fishing license is required for participation in the commercial eel pot fishery, a permit is not, but a notification letter must be provided as part of the mandatory reporting system. Most commercial yellow eel landings in North Carolina occur in October and November, but there is also a small fishery in the spring. Most landings come from the Albemarle Sound area, with additional landings reported from the Pamlico Sound and southern waterbodies under the jurisdiction of North Carolina Division of Marine Fisheries. No catch records are maintained for freshwater inland waters, and the sale of eels harvested from these waters is prohibited. Trip-level commercial landings are required to document all transfers of fish sold from coastal waters from the fishermen to the dealer. Data reported on these forms include transaction date, area fished, gear used, species landed, and fishermen and dealer information. In 2007, to comply with Addendum I, an eel pot logbook program was implemented at the individual commercial fisherman level to collect additional information not reported on trip tickets including pot soak time, the number of pots fished, and landings (pounds) per pot. Annual yellow eel landings in North Carolina historically were greater than 100,000 pounds; however, market demand and attrition of the most knowledgeable eel fishers has contributed to recent low annual landings.

South Carolina instituted a permitting system in 1998 to document total eel gear and commercial landings. Traps or pots used to capture yellow or silver eels must be permitted by water area fished. Restrictions include specific water designations, possession and size limits. Permit conditions outline fishing closure from September 1 through December 31 and immediate bycatch release. Mandatory reporting of effort and catch is required by the 10th of each month. Since 1999, a total of 583.80 pounds of eels were reported.

American eel fishing in Georgia was restricted to coastal waters prior to 1980 but has since expanded to approved inland waters, including portions of the following rivers: Savannah River, Ogeechee River, Altamaha River, Oconee River, Ocmulgee River, Satilla River, and St. Marys River. Landings data are available for Georgia, and as of April 1, 2018, effort data are available due to commercial eel fishermen being required to possess an eel endorsement stamp in addition to a commercial fishing license. Florida's commercial eel pot fishery is operated under a permit system; the recreational fishery has a 25 fish/angler/day bag limit.

3.0 Management Program

3.1 Yellow Eel Coastwide Cap and Management Response to Exceeding the Coastwide Cap

This section replaces Section 3.3.1 of Addendum V.

The coastwide commercial landings cap for yellow eel is 518,281 pounds. The coastwide cap is established using I_{TARGET} , an index-based method that provides management advice based on abundance indices and catch information, as well as management goals specified by the Board.

I_{TARGET} uses catch and abundance index data through 2020 (the terminal year of the stock assessment), with the following parameters specified:

Reference Period: 1974-1987

Multiplier: 1.25

Threshold: 0.5

Background on I_{TARGET}

When using I_{TARGET} to establish a catch cap, there are three parameters that must be specified: the reference period, multiplier, and threshold. The reference period is a time period where the population is stable or at a desirable abundance level. The multiplier represents the target level of abundance that management is aiming to achieve. For example, a multiplier of 1 indicates that the target abundance level is equal to the abundance over the reference period, and a multiplier equal to 1.5 indicates that the target is 1.5 times the average index value over the reference period. The threshold value reflects goals of the fishery. If landings exceed the threshold, then future landings are reduced. A threshold of 0.5 is less conservative, whereas a threshold of 0.8 is more conservative. Adjusting these three parameters affects the resulting coastwide catch cap recommendation.

The stock assessment included analyses that identified regimes in the American eel abundance index data. Regimes are time periods where the abundance index data are more similar compared to other time periods. There were three regimes detected in the yellow eel index: a high yellow eel abundance regime in 1974-1987, a low regime in 1988-1999, and an even lower regime in 2000-2020. The first regime (1974-1987) is used as the reference period for I_{TARGET} under Addendum VII. The assessment recommended using I_{TARGET} with a reference period of 1974-1987, which represents a stable period of relative high abundance of yellow eel.

Figure 10 shows the relative abundance index and catch time series, with the regimes of the American eel abundance indices identified by the shaded areas.

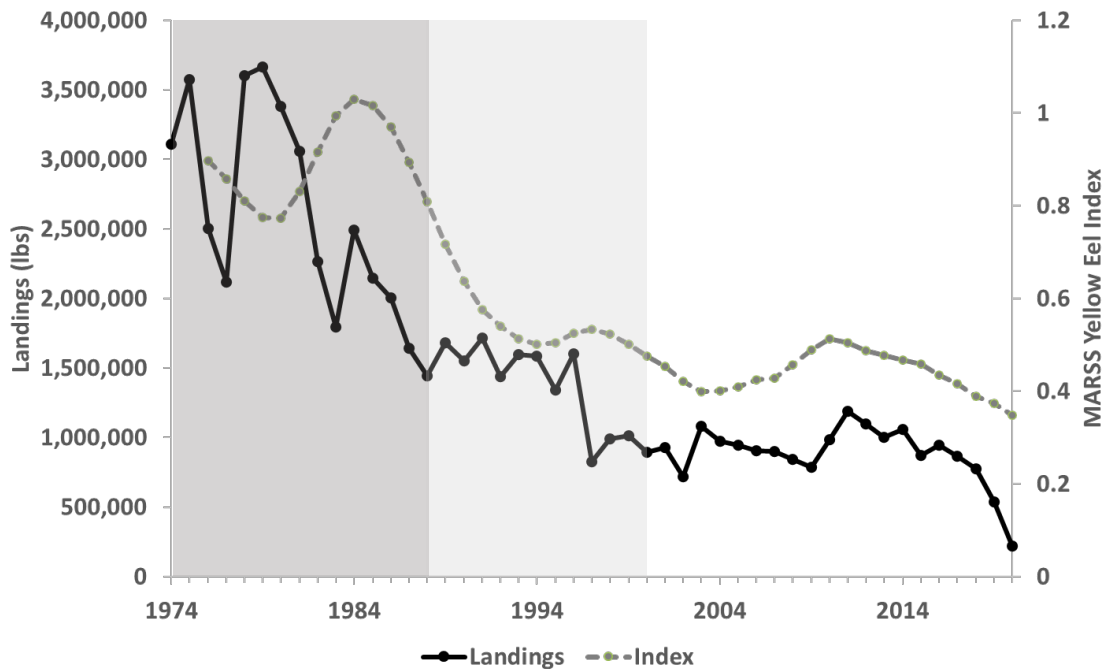


Figure 2. Yellow eel landings and abundance index, 1974-2020. The high abundance regime (1974-1987) that was selected as the I_{TARGET} reference period is represented by the dark gray shaded area. The lower abundance regime (1988-1999) is represented by the light gray shaded area.

The I_{TARGET} multiplier is set at 1.25. This means the abundance target is equal to a relative abundance level that is 1.25 times the average index value from 1974-1987. The use of a 1.25 multiplier, rather than a higher value, recognizes that more factors beyond fishing have influenced the stock. These factors may have changed the maximum population size for American eel that can be supported by the environment, therefore higher abundance levels (e.g., 1.5 times the abundance during the higher abundance regime) might not be achievable under current conditions.

The Board selected a threshold value of 0.5, which reflects a less conservative approach to managing the fishery to achieve the target abundance.

Management Response to Exceeding the Coastwide Cap

This document maintains the status quo management response to the coastwide landings exceeding the cap established by Addendum V Sections 3.3.2 and 3.3.3.

The coastwide landings are annually evaluated against a two-year management trigger. If the coastwide cap is exceeded by 10% (10% of the coastwide cap = 51,828 pounds; coastwide cap + 10% = 570,109 pounds) for two consecutive years, then only states with landings greater than 1% of the coastwide landings, in the year(s) when the management trigger is tripped, will be

responsible for reducing their landings to achieve the coastwide cap in the subsequent year. States with landings greater than 1% of the coastwide landings will work collectively to achieve an equitable reduction to the coastwide cap. For states with landings less than 1% of the coastwide landings, if in subsequent years a state's landings exceeds 1% of the coastwide landings after reductions have been applied, that state must reduce their individual state landings in the subsequent year to return to the less than 1% level.

3.2 Timeframe for Yellow Eel Provisions

There is no sunset date for the coastwide cap established by this Addendum. The coastwide landings cap for yellow eel of 518,281 pounds remains in place for three years (2025-2027). After three years, prior to the 2028 fishing year, the Board may update the coastwide cap with additional years of catch and abundance data, or maintain the same coastwide cap. Updating the cap using the selected I_{TARGET} configuration established in Section 3.1 can be done via Board action. The additional years of data available at that time would be included in the I_{TARGET} model to provide an updated coastwide cap.

If a new or different management program than what is specified in the prior sections (e.g., a different configuration of I_{TARGET}) is desired, a new management document is required.

3.3 Annual Young-of-Year Abundance Survey

This section modifies biological sampling requirements of the annual YOY abundance survey established by Section 3.1.1 of the FMP.

States are not required to collect individual lengths and pigment stage of the YOY catch during the surveys. States may continue to collect biological data voluntarily.

3.4 De Minimis Status

This section modifies Section 4.4.2 of the American eel FMP.

De minimis status is based on the average landings from the previous three years of landings. The averaging of multiple years of data prevents a state from taking action as a result of a rare event. A state can be considered *de minimis* if the average landings for the last three years are less than 1% of the coastwide landings for the last three years.

4.0 Compliance

The provisions of Addendum VII are effective January 1, 2025. Starting January 1, the yellow eel coastwide cap is 518,281 pounds and the management trigger is two consecutive years of exceeding the coastwide cap by 10% (570,109 pounds). *De minimis* status is evaluated using a three-year average of landings starting with the for the 2025 fishing year.

5.0 References

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