

*Atlantic States Marine Fisheries Commission*

**ADDENDUM VIII TO AMENDMENT 3 TO THE AMERICAN  
LOBSTER FISHERY MANAGEMENT PLAN**



*ASMFC Vision Statement:*

*Healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015.*

May 2006

## **1. Introduction**

American lobster management authority lies with the coastal states and is coordinated through the Atlantic States Marine Fisheries Commission (Commission). Responsibility for compatible management action in the Exclusive Economic Zone (EEZ) from 3-200 miles from shore lies with the Secretary of Commerce through Atlantic Coastal Fisheries Cooperative Management Act in the absence of a federal FMP. American lobster has been managed by the states under the Commission's fishery management plan, amendments, and addenda since December 1997. American lobster is currently managed under Amendment 3 to the FMP, which was approved in December of 1997. The plan is designed to minimize the chance of population collapse due to recruitment failure. The goal of Amendment 3 is to have a healthy American lobster resource and a management regime that provides for sustained harvest, maintains appropriate opportunities for participation, and provides for cooperative development of conservation measures by all stakeholders.

The purpose of this addendum document is to establishing new biological reference points based on recommendations from the 2006 stock assessment. The document also establishes a consistent coastwide monitoring and reporting criteria for the lobster fishery. Peer review reports have identified insufficient data as the primary limitation on the ability to manage the fishery.

### **1.1 2006 Stock Assessment Summary**

Breaking from the previous two assessments of American lobster in 1996 and 2000, the 2005 assessment adopted three stock areas: Gulf of Maine (GOM), Georges Bank (GBK), and Southern New England (SNE) (Figure 1 and 2). SNE replaces the South of Cape Cod and Long Island Sound (SCCLIS) stock in the last assessment. Georges Bank (GBK) replaces the Georges Bank and South (GBS) stock in the last assessment. The boundaries of the GOM are unchanged from previous assessments, while GBK is split from other offshore areas and SNE is a combination of southern inshore and offshore waters. These changes are based on lobster distribution and abundance, patterns of migration, location of spawners, growth and maturation rates, and the dispersal and transport of larvae. A review of new maturity-at-size data for offshore Southern New England indicates that maturity-at-size in offshore Southern New England is more similar to inshore Southern New England than Georges Bank. The linkage between inshore and offshore SNE could have potential effects on the resilience of the inshore areas to intense fishing effort.

The U.S. lobster fishery is conducted in each of the three stock units -- GOM, GBK, and SNE. Each area has an inshore and offshore component to the fishery. GOM and SNE areas are predominantly inshore fisheries, while the GBK area is predominantly an offshore fishery. Total landings were relatively constant at 14,000 mt through the late 1970s. Since then, landings have doubled, reaching 37-38,000 mt in 1997-98 and dropping to 33,000 mt in 2003.

GOM supports the largest fishery, constituting 74% of the U.S. landings between 1981 and 2003, and 85% between 2001 and 2003. Landings in the GOM were stable between 1981 and 1989, averaging 14,700 mt, then increased dramatically from 1990 (19,200 mt) to 1999 (30,000 mt), remaining at record levels since (2000-2003 average of 30,300 mt).

GBK constitutes the smallest portion of the U.S. fishery, averaging 5% of the landings from 1981 to 2003. During this time period, landings from the GBK fishery have remained stable, varying between 1,100 and 1,700 mt (1981-2003 average of 1,400 mt).

SNE has the second largest fishery, accounting for 21% of the U.S. landings between 1981 and 2003. Landings increased sharply from the early 1980s to the late 1990s, reaching a time series high of 10,054 mt in 1997. Landings remained near the time series high until 1999, when the fishery experienced dramatic declines in landings. From 2000 to 2003, landings accounted for only 12% of the U.S. landings (3,607 mt), reaching a time series low of 8% in 2003.

The modeling tools used in this assessment to provide management advice for American lobster were similar to models used in previous assessments. An enhanced version of the Collie-Sissenwine model (CSM, a.k.a. “modified DeLury” in ASMFC 2000) was used to estimate mortality and abundance of male and female lobster in individual areas. A life history model (a.k.a. egg-per-recruit model or EPR in ASMFC 2000) was used to estimate egg production per recruit and other per-recruit reference points for male and female lobster in each stock assessment region used in previous assessments. The life history model was updated with new growth parameters and current management measures.

One of the short comings of the recommended biological reference points is that the status of each stock is solely based on comparison with a relatively recent 20 to 22-year trend. In order to corroborate this comparison, trends for a suite of indicators have been examined for the same time period (1982 to present). These indicators were chosen as measures of fishing mortality, stock abundance, and fishery performance. This multiple stock indicator approach or “the traffic light approach” tends to minimize bias/uncertainty by putting equal weight on many indicators, and therefore presents a truer picture of the overall stock status.

Current abundance of the GOM stock overall is relatively high compared to the 22-year time series. Recent fishing mortality is low compared to the past. Recruitment and post recruitment abundance for the southern GOM (area 514) has declined to historical lows. Further restrictions are warranted for Area 514 given the persistence of low recruitment and its effect on total abundance, and by implication, egg production.

The GBK stock appears to be stable; current abundance and fishing mortality are similar to their medians for the 22-year time series..

The SNE stock abundance is relatively low compared to the 20-year time series and fishing mortality is relatively high; further restrictions are warranted. The declining trend in population abundance is well established and due to several causes. All sources of mortality including fishing must be reduced to enhance the probability of stock rebuilding.

This assessment recommends a new robust set of biological reference points (BRPs) to be used for the management of American lobster stocks (Table 1). These include median abundance and median fishing mortality, over the fixed time period of 1982-2003 (1984-2003 for SNE), as threshold reference points for each American lobster stock. The assessment further recommends

that stock status be determined by comparing the average F and average abundance during the most recent three years to stock-specific median values (computed for the fixed years 1982-2003). Additionally, abundance and fishing mortality targets would be defined by the F value below, and the abundance value above, a minimum of one estimated standard error from the threshold.

Based on the recommended reference points, “overfishing” would occur if the average fishing mortality rate for the three most recent years were higher than the 1982-2003 median threshold. A stock would be “depleted” if average abundance for the three most recent years fell below the 1982-2003 median threshold level. In either of these cases, corrective management action should be implemented.

The GOM stock is in favorable condition based on the recommended BRPs. The stock is above the abundance target and at or near the target F. In terms of the recommended reference points, the GOM lobster stock is not depleted and overfishing is not occurring. However, the number of traps fished is relatively high and further increases in effort are not advisable.

The GBK stock is in a favorable condition based on the recommended BRPs. The stock is above the abundance target and below its fishing mortality target. In terms of the recommended reference points, the GBK stock is not depleted and overfishing is not occurring. However, the number of traps fished is relatively high and further increases in effort are not advisable.

The SNE stock is in poor condition based on the recommended BRPs. The stock is below the abundance threshold and at or near the fishing mortality threshold. In terms of the recommended reference points, it is depleted and at the overfishing threshold. The interpretations of stock status remain the same over a range of natural mortality levels.

## **2.0 Biological Reference Points (BRP)**

### **2.1 Background**

Amendment 3 defines overfishing for the American lobster resource to occur when it [any stock] is harvested at a rate that results in egg production from the resource, on an egg-per-recruit basis, that is less than 10% of the level produced by an unfished population (F<sub>10</sub>). The primary management measures used to prevent overfishing includes a minimum size, protection of egg bearing females, and trap limits. Amendment 3 established F<sub>10</sub> as the biological reference point to determine the status of the health of the lobster stock and established an egg rebuilding schedule. Addendum II to Amendment 3 altered the plan timeline to restore egg production to greater than the overfishing definition before the end of 2008. Each lobster stock area has a unique rebuilding program (table 1) developed by members of its Lobster Conservation and Management Team (LCMT).

### **2.2 Statement of the Problem**

The current overfishing definition F<sub>10%</sub> is insufficient from a technical point of view for two reasons. First, it does not distinguish between a depleted stock (at low abundance) and a stock where overfishing is occurring (fishing mortality rates are too high). In addition, a single percent maximum spawning potential does not distinguish between management targets, thresholds, and

limits. Targets are BRPs that identify desirable conditions in the fishery. Thresholds are BRPs that identify situations where corrective management action is required to sustain the stock at minimum acceptable abundance. Limit reference points are BRPs that identify situations requiring more drastic corrective action to reverse unequivocal stock decline that threatens its long-term sustainability. Clear distinctions between BRPs used by managers as targets, thresholds, and limits are an essential component of effective fisheries management. Although intended as a threshold BRP,  $F_{10\%}$  has been used as a management target because the management process has tried to reduce fishing mortality rates to the  $F_{10\%}$  level for many years.

Second, the  $F_{10\%}$  reference point requires the assumption of stability in the population for a time period at least as long as the animal's fishable lifespan. Specifically, the reference point is reasonable only if all model inputs are approximately constant, except fishing mortality and size at entry to the fishery. Recent stock trends have shed serious doubt on such assumptions. This approach can not accommodate the observed surge in coastwide recruitment experienced in the 1990s, nor the well documented die-off in Long Island Sound, or more subtle mortality due to shell disease from Massachusetts to New York. From a practical standpoint, resource status by stock area relative to  $F_{10\%}$  has been inconsistent with the performance of the fishery. Areas with the lowest egg production levels have had increases in landings and abundance while areas with the highest egg production have declined to 25-year lows in landings and abundance.

The Lobster Stock Assessment Model Review Panel found that the scale of fishing mortality and abundance estimates from catch-survey model runs are sensitive to uncertain parameters and modeling conventions. Uncertainty about the scale of fishing mortality estimates makes the use of the current overfishing definition problematic. Furthermore, current assumptions of equilibrium conditions in the stock have been violated as changes in estimates of natural mortality suggest dramatic shifts in the environment facing lobsters as they grow and mature. The review panel recommended that management advice in the current stock assessment be based on estimated trends (rather than exact point estimates) in abundance and fishing mortality as an alternative to the  $F_{10\%}$  BRP approach.

Based on technical issues identified by model reviewers and results of this assessment, a new robust set of biological reference points are recommended, outlined in Option 2, with new overfishing and overfished definitions. These new reference points are meant to serve as interim management tools until a full stock assessment can review new modeling approaches which can overcome the short comings listed above.

## **2.3 Management**

### **2.3.1 Biological Reference Points: Thresholds and Targets**

*This option replaces section 2.4 Definition of an Overfished Resource of Amendment 3 to the American Lobster Fishery Management Plan.*

The stock status is determined by comparison of the average  $F$  and average abundance during the most recent three years to stock-specific median values (computed for the fixed years 1982-2003 for GOM and GBK and 1984-2003 for SNE). Median abundance and median fishing mortality, over the fixed time period of 1982-2003 for GOM and GBK and 1984-2003 for SNE, as

threshold reference points for each American lobster stock (table 2). Additionally, the abundance (N) and F value in table 2 define abundance and fishing mortality targets, respectively. These targets are a minimum of one estimated standard error from the threshold. This standard error corresponds to the measurement error typical of a three-year average fishing mortality rate or abundance value used in status determination. These targets are designed to reduce the risk associated with exceeding the thresholds due to uncertainty in the three-year average estimates. The recommended minimum separation between targets and thresholds is based entirely on the statistical precision of estimates and does not incorporate inherent variability of the stocks or other factors that may affect risk to the stock or fishery. These targets minimize the chances that a stock will be incorrectly characterized based on the variability of the data.

Based on the reference points, “overfishing” would occur if the average fishing mortality rate for the three most recent years were higher than the median threshold. A stock would be “depleted” if average abundance for the three most recent years fell below the median threshold level. In either of these cases, corrective management action should be implemented.

One of the shortcomings of this new approach is that the status of each stock is solely based on comparison with a relatively recent 22-year trend. In order to corroborate this comparison, the stock assessment examined trends in a suite of indicators for the same time period (1982 to present). These indicators were chosen as measures of fishing mortality, stock abundance, and fishery performance.

### **3.0 Monitoring and Reporting**

#### **3.1 Background**

Amendment 3 required that all states must maintain at least their current reporting and data collection program. Action was deferred until the Atlantic Coastal Cooperative Statistics Program (ACCSP) developed a coastwide statistics program. Addendum I to Amendment 3 encouraged all state fisheries management agencies to adopt the monitoring and reporting standards outlined in Sections 3.1.1 and 3.2.1, but did not require any changes to the monitoring and reporting system.

#### **3.2 Statement of the Problem**

Accurate and comparable landings are the principal data needed to assess the impact of fishing on lobster populations. The quality of current landings data is not consistent spatially or temporally. Standardized mandatory reporting of landings data coast-wide would improve the lobster stock assessment. Aligning stock management areas with area designations for landings is necessary. Enhanced sea sampling and port sampling to create a more complete record of biological characteristics of the catch and harvest would also improve the usefulness of these data. This is especially needed in offshore waters.

There is a need to develop consistent techniques that monitor distribution and abundance of lobster independent of the fishery. Current methods (e.g. trawls) are limited in area (gear conflicts) and habitat sampled (unable to access complex bottom). Additional methodologies should be investigated that cover a wide range of sizes and habitats.

The 2004 Lobster Model Review Panel and the 2005 Stock Assessment Review Panel found the data available are woefully inadequate for the management needs of the lobster fishery, and it is the primary limitation on the ability to manage the fishery. Throughout the world most well managed fisheries spend at least 2-5% of the landed value on data collection and analysis. For the Gulf of Maine component of this fishery alone this would suggest an annual investment of \$4-10 million. Estimates indicate the current investment is much less.

### **3.3 Management**

#### **3.3.1 Coastwide mandatory reporting and data collection program**

*This option would replace section 4.0 Monitoring and Reporting of Amendment 3 to the American Lobster Federal Management Plan.*

#### **Minimum Standards:**

1. Require states to collect at a minimum, catch (pounds) and effort data summarized monthly by NMFS Statistical Area and LCMA in an annual recall log format from each permit holder.
  - a. Effort data includes: trap hauls, set-over days, number of trips, total traps set, and average number of traps fished per trip.
2. Require each state to collect trip-level catch and effort reports either as a census or a sample for at least 10% of its lobster fishery (statistically valid at a percent of error determined by the TC)
3. Require all dealers involved with primary purchases (first point of sale) to report lobster landings by weight (pounds) on a trip level basis
4. Permit holders should be linked to federal vessel and individual permit/license level reporting for lobsters using ACCSP protocol (<http://www.accsp.org/cfstandards.htm>)
5. ACCSP would hold this information.

#### **Fishery Dependent Data**

1. At-sea sampling program:

Biological characteristics:

- a. Collect information to characterize the commercial catch: length, sex, v-notched, egg bearing status, legal-size discards, and cull status
- b. Weight sampling intensity by areas and season to match 3-year average of area's seasonal commercial catch.
- c. Fishery Effort: fishing location, total trawls, or traps sampled.

2. Port sampling Program:

Biological characteristics:

- a. Collect information to characterize commercial landings: length, sex, cull status, and market category
- b. Set minimum number to be sampled per unit landings by area and season
- c. Fishery Effort: fishing location, set time, traps per trawl and/or total trawls sampled.

*Sufficient at-sea sampling can replace port sampling.*

### 3.3.2 Implementation

States must implement, at minimum, the monitoring and data collection measures contained section 3.3 of this document by January 1, 2008.

## 5.0 Recommendations for Actions in Federal Waters

The Atlantic States Marine Fisheries Commission believes that the measures contained in Amendment 3 and Addenda I-VIII are necessary to limit the expansion of effort into the lobster fishery, to rebuild stock abundance, to control fishing mortality to recommended levels, and to address stock declines. The Commission recommends that the federal government promulgate all necessary regulations to implement the measures contained in Sections 2 and 3 of this document.

Table 1. Biological Reference Points for each American lobster stock unit. The current (2001-2003) status of each stock is listed based on the reference points.

Note that values listed for SNE stock reflect model results assuming natural mortality (M)=0.15 from 1984-1997 and M=0.65 from 1998-2003. See details in the 2005 Stock Assessment document for full analyses.

| <b>Variable</b>                         | <b>GOM</b> | <b>GBK</b> | <b>SNE</b> |
|---|------------|------------|------------|
| <i>Fishing mortality</i>                |            |            |            |
| Fishing mortality threshold             | 0.76       | 0.34       | 0.82       |
| Fishing mortality target                | 0.67       | 0.31       | 0.74       |
| Recent fishing mortality 2001-2003      | 0.69       | 0.29       | 0.84       |
| Fishing mortality below threshold?      | Yes        | Yes        | No         |
| Fishing mortality near or below target? | Yes        | Yes        | No         |
| <i>Abundance</i>                        |            |            |            |
| Abundance threshold                     | 65.58      | 7.95       | 22.31      |
| Abundance target                        | 69.62      | 8.61       | 23.90      |
| Recent abundance 2001-2003              | 123.12     | 9.05       | 14.01      |
| Abundance above threshold?              | Yes        | Yes        | No         |
| Abundance near or above target?         | Yes        | Yes        | No         |

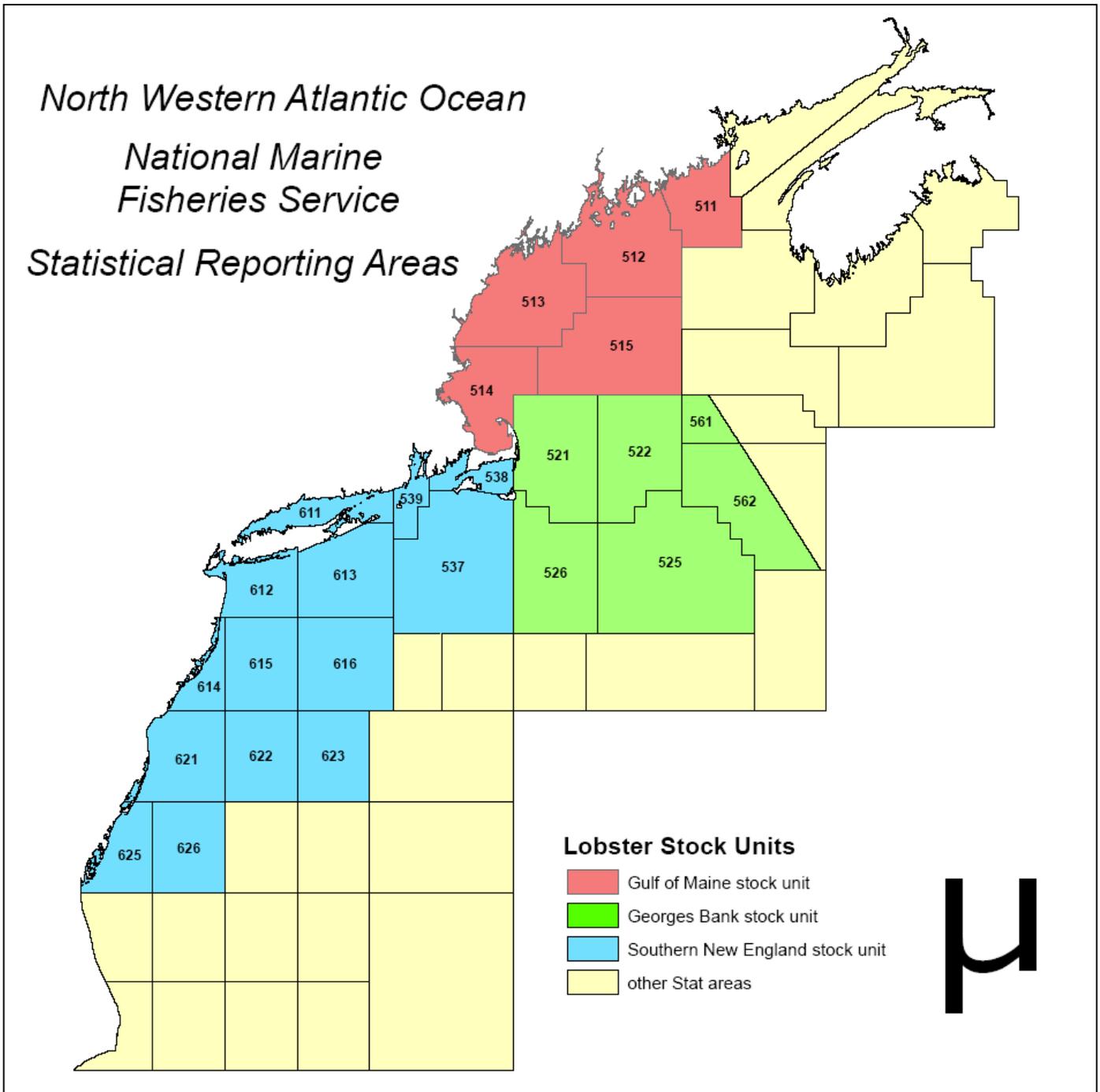


Figure 1. New stock unit definitions for GOM, GBK, and SNE

North Western Atlantic Ocean  
 National Marine  
 Fisheries Service  
 Statistical Reporting Areas

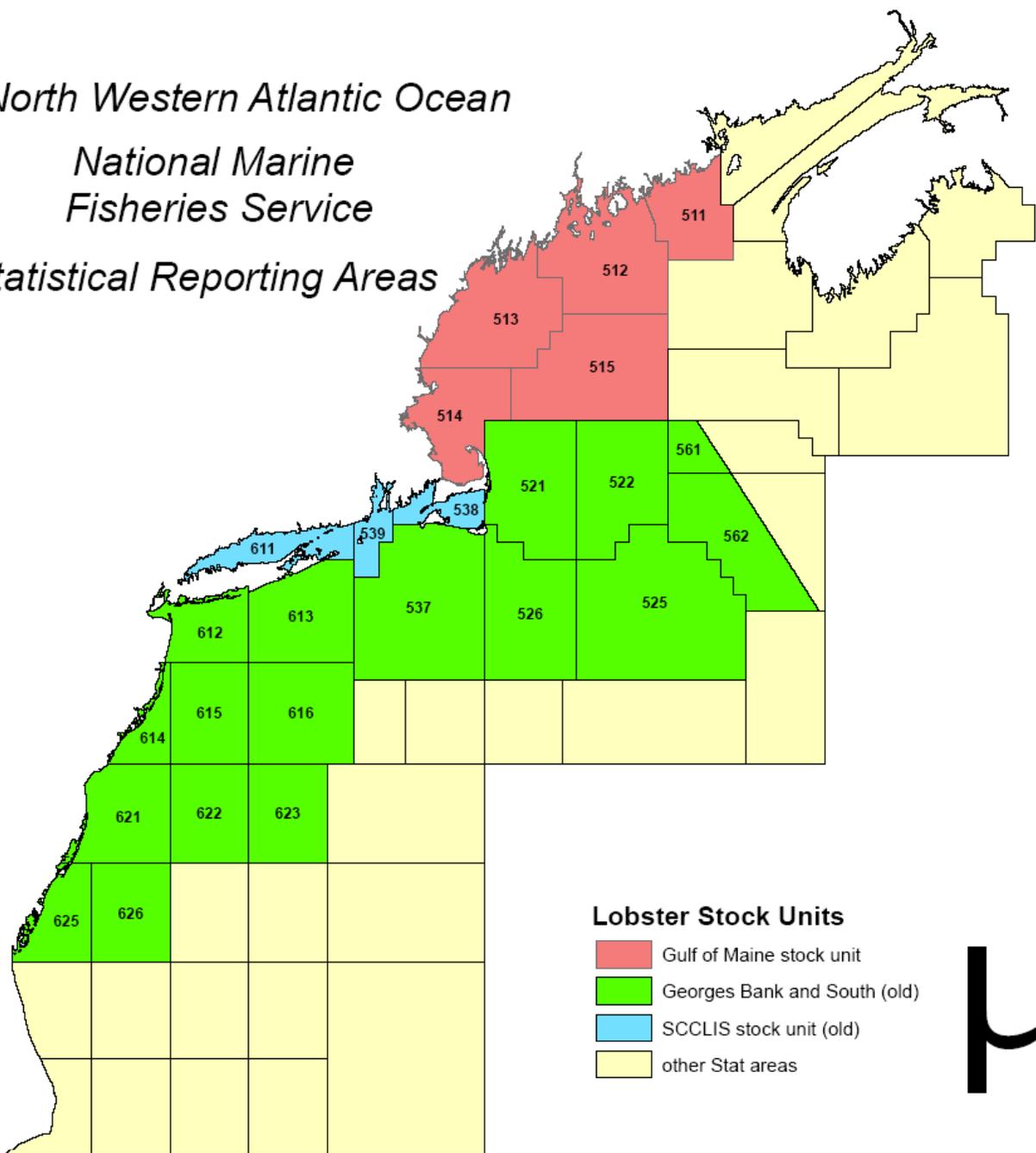


Figure 2. Previous stock unit definitions used in management since 1994, including GOM, GBS, and SCCLIS.