

2011 Butterfish Mortality Cap for the *Loligo* Fishery

March 2010

This document summarizes the 2011 methodology for the butterfish mortality cap on the *Loligo* fishery that was implemented through Amendment 10 to the Atlantic Mackerel, Squid, and Butterfish (MSB) Fishery Management Plan (FMP). The butterfish mortality cap is one of several measures implemented through Amendment 10 to reduce fishing mortality on butterfish and other finfish in the *Loligo* fishery. This methodology was developed by a working group composed of staff from the Northeast Regional Office (NERO), the Northeast Fisheries Science Center (NEFSC), and the Mid-Atlantic Fishery Management Council (MAFMC). ***The allocations in this document have been adjusted to reflect the final 2011 MSB specifications implemented on February 14, 2011, and the revised butterfish specifications implemented on March 15, 2011.***

Background

The butterfish mortality cap is intended to limit butterfish catch (landings and discards) on trips that land greater than or equal to 2,500 lbs of *Loligo*, and is equal to 75% of the butterfish acceptable biological catch (ABC). The 2011 butterfish ABC was previously specified as 1,500 mt (3,306,934 lb), which resulted in a butterfish mortality cap of 1,125 mt. **On March 15, 2011, the butterfish ABC was increased to 1,811 mt, with the entire 311-mt increase applied to the butterfish mortality cap. Thus, the updated butterfish mortality cap for the *Loligo* fishery is 1,436 mt (1,125 mt + 311 mt).** All butterfish catch on trips that land over 2,500 lb *Loligo* after January 1, 2011, are counted against the butterfish mortality cap. The butterfish mortality cap is allocated by trimester: Trimester I – 65%; Trimester II – 3.3%; Trimester III – 31.7%. The remaining 375 mt of the butterfish ABC will account for butterfish catch in other fisheries, including trips landing less than 2,500 lbs of *Loligo*.

Table 1 summarizes the landings allocations for the *Loligo* and butterfish fisheries, and the butterfish mortality cap allocations for the *Loligo* fishery. The NERO Fisheries Statistics Office (FSO) staff monitors the following allocations on a weekly basis:

- 1) *Loligo* landings (on all trips that land *Loligo*) against the *Loligo* trimester closure thresholds;
- 2) Extrapolated butterfish catch on trips that land greater than or equal to 2,500 lbs of *Loligo* against the butterfish mortality cap thresholds during Trimesters I and III; and
- 3) Butterfish landings on all trips that land butterfish (specified as domestic annual harvest (DAH)) against the annual butterfish closure threshold.

Table 1. *Loligo* and butterfish landings and butterfish mortality cap allocations (mt) for 2011.

		Trimester I (Jan-Apr)	Trimester II (May-Aug)	Trimester III (Sep-Dec)
<i>Loligo</i> Quota 19,906 mt total	Allocation	8,560	3,384 ¹	7,962
	Closure Threshold Directed <i>Loligo</i> Fishery	7,704 (90%*8,560)	3,046 (90%*3,384)	18,911 (95%*19,906)
Butterfish Cap 1,436 mt total	Allocation	933.4	47.4	455.2
	Closure Threshold² Directed <i>Loligo</i> Fishery	747 (80%*933.4)	None	1,292.4 (90%*1,436)
Butterfish Quota 495 mt total	Allocation (annual; DAH)	495		
	Closure Threshold³ Directed Butterfish Fishery	396 (80%*500)		

The mortality cap program results in a new range of potential closure scenarios for the *Loligo* fishery. The directed *Loligo* fishery will close if the butterfish mortality cap is harvested during Trimesters I and III. Overages and underages from the Trimester I butterfish catch cap will apply to Trimester III. The butterfish cap will be tracked during Trimester II, but catch overages or underages will be applied to Trimester III.

Thus, for *Loligo*:

- During Trimester I, the directed *Loligo* fishery (landings $\geq 2,500$ lbs/trip) is closed if:
 - *Loligo* landings are projected to reach 7,704 mt -OR-
 - Extrapolated butterfish catch reaches 747 mt
- During Trimester II, the directed *Loligo* fishery (landings $\geq 2,500$ lbs/trip) is closed if:
 - *Loligo* landings are projected to reach 3,046 mt (unless this allocation is increased due to under harvest in Trimester I)
- During Trimester III, the directed *Loligo* fishery (landings $\geq 2,500$ lbs/trip) is closed if:
 - *Loligo* landings are projected to reach 18,911 mt (annual threshold) -OR-
 - Extrapolated butterfish catch reaches 1,292.4 mt (annual threshold)

The tracking of the butterfish catch against the butterfish mortality cap (based on observed trips) and the butterfish quota (DAH, based on dealer reports) will occur simultaneously. During the year, the directed butterfish fishery is closed if butterfish landings are projected to reach 400 mt. If the closure occurs prior to October 1st, the incidental possession limit is 250 lb/trip; if the closure occurs after October 1st, the incidental possession limit is 600 lb/trip.

¹ This allocation may be increased if there is substantial under-harvest in Trimester I.

² Extrapolated butterfish catch on trips that land greater than or equal to 2,500 lb of *Loligo*; observer data.

³ Butterfish landings; dealer data.

Data

In order to monitor the butterflyfish mortality cap, FSO staff will rely on a number of sources of data. The data sources used to monitor the mortality cap during the 2011 fishing year are summarized below, with particular attention to the timeframe over which the data becomes available for catch cap monitoring purposes.

Northeast Fisheries Observer Program Data. The Northeast Fishery Observer Program (NEFOP) collects and processes data and biological samples obtained during commercial fishing trips. Butterfish catch estimates from observed fishing trips that land 2,500 lbs or more of *Loligo* will be used to extrapolate total butterflyfish catch for all trips that land 2,500 lbs or more of *Loligo*. Preliminary (partially audited) observer data is available to FSO for catch cap monitoring purposes within 7 days of the end of the observed fishing trip. Fully audited data is available within 10 - 14 days of the end of an observed trip.

Federal Dealer Data. Federally permitted *Loligo* dealers are required to submit reports that document, among other things, the weight of each species purchased from vessels during a given reporting week by midnight of the first Tuesday following the end of a reporting week. Reports are submitted through the Standard Atlantic Fisheries Information System (SAFIS), and are available to FSO upon submission. Federal dealers are able to purchase *Loligo* and butterflyfish from both federally permitted vessels and non-federally permitted vessels. Thus, information on all trips where 2,500 lbs or more of *Loligo* is sold to federally permitted dealers should be available within 10 days of landing for mortality cap monitoring, regardless of whether the vessel holds a federal *Loligo*/butterfish permit.

Vessel Trip Report (VTR) Data. Federally permitted vessels are required to submit fishing vessel trip reports (VTRs) detailing the weights of each species kept and discarded. VTRs will be used to verify dealer data submissions, or as a substitute for dealer data in the cases where dealer reports are unavailable. Currently, MSB permit holders are only required to submit VTRs on a monthly basis (within 15 days after the end of the reporting month). However, the Northeast Multispecies FMP recently changed reporting frequency such that multispecies permit holders are required to submit VTRs on a weekly basis (first Tuesday following the Sunday to Saturday reporting week). For the 2010 permit year, 92% of *Loligo*/butterfish permit holders (limited access and incidental) also hold active multispecies permits, thus a majority of vessels landing *Loligo* and butterflyfish are expected to submit VTRs on a weekly basis.

Additional data. A small percentage of trips that land 2,500 lbs or more of *Loligo* are taken by non-federally permitted vessels. From 2007 to 2009, between 2 and 6 percent of *Loligo* landings were taken by non-federally permitted vessels landing 2,500 lbs or more of *Loligo*. Though these landings and any associated butterflyfish catch may be difficult to monitor, they are likely not significant enough to change the estimate of butterflyfish catch rates. Most states with active *Loligo* and butterflyfish dealers submit trip-level dealer information to SAFIS throughout the fishing year. However, submissions of state dealer data do not happen as quickly as federal dealer data submissions, and trip-level data is not always available.

Observer coverage

The Northeast Fisheries Science Center (NEFSC) allocates observer sea days to monitor bycatch in commercial fisheries along the Atlantic coast, from Maine to North Carolina through the Standardized Bycatch Reporting Methodology (SBRM) process. Because of limitations in funding, observer sea days are allocated to fleet sectors with similar characteristics (*e.g.* gear type, region) rather than to fisheries defined by target species. The *Loligo* fishery is primarily prosecuted using small-mesh otter trawls, and thus, observer sea days are actually allocated quarterly to small-mesh otter trawls (< 5.5 inch codend mesh) by region (*i.e.*, Mid-Atlantic versus New England ports).

An example of the use of fishing effort (days absent) to apportion the SBRM allocation of observer sea days for small mesh otter trawl trips, during Q1 of 2011, into “*Loligo* trips” versus “all other small-mesh trips” is presented below. For this exercise, *Loligo* trips are defined using the regulatory definition as trips with *Loligo* landings greater than or equal to 2,500 lbs. The *Loligo* fishery has been subject to trimester-based quota management since 2007, and therefore, data for 2007-2009 were used in the analysis. The temporal disconnect between the Trimester I data used in the analysis and the SBRM sea-day allocations occurs because the latter are computed on a quarterly basis for an annual period that runs from April to March and are currently not available beyond Q1 of 2011.

Table 2. Number of trips (ntrips) and days absent (da) during Trimester I, 2007-2009, by region, for Federally-permitted otter trawl (OT) vessels using small mesh codends (<5.5 inches).

Small mesh OT trips with *Loligo* landings \geq 2500 lbs

Year	New England		Mid-Atlantic		Combined regions	
	ntrips	da	ntrips	da	ntrips	da
2007	255	1758	66	378	321	2136
2008	171	1213	78	429	249	1642
2009	133	893	91	575	224	1468
average	186	1,288	78	461	265	1,749

All other small mesh OT trips

Year	New England		Mid-Atlantic		Combined regions	
	ntrips	da	ntrips	da	ntrips	da
2007	240	552	452	1297	692	1,849
2008	254	767	390	1212	644	1,979
2009	283	624	397	1233	680	1,857
average	259	648	413	1,247	672	1,895

Based on the data shown in Table 2, sea-days were apportioned, by region, into “*Loligo* trips” versus “all other small mesh trips” for Q1 of 2011 (Table 3). Sampling rates (*i.e.*, observer coverage rates in terms of days at sea) of 15.8% in New England and 11.7% in the Mid-Atlantic

region are anticipated to be observed (Table 3). However, the sampling rates are forecasted estimates that are conditional on patterns in fishing effort during 2011 that are similar to those for 2007-2009, and thus, are subject to change. For example, if more vessels declare into the fishery than during 2007-2009, then the sampling rates will decline. The sampling rate could be held constant if the allocation of observer sea days to the “other small mesh fisheries” is reduced, but this would be difficult in real-time.

Table 3. Example apportionment of the SBRM small mesh (<5.5 inch codend mesh) otter trawl sea day allocation for Q1, 2011 into *Loligo* sea days versus all other small mesh sea days.

Number of SBRM sea days available (Qtr 1, 2011)			
Small mesh fishery type	New England	Mid-Atlantic	Total
Total, small mesh fisheries	305	200	505
<i>Loligo</i> fishery	203	54	257
All other small mesh fisheries	102	146	248
Sampling rate	15.8%	11.7%	
New England = vessels departing from ports located in ME, NH, MA and RI			
Mid-Atlantic = vessels departing from all other ports			

To facilitate the placement of observers on *Loligo* trips, Amendment 10 also established a trip notification requirement, which requires that vessels notify NMFS at least 72 hours, but no more than 10 days, prior to embarking on a fishing trip in order to possess 2,500 lbs or more of *Loligo*. The trip notification requirement became effective on January 1, 2011, at which point NEFOP began assigning observers to *Loligo* vessels following the trip notification based on availability.

Butterfish catch estimation

Catch estimation. Total butterfish catch is estimated by using data from observed *Loligo* trips to extrapolate to unobserved *Loligo* trips. The rate of butterfish bycatch is estimated as the ratio of observed butterfish catch (landings and discards) to the kept catch of all species on observed trips that land greater than or equal to 2,500 lbs of *Loligo*. Total butterfish catch (in weight) is derived by multiplying the estimated catch rate by total kept pounds of all species on all trips that land greater than or equal to 2,500 lbs of *Loligo*.

The formula for estimating total butterfish catch for a given trimester is:

$$\frac{\text{Observed butterfish catch}}{\text{Observed kept catch (all species)}} \times \text{Kept catch (all species, all Loligo trips)}$$

$$= \text{Total estimated butterfish caught}$$

Many vessels with *Loligo* landings over 2,500 lbs target a range of species, thus in order to account for butterfish encounters for these trips, the estimator is a ratio of butterfish catch to total weight of all species on observed trips that land greater than or equal to 2,500 lbs of *Loligo*. Using all species retained as the denominator reduces bias in the ratio estimator, and is consistent

with a peer-reviewed methodology that has been implemented to estimate discards in other fisheries.

The butterfish catch rate is the year-to-date sum of all observed butterfish catches divided by the year-to-date sum of the observed kept weight of all species on trips that land greater than or equal to 2,500 lbs of *Loligo*. The catch rate changes as more data from observed trips becomes available throughout the year. The catch rate is multiplied by the cumulative dealer-reported landings of all species on the relevant 2,500 lb *Loligo* trips (observed and unobserved) to estimate total butterfish catch by all trips landing 2,500 lbs or more of *Loligo*. It is important to note that the estimate of butterfish catch will change from week to week; the butterfish catch estimate may be lower or higher than the previous week as the estimated butterfish catch rate changes.

A transition method will be applied at the beginning of the year when there are not enough observed trips (i.e., fewer than five trips) to reliably estimate the butterfish catch rate. In estimating the butterfish catch rate, the transition method starts with historical butterfish catch data, which will be updated as in-season catch data becomes available. For Trimester I, FSO will use the annual⁴ butterfish catch rate from the previous year as the assumed catch rate. For example, for Trimester I of the 2012 fishing year, the annual 2011 butterfish catch rate will be used as the assumed catch rate, with a transition to the in-season rate as data from observed trips 1 to 4 becomes available. After the transition to in-season data is complete, the remainder of Trimester I, and Trimesters II and III, will use the cumulative catch rate that is calculated using in-season data.

The formula for the transition rate is:

$$\left(\frac{0.7}{\text{Trip Count}}\right) * \text{Assumed Rate} + \left(1 - \left(\frac{0.7}{\text{Trip Count}}\right)\right) * \text{In_Season Rate}$$

In this formula, trip count is 1 to 4. This transition rate is currently being used to estimate discard rates for the Northeast multispecies fishery.

Annual Review

Amendment 10 states that the SSC will annually review the performance of the butterfish mortality cap program during the specifications process, and that their review should include, among other things, 1) the CV of the butterfish bycatch estimate; 2) the estimate of butterfish fishing mortality; and 3) the status and trends of the butterfish stock. Because the specification setting process is underway well before the end of the fishing year, the SSC will likely only have data from 2011 Trimester I when setting specifications for 2012. Thus, full analysis of the year-

⁴ At the October 2010 MAFMC meeting, the Butterfish Mortality Working Group proposed using the Trimester III catch rate as the assumed rate for the subsequent Trimester I during the transition period (i.e., the catch rate from 2010 Trimester III would be used as the assumed rate for 2011 Trimester I). After public comment at the October meeting, subsequent analysis showed that using the annual rate for the entire previous year as the assumed rate for the transition period was preferable to using the Trimester III rate.

round operation of the mortality cap program cannot occur until the 2011 fishing year ends, and will occur in 2012 during the 2013 specification setting process.

The following items warrant re-examination in developing specifications for the 2012 and 2013 fishing years:

- Is the catch rate estimator (observed butterfish catch over observed kept all on) adequate and precise?
- Does setting the butterfish mortality cap equal to 75% of the butterfish ABC appropriately account for bycatch of butterfish in other fisheries?
- Are any strata appropriate to aid observer sea-day allocation, or to modify the butterfish catch rate estimator, in order to refine butterfish catch estimation?
- Should transition to in-season data occur differently (i.e., should something other than the annual catch rate estimator from the previous fishing year be used)?
- Can state observer program data be incorporated into data used to estimate butterfish catch estimates?