New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John F. Quinn, J.D., Ph.D., *Chairman* | Thomas A. Nies, *Executive Director*

MEMORANDUM

DATE: October 25, 2018

TO: Groundfish Committee

FROM: Jamie M. Cournane, Groundfish Plan Development Team Chair

SUBJECT: Peer review of the Groundfish Plan Development Team analysis for Amendment 23/Groundfish Monitoring

Background

To ensure that any new and novel analyses of Amendment 23 (A23) issues and management alternatives get sufficient independent review, the Council staff is organizing a review of key Plan Development Team (PDT) analyses by a sub-panel of the Scientific and Statistical Committee (SSC).

PDT Analyses

The PDT plans to finalize written summaries of its work by Monday, January 7, 2019. We anticipate completing at least five papers (outlined below), but we may have an additional two papers for a total of seven.

1(a). Estimating Incentives to Discard New England Groundfish Stocks

Transferable quota-based systems generate incentives to discard fish (Arnason 1992). This incentive is a function of the costs and benefits associated with the retention of each individual fish based largely upon differences in quota prices and expected landings prices. We develop a theoretical model specific to sector management that estimates the fisherman's stock and trip-level discard incentive.

1(b). Estimating Prohibited Discards of New England Groundfish Stocks

In any quota-based fishery there exists some incentive to discard legal sized fish, perhaps to highgrade or avoid constraints imposed by small quota allocations (Arnason 1992). This incentive is a function of the costs and benefits associated with the retention of each individual fish based largely upon differences in quota prices and expected landings prices. We suggest the term "prohibited discards" to describe such events. Implicitly, prohibited discarding is assumed not to occur on observed trips. To our knowledge no attempt has been made to estimate its magnitude on unobserved trips. The exclusive focus on estimating mandatory discards has consequences on the precision and accuracy of total discard estimates. Estimating total removals in a fishery requires careful consideration of all the ways in which unobserved discards may differ from observed discards.

2. Evaluating the Observer Effect for the Northeast U.S. Groundfish Fishery

Does data generated on observed fishing trips reflect the activities of the whole fleet? Are estimates generated from these data unbiased? Bias may be induced by either a deployment effect, where the assignment of observers to vessels is non-random, or an observer effect, where the fishing activities on observed trips vary in detectable ways from those on unobserved trips (Benoit and Allard 2009). These two effects, deployment and observer, may act separately and in combination to render data collected by on board observers biased. This paper focuses specifically on one component of the latter effect: do individual vessels alter their behavior in response to the presence of an observer? We use an exact matching method to determine if vessel performance along several metrics vary in a detectable way when an observer is on board, and when one is not. Differences in several metrics (e.g., kept catch of groundfish) suggest vessels alter fishing practices on observed trips, implying that populations of observed and unobserved trips differ along dimensions critical to accurate catch accounting.

3. Potential biases in groundfish catch estimation when discarding behavior hinges on at-sea observation

Evidence suggests that groundfish vessels tend to land more catch of non-limiting stocks (those with relatively high quotas) on unobserved trips than on trips carrying an at-sea observer or monitor. Such an outcome is consistent with illegal discarding of legal-sized fish from limiting stocks. Here, we explore through simulation the potential biases in catch estimation that could result from widespread discarding behavior that is never observed.

4. Fishing Location Differences in Observed and Unobserved Trips

This analysis uses VMS fishing polls for groundfish vessels to determine if fishing locations differ with the presence of an observer. Data are aggregated in three-month bins by calendar year quarter. Polls are matched with AMS data to confirm FMP and activity codes are consistent with groundfish trips. From annual (calendar year) data two sub-samples are drawn, one each from observed and unobserved polls. Sub-sample sizes are determined by the number of observed polls, which is always smaller than the number of unobserved polls. This produces two equal-sized samples, one of observed polls and the other of unobserved polls. These polls are plotted together as a difference heat map, producing a visual depiction of the spatial differences in fishing locations with and without observers.