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A summary of commercial catch investigations conducted in support of an empirical approach to the Georges Bank yellowtail flounder stock assessment

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Introduction

Analysis 1. Impacts of vessel misreporting on the yellowtail flounder stock allocations

WP reference: Palmer MC, Wigley. Using positional data from vessel monitoring systems (VMS) to validate the logbook-reported area fished and the stock allocation of commercial fisheries landings, 2004-2011.

Summary: At-sea observer data and vessel monitoring system (VMS) positional data from northeast United States fisheries were used to validate the statistical area fished and stock allocation of commercial landings derived from mandatory logbooks between 2004 and 2011. A detailed description of the dataset and methodology is provided in the working paper. The analysis indicates that area misreporting and/or under-reporting on vessel trip reports (VTR) is not responsible for large-scale errors in the estimation of landings of Georges Bank yellowtail flounder. When comparing VTR-based stock allocations to those generated from at-sea observer data, the percent allocations of total species landings to the Georges Bank stock were within a $\pm 3.6\%$ range with no indication of directional bias (Table 1). Similarly, comparison of VTR-based allocations to VMS-based allocations also did not reveal differences that would lead to large-scale error in the estimation of Georges Bank stock landings; the two stock allocation methods were within $\pm 4.8\%$ of one another (Table 2).

Analysis 2. Evaluation of the census assumption applied to dealer landing reports

WP reference: Palmer MC. Estimating the magnitude of unreported dealer landings for the northeast large mesh groundfish species from 1996 to 2007.

Summary: The Northeast Fisheries Science Center's (NEFSC) stock assessments have historically assumed that the landings reported in the dealer weighout database represent a census of total United States (US) landings. In 2009, individual fishermen reviewing the National Marine Fisheries Service's (NMFS) records of vessel groundfish landing histories reported discrepancies between the NMFS record and their paper records. Noted discrepancies suggested that the dealer weighout database may not represent a census of total US landings. By comparing the landings information from the dealer weighout database to the vessel trip report (VTR) database this analysis has attempted to quantify the relative magnitude of large mesh groundfish species missing from the dealer database on an annual basis between the years 1996 and 2007. The results from this analysis suggest that the magnitude may be on the order of hundreds of metric tons per species annually. The magnitude of these missing landings relative to the total species landings varies by species. For the flatfish species, yellowtail flounder, winter flounder, American plaice, witch flounder the average percentage of total landings missing was estimated at less than 5% (Figure 1). In general, the percentage

of missing landings has decreased over time. The estimated missing landings likely underestimate the true level of landings missing from the dealer data, but do provide information on the relative magnitude. The magnitude of these differences does not suggest that missing or unreported dealer landings would result in large-scale errors in the estimation of Georges Bank yellowtail catch.

Analysis 3. Comparison of dealer reported landings to observed landings

WP reference: No formal working paper was developed.

Summary: Dealer reported landings of Georges Bank yellowtail flounder were compared to the retained catch estimated by at-sea observers (ASM and NEFOP data as available) on matched trips between 2006 and 2012. The analysis did not apply any restrictions on gear type. Trips were matched using a three-field matching criteria of vessel permit number, VTR serial number and the month of landing. The three-field matching criteria was intended to limit the incidence of false matching. The time series could only be extended back to 2006, the first year VTR serial number was available in observer data.

Overall there was generally good agreement between the two data sources with the 95% confidence interval of the median relative difference (approximated by ± 1.58 (IQR/ \sqrt{n})) encompassing 0 (Figure 2). There was a tendency for the observer estimates to be greater than dealer reported landings with median differences being above zero for all years; in general, the bias was small with median estimates less than 10% relative difference in all years and less than 5% in 5 of the 7 year examined. The estimation bias may be partly explained through water loss between when the fish are weighed at sea and when they are offloaded at the dealer. The interquartile ranges were within the $\pm 25\%$ range for all but one of the years examined (2010). Given the general agreement between the two catch estimates, it does not appear as though errors/bias in dealer reported landings or observer catch estimates would lead to large-scale error in the estimation of Georges Bank stock landings, at least on those trips that are observed.

Analysis 4. Investigation into the possibility of duplicate landings reports early in the landings time series

WP reference: No formal working paper was developed.

Summary: A very cursory examination of landings data was undertaken to evaluate whether there was evidence of landing record duplication early in the dealer weighout time series. Given the results of the analyses above which did not suggest error in the more recent landings time series combined with the precipitous decline of Georges Bank yellowtail landings over time, it seemed prudent to investigate whether there was evidence that landing from earlier in the time series (pre-1994) were artificially inflated.

Dealer landings were summarized by year, month, day, vessel permit number and document number (where available) and then visually examined to look for instances of landings duplication at the transaction level. No obvious patterns were detected.

Tables

Table 1. Comparison of the Northeast Fisheries Observer Program (NEFOP) and Vessel Trip Reports (VTR) stock allocations from 2004 to 2011. This table summarizes the Georges Bank yellowtail flounder results contained in tables 6-13 of the above working paper.

Year	GBK stock landings (kg)		Stock allocation (%)	
	NEFOP	VTR	NEFOP	VTR
2004	247,173	271,682	97.7	96.5
2005	758,539	773,181	97.1	94.6
2006	256,683	277,142	94.9	96.2
2007	177,581	189,671	89.1	89.4
2008	197,165	218,113	93.1	93.9
2009	169,600	178,475	89.5	88.7
2010	64,490	67,521	84.6	85.9
2011	64,746	76,096	59.4	63.0

Table 2. Relative differences between VTR and VMS-based allocations for yellowtail flounder by stock. From table 34 of the above working paper.

Year	Stock		
	GBK	GOM	SNE
2004	-1.6	20.0	53.8
2005	-1.6	1.2	61.9
2006	-2.4	1.1	25.0
2007	-1.9	5.5	1.1
2008	0.3	0.0	-1.8
2009	0.0	-0.8	1.8
2010	-4.8	7.1	1.5
2011	-4.8	7.1	1.5

Figures

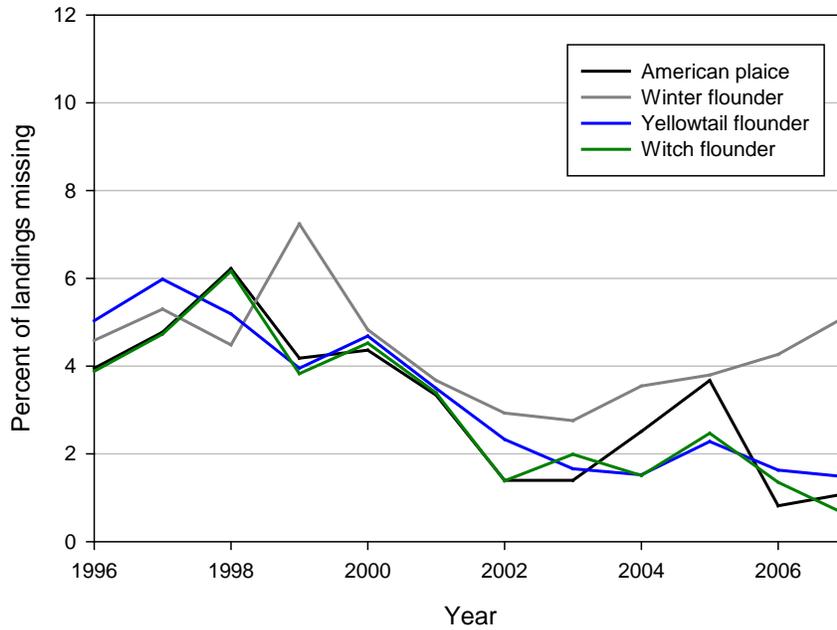


Figure 1. The estimated percentage of American plaice, winter flounder, yellowtail flounder and witch flounder landings missing from the dealer data between 1996 and 2007.

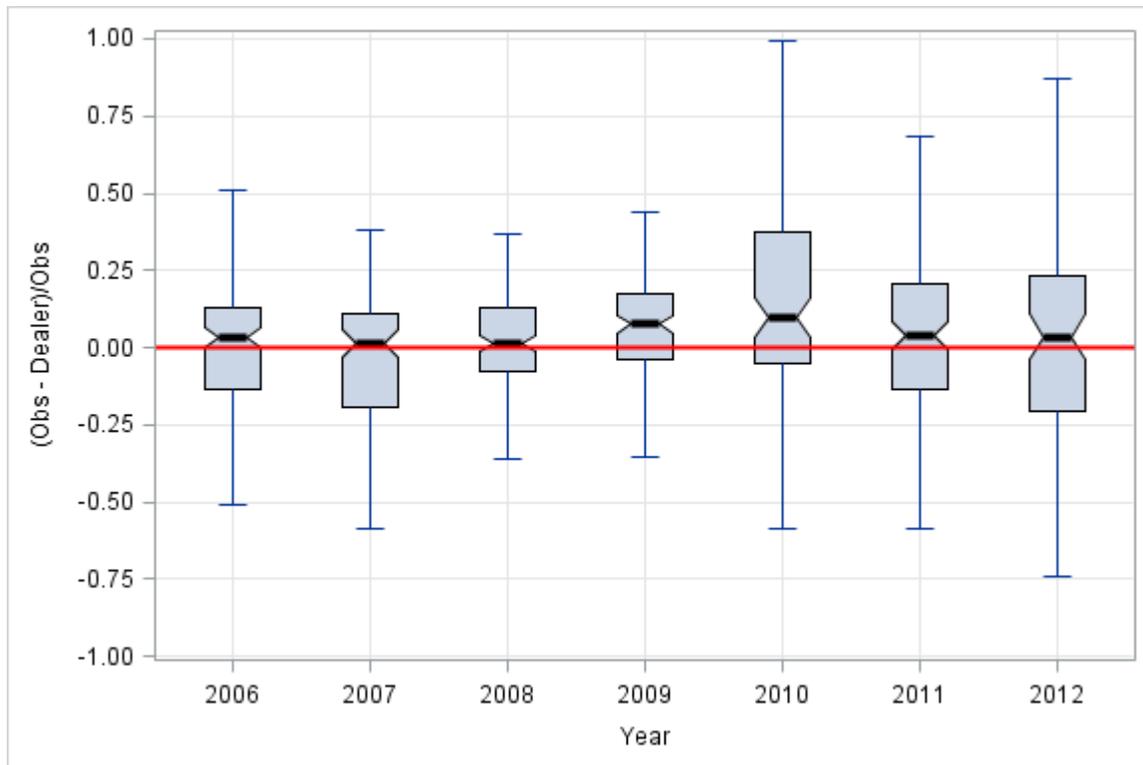


Figure 2. Boxplot distributions of the relative differences between at-sea observer estimates of retained Georges Bank yellowtail flounder catch and dealer landings on matched fishing trips. The boxes represent the interquartile range (IQR) with the notches equal to the median (solid black line) ± 1.58 (IQR/ \sqrt{n}), whiskers represent ± 1.5 IQR. The number of trips by year are as follows: 2006 (150), 2007 (116), 2008 (134), 2009 (149), 2010 (102), 2011 (140), 2012 (93).