

Context for Reaction to the SARC 53 GOM Cod Assessment

by

Steve Correia, Chad Demarest and Tom Nies

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Introduction

The 2011 SARC 53 GOM cod assessment results present a very different perception of the stock's status than that estimated by GARM III in 2008. The results were also unexpected given the restrictive management measures adopted since 2002. Fishermen expressed concern that the assessment does not match their impression of the stock's status.

During and after the SARC 53 meeting groundfish PDT members summarized data from various sources to illustrate these concerns for reviewers that may not be familiar with recent groundfish management history. The primary purpose for collecting the information was to put the disbelief that greeted the assessment results into context. The SARC review panel discussed the issue briefly but did not review the data that was prepared (because it had not been reviewed through the working group and was not available before the meeting for review). Subsequent to the review panel meeting there have been a few claims that the panel did not consider CPUE data prepared by the PDT.

This document provides examples of information on the commercial fishery that were prepared. Some of the data presented here was assembled after the SARC panel and would not have been available to reviewers. Data on the recreational fishery was also collected but is not summarized here given the expected imminent publication of revised data.

Management Impacts on Fishing Mortality

Since 1994 there have been a long series of management actions taken to reduce GOM cod fishing mortality. Each major intervention can be readily identified in the time series of GOM cod fishing mortality from the GARM III assessment because there is a noticeable decline in mortality that coincides with implementation of the management action. As shown in the figure below, fishing mortality declined in the mid to late 1990's as a result of Amendments 5 and 7 and a series of framework adjustments (Figure 1). Mortality increased after 2000 until Amendment 13 was adopted in 2004, and then seemed to decline again in 2007 after adoption of FW 42. Note that none of these efforts reduced mortality below F_{MSY} . While the measures were not sufficient to end overfishing the picture from this GARM III assessment is that the management actions did have a detectable impact on fishing mortality.

The mortality time series from SARC 53 generally illustrates the same trends until 2006. An exception is that this time series does not show a decline in mortality in 2005, delaying it until 2006. In 2006 it diverges and fishing mortality increases rapidly after 2007 in spite of the adoption of FW 42 in late 2006 and the sector system in May 2010 (Figure 2). So this assessment seems to indicate that management approaches that were able to influence mortality (albeit insufficiently) from 1994 through 2006 suddenly became ineffective.

Changes in Groundfish Fishing Effort - General

The management program has dramatically changed the groundfish fishing industry since 1994. Under the effort control system, there was an increase in the number of days-at-sea used between FY 1994 and FY 2001 (

Figure 1 – GARM III trends fishing mortality and SSB trends for GOM cod

Gulf of Maine Cod GARM III Summary Stock Status

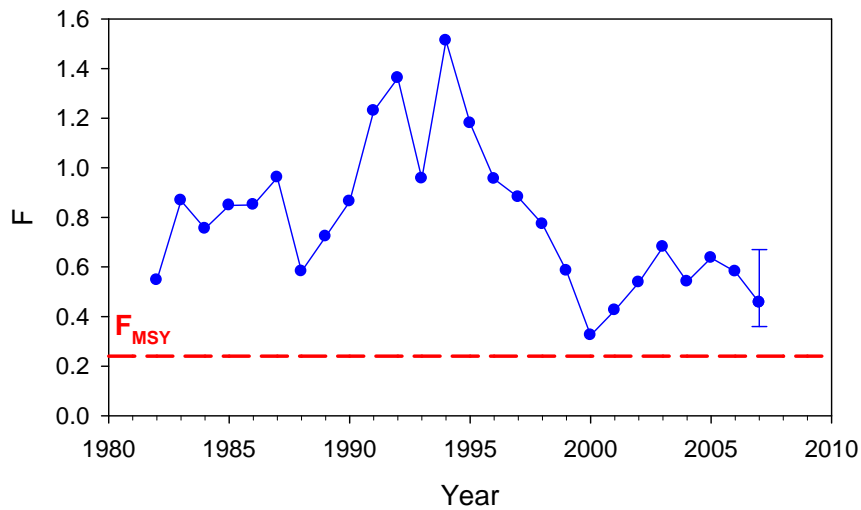
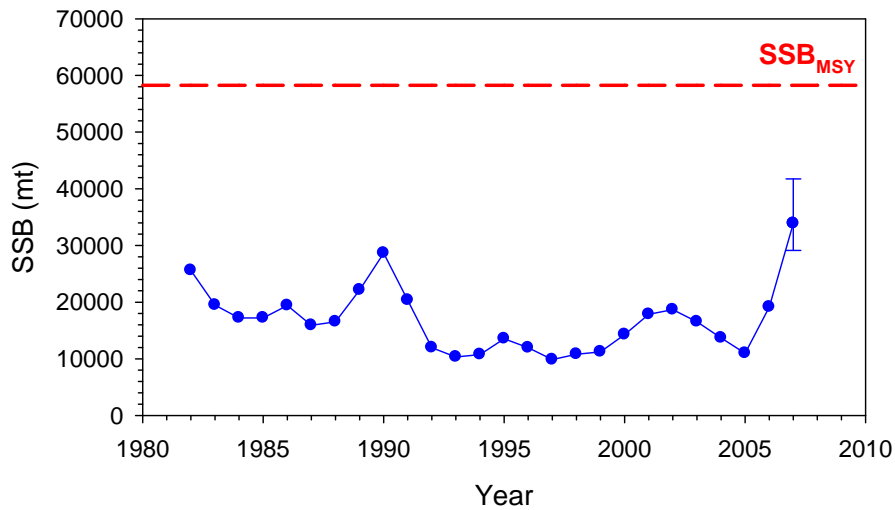
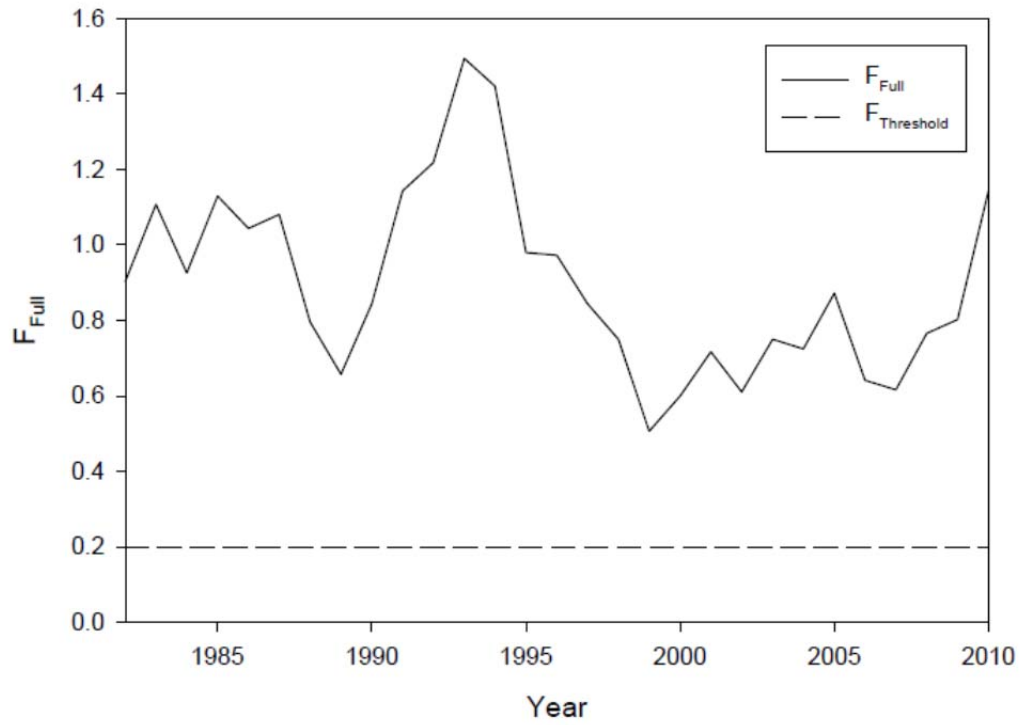


Figure 2 – SARC 53 fishing mortality trend for GOM cod



A5. Estimated trends in fishing mortality (F_{Full}) of Gulf of Maine Atlantic cod and associated overfishing level, $F_{Threshold}$.

Figure 3) but between FY 2001 and FY 2009 the number of DAS was cut in half. The number of permits using DAS also was cut in half (Figure 4). Through GARM III, while fishing mortality for most stocks remained above F_{MSY} the mortality for nearly all stocks was below the median mortality for the time series (Figure 6). This contributed to the perception that management measures were reducing fishing mortality even if not successful in ending overfishing.

Changes in Commercial Groundfish Fishing Effort – Gulf of Maine

While the previous discussion highlights the changes in effort for the fishery as a whole the same changes may not have taken place in all fishing areas. In particular, the overall decline in effort could mask a focusing of effort on a high value species like GOM cod. To explore this possibility the Swept Area Seabed Impact model was used to summarize fishing effort in the GOM. The SASI model, previously reviewed by the SSC, incorporates VTR information to estimate swept-area, days absent, and hours fished. It can provide a metric of changes in fishing effort over time for trawl, sink gillnet, and longline gear. In the case of sink gillnet and longline gear the estimates are an imperfect effort measure since they do not consider soak time. For these two gears the swept-area output is more a reflection of the amount of gear that is fished. For these analyses “high cod trips” were identified as those trips where more than 50 percent of the revenue came from cod.

The results are shown in Figure 8 through Figure 10. While the area swept by trawl gear for all trips declined in the GOM stock area and SA 514 over the period 2000 through 2010, the area swept on high cod trips in SA 514 fluctuated around the time series median. For the GOM area as a whole, area swept on high cod trips fluctuated as well. Longline area swept has been low and relatively unchanged in recent years after an early peak. Sink gillnet area swept in SA 514 increased on high cod trips in 2008 and then declined to the time series median in 2010; there is a similar pattern for the GOM as a whole but in 2010 area swept was below the time series median. The key point here is that for the two gears that land most GOM cod, the effort on high cod trips did not decline as much as the effort on all trips.

The SASI model includes VTR kept catch information. This allows development of a crude measure of catches per unit effort (CPUE) if the landings are scaled by an estimate of discards using an annual fixed discard rate, as one done for this analysis. It is important to note that this is not standardized for any vessel characteristics nor is it adjusted for improvements in technical efficiency. The discard scaling factor also does not reflect spatial, temporal, or vessel differences in discard rates. While there have been numerous regulatory changes over this time period, from 2002 through 2009 the area closure regime was not changed and trip limits were in the range of 500 to 800 pounds. Trip limits were removed in 2010. There were no changes in mesh size from 2002 to 2010, but there a few changes in the limits on the number of sink gillnets. The biggest regulatory changes during this period were adjustments in the DAS allocated and in the counting of DAS.

The LPUE was calculated based on area swept, hours fished, and days absent. The results are shown in Figure 11 through Figure 13. The LPUE for trawl and sink gillnet gear consistently shows an increase from 2004 through 2010, whether in the entire GOM or in SA 514. In SA 514 the changes by area swept on high cod trips indicate a nearly four-fold increase.

GOM Cod Catches by Area

Data used in the assessment highlights changes in the distribution over time of GOM cod landings by statistical area. As shown in Figure 14, landings in SA 511, 512, 513, and 515 have declined in recent years and are near the time series minimum. In SA 514, however, landings have increased since 2000 and are well-above the time series median, and are approaching the high levels observed in the mid-80's.

Discussion

The dramatic changes in overall fishing effort and the number of vessels fishing for groundfish since 1994 clearly support the perception that there is reduced effort in the fishery as a whole. Generally there have been effort declines in the GOM. But on high cod trips, the declines in effort are not as dramatic and in SA 514 the effort on trawl and sink gillnet high cod trips has not declined from the time series median. At the same time, the increase in nominal CLPUE since 2004 on sink gillnet and trawl trips matches the perception of industry participants that catch rates have improved substantially during a period that the assessment indicates saw little increase in SSB, but roughly a one-third increase in total biomass.

Figure 1 – GARM III trends fishing mortality and SSB trends for GOM cod

Gulf of Maine Cod GARM III Summary Stock Status

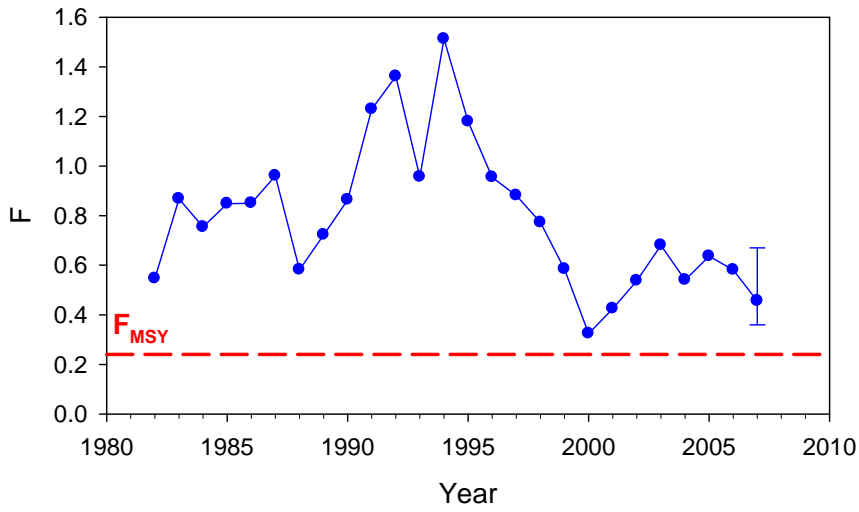
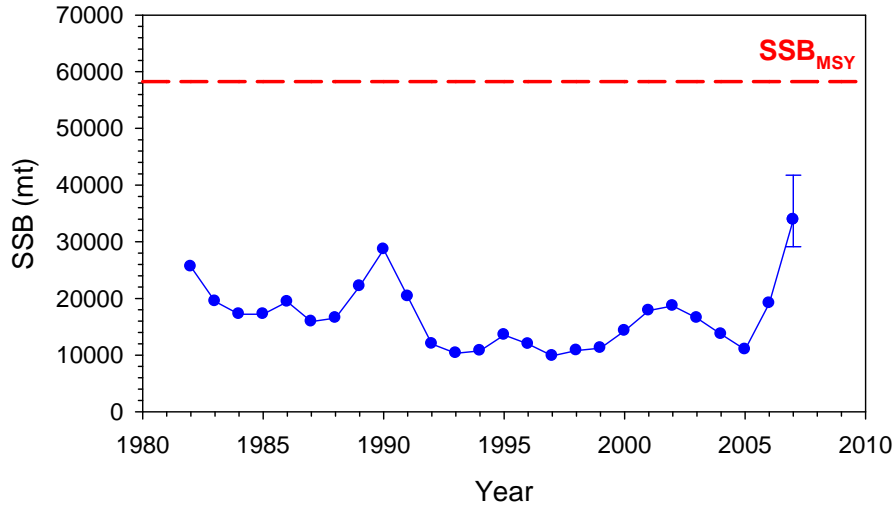


Figure 2 – SARC 53 fishing mortality trend for GOM cod



A5. Estimated trends in fishing mortality (F_{Full}) of Gulf of Maine Atlantic cod and associated overfishing level, $F_{Threshold}$.

Figure 3 - Multispecies DAS allocated and used, 1996 - 2008

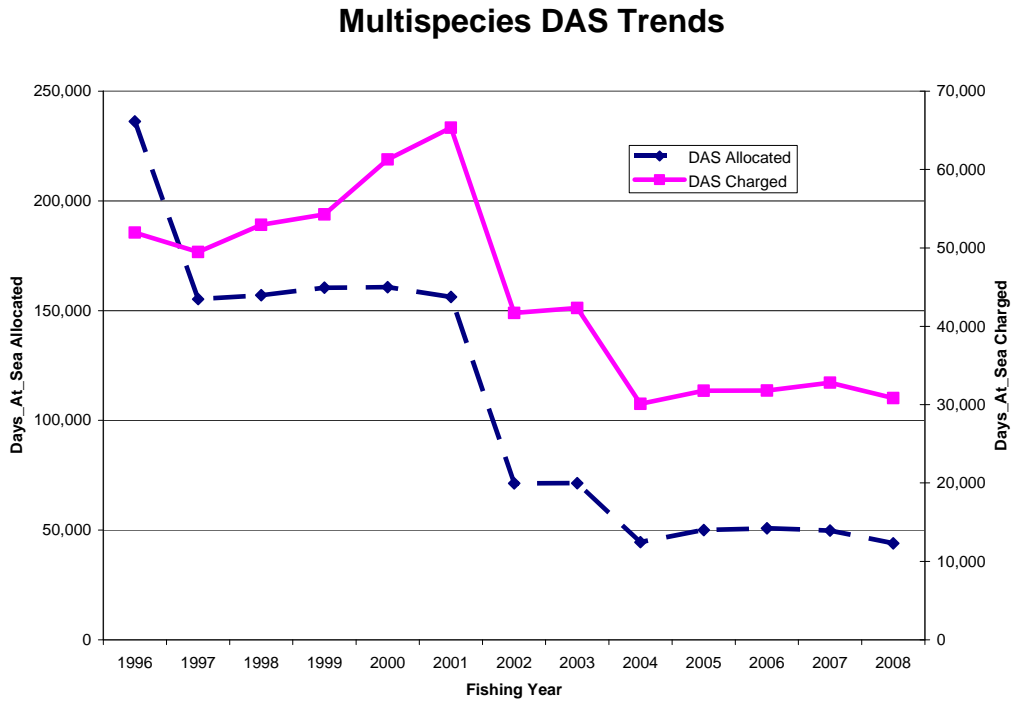


Figure 4 - Figure 5 - Multispecies DAS permits issued and permits using DAS, 1996 - 2008

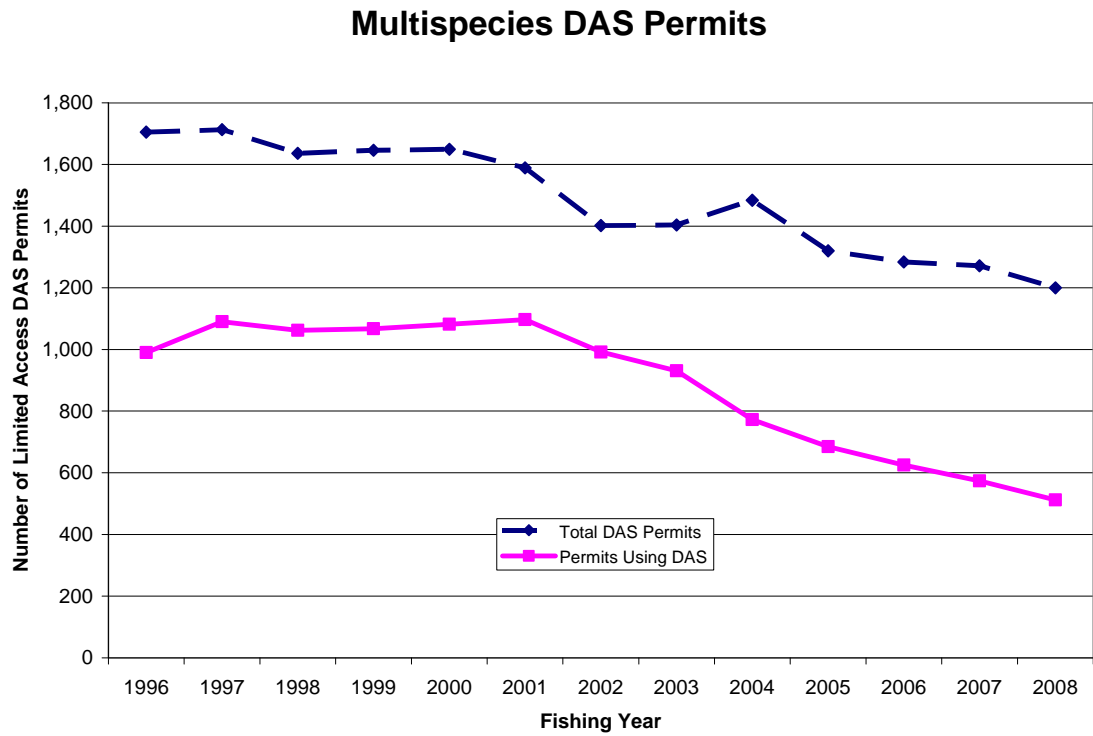


Figure 6 - Figure 7 – Relative fishing mortality for multispecies stocks. Based on GARM III results.

	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	D
GOM GOM Cod F 5-7										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.6
GOM GOM Haddock F 6-8				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	7.7
GOM CC/GOM YTF F 4-5										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.4
GOM Plaice F 6-9										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.7
GOM Pollock EI	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2.3
GOM Atlantic Halibut Relative F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2.2
GOM White Hake F 6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.4
GOM Witch F 8-9										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.9
GOM GM/GB Windowpane EI										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	5.5
GB GB Cod F 5-8										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.4
GB GB Haddock F 5-7	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.6
GB GB YTF F 4-5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.6
GB GB WFL F 4-6										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.7
SNE/MA SNE/MA YTF F 4-5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2.2
SNE/MA SNE/MA WFL F 4-5										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.1
SNE/MA SNE/MA Windowpane EI										●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	7.3
SNE/MA Ocean Pout EI	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	4.2

Legend
 ● Highest ● 2nd Highest ○ Middle ● 2nd Lowest ● Lowest

D = Measure of Dispersion: Range/Median

Figure 8 - Area swept (000's area swept units) by gear, area and trip characterization. Red line is time series median. Note that y axis scale varies by panel.

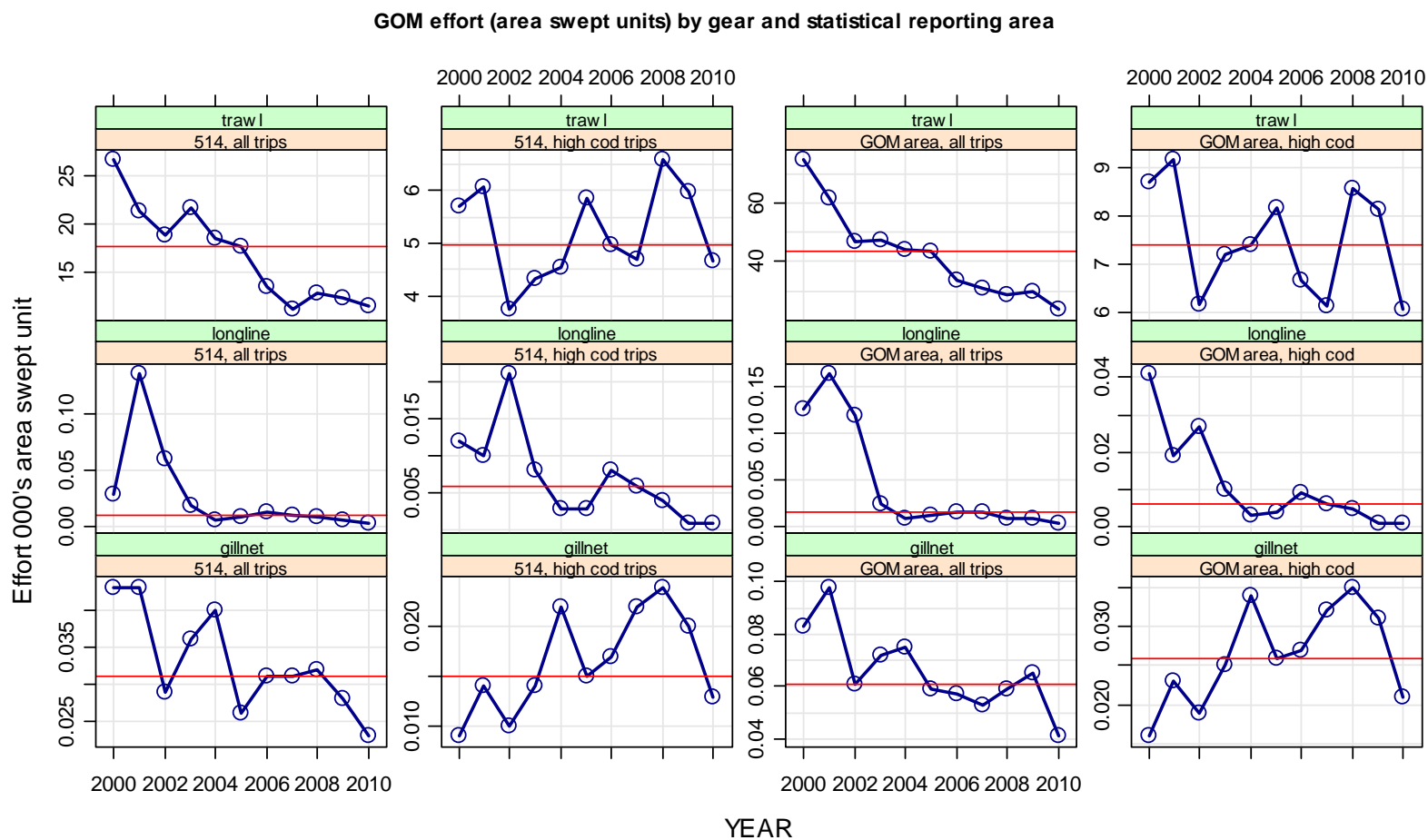


Figure 9 - Days absent (000's) by gear, area and trip characterization. Red line is time series median.

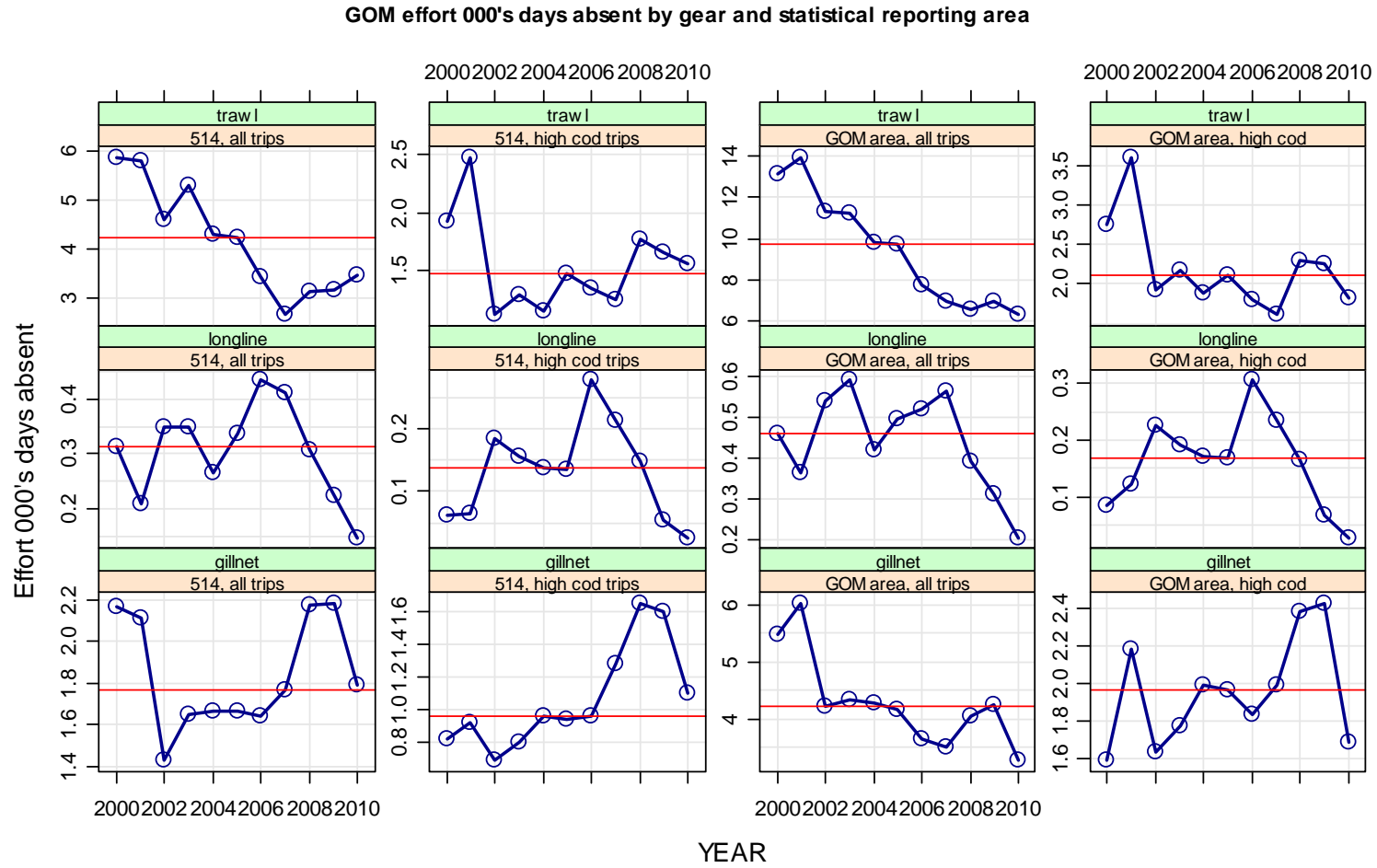


Figure 10 - Hours fished by gear, trip characterization and area. Redline is time series median. Note y axis scale varies by panel.

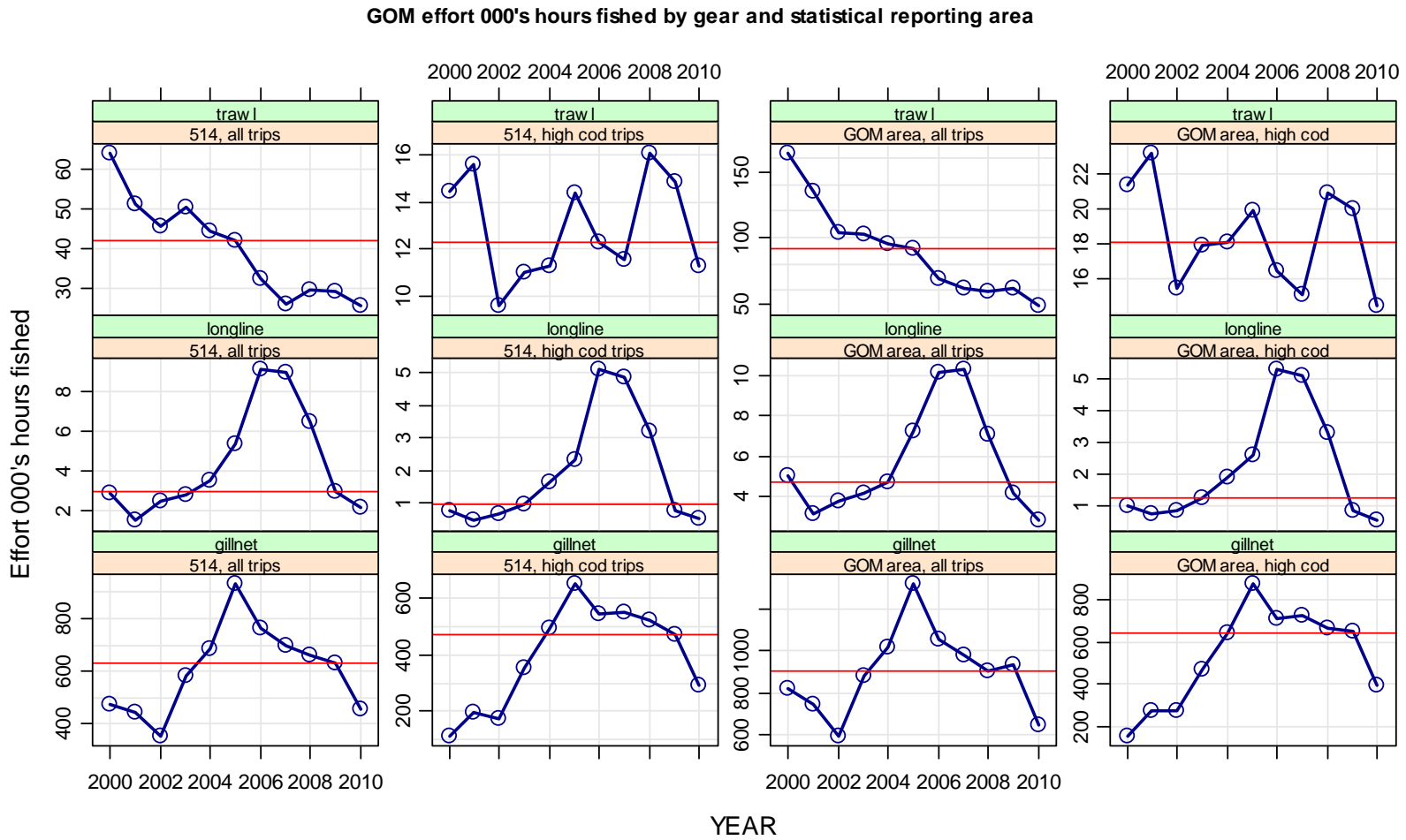


Figure 11 - CPUE cod per area swept by gear, trip characterization and area. Redline is time series median. Note y axis scale varies by panel.

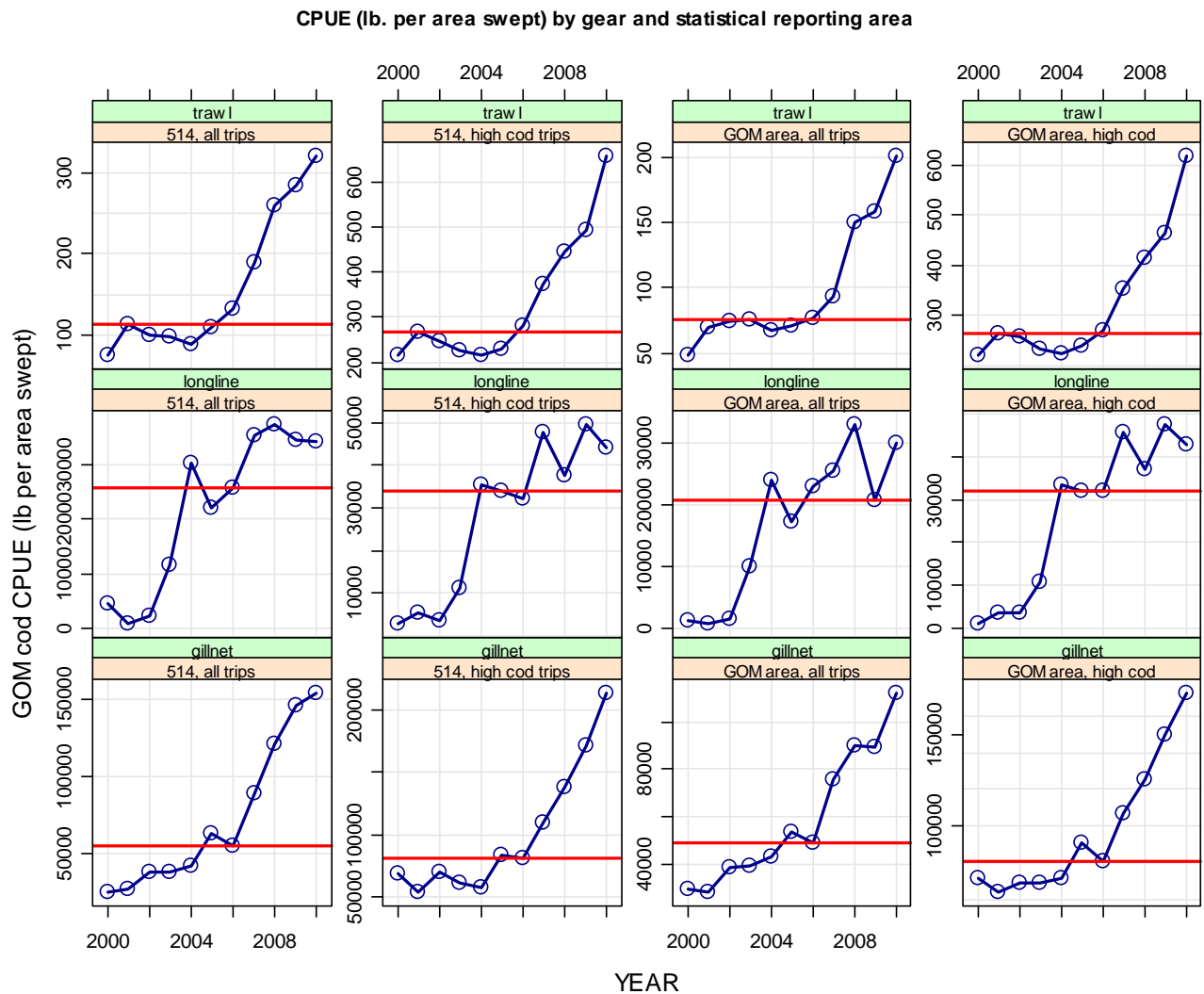


Figure 12 - CLPUE cod per days absent by gear, trip characterization and area. Redline is time series median. Note y axis scale varies by panel.

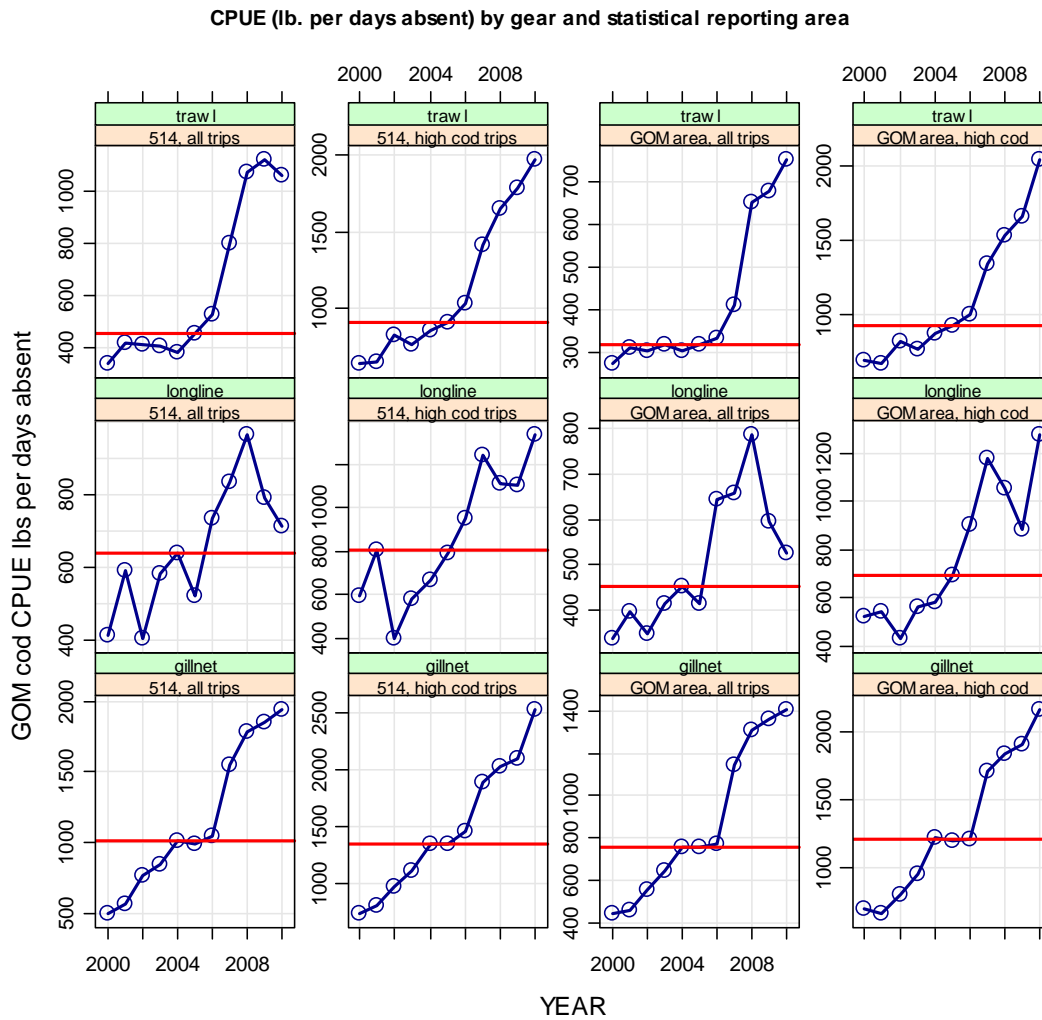


Figure 13 - CPUE cod per hours fished by gear, trip characterization and area. Redline is time series median. Note y axis scale varies by panel

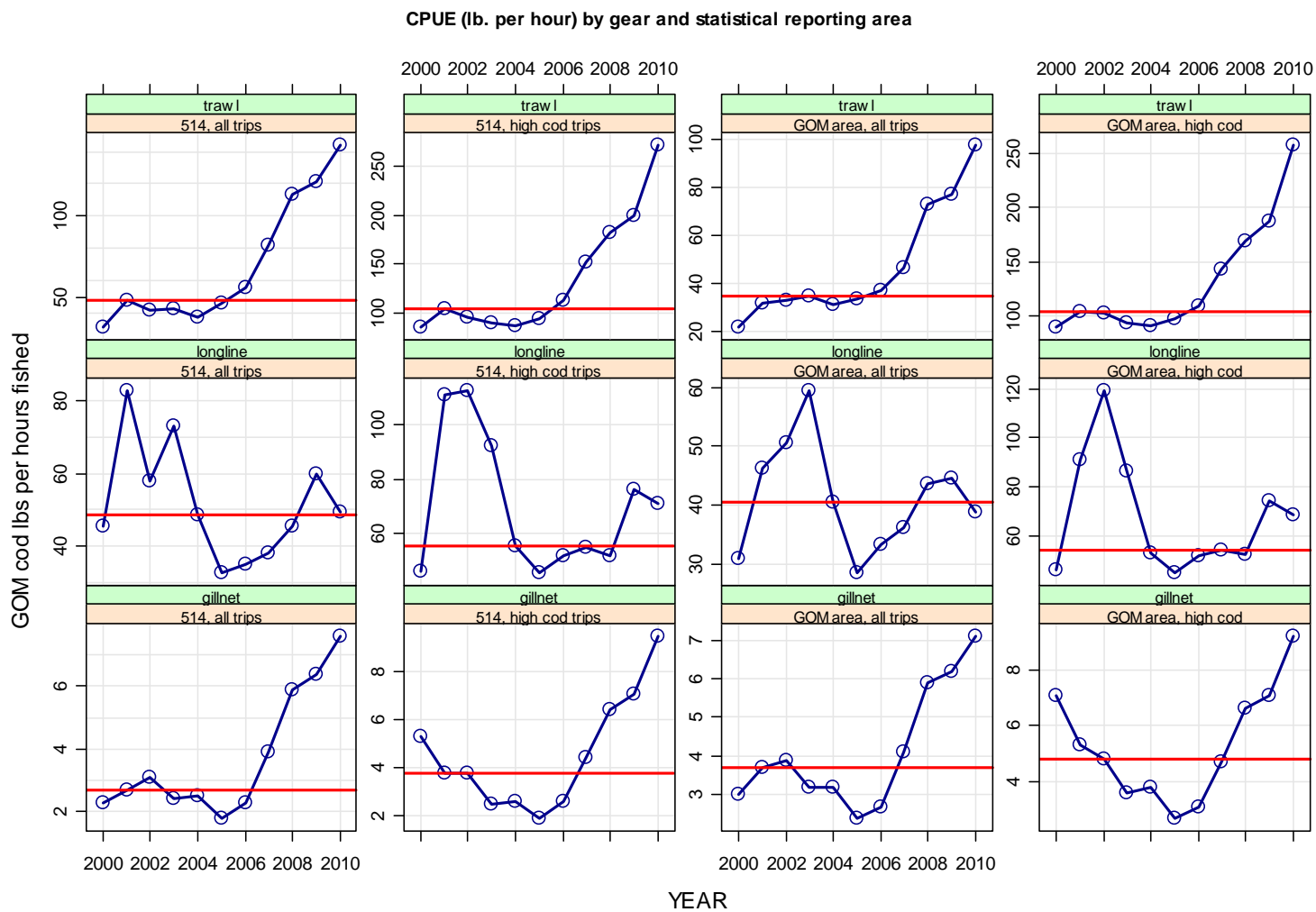


Figure 14 - GOM cod landings (mt) by statistical reporting area. Redline is time series median. Black line is loess smoother with span=0.66 and degree=2. Gray area are approximately 95% confidence interval on smoother. Y-axis scale differs among panels in order to view the trends in areas with low cod landings. Landings from SAR 510, 464 and 465 are note shown, but they are very low compared to SAR 511-515. Panels are ordered right bottom to top left based on median landings in the time series.

