Overview

Over the past decade, biomasses of groundfish stocks have fluctuated without clear, discernible trends. Average biomass has generally increased from a low point in 2005, while the percentage of stocks with biomass levels below 50 percent of BMSY has declined, also since 2005. (BMSY is the biomass that would maximize long-term average catches.) There has been no apparent trend in the percentage of stocks having biomass below BMSY, which has been relatively constant at approximately 71 percent since 2005. With only one year of data available for the Sector Program, it is too early to determine if any changes have occurred since the Program was implemented. Biomass indicators, like many other ecological indicators, may take many years to show patterns of change since they are subject to many different influences. The appearance of a decline in average biomass in 2010 is because of the fact that biomass data were not available for two abundant stocks (pollock, Gulf of Maine winter flounder). We expect those data to be available in the second half of 2014.

Baseline Period

During the baseline period from 2002 through 2009, the average biomass ratio (B/BMSY; see Key Terms and Definitions above) of all surveyed fish stocks initially declined from roughly 0.45 to 0.35 in 2005. The ratio then rose steadily until reaching 0.46 in 2009. This means that the average biomasses across all surveyed species ranged between 35 and 46 percent of the levels that would provide the highest long-term average catches, or maximum sustainable yield (MSY). Two stocks—Gulf of Maine (GOM) winter flounder and GOM haddock—had biomasses that exceeded BMSY for the entire baseline period. In contrast, six stocks had biomasses that were less than 50 percent of BMSY for the entire baseline period. Trends in the biomass of individual stocks showed no consistent patterns, with half of stocks showing an increasing trend and the other half showing a declining trend.

The number of stocks found to have “low biomass” or to be “overfished” during the baseline period did not demonstrate notable trends. In this case, “low biomass” is defined as any stock biomass below BMSY and “overfished” as any biomass less than half of BMSY. (BMSY is the biomass that would provide the highest long-term average catch.) In 2004 and 2005, nine out of 14 of the assessed groundfish stocks had biomass levels that were less than one half of the value that produces MSY. But this number declined to 50 percent by the end of the baseline period, meaning fewer stocks were overfished. In any given year of the baseline period, between two and five of the individual stocks had biomass levels that exceeded MSY, while the majority of stocks had low biomass levels (less than BMSY). Three stocks showed improvement in status, increasing from a “low biomass” level to a level above the biomass reference point during the baseline period. Those stocks were Acadian redfish, Atlantic pollock and Western Georges Bank (GB) haddock. American plaice stock showed improvement from “overfished” to “low biomass,” while GOM haddock declined, shifting from above BMSY to “low biomass” during the baseline period. Meanwhile, witch flounder deteriorated from “low biomass” to “overfished” over the same period. Both GB and GOM cod showed slight improvement in biomass beginning in 2006, although both stocks remain overfished.

Catch Share Program

The average biomass ratio continued its slight upward trend in 2010, following a similar trajectory from the post-2005 baseline years. Both the percentage of stocks with low biomass and the percentage of stocks considered overfished remained relatively unchanged in the first year of the catch share program. One stock (white hake) exhibited an improvement in stock status from “overfished” to “low biomass”, but no other stocks exhibited a change in status during the first two years of the Sector Program. This lack of dramatic change matches expectations, since we would not expect biomass of stocks to change abruptly because of the implementation of the catch shares program or the imposition of annual catch limits (ACLs). Rather, it may take one or more fish generations (at least 5 years) to see improvements in biomass levels. Biomass data for 2011 were available only for four stocks, three of which—GB cod, GB yellowtail flounder, and SNE/MA yellowtail flounder—were overfished. We will monitor changes in biomass regularly as stock status information is updated.

Data Gaps and Limitations

Data for this indicator came from the most recent fisheries stock assessments for 14 of the 16 stocks allocated in the Northeast Multispecies Sector Program. Eastern GB cod and Western GB haddock are not included in this analysis because assessment documents did not include an estimate of BMSY. For GOM winter flounder and Atlantic pollock, the most recent assessment provides biomass estimates only through 2009. We did not attempt to extrapolate biomass levels for these stocks in order to fill in any missing values.

Focusing on average biomass on a stock-by-stock basis allows equal weighting of the different stocks, regardless of their overall biomass. Furthermore, we used the geometric mean of the biomass ratios rather than an arithmetic mean to ensure a proper comparison of species that were above or below the BMSY threshold.

It is important to remember that responses in stock biomass to changes in management or other factors take considerable time to realize. The response time varies from species to species based on generation time. Furthermore, the response may be partially or entirely masked by other factors, such as environmental conditions and predation. It may take a number of years of data to properly identify relevant trends.