

Mid-Atlantic Fishery Management Council actions and the Whiting fishery

Indirect effects of MAFMC management actions on the whiting fishery (includes red hake, silver hake, and offshore hake) were evaluated by looking for re-direction of participant effort from mid-Atlantic fisheries to the whiting fishery following MAFMC actions. In order to construct a realistic list of MAFMC actions to be evaluated, NMFS commercial landings data for 2001 were used to identify the relative importance of mid-Atlantic species to whiting fishery participants.

A total of 484 unique vessels were reported to have landed whiting in 2001. These vessels were categorized into one of nine “whiting landings classes” according to the total weight (lbs) of whiting landings per vessel in 2001 (1000-5000 lbs; 5000-10,000 lbs; 10,000-25,000 lbs; 25,000-50,000 lbs; 50,000-100,000 lbs; 100,000-250,000 lbs; 250,000-500,000 lbs; 500,000-1,000,000 lbs; 1,000,000+ lbs). Total 2001 landings (lbs) of MAFMC-managed species (bluefish, spiny dogfish, summer flounder, scup, black sea bass, Atlantic herring, monkfish, surf clams, ocean quahogs, golden tilefish, *Loligo* and *Illex* squid, Atlantic mackerel, and butterfish) by vessels in each landings class were then tabulated. The ratio of median, per-vessel mid-Atlantic landings to whiting landings identified the relative importance of these species to whiting fishery participants (Table 1). The count of vessels landing both whiting and mid-Atlantic species was also calculated for each landings class (Table 2). Note that among mid-Atlantic species, monkfish and *Loligo* squid stand out as consistently important (median landings per vessel > 10% of median whiting landings per vessel). Additionally, while the relative importance of *Loligo* squid to whiting fishery participants is greatest for vessels landing greater than 250,000 lbs of whiting, the relative importance of monkfish appears to be inversely related to whiting landings per vessel.

Quantitative analysis of the indirect effects of MAFMC management on the whiting fishery was initially considered for both *Loligo* squid and monkfish due to their relative importance (Table 1). The relative complexity, however, of the monkfish management system as well as the fact that monkfish and whiting are harvested with different gear types eliminated monkfish management actions from evaluation. *Loligo*

squid, on the other hand, which are harvested with the same gear as whiting and are managed under a simple, quota-based system allowed for a more straightforward evaluation of whiting fishery responses.

A closure of the *Loligo* squid fishery occurred from 29May-01Jul 2001 (66 FR 29238), essentially for the month of June 2001. In order for this action to have indirectly affected the whiting fishery, either directed whiting trips (whiting were >25% of total trip landings) or overall whiting landings (or both) should have changed in June 2001 relative to the time immediately before the action (for example, the month of May). Whiting landings and trips were tabulated for May and June from 1994 – 2001 in order to determine whether the proportions in May and June 2001 were atypical. Separate comparisons were done for vessels in the over 250,000lb per year whiting landings class and for all vessels landings whiting.

Compared to the 1994-2000 average, the proportion of directed whiting *trips* in June vs. May 2001 decreased both for vessels landing over 250,000lb per year and for all vessels combined (Table 3). The proportion of directed trips in June, however, is quite variable (range 77% in 1994 to 40% in 1999). It is unclear whether the proportional trips in 2001 reflect a response to the *Loligo* closure. Vessels that typically harvest both whiting and *Loligo* squid in the same trip may have suspended effort until they were free to harvest both species again, however, the data were not tested for support of this explanation.

Whiting *landings* in May and June 2001 were consistent with the 1994-2000 average (Table 4). This suggests that the ability of the fleet to harvest whiting was not reduced by the *Loligo* closure, and, in fact, results in increased landings per vessel per trip, on average.

Fisheries data were also examined in order to identify effects of scup GRAs on the whiting fishery. Two gear-restricted areas (Southern GRA: 1Jan – 30Apr; Northern GRA: 1Nov – 31Dec) were established that went into effect Nov 1, 2000 (65 FR 33486). The percent of total annual catch taken within GRA time/area specifications (pGRA) was calculated from vessel trip report (VTR) data for 1996 – 2001. This was done in order to compare catch in areas affected by GRAs before and after the GRAs went into effect. A noticeable downward shift in catch coming from areas where compliance requires

modification of gear would suggest that compliance is driving effort away from the affected area. Because the GRAs are seasonal, the Southern (Jan-Apr) and Northern (Nov-Dec) areas were examined separately. Although GRAs have been in effect since November 2000, VTR data for 2002 are not yet available. Therefore, for the Southern GRA, only the 2001 catch was compared to previous years catch, and for the Northern GRA, the 2000 and 2001 catch was compared to previous years.

Landings by the whiting fishery were highest in the Northern GRA; however, pGRA was quite low overall (range: 0.01% -1.09%; Table 5). For the Southern GRA, *increased* pGRA occurred in 2000 relative to previous years. The most noticeable decrease in pGRA in the time series occurred between 1998 and 1999, before the first GRA rule went into effect (Nov 2000). Whiting catch in the Northern GRA was consistently higher than in the Southern GRA suggesting that the Northern GRA is historically more important to this fishery than the Southern GRA. Although a downward shift in pGRA is present in the whiting time series from 2000 to 2001 (0.26% to 0.06%; Table 5), pGRA throughout the time series is marginal. The absence of a significant negative shift in pGRA suggests that the establishment of the scup GRAs has little effect on the whiting fishery with regard to harvest in the affected areas.

Table 1. Median landings (lbs) of mid-Atlantic-managed species in 2001 as a percent of whiting landings for each whiting landings class. Whiting landings class groups vessels by total 2001 whiting landings (lbs) reported for each vessel. Shaded cells indicates median catch of a given species is >10 % of median whiting catch. Median whiting landings within each class are given on the bottom row.

| Whiting Landings Class (lbs) | 1,000,000+ | 500,000 - 1,000,000 | 250,000 - 500,000 | 100,000 - 250,000 | 50,000 - 100,000 | 25,000 - 50,000 | 10,000 - 25,000 | 5,000 - 10,000 | 1,000 - 5,000 |
|------------------------------|------------|---------------------|-------------------|-------------------|------------------|-----------------|-----------------|----------------|---------------|
| # Vessels | 4 | 15 | 14 | 53 | 58 | 71 | 75 | 50 | 144 |
| Bluefish | 0.2% | 0.6% | 1.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.2% |
| Clam, Surf | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Dogfish, Spiny | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Flounder, Summer | 0.6% | 3.0% | 3.5% | 0.7% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% |
| Herring, Atlantic | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Mackerel, Atlantic | 0.1% | 0.4% | 0.4% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% |
| Monkfish | 5.5% | 4.9% | 12.5% | 22.9% | 85.9% | 153.4% | 232.9% | 318.9% | 587.9% |
| Quahog, Ocean | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Scup | 0.0% | 0.7% | 2.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Sea Bass, Black | 0.1% | 1.0% | 1.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Squid, Illex | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Squid, Loligo | 26.0% | 31.0% | 42.4% | 8.5% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Tilefish, Golden | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Whiting | 1,406,098 | 646,502 | 386,734 | 133,783 | 73,447 | 34,854 | 16,217 | 7,179 | 2,009 |

Table 2. Number of vessels in 2001 within each whiting landings class that also landed mid-Atlantic-managed species. Whiting landings class groups vessels by total 2001 whiting landings (lbs) reported for each vessel. Shaded cells indicates median catch of a given species is >10 % of median whiting catch (see Table 1). Cells corresponding to 1 to 3 vessels are indicated as "1 ≥ N ≥ 3" in order to comply with NAO 216-100).

| Whiting Landings Class (lbs) | 1,000,000+ | 500,000 - 1,000,000 | 250,000 - 500,000 | 100,000 - 250,000 | 50,000 - 100,000 | 25,000 - 50,000 | 10,000 - 25,000 | 5,000 - 10,000 | 1,000 - 5,000 |
|------------------------------|------------|---------------------|-------------------|-------------------|------------------|-----------------|-----------------|----------------|---------------|
| # Vessels | 4 | 15 | 14 | 53 | 58 | 71 | 75 | 50 | 144 |
| Bluefish | 1 ≥ N ≥ 3 | 15 | 12 | 27 | 27 | 30 | 24 | 20 | 74 |
| Clam, Surf | 0 | 0 | 0 | 0 | 1 ≥ N ≥ 3 | 0 | 1 ≥ N ≥ 3 | 0 | 0 |
| Dogfish, Spiny | 1 ≥ N ≥ 3 | 6 | 1 ≥ N ≥ 3 | 17 | 8 | 15 | 12 | 10 | 58 |
| Flounder, Summer | 4 | 14 | 12 | 33 | 29 | 27 | 30 | 17 | 50 |
| Herring, Atlantic | 1 ≥ N ≥ 3 | 6 | 4 | 7 | 7 | 7 | 7 | 0 | 8 |
| Mackerel, Atlantic | 1 ≥ N ≥ 3 | 15 | 13 | 37 | 37 | 29 | 31 | 18 | 47 |
| Monkfish | 4 | 15 | 14 | 53 | 58 | 71 | 74 | 50 | 137 |
| Quahog, Ocean | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Scup | 1 ≥ N ≥ 3 | 15 | 12 | 25 | 24 | 20 | 22 | 14 | 39 |
| Sea Bass, Black | 4 | 14 | 12 | 26 | 27 | 21 | 26 | 13 | 42 |
| Squid, Illex | 0 | 1 ≥ N ≥ 3 | 0 | 1 ≥ N ≥ 3 | 1 ≥ N ≥ 3 | 1 ≥ N ≥ 3 | 4 | 0 | 4 |
| Squid, Loligo | 4 | 14 | 13 | 31 | 28 | 23 | 28 | 15 | 40 |
| Tilefish, Golden | 1 ≥ N ≥ 3 | 5 | 1 ≥ N ≥ 3 | 6 | 5 | 4 | 1 ≥ N ≥ 3 | 0 | 8 |
| Whiting | 4 | 15 | 14 | 53 | 58 | 71 | 75 | 50 | 144 |

Table 3. Proportional distribution of directed whiting trips in May and June from 1994 - 2001 for vessels in the over 250,000 lb per year whiting class (left) and for all vessels landings whiting (right)

| over 250,000 lb per year | | | All vessels | | |
|--------------------------|-----|------|-------------|-----|------|
| Year | May | June | Year | May | June |
| 1994 | 23% | 77% | 1994 | 48% | 52% |
| 1995 | 51% | 49% | 1995 | 55% | 45% |
| 1996 | 55% | 45% | 1996 | 51% | 49% |
| 1997 | 62% | 38% | 1997 | 58% | 42% |
| 1998 | 44% | 56% | 1998 | 49% | 51% |
| 1999 | 60% | 40% | 1999 | 61% | 39% |
| 2000 | 45% | 55% | 2000 | 50% | 50% |
| 2001 | 57% | 43% | 2001 | 59% | 41% |
| Avg 94-00 | 49% | 51% | Avg 94-00 | 53% | 47% |

Table 4. Proportional distribution of whiting landings in May and June from 1994 - 2001 for vessels in the over 250,000 lb per year whiting class (left) and for all vessels landings whiting (right)

| over 250,000 lb per year | | | All vessels | | |
|--------------------------|-----|------|-------------|-----|------|
| Year | May | June | Year | May | June |
| 1994 | 32% | 68% | 1994 | 46% | 54% |
| 1995 | 34% | 66% | 1995 | 49% | 51% |
| 1996 | 55% | 45% | 1996 | 50% | 50% |
| 1997 | 57% | 43% | 1997 | 51% | 49% |
| 1998 | 37% | 63% | 1998 | 43% | 57% |
| 1999 | 54% | 46% | 1999 | 53% | 47% |
| 2000 | 50% | 50% | 2000 | 48% | 52% |
| 2001 | 46% | 54% | 2001 | 49% | 51% |
| Avg 94-00 | 46% | 54% | Avg 94-00 | 49% | 51% |

Table 5. VTR-reported landings of whiting from 1996 - 2001 in the Southern and Northern GRAs as well as for the whole year.

| GRA | Year | VTR landings (lbs) | pGRA |
|--------------------------|------|--------------------|--------------------|
| Southern 1Jan - 30Apr | 1996 | 54,379 | 0.12% |
| | 1997 | 126,659 | 0.30% |
| | 1998 | 83,928 | 0.20% |
| | 1999 | 2,159 | 0.01% |
| | 2000 | 3,706 | 0.01% |
| | 2001 | 67,779 | 0.18% |
| | | Year | VTR landings (lbs) |
| Northern Nov-Dec | 1996 | 14,405 | 0.03% |
| | 1997 | 414,321 | 0.98% |
| | 1998 | 447,581 | 1.09% |
| | 1999 | 60,425 | 0.15% |
| | 2000 | 94,586 | 0.26% |
| | 2001 | 22,742 | 0.06% |
| | | Year | VTR landings (lbs) |
| Whole Year | 1996 | 45,573,249 | |
| | 1997 | 42,277,732 | |
| | 1998 | 41,209,309 | |
| | 1999 | 40,349,698 | |
| | 2000 | 36,937,927 | |
| | 2001 | 37,894,872 | |