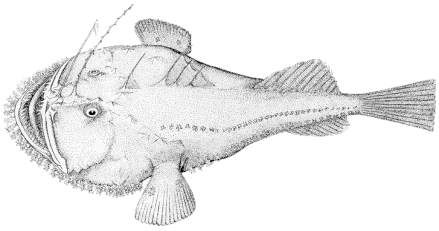


MONKFISH IN DIVISIONS 3L, 3N, 3O AND SUBDIVISION 3Ps

Background

The monkfish or goosefish (Lophius americanus) is a bottom dwelling, lethargic fish that lives in relatively warm waters. In the western Atlantic, it is found occasionally as far north as the Labrador Shelf, but more commonly on the southern Grand Banks, throughout the Gulf of St. Lawrence, on the Scotian Shelf and in the Bay of Fundy, and further south to northern Florida. It has been found in depths from the tide line down to about 650 meters (355 fathoms). It is found in temperatures from 0-21° C, although the preferred condition on the Grand Banks is where temperatures exceed 3° C. Limited studies on the Scotian Shelf have indicated a seasonal migration to shallower water in summer and deeper water in winter.

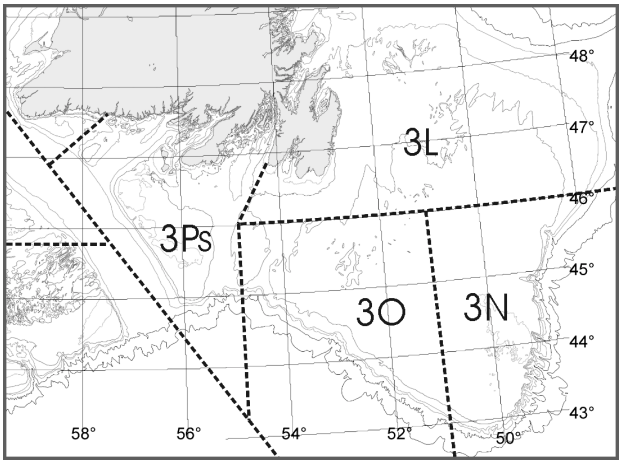
Spawning is thought to occur from June to September in Canadian waters. Females lay a buoyant mucoid egg mass as long as 12m. Upon hatching, larvae with enlarged dorsal head spines and pelvic fins float to the surface, spending several months in a pelagic phase, then settle to the bottom as post-larvae. Young stages have been found as far north as the northeastern edge of the Grand Banks.

Growth appears to be fairly rapid and similar between sexes. Limited information suggests that they reach a length of about 11 cm (3 inches) at age 1, and lengths of about 76 cm (30 inches) and 102 cm (40 inches) at ages 7 and 10, respectively. Monkfish is thought to be a relatively short lived species, with a maximum age of about 11 years. The largest specimens weigh about 27 kg.

Monkfish are voracious predators, consuming a wide variety of fish and invertebrates, sometimes almost as big as themselves. The fishing 'lure' on its head serves as an attraction to prey.

The stock structure of monkfish is not known. However, on the Grand Banks, its distribution is restricted to the southwest slope and adjacent Laurentian Channel. Survey distributions do not indicate a discontinuity with fish to the south and west. Degree of mixing with monkish on the Scotian Shelf is unknown.

Until recently, monkfish were taken only as bycatch in 3LNOPs, but with the decline in other resources, a directed trawl fishery was initiated in 1991. An experimental gillnet fishery was carried out in 1993-1994 and, since then, a limited directed fishery has been prosecuted using primarily gillnets. In 1999-2000, there are no quota restrictions for this species.



Summary

- There are deficiencies in the knowledge of monkfish in 3LNOPs: information on size and age structure, growth rates, age of maturity, commercial catch size and ages, and uncertainties in reported landings all limit our ability to assess this species.
- The monkfish population has shown significant fluctuations in survey

biomass over the years, but the extent of distribution has been stable.

- The ratio of commercial removals to survey biomass index has declined, due mainly to lower reported catches. Closure due to bycatch restrictions has regulated the catches.

The Fishery

Canadian catches, since extension of jurisdiction in 1977, remained less than 200 t annually until 1991. During that period all landings were bycatch. A directed experimental trawl fishery began in 1991, and 314 t was caught that year.

Landings (t)

Year	77-90 Avg.	91-94 Avg.	1995	1996	1997	1998	1999	2000[1]
TAC			.2	.2	.2			
Can.	+	.2	.2	.4	.6	.4	.2	.1
Others	.8	.1	+	+	+	+	+	+
Total	.8	.3	.2	.4	.6	.4	.2	.1

[1] Provisional

[+] Catch less than 100 t

Most effort shifted to gillnets after a successful experimental fishery in 1993-94, and 836 t was taken in 1994. The 1995 catch fell to only 170 t under a precautionary quota restriction of 200 t. An average of 350 t has subsequently been taken annually by Canada.

Canadian catches have come predominantly from Division 3O and Subdivision 3Ps. In 1995-2000, 59% was reported from 3O and 36% from 3Ps. Prior to 1991, most monkfish were discarded by the Canadian fleet.

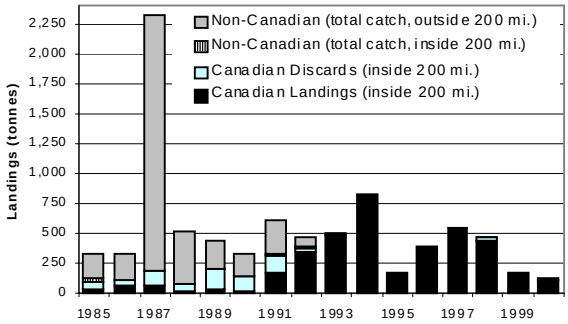


Figure 1 – Catches of monkfish by country and location, 1985-2000 (2000 is preliminary).

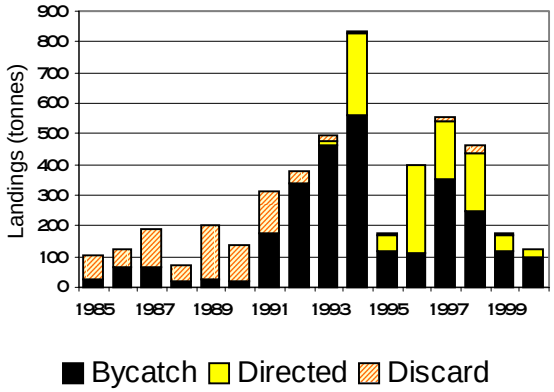


Figure 2 – Canadian catches in 3LNOPs, directed and bycatch including estimates of discarding, 1985-2000 (2000 is preliminary).

Monkfish caught during the 1995-2000 Canadian fishery ranged in size from 40 to 118 cm (17-46 inches) total length, although most were within 60-100 cm (24-39 inches) and averaged about 80 cm (32 inches). The predominant gear used to capture monkfish was gillnet, using large (300 or 356 mm) mesh.

Non-Canadian catches have generally been less than 500 t annually, although it was reported that about 3,500 t were taken in 1977 and 1,808 t in 1987. It is possible that the 1987 figure may be inflated due to mis-reporting. Most of the non-Canadian catches have been from Division 3N and are likely attributable to bycatch in other fisheries. No non-Canadian catches have been reported since 1994.

Resource Status

The only information available for monkfish in this area comes from research surveys. The **survey relative biomass indices** for the different areas clearly indicate that most monkfish (99%) are found in Division 3O and Subdivision 3Ps, with 66% in 3O and are distributed along the southwest slope of the Grand Banks and into the Laurentian Channel.

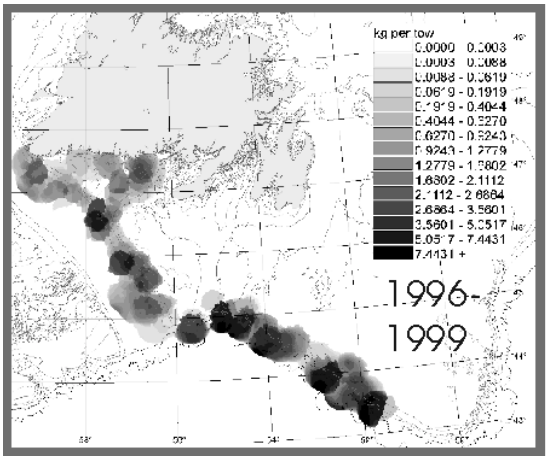


Figure 3 – Distribution of monkfish based on spring 1996-1999 surveys.

Estimates of biomass have fluctuated over the years, reaching a low point in the late seventies, then increasing substantially and peaking in the late 1980s. The index declined suddenly after 1991 and has fluctuated since.

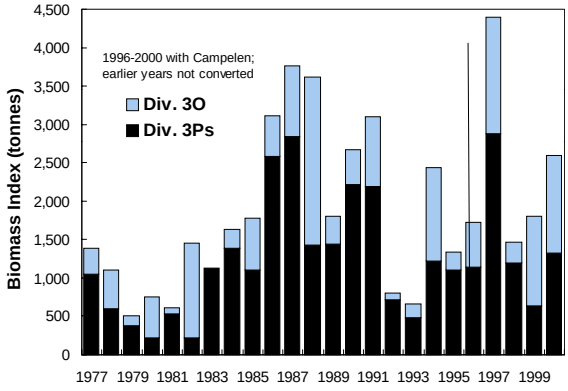


Figure 4 – Spring survey relative biomass index for monkfish, 1977-2000.

Although fisheries data indicate that catches have been taken in both divisions 3L and 3N, the spring surveys from 1977 to the present have not found any monkfish in 3L, and very few in 3N. The fall survey occasionally encounters monkfish as far north as 2J where bottom temperatures are warmest.

Average size of monkfish (biomass/abundance) from the spring survey has declined since 1996. Whether this decline relates to an increased proportion of smaller fish present in the population or a decline in adults is unclear. The abundance index for 2000 is the highest in the Campelen time series.

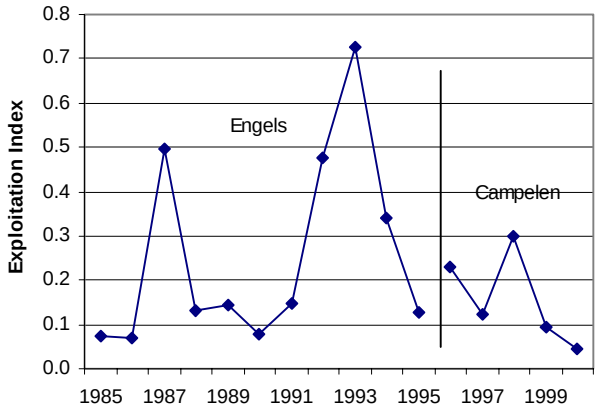


Figure 5 – Index of exploitation (total commercial catch/spring survey biomass) for Monkfish.

The patterns in the biomass and abundance indices over time suggest that monkfish are subject to natural fluctuations, perhaps not surprising for a fecund, relatively short lived fish. The large inter-annual fluctuations observed between years suggest changes in catchability from year to year. Due largely to the reduction in catches since 1997, the exploitation index has declined over the past 3 years.

Sources of Uncertainty

Monkfish are not caught in great abundance during research surveys and have not been routinely studied. Size, growth rates, ages, maturity, fecundity, movements and stock structure are all unknown.

Outlook

The status of monkfish in 3LNOPs is difficult to evaluate based on existing data. Survey biomass and abundance patterns show considerable fluctuation among years. Variable catchability for this species makes it difficult to monitor. In 2000, average size was at a low in the time series while abundance was at it highest suggesting a good year class. Landings have declined over the past 4 years. This species is not under restriction of quota and thus catches are market driven. Should market conditions change leading to increased catches, exploitation will have to be closely monitored.

For More Information

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