3.4 Gulf of Maine haddock

Catch and Survey Indices

Between 1960 and 2000, landings of Gulf of Maine haddock have generally ranged between 2,000 and 6,000 mt per year with occasional periods of higher or lower catches (Figure 3.4.1). Following recruitment of the 1975 and 1978 year classes, landings of haddock in the Gulf of Maine ranged between 6,000 and 8,000 mt from 1980 to 1984. Landings declined steadily between1982 and the mid 1990s, reaching an historic low of 112 mt in 1994. Haddock landings have increased steadily since 1994 reaching 1,000 mt in 1998 but declined thereafter to about 600-700 mt in 1999 and 2000.

Survey biomass indices (stratified mean weight/tow) are available from the NEFSC spring (1968 to 2000) and autumn (1963 to 2000) surveys. Spring survey biomass indices declined from high levels during the late 1970s to record low levels by 1990 (Figure 3.4.1). During the1990s, spring survey indices remained at chronic low levels, with the exception of 1997, 1999, and 2000. The 2000 biomass index was the highest observed since 1985.

NEFSC autumn survey biomass indices declined from very high levels in the mid -1960s to low levels in the early 1970s. The indices increased during the late 1970s and early 1980s following recruitment of the 1975 and 1978 year classes, and subsequently declined to historic low levels in 1991. Biomass indices increased gradually during the mid 1990s and more rapidly beginning in 1996. The 1999 autumn survey biomass index was the highest observed since1985, and the 2000 biomass index is approaching levels observed during the mid 1960s.

Stock Assessment

The Gulf of Maine haddock stock was last assessed in 2000, and the results were reviewed at the 32nd Northeast Regional Stock Assessment Workshop in 2000 (NEFSC 2001b). At that time, exploitation ratios (catch/survey biomass) had declined and were among the lowest on record. Total survey biomass indices had begun to increase from the very low levels of the early 1990s, and survey indices at age reflected an increase in recruitment and some broadening of the age structure. The survey indices for younger ages indicated improved recruitment, especially for the1998 year class.

Relative Exploitation Rate Analyses

The replacement level of relative F is estimated to be 0.23 (Table 4.1.1). By either fixing the biomass index associated with MSY or MSY itself, the other quantity can be calculated from MSY/I = relF. During the period 1959-1966 landings of Gulf of Maine haddock averaged 5,100 mt and were stable (Clark et al. 1982). If this value is fixed as MSY, then the recommended Bmsy proxy is 5.1/0.23 = 22.17 kg/tow. This value is within the observed survey series (Figure 3.4.1) and is similar in relative increase to that proposed for the Georges bank haddock stock. These two stocks are believed to be closely linked (Figure 3.4.3), so the proposed increases in their reference points (different scales but approximately similar proportional increases in proposed BMSY) seem warranted.

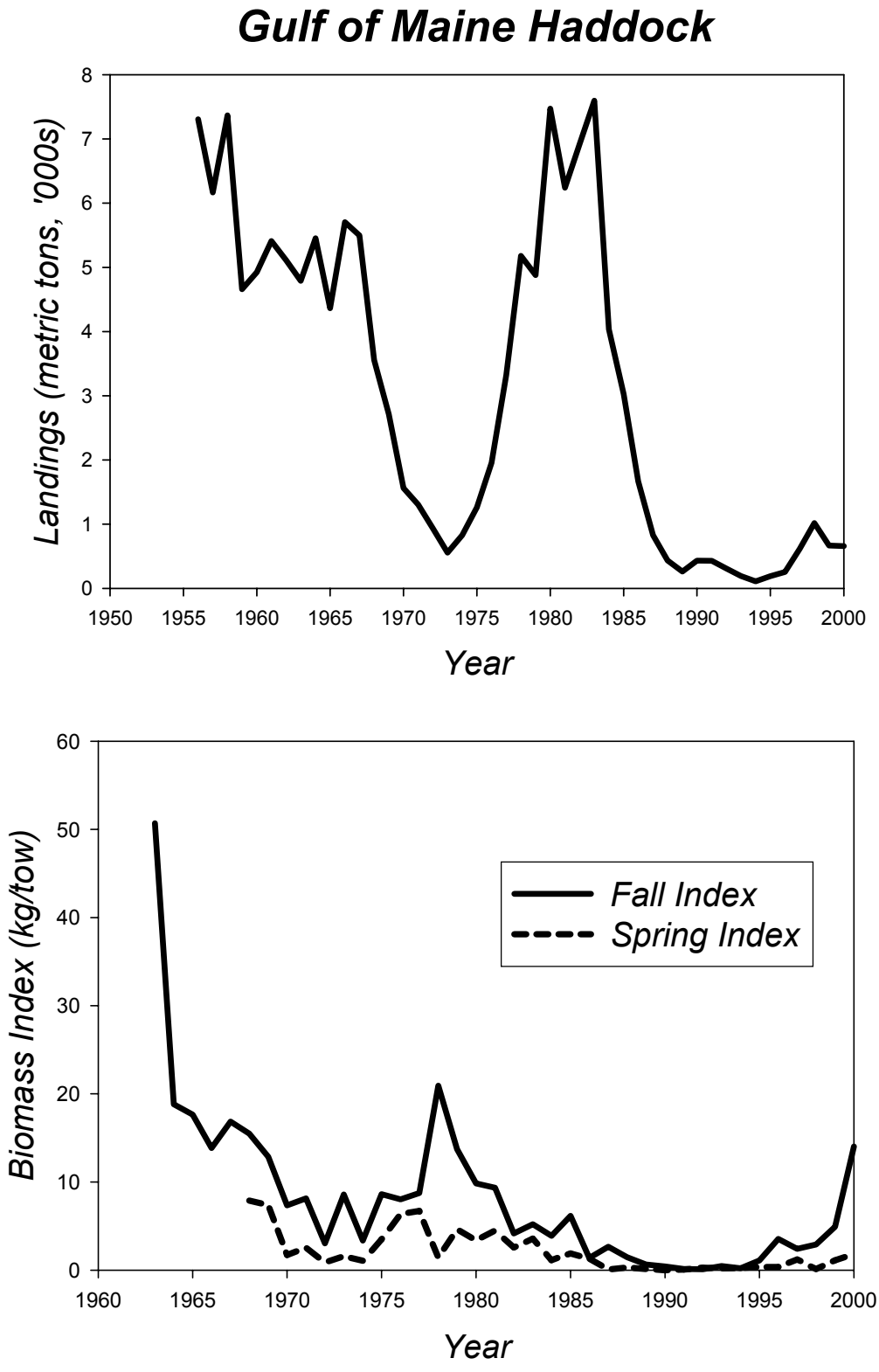


Figure 3.4.1. Landings and research vessel survey abundance indices for Gulf of Maine haddock.

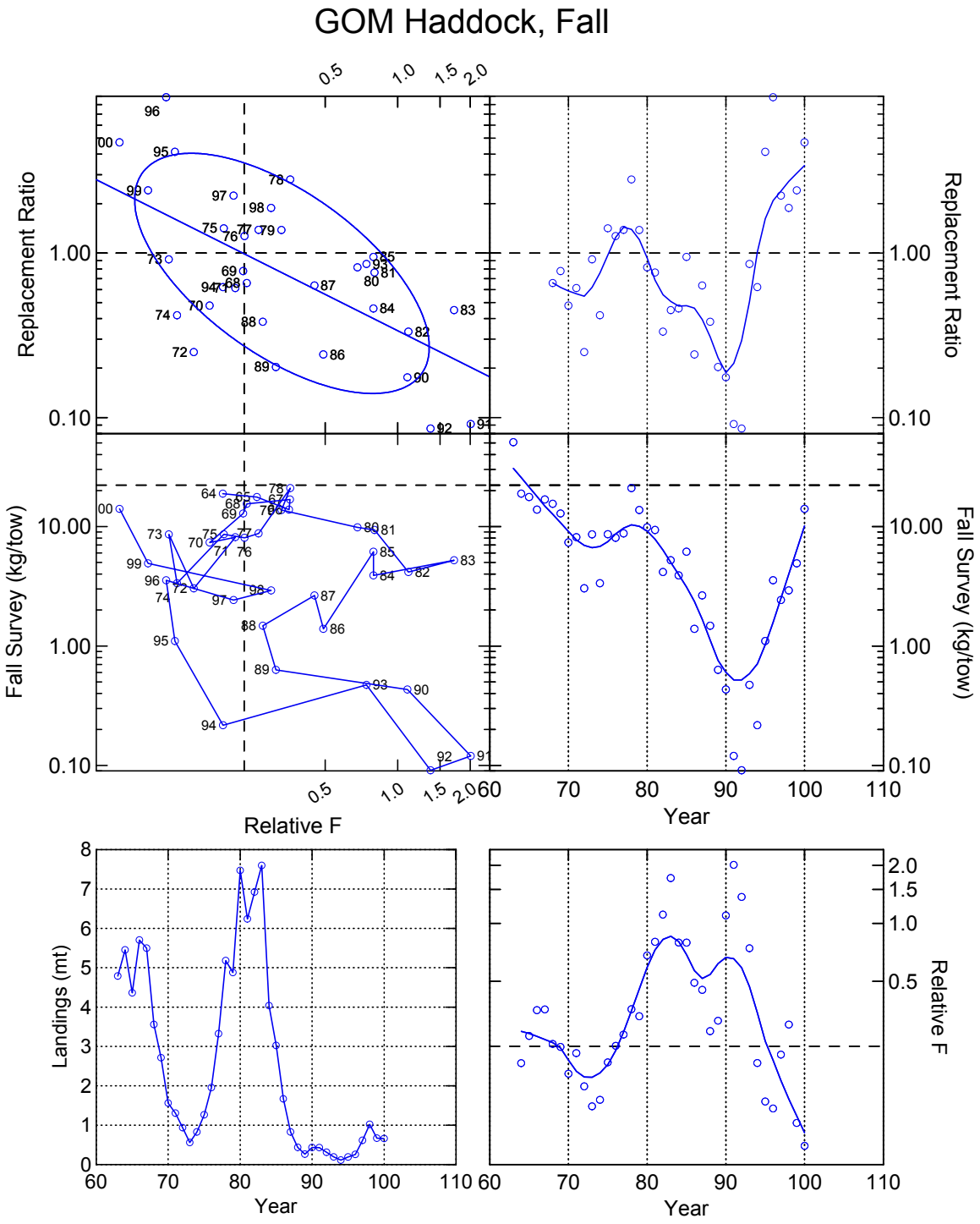
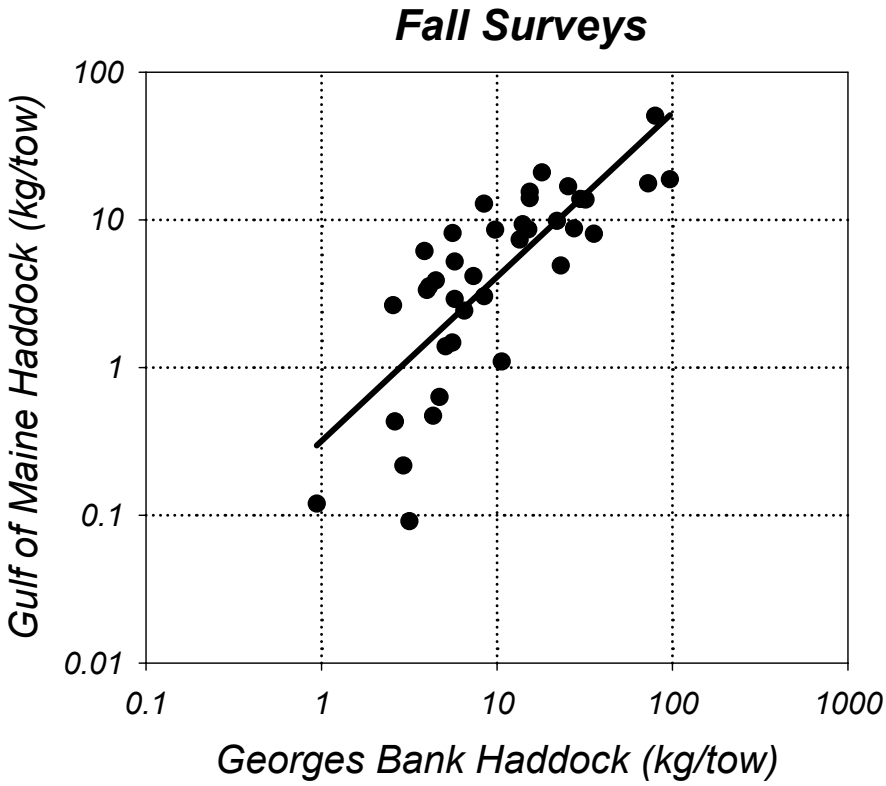


Figure 3.4.2. Trends in relative biomass, landings, fishing rate mortality rate indices (landings/ survey index) and replacement ratios for Gulf of Maine haddock - fall. Dashed lines indicate proposed biomass and fishing mortality rate proxies of Bmsy and Fmsy.



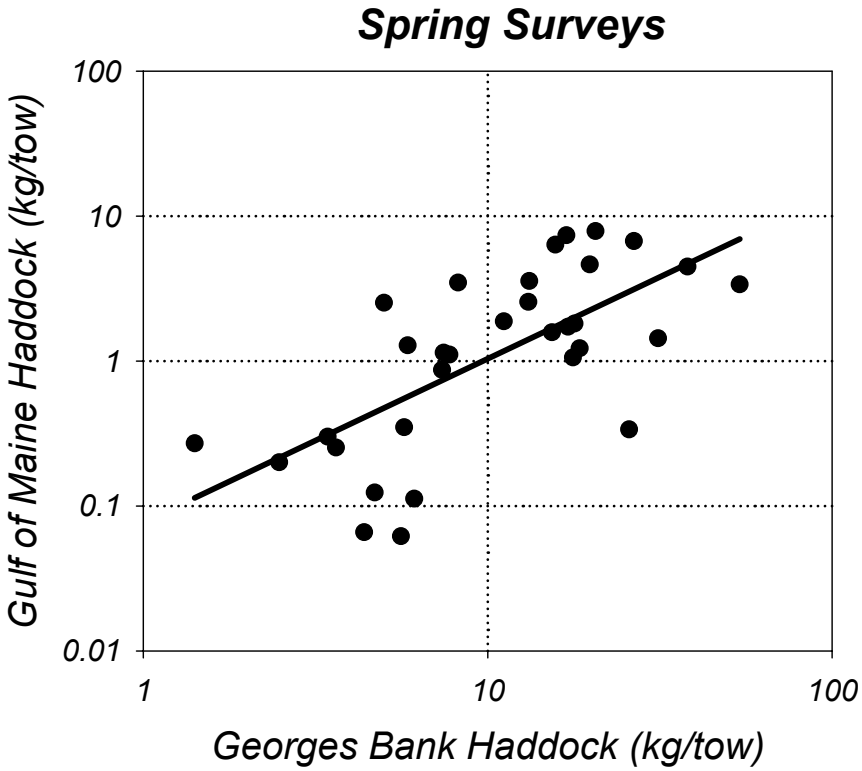


Figure 3.4.3. Relationships between survey abundance indices for Gulf of Maine and Georges Bank haddock in fall and spring surveys. Data are annual weight per tow indices (kg).