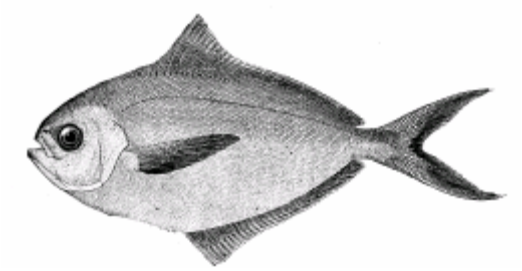

Last Revised: December 2006

Butterfish

by

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Distribution, Biology and Management

The butterfish, *Peprilus triacanthus*, is a small, bony foodfish weighing up to 0.5 kg, with a thin oval body. Butterfish are short-lived and grow rapidly. Few live to more than 3 years of age, and most are sexually mature at age 1. Butterfish range from Florida to Newfoundland, but are primarily found from Cape Hatteras to the Gulf of Maine where the population is considered to be a unit stock (Figure 24.1).

The Butterfish migrate in response to seasonal changes in water temperature. During summer, butterfish move northward and inshore to feed and spawn. Spawning occurs during June to August, and peaks progressively later at higher latitudes. During winter, butterfish move southward and offshore to avoid cool waters. Butterfish are primarily pelagic, and form loose schools that feed upon small fish, squid, and crustaceans. Butterfish have a high natural mortality rate and are preyed upon by many species including silver hake, bluefish, swordfish, and long-finned squid. During summer, juvenile butterfish associate with jellyfish to avoid predators.

The butterfish stock is managed using annual quotas under the Mid-Atlantic Fishery Management Council's Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. The information provided herein reflects the results of the most recent peer-reviewed assessment for the butterfish stock (NEFSC 2004).

The Fishery

Commercial landings of butterfish increased in the late 1960s and early 1970s due to distant water fleet fisheries and total landings peaked at 34,300 mt in 1973 (Figure 24.2). Discards of butterfish in fisheries targeting other species can be considerable and annual estimates have recently averaged between 1,000-9,200 mt (Table 24.1). US commercial landings, which averaged 3,200 mt per year during 1965-2002, peaked at 11,972 mt in 1984. Since 1985, landings declined and in 2005 were 432 mt, at record-low (Table 24.1).

Research Vessel Survey Indices

Biomass indices in NEFSC NEFSC spring research vessel surveys were generally higher in the early 1970s and mid 1980s than in the late 1980s and early 1990s. (Figure 24.3). The spring survey indices increased in the late 1990s but then declined slightly and have since been stable. NEFSC autumn biomass indices exhibited large fluctuations during 1980-2000 but have since declined to record low levels. Age groups 0-2 are common in the surveys, with the age 0 catch dominating in number. Very few 3 and 4 year olds were in the survey catches (Figure 24.4).

Assessment Results

Average fishing mortality estimates (age 1+, unweighted) have fluctuated between 0.12 and 0.65 since 1980 and was 0.34 in 2002 **(**Figure 24.5). Spawning biomass has fluctuated between 7,800-62,900 mt during 1968-2002 and has declined since 1980. In 2002 spawning biomass was 8,700 mt, one of the lowest values in this time series (Figure 24.6). Recruitment biomass has also been highly variable, varying between 10,000-50,000 mt (Figure 24.6). The 2001 and 2002 year class are among the lowest observed.

Biological Reference Points

Yield reference points were last estimated in the 1983 assessment (Waring and Anderson 1983) and are shown in Table 24.2.

The SSB-recruitment plot for butterfish shows that recruitment is highly variable over a wide range in SSB for 10,000-50,000 mt (Figure 24.7). Survival ratios for butterfish were generally high in the 1970s, low in the 1980s, and relatively high in the 1990s (Figure 24.8).

New MSY reference points were estimated in the most recent assessment conducted in 2003 (NEFSC 2004). A Fox model of surplus production for 1965-2002 produced an MSY = 12,175 mt (including discards), B_{msy} = 22,798 mt, and F_{msy} = 0.38. However, there is considerable uncertainty in these estimates.

Table 24.1. Commercial landings and discards of butterfish (thousand metric tons).

Category	1986-95 Average	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
U. S. Recreational	-	-	-	-	-	-	-	-	-	-	-
Commercial											
U.S. Landings	3.2	3.5	2.8	2.0	2.1	1.4	4.4	0.9	0.5	0.5	0.4
U.S. Discards	5.3	6.8	3.9	3.3	4.1	2.4	7.3	1.8	n/a	n/a	n/a
Foreign	24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Nominal Catch	32.5	10.3	6.7	5.3	6.2	3.8	11.7	2.7	0.5	0.5	0.4

Table 24.2. Yield and MSY based reference points for butterfish.

Yield per Recruit-based Reference Points

$F_{0.1}$ = 1.60

MSY-based Reference Points

MSY = 12,175 mt

B_{msy} = 22,798 mt

F_{msy} = 0.38

For further information

Murawski, S. and G. Waring. 1979. A population assessment of butterfish, *Peprilus triacanthus*, in the Northwest Atlantic Ocean. Trans. Am. Fish. Soc. 108:427-439.

NEFSC [Northeast Fisheries Science Center] 2004. B. Atlantic butterfish. Report of the 38th Northeast Regional Stock Assessment Workshop (38th SAW): Stock Assessment Review Committee (SARC) Consensus Summary of Assessments. Cent. Ref. Doc. 04-03. 246 p.

Waring, G.T., and E.D. Anderson. 1983. Status of the northwestern Atlantic butterfish stock 1983. NEFSC Lab. Ref. Doc. 81-41, p?

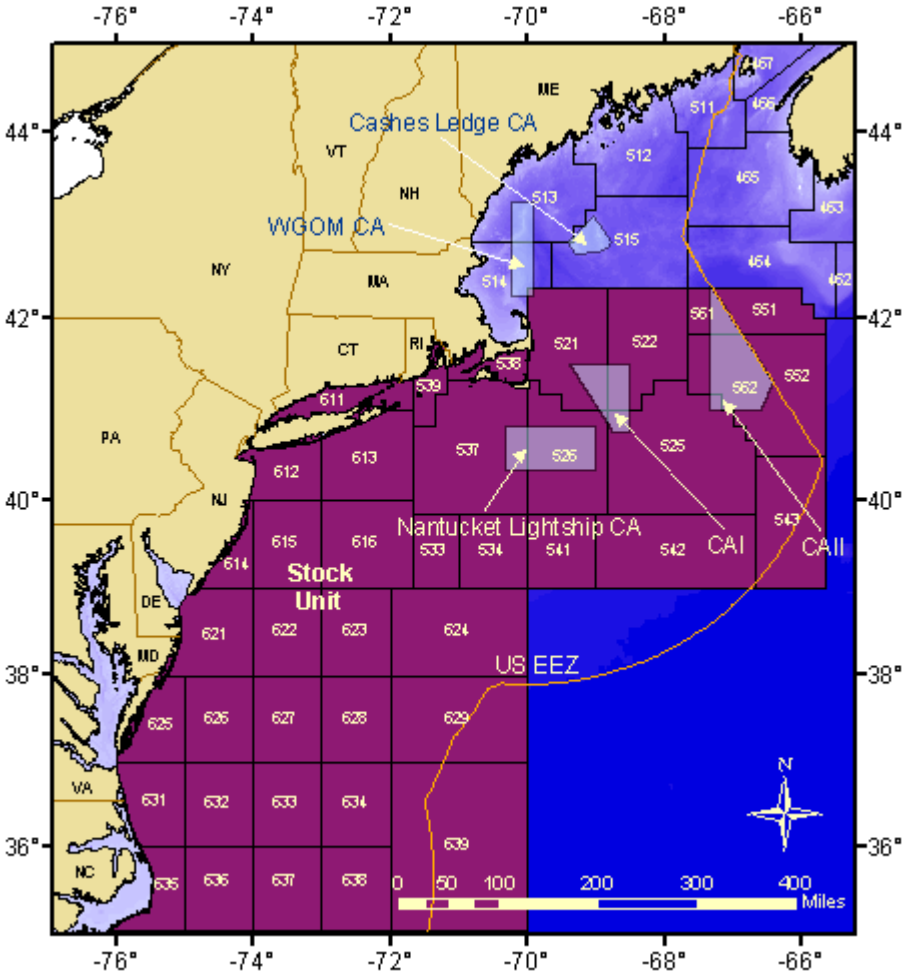

Figure 24.1. Statistical areas used to define the butterfish stock.

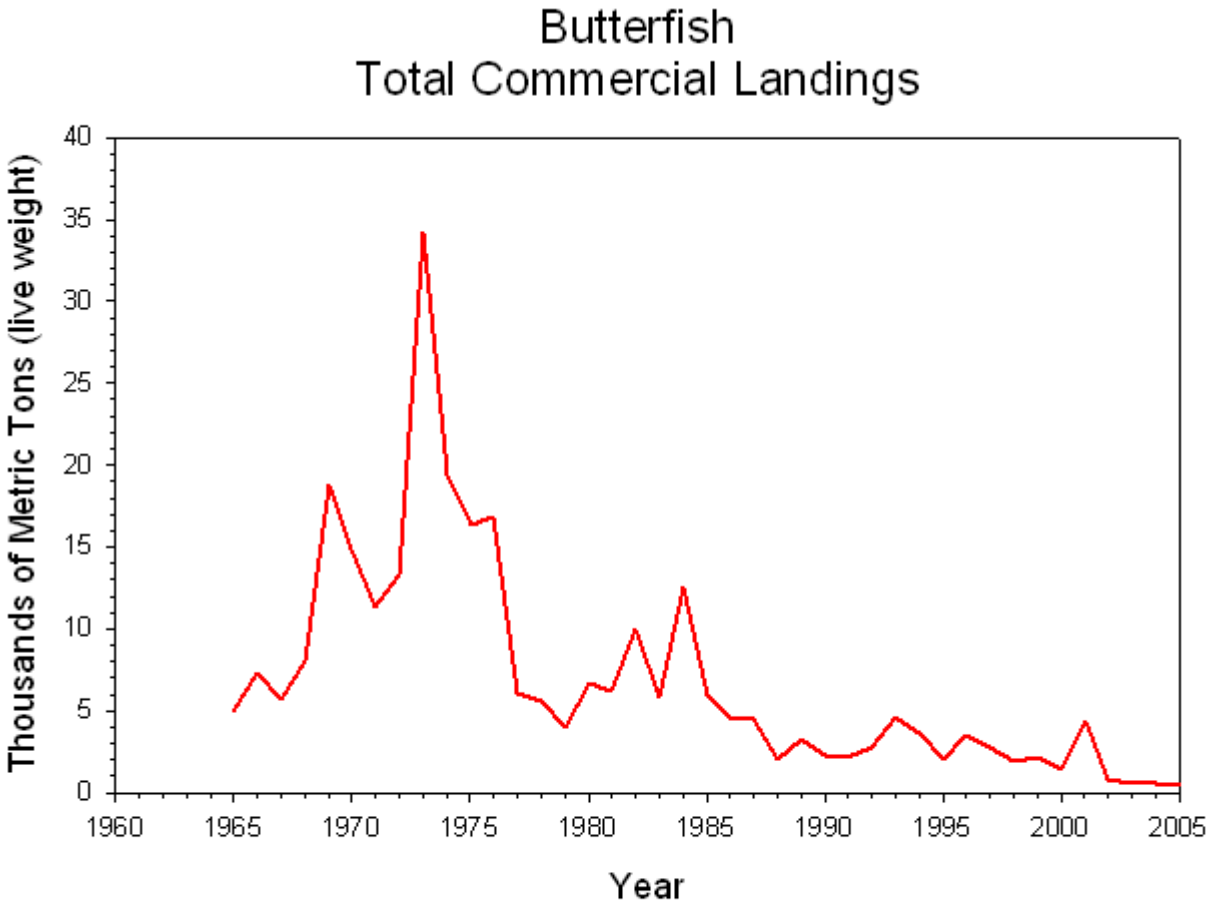

Figure 24.2. Total commercial landings of butterfish (NAFO SA 5 and 6), 1960-2005.

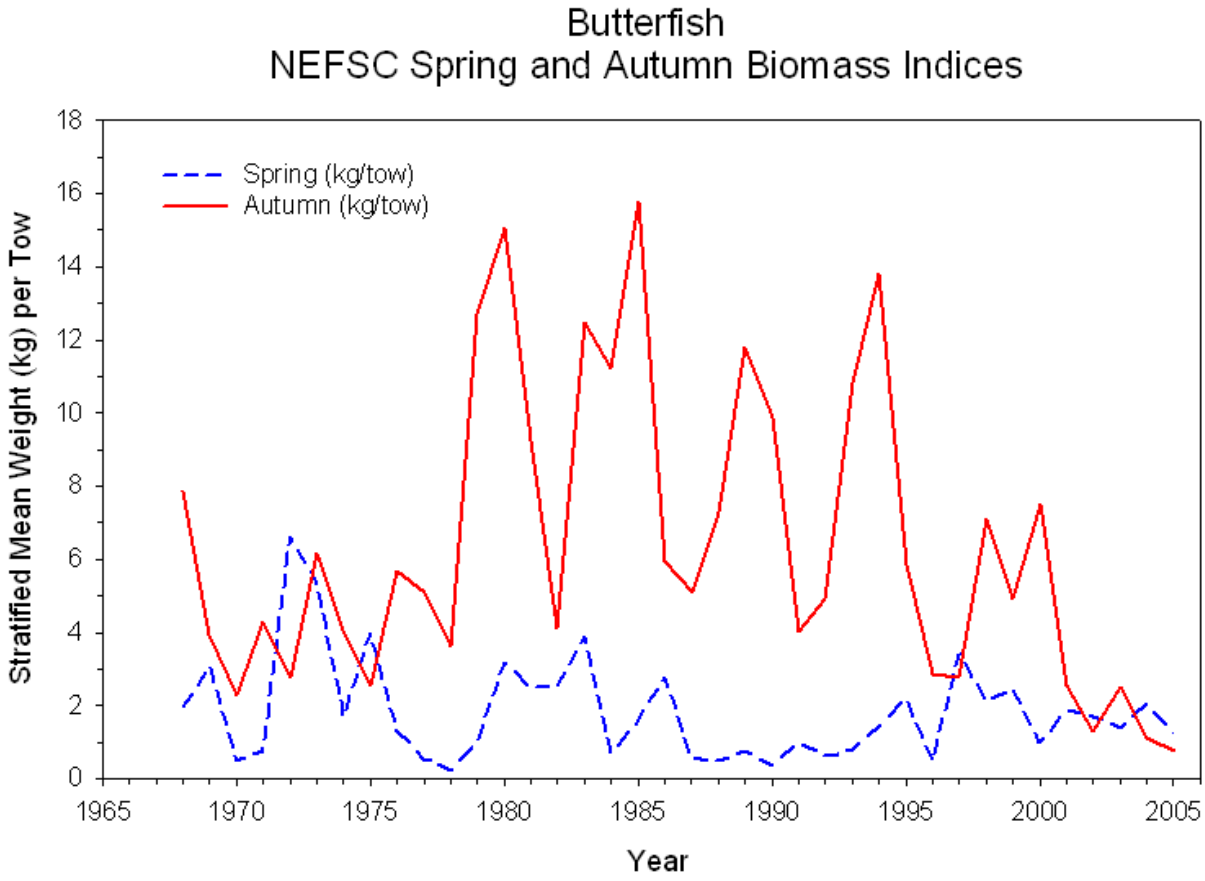

Figure 24.3. Biomass indices (stratified mean weight per tow) for butterfish from NEFSC spring and autumn research vessel surveys.

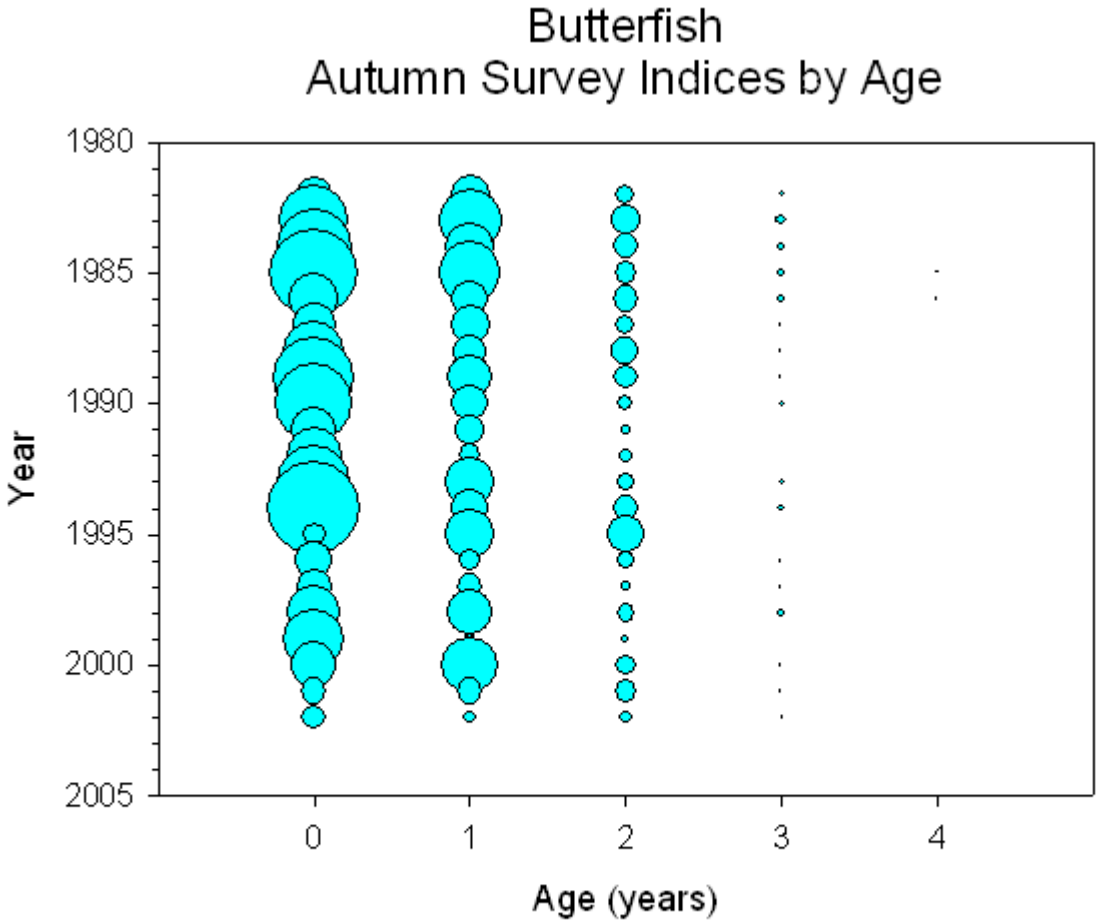

Figure 24.4. Age structure of the butterfish population, 1982-2002.

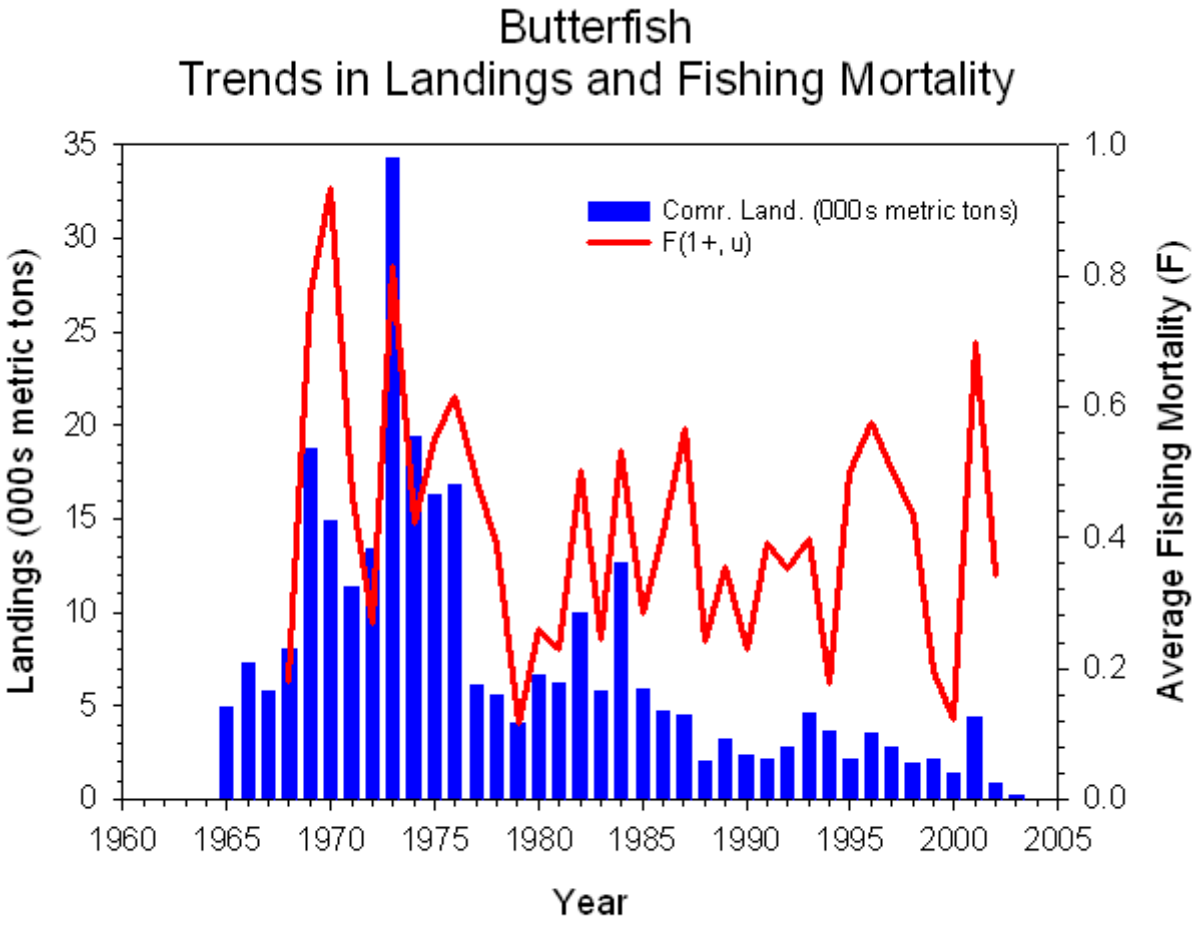

Figure 24.5. Trends in landings and fishing mortality for butterfish.

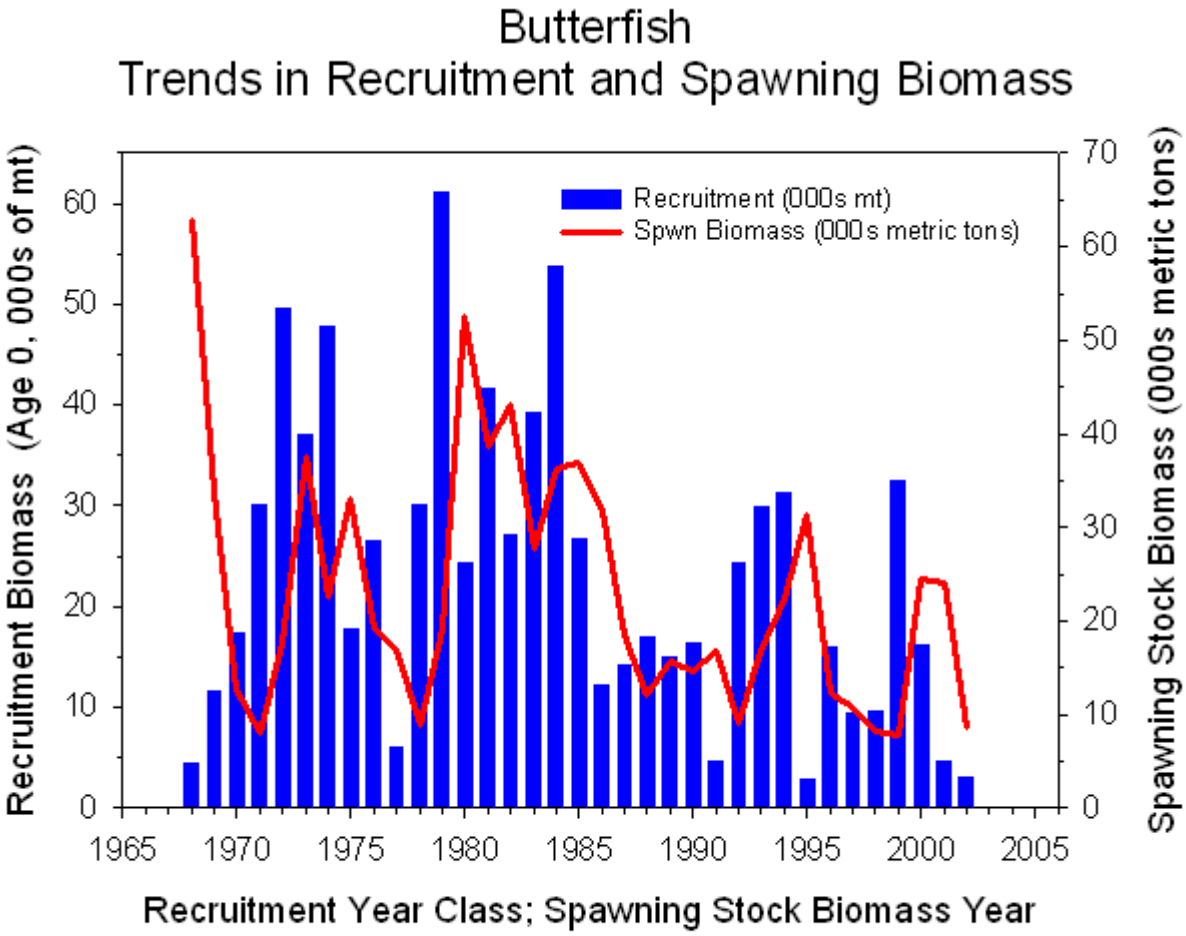

Figure 24.6. Trends in recruitment (age 0) and spawning biomass for (age 1+) butterfish.

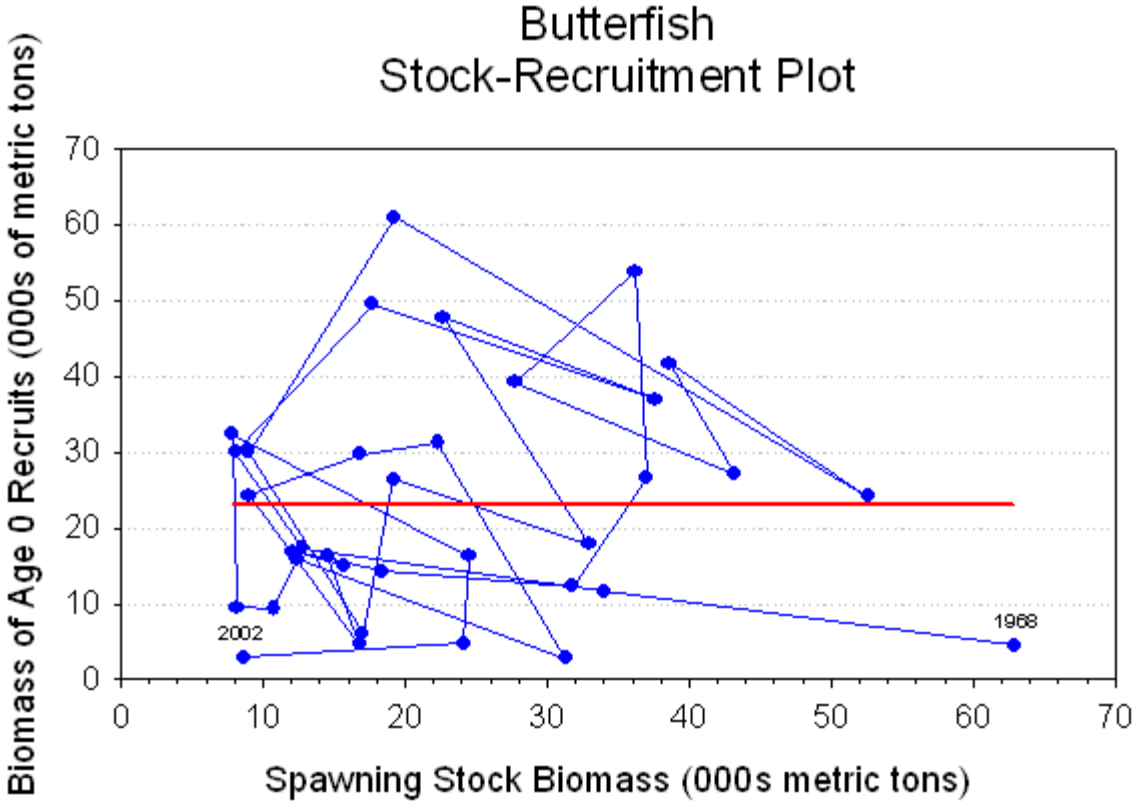

Figure 24.7. Spawning stock-recruitment scatter plot for butterfish. The solid horizontal line represents the geometric mean recruitment (23,200 mt of age 0 biomass).

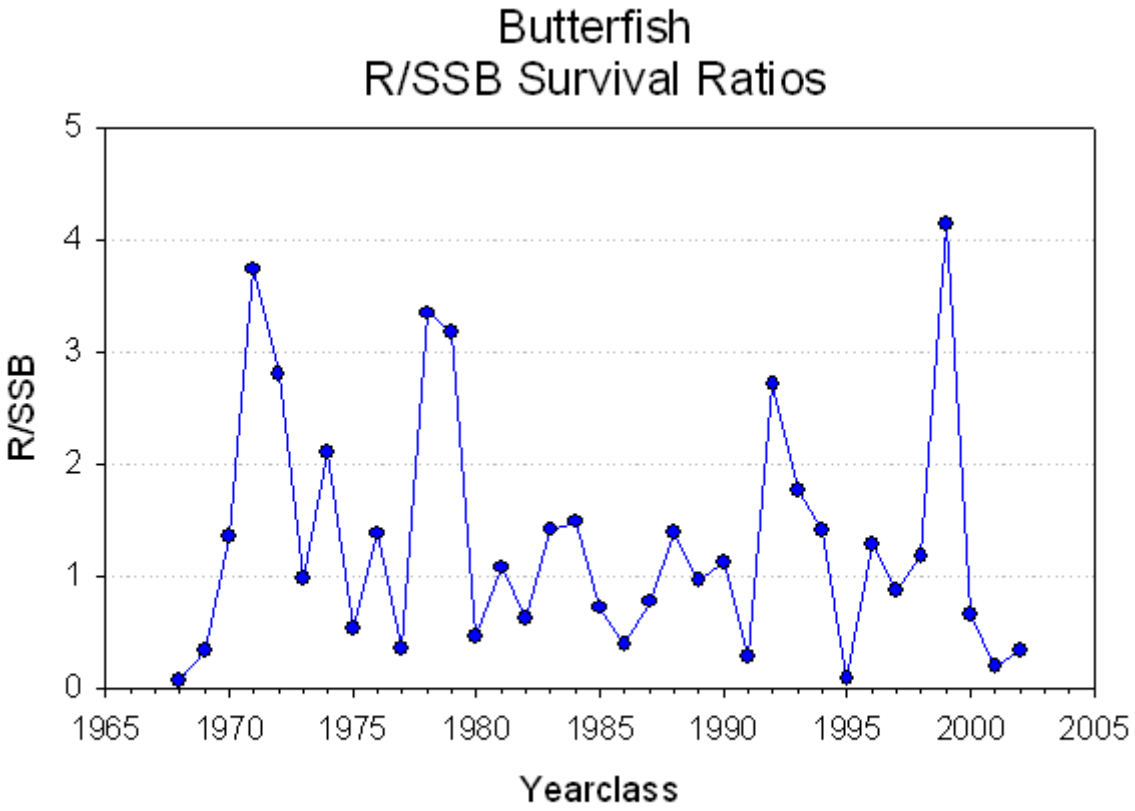

Figure 24.8. Trends in survival ratios (R/SSB) for butterfish.