

RHODE ISLAND MARINE FISHERIES STOCK STATUS & MANAGEMENT

2007 IN REVIEW

Report presented to the
Rhode Island General Assembly

By

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Our mission is to ensure that the Freshwater, Marine, and Wildlife Resources of the State of Rhode Island will be conserved and managed for equitable and sustainable use.

EXECUTIVE SUMMARY

This report summarizes the status marine fisheries resources, management, and related activities in Rhode Island for 2007.

Rhode Island commercial fisheries landed almost 34 thousand metric tons valued at approximately \$77 million in 2007, all species combined. The recreational fisheries harvested 2,065 metric tons in 2007. Over half of recreational anglers were non-residents, as has been the case the past twenty-seven years.

The most recent stock assessment information suggests that ten marine species important to Rhode Island are not overfished and overfishing is not occurring. These are the stocks of Atlantic herring, Atlantic mackerel, Atlantic menhaden, Atlantic striped bass, bluefish, longfin squid (*Loligo*), silver hake—Southern stock, little skates, spiny dogfish, and witch flounder. Six species of commercial importance to Rhode Island are considered overfished and experiencing overfishing: monkfish, scup, tautog, winter flounder—Southern New England stock, winter flounder—Narragansett Bay stock, and yellowtail flounder—Southern New England / Mid-Atlantic stock. The Atlantic sturgeon, butterfish, quahog, and windowpane flounder—Southern New England / Mid-Atlantic stocks are overfished, but overfishing is not occurring. The American lobster—Southern New England stock, summer flounder, and tautog stocks are experiencing overfishing, but these stocks, with the exception of tautog, are not overfished or the status relative to overfished is unknown.

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1 INTRODUCTION

The Rhode Island Division of Fish and Wildlife's (RIDFW) Marine Fisheries Section prepares annual reports on the conservation and management of marine fisheries resources for the General Assembly and the citizens of the State. Data presented reflect the most currently available at the time this report was written. The current report provides a review of the fishing industry, resource status, management, and programs relevant to RI marine fisheries in 2007.

2 INDUSTRY STATUS

2.1 Commercial Fishery

Rhode Island commercial fisheries support approximately 2,495 license holders. Rhode Island commercial fisheries landed 34 thousand metric tons. Landings of groundfish, squids, shellfish, and lobster provide the mainstay of the industry (Tables 2.1, 2.2). The commercial landings of longfin squid were the largest in terms of weight and value in 2007. Squid landings had brought in the most weight compared to other species until 2006, but is now the highest again. Following longfin squid, American lobster and sea scallops were the most valuable commercial species in Rhode Island during 2007. Despite being the highest valued species landed in 2007, the estimated value of commercial longfin squid landings showed a 20% decrease between 2006 and 2007 (Table 2.2).

The direct dockside value of total commercial landings has been somewhat variable over the last ten years between a high of \$86 million recorded in 1999 and a low of \$64 million in 2002 (National Marine Fisheries Service, Fisheries Statistics Division, Silver Spring, MD, pers. comm.; Figure 2.1). In 2007, this value was estimated at nearly \$77 million. This value does not include domestic sales, exports, or purchases of supplies and services, suggesting the total value of the industry is much higher.

2.2 Recreational Fishery

Total recreational harvest is nominal when compared to commercial landings in terms of weight when all species are combined (Figures 2.1, 2.2). However, the recreational take has exceeded the commercial take in Rhode Island for several important species in recent years (*e.g.*, striped bass, bluefish, and tautog). In 2007, recreational harvest of striped bass was largest in terms of weight relative to other species (Table 2.3). Bluefish, summer flounder, tautog, and scup also contributed substantially to the recreational harvest by weight in 2007. In terms of numbers of fish, anglers harvested more scup in 2006 and 2007 than other species (Table 2.4).

In 2007, approximately 400,678 recreational anglers—57% of them non-residents—participated in over 1.5 million fishing trips. According to the most recent National Survey of Fishing, Hunting, and Wildlife-Associated Recreation sponsored by the U.S. Fish and Wildlife Service (USFWS), U.S. residents spent over \$115.9 million on fishing trips and equipment in Rhode Island in 2006 (USFWS 2006). This estimate includes expenditures on food and lodging, transportation and other trip costs, and equipment. The report is updated every five years therefore an updated report is to be completed in 2011.

Table 2.1 Comparisons between the top ten species in descending order by weight for Rhode Island commercial landings in 2006 and 2007. Data source is NMFS.

2006			
RANK	SPECIES	WEIGHT (metric tons)	VALUE (dollars)
1	Atlantic Sea Herring	10,500.80	\$2,392,376
2	Longfin Squid	9,659.90	\$16,823,537
3	Shellfish	8,207.60	\$5,730,437
4	Atlantic Mackerel	4,601.00	\$4,122,096
5	Skates	4,051.50	\$1,100,794
6	Goosefish	1,752.80	\$4,520,107
7	American Lobster	1,700.80	\$18,388,252
8	Scup	1,652.60	\$2,794,921
9	Silver Hake (Whiting)	1,543.10	\$1,699,105
10	Sea Scallop	1,492.40	\$20,821,704
All Other Species Combined		5934.2	\$21,084,804
Total		51,097	\$99,478,133

2007			
RANK	SPECIES	WEIGHT (metric tons)	VALUE (dollars)
1	Longfin Squid	7,199.80	\$13,453,556
2	Shellfish	3,559.10	\$1,916,516
3	Atlantic sea herring	3,418.80	\$981,869
4	Skates	3,387.00	\$646,874
5	Silver Hake (Whiting)	2,010.50	\$2,163,677
6	Atlantic Mackerel	1,924.20	\$1,182,115
7	Scup	1,784.60	\$2,783,099
8	Goosefish	1,415.50	\$3,548,721
9	American Lobster	1,043.90	\$12,146,044
10	Atlantic Rock Crab	978.50	\$1,195,629
All Other Species Combined		7,406.00	\$36,775,732
Total		34,127.90	\$76,793,832

Table 2.2 Comparisons between the top ten species in descending order by value for Rhode Island commercial landings in 2006 and 2007. Data source is NMFS.

2006			
RANK	SPECIES	VALUE (dollars)	WEIGHT (metric tons)
1	Sea Scallop	\$20,821,704	1,492.40
2	American Lobster	\$18,388,252	1,700.80
3	Longfin Squid	\$16,823,537	9,659.90
4	Shellfish	\$5,730,437	8,207.60
5	Summer Flounder	\$5,074,951	963.1
6	Goosefish	\$4,520,107	1,752.80
7	Atlantic Mackerel	\$4,122,096	4,601.00
8	Quahog	\$3,528,565	307.9
9	Scup	\$2,794,921	1,652.60
10	Winter Flounder	\$2,565,063	586.4
All Other Species Combined		\$15,108,500	20,172
Total		\$99,478,133	51,097

2007			
RANK	SPECIES	VALUE (dollars)	WEIGHT (metric tons)
1	Longfin Squid	\$13,453,556	7,199.80
2	American Lobster	\$12,146,044	3,559.10
3	Sea Scallop	\$8,962,587	3,418.80
4	Quahog	\$8,369,355	3,387.00
5	Summer Flounder	\$4,415,020	2,010.50
6	Goosefish	\$3,548,721	1,924.20
7	Scup	\$2,783,099	1,784.60
8	Winter Flounder	\$2,390,046	1,415.50
9	Silver Hake (Whiting)	\$2,163,677	1,043.90
10	Shellfish	\$1,916,516	978.50
All Other Species Combined		\$16,645,211	7,406.00
Total		\$76,793,832	34,127.90

Table 2.3 Comparisons between the top ten species in descending order by weight for Rhode Island recreational harvest in 2006 and 2007. Data source is NMFS.

2006			
RANK	SPECIES	WEIGHT (metric tons)	NUMBER (#)
1	Bluefish	425	363,511
2	Striped Bass	416	75,279
3	Summer Flounder	388	263,704
4	Scup	206	426,993
5	Tautog	183	81,479
6	Black Sea Bass	30	52,693
7	Weakfish	15	2,852
8	Herrings	9	40,601
9	Atlantic Cod	6	2,108
10	Dogfish	3	1,457
All Other Species Combined		5	23,055
Total		1,688	1,333,732

2007			
RANK	SPECIES	WEIGHT (metric tons)	NUMBER (#)
1	Striped Bass	638	102,112
2	Bluefish	434	326,785
3	Tautog	432	164,084
4	Summer Flounder	324	232,495
5	Scup	189	452,073
6	Black Sea Bass	37	54,034
7	Sharks	19	1,495
8	Atlantic Bonito	4	742
9	Atlantic Cod	3	763
10	Skates	1	15,965
All Other Species Combined		4	81,441
Total		2,085	1,431,989

Table 2.4 Comparisons between the top ten species in descending order by number for Rhode Island recreational harvest in 2006 and 2007. Data source is NMFS.

2006			
RANK	SPECIES	NUMBER (#)	WEIGHT (metric tons)
1	Scup	426,993	206.409
2	Bluefish	363,511	424.99
3	Summer Flounder	263,704	387.939
4	Tautog	81,479	182.872
5	Striped Bass	75,279	415.542
6	Black Sea Bass	52,693	30.339
7	Herrings	40,601	9.46
8	Cunner	5,923	2.224
9	Skates/Rays	3,885	0
10	Sea Robins	3,824	0
All Other Species Combined		15,840	28
Total		1,333,732	1,688

2007			
RANK	SPECIES	NUMBER (#)	WEIGHT (metric tons)
1	Scup	452,073	189
2	Bluefish	326,785	434
3	Summer Flounder	232,495	324
4	Tautog	164,084	432
5	Striped Bass	102,112	638
6	Black Sea Bass	54,034	37
7	Herrings	36,543	0.67
8	Other Fishes	25,773	0.10
9	Skates/Rays	15,965	1
10	Eels	5,954	0.00
All Other Species Combined		16,171	28.93
Total		1,431,989	2,084.57

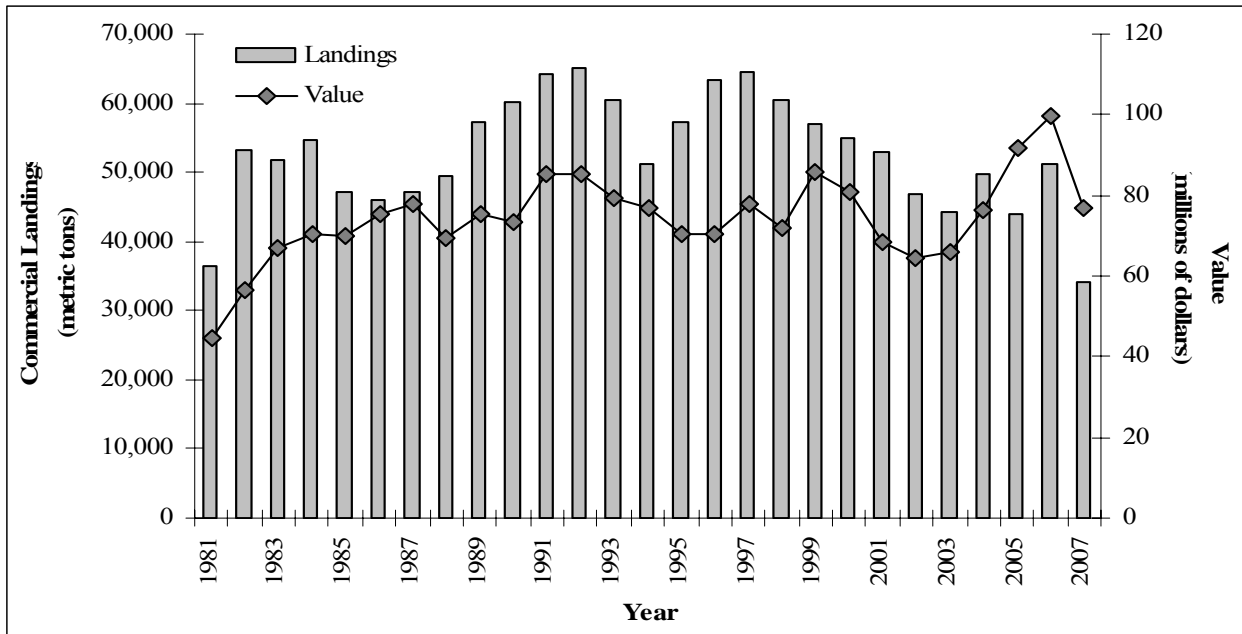


Figure 2.1 Total weight and estimated value of commercial landings in Rhode Island, all species combined. Data source is NMFS.

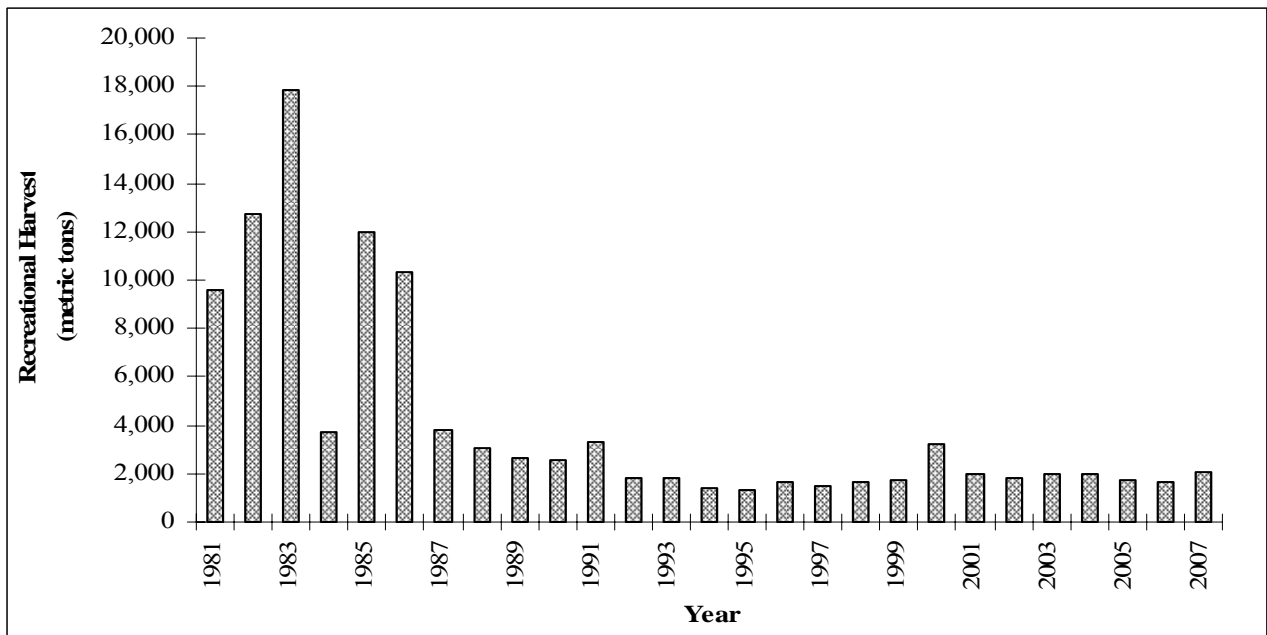


Figure 2.2 Weight of recreational harvest taken in Rhode Island, all species combined. Data source is NMFS.

3 RESOURCE STATUS

3.1 Overview

A stock or stock complex is considered overfished when the population level falls below a predefined threshold. A stock becomes overfished when its size is too low to replenish itself. A rebuilding plan is a management strategy intended to rebuild stocks to a size that is at or above the threshold level. Rebuilding plans are required for all stocks that are overfished. Overfishing occurs when the harvest rate threatens a stock's ability to produce Maximum Sustainable Yield (MSY) on a continuing basis. MSY is the largest yield that can be continuously removed from a stock under current environmental conditions without adversely affecting the stock's ability to reproduce.

For species of commercial and recreational importance to RI fisheries, nine species are considered overfished and overfishing is occurring in nine species (Table 3.1). Management restrictions on catch of these species must be maintained if these stocks are to reach sustainable levels. There are ten species that are not being overfished and not experiencing overfishing. The status of six species with respect to both overfished and overfishing is not known due to undefined overfishing definitions and/or unreliable or unavailable estimates of stock size or exploitation rates.

Specific information on the stock status of the three fishery sectors within RI follows this section. The status information presented is based on the most recent scientific peer-review stock assessment for the given species.

3.2 Lobster

The RI inshore fishery for American lobster (*Homarus americanus*) has declined sharply in recent years. Commercial fishery landings decreased from 3,700 metric tons in 1999 to 1,044 metric tons in 2007 (Figure 3.1). Biomass trends measured from RI's fishery-independent trawl survey also showed a decline from the mid-1990s through 2002; however, observations in recent years suggest a potential increase in relative biomass (Figure 3.1).

The value of the fishery in Rhode Island peaked in 1999 at a value of over \$31 million dollars (NMFS, pers. comm.). Landed weight also peaked in 1999 at 3,700 metric tons. The landings and value have since declined. In 2007, the commercial lobster fishery landed just under 1,100 metric tons with an estimated value of \$12.1 million. A number of factors have been implicated in the decline including oil spills, natural cycles, increased predation, pollution, and overfishing.

The lobster problem can be traced back to a decline in newly settled lobsters observed in the early 1990s. In the first summer after hatching, lobsters spend several weeks in the water column as larvae before settling to the bottom as miniature adults. Rhode Island, Massachusetts, Maine, and New Brunswick support a sampling program to monitor larval settlement along the New England coast. Divers use suction samplers to collect young-of-year lobsters from shallow nearshore nursery areas; the data are then used to develop an index of year-class strength. New settler abundance trended downward from 1990 to 1995 reaching a low point in 1996 (Figure 3.2). It is generally accepted that lobsters take 6 to 8 years to reach legal-size. The 1995–1996 settler low is consistent with low abundance of adults in the trawl survey and fishery in 2003

(Figure 3.1). It should be noted that, although there was some improvement in settler abundance in 1997–1999, the settlement index exhibited relatively low values from 2002–2007, and a Mann-Kendall trend analysis test on the data indicates that the overall trend in the settlement index is decreasing ($z=-1.97$, $\alpha=0.05$). This suggests that abundance of legal-size lobster could take some time to rebuild to former levels. The decline in settler abundance apparent from 1990 to 1996 preceded an outbreak of shell disease and the North Cape oil spill. Although these factors may have contributed to the problem, they are not likely the root cause. The source of Rhode Island lobster larvae is not well known, but is likely from both local and offshore spawners. Because of intense fishery removals, sublegal first-time spawners dominate inshore spawners while the offshore stock contains a higher proportion of older, larger spawners. It may be that changing oceanographic conditions have reduced the subsidy from offshore spawners, leaving only the limited inshore spawning stock to effect reproduction. A scientific peer-review panel determined that, over the past few years, the Southern New England (SNE) stock of American lobster has been at low abundance, experiencing low recruitment, and subject to relatively high fishing mortality rates (ASMFC 2006a). The ASMFC is developing remedial measures to rebuild stocks. This includes the development of an effort control plan that was implemented in 2006.

3.3 Shellfish

The Rhode Island shellfish fishery is dominated by the Bay quahog (*Mercenaria mercenaria*). The Department of Environmental Management manages quahogs entirely within state waters (except Block Island) incorporating advice from the Rhode Island Marine Fisheries Council. The Department, through the RIDFW, uses a set of management areas and a rotational transplant/harvest system to manage the resource. Permanent and conditional pollution closures restrict the fishery in addition to seasons, possession limits, and management closures.

The shellfish fishery management plan specifies that bay-wide fishing mortality rates (F) should be maintained near the target level but below the F_{MSY} overfishing definition to allow for biomass rebuilding. This requires maintenance of fishing effort near current levels. The rotational harvest and transplant/spawner sanctuary program should be expanded to include more areas. The most recent boat counts conducted in 2000 through 2002 and analysis of dealer landings slips indicate that about 350 active shell fishers prosecute the quahog fishery.

Stock assessments based on fishery landings, fishery effort, and fishery-independent survey data indicate that quahog stock biomass is at a relatively low level and well below that needed to produce MSY (Figure 3.3). However, the steady decline observed between the mid-1980s and mid-1990s has since leveled off. It is believed that the apparent stock stabilization is a result of improvements to Greenwich Bay water quality, which allowed for reopening in 1994, and the Department's rotational harvest/transplant program in the Pottowomut and High Banks spawner sanctuaries, which began in 1997 (Note: Quahog production model not updated to 2007). Overfishing of the stock occurred from 1979 to 1995, but recent effort levels have been below that needed to generate MSY as is desired under precautionary management (Figure 3.4).

Continued limitations on new entry and continuation of the rotational harvest/transplant program are needed to rebuild stock biomass to the threshold level, B_{MSY} (Figure 3.3). Recent deterioration of water quality in Narragansett Bay is of major concern and could threaten future management efforts. Other shellfish species commercially harvested from RI waters include soft-

shelled clams, oysters, surf clams, and blue mussels. There are insufficient data available to conduct regular analytical assessments for these species, but catch-per-unit-effort (CPUE) data can be used to examine relative trends. For instance, commercial landings suggest that the relative abundance of soft-shelled clams has been increasing in recent years (Figure 3.5). However, effort in the soft shelled clam fishery may also be increasing as indicated by an increase in licenses eligible to harvest this species. An analysis in to catch per unit of effort in the soft shelled clam fishery does indicate a decreasing trend in recent years, most notably in the upper bay (see RI Marine Fisheries regulation ERLID number 4958). The decline in oyster abundance is associated with an increase in the parasitic diseases MSX and Dermo (Oviatt et al. 1998; Gomez-Chiarri and Rice 2004).

In August 2003, a substantial anoxic event occurred within Greenwich Bay resulting in the death of many organisms including four species of finfish, three species of crab, and one species of shellfish (soft-shelled clams). An estimated one billion soft-shelled clams perished, mostly young-of-year. The impact on the population is uncertain at this point but caution should be taken regarding an increase in fishing pressure.

3.4 Finfish

Marine finfish fisheries in Rhode Island state waters are dominated by the species for which the state has an assigned quota. RIDFW monitors catch rates and closes the fisheries once the quota poundage is reached. Most species under quota management are seasonal migrants to Rhode Island waters and include summer flounder, scup, black sea bass, tautog (limited migration; Lynch 1993; Cooper 1965), striped bass, and bluefish. State-federal management programs have called for reductions in fishing mortality rates of a number of species in order to allow for stock rebuilding. Commercial quotas decreased in 2007 from the 2006 levels for scup, summer flounder, and black sea bass as a result of potential decreased abundance. The quota for tautog and bluefish remained unchanged.

Indices derived from the RIDFW's fishery-independent trawl survey are used to monitor relative trends in the local occurrence of marine finfish species. Species such as scup, summer flounder, and black sea bass have exhibited an overall increasing trend in relative biomass over time. The 2006 index for scup dropped off but then increased in 2007 to the highest observed in the survey's time series (23.76 kg/tow) (Figure 3.6). The trend has been increasing for scup relative biomass since 1993 (Mann-Kendall test, $z=2.97$; $\alpha=0.05$). The relative biomass of summer flounder peaked in 2003 (4.37 kg/tow; Figure 3.7). Though the index has decreased from 2004 until 2006, the biomass index for 2007 went up to 3.77 kg/tow, and the trend has generally increased since the mid-1990s (Mann-Kendall test, $z=3.26$; $\alpha=0.05$). The black sea bass index had exceeded historic levels from 2002 through 2004 (0.47 kg/tow); it dropped off to a quarter of that observed in 2004 to the 2006 value (0.05 kg/tow) but went back up in 2007 (0.18 kg/tow; Figure 3.8). The trend in relative abundance for black sea bass has been generally increasing since 1990 (Mann-Kendall test, $z=2.73$; $\alpha=0.05$). The relative index for tautog demonstrated a period of relatively high biomass during the mid-1980s, when recreational harvest was also large (Figure 3.9). The relative biomass has since exhibited fairly low levels. The index of relative biomass for bluefish has been extremely variable over the time series (Figure 3.10). The 2004 and 2005 values suggested an increase in bluefish biomass but the index dropped in 2006 (0.33

kg/tow). The 2007 index increased (1.10 kg/tow), thus continuing the variability of the times series.

Due to the apparent decreases in population size for some species, quotas assigned to the state are beginning to decrease. There is a lag between stock biomass increase and quota increase because it is necessary to keep fishing mortality (rate of removal) in check lest overfishing begin anew. When available fishing effort exceeds sustainable quota levels, restrictive regulations are required. The state cannot currently maintain year-round open seasons in the quota fisheries. For example, in 2007 the summer flounder commercial fishery was only open 277 out of the 365 days available for the season. By comparison, the season in 2005 was open 359 days and the season in 2006 was open 346 days. This trend of decreasing quotas and stable to increased effort will most likely exacerbate fishery closures for the next few years.

Resident demersal, or bottom dwelling, finfish have special problems not necessarily related to overfishing. Abundance of flatfish such as winter flounder, windowpane flounder, and hogchoker has declined substantially relative to historic levels (Figures 3.11, 3.12). Winter flounder have been fished extensively, but the hogchokers, not targeted by commercial or recreational fishermen, have also declined at the same rate, possibly due to anthropogenic or environmental variables. Similar trends have been observed in other demersal species of Narragansett Bay that have little fishery value such as toadfish and sculpins.

The wide range of species involved suggests that the Bay's bottom habitat has been impaired. Monitoring data indicated that Bay water temperatures have increased and that episodes of low oxygen levels occur in the Bay. Power plants and increased urbanization around the Bay impact selected fish stocks through entrainment, impingement, and thermal pollution. Overfishing continues to be a problem for winter flounder, as confirmed by the 2005 Groundfish Assessment Review Meeting (GARM) convened in Woods Hole, MA in August of 2005 (NEFSC 2005).

Table 3.1 Summary of most recent stock status information available for fish species important to Rhode Island.

SPECIES	OVERFISHED	OVERFISHING	REBUILDING STATUS	LAST BENCHMARK STOCK ASSESSMENT
American Eel	Undefined	Undefined		(ASMFC 2006c)
American Lobster (Southern New England stock) ¹	Undefined	Yes ²	Restore egg production above overfishing definition by 2008	(ASMFC 2006a)
American Shad	Undefined	Unknown	Benchmark assessment completed and peer review approved	(ASMFC 2007a)
Atlantic Herring	No	No	Rebuilt	TRAC (Overholtz et al. 2004)
Atlantic Mackerel	No	No		42nd SAW (NEFSC 2006a)
Atlantic Menhaden	No	No	Rebuilt	
Atlantic Striped Bass	No	No	Rebuilt since 1995	(ASMFC 2005)
Atlantic Sturgeon	Yes	No ³	1998 moratorium in effect until there are at least 20 protected year classes of females in the spawning population; to be rebuilt by ~2038	(ASMFC 1998)
Black Sea Bass	Unknown	Unknown	Scheduled to be rebuilt by 2010	43rd SAW (NEFSC 2006b)
Bluefish	No	No	Scheduled to be rebuilt by 2008	41st SAW (NEFSC 2005c)
Butterfish	Yes	No	Plan under development	38th SAW (NEFSC 2004)
Horseshoe Crab	Undefined	Undefined	No rebuilding schedule	(ASMFC 2004)
Longfin Squid (<i>Loligo</i>)	No	No		34th SAW (NEFSC 2002a)
Monkfish	Yes	Yes ⁴	Scheduled to be rebuilt by 2009	40th SAW (NEFSC 2005b)
Northern Shortfin Squid (<i>Illex</i>)	Unknown	No ⁵		42nd SAW (NEFSC 2006a)

¹ The current assessment applied stock boundaries that differ from previous assessments and is recommending management areas be redefined in terms of the new assessment areas; the Southern New England stock area would replace the South of Cape Cod and Long Island Sound stock complex used in the previous assessment (ASMFC 2006a)

² Uncertainty about the comparability of the current assessment estimates of fishing mortality rates to the established overfishing definition resulted in recommending changes to the current overfishing definition; while the current assessment and associated recommendations are still under review, the peer review panel expressed concerns about the relatively high fishing mortality rates, low abundance, and low recruitment affecting the Southern New England stock (ASMFC 2006a)

³ Harvest of Atlantic sturgeon is prohibited

⁴ Though the monkfish stock is considered to be experiencing overfishing, the most recent stock assessment was unable to reliably estimate current exploitation rates; as such, the stock status with respect to fishing mortality rate is unchanged, in anticipation of an updated stock assessment (NMFS 2006)

⁵ Though the *Illex* stock is considered not to be experiencing overfishing, the most recent stock assessment was unable to reliably estimate current exploitation rates; as such, the stock status with respect to fishing mortality rate is unchanged, in anticipation of an updated stock assessment (NMFS 2006)

Table 3.1 (continued) Summary of most recent stock status information available for fish species important to Rhode Island.

SPECIES	OVERFISHED	OVERFISHING	REBUILDING STATUS	LAST BENCHMARK STOCK ASSESSMENT
Quahog	Yes	No		
River Herring ⁶	Undefined	Undefined	Benchmark assessment and peer review pending	(Crecco and Gibson, 1990)
Scup	Yes	Yes ⁷	Draft amendment in development/review	35th SAW (NEFSC 2002b)
Silver Hake (Southern stock)	No	No	Scheduled to be rebuilt by 2009	42nd SAW (NEFSC 2006a)
Skates (Little Skates)	No	No	No rebuilding schedule	
Spiny Dogfish	No	No	FMP reads “the time necessary to rebuild the female portion of the spawning stock biomass at $F = 0.03$ ”	43th SAW (NEFSC 2006b)
Summer Flounder	No	Yes	Biomass exceeded threshold since 2003; scheduled to be rebuilt by 2010	41st SAW (NEFSC 2005c)
Tautog	Yes	Yes	Trend in F is declining to most recent estimate of $F=0.299$. Target $F = 0.2$. Biomass is not rebuilding at a substantial rate.	(ASMFC 2006b)
Weakfish	Unknown	Unknown	Six-year rebuilding period if spawning stock biomass < threshold level	40th SAW - incomplete (NEFSC 2005b)
Windowpane Flounder (Southern New England / Mid-Atlantic stock)	Yes	No	Rebuilt	GARM (NEFSC 2005a)
Winter Flounder (Southern New England stock)	Yes	Yes	Scheduled to be rebuilt by 2015	GARM (NEFSC 2005a)
Winter Flounder (Narragansett Bay stock) ⁸	Yes	Yes	Rebuilding schedule to be established under Amendment 1	
Witch Flounder	No	No		GARM (NEFSC 2005a)
Yellowtail Flounder (Southern New England / Mid-Atlantic stock)	Yes	Yes	Scheduled to be rebuilt by 2015	GARM (NEFSC 2005a)

⁶ The catch, take, landing, and possession of river herring in Rhode Island marine waters are currently prohibited (RIMF Reg. Part 7.20 2006a).

⁷ Though the scup stock is considered to be experiencing overfishing, the most recent stock assessment was unable to reliably estimate current exploitation rates; as such, the stock status with respect to fishing mortality rate is unchanged, in anticipation of an updated stock assessment (NMFS 2006)

⁸ Within the Southern New England stock of winter flounder, a resident population uses Narragansett Bay as spawning and over-wintering grounds; RIDFW assesses the Narragansett Bay stock on an annual basis

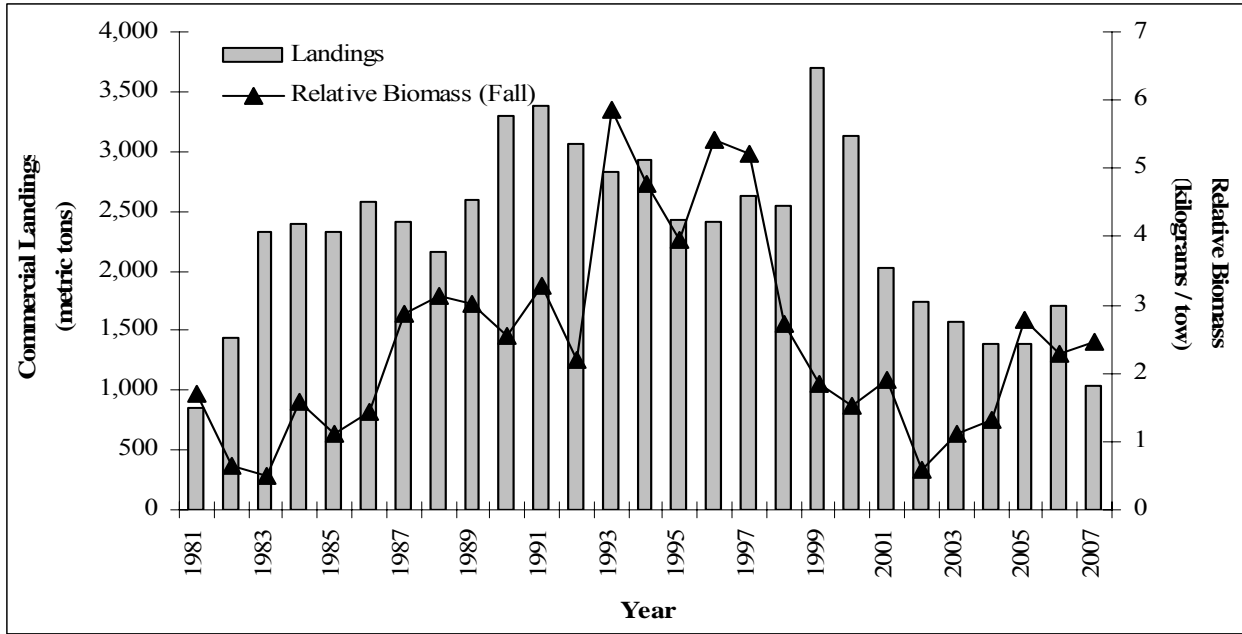


Figure 3.1 American lobster commercial landings in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

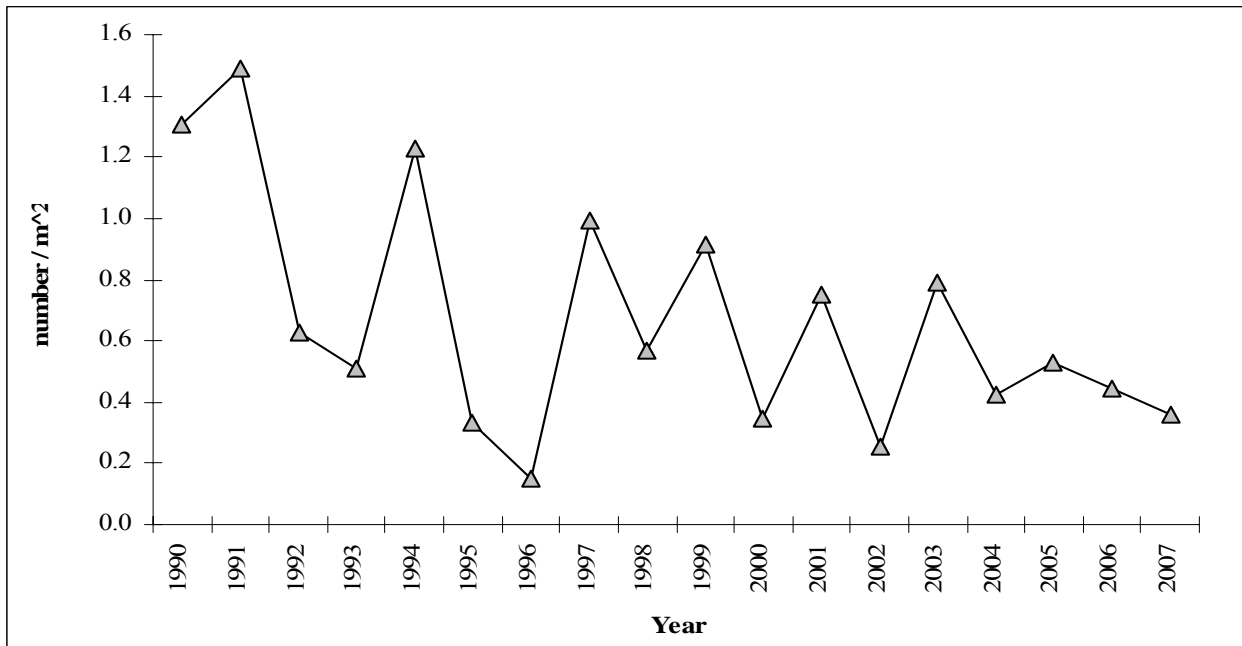


Figure 3.2 Relative abundance of newly settled American lobster as measured by the New England lobster settlement index. (Source: Wahle et al. 2005)

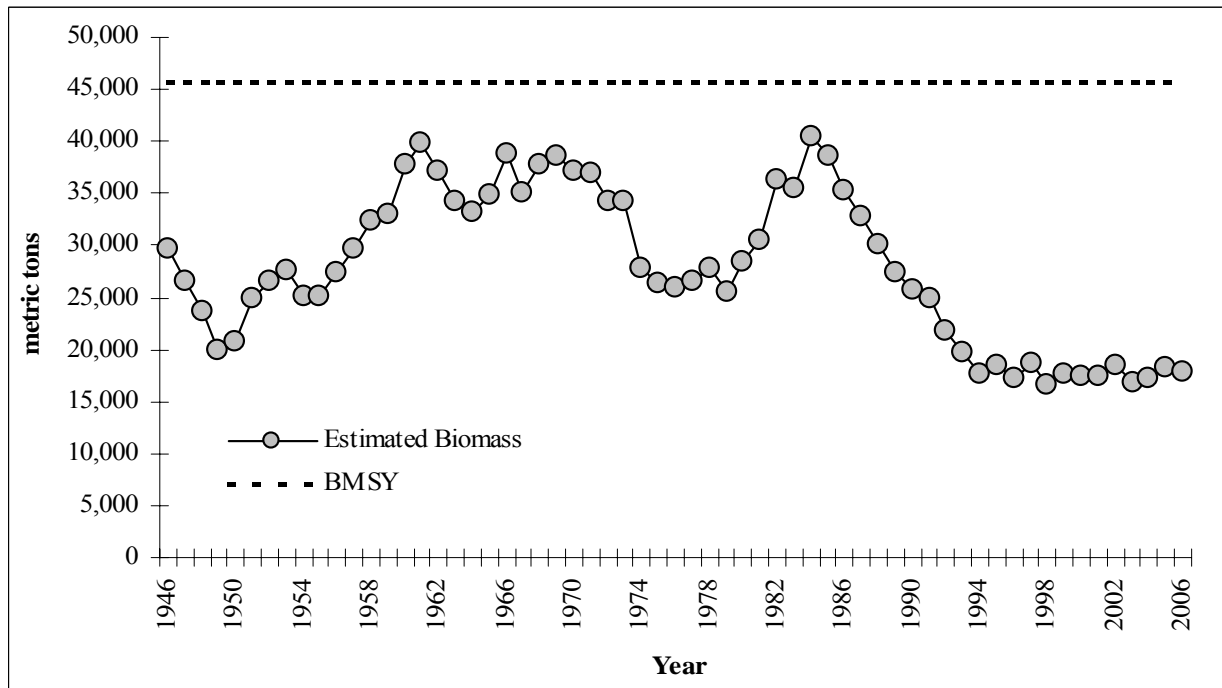


Figure 3.3 Estimated stock biomass of quahog in Rhode Island relative to estimated B_{MSY} (Note: Quahog production model not updated through 2007).

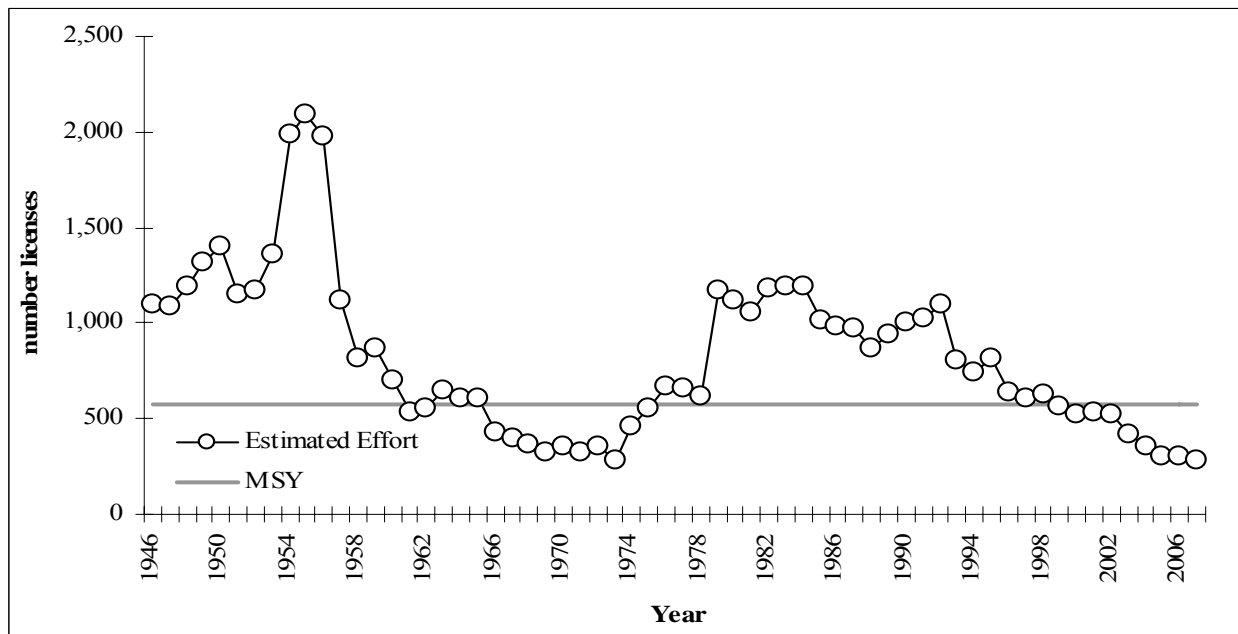


Figure 3.4 Estimated fishing effort in the Narragansett Bay quahog fishery relative to the estimated level of MSY.

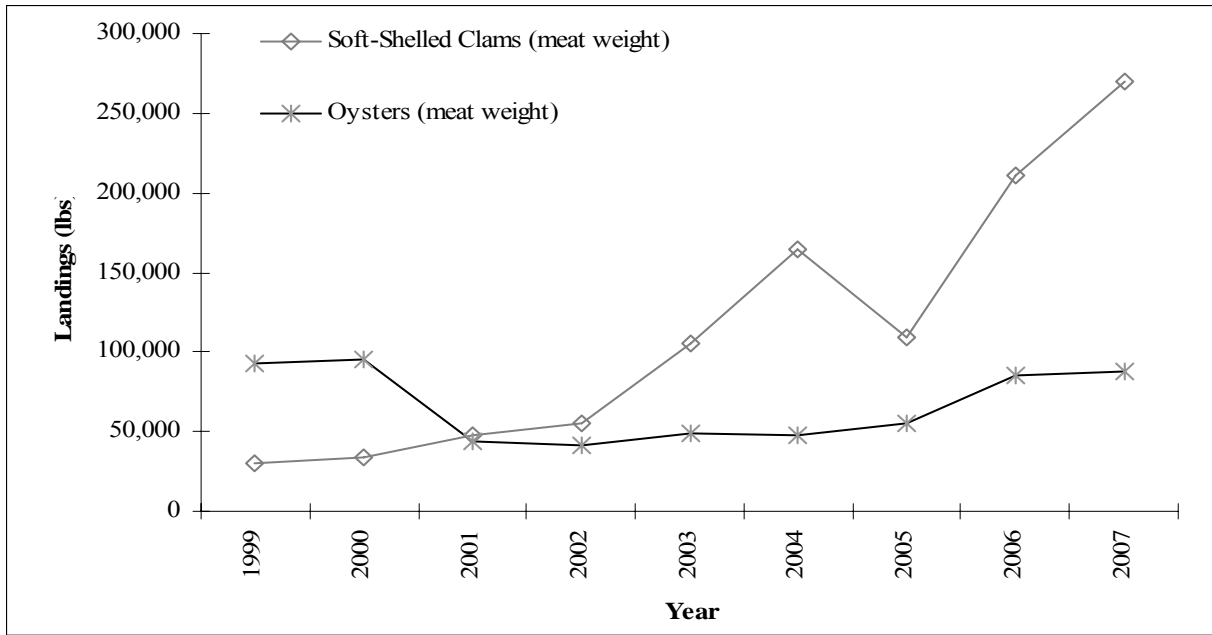


Figure 3.5 Rhode Island landings for soft-shelled clams and oysters.

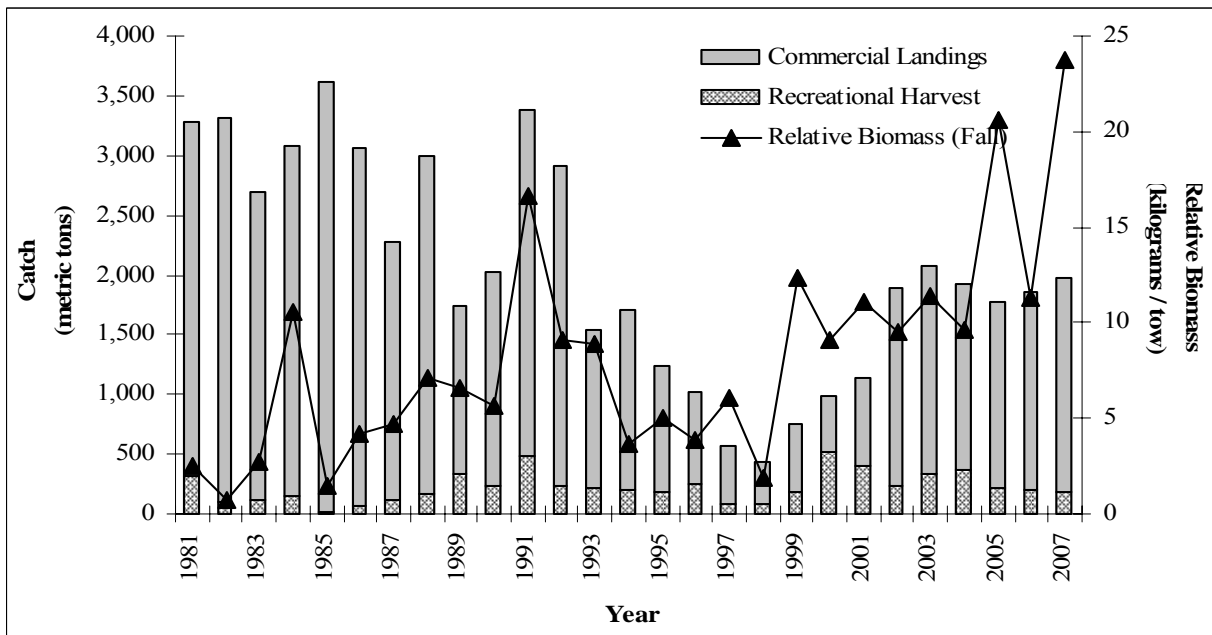


Figure 3.6 Commercial landings and recreational harvest of scup in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

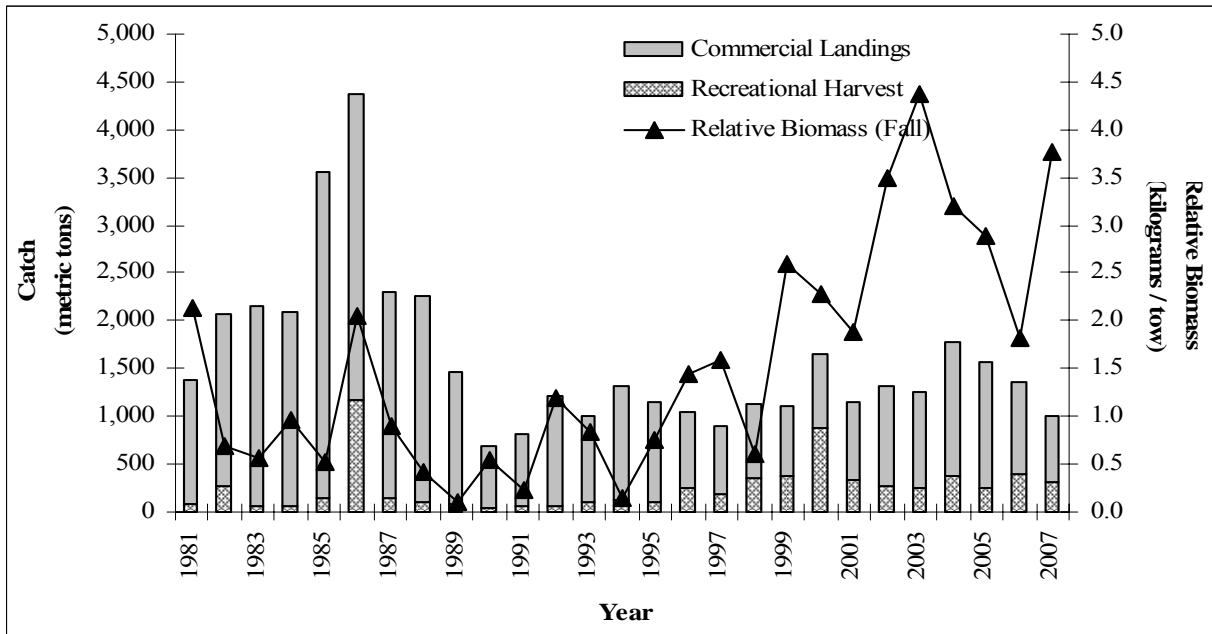


Figure 3.7 Commercial landings and recreational harvest of summer flounder in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

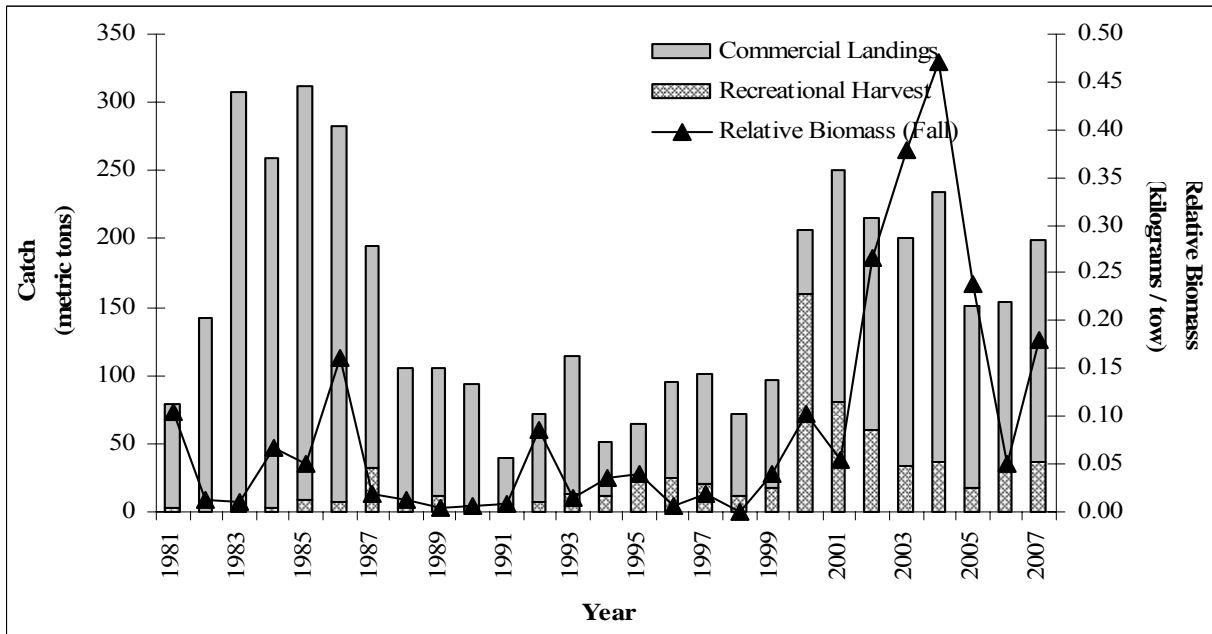


Figure 3.8 Commercial landings and recreational harvest of black sea bass in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

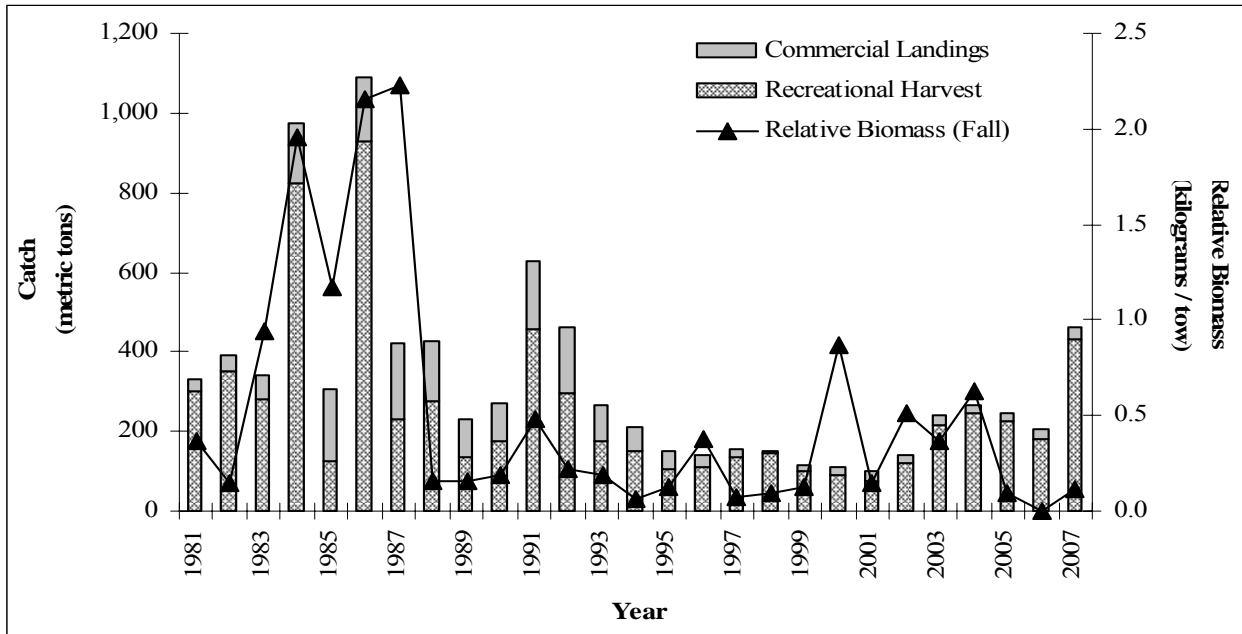


Figure 3.9 Commercial landings and recreational harvest of tautog in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

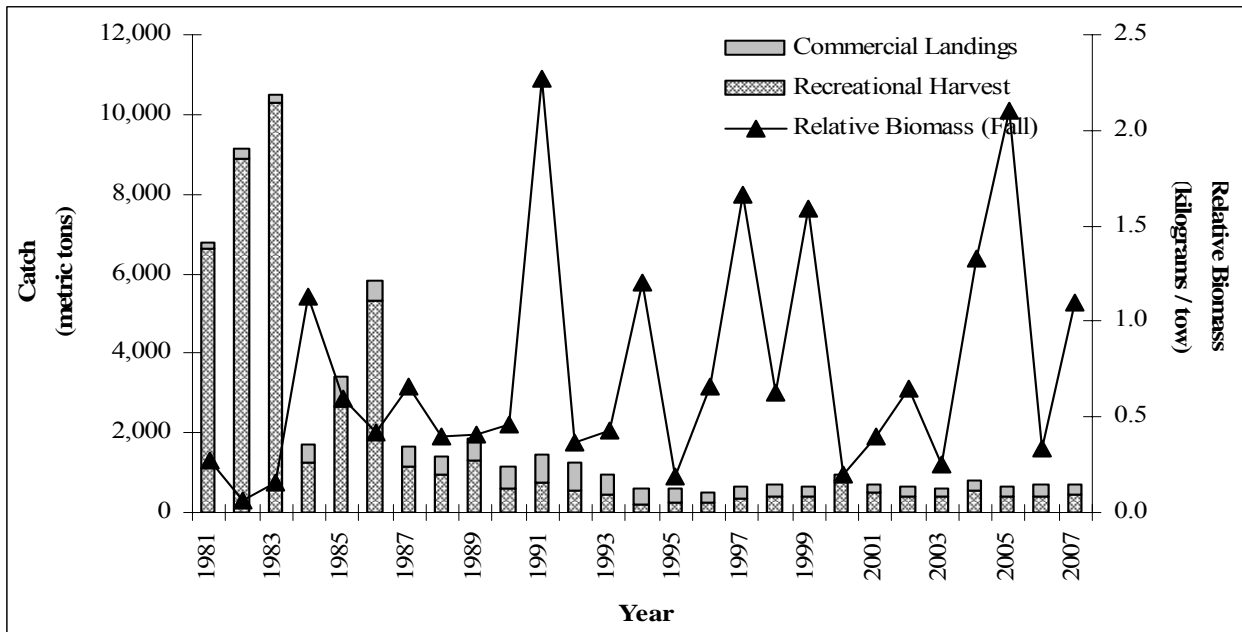


Figure 3.10 Commercial landings and recreational harvest of bluefish in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

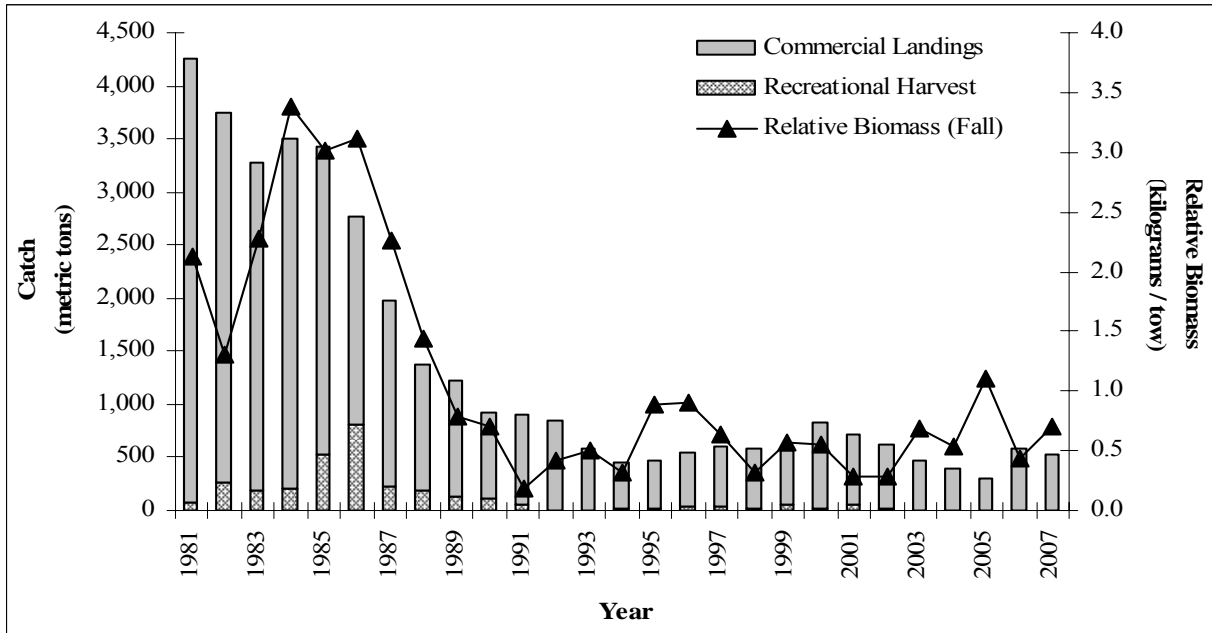


Figure 3.11 Commercial landings and recreational harvest of winter flounder in Rhode Island versus relative biomass as observed in the RIDFW Marine Fisheries Section's Trawl Survey.

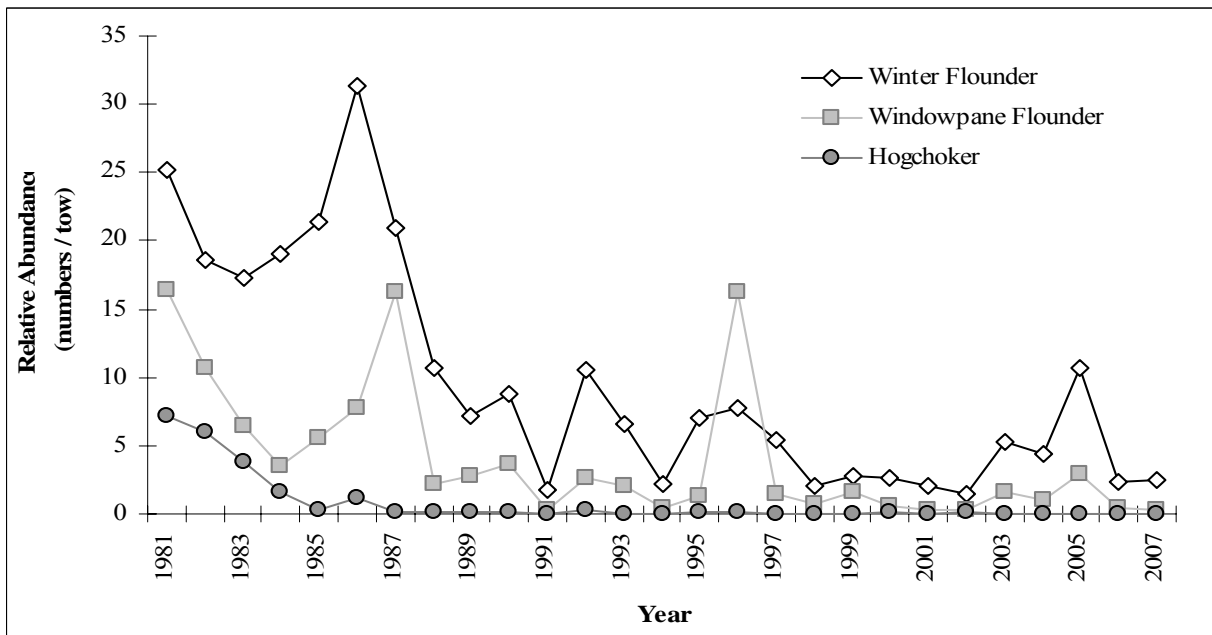


Figure 3.12 Relative abundance of winter flounder, windowpane flounder, and hogchoker as observed in the fall component of the RIDFW Marine Fisheries Section's Trawl Survey.

4 MANAGEMENT

4.1 Organization & Authority

Rhode Island has exclusive management control only for those species that spend their entire lives in state waters. Exclusivity is effectively limited to sedentary bivalves such as quahogs, oysters, and whelks, except for Block Island, which maintains town jurisdiction. The Atlantic States Marine Fisheries Commission (ASMFC), a compact of the U.S. East Coast States, manages inshore migratory species along the Atlantic seaboard inside of 3 miles. This interstate fishery management program covers species such as striped bass, bluefish, scup, black sea bass, summer and winter flounders, menhaden, weakfish, and tautog. Adding tautog to the list of state controlled species is currently under consideration, as this species has been found to spend the majority of its life in state waters. At the current time tautog is still managed through the ASMFC, however through Addendum IV to the ASMFC Tautog Fishery Management Plan (ASMFC 2007b), the tautog stock is assessed on a regional basis, therefore RI has to comport with the status of the stock in local (MA and RI) waters. The New England Fisheries Management Council and/or the Mid-Atlantic Fisheries Management Council manage those species that spend most of their life cycles in federal waters (3–200 miles) and have fisheries that are prosecuted in federal waters. Once a fishery management plan has been formulated at the federal level through these interstate fishery management organizations, the RI Marine Fisheries Council advises the state as to how to implement management measures in state waters with regard to specifications such as seasons, quota allocations, and possession limits. These state specific management measures can be modified within the framework of the interstate fishery management plans.

Recognizing the crisis confronting fisheries management in Rhode Island, the General Assembly passed and the Governor signed new legislation in 2004 (S 2771) that provides a framework for the Director of DEM and the Marine Fisheries Council to better manage marine fisheries in Rhode Island. In addition, the new statute creates a much improved fisheries management process, consistent with the goals established by the General Assembly in the Marine Fisheries Management Modernization Act of 2001.

In 2002, the General Assembly passed comprehensive new legislation that restructured the commercial fishing-licensing program and further reformed the state's marine fisheries management program. The licensing statute identified new management goals and fishery conservation standards that are compatible with those by federal and interstate agencies to prevent overfishing and to assure sound management of marine resources. The Department Director was granted rule-making powers to establish a commercial licensing system in order to accomplish the goals and principals set forth in this Act with regard to participation, gear and effort restriction, area closures, and minimization of by-catch. This new commercial licensing system has been successfully implemented for the past five years.

4.2 Regulation Changes in 2007

During the state of RI's fishery management process, thirty-two separate regulation filings were completed in 2007 (Table 4.1). The majority of these filings were possession limit changes. These changes are applied on a one-time basis and are filed to ensure that the various commercial fisheries harvest the quota they have been allotted for the year. The other filings included modifications to the existing management plans for both the commercial and recreational fisheries in the state, commercial licensing regulatory changes, and lobster effort control plan regulation changes. Two of the larger regulation changes for 2007 were the enactment of commercial licensing changes and the promulgation of a new lobster v notching definition.

4.3 Licenses & Endorsements

A summary of licenses issued by the Department under the new licensing system, is found in Table 4.2.

Table 4.1 Regulation changes during 2007. Note: multiple changes can occur during one filing.

DATE	SPECIES/ITEM	DESCRIPTION
20-Dec-07	Fluke	Closed the commercial fishery for summer flounder
7-Dec-07	Licensing	Establish the marine fisheries commercial licensing system
29-Nov-07	Black sea bass	Closed the commercial fishery for black sea bass
19-Nov-07	Tautog	Closed the commercial fishery for tautog
22-Oct-07	Striped bass	Closed the floating fish trap category commercial fishery for striped bass
18-Oct-07	Scup	Increased the possession limit for the general category commercial fishery for scup and closed the commercial fishery for spiny dogfish
10-Oct-07	Striped bass	Closed the general category commercial fishery for striped bass
1-Oct-07	Spiny dogfish	Closed the commercial fishery for spiny dogfish
27-Sep-07	Striped bass	Opened the general category commercial fishery for striped bass
21-Sep-07	Scup	Increased the possession limit for the general category commercial fishery for scup
13-Sep-07	Scup	Increased the possession limit for the general category commercial fishery for scup and increases the commercial possession limit for black sea bass
6-Sep-07	Striped bass	Closed the general category commercial fishery for striped bass and amended the commercial fishery management plan for the floating fish trap sector of the striped bass fishery
24-Aug-07	Fluke, scup, black sea bass, and horseshoe crabs	Closed the commercial fishery for summer flounder and increased the commercial possession limit for scup (general category fishery) and black sea bass. Also closed the bait fishery for horseshoe crabs
17-Aug-07	Licensing	Repealed the fishing activity requirement for the transfer of license upon sale of vessel and gear regulation.
1-Aug-07	Tautog, weakfish, and horseshoe crabs	Amended the season for the commercial fishery for tautog, the commercial and recreational possession limits for weakfish, and the language for the horseshoe crab fishery
31-Jul-07	Black sea bass	Maintained the possession limit for the commercial fishery for black sea bass
3-Jul-07	Menhaden	Emergency action imposed a daily possession limit and reporting requirements for the commercial menhaden fishery
21-Jun-07	Scup, striped bass	Decreased the possession limit for the commercial general category fishery for scup and closed the commercial general category fishery for striped bass
14-Jun-07	Fluke, black sea bass	Decreased the possession for the commercial fishery for summer flounder and increased the commercial possession limit for black sea bass
25-May-07	Scup	Decreased the possession limit for the commercial floating fish trap fishery for scup
23-May-07	Lobster, tautog	Technical revision to the lobster fishery regulations and closed the commercial fishery for tautog
11-May-07	Black sea bass, striped bass	Amended the escape vent dimensions for black sea bass pots and the commercial management plan for the general category striped bass fishery
30-Apr-07	Spiny dogfish	Increased the commercial fishery for spiny dogfish
27-Apr-07	Fluke	Amended the commercial and recreational fishery management plans for summer flounder, and the commercial management plans for spiny dogfish and scup
13-Apr-07	Fluke	Closed the commercial fishery for summer flounder
11-Apr-07	Lobster	Updated the lobster effort control plan for area 2
23-Mar-07	Fluke	Increased the commercial possession limit for summer flounder and closed the recreational fishery for summer flounder
21-Mar-07	Lobster	Promulgated the 1/8" v-notch definition for lobsters
23-Feb-07	Fluke	Increased the commercial possession limit for summer flounder
2-Feb-07	Fluke	Technical revision to the commercial possession limit for summer flounder
23-Jan-07	Fluke	Increased the commercial possession limit for summer flounder and amended the floating fish trap regulations
8-Jan-07	Spiny dogfish	Closed the commercial fishery for spiny dogfish

Table 4.2 Types of fishing licenses issued by Rhode Island in 2007 compared to 2004, 2005, and 2006. The ‘Change’ column reflects the difference in licenses issued between 2006 and 2007.

LICENSES					
	2004	2005	2006	2007	Change
MULTI-PURPOSE LICENSE	1,135	1,075	1,019	973	-46
PRINCIPAL EFFORT LICENSE	1,148	997	930	862	-68
<i>LOBSTER ENDORSEMENT</i>	56	52	46	44	-2
<i>NON-LOBSTER CRUSTACEAN ENDORSEMENT</i>	20	16	16	15	-1
<i>QUAHOG ENDORSEMENT</i>	776	633	587	538	-49
<i>NON-QUAHOG ENDORSEMENT</i>	556	455	434	402	-32
<i>RESTRICTED FINFISH ENDORSEMENT</i>	326	311	298	284	-14
<i>NON-RESTRICTED FINFISH ENDORSEMENT</i>	147	137	131	135	4
COMMERICAL FISHING LICENSE	283	317	397	464	67
<i>LOBSTER ENDORSEMENT</i>	48	41	38	32	-6
<i>NON-LOBSTER CRUSTACEAN ENDORSEMENT</i>	69	83	105	118	13
<i>QUAHOG ENDORSEMENT</i>	N/A	51	94	104	10
<i>NON-QUAHOG ENDORSEMENT</i>	172	181	247	323	76
<i>RESTRICTED FINFISH ENDORSEMENT</i>	N/A	13	13	11	-2
<i>NON-RESTRICTED FINFISH ENDORSEMENT</i>	198	220	242	261	19
OVER 65 SHELLFISH LICENSE	86	93	130	136	6
STUDENT SHELLFISH LICENSE	97	72	71	60	-11
LANDING PERMITS					
	2004	2005	2006	2007	Change
RESIDENT					
<i>MULTI-PURPOSE</i>	20	40	25	38	13
<i>FINFISH</i>	8	9	10	13	3
<i>CRUSTACEAN</i>	1	0	0	3	3
<i>SHELLFISH</i>	0	0	0	1	1
<i>MISCELLANEOUS</i>	0	0	0	0	0
NON-RESIDENT					
<i>MULTI-PURPOSE</i>	46	60	82	47	-45
<i>RESTRICTED FINFISH</i>	5	5	6	8	2
<i>NON-RESTRICTED FINFISH</i>	23	21	18	17	-1
<i>CRUSTACEAN</i>	2	1	0	1	1
<i>SHELLFISH</i>	4	35	32	10	-22
<i>MISCELLANEOUS</i>	0	0	0	0	0

Table 4.2 (continued) Types of fishing licenses issued by Rhode Island in 2007 compared to 2004, 2005, and 2006. The ‘Change’ column reflects the difference in licenses issued between 2006 and 2007.

GEAR ENDORSEMENTS					
	2004	2005	2006	2007	Change
MID WATER/PAIR TRAWL	N/A	N/A	N/A	N/A	N/A
SOFTSHELLED CLAM	N/A	N/A	N/A	N/A	N/A
PURSE SEINE	N/A	N/A	N/A	N/A	N/A
FISH TRAP	7	7	7	8	1
GILL NET	307	287	275	263	-12
OTHER LICENSES & DECLARATIONS					
	2004	2005	2006	2007	Change
AQUACULTURE LICENSE	9	11	18		N/A
VESSEL DECLARATION	1,829	1,788	1790		N/A
BOAT PLATE	65	60	52		N/A
DEALER LICENSES					
	2004	2005	2006	2007	Change
MULTI-PURPOSE	176	93	90		N/A
FINFISH	30	15	18		N/A
LOBSTER	6	2	1		N/A
SHELL	22	12	11		N/A

5 PROGRAMS

5.1 Commercial Fisheries Data Collection

The state of Rhode Island is currently supporting three commercial fisheries statistic data collection programs. Data collection is currently based on a two-ticket system that incorporates data elements from both seafood dealers and commercial fishermen. The Atlantic Coastal Cooperative Statistics Program (ACCSP) funds this project entirely with a full-time project coordinator.

5.1.1 Portside Sampling

RIDFW conducts commercial dockside sampling of four commercial fisheries in RI—floating fish trap and rod and reel striped bass and scup, floating fish trap weakfish, and lobster. A federally funded contract position was created to carry out the sampling. This biologist works full-time and collects length and weight statistics as well as hard structures for aging.

5.1.2 Commercial Fishing Catch and Effort Logbooks

In 2006, RIDFW had continued the RI Lobster Catch and Effort Logbook program, which was funded with a federal grant. The data had proved itself invaluable in determining commercial catch and effort statistics as well as tracking active versus latent license holders. In 2007 a new and comprehensive logbook program was implemented in an effort to gather more data and better detail from commercial fishermen. The new program consists of a commercial landing logbook for all species sold to a RI seafood dealer and a second logbook that captures dockside sales. Rhode Island commercial licensees may not renew their licenses unless they have completed their catch and effort logbooks.

5.1.3 Electronic Dealer Reporting

RIDFW's Marine Fisheries Section has been carrying out a statewide implementation of SAFIS (Standard Atlantic Fisheries Information System)—an internet based electronic fisheries reporting interface—since mid-2003. The RI ACCSP coordinator, in conjunction with the NMFS RI-CT port agent, and ACCSP IT staff worked jointly during 2004 to bring approximately 95% of federally permitted dealers into compliance with the federal rule mandating electronic reporting (50 CFR Part 648). The result of this effort has been that the majority of high and many mid-volume seafood dealers are reporting landings via SAFIS. These dealers are responsible for roughly 70% of the total landings and 90% of the landings of quota-managed species in Rhode Island. RIDFW has put a regulation in place requiring all seafood dealers holding a Rhode Island Seafood Dealer license to enter complete trip level data into SAFIS (RIMF Reg. Part 19.14 2006b). The state used a phased approach to implementation involving individual training and support to all of its state licensed non-federally permitted dealers (state only dealers). State licensed federally permitted dealers are given technical support upon request.

The state dealer implementation has been under way in earnest since May 2006. Currently, all state licensed seafood dealers are required to report through SAFIS. A non-primary buyer is a dealer who does not purchase seafood directly from vessels or harvesters. These dealers are

required to sign a statement confirming this status annually and will have negative reports entered into SAFIS for the year.

RIDFW has completed the process of relieving dealers of the state requirement of calling in landings of quota-managed species via the computerized Interactive Voice Response (IVR) system. Each dealer must have successfully entered landings into SAFIS and the IVR for a benchmarking period. Both sets of landings data were compared for quality assurance after which the dealer was excused of IVR reporting. Excusing dealers from the state run IVR reporting was the first step towards monitoring landings of state quota species (summer flounder, scup, black sea bass, striped bass, tautog, and bluefish) with SAFIS data. The RI ACCSP coordinator has developed a Microsoft Access database program that compiles data from the ACCSP data warehouse into a format that can be used by RIDFW staff. This program monitors quota balances, and tracks compliance for each of the state run quotas. Additional modules presented in this proposal capture data from other state specific fisheries of interest in the future, including things like monkfish and Atlantic menhaden.

5.1.4 Lobster Research and Management Program

In November 1990, a long-term monitoring program was initiated to collect biological and catch/effort data for the lobster resource. The survey was designed to collect data at-sea from areas and during times that provide sufficient precision for use in stock assessments. Biological and fishery data are collected from both inshore and offshore areas where the Rhode Island commercial lobster trap fishery operates. The inshore fishery area includes Narragansett Bay and Rhode Island Sound (out to approximately 20 nautical miles). Four sampling areas (upper Narragansett Bay, Narragansett Bay–Lower East Passage, Narragansett Bay–Lower West Passage, and Rhode Island Sound) were chosen to adequately cover the major areas of the inshore lobster fishery. The offshore fishery area includes mid-shelf areas (30–60 fathoms) and canyon areas (70–200 fathoms). The mid-shelf area sampling was dropped from the project during 1993. The canyon sampling area is defined by the region along the edge of the Continental Shelf in and around Hudson Canyon.

During normal lobster fishing activities, catches of volunteer commercial lobstermen are monitored in each designated area by a RIDFW biologist. The biologist records biological data from individual lobsters as well as data describing the total catch. Effort data and physical parameters are also recorded. Multiple lobster fishery operations are observed to reduce bias from varying degrees of fishing skill and to enhance area coverage. Inshore sampling trips are day trips, conducted twice per month, with each inshore area being sampled over a two-month period. Offshore (Hudson canyon area only) sampling trips last an average of four days and are conducted once every three months. Data entry and analysis follow the methods approved by the ASMFC American Lobster Technical Committee and Stock Assessment Subcommittee.

The RIDFW also participates in the New England lobster settlement index survey. Three US states and Canada's Department of Fisheries & Oceans (DFO) currently support this survey. One of the central goals is to better understand the causes and consequences of variable larval supply to regional differences and time trends in the adult lobster population (Wahle et al. 2005).

An additional project performed by the RIDFW is a ventless trap survey. This survey catches lobsters in size ranges not recorded during normal sea sampling with the use of lobster traps that do not include escape vents. This data is used in addition to the fishery dependent sea sampling

data to obtain a more robust data set of lobster biological information. A federally funded contract position was created to carry out the ventless trap sampling in RI.

5.2 Cooperative Research

5.2.1 RIDFW/Purse Seine Industry Menhaden Monitoring Program

Adult Atlantic menhaden (*Brevoortia tyrannus*) entered Narragansett Bay in large numbers in the summer of 2007 and were subject to an active purse-seine fishery. Out of concern for escalating effort, RIDFW implemented a daily possession limit and rigorous reporting requirements in the fishery. In view of the ecological and social value of menhaden, RIDEM implemented an interim management policy that restricted fishery removals to 50% of the amount of adult menhaden that entered the Bay.

The policy that was implemented was monitored through a two phase program. DEM regulations were promulgated that required purse seine vessels fishing for menhaden in Narragansett Bay to report their catches and number of net sets each day to the RIDFW. The industry participants also agreed to carry a RIDFW observer on both the fishing vessel and the spotter plane upon request. When on the fishing vessel, the RIDFW observer sampled the catch and recorded the weight of the catch offloaded. Catch sampling included length frequencies, body weights, scale sampling for age analysis, and determination of sex and gonad status. When in the air, RIDFW observers recorded the pilot counts of the number of menhaden schools observed, the estimated weight within the schools, and the location of the schools. Other commercial harvesters such as floating trap fishers were required to file logbook reports monthly with the RIDFW that detail daily fishing activities. The fixed gear fisheries were useful as sentinels, documenting the arrival and movements of menhaden in state waters. Catches were also sampled from this portion fishery for length, weight, and scales for aging. Collectively, these sources of information were analyzed using the theory of depletion estimation as applied to open population through the use of a mathematical depletion model for open populations as described in Gibson, 2007.

During 2007, adult menhaden entered the Bay in May and were largely gone by August. Model estimates indicated that from an initial population of 4.52 million pounds in May, abundance increased to 9.13 million by July 10. Total exploitable abundance for the season was estimated at 12.39 million pounds (Figure 5.1). The purse seiners ceased fishing in early August when abundance dropped to unprofitable levels. The limit exploitation rate was not reached in 2007, meaning that less than 50% of the exploitable biomass was removed from Narragansett Bay by purse seine (Figure 5.2). Over 6,800 fish were sampled for biological attributes during 2007. The mean length and weight of the menhaden that were sampled was 282 mm and 400 grams respectively.

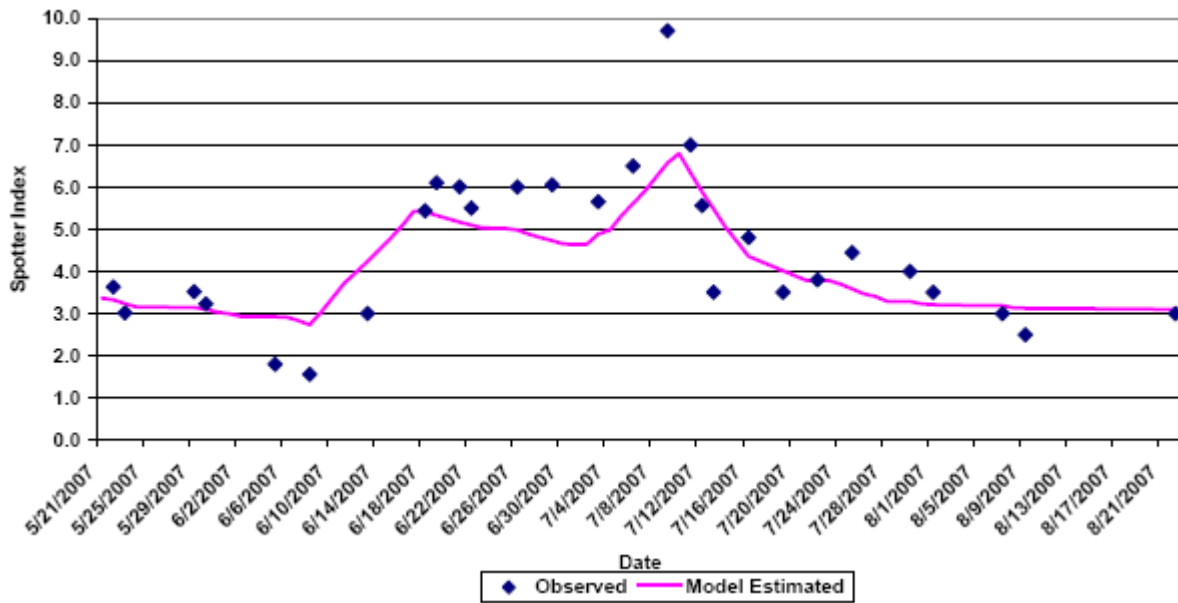


Figure 5.1 Observed and Model Estimated Spotter Index of Menhaden in Narragansett Bay in 2007 (Gibson 2007).

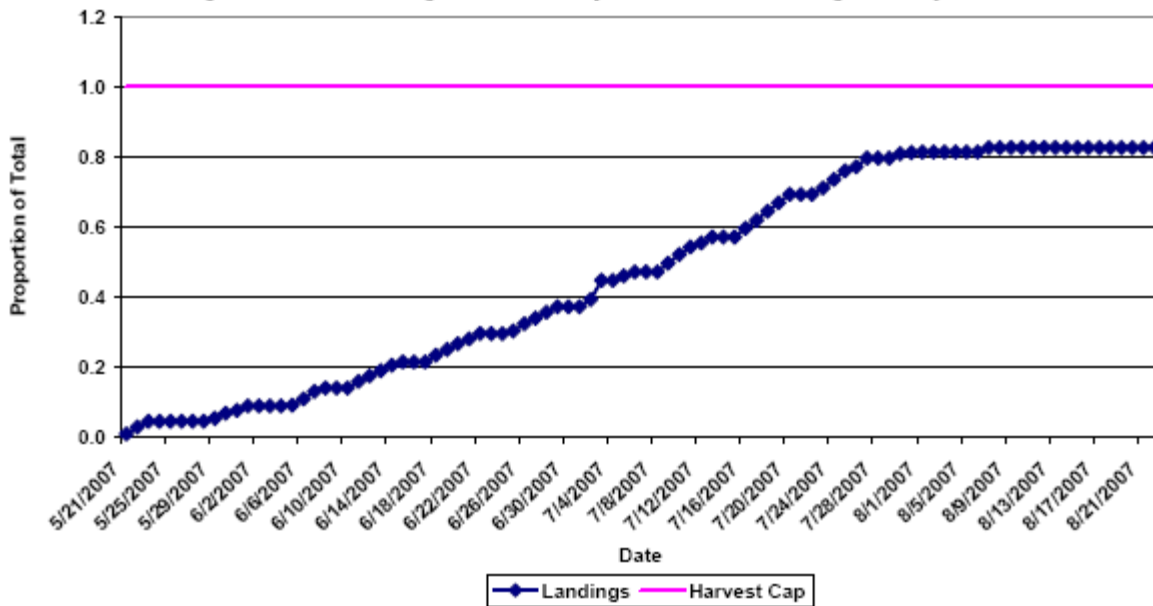


Figure 5.2 Cumulative Landings of Menhaden by Purse Seine from Narragansett Bay in 2007 (Gibson 2007).

5.3 Fishery-Independent Monitoring

RIDFW operates a number of fishery-independent monitoring programs that target species of recreational and/or commercial importance. These surveys provide data that are used with fishery-dependent information to support stock assessments and develop management advice at the state and regional level.

5.3.1 Coastal Fishery Resource Assessment Trawl Survey

The year 2007 marked the twenty-ninth year of RIDFW's seasonal trawl survey. The survey was initiated in 1979 to monitor recreationally important finfish stocks in Narragansett Bay, Rhode Island Sound, and Block Island Sound. The survey employs a stratified random design and records aggregate weight by species, frequency, individual length measurements, and various physical data. In 1990, a monthly component was added to the survey, which includes 13 fixed stations in Narragansett Bay. Together, both components of the survey aim to monitor trends in abundance and distribution, to determine population size/age composition, and to evaluate the biology and ecology of estuarine and marine finfish and invertebrate species occurring in RI waters. Over the years this survey has become an important component of fisheries resource assessment and management at the state and regional levels.

In 2005, the Division replaced the research vessel and survey gear that has been utilized by the survey since its inception. The R/V *Thomas J. Wright* was replaced with a 50' research vessel, the R/V *John H. Chafee*. During the spring and summer of 2005, a series of paired tow trials were conducted using modern acoustic equipment and new nets designed to match the trawl net used by the National Marine Fisheries Service. The results of this experiment were used to calibrate the old and new vessels in order to maintain the continuity of the survey time series. Unfortunately, the new net design was too large for the new research vessel and could not be successfully towed in many of the areas required by the trawl survey. Because of this a new net was designed in the same dimensions as the net previously used for the survey and is used for the trawl survey. By using a similar net design to the previous survey net, the continuity of the survey is able to be maintained.

5.3.2 Narragansett Bay Juvenile Finfish Survey

The RIDFW has performed a juvenile finfish beach seine survey since 1986. The survey is intended to monitor the relative abundance, distribution, and size composition of juvenile winter flounder, tautog, bluefish, scup, squeteague, members of the family Clupeidae, and selected species of commercial and recreational importance. The survey takes monthly samples at 18 fixed stations in Narragansett Bay from June to October. All juvenile finfish are identified, counted, and measured. Data collected from the juvenile marine finfish survey have been used to identify critical habitat features affecting production, to examine multispecies interactions, and to evaluate the efficacy of various management scenarios. The survey data have also been incorporated into state and regional stock assessments and are used to provide regulatory agencies with sufficient information to make informed decisions in the permitting process.

5.3.3 Young-of-Year Survey in Rhode Island Coastal Ponds

RIDFW's survey of coastal ponds continued to collect data for the assessment of spawning success and recruitment of winter flounder and other recreationally important finfish species. The survey takes monthly samples during May to October from Rhode Island coastal ponds and estuaries using a beach seine. At each station, physical data are recorded and collected fish are sorted by species, measured and counted. The presence and abundance of any invertebrates or aquatic vegetation is noted. Sampling sites are located in Winnapaug Pond, Quonochontaug Pond, Ninigret Pond, Point Judith Pond, Narrow River, and the Great Salt Pond (Block Island).

5.3.4 Narragansett Bay Ichthyoplankton Survey

The RIDFW ichthyoplankton survey was started in 2000 to identify spawning areas and seasons for major recreational species as well as provide data to support stock assessment and management for those species. The survey uses paired Bongo nets to collect eggs and larvae from 15 spatially stratified stations in Narragansett Bay. Various physical data are also recorded. Collections are made year-round on a monthly basis. Data collected from the survey will be used to develop indices reflecting relative population changes over time.

5.3.5 Narragansett Bay Quahaug Dredge Survey

The quahaug dredge survey was initiated in 1993 as part of the RI Quahaug Management Plan. The aim of the survey is to determine the density of the subtidal infaunal organisms, primarily the hard shell clam *Mercenaria mercenaria* (bay quahaug). Sampling is conducted through the summer months. A hydraulic dredge is used to sample locations that are randomly selected within predefined quadrats throughout Narragansett Bay. Data on abundance, size frequency, species composition, predators, and bottom composition are recorded. Additional small-scale surveys are conducted in the coastal salt ponds using shoreline quadrat sampling.

5.3.6 Pelagic Finfish Gillnet Survey

Observations recorded during the RIDFW gillnet survey are intended to complement data collected by other fishery-independent surveys within the state to provide a more complete and comprehensive characterization of recreationally important pelagic species occurring within RI waters. The survey samples stations from eight geographic-defined areas within Narragansett Bay. Multi-panel gillnets are set at the sampling sites and allowed to soak for twenty-four hours. After the nets are retrieved, the catch is sorted and processed. The data are used to characterize the species composition, relative abundance, size, age, and sex composition of Rhode Island marine finfish. The survey targets adult pelagic species including striped bass, bluefish, weakfish, shad, and menhaden. Physical data are also recorded at each station. The information provided by this survey will be used for coastwide species stock assessments and interstate fisheries management.

5.3.7 Young-of-Year Glass Eel Assessment

In 2000, the ASMFC mandated that all member states/jurisdictions conduct an annual young-of-year (YOY) abundance survey to monitor recruitment of American eel (ASMFC 2000). The ASMFC requires that at least one location be sampled over a six-week period. The seventh year of Rhode Island's American eel recruitment survey was carried out in 2007. The first monitoring

site was set up in 2000 at Gilbert Stuart Dam in the Pettasquamscutt River. In 2004, RIDFW established a second site at the Hamilton Fish Ladder in the Annaquatucket River. A modified Irish elver ramp is deployed at each site during the sampling season, generally April through June, and monitored daily. The YOY eel catch is weighed and enumerated. Various physical data are also recorded. Twice a week, lengths and weights of individual YOY eels are measured.

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