

**2001 REVIEW OF THE FISHERY MANAGEMENT PLAN  
FOR RED DRUM  
(*Sciaenops ocellatus*)**

Prepared by:

The Red Drum Plan Review Team

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**I. Status of the Fishery Management Plan**

The Atlantic States Marine Fisheries Commission (ASMFC) adopted a *Fishery Management Plan (FMP) for Red Drum* in 1984. The original management unit included the states from Florida to Maryland. In 1988, the Interstate Fisheries Management Program (ISFMP) Policy Board requested that all states from Florida to Maine implement plan requirements to prevent development of northern markets for southern fish. This action was the first of two revisions to the 1984 plan.

The second revision came with Amendment 1 in 1991. Amendment 1 replaced the 1984 plan with one developed jointly between ASMFC and the South Atlantic Fishery Management Council (SAFMC). The plan adopted by SAFMC prohibited harvest of red drum in the Exclusive Economic Zone (EEZ), thereby placing regulatory responsibility at the state level. However, cooperative state/federal efforts were augmented under provisions in the SAFMC plan to direct federal data collection and analyses for long-term objectives to rebuild overfished stocks.

The goal of Amendment 1 was to attain optimum yield from the fishery over time. Optimum yield is defined as the amount of harvest that can be taken while maintaining the spawning stock biomass per recruit (SSBR) level at or above 30 percent of the level that would result at a fishing mortality rate of  $F=0$ . However in 1998, the SAFMC adopted a new optimum yield level of 40 percent static SBR and threshold overfishing definition of 10 percent static SBR. The new management objectives were to: (1) assure escapement by controlling fishing mortality; (2) address incompatibility and inconsistency among state and federal regulations; (3) promote cooperative collection, analysis, and utilization of biological and socioeconomic data.

In 2000, the Council recommended that management authority for red drum be transferred to the states, through the Commission's ISFMP process. A round of public information hearings have been held to develop Amendment 2 to the ASMFC FMP and a public hearing draft of the amendment is in preparation. Approval of Amendment 2 is scheduled for the Spring of 2002.

**II. Status of the Stocks**

It is important to remember that the population models used in the assessment (specifically yield per recruit and static SPR) are based on equilibrium assumptions. Previous estimates of escapement rates (relative survival of red drum from age at entry to fishery to age 4) for 1992-94 ranged from 10.4% for the northern region (North Carolina and north) and 17.2% for the southern region (South Carolina and south). Unpublished data from Florida showed much higher

escapement rates of between 55 to 62%; this may mean that escapement rates in Georgia and South Carolina are lower than the regional estimate. Estimates of static SPR (the ratio of spawning stock biomass per recruit with and without fishing mortality) ranged from 9% for the northern region to 14% for the southern region. This may be an overestimate because most states north of North Carolina allow a fishery for adults and the analysis assumes no adult fishing mortality or any discard mortality from commercial fishing operations and recreational use of commercial (gillnet) gear.

Based on the most recent full assessment (Vaughan and Carmichael 2000) the Amendment 1 target of  $SSBR > 10\%$  appears to have been met for both the northern (18%) and southern (15%) regions. The assessment results for the northern region indicated that escapement rates were on the order of 18%, but may be overestimated due to the lack of discard data from both the commercial fishery and recreational netting practices. Also, the estimate for the southern region (17%) may not be reflective of escapement rates throughout the region, where there appears to be significant regional differences between Florida and Georgia/South Carolina. The red drum population on the east coast of Florida appears to be recovering much faster than in neighboring state waters, which may be a result of very strict harvest controls in Florida. Annual escapement estimates from Florida waters averaged 77% from 1993-97.

Since no direct estimates are available on the current status of the adult stock, model results imply potential longer term, equilibrium effects. In this regard, the joint Commission/Council plan development team maintains that the National Marine Fisheries Service (NMFS) Marine Recreational Fisheries Statistics Survey (MRFSS), as the basis of management data, provides insufficient information to assess the status of adult red drum stocks.

### **III. Status of the Fishery**

Back to 1960, few commercial landings of red drum have been recorded in states north of Maryland (Table 1). Only Rhode Island, New York and New Jersey have reported any landings since 1980. Coastwide commercial landings show no particular temporal trends, ranging from 58,000 to 422,000 pounds annually. Coastwide commercial landings for 2000 amounted to 285,000 pounds; the majority (95%) from North Carolina. Based on available information from tagging studies, a large portion of harvest in state waters appear to be supported primarily by catches of sub-adult red drum (0-5 yr.).

Historically, the major commercial harvesters had been North Carolina and Florida. However, commercial harvest has been prohibited in Florida since January 1989, under state regulations. An annual quota of 250,000 pounds controls the commercial harvest of red drum in North Carolina. The North Carolina Marine Fisheries Commission recently approved a new red drum FMP which: prohibits the possession or sale of red drum larger than 27 inches; reduced the recreational bag limit to 1 fish per day between 18-27 inches; imposed a commercial daily trip limit of 50 pounds with a 250,000 pound annual quota; and required fishermen to attend gill nets less than five-inch stretched mesh from May 1-October 31, in order to reduce regulatory discards.

**Table 1. Commercial landings (in pounds) of red drum along the Atlantic coast, 1960-2000  
(source: NMFS commercial landings data).**

Year	RI	NY	NJ	MD	VA	NC	SC	GA	FLEC	Total
1960				200	29400	79300	4200	400	129000	242500
1961					1200	89700	900	1000	114500	207300
1962					12900	60900			149300	223100
1963					2700	71200			134200	208100
1964					4600	101500	11500		119000	236600
1965				1200	94900	71400			146300	311100
1966				200	3100	35200	200	2700	153000	194400
1967					1100	12800	900	5800	147100	167700
1968					100	12500		5500	167000	185100
1969				400	700	3900	700	2700	119000	127400
1970					100	7500	400	2200	146800	157000
1971					700	17200	1300	1200	85200	105600
1972					5900	42900	1200	3400	128400	181800
1973			900		6200	70300	600	3700	166500	248200
1974					15700	142000	2300	3100	137300	300400
1975			200		19600	214000	12400	10000	83300	339500
1976					18600	168200	2600	7300	106000	302700
1977			200		300	19700	800	5000	103500	129500
1978			300		2100	21774	4325	328	104696	133523
1979				100	1900	126517	1767	935	92684	223903
1980					400	243223	4107	1493	191222	440445
1981					200	93420		261	258374	352255
1982					1700	52561	2228	251	139170	195910
1983				100	41700	219871	2274	1126	105164	370235
1984					2600	283020	3950	1961	130885	422416
1985					1100	152676	3512	3541	88929	249758
1986				1000	5400	249076	12429	2939	77070	347914
1987					2600	249657	14689	4565	42993	314504
1988				8100	4000	220271		3281	284	235936
1989				1000	8200	274356	165	3963		287684
1990				29	1481	183216		2763		187489
1991				7533	24771	96045	1475	1637		131461
1992				742	2352	128497		1759		133350
1993				121	8637	238099		2533		249390
1994	5094			1152	4080	142159		2141		149532
1995		668		6	2992	248193		2578		253769
1996		8			2073	113401		2271		117753
1997	43			24	4049	52548		1395		58059
1998	165	57	311	419	6436	294415		672		302475
1999		47	241	707	12368	372749		1115		387227
2000		1215		877	11457	271013		707		285269

The number of red drum harvested by recreational fishermen has generally been in the 300-500,000 range since 1981. Over a million fish were taken in both 1984 and 1985, but this has proven to be the exception in recent years. The recreational harvest for 2000 was almost 393,000 fish, the majority of which were taken by Florida anglers (Table 2). The number of red drum released by recreational fishermen has averaged about one million fish per year since 1991 (Table 5). Approximately 1.3 million were released in 2000.

**Table 2. Recreational harvest (numbers of A + B1 fish) of red drum along the Atlantic coast, 1981-2000 (source: pers. comm. NMFS, Fish. Stats. & Econ. Div.).**

Year	DE	NJ	MD	VA	NC	SC	GA	FLEC	Total
1981			601	49630	15054	27319	6323	75244	174171
1982					16445	160760	30757	204401	412363
1983			2413	32940	81528	104806	56854	344513	623054
1984				1457	108787	129547	258188	549381	1047360
1985					22077	530110	183837	265185	1001209
1986			12804	28139	17501	193188	102279	113440	467351
1987				2186	61100	522420	138062	51225	774993
1988				4311	142626	287916	147042	9542	591437
1989			1014	12007	62359	127492	51557	34748	289177
1990			1279		33149	118666	76304	44280	273678
1991			2745	17119	38658	125833	162802	102727	449884
1992				13275	23593	112534	83861	104265	337528
1993				14005	49493	119189	105710	65140	353537
1994				1378	28953	129515	134214	120938	414998
1995				3665	88593	202430	134915	96927	526530
1996				572	36746	130649	60251	146823	375041
1997				1920	8749	129022	39041	75235	253967
1998				13070	114638	46509	24929	107982	307128
1999				12425	64739	44069	67283	126180	314696
2000				22024	58099	35843	90913	185776	392655

#### IV. Status of Research and Monitoring

In cooperation with the states, the NMFS laboratory in Beaufort, North Carolina has compiled information and performed analyses on status of the stocks periodically since 1989. Fishery independent data collected by the states (North Carolina, South Carolina, Georgia, Florida) periodically have been utilized in coastwide stock assessment. Virtual population analyses utilize the MRFSS as the primary data source.

In November 1994, the states of North Carolina, South Carolina and Georgia initiated a multi-year study to collect fishery independent data utilizing trammel nets and tagging techniques. The Florida Marine Research Institute continues to monitor juvenile red drum abundance in the northern Indian River Lagoon. A monitoring program, which used trammel nets to catch sub-adult red drum for tagging and age composition sampling, was replaced in 1997 by a 300 foot haul seine used in a stratified random sampling design to provide age composition data and relative abundance indices for exploitable-sized fish. A coastwide red drum stock assessment was completed in late 1999, and peer-reviewed during 2000. A revised bag and size limit analysis was developed for each region using the new overfishing definitions and standards as benchmarks.

**Table 3. Recreational harvest (pounds of A + B1 fish) of red drum along the Atlantic coast, 1981-2000 (source: pers. comm. NMFS, Fish. Stats. & Econ. Div.).**

Year	DE	NJ	MD	VA	NC	SC	GA	FLEC	Total
1981			4370	347939	31519	50230	9442	317963	761463
1982					37511	340686	52150	480676	911023
1983			3018	51299	109540	222691	67298	675924	1129770
1984				1285	1160539	183282	294583	976971	2616660
1985					70677	1532316	185887	414176	2203056
1986			754161	145517	31594	498586	173837	360725	1964420
1987				44332	200729	913639	250795	227222	1636717
1988				9030	451974	1050049	385860	12507	1909420
1989			2348	27236	214849	396771	127245	146064	914513
1990			2679		302994	631819	161712	258569	1357773
1991			5635	30582	108268	284290	337207	516999	1282981
1992				55324	109134	411484	198751	396555	1171248
1993				45505	266459	282614	328245	290930	1213753
1994				3684	192060	314632	353616	578412	1442404
1995				66270	405620	417595	300337	525231	1715053
1996				1512	204556	396394	164756	596483	1363701
1997				1810	39077	296155	129836	345390	812268
1998				34861	591428	129619	84348	487091	1327347
1999				92794	326303	103777	166630	540310	1229814
2000				93105	297835	89688	221029	860892	1562549

## V. Status of Management Measures

With approval of Amendment 1 in 1991, ASMFC adopted a "phase-in" approach to attain the management goal of 30% SSBR in the fishery. The initial phase required all states to adopt

measures which would achieve a 10% SSBR; all states have complied with this requirement. The SAFMC set optimum yield for red drum at 40% static SPR with a threshold overfishing definition level at 10% static SPR. Once static SPR falls below 10%, F must be equal to 0. Because management measures restrict the harvest of large, adult red drum, the understanding of their population dynamics is limited. Consequently, escapement (juvenile fish that escape from the fishery to reach the large protected size) limits the ability to estimate static SPR.

Recent discussions between the Council's Red Drum Management Committee and the South Atlantic Board, led the Council to recommend in December 2000 to transfer management authority to the states in December 2000. This has necessitated the development of an amendment to the current Interstate FMP. The Board's intent has been to initiate the development of Amendment 2 once the stock assessment was updated and reviewed. This process has begun and the draft amendment is scheduled to be approved in the Spring of 2002. Management measures which may be implemented through the new amendment include revised bag and size limits. However, some states notably North and South Carolina, have already taken steps to reduce the harvest of red drum through revised bag and size limits.

## **VI. Current State-by-State FMP Implementation per Compliance Requirements as of October 1, 2001**

Amendment 1 designated a series of steps to achieve the target SSBR level of 30%. Currently, the South Atlantic Board has determined that the states must adopt the management measures that will attain an SSBR level above 10% (first step of phase-in approach). The 10% scenario required states to adopt either of two options:

1. 18-inch Total Length (TL) minimum, 27-inch TL maximum, and a 5 fish bag limit with one fish exceeding 27-inch TL; or
2. 14-inch TL minimum, 27-inch maximum, and 5 fish bag limit, with no fish exceeding 27-inches TL

It is anticipated that Amendment 2 will have new compliance criteria that will be in effect once it has been approved.

## **VII. Status of Assessment Advice**

The last red drum assessment was conducted in 1999 and reviewed by the Scientific and Statistical Committee of the SAFMC in 2000. Recreational and commercial catches were converted to catch in numbers at age using available length-frequency distributions and age-length keys. Separable and tuned virtual population analyses were conducted on the catch in numbers at age to obtain estimates of fishing mortality rates (F) and population size. These estimates of F combined with estimates of growth, sex ratios, sexual maturity and fecundity are

used to estimate yield per recruit, escapement to age 4, and static (or equilibrium) spawning potential ratio (static SPR, based on both female biomass and egg production). The FADAPT VPA methodology was chosen by the Technical Committee as the population modeling approach to determine the status of the stock.

**Table 4. Summary of Atlantic coast red drum regulations by state/jurisdiction, as of October 1, 2001 (N/A = Not Applicable).**

State	Size Limit (TL inches)	Possession Limit	Other	Meets FMP requirement?
ME	None	None	None	N/A
NH	18" - 27"	None	0 fish > 27" TL	N/A
MA	14"	None	None	N/A
CT	None	None	0 fish < 32" TL	N/A
RI	None	None	None	N/A
NY	14"	None	2 fish > 32" TL	N/A
NJ	18" - 27"	None	1 fish > 27" TL	Yes
PA	None	None	None	No
DE	18" - 27"	5 fish	1 fish > 27" TL	Yes
MD	18" - 27"	5 fish	1 fish > 27" TL	Yes
PRFC	18" - 27"	5 fish	1 fish > 27" TL	Yes
VA	18" - 27"	5 fish	1 fish > 27" TL	Yes
NC	18" - 27"	1 fish	0 fish > 27" TL; Commercial cap = 250,000 lbs.; daily trip limit of 50 lbs.; gill nets < 5" stretch mesh must be tended from 5/1-10/31	Yes
SC	15" - 24"	2 fish	Gamefish - no sale	Yes
GA	14" - 27"	5 fish	0 fish > 27" TL	Yes
FL	18" - 27"	1 fish	Gamefish - no sale	Yes

## VIII. Recommendations of FMP Review Team

### Management and Regulatory Recommendations

1. ASMFC and the Regional Fishery Management Councils should continue to collaborate on cooperative review of stock assessments and formulation of management measures.
2. States north of New Jersey should adopt management measures to avoid open ports for commercial landings.
3. The management unit should be divided at the North Carolina/South Carolina border, and be managed as two separable sub-units of an Atlantic stock.
4. States should maintain annual age-length keys.
5. A technical review of North Carolina's commercial quota should be made to determine its conservation equivalency in relation to the two management options in the plan.
6. States with significant fisheries (over 5,000 pounds recorded by MRFSS) should collect socioeconomic data on red drum fisheries through add-ons to the MRFSS or by other



means.

### **Prioritized Research and Monitoring Recommendations**

1. Develop a survey design for fishery-independent sampling of sub-adult and adult red drum in each state from North Carolina to Florida. The purpose of this survey would be to: 1) verify escapement to the spawning population; 2) provide an index of recruitment to age 1; and 3) provide an estimate of the biomass of adult red drum.
2. Determine habitat preferences, environmental conditions, growth rates, and food habits of larval and juvenile red drum throughout the species range along the Atlantic coast. Assess the effects of environmental factors on stock density.
3. Identify spawning areas of red drum in each state from North Carolina to Florida so these areas may be protected from degradation and/or destruction. Determine the impacts of dredging and beach re-nourishment on red drum spawning and early life history stages.
4. Continue tagging studies to determine stock identity, inshore/offshore migration patterns and mortality estimation. Evaluate utility of genetic discrimination studies for identifying unit stocks.
5. Determine the survival rate of red drum following regulatory and voluntary discard from commercial and recreational gear, including recreational net fisheries. Evaluate effects of water temperature and depth of capture.
6. Improve catch/effort estimates and biological sampling from recreational and commercial fisheries for red drum, including increased efforts to intercept night-time fisheries for red drum by the NMFS MRFSS, and recreational net fisheries. Characterize magnitude of commercial and recreational discards.
7. Investigate and evaluate new stock assessment techniques as alternatives to age-structured models. Conduct yield modeling on red drum.
8. Investigate the concept of estuarine reserves to increase the escapement rate of red drum along the Atlantic coast.
9. Fully evaluate the efficacy of using cultured red drum to restore native stocks along the Atlantic coast, including cost-benefit analyses.
10. Identify the effects of water quality degradation on the survival of red drum eggs, post-larvae, larvae, and juveniles.
11. Refine maturity schedules on a geographic basis, determine relationships between annual egg production over a range of sizes, ages and across latitude.
12. Develop a more reliable estimate of natural and fishing mortality through directed sampling of the adult population.
13. Examine the effectiveness of controlling fishing mortality and minimum size in managing red drum fisheries.
14. Quantify relationships between red drum production and habitat.
15. Determine methods for restoring red drum habitat and/or improving existing environmental conditions that adversely affect red drum production.
16. Document and characterize schooling behavior for Atlantic coast red drum.
17. Encourage the NMFS to conduct socioeconomic add-on surveys via the MRFSS that are specifically oriented to red drum recreational fishing (example: The 2000 Northeast Summer Flounder Survey).

18. Analyze the costs-earnings in the Virginia and North Carolina red drum commercial fisheries especially with regard to seasonal income and employment in the various fishing communities.
19. Where appropriate, conduct comprehensive studies to quantify the relative cost and benefits associated with regulatory induced allocations between user groups.
20. Estimate supply-demand functions at the ex-vessel and wholesale level for red drum products including the effects of domestic and imported substitutes for red drum in the market place.
21. Estimate the economic impacts (e.g. sales, jobs, income, etc.) of recreational red drum fisheries at the state and regional level including the “for-hire” sector (e.g. fishing guides).

**Identified Management Needs/Issues**

- none at this time

*Notes:*

**Research Needs Identified as Being Met**

**Table 5. Recreational releases (numbers of B2 fish) of red drum by state, 1981-2000**  
 (source: pers comm. NMFS Fish. Stats. and Econ. Div.).

Year	DE	NJ	MD	VA	NC	SC	GA	FLEC	Total
1981					2230	417		9042	11689
1982						2496	3377	10172	16045
1983					1866	6751	1417	54723	64757
1984					2931		4232	47196	54359
1985				1115		16688	6315	193399	217517
1986				7595		24018	56045	100095	187753
1987					18499	82595	234676	377959	713729
1988				3958	24874	269176	177319	233988	709315
1989			2918	7038	7566	42824	71162	172303	303811
1990				934	12452	102611	156263	68667	340927
1991			4432	14461	121178	99968	92803	645773	978615
1992		301		15383	60230	46269	128066	284893	535142
1993				50434	182301	146324	140386	465656	985101
1994				10684	107662	324706	146039	691261	1280352
1995				33560	164520	362844	356618	683706	1601248
1996				2424	35752	176517	71983	500374	787050
1997	2571			109754	259570	175772	22736	560559	1130962
1998			2768	93660	199701	84274	33882	481009	895294
1999			2148	232893	247146	87776	18586	565981	1154530
2000				192171	192853	90645	123656	673969	1273294