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Thoughts on Flounder Management and the Need for Action in Virginia

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by

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Amendment II to the ASMFC/MAFMC Fisheries Management Plan for summer flounder (fluke), *Paralichthys dentatus*, requires, for recreational fishing, a 14" TL minimum size limit, a 15 May-30 September season, and a 6 fish a day bag limit. Virginia is not in compliance as it has only adopted a 14" TL size limit.

A Flounder Plan Monitoring Committee composed of federal and state scientists, and regional council staff members met on 2 March 1994 to review the plan and consider needed changes (Appendix I). The Committee met last September and recommended a coastwide recreational harvest limit of 10.67 million pounds in 1994. No action was taken however, on recommending a coastwide season or possession limit until the 1993 recreational landings data were available.

In an effort to predict the 1994 landings the Mid-Atlantic Fisheries Management Council staff (Appendix II) prepared an analysis that used past landings and stock size from 1982 through 1992. This analysis projects "unregulated landings", those that would be expected without Amendment II to the Plan. This analysis gives a landing envelope of from 9.5 to 18.4 million pounds for 1994. Thus, landings would have to be reduced from 0 (9.5

million) to 40% (18.4 million). Their analyses also show that most of the recreational catch has been on two year old fish (14"), a size at which most Mid-Atlantic Bight (MAB) stock flounder have migrated north out of southern MAB estuaries. This view has been held by scientists and managers since at least the early 1960's when John Poole of the NY Department of Environmental Conservation , conducted his studies on Long Island. Recent work at VIMS (Desfosse, unpublished dissertation) and in North Carolina would seem to refute this hypothesis and point to separate populations within the MAB, and ony limited (≤ 20%) emigration to the northern estuaries. The fish "lost" from Virginia waters are not the larger, older individuals but are mostly young-of-the-year-fish which shared nursery areas with the young-of-the-year from a southern stock.

The 1994 recreational landing projections also used a hooking-release mortality of 25 %. When this rate is applied to the 11.97 million pounds released in Virginia there is an additional mortality of 2.99 milllion fish, or a total hooking mortality of 7.68 million fish, not 4.689 or 6.194 fish as indicated in Table 1 (Appendix 1, p.3).

The Summer Flounder Monitoring Committee was asked to provide a recommendation to the MAFMC for 1994 recreational management measures. MAFMC staff recommended a possible relaxation of the season and/or

possession limit, two management measures that Virginia has not adopted (and is therefore out of compliance), as their analyses suggested there may be more fish available during 1994 than can be harvested under current regulations. However, they cautioned the Committee to remember that there is "...no penalty applied to the recreational fishery for annual overages,..." and so "...a cautious risk adverse approach is warranted."

The recommendations developed by the Monitoring Committee were to expand the season from 15 May - 30 September, to 1 May - 15 October; and to increase the daily possession limit from 6 to 7. The size limit is to be left at 14" TL.

Using the Virginia Juvenile Summer Flounder Index (VIMS) and the Coastal Recreational Landings (MAFMC) we plotted the relationship of juvenile index and recreational landings of flounder two years later (e.g. 1980 juvenile index against 1982 recreational landings) (Figure 1). There is a pattern. Large juvenile indices (>5) produce large landings two years later (e.g. 1980 index, 1982 landings and 1981 index and 1983 landings). The 1984 landings however, are higher than our model would predict, probably because the catch that year had a lot of III (1981 year class) and even IV year old fish (1980 year class), both of which were "dominant" year classes. Juvenile indices of around one (1) to three (3) produce "average" year classes and subsequent recreational

landings (12 to 25 million pounds) two years later.

Of greatest importance are the results of small, possibly "failure" year class recruitment. For the two years that the juvenile index was near or below one (1) the recreational landings were less than 10 million pounds. The only time the index was ever below 0.5 the landings set a record low of only 2.7 million. The 1994 recreational landings will be comprised of those fish produced in 1992, and 1995 of those spawned in 1993. The 1992 and 1993 indices are the two lowest in the history of the index series (0.48 and 0.49). If the pattern follows in 1994, then landings could be as low or lower than 5 million pounds. Not a situation or time to "relax" the management restrictions. An increase in recreational harvest effort during 1994, on a reduced stock, may have a detrimental impact on the past management efforts to rebuild the stock.

In Virginia, the 14" management option produced one of the largest reductions in landings along the east coast. This may seem like a rationale to continue the no-season, no-bag limit management option; and there are strong socio-economic forces at work to support this. The new administration is likely to follow a path of support for jobs, particularly in light of the MAFMC position that the stock is increasing and so restrictions should be lifted. The juvenile index data however, suggest that the stock recovery was temporary and that we are likely to see a reversal in the landings trend.

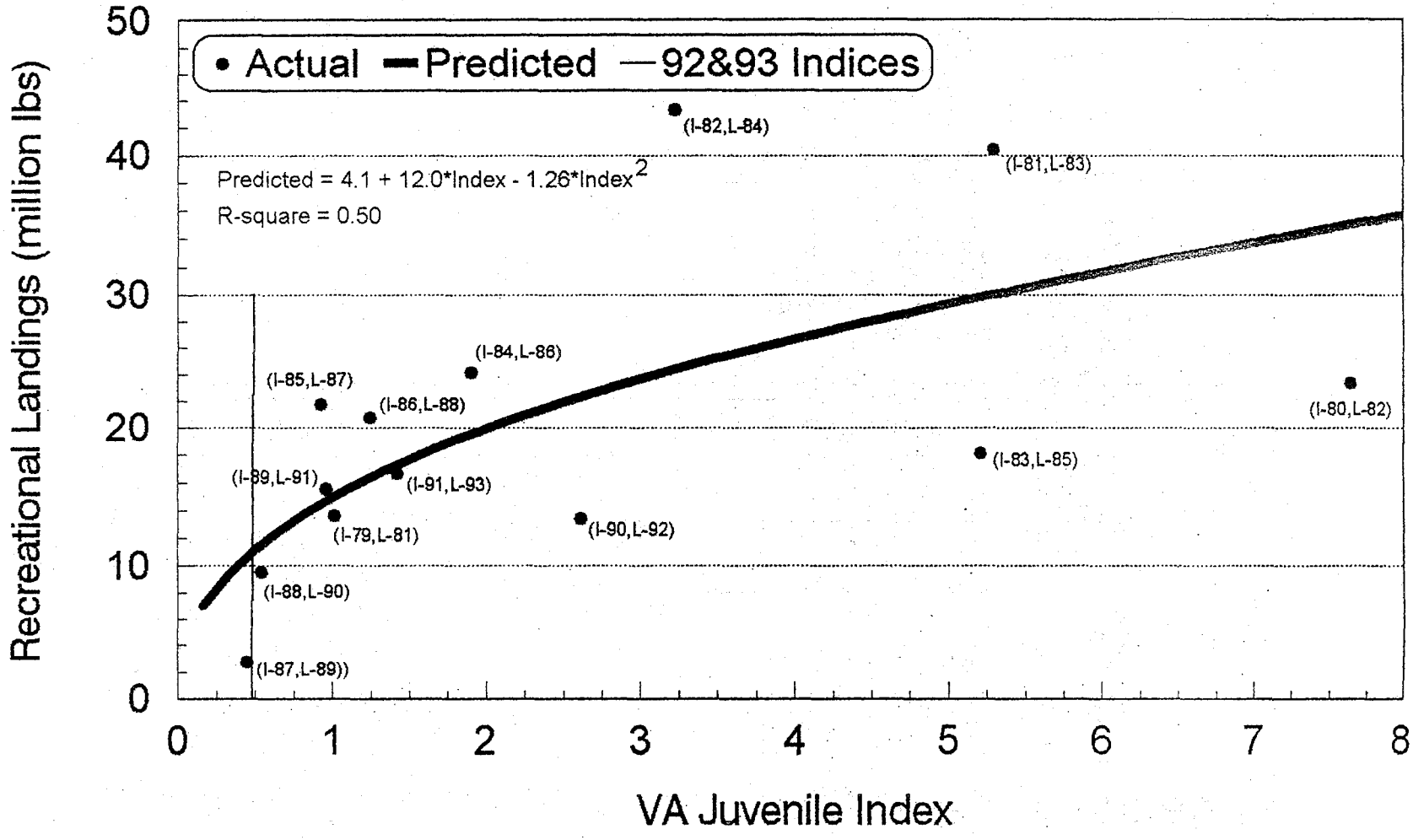
If there are any indications that the spring recreational catch is down compared to past year,s, the VMRC should take prompt action. At the very least, Virginia should give serious consideration to adopting the "relaxed" May-October season and seven fish bag limit. Advantageous to both Virginia fishermen and the stock might be a split season allowing fishing in the early spring (April-May), closed during summer when the small fish are in the Bay (June-August) and open again in the fall (September-October).

Figure 1

VIMS Juvenile Summer Flounder Index vs Coastal Recreational Landings

Data and graph prepared by Chris Bonzek, Fisheries Data Management Unit, SMS/VIMS.

Comparison of VIMS Juvenile Summer Flounder Index and Coastal Recreational Landings



APPENDIX

I

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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David R. Kelfer
Executive Director

Date: February 17, 1994

To: Summer Flounder Plan Monitoring Committee

From: Chris Moore CM

Subj: Summer Flounder Recreational Management Measures for 1994

The Summer Flounder Monitoring Committee met last September and recommended a coastwide recreational harvest limit of 10.67 million pounds for the summer flounder fishery in 1994. The 1994 harvest limit represented a 30% increase relative to the target for 1993, an increase that was identical to the increase in the commercial quota for 1994. However, the Committee decided not to recommend a coastwide recreational possession limit and season to attain the 1994 target harvest limit until the 1993 recreational landings data were reviewed.

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The harvest limit established for 1993 was 8.38 million pounds or 4.36 million fish. The preliminary recreational data for 1993 indicate that recreational fishermen caught 16.66 million summer flounder (Table 1). However, they landed 4.69 million fish which weighed 6.2 million pounds. Relative to the 1993 limit, fishermen exceeded the target number by slightly more than 325,000 fish but were below the target weight by approximately 2.2 million pounds.

Most States implemented the coastwide recreational management measures of a 14" TL minimum fish size, a 6 fish possession limit, and a May 15 to September 30 season (or equivalent) in 1993. However, several States were out of compliance with the plan including CT (no possession limit or season), MD (10 fish possession limit), VA (10 fish possession limit and no season), and NC (13" TL minimum size, no possession limit or season). Compared to 1992 summer flounder landings, not all States saw a decrease in their recreational harvest in 1993 (Table 2).

As a review, the effects of the recreational limits were derived using 1986-1990 MRFSS data (Tables 3-7). The effect of the limits, defined as the percent reduction in the number of summer flounder killed by anglers, was calculated using a simple censoring procedure which accounted for a 25% post-release mortality.

Based on the analyses conducted for Amendment 2, the potential effects of the size limit and season were more evident in States from MD to NC (Table 8). Seasons would have more effect in these southern States since flounder are available to recreational fishermen

~~Keep season as is~~ 1 May - 15 Oct
8 fish
14" TL

for a longer period of time during the year. In addition, because these states had a 12" TL or 13" TL minimum size limit in effect from 1986-1990, the 14" TL minimum size regulation would have had more of an impact in these States compared to northern States which had had 14" TL minimum size regulations during those years. However, the 6 fish possession limit would have had the greatest impact on States from ME to CT.

As expected, 1993 data indicate that the coastwide reduction in landings resulted principally from the implementation of a 14" TL minimum size limit in the States from NJ through VA (Table 9). The possession limit had a small effect. Coastwide, catch frequencies remained relatively unchanged compared to the 1986-90 data, with 73% of the successful trips landing 2 or less fluke per trip based on both 1986-90 and 1993 data (Table 10). However, most states with possession limits did see a slight decrease in the number of trips catching more than 6 fish (Table 11). In addition, the season probably resulted in a slight reduction in landings in some States. However, the coastwide distribution of landings by wave in 1993 remained relatively unchanged compared to 1992 (Table 12).

The Committee must decide what changes (if any) should be made to the limits in 1994. Based on the above analyses and review of the performance of the recreational industry in 1993, the season and/or possession limit could be relaxed in 1994. However, because of the uncertainty associated with the level of recreational effort in 1994 and the fact that there is no penalty applied to the recreational fishery for annual overages, a cautious, risk adverse approach is warranted.

Table 1. Summer flounder recreational catch and landings by year, 1979-93. The number of fish discarded is presented as a proportion of the total catch (% Rel).

Year	Catch ('000)	Landing ('000)	Landing ('000 lbs)	% Rel
1979	23,638	20,828	24,063	12
1980	28,478	22,213	25,842	22
1981	13,673	9,333	11,297	32
1982	23,311	15,989	18,901	31
1983	40,400	26,540	35,651	34
1984	43,336	26,227	28,878	40
1985	18,171	15,110	17,085	17
1986	24,139	11,970	17,573	50
1987	21,799	8,674	13,131	60
1988	20,756	12,489	18,422	40
1989	2,710	1,821	3,192	33
1990	9,554	4,028	5,368	58
1991	15,576	5,986	7,790	62
1992	13,435	5,530	7,761	59
1993	16,661	4,689	6,194	72

10.67

25% Release mortality

Source: Unpublished NMFS MRFSS Data.

Table 2. Summer flounder recreational landings ('000 lbs) by state, 1992 and 1993.

State	1992	1993
ME	0	*
NH	0	*
MA	104	111
RI	156	123
CT	183	81
NY	952	1,235
NJ	4,155	3,135
DE	418	374
MD	557	183
VA	962	659
NC	274	293

* = less than 1,000 lbs.
Source: Unpublished NMFS MRFSS Data.

Table 3. The estimated percent of successful anglers landing 1 to 42 summer flounder (MRFSS Type A fish) per day, 1986-90 combined.

Catch/ trip	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5136	55.6	5136	55.6
2	1670	18.1	6806	73.7
3	951	10.3	7757	84.0
4	434	4.7	8191	88.7
5	355	3.8	8546	92.6
6	173	1.9	8719	94.4
7	122	1.3	8841	95.8
8	86	0.9	8927	96.7
9	52	0.6	8979	97.2
10	107	1.2	9086	98.4
11	12	0.1	9098	98.5
12	16	0.2	9114	98.7
13	24	0.3	9138	99.0
14	22	0.2	9160	99.2
15	20	0.2	9180	99.4
16	2	0.0	9182	99.4
17	3	0.0	9185	99.5
18	3	0.0	9188	99.5
19	4	0.0	9192	99.6
20	18	0.2	9210	99.8
21	2	0.0	9212	99.8
23	3	0.0	9215	99.8
25	1	0.0	9216	99.8
26	2	0.0	9218	99.8
27	3	0.0	9221	99.9
28	3	0.0	9224	99.9
29	1	0.0	9225	99.9
30	3	0.0	9228	99.9
33	1	0.0	9229	100.0
37	1	0.0	9230	100.0
40	2	0.0	9232	100.0
42	1	0.0	9233	100.0

Source: Unpublished NMFS MRFSS data.

Table 4. The effect of various size and possession limits on 1986-90 combined summer flounder recreational landings (MRFSS Type A fish). (The table contains the percent reduction in the number of summer flounder killed by anglers.)

Possession Limit	Size Limit (TL inches)					
	No	12"	13"	14"	15"	16"
No	-	5.0	11.3	26.0	41.4	53.7
1	42.7	47.1	51.6	64.4	74.6	79.9
2	28.4	33.2	38.2	51.9	64.5	72.1
3	19.9	24.7	30.2	44.3	58.0	67.1
4	14.7	19.6	25.3	39.4	53.7	63.7
5	11.1	16.0	21.8	36.2	50.9	61.5
6	8.7	13.5	19.5	33.9	48.8	59.8
7	6.9	11.8	17.8	32.3	47.3	58.6
8	5.5	10.4	16.5	31.0	46.1	57.7
9	4.4	9.3	15.4	30.1	45.3	57.0
10	3.5	8.5	14.6	29.3	44.6	56.5
11	3.0	8.0	14.1	28.8	44.1	56.1
12	2.6	7.5	13.6	28.4	43.7	55.8
13	2.1	7.1	13.2	28.0	43.3	55.5
14	1.8	6.8	12.9	27.7	43.1	55.3
15	1.5	6.5	12.7	27.5	42.8	55.1
16	1.4	6.3	12.5	27.3	42.7	54.9
17	1.2	6.1	12.3	27.1	42.5	54.8
18	1.0	6.0	12.2	27.0	42.4	54.6
19	0.9	5.8	12.0	26.9	42.3	54.5
20	0.7	5.7	11.9	26.7	42.1	54.4

Source: Unpublished NMFS MRFSS data.

Table 5. Recreational summer flounder landings expressed as the percent of annual total for each bimonthly sampling period, 1986-90.

Months	Coast	ME-CT	NY-DE	MD-NC
J-F	0.02	0.00	0.00	0.10
M-A	2.00	0.03	0.02	8.14
M-J	26.06	19.04	27.75	24.26
J-A	51.01	47.44	54.64	42.56
S-O	18.60	33.49	17.58	15.45
N-D	2.31	0.00	0.01	9.48

Source: Unpublished NMFS MRFSS data.

Table 6. The percent reduction in the number of summer flounder killed by anglers with the implementation of various fishing seasons, 1986-90. (Reductions were calculated assuming a combined effort transference/hooking mortality rate of 33%.)

Fishing season	Coast	ME-CT	NY-DE	MD-NC
5/1 to 12/31	-	-	-	5.5
6/1 to 12/31	10.1	6.4	9.3	-
6/15 to 12/31	14.5	9.6	14.0	-
7/1 to 12/31	18.8	12.8	18.6	-
5/15 to 9/30	13.5	14.4	10.6	-

Source: Unpublished NMFS MRFSS data.

Table 7. Possession limits and seasons with a 14" TL minimum recreational fish size that most closely approximate a 47% reduction in exploitation for the summer flounder recreational fishery 1986-1990.

Fishing season	Coast	ME-CT	NY-DE	MD-NC
No season	3	2	2	6
5/1 to 12/31	-	-	-	10
6/1 to 12/31	5	3	-	-
6/15 to 12/31	7	-	3	-
7/1 to 12/31	10	4	4	-
5/15 to 9/30	6	5	3	-

Source: Unpublished NMFS MRFSS data.

Table 8. The coastwide and subregional effects (defined as the percent reduction in the number of summer flounder killed by anglers) of the recreational limits on 1986-90 recreational landings.

	Coast	ME-CT	NY-DE	MD-NC
14" TL size limit	26.0	15.6	17.9	37.4
6 fish possession	8.7	15.6	6.9	9.4
Season	13.5	14.4	10.6	21.1

Hooking Z by size?

Source: Unpublished MRFSS Data.

Table 9. The percent of measured summer flounder (MRFSS Type A fish) less than 14" TL by state, 1992 and 1993 (sample size in parentheses).

State	1992	1993
ME	*	*
NH	*	100.0 (1)
MA	7.1 (28)	20.0 (50)
RI	8.5 (260)	2.8 (178)
CT	5.1 (137)	*
NY	9.2 (498)	7.9 (764)
NJ	19.3(1525)	5.7(1266)
DE	4.6(1265)	2.9(1322)
MD	39.0 (272)	6.8 (74)
VA	17.2 (944)	1.9 (738)
NC	27.7 (556)	27.0 (979)

* = no fish measured.
Source: Unpublished NMFS MRFSS Data.

Table 10. The percent of successful anglers landing 1 to 30 summer flounder (MRFSS Type A fish) per day, 1993.

Catch/ Trip	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1523	49.7	1523	49.7
2	726	23.7	2249	73.4
3	370	12.1	2619	85.4
4	170	5.5	2789	91.0
5	115	3.8	2904	94.7
6	102	3.3	3006	98.1
7	25	0.8	3031	98.9
8	16	0.5	3047	99.4
9	1	0.0	3048	99.4
10	7	0.2	3055	99.7
11	2	0.1	3057	99.7
12	2	0.1	3059	99.8
15	5	0.2	3064	100.0
30	1	0.0	3065	100.0

Source: Unpublished NMFS MRFSS Data.

Table 11. The percent of trips landing more than 6 fish by state, 1992 and 1993 (sample size in parentheses).

State	1992		1993	
ME	*		*	
NH	*		0.0	(1)
MA	6.9	(29)	5.6	(36)
RI	4.1	(145)	0.0	(92)
CT	5.6	(71)	2.8	(71)
NY	1.4	(356)	0.0	(486)
NJ	5.7	(717)	2.9	(615)
DE	1.6	(696)	0.7	(769)
MD	1.2	(246)	1.8	(57)
VA	1.5	(537)	2.6	(342)
NC	4.0	(328)	3.8	(583)

* = no angler intercepts.
Source: Unpublished NMFS MRFSS Data.

Table 12. Recreational summer flounder landings expressed as a percent of the annual total for each MRFSS wave (bimonthly sampling period), 1992 and 1993.

Months	1992	1993
J-F	0.0	0.0
M-A	0.7	0.5
M-J	19.4	24.6
J-A	59.7	47.4
S-O	19.7	26.6
N-D	0.6	0.9

Source: Unpublished NMFS MRFSS Data.

APPENDIX

II

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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David R. Keifer
Executive Director

Date: February 28, 1994

To: Summer Flounder Monitoring Committee

From: Chris Moore CMM

Subj: Summer Flounder Recreational Limits for 1994

In my continuing effort to help with our deliberations on summer flounder recreational limits, I conducted additional analyses to predict recreational landings in 1994. As you know, recreational landings reflect the total amount of recreational effort (participants and trips) as well as the angler success rate. Both the success rate and the effort are directly related to summer flounder abundance. Based on 1982 to 1992 data, both the number of summer flounder trips and LPUE (landings per unit of effort) increase with increasing stock size (Figs. 1 and 2).

I determined the relationship between stock size and landings for the years 1982 to 1992 to derive the potential, unregulated (i.e., prior to implementation of Amendment 2 regulations) harvest in 1994 (Fig. 3). Based on this relationship, and the predicted stock size for 1994 from VPA results (three levels based on low, medium, and high estimates of recruitment and age 1 fish), unregulated landings could range from 9.5 to 18.4 million pounds depending on stock size (Table 1). The target in 1994 is 10.67 million pounds. Thus potential landings would have to be reduced from 0 to over 40% to ensure that recreational landings did not exceed the target in 1994.

It is probable that the number of anglers fishing for summer flounder and the number of successful trips will increase as the stock rebuilds. In addition, the number of anglers landing the possession limit will increase as more and larger summer flounder become available to recreational fishermen due to both increases in stock size and restrictions imposed on commercial fishermen. In fact, based on stock size estimates for 1993 and 1994, the number of age 2 and older summer flounder (fish larger than 14" TL) will increase over 92% from 1993 to 1994. As such, it would probably be best to assume a high level of unregulated landings for 1994 and set the limits accordingly.

This risk adverse position would be consistent with our earlier recommendations. Recall that the Monitoring Committee recommended that the 1994 coastwide quota be based on a conservative level of recruitment and age 1 fish for a number of reasons (see August 25, 1993 memo to the Committee). Assuming that the availability of summer flounder to recreational anglers will be high in 1994 is consistent with this conservative strategy.

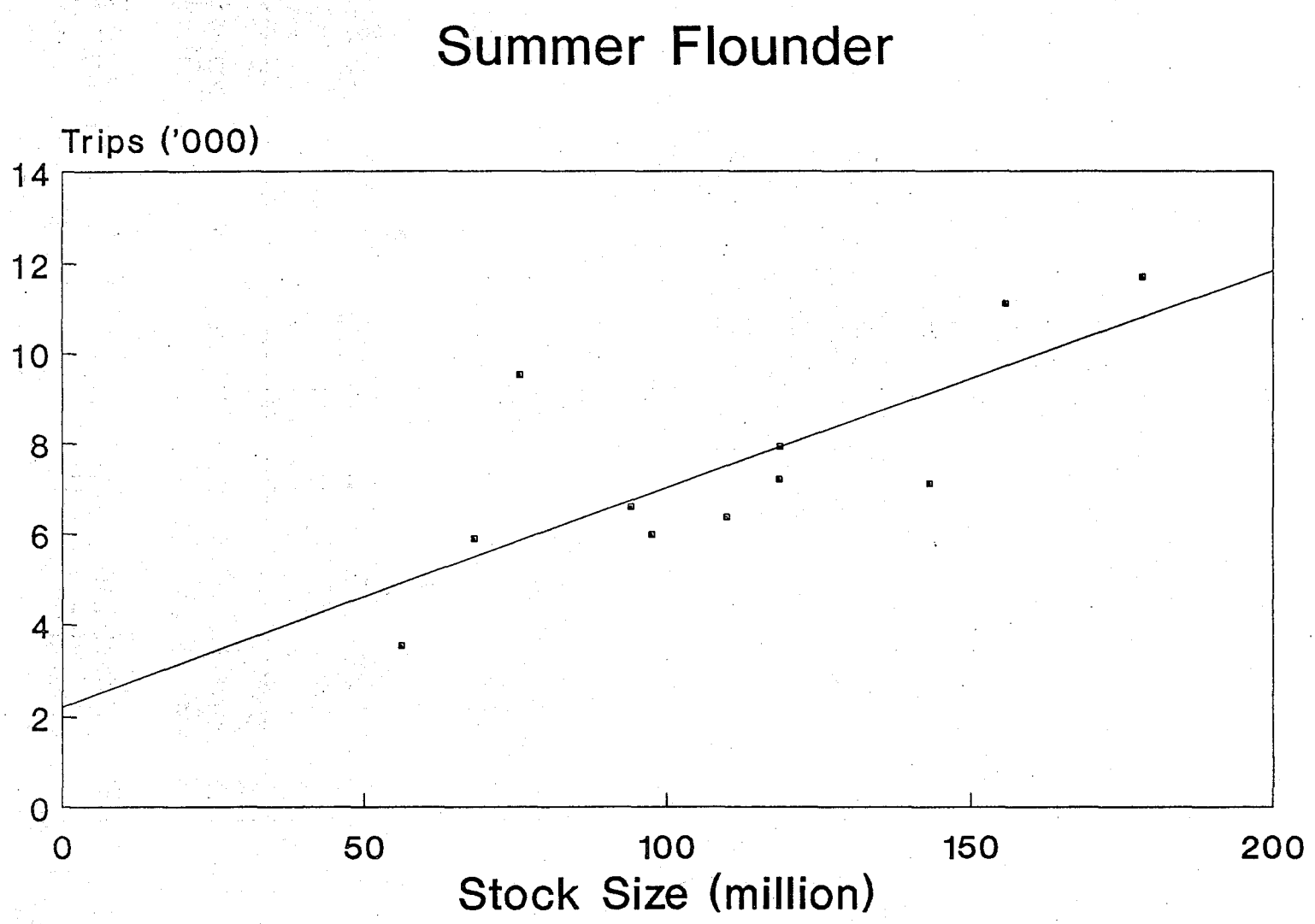

Fig 1. Stock Size vs Rec Trips

Table 1. Estimated stock numbers for 1994 and the associated unregulated recreational harvest based on the relationship between stock size and recreational landings for 1982-92.

Recruitment/ age 1 abundance	1994 Stock Size ('000)	Potential Landings ('000 lbs)
Low	96,949	9,499
Medium	116,481	13,404
High	141,471	18,401

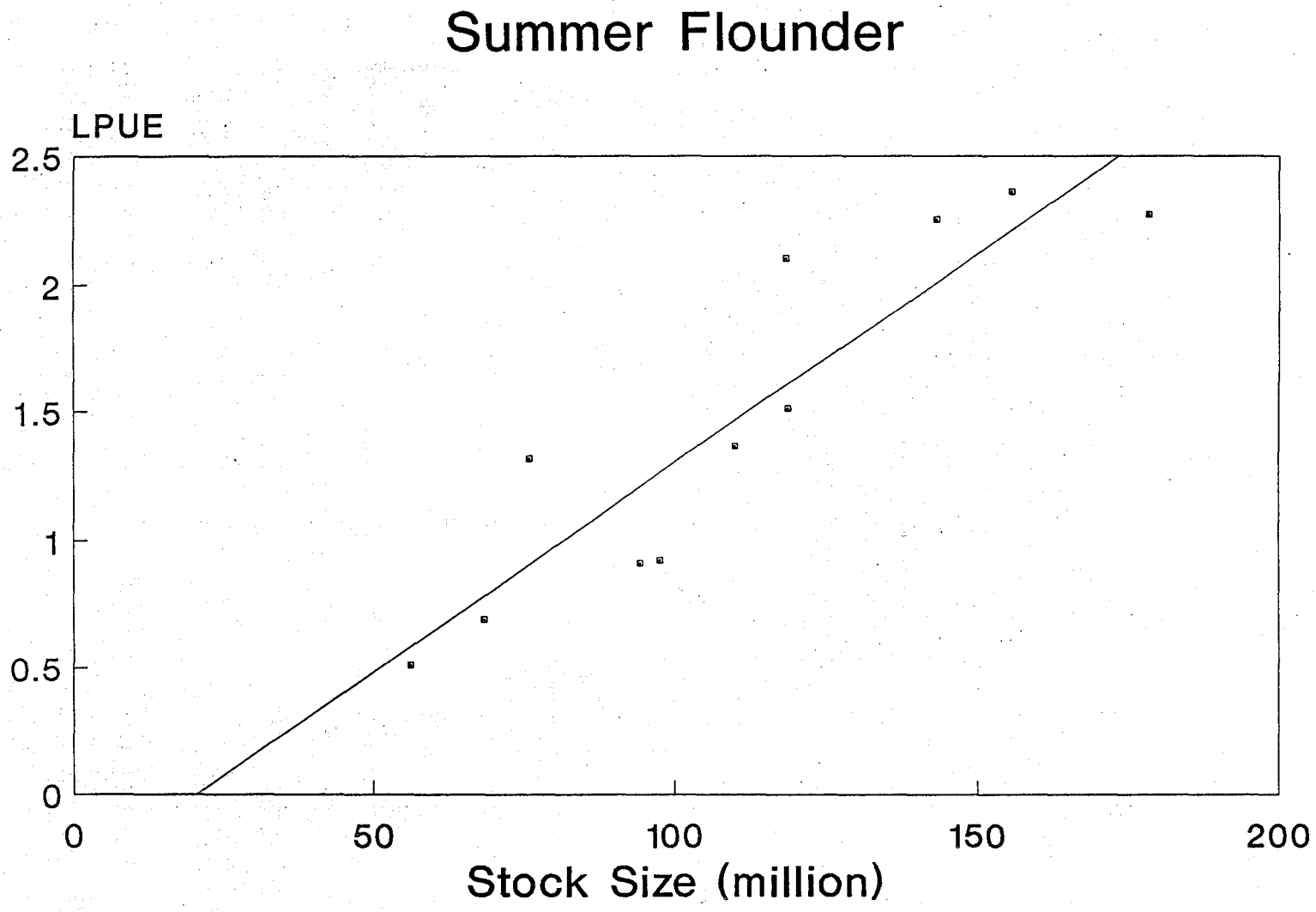

Fig 2. Stock Size vs LPUE

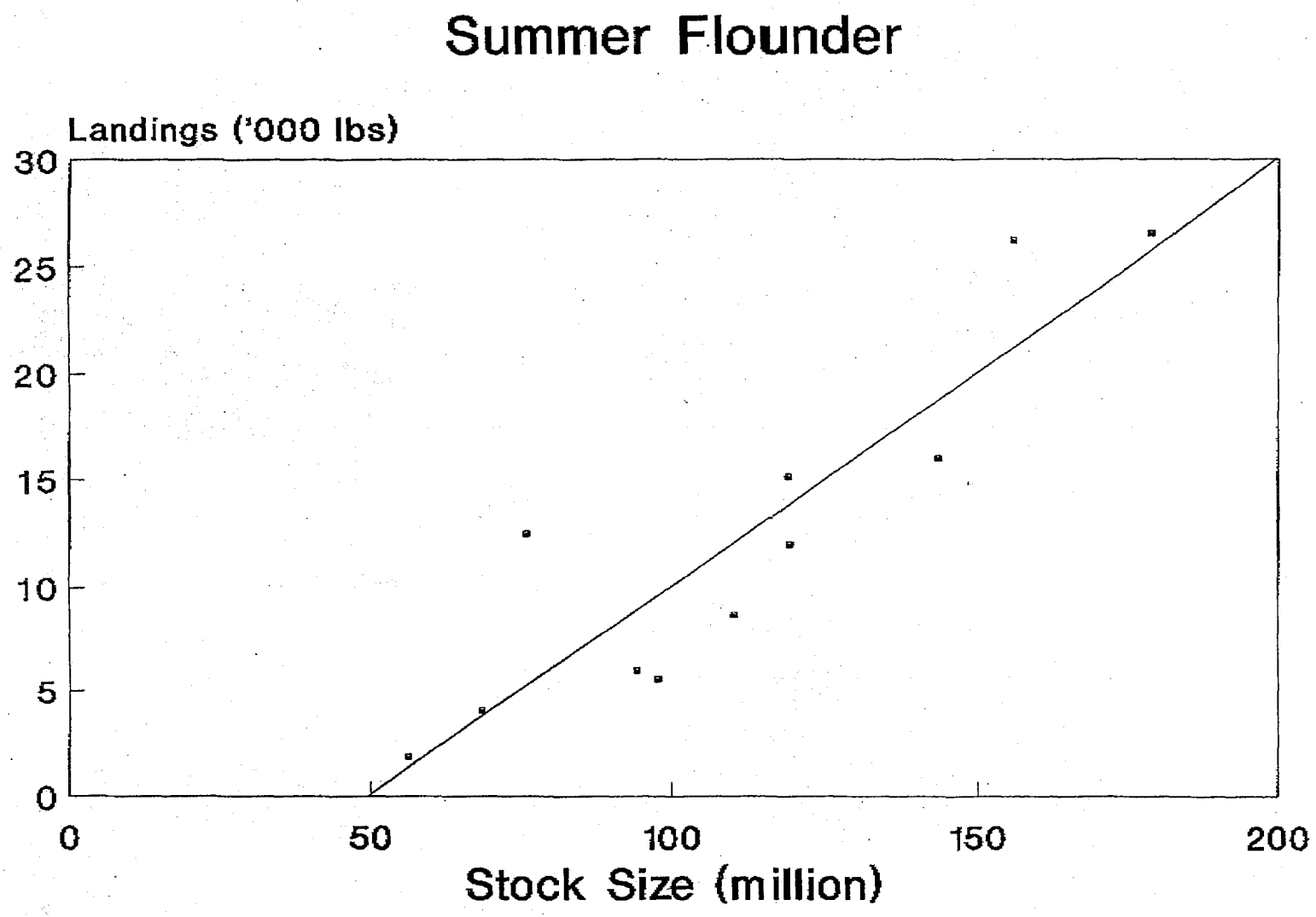

Fig 3. Stock Size vs Rec Landings

Comparison of VIMS Juvenile Summer Flounder Index and Coastal Recreational Landings