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3-19-1980

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Recommended Citation

Musick, J. A. (1980) Evaluations of Menhaden Net Mesh Regulations Options. Marine Resource Report No. 80-2. Virginia Institute of Marine Science, College of William and Mary. <http://dx.doi.org/doi:10.21220/m2-4evk-8a71>

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EVALUATIONS OF MENHADEN NET MESH REGULATIONS OPTIONS

by

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and

College of William and Mary

Prepared for Virginia Marine Resources Commission

19 March 1980

Virginia Marine Resources Report #80-2



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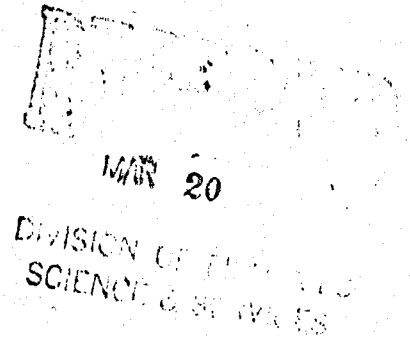


Gloucester Point, Virginia 23062

March 19, 1980

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Fisheries Management Plans
Coordinator
Virginia Marine Resources
Commission
P.O. Box 756
Newport News, VA 23607



Dear Russ:

Enclosed are my evaluations of menhaden net mesh regulations options as perceived with the limited data made available. As I have noted in memos to the Commissioner, and Bob Craft and in conversations with you in the past, the data supplied to us by the net manufacturers do not allow a statistical analysis of knotted versus crocheted netting. But perhaps such an analysis would be meaningless anyway without a very extensive and expensive research project involving measurement of nets of different age (in use) etc. As I see it the question is: whether nets made to 1 3/4" stretched mesh diameter (inside-outside) specifications with knotted netting and with crocheted netting are comparable, or does one net "fish" with a smaller opening and retain smaller fish?

A major point to realize is that the materials and production methods in the two processes are very different and the nets made with the two products behave differently when dyed and/or treated and after use for several months.

1. The knotted net apparently must be preshrunk to "set" the knots, the crocheted net does not.
2. Both types of netting are "treated" for preservation by the fishing companies.
3. When "treated" the crocheted netting shrinks about 15-20% (according to the Friths who manufacture it). But with use, this treated crocheted netting may stretch back out.
4. There are generally 2 grades of twine or netting used in a standard menhaden net: A. a relatively light product in the main part of the net, usually #7 knotted twine, or #147 crocheted netting; B. a relatively heavier product in the bunt of the net, usually # 15 or #18 knotted twine, or #420 crocheted netting.

5. In the 1979 season apparently most companies went over to using knotted net bunts - even those that used crocheted nets. (This information from Hagin Frith).

Lets go on to look at the variables involved in measuring meshes and try to reach some tentative conclusions.

1. Mensuration variables:

- a. Number of meshes to be measured. Should a VMRC Officer measure 6 or 10 meshes?
- b. What pressure should be applied to the meshes by the measuring device: 5, 10 or 20 pounds?

2. Netting variables: Treatment, Netting grade

- a. Crocheted netting: usually delivered
(1) untreated, white, then (2) treated for fishing (shrunk).
- b. Knotted netting: Several processes may be involved including: (1) untreated, (2) preshrunk, (3) dyed, (4) treated, (5) all of the above.

The most important comparisons would appear to be:

1. Comparison of raw untreated netting

Applied load (lb)	Average mesh size over 6 meshes		Average mesh size over 10 meshes	
	Crocheted #147	Knotted #7	Crocheted #147	Knotted #7
5	1 21/32"	1 18/32"	1 21/32"	1 21/32"
10	1 22/32"	1 18/32"	1 22/32"	1 22/32"
20	1 25/32"	1 19/32"	1 25/32"	1 23/32"

These data suggest that the average over 6 meshes and that over 10 meshes do not vary much for the crocheted net but that the 10 mesh average is substantially larger for the knotted net. Also, the crocheted netting tends to stretch more under the 20 lb applied load, than the knotted netting. At 5 and 10 lb loads, over 10 meshes, the two kinds of netting are about the same.

2. Comparison of netting as it is fished (new). Knotted netting is preshrunk dyed and treated. Crocheted netting is treated (shrunk). Because no hard data were supplied for the treated

crocheted product, a shrinkage factor of 20% from the raw product was applied to the data.

Applied load (lb)	Average mesh size over 6 meshes		Average mesh size over 10 meshes	
	<u>Crocheted</u>	<u>Knotted</u>	<u>Crocheted</u>	<u>Knotted</u>
	#147	#7	#147	#7
5	1 11/32"	1 11/32"	1 11/32"	1 14/32"
10	1 11/32"	1 12/32"	1 11/32"	1 15/32"
20	1 13/32"	1 13/32"	1 13/32"	1 17/32"

These data suggest that there is little difference between the two kinds of netting at any of the three measured loads when measured over 6 meshes, but that the knotted netting yields higher values when measured over 10 meshes. However, knots take up space and there is a real question whether there is any difference in the actual "fishing" area enclosed within a mesh between the two materials.

3. Other comparisons: if most menhaden nets in Virginia waters have been fitted with knotted net bunts then the question of crocheted versus knotted net bunt material becomes rhetorical. Nonetheless, I enclose the following for your perusal. I have included two sizes of knotted netting because both may be in use. This table is for netting as it is fished (new).

Applied load (lb)	Average mesh size over 6 meshes			Avg mesh size over 10 meshes		
	<u>Crocheted</u>	<u>Knotted</u>	<u>Knotted</u>	<u>Crocheted</u>	<u>Knotted</u>	<u>Knotted</u>
	#420	#15	#18	#420	#15	#18
5	1 11/32"	1 12/32"	1 10/32"	1 11/32"	1 12/32"	1 14/32"
10	1 11/32"	1 13/32"	1 11/32"	1 12/32"	1 13/32"	1 15/32"
20	1 13/32"	1 13/32"	1 12/32"	1 13/32"	1 14/32"	1 17/32"

These data suggest that when measured over 6 meshes the #420 and #15 netting are about comparable over all loads and the number 18 has slightly smaller meshes. Over 10 meshes the #420 and #15 are again little different, but the #18 appears to have substantially larger meshes particularly under a 20 lb load. But, because of the heavier twine and large knots in the #18 netting, the actual fishing space within the mesh may not be greater at all.

Conclusions: After treatment for fishing, none of the netting tested meets the existing regulation standard of 1 3/4" (1 24/32"). Average values ranged from 1 11/32" to 1 17/32". But, we have no way of telling how this netting fishes after being in use for a week, a month, or several seasons. Based on the available data, there is little difference (if any) between the diameter of crocheted netting and comparable knotted netting when measured wet as fished new. The crocheted net measurement changes little when

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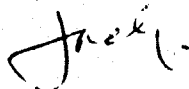
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measured over 6 or 10 meshes. The knotted net measurements yield higher estimates on the average when measured over 10 rather than 6 meshes. A comparison of measurements under loads of 5, 10 and 20 lbs shows that the treated crocheted netting increased a maximum of 1/16" over the entire load range whereas the treated knotted netting increased as much as 3/32".

Recommendations: Considering all of the above facts, and realizing the statistical inadequacies of the data, the following provisional course of action may be the most practical: Nets should be measured to the nearest 1/8" over 6 meshes using a 5 lb weight. The regulation standard should be maintained at 1 3/4" with allowed variation down to a minimum average of 1 3/8" measured to the nearest 1/8". We know that use of a 20 lb weight could raise the minimum by a few 1/32" but why make that much more work for the VMRC personnel?

I suspect the Fisheries Management Plan may have some very specific recommendations for net mesh regulations. Until then, lets hope that this will satisfy all parties concerned.

Best wishes,



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Associate Marine Scientist

JAM:bjt