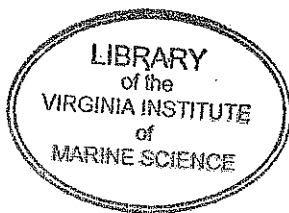


Characterization of the Virginia Soft Crab / Peeler Industry

By **Mike Oesterling
and Niels Moore**

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**Virginia Sea Grant Marine Advisory Program
Virginia Institute of Marine Science
College of William and Mary
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The blue crab (*Callinectes sapidus*) is the most valuable food-fishery within Chesapeake Bay. In 1992, the Virginia Marine Resources Commission (VMRC) reported total commercial landings of all blue crabs to be 23,866,552 pounds with a dockside value of \$10,467,129. This was the lowest reported landings of blue crabs in Virginia for the last decade (Table 1). The blue crab industry is actually two different commercial fisheries, one directed towards the har-

INTRODUCTION

Table 1. Reported blue crab landings, 1982-1992. All data from Virginia Marine Resources Commission, Commerical Fisheries Statistics, Annual Summaries. (*Preliminary data.)

Year	Hard Crabs		Soft Crabs/Peelers		Total Blue Crabs	
	Pounds	Value(\$)	Pounds	Value(\$)	Pounds	Value(\$)
1982	44,057,437	9,128,196	806,114	889,235	44,863,551	10,017,431
1983	46,044,180	11,010,843	657,847	808,808	46,702,027	11,819,651
1984	49,447,387	11,132,816	970,126	1,107,529	50,417,513	12,240,345
1985	37,701,016	7,910,292	1,163,489	1,209,350	38,846,505	9,119,642
1986	40,243,408	9,762,706	949,352	1,094,787	41,192,760	10,857,493
1987	33,591,581	10,054,747	561,782	822,842	34,153,363	10,877,589
1988	37,095,522	11,946,782	1,131,074	1,669,529	38,226,596	13,616,311
1989	43,244,483	12,316,605	1,305,188	2,723,770	44,549,671	15,040,375
1990	47,840,144	15,410,942	930,659	1,744,952	48,770,803	17,155,894
1991	43,532,011	10,255,586	1,343,110	1,724,847	44,875,121	11,980,433
1992	23,347,723	9,072,696	518,829	1,394,433	23,866,552	10,467,129
1993*	51,068,403	26,934,506	1,739,511	3,526,184	52,807,914	30,460,690

vest of hard crabs and the other towards the harvest of peeler (pre-molt) crabs for soft crab production or recreational fishing bait. The hard crab fishery harvests the largest portion of the total landings (Table 2), but the soft crab/peeler fishery is the more valuable on a per poundage basis (Table 3). In addition to the commercial harvest of blue crabs, there is a sizable, but undocumented, recreational harvest.

With any common property resource that is exploited by multiple user-groups, there is potential for conflicts regarding resource allocations. When the blue crab is plentiful, these conflicts are minimal and do not cause questions to be posed concerning management issues. However, during times of reduced abundance, various management schemes are proposed by the differing factions to increase their own harvest of crabs. Many times these proposals are directed at limiting the competing uses of the resource. An exceptionally poor hard crab harvest during 1992 (a 46% reduction in landings from the previous year), coupled with the expansion of the soft crab/peeler fishery over the past decade, prompted the VMRC to actively consider regulatory restrictions on the blue crab fisheries, with much emphasis placed on the soft crab/peeler portion of the industry. During the regulatory hearing process the question was raised as to the impact of the soft crab fishery on the total blue crab industry.

Table 2. Relative percentage contributions of hard crabs and soft crabs/peelers to the total commercial blue crab harvest. (*Preliminary data.)

Year	Hard Crabs	Soft Crabs/Peelers
1982	98.2%	1.8%
1983	98.6	1.4
1984	98.1	1.9
1985	97.1	2.9
1986	97.7	2.3
1987	98.4	1.6
1988	97.0	3.0
1989	97.1	2.9
1990	98.1	1.9
1991	97.0	3.0
1992	97.8	2.2
1993*	96.7	3.3

Table 3. Dockside value of commercial blue crab harvests expressed on a per-pound basis. (*Preliminary data.)

Year	Hard Crabs	Soft Crabs/ Peelers
1982	\$0.21	\$1.10
1983	0.24	1.23
1984	0.23	1.14
1985	0.21	1.04
1986	0.24	1.15
1987	0.30	1.46
1988	0.32	1.48
1989	0.28	2.09
1990	0.32	1.87
1991	0.24	1.28
1992	0.39	2.69
1993*	0.53	2.03

In order to begin addressing the conflict between the soft crab/peeler fishery and the hard crab fishery, it is necessary to understand the composition of the fisheries. Much information has been developed profiling the hard crab fishery; however, little descriptive information exists for the soft crab/peeler industry. The true magnitude of the soft crab/peeler fishery is generally acknowledged to be substantially more than the reported values. Prior to 1994, no permits were required to shed blue crabs, thus the actual number of participants in this portion of the fishery was unknown. Additionally, many hard crab fishermen also sell peeler crabs to soft crab producers or for recreational fishing bait, further confounding the total soft crab/peeler fishery.

As a first step in trying to characterize the soft crab/peeler fishery, a survey was conducted of licensed soft crab producers during the 1994 soft crab season. The major objectives of this study were to develop a profile of production technology, marketing strategies, and to obtain a producer's opinion of potential regulatory measures.

METHODS

In 1994, the VMRC initiated licensing of soft shell crab producers. The implementation of licensing provided the opportunity to conduct a mail survey of known soft crab producers. A survey form was developed (Appendix 1) and mailed to all licensed soft crab producers (current as of 31 July 1994). Survey forms were coded in order to facilitate subsequent mailings. Approximately two weeks after the initial survey mailing, a postcard was mailed requesting return of the completed survey. After an additional three weeks, any soft crab producer license holder who had not yet responded to the survey was mailed another survey form and encouraged to participate in the survey.

RESULTS AND DISCUSSION

A total of 407 surveys were mailed initially. The final number of surveys returned was 220, for a return rate of 54.1%.

The remainder of this section will be presented on a per-question basis with groupings of similar topics. In some cases, the number of responses will not equal the total number of returned surveys, either because of multiple responses or no response at all. Each individual question will be addressed based upon the number of responses to that particular question.

Question 1. Please provide the following information:

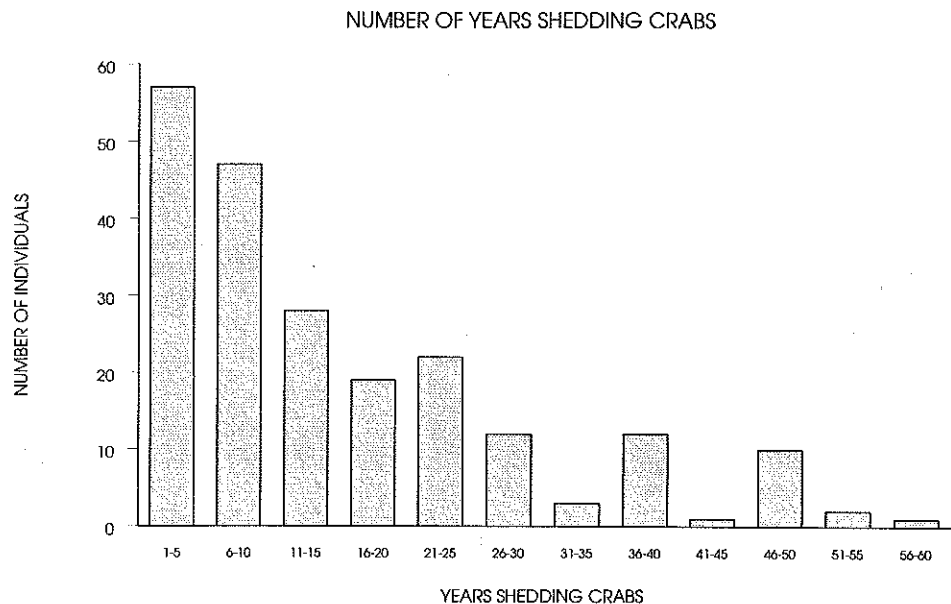
A. Location for shedding facility.

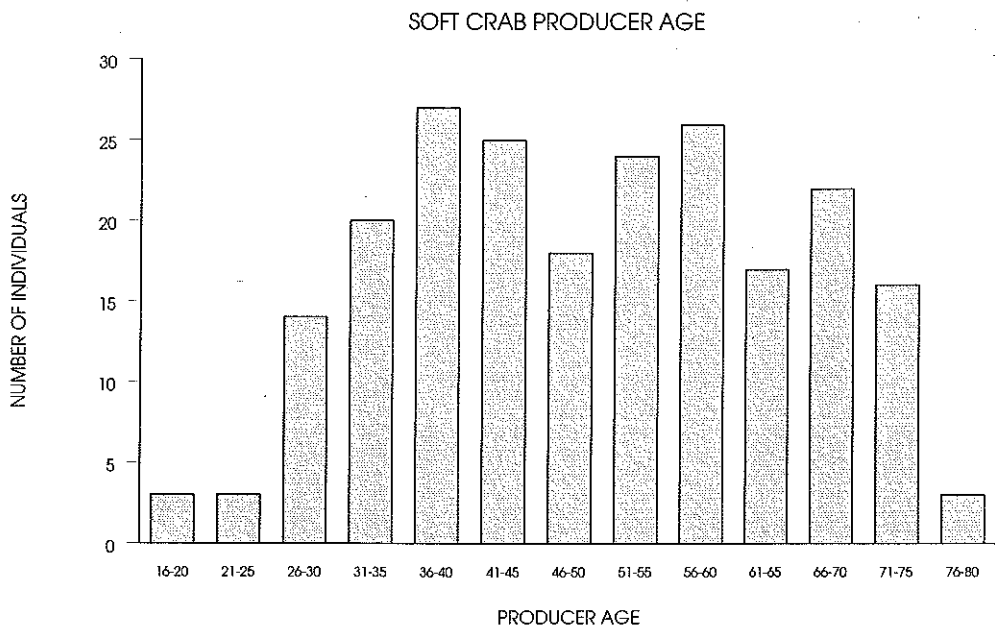
Location	Number of VMRC Licenses	Number of Responses	Percent of Licenses
Accomack County	124	77	62.1
Gloucester County	38	23	60.5
Westmoreland County	34	18	52.9
Middlesex County	34	16	47.0
Northampton County	19	14	73.7
Northumberland County	35	14	40.0
York County	25	14	56.0
Lancaster County	27	11	40.7
Mathews County	19	8	42.1
Richmond County Region	8	7	87.5
Essex County	6	3	50.0
Hampton/Newport News	8	4	50.0
Norfolk/Virginia Beach	6	4	66.7
James City County	2	2	100.0
King and Queen County	2	1	50.0
Portsmouth/Suffolk	4	2	50.0
No Response		2	

Accomack County includes Tangier Island, long recognized as a major center of soft shell crab production. The next nine counties are all in the Middle Peninsula, Northern Neck or Eastern Shore regions. These areas are more rural in nature and have traditional fishing industries.

B. Number of years shedding crabs.

There were 214 responses to this question. The range of responses was from 1 year to 60 years, with the mean number of years shedding crabs being 16. The production of soft shell crabs still provides entry level opportunities, as well as supporting long-standing participants.





C. Age of the respondent.

A total of 218 responses were obtained. Soft crab producer ages ranged from 16 to 78 years, with the average age being 50 years. There was a surprising number of respondents over the age of 60 (47 or 21.6% of respondents), and of these 14 were over 70 years of age.

D. Number of people in the household.

There were 214 responses to this question. Household sizes ranged from 1 person (the producer) to 7 people, with an average number of approximately 3 people (2.71).

Question 2. Please provide the following information about your shedding system:

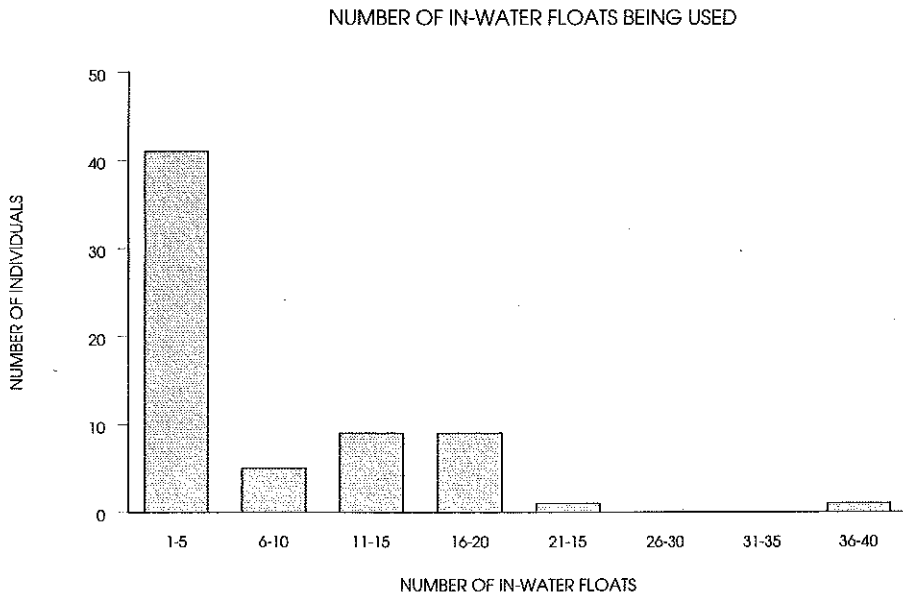
A. Number of in-water floats and most common float size.

A total of 66 respondents indicated that they used in-water floats to produce soft crabs. This represents 30% of the total respondents to the survey. Float numbers used ranged from 1 to 40, with the average number being 7; however, the most frequent response was 5.

The most common float size measured 4 feet by 8 feet (65% of float users). Float sizes ranged from 4 feet by 12 feet to 3 feet by 3 feet. In-water floats still represent a major production method for Virginia soft crab producers, even though the technology dates back to the earliest beginnings of the industry.

B. Number of on-shore, flow-through shedding tanks, their construction material, most common size and whether or not they are housed under some protection.

Over 64% (142) of the respondents utilize on-shore, flow-through shedding tanks.

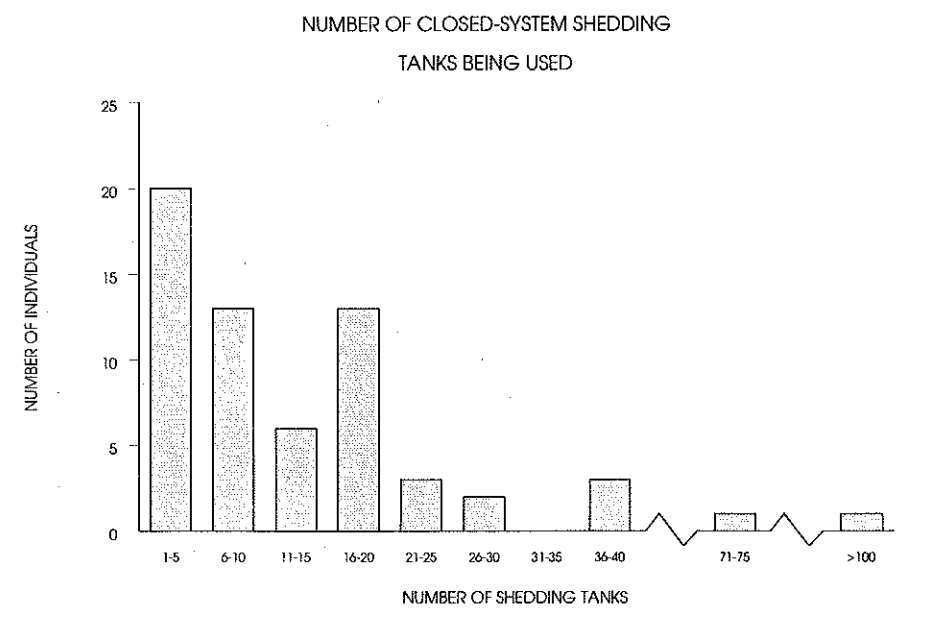
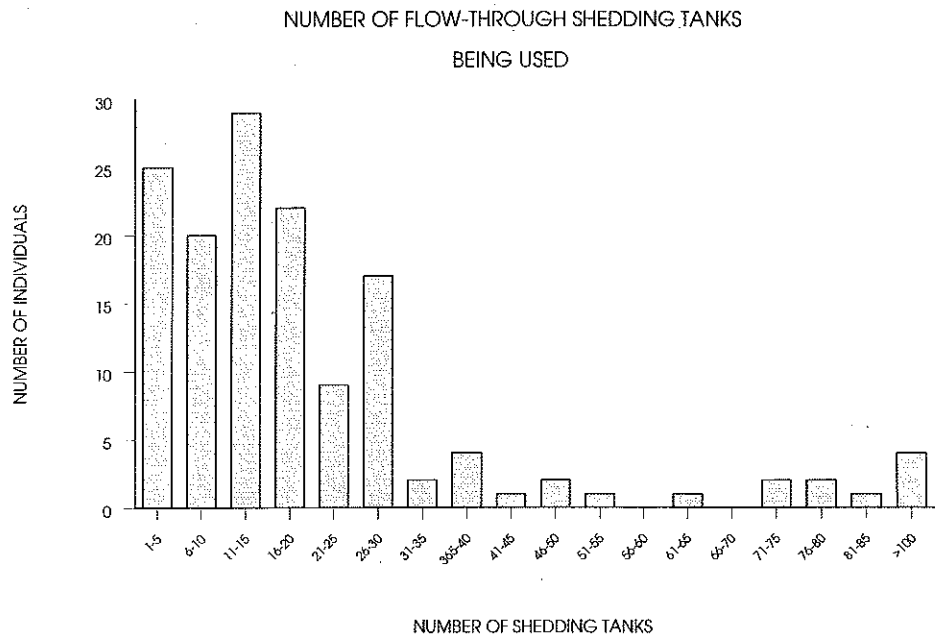


This type of shedding technology is the most prevalent in the Virginia industry today. Shedding tank numbers ranged from 1 to a high for all shedding technologies of 168. The average number of flow-through shedding tanks was 22, with the most frequent response being 12. As was to be expected, the most common construction material was overwhelmingly wood (138 respondents), followed by fiberglass (6 respondents) and finally, concrete (3 respondents). The most common shedding tank size was 4 feet by 8 feet (91.7%), which corresponds to plywood sheet

size, the usual tank bottom construction material. A total of 81 (57%) respondents reported that they shed crabs under some sort of protection. It was interesting to see that 43% (61) of those producers using flow-through systems still shed crabs without any protection from the elements.

C. Number of on-shore, recirculating (closed) shedding tanks, their construction material, most common size, whether or not they are housed under some protection and presence of water heating capabilities.

Sixty-two individuals (28.2% of respondents) reported using recirculating water technology to produce soft crabs. As many as 132 tanks are being used by one individual, although the average number being used is 15. The most frequent responses to numbers of tanks was either 2 or 20. Wood was the predominant construction material for tanks, although more individuals reported using more fiberglass tanks than for the flow-through systems (11 individuals using up to 46 tanks for closed system, versus 6 individuals using up to 15 tanks for flow-through). Concrete tanks again represented the smallest number of tanks in use (3 individuals with up to 18 concrete tanks).



Once again the most common tank size was 4 feet by 8 feet (90.2% of respondents). A much higher percentage of individuals using a closed system operate under some protection (86.7%) than those using a flow-through system (57%). This is a reflection of the better control over environmental factors afforded by the closed system design. Along this same vein, 36.7% of the respondents reported that they employ some sort of water heating device in their closed system. The ability to heat water during the early shedding season can enable the closed system producer to initiate soft crab production earlier than with other production methods.

Question 3. How many family members work at your shedding facility?

Family members represent a significant workforce for soft shell crab producers. Over 50% of the total respondents reported either one (74 respondents) or two (59 respondents) family members worked at the shedding facility; 25 respondents said three family members worked at the facility; 13 respondents reported 4 family members worked at the facility; 6 respondents reported 5 family members worked at the facility; 43 respondents answered zero or had no response at all. Combining all family members and the shedding facility operator for all respondents, a total of 569 family members work at the 220 shedding facilities of the respondents.

Question 4. How many non-family members work full time or part time at your shedding facility?

Most shedding facilities rely on family members for labor. Respondents reported employing a total of only 44 full-time and 58 part-time non-family members at their shedding facilities.

Question 5. Other Fisheries Employment
(172 Individuals responded)

Type of Fishery	Number	% of Respondants
Hard crab	148	86.0
Gill net	71	41.3
Clamming	35	20.3
Oysters	34	19.8
Eel	8	4.7
Pound net	5	2.9
Other	2	1.2

Question 5. Do you have fisheries employment besides soft shell crab production? If yes, in which fisheries do you participate?

Over 78% of respondents (172) indicated that they also fish for other species. The most common other fisheries occupation was hard crabbing (148 respondents). The next most common response was gill netting (71 respondents), followed by clamming (35 respondents) and oystering (34 respondents). Eight individuals reported fishing for eels and five respondents stated they fished pound nets. From these responses, it is apparent that the greatest majority of soft crab producers do not make their entire living from shedding crabs, but must rely on other fisheries for some of their livelihood (see Question 7).

Question 6. Do you have non-fisheries income?

Surprisingly almost 50% of the respondents (48.8%) indicated that they had non-fisheries income. In numerous cases, the respondent added that their non-fisheries income came from "social security" or other retirement benefits. This correlates to the large number of respondents that were over 60 years of age.

Question 7. Relative to your 1993 income, what percentage of your family/household income came from soft crabs, other fisheries or non-fisheries?

In keeping with the responses regarding other fisheries income and non-fisheries sources, it was not surprising that relatively few respondents indicated that soft crab production accounted for a major portion of their income. Over 60% of the respondents (110) indicated that less than half of their family income came from soft crabs, while only 27.5% (50 respondents) stated that over 70% of their family income came from soft crabs.

Question 7. Percentages of 1993 family income from different sources. Data is presented as number of respondents in respective categories.

Percentage of Income	Income Source		
	Soft Crabs	Other Fisheries	Non Fisheries
Less than 10	35	65	97
10 - 19	28	11	5
20 - 29	26	22	11
30 - 39	12	16	5
40 - 49	9	8	6
50 - 59	15	16	7
60 - 69	7	8	7
70 - 79	23	11	9
80 - 89	11	10	11
90 - 99	9	13	19
100	7	2	5

Question 8. Do you catch your own peelers and, if yes, what type and how many kinds of gear do you use?

Overwhelmingly, soft crab producers catch peelers for their shedding systems. A total of 201 out of 220 respondents (95%) indicated that they harvest peelers.

The most common piece of gear mentioned was the peeler pot, with 156 respondents (77.6% of those that harvest their own peelers) reporting using peeler pots. The table to the right shows a breakdown on the number of peeler pots used.

The average number of peeler pots used by all those indicating that they fished with them was 170. Seventy-five percent of those using peeler pots used 200 or fewer peeler pots to harvest peelers.

The second most common piece of gear used to harvest peelers by soft crab shedders was the hard crab pot. Since 86% (148) of respondents indicated that they were also hard crab fishermen, this is not surprising. A total of 119 respondents indicated they used hard crab pots to harvest peelers.

Number of pots used	Number of respondents
1 - 100	65
101 - 200	52
201 - 300	21
301 - 400	11
401 - 500	3
501 - 600	3
601+	1

Number of hard crab pots	Number of respondents
1 - 100	51
101 - 200	29
201 - 300	21
301 - 400	14
401 - 500	4

Number of peeler pounds	Number of respondents
1 - 10	24
11 - 20	11
21 - 30	8
31 - 40	6
41 - 50	3
51 - 60	1
61 - 70	1
71 - 100	0
101+	6

The table to the left is a breakdown of the number of hard crab pots used to harvest peelers:

The average number of hard crab pots used by soft crab producers to harvest peelers was 183. Sixty-seven percent of those using hard crab pots to harvest peelers reported using 200 or fewer pots.

Seventy-five individuals (37% of those harvesting their own peelers) reported using scrapes to harvest peelers. Over 69% (52) of these individuals fish with two scrapes, while the other 23 individuals only use one scrape.

The next piece of gear listed as being used to harvest peelers was the peeler trap/pound. A total of 60 individuals reported using peeler pounds to harvest their peelers. The second table to the left is a breakdown on the number of peeler pounds being used by soft crab producers.

There is some doubt as to whether or not the 6 respondents indicating over 100 peeler pounds in use understood the question. Given the labor involved in fishing peeler pounds, it is not surprising that 65% of the respondents that use pounds, fish 20 or fewer peeler pounds (discounting the respondents indicating over 100 pounds).

The final piece of gear mentioned as being used to harvest peelers was the dipnet. Seven individuals indicated that they netted crabs. Most likely these are producers that only have a few shedding tanks and do not rely on soft crabs for much of their income.

Question 9. Do you buy peelers? Do you buy peelers from outside of Virginia? Do you sell peelers for fishing bait?

Only 26% (58) of the respondents indicated that they purchase peeler crabs. The vast majority (162, 74%) stated that they do not buy peeler crabs. This is somewhat surprising given the reportedly large numbers of peelers sold by full time hard crab fishermen, especially during the spring doubler run. Of those that reported buying peeler crabs, purchased peelers accounted for on the average 48% of all the peelers utilized in their shedding systems. A total of seven individuals reported buying 100% of the peelers they use in their shedding facilities.

Of the 58 individuals that purchase peelers, 21 indicated that they buy peelers from outside the state of Virginia. The states that peelers are purchased from were New Jersey (18 respondents), Delaware (13 respondents), North Carolina (12 respondents) and Maryland (3 respondents). Both New Jersey and Delaware have hard crab fisheries, but poorly developed soft crab industries.

Eighty-one respondents (36.8%) stated that they sold peelers for bait. Of these, 42 reported that peelers for bait accounted for 5% or less of their soft crab income and only 6 responded that peelers for bait accounted for 50% or more of their income. Most likely the opportunity to sell peelers for bait is a direct function of where the shedding facility is located. Those shedding facilities that are not readily accessible to recreational fishermen (for instance, those on Tangier Island) would not be expected to be able to sell peelers as fishing bait.

Question 10. When do you normally begin shedding crabs and when do you normally stop shedding crabs?

Not unexpected, 76% of all respondents begin shedding crabs in May, the month of the spring doubler run. Twenty-one percent of soft crab producers begin in the month of April and only 4% begin in June.

Close to 82% of all shedding operations have ceased shedding crabs by the end of September. Only 39 individuals indicated that they shed crabs into October. Twelve percent of respondents (27) reported that they stopped shedding crabs by the end of June. These soft crab producers most likely only take advantage of the period of time when doubler crabs are most abundant and peelers are easier to obtain.

Question 11. What are your top 2 most productive months in terms of volume produced?

Overwhelmingly the most productive month indicated was May (160 individuals, 78% of respondents). Twenty-seven respondents indicated that June was the most productive month for them, while twelve individuals stated that July was their best month.

The second best month for production was closely divided between June (75 individuals, 39%), July (52 individuals, 27%), and August (44 individuals, 23%).

Question 12. For 1993, please estimate your soft crab production.

Soft shell blue crabs are usually marketed by size grades based upon the distance across the back of the shell, measured from point to point. This question asked for production estimates for the following grades: mediums (3.5 to 4.0 inches wide); primes (4.0 to 5.0 inches wide); large/jumbo (5.0 to 5.5 inches wide); slabs/whales (over 5.5 inches wide); and, ungraded or mixed sizes. The "prime" category actually combined two grades, hotels (4.0 to 4.5 inches wide) and prime (4.5 to 5.0 inches wide); this was done because the hotel grade is not universally utilized.

Unfortunately, this question was the one that was most often not answered or elicited the response "don't know." Thus, the numbers that are presented here must be taken as underestimations of the true production, but can be used as a reflection of the catch composition.

Eighty-four individuals reported producing 33,624 dozen "medium" soft crabs. At an average weight of 1.4 pounds per dozen, this was 47,073.6 pounds.

A total of 57,414 dozen "primes" were reported by 109 respondents. At an average weight of 2.25 pounds per dozen, this was 129,181.5 pounds.

More "large/jumbo" soft crabs were produced than any other grade. One hundred-ten respondents reported producing 123,270 dozen "large/jumbo" soft crabs. At an average weight of 3.33 pounds per dozen, this was 410,489.1 pounds.

Question 12. Soft Crab Survey Production Composition

Soft Crab Grade	Number of Responses	Production in Dozens	Production in Pounds
Mediums (3.5-4.0")	84	33,624	47,074
Primes (4.0-5.0")	109	57,414	129,182
Large (5.0-5.5")	110	123,270	410,489
Whales (over 5.5")	66	20,254	81,016
Ungraded	33	5,317	14,037
Total		239,879	681,798

Sixty-six respondents reported producing 20,254 dozen "slabs/whales." At an average weight of 4.0 pounds per dozen, this was 81,016 pounds.

In the ungraded or mixed category, 33 respondents reported producing 5,317 dozen soft crabs. At an average weight of 2.64 pounds per dozen, this was 14,036.88 pounds.

The production of "large/jumbo" soft crabs accounted for 51% of the total reported production of soft crabs. "Primes" contributed 24% of the total production; "mediums" were 14% of the total production; "slabs/whales" accounted for only 8% of the total production; and, ungraded or mixed sizes were only 2% of the total reported production.

A part of the current controversy within the blue crab industry is what impact, if any, the soft shell blue crab fishery is having on the hard shell crab fishery. Another way to look at the soft crab production data is to transform it into "potential hard crabs" by converting to actual numbers and then dividing by 2.5 hard crabs per pound. By doing this, the two largest grades of soft crabs (large/jumbo and slabs/whales) would translate to approximately 688,915 pounds of hard crabs. At the VMRC reported 1993 dockside value for hard crabs of \$0.53 per pound, this represents a potential economic contribution of \$365,125. However, if the VMRC 1993 dockside value *across all grades* of soft crabs (\$1.72 per pound) is used to estimate the economic contribution for just large/jumbo and slabs/whales soft crabs, the value is \$845,389, over twice the potential hard crab value. On purely economic issues the soft crab fishery is a more reasonable utilization of the resource.

Question 13. What percent of your soft crabs do you sell fresh, frozen cleaned, frozen uncleaned? What percent of your annual soft crab sales are to wholesale, retail, restaurants or individuals?

By a very large margin, soft crabs are marketed primarily as a fresh product. Over 83% of all soft crabs are marketed as fresh product, only 15% are sold as a frozen, cleaned product, and 1% are marketed frozen, uncleaned.

Not surprisingly, over 70% of all soft crab sales are to a wholesaler or processor. This is in keeping with the fresh product form. The next important market outlet was direct sales to private individuals, with approximately 13% of all sales. Retail outlets accounted for 10% of sales and direct sales to restaurants was a little more than 6% of the total sales.

Question 14. Soft Crab Business Changes Since 1990

(177 individuals responded, indicating 203 choices)

Response Choice	Number	Percent of Individual Responses
No change	100	56.5
Added shedding tanks	41	23.2
Increased peeler harvest	24	13.6
Changed marketing strategy	14	7.9
Purchased more peelers	12	6.8
Changed production method	10	5.7
Sold peelers for bait	2	1.1

Question 14. If you were shedding crabs before 1990, how has your business changed in the last 4 years?

Seven choices were provided on the survey form relative to potential changes that could have occurred in the past 4 years. Respondents were instructed to check all choices that applied to their situation. A total of 177 individuals responded to this question. One hundred individuals (56%) responded that their business was unchanged in the last 4 years. Over 23% of the respondents indicated that they had added shedding tanks to their business, while 13.6% in-

creased their peeler harvesting activities and 6.8% purchased more peeler crabs. The addition of shedding tanks, increased peeler harvesting and purchasing, when taken together, give an indication of the past expansion of the soft shell blue crab industry. All together these responses were 37.9% of all the choices indicated by the respondents. Fourteen individuals (7.9%) indicated that they had changed the way that they marketed their soft crabs and 1.1 % (2) said that they began to sell peelers for bait. The final choice provided an indication as to whether or not the producer had altered his production technology (e.g. from flow through to recirculating water systems) within the past 4 years. Only 10 individuals (5.7%) indicated that they had made a change in their production technology.

Question 15. What are your future soft crab business plans?

Once again, choices were provided that could be used to evaluate the condition of the soft crab industry. Six choices were provided, with an additional space for other plans. Two hundred and thirteen respondents indicated 266 choices as future business plans. Over 72% (154) respondents indicated that they had no expansion plans, but intended to remain the same size. Only 30 individuals (14.1%) expressed plans in expanding their production facility, presumably by adding shedding tanks. Just 26 individuals (12.2%) indicated that they planned to increase their peeler harvesting activities in the future, while only 15 (7.0%) individuals thought they would purchase more peelers. Taken together, the addition of production facilities, increased peeler harvesting and purchasing give some indication as to the expansion plans within the soft crab industry. These responses represented 26.7% of all the choices indicated by the respondents. Twelve individuals indicated that they planned to change their marketing strategies. The final choice offered was to "get out of the business." A total of 27 individuals (12.7%) said that they planned to leave the soft crab business.

Question 16. Consideration is being given to different regulatory options in the soft crab industry. What is your opinion on the following suggestions?

This question listed 9 different regulatory options that were being considered by the VMRC at the time of the survey. For each option, respondents were asked if they "agreed," "disagreed," or were "not sure" with the particular regulatory measure. Following the stated options, a space was provided for the respondent to offer an opinion as to the "best management" options for the soft crab industry. Without a doubt, this was the most controversial question on the entire survey and the one that elicited the most responses, either for the stated options or for opinions. Each regulatory option will be addressed separately and then the opinion portion will be summarized as many of the comments had common threads.

Question 15. Future Soft Shell Business Plans
(213 individuals responded, indicating 266 choices)

Response Choice	Number	Percent of Individual Responses
No change	154	72.3
Expand production system	30	14.1
Get out of business	27	12.7
Increase peeler harvest	26	12.2
Purchase more peelers	15	7.0
Change marketing strategy	12	5.6
Other	2	0.7

Question 16. Opinions on Management Alternatives

Management Option	Number of Responses	Agree	Disagree	Not Sure
Limit Number of Peeler Pots	217	162	40	15
Limit Number of Shedders	199	58	100	41
3" Minimum Peeler Size	210	92	101	17
3.5" Minimum Soft Crab	207	118	78	11
Cull Ring in Peeler Pots	208	66	127	15
Cull Ring in Peeler Pounds	199	74	104	21
Stop feeding "Stud" Jimmies	195	61	96	38
No Harvest of Green Peelers	206	57	134	15
Harvest Area Restrictions	202	42	118	42

General Volunteered Management "Suggestions"

1. Curtail harvest of adult females (busted sooks and dredge fishery).
2. Do nothing; leave it as it is.
3. Stricter enforcement of the minimum hard crab size limit and restrict "night" crabbing.
4. Limit out-of-state crabbers and stop part-time soft crab producers.
5. Relax ban on the harvest of striped bass.

A. Limit the number of peeler pots. A total of 162 individuals out of 217 (74.7%) agreed with this management option. What they did not agree upon, however, was the number of pots that should be permitted. This was expressed in the opinion section. Only 40 individuals (18.4%) disagreed with limiting the number of peeler pots as a management option. Fifteen individuals (6.9%) were not sure about the management option.

B. Limit the number of shedders. Essentially, this option asked if the soft crab producers would support a limited entry scheme for the soft crab industry. Surprisingly, 100 out of 199 respondents (50.3%) disagreed with this management option and would not support limited entry. It did seem to cause a great deal of confusion, since 20.6% (41) of the respondents were not sure about this option. Those that agreed with this management option numbered 58 (29.1%).

C. Set a minimum size for peelers of 3 inches. Responses were closely divided for and against this option. Out of 210 responses, 101 (48.1%) disagreed with this option and 92 (43.8%) agreed with this management measure. Only 17 individuals (8.1%) were unsure about this option.

D. Set a minimum size for soft crabs of 3.5 inches. While the respondents may have been evenly divided about minimum peeler size, there was no doubt where the majority stood on this management option. A total of 207 individuals responded to this option; 118 (57.0%) agreed with the management measure, and 78 (37.7%) disagreed. This option caused the least confusion of any listed; only 11 individuals (5.3%)

were not sure about the option. Additional comments from soft crab producers concerning the minimum size for peelers versus a minimum size for soft crabs, stressed the fact that producers would much prefer not to have their soft crabs handled by inspectors, and that if a minimum size was to be implemented, they would prefer a minimum peeler size to soft crab minimum. In some respects this is contrary to comments made during VMRC public hearings, when soft crab producers explained that any increased handling of peelers, which could be expected during a VMRC inspection, could result in increased mortalities in the shedding process.

E. Require the placement of cull rings (escape vents) in peeler pots. By almost a 2 to 1 margin, respondents disagreed with this management measure. A total of 208 individuals expressed their opinion on this option; 127 (61.1%) disagreed with this management option, and 66 (31.7%) agreed with the proposed option. It is not surprising that those producers that utilized large numbers of peeler pots were not in favor of this option, while those that did not rely heavily on peeler pots were in favor of the option. Only 7.2% (15) of the respondents were unsure of this management option.

F. Require the placement of cull rings (escape vents) in peeler pounds. While not as big a margin as with peeler pots, the majority of respondents did not agree with this option. Of the 199 individuals that expressed an opinion on this option, 104 (52.3%) disagreed with it and 74 (37.2%) agreed with the option. In both cases, pots and pounds, the producers feared the loss of peelers if cull rings were included in their harvesting gear. A total of 21 individuals (10.5%) were not sure about this management measure.

G. Stop feeding "stud" jimmies during the doubler run. The majority (49.2%) of respondents disagreed with this management option. Over 31% of the individuals responding to this option agreed with it, while 19.5% were not sure about this management measure.

H. Prohibit the harvesting of "green" peelers. Green peelers are the farthest away from molting and consequently experience the highest mortality within a shedding system. At certain times during the shedding season, the majority of the peelers available are green. An overwhelming majority of respondents disagreed with this management option (134 individuals out of 206, 65%). Those that agreed with this option totalled 57 (27.7%) and those that were not sure numbered 15 (7.3%).

I. Restrict harvest areas (exclude gears). Of all the listed management options this one caused more uncertainty among the respondents. An equal number of individuals were not sure of this option as agreed with it (42 of 202 individuals, 20.8%). Even though there was uncertainty, the majority of respondents (58.4%) disagreed with this management measure. It is possible that the option was not adequately explained enough, causing the uncertainty.

J. **In your opinion, what would be the best management options for the soft crab industry?** This permitted respondents to express their opinion on different management options. Some restated management

measures that were listed above. Others took this opportunity to comment on a wide range of management considerations for both the hard crab and soft crab fisheries. Of all the different options mentioned, the one that was expressed most often was a curtailment on the harvest of adult female crabs in the hard crab fishery. This took one of two forms. More than any other measure suggested was a ban on the harvest of egg-bearing female crabs (sponge crabs). The other adult female management measure suggested was either a restriction or cessation of dredging. The next most common response was a reiteration of a need for a limitation on the number of peeler pots that could be used. Suggested maximum number of pots ranged from 50 to 400, with the range of 100 to 200 being the most common numbers offered. It was also suggested that hard crab pot numbers be limited to 300 per person. Following this option, the next most common response dealt with either doing nothing (leave it as it is) or stricter enforcement of existing regulations. Along this same line, the need for better enforcement of the minimum hard crab size limit figured prominently. An additional enforcement type suggestion focused on nighttime crabbing or limiting the hours that peelers could be harvested. Two other suggestions offered related to limiting out-of-state crabbers and eliminating the part-time soft crab producer. A final unsolicited measure called for a relaxation of the ban on the harvest of striped bass, alluding to striped bass "eating all" the crabs in the Bay. All the remaining stated options received support from individuals.

Question 17. How would you rate the following "problems" within the soft crab industry?

Question 17. Problems within the soft crab industry.

	Big Problem	Little Problem	No Problem
Shedding mortalities	49	103	50
Peeler quality	27	74	102
Peeler prices	27	58	103
Soft crab prices	49	80	73
Marketing	26	62	105
Competition from other states	76	54	58
Competition within Virginia	17	69	97
Quality control (paper shells, missing legs, etc.)	19	76	96
Need for industry standards	29	56	95
Facility design	5	46	130
Diseases	16	57	109
Regulations	65	54	70
Operating expenses	46	85	55
Availability of loans	35	44	96

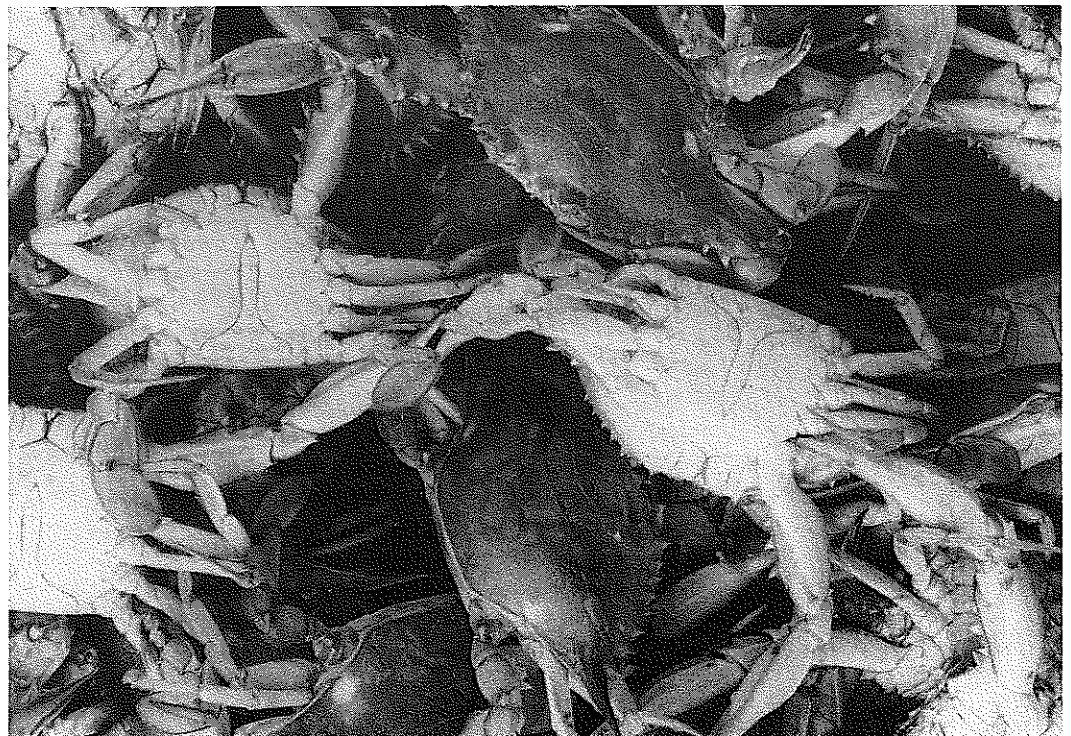
A list of 14 categories was provided with space for the respondent to indicate if they felt the situation was a "Big Problem," "Little Problem" or "No Problem." These will be reported in tabular form, with the actual number of individual responses listed.

From this list, there was only one item that people thought was a big problem more than anything else. That was competition from other states.

SUMMARY

Using all the responses to the survey, excluding management/problem questions, it is possible to construct the "typical" Virginia soft crab producer. The typical Virginia soft crab producer lives in Accomack County, is 50 years old with 3 family members. He has been shedding crabs for 16 years, using a flow-through shedding system with 22 wooden tanks. He probably does not hire any outside help, but has 1 or 2 family members that assist him. Besides shedding soft crabs, he also harvests hard crabs, but has some non-fisheries income as well. In all likelihood, less than 50% of his total family income is generated from his soft crab operation. He harvests his own peelers using fewer than 200 peeler pots and less than 200 hard crab pots. He begins shedding crabs in May and is finished producing soft crabs by the end of September. During this time he could expect to produce about 2500 dozen soft crabs which he sells fresh to a wholesaler. Most likely he has not changed how he has done business over the past 4-5 years, nor does he have plans to do anything differently in the coming years.

In regards to different management issues, it is apparent that soft crab producers recognize the need for regulatory measures; there is no consensus as to what needs to be implemented. Of the regulatory options presented, only two, a limitation of the number of peeler pots and a minimum soft crab size, garnered agreement from the majority of respondents. Not surprising was the general opposition to imposition of any regulations. Additionally, the call for regulations on "other" portions of the blue crab fishery, for example, restrictions on sponge crab harvest, was to be expected. It remains for the VMRC to work out "compromises" between the different factions within the total blue crab fishery for the continued health of the resource.



APPENDIX I. Virginia Soft Crab Producers' Survey

Please provide the following information.

_____ County location for shedding facility
_____ Number of years you've been shedding crabs
_____ Your age
_____ Number of people in your household

Please provide the following information about your shedding system.

_____ Number of in-water floats
_____ Most common float size
_____ Number of on-shore, flow-through tanks
_____ Number of tanks constructed of wood
_____ Number of tanks constructed of fiberglass
_____ Number of tanks constructed of concrete
_____ Most common tank size

Do you shed in a building or under some other protection? ____ Yes ____ No

_____ Number of on-shore, recirculating (closed) tanks
_____ Number of tanks constructed of wood
_____ Number of tanks constructed of fiberglass
_____ Number of tanks constructed of concrete
_____ Most common tank size

Do you shed in a building or under some other protection? ____ Yes ____ No

Do you heat your water? ____ Yes ____ No

How many family members work at your shedding facility? _____

How many non-family members work at your shedding facility?

_____ Full Time _____ Part Time

Do you have fisheries employment besides soft shell production? ____ Yes ____ No

If YES, please check all that apply:

_____ Hard crab _____ Pound net
_____ Oyster _____ Gill net
_____ Clam _____ Other (please specify) _____

Do you have non-fisheries income? Yes No

Relative to your 1993 income, what percentage of your family/household income came from the following:

% Soft crabs

% Other fisheries

% Non-fisheries

Do you catch your own peelers? Yes No

If YES, please provide the following information:

Number of peeler traps or pounds used

Number of peeler pots used

Number of hard crab pots used

Number of scrapes used

Other method used (please specify) _____

Do you buy peelers? Yes No

If YES, what percentage of your peelers are purchased? %

Do you buy peelers from outside Virginia? Yes No

If YES, please check all states that you purchase from.

New Jersey

Delaware

Maryland

North Carolina

South Carolina

Georgia

Florida

Other (please specify) _____

Do you sell peelers for fishing bait? Yes No

If YES, what percent of your soft crab income is peeler sales for bait? %

What month do you normally begin shedding crabs? _____

What month do you normally stop shedding crabs? _____

What are your top 2 most productive months in terms of volume? Please place a "1" next to the highest production, a "2" by the next highest month of production.

April

July

May

August

June

September

For **1993**, please estimate your soft crab production.

- dozen, mediums (3.5-4.0 inches wide)
- dozen, primes (4.0-5.0 inches wide)
- dozen, large/jumbo (5.0-5.5 inches wide)
- dozen, slabs/whales (over 5.5 inches wide)
- dozen, ungraded or mixed sizes

What percent of your soft crabs (volume, not dollars) do you sell?

- % Fresh
- % Frozen, cleaned
- % Frozen, uncleaned

Please estimate the percent of your annual soft crab sales (volume, not dollars and no peelers) to each of the following:

- % Wholesaler/processor
- % Retail outlets
- % Restaurants
- % Individuals (consumers)

If you were shedding crabs before 1990, how has your business changed in the last four years? (Check all that apply)

- Hasn't changed
- Added shedding tanks
- Increased peeler harvesting
- Purchased more peelers
- Sold peelers for bait
- Changed production systems (flow-through to closed, etc.)
- Marketed soft crabs differently (please explain) _____

What are your future soft crab business plans? (check as many as apply)

- Stay the same
- Expand production facility
- Increase peeler harvesting
- Purchase more peelers
- Change marketing strategies
- Get out of the business
- Other plans (please specify) _____

Consideration is being given to different regulatory options in the soft crab industry. What is your opinion on the following suggestions?

	AGREE	DISAGREE	NOT SURE
Limit number of peeler pots	_____	_____	_____
Limit the number of shedders	_____	_____	_____
Minimum size for peelers (3 inches)	_____	_____	_____
Minimum size for soft crabs (3.5 inches)	_____	_____	_____
Cull ring in peeler pots	_____	_____	_____
Cull ring in peeler pounds	_____	_____	_____
Stop feeding "stud" jimmies	_____	_____	_____
No harvesting of "green" peelers	_____	_____	_____
Restrict harvest areas (exclude gears)	_____	_____	_____

In your opinion, what would be the best management options for the soft crab industry?

How would you rate the following "problems" within the soft crab industry?

	Big Problem	Little Problem	No Problem
Shedding mortalities	_____	_____	_____
Peeler quality	_____	_____	_____
Peeler prices	_____	_____	_____
Soft crab prices	_____	_____	_____
Marketing	_____	_____	_____
Competition from other states	_____	_____	_____
Competition within Virginia	_____	_____	_____
Quality control (Paper shells, missing legs, etc.)	_____	_____	_____
Need for industry standards	_____	_____	_____
Facility design	_____	_____	_____
Diseases	_____	_____	_____
Regulations	_____	_____	_____
Operating expenses	_____	_____	_____
Availability of loans	_____	_____	_____
Other (please specify) _____	_____	_____	_____

We are interested in hearing your thoughts on the needs that exist within the soft crab industry. If you have any comments for soft crab research or management, we would appreciate you writing them below.

If you have been shedding crabs for less than 10 years, whom did you rely on the most for information on shedding system construction and operation? (Choose the one best answer.)

- My family or my friends
 - Publications and research literature
 - VMRC personnel
 - VIMS personnel
 - Virginia Tech Cooperative Extension Service personnel
 - Virginia Sea Grant personnel
 - Other source of information (please specify) _____
-

Your cooperation with this survey is greatly appreciated. By finding out more about the soft crab fishery, we can better be prepared to perform research and assist in resource management that will benefit Virginia's soft shell crab producers.