

ECONOMIC AND BUSINESS CONSIDERATIONS FOR SMALL-SCALE SOFT CRAB PRODUCTION

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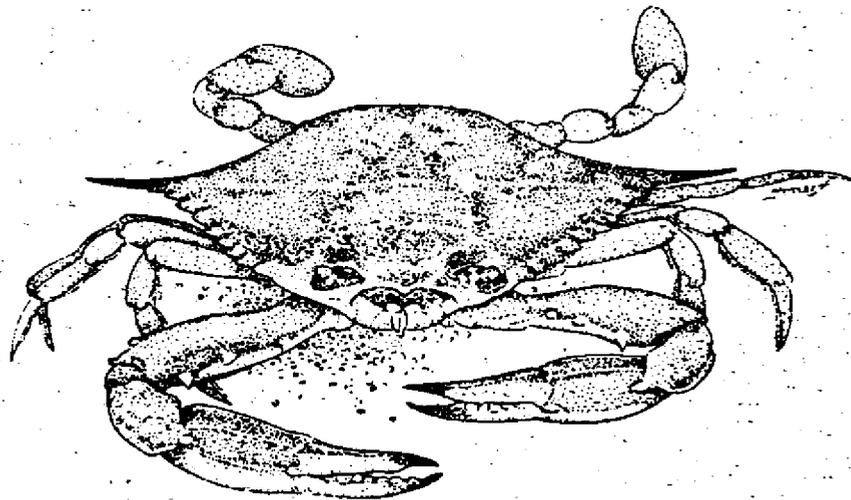
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It's getting very hard to find a waterman that just does one thing anymore. People who make a living from the water have had to change—or get left ashore. So it is no news flash that many watermen have had to diversify and do a little of several things rather than a lot of just one. Many watermen pot crabs, then chase finfish with gill nets when they are plentiful, or they may hard clam when crabs and fish are slow. A little here. . . a little there. . . and maybe you can still make a living from the water. This advisory suggests another way you might be able to make a little more from doing something else—soft crabs.

Soft crabs have been produced in Virginia for years. The technology required to hold a peeler crab until it sheds is well understood. The market for soft crabs is established and consistently strong. And the initial investment required to build a small-scale system is *relatively* small. Relative, that is, to a shedding facility capable of producing many hundreds of dozens of soft crabs a week. Yet even with such large shedding operations in existence, the market for a high quality, soft crab is still strong. Seafood wholesalers, specialized soft crab buyers, local restaurants and retail seafood establishments offer excellent market opportunities for even the small-scale producer.

However, there are many questions that need to be answered before jumping into soft crab production. **What size shedding system are we talking about? What does it cost to build it? How much money in soft crab sales (revenue) can be expected? How long will it take to recover the money to get started in the business? And how sensitive are net returns to changes in the market, peeler availability, rate of production, etc.?** Although everyone's situation is different, this advisory will try to answer these questions and help you determine if small-scale soft crab production makes sense as another source of supplemental income for your business.

A basic soft crab production "unit" is a 4' X 8' X 1' tank hooked up to a water circulation system. Blue crabs that are about to shed (peelers) are placed in a tank and watched. When they shed, you place them in

a box in the refrigerator until you have enough to take to a buyer. Some of the larger crab shedding facilities have dozens, or more, of these tanks, with the pumping systems required to move the necessary water through them. For our example, however, we're talking *small-scale*—3 tanks. The entire system will consist of three tanks and stands, a pump (and one backup), a filter system (for a recirculating water system), plumbing, a refrigerator, some wiring and a few lights, and various assorted supplies. You will also need a covered area to place the tanks and the necessary sewer, water, and electrical hookups. That's about it!

Table 1 lists the expenses required to build a 3-tank crab shedding system. The three most expensive components include the wood and materials for the tanks themselves, the pumps, and an in-ground biofilter. These three items account for two-thirds of the total expense. When everything is added up, the total initial outlay amounts to about **\$2,700**. Keep in mind that this is for a *recirculating water system* (i.e., the water is sent through the filter system and pumped back into the tanks to be used again). The initial outlay may be less for a *flow-through system* where the water is continually pumped through the tanks from an outside source. You may already have some of the necessary items. If so, great! That will reduce your initial investment even more.

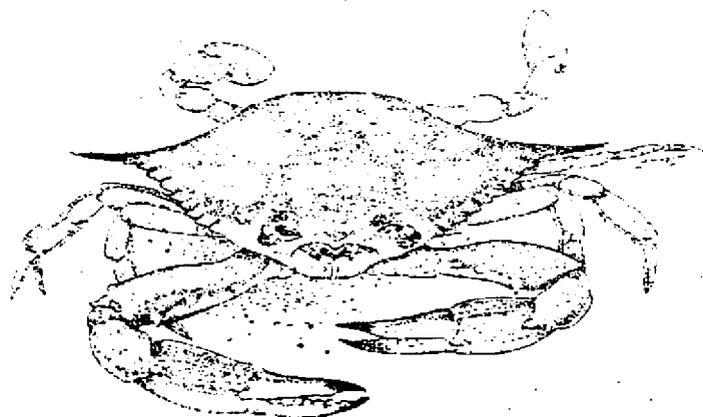
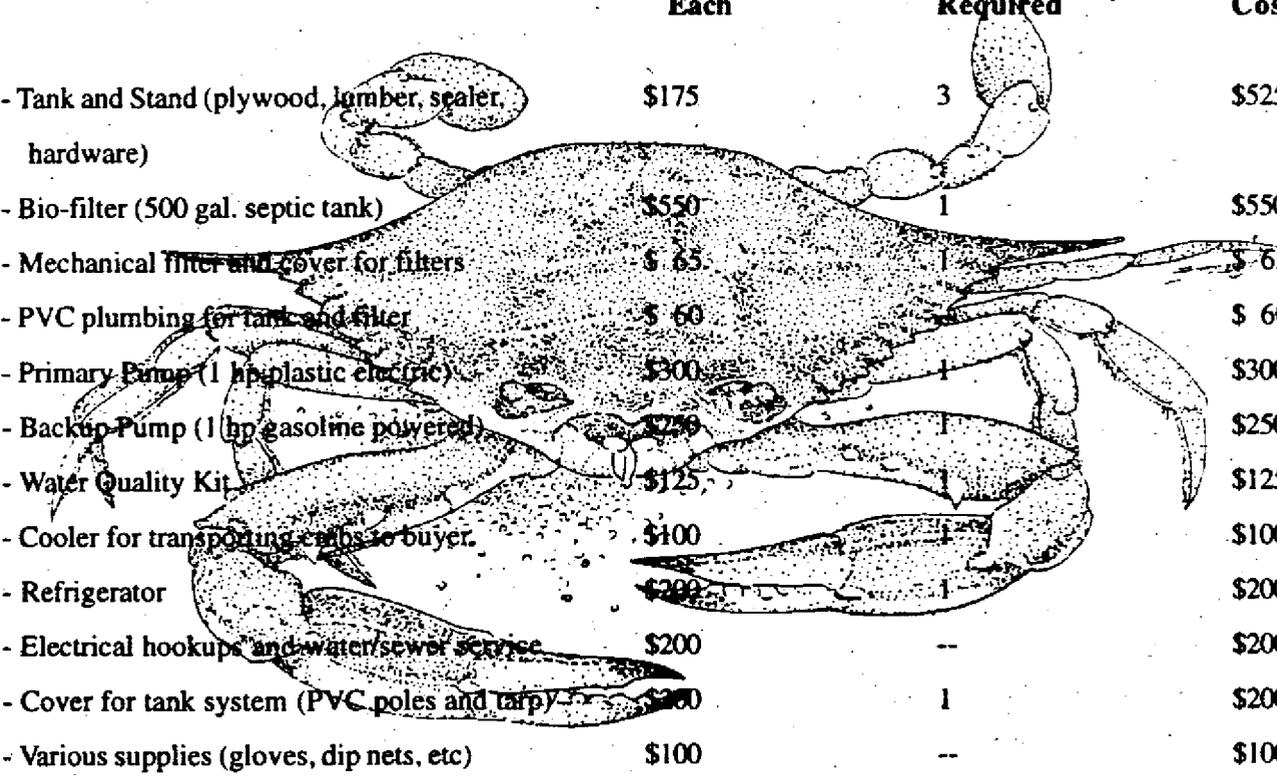


Table 1. The Initial Investment Required for a 3-Tank Soft Crab Shedding System.



Item	Cost Per Each	Number Required	Total Cost
- Tank and Stand (plywood, lumber, sealer, hardware)	\$175	3	\$525
- Bio-filter (500 gal. septic tank)	\$550	1	\$550
- Mechanical filter and cover for filters	\$ 65	1	\$ 65
- PVC plumbing for tank and filter	\$ 60	1	\$ 60
- Primary Pump (1 hp plastic electric)	\$300	1	\$300
- Backup Pump (1 hp gasoline powered)	\$250	1	\$250
- Water Quality Kit	\$125	1	\$125
- Cooler for transporting crabs to buyer.	\$100	1	\$100
- Refrigerator	\$200	1	\$200
- Electrical hookups and water/sewer service	\$200	--	\$200
- Cover for tank system (PVC poles and tarp)	\$200	1	\$200
- Various supplies (gloves, dip nets, etc)	\$100	--	\$100
Total Initial Investment			\$2,700

To estimate the revenue, operating costs, and net returns associated with operating a 3-tank shedding system, we made the following basic assumptions about how the system would operate. *If you plan to operate your system differently, you can adjust this example to get a reasonably accurate look at your revenue, operating costs and net returns.*

Assumptions on How the System is Operated and How Revenue and Costs are Estimated

Production

- The tanks are each stocked with 200 peeler crabs.
- Two out of every ten peelers will die before shedding.
- All peelers that survive will shed within 5 days...or each tank will "turn" about 1.5 times per week.
- Production is consistent every week...or about 20 dozen per tank per week.
- All harvested soft crabs are the same size and of equal marketable quality.
- Each production season lasts 8 weeks.

Prices and Operating Costs

- Peelers are purchased for 40 cents each.
- Soft crabs are sold live for \$18 per dozen.
- Shipping costs are 50 cents a dozen for boxes, packing materials, etc., plus \$20/week for gasoline for delivery.
- Utilities are 58 cents/day electrical, plus water/sewer...or approximately \$12/week total for the entire system.
- Repair/maintenance is about \$20/week for the system.
- Labor (not charged, family labor used).

The major costs associated with operating a shedding system include utilities, shipping, repair maintenance/supplies, and . . . the peelers. Given the previous assumptions, the weekly production, operating costs, and revenue are calculated as shown below:

Production—200 peelers per tank X .80 survival = 160 crabs X 1.5 turns/week = 240 crabs/12 = 20 dozen crabs X 3 tanks = 60 dozen soft crabs per week.

Peelers—200 peelers per tank X \$0.40 each = \$80 X 1.5 turns/week = \$120 X 3 tanks = \$360 per week.

Utilities—\$12 per week for the entire 3-tank system.

Repair/Maint.—\$20 per week for the entire 3-tank system (extremely variable, mostly incurred during the off-season).

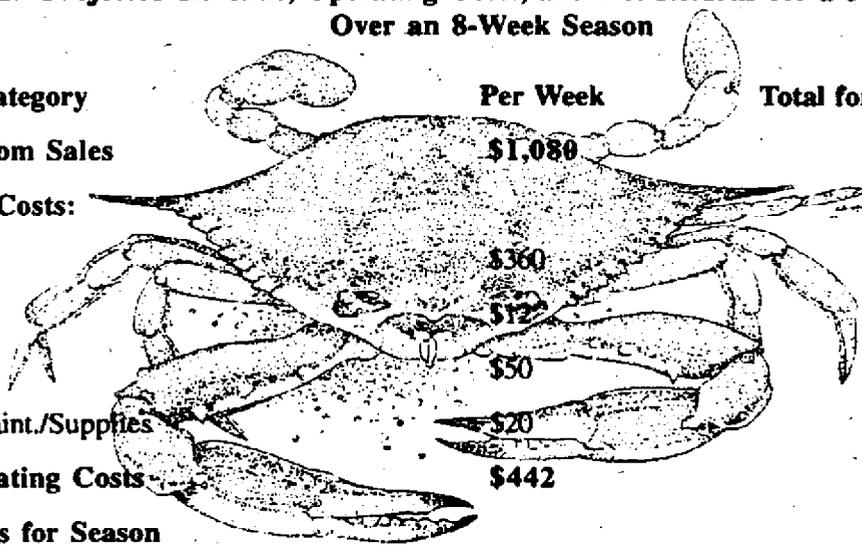
Shipping—\$0.50 per dozen soft crabs X 60 dozen = \$30/week + \$20 gasoline = \$50/week for entire system.

Revenue—20 dozen soft crabs per tank X 3 tanks = 60 dozen soft crabs X \$18 per dozen = \$1,080/week.

Therefore, for an 8-week season, the 3-tank system can generate \$8,640 in total revenue. After operating costs of \$3,540 are incurred, that leaves a seasonal net return of \$5,100. Note that this does not take into consideration your cost of labor or what you could have earned with your capital and labor in your next best alternative. What you could have earned elsewhere is your *opportunity cost*. As long as that value does not exceed \$5,100, then your time and money spent producing soft crabs is probably worthwhile. Also, it is assumed you will pay the initial investment out-of-pocket. A loan would require interest and principal payments, which are not included in this case. Given that the initial investment totaled \$2,700, the 3-tank system pays this back within the first 8-week season. Other costs not included are the necessary annual licenses and permits, as well as the cost of acquiring enough high quality water to initially fill and maintain the 3-tank system. Also, the utility costs associated with biofilter conditioning are not included.

Table 2 summarizes the projected revenue, operating costs, and net returns that would be expected for an 8-week season, given the assumptions previously described. Your season may be longer or shorter.

Category	Per Week	Total for 8-Week Season
Revenue from Sales	\$1,080	\$8,640
Operating Costs:		
Peelers	\$360	\$2,880
Utilities	\$12	\$100
Shipping	\$50	\$400
Repair/Maint./Supplies	\$20	\$160
Total Operating Costs	\$442	\$3,540
Net Returns for Season		\$5,100



Thus, it appears that a small-scale soft crab shedding system may be profitable, and an attractive source of supplemental income. But remember, that is only the case if our initial set of assumptions holds. What if some of them don't?

The previous example assumes a lot of things. For example, we have assumed that market prices, survival levels, peeler availability, and the size of harvested crabs remain the same. What if they don't? In addition, what if the crabs shed slower or faster? What happens to net returns when you double the number of tanks? What happens to costs if you have a flow-through instead of a recirculating system? **Table 3** provides some indication of how net returns change as some of these assumptions change. In reality, several of these key factors may be changing at the same time. But to keep it simple and to see how important each one is, we will look at how operating costs and net returns change when we change them *one at a time*.

The situation changes a bit if you are already a commercial crabber and can provide your own peelers when needed. In that case, you will be able to avoid the single largest operational expense... peelers. Of course, those peelers do not come free. Though you will likely already own a boat and motor, the fuel and maintenance required will be added expenses. Also, the peelers have an *opportunity cost* as well. They could be sold into the live or picking house market. Given the current market prices, however, each peeler directed into the shedding tanks will earn about \$1 more than if sold as a hard crab. And that is even taking into account all shedding costs per crab and the fact that some peelers will die in the shedding tanks. It doesn't take many peelers to pay for your gas. You may also find that if you produce your own peelers, the losses to mortality may be lower, since you will be handling the peelers less and likely treating them with more care... like eggs. But, the most troublesome barrier to being successful as a soft crab producer will be finding an adequate supply of peeler crabs. As a commercial crabber, you may have an advantage.

Few things are certain. But if the basic assumptions discussed above hold, small-scale soft crab shedding appears to be a potential source of supplemental income. Do your homework before you invest. Determine how your situation differs from the example given in this advisory. Only after fully understanding the factors that might affect production in your area, particularly the availability of peeler crabs, will you minimize the likelihood of failure.

There are sources for assistance in constructing and operating your soft crab production system. Every coastal state in the U.S. has a Sea Grant Program that can either directly provide information on soft crab production, or can put you in touch with the right person to answer your questions. To identify the appropriate individual in your area for assistance—in Virginia, contact Mike Oesterling at 804-684-7165; in Florida, contact the Florida Sea Grant Program at 352-392-1837.



Table 3. How Operating Costs and Net Returns Change When The Assumptions Change¹

Market Price (per doz.)	\$16	\$18	\$20	\$22	\$24
Operating Costs	\$3,540	\$3,540	\$3,540	\$3,540	\$3,540
Net Returns	\$4,140	\$5,100	\$6,060	\$7,020	\$7,980
Price of Peelers	\$0.30	\$0.40	\$0.50	The price of peelers may change with season, size of peeler, or white vs. pink vs. red conditions.	
Operating Costs	\$2,820	\$3,540	\$4,340		
Net Returns	\$5,820	\$5,100	\$4,380		
Stocking Densities	100 per tank	150 per tank	200 per tank	250 per tank	300 per tank
Operating Costs	\$1,980	\$2,760	\$3,540	\$4,320	\$4,510
Net Returns	\$2,340	\$3,720	\$5,100	\$6,480	\$7,860
Survival Rates	60%	70%	80%	90%	Shipping costs change, as does revenue
Operating Costs	\$3,480	\$3,510	\$3,540	\$3,570	
Net Returns	\$3,000	\$4,050	\$5,100	\$6,150	
Size Distribution of Harvested Soft Crabs	All M	½ M & ½ L	3S, 3M, 3L	Different size peelers will produce different size soft crabs. The peeler prices change, as do the market prices for soft crabs.	
Operating Costs	\$3,540	\$4,260	\$3,320		
Net Returns	\$5,100	\$5,340	\$5,640		
Tank Turns per Week	1.0 Turns	1.5 Turns	2.0 Turns	As the tanks turn more or fewer times, peeler and shipping costs change, as does revenue.	
Operating Costs	\$2,500	\$3,540	\$4,580		
Net Returns	\$3,260	\$5,100	\$6,940		
Flow-Through vs. Recirculating System	Recirculating	Flow-Through	The initial investment is different for a flow-through system. Plumbing costs increase. But a less expensive submersible pump is required. No biofilter or water quality kit is needed. Returns and operating costs, including peelers, do not change.		
Initial Investment	\$2,700	\$1,640			
Operating Costs	\$3,540	\$3,540			
Net Returns	\$5,100	\$5,100			
Number of Tanks	3 Tanks	6 Tanks	10 Tanks	As the number of tanks increases, the total investment increases, as do most other costs. More tanks allow much higher production	
Initial Investment	\$2,700	\$3,040	\$4,290		
Operating Costs	\$3,540	\$6,780	\$10,980		
Net Returns	\$5,100	\$10,500	\$17,820		

¹Bold cells indicate the basic assumptions.

²S-primes, M-jumbos, L-whales. The prices associated with different size peeler crabs are as follows: S-\$0.35, M-\$0.40, L-\$0.50. Market prices (per dozen) for the different size soft crabs are as follows: S-\$16, M-\$18, L-\$22.

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