

SHELLFISH MANAGEMENT DIVISION EVALUATION, 2/28/2023

DISCUSSION: Request for approval of the 2023 Oyster Replenishment and Restoration Plan (ORP) and the Associated Procurements Procedures.

ISSUES:

Each year the Commission reviews proposed projects, funding and procurement procedures that will be used for the maintenance and expansion of the oyster resource. Oysters are ecologically, economically, and culturally important resource to Virginia. The estimated dockside value of oysters harvested from Virginia is ~\$40 million each year. In addition to public harvest, shellfish aquaculture of hard clams and oysters produced \$94.3 million in sales in 2018 (USDA-NASS, 2018). Virginia continues to lead the nation in hard clam aquaculture production and is first on the U.S. east coast for Eastern Oyster production. The oyster fishery is the largest economic contributory to a Virginia Seafood Industry, which is valued at over \$1 billion annually.

The Replenishment Program administers ~\$4-\$10 million annually for oyster restoration and replenishment projects. Funding is procured from a variety of sources, and includes \$4 million in annual general funds, the remaining funding is a combination of grants, special legislative funds, and user fees collected from the oyster industry.

The Virginia Marine Resource Commission (VMRC) has been at the forefront of oyster restoration and replenishment efforts since the establishment of its Replenishment program in 1929. The VMRC's oyster management program has focused on restoring oyster populations in the Chesapeake Bay, one of the largest estuaries in the world. Today it is the largest public oyster replenishment program in the country and is the lead partner for the world's largest oyster restoration effort. The VMRC's ongoing commitment to oyster restoration and replenishment serves as a model for other states and provides important benefits for both the environment and the local economy of the Commonwealth.

BACKGROUND:

The implementation of harvest effort controls, effective management strategies, and consistent replenishment and restoration efforts have put the Virginia Oyster Resource in the best condition it has been in a generation. Prior to the negative market impacts of the COVID 19 pandemic, the five-year average harvest from public grounds (255,302 bushels) was similar to the long-term average dating back to the 1957-58 oyster season (257,036 bushels). The excellent condition of the resource was taken into account when the Commission established an extended harvest season in the Fall of 2022. This season has now had additional extensions in some areas, and it is likely that the harvest of public oysters for the 2022-23 season will top 300,000 bushels for the first time since the 1987-88 season. After the 1987-88 season, the oyster fishery crashed due to the impacts of both wide spread disease and harvest efforts. The public harvest did not exceed 200,000 bushels for 25 years. However, the resource is currently showing signs of sustained recovery since the widespread impacts of disease that so decimated oyster populations in the late 1980s through the early 2000s. Long running stock assessment data indicates the

standing stock of oysters has increased since low points that corresponded with the low harvest rates seen in the 1990s and early 2000s. Although the public oyster resource is currently stable and showing consistent improvement, the recent positive trends could reverse if the stock receives consecutive years of poor spat sets, diminished replenishment and restoration efforts, other natural causes, or significant changes in the current management strategy that result in substantial increases in harvest amounts.

In Virginia, the public and private fishery are closely intertwined. An increasing oyster population in any one area, harvest, sanctuary, or private ground, can have benefits to the others. These co-benefits run the gambit from collectively improving recruitment, water quality, and the development of disease resistance to, for areas open to legal harvest, fulfilling market demands during certain times of year. Based on VMRC harvest reporting, oysters from public ground provide the bulk of oysters harvested in Virginia during the fall and winter, while private ground harvest does the same in the spring and summer. In 2021, based on VMRC data, more than 70% of all oysters harvested, from both public and private ground, could be considered “wild” and were largely dependent on natural spat sets or the transfer of “seed oysters” from public to private ground. Many of the same people, be it buyers, harvesters, truck drivers, and the countless others that handle Virginia oysters on the journey to the consumer are employed in the oyster industry as a result of the continued success and growth of both the private and public oyster fishery. The entire seafood industry, both recreational and commercial, benefits not just from the increased number of oysters created by continued restoration work, but by the cascade of positive impacts a more fully functional ecosystem creates for all users. Both public and private ground benefit from restoration work. In addition, many of the factors that influence natural spat set, such as water quality and salinity levels, can adversely impact oyster hatchery production and the containerized oyster production that hatcheries support. These are the reasons that for more than a century the public and private ground harvest has risen and fallen together.

Since about the mid-2000s, Virginia has been experiencing a period of relatively high and consistent spat sets or recruitment, in most areas most years. Spat sets in 2018 were an exception and lower than average in almost all areas of the Bay and its tributaries. This is likely correlated with 2018 being the wettest year the Chesapeake Bay region has ever recorded. In addition, many areas experienced substantial levels of oyster mortality. Portions of the Potomac, Rappahannock, and James Rivers experienced upwards of 90% mortality. Current climate science suggests that weather events, such as those seen in 2018, are likely to become increasingly common. It should be noted that even in this year of record rainfall, there were two areas that received above average spat sets. Portions of the Tangier Sound and the James River, which were replenished with fossil shell in 2018, saw substantially higher numbers of spat per square meter. This highlights the importance of a continued Virginia bay wide replenishment and restoration effort that can take advantage of a spat set even if it is not evenly distributed. This helps to diversify the increased risk to the oyster resource and oyster fishery associated with a changing climate and unpredictable weather patterns. Seed from these areas of high recruitment was transported to other areas in 2019, 2020, 2021, and 2022. As a result, the negative impacts to the fishery were likely substantially mitigated. The recently increased replenishment effort has also allowed the increasingly high spat sets to be better captured as there is physically more substrate in more places available for spat to attach. Simply put, having

more shell on the bottom provides more locations for spat to attach in years of high recruitment. The record number of market oyster observed during the 2021 and 2022 survey is the likely result of the increased replenishment effort combined with these recent high recruitment events (spat sets).

The current management strategy has been relatively consistent for more than a decade. The last time a broad discussion of this management strategy took place was in 2007 with the second convening of the Blue Ribbon Oyster Panel. Many of the recommendations of the 2007 Blue Ribbon Oyster Panel (BRPOP) and the Shellfish Management Advisory Committee (SMAC) relating to harvest and management have been implemented and have contributed to the stable or increasing public harvest. Current harvest levels are largely not self-sustaining and are dependent on continued public investment in replenishment effort (shell planting). In more recent years, as oyster densities have reached new record high levels, some areas have been transitioned back to the less destructive harvest gears, patent tong and hand tongs, which dominated the fishery in the past. This will allow for a finite amount of replenishment effort to be further focused on improving additional areas, as less replenishment is needed in areas that have not seen extensive harvest utilizing dredges or scrapes.

In 2007, the BRPOP recommended that at least \$2.5 million in State General Funds be appropriated each year for oyster replenishment. Funding was inconsistent until Fiscal Year (FY) 2013, when the Governor and the General Assembly appropriated \$2 million for oyster replenishment. Appropriations of \$2 million have been included in budgets for both the 2014-2016 and 2016-2018 biennia. Consistent funding for the oyster replenishment program is critical to maintaining productivity of the public oyster beds. However, the costs of oyster restoration have increased close to 400 percent since 2007. State General Funds were increased for FY 2019 and again for FY 2020. These budget increases are included in the FY 2023 and FY 2024 budget request as well. The budget increase, starting in FY 2019, included a change in language in the budget bill. Previously, all the General Funds were for the “replenishment” of public oyster grounds. The new language makes a distinction between funding for “restoration” and funding for “replenishment”. Although in the past, replenishment has been conducted on both harvest and non-harvest areas, it has been determined that, with the new budget language, restoration specific funds will be expended only on non-harvest areas. This brings the potential available General Funds for this year’s plan to \$4 million.

Table 1. Non-Federal Funding Sources and total dollar amounts available for replenishment and restoration in 2023

NON-FEDERAL FUNDING SOURCES	AMOUNT
General Funds Replenishment (GF)	\$2,500,000
General Funds Restoration (GF)	\$1,500,000
The Nature Conservancy (TNC)	\$125,000
Non-General Funds (NGF) Oyster Resource User Fees	\$200,000
Total	\$4,325,000

Seed Transfer:

James River

The Conservation and Replenishment Department (CRD) has moved a small amount of seed from the James River to the Potomac tributaries for many years. In addition, seed has been moved from other areas when a very high spat set has occurred on recent shell plants to locations that have had poor or often get poor sets. A rotational harvest strategy has been instituted in the Potomac River tributaries for areas that have recently been planted with seed oysters. The tributaries in the rotation are the Coan, Nomini, and the Yecomico. One of these areas has been planted annually for the last 4 years. The CRD recommended replacing the Nomini with additional areas in either the Coan or the Yecomico and opening it to harvest early in the rotation. Based on the results from the fall dredge survey and a subsequent survey using side scanning sonar, one of the areas that was planted with seed in the Nomini in 2020 is not showing signs that it will produce improved harvest returns. Staff is continuing to investigate this area of concern to manage towards long-term sustainable harvest.

Initially the majority of the transported seed from the James River was harvested from the Hand Tong Seed Areas. However, the cost of harvesting and then transporting this seed has continued to increase. As a result, the SMD has not received responses to the notices to transport and plant seed at the price that has been offered in recent years. Fortunately, seed of equal quality is able to be moved for a significantly lower price from areas that have received consistent and very good spat sets in the lower James River. These areas are then re-shelled and were expanded in 2018, 2019 and again in 2020. Most have continued to receive good spat sets. As a result of the lower cost, and as a way of increasing productivity in low recruitment areas beyond the Potomac tributaries, staff has transported some of this seed to multiple areas for the last 4 years. The SMD again intends to transport seed taken from these areas of the lower James River to up to three areas that do not consistently receive high spat sets from shell planting alone. The areas recommended for planting are the Potomac Tributaries, area 8 and 7 in the Rappahannock, and a portion of the Pocomoke Sound several miles from the Maryland Virginia state line. The areas planted with seed may not be opened for immediate harvest. Staff would evaluate the seed plant areas prior to opening them to harvest. The cost for each bushel of seed to be harvested, transported, and planted in these areas will be at least \$6.00/bushel. Funds from Oyster Resource User Fees and replenishment GFs will be used for this project

Proposed Project	Up to 20,000 bushels of seed oysters @ ~\$6.00/bu.
Estimated Cost	\$200,000
Funding Sources	NGF and GF (Replenishment)

Shell Planting:

Bay and Tributaries:

Shells on public beds naturally degrade over time and lose their effectiveness as a substrate for oyster larval attachment. In most of the mid-salinity areas in Virginia, the half-life of shells appears

to be 3 to 4 years. Additional shell is lost and degradation intensified by the harvest and removal of market oysters. The density of living oysters and shell volume are determined from the results of the VIMS-VMRC annual hydraulic patent tong survey and this information is used to determine what areas are in the most in need of shell. If the mean volume of shell observed in the fall survey does not fall below 5 liters per square meter, a reasonable degree of productivity can be maintained.

Most of the harvest areas in the Chesapeake Bay and tributaries are experiencing a period of relatively consistent and high recruitment. However, there is strong evidence to suggest that extreme weather events, such as those seen in 2018, could become more frequent, resulting in the possibility of localized high oyster mortality and low recruitment. Replenishment should continue in areas that are determined to be in need of additional substrate. This will prevent further degradation of the public ground that is opened to harvest and provide an additional buffer for localized high mortality events and low spat sets should they occur. In addition, should a good spat set occur, more substrate will be available for spat to settle on and the areas will be able to more quickly recover from harvest or unpredictable natural causes.

The majority of the replenishment specific general funds appropriation for FY 2024 will be used for adding new shell to those areas in most need of shell and/or those that have been recently opened to public oyster harvest. Some restoration General Funds will be used to maintain or expand sanctuary areas. Funds for oyster replenishment are not likely to be enough to maintain the public beds at maximum productivity, but will be used to maintain a minimum volume of shell, as observed in the fall survey, above 5 liters per square meter where possible and practical, with a goal of maintaining 10 liters per square meter or more. In Table 2 (attachment 2), there is a list of all of the areas and acreages of oyster beds that staff has determined to be in need of shell in 2023. In total, more than 5,000 acres of oyster beds need shell. The CRD will seek to plant the largest quantity of comparable shells for the lowest area dependent per-unit price. This will likely be a combination of house, reef and dredged shells. There is currently one location permitted for hydraulic shell dredging (reef shells) in the lower James River, the SMD intends to seek permit authorization for a second location in the vicinity of the Craney Island Eastward Expansion.

Proposed Project	600 – 800 acres of oyster shell restoration @ 1,000 bushels/acre @ \$2.50 - \$4.50/bushel
Estimated Cost	\$2,500,000-\$4,030,000
Funding Sources	NGF and GF

Eastern Shore:

The CRD-SMD and The Nature Conservancy (TNC) have consistently collaborated on Seaside replenishment and restoration efforts. Last year, for the fourth year in a row, TNC funds were used on areas both closed and open to harvest. The SMD will contract for shell planting for a Nature Conservancy project, assist with the site selection, and shell planting monitoring. If funding allows additional locations will be planted using General Funds for restoration.

Approximately 11 acres will be planted with shells harvested from local shell deposits or purchased from local sources.

Proposed Project	11 acres @ 10,000 bushels of shells/acre @ ~\$2.50/bushel
Estimated Cost	\$225,000
Funding Sources	NGF-TNC and GF (restoration)

Alternative Cultch Projects:

The supply of shell for restoration, replenishment, and aquaculture will always be limited. The demand for shells in most years tends to be higher than the supply leading to increasing prices. Over the last several years, the CRD-SMD and other restoration partners have begun using alternative substrate in certain areas. Non-harvest locations have been planted with larger sized substrate. In the Rappahannock, several harvest areas have been planted with a smaller sized material. The first planting used crushed concrete that was slightly larger than ideal. Some oysters were crushed during harvesting. The other areas that were planted used a slightly smaller size. These areas have been open to harvest recently, and it appears that the size of the alternative substrate is no longer an issue. Not all areas are suitable for planting with stone or concrete. The bottom needs to be firmer than areas that can be planted with shell.

The SMD has identified a number of locations that could have suitable bottom for alternative cultch plantings. These areas tend to have sandier bottoms and low oyster densities. Staff has existing permits (JPAs) for several locations. The locations would be near the Deep Rock Area, two locations in the Lower Rappahannock, the Lower James River near Nansemond Ridge, and the lower Pocomoke Sound adjacent to Onancock Rock. Only a small portion of the permitted areas would be planted at any given time. In the event that issues with acquiring shell arise, these areas could be expanded as needed and as suitable for planting.

In addition to these harvest areas, funds are available for alternative cultch projects that will primarily focus on the restoration of non-harvest areas. Areas in Mobjack Bay will be permitted for alternative substrate. The CRD-SMD will continue to carefully selected locations in these areas for alternative substrate planting that will minimize potential user conflict. The intent is to create “new oyster reefs” that will have multiple benefits to adjacent areas, through improved water quality, increased fish habitat, and oyster larval transport to both public and private ground.

Proposed Project	0-50 acres @250 tons/acre @ ~\$50.00/ton Up to 100 acres @ 250-1000 tons/acre
Estimated Cost	\$0-\$2,627,000
Funding Sources	GF Restoration and Replenishment

Table 1. Summary of proposed projects and costs for oyster replenishment and restoration for 2023.

Proposed Project	Estimated Cost	Funding Sources
Seed Oysters: Up to 20,000 bushels @ ~\$6.00/bu.	\$200,000	NGF and GF (Replenishment)
Shell Planting: 600 – 800 acres of oyster shell restoration @ 1,000 bushels/acre @ \$2.50 - \$4.50/bushel	\$2,500,000	GF Replenishment
	\$0-\$1,500,000	GF Restoration
	\$0-30,000	NGF
Eastern Shore Shell Planting	\$225,000	GF Restoration and TNC
Alternative Cultch Projects: 0-50 acres @250 tons/acre @ ~\$50.00/ton Up to 100 acres @ 250-1000 tons/acre	\$0-\$2,627,000	GF Restoration and Replenishment

Attachments:

1. Procurement Procedures
2. Table 2 areas in need of shell

APPROVAL OF PROCUREMENT ACTIVITY FOR THE 2023 OYSTER REPLENISHMENT PROGRAM:

General:

Certain aspects of the procurement of seed, shell, and replenishment services differ from the Commonwealth's standard procurement procedures, and therefore must be documented and approved by the Commission. The Commission will be exercising this option under Section 28.2-550 of the Code of Virginia.

This section of the Code states that:

“C. The Commission, when it makes a determination in writing that competitive bidding or competitive negotiation is not feasible or fiscally advantageous to the Commonwealth, may authorize other methods of purchasing and contracting for seed oysters, house shells, reef shells, shell bed turning, and other goods and services for oyster ground replenishment, which are in the best interest of the Commonwealth and which are fair and impartial to suppliers. It may establish pricing for its award and purchases; use selection methods by lot; and open, close, and revise its purchases according to changing conditions of the natural resources, markets, and sources of supply.”

For the harvest and movement of wild seed oysters, shell bed cleaning, and excavated shells, the Commission will set the per bushel price to be paid. For the production of oyster eyed larvae, the Commission will set a price per million larvae. Public notices will be posted, and all interested parties may apply. Selection of contractors will be according to the lottery method.

The Commission will also set the price for the purchase of house shells. The prices are currently estimated to be \$1.50 per bushel for conch shells, \$1.00 per bushel for clamshells, and \$2.75 per bushel of oyster shells at the shucking house. Loading, transporting, and planting costs will be set by the Commission based on handling costs, the type of activity, and the distance for transporting to the activity sites. Letters were sent to all licensed shucking houses inquiring as to the availability of shell. All houses that responded positively will provide shells to the 2023 program until the total dollar limit for this activity is met. If funds are sufficient, all available house shells in the state will be purchased for the Oyster Replenishment Program. If funding sources do not allow the purchase of the entire shell market, house shell contracts and/or contract amounts will be based on geographical location, mobilization cost, and shell planting locations, which provide the greatest benefit to the oyster industry and to the Commonwealth.

The Commission will also set the price per ton for ground concrete or granite stone that will be used as an alternative cultch material. Loading, transporting, and planting costs for this material will be set by the Commission based on handling costs, the type of activity, and the distance for transporting to the activity sites. Public Notices will be posted and all interested parties may apply. Contractors will be selected by lottery, or allowed to provide the material until the project is completed.

The agency anticipates that all other 2023 oyster replenishment activities will be

completed using the Invitation for Bid or Request for Proposal process in accordance with the Virginia Public Procurement Act.

If the conditions of the oyster resource changes, or if the Conservation and Replenishment Department Head encounters unanticipated/unscheduled situations with the Oyster Replenishment Program, planned procurement activities may be changed, and one or more of the alternative methods of procurement listed above may be utilized to facilitate the completion of the 2023 Replenishment Program.

APPROVAL, BY THE COMMISSION, OF THE REPLENISHMENT PROGRAM WILL ALSO INCLUDE APPROVAL OF THE PROCUREMENT METHODS MENTIONED ABOVE.

Tab 2 Areas in
Need of Shell

Area	Row Labels	Average of Spat	Average of Small	Average of Market	Average of Brown_Shell_Volume	Acreage
Total in need						7167.1
Total most in need						5142.3
Pocomoke Tangier Sounds						
	Public Ground #10 H-2	0.7	1.3	1.3	0.7	20.983
	PG07 H-4 Thoroughfare	2.0	2.0	1.3	1.7	4.125
	Public Ground #10 H-1	2.7	2.7	2.5	2.9	69.665
	Island Rock	6.0	5.3	2.1	3.4	47.63
	PG05 H-1 Fox Island Rock	9.7	6.3	5.7	4.3	6.252
	PG08-H1 California Rock	7.0	7.3	3.8	5.0	8.943
	Byrd Rock	11.3	9.0	8.5	5.3	65.52
	Public Ground 11-1	2.0	2.6	8.2	5.6	37.329
	Public Ground #9 H-2	1.3	10.3	8.7	6.4	32.577
	PG13 H-5	2.4	5.2	16.4	6.4	18.8
	Cod Harbour	23.0	25.8	16.4	6.8	4.549
	PG18 Onancock Rock A	16.0	4.3	12.0	7.5	10.449
	PG13 H-2	4.9	12.1	13.0	7.9	39.644
	Public Ground #9 H-1	1.3	19.7	5.0	8.0	21.309
	Marshalls Rock	24.3	19.5	5.0	8.3	7.3
	PG08-H4 California Rock	22.2	26.4	13.8	8.4	14.905
	PG17 Parker's Rock A	22.8	16.8	9.3	8.8	33.555
Rappahannock						
	Mosquito Island	16.7	2.7	1.3	0.4	2.055
	Drumming Ground sanctuary 2	34.4	5.8	1.4	0.8	2.801
	Big Wicks B	25.5	7.0	2.8	2.5	24.232
	Temple Bay sanctuary	60.3	3.3	2.0	2.8	8.846
	Temple Bay 3	45.8	4.0	6.5	3.1	4.577
	Big Wicks C	45.5	7.8	3.3	4.8	23.989
	Monaskin Bluff	113.8	8.3	2.5	4.9	161.82
	MORATTICO BAR	41.2	9.1	6.4	5.2	121.306
	Corrotoman sanctuary	28.7	18.0	11.0	5.3	9.241
	Drumming Ground sanctuary 1	67.8	13.5	11.8	5.8	7.096
	Little Wicks B	40.0	5.5	2.5	5.8	24.232
	Hog House Inshore	94.0	8.0	2.5	6.8	3.735
	Mill Creek sanctuary	145.3	17.8	9.5	6.9	4.111
	Temple Bay 2 (S.P. 136)	104.0	4.3	6.3	7.8	5.687
	STOVE POINT	64.5	11.8	5.7	8.0	29.466
	Waterview B	59.5	18.5	10.0	8.0	19.825
	Bush Park	33.0	14.0	17.0	8.3	4.24
	Parrot Rock sanctuary	25.7	29.7	20.0	8.3	9.529
	Smokey Point	99.2	15.3	6.0	8.3	26.12
	Butler's Hole West	37.6	21.4	16.0	8.4	7.287
	Whitehouse West	143.6	19.2	12.2	8.4	14.288

Tab 2 Areas in
Need of Shell

Butler's Hole East	19.3	23.8	20.3	8.5	6.166
Larson's Lower sanctuary	19.0	25.0	25.7	8.8	2.242
Corrotoman Point C-3	101.6	31.8	13.6	9.0	8.308
Lower Edge Broad Creek East	31.4	34.7	18.4	9.1	17.664
Little Wicks A	59.3	13.7	2.3	9.3	5.563
Spike	36.5	51.0	12.2	9.3	7.103
Temple Bay 5	74.0	15.3	14.0	9.5	17.51
Whiting Creek	110.3	19.5	5.0	9.8	12.89
Parrot's Rock East	82.2	15.6	21.6	9.8	11.117

James

UPPER JAIL ISLAND	7.7	26.9	0.3	1.1	611.716
SWASH MUD SLOUGH	13.7	51.3	0.1	2.3	1230.359
LOWER JAIL ISLAND	11.7	20.8	2.9	2.4	628.863
OFFSHORE SWASH	21.7	75.6	0.9	3.6	641.089
OFFSHORE JAIL ISLAND	6.7	27.9	2.2	3.7	1017.168
SHANTY ROCK	16.3	34.8	2.0	4.3	3.126
SWASH	29.5	96.3	1.3	4.5	201.361
NANSEMOND RIDGE	34.9	10.3	2.9	4.9	294.99
MULBERRY POINT	40.8	123.8	2.0	5.8	48.4
DAYS POINT	12.8	61.0	3.6	5.9	275.251
CRUISER'S SHOAL	11.5	13.0	8.5	6.0	54.896
Upper Brown Shoal	10.4	15.7	5.1	6.4	23.463
WRECK INSHORE	24.4	47.4	4.2	6.5	584.841
DOG SHOAL UPPER	30.3	29.7	5.8	6.5	74.021
LONG ROCK also Cross Rock	28.8	154.0	4.0	8.8	40.87

York/Mobjack

Tow Stake West	0.6	6.6	3.6	2.4	3.094
PULTZ BAR	10.1	14.3	6.0	3.3	14.06
Tow Stake East	6.0	9.5	2.3	3.5	6.187
Sarah's Creek 2	13.5	24.0	2.8	5.0	26.664
Brown's Bay #2	5.2	3.0	13.8	6.3	20.11
Cheatham PG 1	4.8	10.8	9.5	8.3	1.876
Timberneck	2.3	9.3	9.1	9.1	47.535

Great Wicomico

VMRC 3/GW Corps 4	0.0	1.0	0.3	0.0	3.4
VMRC 15/GW Corps 21	0.7	0.7	0.3	0.2	3.1
VMRC 12/GW Corps 17	3.3	0.0	0.0	0.4	1.8
VMRC 11/GW Corps 14,15 & 16	9.2	15.9	5.1	2.6	14.4
Mill Creek East	17.0	12.3	7.7	2.8	2.3
VMRC 10/GW Corps 12, 13	3.0	15.7	6.0	3.0	5.1
VMRC 8/GW Corps 9	16.1	27.6	4.1	4.1	13.5
VMRC 4/GW Corps 5	10.7	22.7	8.0	5.5	2.8
HAYNIE POINT	253.8	49.2	10.2	6.8	4.7

Tab 2 Areas in
Need of Shell

Dameron Marsh East	136.0	43.3	13.3	8.3	11.8
INGRAM'S Bay South	19.0	63.0	18.3	8.7	8.6
HARCUM FLATS	33.8	66.5	7.8	9.5	6.0
SANDY POINT	112.4	55.0	9.6	9.9	11.8

Piankatank

THOMPSONS	0.3	0.3	0.3	0.3	1.706
DOCS VIEW	6.0	1.7	0.7	1.2	1.1
Burton Point NOAA Stone Plant	10.3	4.0	2.5	1.4	16.0
SHIPLEYS EDGE	4.0	1.7	0.3	1.5	1.0
PALACE BAR B also PALACE BAR 2	9.0	11.0	2.3	2.0	6.7
BURTON POINT B also BURTON POINT 2	15.0	8.3	2.0	4.8	7.6
Fishing Point	29.5	29.1	6.4	5.1	2.0
HILLS BAY	21.2	35.6	9.8	5.9	9.4
HERON ROCK	30.3	47.3	16.7	6.7	13.3
PALACE BAR also PALACE BAR 1	56.4	54.6	11.1	7.0	38.5
BLAND POINT	28.5	49.3	16.6	8.0	25.0
CAPE TUNE	51.1	49.5	12.5	8.4	41.4
Heron Rock NOAA Stone Plant	22.5	37.5	20.3	8.5	13.3
COBBS CREEK	31.0	24.7	29.3	9.3	4.3