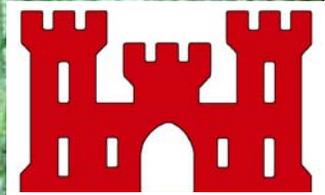


Plant Materials for Dune

Coastal Stabilization

Tommy Socha

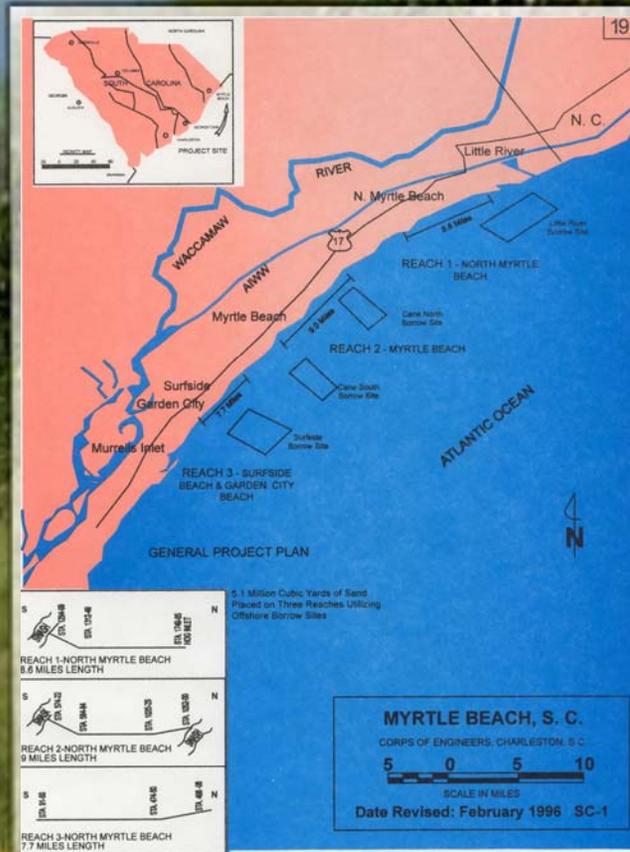


US Army Corps
of Engineers
Charleston
District



Controlling Waterway Erosion

Introduction



North Myrtle Beach Dune Stabilization Projects

Reach 1, 2, 3

Dredging : Sept. 12-1996 Nov. 24, 1998

Total Miles : 25.37

Total Dredging : 6,390,314 cubic yds

Total Cost : \$50,698,846

BEACH EROSION FROM STORM SURGES



Garden City

SOUTH CAROLINA





**GARDEN CITY TEST SITE
MAY 4, 1995**

TEST SITE JULY 1996

HEALTHY PLANT & DUNE FORMING



TEST SITE IN LATE SUMMER OF 1996



HURRICANE JOSEPHINE CRUISES THE SOUTH CAROLINA COASTLINE OCTOBER 8, 1996



HIGH TIDES WASH TEST SITE AS HURRICANE JOSEPHINE CRUISES SOUTH CAROLINA COASTLINE



PANICUM AMARUM 'BITTER PANICUM NORTHPA AND SOUTHPA' WITH FAST & HEALTHY GROWTH



50 LBS OF 10-10-10 FERTILIZER APPLIED OVER 3,000 SQ
FT

FRONT AND BACK SIDE OF NEW DUNE AT TEST SITE IN 1999



BEACH RENOURISHMENT



Myrtle Beach Dune Stabilization Projects Reach 1, 2, & 3

NOTE: ALL TOTALS ARE APPROXIMATEY, BASED ON BID CALCULATIONS

Dredging: Started 12 September 1996 & Ended 24 November 1998

Stations:

Reach 1-1749+65 to 1295+00 = 45,465 ft
Sand 2,622,904 cubic yards at a cost of \$20,154,213

Reach 2-1052+00 to 574+00 = 47,800 ft
Sand 2,249,916 cubic yards at a cost of \$16,870,194

Reach 3-498+00 to 91+50 = 40,650 ft
Sand 1,517,494 cubic yards at a cost of \$13,674,439

Total for Reach 1, 2 & 3 =133, 915 ft = 25.37 miles

Total for Reach 1, 2 & 3=Cubic Yards=6,390,314

Total Cost for Reach 1, 2 & 3=\$50,698,846

Planting instructions:

Plant Material 18" spacing between rows/24"between plants

Planting Depth Beach Grass 6"-8"/Sea Oats-Bitter Panicum 5"-7"

Reach 1 24 Rows=BGC-8/NPA-10/SO-6

American. Beach Grass Cape (Ammophila breviligulata)	No. plants 545,592
Bitter Panicum (Panicum amarum 'Northpa')	No. plants 227,340
Sea Oats (Uniola paniculata)	No. plants 136,404

Reach 2 24 Rows=BGC-8/NPA-10/SPA-2/SO-4

American. Beach Grass Cape (Ammophila breviligulata)	No. plants 539,664
Bitter Panicum (Panicum amarum 'Northpa')	No. plants 231,987
Bitter Panicum (Panicum amarum 'Southpa')	No. plants 42,736
Sea Oats (Uniola paniculata)	No. plants 74,499

Reach 3 8 Rows=BGB-3/NPA-5

American. Beach Grass Bogue(Ammophila breviligulata)	No. plants 153,819
Bitter Panicum (Panicum amarum 'Northpa')	No. plants 153,819

Total For Reach 1, 2& 3

American. Beach Grass Cape/Bogue	No. plants 1,239,075
Bitter Panicum (Panicum amarum 'Northpa')	No. plants 459,327
Bitter Panicum (Panicum amarum 'Southpa')	No. plants 42,736
Sea Oats (Uniola paniculata)	No. plants 210,903

Total 1,952,041 Plants

- Note:
1. Beach Grass 3 culms per hole
 2. Bitter Panicum was used more as project continued because of its success, while sea oats were reduced.
 3. Planting rows were reduced in Reach 3 do to narrower beach.
 4. Fencing and planting were separated in Reach 1 & 2 do to berm width and try to establish 2 dune systems.
 5. Reach 2 grass and fencing were intermingled do to emergency lane and narrower berm width. Result was dune built faster in areas.
 6. Dune establishment depended on air flow which was based on structures behind fencing and planting. Homes-excellent/Condos-good if open underneath/Hotels-poor
 7. Planting reduced beach erosion and rebuilt dunes when hurricanes cruised the coastline. When hurricane cruised the coastline beached eroded 10"-12" in bare areas and 2"-3" in planted areas which repaired themselves in 3 to 4 months.
 8. Fencing reduced wave damage and trapped organic material which was good for plants

Fertilization-16-4-8-300lbs per/acre

Reach 1-18.1 Tons
Reach 2-16.5 Tons
Reach 3-5.1 Tons

Total=39.7 Tons

Sand Fencing

Reach 1-1749+65 to 1295+00 = 45,465 ft
Reach 2-1052+00 to 574+00 = 47,800 ft
Reach 3-498+00 to 91+50 = 40,650 ft

Total=133, 915 ft = 25.37 miles

Number of Panels:

Reach 1-Panels=2,312 each
Reach 2-Panels=2,414 each
Reach 3-Panels=1,640 each

Total Panels=6,366

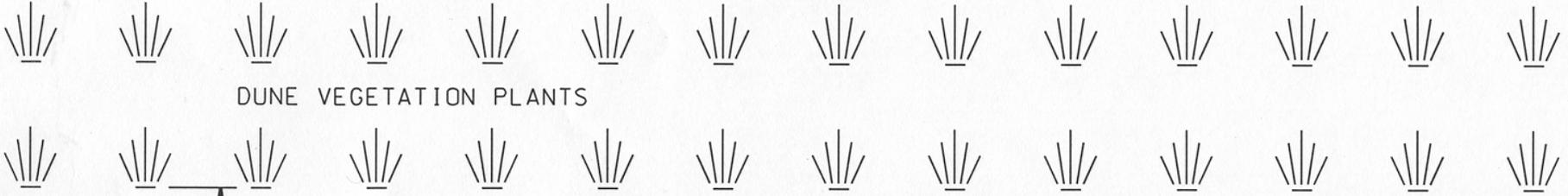
Cost of Dune Establishment-Grassing & Fencing

Reach 1-\$667,249.00 Grass/\$188,261 Fencing-97/98

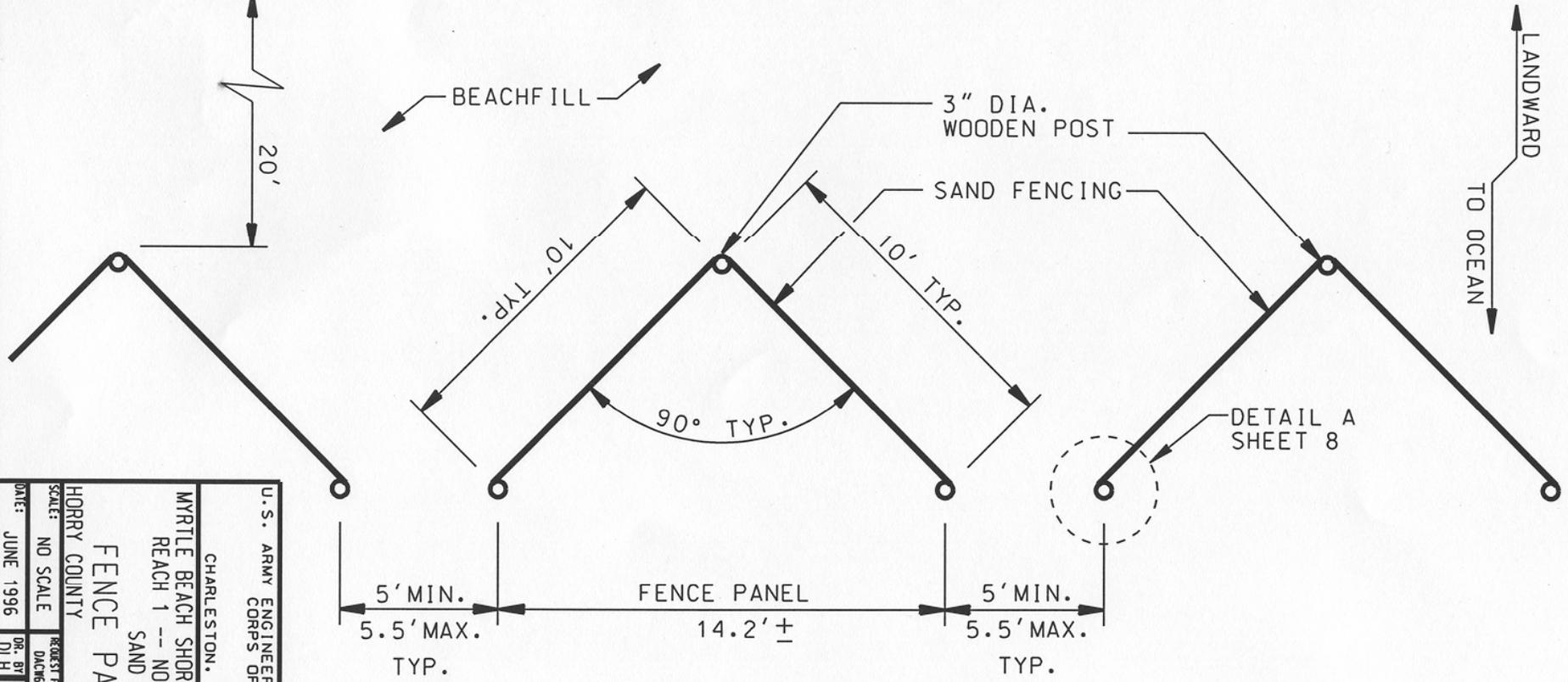
Reach 2-\$644,200 Grass/\$193,100 Fencing-98/99

Reach 3-\$423,000 Grass/Fencing 02/03

TOTAL COST=\$2,115,810.00



DUNE VEGETATION PLANTS



U.S. ARMY ENGINEER DISTRICT, CHARLESTON
 CORPS OF ENGINEERS
 CHARLESTON, SOUTH CAROLINA
 MYRTLE BEACH SHORE PROTECTION PROJECT
 REACH 1 -- NORTH MYRTLE BEACH
 SAND FENCING
 FENCE PANEL PLAN
 HORRY COUNTY SOUTH CAROLINA
 NO SCALE
 REQUEST FOR QUOTATIONS NO. DACW60-96-R-0005
 DATE: JUNE 1996
 DR. BY DLH
 CX. BY TMS
 SHEET 7 OF 8
 mbsfemp1.dgn

NOTES:

1. DRAWING NOT TO SCALE.
2. FOR ELEVATION, PROFILE, AND DETAILS OF SAND FENCING, SEE SHEET 8.
3. FOR DETAIL OF DUNE VEGETATION, SEE SHEET 5.



NOTES:

- Contractor shall insure plant stock meets accession number and scientific name.
- Plants' root system shall be soaked in water for 30 minutes before planting.
- A 6 foot wide path shall not be planted in front of all walkovers (public or private).
- Plants shall not be planted under piers and walkovers.
- In Reach 2, all vehicles other than mechanical planting equipment shall stay on beach side of sand fencing during planting & fertilizing.
- A 30 foot wide path shall not be planted where Emergency Accesses exist. (Approximately 10 ea.)
- Plant matrix rows will be reduced where buildings protrude into planting area as mutually agreed to in the field.
- Contractor warrants survival of plants as specified in Note 4 of Modification P00001.

SPACING NOTES:

STA. 574+22 (29th AVE. S.) TO STA. 828+00 (32nd AVE. N.)
 SPACING-MINIMUM 12 FT. WIDE BETWEEN FENCE AND 1ST. ROW OF PLANTING MATRIX. PLANT ROWS 1 THRU 23 OF PLANT MATRIX.

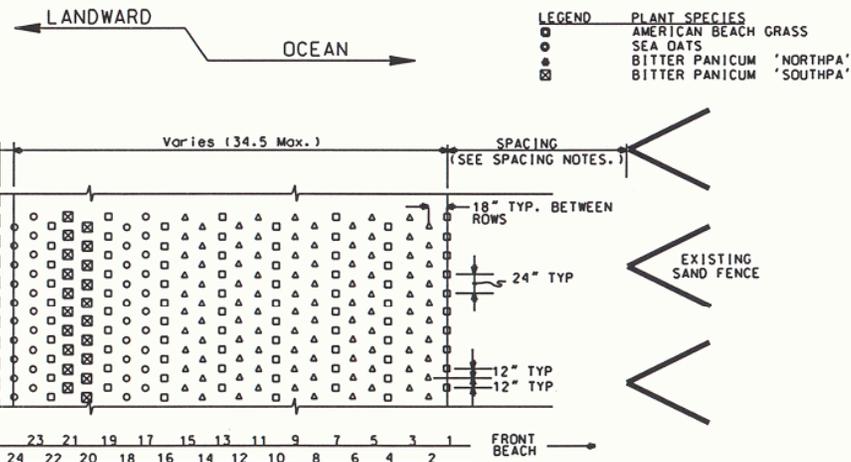
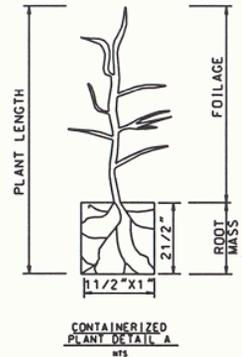
STA. 828+00 (32nd AVE N.) TO STA. 915+00 (SC 73 HIGHWAY)
 SPACING-MAXIMUM POSSIBLE SPACING BETWEEN FENCE AND ROW 1 ALLOWING FULL 24 ROW MATRIX TO BE INSTALLED, BUT NOT MORE THAN 10 FT.

STA. 915+00 (SC 73 HIGHWAY) TO STA. 1052+00 (82nd AVE. NORTH)
 SPACING-MAXIMUM SPACING 1 FT. WIDE BETWEEN FENCE AND 1ST. ROW OF PLANTING MATRIX. PLANT ROWS 1 THRU 24 OF THE PLANT MATRIX.

REVISIONS		
NO.	DESCRIPTION	DATE

PLANT REQUIREMENT SCHEDULE

Botanical Name	Common Name	Accession Number	Required Planting Dates	Planting Specifications	Fertilization
<i>Ammophila breviligulata</i> 'Cape'	American Beachgrass 'Cape'	Pi 421130	1 NOVEMBER THRU 7 APRIL	Plants shall be bare rooted and 16" - 24" in length. Plant 6" - 8" deep. Use 3 plants per hole. See Plant Detail B. See Planting Detail for spacing.	FERTILIZER: 16-4-8 GRANULAR OR PELLITIZED FERTILIZER SHALL BE BROADCAST AT A RATE OF 300 POUNDS PER ACRE FOR EACH APPLICATION.
<i>Uniola paniculata</i>	Sea Oats	N/A	1 March THRU 7 APRIL	Plants shall be containerized nursery seedlings. Individual plants shall have a root mass of no less than 1 1/2" x 1" wide and 2 1/2" deep with foliage not less than 10" long. Plant 5"-7" deep. See Planting Detail A. See Planting Detail for spacing.	APPLICATIONS: 1ST APPLICATION - APPLY AFTER THE INITIAL PLANTING BUT NOT BEFORE 1 MARCH, AND NOT LATER THAN 30 APRIL. 2ND APPLICATION - APPLY 4-6 WEEKS AFTER THE 1ST APPLICATION. 3RD APPLICATION - ONLY IN AREAS WHERE SECOND/REPLACEMENT PLANTING IS REQUIRED UNDER WARRANTY. APPLY AFTER SECOND/REPLACEMENT PLANTING BUT NOT BEFORE 1 MARCH, AND NOT LATER THAN 30 APRIL.
<i>Panicum amarum</i> 'Northpa'	Bitter Panicum	Northpa (Pi 421957)	1 March THRU 7 APRIL	Plants shall be containerized nursery seedlings. Individual plants shall have a root mass of no less than 1 1/2" x 1" wide and 2 1/2" deep with foliage not less than 10" long. Plant 5"-7" deep. See Planting Detail A. See Planting Detail for spacing.	4TH (FINAL) APPLICATION - APPLY 4-6 WEEKS AFTER THE THIRD APPLICATION. FERTILIZER SHALL BE APPLIED IN ALL AREAS THAT WERE PLANTED (INITIAL AND SECOND/REPLACEMENT PLANTING)
<i>Panicum amarum</i> 'Southpa'	Bitter Panicum	Southpa (Pi 561721)	1 March THRU 7 APRIL	Plants shall be containerized nursery seedlings. Individual plants shall have a root mass of no less than 1 1/2" x 1" wide and 2 1/2" deep with foliage not less than 10" long. Plant 5"-7" deep. See Planting Detail A. See Planting Detail for spacing.	

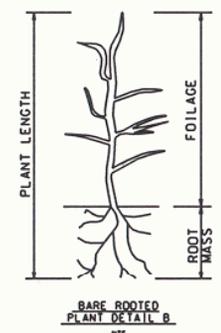


MYRTLE BEACH SHORE PROTECTION PROJECT	START STATION	END STATION
REACH 2 - MYRTLE BEACH	574+22	1052+00

PLANTING DETAIL
N.T.S.

STATION	STREET OR RAMP	NUMBER OF WALKOVERS & RAMPS	PIERS
574+22	48th AVE. S.	33	
626+51	20th AVE. S.		
626+51	20th AVE. S.	46	1
674+97	7th AVE. S.		
674+97	7th AVE. S.	40	
724+98	6th AVE. N.		
724+98	6th AVE. S.	54	1
775+29	19th AVE. N.		
775+29	19th AVE. N.	58	
835+06	34th AVE. N.		
835+06	34th AVE. N.	60	
894+97	50th AVE. N.		
894+97	50th AVE. N.		
945+01	Hobbsville Cir.		45
945+01	Hobbsville Cir.		45
995+83	72nd AVE. N.		
995+83	72nd AVE. N.	29	
1035+29	82nd AVE. N.		
1035+29	82nd AVE. N.		1
1052+00	82nd AVE. N.		

Public Accesses = 81
Emergency Accesses = 10



REVIEWED 8 SEPTEMBER 1998 BY TMS

U.S. ARMY ENGINEER DISTRICT, CHARLESTON
 CORPS OF ENGINEERS
 CHARLESTON, SOUTH CAROLINA

MYRTLE BEACH SHORE PROTECTION PROJECT
 SAND FENCING AND DUNE VEGETATION
 REACH 2
 DUNE VEGETATION
 NOTES AND DETAILS
 MODIFICATION NO. P00002

HORRY COUNTY SOUTH CAROLINA

SCALE: NO SCALE CONTRACT NUMBER: DACW40-98-C-0003 SHEET 54 OF 6
 DATE: AUGUST 1998 THIS DRAWING IS THE PROPERTY OF THE U.S. ARMY ENGINEER DISTRICT, CHARLESTON, SOUTH CAROLINA

Earth Balance Nursery

North Port, FL



**Beach
before
planting**





Layout



The new way of planting



Last, but not least - WATERING



North MYRTLE BEACH



Reach 1









This is...

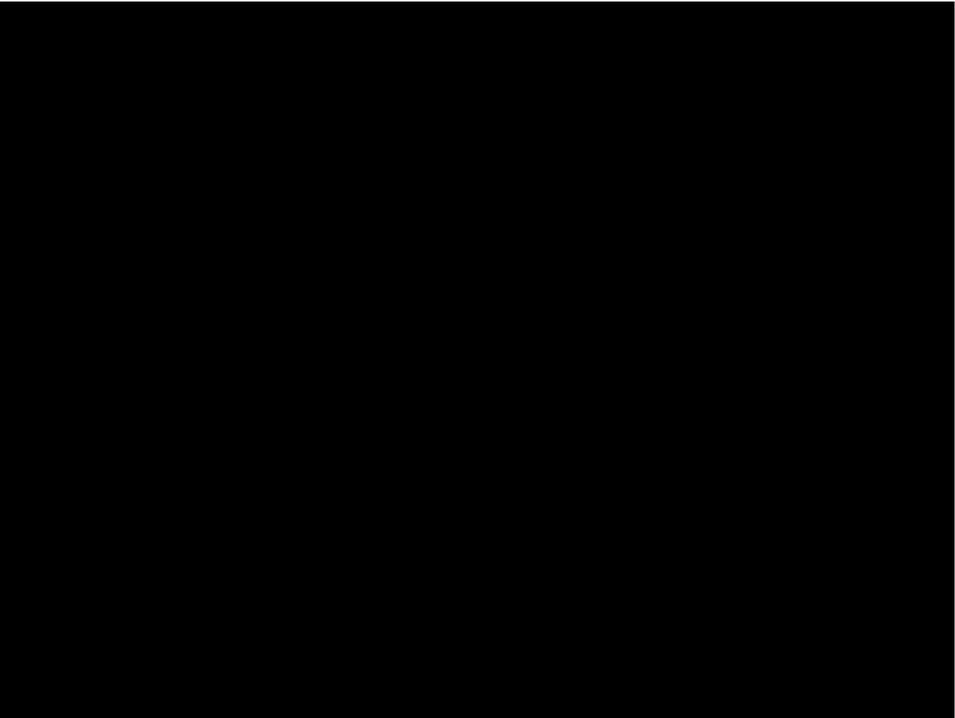
Myrtle Beach
Reach 2







Reach 3



2003 WINTER PLANTING



AUGUST 2003 6 MONTHS FROM TIME OF PLANTING





Find the Fence



Garden City 2005



PAWLEYS ISLAND MAY 1995



Winter of 1996



PAWLEYS ISLAND 2003



Short on Sweetgrass



Elizabeth Bennett makes a sweetgrass basket in her home in New York City.

MIC SMITH/STAFF