

NPDES Phase II Stormwater Program for Small Separate Municipal Stormwater Systems (MS4s)

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CWSEC Goal

Develop and implement effective, outcomes-based *stormwater education and outreach programs* that meet federal requirements and satisfy local environmental and economic needs.



Education Providers



- Coastal Carolina University's Waccamaw Watershed Academy
- North Inlet-Winyah Bay National Estuarine Research Reserve's Coastal Training Program
- South Carolina Sea Grant Consortium Extension Program
- Clemson University Extension Service (Carolina Clear)
- Waccamaw Riverkeeper™
- Murrells Inlet 2007



Point Source Pollution



Nonpoint Source Pollution



Regulatory Driving Force: Federal Clean Water Act

National Pollution Discharge Elimination System (NPDES) Permit Program

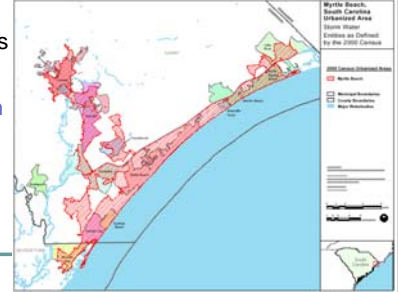
- Point Sources
- Nonpoint Sources
 - Phase I Stormwater Program
 - 1990
 - >100,000
 - Phase II Stormwater Program
 - 2003
 - "Certain" Small MS-4 communities
 - Construction activities permit threshold lowered from 2 down to 1 acre
 - Less than 1 acre on a case-by-case basis
 - Single-family lots no longer exempt

Municipal Separate Storm Sewer Systems



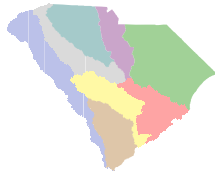
Small MS-4 Communities of the Grand Strand

- Horry County
 - North Myrtle Beach
 - Atlantic Beach
 - Briarcliffe Acres
 - Myrtle Beach
 - Surfside Beach
 - Conway
 - Georgetown County
- CWSEC Members**



Goals

- Protect water quality
- Reduce pollutant discharge to *maximum extent practicable*
- Satisfy Clean Water Act requirements



Six Minimum Measures

1. Public *education* and outreach on stormwater impacts
2. Public *involvement*/participation
3. *Illicit discharge* detection and elimination
4. *Construction* site stormwater runoff control
5. *Post-construction* stormwater management in new development and redevelopment
6. Pollution *prevention/good housekeeping* for municipal operations (*you are the role model*)



Official Start Date

- March 1, 2006
- 18 months
 - Construction-Site Runoff Control
 - Post Construction Runoff Control
- 5 years
 - Other minimum measures

Stormwater Ordinance
Stormwater Design Manual
Erosion Control Ordinance
Land-Development Regulations



Iterative Perspective

- First 5 years: Set up
 - Stormwater Ordinance
 - Support Staff
 - Funding Mechanism
- Second 5 years
 - Start to see improved water quality
- Third 5 years
 - Stable, productive program

PERMIT BECOMES MORE RESTRICTIVE OVER TIME



Challenges

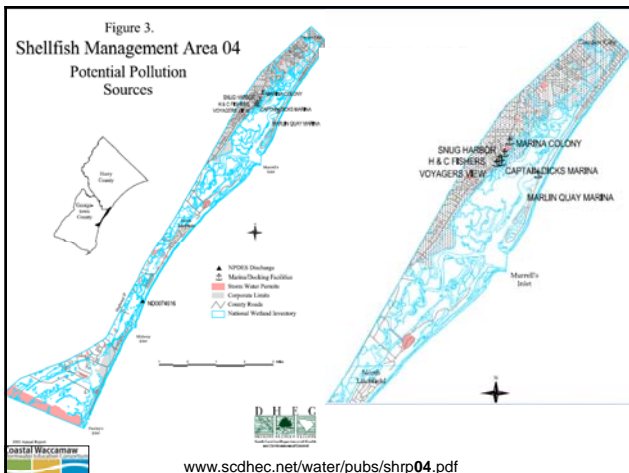
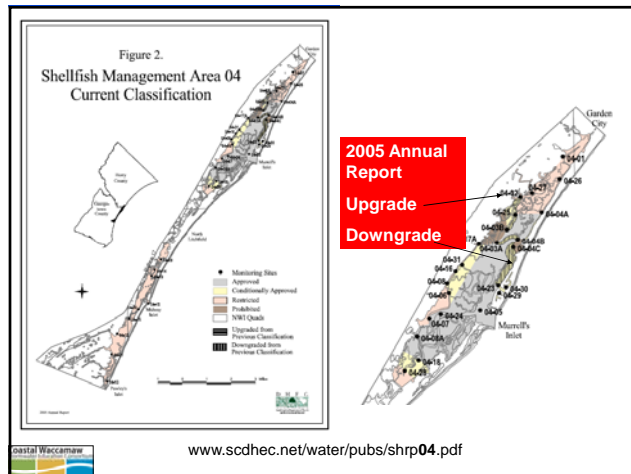
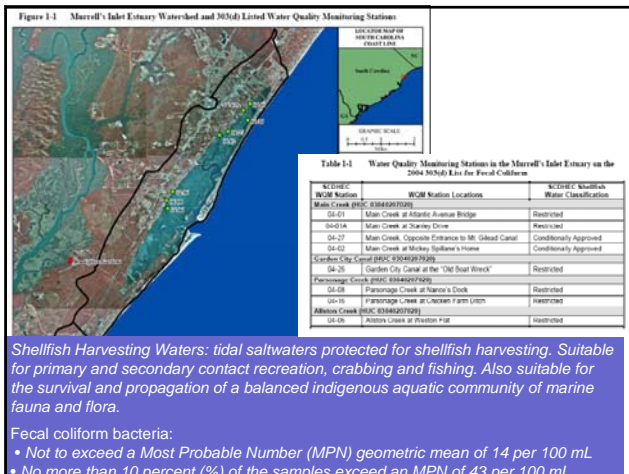
- Maintain dual focus
 - Retrofit/Restoration
 - Prevention
- Stormwater Management Plan
 - *Maximum Extent Practicable*
 - *Reasonable Assurance*
 - Priority to 303(d) listed sites
 - Science-based
 - Public input and comment
 - Information accessibility (website)
- Implementation
- Assessment
 - Document Pollution Reduction
 - Monitoring



Georgetown County: 2004 303(d) List

- | | |
|-----------------------|------------------|
| ● Fecal Coliform (24) | ● pH |
| ● Murrells Inlet | ● Winyah Bay: 1 |
| ● Pawleys | ● Sampit: 2 |
| ● North Inlet | ● Turbidity |
| ● Winyah Bay | ● Minim Creek: 1 |
| ● Santee | ● Black River: 1 |
| ● Mercury | ● Copper |
| ● Pee Dee Rivers: 2 | ● Sampit: 1 |
| ● Black River: 7 | |
| ● Santee: 2 | |
| ● Sampit: 1 | |





TOTAL MAXIMUM DAILY LOADS FOR FECAL COLIFORM IN SHELLFISH WATERS OF THE MURRELL'S INLET ESTUARY, SOUTH CAROLINA

HYDROLOGIC UNIT CODE: 03040207
(STATIONS 04-01, 04-01A, 04-02, 04-06, 04-08, 04-16, 04-26, 04-27)

Murrell's Inlet

- Saltwater, tidally-dominated
- Meandering creeks
- Tidal deltas
- Intertidal mudflats
- Intertidal oyster reefs
- High marshes
- Garden City to Huntington Beach State Park
- 3,108 acres
- Represents 71% of habitat suitable for shellfish production within MA 04.
- **Most economically important shellfish-producing area along the northern coast of South Carolina** (SCDHEC 2003b).

Prepared for:
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 4,
ATLANTA, GEORGIA
AND
THE SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL, SURFACE WATER BUREAU

CONTRACT 68-C-02-111

Prepared by:
QUANTITATIVE ENVIRONMENTAL ANALYSIS, LLC

APRIL 2005 <http://www.epa.gov/region4/water/tmdl/southcarolina/index.htm>

Non Point Sources

- **Septic Tanks**
 - Three small areas bordering Main Creek not currently served by central sewer.
 - 119 active septic systems (of 1869 visited). Only two malfunctioning.
- **Wild and domestic animal populations**
 - Pets (no)
 - Approximately 273 cats and 240 dogs.
 - Wildlife (may)
 - Brookgreen and Huntington Beach State Park
 - Deer, Shorebirds, Racoons, Opposum, Rabbits, Rodents, Songbirds, Migratory Waterfowl
- **Boat traffic**
 - Multiple Antibiotic Resistance Testing – non-human source
- **Urban and suburban stormwater runoff**
 - Channeled into creeks
 - Increased development = increasing load



Load Reductions

Table 5-1 TMDL Summary for Impaired Watersheds within Murrell's Inlet

TMDL ¹ (counts/day)	WLAs (counts/day)	MS4 WLA ² (% Reduction)	LA ² (% Reduction)	Explicit MOS	Percent Reduction Model ³ Distribution ⁴	
3.6x10 ¹¹	N/A	80.4%	80.4%	5%	80.4%	76.5%
Parsonage Creek/Allston Creek (Impaired Stations 04-08, 04-16 and 04-06)						
3.0x10 ¹⁰	N/A	N/A	81.4%	5%	53.5%	81.4%
Garden City Canal (Impaired Station 04-26)						
4.4x10 ¹⁰	N/A	N/A	71.4%	5%	0.0%	71.4%

NA – not applicable

1 – Represents the TMDL estimated as the product of the critical flow conditions (i.e., 10th percentile tidal flow) and the geometric mean standard (minus the MOS). This value cannot be directly compared to the existing load to derive the percent reductions because the percent reductions are based upon the statistical distribution of the fecal coliform levels under critical conditions that meet the geometric mean standard.

2 – The more stringent of the two percent reductions (i.e., model vs. distribution) applied to both MS4 WLA and LA components of TMDL.

3 – The percent reduction needed to achieve the geometric mean standard at all stations within the impaired system. This value is based on the fecal coliform levels predicted by the model and, thus, will deviate from the measured in-stream values due to the simplifying assumptions made during model calibration.

4 – The average percent reduction (computed from station-specific percent reductions) needed to achieve the not to exceed 10% standard.



Monitoring

5.1 Monitoring

The Department **will monitor** the quantity of, and the concentration of pollutants in, storm water **discharges** from the areas and/or locations designated in the County's SWMP and will monitor impact to **receiving water**. The Department will establish a water quality monitoring **plan** for its jurisdictional area to be in compliance with its NPDES permit for storm water discharges. This monitoring plan will address at a minimum the appropriate measures as outlined in the County's Phase II SWMP (when developed).

Draft, Georgetown County Stormwater Ordinance



Monitoring

- You can't monitor everything, all the time, everywhere.
- Develop prioritized monitoring plan
- Target highest priority issues
 - 303(d) listed sites
 - Biggest use impairments
- Partnering with other MS4 communities
 - Watershed Approach



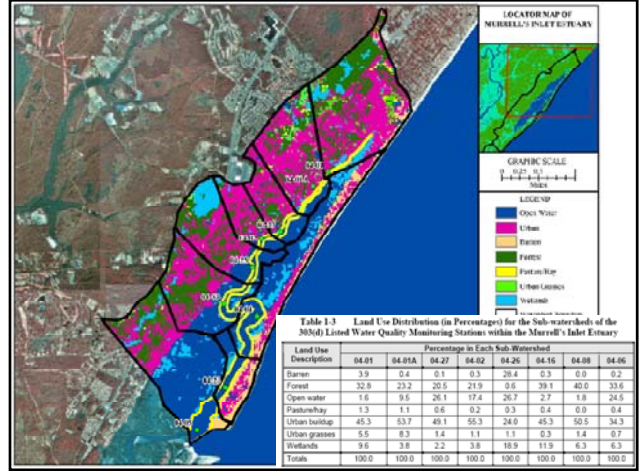


Table 2-1 Summary of Fecal Coliform Data (September 2001 - August 2004) for the 303(d) Listed Stations within the Murrell's Inlet Estuary

WOM Station	Number of Measurements	Geometric Mean	Samples >43/100 mL		Listing Cause	
			Number	Percent	Violates Geo. Mean Standard	Violates > 10% Standard
Main Creek (HUC 03040207020)						
04-01	36	42.9	19	53%	Yes	Yes
04-01A	17	30.6	7	41%	Yes	Yes
04-02	45	7.5	6	13%	No	Yes
04-27	38	13.4	8	22%	No	Yes
Allston Creek (HUC 03040207020)						
04-06	50	8.7	12	24%	No	Yes
Parsonage Creek (HUC 03040207020)						
04-08	36	24.4	15	42%	Yes	Yes
04-16	35	72.7	19	54%	Yes	Yes
Garden City Canal (HUC 03040207020)						
04-26	48	14.7	12	25%	Yes	Yes

Load Estimates

Table 4-3 Estimated Average Existing Fecal Coliform Loadings to the Impaired Systems by Source Area (September 2001 to August 2004)

Impaired System	Average Existing Loadings By Source Area (counts/day)		
	Nonpoint Sources	Septic Systems	Total Loading
Main Creek	1.5x10 ¹²	1.4x10 ¹²	1.5x10 ¹²
Parsonage Creek/ Allston Creek	3.4x10 ¹¹	0	3.4x10 ¹¹
Garden City Canal	1.1x10 ¹¹	0	1.1x10 ¹¹

Table 4-1 Water Quality Monitoring Stations in the Murrell's Inlet Estuary as the 303(d) Listed for Fecal Coliform

WOM Station	WQM Station Location	WQM Station	WQM Station
04-01	Main Creek at Shivers Avenue Bridge	04-01	Main Creek at Shivers Avenue Bridge
04-01A	Main Creek at Shivers Drive	04-01A	Main Creek at Shivers Drive
04-02	Main Creek at Shivers Farm Road at Old Church Road	04-02	Main Creek at Shivers Farm Road at Old Church Road
04-06	Garden City Canal at the Old Boat Ramp	04-06	Garden City Canal at the Old Boat Ramp
04-08	Parsonage Creek at Shivers Drive	04-08	Parsonage Creek at Shivers Drive
04-16	Parsonage Creek at Choker Farm Drive	04-16	Parsonage Creek at Choker Farm Drive
04-26	Allston Creek at Shivers Farm	04-26	Allston Creek at Shivers Farm

Main Creek: 01, 01A, 02, 27
 Garden City Canal: 26
 Parsonage and Allston Creeks: 6, 8, 16