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Shellfish Management Area 03 2006 Annual Update

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2008 ANNUAL UPDATE
Shellfish Management Area 03
SCDHEC EQC Bureau of Water

Data Inclusive Dates:
01 / 01 / 05 thru 12 / 31 / 07

Classification Change:
 Yes X No

Shoreline Survey Completed: YES

(I)ncreased/(D)ecreased/(N)one:

Prior Report & Date: Annual-2007

 N Approved
 N Cond. Approved
 N Restricted
 N Prohibited

SUMMARY

The shoreline reconnaissance and bacteriological data review for Shellfish Management Area 03 indicate that the current Restricted classification is appropriate. The area is adversely affected by storm water runoff from various nonpoint sources. Both estuaries serve as major drainage basin outlets for the City of Myrtle Beach. Depuration harvest activities will not be permitted within this area.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47, which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted, or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved Area - Growing areas shall be classified approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations that would render shellfish unsafe for human consumption. Approved classifications shall be determined upon a sanitary survey that includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, nor shall more than ten percent of the samples exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform MPN shall not exceed fourteen per one hundred milliliters, nor shall the estimated ninetieth percentile exceed an MPN of forty three per one hundred milliliters (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be determined using National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish methodology.

Conditionally Approved Area - Growing areas may be classified conditionally approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in non-point source pollution from rainfall runoff or discharge of a major river, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as conditionally approved. Where appropriate, the management plan for each conditionally approved area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems), evaluation of each source of pollution, and means of rapidly closing and subsequently reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish shall not be directly marketed from a conditionally approved area until conditions for an approved classification have been met for a period of time likely to ensure the shellfish are safe for consumption. Shellstock from conditionally approved areas that have been subjected to temporary conditions of actual or potential pollution may be relayed to approved areas for purification or depuration through controlled purification operations only by special permit issued by the Department.

Restricted Area - Growing areas shall be classified restricted when sanitary survey data show a moderate degree of pollution or the presence of deleterious or poisonous substances to a degree that may cause the water quality to fluctuate unpredictably or at such a frequency that a conditionally approved classification is not feasible. Shellfish may be harvested from areas classified as restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. The suitability of restricted areas for harvesting of shellstock for relay or depuration purposes may be determined through the use of comparison studies of background tissue samples with post-process tissue samples, as well as other process verification techniques deemed appropriate by the Department. For restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one

hundred milliliters nor shall more than ten percent of the samples exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters nor shall the estimated ninetieth percentile exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish methodology.

Conditionally Restricted Area - Growing areas may be classified conditionally restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as conditionally restricted. Where appropriate, the management plan for each conditionally restricted area shall include performance standards for sources of controllable pollution, e.g., wastewater treatment and collection systems and an evaluation of each source of pollution, and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as conditionally restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For conditionally restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of conditionally restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters nor shall more than ten percent of the samples exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters nor shall the estimated ninetieth percentile exceed an MPN of two hundred and sixty per one hundred milliliters (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish methodology.

Prohibited Area - Growing areas shall be classified prohibited if there is no current sanitary survey report or if the sanitary survey report or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or otherwise indicate that such substances could potentially reach quantities that could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

Shellfish Management Area 03(Area 03) includes two separate estuaries that serve as major storm water drainage outlets for the City of Myrtle Beach. Withers Swash is located between 3rd and 5th Avenues South and extends a distance of several hundred yards to the west of U. S. Highway 17. Midway Swash is located near 29th Avenue South. Its small, meandering channel is easily discernable from the ocean outlet to the Myrtle Beach Jetport property. Total combined area for the two drainage areas is approximately 14.4 acres.

The harvesting classifications of Area 03 prior to this sanitary survey were as follows:

Prohibited: None

Restricted:

- 1) All waters of Withers Swash
- 2) All waters of Midway Swash

Conditionally Approved: None

Approved: None

The shellfish industry in South Carolina is based primarily on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams, which include both the northern clam (*Mercenaria mercenaria*) and several small populations of the southern clam (*Mercenaria campechiensis*). The South Carolina Department of Health and Environmental Control currently disallows harvesting of oysters and clams within Area 03 for direct marketing purposes. No relay projects have been permitted during the past three-year review period.

Shellfish harvesting season in South Carolina normally extends from September 16 through May 15. The South Carolina Department of Natural Resources (SCDNR) has the authority to alter the shellfish-harvesting season for resource management purposes and grant permits for year-round mariculture operations. Additionally, the South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

SURVEY PROCEDURES

The Region 6 Shellfish Sanitation Section conducted a Shoreline survey of Area 03 in 2004.

POINT SOURCE POLLUTION

- A. Municipal and Community Waste Treatment Facilities** - The majority of the City of Myrtle Beach has central sewer and is serviced by the City of Myrtle Beach. Discharge of effluent from their facilities is to the Atlantic Intracoastal Waterway (Waccamaw River) and does not affect Area 03 shellfish growing waters.
- B. Industrial Waste** - NPDES discharge sites are indicated on the Potential Pollution Sources map. These are groundwater remediation sites, which are located on the site of the former Myrtle Beach Air Force Base. Aircraft and automotive fuels are a prime contaminant, as are chlorinated solvents (cleaners, degreasers, etc.). Three of the five sites ultimately discharge

to the Atlantic Ocean via Midway Inlet. Additionally, chlorinated solvent contaminated groundwater has been documented near the AVX Corporation facility at 16th Avenue South.

- C. **Marinas** - In 2007, prompted by the Department's Office of Coastal Resource Management (OCRM) marina definition change, the Shellfish Sanitation Section incorporated the following marina definition. S.C. Regulation 61-47, Shellfish defines Marina as any of the following: (1) locked harbor facility; (2) any facility which provides fueling, pump-out, maintenance or repair services (regardless of length); (3) any facility which has effective docking space of greater than 250 linear feet or provides moorage for more than 10 boats; (4) any water area with a structure which is used for docking or otherwise mooring vessels and constructed to provide temporary or permanent docking space for more than ten boats, such as a mooring field; or (5) a dry stack facility. There are no marinas located in Area 03 due to lack of navigable channels.
- D. **Radionuclides** - Sources of radionuclides have not been identified within Area 02, and radionuclide monitoring has not been conducted.

NONPOINT SOURCE POLLUTION

- A. **Urban and Suburban Storm water Runoff** - ¹The U.S. Geological Survey (USGS), in cooperation with the City of Myrtle Beach, prepared a report concerning enteric bacteria within the Withers Swash Basin. The report, which utilized data collected between 1991 and 1993, noted high concentrations of bacteria. However, due to the sporadic nature of these concentrations, the USGS was unable to define a single source. Likely sources quoted in the report were "...septic tanks, garbage containers, and the feces of waterfowl and domestic animals." Beach water monitoring in the vicinity of the Withers Swash ocean inlet during the summers of 1998, through 2004 confirmed elevated levels of *Enterococcus sp.* following rainfall events. Efforts are underway to eliminate identifiable pollutant inputs and remediate the Withers Swash area.
- B. **Agricultural Runoff** - There are no commercial agricultural activities conducted adjacent to the waters of Area 03, and sampling for pesticides and herbicides has not been conducted.
- C. **Individual Sewage Treatment and Disposal (ISTD) Systems** - Individual sewage treatment and disposal (ISTD) systems are known to exist in the Withers Swash Basin, however, exact numbers and locations have not been documented.
- D. **Wildlife and Domestic Animals** - Wildlife in Area 03 consists primarily of birds, small mammals and rodents. These populations, in combination with domestic cats and dogs, are contributors to nonpoint source.

¹U.S. Geological Survey, Prepared in cooperation with the City of Myrtle Beach, 1995, *Water-quality in the Withers Swash Basin, with Emphasis on Enteric Bacteria, Myrtle Beach, South Carolina, 1991-1993*: Water Resources Investigations Report 95-4120, 102 p.

- E. **Boat Traffic** - The lack of navigable channels within Area 03 generally precludes watercraft use.
- F. **Marine Biotoxins** - During the winter and spring of 1988, South Carolina experienced an occurrence of "Red Tide", specifically *Karenia brevis* (*Ptychodiscus brevis*), which affected water quality in Horry and Georgetown counties' coastal waters. There has been no documented reoccurrences of this organism at levels requiring emergency response in South Carolina waters subsequent to the 1988 event. The Department participates in a State Task Group on Toxic Algae and operates a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGIC CHARACTERISTICS

PHYSIOGRAPHY

The Withers Swash system is approximately 850 meters in length from its ocean inlet to its upper reaches. Maximum width is approximately 200 meters with typical widths being less than 35 meters. Salinities during the review period ranged from 0 ppt to 32 ppt. Mean salinity for the review period was 18 ppt.

Midway Swash is approximately 450 meters in length with an average width of less than 50 meters. Salinities during the review period ranged from 0 ppt to 26 ppt. Mean salinity for the review period was 4 ppt.

TIDES - Tides along the beaches in Myrtle Beach are semidiurnal, consisting of two low and two high tides each lunar day. Mean tidal ranges are 5.06 feet during normal tides and 5.87 feet during spring tides (Tides and Currents for Windows, Version 2.2, Nautical Software Inc.).

PRECIPITATION – The 30 year mean precipitation (1971-2000) for NWS Coop Station 386153 (Myrtle Beach 2) is 45.72 inches. Heaviest rainfall typically occurs during the summer months with tropical storms and hurricanes occasionally producing extreme precipitation. The last major hurricane that affected this area was in September 1999. Hurricane Floyd caused severe flooding throughout Horry County, S. C. with a twenty-four hour total rainfall for Myrtle Beach of approximately 15 inches.

During winter months rainfall is more uniform in nature; heavy, short-term rainfall events are uncommon- yet occasional intense thunderstorms associated with rapidly moving low pressure systems may generate heavy rains. Precipitation rarely occurs in the form of snow or ice, however, low pressure systems infrequently cross Florida and become stationary just offshore of the Georgia coast. Such was the case in late December 1989. This storm system resulted in approximately 14 inches of snow along Horry County's beaches. Spring weather patterns are often extremely dynamic with associated thunderstorms and severe weather conditions.

WINDS - Prevailing winds along the northern portion of the South Carolina coast are from the southwest during spring and south/southwest during the summer. During autumn wind direction is generally from the Northeast. Winter winds fluctuate between Northeast and Southwest. Wind

speeds average less than 10 mph, however, strong weather systems may generate winds in excess of 25 mph. Tropical storms and hurricanes frequently occur.

RIVER DISCHARGES - There are no rivers in close proximity to Area 03. Freshwater input occurs via localized precipitation and resulting runoff.

CURRENTS - Currents are tidally generated, although wind speed and direction may affect current velocities. Tidal flows reverse direction approximately every six hours.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 03 in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays, and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July 1998, an updated data analysis procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station yet provides a six-sample "cushion" (above the NSSP required 30 minimum) for broken samples, lab error, breakdowns, etc. This also allows each annual report to meet the NSSP Triennial Review sampling criteria.

Seventy-two surface water quality samples (<1.0 ft. deep) were collected for bacteriological analyses and classification purposes from two active water quality sampling stations in Area 03 during the period 01/01/05 through 12/31/07. The samples were collected in 120ml amber glass bottles, immediately placed on ice and transported by bus to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. Upon receipt at the laboratory, sample sets that exceeded a 30-hour holding time or contained a temperature control greater than 10 degrees C. were discarded. Samples collected after September 1, 1986 have been analyzed using the five-tube/three dilution modified A-1 method described by Nuefeld (1985)².

² Nuefeld, N. 1985. Procedures for the bacteriological examination of seawater and shellfish. In: A.E. Greenberg and D.A. Hunt (eds.) Laboratory procedures for the examination of seawater and shellfish, Fifth Edition. American Public Health Association, Washington, D.C. p. 37-63.

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using automatic temperature compensated refractometers. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined Nautical Software's Tides and Currents, Version 2.2 (1996).

Both shellfish water quality fecal coliform MPN/100 ml geometric means exceeded a value of 88. Additionally, both stations exceeded an estimated 90th percentile fecal coliform MPN/100 ml. value of 260.

CONCLUSIONS

Withers Swash and Midway Swash serve as ocean outlets for two of the City of Myrtle Beaches major drainage basins. Although the majority of the city is on municipal sewer service, septic systems are known to exist. Nonpoint source runoff from varied pollution sources is the prime contributor to elevated fecal coliform bacteriological levels in the area. Chlorinated solvent contaminated groundwater has been documented in southern portions of the City of Myrtle Beach.

RECOMMENDATIONS

The shoreline reconnaissance and bacteriological data review of shellfish growing Area 03 indicate that the current Restricted classification is appropriate. Due to the excessive estimated 90th percentile values, no depuration activities should be allowed. The harvesting classifications of Area 03 are recommended to remain as follows:

Prohibited: None.

Restricted:

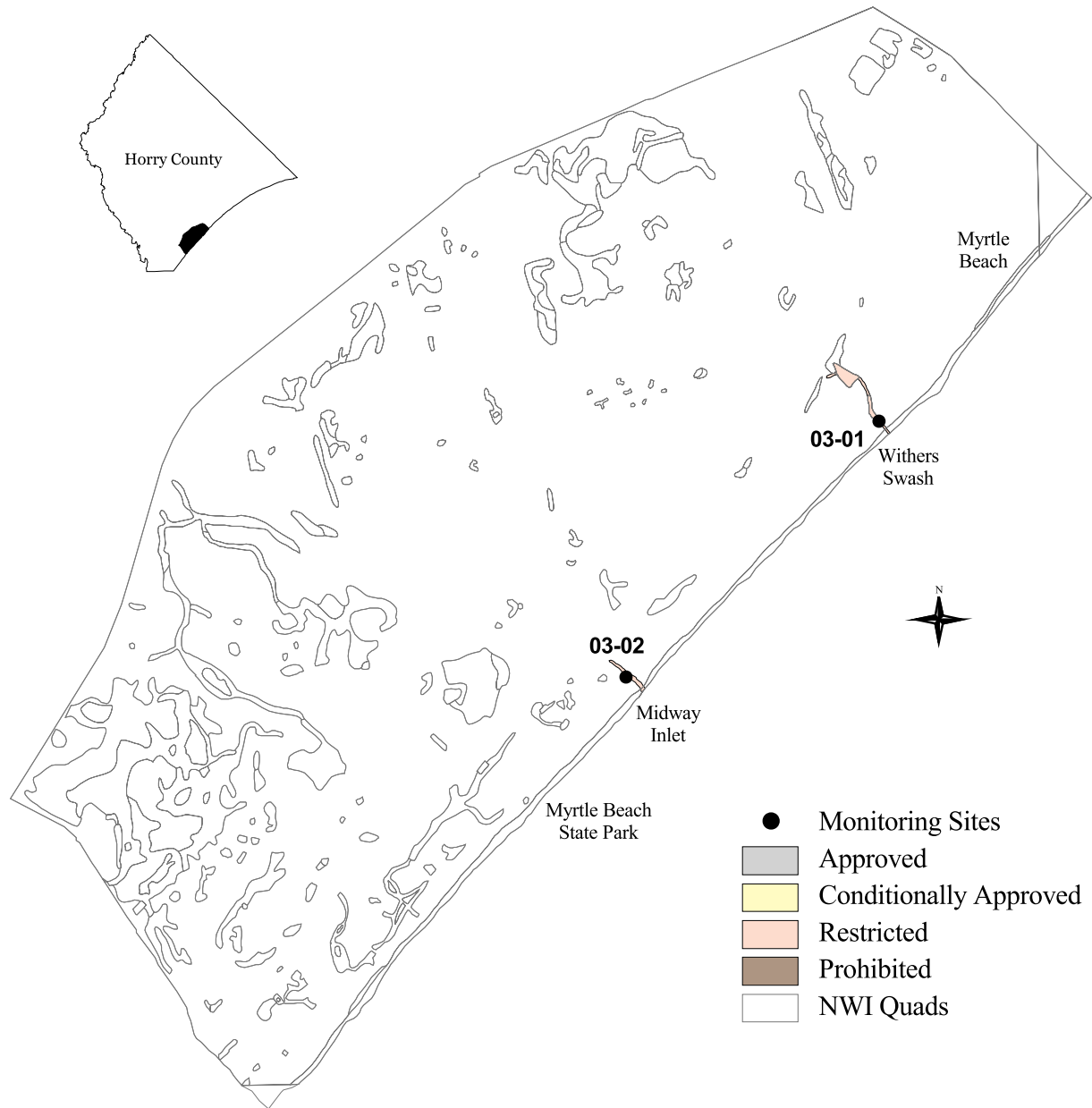
- 1) All waters of Withers Swash; and
- 2) All waters of Midway Swash;

Approved: None.

Approved: None.

Station Addition/Deactivation/Modification: None

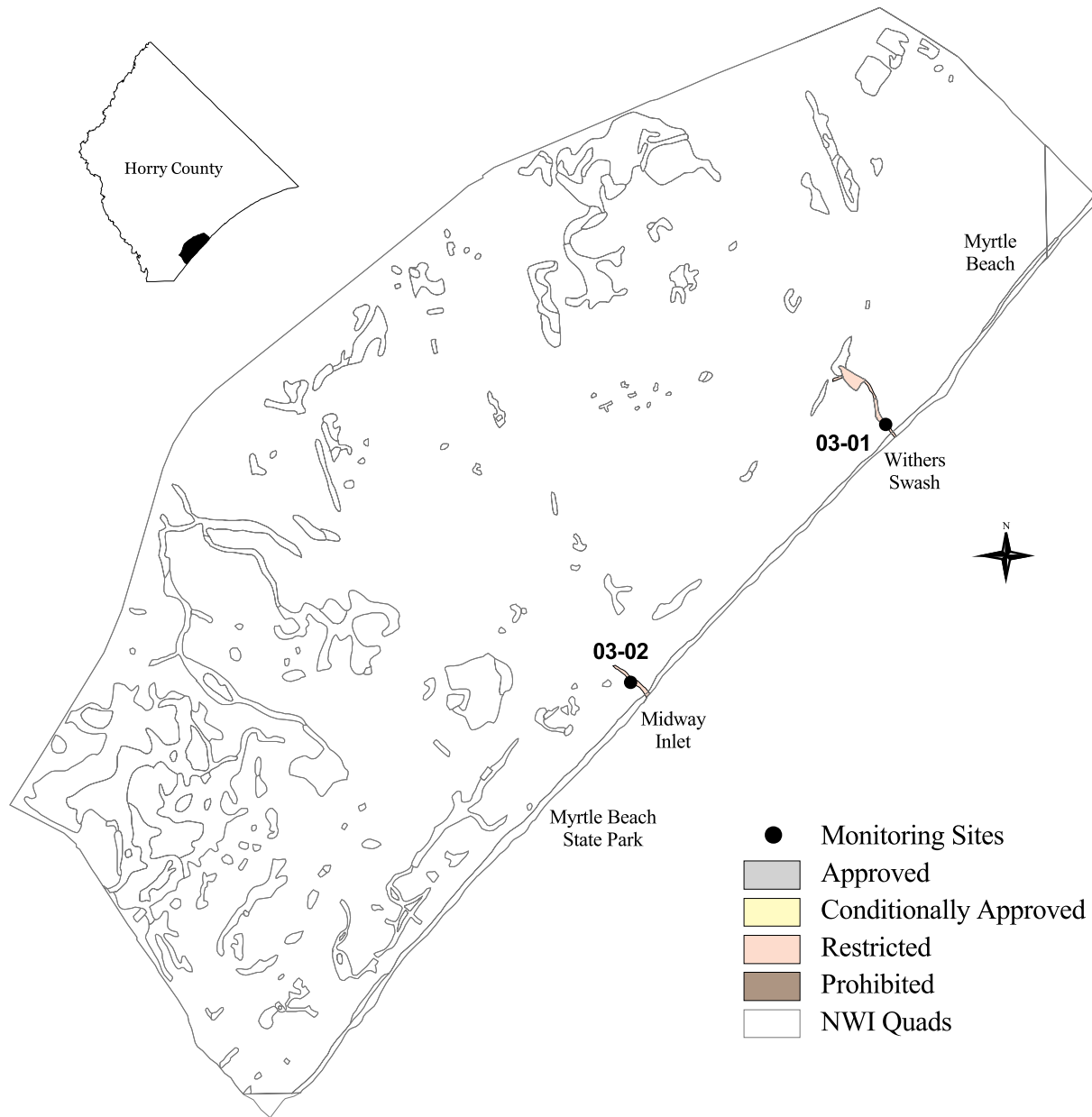
Figure 1. Shellfish Management Area 03 Prior Classification



- Monitoring Sites
- Approved
- Conditionally Approved
- Restricted
- Prohibited
- NWI Quads



Figure 2. Shellfish Management Area 03 Current Classification



- Monitoring Sites
- Approved
- Conditionally Approved
- Restricted
- Prohibited
- NWI Quads

0.5 0 0.5 1 Miles



Figure 3. Shellfish Management Area 03 Potential Pollution Sources

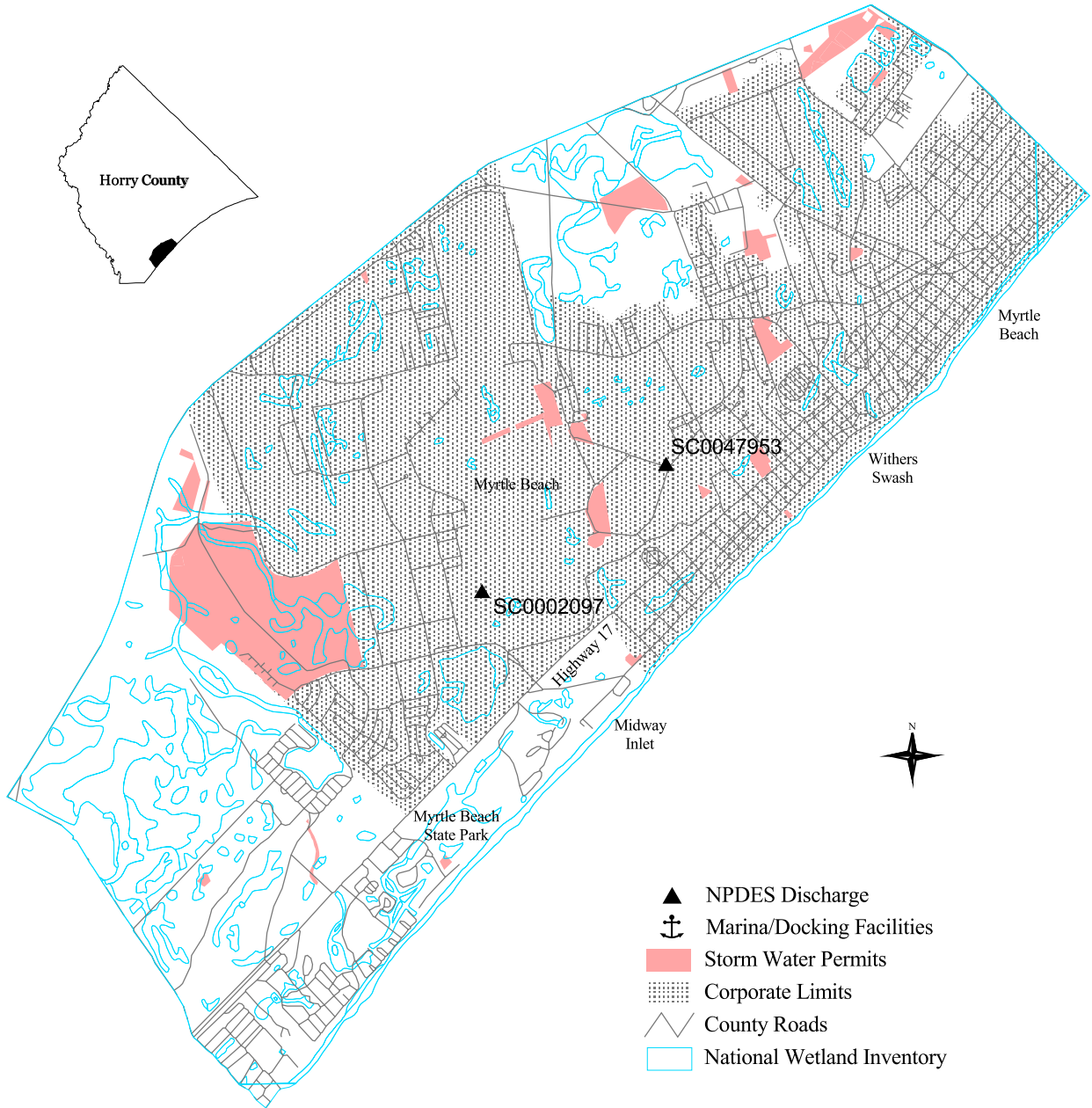


Table #3

**WATER QUALITY
SAMPLING STATION DATA**

Detailed data for each shellfish monitoring station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports can be obtained by writing South Carolina's Department of Health and Environmental Control – Freedom of Information Office at the address below.

Freedom of Information
SC Dept. of Health & Environmental Control
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.