South Carolina Department of Health and Environmental Control

ENVIRONMENTAL AFFAIRS

SHELLFISH MANAGEMENT AREA 19

2023 ANNUAL UPDATE

Shellfish Sanitation Section
Environmental Affairs
2600 Bull Street
Columbia, SC 29201

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SHELLFISH MANAGEMENT AREA 19
2023 ANNUAL UPDATE

[Data Through December 2022]

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Data Inclusive Dates:
01/01/20 thru 12/31/2022

Classification Change:
___Yes _X_ No

Shoreline Survey Completed: Yes

Prior Report & Date: 2022 Annual Update

(I)ncreased/(D)ecreased/(N)one:
_N_ Approved
_N_ Conditionally Approved
_N_ Restricted
_N_ Prohibited

SUMMARY

Bacteriological water quality data in Shellfish Management Area 19 (SFMA 19) exhibits very similar conditions as reported in the 2022 Annual Update. There are no classification changes recommended in this management area for the upcoming 2023-2024 shellfish harvesting season. In the May River Station 19-24 (May River at Southern end of Crane Island) will continue to be a boundary station for the upcoming harvesting season. Bacteriological water quality and shoreline survey data indicate that SFMA 19 is properly classified.

Rainfall and associated runoff continue to strongly influence water quality within portions of SFMA 19. SFMA 19 was impacted by two (2) sanitary sewer overflows (SSOs) during this review period and was closed for harvesting in those areas for 21 days.

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 (SCDHEC) 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 the 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 depurated 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 the 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 the 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 19 consists of approximately 28,609 acres of shellfish growing area habitat in Beaufort and Jasper Counties. Nearly 480 acres are classified as prohibited. It is comprised of the May, Cooper, New and Wright Rivers and their tributaries including Bull Creek and Ramshorn Creek.

The area's northern boundary begins at Highway 170 near the intersection of Highway 46 and Highway 170. It continues along Highway 278 to the western shore of Mackay Creek. The eastern boundary is defined by the shoreline of Calibogue Sound to the confluence of the

Savannah River. The Savannah River defines the southern boundary. The western boundary begins near Station 19-20 in the Wright River and Station 19-21 in the New River and ends at the intersection of Highways 46 and 170.

The Atlantic Intracoastal Waterway (AIWW) runs through SFMA 19 between the Cooper River and Savannah River. Residential development in SFMA 19 is centered around Highway 278, the Bluffton area, and on Daufuskie Island, which is accessible only by boat. The majority of the shellfish resources and harvesting activity is located around the May River area.

The shellfish industry in South Carolina is based mainly on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams (*Mercenaria sp.*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include State Shellfish Grounds, Culture Permits, and Kings Grant areas.

There are four shellfish culture permit areas in SFMA 19. They are as follows: C002, C004, C009, and C057. There is one mariculture permit area, M009. There are 3 Kings Grant areas in SFMA 19: G001, G005, G006. The general public is allowed to harvest on three state shellfish grounds in SFMA 19. State Shellfish Ground S003 is located on Turtle Island, S005 is located on Haig Point, and S007 is in Bull Creek. Recreational harvesting is allowed for clams and oysters in all approved areas, and commercial harvesting by licensed individuals is allowed, subject to seasons established by SCDNR. Recreational harvesting only is allowed on the Bull Creek/May River Public Shellfish Ground (R008).

The shellfish harvesting season in South Carolina typically extends from October 1 through May 31. 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.

In 2009, Station 19-19, located in the headwaters of the May River at the first dock past Palmetto Bluff, appeared to be in a state of decline. Beginning in 2010, new monitoring stations were established to better assess water quality along portions of the May River extending from the upper most headwaters seaward through Station 19-19 and continuing to Station 19-24, located in the May River at the southern end of Crane Island.

The harvesting classifications of SFMA 19 **prior** to this sanitary survey were as follows:

PROHIBITED

1. Freeport Marina (Cooper River), closure zone of 1,000 feet around marina.
2. Melrose Landing (Cooper River), closure zone of 1,000 feet around marina.
3. Savannah River, all waters in South Carolina portion.
4. Field's Cut, from its confluence with the Savannah River to its confluence with the Wright River at Station 19-22.
5. New River, closure zone of 1,000 feet around site of future marina.

RESTRICTED

1. Portions of the May River, from the headwaters, including Rose Dhu and Stoney Creeks, to Station 19-24.
2. New River from Station 19-02A, near the confluence of the Cooper River, continuing upstream to the boundary of SFMA 19, excluding the Prohibited zone for a future marina.

CONDITIONALLY APPROVED

None

APPROVED

1. May River, from sample station 19-24 continuing downstream to its confluence at the Calibogue Sound.
2. Bull Creek, entire waterbody.
3. Savage Creek, entire waterbody.
4. Cooper River, from its confluence with the Calibogue Sound to its confluence with the New River, excluding the Prohibited closures zones.
5. Ramshorn Creek, entire waterbody.
6. Mulligan Creek, entire waterbody.
7. New River, from its confluence with the Atlantic Ocean to Station 19-02A, near the confluence of the Cooper River.
8. Wright River, from its confluence with the Atlantic Ocean to the boundary of SFMA 19.

Station Addition/Re/Deactivation/Modification: None

POLLUTION SOURCE SURVEY

SURVEY PROCEDURES

The South Carolina Department of Health and Environmental Control, Environmental Affairs, Lowcountry – Beaufort, Shellfish Sanitation Staff, routinely conducts shoreline survey activities in SFMA 19. Extensive visual examination of lands adjacent to the waters of SFMA 19 was conducted to determine type of activities, location of significant concentrations of domestic animals and other actual and potential sources of pollution entering shellfish growing waters.

POINT SOURCE POLLUTION

A. Municipal and Community Waste Treatment Facilities - There are no direct discharges of wastewater into the waters of SFMA 19. Treated effluent from the area's wastewater treatment plants is typically used for spray irrigation on golf courses. The Beaufort Jasper Water & Sewer Authority/Palmetto Bluff WWTP is a 0.20 mg/d facility consisting of a Hycor fine screen, aerated pond, chlorination, and effluent holding pond. The Palmetto Bluff WWTP discharges treated effluent to a dedicated 86-acre golf course and a 167-acre all weather disposal site as a backup site. Because the disposal sites are adjacent to shellfish waters, the permit's fecal coliform bacteria limits are a monthly average of 14/100 ml and a daily maximum of 43/100 ml.

Sanitary Sewer Overflows				
Beaufort Jasper Water Sewer Authority (2020-2022)				
Date	**Location**	**Gallons**	**Water Body Entered**	**Comments**
10/26/2020	Pump Station BR03 Bluffton, SC	105,000	May River	21-Day Closure was put in place after issue was repaired.
09/24/2022	Lawrence St. Bluffton, SC	2,100	May River	21-Day Closure was put in place after issue was repaired.

B. Industrial Waste - Industrial wastewater discharges have not been permitted within SFMA 19.

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 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 two marinas located in SFMA 19. Freeport Marina and Melrose Landing, located on the Cooper River at Daufuskie Island, have an approximate 1,100 meter by 470 meter administratively Prohibited closure zone encompassing both facilities. Melrose Landing has fueling capabilities and a sewage pump-out facility, however, this marina is not in operation at this time.

D. Radionuclides - Due to concerns related to the Department of Energy - Savannah River site (DOE-SR), the Savannah River is routinely monitored for radionuclide impacts. Radiological monitoring of surface water is conducted on and adjacent to the Savannah River Site. Routine samples from surface water locations are collected weekly for tritium analysis. Samples are also collected weekly from each location to produce a monthly composite. The monthly composites from each location are analyzed for gross alpha, gross beta and beta-gamma-emitting radionuclides. An annual report is generated and can be reviewed at:

www.scdhec.gov/HomeAndEnvironment/Pollution/DHECPollutionMonitoringServices

This report has summarized that very low doses of radionuclides are present in the Savannah River that are located near the southern portion of SFMA 19 that can affect waters located on Fields Cut leading from the Savannah River to the confluence of the Wright River. All portions of the Savannah River within South Carolina, as well as Fields Cut (Savannah River to the Wright River near Station 19-22) are administratively Prohibited to shellfish harvest. No radiological adversities exist affecting water quality for shellfish harvesting. In 2010, SCDHEC's Environmental Surveillance and Oversight Program (ESOP) was tasked to conduct mercury monitoring that may affect South Carolina waters located in or near SFMA 19. Current Fish Advisory postings can be located at:

www.scdhec.gov/environment/water/fish

NONPOINT SOURCE POLLUTION

A. Urban and Suburban Stormwater Runoff - Stormwater runoff may impact water quality by transporting fecal coliform bacteria (and other pollutants) from land to the shellfish growing area. Stormwater from roads, residences, and agricultural land is directed to the lowest point of elevation - typically the nearest creek or marsh. In addition, there are freshwater wetland areas, ditches, and impoundments that drain into tidal creeks.

Beaufort County enacted a Stormwater Management Utility which was established by county ordinance in 2001 and amended and enacted most recently in 2015. The Stormwater Utility is guided by a Comprehensive Master Plan and a Stormwater Management Utility Board which is dedicated to stormwater-related activities. The Comprehensive Master Plan identified nine (9) program elements that the utility must address. These elements include: Stormwater Control Regulations, Water Quality Controls for Existing Developments, Water Quality Monitoring, Annual Maintenance, Inventory of Secondary Stormwater Management Systems, Additional and On-going studies and analysis, Public Information, and Utility Administration.

The Comprehensive Master Plan is funded through the fees collected by Beaufort County. The Master Plan was designed to identify problem areas related to stormwater, and to recommend a plan to solve problems and better control the impacts on receiving waters in Beaufort County. The Stormwater Management Utility also partners with four Municipalities which include: The Town of Hilton Head Island IGA, Town of Bluffton IGA, Town of Port Royal IGA, and the City of Beaufort IGA. The above information was gathered from the Beaufort County Stormwater webpage which can be found at:

https://www.beaufortcountysc.gov/stormwater/index.html

The Beaufort County Manual for Stormwater Best Management Practices and Design Practices (BMP's) was developed in May 2010 and most recently revised in 2018. This manual has recommended policies and standards for stormwater pollution control for new developments, policies and standards for existing developments, and structural BMP design guidelines. This manual also has the Average Annual Fecal Coliform Runoff Load Calculations for various land uses with percentage reductions required to meet fecal coliform loading targets. This manual not only requires pollutant removal, but also considers stormwater volume control to meet the County's antidegradation goals. Sec. 99-107 of the County Codes sets requirements for on-site stormwater systems: enforcement, methods, and inspections.

On June 4, 2014, SCDHEC designated Beaufort County as a Municipal Separate Storm Sewer System (MS4). MS4 is a component of the National Pollutant Discharge Elimination System (NPDES). The notice of intent was submitted, and the expected effective date was October 1, 2015 (Beaufort County Stormwater Utility, 2015).

Most land disturbing activities in South Carolina must comply with the Stormwater Management and Sediment Reduction Act of 1991. The final regulations, effective on June

28, 2002, establish the procedures and minimum standards for a statewide stormwater management program. For activities in the eight coastal counties, additional water quality requirements are imposed. For all projects, regardless of size, which are located within one-half mile of a receiving water body in the coastal zone, the criteria for permanent water quality ponds having a permanent pool are that they are designed to store the first inch of runoff from the entire site over a 24-hour period or storage of the first one inch of runoff from the built-upon portion of the property, whichever is greater. Storage may be accomplished through retention, detention, or infiltration systems, as appropriate for the specific site. In addition, for those projects that are located within 1000 feet of shellfish beds, the first one and one-half inches of runoff from the built-upon portion of the property must be retained on site. Since 1992, these regulations have been applied to the development of residential subdivisions, golf courses, and business areas.

B. Agricultural Runoff - There are several horse stables observed and documented in SFMA 19 with an unknown approximation for the number of horses at each stable. These numbers vary from season to season. Joint cooperation between the Town of Bluffton, the Beaufort County Stormwater Utility, South Carolina Department of Health and Environmental Control Environmental Affairs, and each owner of the horse stables have an established waste management plan implemented for the proper disposal of horse manure. It appears there are no adverse impacts to water quality existing between the locations of these stables and nearby water bodies throughout the shellfish management area. No cattle have been observed in SFMA 19 during the survey update period.

C. Individual Sewage Treatment and Disposal (ISTD) Systems - The majority of homes in SFMA 19 utilize central sewage collection systems for wastewater disposal. Older homes adjacent to the May River typically utilize ISTDS. In 2008, the Town of Bluffton contracted for a thermal image study (reference Water Quality Study section of this report for further details) to observe any indications of failing septic tanks near the headwaters of the May River.

The Town of Bluffton and the May River Watershed Action Plan Advisory Committee have made further efforts to determine if ISTD Systems are negatively affecting water quality by Microbial Source Tracking samples. No evidence of major violations of failed septic systems was noted upon the completion of this study. However, through analysis of the MST samples and field work conducted by both Town of Bluffton staff and DHEC Onsite Wastewater Staff, a number of other septic violations have been identified and remediated.

D. Wildlife and Domestic Animals - This area supports populations of white-tailed deer, raccoons, wading birds, migratory waterfowl, and other wildlife, which may contribute to fecal coliform levels in some areas. Domestic animals present in the area include dogs, cats, horses, and goats.

E. Boat Traffic - Calibogue Sound provides access to the Atlantic Ocean for commercial and recreational vessels. The Atlantic Intracoastal Waterway (AIWW) runs between the Cooper River and the Savannah River. Tugs and barges, commercial and recreational vessels utilize this North/South route. The Town of Bluffton has identified impacts concerning water quality on the May River and is currently addressing the need to control watercraft and its recreational usages. These can be reviewed in the May River Waterbody Management Plan, published in 2008, located on the Town of Bluffton's website referenced in the Water

Quality Studies section of this report.

F. Hydrologic and Habitat Modification - Hydrologic and habitat modification in estuarine areas requires both State and Federal approval.

NATURALLY OCCURRING PATHOGENS

A. Marine Biotoxins - During the winter and spring of 1988, South Carolina experienced an occurrence of "Red Tide", specifically *Ptychodiscus brevis* (*K. brevis*), which affected water quality in other coastal areas of the state. There have been no documented reoccurrences of this organism at levels requiring emergency response in South Carolina waters subsequent to the 1988 event. Due to the vast media coverage of events related to *Pfiesteria pisicida*, the Department participates in a State Task Group on Toxic Algae and operates a toxic algae emergency response team. The Department also has a Marine Biotoxin Contingency Plan in place that must be evaluated and updated annually.

B. *Vibrio Management Plan* – Because State water temperatures exceed 81 degrees Fahrenheit (F) during June through September, *Vibrio* management controls must be implemented during these months. Management controls for permitted Aquaculture facilities are specifically addressed in R.61-47. The season for wild-stock harvest is currently closed from June 1 through September 30th. The Department is currently not opposed to the issuance of special wild-stock harvest permits to Certified Shippers during the closed season as long as special permit conditions are included. Special permit conditions for maricultured triploid oysters during the vibrio control months must include current R.61-47 and NSSP temperature control requirements to be included in the Certified Shipper's HACCP plan.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Shellfish Management Area 19 is part of the Savannah River estuary, a coastal plain system that includes the New, Wright, and Savannah Rivers and several distributaries of Savannah River (e.g. Front, Back, and Middle Rivers and the South Channel). It is separated from the Broad River estuary by a tidal node in Calibogue Sound, just northeast of May River. The average depth of the estuary is approximately 5 meters at mid tide level. Navigational channels downstream from Highway 17 in the lower Savannah and Front Rivers range from 9m to 12m in depth and facilitate the intrusion of saltwater into the estuary. The conversion of thousands of acres of saltwater wetlands into impounded disposal areas on the South Carolina side could also have altered flow patterns and salinity regimes.

Most tidal exchange occurs through the entrance to Savannah River, primarily through the North Channel; however, limited exchange occurs with the Broad River estuary through Calibogue Sound. The salinity structure is primarily determined by controlled releases of freshwater from impoundments on Savannah River and its tributaries. (NOAA, 1994).

Tides in SFMA 19 are semidiurnal, consisting of two low and high tides each lunar day. Mean tidal range is 7.0 feet during normal tides and 8.9 feet above mean low water during spring tides. The greatest tidal ranges of the year typically occur around full moon during the months of

September through December. There is considerable variation in the normal tide range due to the prevailing strength and direction of winds.

In 2017, the collection of rainfall data has been improved for a more consistent, accurate, and reliable data set that can be accessed directly from a shellfish staff member's computer or phone. With assistance from the National Weather Service's Southeastern River Forecast Center, the development of the South Carolina Shellfish Rainfall Program was introduced and utilized. This new technology provides shellfish program staff with real-time daily updates for rainfall accumulation in each of the South Carolina shellfish growing management areas, as well as providing critical triggers that alert staff to when rainfall thresholds for closures are exceeded.

The ten-year average annual rainfall amount for SFMA 19 was 46.17 inches. The annual rainfall amount for 2022 was 49.92 inches. Typically, 40% of the annual rainfall falls in the three-month period from June to August. Weather patterns during this time period are often characterized by thunderstorms and thundershower activity of short duration. In addition, these three months also have the highest numbers of days with rainfall greater than 1.00". The months of December through March historically have the greatest number of days with rainfall exceeding 0.10" and 0.50". Rainfall events during these months are typically of a longer duration.

Prevailing wind direction during January through February is generally from the west to northwest with an average speed of 8-12 MPH. During the months of March through August, wind direction is typically a southerly component at an average speed of 7-10 MPH and September through December normally maintains a north-north easterly wind direction with an average speed of 6-8 MPH (NOAA).

The May River receives no freshwater from river discharges, but some from freshwater wetlands. The New River receives freshwater input from the Great Swamp. The Wright River receives most of its freshwater input from the Savannah River. Fields Cut connects the AIWW and Wright River to the Savannah River. Highest river discharge usually occurs in late winter and early spring due to heavy precipitation in the Blue Ridge and piedmont areas, with the lowest discharge occurring late summer and fall. The salinity structure of the Savannah River estuary is primarily determined by controlled releases of freshwater from impoundments on Savannah River and its tributaries. Field's Cut, from the Savannah River to near its confluence with the Wright River is administratively Prohibited.

WATER QUALITY STUDIES

DESCRIPTION OF PROGRAM

The Department utilizes a systematic random sampling (SRS) strategy within SFMA 19 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 calendar year 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.

During the period 01/01/20 through 12/31/22, nine-hundred and nine (909) surface water samples (<1.0 ft. deep) were collected at the twenty-six (26) currently active SFMA 19 monitoring stations for bacteriological analyses. Samples were collected in 120 ml bottles, immediately placed on ice and transported to the South Carolina Department of Health and Environmental Control, Environmental Affairs, Lowcountry – Beaufort laboratory in Burton, 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 >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).

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 using the National Oceanic and Atmospheric Administration, 2017 Tides and Currents Predictions website located at http://tidesandcurrents.noaa.gov/curr_pred.html.

The final report on "*A Baseline Assessment of Environmental and Biological Conditions in the May River, Beaufort County, South Carolina*" was released in April 2004. The report's conclusions state that: "A triad assessment of water quality, sediment quality, and biotic condition was used in this study to evaluate overall condition in each habitat (i.e., headwater creeks, large tidal creeks, and open water sites) using a weight of evidence. Based on current State criteria and regional guidelines, the results indicated that most of the May River estuarine habitats are in good condition, although several headwater creeks showed some signs of stress.

Based on an evaluation of land use patterns, the stressful conditions observed in these creeks were probably not related to anthropogenic inputs and are likely natural phenomena of this system.

Fecal coliform bacteria concentrations, while relatively high in all headwater tidal creeks were generally not indicative of human sources (relatively 'high' concentrations of fecal coliform have been observed in headwater creeks during previous studies.) These elevated bacterial counts in the unpopulated Palmetto Bluff Creek and the sparsely populated Stony and Rose Dhu Creek watersheds indicate a natural source of fecal coliform bacteria that is probably attributable to wildlife.

In June 2008, the May River Waterbody Management Plan was established through a collaborative planning effort between the Town of Bluffton and the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management (DHEC OCRM). This plan was to recognize the significance of the May River and its importance both to local residents and to the region. Beginning in the late 1990s, the sleepy coastal area began to expand as new development resulted in a larger year-round population. Bluffton also grew from roughly one square mile to almost 55 square miles through the

annexation of nearby areas. Recognizing the potential impacts of this sudden change, the Town Council was instrumental in identifying and engaging collaborators to document, study, and analyze the May River. A major theme of the project was identifying and advancing realistic options that would, first and foremost, preserve the River and its uses into the future. The project team, comprised of staff from the Town of Bluffton's Department of Environmental Protection and DHEC OCRM, began work in May 2007. Considerable information and data had been collected on and about the environment, ecology, habitats, and physical parameters of the May River and its watershed. However, this information had not been previously consolidated and summarized in one document specific to the manner and extent in which people utilize the River. The Waterbody Management Plan for the May River provided an opportunity for the compilation and review of existing information from a variety of sources, and analysis based on goals and objectives established for the project. This analysis resulted in the identification of potential issues and conflicts between users, user groups, and the environmental conditions that were identified for protection. Ultimately the Waterbody Management Plan identified specific tasks and recommendations that should be implemented over the next five years that would be the most likely to achieve the various Project Goals and Objectives. The development of the Waterbody Management Plan involved a three-step process beginning in June 2007. First, an Inventory of Existing Conditions within the Study Area was prepared, incorporating information on the ecology, water quality, flora and fauna, boat use, drainages, public access, fishing and bathing, economy, and a range of uses of the May River and its upland watershed. The Second phase involved the project team performing an analysis of the information gathered against the Project Goals and Objectives established for the protection of the River. This analysis identified recurring issues, conflicts that currently or is predicted to occur between the uses and the project goals and objectives, and possible options to avoid or minimize the problems identified. The final phase involved the identification of implementation priorities and development of a strategy to advance the goals and objectives of the Waterbody Management Plan. Further details concerning watershed management and the Town of Bluffton can be found at:

http://www.townofbluffton.sc.gov/engineering-department/watershed-management

In November 2011, subsequent to the May River Waterbody Management Plan, the Town of Bluffton, in partnership with other organizations, developed the "May River Watershed Action Plan." The Watershed Action Plan was initiated to determine and mitigate issues within the May River to reestablish the ability to harvest shellfish and implement preventative measures that would aid to deter future degradation of water quality (www.townofbluffton.sc.gov).

Special Sampling Studies

The SCDHEC Office of Ocean and Coastal Resource Management completed a Waterbody Management Plan that provided the Town of Bluffton an assessment tool to better understand the delicate balance between the natural environment and the Town's continued growth in development. The Town of Bluffton has received several EPA grant awards distributed through the SCDHEC Section 319 program. Further updates and information concerning the progresses of these grant projects can be found through the Town of Bluffton's Growth Management Department located at:

http://www.townofbluffton.sc.gov/growth-management-department/home

The Town of Bluffton, along with the Beaufort County Stormwater Utility is continually

conducting water quality monitoring throughout all sensitive areas of the watershed. Specific areas of interest are along the May River and the New River sub-watersheds. The Town of Bluffton also continues collaborative efforts with several other private and government agencies and is constantly analyzing consolidated data for trends in water quality in the May River and other bodies of water in the Beaufort County district.

MONITORING RESULTS

Sample stations 19-01, 19-02, 19-02A, 19-03, 19-04, 19-05, 19-06, 19-07, 19-08, 19-09, 19-11, 19-12, 19-16, 19-17A, 19-18, 19-20, 19-22, 19-24, 19-25, 19-26, and 19-27 met the fecal coliform criteria for the Approved Classification.

Sample stations 19-19, 19-19A, 19-19B, 19-19C and 19-21 exceeded a fecal coliform MPN geometric mean value of 14 and a fecal coliform MPN estimated 90th percentile value of 43 and will retain a Restricted classification. A fecal coliform bacteriological data summary is included as Table # 2.

CONCLUSIONS AND RECOMMENDATIONS

For this year's review period, Shellfish Management SFMA 19 exhibited very similar water quality data to the data that was reviewed last year. No classification changes will be recommended for this period for the 2023-2024 shellfish harvesting season.

During this review period, the fecal coliform bacteriological data in combination with the pollution source survey indicates that SFMA 19 is affected by four sources of actual or potential pollution; Point Source Pollution, Non-Point Source Runoff, Individual Sewage Treatment and Disposal Systems (ISTDS) and Freshwater Inflow.

Point Source Pollution

Numerous point sources such as wastewater treatment facilities and marinas are located within SFMA 19. Administratively Prohibited closures are established around these pollution sources.

Non-Point Source Runoff

Stormwater runoff appears to be the primary source of fecal coliform bacteria concentrations in SFMA 19. Possible sources of fecal coliform bacteria contamination include pets, wildlife, domestic animals such as horses, failing septic systems, and drainage from roads and freshwater wetlands. Particular areas of concern are located near the headwaters of the May River.

Freshwater Inflow

Freshwater inflows from the furthest reaches of the New River influence the water quality in the lower portions of shellfish management SFMA 19. Other freshwater influences come from surrounding swamp and wetlands that discharge into these sub-watersheds. Wildlife, shallow ground water flow and soil bacteria can also cause elevated fecal coliform concentrations

throughout the management area.

Individual Sewage Treatment and Disposal Systems (ISTDS)

Most homes adjacent to shellfish waters in SFMA 19 are served by ISTDS. Soils in most areas are considered to be suitable for ISTDS and should operate properly if maintained. However, many older homes with "grandfathered" systems may not meet current standards.

Sewage overflows are infrequent and will continue to be managed in accordance with National Shellfish Sanitation Program emergency closure guidelines.

All existing marinas should retain their administrative Prohibited Classification. Additionally, during the harvest season, all Approved portions of the estuary should continue to be placed under a precautionary closure upon issuance of an official National Weather Service Hurricane Warning or upon receipt of four or more inches of rainfall within twenty-four hours, as recorded by the National Weather Service, Southeastern River Forecast Center.

Based upon the findings of this Annual Update, the following classification is recommended:

PROHIBITED

1. Freeport Marina (Cooper River), closure zone of 1,000 feet around marina.
2. Melrose Landing (Cooper River), closure zone of 1,000 feet around marina.
3. Savannah River, all waters in South Carolina portion.
4. Field's Cut, from its confluence with the Savannah River to its confluence with the Wright River at Station 19-22.
5. New River, closure zone of 1,000 feet around site of future marina.

RESTRICTED

1. Portions of the May River, from the headwaters, including Rose Dhu and Stoney Creeks, to Station 19-24.
2. New River from Station 19-02A, near the confluence of the Cooper River, continuing upstream to the boundary of SFMA 19, excluding the Prohibited zone for a future marina.

CONDITIONALLY APPROVED

None

APPROVED

1. May River, from sample station 19-24 continuing downstream to its confluence at the Calibogue Sound.
2. Bull Creek, entire waterbody.
3. Savage Creek, entire waterbody.
4. Cooper River, from its confluence with the Calibogue Sound to its confluence with the New River, excluding the Prohibited closures zones.
5. Ramshorn Creek, entire waterbody.

6. Mulligan Creek, entire waterbody.
7. New River, from its confluence with the Atlantic Ocean to Station 19-02A, near the confluence of the Cooper River.
8. Wright River, from its confluence with the Atlantic Ocean to the boundary of SFMA 19.

Station Addition/Re/Deactivation/Modification: None

Analysis of sampling data for SFMA 19 demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24-hour period. Therefore, a precautionary closure of SFMA 19 will be implemented following rainfall events of greater than 4.00" in a 24-hour period, as measured by the National Weather Service, Southeastern River Forecast Center. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States have been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (National Weather Service). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52, and 53 (National Research Council, 1985).

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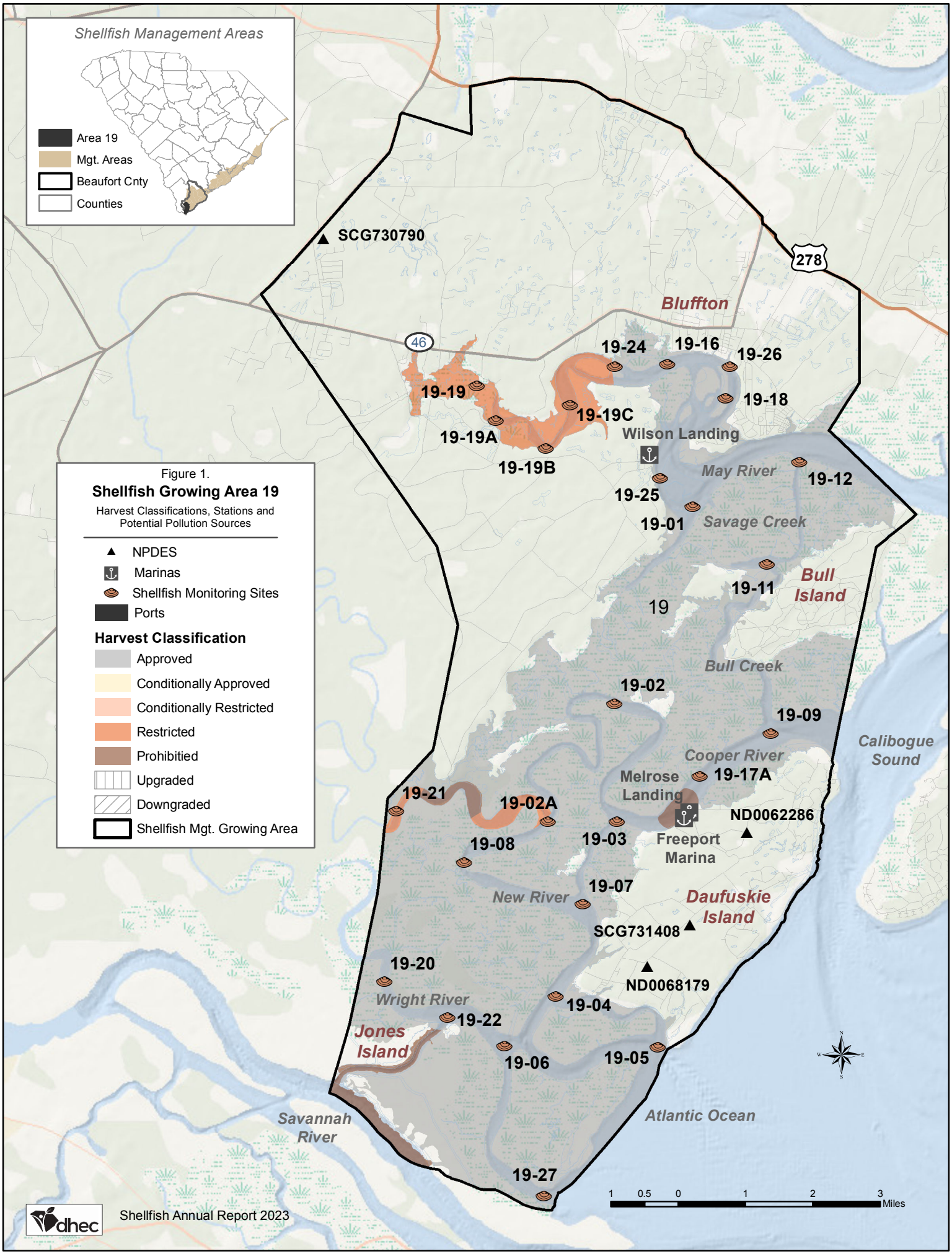
Shellfish Management Areas
Area 19
Mgt. Areas
Beaufort Cnty
Counties
Figure 1.
Shellfish Growing Area 19
Harvest Classifications, Stations and Potential Pollution Sources
NPDES
Marinas
Shellfish Monitoring Sites
Ports
Harvest Classification
Approved
Conditionally Approved
Conditionally Restricted
Restricted
Prohibitied
Upgraded
Downgraded
Shellfish Mgt. Growing Area
SCG730790
278
46
Bluffton
19-24
19-16
19-26
19-19
19-18
19-19C
19-19A
Wilson Landing
19-19B
May River
19-12
19-25
19-01
Savage Creek
19-11
Bull Island
19
Bull Creek
19-02
19-09
Calibogue Sound
Cooper River
19-17A
Melrose Landing
19-21
19-02A
ND0062286
19-08
19-03
Freeport Marina
19-07
New River
Daufuskie Island
SCG731408
19-20
ND0068179
Wright River
19-04
19-22
Jones Island
19-06
19-05
Atlantic Ocean
Savannah River
19-27
1 0.5 0 1 2 3 Miles
dhec
Shellfish Annual Report 2023

TABLE # 1
Shellfish Management Area 19
WATER QUALITY SAMPLING STATIONS DESCRIPTION

Station	Description
19-01	May River South of Palmetto Bluff, Marker #8
19-02	Unnamed Creek at Jack Crow Island in Cooper River
19-02A	Cooper River at New River
19-03	Ramshorn Creek at Cooper River
19-04	Cooper River at Marker #41 - Daufuskie Island
19-05	Bloody Point at Mungen Creek
19-06	Wright River, Marker #43
19-07	Ramshorn Creek at New River
19-08	New River at first creek on left upstream of 19-07
19-09	Bull Creek at Cooper River
19-11	Bull Creek at Savage Creek
19-12	Bull Creek at May River
19-16	May River Behind Bluffton Oyster Co
19-17A	Cooper River Marina at Edge of CSZ
19-18	May River below Drainage Canals at Marker #11
19-19	May River at First Dock in Headwaters past Bluff
19-19A	Unnamed Tributary near SW corner of Gascoigne Bluff
19-19B	Bend in May River nearest the high bluff of Palmetto Bluff
19-19C	First Unnamed Tributary leading from Gascoigne Bluff
19-20	1.5 Miles up Wright River from Fields Cut
19-21	2.5 Miles up New River from Station 19-02A
19-22	Wright River at Fields Cut
19-24	May River at Southern end of Crane Island
19-25	May River at Green Marker #25
19-26	May River, Southeast of Heyward Cove
19-27	Wright River at confluence with Atlantic Ocean

(**Total Active - 26**)

Table #2

Shellfish Management Area 19
Fecal Coliform Bacteriological Data Summary
From Shellfish Water Quality Sampling Stations Between

January 01, 2020 to December 31, 2022

Station #	01	02	02A	03	04	05	06	07	08	09	11
Samples	35	35	35	35	35	34	35	35	35	35	35
Geometric Mean	4.1	6.7	9	4.4	4.2	3.1	4.6	4.9	4.5	3	2.7
90th percentile	14	23	39	13	12	10	17	14	14	8	7
Water Quality	A	A	A	A	A	A	A	A	A	A	A
Classification	A	A	R	A	A	A	A	A	A	A	A

Station #	12	16	17A	18	19	19A	19B	19C	20	21	22
Samples	35	35	35	35	35	35	35	35	35	35	35
Geometric Mean	3.2	9.3	3.8	7	40.6	28.6	18.8	14.5	4.9	18.1	6.7
90th percentile	9	33	13	28	192	92	74	58	16	77	29
Water Quality	A	A	A	A	R	R	R	R	A	R	A
Classification	A	A	A	A	R	R	R	R	A	R	A

Station #	24	25	26	27
Samples	35	35	35	35
Geometric Mean	9.2	5.4	7.7	4.3
90th percentile	36	16	41	14
Water Quality	A	A	A	A
Classification	R	A	A	A

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** - Prohibited

TABLE #3

Fecal Coliform Historical Trend Sheet

Area 19 Stations 90th%ile Values for Annual Updates Related to Rainfall

Station #	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
19-01	14	10	12	9	11	9	10	7	7	6	7
19-02	23	20	15	12	21	22	23	13	16	15	17
19-02A	39	27	24	19	26	24	25	17	13	7	11
19-03	13	12	14	13	21	19	18	9	8	8	8
19-04	12	11	10	9	12	12	11	8	7	6	8
19-05	10	13	11	11	12	13	11	8	6	6	5
19-06	17	21	18	14	19	19	22	16	12	9	8
19-07	14	13	12	11	12	12	10	9	9	9	9
19-08	14	12	11	13	14	14	12	8	6	6	7
19-09	8	8	9	6	7	6	6	6	6	6	6
19-11	7	6	5	5	6	9	10	9	6	5	6
19-12	9	9	8	7	6	7	7	6	7	5	6
19-16	33	34	35	32	34	30	22	13	13	14	18
19-17A	13	10	10	6	8	7	6	5	6	7	7
19-18	28	27	27	25	24	17	24	18	20	8	13
19-19	192	139	106	168	171	204	106	222	204	206	148
19-19A	92	69	59	90	102	124	81	105	95	82	80
19-19B	74	60	51	64	68	83	68	57	52	40	46
19-19C	58	42	37	52	58	59	67	55	56	29	35
19-20	16	21	17	15	18	13	15	16	16	12	8
19-21	77	69	62	77	88	76	49	26	20	15	30
19-22	29	32	29	23	25	18	20	22	25	17	16
19-24	36	31	31	39	42	39	30	26	29	21	26
19-25	16	15	16	17	16	13	13	9	9	5	7
19-26	41	39	43	23	25	18	18	12	16	12	16
19-27	14	20	21	18	22	20	21	14	9	7	7
Annual Rainfall (inches)	**49.92**	**54.64**	**48.19**	**47.26**	**48.64**	**45.97**	**39.10**	**42.92**	**44.93**	**50.09**	**40.05**

ND = No Data Red = Impaired Water Quality

TABLE #4

WATER QUALITY SAMPLING STATION DATA

Shellfish Management Area 19

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.

TABLE #5

RAINFALL DATA

Shellfish Management Area 19

Source:

2020 – 2022 Data
National Weather Service - Southeastern River Forecast Center
Location: Hilton Head Island, South Carolina

2020 Annual Rainfall Summary
Source: National Weather Service - Southeastern River Forecast Center
Location: Hilton Head Island, South Carolina

2020	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1		0.35		0.31	0.04		0.01		0.02		0.05	0.07
2							0.02				0.02	
3			0.03				0.15	0.17	0.35			
4	0.11		0.07					0.15				
5	0.14		2.67			0.23		0.02				0.25
6			1.47			0.45	0.46		1.47			
7		0.95				0.02	0.20	0.27	0.28	0.01	0.29	0.03
8							0.49	0.03	0.21		0.05	
9				0.01		0.07	0.08	0.01	0.06		0.32	
10				0.03		0.67	0.15	0.57	0.20		0.06	
11	0.02			0.01		0.01		0.14		0.12	0.75	
12	0.05		0.04			0.34		0.03	0.24		0.50	
13	0.06			0.20		2.54		0.02	0.13		0.45	0.01
14		0.36		1.42		0.01		0.51	0.05			
15		0.08		0.02		0.04		0.20				0.03
16				0.37				0.04	0.28		0.04	0.02
17	0.01	0.27							0.74			0.55
18									0.65			
19		0.27				0.54						
20				3.27		0.09		0.05		0.01		0.04
21		0.67		0.03	1.23	0.02		0.08		0.02		0.19
22						0.55				0.38	0.01	
23					0.43			0.52			0.02	
24	0.18			2.51		1.49		0.18				
25	0.13	0.74					0.02	0.40	0.21	0.08		0.47
26		0.10	0.01		0.09		0.08		0.54	0.02		
27	0.09	0.10			0.53		0.13	0.16				
28					0.02	0.22			0.19		0.58	
29							0.36		0.85		0.29	
30	0.36			0.21	0.01		0.07		0.77	0.42	0.86	0.02
31							0.37	0.38				0.04
Total	**1.15**	**3.89**	**4.29**	**8.39**	**2.35**	**7.29**	**2.59**	**3.93**	**7.24**	**1.06**	**4.29**	**1.72**

***Days highlighted indicate 4 or more inches of rain in a 24-hour period. Blank fields indicate no rainfall.**

*** Sample dates are indicated in blue.** | **ND = No Data** | **ANNUAL RAINFALL** | **48.19**

2021 Annual Rainfall Summary
Source: National Weather Service - Southeastern River Forecast Center
Location: Hilton Head Island, South Carolina

2021	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1		0.67		0.13								
2	0.08		0.18			0.08	0.01	0.22				
3	0.23		2.54			0.04	0.34	0.33				
4			0.12			0.13	0.05	0.55				
5					0.01	0.11		0.01				
6		0.11				0.05		0.61	0.01	0.43	0.64	
7		0.31				0.01	0.23	0.06		0.66	2.42	
8	0.18					0.08	*6.23	0.03			0.04	
9		0.01				0.01	0.08	0.44	1.16	0.34		0.27
10		0.21		0.04		0.17	0.03		0.13	0.11		
11		0.35		0.07		0.12	0.10					
12	0.03	0.01			0.47	0.20	0.25				0.01	0.06
13		0.13			0.54	1.16		0.03				
14	0.01	0.62			0.01	0.19	0.08					
15		1.09					0.03	0.03				
16	0.25	0.19				0.25		0.16	0.25			
17			0.03	0.04				1.21	0.50	0.01		0.23
18				0.01				0.12	0.03			
19		0.32	0.40				0.07	0.37	0.01			
20		0.28			0.01	0.05	0.20		0.37			0.10
21			1.32			0.15	0.42		*5.16			0.16
22	0.17		0.40			0.02	0.04	0.41	0.60			0.20
23	0.30	0.05				0.83	0.58	0.45	0.20			
24								0.16				
25				2.58						1.82		
26							0.08			0.20	0.01	
27	0.05					0.35	0.44					
28	0.20					0.01	0.73	0.02				
29			0.10			3.49	0.01			0.83		
30					0.03							
31			0.06									0.03
Total	1.50	4.35	5.15	2.87	1.07	7.50	10.00	5.21	8.42	4.40	3.12	1.05

*Days highlighted indicate 4 or more inches of rain in a 24-hour period. Blank fields indicate no rainfall.

* Sample dates are indicated in blue.	ND = No Data	ANNUAL RAINFALL	54.64

2022 Annual Rainfall Summary
Source: National Weather Service - Southeastern River Forecasting Center
Location: Hilton Head Island, South Carolina

2022	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1				0.17		0.18	0.73		0.19	0.11		0.09
2							0.47	0.01	0.50			
3	0.05	0.03				0.01			0.51			
4					0.01			0.09	0.44			
5		0.15			0.02	0.19		0.14	1.00		0.03	
6		0.01		0.34		0.87	0.02	0.06	0.09		0.29	0.09
7		0.25		0.29	0.02	0.14	0.04	0.28				
8		0.11		0.03		0.18	0.79	0.52				
9			0.13			0.66	0.07	0.17	1.41			
10	0.39		0.28			0.76	1.25		1.46			0.29
11							1.05	0.01	0.01		1.78	
12			0.10			0.88	0.76	0.69	0.16		0.08	0.01
13		0.03	0.06		0.10		0.19	0.34		0.73		
14							0.30					
15						0.24	0.49				0.09	0.06
16	0.16		0.05		0.01		0.02					0.20
17	1.17		0.09	0.02								
18				1.92		0.15	0.19	0.12	0.09			
19		0.28	0.32	0.23			0.71	1.11	0.03			
20			0.17				0.20	0.23	0.06		0.03	0.11
21	0.32						0.73					1.20
22	0.22	0.02			0.01		0.05	1.14				0.07
23					2.10		0.25	0.94				0.08
24			0.70		0.43	0.24	0.01	0.06				
25			0.44				0.01	0.03				
26					0.03			1.33			0.06	
27				0.44	1.15			0.03	0.10		0.09	
28		0.20			0.09			0.10			0.08	
29					0.01	0.33	0.01	0.49				
30						0.33		2.72	0.88	0.04		0.03
31					0.04							0.05
Total	2.31	1.08	2.34	3.44	4.02	5.16	8.34	10.61	6.93	0.88	2.53	2.28

*Days highlighted indicate 4 or more inches of rain in a 24-hour period. Blank fields indicate no rainfall.

* Sample dates are indicated in blue.	ND = No Data	ANNUAL RAINFALL	49.92

TABLE #6
Shellfish Management Area 19
Precautionary & Pollution Event Closures
2020 – 2022

Event	Date(s)	Sample Date(s)	Opening Date	Comments
105,000-gallon sanitary sewer overflow which got into the May River.	10/26/2020 - 10/28/2020	N/A	11/17/2020	Gravity line break was repaired and a 21-day emergency harvesting closure was put in place.
6.23” of rainfall	7/8/2021	N/A	N/A	Shellfish harvesting season was closed. No summer harvest in SFMA 19.
5.16” of rainfall	9/21/2021	N/A	N/A	Shellfish harvesting season was closed. No summer harvest in SFMA 19.
2,100-gallon sanitary sewer overflow which got into the May River.	09/24/2022	N/A	10/17/2022	Force main break was repaired and a 21-day emergency harvesting closure was put in place.

TABLE #7
Shellfish Management Area 19
MARINA INVENTORY

Marina	Total Slips	Pump-out Facility	Fuel Dock
Freeport Daufuskie Island	70	No	No
Melrose Landing	N/A	Yes (Not Operational)	Yes (Not Operational)