

## **St. Mary's River Pilot Per- and Polyfluoroalkyl Substances (PFAS) Study**

### **Study Objective**

The purpose of this monitoring effort is to assess the occurrence of Per- and Polyfluoroalkyl Substances (PFAS) in surface water and oysters in and around St. Inigoes Creek, the St. Mary's River and the mouth of the Patuxent River, and to pilot a monitoring approach which may be utilized in other locations in the State. The Department will collect samples along transects and discrete locations within St. Inigoes Creek and the St. Mary's River as well as locations at the mouth of the Patuxent River. Sampling locations are targeted to focused on potential source areas and potential areas of concern (AOC). Sample data collected during this investigation will be compared to applicable state and federal risk-based concentration levels or site and media specific risk-based screening levels derived for the protection of human health.

### **Per- and Polyfluoroalkyl Substances (PFAS) to be Analyzed**

The target analyte list of PFAS compounds and supporting documentation from the selected contract laboratory are detailed in Appendix I.

### **Sampling Locations and Collection Procedures**

Samples are proposed for collection from surface water and oyster tissue in and around St. Inigoes Creek, the St. Mary's River, Smith Creek, Fishing Bay, and the mouth of the Patuxent River. Figures 1 through 5 show the sampling locations for surface water and oyster tissues in the St. Inigoes Creek, St. Mary's River, Smith Creek, Patuxent River, and one site in Fishing Bay. The Fishing Bay site will be used as a reference site or control. The sample plan in the St. Mary's may be used as a pilot process in formulating potential future sampling plans in other areas of the Chesapeake Bay and its tributaries.

The Department will collect surface water samples at five transects in the St. Mary's River: near the shore, middle of the River, to the opposite shore as well as seven discrete sampling locations in the area and identified in Table 1 and the corresponding Figures.

The Department will also collect oyster samples at six locations in the St. Mary's River: main stem of the River upstream of St. Inigoes Creek, two locations in St. Inigoes Creek (adjacent to and upstream of Webster Field), mainstem near Webster Field, one in Smith Creek, and one near the mouth of the River (Figure 1). Additionally, oyster samples will be collected from 2 locations at the mouth of the Patuxent River (Figure 3) and one reference location in Fishing Bay (Figure 4). Samples will be collected and submitted for analysis of PFAS. Samples will be collected in laboratory-supplied bottles. The contract laboratory will be identified prior to field activities and corresponding analytical methodologies and quality control procedures will be detailed and provided in the final report.

Sampling will be completed by the Department's designated field teams within the Water and Sciences Administration. Each team will be provided with a trip blank and a field blank of PFAS-free water supplied by the contract laboratory or equivalent provider. This water will be transported to the field the day of sample collection and transferred to the appropriate sample containers. In addition, each team will collect an aqueous equipment rinsate blank prior to beginning to collect sample. Duplicate samples will be collected at locations designated by the field team(s). The approximate number of samples, sample locations and quality control samples

are detailed in Table 1. After sampling is completed, the samples will be shipped to the laboratory following approved sample handling and preservation procedures that will be documented in the field notes and chain of custody forms.

### **Surface Water Samples**

All proposed surface water sample locations, sample identification numbers and location descriptions are detailed in Table 1. The exact location of sample collection will be at the discretion of the field team. Surface water samples will be collected approximately one foot below the surface on the ebbing tide if practical. Sampling matrix, date and time of collection, sampling team, environmental conditions and water quality measurements will be recorded on field data sheets. The exact location of each sample will be recorded by GPS in the field. Laboratory-supplied bottles will be used for sample collection. Specific analytical methodologies, the PFAS target compound list and the quality control procedures will be documented upon selection of a contract laboratory and described in the final report.

### **Oyster Tissue Samples**

Oyster tissue sample locations, sample identification numbers and location descriptions are detailed in Table 1. The exact location of sample collection will be at the discretion of the field team. Samples will be collected utilizing a dredge and samples collection procedures will be documented in the field notes. As with the water samples, data and time of collections, environmental conditions and water quality measurements will be recorded. Oyster tissue samples will be composites of oyster tissue collected from no less than 24 market size oysters (a minimum of three inches in size oysters) per location and will consist of two samples per location. Oysters tissue samples per location will consist of 2 samples of no less than 12 oysters, one with liquor and one without. Sampling equipment will be documented in the field notes and homogenization of the oyster tissue will be performed by the contract laboratory. The exact location of each sample will be recorded by GPS in the field. Laboratory-supplied bottles will be used for sample collection. Specific analytical methodologies, the PFAS target compound list and the quality control procedures will be documented upon selection of a contract laboratory and described in the final report.

### **QA/QC Samples**

Two duplicate surface water samples and one duplicate oyster tissue sample will be collected. The number of field and trip blanks as well as laboratory required quality control blanks are detailed in Table 1. Based upon the recommendations of the contract laboratory quality control samples may be modified prior to field deployment and will be documented in the final report.

### **Reporting**

Post field activities, sample collection, sample analysis and reporting the Department will evaluate and assess the results of the data according to the study objectives in consultation with our technical experts and partners. A final report will be published and communicated to stakeholders.

**St. Mary's River, St. Inigoes Creek, Smith Creek, Fishing Bay, and Patuxent River -Water Collections**

Location	Position	Reference	Sample ID	Sample Type	Field Blanks
Upper St. Mary's River - West St. Mary's Bar and Seminary Bar	Eastern Shore	Transect 1-A	T1-W1	Water	FB-1A
Upper St. Mary's River - West St. Mary's Bar and Seminary Bar	Middle of Transect	Transect 1-B	T1-W2	Water	FB-1A
Upper St. Mary's River - West St. Mary's Bar and Seminary Bar	Western Shore - Near West Saint Mary's Airport	Transect 1-C	T1-W3	Water	FB-1A
Mouth of St. Inigoes Creek - Kennedy Bar	North Shore	Transect 2-A	T2-W1	Water	FB-2A
Mouth of St. Inigoes Creek - Kennedy Bar	Middle of Transect	Transect 2-B	T2-W2	Water	FB-2A
Mouth of St. Inigoes Creek - Kennedy Bar	Southern Shore	Transect 2-C	T2-W3	Water	FB-2A
Middle St. Mary's River - Webster Field WWTP discharge to Cedar Lane - Preist and Goad Bars	Eastern Shore Near WWTP	Transect 3-A	T3-W1	Water	FB-3A
Middle St. Mary's River - Webster Field WWTP discharge to Cedar Lane - Preist and Goad Bars	Middle of Transect	Transect 3-B	T3-W2	Water	FB-3A
Middle St. Mary's River - Webster Field WWTP discharge to Cedar Lane - Preist and Goad Bars	Western Shore Near Cedar Lane	Transect 3-C	T3-W3	Water	FB-3A
Middle St. Mary's River - Webster Field WWTP discharge to Cedar Lane - Preist and Goad Bars	Western Shore Near Cedar Lane	Transect 3-D	T3-W4	Water	FB-3A
Lower St. Mary's River Mouth - Cherry Bar and Sedge Point Bar	Eastern Shore of Mouth	Transect 4-A	T4-W1	Water	FB-4A
Lower St. Mary's River Mouth - Cherry Bar and Sedge Point Bar	Middle of Transect	Transect 4-B	T4-W2	Water	FB-4A
Lower St. Mary's River Mouth - Cherry Bar and Sedge Point Bar	Western Shore of Mouth	Transect 4-C	T4-W3	Water	FB-4A
Chicken Cock Bar - Near Mouth of Lower St. Mary's River	Single Sample	Lower Site	CC-W1	Water	FB-4A
St. Inigoes Creek - Mid Creek	North Shore	Transect 5-A	T5-W1	Water	FB-5A
St. Inigoes Creek - Mid Creek	Middle of Transect	Transect 5-B	T5-W2	Water	FB-5A
St. Inigoes Creek - Mid Creek	Southern Shore	Transect 5-C	T5-W3	Water	FB-5A
Smith Creek	Single Sample	Smith Creek	SC-W1	Water	FB-6A
Fishing Bay	Single Sample	Reference Control	FB-W1	Water	FB-7A
Webster Field Discrete Samples	Single Sample	Webster Field	WFDS-W1-W6	Water	3 Field Blanks (FB-8A, 8B, 8C)
Patuxent River/Chesapeake Bay - Hog Point	Single Sample	Patuxent River/ Chesapeake Bay	HP-W1	Water	FB-9A
Patuxent River/Chesapeake Bay - Drum Point	Single Sample	Patuxent River/ Chesapeake Bay	DP-W1	Water	FB-9B

Replicate Water Sample Stations

Water Quality Samples

Field Blank Total = 12

Trip Blank Total = 4

36 PFA Analytes

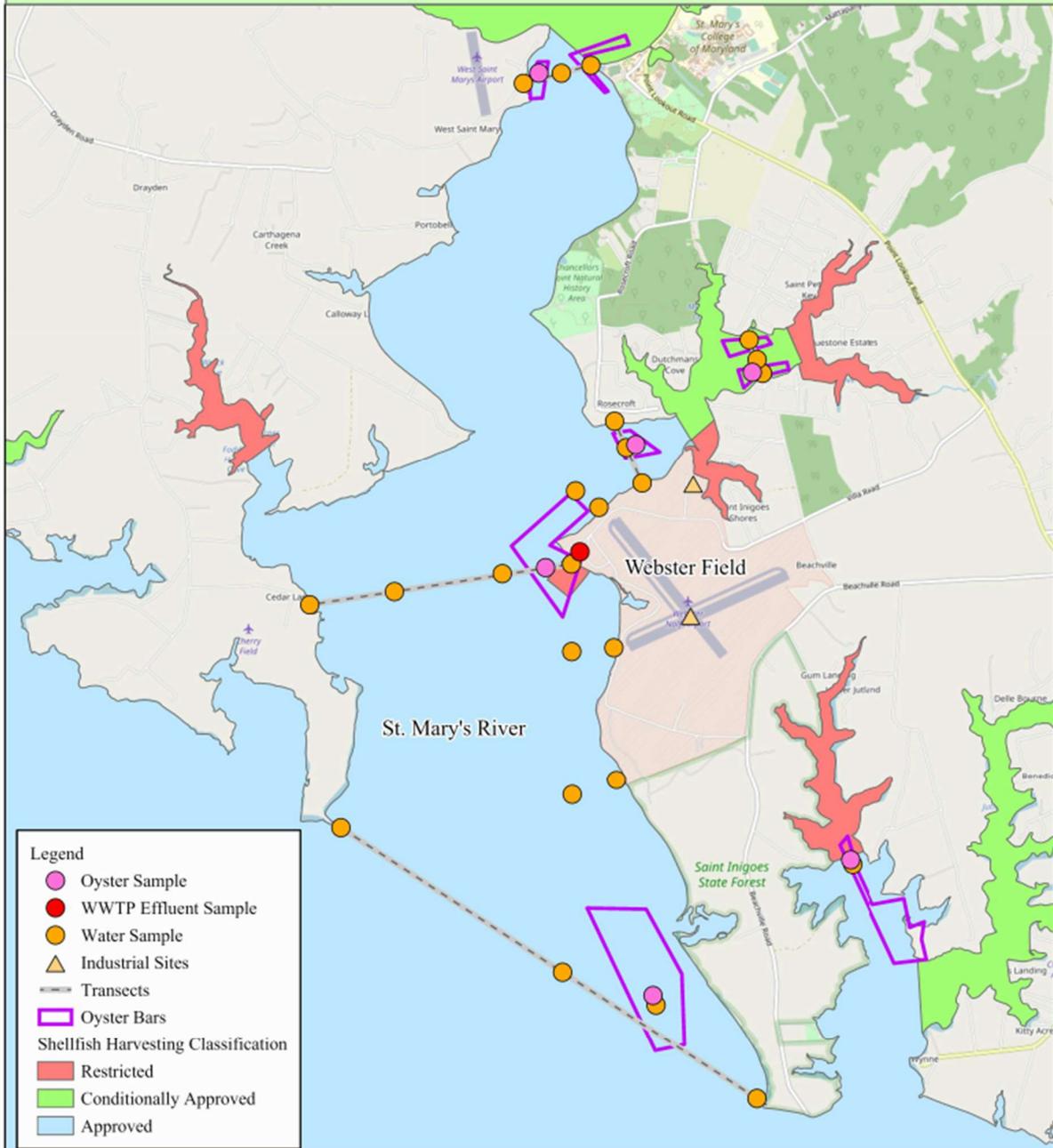
Media	Analyte count	Number of Samples
Oyster	14	12
Oyster	36	7
Water	14	40
Water	36	5

**St. Mary's River, St. Inigoes Creek, Smith Creek, Fishing Bay, and Patuxent River - Oyster Shellstock Collections**

Location	Position	Reference	Sample ID	Sample Type	Number of Samples	Total Number of Oysters
Upper St. Mary's River - West St. Mary's Bar and Seminary Bar	Single Dredge	Transect 1-T	T1-O1	Oyster	2	24
Mouth of St. Inigoes Creek - Kennedy Bar	Single Dredge	Transect 2-T	T2-O1	Oyster	2	24
Fishing Bay	Single Dredge	Reference Control - T	FB-O1	Oyster	2	24
St. Inigoes Creek	Single Dredge	Transect 5-T	T5-O1	Oyster	2	24
Smith Creek - Near Closed area in Jutland Bar	Single Dredge	Smith Creek	SC-O1	Oyster	2	24
Webster Field Discharge	Single Dredge	Webster Field	WFWWTP-O1	Oyster	2	24
Chicken Cock Bar - Near Mouth of Lower St. Mary's River	Single Dredge	Lower Site - T	CC-O1	Oyster	2	24
Patuxent River/Chesapeake Bay near Patuxent Naval AirStation - Hog Point	Single Dredge	Patuxent Site 1	HP-O1	Oyster	2	24
Patuxent River/Chesapeake Bay across from Patuxent Naval AirStation - Drum Point	Single Dredge	Patuxent Site 2	DP-O1	Oyster	2	24

Table 1: St. Mary's River, St. Inigoes Creek, Smith Creek, Fishing Bay, and Patuxent River Water and Oyster Sampling List

PFAS Pilot Sampling Project - Monitoring Design  
 St. Mary's River, St. Mary's County  
 Water and Oyster Sample Locations



**Legend**

- Oyster Sample
- WWTP Effluent Sample
- Water Sample
- ▲ Industrial Sites
- Transects
- Oyster Bars

**Shellfish Harvesting Classification**

- Restricted
- Conditionally Approved
- Approved

Larry Hogan - Governor  
 Boyd K. Rutherford - Lt. Governor  
 Ben Grumbles - Secretary



Miles

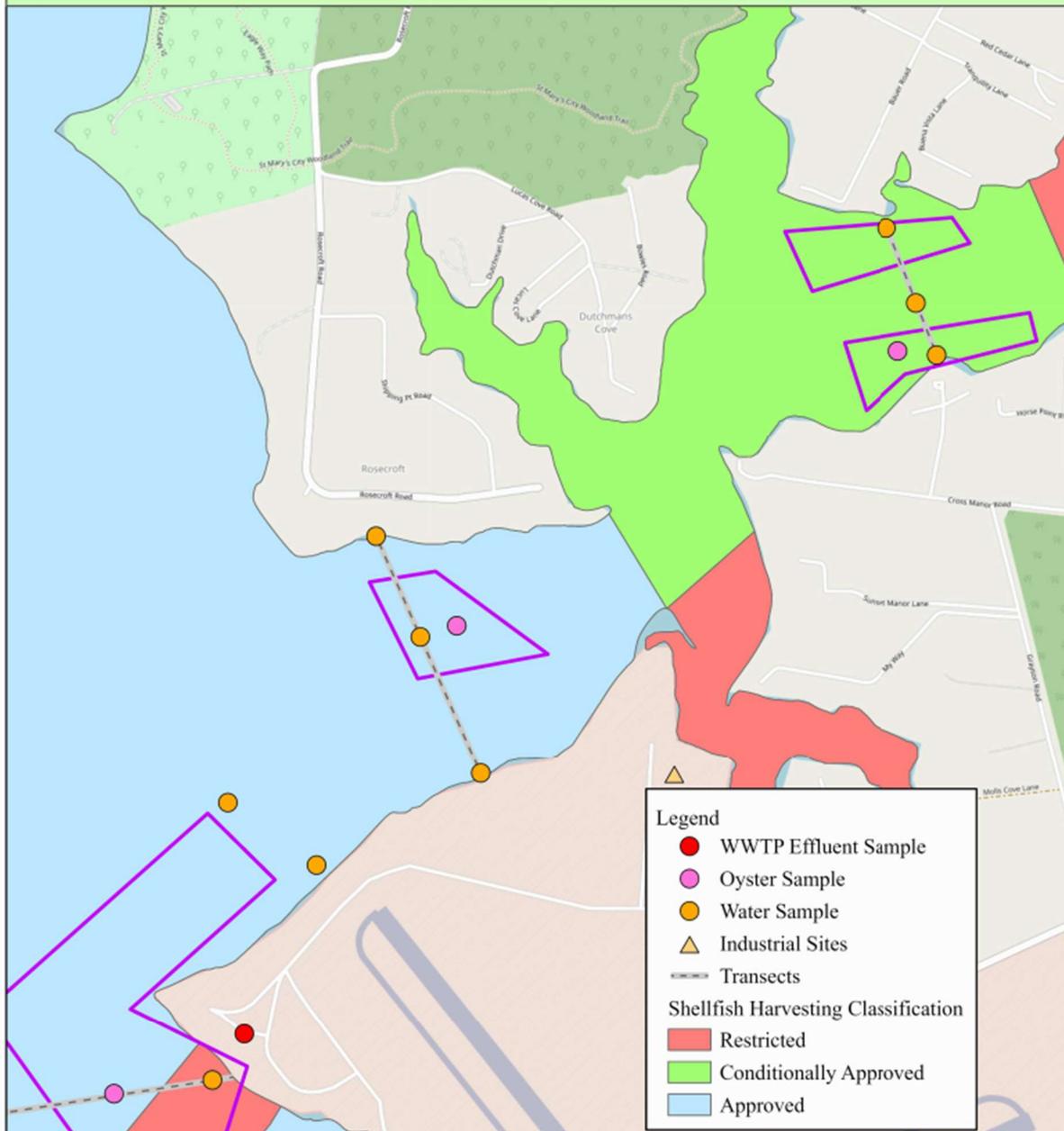
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 Date: 04/09/2020

Figure 1: St. Mary's River, St. Mary's County Overview of Water and Oyster Sampling

PFAS Pilot Sampling Project - Monitoring Design  
 St. Inigoes Creek, St. Mary's River, St. Mary's County  
 Water and Oyster Sample Locations



**Legend**

- WWTP Effluent Sample
- Oyster Sample
- Water Sample
- ▲ Industrial Sites
- Transects

**Shellfish Harvesting Classification**

- Restricted
- Conditionally Approved
- Approved

Larry Hogan - Governor  
 Boyd K. Rutherford - Lt. Governor  
 Ben Grumbles - Secretary

0 0.13 0.25 0.5 Miles  
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 Date: 04/09/2020

Figure 2: St. Inigoes Creek, St. Mary's River, St. Mary's County Overview of Water and Oyster Sampling

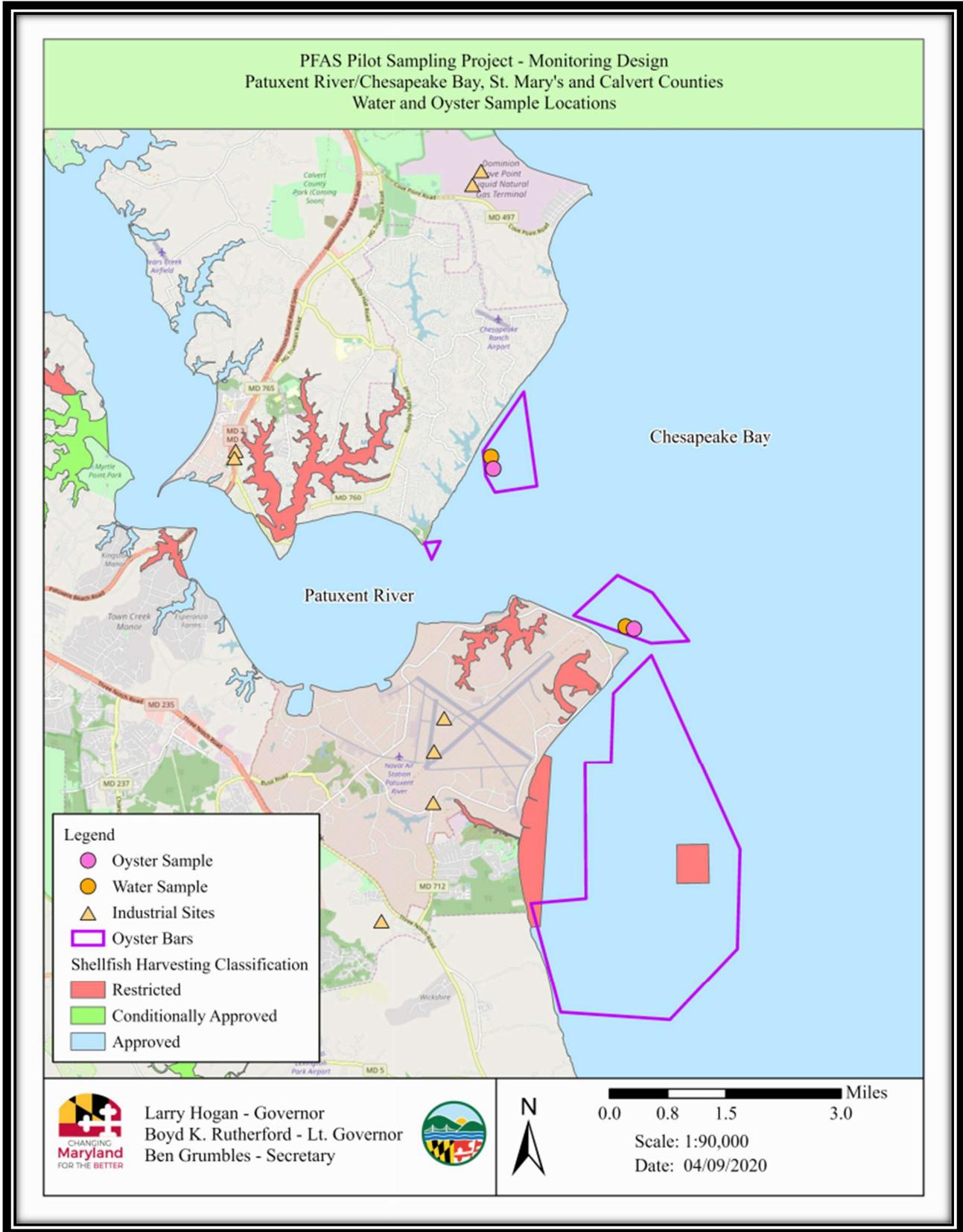
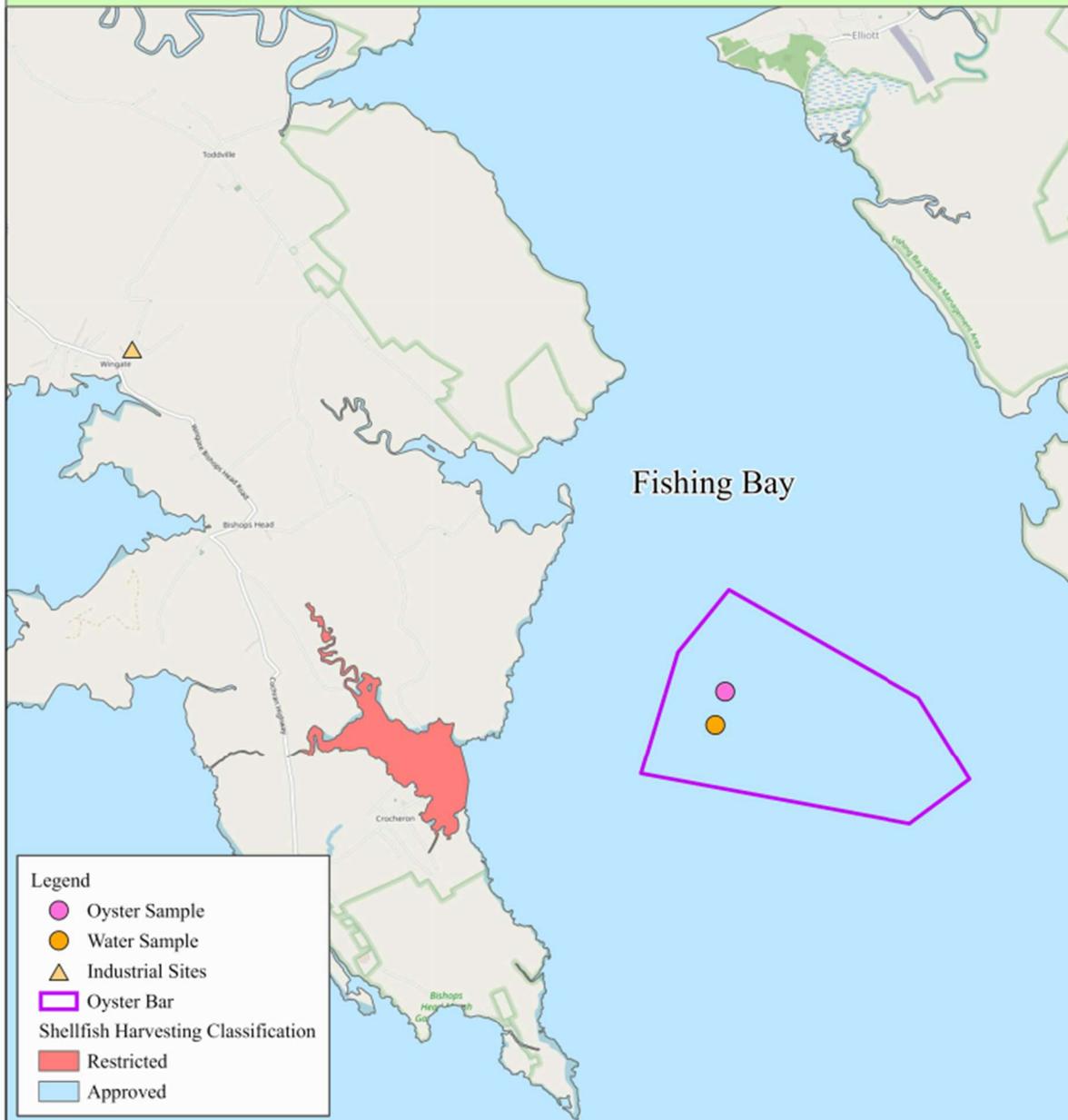


Figure 3: Patuxent River/Chesapeake Bay, St. Mary's and Calvert Counties Overview of Water and Oyster Sampling

PFAS Pilot Sampling Project - Monitoring Design  
Fishing Bay, Dorchester County - Control Sample Site  
Water and Oyster Sample Locations



Larry Hogan - Governor  
Boyd K. Rutherford - Lt. Governor  
Ben Grumbles - Secretary

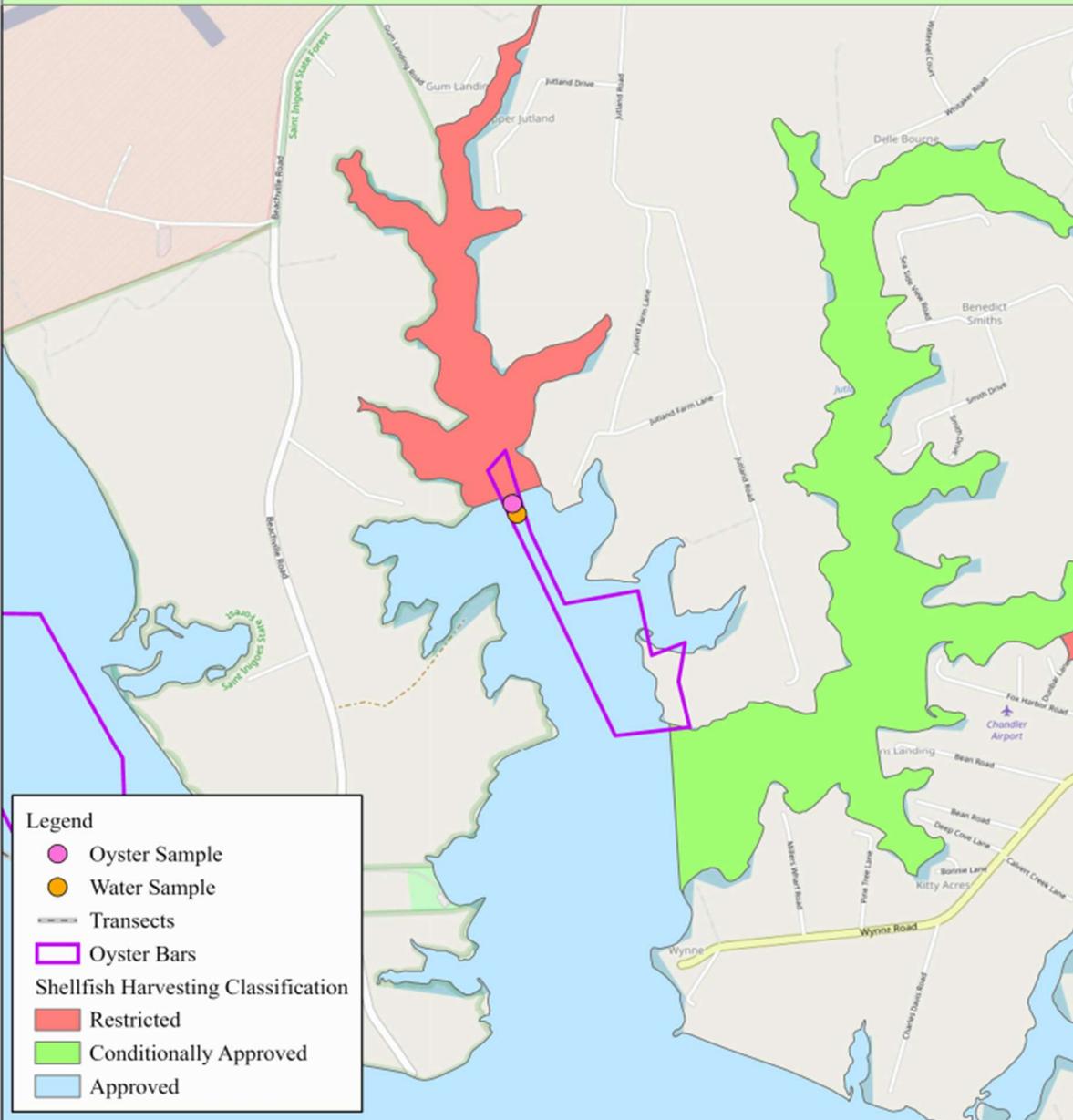


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Figure 4: Fishing Bay, Dorchester County Overview of Water and Oyster Sampling

PFAS Pilot Sampling Project - Monitoring Design  
 Smith Creek, St. Mary's River, St. Mary's County  
 Water and Oyster Samples



**Legend**

- Oyster Sample
- Water Sample
- Transects
- ▭ Oyster Bars

**Shellfish Harvesting Classification**

- Restricted
- Conditionally Approved
- Approved

Larry Hogan - Governor  
 Boyd K. Rutherford - Lt. Governor  
 Ben Grumbles - Secretary

N

0 0.1 0.3 0.5 Miles

Scale: 1:20,000  
 Date: 04/09/2020

Figure 5: Smith Creek, St. Mary's River, St. Mary's County Overview of Water and Oyster Sampling

See APPENDIX I: Target Analyte List, Analytical Methodology, and Supporting Documentation