Alaska Department of Environmental Conservation
Divison of Water

Module 6

Effluent Monitoring and Receiving Water Monitoring

2012 Seafood Processing Waste Permitting & Compliance Workshop

Seattle, Washington April 24-25, 2012

Module 6 – Effluent Monitoring & Receiving Water Monitoring

MODULE 6

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Module 6 – OBJECTIVES

- Sampling and analytical requirements

A.Sampling Equipment

B.Testing Equipment

- Discuss onboard monitoring issues
- Discuss monitoring parameters that require a certified commercial laboratory

Module 6 – What You Will Learn

- Test methods and sampling required

A.Check Federal Register/Vol. 72, No. 47, March 12, 2007 for approved analytical methods. This is where 40 CFR Part 122, 136 et al are published.

- Where to collect/analyze these samples.
- Overall scope of new monitoring requirements

Monitoring Planning and Preparation

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- Plan sample collection and analysis
- Obtain the necessary sampling and analysis equipment for testing the required parameters
- Train personnel in sampling and analysis
- Create SOPs for sample collection and analysis
- Create an SOP for offsite sample collection and shipping

Required APDES Water Samples

Seafood processor will be required to collect:

- Effluent Samples
  - Main Seafood
  - Sanitary Wastewater
  - Grey Water
  - Other Process Effluents
- Mixing Zone Sample (Edge of MZ)
- Background Receiving Water Samples

Sampling Equipment

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Standard Operating Procedure for Niskin or LaMotte Van Dorn Bottles

Sampling Equipment

- Materials you will need:

  Bottles, Knowledge of Holding Time Limits, Preservatives, PPE, Sample Coolers, Cooling Material, Chain of Custody, Sample Logbook, Custody Tape, Cooler Closer Tape, Shipping Logbook

Sampling Equipment

- Representative Sampling:

A. Grab

B. Composite

C. Direct Readout

See Standard Methods section 1060 for more on sample collection and preservation.

Testing Equipment

- Multimeter / Multiprobe instruments for measuring pH, Conductivity/Salinity, Dissolved Oxygen, and Temperature

- Reagent to check calibration:

A. pH Buffers

B. Conductivity Standard and blank

C. Dissolved Oxygen Standard and blank

D. Certified Thermometer

Testing Equipment

YSI Environmental

YSI 556 Multiparameter System

Versatile, multiparameter handheld instrument

Rugged and reliable, the YSI 556 MPS (Multiprobe System) combines the versatility of an easy-to-use, easy-to-read handheld unit with all the functionality of a multiparameter system.

- **Simultaneously measures dissolved oxygen, pH, conductivity, temperature, and ORP**
- **Field-replaceable electrodes**
- **Compatible with EcoWatch® for Windows® data analysis software**
- **Stores over 49,000 data sets, time and date stamped, interval or manual logging**
- **Three-year warranty on the instrument; one-year on the probes**
- **GLP assisting, records calibration data in memory**
- **Available with 4, 10, and 20-m cable lengths**
- **IP-67, impact-resistant, waterproof case**
- **Easy-to-use, screw-on cap DO membranes**
- **RS-232 interface for PC connection**

Testing Equipment

- Total Residual Chlorine and Turbidity

A. Standards

B. Blanks

C. Safety equipment

- Color

A. Color comparator

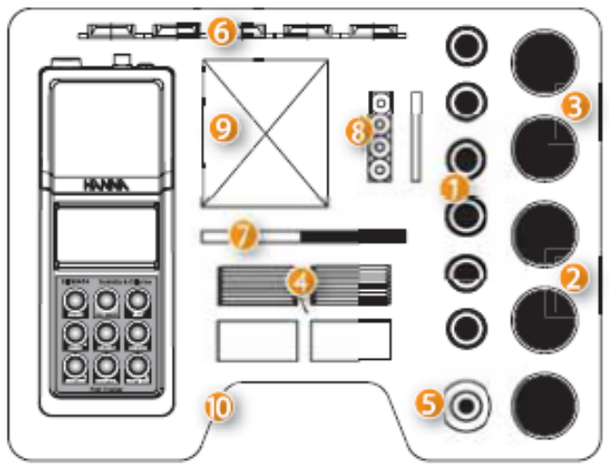
B. Filtration Apparatus (0.45 um membrane)

Testing Equipment

HI 98703 EPA Compliant Turbidity Meter
HI 93414 EPA Compliant Turbidity and Chlorine Meter

SPECIFICATIONS

Turbidity (HI 93414 & HI 98703)	
Range	0.00 to 9.99; 10.0 to 99.9 and 100 to 1000 NTU
Range Selection	Automatic
Resolution	0.01 NTU from 0.00 to 9.99 NTU; 0.1 NTU from 10.0 to 99.9 NTU; 1 NTU from 100 to 1000 NTU
Accuracy	±2% of reading plus 0.02 NTU
Repeatability	±1% of reading or 0.02 NTU, whichever is greater
Stray Light	< 0.02 NTU
Typical EMC Deviation	±0.05 NTU
Light Detector	Silicon Photocell
Method	Ratio Nephelometric Method (90°), ratio of scattered and transmitted light; Adaptation of the USEPA Method 180.1 and Standard Method 2130 B.
Measuring mode	Normal, Average, Continuous
Turbidity Standards	<0.1, 15, 100 and 750 NTU
Calibration	Two, three or four-point calibration
Free and Total Chlorine (HI 93414 only)	
Range	Free Cl_2 0.00 to 5.00 mg/L; Total Cl_2 0.00 to 5.00 mg/L
Resolution	0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 above 3.50 mg/L
Accuracy	±0.02 mg/L @ 1.00 mg/L
Typical EMC Deviation	±0.02 mg/L
Detector	Silicon photocell with 525 nm narrow band interference filters
Method	Adaptation of the USEPA Method 330.5 and Standard Method 4500-Cl G. The reaction between chlorine and DPD reagent causes a pink tint in the sample.
Standards	1 mg/L free chlorine, 1 mg/L total chlorine
Calibration	One-point calibration



Testing Equipment

HACH®

0 item(s), Total:

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Color Test Kit, Model CO-1

Overview | Details | Parameter/Reagent | Downloads

Product #: 223400
USD Price: $73.05
Available

Quantity 1

Add to Cart

Color disc kit reads apparent color created by dissolved substances that can indicate industrial, agricultural, or natural pollution
Dual range measurement

Specifications

# Tests:	No Limit
Case Style:	D
Footnote:	*mg/L unless otherwise noted; ppb = µg/L; ppm = mg/L.; gpg = grains per gallon; 1 gpg = 17.1 mg/L or 17.1 ppm.
Method:	Color disc/APHA Platinum – Cobalt
Model:	CO-1
Parameter:	Color - as color units
Range:	0 - 100 units
Range 2:	0 - 500 units
Ship Wt. (lbs):	1.0

Mixing Zone Determination Information

- The mixing zone authorized by DEC in the past has been a maximum a 100 foot radius circle centered at the outfall pipe or discharge pipe terminus.
- This size needs data to show it is appropriate for protection of the State Water Quality Standard.

Mixing Zone Sampling

Samples will be collected at the edge of the mixing zone for the seafood wastewater outfall:

- Duplicate samples one meter below the surface will be collected
- Duplicate sample will be collected in waters < 120 ft in depth, mid way between the surface and the bottom
- Waters > 120ft in depth, will be sampled at a depth of 60 feet in duplicate.

Mixing Zone Sampling

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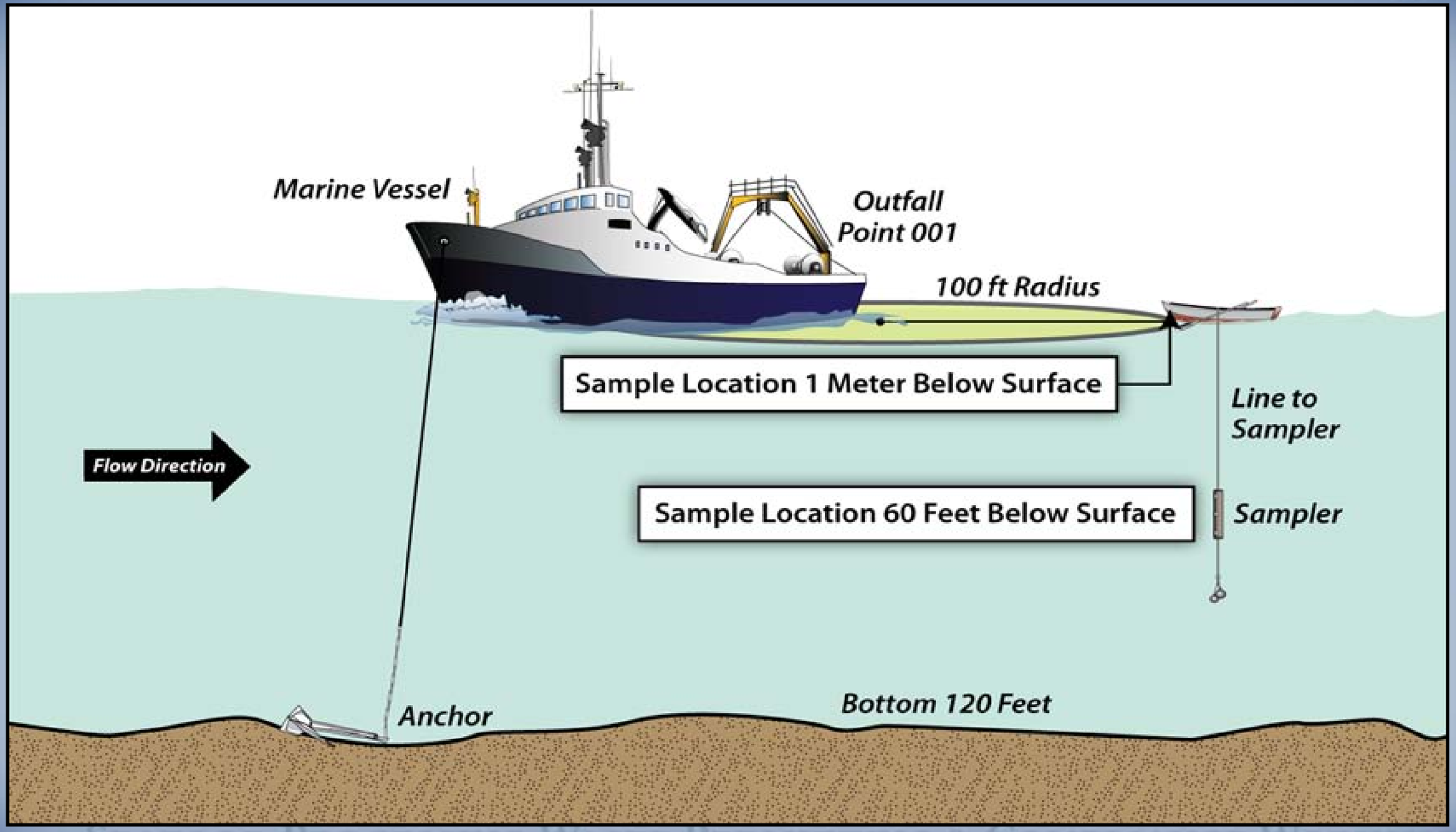

Mixing Zone Sampling

Background Samples from the receiving water outside the influence of the vessel wastewater discharges are required.

Total Residual Chlorine testing is not required by the permit at the background location, but it could be collected to compare to mixing zone sample results.

Receiving Water Monitoring

Background samples are important to understanding the quality of the water bodies that the seafood processor will discharge into and to help evaluate the test data for some parameters, such as, turbidity, color, salinity, and temperature.

Mixing Zone & Receiving Water Tests

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Facility Wastewater Testing Onsite:

Total Residual Chlorine (TRC), pH, Temperature, color, turbidity, settleable solids, salinity, and DO, TRC not test in receiving water.

Offsite Testing by Commercial/Certified Laboratory:

Oil and grease, BOD_5, Total Suspended Solids, Fecal and Enterococci Coliform Bacteria.

Effluent / Wastewater Monitoring

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The wastewater testing will be performed on the main seafood wastewater discharge, sanitary wastewater effluent (MSD), and the greywater effluent. Other waste streams may also be tested.

Monitoring

<u>Onsite laboratory</u>:

- Total Residual Chlorine (4500-Cl G)
- pH (4500-H B)
- Temperature (2550 B)
- Color (2120 B)
- Dissolved Oxygen (4500-O G)
- Salinity (2520 B)
- Turbidity (2130 B)

Note: Method Number are from Standard Methods 21st Edition unless specified.

<u>Commercial lab</u>:

- Oil and Grease (EPA 1664A)
- BOD_5 (5210 B)
- Total Suspended Solids (2540 D)
- Fecal (9221 C or E) and Enterococci (9230 B or EPA 1600)

Sample / Analysis

- Sample Collection Preparations

  First, determine that the facility has been processing seafood for a number of hours and is near full capacity and steady state. Collect the samples that can be tested onsite.

Sample / Analysis

Determine what additional samples will be collected:

If the vessel or facility is within 4 hours of a testing laboratory, collect the offsite samples for shipment.

Airport Hub/ Laboratory Locations

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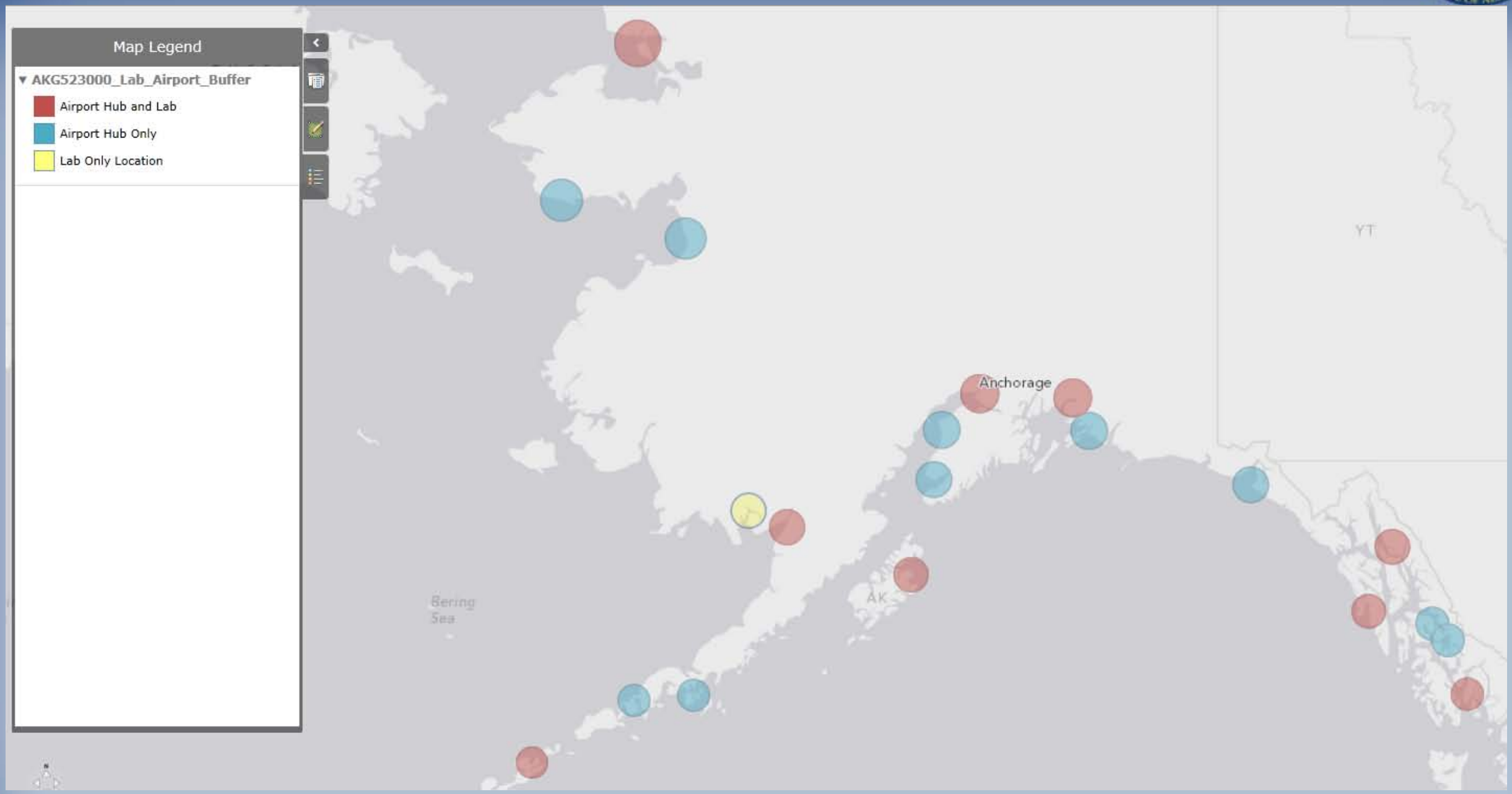

Sample / Analysis

- Collect all of the samples from all of the outfalls, mixing zones and background receiving water locations.
- Obtain all test results, determine if the quality assurance and results meet permit requirements,

Sample / Analysis

After Laboratory Testing -

- If results meet quality assurance requirements, sampling and testing is complete for that calendar quarter or frequency as specified by the permit.

or

- If the results do not meet quality assurance requirement, collect more samples and repeat testing and evaluation until results are acceptable.

Monitoring / Sampling Data Outcomes

- DEC will evaluate all mixing zone and background sample collected during this permit cycle and potentially refine the size of the general permit defined standard mixing zone for receiving waters within the coverage area of the permit.
- Effluent Data Monitoring and Reporting

End of Module 6