Mobile Bay National Estuary Program

Wastewater Detection Canine Program

Dauphin Island Sea Lab
Alabama Center for Marine Education and Research

Mobile Bay National Estuary Program

Purpose

Promote the wise **stewardship** of the water quality and living resources of Alabama's estuaries and coast

Goals

- Reduce the **time** and **cost** associated with traditional point and nonpoint source tracking methods

- Improve **efficiency** in identifying human-source wastewater pollution, enabling quicker response and mitigation

- Provide a **tool** for municipalities and organizations

Overview

- Train a canine to identify sources of sewage in our waterways
- Use the canine as a screening tool to detect regulatory levels of wastewater
- Facilitate better environmental management initiatives

Partners

Dauphin Island Sea Lab
Alabama Center for
Marine Education and Research

USA

FDA

ESA

XanO

MOBILE
ALABAMA

MOBILE COUNTY ALABAMA
ESTABLISHED 1812

ALABAMA DEPARTMENT OF PUBLIC HEALTH
1875

CITY OF FAIRHOPE
ALABAMA

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

Veteran Led

Cody Aloi (Program Manager, MBNEP)

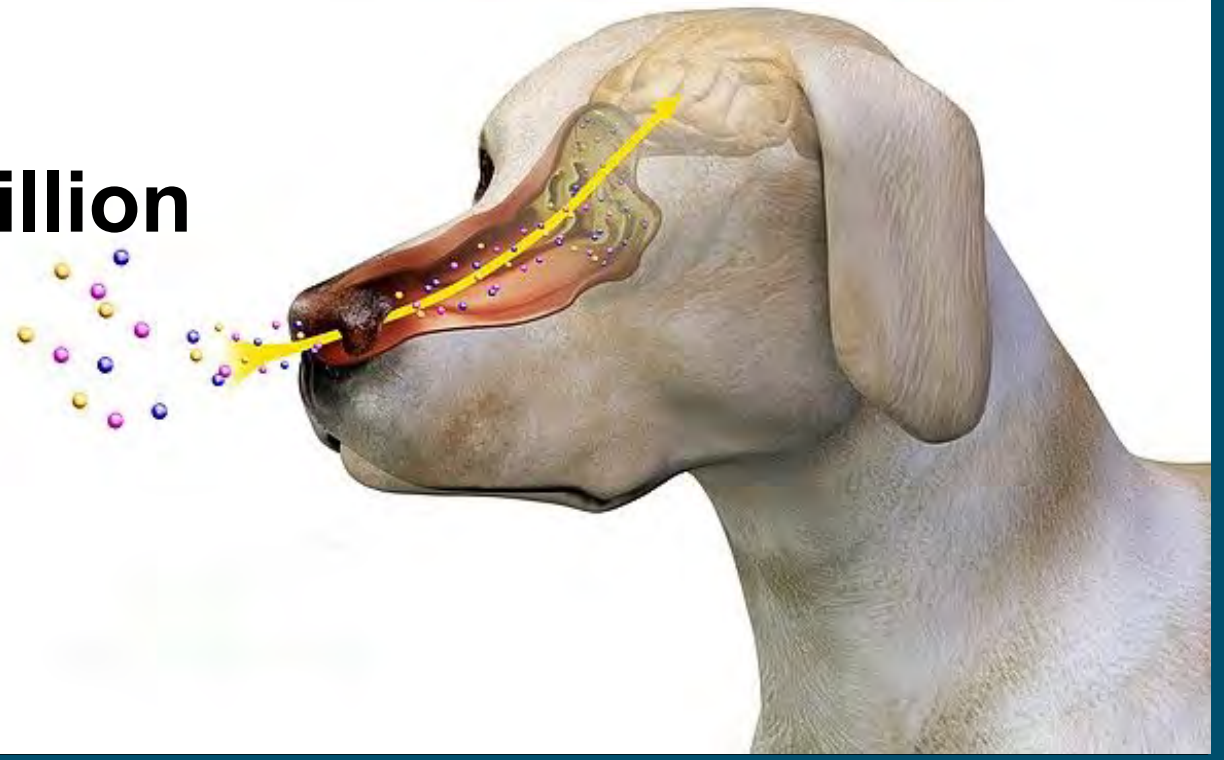
- United States Navy Veteran
- 15 years of canine experience

K-9 Utilization

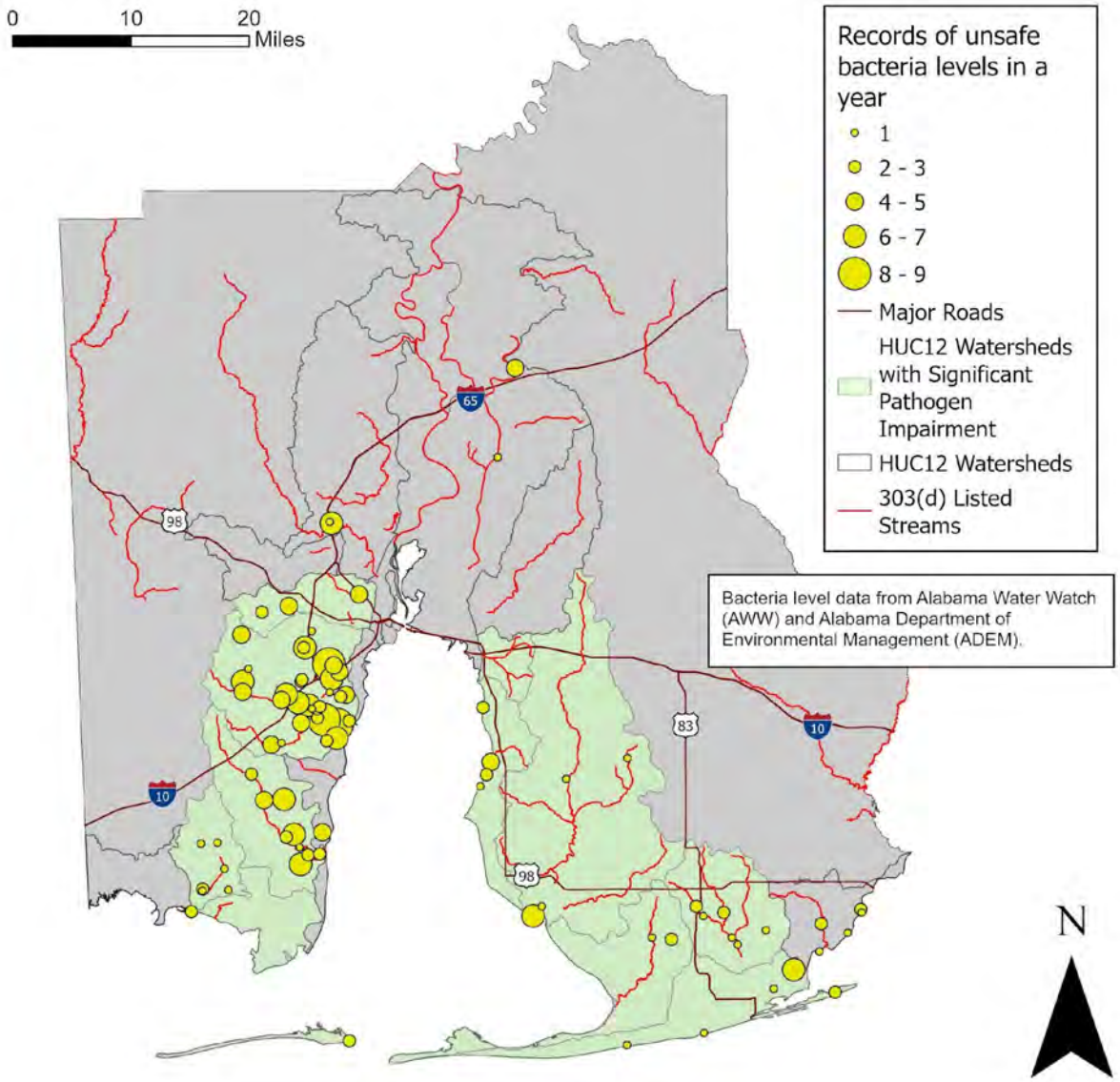
- Police Work (Narcotics/Tracking)
- Search and Rescue
- Service Animals for Disabilities
- Virus Detection (Agriculture)
- Mental/Medical Health Assistance
- Emotional Support
- Messengers
- Sentry
- Wastewater Detection

Canine Olfactory System

- 300 million olfactory receptors
- Olfactory region is 40 times greater than humans
- Scent detection parts-per-trillion
- Discrimination ability

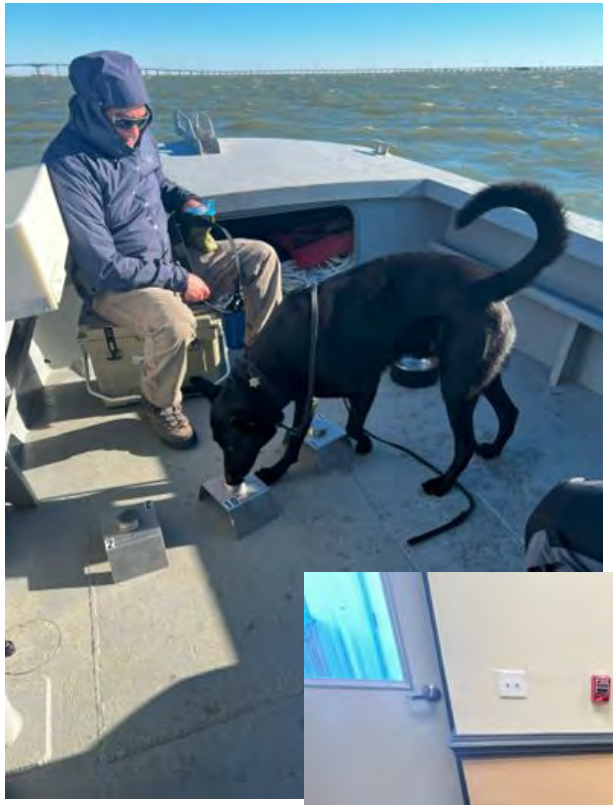


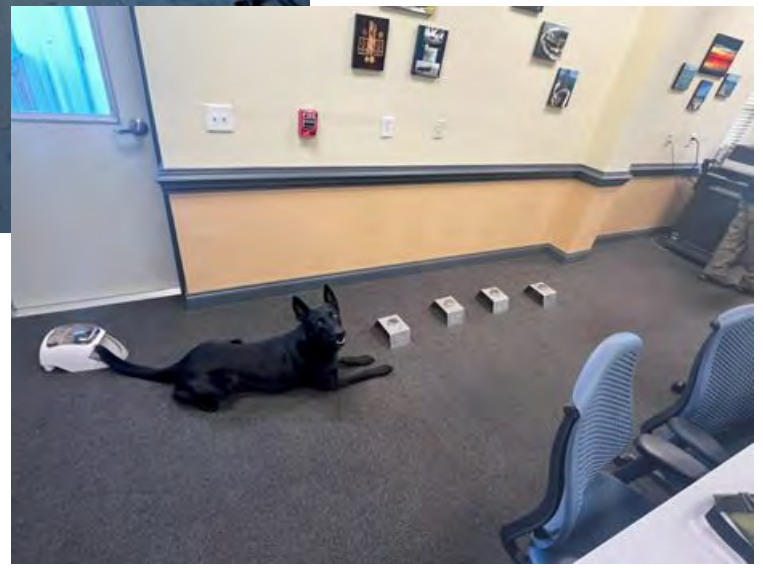
The Problem


0
10
20
Miles
Records of unsafe bacteria levels in a year
1
2 - 3
4 - 5
6 - 7
8 - 9
Major Roads
HUC12 Watersheds with Significant Pathogen Impairment
HUC12 Watersheds
303(d) Listed Streams
Bacteria level data from Alabama Water Watch (AWW) and Alabama Department of Environmental Management (ADEM).
65
98
10
83
10
98
N

Our Solution

Use the canine to screen samples, reducing excessive and expensive laboratory analysis





Methodology

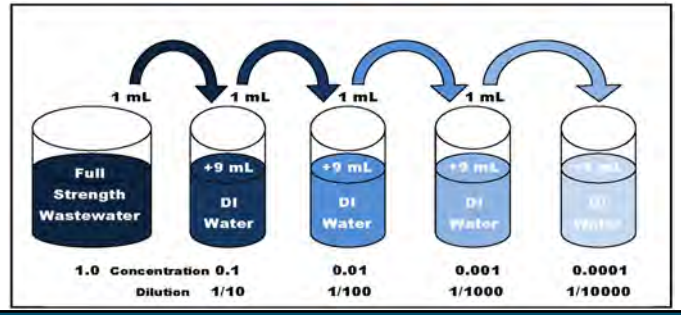
Raw wastewater samples collected from local municipal wastewater treatment plants

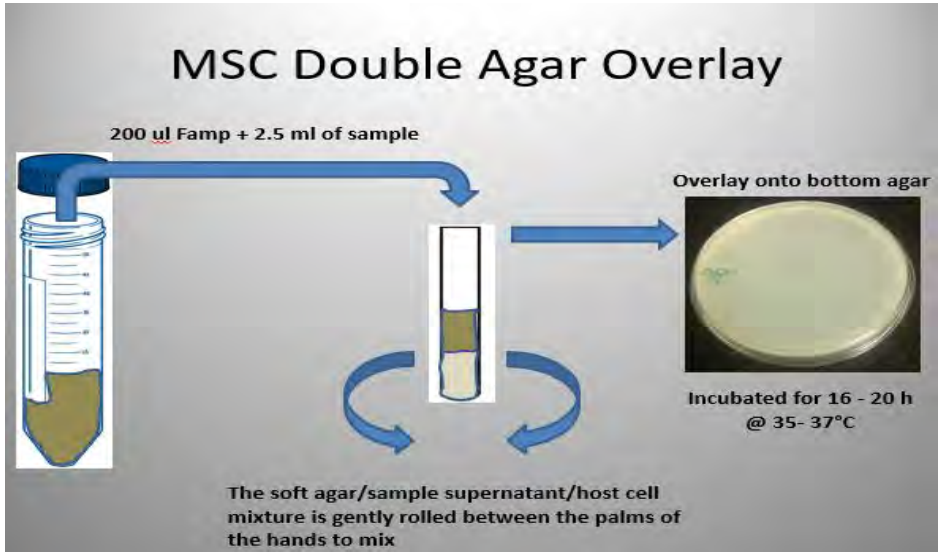
Samples combined and mixed

Microbiological analysis will be conducted for the enumeration of Fecal Coliforms (FC), *Escherichia coli* (EC) and Male-specific coliphage (MSC)

Impregnate raw wastewater scent into GETXENT tubes utilizing the SciK9 Impregnation Kit

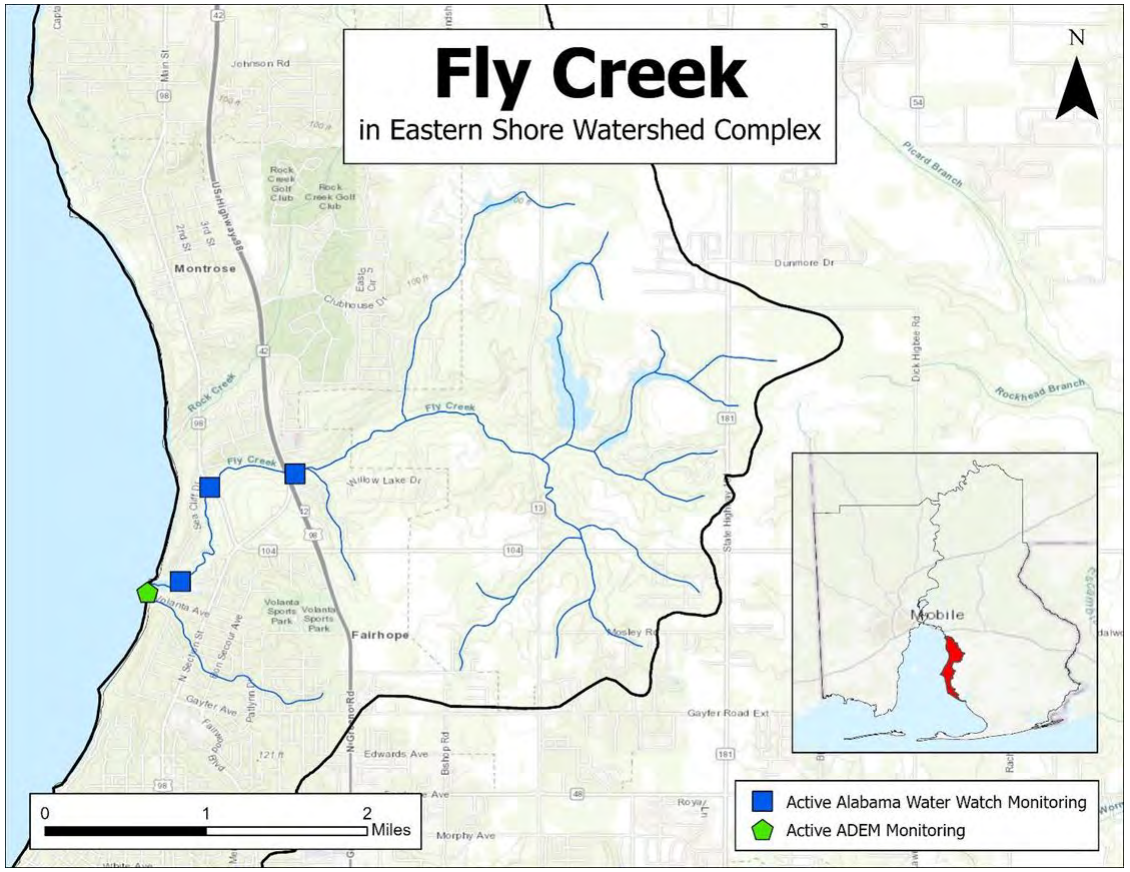
Canine trained to detect raw wastewater

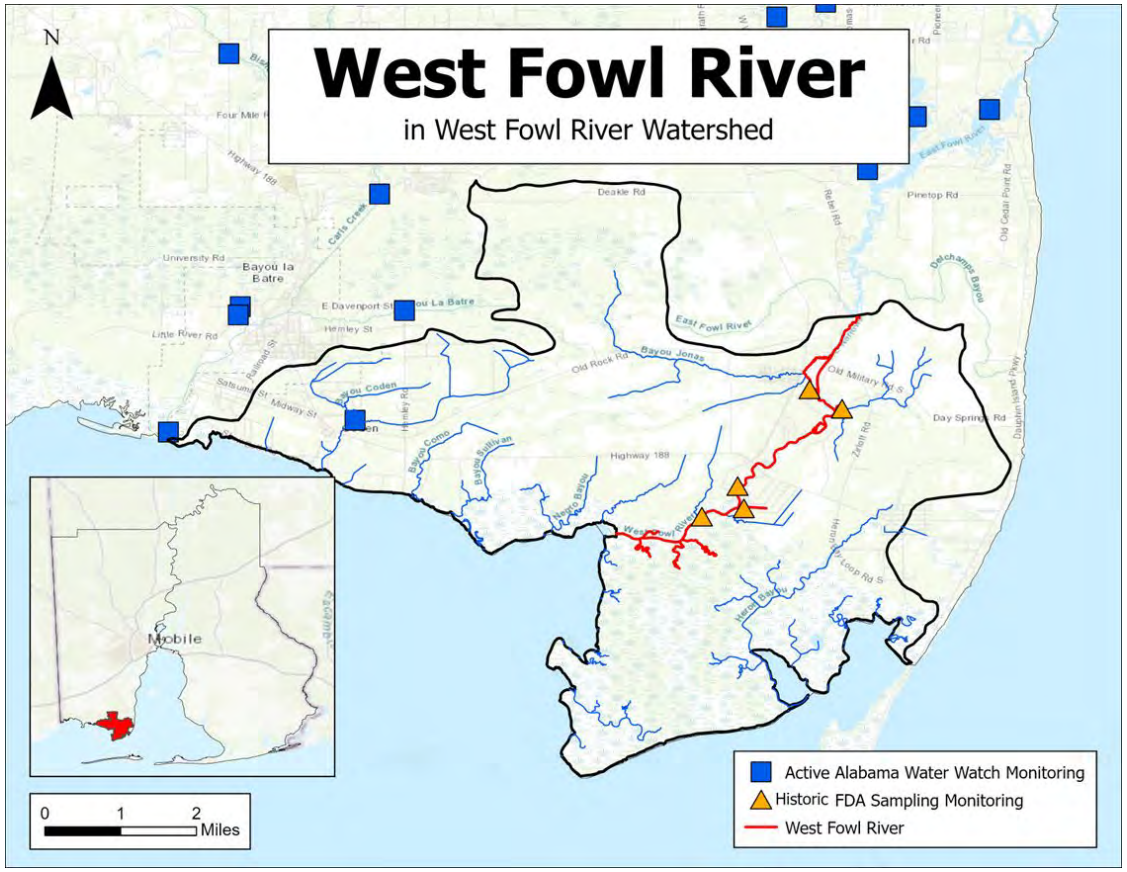




Quanti-Tray System

Where?


Fly Creek
in Eastern Shore Watershed Complex
N
Montrose
Fairhope
Fly Creek
Rock Creek
Rockhead Branch
Picard Branch
Dunmore Dr
Willow Lake Dr
Gayfer Road Ext
Edwards Ave
Morphy Ave
Mobile
0 1 2 Miles
Active Alabama Water Watch Monitoring
Active ADEM Monitoring

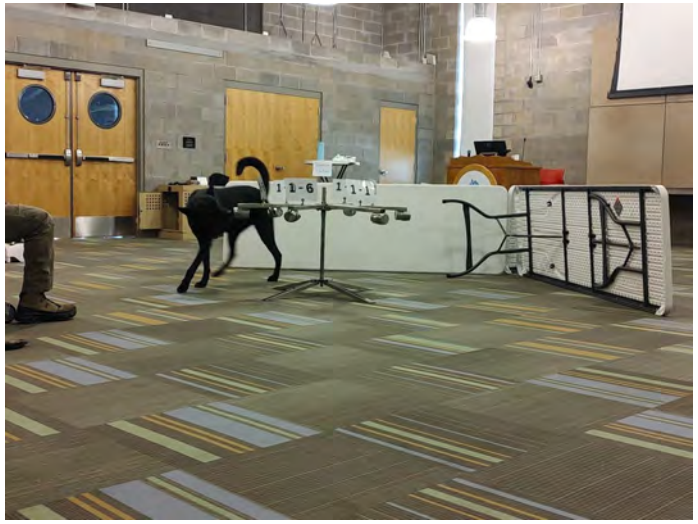

West Fowl River
in West Fowl River Watershed
N
Bayou la Batre
East Fowl River
Bayou Jonas
Bayou Coden
Highway 188
Deakle Rd
Pinetop Rd
Old Military Rd S
Day Spring Rd
Mobile
0 1 2 Miles
Active Alabama Water Watch Monitoring
Historic FDA Sampling Monitoring
West Fowl River

Accomplishments

UPWDA
UNITED POLICE WORK DOG ASSOCIATION

ESA

Double Blind Study



- 180 nose to odor exposures
- 8-hour test and assessment
- <u>99.4% Accuracy</u>

Threshold Test

- Professor X was unable to detect -14 dilution (1:100,000,000,000,000)
- MSC test around -5 (1:100,000)
- Canine is around nine orders of magnitude lower than MSC test

Operational Testing

- 55 Nose to Odor Exposures
- Distractors
- Fly Creek Project
- 100% Accuracy

Independent Certification

Obtained a certification from the United Police Working Dog Association (UPWDA)

Next Steps

- **Now:** Prove Value
- **Next:** Validate for Regulatory Use
- **Later:** Scale and Operationalize

QUESTIONS?

Contact Information

Cody Aloi – Mobile Bay National Estuary Program

caloi@mobilebaynep.com