

A Pawsitive Approach To Source Tracking Sewage Pollution

Laura Symonds, Canine Handler,
Midwest Region Team
Environmental Canine Services LLC



ENVIRONMENTAL CANINE SERVICES (ECS)

Founded by Karen &
Scott Reynolds in 2009

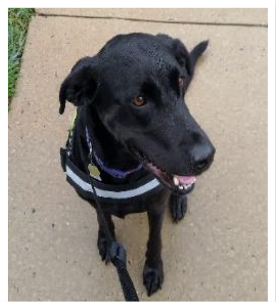


Sable and Logan – 1st sewage detection K9s

- Identify and source track sewage pollution caused by leaking sewer lines, illicit pipe connections, and failing septic systems
- Storm water systems and surface waters

RESCUED DOGS PROTECTING THE ENVIRONMENT!

3 Regional Teams (East Coast, Midwest, West Coast) providing nationwide services



EAST COAST
Based in ME

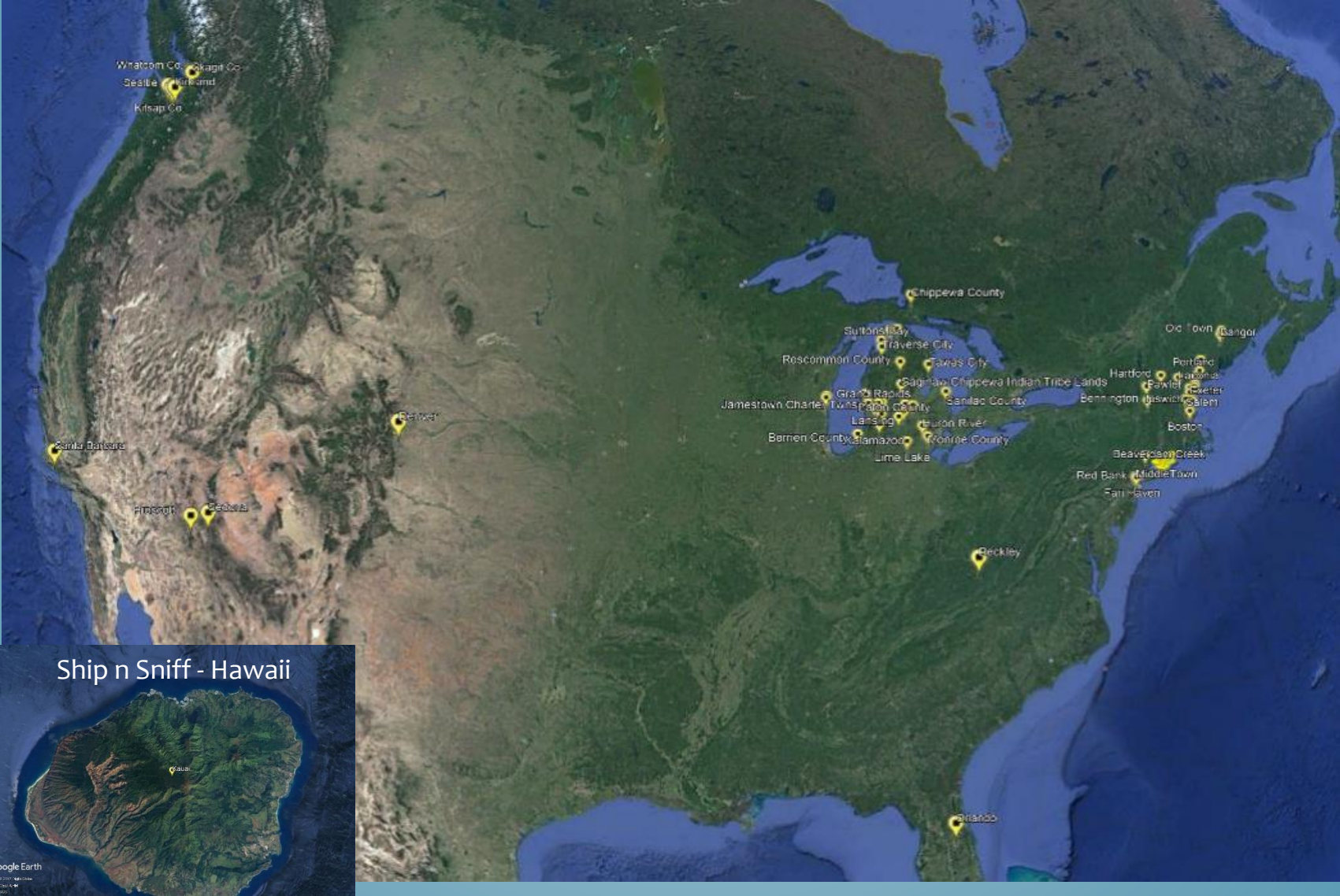


WEST COAST
Based in CA

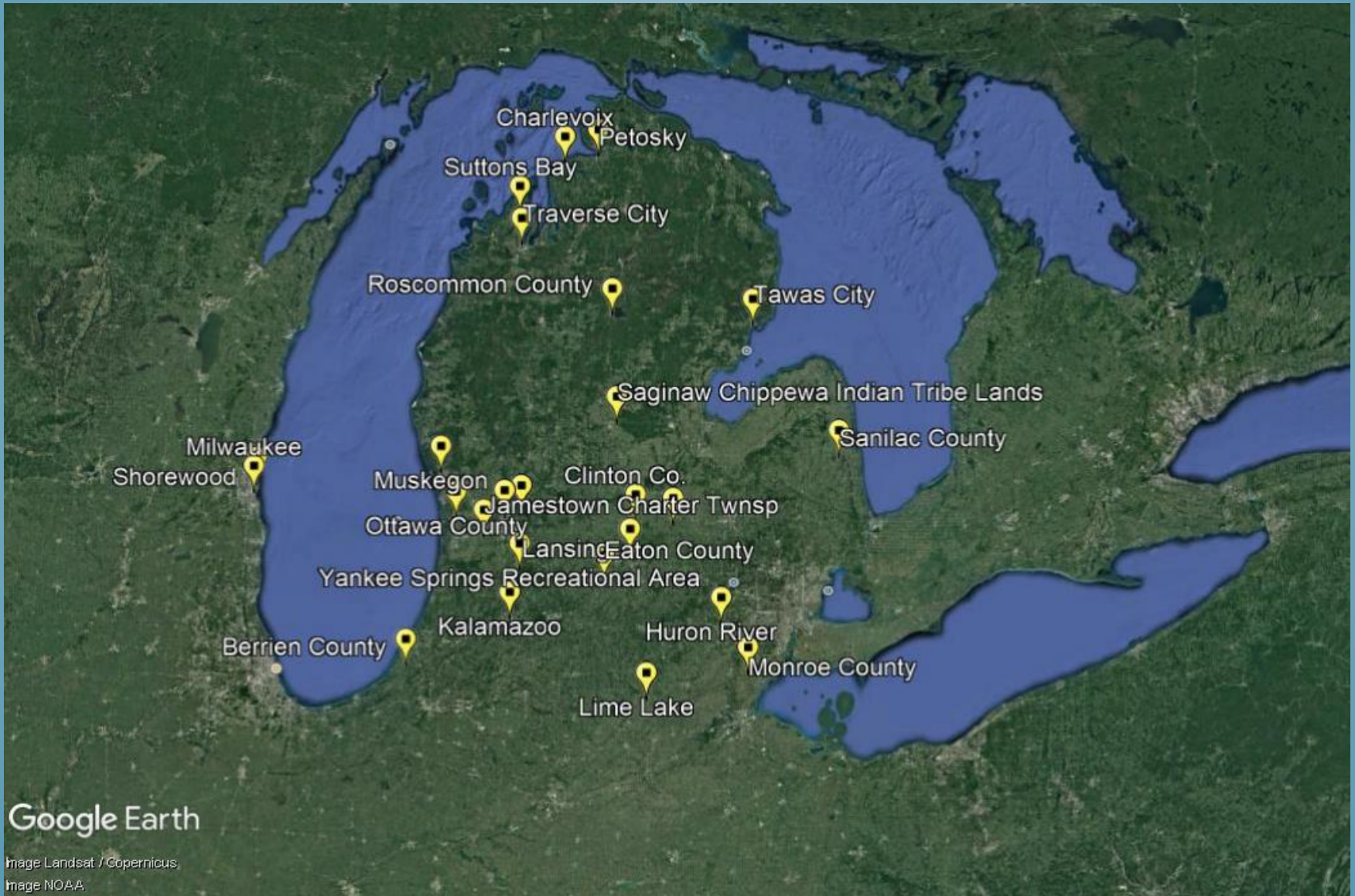


MIDWEST
Based in MI

ECS NATIONWIDE: OVER 70 IDDE PROJECTS IN 14 STATES & 30 SHIP & SNIFF SERVICES COMPLETED

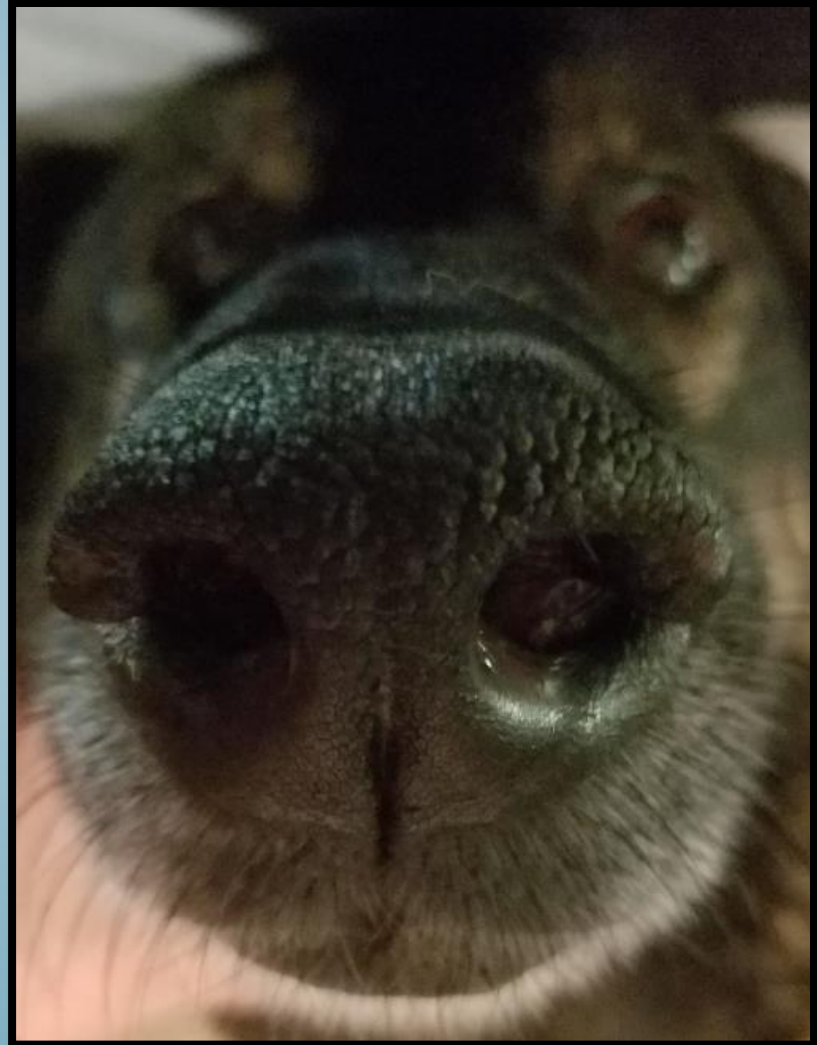


MICHIGAN & GREAT LAKES PROJECTS



WHY USE CANINES? BECAUSE THE NOSE KNOWS!

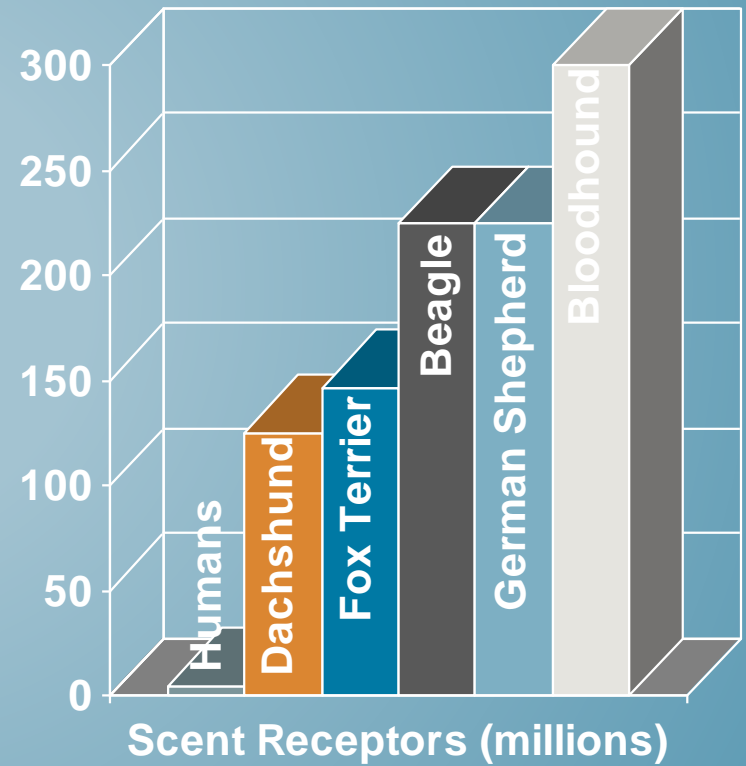
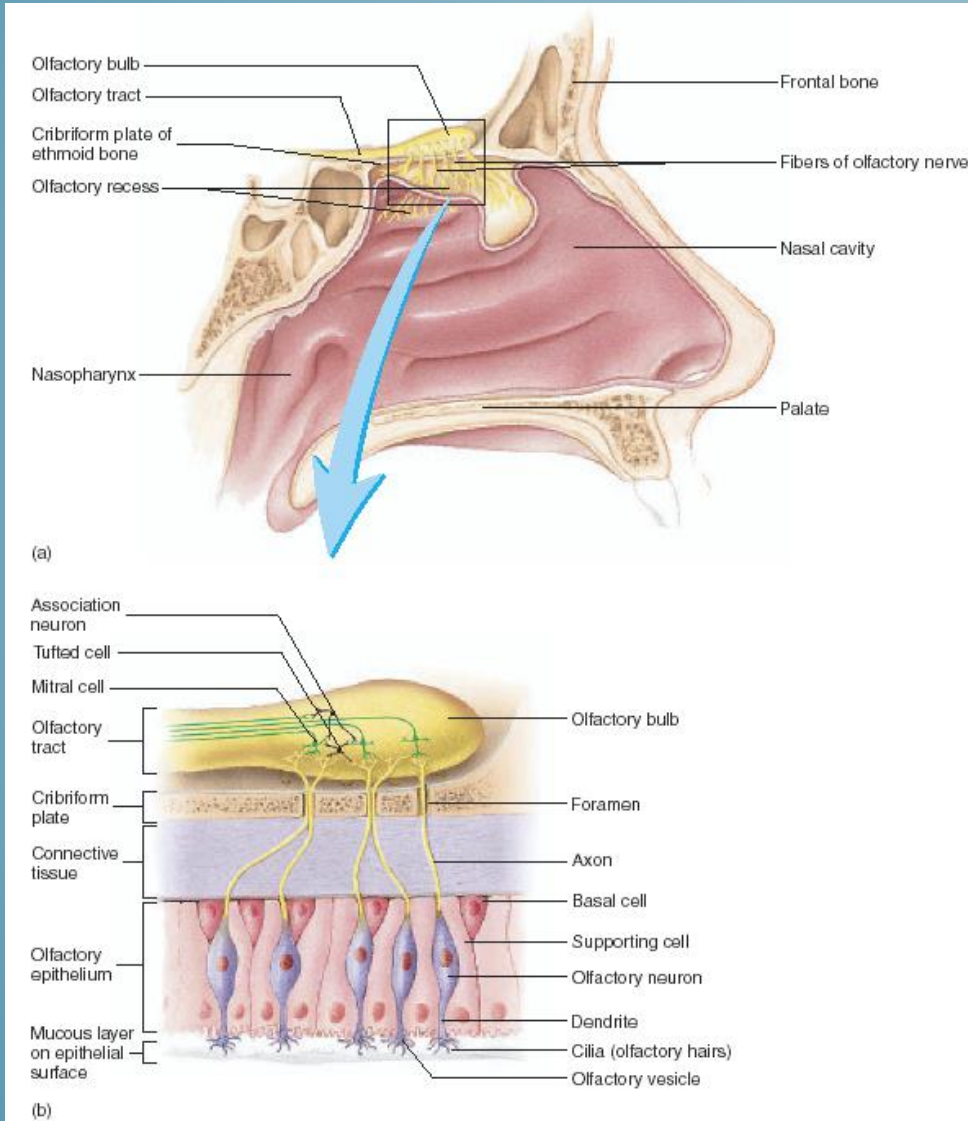
*Canine Olfaction and
the Working Dog*



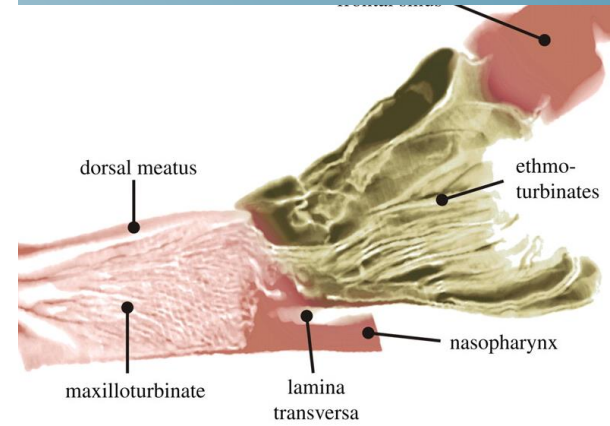
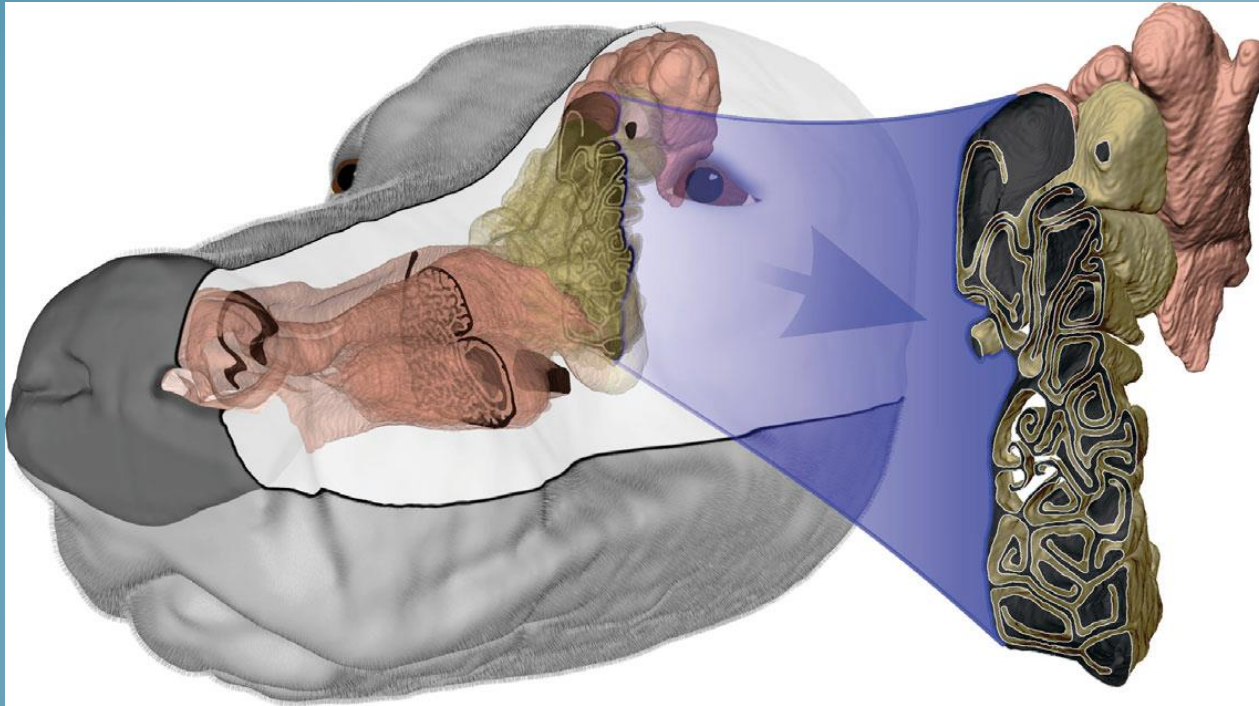
NOT GOOD AT A DESK JOB



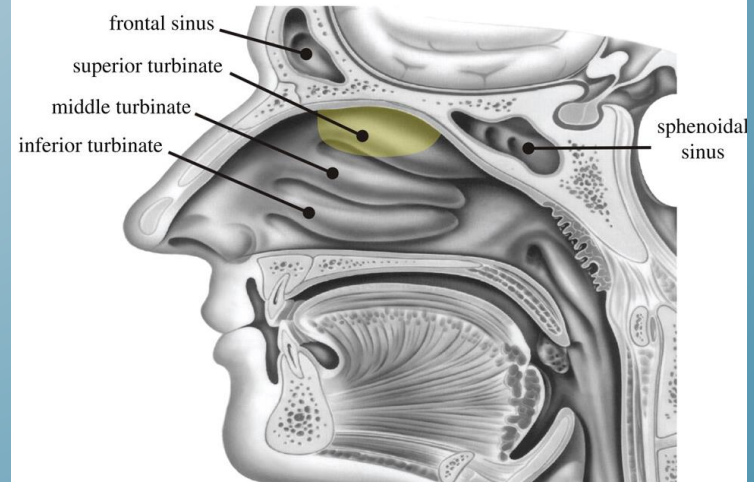
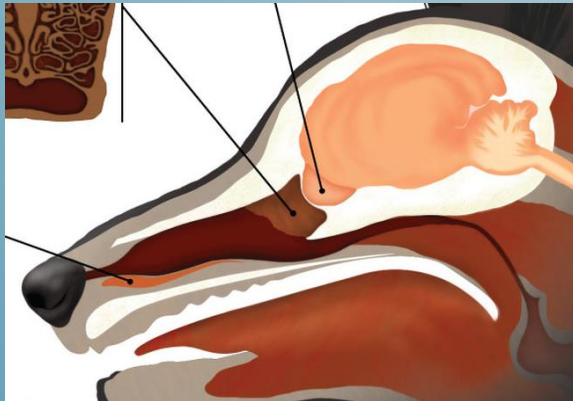
OLFACTORY NEURONS (RECEPTORS)



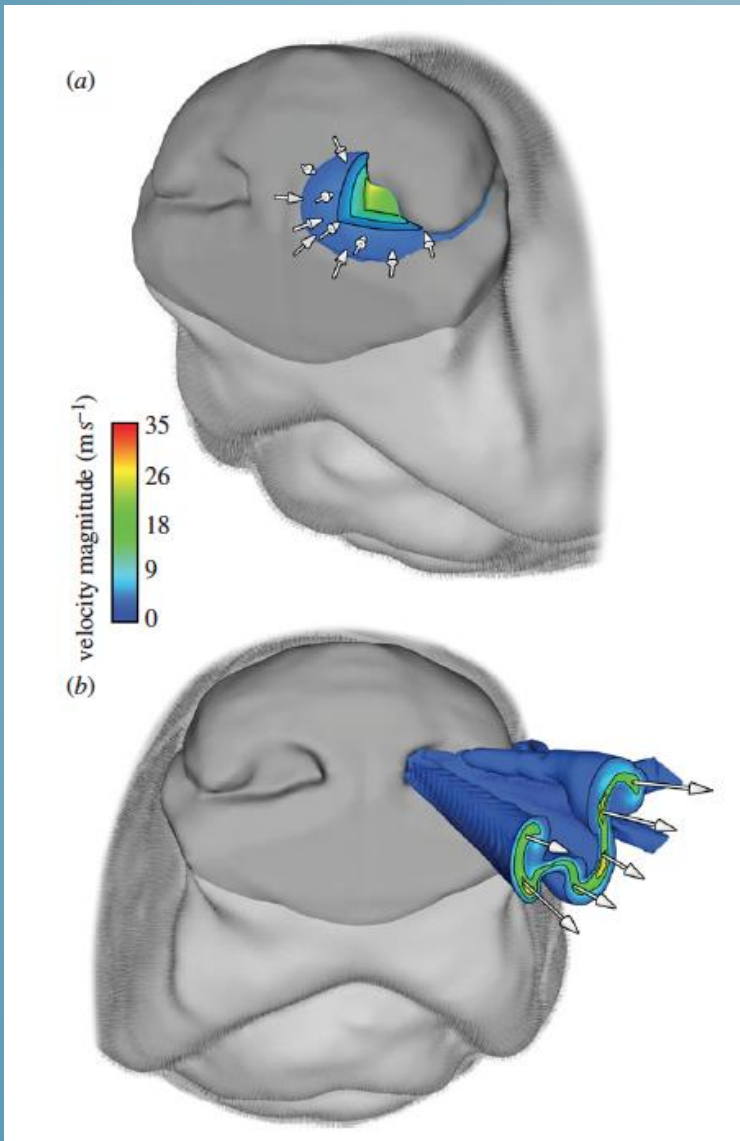
NASAL CAVITY IN DOG NOSE



Vomeronasal Organ



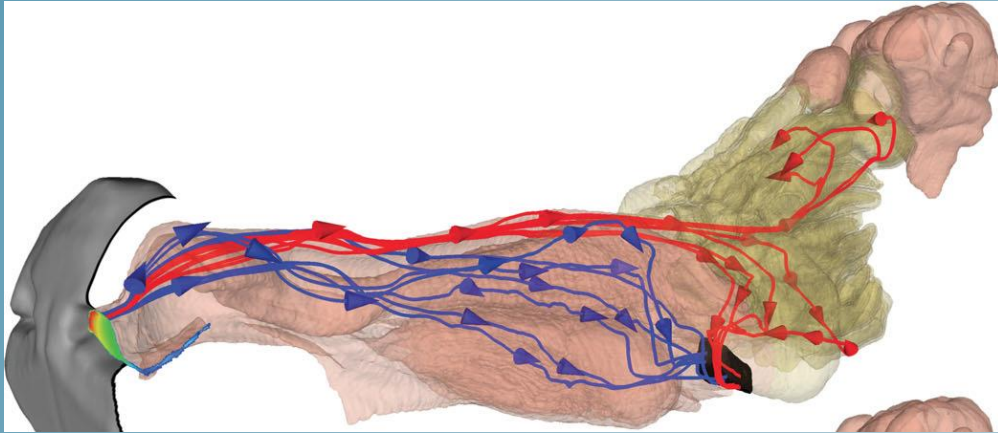
AIRFLOW THROUGH DOG'S NOSTRILS



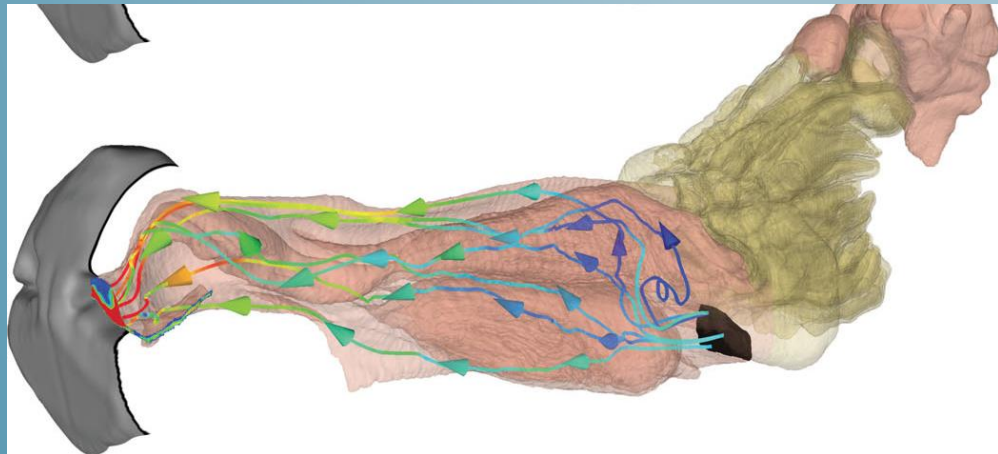
Inflow; ≤ 1 cm “reach”
(allows internostril separation)

Outflow; though side slit
(inflow not contaminated by
outflow)

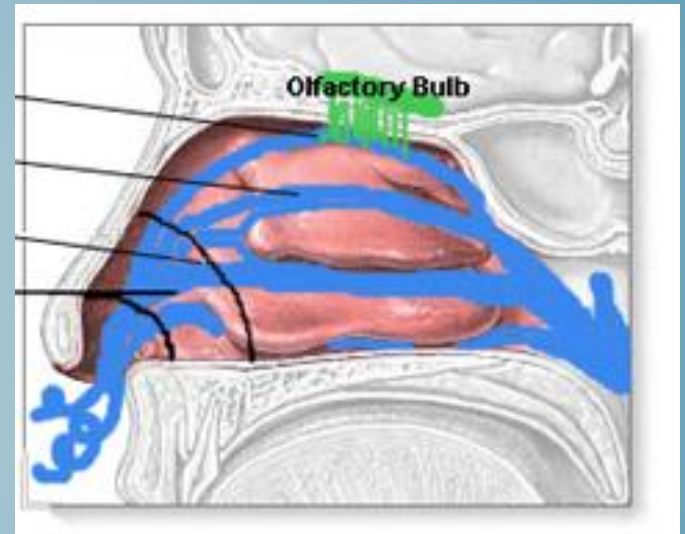
OLFACTORY FLOW



Dog: Inspiration – 2 paths



Dog: Expiration – bypasses olfactory recess



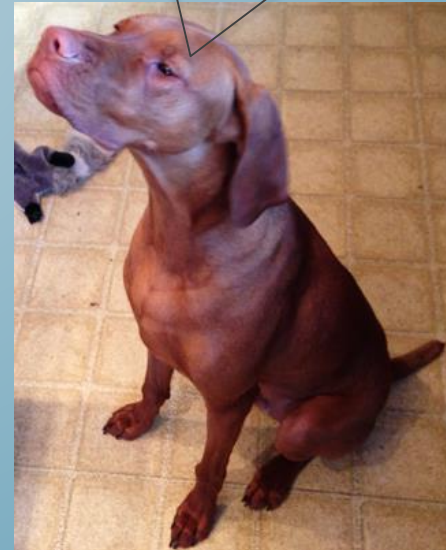
Human: 1 path in & out

DOGS SMELL IN DETAIL

Mmmm..
hamburger!



Mmmm... fried ground cow muscle, gristle, and fat; soy extender; imitation American cheese, vegetable oil and dry milk; wheat bun, 20 sesame seeds, on leaf day-old lettuce; tomato slice, partly green, vinegar, spices in a tomato-based sauce, touched by the hand of a human that I know...



**IT'S NOT JUST SMELLING – IT'S THINKING
(AND THAT'S HARD WORK!)**



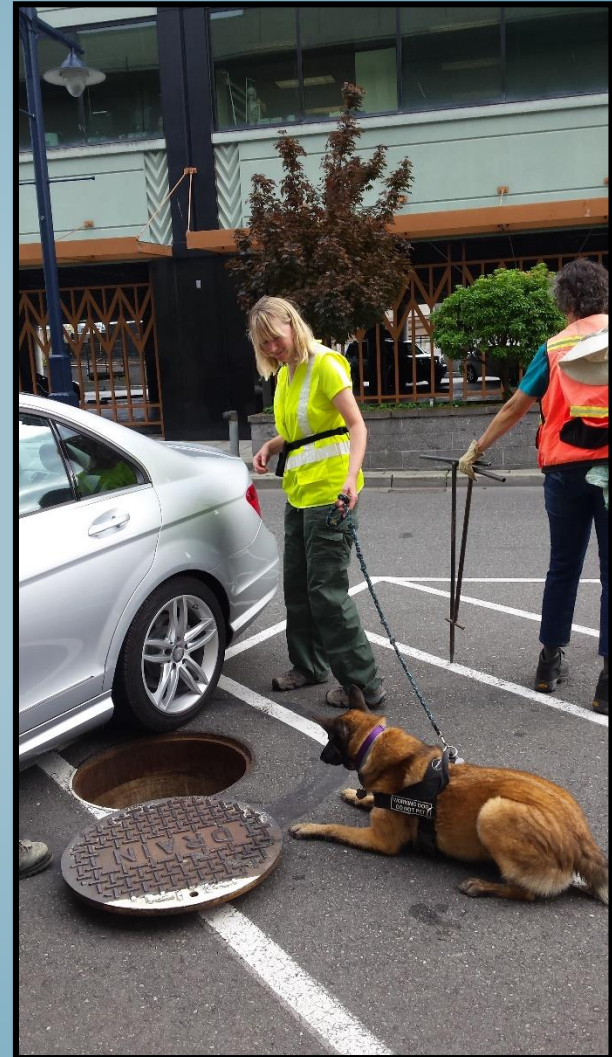
WHAT ECS K9S DETECT

The presence of:

- *Human waste in sewage*
- *Some K9s alert to greywater components (detergents, FOG)*
- *Residual scent from previous sewage discharges*

What they can't tell us:

- ***FIB (i.e. E. coli) presence & levels***
- ***How long the scent has been there***



SCENT DETECTION DEMO



ECS Canine Kenna!

HUMAN SPECIFIC!

WHAT THE CANINES DON'T ALERT TO

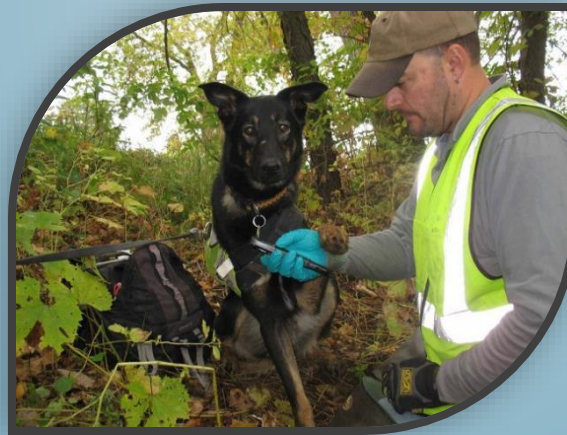
➤ *Animal waste sources*



A COMPLEMENTARY TOOL

ECS K9/Handler team scent detection/interpretation skills
& ECS on-site Project Manager illicit discharge expertise

+ Collaboration With Labs, State & Federal Agencies,
Researchers, Local Communities, Other Stakeholders



= More efficient, accurate, cost effective results!

K9 SEWAGE DETECTION APPLICATIONS

Water Sample Scenting



On site or
“SHIP AND SNIFF” method



Stormwater Investigations Sewer and septic discharges



Surface Water Investigations

Beaches, Shorelines, Drains, Streams



MS4 Screening/Source Tracking

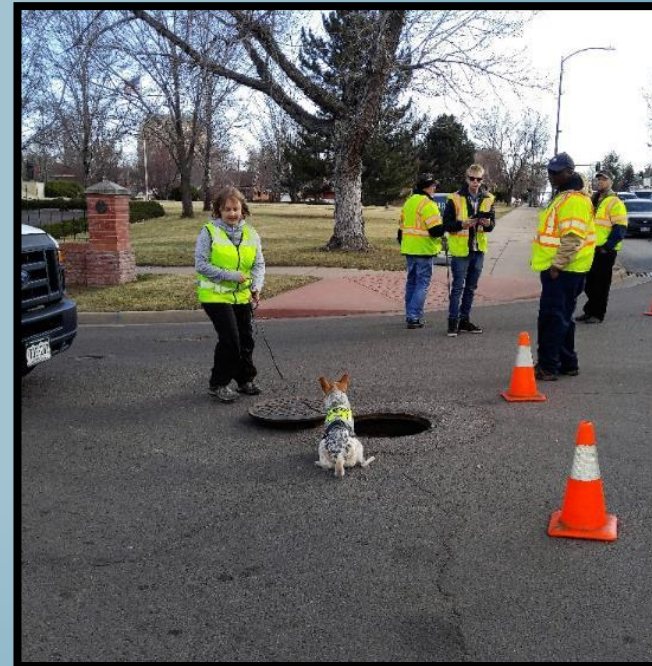


Milwaukee, WI



Orlando, FL

Outfalls, manholes,
catch basins



Denver, CO

ADVANTAGES OF USING ECS CANINES

- ❖ *Immediate “yes/no” to presence/absence of sewage*
- ❖ *Reduced sampling/lab testing costs*
- ❖ *High # site investigations per day*
- ❖ *Distinguish human from animal sources*
- ❖ *Rapid, “on the fly” source tracking*
- ❖ *Find or isolate sources in hours or days instead of weeks, months, years*



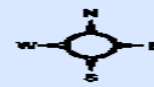
LAKE MICHIGAN WATERSHED, BERRIEN COUNTY, MI

July 2016

- **Collaboration with The Conservation Fund, SW Michigan Planning Commission, a private lab, and 4 municipalities**
- **Funded by MI DEQ SAW grant**
- **12 streams discharging to Lake Michigan not meeting EPA water quality standards and no watershed management plans**

Lake Michigan Tributaries

NORTH SECTION



MUNICIPAL BOUNDARIES

Legend

- Municipal Boundary
- Railroad
- Drain
- Stream

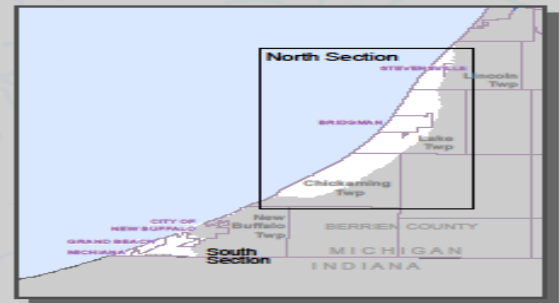
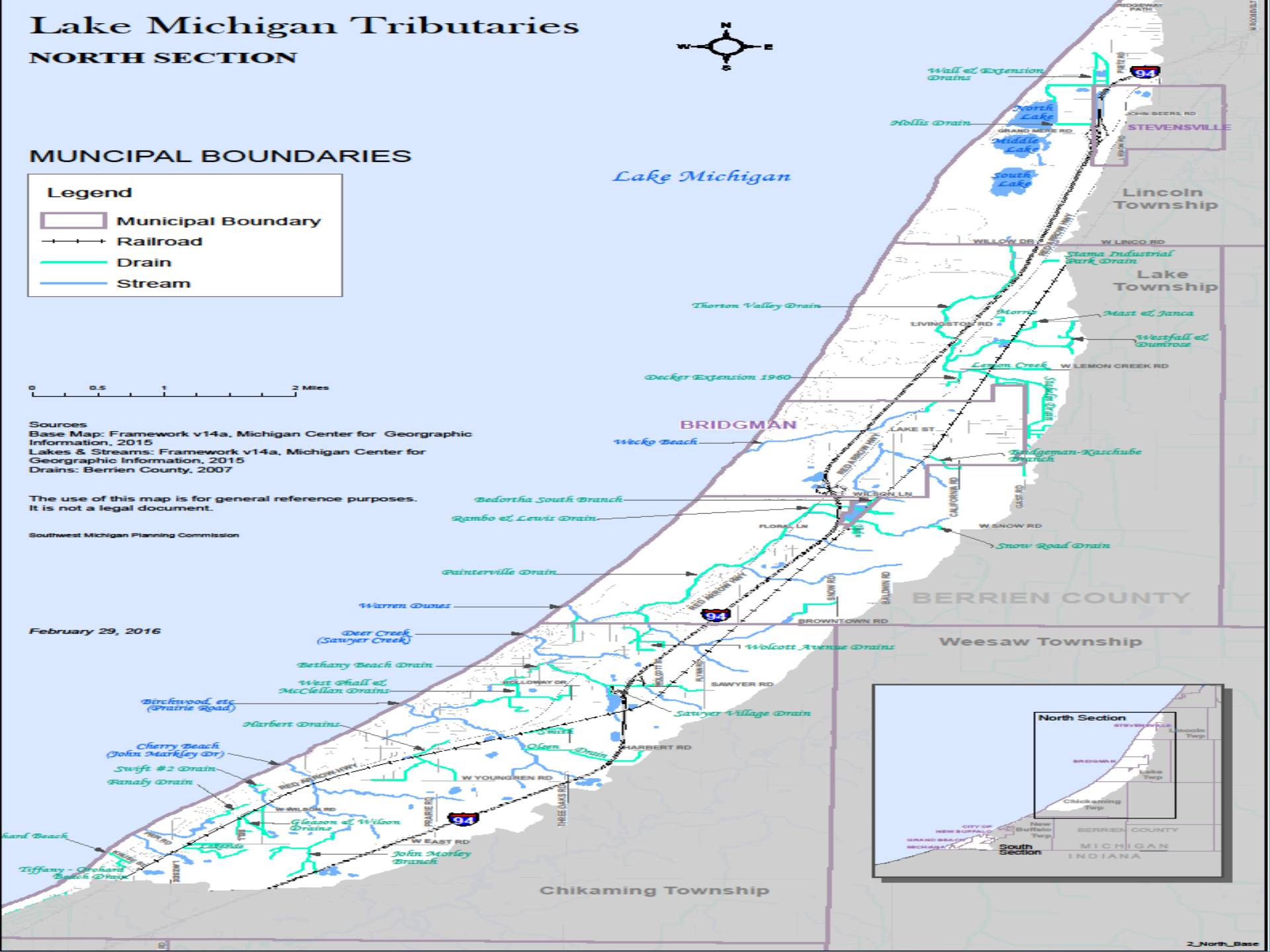


Sources
Base Map: Framework v14a, Michigan Center for Geographic Information, 2015
Lakes & Streams: Framework v14a, Michigan Center for Geographic Information, 2015
Drains: Berrien County, 2007

The use of this map is for general reference purposes. It is not a legal document.

Southwest Michigan Planning Commission

February 29, 2016





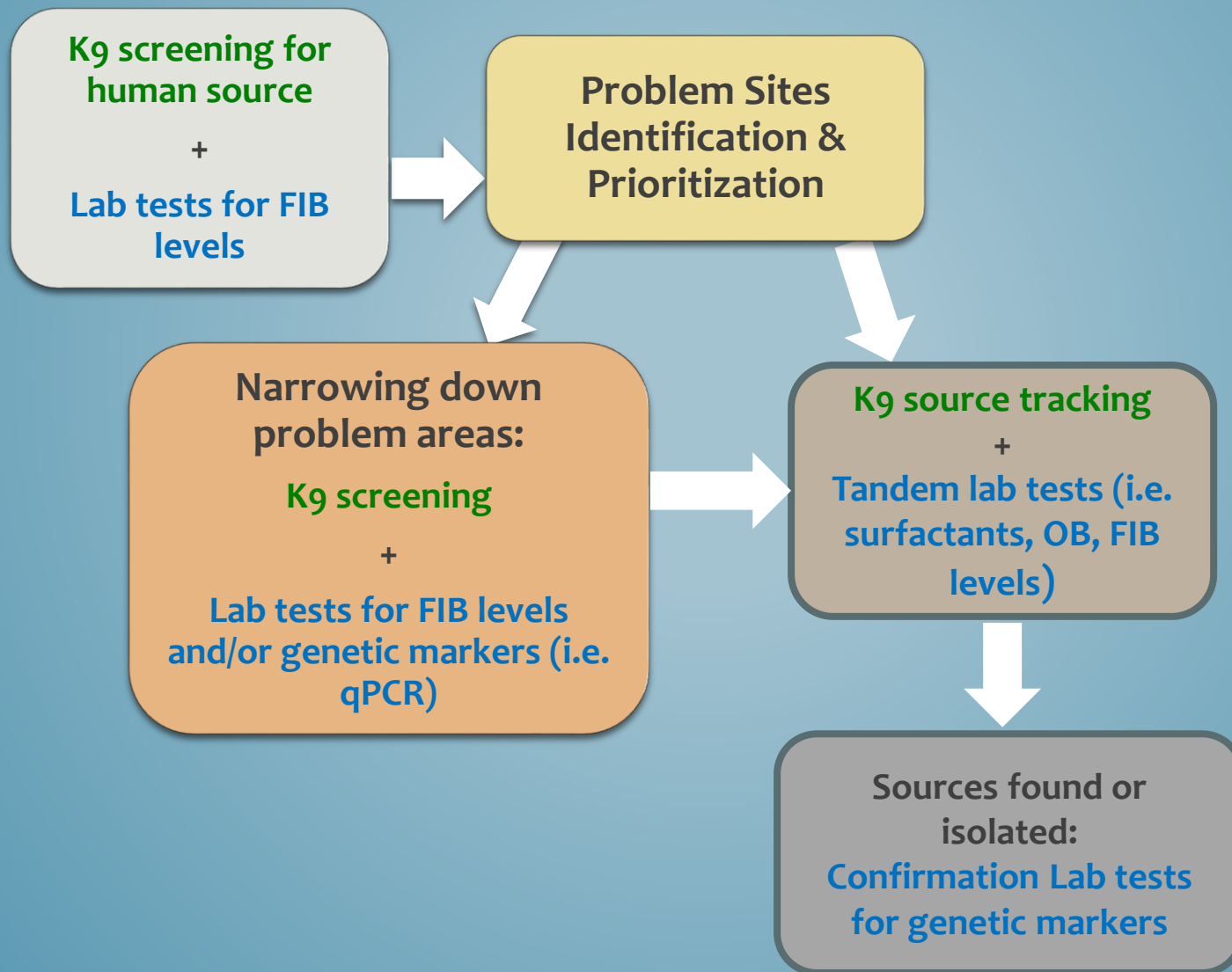
- 64 Ship and Sniff samples from watershed
 - 22 hot spots identified
- On-site investigations
 - 4 days
 - 2 Canine/Handler teams each day:
 - Me/Kenna, Dan/Abbey (MI teams), E. Coast team Karen/Sable
 - SWMIPC investigator + TCF investigator
 - Sewer and septic areas

Results (To Date):

- Direct discharge from home to stream
- Illicit connection to stormwater pipe
- 2 failing septic systems
- Several failing lift stations, with eroded pipes



Canine & Lab Results – Combined Model for Human Pathogen Pollution Source Tracking



QUESTIONS?

facebook



Contact:

Karen Reynolds, President/K9 Handler

517-282-5493

k.reynolds@ecsk9s.com

www.ecsk9s.com