



The Nose Knows! Illicit Discharge Detection Canine

*A shelter dog becomes
a protector of the environment*

Scott Reynolds



Agenda

- Background and History
- Program Development
- Accomplishments
- Future Plans
- Summary and Conclusions



Illicit Discharge Detection & Elimination

- NPDES
- Assisting Phase II Communities with MS4's



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Annual Evaluation

- Human Observations
 - 71% of illicit discharges found based on
- Surfactants
 - 77% illicit discharges found based on
- *E-coli*
 - 49% illicit discharges found based on
 - May give false positive from non-human sources
- How Do We?
 - Improve observations
 - Reduce delays from testing

A Dog to Smell What?!

In December 2006, the Idea was Hatched...

- Could a dog be trained to alert to the presence of sewage/detergents?
- Research/planning
- Health and Safety
- Sell it to Management

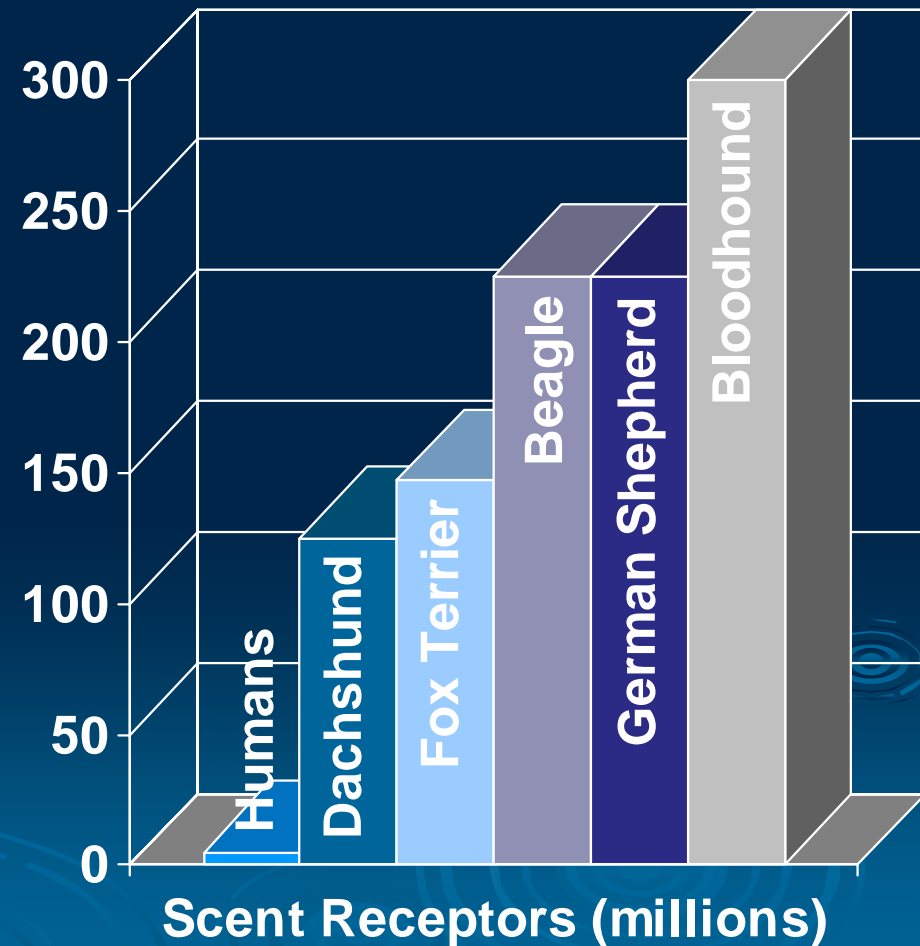


Why a Canine?

- Narcotics
- Explosives
- Live human
- Human remains
- Drowning victims
- Avalanche
- Evidence (guns, knives, money, etc.)
- Arson
- Diabetic alert
- Toxic Molds
- DVDs
- Mercury- 1mg
- Fruits, vegetables, meats
- Brown Snakes
- Entomology pests
- Utility pole rot
- Fox scat
- Grizzly Bear scat
- Whale feces
- Gas leaks
- Water leaks
- Abalone
- Truffles
- VOC's
- 4 - Cancers
- Bovine Estrus
- Gypsy moth eggs
- Cooling fluid for underground power lines
- *And many more. . .*

Born to Sniff

- 75% Nature, 25% Nurture
- Scent Receptor Area
 - 60 times more than human
- Chemical Signals
 - Create odor image
 - More detailed than a photograph for people
- Bloodhounds have been known to stick to a trail for over 130 miles



The Nose Knows

- Jacobson's Organ
 - Specialized receptors
- Sniff vs. Breathing
 - Stays in the "pocket"
- Scent Discrimination
 - Filter background scent



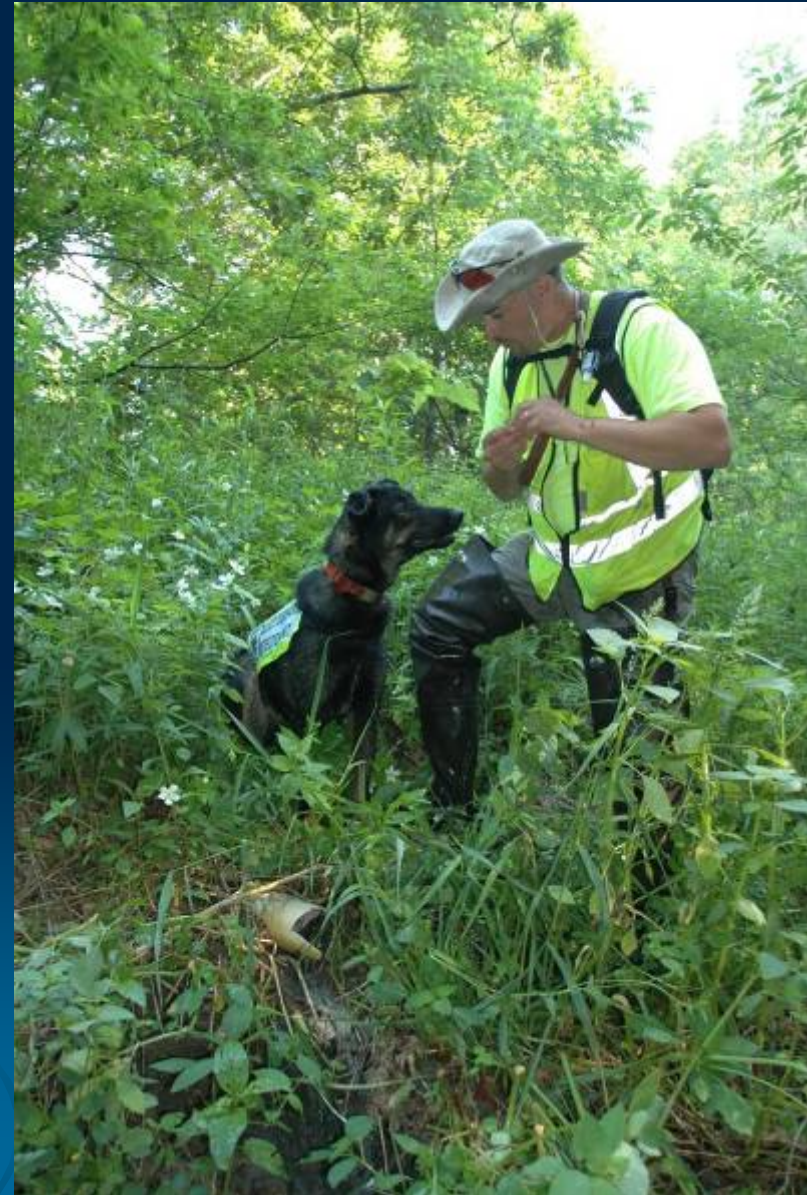
Enter . . . Sable

- Search
 - High prey drive
 - Curiosity and focus
 - No aversion to sewage
- Adopted
 - Mackenzie's Animal Sanctuary
 - March 2007
- 1.5-yr German Shepherd mix



Timeline

- March 2007
 - Adoption
- April 2007
 - Begin training
- July 2007
 - Began live field trials
 - At known connections (beta testing)
- August 2007
 - Full team member
 - Recording alerts as part of field screening
- 2008
 - First full field season



Training

- Positive Reinforcement
- Septage from Residential System
 - Contains detergents and fecal material
- Detergents
 - Separate from sewage





Double Blind Field Trials

Applications

- Downstream Investigations and Source Tracking
 - Genesee County, MI
 - Livingston County, MI
- Source Removal Verification
 - Bay City, MI
- CSO Project Performance Certification
 - Lansing, MI
- *E. coli* Investigation
 - Kawkawlin River, MI



Rural Genesee Co. Michigan



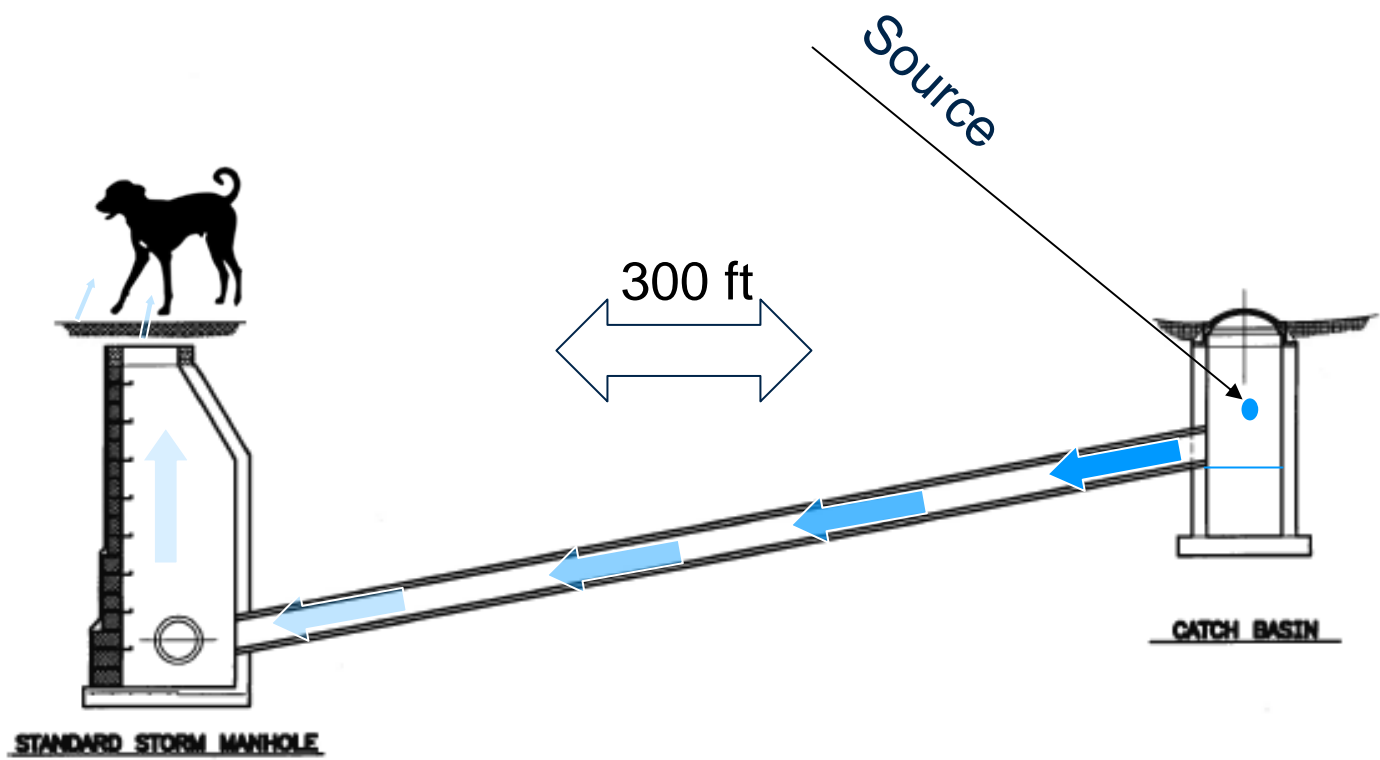
City of Lansing, Michigan



Why It's A Team Effort



Scent in the Storm Sewer









City of Lansing PPC

- Former Combined Sewer System
 - Newly separated
- Conduction storm system inspections/sampling
- Sable alerts on a dry storm manhole
 - 15-inch RCP outlet
- Field crews check as-built sewer maps
- Take Sable to next manhole....







Next Step?

- Continued Training
 - Surfactant vs. Perfume/Dye
- Demonstrate Fecal Matter Discrimination
 - Human vs. Animal
- Beach Samples
- Tracking Sources from a Boat



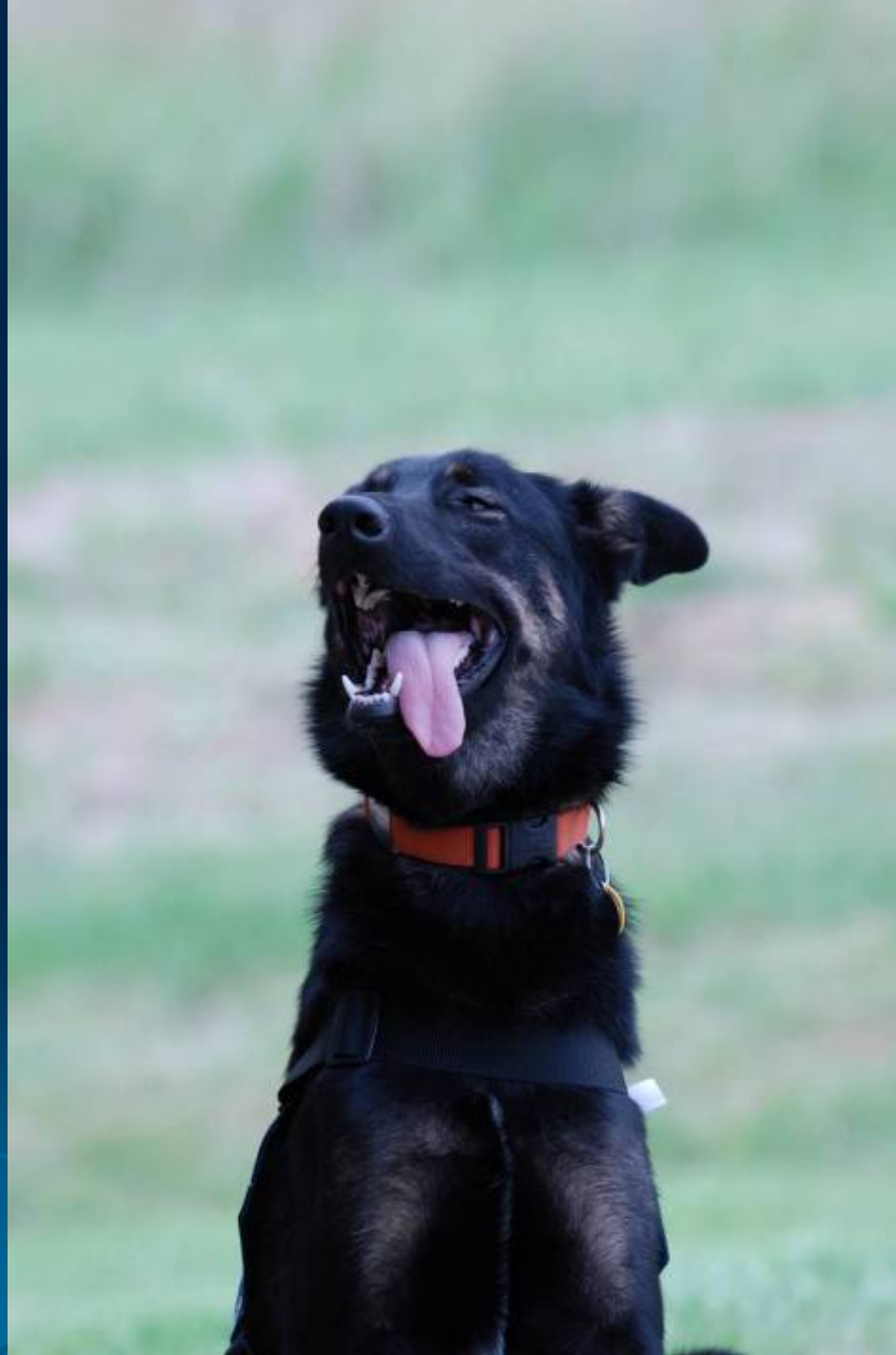
Doggie Bag

The Take Home Message

- K-9 Scent Tracking is a viable means of Illicit Discharge Detection
- Immediate upstream investigations
 - Rapid feed back
 - No 2 week wait
- Handler/K-9 are a team
- Public Education



- Discussion
- Questions?
- Dog Biscuits?



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THANK YOU

