Watercraft Inspections Using Scent Detection Dogs: An Evaluation of the Efficacy of California Department of Fish and Game's Canines to Detect Dreissenid Mussels

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Dreissenid Mussels in California

- First discovered in 2007
- DFG lead agency
- State Legislature passed laws with goal of preventing spread
  - FGC § 2301
  - FGC § 2302
- Role of local agencies

Preventing the Over-land Spread

- Closures and restrictions
- Border Protection Stations
- Watercraft quarantines
- Local inspection programs
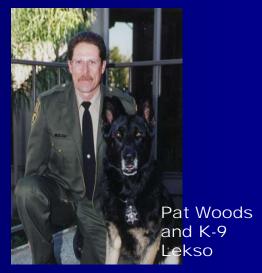
>> Additional tools are needed

DFG Enforcement

- Wardens trained to inspect watercraft
- K-9 Program

History of DFG K-9 Program

- 90's – early 2000 three wardens used personally owned K-9s
- 2006 Chief requested a proposal for a Department-sponsored program

Kathy Ponting and K-9 Kodiak

Pat Woods and K-9 Lekso

Lynette Shimek and K-9 Brett

Program Support

- Funded by donations and fundraisers
- Non-profit, managed CalTIP, Inc.

K-9 Program Objectives

1. Provide and outstanding public relations and educational tool

2. Assist wardens and the citizens of California in protecting the natural resources of the state

3. Create a deterrent for violators

4. Assist our own, and other agencies, with locating suspects and/or evidence in serious criminal cases

Team Definitions

- Detection
- Cross Trained/Dual Purpose
- Companion

DFG Training

- Start with the right dog
- Positive reinforcement
- Associate target scent with reward
- Reward alert
- Continued positive reinforcement

DFG Enforcement K-9s

- Assorted breeds
- Up to 9 scents (all – mussels, abalone and lobster, squirrel, upland game, birds, sturgeon roe, firearms, casings and gunpowder, bear meat, blood, hide, & gall bladder, deer meat, blood & hide)
- 25 trained on mussels; 16 actively working

History of K-9s for Scent Work

- Domestication >> selective breeding
- Romans c. 3000 BC
- Europeans c. 200 AD
- Current
  - Military
  - Law enforcement
  - Customs/imports
  - Conservation

Conservation Applications

- Surveys
- Recovery
- Invasive species

Some invasive species K-9s have been trained to detect:

- Noxious weeds (Isatis tinctoria, Montana)

- Rosy wolfsnail (*Euglandina rosea*, Hawaii)

- Brown tree snake (Guam)

K-9 Scent Abilities

- Capable of detecting trace concentrations ~ 10 ppq (10^{15})
- > 100 M x more sensitive than humans
- Can discern target scent from background
- Can learn at least 10 different scents

Limiting Factors

- Duty cycle
- Temperature
- Humidity
- Weather
- Terrain

How Watercraft are Inspected

- Handler directs search
- Systematic

Are DFG's K-9s more effective than humans at inspecting watercraft for Dreissenid mussels?

- Quicker?
- More accurate?
- How accurate?

Information Need

- Make a recommendation to local agencies about using K-9s
- Validate the utility and effectiveness of DFG's K-9 Program

Measures of Efficacy

- Sensitivity vs. discrimination
- Detection vs. accuracy

Study Design

Goal : Simulate field conditions

- Various types and sizes of watercraft
- Random placement on watercraft
- Random order of inspection
- Naïve inspectors

Challenges

- Logistics
- Measure alerts or finds?
- Body language vs. alert

Conclusions

- K-9 + handler = team
- Very effective educational tool
- They aren't machines
- Equivalent human inspectors needed
- Ideally single-scent trained for inspectors

Thanks!

- Law Enforcement Division
- Chief Foley
- Debra Hamilton
- Working Dogs for Conservation

Questions?

Best Legal Monthly Maintenance Training Time

- Detection teams – 16 hrs per mo
- All teams must certify at least annually in obedience, as well as in their individual disciplines.
- Additional training may be done individually, or with other agencies or Department teams, depending on the handler's training and experience.
- Teams must document all time spent training. Unless approved, all training must be done on Department time.

Academy Training

- Detection academies are at least 6 weeks long.
- Dual Purpose academies are at least 8 weeks long
- Additionally, teams receive 8-16 hours of formal maintenance training each month