

# What Are They Doing Over There?

## John Randall The Nature Conservancy





## Cactus Moth.....

On it's way to California's Deserts??

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#### Cactoblastis cactorum detections in the Southeastern United States



**USDA-APHIS Plant Health** 

## UF-CTA Potential Invasive Pests Workshop October 10-14, 2010 Mayfair Hotel • Miami (Coconut Grove), Florida USA



Sponsored by: UF IFAS, Center for Tropical Agriculture (CTA) | USDA TSTAR | APHIS PPQ



# Weed Detection Dogs

**Kim M. Goodwin, Rick E. Engel, and David K. Weaver . 2010.** Trained Dogs Outperform Human Surveyors in the Detection of Rare Spotted Knapweed (*Centaurea stoebe*). Invasive Plant Science and Management: June-August, Vol. 3, No. 2, pp. 113-121.







# Biosurveillance for Emerald Ash Borer with *Cerceris fumipennis*



Michael Bohne et al.

USFS & state agencies CT, NA, ME, NH ,NY, RI, VT and U. Guelph

# Aquatic weed surveillance using Robotic Aircraft

Salah Sukkarieh University of Sydney Land & Water Australia



#### Even here, weeds aren't safe from the eye in the sky!



### Lateral Flow Devices to detect Phytophthora ramorum (the Sudden Oak Death Pathogen)



Like a pregnancy test – uses antibodies to detect specific proteins



#### **Re-invaders?**

James C. Russell Steven D. Miller Grant A. Harper Hamish E. MacInnes Malcolm J. Wylie Rachel M. Fewster 2010. Biological Invasions





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OTRE DAME

#### Environmental DNA (eDNA) monitoring of Asian carp in the Chicago Area Waterway system



#### W. Lindsay Chadderton<sup>1</sup>, Christopher L. Jerde<sup>2</sup>, Andrew R. Mahon<sup>2</sup>, & David M. Lodge<sup>2</sup>



Science Serving Societ



# **Detection limitations most likely**

Probability of detection using traditional methods in canal & at low densities is poor

Electric fishing – Effective down to 2-3 meters - Carp capable of avoiding electric field

Asian carp adept at avoiding static nets



# Inspired by other research using DNA based - indirect detection methods

#### Techniques in use for <a>20 years</a>

#### DNA from environment, e.g. feces, shed hair, sloughed skin



Ficetola et al. 2008. Bullfrog detection using environmental DNA from water samples. *Biol. Letters* 4, 423-425.

## **Asian Carp environmental DNA**

- Fish naturally shed sloughed cells in mucus, scales, feces, and urine
- Some cellular material will remain in suspension and can be collected







#### **Data interpretation**

Strength of Evidence	eDNA Observations	Asian Carp Examples in the CAWS
stronger	eDNA detection with support from alternative detection methods	Calumet River/Lake Calumet: commercial net
		Lockport Pool below electric barrier: Rotenone
		Brandon Road Pool: observed electroshocking
		Dresden Island Pool: captured electroshocking
	Repeated trips with positive samples over different years	Little Calumet River South of O'Brien Lock
		North Shore Channel of the Chicago River (near the Wilmette pump station)
		Chicago Sanitary and Ship Canal
	Repeated trips with positive samples	Indiana and Michigan Canal
		Calumet-Sag Channel
	Multiple positive samples from a single trip	Calumet Harbor
	Single positive sample	Downtown Chicago near Navy Pier
•		Des Plaines River (below Hoffman Dam)
weaker	No detections	St. Joseph River (South Bend, Indiana)
		Des Plaines River (above Hoffman Dam)

#### Supporting evidence Capture or observation of live Asian carp



New detection of a 30-year-old population of introduced mongoose *Herpestes auropunctatus* on Kyushu Island, Japan Yuya Watari, Junco Nagata and Kimitake Funakoshi Biological Invasions DOI 10.1007/s10530-010-9809-5







# Self-resetting traps Goodnature Limited, Wellington, NZ



## **Florida Keys Python Patrol**



#### "TREADMILLING"



Assessment of eradication success was undertaken using attractive baits.

The absence of exotic ants at bait stations and the return of native ants (such as the Savanna Strobe Ant (*Opisthopsis haddoni*) shown in this picture) indicated successful eradication Hoffmann & O'Connor 2004 Ecological Management & Restoration; Hoffmann 2010 Biological Inv.