USDA Agricultural Research Service National Program Overview of Biocontrol of Weeds

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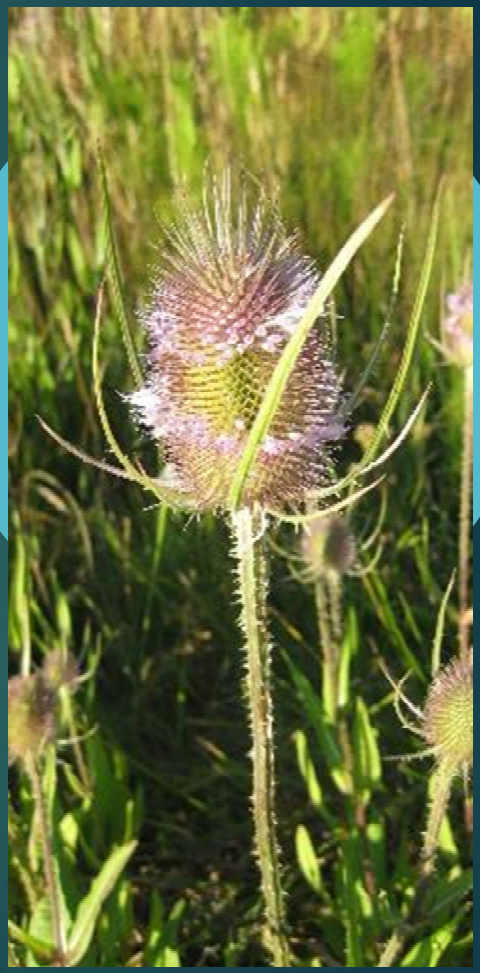
Invasive Plants

- Reduce diversity of native plants
- Reduce habitat
- Alter ecosystem services
- Displace rare species



Biological Control of Weeds

Control of pests using natural enemies

Herbivores:

- goats, cows
- herbivorous insects and mites
- plant pathogens

Biocontrol methods

- Inundative
- Augmentative
- Classical

nvasive Plants

Steps to Biocontrol

1. Identify the target
2. Identify the target's native home
3. Look for natural enemies (biocontrol agents)
4. Propagate "pure" cultures
5. Test for host specificity and efficacy
6. Get permits for release
7. Mass propagate and release

Biological Weed Control

- **Benefits**
  - Once developed, very cheap to use
  - Works in ecologically sensitive areas
  - Works in difficult-to-reach areas
  - Harnesses ecological processes to reverse plant invasions

Biological Weed Control

Cons

- Takes a long time to develop initially
- Requires knowledge about the origin of the invasive plant
- Effective natural enemies can be hard to find
- Safety testing can be time consuming and expensive
- Cannot easily be reversed

Government involvement

- USDA Agricultural Research Service (ARS)
- National Institute for Food and Agriculture (NIFA)
- Army Corp of Engineers
- APHIS, Fish & Wildlife
- States
- Local governments
- Land managers (public and private)
- Conservation organizations

Agricultural Research Service

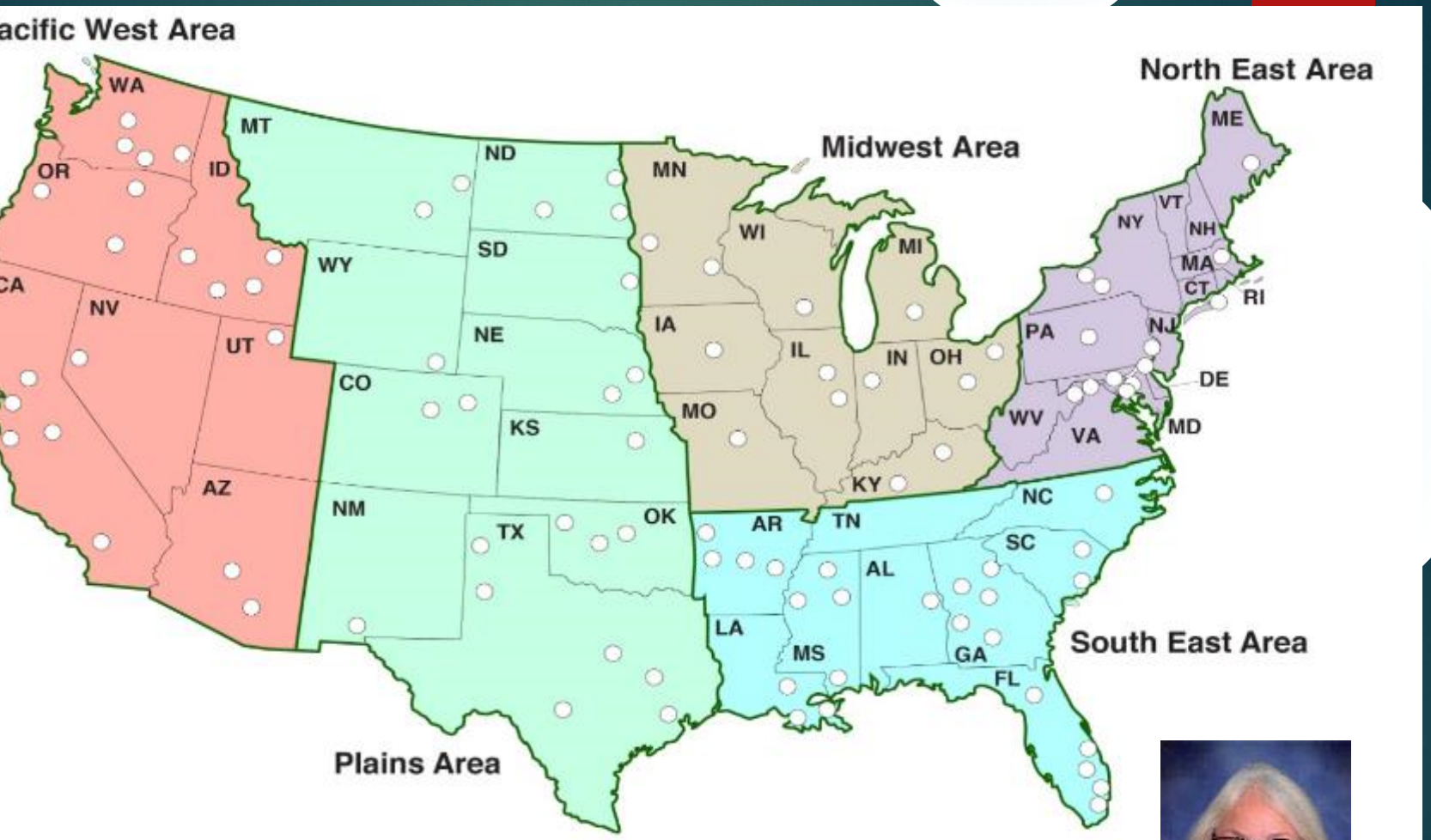
USDA's chief scientific *in-house* research agency.

Mission: Conduct research to find solutions to agricultural problems that affect Americans every day from field to table.

Scope:

- 750 research projects, 17 National Programs
- 2000 PhD Researchers + 6000 other employees
- 90 research locations, including 4 overseas labs

ARS Laboratory Locations



South East Area Director
Dr. Deborah Brennen

Administrative Structure

Sonny Perdue (nominated)
[Formerly Thomas Vilsack]
USDA Secretary

Acting Dr. Anne Bartuska
[Formerly Dr. Cathie Woteki]
Under Secretary, Research, Education, and Economics (REE)

Dr. Chavonda Jacobs-Young
Administrator
Agricultural Research Service

ARS Administrative Structure

Dr. Chavonda Jacobs-Young
Administrator
Agricultural Research Service

Dr. Steven Kappes
Associate
Administrator
National Programs

Dr. Simon Liu
Associate
Administrator Research
Operations

Maureen Whalen
Deputy
ministrator
nts/Crops

Dr. Jeff Silverstein
Deputy
Administrator
Prod. Animals

Dr. Sally Schneider
Deputy
Administrator
Natural Resources

Dr. Pam Starke-Reed
Deputy
Administrator
Foods/Nutri

USDA-ARS National Programs

Crop Production & Protection

- Crop Genetics and Breeding
- Crop Production
- Plant Protection
  - Plant Pathogens
  - Insects/Arthropod Pests
  - Weeds

SDA-ARS
nvasive Plant Research Lab
t. Lauderdale, FL

Air potato biocontrol

une 2012

rior to
ocontrol

Dr. Min Rayamajhi

Air potato biocontrol

ug 2013

lants after

eetle

rel

Lilioceris cheni

Air potato biocontrol

Sept 2016

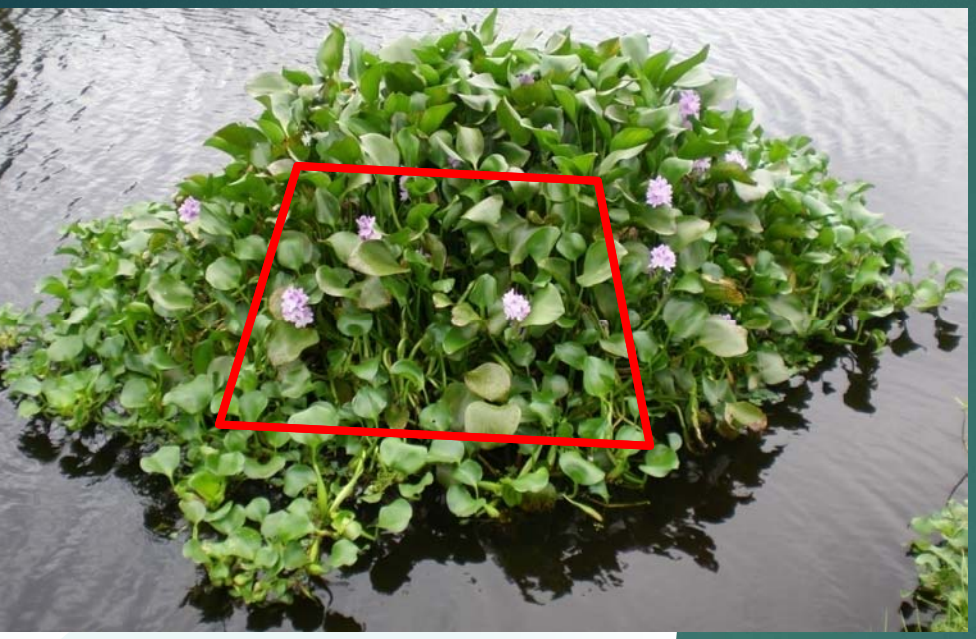
Restoration

native

vegetation

Biocontrol of Waterhyacinth

No Biocontrol



Biocontrol

41-68% less biomass.

90% less seed.

Greater susceptibility to herbicides.

Biocontrol of Giant Salvinia

Before Biocontrol

After Biocontrol

70.4% less biomass

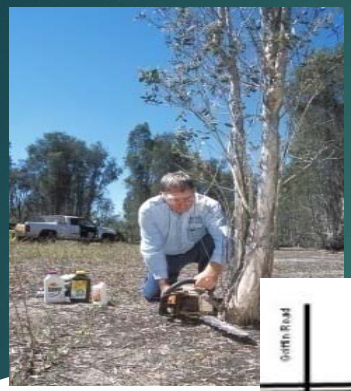
45% more open water

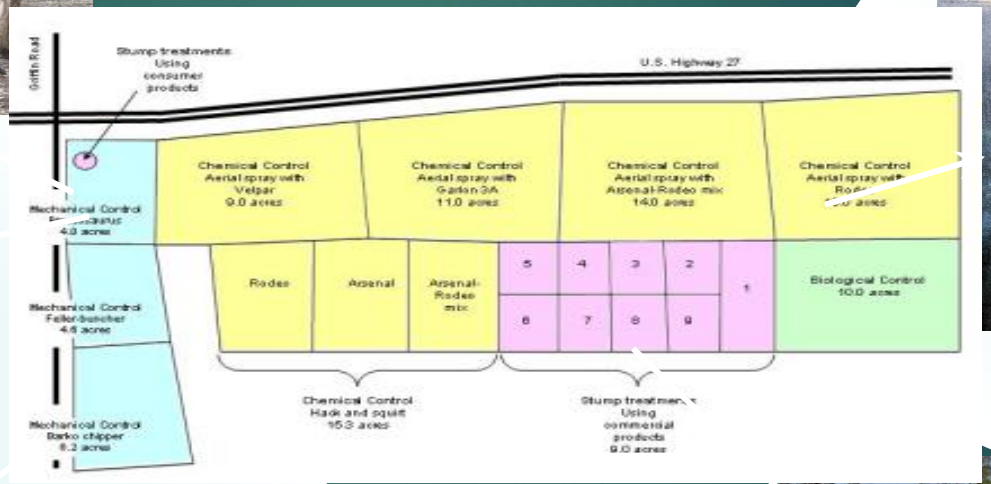
ARS Areawide Pest Management Program

- Targets pests of significant economic or ecological consequence
- Target pests that require an area-wide approach for effective control

Melaleuca

reawide Pest Management



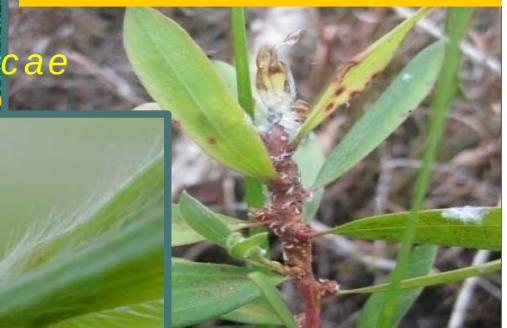


Melaleuca Biocontrol Agents

- Reduce plant growth
- Limit reproduction
- Suppress seedling survival
- Initiate leaf abscission
- Decrease plant density
- No non-target effects

Oxyops vitiosa

Boreiglycaspis melaleucae



New projects

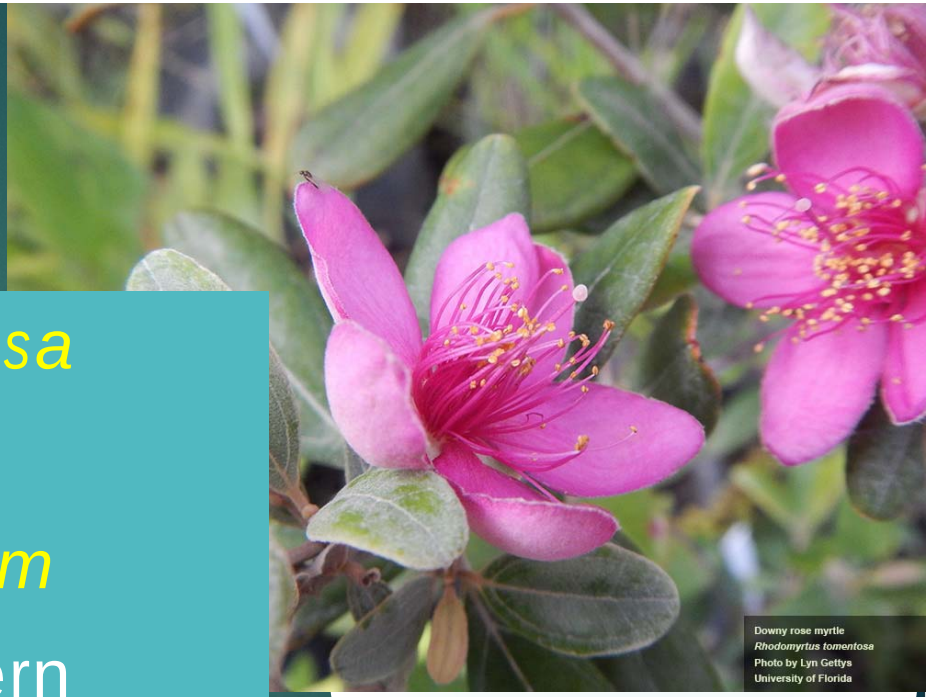
- *Rhodomyrtus tomentosa*

  Downy Rose Myrtle
- *Lygodium microphyllum*

  Old World climbing fern
- *Schinus terebinthifolia*

  Brazilian Peppertree
- *Triadica sebifera*

  Chinese tallow
- *Acacia auriculiformis*



More accurate cooperator list

City/county

State/district

University

Federal

Foreign