



Invasive Species Management in the National Wildlife Refuge System

Yellow Starthistle

OVERVIEW

- Background information
- Impacts of Invasive Species on the NWRS
- Invasive Species Initiatives in the NWRS
- Volunteer Opportunities and Training

What IS an Invasive Species?

“Invasive Species”

“...an alien [*non-native*] species whose introduction does or is likely to cause economic or environmental harm or harm to human health.”

(E.O. 13112, 3 February 1999)

“Invasive” means....

- alien
- non-native



R
D
O

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

NATIVE?

MISSION

Biological Integrity Policy (601 FW 3)

3.16 How Do We Manage Non-native Species?

- **Prevent, detect, control** invasive populations
- **Restore** native species and habitats
- Use **IPM** strategies (mechanical, chemical, biological, and cultural)
- No action required against non-native, but non-invasive, plants or animals



What IS an Invasive Species?

“Invasive Species”

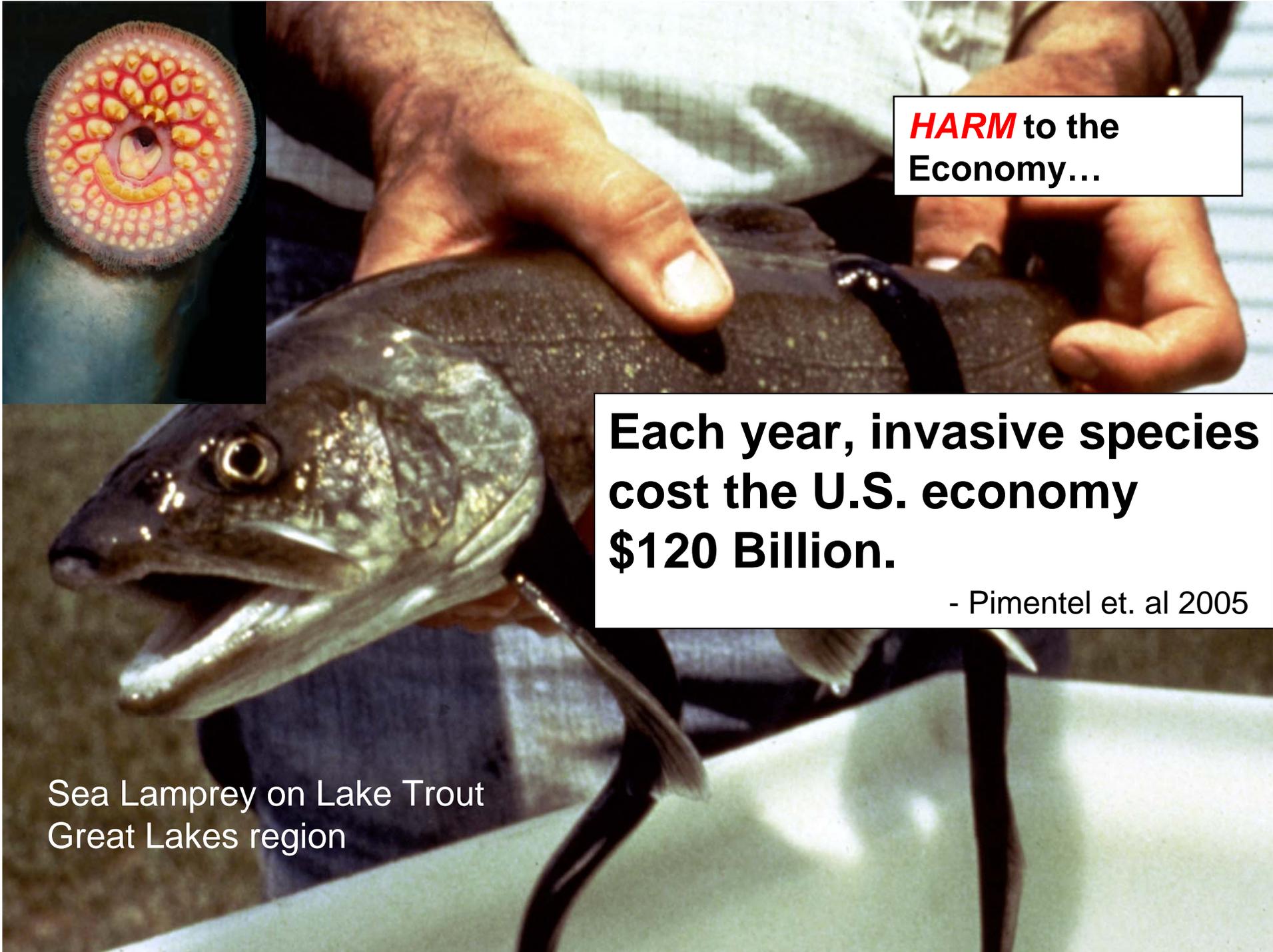
“...an alien [*non-native*] species whose introduction does or is likely to cause economic or environmental harm or harm to human health.”

(E.O. 13112, 3 February 1999)

HARM to....

- Economy
- Environment
- Human Health





HARM to the
Economy...

**Each year, invasive species
cost the U.S. economy
\$120 Billion.**

- Pimentel et. al 2005

Sea Lamprey on Lake Trout
Great Lakes region



FUTURE LINK COMMUNICATIONS
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Email Print

Man gets Caught in Milfoil in Columbia River and Drowns

Aug 26, 2007 06:41 PM EDT

KENNEWICK, Wash - "(Columbia Basin) Dive Rescue did locate a body approximately 10:20 this morning," said Kennewick Police Corporal Chris Walters.

After an overnight and morning search spanning more than 10 hours in the Columbia River, Columbia Basin Dive Rescue recovered the body of an unidentified 22-year-old man. Kennewick police say they received a report of a drowning around 10 o'clock last night.

"The Columbia River has a lot of obstacles," says Columbia Basin Dive Rescue PIO Scott Pattison. Large rocks, concrete, rebar, milfoil, lot's of things to get entangled in."

Authorities say peer pressure from friends caused the man to swim out to a bridge pillar underneath the Blue Bridge, 150 feet from shore. As he headed back, his legs got caught in milfoil, an equivalent to quicksand.

"Your legs get entangled in it and you panic and it starts to pull you down and gets a better hold of ya and you just continue to go down," says Pattison. There's really not a lot you can do about it. If you panic and aren't able to get your legs out."

According to officials, milfoil is impossible to see at night. It's even difficult during the day.



Eurasian watermilfoil

UGA1624031

Video Now
22-Year-Old Man Dead After Columbia Park Drowning



Dunkin' Donuts
coffee FREE!
Budge
GO

Spotlight Staying Healthy Fun! More Lifestyle
Find a new job
Get a degree... online
What could your symptoms mea

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Quality with Integrity
Perfect Home



HARM to the
Environment...

**Hummingbird and
bat impaled on the
invasive burdock
weed in the Western
U.S.**





Find the albatross
in the *Verbesina*!

Midway NWR

Walrus Island, Pribilof Group

Before Foxes



After Foxes

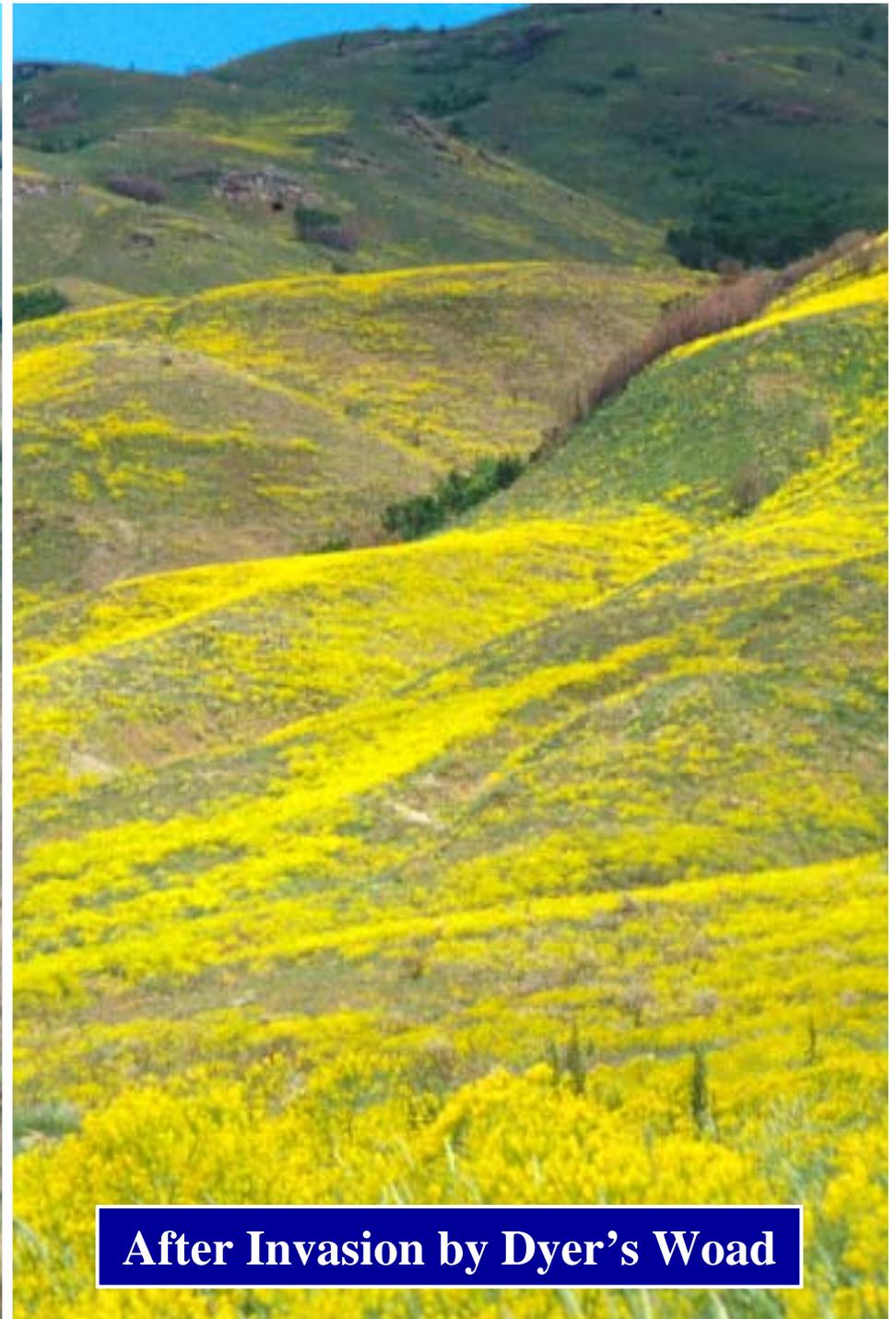


Invasive Species Attack Our Native Plants and Animals!



Invasive species can reproduce rapidly and out compete natives to form a monoculture that dominates the landscape and reduces diversity

Before Invasion

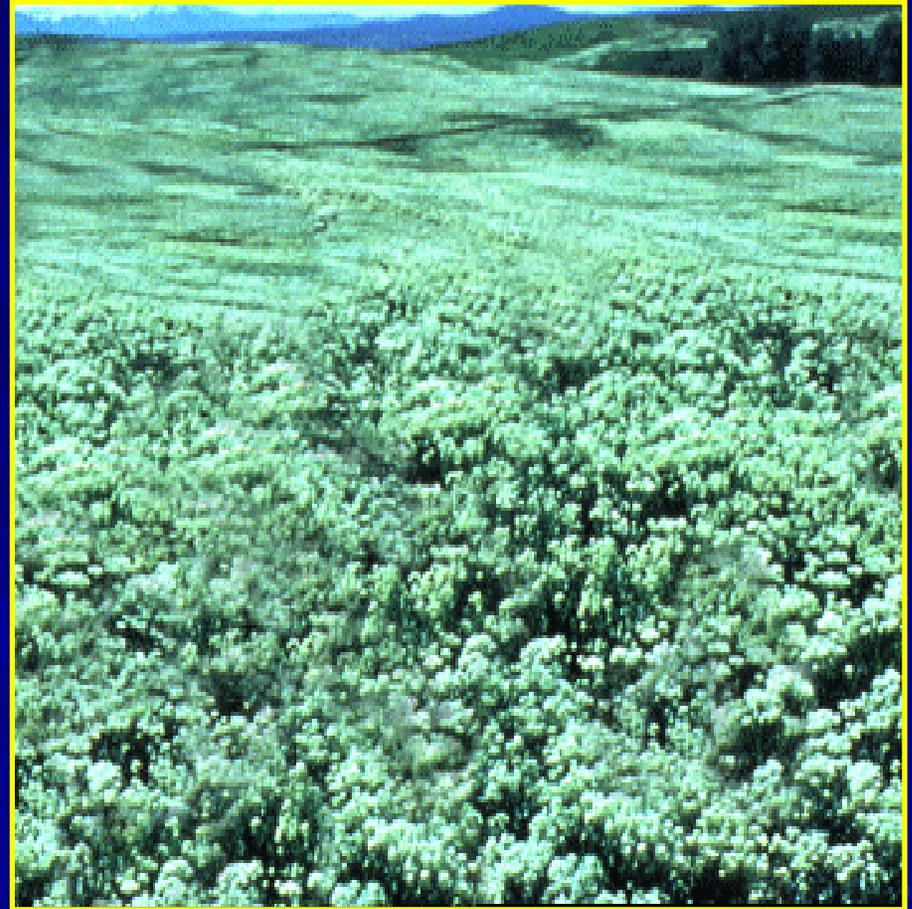


After Invasion by Dyer's Woad

WILDFIRE



INVASIVE PLANT INFESTATION



Hoary Cress in Oregon

WHICH IS WORSE FOR THE ECOSYSTEM?



Wisteria

Privet

Phragmites

Invasive species are often associated with disturbance; such as fire, forestry, construction, agriculture, or flooding.

So...how did they get here?

Unintentional:

➤ Cultivation and Landscaping

Garlic mustard, buckthorn

➤ Nursery Stock

Wooley adelgid, Chestnut blight

➤ Ship Ballast

Zebra mussel, round goby

➤ Boats, Planes, Trucks

Brown Tree Snake, Eurasian water milfoil

➤ Packing and shipping materials

Japanese stiltgrass, Asian long-horned beetle



Japanese Stiltgrass

So...how did they get here?

Deliberate:

- **Sport Fishing**
Snakehead, Rainbow Trout
- **Home Aquaria and Pets**
Hydrilla, Pythons, House Cats
- **Biocontrol**
Grass carp
- **Erosion Control**
Kudzu
- **Gardening and Landscaping**
Purple Loosestrife, Honeysuckle



A Breeding Population of Burmese Pythons has been established in the Everglades National Park

Gator eats snake



Where did the pythons come from?

Release of unwanted pets!



Snake eats gator!

Feral and Domestic Housecats are major predators on wild birds and mammals



There are approximately 100 million domestic and free roaming cats in the United States.

Combined, these cats kill billions of small mammals and millions of wild birds each year.



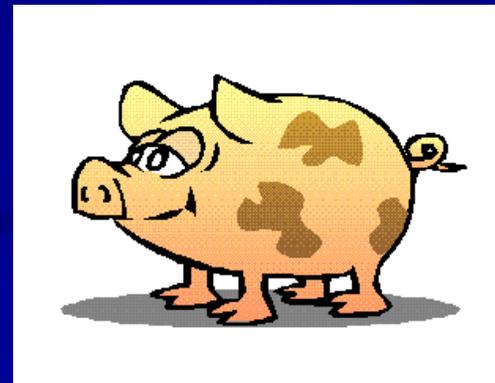
RESOURCE IMPACTS

On-The-Ground Impacts:

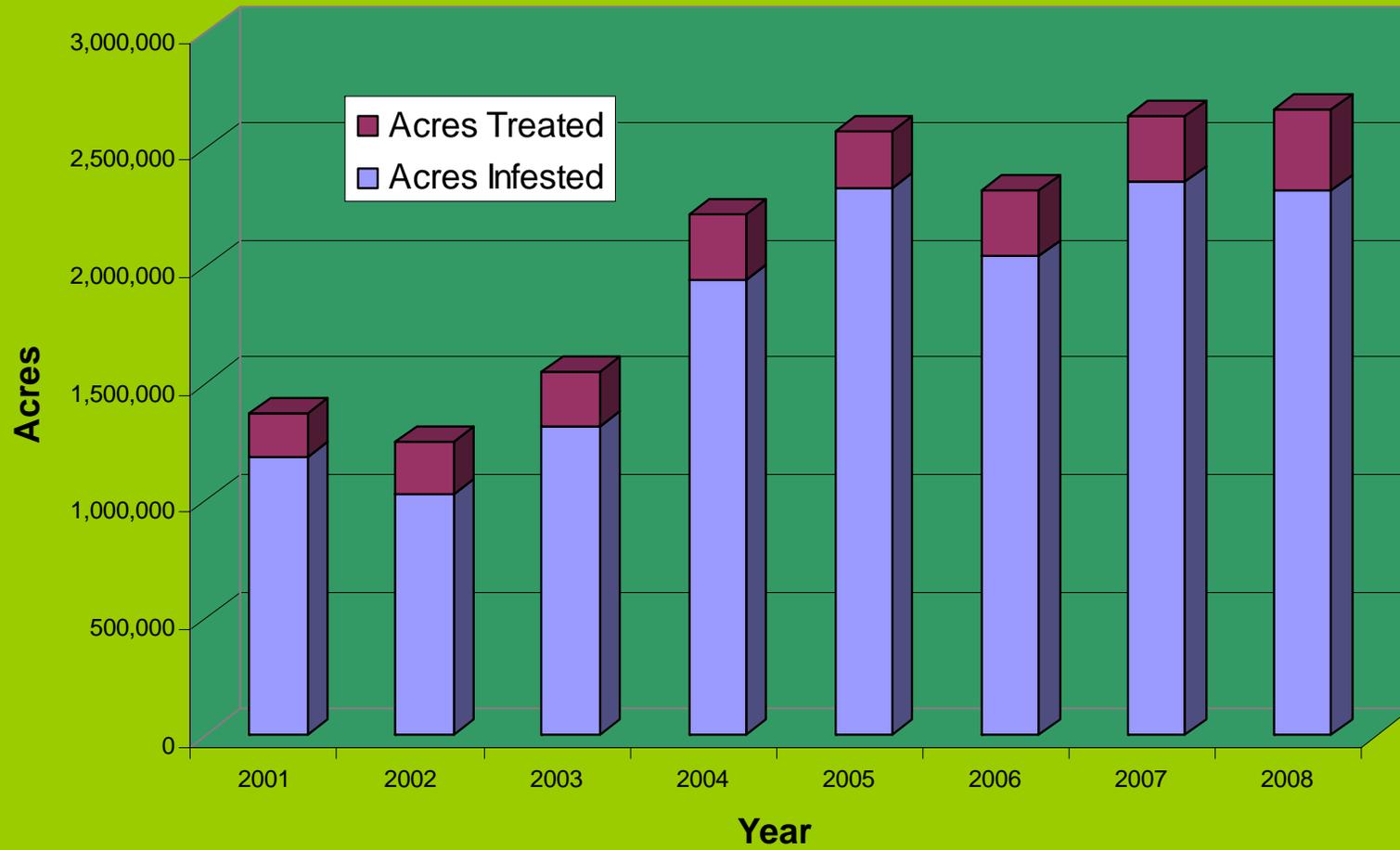
2.3 million acres of refuge lands are infested with invasive plants



There are **4,387** invasive animal populations on refuge lands



INVASIVE PLANTS ON REFUGES

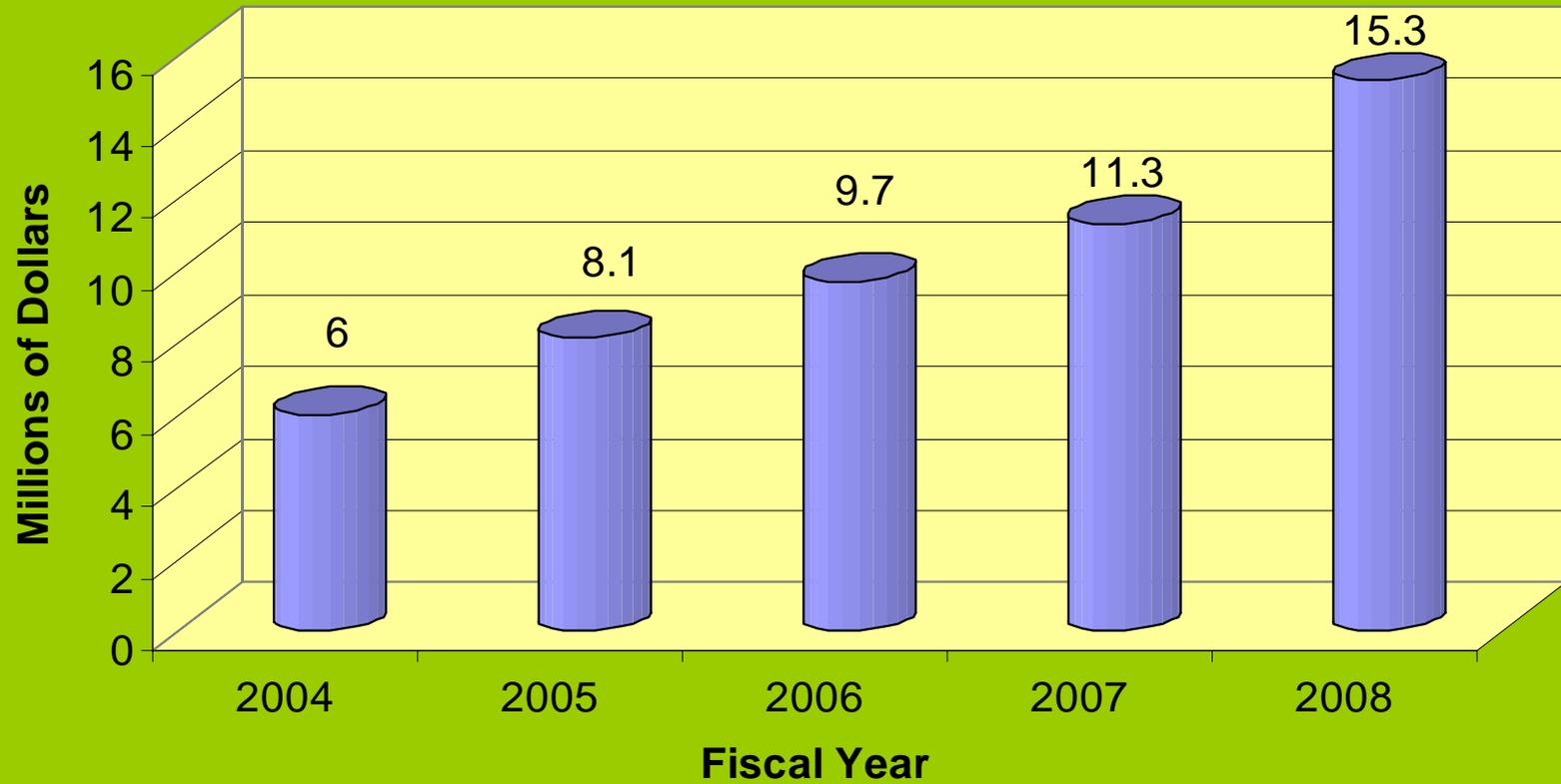


RESOURCE IMPACTS

General Management Impacts:

- Sept. 2008 GAO Report on Refuge Spending from 2002 – 2007:
 - Invasive Plants – **Number One** Threat to Wildlife Habitat
 - Invasive Plants – **Number One** Area of Increased Spending

Cost of Invasive Species Management



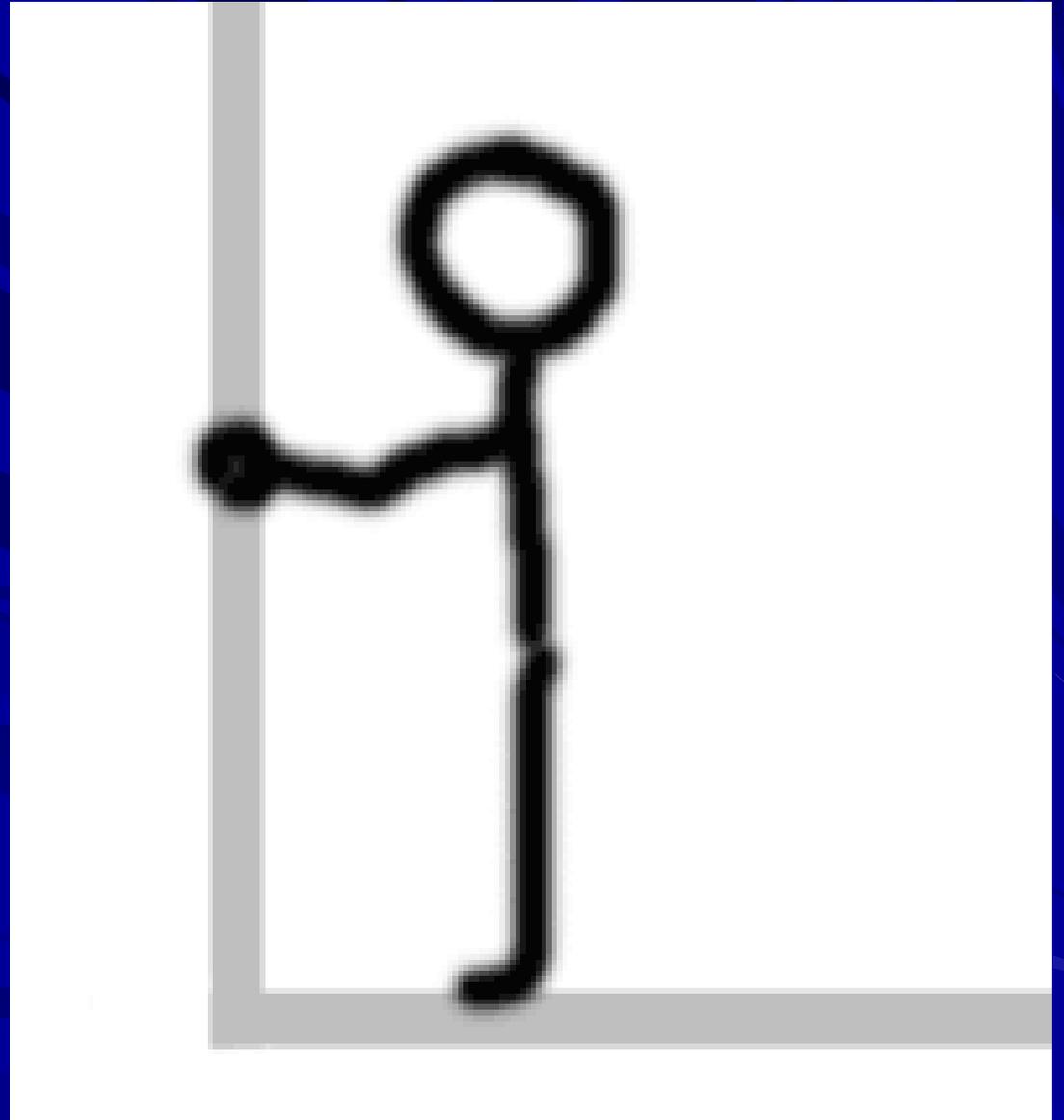
**155% Increase in Spending
From Base in 4 Years**



**IS THERE
ANY
HOPE!?!**

-- OR --

**ARE WE
JUST
BEATING
OUR HEADS
AGAINST
THE WALL?**





SUCCESS!
IN THE NATIONAL
WILDLIFE REFUGE
SYSTEM

Water Chestnut
Silvio O Conte NFWR



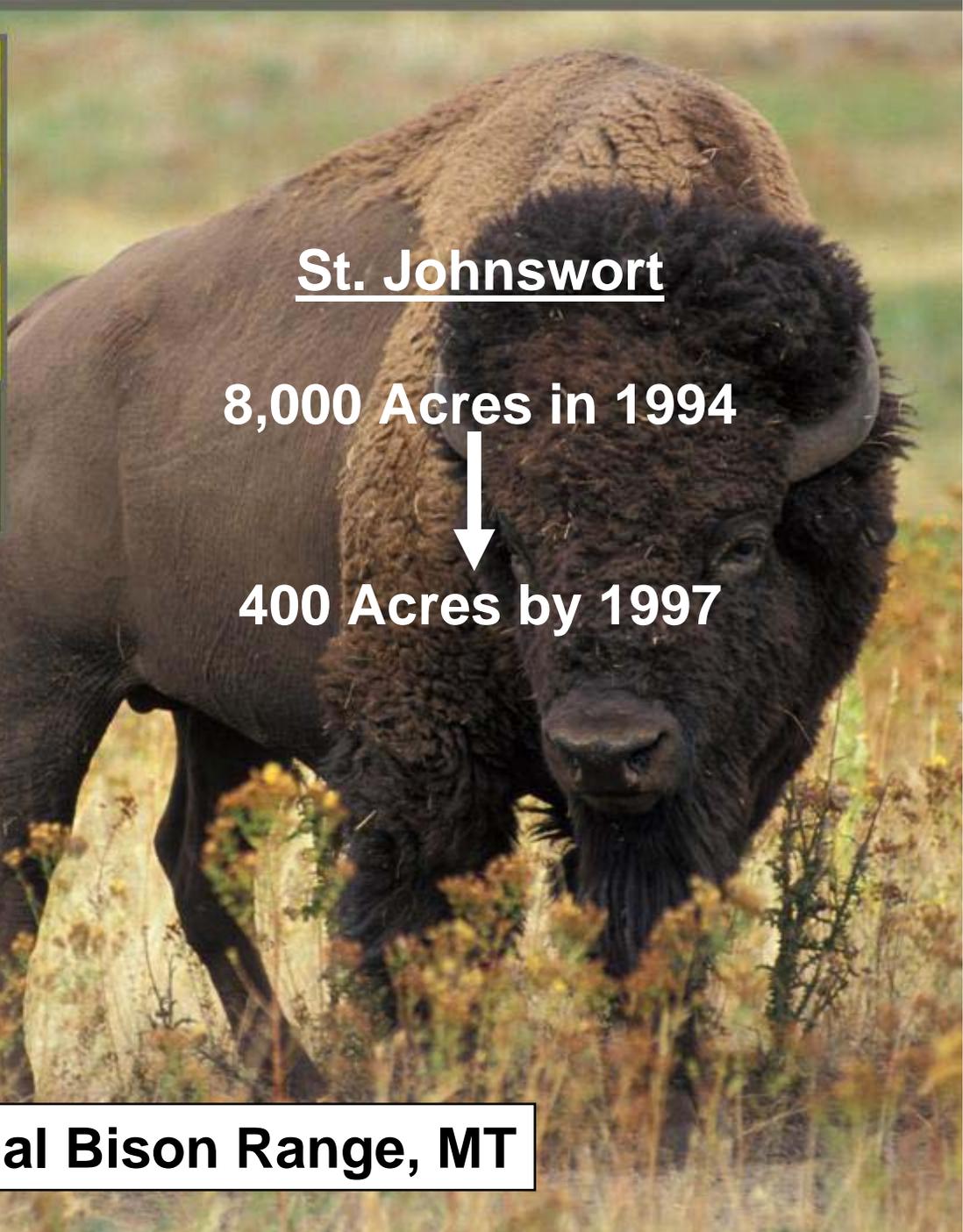
St. Johnswort

8,000 Acres in 1994



400 Acres by 1997

National Bison Range, MT





Water Chestnut Removal Silvio O. Conte NFWR

2002: 4,000 pounds



2007: 2 pounds!



**Giant Gambian Pouch Rat
Grassy Key, FL**



DEFEATED BY PARTNERSHIPS!

OUTREACH

On-line invasive field trip for elementary school children



Removing Classroom Walls. Opening Windows to Our World.©



Welcome to the 2004-2005 school year eFieldTrip on invasive species. We are excited to have you be a part of our efforts to provide students nationwide with a quality educational experience. We have designed our eFieldTrip to meet [national education standards](#)

www.efieldtrips.org

OUTREACH

Public service announcements on “Good Fishing”
w/ Babe Winkelman (\$50,000)

The screenshot shows a web browser window titled "Babe Winkelman Productions - Microsoft Internet Explorer". The page features a filmstrip header with the text "BABE WINKELMAN PRODUCTIONS, INC." and a navigation menu with links: "On T.V.", "Store", "Dream Trips", "Viewer Services", "News", "Partners", and "Tips". The date "August 7, 2006" is displayed. A sidebar on the left contains links: "Home", "Kris' Kitchen", "Pro Staff", "Contact", "About Us", "Need T.V. Production", and "Site Map". Below the sidebar is a section for "Invasive Species Information" with links: "Identifying the Invaders", "Preventing Invasive Species", "Controlling Invasive Species", and "Contact the Experts for Assistance". The main content area has the heading "INVASIVE SPECIES" in purple, followed by the quote "...Like a Catastrophic Wildfire in Slow Motion" in yellow. Below this is a paragraph of text explaining the impact of invasive species. To the right is a photo of Babe Winkelman with the text "Learn from Babe how to prevent the spread of invasive species." and a "Click Here (QuickTime Movie)" link. At the bottom are logos for the U.S. Forest Service, Wildlife Forever, and U.S. Fish & Wildlife Service, along with a grid of images showing various invasive species and a "Whaling Disease" logo.

<http://www.winkelman.com/invasivespecies>

OUTREACH



U.S. Fish & Wildlife Service

Invasive Species



Learn More About Invasive Species

[Invasive Species Home](#)

[News and Resources](#)

[Partnerships and Grants](#)

[What You Can Do](#)

[Laws and Regulations](#)

[Invasive Species Activities](#)

[FWS Invasive Programs](#)

[Contact Us](#)

What's New

[Online Training Helps Volunteers Fight Invasive Species](#)

[Online Training Helps Refuge Staff Manage Invasive Species](#)

What are Invasive Species?

Invasive species are organisms that are introduced into a non-native ecosystem and which cause, or are likely to cause, harm to the economy, environment or human health. It is important to note that when we talk about a species being invasive, we are talking about environmental boundaries, not political ones. In addition to the many invasive species from outside the U.S., there are many species from within the U.S. that are invasive in other parts of the country.

The U.S. Fish and Wildlife Service is the only agency of the U.S. Government whose primary responsibility is the conservation of the nation's fish, wildlife, and plants. Because of our responsibilities, the Service is very concerned about the impacts that invasive species are having across the Nation. Invasive plants and animals have many impacts on fish and wildlife resources. Invasive species degrade, change or displace native habitats and compete with our native wildlife and are thus harmful to our fish, wildlife and plant resources.



A partnership between the FWS and Wildlife Services is helping to eradicate the Gambian Pouch Rat from the Florida Keys.

Credit: USFWS

For more information...

- [News and Resources](#) - Information and links to FWS Frequently Asked Questions, Invasive Species related contacts, Injurious wildlife information, and links to information on specific species.
- [What You Can Do](#) - Information and links on what you can do to prevent the introduction and spread of invasive species.
- [Invasive Species Activities](#) - Learn more about what the Service is doing under various common categories of invasive species activities.
- [FWS Invasive Programs](#) - Find invasive species information for a specific Service program.
- [Partnerships and Grants](#) - See how the Service works with other stakeholders to address invasive species.
- [Laws and Regulations](#) - Links to the various pieces of legislation under which the Service operates.

[Invasive Species Home](#) | [News and Resources](#) | [What You Can Do](#) | [Laws and Regulations](#)

www.fws.gov/invasives

INREACH

Excuse me –
but could we
not be quite so
proud of our
**invasive
species
infestations?**



Leadership



The overall building orientation, as well as the height, ventilation, and geometry of the roof and windows, provide an excellent model of energy efficiency and high building performance.



The building provides visitors with an orientation to energy and water conservation, preservation of diverse habitats, and good stewardship to support wildlife in national wildlife refuges.



Environmentally benign construction practices make the Parker River Visitor Center and Administrative Headquarters an exemplary model of sustainable design. Special care is being taken at the site to restore disturbed land to natural habitats of wetland, field, woods, and coastal areas. Recycled and low-VOC building materials were used throughout, and non-hazardous preservative was applied to exterior wood surfaces. Water conservation technologies include low-flow fixtures and directing roof runoff to groundwater recharge. Passive solar techniques such as southeastern building orientation and daylighting, along with super insulation of the building envelope, high-efficiency lighting, and a geothermal heat exchange system, reduce energy use by 41 percent over a traditional office building.

Parker River National Wildlife Refuge
Plum Island, Newburyport, MA

Cambridge Seven Associates, Architects. Photos courtesy Alex Holbyan



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the POWER™**

United States Department of the Interior
Federal Energy Management Program



Printed on recycled paper with soy-based ink.

For more information on how you can get involved in the You Have the Power campaign, visit the FEMP Web site at www.eere.energy.gov/femp.

INREACH



Maintenance, law enforcement, and fire crews can help slow the spread of invasive species!

New

**Fire Management and
Invasive Plants Handbook**



INREACH - TRAINING



**NCTC Course:
Field Techniques for
Invasive Plant
Management**

ONLINE TRAINING



U.S. Fish & Wildlife Service
National Wildlife Refuge System
Conserving the Nature of America

MANAGING INVASIVE PLANTS

Concepts, Principles, and Practices

Print  | Text Size: A A A

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MIP HOME

GETTING STARTED

Learning Modules

- ▣ PLANNING
- ▣ ASSESSING
- ▣ MANAGEMENT METHODS



Working toward desired vegetation conditions

You need ADOBE Flash Player installed and javascript enabled on your computer to display this flash presentation. Click [here](#) to download Adobe Flash.

Conserving native plant communities and wildlife habitat in the National Wildlife Refuge System involves managing existing invasive plant infestations and preventing the establishment of problematic plant species. The challenges associated with the invasive plant management process are numerous and complex—they require the understanding and integration of ecology, biology, social science, and technology, all under operational constraints. Developing a strategic approach based on this knowledge can guide invasive plant management toward achieving goals of desired vegetation conditions.

- **The Learning Modules**

The learning modules provide an introductory overview of invasive plant management concepts, principles, and practices. By presenting science-based concepts and principles integral to understanding management, and illustrating practices implemented by the Refuge System and

www.fws.gov/invasives/staffTrainingModule/

Online Training for Refuge Staff

Modules topics...

- Planning for invasive plant management
- Assessing and monitoring invasive plant infestations
- Management methods, such as physical, chemical, biological, prescribed grazing and prescribed burning

www.fws.gov/invasives/staffTrainingModule

STRIKE TEAMS

- Modeled after wild land firefighting
- Rapidly respond to new invasive plant infestations
- Provide technical assistance to Refuges

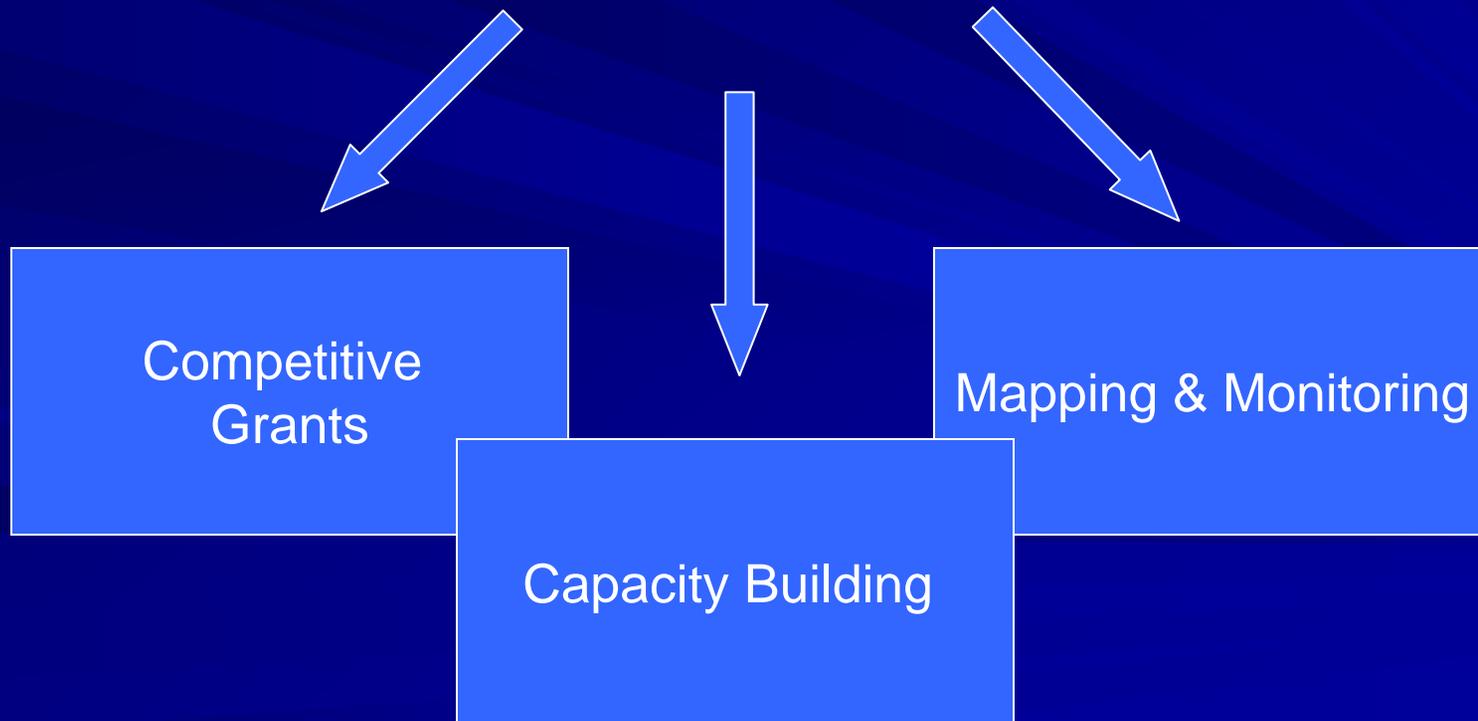


NWRS Invasive Species Strike Teams



VOLUNTEERS & INVASIVES PROGRAM

To engage volunteers in invasive species management on refuges



Competitive Grants for Controlling Invasive Plants

- Projects Funded
 - 56 projects in 2005
 - 60 projects in 2006
 - 61 projects in 2007
 - 50 projects in 2008
- Total over 3-year period (2005-2007): 2,750 volunteers contributed over 49,000 hours to management of more than 211,000 acres of refuge lands = \$7 an acre!
- <http://www.fws.gov/refuges/IS/>
- <http://www.refugeassociation.org/New-invasives/vimp.html>



Girl Scouts GPS at Horicon NWR in Wisconsin

Weeding out Invasives Begins with Awareness

Parker River NWR

\$5,000 received 2006
(combined with PTI grant)

Engaged 70 volunteers
who pulled 3,000 lbs of
perennial pepperweed &
established "fire lane"



Volunteers clearing sumac at Weber WPA, MN



2007/08/30

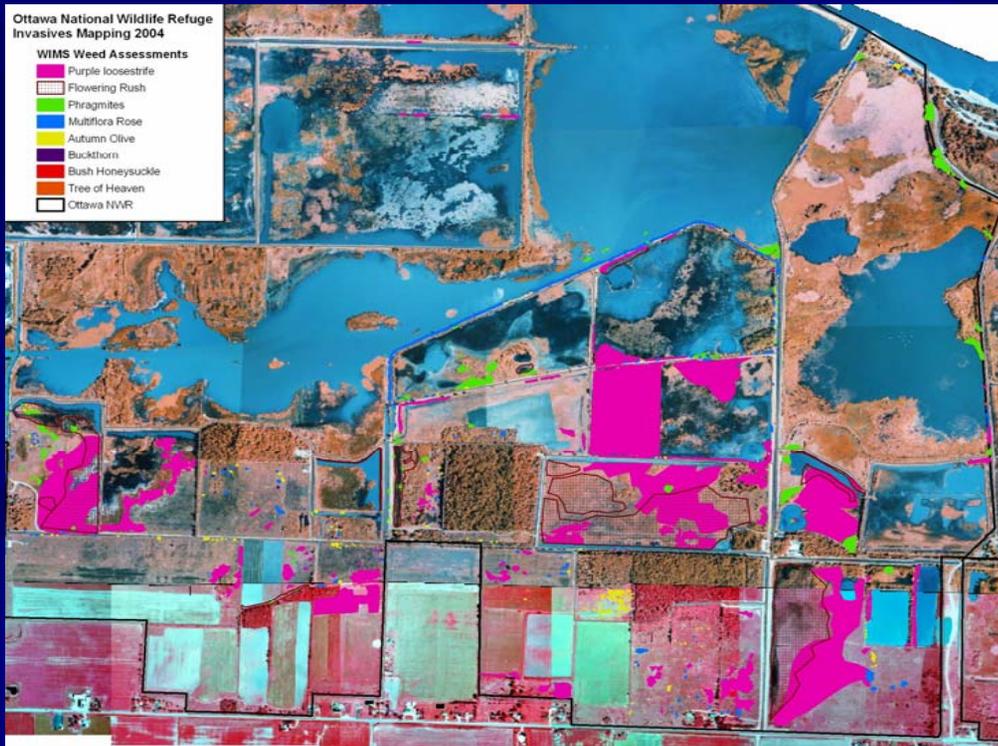
Mapping Project Results (FY03, FY05, FY06)

- Over 198 volunteers trained
- On 30 refuges/complexes
- 24,862 acres of refuge lands surveyed and mapped
- Development of original NWRS software (RLGIS) and manual for weed mapping
- USGS predictive modeling component

San Pablo Bay NWR



Ottawa NWR



Where was kudzu growing in 1971?



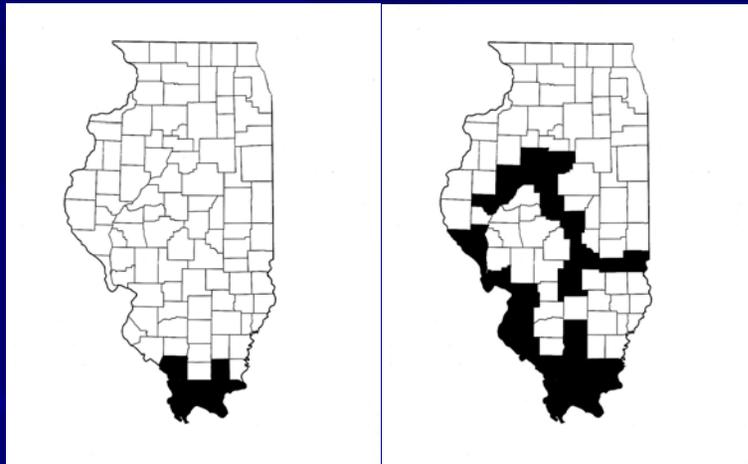
Focus on mid-western populations, away from urban centers or mountains



Where is it growing now?

1971

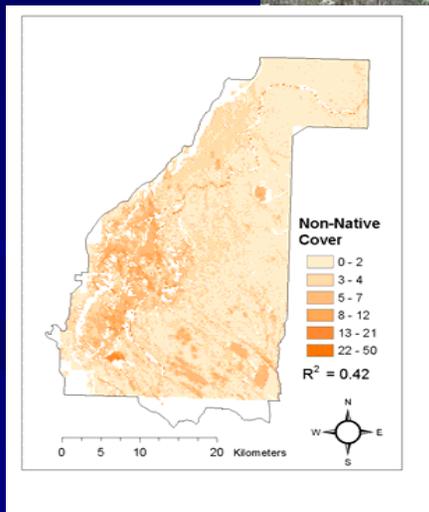
2006



Challenges: Location location location!



Predictive
Modelling



Hart Mt NWR

Plot-based vegetation sampling





U.S. Fish & Wildlife Service

National Wildlife Refuge System

Conserving the Nature of America



Volunteers and Invasive Plants LEARNING AND LENDING A HAND

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GO

V&IP HOME

GETTING STARTED

Learning Modules

THE NWR SYSTEM

VOLUNTEERS

THE BIG PICTURE

MANAGING INVASIVES

PUBLIC OUTREACH



Arctic ecosystem
Arctic NWR, AK

Working to protect the National Wildlife Refuge System

America's National Wildlife Refuges are being threatened and impacted by invasive plants.

For refuge managers, these troublesome plants present a complex challenge that demands many resources and long-term attention.

One of a refuge's most valuable resources for addressing invasive plant problems is the dedication of volunteers. Across the country, refuge volunteers are learning about invasive plants and lending a hand in management activities such as prevention, early detection, control, restoration, and outreach.

It's all about Volunteers:
Learning & Lending a Hand is for You!



www.fws.gov/invasives/volunteers TrainingModule

Learning and Lending A Hand

Module Topics...

- History of NWRS and impacts of invasive plants on refuges
- Global view of invasives, how they travel and are introduced
- Managing invasive plants, including IPM & various methods
- Experiences of volunteers working to manage invasives on refuges (videos, slide shows, stories)
- Tips & tools for public outreach, a powerpoint presentation for visitors, schools, garden clubs, etc.



KUDZU: The Vine That Ate the South!