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# **Integrated Noxious Weed Invasive Species Project**

## **Washington State University Extension**

**(Soon to be "Integrated Weed Control Project")**

**Dan Fagerlie**  
**WSU Ferry County Extension & INWISP Director**  
**20 September 2006**





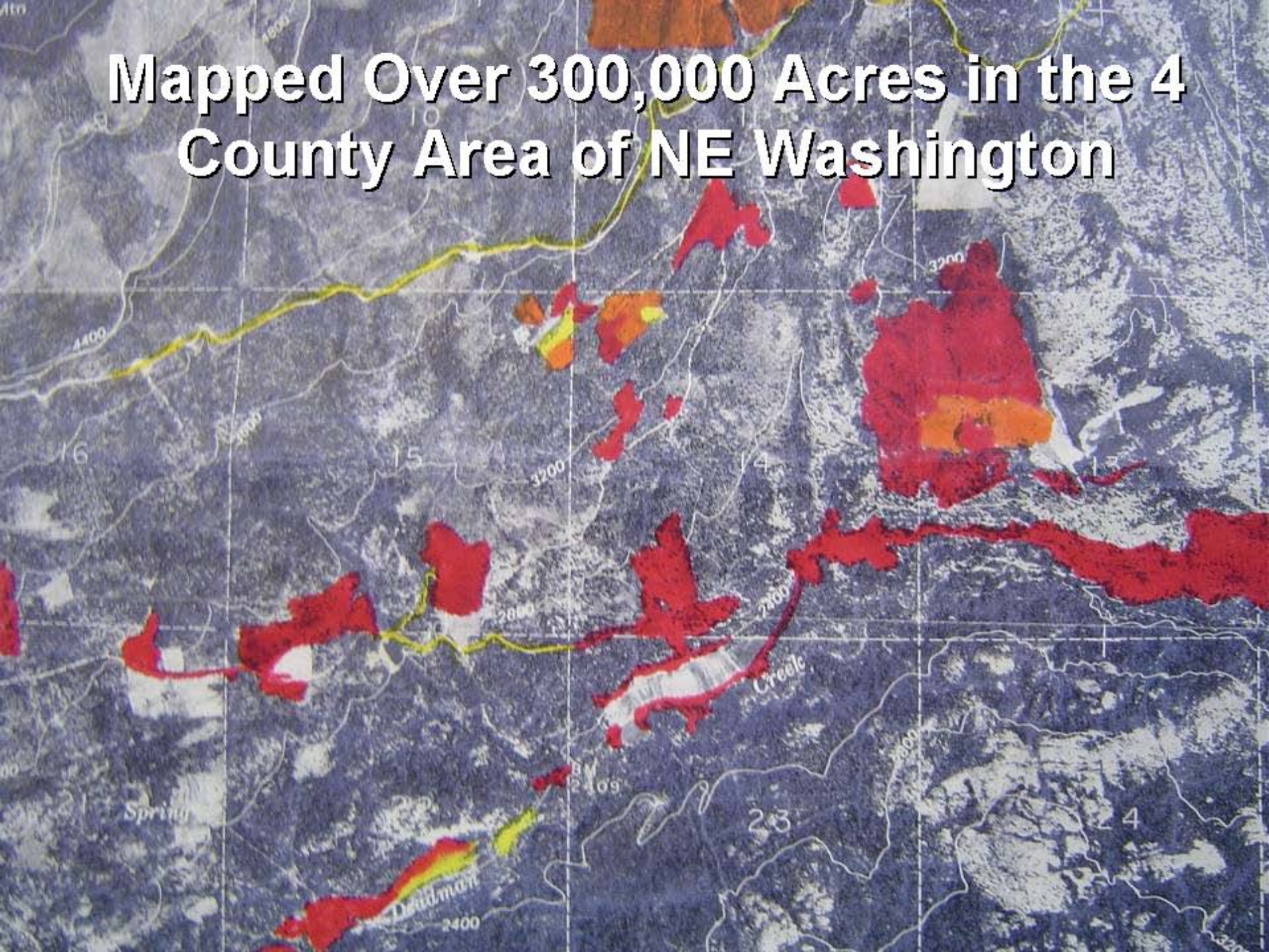
## **Non-Native Invasive Weeds Impact Livelihoods & Wildlife Habitat**



# Diffuse Knapweed (*Centaurea diffusa*)



# Mapped Over 300,000 Acres in the 4 County Area of NE Washington







# Herbicide Treatments Helped Contain the Spread of Diffuse on Rangeland, But at a Growing Cost









**Quad County – Colville Reservation Project  
Was Initiated in 1999**

# Chose to Enhance **BIOLOGICAL TREATMENT**

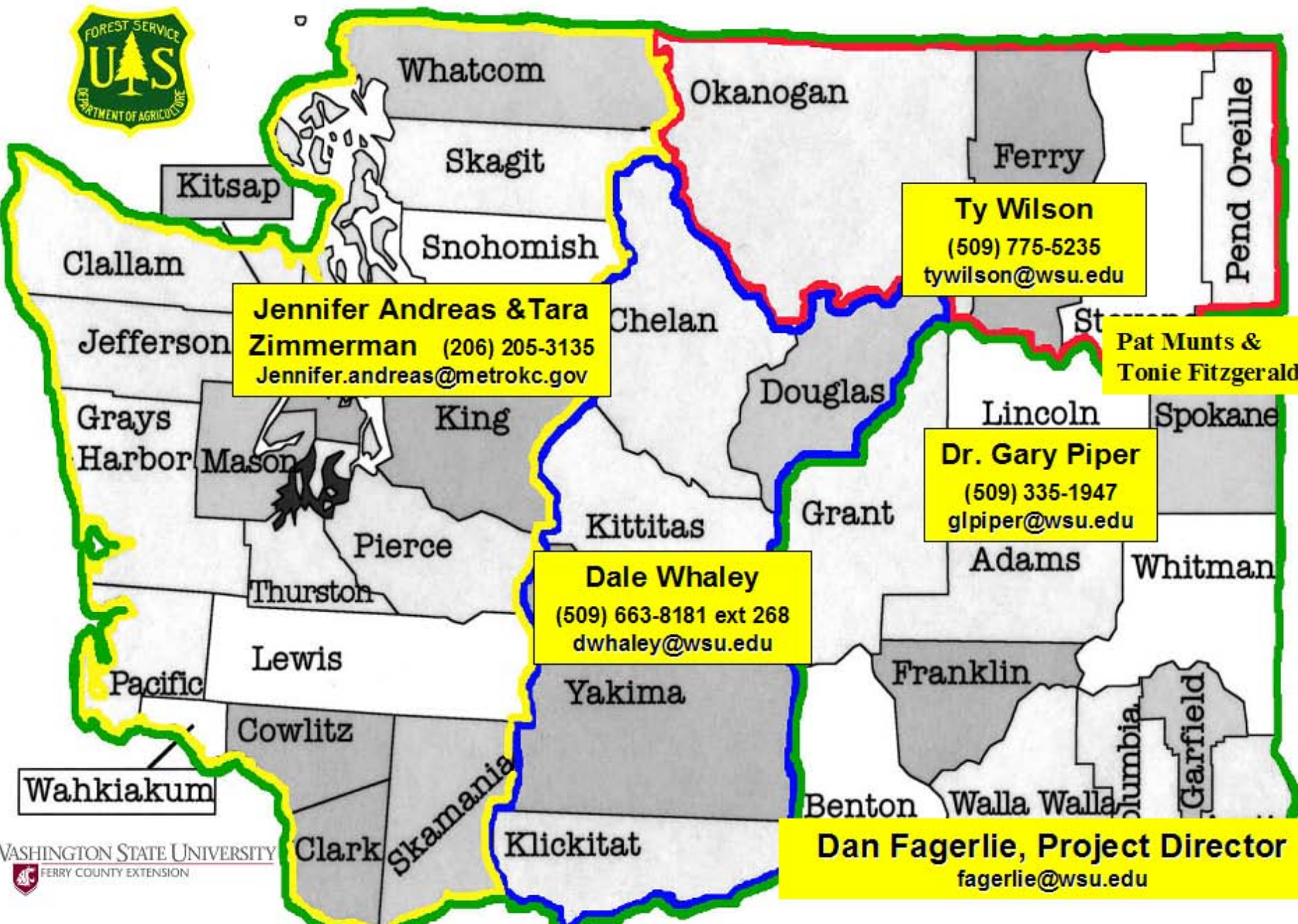




Okanogan National Forest



**The USFS, Colville Confederated Tribes, WSDFW, DOT, Bureau of Indian Affairs, Colville & Wen-Okanogan NF, 2 Canadian Weed Areas, WSU, and 30+ Counties Collaborated for the project in 2005-6**



**Jennifer Andreas & Tara Zimmerman**  
(206) 205-3135  
jennifer.andreas@metrokc.gov

**Ty Wilson**  
(509) 775-5235  
tywilson@wsu.edu

**Pat Munts & Tonie Fitzgerald**

**Dr. Gary Piper**  
(509) 335-1947  
gpiper@wsu.edu

**Dale Whaley**  
(509) 663-8181 ext 268  
dwhaley@wsu.edu

**Dan Fagerlie, Project Director**  
fagerlie@wsu.edu

# Washington Integrated Noxious Weed Invasive Species Project





**Tara**



**Chris**



**Ty**



**Pat**



**Dan**



**Dale**



**Jennifer**



**Gary**

# Setting up a rearing cage in Nespelem on the Colville Reservation





# Releasing the Insects On Invasive Weeds



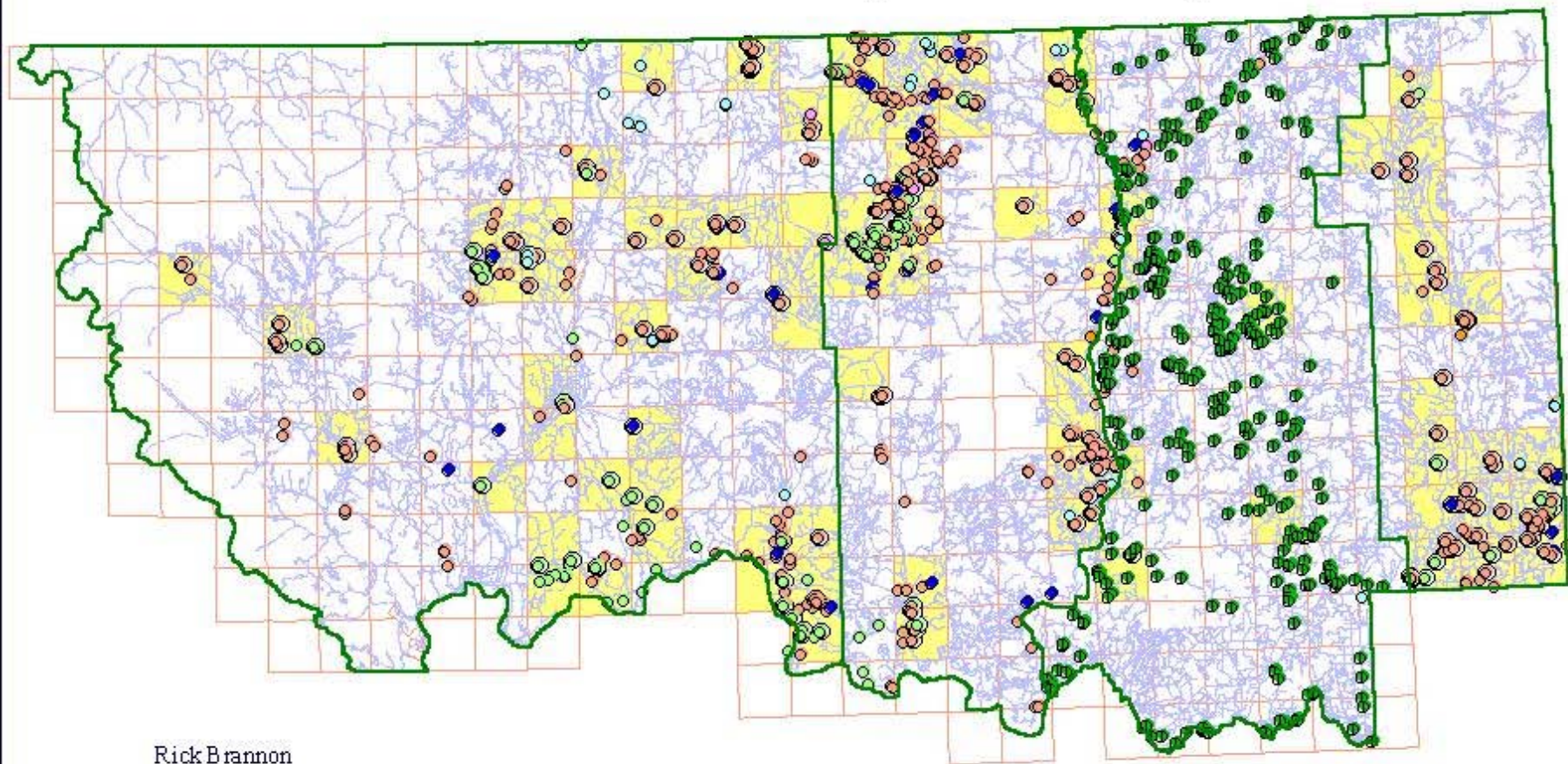


# Field Releases on the Yakama Reservation



# *BioAgent Release Sites*

## *Washington State Invasive Weed Bioagent Enhancement Project - NE Region*



Rick Brannon  
SCNWCB 3/18/04



*Dan Fagerlie, Project Director; Daro Palmer,  
Project Coordinator; & Chris Adams, Technical  
Assistant*



# Knapweed Results!





**Damage to diffuse  
knapweed caused by  
larval feeding of  
*Cyphocleonus achates***



*Larinus minutus*

Knapweed seed head weevil





***Larinus minutus***  
pupa in a diffuse  
knapweed seed  
head









# Diffuse Knapweed (*Centaurea diffusa*)



# *Invasive Weed Success!*

*Larinus minutus* at work in Swawilla Basin area of the Colville Reservation



***Before***



***After***



***Before***



***Sanpoil Valley***

***After***





***Impacts on an  
Estimated 138,000+  
acres of Diffuse  
alone from project  
releases***



**Diffuse knapweed  
biomass has  
declined from  
1860 lbs/acre in  
1984 to less than  
10 lbs/acre with  
grasses  
returning.**



# Dalmatian Toadflax Results!

*Linaria dalmatica*



# Bioagent for the suppression of Dalmatian Toadflax

- *Mecinus janthinus*  
Stem-boring Weevil



Montana State University

*Mecinus janthinus* adults.

Collaborating with USDA APHIS:  
140,000 insects a year from our  
INWISP collection sites to  
Washington & the Western USA.







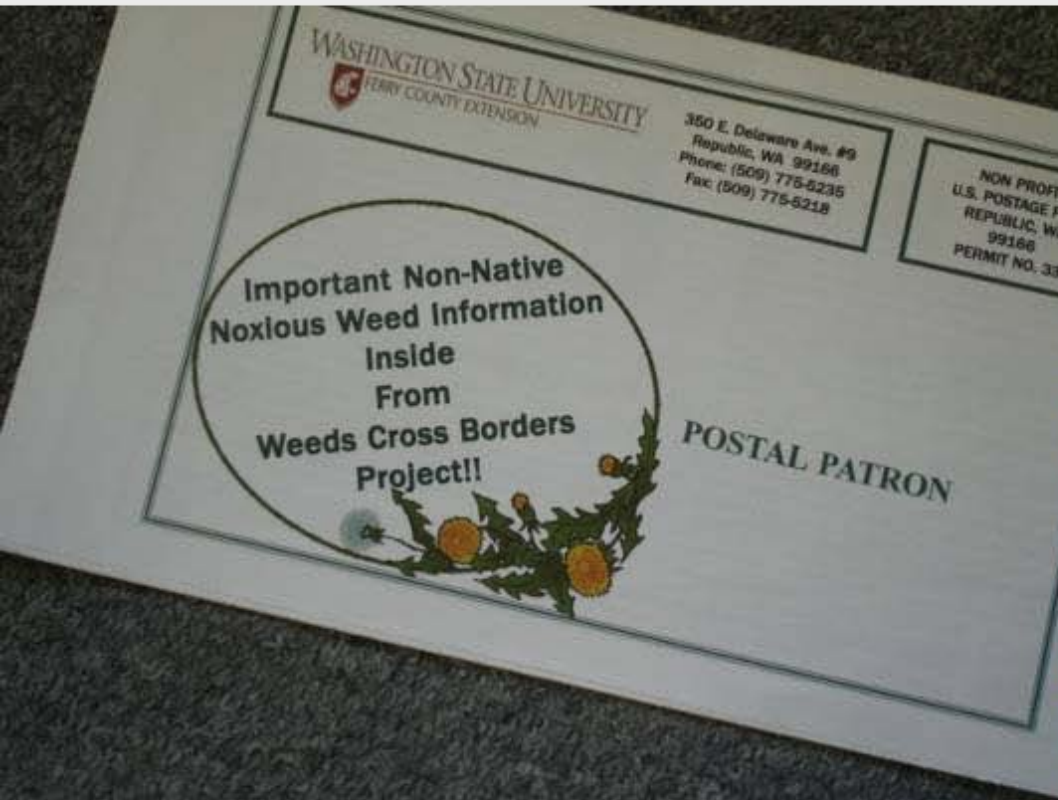


# Expanding into Enhancing Integrated Control: *Education*

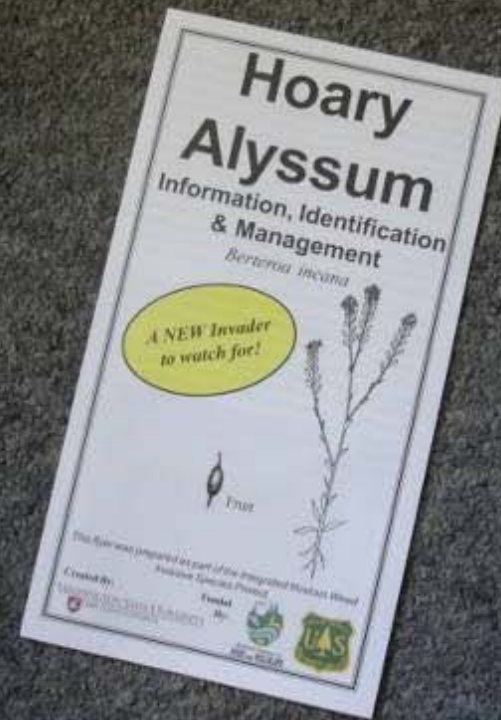
Getting People to Know Our  
New Non-Native Weed Invaders



# Produced 20,000 8 page Weed ID, Prevention & Control Flyers, Copied by Fed. DOT & Sent Across USA!



**29,000 alerts  
distributed on a  
New Invader  
recently added to  
State Noxious  
Weed List**



# Demonstration Control Plots in Alfalfa & Range Working With WSU Weed Specialists



# Public Awareness Through Displays & Large Posters



## Working to Fight Non-Native Weeds on the Colville Reservation

Project funded by the US Forest Service, Confederated Tribes of the Colville Reservation, and Washington State University Extension

Project directed by Washington State University Extension

### QUAD COUNTY/COLVILLE RESERVATION BIOAGENT PROGRAM FOR NON-NATIVE INVASIVE WEEDS

Program led by Washington State University-Perry County Cooperative Extension, with funding & support from the U.S. Forest Service, USFS, National Resource Conservation Service (NRCS), FWS, and the Confederated Tribes of the Colville Reservation, Area Weed Boards and Extension Offices



Washington State University  
Extension  
Perry County Cooperative Extension



#### The "ROOTS" of the Bioagent Program

Early efforts to introduce bioagents to the area started in the mid-1990s. The program was established in 2000 as a result of a grant from the U.S. Forest Service and Washington State University Extension. The program is currently managed by the Perry County Cooperative Extension and the Confederated Tribes of the Colville Reservation.

#### Biological Treatment What is it? Why is it Needed?

Biological treatment is the use of natural enemies to control pest populations. It is a sustainable and cost-effective method of weed control. The program uses a variety of bioagents, including insects, fungi, and nematodes, to target specific weed species. This approach is particularly effective for long-term weed management and is often used in conjunction with other control methods.

### QUAD COUNTY/COLVILLE RESERVATION BIOAGENT PROGRAM

Washington State University  
Extension  
Perry County Cooperative Extension



The U.S. Forest Service, along with the Confederated Tribes of the Colville Reservation and the Perry County Cooperative Extension, have partnered with Washington State University Extension to support and expand the bioagent program. This partnership is a key component of the U.S. Forest Service's National Weed Management Strategy and the WSU Extension's National Weed Management Strategy.

#### RESPONSIBILITIES

Washington State University Extension  
Perry County Cooperative Extension  
Confederated Tribes of the Colville Reservation  
U.S. Forest Service  
National Resource Conservation Service (NRCS)



The U.S. Forest Service, along with the Confederated Tribes of the Colville Reservation and the Perry County Cooperative Extension, have partnered with Washington State University Extension to support and expand the bioagent program. This partnership is a key component of the U.S. Forest Service's National Weed Management Strategy and the WSU Extension's National Weed Management Strategy.



### Meet the Bioagents for the suppression of:

Washington State University Extension  
Perry County Cooperative Extension

- 1.1 Yellow & Spotted Knave**
  - 1.1.1 Description of the bioagent
  - 1.1.2 Target weed species
  - 1.1.3 Application methods
  - 1.1.4 Distribution
  - 1.1.5 Status
- 1.2 Black Flies**
  - 1.2.1 Description of the bioagent
  - 1.2.2 Target weed species
  - 1.2.3 Application methods
  - 1.2.4 Distribution
  - 1.2.5 Status
- 1.3 Parasitic Nematodes**
  - 1.3.1 Description of the bioagent
  - 1.3.2 Target weed species
  - 1.3.3 Application methods
  - 1.3.4 Distribution
  - 1.3.5 Status
- 1.4 Parasitic Fungi**
  - 1.4.1 Description of the bioagent
  - 1.4.2 Target weed species
  - 1.4.3 Application methods
  - 1.4.4 Distribution
  - 1.4.5 Status
- 1.5 Parasitic Insects**
  - 1.5.1 Description of the bioagent
  - 1.5.2 Target weed species
  - 1.5.3 Application methods
  - 1.5.4 Distribution
  - 1.5.5 Status





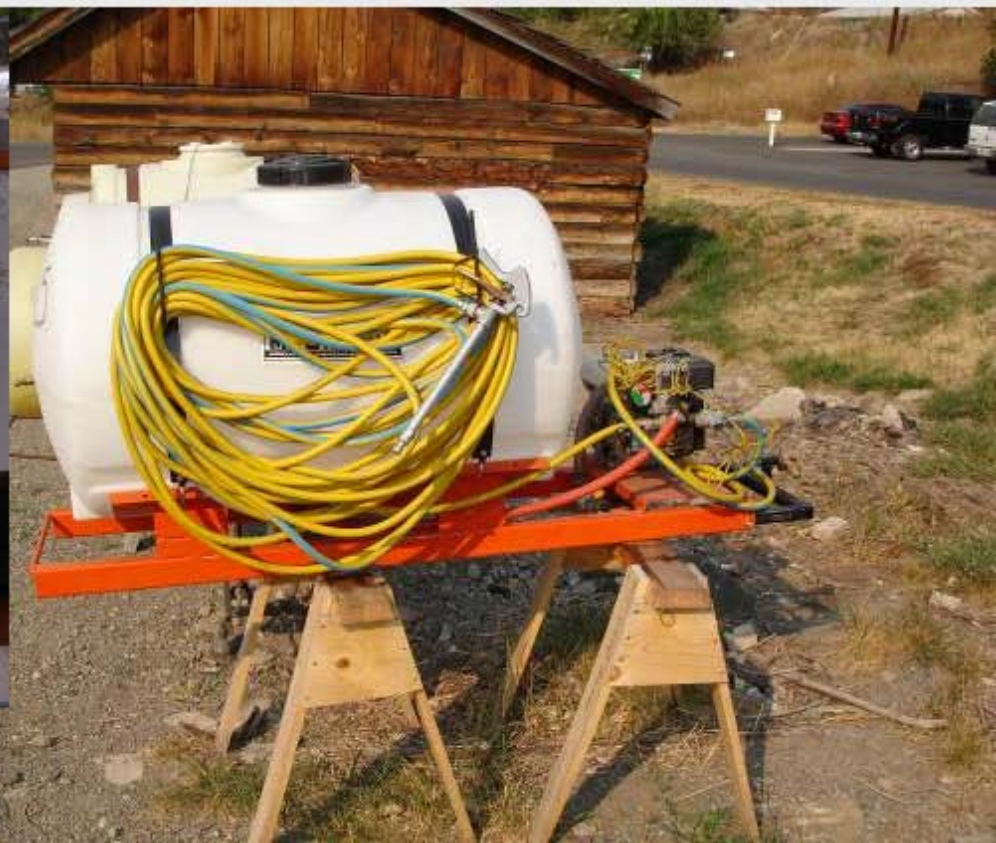
## Riker Mounts used to display bioagents and plant parts



# Public Awareness Through Signage



**Wrote secure rural schools RAC projects for equipment and added a “rapid response” to INWISP project component, providing \$50,000 for weedboards “on the ground treatment” of early invaders such as balkan catchfly & hoary alyssum across quad county area in 2006**



# Once public concern is heightened, education on pesticide safety is a needed component



WASHINGTON STATE UNIVERSITY

FERRY COUNTY EXTENSION

# WEED CONTROL HANDS-ON CALIBRATION WORKSHOP



PRESENTED BY:

WSU FERRY COUNTY EXTENSION &  
FERRY COUNTY WEED BOARD



**54 Sessions this last year have been held which increase protection of the individual, environment and pocketbook.**



**Grass seed & equipment have been provided to re-vegetate treated areas & seed disturbed sites on 783 acres in 2006**



**Public Outreach also included Full Page Ads in 4 newspapers in Targeted areas reaching a circulation of 368,645 recipients. These ads were timed to come out the week before and during grouse and bowhunting season opened**





Hoary Alyssum

Orange Hawkweed

Meadow Hawkweed

Common Bugloss

Buffalo Bur



Houndstongue



Spotted Knapweed



Leafy Spurge



Dalmatian Toadflax



Yellow Starthistle



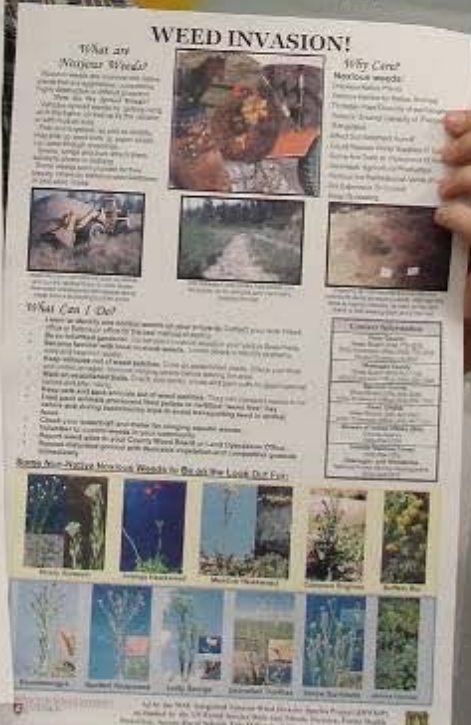
Japanese Knotweed

WASHINGTON STATE UNIVERSITY  
EXTENSION

This alert brought to you by WSU INWISP co-funded by the US Forest Service State and Private Forestry, Forest Health Protection, and the Okanogan-Wenatchee and Colville National Forest Secure Rural Schools Title II Funds, and many other collaborators.







**650 Recreation Area Posters and 50+ Large Posters Created & Distributed Across NE, NC Washington & Southern Canada**

Hi Dan,

I just wanted to mention to you the incredible response that we have had following the Hoary Alyssum ad in the Chronicle and Wenatchee World. We have had phone calls and people stopping into the office for more information. It really brought it to peoples' attention that we may have some serious issues with this New Invader. We also had quite a lot of people stop by our fair booth, in fact, we were swamped!! We gave out an awesome amount of information, including a lot of the Hoary Alyssum brochure that was printed previously.

Because of the funding that you provided from the Forest Service, we have been able to treat a lot of Hoary Alyssum that would have been left untreated within the buffer area. We are pushing to keep it from infesting out of that area. Landowners within the buffer area have been very receptive and appreciate the efforts that we are making to get the Hoary Alyssum back to an amount that they can handle on their own. Most of them were unaware of the Alyssum's potential to spread and invade but will be doing their own control work in the future to prevent it from spreading further.

Again, Thanks, and we appreciate all that you do!!

Anna Lyon, Manager, 509-422-7168

alyon@co.okanogan.wa.us



**Project Displayed at 2005 & 06  
National Invasive Weed  
Awareness Week,  
*Educating our Congressional  
Representatives on Invasive  
Weeds and Projects***



LEGENDS TEE OFF TODAY  
 Cooking for 150 hungry Hawks  
 Lighthouses A one-tank tour of six historic sentinels

**The Seattle Times** THURSDAY  
 APRIL 17, 2008  
 \$5.00

# Should we leave Iraq? Major split in state

**SEATTLE TIMES POLL**  
 About half more Americans say we should leave Iraq now than we did last week. The poll shows a 55 percent increase in support for leaving Iraq now, from 33 percent last week.

**10 years later, arrest is made in slaying of JonBenet**  
 FORMER U.S. SHERIFF ARRESTED IN INVESTIGATION  
 Man said he saw hooding of child was close to actual

**In war on weeds, the Bug Lady bets on hungry weevils**

**Faculty, students out of touch**  
 Faculty Senate switchback complete

**WSU Foundation Fund-Raising Totals**

40000000  
 30000000

4 • September 1, 2008 WSU Today

# War on weeds

## Bug Lady deploys hungry weevils

FROM THE SEATTLE TIMES, MAR. 27, 2008

The Bug Lady — as British weevils call Jennifer Andrus, inventor of the WSU's Bug Lady program — is carefully placing her weevils in a field of alfalfa.

Andrus, a plant with a beautiful purple-pink flower and an eye for an eye, is a weevil specialist. It's among the 1,000 invasive weevils that a 2006 federal surveying report estimated have caused "biological invasions" in America by crowding out the local vegetation. The report called this widespread species a "false native."

Slow but cheap  
 If they live up to their name as weevils, the Bug Lady weevils, she says, will make any

Andrus, 40, was asked to investigate the WSU's weed management program in western Washington. Before the program, the weed was weedy with dense standing crop in the U.S. forest habitat.

Andrus, a former weed fighting bug for weed control agencies in 19 countries, in 2000, she collected 42,000 weevils — 15 different kinds of this, weevils and beetles.

She's obviously enthusiastic about the Bug Lady weevils, she had kept all weevils with some 10,000 of the bugs in the refrigerator of the combination she shares with her husband.

"I think he wishes he had another refrigerator," she said.

for their eggs in the European forests. Then, their offspring will go on to the weeds.

There are four weevils now. Andrus hopes to witness their successful future, but she says she's not sure.

"We have to be patient," she said.

But Andrus said, she would not be surprised if the weevils did a job that would be a lot of work for humans. The little critters are given to countries that want them. The bugs, she said, would be particularly useful in large areas of land that would otherwise require a considerable amount of chemical.

ONLINE: http://www.wsu.edu/buglady/buglady.html  
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Andrus Andrus (left) spends a lot of time in the field with her weevils. (Photo courtesy of Jennifer Andrus)

# OUTDOORS & TRAVEL

## Weeding out the wildlife

### INVASIVE SPECIES LEAVE CRITTERS HUNGRY

OUT & ABOUT  
 State DU says

Jeering to hours of hiking

Forest facilities reserved online

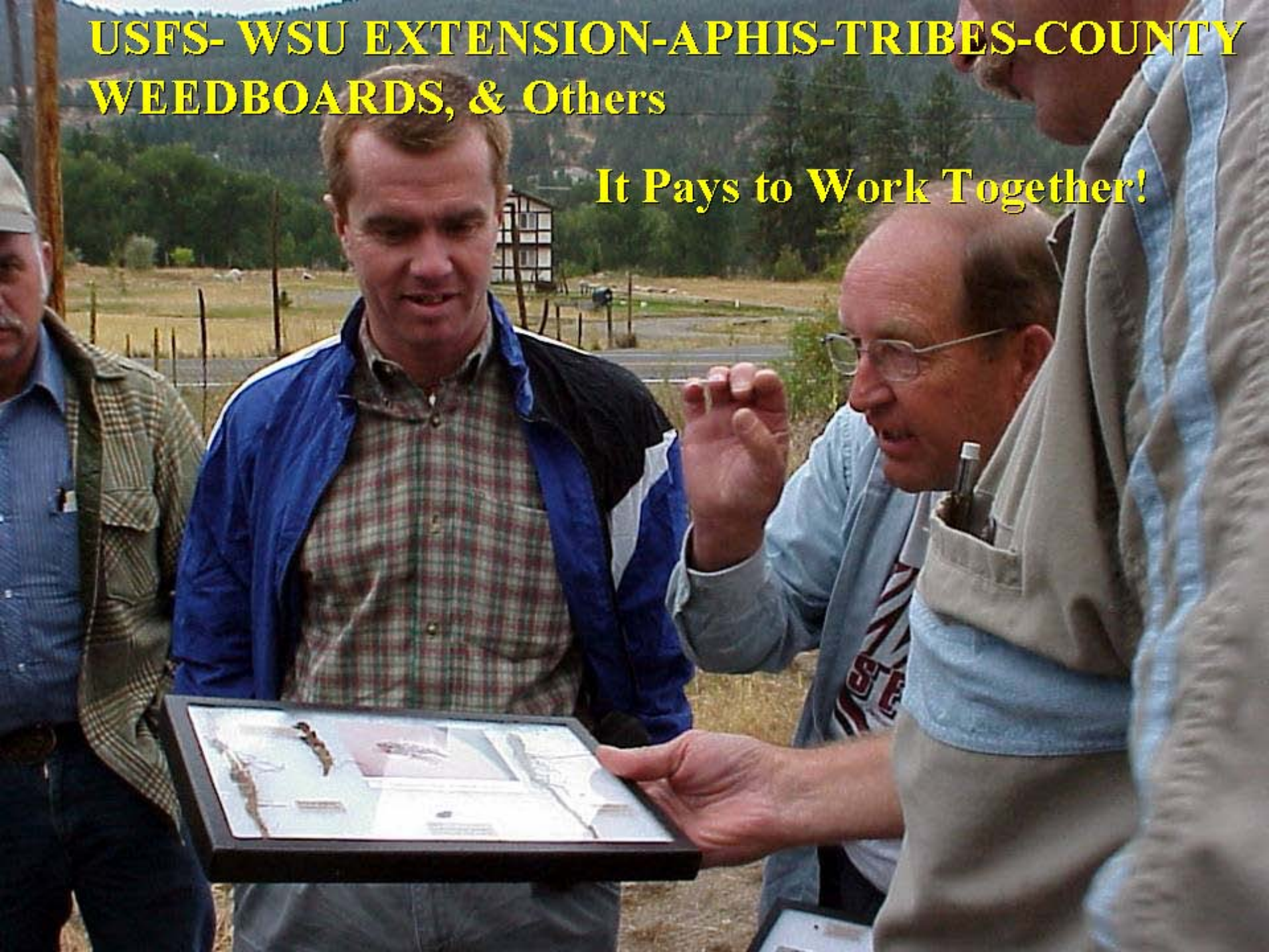
Photo: Andrus and her husband are planting a field of alfalfa with weevils. The weevils are given to countries that want them. The bugs, she said, would be particularly useful in large areas of land that would otherwise require a considerable amount of chemical.






# **USFS- WSU EXTENSION-APHIS-TRIBES-COUNTY WEEDBOARDS, & Others**

**It Pays to Work Together!**





***Thank you, And Now Jennifer  
Will Update You on Further  
Western Washington Efforts,***



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**Washington State University Extension**  
**Integrated Noxious Weed Invasive Species Project**  
(Soon to be "Integrated Weed Control Project")  
**-Western Washington-**

Jennifer Andreas  
Western WA Integrated Weed Control Program Coordinator  
20 September 2006



# Challenges in Western WA

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- Environmental
  - Desert to rainforest
  - Affect on weeds?
  - Affect on insects?
- Landscape scale and land use practices
  - Islands
  - Hobby farms, timber; many landowners
- First organized effort using biocontrol



# Serving Western WA

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- Providing weed wrenches regionally
- Act as resource for new information
- Primarily biocontrol
  - 42,820 insects (12 species) released in 2005
  - 19 County Weed Boards, military agencies (Fort Lewis, McChord AFB), WA State Parks, Land Trusts, Tacoma Power, WA Fish and Wildlife, Forest Service

# Weed Species

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- Purple loosestrife (3 agents)
- Scotch broom (2 agents, 1 potential)
- Canada & bull thistle (1 agent each)
- Dalmatian toadflax (1 agent)
- Knapweeds (meadow, diffuse, spotted) (8 agents)
- Tansy ragwort (1 agent)
- St. Johnswort (3 agents)

# Purple loosestrife

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***Lythrum salicaria***



# Purple Loosestrife Biocontrol

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## ***Galerucella californiensis* / *G. pusilla***

- Foliage-feeding beetles
- Highly effective
- Do not like tidal-influenced waters

# Purple Loosestrife Biocontrol



## *Hylobius transversovittatus*

- Root-feeding weevil
- Combine with leaf beetles
- Tolerate tidal influenced water



## *Nanophyes marmoratus*

- Bud/ flower-feeding weevil
- Outcompeted by leaf beetles
- Tolerate tidal influenced water

# *Hylobius* Rearing



Eric Coombs, ODA

- Collect infested roots
- Rear *Hylobius* in a screen-house



Eric Coombs, ODA

- Collect uninfested roots and release *Hylobius* to increase numbers
- Rearing protocol developed by Eric Coombs, ODA

# Scotch Broom

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WSU Extension

***Cytisus scoparius***

## ***Bruchidius villosus***

- Seed-feeding bruchid
- Nursery sites



E. Coombs, ODA

## ***Exapion fuscirostre***

- Seed-feeding weevil
- Widespread



Coombs, ODA; [www.invasive.org](http://www.invasive.org)



Coombs, ODA; [www.invasive.org](http://www.invasive.org)

# Potential New Agent

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**Scotch broom**  
(*Cystisus scoparius*)

**Scotch broom gall mite**  
(*Aceria genistae*?)

- **Accidentally introduced**
- **Appears to reduce seed production, biomass and may cause stem-die-back**



# Host-specificity Testing



- Testing 12 species
- Greenhouse and field choice tests
- If host-specific, petition APHIS in 2 years for approval
- Once approved, begin distributing in WA, OR, CA
- Funding USFS, RMRS



# Acknowledgements

- Primary funded by U.S. Forest Service
- Additional funding through Native American Tribes, Smith-Lever 3(b) & (c), WA Department of Fish and Wildlife, USDA APHIS, County Weed Boards and County governments
- Collaborations with University of Idaho & Oregon Department of Agriculture





**Thank You**

Questions?