Effective control techniques for land mangers combating water primrose and yellow floating heart

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Integrated Resource Management

IRM's AIS Management Background

- Prior to 2011: Yellow flag Iris, purple loosestrife and knotweed treatments at various locations
- 2011: Ludwigia Control in the City of Eugene's Delta Ponds
- 2014: BSWCD -Collins Bay Ludwigia and Horseshoe Lake Yellow floating heart (Corvallis & Albany)
- 2014: Metro- Smith Bybee Lakes Ludwigia (Portland)
- 2015: BSWCD –Stewart Slough (Corvallis)
- 2016-present: Managing over a dozen sites
- Looking forward: OPRD's Willamette Mission and Gail Achterman

Evolution of AIS Treatment Techniques

Evolution of AIS Treatment Techniques

Early Restoration Techniques 2010

Evolution of AIS Treatment Techniques

Early Restoration Techniques 2010

Evolution of AIS Treatment Techniques

Early Restoration Techniques 2015

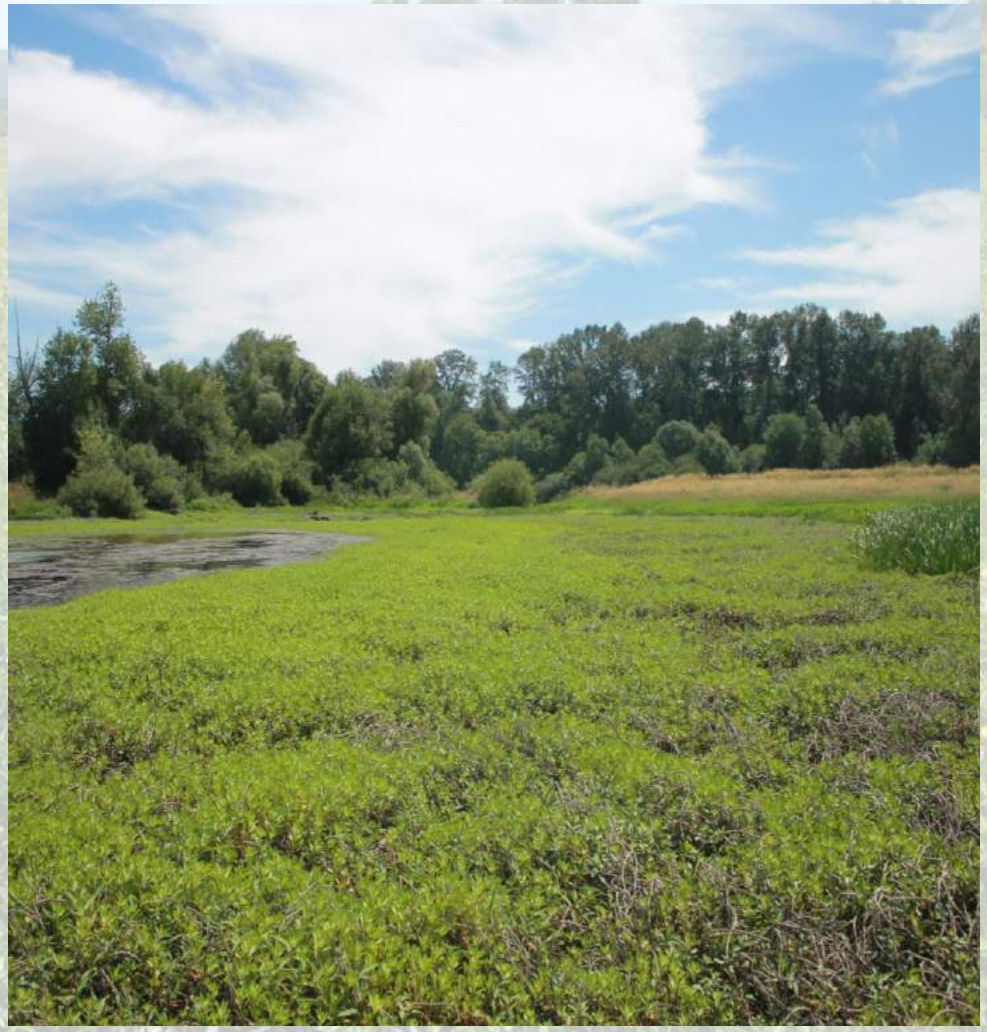
Evolution of AIS Treatment Techniques

Restoration Techniques 2017

Presentation Overview

Habitat types occupied by Ludwigia and Yellow floating heart

- Floating surface
- Mud flat
- Open water
- Shore line
- Slough system
- Miscellaneous



Presentation Overview

Control Techniques for combating Ludwigia and Yellow floating heart

- ATV application
- Backpack
- Canoe application
- Hand pulling
- Intelli-spray
- UAV mapping

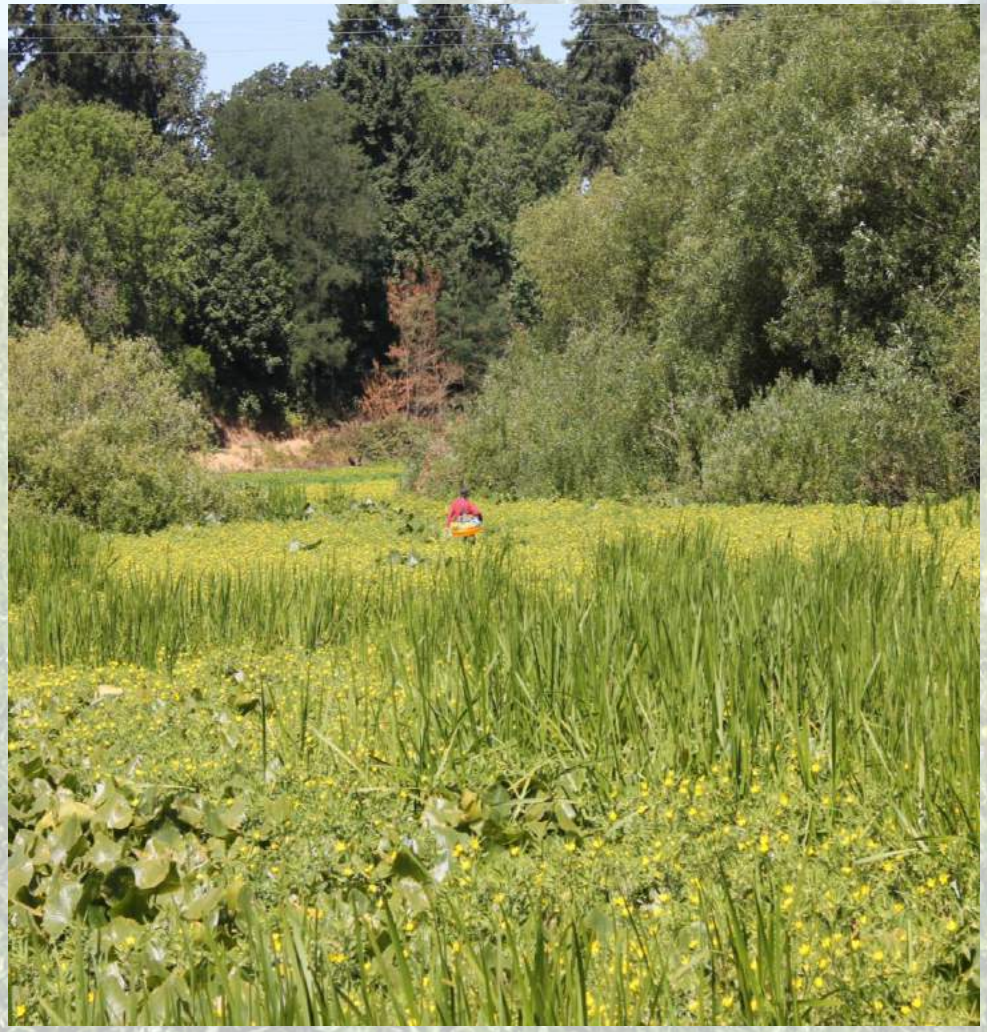
Habitat Type: Floating Surface

Pre-Treatment

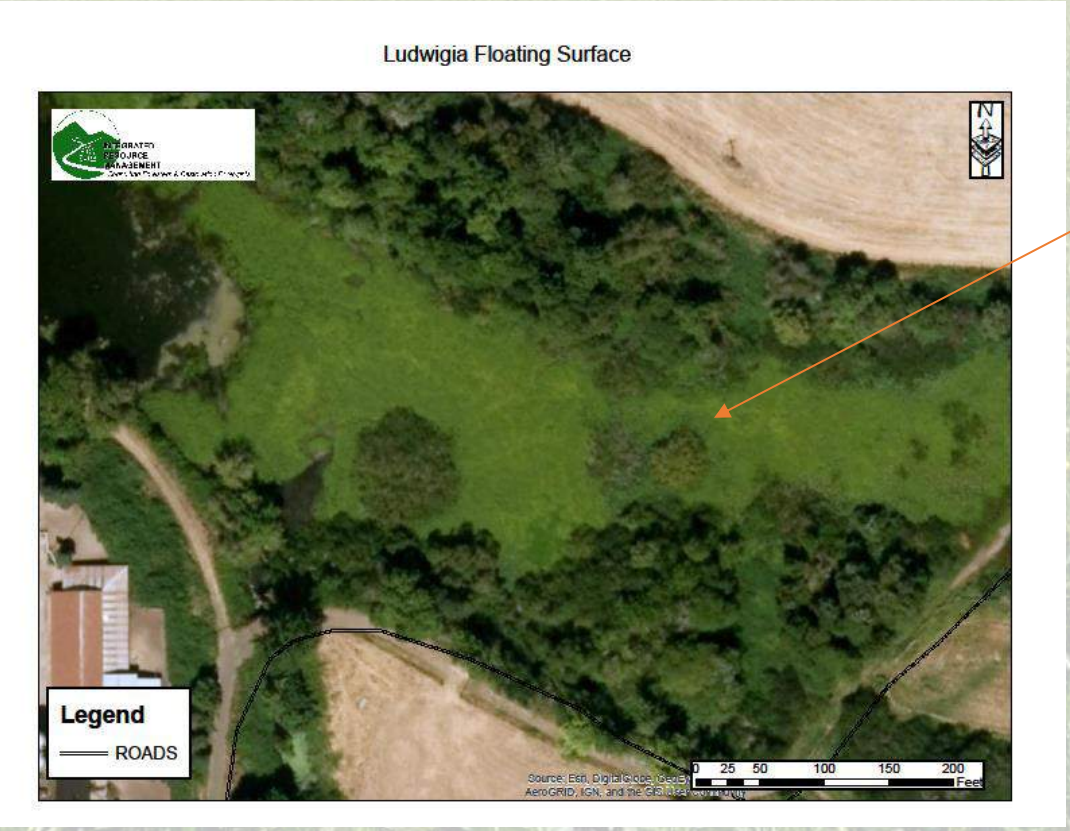
Post-Treatment

Habitat Type: Floating Surface

- Composite of dead and live Ludwigia and sediment
- Often composed of several feet of Ludwigia thatch with a with several feet of water and mud underneath
- Generally the most mature patches of Ludwigia
- Long-term control difficult



Habitat Type: Floating surface

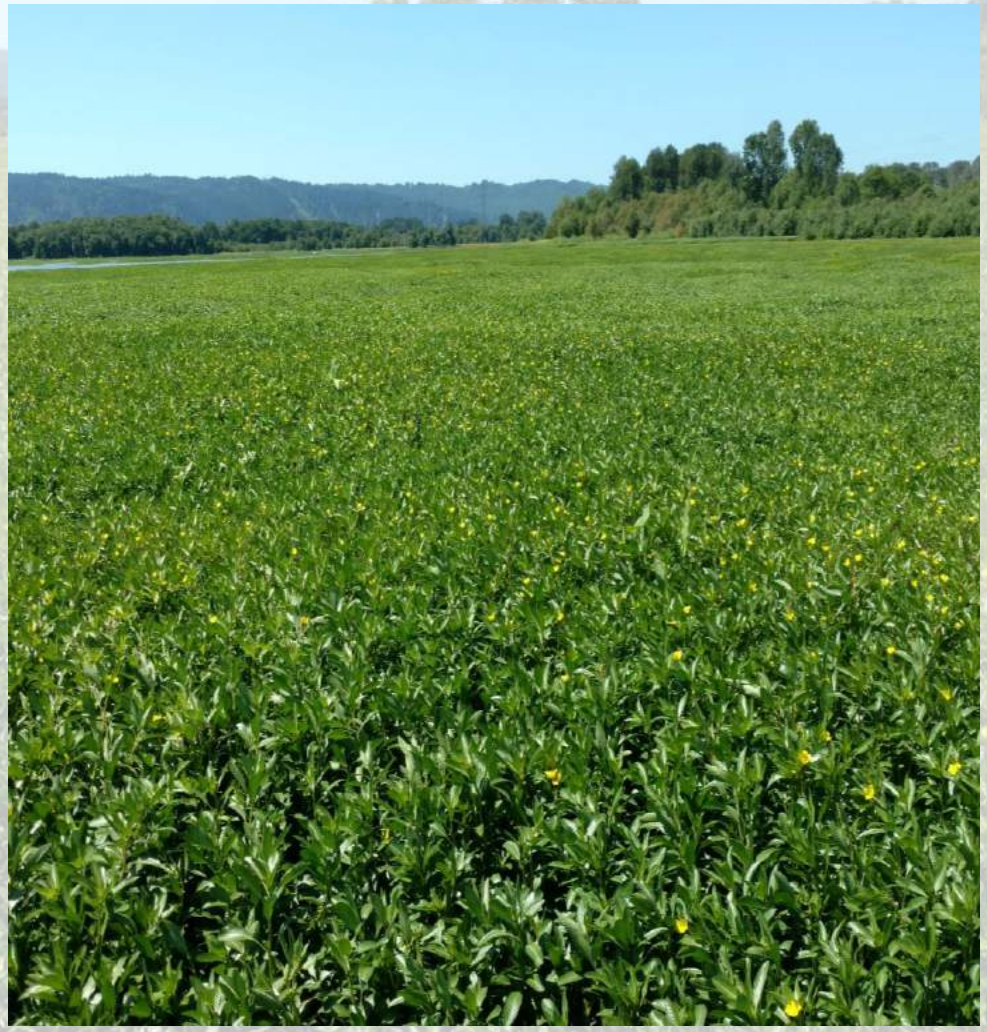


Location of applicator in previous slide

Habitat Type: Mud Flat

Habitat Type: Mud Flat

- Mud surface material can be inches or feet of mud
- What species will germinate?
- What are the variables effecting surface condition?
  - -Precipitation
  - -Seasonal rainfall
  - -Temperatures
  - -River levels
  - -Tides



Mud flat that developed into a monoculture of Ludwigia

Habitat Type: Mud Flat

Mud flat germinated into mostly native species

Mud flat germinated into Ludwigia monoculture

Habitat Type: Open Water

Pre-treatment open water Ludwigia

Post-treatment open water Ludwigia

Habitat Type: Open Water

- Volume of target species
- Access throughout project area and from shoreline
- Impact of water levels in project area and

  factors that influence water levels

Habitat Type: Open Water

Open water application using hose and gun

Habitat Type: Shoreline

Shoreline habitat at Delta Ponds in Eugene, OR

Habitat Type: Shoreline

- Interface with native vegetation
- Ludwigia's success on dry ground
- Timing of plant development

Habitat Type: Shoreline

Shoreline backpack application

Habitat Type: Slough System

Slough system with Ludwigia

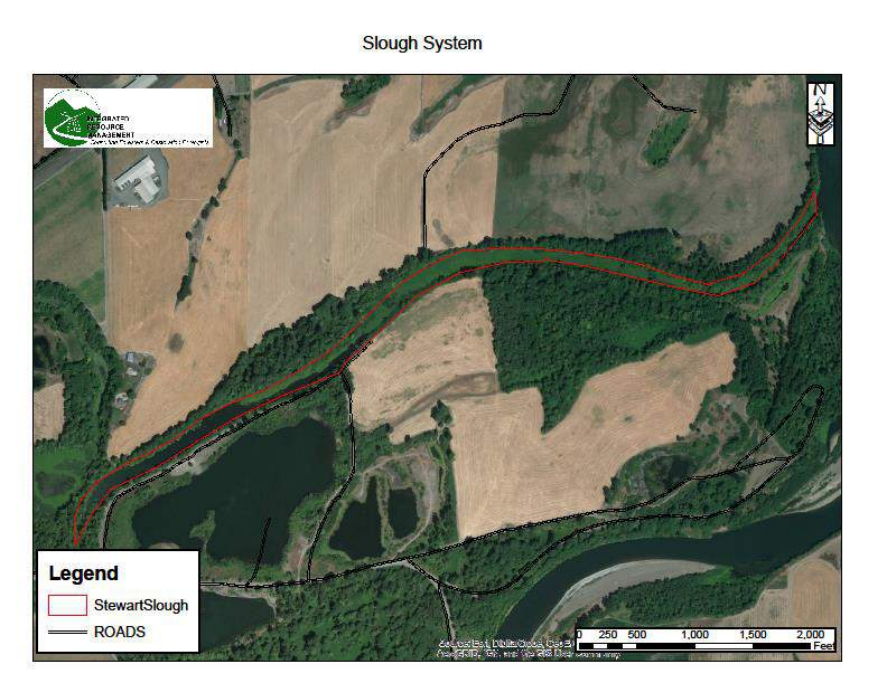
Habitat Type: Slough System

- Often need to coordinate across multiple ownerships
- Locate access points
- Have access to multiple forms of treatment techniques available

Habitat Type: Slough System

Follow up Ludwigia treatment in slough system

Habitat Type: Slough System



Stewart Slough near Corvallis, OR

Habitat type: Miscellaneous

Ludwigia at Willamette Falls

Habitat type: Miscellaneous

- AIS don't limit their presence to well defined location
- There is always an exception
- Safety is essential

Treatment Techniques

- ATV application
- Backpack
- Canoe application
- Hand pulling
- Intelli-spray
- UAV mapping

Treatment Techniques

Ludwigia Herbicide Prescription

-3% Glyphosate (Rodeo)

-1% Surfactant (Agridex)

-.25 oz/gal dye (Hi-Light)

-Results→ Effective

Yellow Floating Heart Herbicide Prescription

-Ludwigia glyphosate mix

Results → Unsuccessful

-1-2% Clearcast (Imazamox)

-1% Surfactant (Agridex)

-.25 oz/gal dye (Hi-Light)

Results→ Promising

Treatment Technique: ATV Herbicide Application

- ATV Chemical transport
- ATV hose & gun
- Jet boat deployment
- ATV broadcast application
- Tracked ATV herbicide application

Treatment Technique: ATV Application

ATV chemical transport and hose & gun

Treatment Technique: ATV Application

Jet boat ATV deployment

Treatment Technique: ATV Application

- Limited by ground condition and weight of machine
- Useful as transport vehicle as well as application tool
- Max load for hose & gun: 36 gallons
- Max load for transport: 56 gallons
- Can be used for either hose & gun or boomless application

Treatment Technique: ATV Application

Treatment Technique: Backpack

Backpack Ludwigia treatment

Treatment Technique: Backpack

- Backpack still remains the most necessary tool
- Needed to work around native species
- Chose your backpack model carefully
- Extend your backpack capacity with other tools
- Backpacks on boats don't mix well

Treatment Technique: Backpack

Shoreline Ludwigia backpack application

Treatment Technique: Canoe Herbicide Application

- Canoe chemical transport
- Canoe hose & gun
- Canoe Intelli-spray

Treatment Technique: Canoe Herbicide Application

Securing equipment to canoe

Treatment Technique: Canoe Herbicide Application

Hose & gun mounted in boat

Treatment Technique: Canoe Herbicide Application

Hose & gun herbicide application

Treatment Technique: Canoe Herbicide Application

- Necessary to access most aquatic sites
- Versatile for multiple application techniques
- Ensure that there is adequate growth above waterline
- Careful of wake from canoe
- Ensure that equipment and chemical is secured to boat

Treatment Technique: Canoe Herbicide Application

Hose & Gun mounted in canoe

Treatment Technique: Hand Pulling

Mix of Wapato and Ludwigia in
Wapato Slough near Corvallis, OR

Treatment Technique: Hand Pulling

Submerged aquatic vegetation

Treatment Technique: Hand Pulling

Re-growth of hand pulled Ludwigia (resulting from heavy rainfall shortly after treatment)

Treatment Technique: Hand Pulling

Bagging and removing Ludwigia

Treatment Technique: Hand Pulling

- Can be used in leu of herbicide application or in combination with
- Attempt to get entire root system as well as all vegetative material
- Useful when plants are below waterline
- Disposal on site or bag material
- One site disposal techniques

Treatment Technique: Intelli-Spray

6x6 UTV Intelli-Spray with 100 gallon tank and 700’ of hose

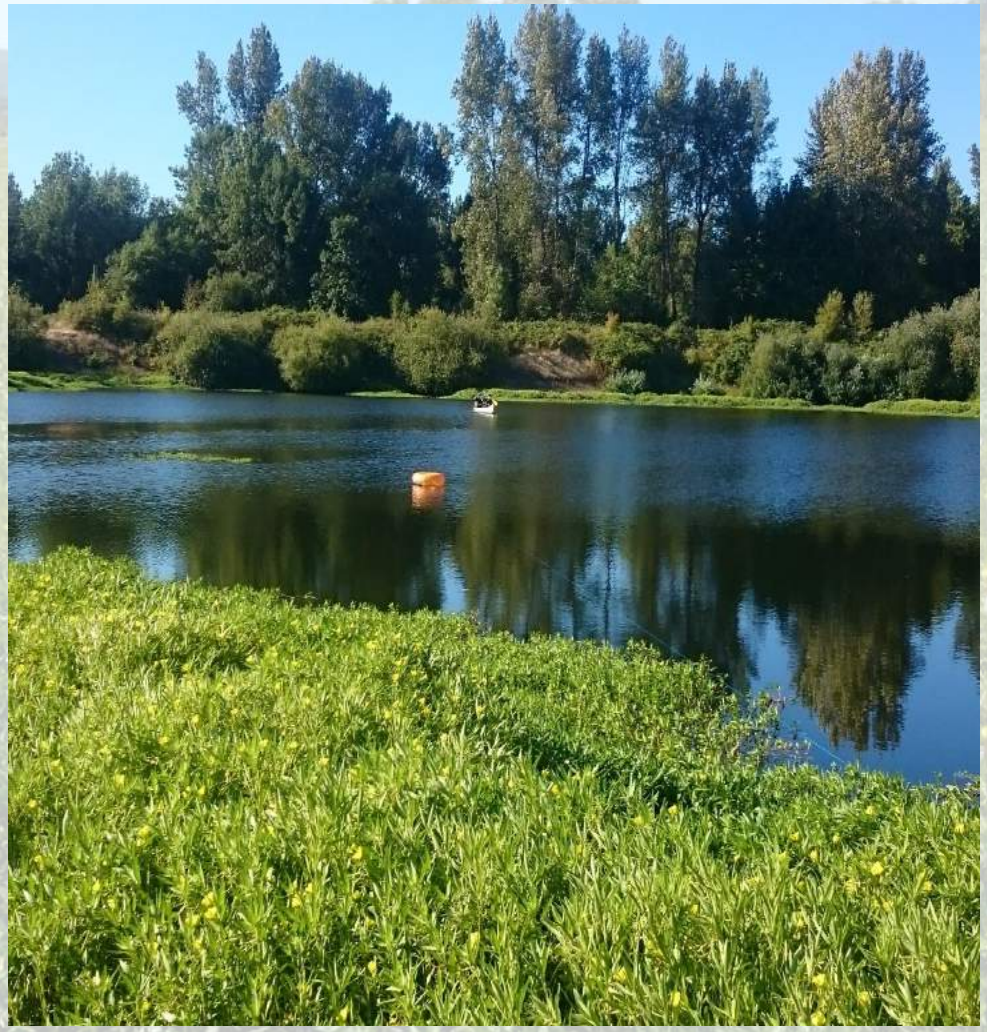
Treatment Technique: Intelli-Spray

Intelli-Spray Vehicles

- Tractor mounted Intelli-spray
- Truck mounted Intelli-spray
- 6x6 UTV mounted Intelli-spray
- Jet boat mounted Intelli-spray

Intelli-Spray Techniques

- Application from watercraft
- Application by land vehicle
- Application by foot



Treatment Technique: Intelli-Spray

Tractor mounted Intelli-Spray with 120 gallon tank and 700’ of hose

Treatment Technique: Intelli-Spray

Intelli-Spray mounted in bed of pick up

Treatment Technique: Intelli-Spray

Broadcast herbicide application with UTV

Treatment Technique: Intelli-Spray

100 gallon Intelli-Spray mounted in jet boat

Treatment Technique: Intelli-Spray

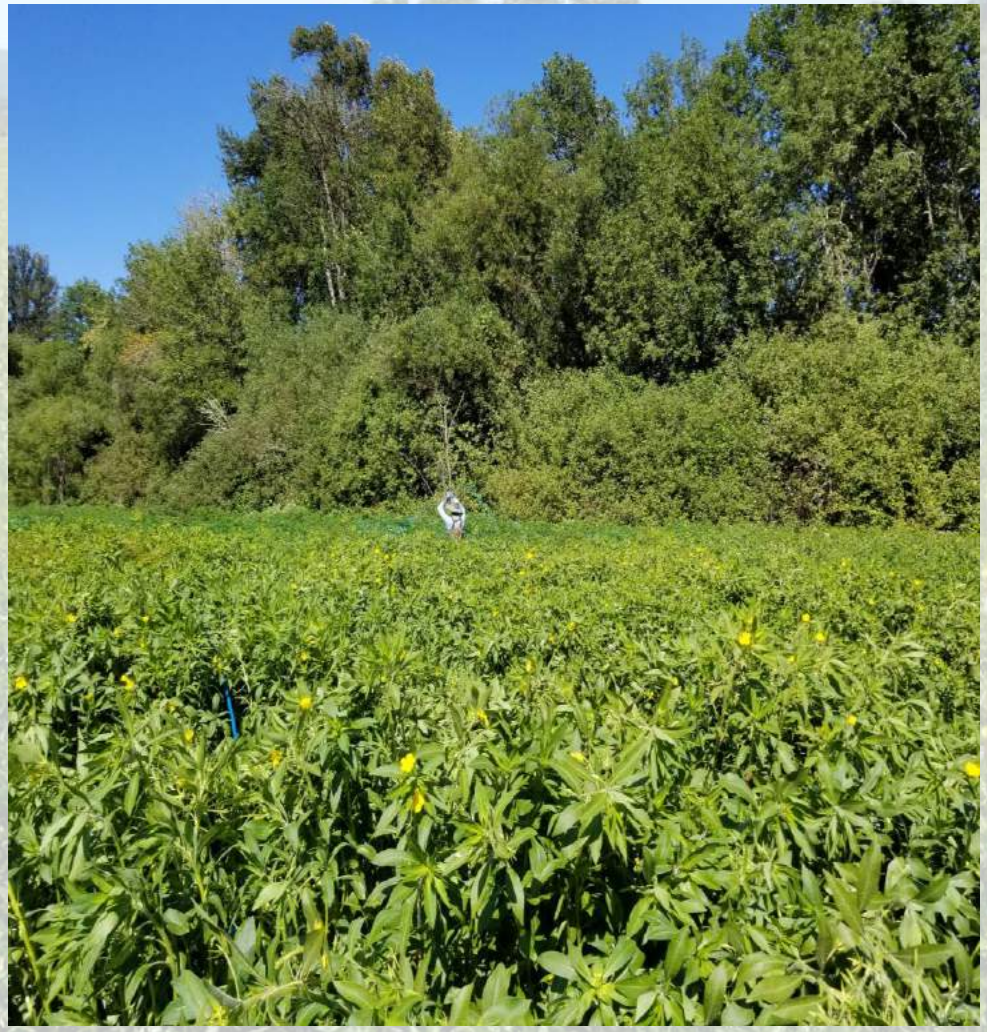
Extended 700’ hose at Delta Ponds in Eugene, OR

Treatment Technique: Intelli-Spray

Follow up Ludwigia treatment using Intelli-Spray

Treatment Technique: Intelli-Spray

- Delivers adequate volume to remote locations
  - -700 feet of hose & 100 or 120 gal tank
- Can be used applicators on foot, tractor, truck, in UTV or in boat
- Can be used to refill either hose & gun or backpacks at end of hose



Treatment Technique: Intelli-Spray

- Be aware of load weight capacity of vehicle and the surroundings (8.3 lbs./ gal)
- Be aware of the rate/ acre of the application (Rodeo= 2 gal/acre/year)
- Use caution if drawing water from natural waterbodies (Permits, safety, effectiveness)

Treatment Technique: UAV Mapping

Overhead view from UAV

Treatment Technique: UAV Mapping

Clipped high-resolution imagery

Treatment Technique: UAV Mapping

Treatment Technique: UAV Mapping

- DJI Inspire 1 V.2
- Camera: 12 Megapixel Photographs and 4K Resolution Video
- Produces high resolution, spatially referenced orthophotos.
- The drone can collect data in hostile terrains where manned applications are difficult.

Questions-Comments?

Thank You