

Glyphosate Strategies

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Agenda

Glyphosate issues

Inland Empire current site prep mixes

Common Release Tank Mixes

Proposed tank mixes if we need them

What are the Issues With Glyphosate?

- A concerned public
 - Anti/lawsuit commercials, social media?
 - Concerned employees, customers, neighbors
- Resistance management
 - We need to rotate modes of action to prevent the buildup of resistant weeds

Do We Have To Use Organic Products?



No but the public is moving in that general direction.....

A Harsh Reality: Ag's Declining Political Influence

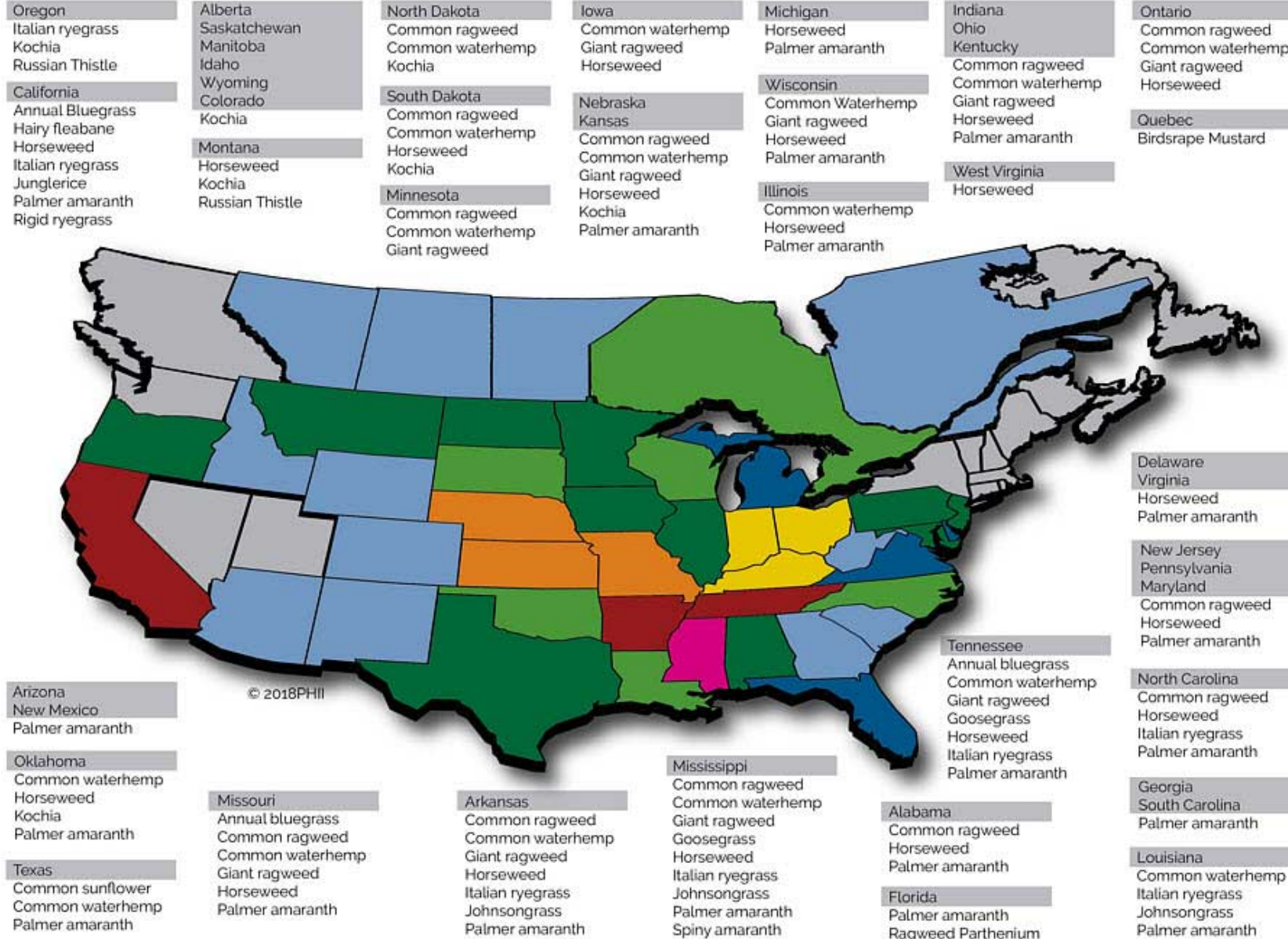
1950

- U.S. population – 150 million
- Farm population – 25 million
- Ag lobby has a formidable political presence.

2019

- U.S. population – 325 million
- Farm population – 3.2 million
- Ag lobby is outnumbered by larger political constituencies.

2018 Map



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History of Glyphosate Resistance

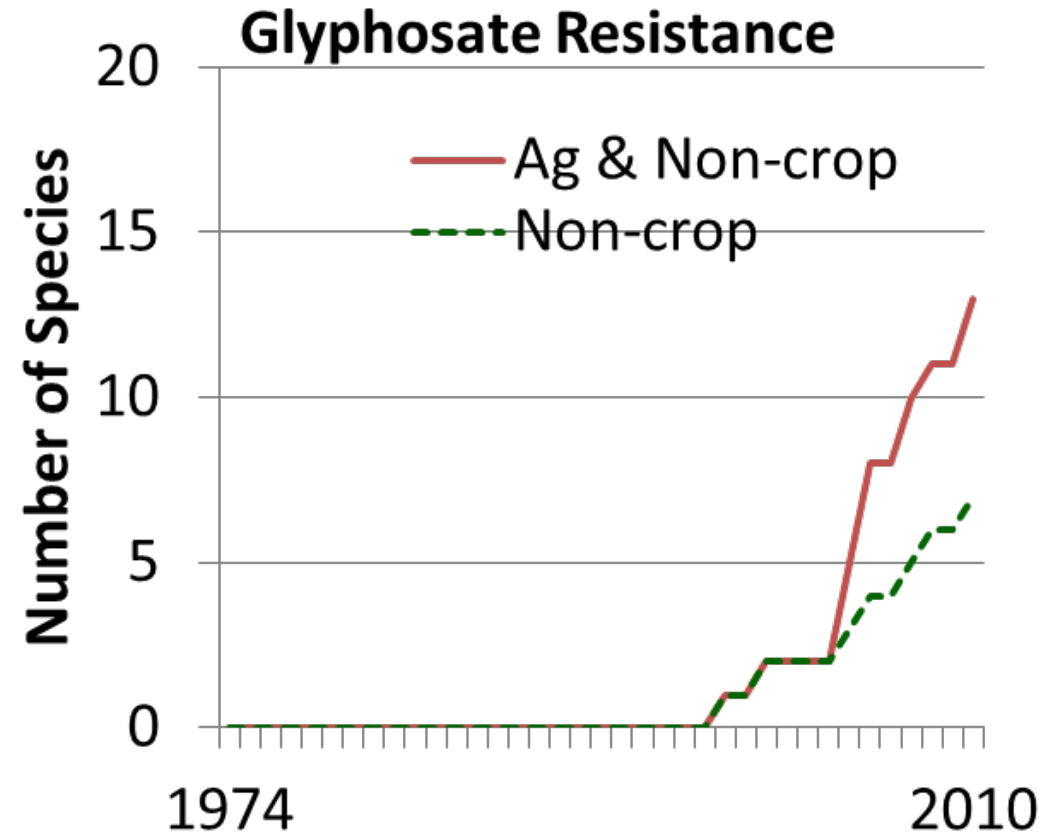
Ag and Non-Crop in the United States

Roundup® brand herbicides have been used commercially since 1974

By 2010 in the United States, 13 weeds had confirmed resistance in both Ag and non-crop sites combined

7 annual weeds have confirmed resistance to glyphosate in non-crop areas

Name	Non-crop Site	Year
Rigid Ryegrass	Almonds (CA)	1998
Horseweed	Nurseries (MI), Roadsides (CA)	2000
Italian Ryegrass	Orchards (OR)	2004
Palmer Amaranth	Orchards (NM)	2005
Hairy Fleabane	Roadsides (CA), Vineyards (CA)	2007
Junglerice	Orchards (CA), Roadsides (CA)	2008
Annual Bluegrass	Turf (MO)	2010



For more information, please see www.weedscience.org

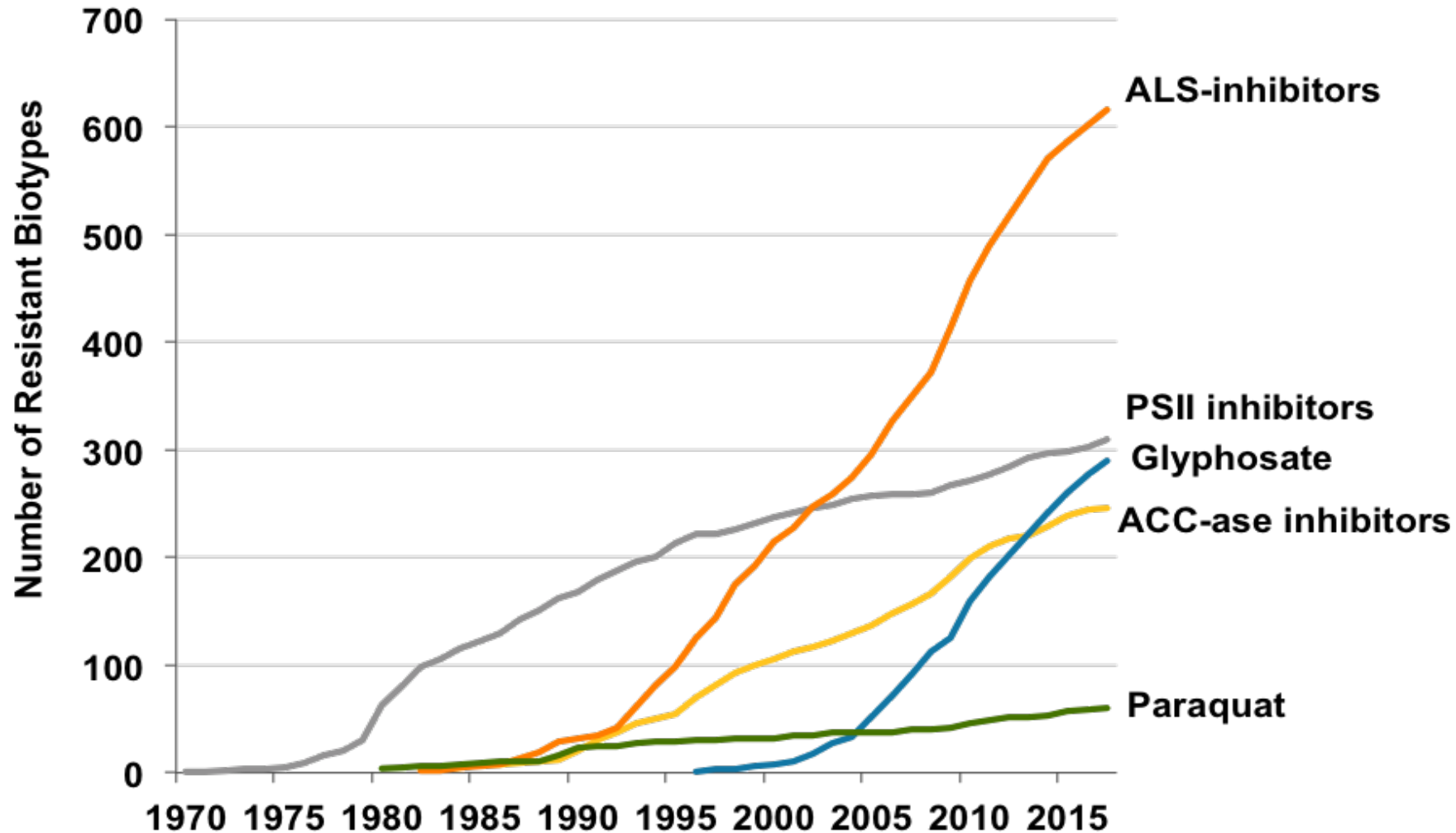
Site Prep With Glyphosate

- At least 2 modes of action
- Glyphosate-Group 9
- Imazapyr-Group 2
- Oust/Escort – Group 2
- Growth Regulators Group 4

Site Prep Without Glyphosate

- Imazapyr-Group 2
- Oust/Escort – Group 2
- We may need to add a growth regulator or a contact herbicide for resistance management!

Resistance By Mode of Action



No Glyphosate-More Mechanical Site Prep?

- Environmental advantages over mechanical methods, such as dozers & excavators
- Herbicide veg. control reduces the erosion of valuable topsoil and eliminates compaction associated with mechanical means
- Controls grass, weeds, and brush
- Reduces competition for moisture



Site Prep Without Glyphosate?

- We can use more systemic products
 - Escort
 - Rotary
 - Transline
 - Opensight
 - Garlon, 2,4-D
- We can also use more soil residuals
 - Atrazine
 - Esplande F
 - Velpar

Glyphosate Alternatives

- Axxe
- Suppress
- Finale
- Cheetah Pro
- We have to be careful when using contact herbicides with systemics
- They can burn leaf tissue and reduce uptake of systemic herbicides
- Further studies are needed!

AXXE[®] Herbicide

A revolutionary non-selective herbicide that utilizes a reduced-risk chemistry for fast burn down results on a broad-spectrum of weeds.

- Non-selective weed control
- Results visible within few hours
- Labeled for Provides up to 4+ weeks of control
- No toxic residuals (breaks down within a few days)

Mode of Action

Disrupts plant tissue through cell wall penetration, resulting in cease of plant growth and brown necrosis.

Use Rates and Volumes

Application rates: 8%-15.0% v/v

Spray volume: 40-100 gallons/acre



**Broadleaf
Weeds**

Before AXXE



Immediately after AXXE Spray (8.0% v/v)



48 hrs after AXXE Spray



24 hrs after AXXE Spray



Inland Empire Plantation Issues?



Moisture



Stands with multiple species
including Larch



Application timing differences

APPLICATION OPTIONS



Aerial



Waving Wand



Directed w/ Shield



Directed July Hand Spray

Release: Clopyralid, Glyphosate, Imazapyr



Spot Application



- Velpar
- Atrazine
- Oust
- Transline



Spot Application Over Seedlings

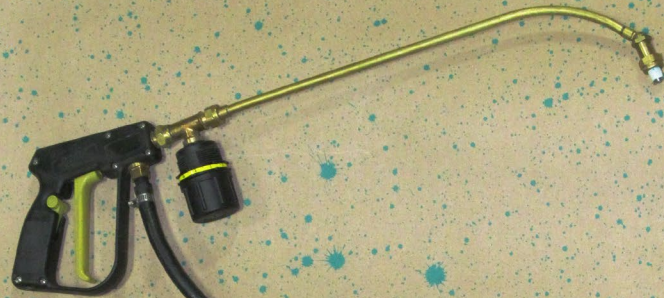
- Velpar L 128 oz.
- Crosshair 4 oz
- Hi-Light Dye 2 oz.
- Dormant PP, LP, DF, ES

- Atrazine 96 oz.
- Crosshair 4 oz
- All dormant conifer

- Oust XP 1.5 dry oz.
- Crosshair 4 oz
- Climb 0.25 oz.
- Hi-Light Dye 2 oz.
- All dormant conifers



Meter-Jet gun



w/o
DISK





Low volume basal application



Hack &
Squirt



Cut Stump Treatment



Site Preparation / Release

- **Site Preparation**
- Before you plant
- More effective
- Safer for seedlings
- Product specific
- Be Pro-active!
Not re-active!
- Summer/Fall
- **Release**
- After planting /
naturals
- Herbicide specific to
 - Target
 - Conifer species
 - Season
 - Dormancy
- Riskier for conifers
- Late Summer/Fall and
early Spring

Brush That Keeps Seedlings Short

- Maple
- Willow
- Cherry
- Alder
- RS & SL Ceanothus
- Serviceberry
- Elderberry
- Ninebark
- Ocean Spray
- Birch
- Cottonwood
- Aspen
- Thimbleberry*
- Snowberry*
- Raspberry*
- Bracken Fern*



Site Preparation For Brush

- Seedling survival and growth decrease when brush cover is above 30%
- 2 months after planting



Site Preparation For Grass

- Seedling survival is reduced above 50% cover
- Less than 40% cover for enough moisture needed for seedling 1st year survival and growth
- Grass can obtain 50% cover in 2 years after removal of closed canopy



Site Prep. Mix With Glyphosate

Use July Thru Sept.

- Aqua Neat 64 oz.
- Rotary SP 24 oz.
- Bronc Max 6.4 oz
- Crosshair 4 oz.
- Syl-Tac 6.4 oz.
- May add Escort for some brush species
- Oust for heavy grass?
- Opensight for Thistles?



AquaNeat, Rotary and Escort!



Site Prep. Mix Without Glyphosate

Use July Thru Sept.

- Rotary SP 32 oz.
- Escort XP 2 dry oz.
- Oust XP 1.5 dry oz.
- Crosshair 4 oz.
- Syl-Tac 6.4 oz.



Additional Modes of Action Group 4

Garlon 3A

Opensight

Transline

Vengeance Plus

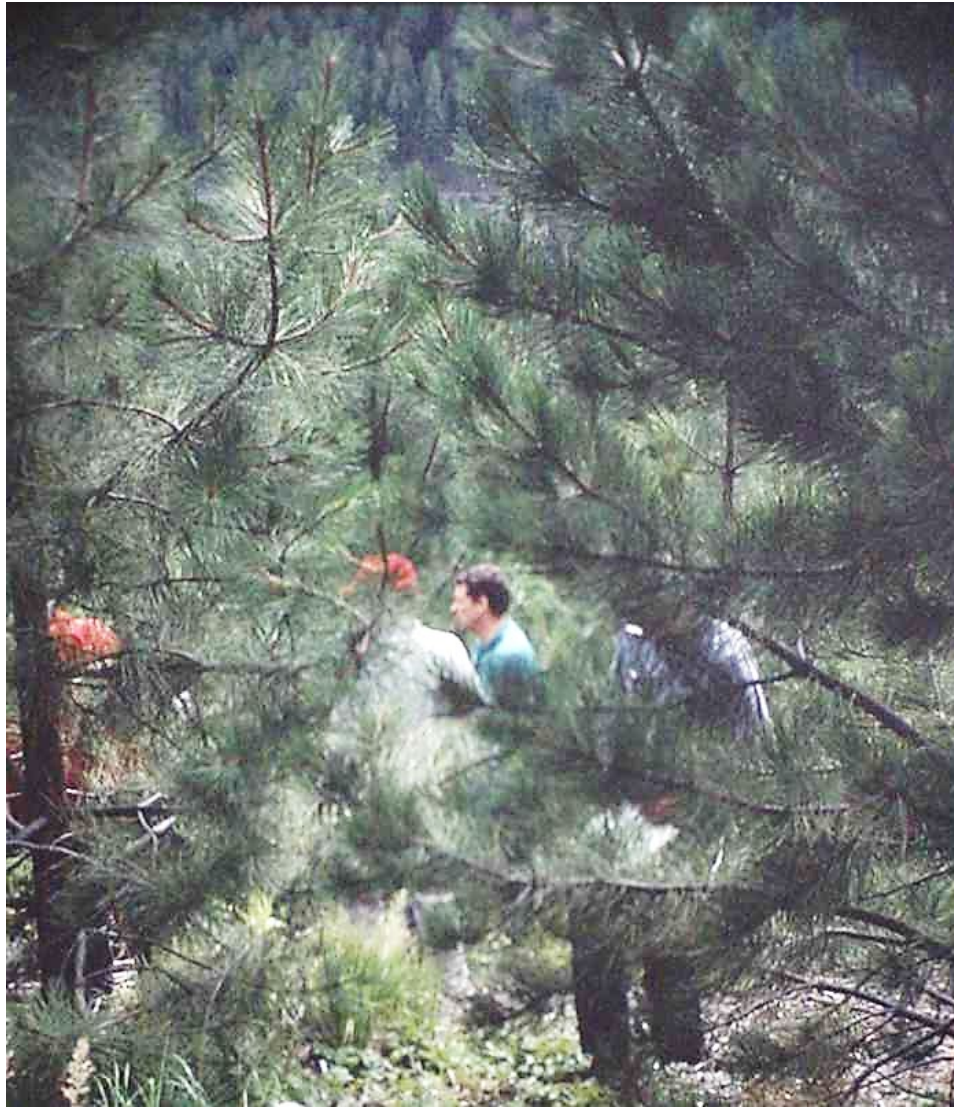
Broadrange 55----2,4-D

Hexazinone Products

- **Velpar L & DF**
- Safe for PP; DF; LP; GF; ES
Kills WL; WP
- Site prep or release applications
Spring & Fall
- Soil & foliar active systemic
- Post & pre-emergent for;
Grass, SL Ceanothus, Bear grass,
Aspen, Willow, Hawthorn



Velpar Site Prep Twelve Years Old



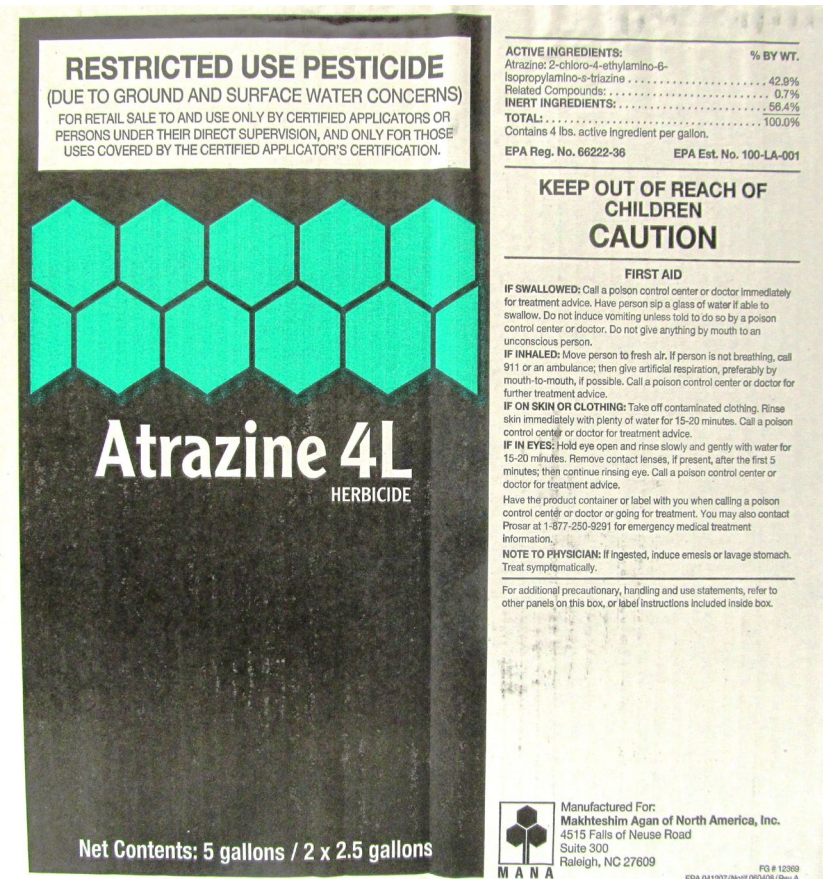
Use Spring Through Fall



**SAME SITE, NO SITE
PREP, 12 YEARS
LATER**

Atrazine

- Soil & foliar active, post, pre-emergent
- Good for grass, weeds, forbs, seed pre-emergent
- Can be sprayed on freshly burned or logged areas
- Site prep or release over top dormant conifers
- Federally restricted use, all states



Soil From Treated Area On Shovel

- Atrazine Site Prep



Late Fall Site Prep. Mix

- Atrazine 128
oz.
- In-Place 8
oz.



Atrazine Test Strip



Same site



Waving Wand Application



Opensight™ Packaging

1.25 lb. and 10 lb. containers



**2 x 10 lb containers/case
20 oz measuring device**



6 x 1.25 lb containers/case

Species Controlled

- **Over 160 weeds listed on label**
- **General weeds**
 - **Horsenettle, bedstraw, ragweed's, horseweed (maretail), goldenrods, spiny amaranth, dandelion, wild carrot, ironweed, annual broomweed, biennial thistles**
- **Noxious weeds**
 - **Bull thistle, Canada thistle, Italian thistle, Scotch thistle, buttercup, sulfur cinquefoil, hawkweeds, knapweeds, common tansy, tansy ragwort, poison hemlock, pigweed, hoary cress (whiteweed), houndstongue, common mullein, *Sericea lespedeza***
- **Brush**
 - **Buckbrush, locust (black and honey), blackberry, gorse, hawthorn, poplar, salmonberry, Scotch broom, thimbleberry, dewberry, rose spp., wisteria, tree of heaven and mimosa.**

Forestry Site Prep - Opensight

- Tank mix with Polaris/Rotary SP
- Will give better control of Canada thistle and many other hard to control weeds
- Use rate 2.5 to 3.3 oz per acre
- Have seen some slight stunting of seedlings
 - Skid trails.....

Opensight for site prep Labeled by ground or air



Excellent control when tank mixed with Polaris and Glyphosate



Opensight



Site prep in North Idaho Shows skip the spring after a summer site prep spray





Fall Release 10 MAT

Glyphosate 40 oz.

Oust XP 1.5 oz.

In-Place 11.5 oz.

Fall Conifer Release

- Aqua Neat 40 oz.
- Polaris AC 2 oz.
- R-11 1 oz.

- 8 MAT



Spring Conifer Release Mix

- Transline 16 oz.
- In-Place 4 oz.



Transline Release



Weed Shifts?

- Prickly lettuce
- Maretail
- Seen 1 to 2 years after chemical site prep
- Seems to be worse where we used SU's?

Spring release at early post bud break Transline and Esplanade F





Good spring annual preemergent control





Good over the top conifer tolerance



Questions?
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