2014 Growing Season Issues

- Applicators were slow to react, and respond to "better than average" growing season.
- 2012 & 2013 growing seasons were drought stricken years. Weeds were difficult to control because they were in a "survival mode" and lack of moisture made them shut down and slow their growth. They were not in an absorptive mode. Most successful treatments were made with a change in surfactants, going from a 90% non-ionic to a penetrant such as crop oil, ie. MSO.
- 2014 annual average rainfall compared to 2013 was just an 1.5 inch higher (16.1" versus 17.6") but the timing was far better, and weeds were just as difficult to control because rate adjustments were poor.
- When growing conditions are above average, applicators need to increase their herbicide rates.

Market Assumptions

- DowAgro
- Dupont/Bayer
- Alligare
- BASF
**Most Often Asked Question This Time Of Year – How Late or Early Can I Spray?**
(As Long As The Soil Is Not Frozen Or Covered In Snow)

* Milestone herbicide was applied 12/1/2010 at a rate of 7 fluid ounces/acre to control Russian knapweed.
* 4 seed varieties (Galleta, Slender Wheatgrass, Sand Dropseed, Alkali Sacaton)
* Seeding was completed on 3/3/2011.
* In May, 2011 plots were over sprayed with Vista @ 1 pint + 4 & 2, 4-D @ 1 pint for Russian thistle control.
* Additional Milestone treatments were applied at bolting stage.

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**Cultural Control**

- Re-vegetation
  - Seeding to desirable species
  - Weed control, cover crop, grass seeding
- Grass species allow for selective weed management – mowing, herbicides

**Drill, not broadcast**

**cover crops:**
- Sorghum
- Sudangrass
- Millet

*Plant in June*

**Sterile or longer maturing varieties**
Seedling tolerance – 4 If, 4 inches
Vista – kochia
Transline – Canada thistle

Grazing – weed management

Grazing – important part of range mgnt

ungrazed

grazed
Grazing Issues

• Costs
• Inadvertent spread
  – Trailers, bedding straw
  – Quarantine?
• Resource damage?
• Perceived effectiveness

Insect bio-control

Common rangeland weeds

60 million acres of rangeland across the west infested with cheatgrass
Impact of Invasive Noxious Weeds

What Does It Mean When We Hear The Phrase, “You Need To Reduce Competition In Order To Establish Grasses”? 

Confront/Redeem – Escort/Manor
Matrix

- Rimsulfuron – labeled for various crops and supplemental non-crop
- No grazing for 1 year
- Effective for cheatgrass control fall and spring
- Desirable grass injury?

Feral Rye
*Secale cereale*

Escaped cultivar
Problem weed in wheat
Reclamation spp – big mistake
Rye management
• No herbicide label
• Plateau - ??
• 3 oz Matrix – fall
• 12-16 oz RU - spring

Annual weeds

Post Emergence
Annual Broadleaf Weed Control
• Kochia – most prevalent spp
  o High degree of genetic variability
  o Resistant to multiple modes of action
    o SU’s – Telar, Escort, Matrix
    o IMI’s – Plateau, Arsenal/Habitat
    o Glyphosate – Roundup........

Selective post emergence kochia control, not: Tordon, 2,4-D, Transline, Milestone ....
Kochia – selective control
- Dicamba
- Banvel, Vanquish, Clarity
- Fluroxypyr
- Vista, Starane

Weed seeds produced by 1 plant

<table>
<thead>
<tr>
<th>Weed</th>
<th>Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Panicum</td>
<td>500,000</td>
</tr>
<tr>
<td>Yellow Foxtail</td>
<td>11,000</td>
</tr>
<tr>
<td>Giant Foxtail</td>
<td>20,000</td>
</tr>
<tr>
<td>Crabgrass</td>
<td>89,000</td>
</tr>
<tr>
<td>Lambsquarters</td>
<td>72,000</td>
</tr>
<tr>
<td>Velvetleaf</td>
<td>31,000</td>
</tr>
<tr>
<td>Giant Ragweed</td>
<td>23,000</td>
</tr>
<tr>
<td>Common Ragweed</td>
<td>3,380</td>
</tr>
<tr>
<td>Smartweed</td>
<td>3,140</td>
</tr>
<tr>
<td>Pigweed</td>
<td>17,400</td>
</tr>
</tbody>
</table>

Herbicide Options
- With dense, established grass stand, use longer soil residual herbicides such as Tordon 22K, Milestone and Telar for perennial weed control.
- With sparse, thin grass stands, consider using shorter soil residual herbicides such as Overdrive, Paramount, E-2 for both perennial and annual weed control.
- Longer soil residual herbicides inhibit grass germination.

Russian thistle – 2,4-D

Post Emergence Annual Broadleaf Weed Control
- Dicamba + 2,4-D
  - Brash
  - Rangestar
  - Outlaw
  - Weedmaster
  - Veteran 720
  - ………..
What Happened Here?
- Spot Treatment?
- Lazy Applicator?
- Pre-Emergent Failure?

Puncturevine
Multiple flushes through season
Best residual control - Telar

Field bindweed
- Perspective
- Tordon
- Paramount

Mustard Species
- Hoary cress
- Perennial pepperweed
- Jim Hill mustard
- Blue mustard
- Flixweed
- Hoary alyssum
Susceptible to SU & IMI herbicides
- Telar
- Escort
- Plateau
Apply early spring

Leafy Spurge
Leafy spurge
- Tordon + Plateau + Rangestar
  - 16 oz + 4 oz + 16 oz

Paramount – 16 oz + Overdrive – 4 oz + 1 qt MSO
Effective, safe around trees & grasses, costly - $70/acre

Leafy Spurge Management
- Dicamba/2,4-D, Milestone, Transline not effective
- Tordon – 1 pint – 1 qt
  - w/Overdrive – 4-6
- Plateau – 10-12 oz
  - Fall, cool season grass injury

Leafy Spurge Management
- Krenite – 1-2 gal
  - Flowering
- Paramount – 12-16 oz
  - w/Overdrive – 4-6 oz
- Perspective
  - Aminocyclopyrachlor + Telar
Canada thistle

Biennial thistles
- Musk
- Scotch
- Bull
- Plumeless

Canada thistle
- Milestone
- Perspective
- Tordon
- Transline
- Pre-mixes
- Telar
Spring applied

Biennial thistles
- Milestone
- Perspective
- Tordon
- Transline
- Pre-mixes
- Telar
Diffuse, Spotted Knapweed
Rosette – bolt stage
• Tordon
• Perspective
• Transline, Curtail, Redeem
• Milestone

Late bolt – early flower stage
- add 2,4-D

Russian knapweed
• Perspective
• Tordon
• Transline, Curtail, Redeem
• Plateau
• Milestone
• Telar
Wide applic window
Foliar application
Tordon
Viewpoint
Garlon
Habitat

Brush and Woody Species

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>RATE/ACRE</th>
<th>COST/ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escort + 4# Amine</td>
<td>2 oz + 2 qts</td>
<td>$17.98</td>
</tr>
<tr>
<td>Arsenal + Escort</td>
<td>2 qts + 2 oz</td>
<td>$48.68</td>
</tr>
<tr>
<td>Crossbow</td>
<td>1 gallon</td>
<td>$49.88</td>
</tr>
<tr>
<td>Garlon 3A + Escort</td>
<td>2 qts + 2 oz</td>
<td>$47.00</td>
</tr>
<tr>
<td>Garlon Ultra 4</td>
<td>3 quarts</td>
<td>$61.20</td>
</tr>
<tr>
<td>Streamline</td>
<td>10 oz</td>
<td>$54.08</td>
</tr>
<tr>
<td>Viewpoint</td>
<td>12 oz</td>
<td>$50.05</td>
</tr>
</tbody>
</table>

Perspective

• Effective – most perennials
• Grass safety is rate dependant
• Applications near trees??
• Rates – 4.75 – 8.0 oz product perennial weed species

Perspective
Grass safety is rate dependant
3-4 oz + 4 oz Overdrive - safer
Perspective Restrictions

- Do not graze, or feed forage, hay or straw from treated areas to livestock.
- If non-crop sites treated by Perspective are to be converted to a food, feed or fiber agricultural crop, or to a horticultural crop, do not plant the treated sites for at least one year after the Perspective application. A field bioassay must then be completed before planting the desired crop.
- **ALWAYS REFER TO THE MOST RESTRICTIVE STATEMENT ON A LABEL. TELAR VERSUS PERSPECTIVE.**

Tree Facts

- Tap Root
- Flat Root
- Average depth 3’ – 7’
- Occupy large area underground
- Feeder Roots
  - 1” – 3” under ground
  - Extend from crown 2 - 4 times diameter of crown
  - Extend 2 – 3 times branch spread
  - Less than 50% of root system is between trunk and dripline

Tree Anatomy

Root Spread
Tree Roots

The roots of a tree extend far from the trunk and are found mostly in the upper 6 to 12 inches of soil.

Reseeding/Overseeding Restrictions

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>WAITING PERIOD</th>
<th>PRODUCT</th>
<th>WAITING PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banvel</td>
<td>45 Days</td>
<td>Glyphosate Pro 4</td>
<td>No waiting period</td>
</tr>
<tr>
<td>Barricade 65 WDG</td>
<td>120 - 180 Days</td>
<td>Tordon 22K</td>
<td>120 - 180 Days</td>
</tr>
<tr>
<td>Redeem R &amp; P</td>
<td>21 Days</td>
<td>Perspective</td>
<td>365 Days</td>
</tr>
<tr>
<td>4# Amine (CB)</td>
<td>21 - 28 Days</td>
<td>Surflan AS</td>
<td>90 – 120 days</td>
</tr>
<tr>
<td>Telar</td>
<td>0 – 365 Days</td>
<td>Trimec Classic</td>
<td>21 – 28 Days</td>
</tr>
<tr>
<td>Paramount</td>
<td>No waiting period</td>
<td>Vessel</td>
<td>21 – 28 Days</td>
</tr>
<tr>
<td>Escalade</td>
<td>21 – 28 Days</td>
<td>Vanquish/Clarity</td>
<td>45 Days</td>
</tr>
<tr>
<td>Transline</td>
<td>21 Days</td>
<td>Speedtome</td>
<td>24 Days</td>
</tr>
<tr>
<td>Pendulum 3,3 EC</td>
<td>90 Days</td>
<td>Quicksilver</td>
<td>1 Day</td>
</tr>
</tbody>
</table>

Non - Crop Versus Range/Pasture Herbicides

A Review Of What Defines A Non-Crop Herbicide As Opposed To A Range/Pasture Labeled Herbicide
Non-crop or rangeland/pasture?

Criteria For Determining Non-Crop versus Range/Pasture
1. Will the land in question be grazed by livestock?
2. Will hay be removed from the land in question?
3. Is the land in question taxed as agricultural land?

Criteria - Continued
“If I make a commitment to not hay or graze my land for a year, can I use a current non-crop herbicide”
1. That land by the essence of the question is land that is already being hayed or grazed and is more than likely land that is taxed as agricultural land.
2. Current non-crop herbicide labels do not meet the criteria therefore cannot be used in range/pasture site locations.

What Are Grazing Tolerances?
• When a herbicide label states that it has grazing tolerances or no grazing restrictions, it means animals such as cattle, horses, and other domesticated animals can safely and legally graze the treated vegetation.
• Only herbicides that have undergone stringent testing (under EPA guidelines) and registration are able to gain this label designation.
Grazing Tolerances - continued

• When treating an area such as a right-of-way that crosses a pasture, even if the herbicide is registered on right-of-ways, EPA still requires a tolerance or exemption from tolerance for any food or feed commodity, including meat, grass or hay.
• This means that unless it can be assured that no animals graze the treated area, the herbicide manufacturer may have an unenforceable label and the product could be cancelled, and the applicator may be liable for a misapplication.

Grazing Tolerances versus Grazing Restrictions

• A herbicide that contains grazing tolerances on its label allows cattle and other domesticated animals to safely graze treated vegetation.
• A herbicide that contains grazing restrictions on its label means that applications may not come in contact with grazed areas.
• This is a violation of the label and causes any animal that grazes the treated vegetation to be unfit for slaughter and human consumption.

Grazing Tolerances vs Restrictions

• If treated grazed areas with a herbicide that does not have grazing tolerances, it is a violation of the label and subject to state and federal regulatory action.
• Having grazing tolerances is similar to using herbicides with both aquatic and terrestrial use site labeling.
• When a herbicide has both aquatic and terrestrial labeling, applicators are able to treat entire ROW's, even when encountering creeks, streams and wetlands, treating to the waters edge, and more.

What Is The Definition Of Grazed Areas?

• The definition of grazed areas can be broad, and ambiguous. It mainly refers to pasture or rangeland set aside for grazing cattle or other domesticated animals.
• Grazing animals are liable to escape these lands, and when they do, they tend to gravitate toward the best-looking grass, where they will graze until gathered.
• Murphy's Law will then apply, and that ROW may be treated with a herbicide that has grazing restrictions.

Definition Of Grazed Areas – cont.

• In certain states, harvesting of hay along roadsides or even utility ROW’s is commonplace.
• If that harvested hay has been treated with herbicides without grazing tolerances, cattle that eat it could become affected, die or become unsellable at market.
• This means that even if designated pastures weren’t treated, there are still potential liability issues that may occur if you treat anywhere near grazed areas with herbicides that have no grazing tolerances.

Grazing & Haying Restrictions

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>HAY HARVEST RESTRICTIONS</th>
<th>LIVESTOCK GRAZING RES</th>
<th>LACTATING DAIRY</th>
<th>SLAUGHTER RESTRICTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4R Amine</td>
<td>30 Days</td>
<td>0</td>
<td>7 Days</td>
<td>3 Days</td>
</tr>
<tr>
<td>4/6R U Esir</td>
<td>30 Days</td>
<td>0</td>
<td>7 Days</td>
<td>3 Days</td>
</tr>
<tr>
<td>Overdrive</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dicamba</td>
<td>37 - 70 Days</td>
<td>0</td>
<td>7 – 40 Days</td>
<td>30 Days</td>
</tr>
<tr>
<td>Escort XP</td>
<td>0 – 3 Days</td>
<td>0 – 3 Days</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grazon P + D</td>
<td>30 Days</td>
<td>0</td>
<td>7 Days</td>
<td>3 Days</td>
</tr>
<tr>
<td>Plateau</td>
<td>7 days</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Milestone</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tordon 22X</td>
<td>14 Days</td>
<td>0</td>
<td>14 Days</td>
<td>3 days</td>
</tr>
<tr>
<td>Telar XP</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Perspective</td>
<td>Non Crop</td>
<td>Non Crop</td>
<td>Non Crop</td>
<td>Non Crop</td>
</tr>
</tbody>
</table>
General Broadleaf Control

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>RATE/ACRE</th>
<th>COST/ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tordon 22K 1 quart</td>
<td>$ 16.25</td>
<td></td>
</tr>
<tr>
<td>Opennight/Chaparral 3.3 ounces</td>
<td>$ 16.91</td>
<td></td>
</tr>
<tr>
<td>Milestone 7 ounces</td>
<td>$ 16.89</td>
<td></td>
</tr>
<tr>
<td>E-2 1 quart</td>
<td>$ 13.21</td>
<td></td>
</tr>
<tr>
<td>Escort XP 1 ounce</td>
<td>$ 5.45</td>
<td></td>
</tr>
<tr>
<td>Veteran/TD/Range Star 2 quarts</td>
<td>$ 18.32</td>
<td></td>
</tr>
<tr>
<td>Perspective 4 ounces</td>
<td>$ 10.16</td>
<td></td>
</tr>
</tbody>
</table>

Best Aquatic/Terrestrial Herbicide Combination?

- 4# Amine 2, 4-D
- Garlon 3A

Aquatics – Wetlands & Drainage Areas

<table>
<thead>
<tr>
<th>PRODUCTS</th>
<th>RATE/ACRE</th>
<th>COST/ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodeo 3 quarts</td>
<td>$ 17.47</td>
<td></td>
</tr>
<tr>
<td>Clearcast 2 quarts</td>
<td>$ 126.55</td>
<td></td>
</tr>
<tr>
<td>Habitat 2 quarts</td>
<td>$ 49.98</td>
<td></td>
</tr>
<tr>
<td>Garlon 3A 1.5 gallons</td>
<td>$ 109.80</td>
<td></td>
</tr>
<tr>
<td>2, 4-D 48 Amine 3 quarts</td>
<td>$ 9.72</td>
<td></td>
</tr>
</tbody>
</table>

Bareground - Hard Residual

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>RATE/ACRE</th>
<th>COST/ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krovar I DF 10 pounds</td>
<td>$ 115.00</td>
<td></td>
</tr>
<tr>
<td>Sahara DG 10 pounds</td>
<td>$ 122.00</td>
<td></td>
</tr>
<tr>
<td>Perspective/Piper 11 ounces + 10 ounces</td>
<td>$ 119.74</td>
<td></td>
</tr>
<tr>
<td>Viewpoint/Frequency 20 ounces + 6 ounces</td>
<td>$ 116.96</td>
<td></td>
</tr>
<tr>
<td>Arsenal/Piper 3 pints + 10 ounces</td>
<td>$ 94.53</td>
<td></td>
</tr>
<tr>
<td>Throttle XP 12.5 ounces</td>
<td>$ 93.75</td>
<td></td>
</tr>
<tr>
<td>Perspective/Oust 11 ounces + 3 ounces</td>
<td>$ 95.20</td>
<td></td>
</tr>
<tr>
<td>Viewpoint 20 ounces</td>
<td>$ 77.00</td>
<td></td>
</tr>
<tr>
<td>Arsenal/Frequency 3 pints + 6 ounces</td>
<td>$ 67.99</td>
<td></td>
</tr>
<tr>
<td>Perspective/Oust 11 ounces + 5 ounces</td>
<td>$ 62.68</td>
<td></td>
</tr>
</tbody>
</table>
## Bareground – Soft Residual

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>RATE/acre</th>
<th>COST/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surflan AS/Piper</td>
<td>1 gallon + 10 ounces</td>
<td>$117.50</td>
</tr>
<tr>
<td>Piper/Frequency</td>
<td>10 ounces + 6 ounces</td>
<td>$106.46</td>
</tr>
<tr>
<td>Esplanade/Pendulum 3.3</td>
<td>7 ounces + 4.8 quarts</td>
<td>$100.31</td>
</tr>
<tr>
<td>Esplanade/Frequency</td>
<td>7 ounces + 6 ounces</td>
<td>$97.08</td>
</tr>
<tr>
<td>Surflan AS + Frequency</td>
<td>1 gallon + 6 ounces</td>
<td>$90.96</td>
</tr>
<tr>
<td>Esplanade/Plateau 3.3 + Frequency</td>
<td>4.8 quarts + 6 ounces</td>
<td>$83.15</td>
</tr>
<tr>
<td>Plateau/Piper</td>
<td>32 ounces + 10 ounces</td>
<td>$79.62</td>
</tr>
<tr>
<td>Esplanade/Plateau</td>
<td>7 ounces + 12 ounces</td>
<td>$70.25</td>
</tr>
<tr>
<td>Proclipse/Frequency</td>
<td>2.3 pounds + 6 ounces</td>
<td>$69.75</td>
</tr>
<tr>
<td>Plateau/Frequency</td>
<td>32 ounces + 6 ounces</td>
<td>$53.08</td>
</tr>
</tbody>
</table>

Questions, Suggestions, Comments
kkgallagher@q.com