

2013 Tri River Area Pest Management Workshop
Wednesday, February 20th
Industrial & Right of Way
(109)
Kevin Gallagher

2012 GROWING SEASON ISSUES

- **Supply & Demand Issues.**
 - 2,4-D/dicamba/glyphosate shortages
- **Stubborn Annual Weed Control.**
 - Kochia/Pigweed
- **Rookie Mistakes From Veteran Applicators.**
 - **Krovar I DF & Sahara DG have no conscience**

SUPPLY AND DEMAND ISSUES

- 1 Rail-car = 180,000 pounds of tech material.
- 180,000 lbs of tech = 130,000 gallons 4# Lo Vol.
- 130,000 gls 4# Lo Vol = 26,000 cases (2x2.5 gls).
- 26,000 cases = 722 pallets (36 cases/pallet).
- 722 pallets = 33 semi-truck loads (22 pallets/load).
- Rail-car tech was formulated and packaged in 4 days.
- All 33 truckloads were shipped out to Ag retailers within 3-4 days.
- Product was sprayed out within 3-4 days.

Successful R-O-W Programs

(Pictures Are Worth a Thousand Words)

1. Label Considerations/Interpretations
2. Impact of Invasive Noxious Weeds
3. Herbicide Versatility
4. Factors Affecting Herbicide Performance
5. Product/Rate Recommendations

COLORADO VERSUS IOWA

IS THERE A COMMON DENOMINATOR?
YES --- RIGHT-OF-WAYS

<u>STATE</u>	<u>RANK</u>	<u>% PUBLIC</u>	<u>% PRIVATE</u>
Colorado	10 th	43.3 %	56.7 %
Iowa	47 th	2.8 %	97.2 %

TERMINOLOGY

- **Turf, Tree and Ornamental**
 - Non-Turf
 - Flower beds, ground covers, nursery stock, shrubs, coniferous & deciduous trees.
 - Soft Residual Products (**Selective-Preemergent**)
 - Surflan, Barricade, Dimension, Gallery, Pendulum, Ronstar, Treflan, Snapshot, SureGuard.
- **Vegetation Management**
 - Bareground
 - Railroad, utilities, storage, highways, airports, industrial plant sites, right-of-way.
 - Hard Residual Products (**Non-Selective-Preemergent**)
 - Krovar, Sahara, Arsenal, Perspective, Oust, Hyvar.

Right of Way Issues In An Urban Environment

How To Take Advantage Of Herbicide Versatility & Label Restrictions

Town of Mead

- Reduce chemical inventory
- Reduce chemical cost
- Reduce labor cost
- Identify site locations with weed problems
- Identify herbicides that can be used in multiple site locations
- Stay legal with use of herbicides

Understanding Expectations

- Selective Noxious Weed Control
 - 90 % Control – Victory! (By who's standard?)
- Non-Selective Weed Control
 - 100 % Control – Victory! (By who's standard?)

Standards are created by either customer or applicator

FACTORS AFFECTING PERFORMANCE

- Herbicide mode of action
- Type of plants (annual or perennial)
- Soil (PH)
- Water (PH)
- The application (human element)
- Temperature
- Surfactants
- Sunlight

Impact of Invasive Noxious Weeds

Herbicide/Market Segmentation

ADJACENT VEGETATION AND PROPERTY

- KNOW CHEMICAL TOLERANCE OF ADJACENT VEGETATION
- BE VERY CAREFUL AROUND AGRICULTURE CROPS
- BUFFER SENSITIVE AREAS
- HERBICIDE DELIVERY SYSTEMS

Herbicide Delivery Systems Spray Equipment

WEED CONTROL UNDER ASPHALT

- Parking Lots
- Industrial Areas
- Paved Sidings
- Sidewalks
- Cart & Bike Paths
- Driveways
- Roadways
- Airport Runways
- Tennis Courts
- Landscaped Areas
- Running Tracks
- Sports Fields

Precautions Under Asphalt

- Do not use the products under pavement in residential properties such as driveways, or in recreational areas, including jogging or bike paths, tennis courts, or golf cart paths.
- Desirable plants may be injured if their roots extend into treated areas or if planted in treated areas. (KROVAR® I DF, HYVAR®, SAHARA DG)
- **Always refer to the most restrictive statement on a label.**

Herbicides for Under Surfacing Materials

PRODUCT	FORM	A.I.	RATE/ACRE
Arsenal 0.5G	Granules	0.5% Imazapyr	200-300 lbs
Casaron 4G	Granules	4% Dichlobenil	250-300 lbs
Sprakil SK-13	Granules	1% Tebuthiuron + 3% Diuron	150-400 lbs

Herbicides Under Asphalt Use-cont.

PRODUCT	FORM	A.I.	RATE/ACRE
Arsenal	Sprayable	28.7% Imazapyr	3-6 pts
Barrier 50W	Sprayable	50% Dichlobenil	20-24 lbs
Hyvar XL	Sprayable	21.9% Bromacil	2.5-12 gls
Krovar I DF	Sprayable	40% Bromacil 40% Diuron	7-18 lbs
Landmark XP	Sprayable	50% Sulfometron 25% Chlorsulf.	4.5 oz/acre
Oust XP	Sprayable	75% Sulfometron	3-8 oz
Plateau	Sprayable	23.6% Imazapic	12 oz/acre
Sahara DG	Sprayable	7.78% Imazapyr 62.2% Diuron	10-19 lbs
Spike 80DF	Sprayable	80% Tebuthiuron	5 lbs

HERBICIDE VERSATILITY

- **Selective Weed Control.**
- **Non-Selective Weed Control.**
- **Plant Growth Regulators/Chemical Mowing.**

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Chemical Mowing Cost On 36 Miles Of I-25 Between Fort Collins and North Denver

- **Arsenal/Oust Combinations**
- \$ 878.04
- **Plateau/Milestone Combinations**
- \$ 5,112.72
- **Embark/Stronghold Combinations**
- \$ 12,998.88

www.VegMath.com

Chemical Mowing Cost Comparisons

PRODUCT	RATE/ACRE	COST/ACRE	*COST/MILE
Arsenal Glyphosate	2 ounces @ .90/oz 10 ounces @ .14/oz	\$ 3.20	\$ 19.20
Oust Vanquish	¼ ounce @ \$ 5.00/oz 8 ounces @ .46/oz	\$ 4.93	\$ 29.58
Plateau Opensight	4 ounces @ \$ 1.20/oz 3.3 ounces @ \$ 5.72/oz	\$ 23.67	\$ 142.02
Embark 25 IVM Hi-Dep	28 ounces @ \$ 2.04/oz 32 ounces @ .16/oz	\$ 62.24	\$ 313.44
Stronghold PGR	32 ounces @ \$ 2.25/oz	\$ 72.00	\$ 432.00
Proxy (Ethepon 2 SL)	1.7 gallons @ \$ 33.12/gl.	\$ 56.30	\$ 337.80

*Mile equals 5280 feet x 50 feet = 264,00 square feet, or 6 acres.

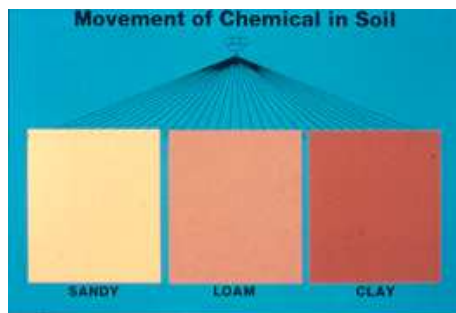
Economic Analysis

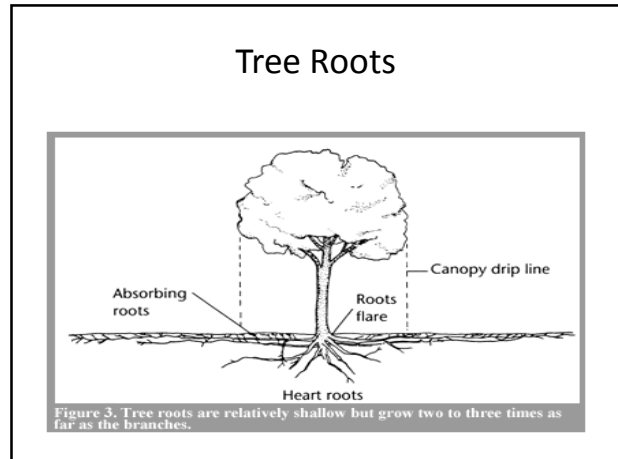
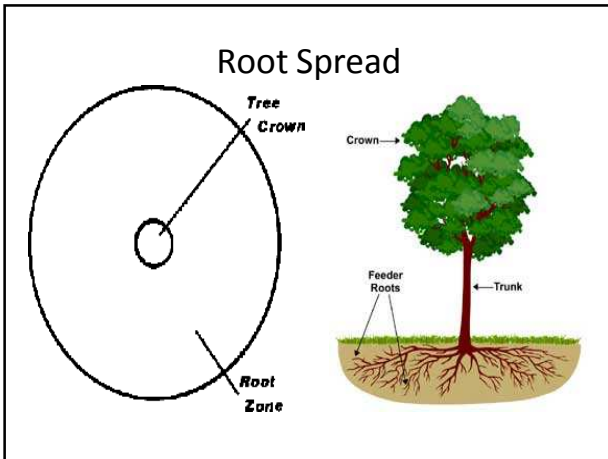
- Meticulous record keeping and documentation are important!
- Hillsborough County manages 6,500 acres of roadside rights of way.
 - Mechanical mowing cost is \$60.00 per acre.
 - One mowing cycle costs \$390,000.
 - Six mowing cycles per year costs \$2,340,000.
- One herbicide application/cycle (chemical mowing) costs \$35.00 per acre and lasts up to six months before weed regrowth occurs.
 - One chemical mowing round costs \$227,500.
- Plan is to chemical mow twice a year (cost: \$455,000) and mechanical mow twice a year (cost: \$780,000).
 - Annual cost savings of \$1,105,000. !!!
 - Labor/machinery reallocated.

PERSONAL AND CONFIDENTIAL

IS RAINFALL YOUR FRIEND ?

- The first rain after the application:
- ½ inch gentle rain is ideal.
- 2 inch down pour can cause off target movement, or downward movement in light soil-types.





TEMPERATURE AFFECTS

- Speed of all chemical reactions
- Rate of plant growth
- Translocation of systemics
- Absorption of residual herbicides from soil
- High temperatures speed up degradation
- Volatility

TEMPERATURES

- High Air Temperatures
 - Usually increase herbicide activity
 - Increased chance of volatility
 - Day time variations
 - Asphalt parking lots
 - Amine formulations desirable
- Soil Temperatures
 - Pre-emergent control (prior to 55 F)
 - **Do not apply to frozen soils**

How Late Can You Apply Herbicides

(As Long As The Soil Is Not Frozen Or Covered In Snow)

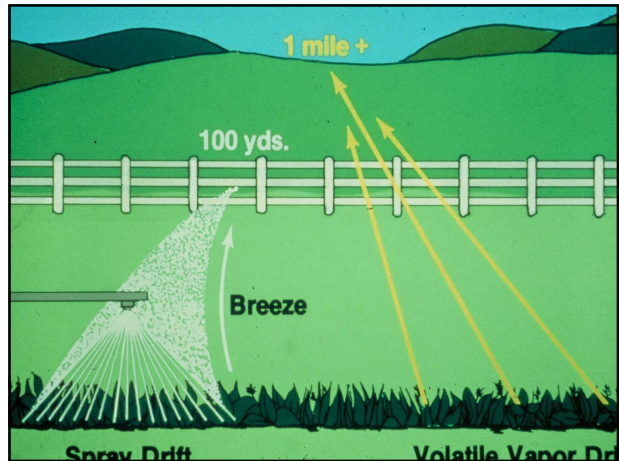
- Milestone herbicide was applied **12/1/2010** at a rate of 7 fluid ounces/acre to control Russian knapweed.
- 4 seed varieties (Galleta, Slender Wheatgrass, Sand Dropseed, Alkali Sacaton)
- Seeding was completed on **3/3/2011.**
- In May, 2011 plots were over sprayed with Vista @ 1 pint + 4 # 2, 4-D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

ENVIRONMENTAL CONDITIONS

- AVOID APPLICATION DURING HIGH WIND, HIGH TEMPERATURES AND LOW HUMIDITY TO AVOID OFF-TARGET DRIFT
- BE CAUTIOUS OF PASSING VEHICLE SHEAR
- **TEMPERATURE INVERSIONS ARE ONLY GOOD FOR MOSQUITO CONTROL ADULTICIDING, WHERE YOU WANT DRIFT**

WIND

- ERRATIC PRE-EMERGENT CONTROL
– UNEVEN BARRIER
- INCONSISTENT POST-EMERGENT CONTROL
- INJURY TO SENSITIVE NON-TARGET PLANTS



The Value of Understanding Other Pesticides

Acelepryn Versus Merit

Water Solubility

- Water solubility is a measurement of how much of a chemical will dissolve in water, and is typically expressed in parts per million.
- The greater the solubility, the more the chemical dissolves into water.

Solubility Rankings Based on Water Solubilities of a Compound

Relative Solubility	Water Solubility (ppm)
• Very Soluble	- 1,000 to 10,000
• Moderately Soluble	- 100 to 1,000
• Low Solubility	- 10 to 100
• Very Low Solubility	- 1 to 10
• Extremely Low Solubility	- 0.1 to 1

Herbicide/Water Solubility

PRODUCT	ACTIVE	PARTS PER MILLION (PPM)
Proclipse/Endurance	prodiamine	- 0.013
Pendulum	pendimethalin	- 0.200
Payload	flumioxazin	- 2
Portfolio/Echelon	sulfentrazone	- 300
Oust	sulfometuron	- 300
Imprelis/Perspective	aminocyclopyrachlor	- 408
Tordon 22K	picloram	- 430
Karmex	diuron	- 480
Telar	chlorsulfuron	- 587
Hyvar	bromacil	- 815
4# Amine	2, 4-D	- 900
Milestone	aminopyralid	- 2,480
Banvel	dicamba	- 4,500
Plateau	imazapic	- 11,272
Roundup Pro	glyphosate	- 11,600
Frequency	topramezone	- 15,000
Gramaxone	paraquat	- 620,000

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What makes Payload work best?

- **Moisture**
 - Needs moisture 14 – 21 days after application
- Water pH below 8
 - Use a water conditioning agent/PH buffer adjuvant to neutralize water PH or water hardness.

Reseeding/Overseeding Restrictions

<u>PRODUCT</u>	<u>WAITING PERIOD - DAYS</u>
Banvel	45
Endurance	120-180
4# Amine	21-28
Telar	120
Paramount	No restrictions
Pendulum	90
Roundup	No restrictions
Milestone	90 – 120
Tordon	90 - 120
Imprelis	No restrictions
Perspective	120 - 180

**Zone 1
General Broadleaf Weed Control**

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
•Tordon 22K	1 quart	\$ 15.00
•Opensight/Chaparral	3.3 ounces	\$ 16.09
•Milestone	7 ounces	\$ 16.39
•Telar XP	1 ounce	\$ 18.50
•Escort XP	1 ounce	\$ 10.35
•Veteran 720/Range Star	2 quarts	\$ 12.20
•Perspective	5 ounces	\$ 21.88

**Zone 1
General Broadleaf Weed Control-Blends**

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
•Tordon 22K + 4 # Amine	1 qt + 1 qt	\$ 18.09
•Opensight/Chaparral + 4# Amine	3.3 oz + 1 qt	\$ 19.18
•Milestone + 4 # Amine	7 ounces + 1 qt	\$ 19.48
•Telar XP + 4 # Amine	1 ounce + 1 qt	\$ 21.59
•Escort XP + 4 # Amine	1 ounce + 1 qt	\$ 13.59
•Veteran 720/Range Star + Escort XP	2 quarts + 0.50 oz	\$ 19.88

**Zone 2
Bareground - Hard Residual**

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Krovar I DF	8 pounds	\$ 101.20
• Sahara DG	10 pounds	\$ 121.50
• Throttle XP	12.5 ounces	\$ 85.94
• Landmark XP + Frequency	4.5 oz + 4 oz	\$ 69.34
•Perspective/Oust	11 oz + 3 oz	\$ 63.15
•Viewpoint	20 ounces	\$ 73.38

**Zone 3
Bareground – Soft Residual**

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Frequency + Proclipse	4 oz + 2.3 pounds	\$ 67.77
•Frequency + Echelon 45C	4 oz + 1 qt	\$ 90.02
• Journey + Frequency	1 qt + 4 oz	\$ 54.98
• Plateau + Frequency	12 oz + 4 oz	\$ 45.19
• Proclipse + Sureguard	2.3 pounds + 10 oz	\$ 112.87
• Pendulum 3.3 + Frequency	4.8 qts + 4 oz	\$ 66.12
•Surflan A.S.	1 gallon	\$ 56.00

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Zone 4

Brush and Woody Species

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Escort + 4# Amine	2 oz + 2 qts	\$ 26.72
• Arsenal + Escort	2 qts + 2 oz	\$ 83.20
• Crossbow	1 gallon	\$ 40.00
• Garlon 3A + Escort	2 qts + 2 oz	\$ 56.50
• Garlon Ultra 4	3 quarts	\$ 67.91
•Streamline	10 oz	\$ 51.50
•Viewpoint	13 oz	\$ 47.70

Zone 5

Aquatics – Wetlands & Drainage Areas

<u>PRODUCTS</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Rodeo	3 quarts	\$ 14.61
• Clearcast	2 quarts	\$ 115.00
• Habitat	2 quarts	\$ 52.80
• Garlon 3A	1.5 gallons	\$ 107.40
• 2, 4-D 4# Amine	3 quarts	\$ 9.03

Selective Herbicides Labeled For R-O-W Post Emergent's

<u>PRODUCT</u>	<u>ACTIVE INGREDIENT</u>	<u>PRODUCT</u>	<u>ACTIVE INGREDIENT</u>
4 # Amine	2, 4-D	Milestone VM	Aminopyralid
4 # Lo Vol	2, 4-D Ester	Milestone Plus	Aminopyralid, Triclopyr
Brushmaster	2,4-D, Dicamba Ester	Oust	Sulfometuron Methyl
Chaparral	Aminopyralid ,Metsulfuron	Tordon 22K	Picloram
Vanquish	Diglycolamine Dicamba	Payload	Flumioxazin
Crossbow	Triclopyr, 2, 4-D esters	Perspective	Aminocyclopyrachlor
Curtail	Clopyralid , 2, 4-D	Paramount	Quinclorac
Banvel	Dicamba	Plateau	Imazapic
Garlon 3A	Triclopyr Amine	Pathfinder II	Triclopyr Ester
Garlon 4	Triclopyr Ester	Pathway	Picloram, 2,4-D Amine
Embark 2S	Mefluidide	Pronone Pellets	Hexazinone
Forefront	Aminopyralid, 2,4-D	Redeem R & P	Clopyralid, Triclopyr
Grazon P & D	Picloram, 2,4-D	Spike 20 P, 80 DF	Tebuthiuron
Hi-Dep	Dimethylamine, Diethanol	Telar	Chlorsulfuron
Journey	Imazapic, Glyphosate	Transline	Clopyralid
Krenite S	Fosamine	Trimec	2, 4-D, MCP, Dicamba
Lineage Clearstand	Sulfometuron, Metsulfuron	Veteran 720	2, 4-D, Dicamba Amine
Maverick	Sulfusulfuron	Vista	Fluroxypyr

Non-Selective Herbicides Labeled For R-O-W Preemergents

<u>PRODUCT</u>	<u>ACTIVE INGREDIENT</u>	<u>PRODUCT</u>	<u>ACTIVE INGREDIENT</u>
Arsenal	Imazapyr	Lineage Clearstand	Imazapyr, Metsulfuron
Atrazine 4L	Atrazine	Landmark XP	Sulfometuron,
Barrier 50W	Dichlobenil		Chlorsulfuron
Clearcast	Imazamox	Oust XP	Sulfometuron
Dibro 2 + 2	Bromacil, Diuron	Payload	Flumioxazin
Diuron 4L, 80 WDG	Diuron	Pendulum	Pendimethalin
Proclipse 65 WDG	Prodiamine	Perspective	Aminocyclopyrachlor
Frequency	Tropamezone	Pramitol	Prometon
Roundup Pro	Glyphosate	Princep	Simazine
Gramaxone	Paraquat Dichloride	Sahara DG	Imazapyr, Diuron
Habitat	Imazapyr	Surflan AS	Oryzalin
Hyvar XL	Bromacil	Throttle XP	Sulfentrazone ,
Journey	Imazapic, Glyphosate		Sulfometron,
Krovar I DF	Bromacil, Diuron	Sureguard	Chlorsulfuron
			Flumioxazin