

New Mexico Vegetation Management Association

November 16th, 2016

Albuquerque, NM

RIGHT OF WAY ISSUES IN AN URBAN AND RURAL ENVIRONMENT

Kevin Gallagher

Heinen Brothers

Wellington, EAST CALIFORNIA (COLORADO)

(970)-631-4178

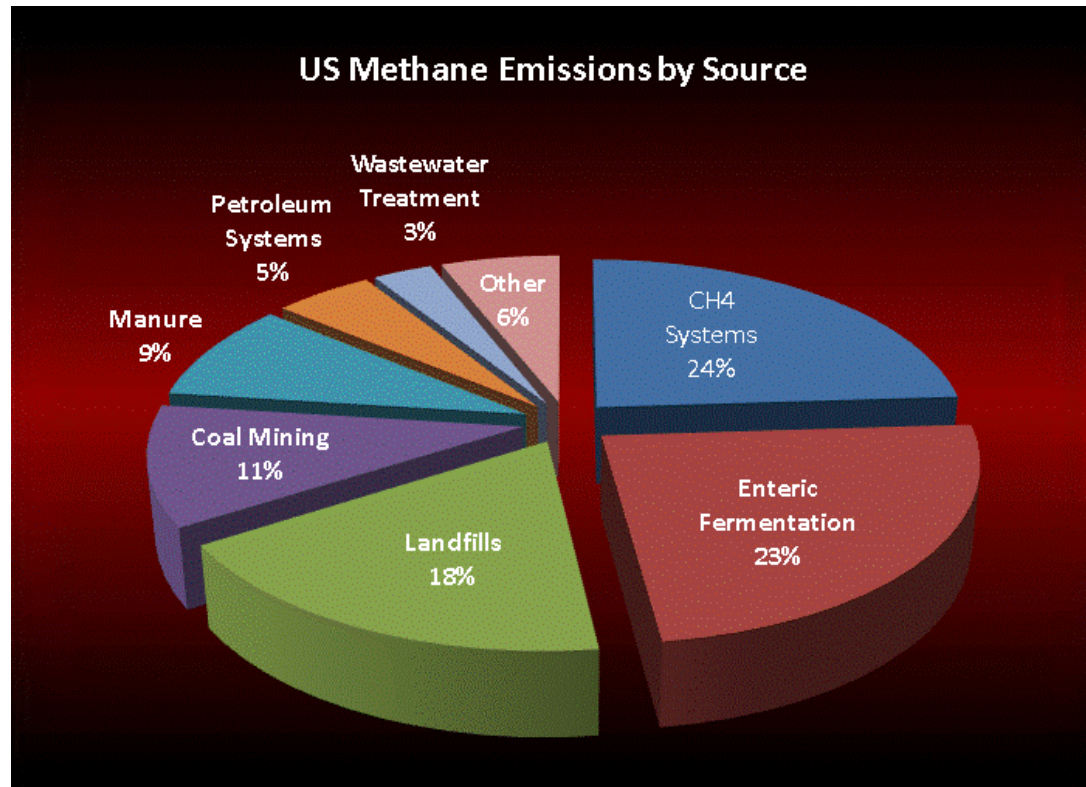


Cell Phone Management – Turn On
Mute, Take Pictures of Slackers, E-mail
To Me For Public Consumption



Yee Ha, Let's Get Western

Estimated cattle population in U.S. = 98.4 million



TODAY'S GOAL

INCREASE YOUR AWARENESS OF
ALL THE VARIOUS ASPECTS OF
RIGHT-OF-WAY WEED CONTROL,
(17 million acres) PRIMARILY
THRU THE USE OF HERBICIDES

TODAY'S GOAL

- Identify R-O-W site locations.
- How weeds compete/thrive in a R-O-W environment.
- Why do we control weeds in a R-O-W environment.
- How invasive noxious weeds impact the environment.
- Herbicide versatility.
- Herbicides have no conscience.
- Herbicide traits and characteristics.

Why Control Vegetation On R-O-W's?





How Do Weeds Compete & Thrive

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

IPM = Cultural Control

- Establishment of desirable and **competitive** vegetation.
- Restoration – Shift dominance from weeds to desirable species.
 - Recognize and accept establishment of desirable grasses.
 - Choose proper grasses for R-O-W sites.
 - Understand herbicide versatility, then institute and commit.

Competitive Grasses





No Grasses, No Competition = Spotted Knapweed

How Do Weeds Self/Cross-Pollinate?

WIND is a major vector









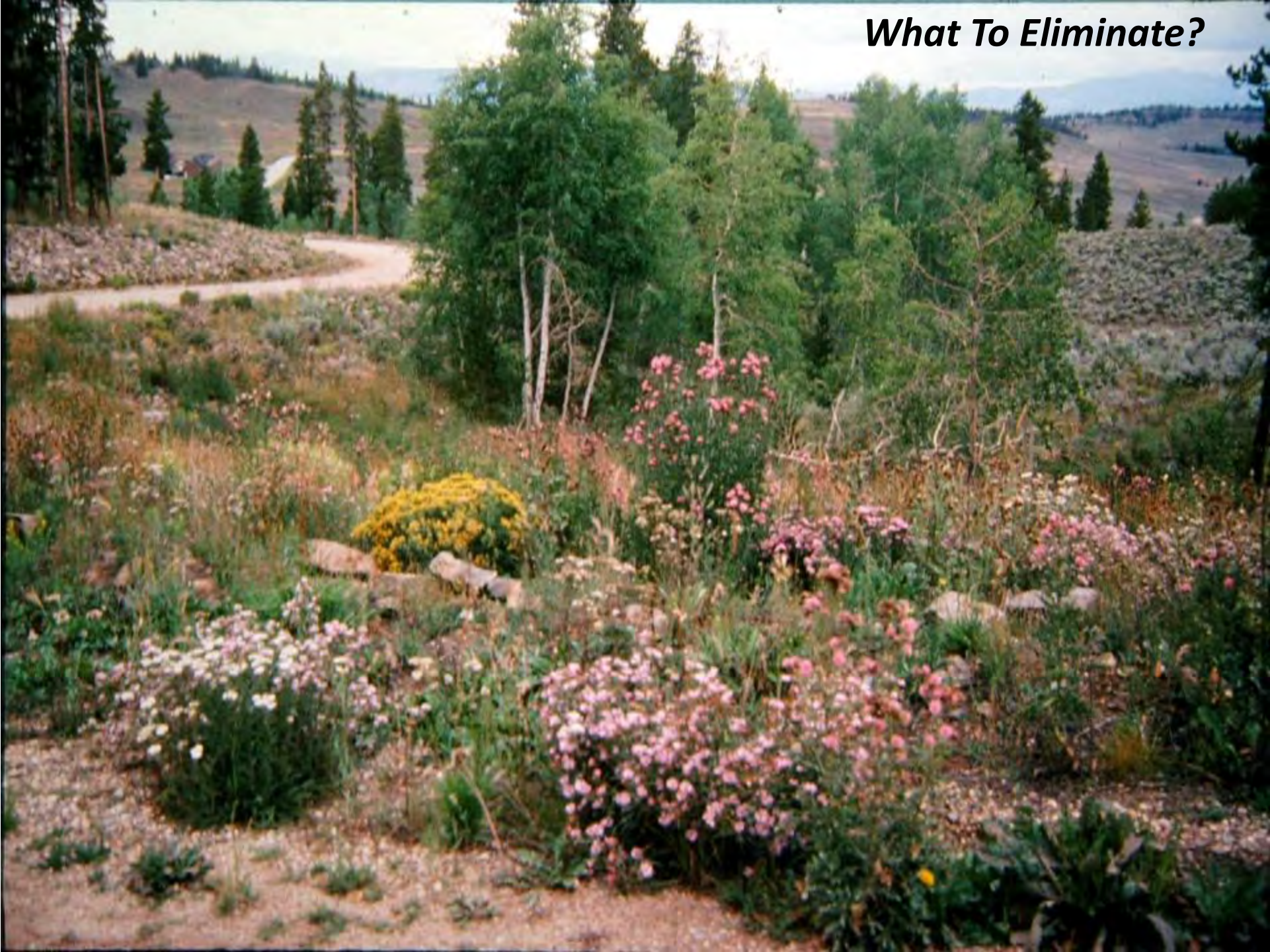




Impact of Invasive Noxious Weeds

Herbicide/Market Segmentation

What To Eliminate?



*Escaped
Ornamentals*





DRAKE LANDING

AT LAKEPOINT



WENCO HOMES, DEVELOPER
FRISCO, COLORADO

MARKET PLACE PROPERTIES
DILLON, COLORADO

FOR SALE

COLDWELL BANKER

COLORADO ROCKIES
REAL ESTATE

PLEASE CALL
668-0900 / 432-9300

1,2 & 3 BEDROOMS, WITH GARAGES
CONTINENTAL DIVIDE &
BUFFALO MOUNTAIN VIEWS
CLUB SPAS, BIKE PATH, WALK TO LAKE DILLON
IDEAL FRISCO LOCATION

From: \$199,000

COLDWELL BANKER

COLORADO ROCKIES
REAL ESTATE

668-0900











Confront/Redeem or Escort/Manor?



Successful R-O-W Programs

(Pictures Are Worth a Thousand Words)

- 1. Label Considerations/Interpretations**
- 2. Herbicide Versatility**
- 3. Factors Affecting Herbicide Performance**
- 4. Product/Rate Recommendations**

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.

Factors to Consider in Herbicide Choices on ROW

- Selective versus non selective
 - Selective – Roadsides, irrigation ditch banks, some open space, fence lines.
 - Non selective – Oil & gas sites, substations, power plants, equipment yards, guardrails.
 - The soil residual on all herbicides can be determined by the seeding restrictions stated on label.
 - 2, 4-D, dicamba, etc. has 21 -45 days seeding restrictions.
 - Perspective, Tordon 22K, Telar, Milestone seeding restrictions are 90 – 120 days seeding restrictions.
 - Can be referred to as soft residual versus hard residual herbicides.
 - Hard residuals have less of a conscience. All are safe to use on grasses, but Tordon 22K is death near trees, while Telar is safe to use around trees. Milestone is in between. Show respect, but can be more aggressive than Tordon 22K.
 - Some herbicides like glyphosate are categorized as non selective, but a soft residual, because there are no seeding restrictions. Can treat in the morning, and theoretically plant that afternoon.

Herbicide Versatility = Range Rate

- Post Emergent versus Preemergent
 - Post emergent herbicides can be both selective and non selective.
 - Some herbicides can be both, depending on rate – Perspective, Oust, Esplanade.

Factors to Consider in ROW Herbicide Choices

- **Plant Identification is Fundamental**
 - Annual versus biennial versus perennial.
 - Kochia versus Bull Thistle versus Canada Thistle
 - Broadleaf weed control versus grass control.
 - Leafy Spurge versus Foxtail Barley
 - Winter annual versus summer annual.
 - Cheatgrass/Medusahead versus Puncturevine.

Herbicide Options

- With dense, established grass stands, 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.

Reseeding/Overseeding Restrictions

PRODUCT	WAITING PERIOD	PRODUCT	WAITING PERIOD
Banvel	45 Days	Glyphosate Pro 4	No waiting period
Barricade 65 WDG	120 - 180 Days	Tordon 22K	120 -180 Days
Redeem R & P	21 Days	Perspective	365 Days
4# Amine (CB)	21 - 28 Days	Surflan AS	90 – 120 days
Telar	0 – 365 Days	Trimec Classic	21 – 28 Days
Paramount	No waiting period	Vessel	21 – 28 Days
Escalade	21 – 28 Days	Vanquish/Clarity	45 Days
Transline	21 Days	Speedzone	14 Days
Pendulum 3.3 EC	90 Days	Quicksilver	1 Day

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















What defines an aquatic site?
How do you determine the need to use
an aquatic herbicide?
Can You Say – NPDES.
100 year flood event.



Town of Mead

Before



After



Town of Mead

Before



After



Town of Mead

Before



After



LABEL CONSIDERATION

Right-Of-Way? Industrial?

Non-Crop? Steep Slopes? Solubility? Mobility?

Passing Vehicle Wind Shear? Identified Vegetation?

Range & Pasture?



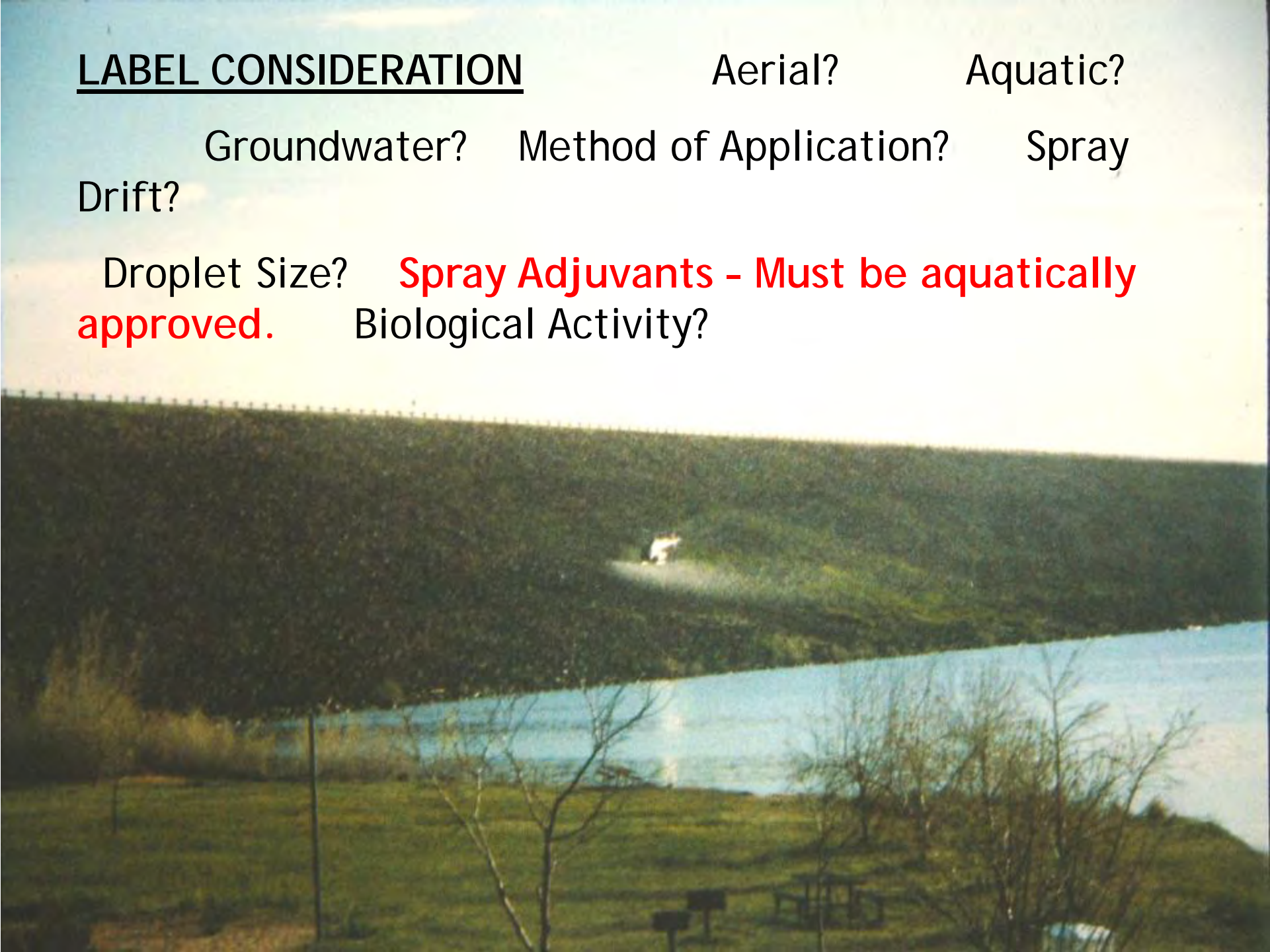
LABEL CONSIDERATION

Aerial?

Aquatic?

Groundwater? Method of Application? Spray
Drift?

Droplet Size? **Spray Adjuvants - Must be aquatically
approved.** Biological Activity?



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**
- Temperature
- Surfactants
- Sunlight

Herbicide Delivery Systems

Spray Equipment





Poor Structural Planning





7/6/2004

Labeled For Use On Various Industrial Sites



Railroads



Pipeline ROW

Petroleum Tank
Farms



Highways



Lumber yard

Storage areas


Industrial plant sites

Airports







A person with reddish-brown hair, wearing a light blue long-sleeved shirt, dark suspenders, and green gloves, is seen from behind. They are holding a yellow tool, possibly a surveying instrument, and standing on a gravelly path. The landscape is a vast, flat, open field with sparse, dry vegetation. In the distance, a tall, white lighthouse stands on a small hill. The sky is clear and blue, and distant mountains are visible on the horizon.

Non-Crop/R-O-W or Range & Pasture?

Range/Non-Crop or Pasture



Non-Crop/R-O-W Versus Range/Pasture Herbicides

A Review Of What Defines A Non-
Crop Herbicide As Opposed To A
Range/Pasture Labeled Herbicide

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.
- **Vanquish herbicide addresses this issue, and allows use, only in the R-O-W designated areas.**

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.
- **Aquatically approved 4# Amine, Arsenal, Garlon 3A.**

Wildlife vs Domesticated Animals



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

PRODUCT	HAY HARVEST RESTRICTIONS	LIVESTOCK GRAZING RES.	LACTATING DAIRY	SLAUGHTER RESTRICTIONS
4# Amine	30 Days	0	7 Days	3 Days
4/6# LV Ester	30 Days	0	7 Days	3 Days
Overdrive	0	0	0	0
Dicamba	37 -70 Days	0	7 – 40 Days	30 Days
Escort XP	0 – 3 days	0 – 3 Days	0 – 3 Days	0
Grazon P + D	30 Days	0	7 Days	3 Days
Plateau	7 days	0	0	0
Milestone	0	0	0	0
Tordon 22K	14 Days	0	14 days	3 days
Telar XP	0	0	0	0
Perspective	Non Crop	Non Crop	Non Crop	Non Crop

ADJACENT VEGETATION AND PROPERTY

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

Bareground/Sensitive Area



Rabbit Brush/Grasses 3 Years After Treatment



5 Years After Treatment



Good Drift Control



Cibola National Wildlife Refuge – Western AZ

Poor Drift Control



Drift Management



Swaths applied in E/W directions

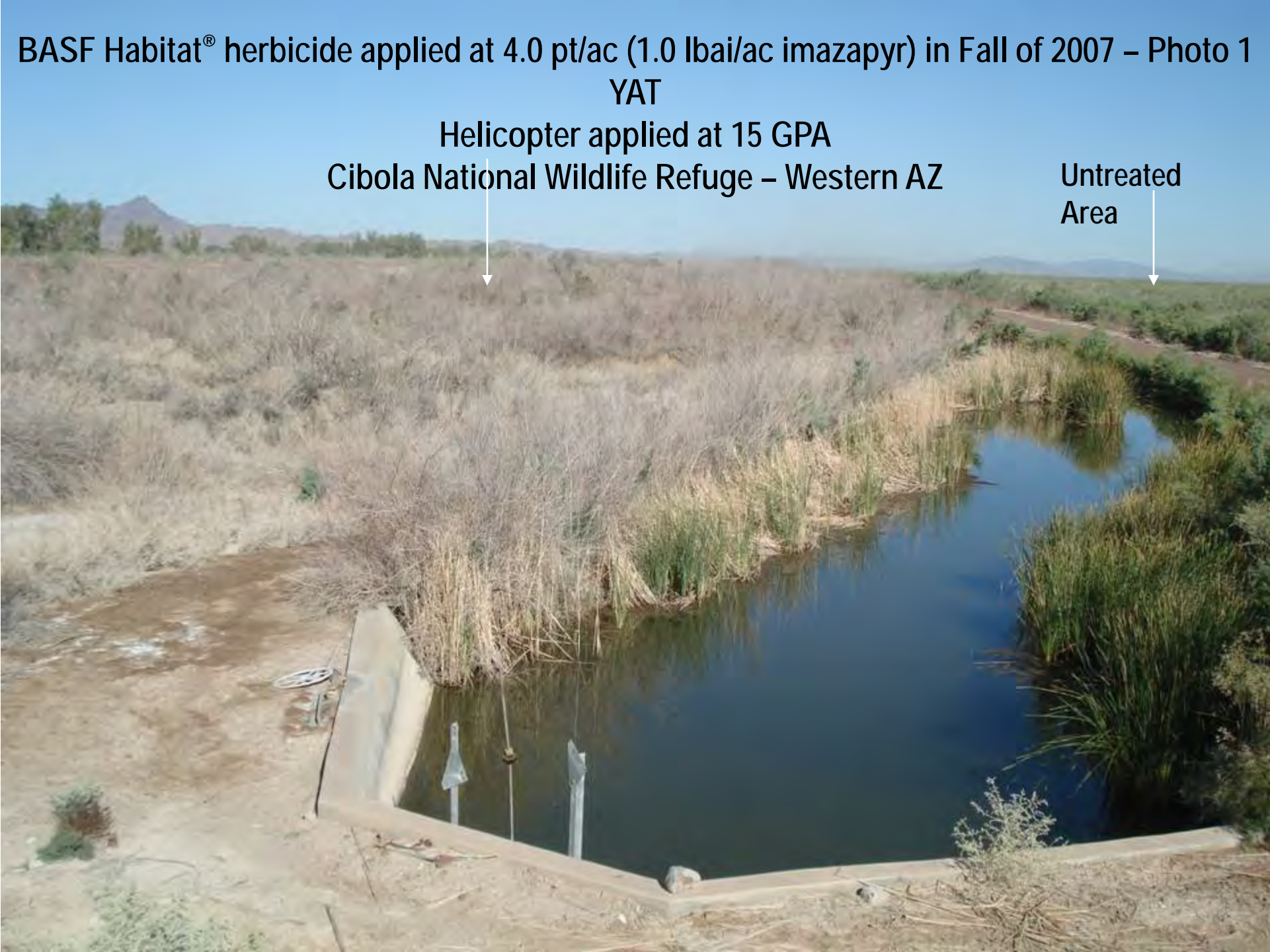
35-45 ft of Untreated Area along Colorado River

Cibola National Wildlife Refuge – Western AZ

BASF Habitat[®] herbicide applied at 4.0 pt/ac (1.0 lb ai/ac imazapyr) in Fall of 2007 – Photo 1
YAT

Helicopter applied at 15 GPA
Cibola National Wildlife Refuge – Western AZ

Untreated
Area



Initial Treatment Example



Bareground - Hard Residual/Initial Treatments

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Krovar I DF	10 pounds	\$ 126.50
• Sahara DG	10 pounds	\$ 126.50
• Perspective/Esplanade	11 ounces + 7 ounces	\$ 117.10
• Arsenal/Piper	3 pints + 10 ounces	\$ 113.20
• Viewpoint/Frequency	20 ounces + 4 ounces	\$ 102.78
• Throttle XP	12.5 ounces	\$ 88.51
• Perspective/Frequency	11 ounces + 4 ounces	\$ 80.00
• Arsenal/Frequency	3 pints + 4 ounces	\$ 76.11
• Viewpoint	20 ounces	\$ 73.38
• Perspective/Oust	11 ounces + 3 ounces	\$ 65.60

Bareground – Soft Residual/Maintenance

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Surflan AS/Piper	1 gallon + 10 ounces	\$ 119.50
• Proclipse/Piper	2.3 pounds + 10 ounces	\$ 103.53
• Esplanade/Frequency	7 ounces + 5 ounces	\$ 97.10
• Piper/Frequency	10 ounces + 4 ounces	\$ 95.90
• Journey/Piper	1 quart + 10 ounces	\$ 92.08
• Surflan AS/Frequency	1 gallon + 4 ounces	\$ 82.40
• Plateau/Piper	12 ounces + 10 ounces	\$ 81.50
• Proclipse/Frequency	2.3 pounds + 4 ounces	\$ 66.43
• Pendulum 3.3/Frequency	4.8 quarts + 4 ounces	\$ 66.12
• Plateau/Frequency	12 ounces + 4 ounces	\$ 44.40

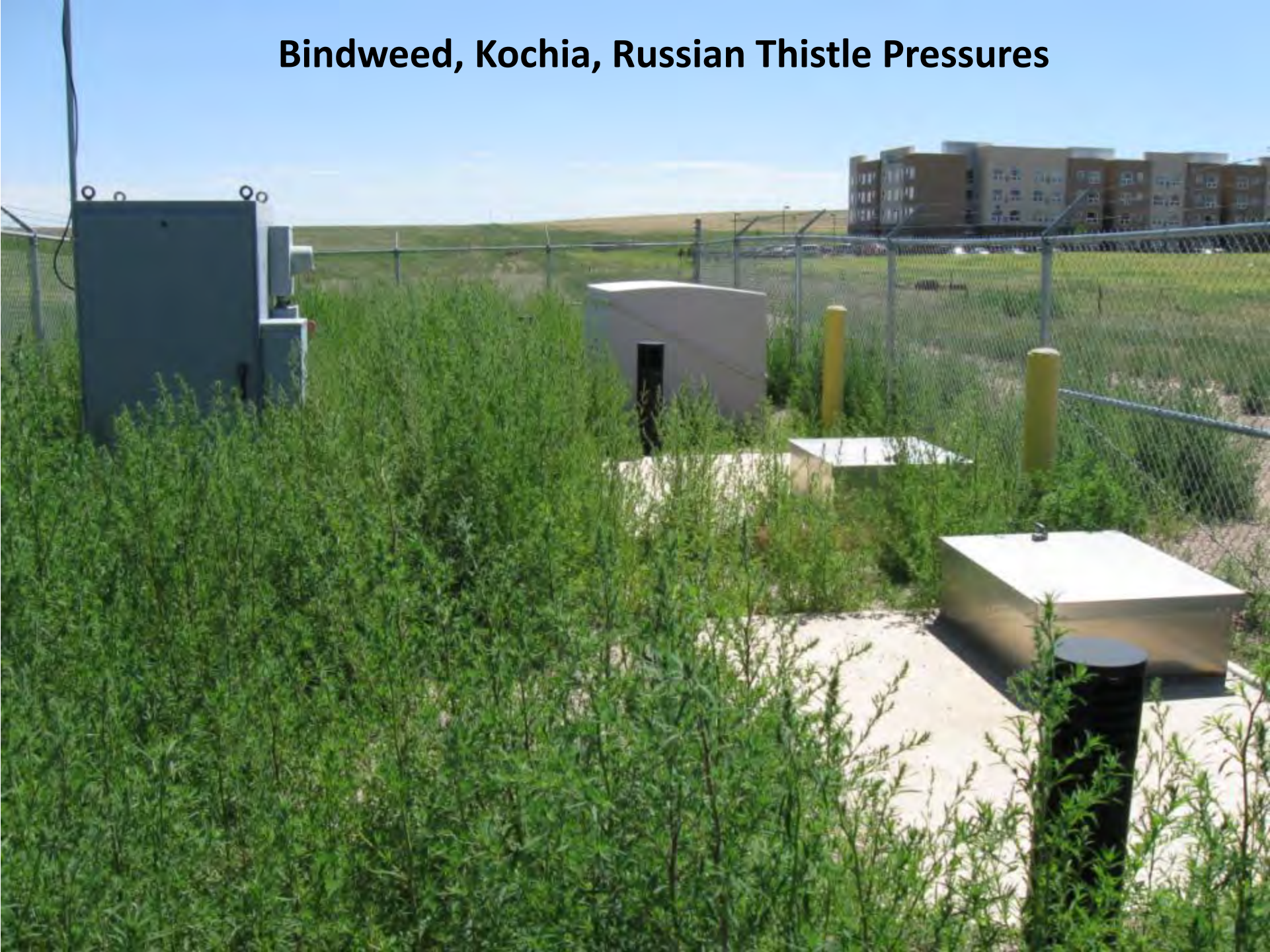




A Head Scratcher Indeed

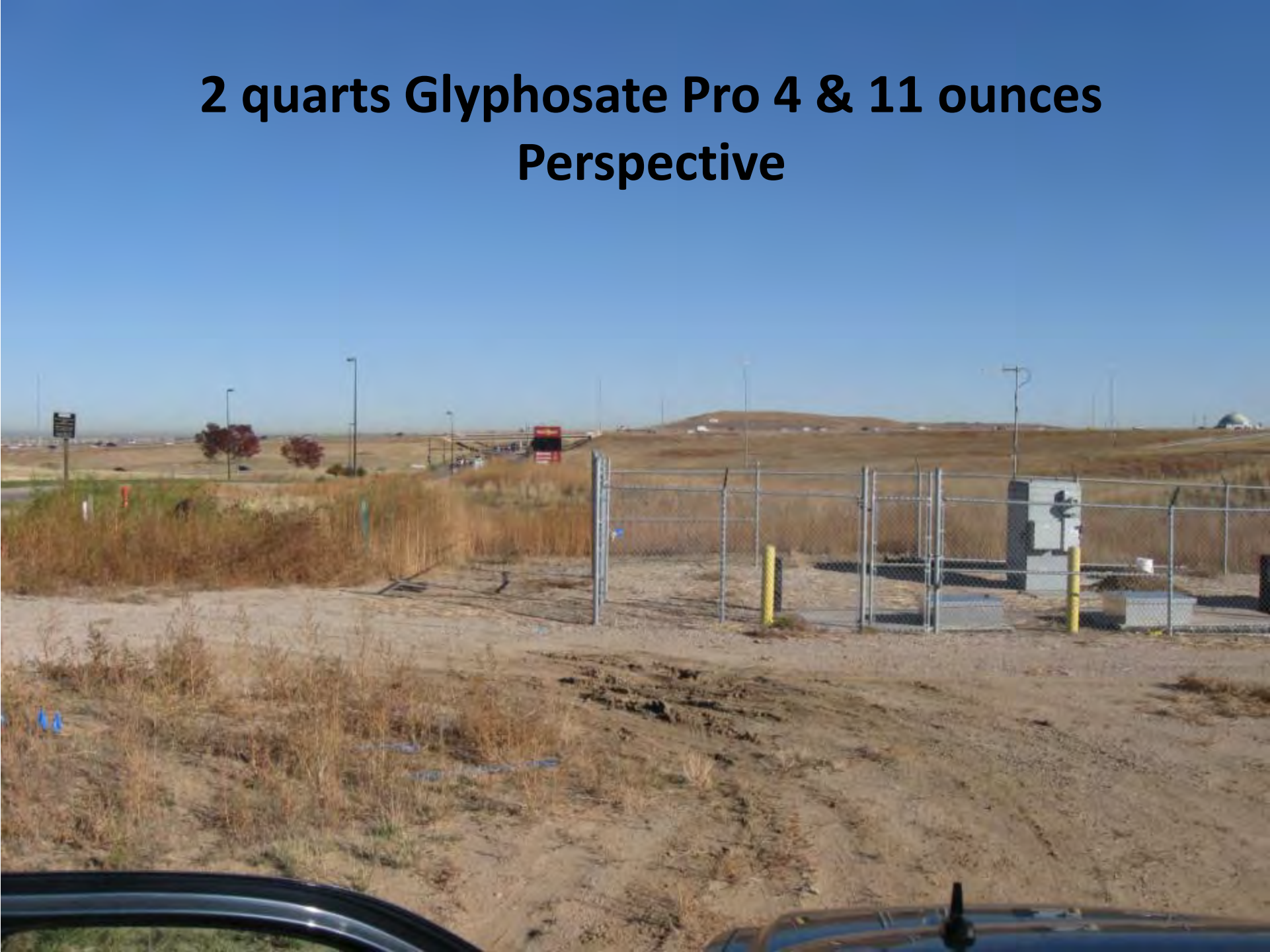


Bindweed, Kochia, Russian Thistle Pressures





2 quarts Glyphosate Pro 4 & 11 ounces Perspective



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



Bindweed Damage





Rescue Treatment 3 Weeks Later
Arsenal or Plateau?



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

Weed Control is a Science and an Art

-Herbicide Versatility-

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

Economics of Mowing



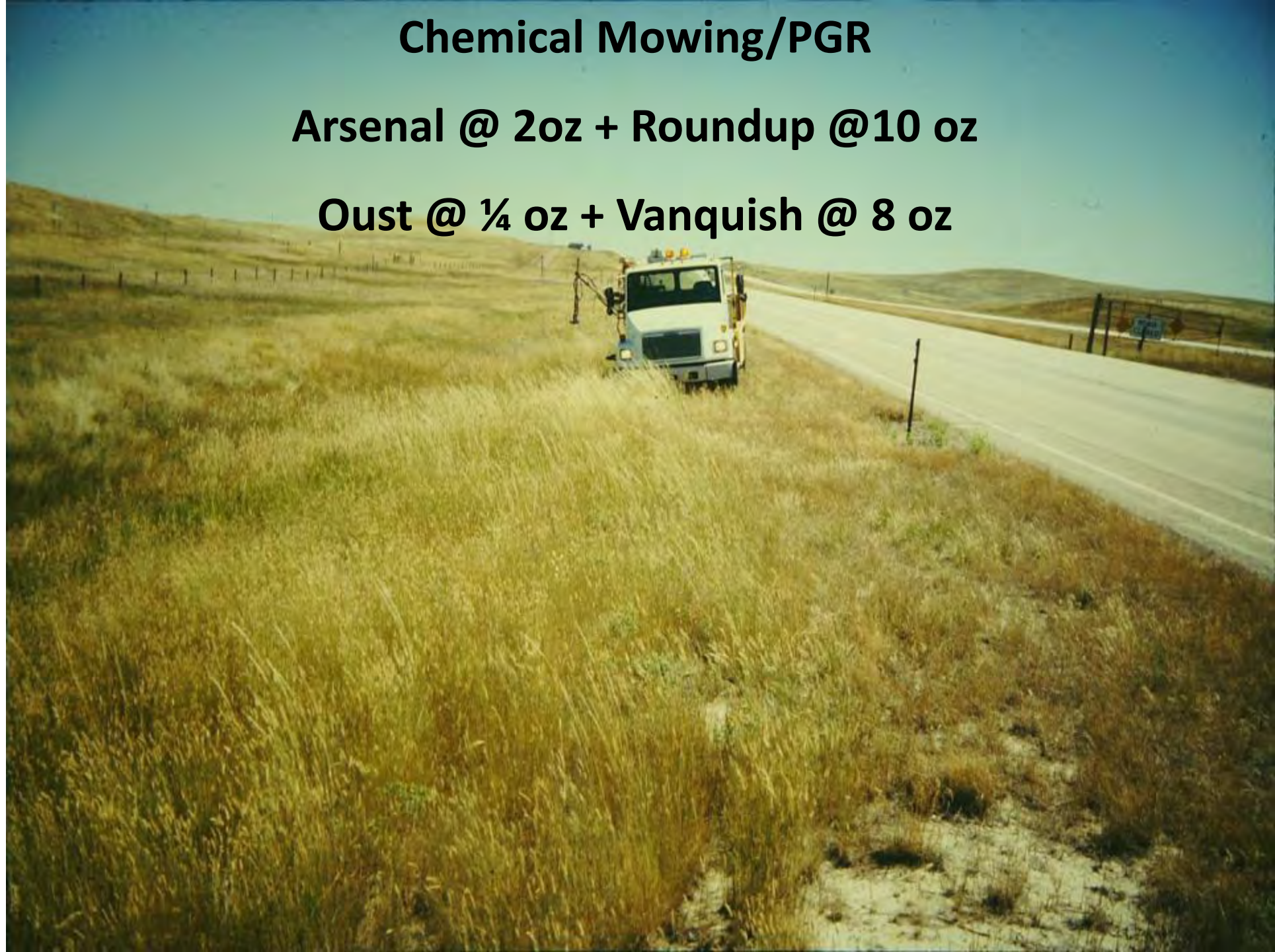




Chemical Mowing/PGR

Arsenal @ 2oz + Roundup @10 oz

Oust @ ¼ oz + Vanquish @ 8 oz



Tall Fescue Seed Head Suppression Plot
Plateau
4 oz / per Acre
Applied 4/3/05
Photo - 6/25/05
U T Knoxville



TDOT – Dyersburg TN
Plateau @ 8oz / acre
Applied 6/4/06
Bermudagrass – Seedhead Suppression /
Plant Growth Regulation



07/11/2006



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

Chemical Mowing Cost Comparisons

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>	<u>*COST/MILE</u>
Arsenal	2 ounces @ .90/oz	\$ 3.20	\$ 19.20
Glyshosate	10 ounces @ .14/oz		
Oust	¼ ounce @ \$ 5.00/oz	\$ 4.93	\$ 29.58
Vanquish	8 ounces @ .46/oz		
Plateau	4 ounces @ \$ 1.20/oz	\$ 23.67	\$ 142.02
Opensight	3.3 ounces @ \$ 5.72.oz		
Embark 2S IVM	28 ounces @ \$ 2.04/oz	\$ 62.24	\$ 313.44
Hi-Dep	32 ounces @ .16/oz		
Stronghold PGR	32 ounces @ \$ 2.25/oz	\$ 72.00	\$ 432.00
Proxy (Ethephon 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.

Moisture/Water/Rainfall

- Needed for vegetation growth.
- Used as a carrier for herbicides during application.
- **Can wash herbicide off foliage – RUNOFF**
- Drought Stress - Reduces transpiration, closes stomata
- Humidity – Hydrates cuticle, increases penetration.
- Dew – Solubilizes and carries residual herbicides into the soil to plant roots.



Good quality water taken from cement irrigation ditch
100 gallons of water and spray mix used per load and applied at 15 GPA
Cibola National Wildlife Refuge – Western AZ

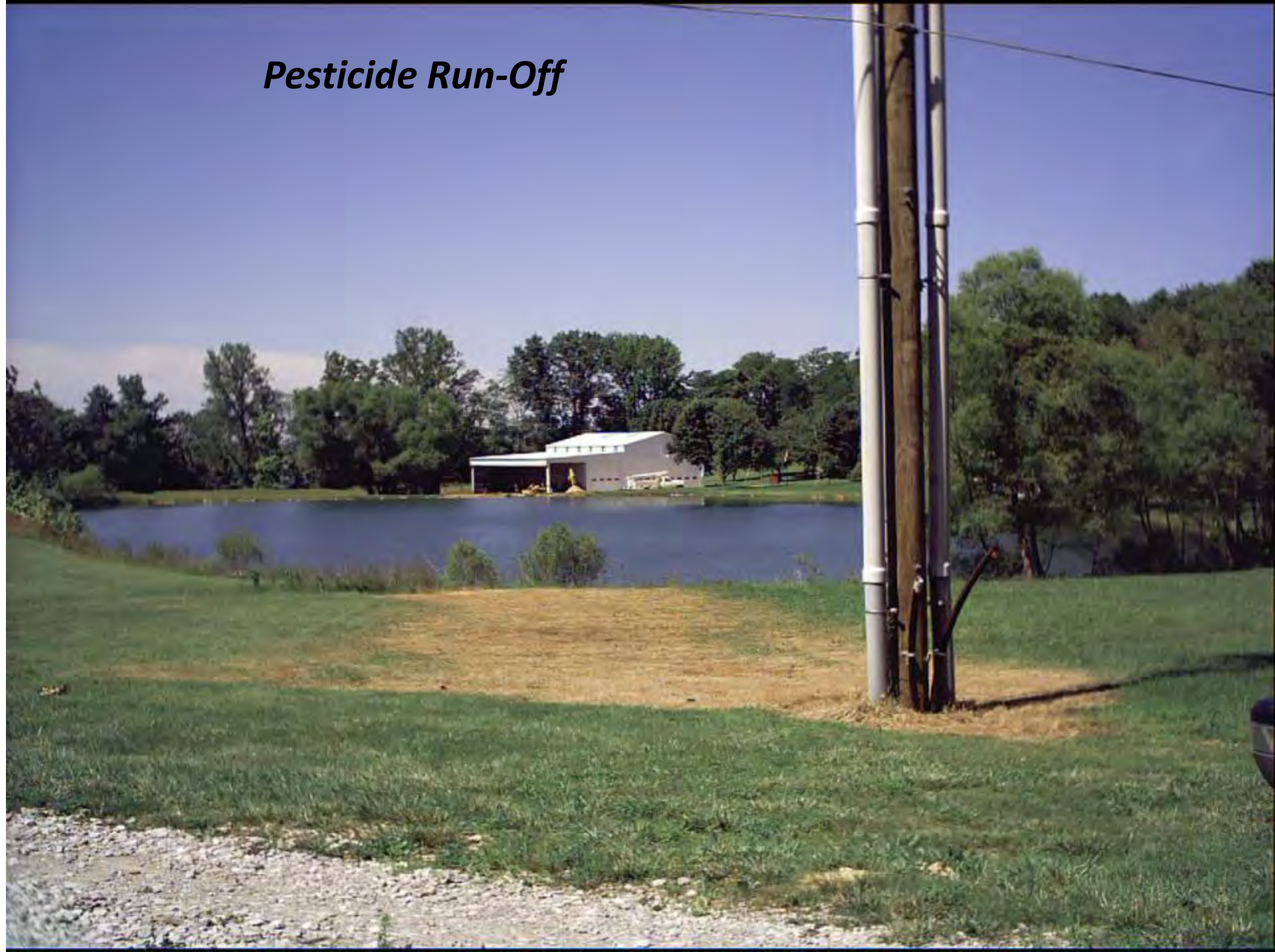
IS RAINFALL YOUR FRIEND ?

HERBICIDES HAVE NO CONSCIENCE

- The first rain after the application:
- ½ inch gentle rain is ideal
 - 1" of rain falling on 1 acre of ground is equal to 27,154 gallons of water
 - ½ " of rain falling on 1 acre of ground is equal to 13,577 gallons of water
 - ¼" of rain falling on 1 acre of ground is equal to 6,788 gallons of water
- 2 inch down pour can cause off target movement.



Pesticide Run-Off





Herbicide Damage (Volatization or
Leaf/Dollar Spot ?)



Scalping/Dollar/Leaf Spot vs Herbicide Injury

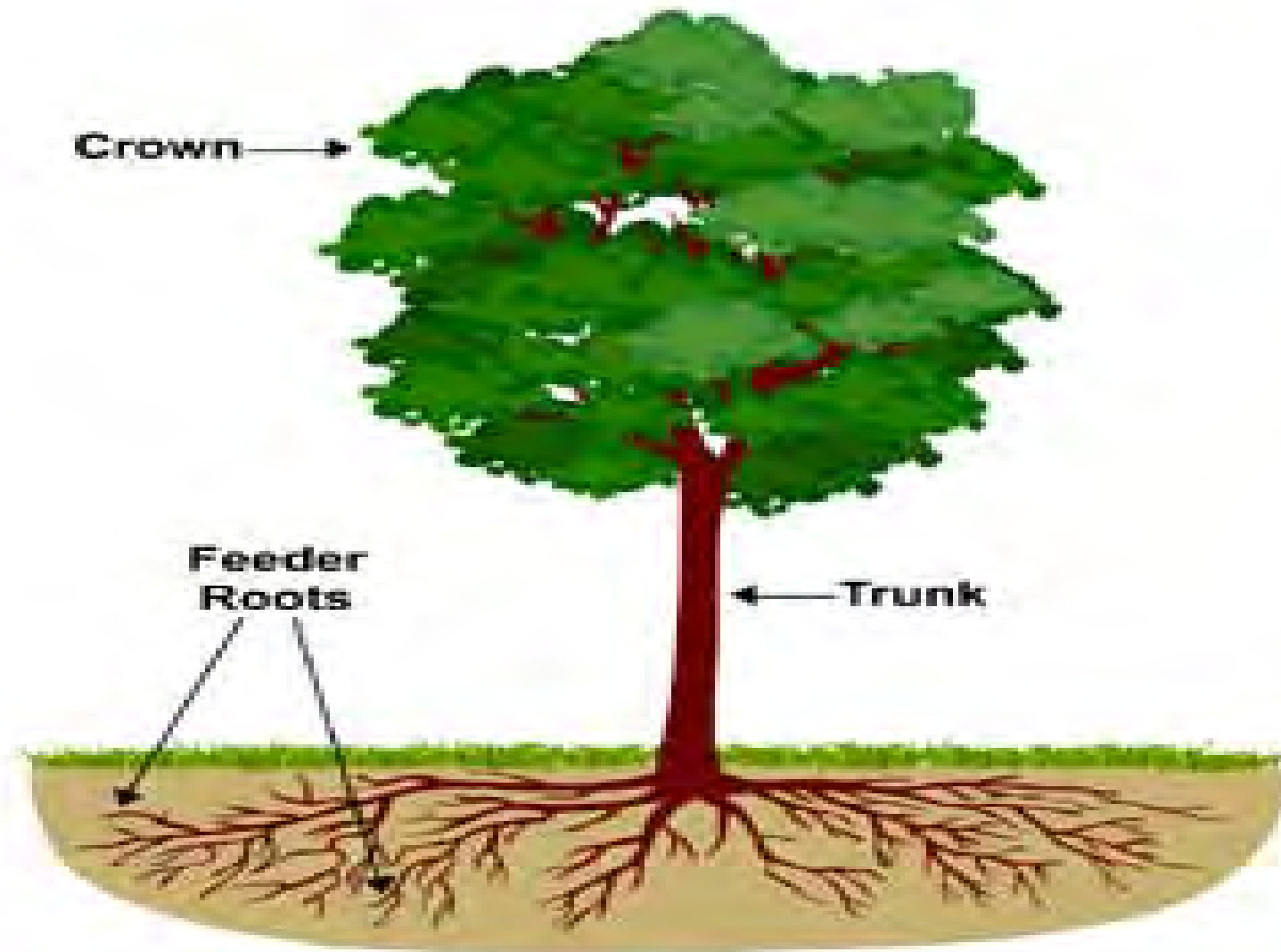




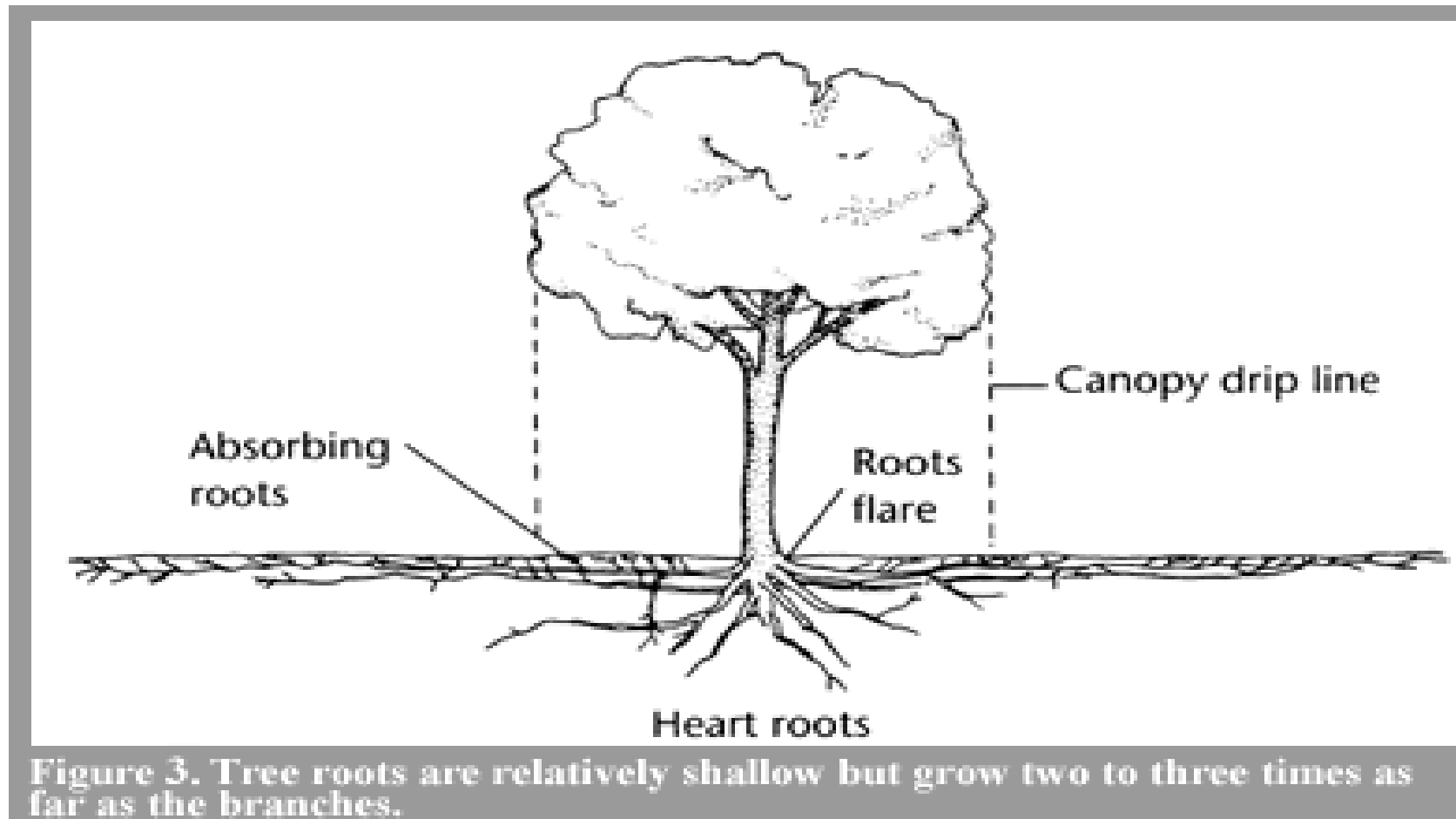
Tree Drip-Line



Tree Anatomy



Tree Roots



















Factors Affecting Performance

- **Herbicide mode of action**
- Type of plant (annual or perennial)
- Soil (PH)
- Water (PH)
- The Application
- Temperature
- Surfactants
- Sunlight



What Happened Here?

- Poor Application?
- Bad Timing?
- Wrong Herbicide?



What Happened Here?

- Spot Treatment?
- Lazy Applicator?
- Pre-Emergent Failure?



2,4-D/Dicamba Resistent Kochia

Treated March 5, 2014

Perspective @ 11 ounces/acre

+

Arsenal @ 32 ounces/acre

Rescue Treatment July , 2014

Weedmaster @ 64 ounces/acre

**PICTURE TAKEN
SEPTEMBER 9, 2014**

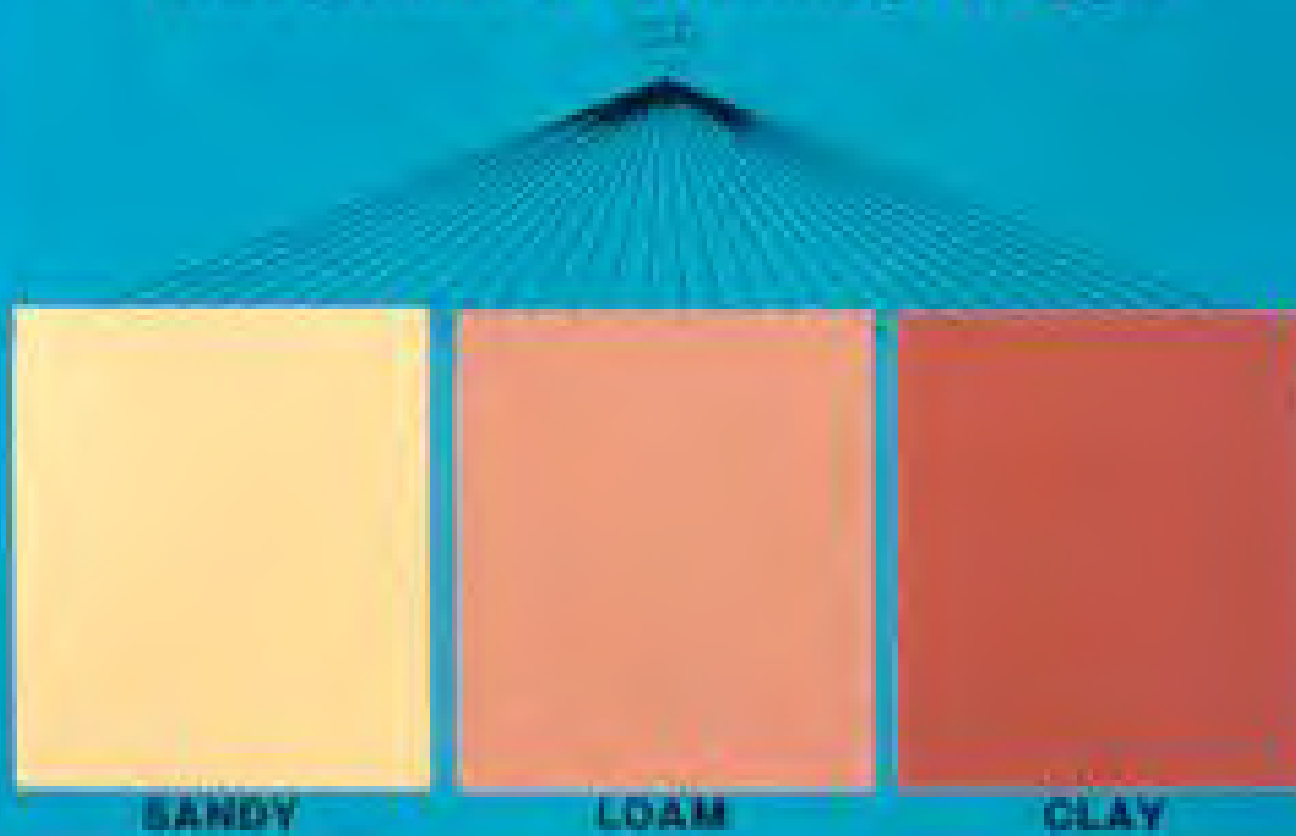


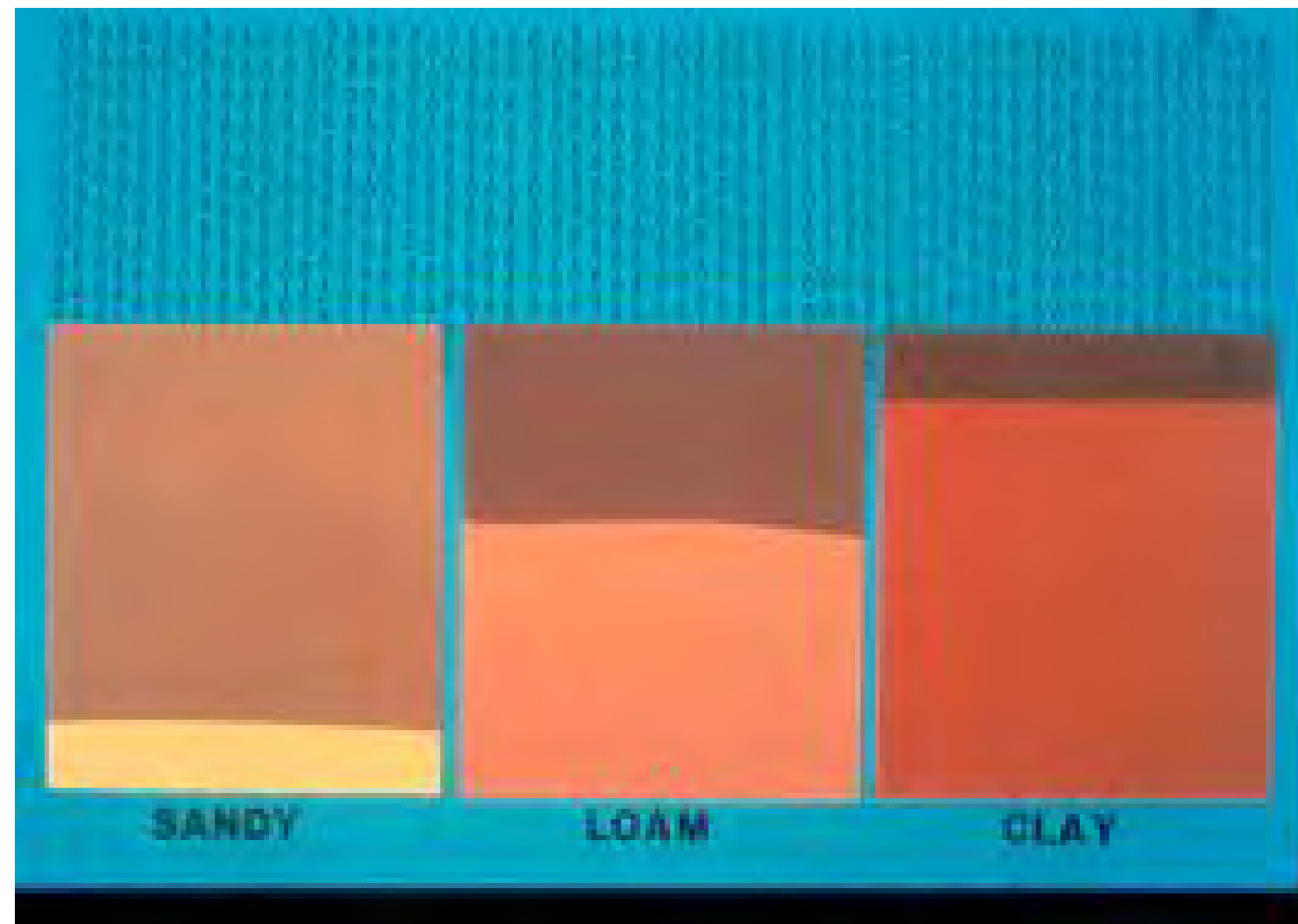
Herbicide Movement in Soil

- Key Factors-

- Soil structure: sand, clay, loam, particle size
- Rainfall/irrigation
- Herbicide water solubility
- KOC Value
 - Measures the affinity to bind to organic matter
- Soil $\frac{1}{2}$ life
- Slope

Movement of Chemical in Soil





How Late Can You Apply Herbicides

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

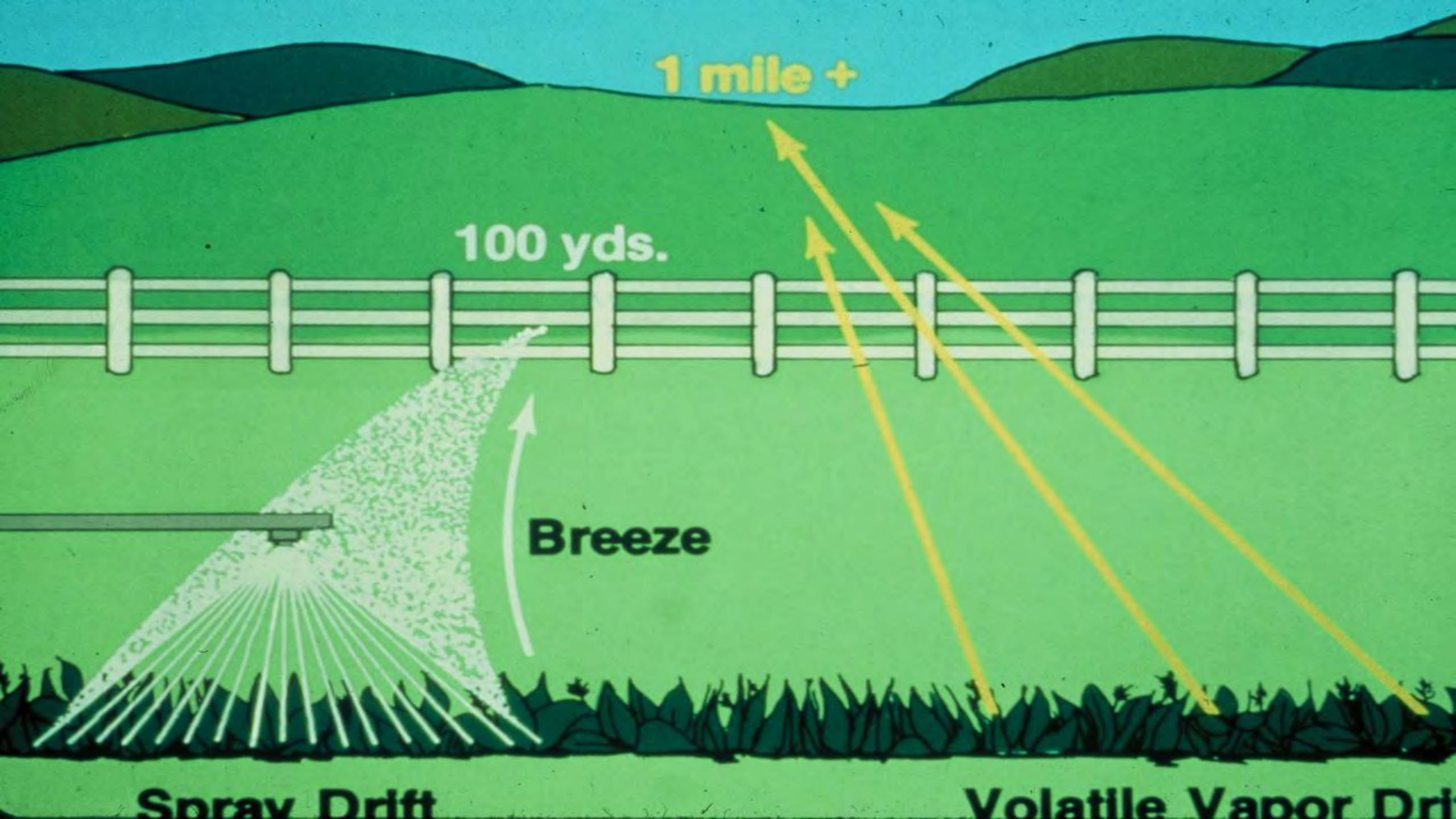
- Milestone herbicide was applied 12/1/2010 at a rate of 7 fluid ounces/acre to control Russian knapweed.
- 4 seed varieties (Galleta, Slender Wheatgrass, Sand Dropseed, Alkali Sacaton)
- Seeding was completed on 3/3/2011.
- In May, 2011 plots were over sprayed with Vista @ 1 pint + 4 # 2, 4-D @ 1 pint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





WIND

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



1 mile +

100 yds.

Breeze

Spray Drift

Volatile Vapor Drift



CSU Bare Ground Field Trials

M.S. Student: Derek Sebastian

Advisors: Dr. Phil Westra, Dr. Scott Nissen

Collaborators: Jim Sebastian, Bobby Goeman, Tim D'Amato



Bayer CropScience

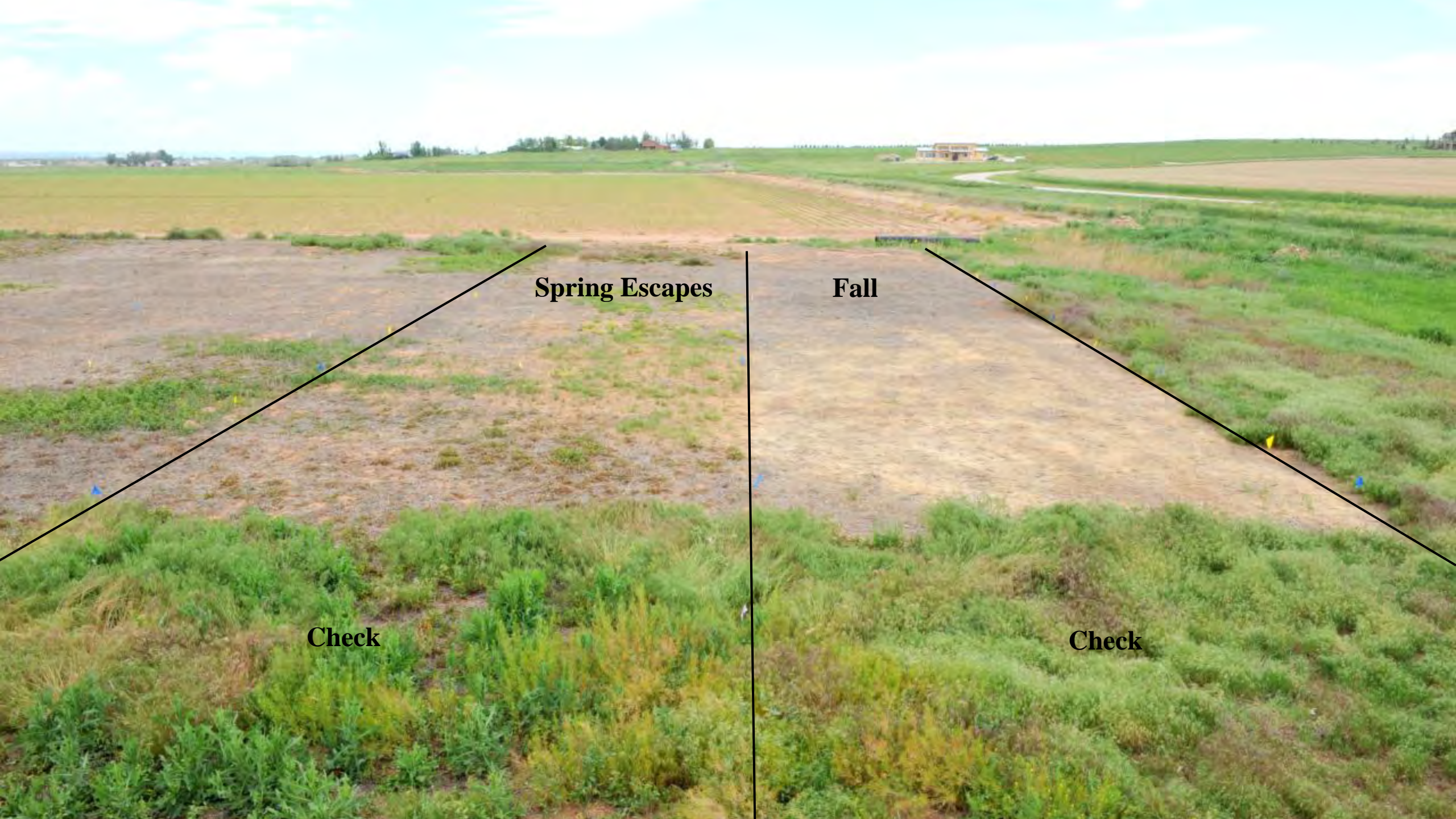


 **BASF**
The Chemical Company



Dow AgroSciences





Spring Escapes

Fall

Check

Check

July 2014



Spring Escapes

Fall



Fall

Spring



Fall

Spring

Time Dependent Binding

The longer the soil and herbicide have time to interact, the stronger the binding, less leaching and lateral movement.



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.**

Herbicide Behavior or Fate Affected By

Soil Sorption

“Ability of herbicide to bind to or into soil particles”

Commonly expressed partition coefficient (Koc) which measures tendency to leach.

- Values <100 ml/g is low indicating more likely to leach in low organic matter containing soil.
- Values >500 ml/g are unlikely to leach unless their half life is > 100 days.

Solubility Rankings Based on Water Solubilities of a Compound

“How Easily A Herbicide Dissolves In Water”

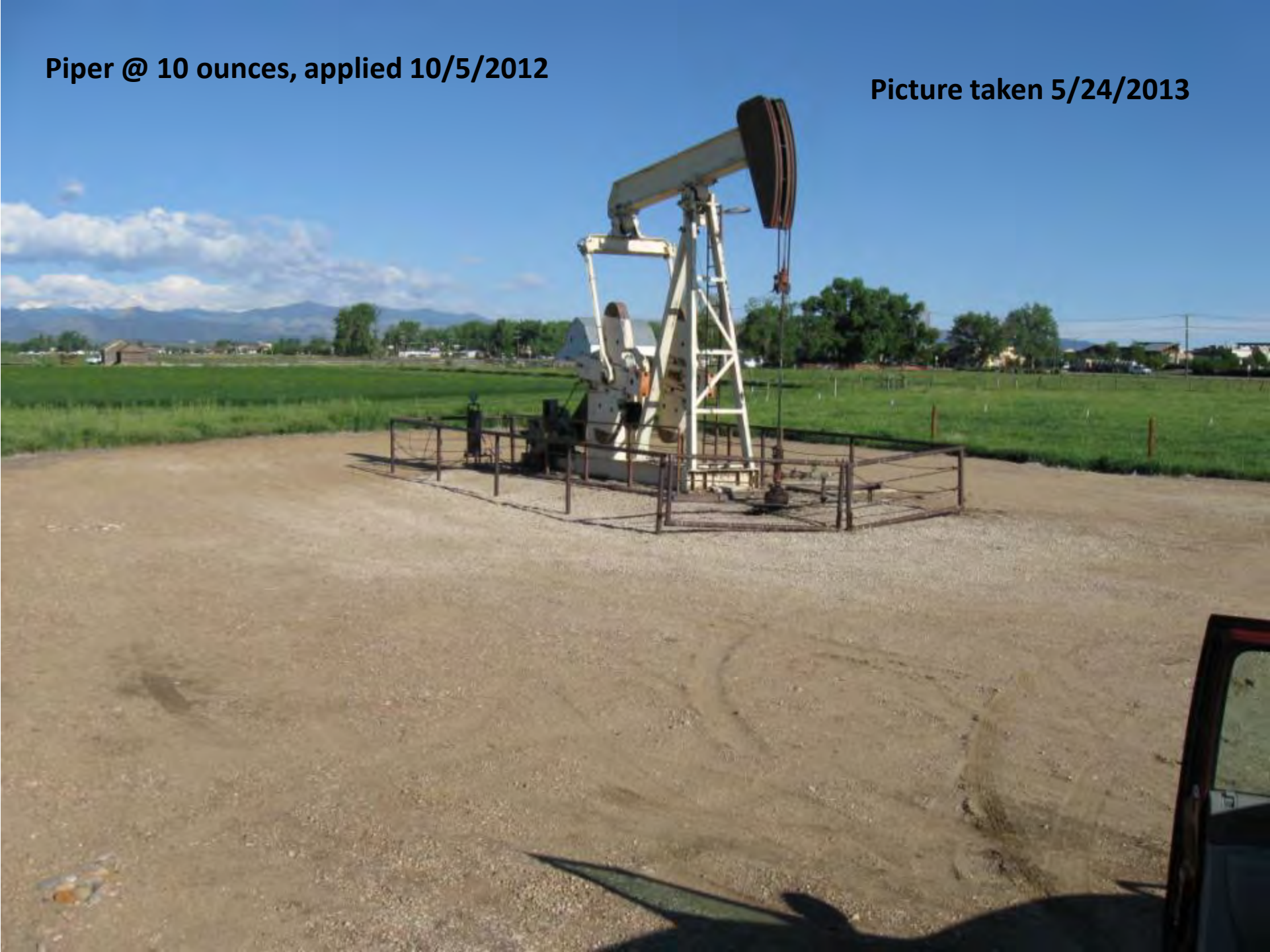
Relative Solubility	Water Solubility (ppm)
• Very Soluble	- 1,000 to 10,000
• Moderately Soluble	- 100 to 1,000
• Low Solubility	- 10 to 100
• Very Low Solubility	- 1 to 10
• Extremely Low Solubility	- 0.1 to 1

Herbicide/Water Solubility

<u>PRODUCT</u>	<u>ACTIVE</u>	<u>PARTS PER MILLION (PPM)</u>
Proclipse/Endurance	prodiamine	- 0.013
Pendulum	pendimethalin	- 0.200
Piper/Esplanade	flumioxazin/indaziflam	- 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
Arsenal	imazapyr	- 11,272
Roundup Pro	glyphosate	- 11,600
Frequency	topramezone	- 15,000
Gramaxone	paraquat	- 620,000

Piper @ 10 ounces, applied 10/5/2012

Picture taken 5/24/2013















Piper @ 10 ounces 1 year after treatment – 10/11/2013



General Broadleaf 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
•E-2	1 quart	\$ 13.08
•Escort XP	1 ounce	\$ 10.35
•Veteran 720/Range Star	2 quarts	\$ 13.55
•Perspective	5 ounces	\$ 23.00

Brush and Woody Species

<u>PRODUCT</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Escort + 4# Amine	2 oz + 2 qts	\$ 26.72
• Sendero	1.75 pts	\$ 23.62
• Crossbow	1 gallon	\$ 40.00
• Garlon 3A + Escort	2 qts + 2 oz	\$ 56.50
• Remedy Ultra	1 quart	\$ 17.00
•Streamline	10 oz	\$ 51.50
•Viewpoint	13 oz	\$ 47.70

Aquatics – Wetlands & Drainage Areas

<u>PRODUCTS</u>	<u>RATE/ACRE</u>	<u>COST/ACRE</u>
• Rodeo	3 quarts	\$ 14.61
• Clearcast	2 quarts	\$ 117.30
• Habitat	2 quarts	\$ 52.80
• Garlon 3A	1.5 gallons	\$ 107.40
• 2, 4-D 4# Amine	3 quarts	\$ 10.35



Questions, Suggestions,
Comments?

kkgallagher@q.com