

CONIFER TOLERANCE AND VEGETATION CONTROL WITH TWO NEW FORESTRY HERBICIDES

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Cleantraxx Development

- The first work in forestry with Pindar GT was in northern California
- Name later changed to Cleantraxx
- Driver for development of new herbicide options:
 - Increased planting of hexazinone intolerant conifers (sugar pine, incense cedar, western larch, true firs, redwood, and interior Douglas-fir)
 - Reduction in atrazine use
 - Conifer tolerance issues inland with sulfometuron

Cleantraxx

- Combination of oxyfluorfen and penoxsulam
- Oxyfluorfen (PPO inhibitor) has been used for years in nursery and Christmas tree operations as Goal and GoalTender
- Penoxsulam is a new ALS inhibitor, active at extremely low use rates
- Mainly pre-emergent activity
- Controls annual grasses and broadleaf herbaceous, and pre-emergent control of some woody brush species

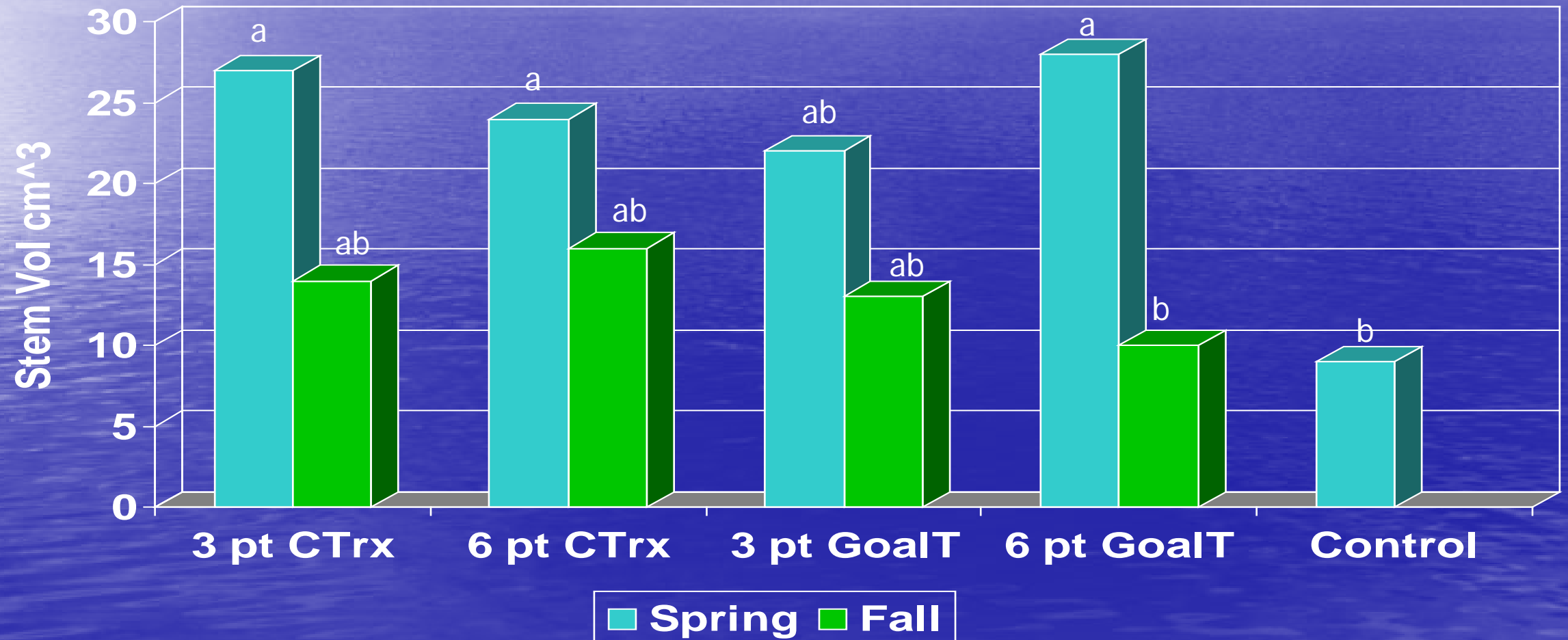
Unrivaled Conifer Tolerance

- May be applied pre or post plant
- Can be applied pre or post bud break
- Can be applied pre or post bud break with or without an adjuvant
- As good or better conifer tolerance than atrazine on:
 - Douglas-fir
 - White fir
 - Western larch
 - Sugar pine
 - Incense cedar
 - Redwood
 - Western red cedar

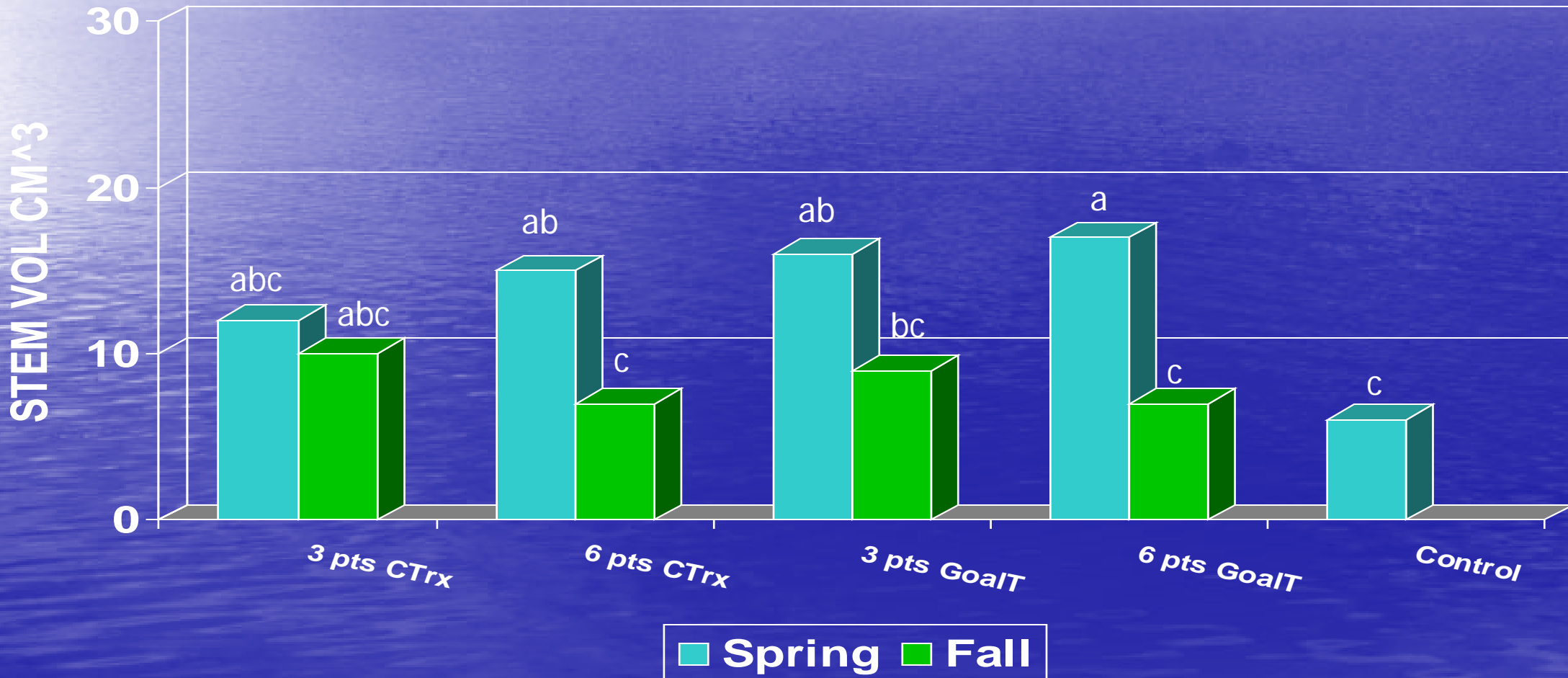
6 pts/ac Cleantraxx Over the Top – Spring Application 17 MAT – PP, DF and WF



DOUGLAS-FIR STEM VOLUME 17 AND 10 MONTHS AFTER TREATMENT FOR SPRING AND FALL CLEANTRAXX APPLICATIONS, RESPECTIVELY



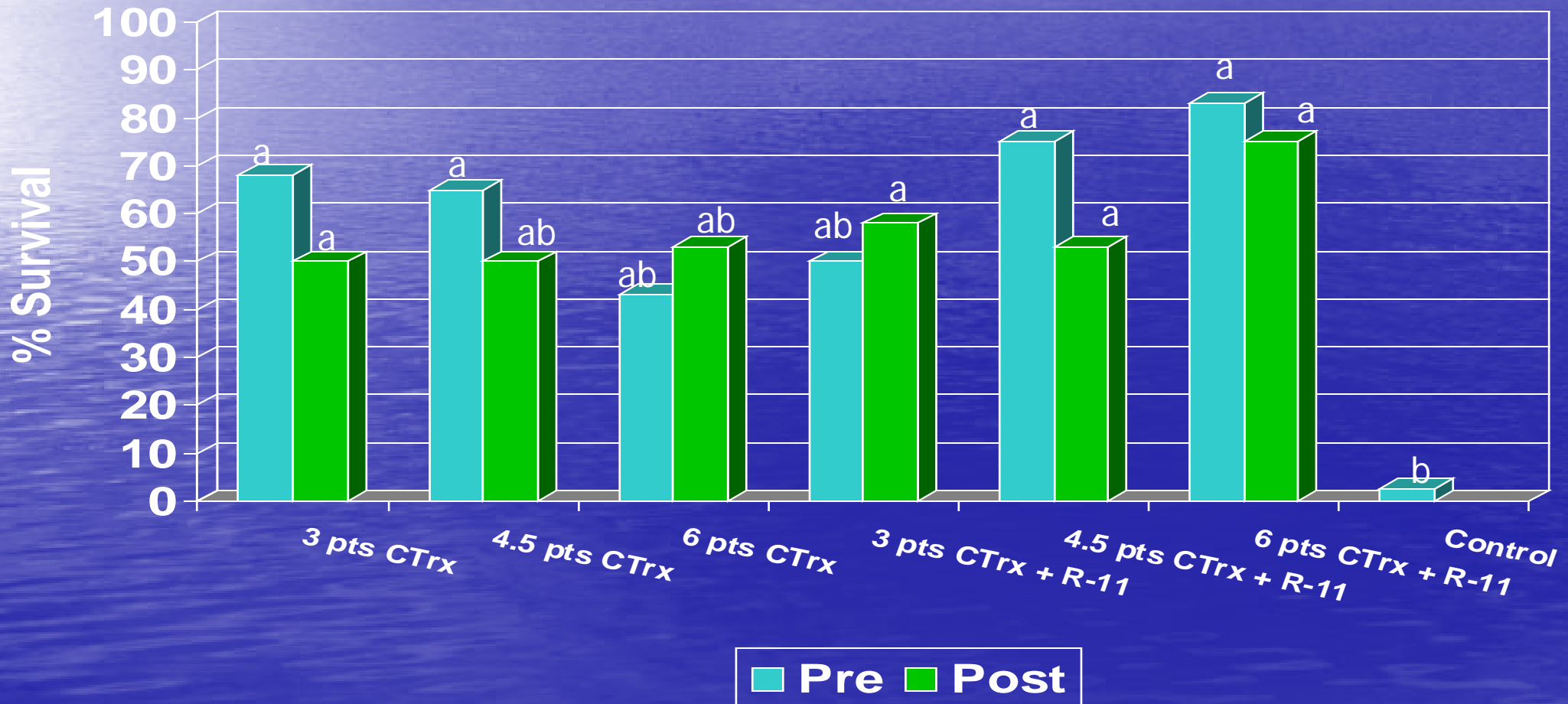
WHITE FIR STEM VOLUME 17 AND 10 MONTHS AFTER TREATMENT FOR SPRING AND FALL CLEANTRAXX APPLICATIONS, RESPECTIVELY



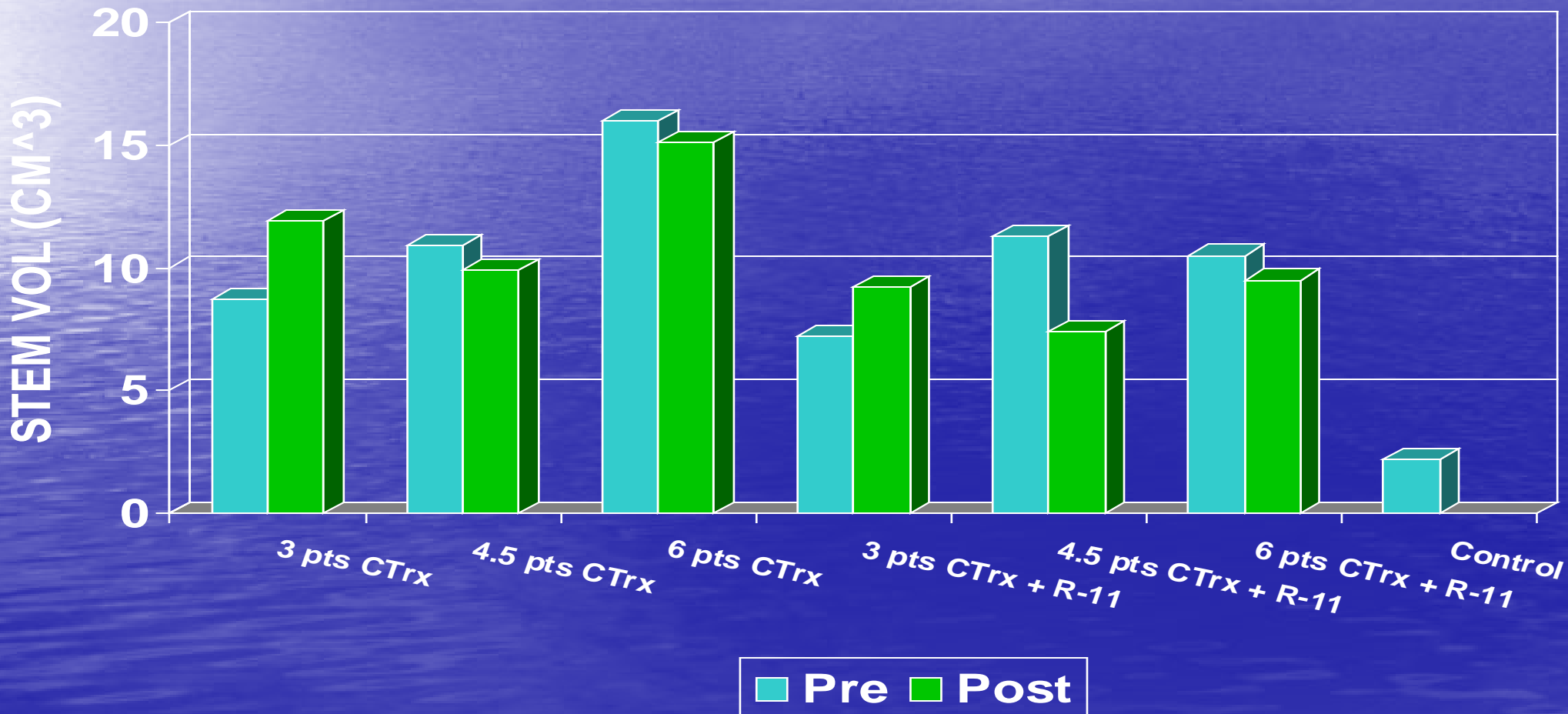
IC, SP & PP 3 YAT – 6 pts Cleantraxx plus 0.25% R-11
Post Bud Break Application Timing



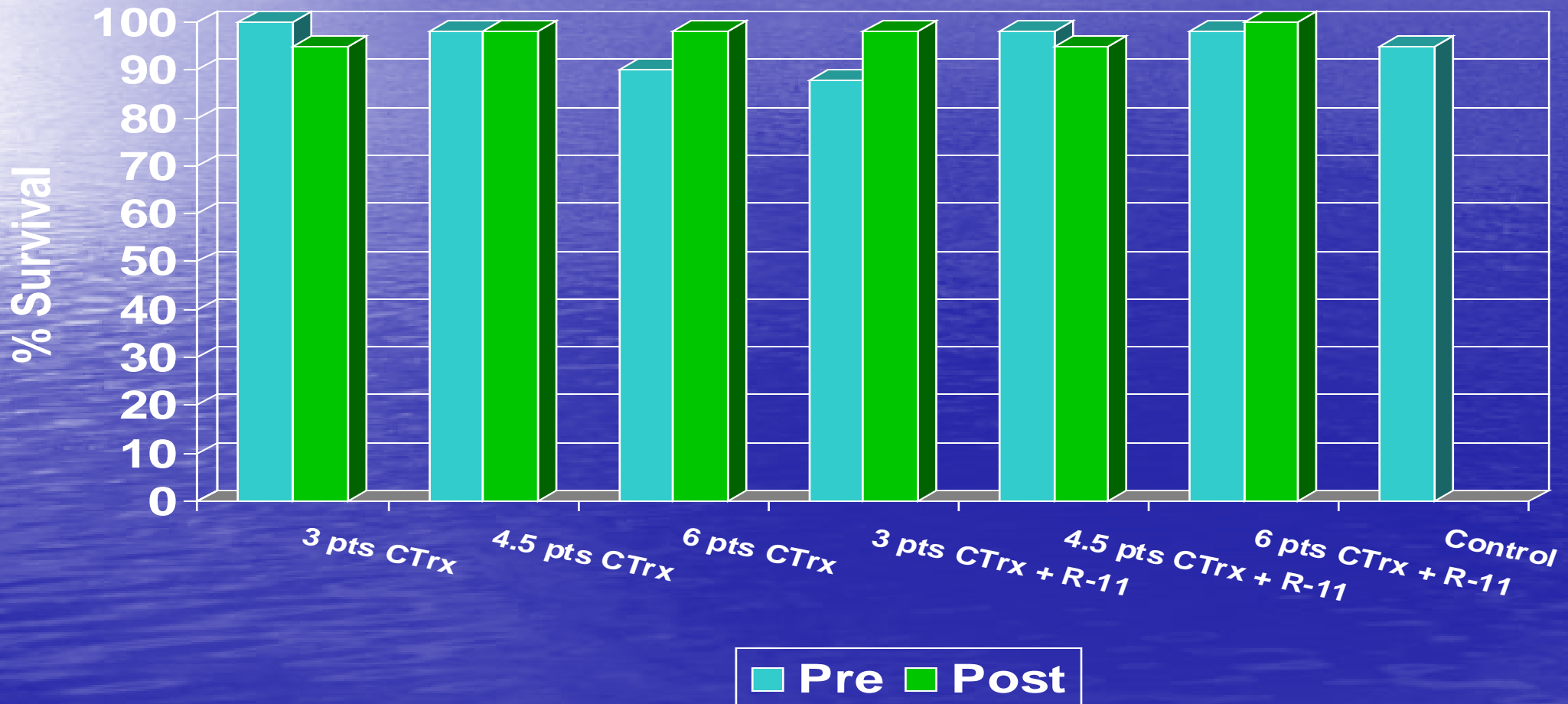
SUGAR PINE SURVIVAL 17 MONTHS AFTER TREATMENT FOR OVER THE TOP CLEANTRAXX APPLICATIONS PRE AND POST BUDBREAK



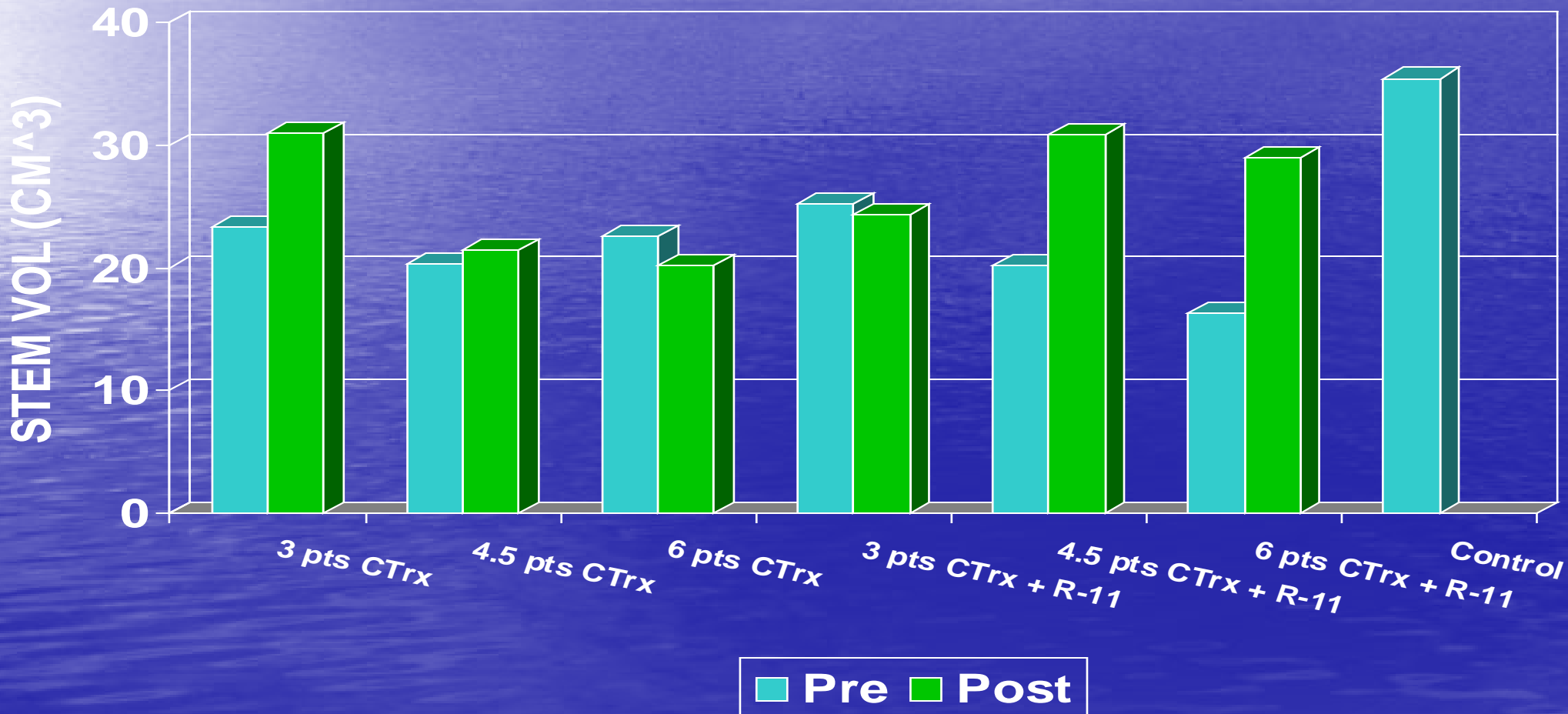
SUGAR PINE STEM VOLUME 17 MONTHS AFTER TREATMENT FOR OVER THE TOP CLEANTRAXX APPLICATIONS PRE AND POST BUDBREAK



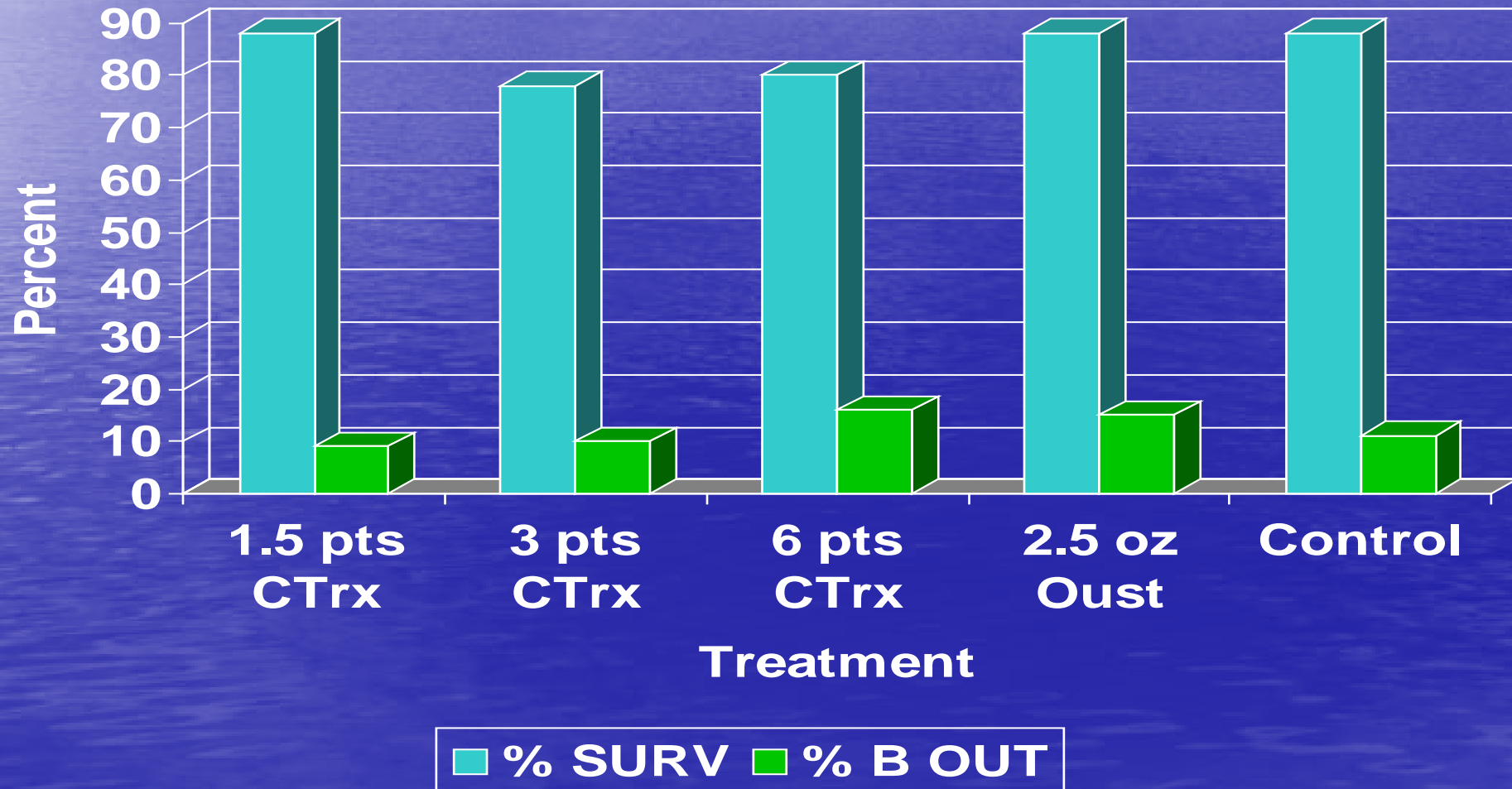
INCENSE CEDAR SURVIVAL 17 MONTHS AFTER TREATMENT FOR OVER THE TOP CLEANTRAXX APPLICATIONS PRE AND POST BUDBREAK



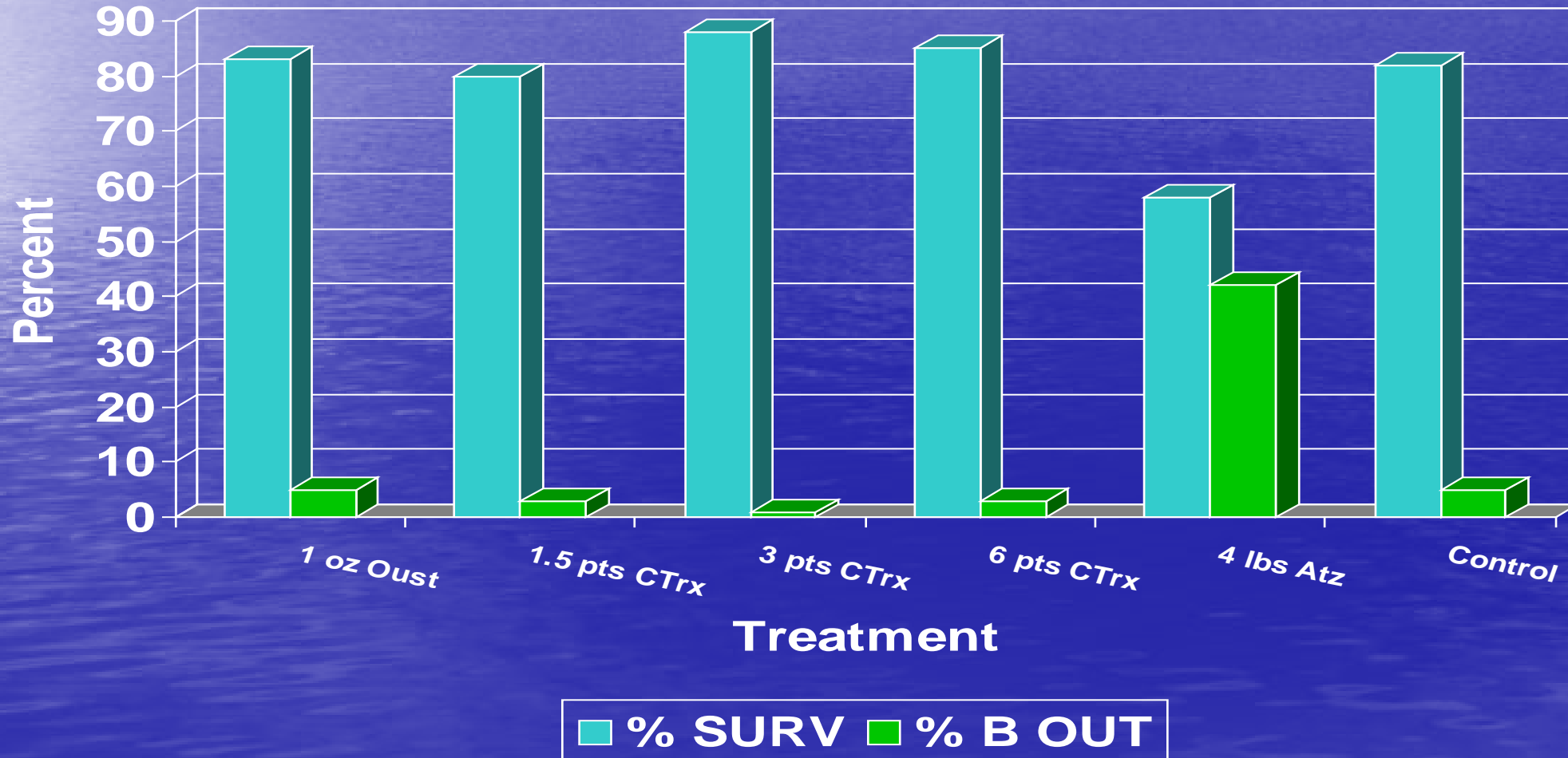
INCENSE CEDAR STEM VOLUME 17 MONTHS AFTER TREATMENT FOR OVER THE TOP CLEANTRAXX APPLICATIONS PRE AND POST BUDBREAK



Over the Top Applications of Cleantraxx and Oust Immediately after Planting Styro 15 Redwood



Over the Top Applications of Cleantraxx, Atrazine and Oust Immediately after Planting Styro 8 Western Larch



WL 4.5 pts/ac Cleantraxx Applied as a Spring Pre-plant-5 MAT



Split 4.5 pt/ac Cleantraxx Treatment on Western Red Cedar (2.25 fall/2.25 spring)

- Excellent conifer tolerance on the Oregon Coast, western red cedar



Vegetation Control

- Excellent **PRE**-emergent control of:
 - Annual grasses
 - Annual broadleaved herbaceous
 - Woody brush seed (Ceanothus and Arctostaphylos species)
- Does not control perennial grasses
- Weak on cheatgrass
- Primarily a spring treatment
 - Exception is split treatments (The Kelpsas...)
- Need to be aware of what vegetation is on the site prior to using Cleantraxx!!!

Spring Pre-Emergent Application of Cleantraxx vs GoalTender

2 YAT

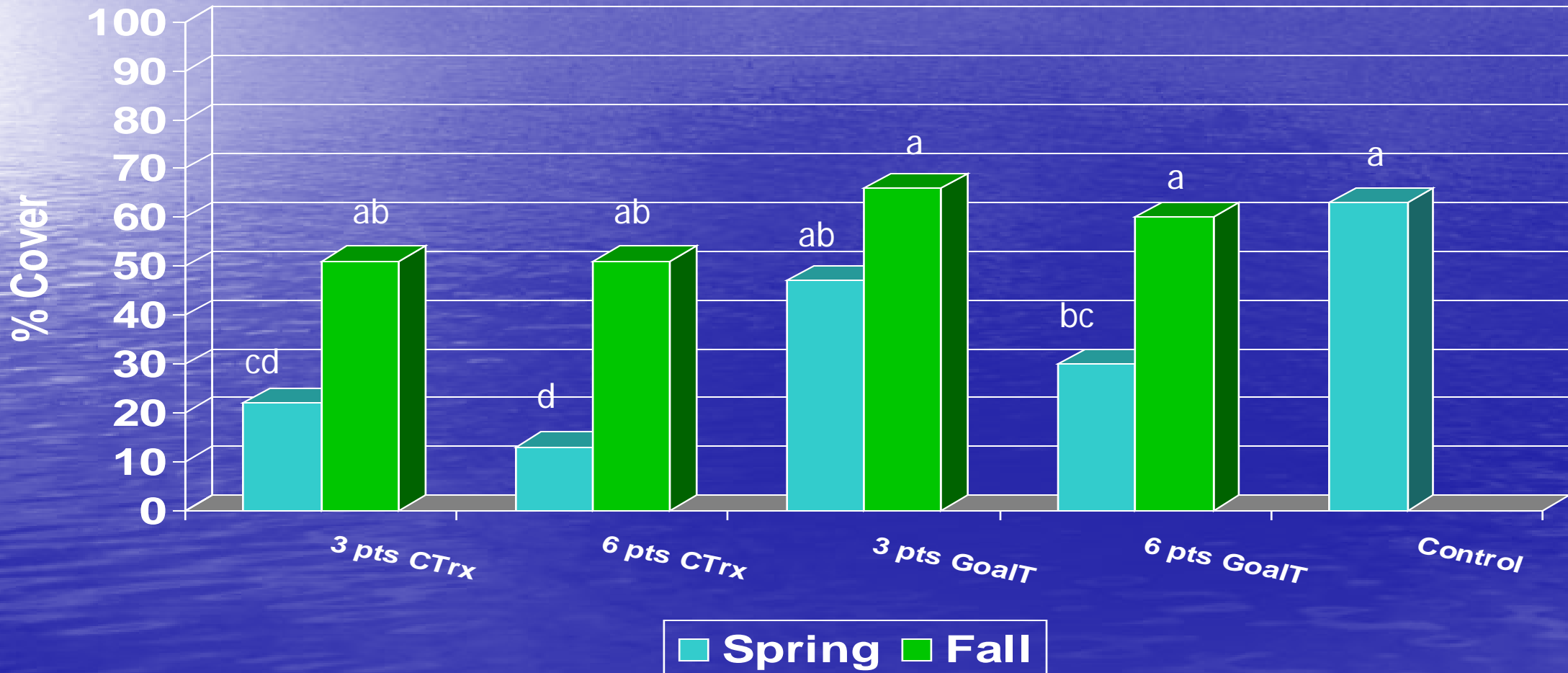
3 pts Cleantraxx



3 pts GoalTender



PERCENT SQUAW CARPET COVER 17 AND 10 MONTHS AFTER TREATMENT FOR SPRING AND FALL APPLICATIONS OF CLEANTRAXX AND GOALTENDER, RESPECTIVELY

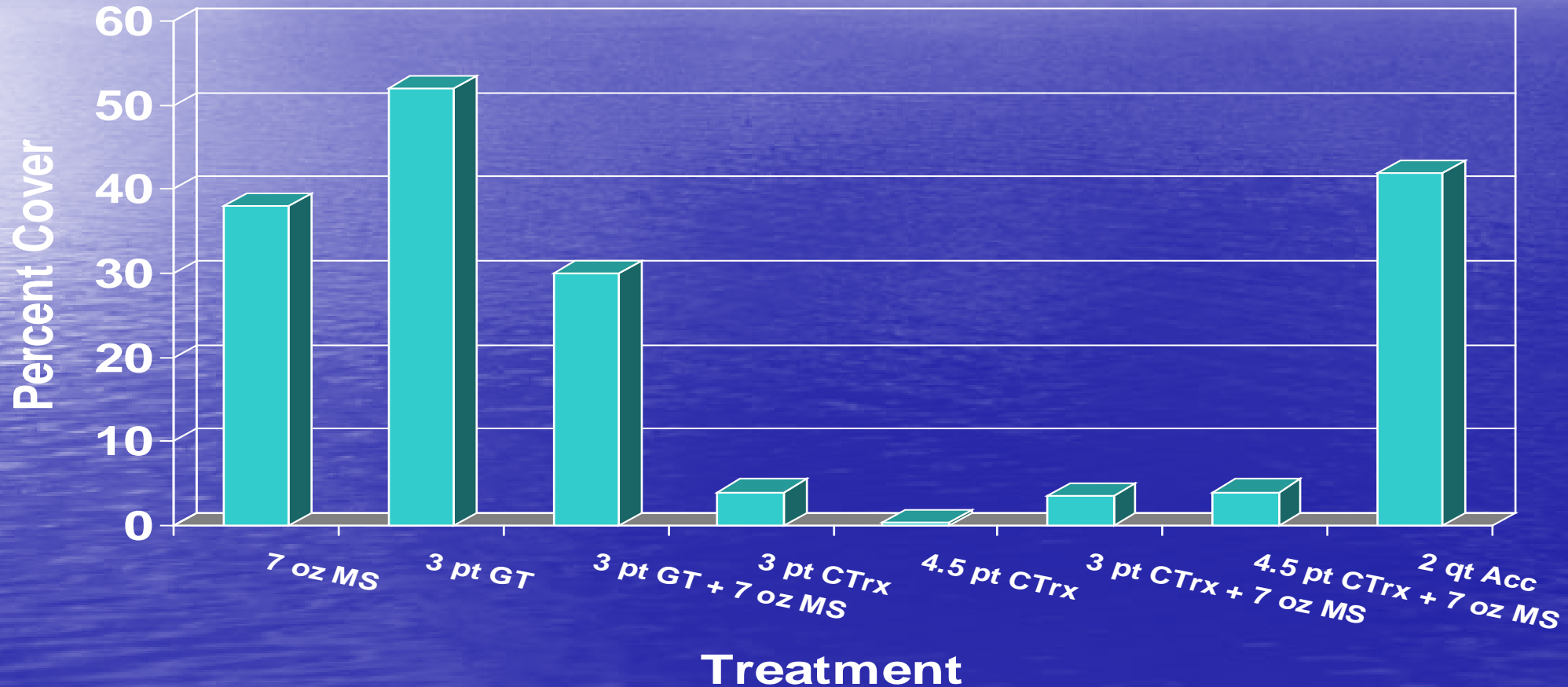


Pre-emergent Snowbrush Control with Fall Applications of Cleantraxx

- Snowbrush control with a fall application of 3 pts Cleantraxx
- Two years after application
- East side Cascades



Pre-Emergent Snowbrush Cover 2 YAT – Applied October 2014

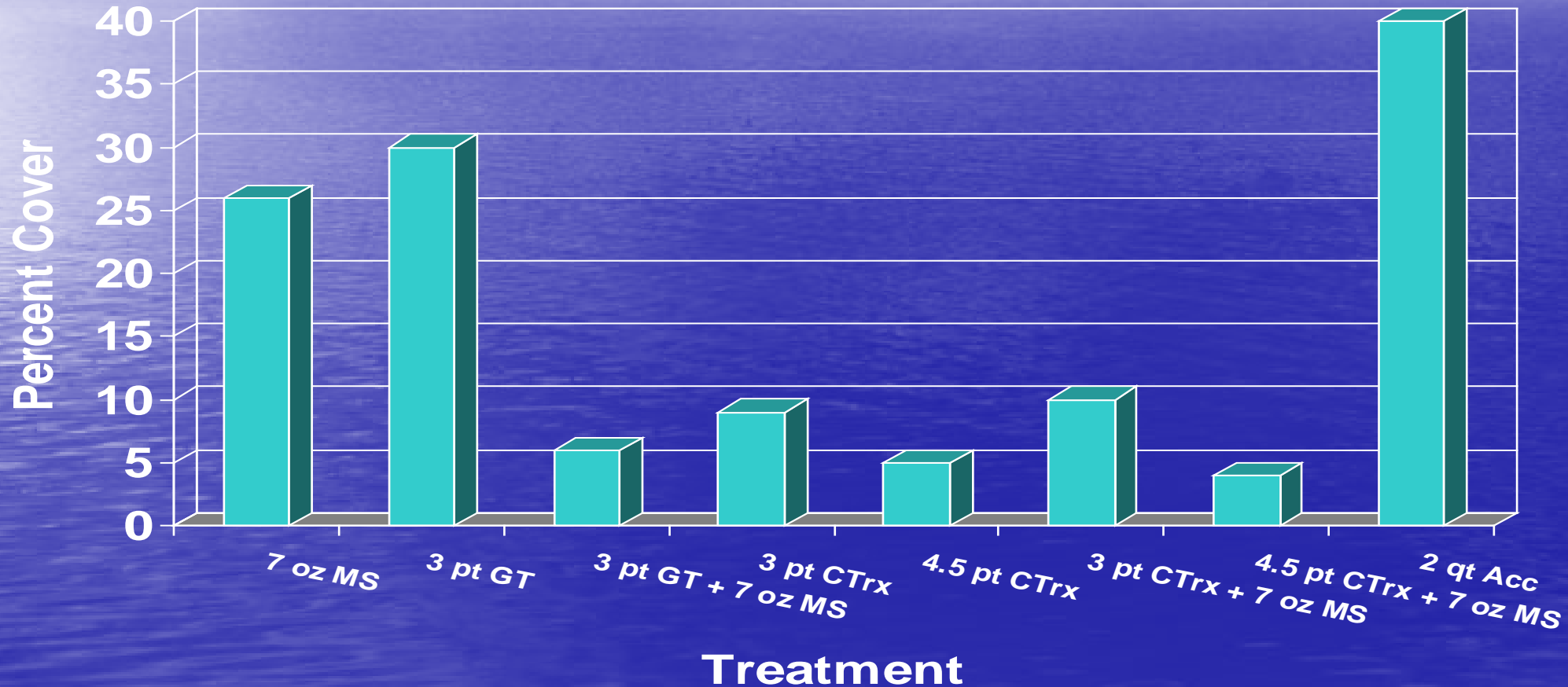


Pre-emergent Deerbrush Control with Cleantraxx

- Fall pre-emergent application
- 4.5 pts/ac Cleantraxx



Pre-Emergent Deerbrush Cover 1 YAT – Applied October 2013



Two Important Considerations.....

- Post emergent applications
- Perrenial grasses
- Spring post emergent application at 3 pts Cleantraxx per acre



A New Approach to Site Preparation Applications – “The Kelpsas”

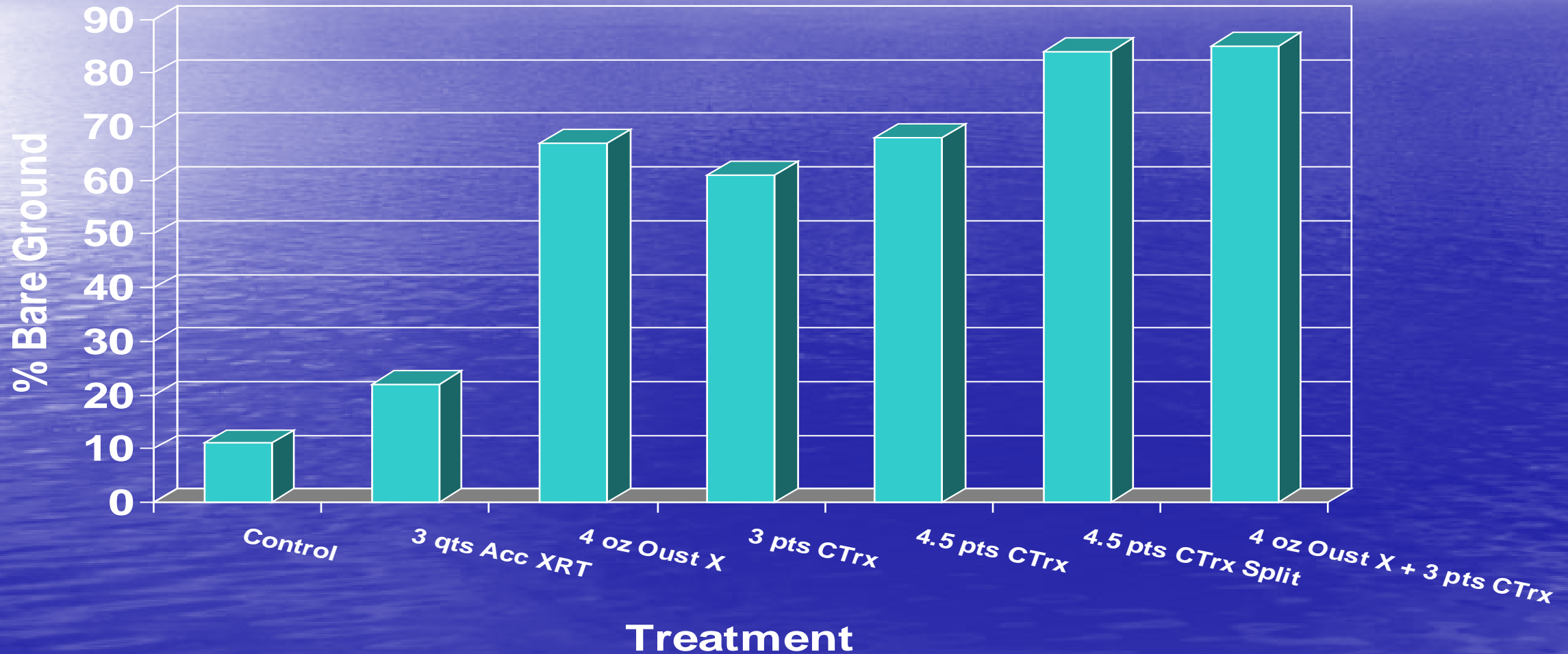
- Split treatment of 4.5 pts Cleantraxx per acre
- Fall and Spring applications 2.25 pts each



4.5 pts/ac Cleantraxx Split 2.25 pts/ac in the Fall Followed by a Second Application of 2.25 pts in Spring



Percent Bare Ground for Fall/Spring Split Cleantraxx Treatments vs Various Fall Site Preparation Treatments 8 MAT



Fall/Spring Split Application 2.25pts Each Timing



Conclusions

- Pre-Emergent Herbicide
- Needs Help if herbaceous vegetation or woody brush has germinated
- Normally spring timings are better than fall, unless a split treatment.....????
- Need to be aware of what vegetation is on your site prior to using Cleantraxx
- Conifer tolerance is NOT an issue, period.
- Cleantraxx is NOT Velpar.....



Science For A Better Life



Improving Vegetation Management Efficiency and Enhancing Tree Vigor with Esplanade[®] F

Harry Quicke and Kent Pittard, Bayer

Site 1. Wallowa Oregon

Esplanade F applied pre-plant to larch and Douglas-fir

- Previous unit a dense natural stand with DF, WF, spruce, larch
 - Very little in understory
- Pre-plant treatment
 - Sprayed May 26, 2017
 - Waving wand
 - Esplanade F (5 oz) + Roundup Pro Conc (2 qt)
- Planting
 - Two days after site prep
- Pictures June 28







Esplanade® F

Pre-emergence Control of Broadleaf and Grass Weeds



Broadleaf

Grass



Untreated

Esplanade F

Untreated

Esplanade F





Site 2. Northeast of Redding, CA
Cheatgrass infestation after fire

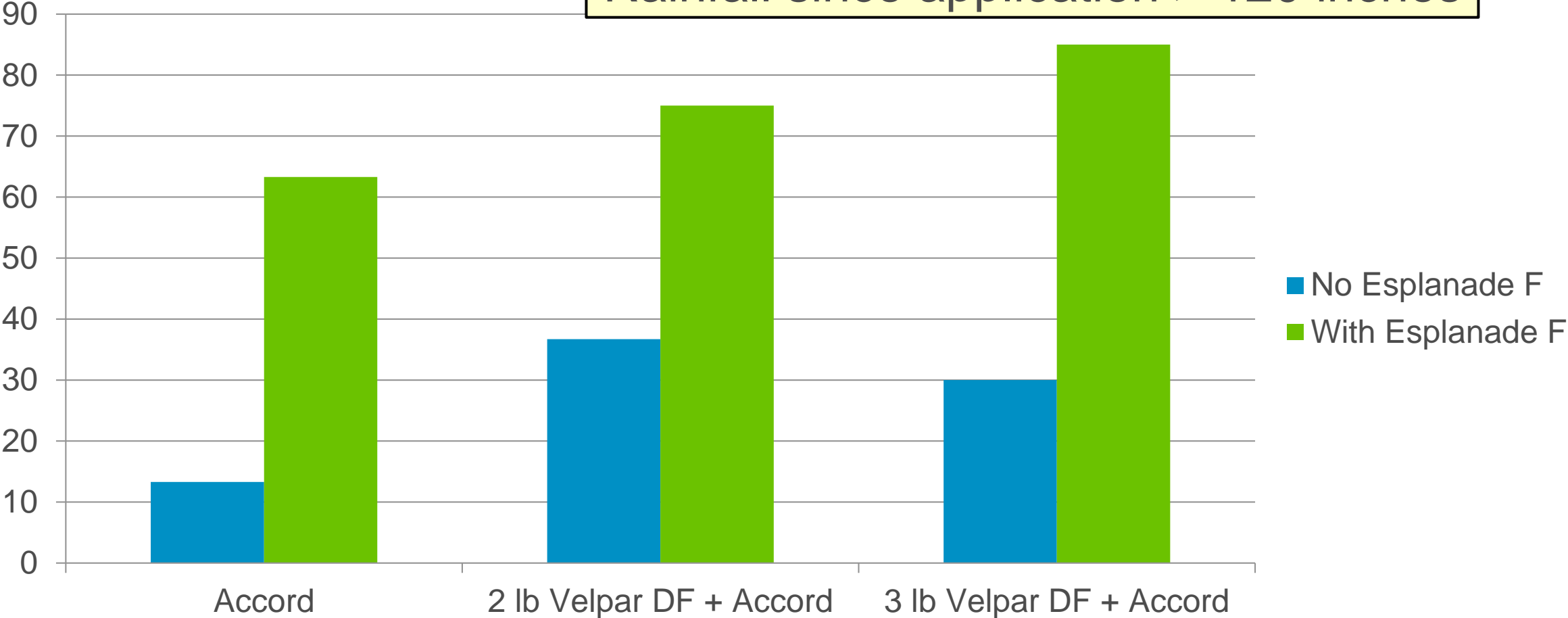
- Cheatgrass is an annual invasive grass
- Germinates in fall, grows roots in winter, rapid top growth in late winter/spring
- Steals moisture and nutrients before planted trees start active growth
- Provides forage for cattle and wildlife for only approximately 3 weeks

Site 2: Esplanade® F for annual grass control

Application Oct 2016, % Bareground August 2017

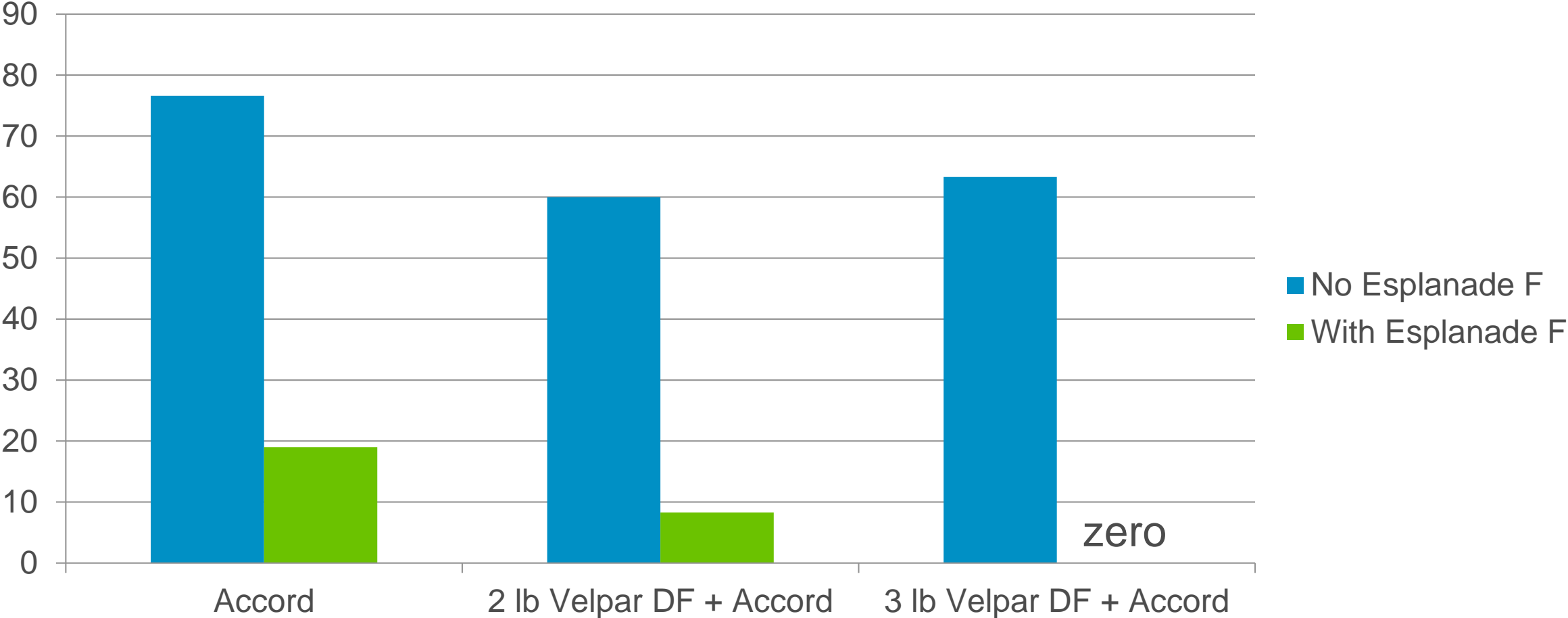


Rainfall since application > 120 inches



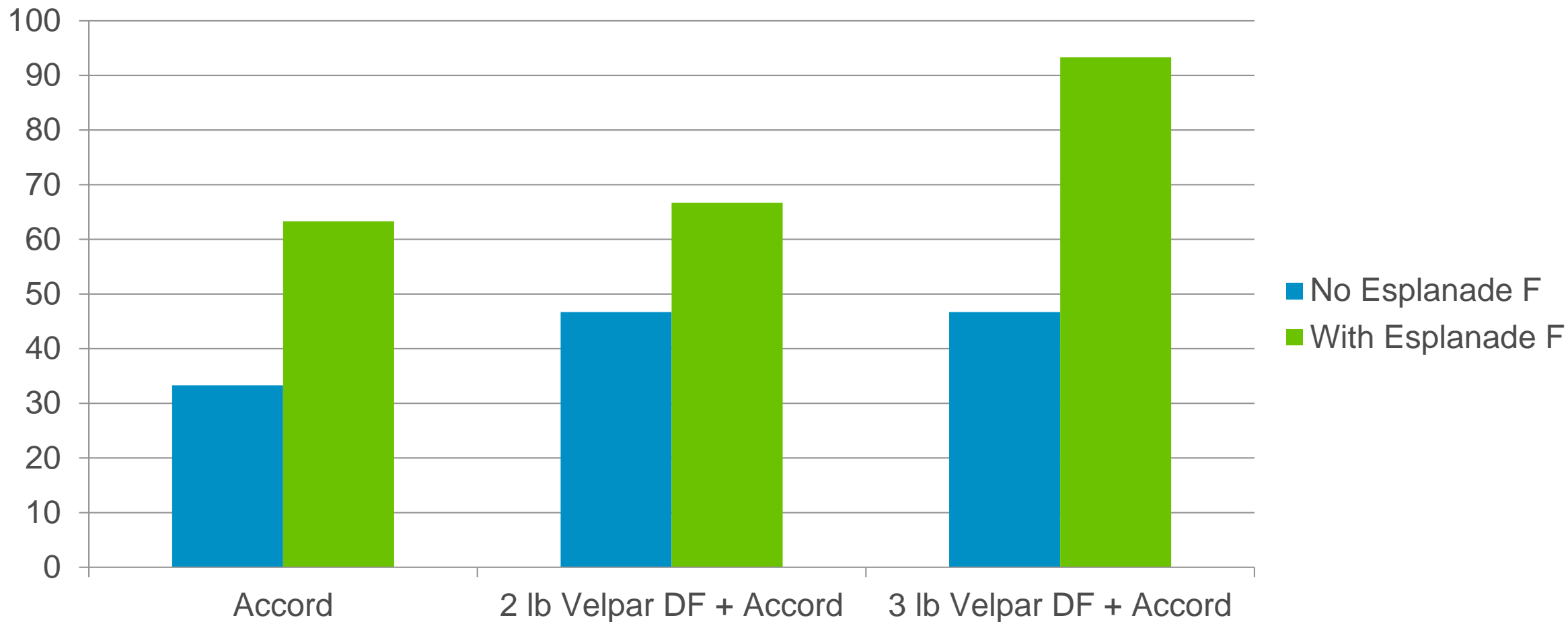
Site 2: Esplanade[®] F for annual grass control

Application Oct 2016, % Cheatgrass Cover August 2017





% Douglas-fir survival August 2017





Esplanade[®] F + Velpar[®] DF VU + Accord[®] XRT II



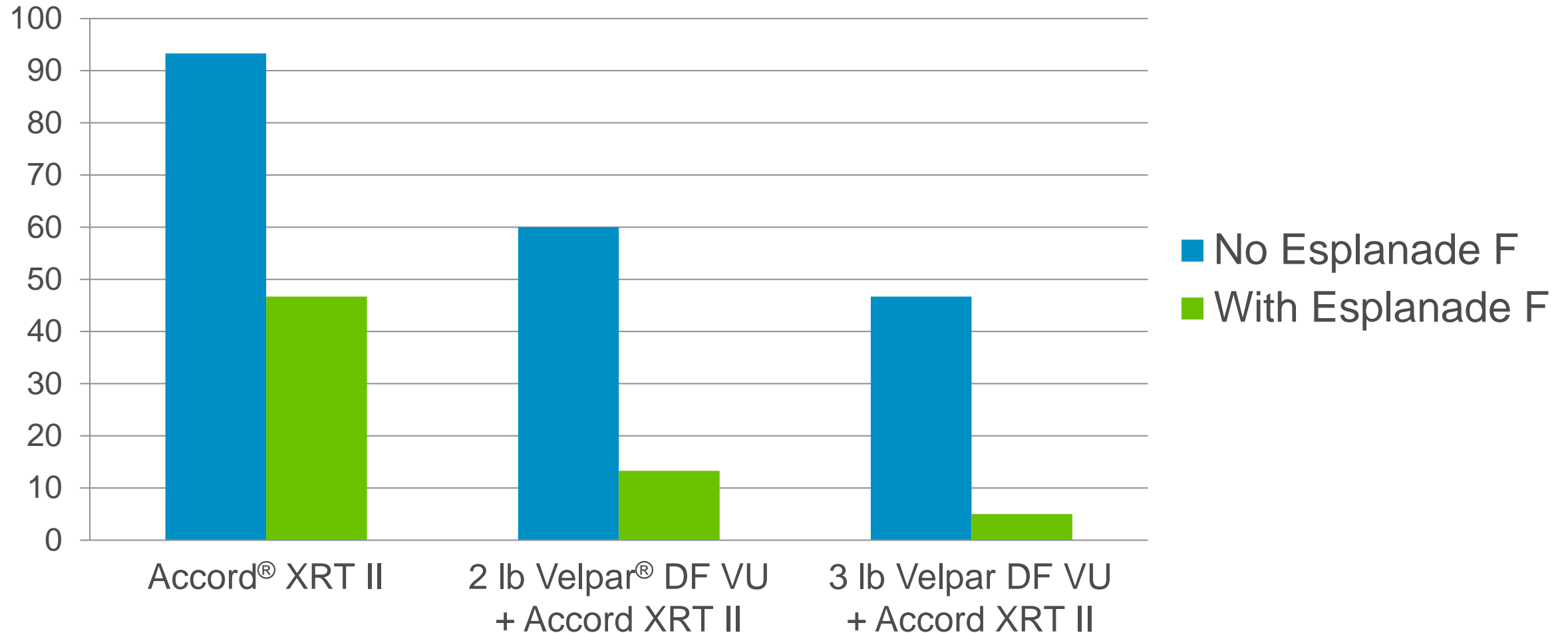
Site 3. Sierra Nevada Mountains North of Yosemite
Cheatgrass infestation after Rim fire



- Heavy thatch layer = major threat of high intensity wildfire
- If cheatgrass germination is stopped, thatch layer is reduced after one year
- Only Esplanade[®] F can stop annual germination for multiple years

Site 3: Esplanade® F for annual grass control

Application Oct 2016, % Cheatgrass Cover July 2017

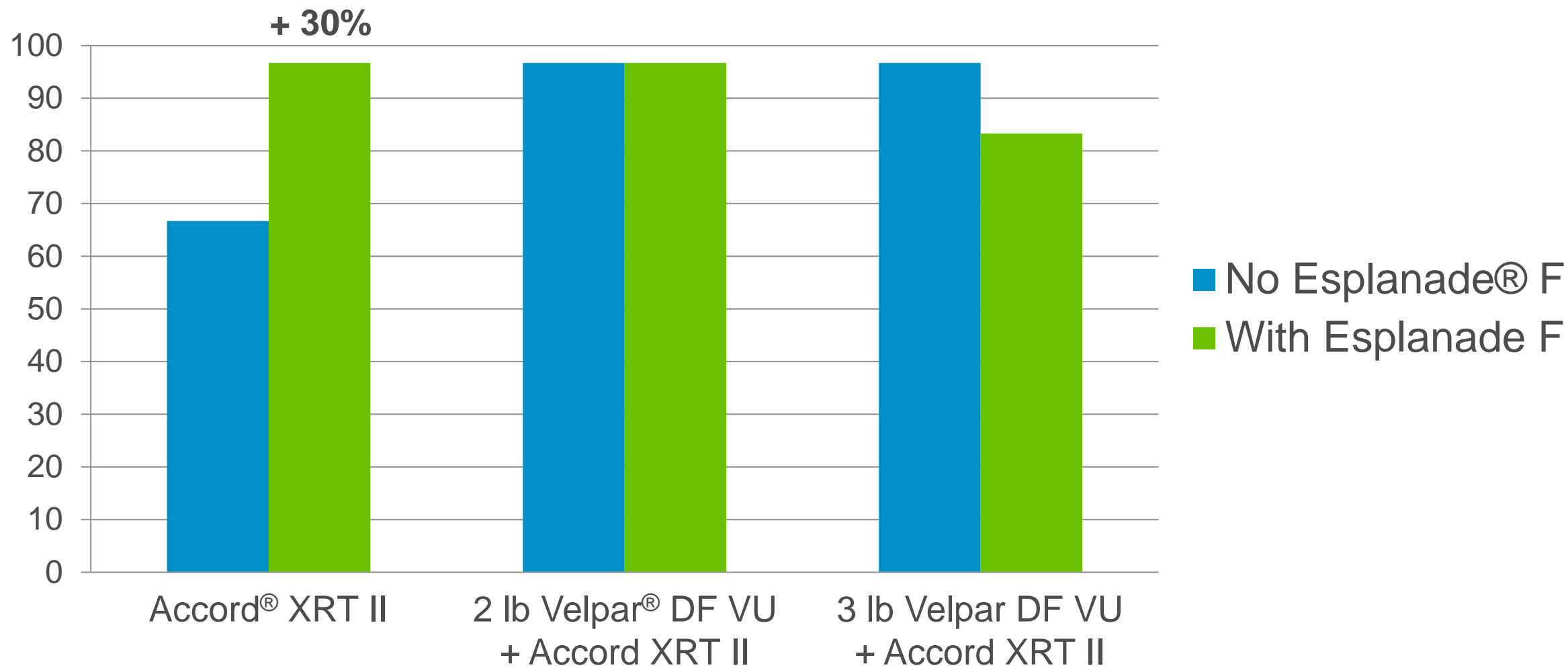




Rainfall from application through July 2017 assessment > 80 inches

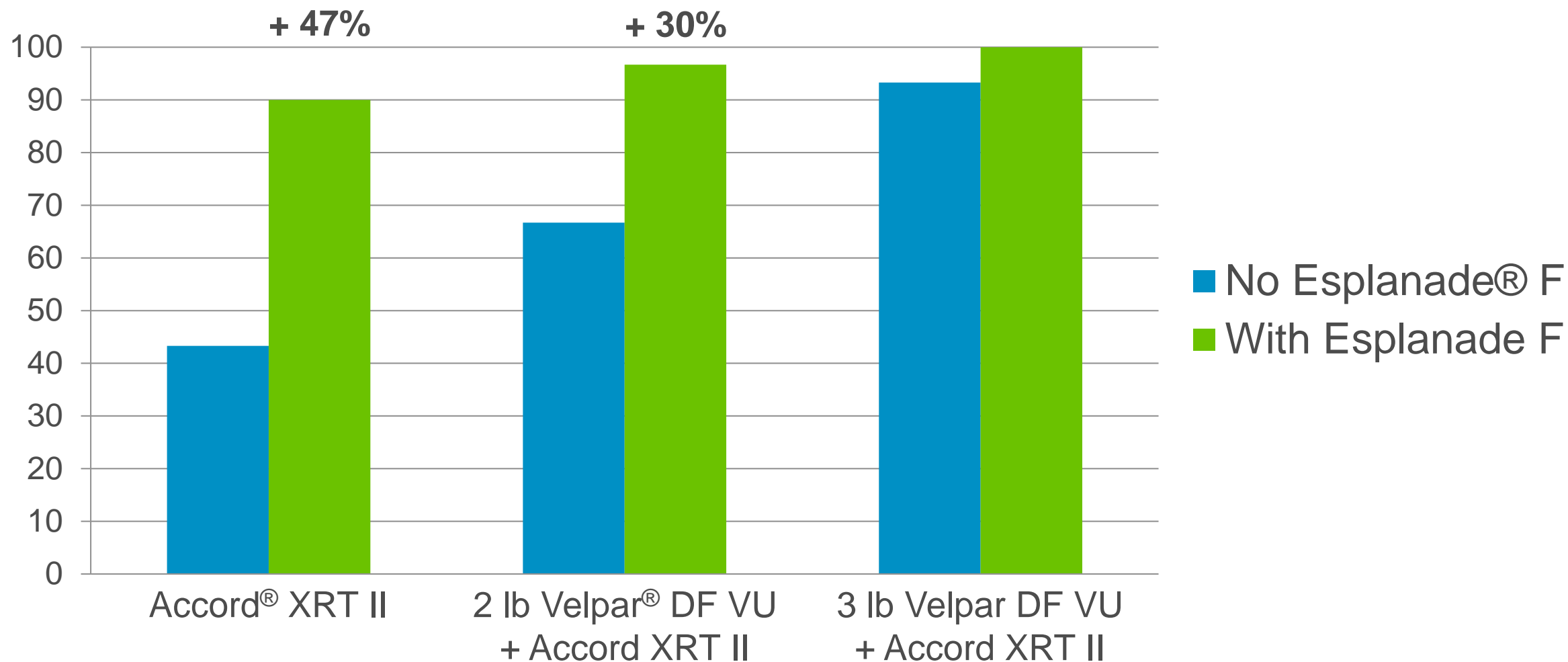


% Ponderosa pine survival July 2017

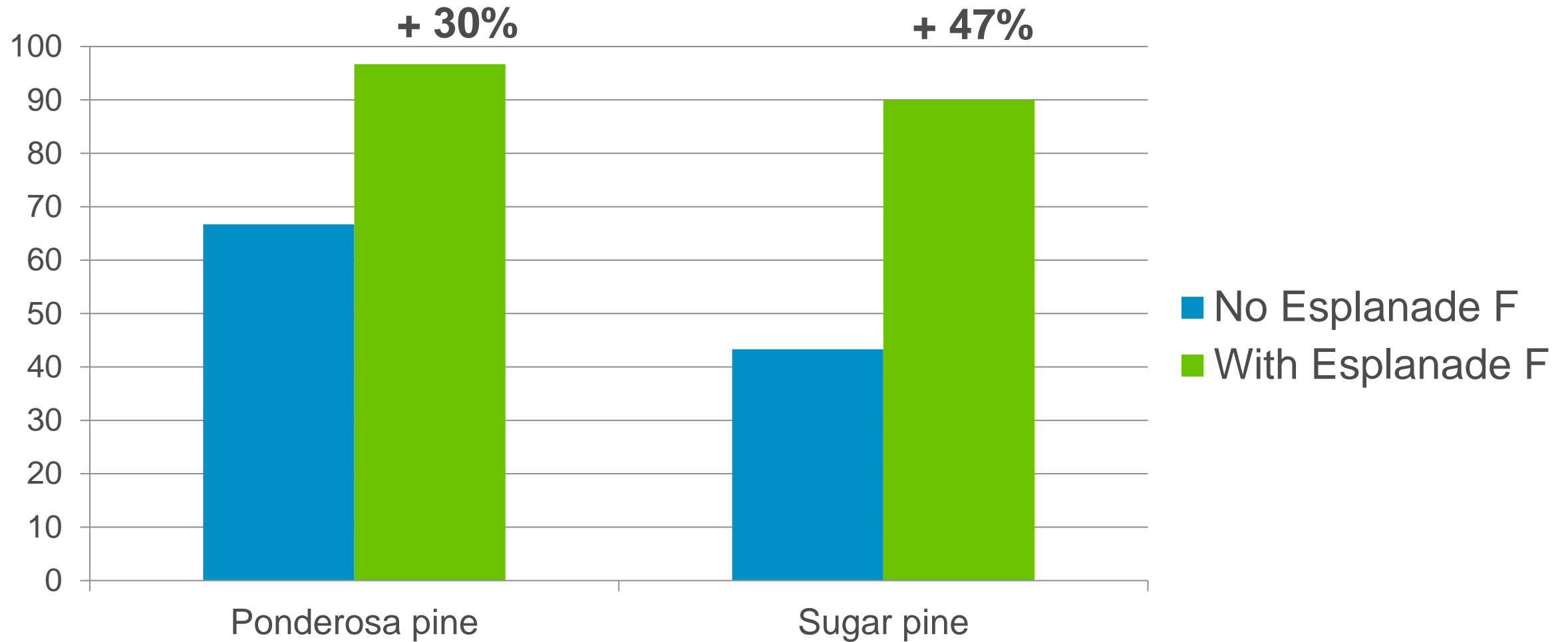




% Sugar pine survival July 2017



Survival increase from adding Esplanade[®] F to Accord (no Velpar[®])



Second year growth assessment due at end of 2018

A photograph of a field of young pine trees, likely a nursery or a field trial. The trees are small and green, scattered across a dry, brownish ground covered with dry grass and twigs. Several white markers are placed around the trees, some with numbers written on them. The background shows a dense field of tall, dry grass. The overall scene is arid and appears to be a natural or semi-natural environment.

Esplanade® F + Velpar® DF VU + Accord® XRT II

Site 4: California coast range near Orick, CA

Main Species - Perennial grass, sheep sorrel, false dandelion

Douglas-fir planted March 8, 2016

Herbicides applied 9 days after planting

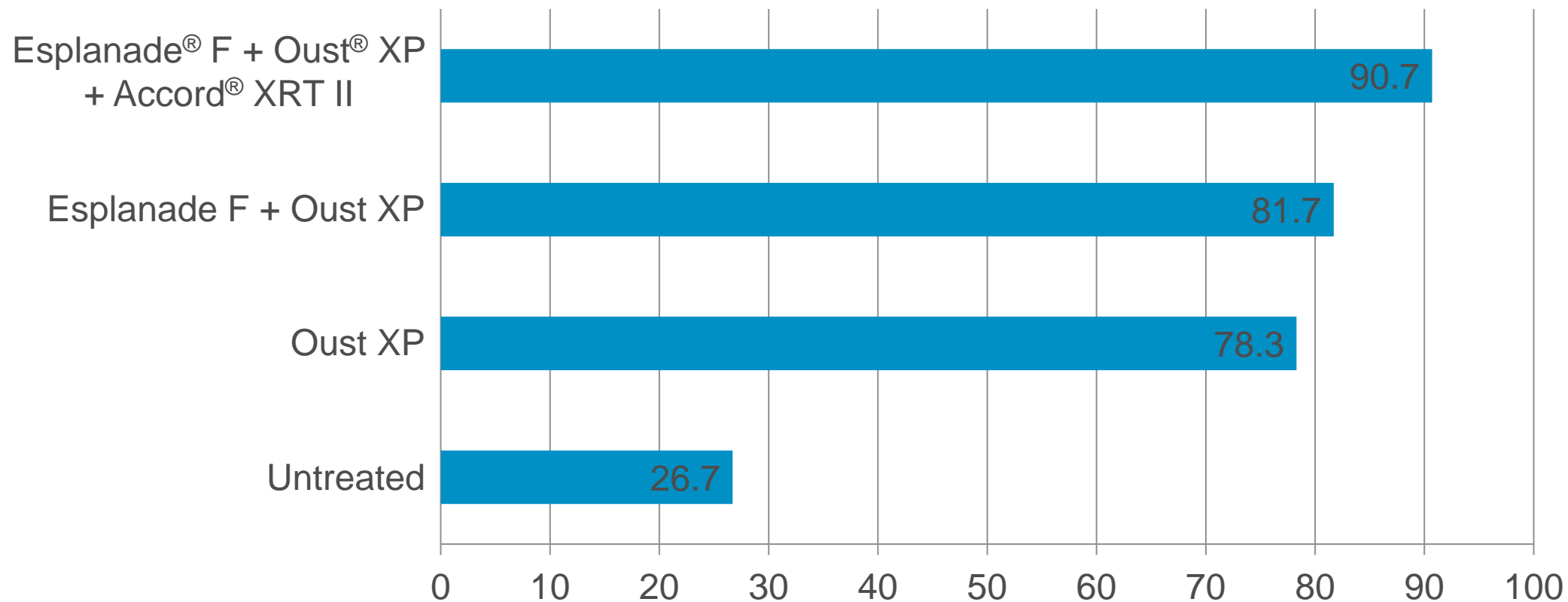
Sprayed over the top of trees (treatment with Accord was directed)





All treatments provided good vegetation control in year 1

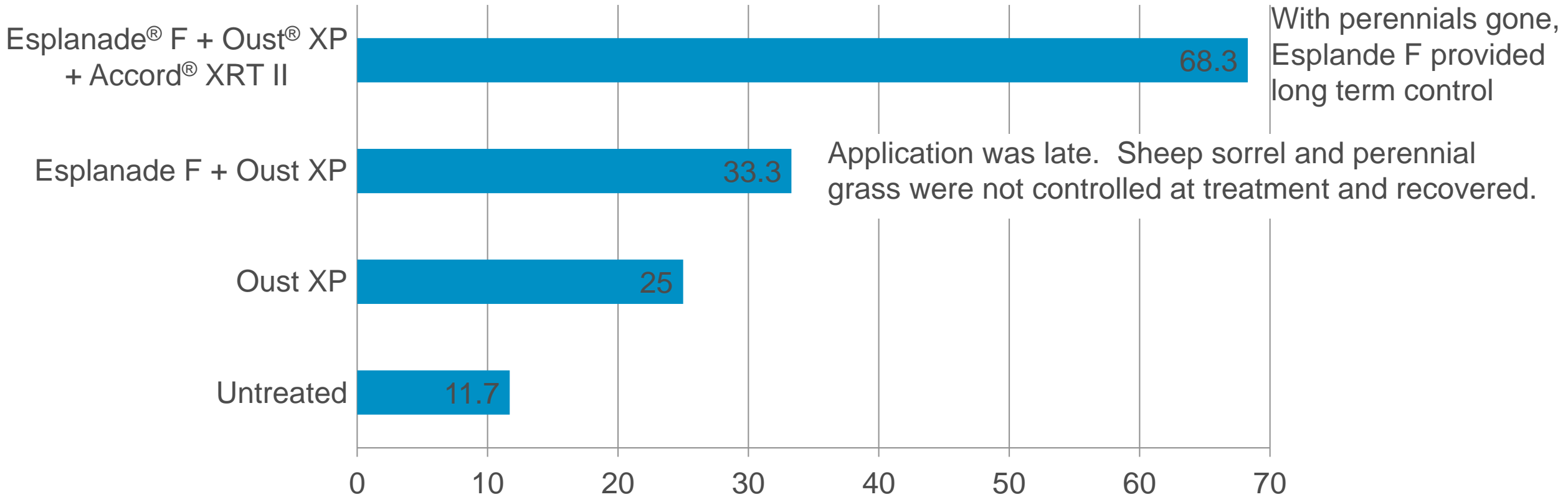
% Bareground - Year 1





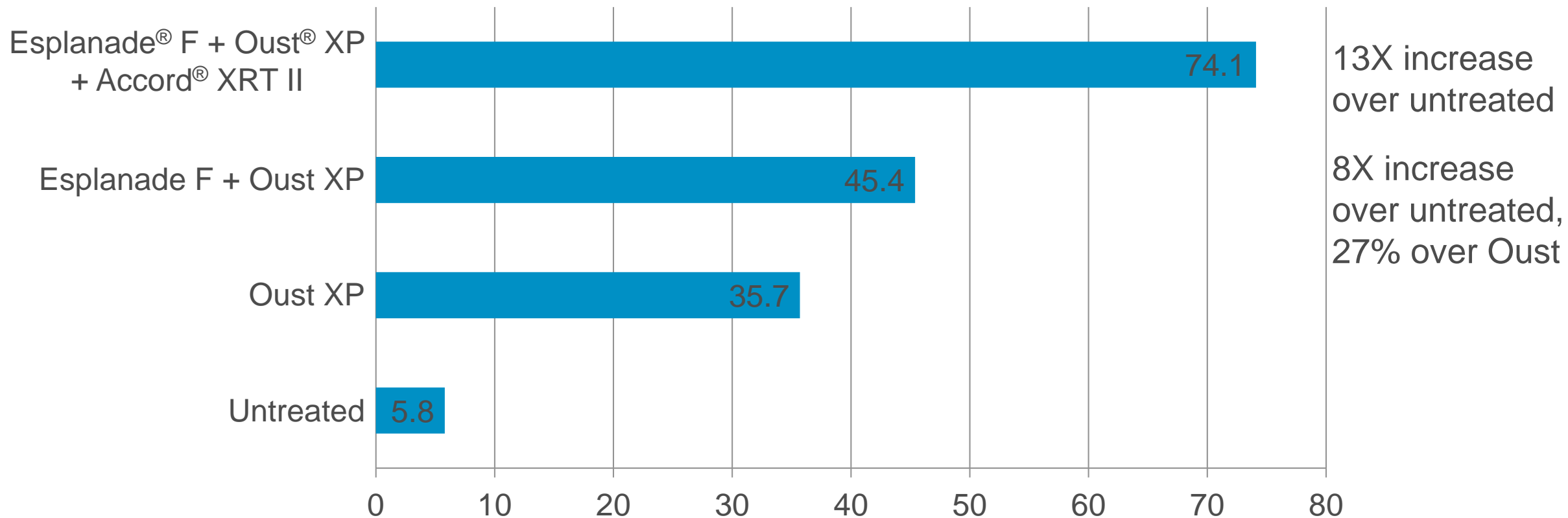
Perennials must be controlled at treatment

% Bareground - Year 2





Douglas-fir Stem Volume Index (cm³) - Year 2



April – 3 Weeks After Treatment



Untreated



Esplanade[®] F + Oust[®] XP



**Esplanade F + Oust XP
+ Accord[®] XRT II**

July – First Year After Treatment



Untreated



Esplanade[®] F + Oust[®] XP



Esplanade F + Oust XP
+ Accord[®] XRT II

September, second year after treatment



Untreated



Esplanade[®] F (7 oz)
Oust[®] XP (1.5 oz)



Esplanade F (7 oz)
Oust XP (1.5 oz)
Accord[®] XRT II (1 qt)

Site 5: California Coast Range near Blue Lake, CA

Main species - Senecio, perennial grass, sheep sorrel, false dandelion

Coast redwood planted March 4, 2016

Herbicides applied 11 days after planting

Sprayed over the top of trees (treatment with Accord was directed)



At establishment

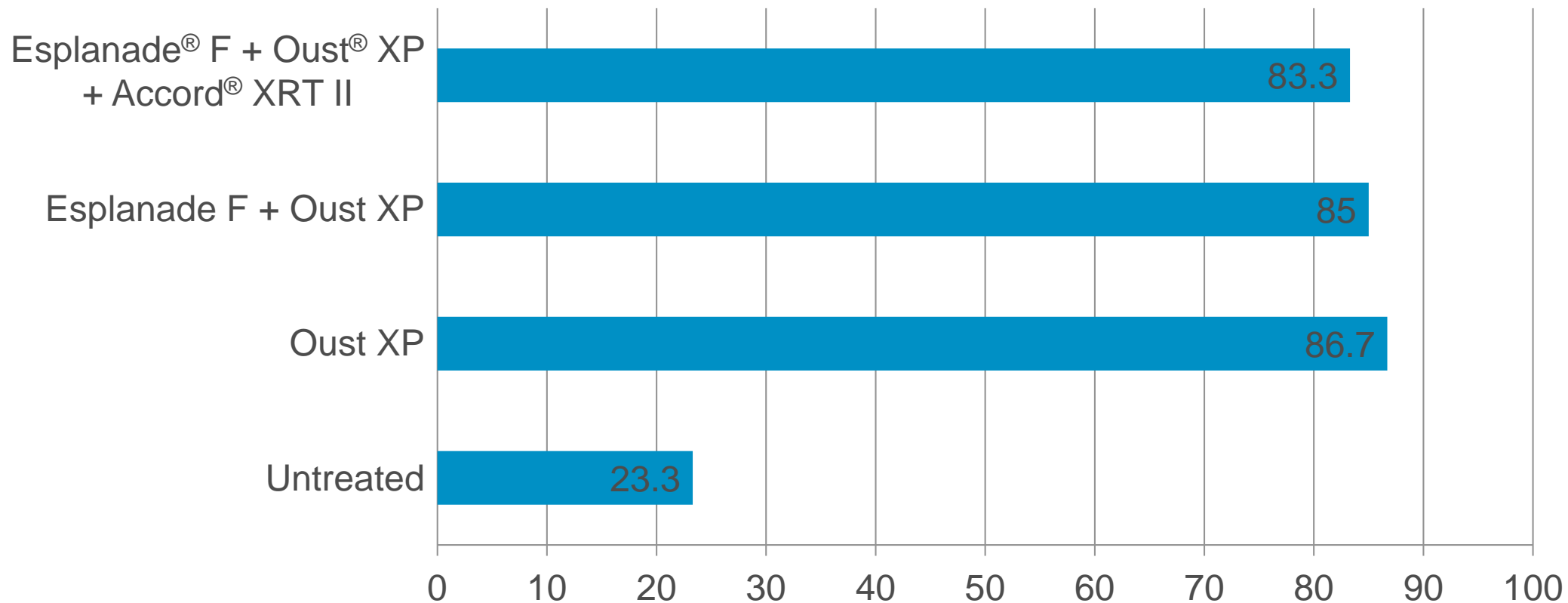


Second year after establishment



All treatments provided good vegetation control in year 1

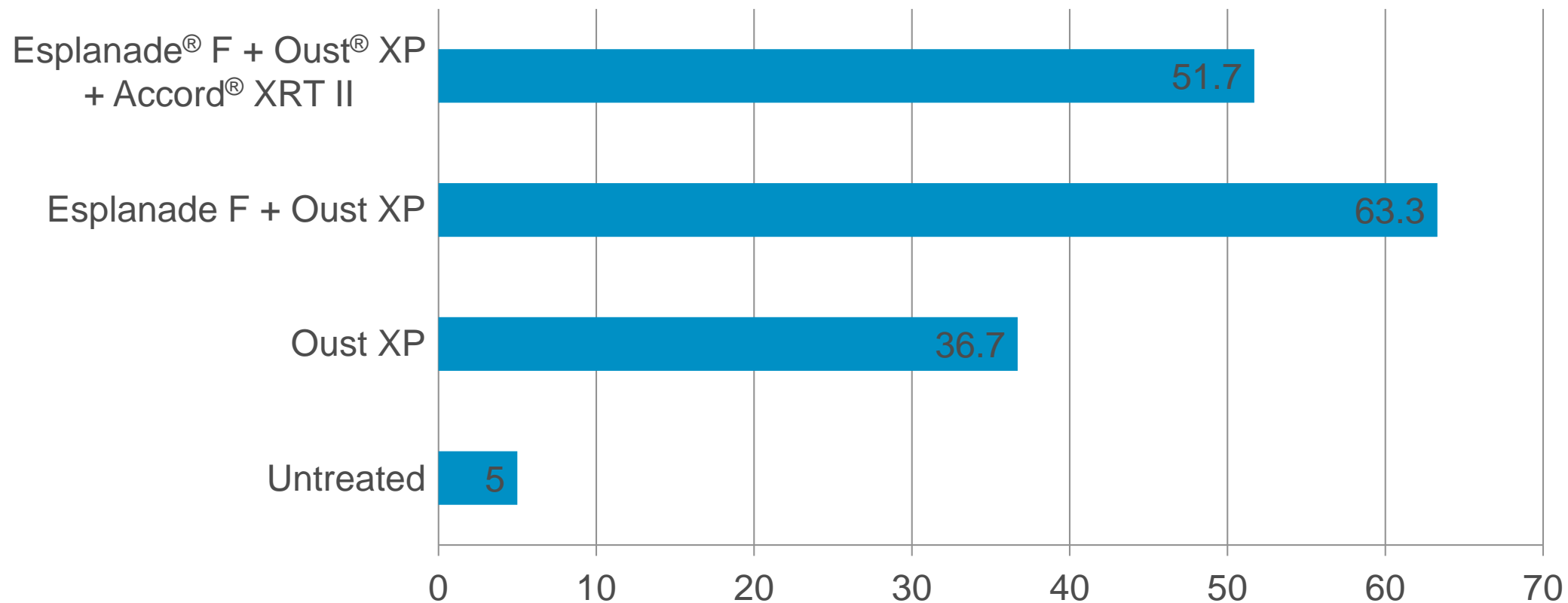
% Bareground - Year 1





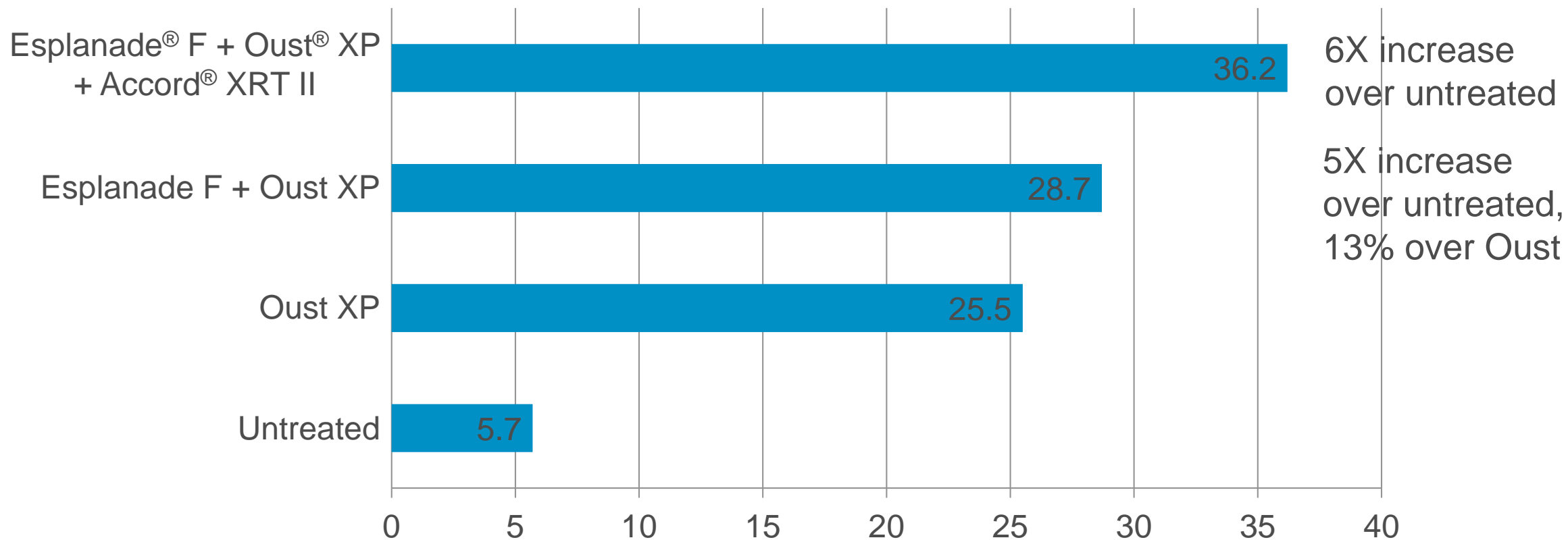
Esplanade[®] F provided long term residual control

% Bareground - Year 2





Redwood Stem Volume Index (cm³) - Year 2



Means adjusted by covariance analysis for differences in initial stem volume index

Untreated vegetation shifted from broadleaf domination to perennial grass



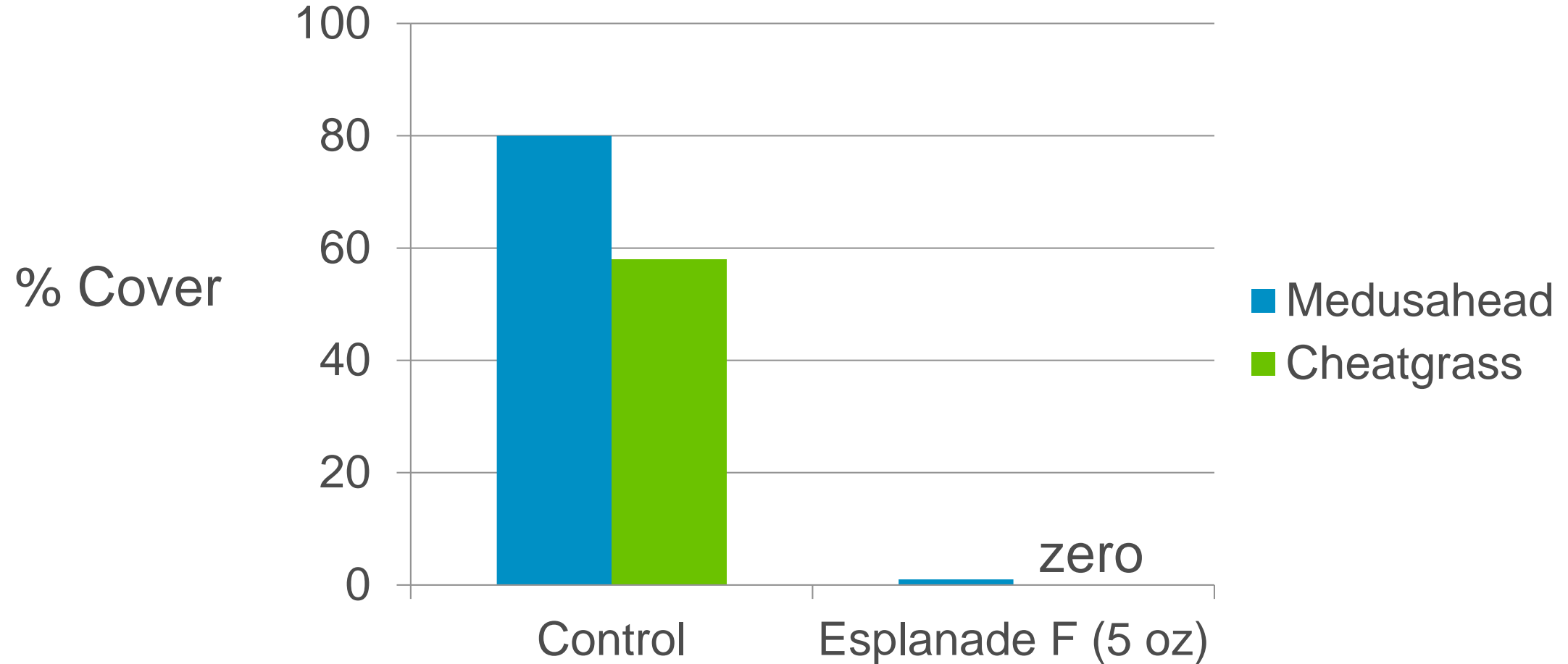
First year after treatment



Second year after treatment

Esplanade[®] F prevented germination of perennial grass

Medusahead and cheatgrass control 12 months after treatment, Sprayed 3/20/08

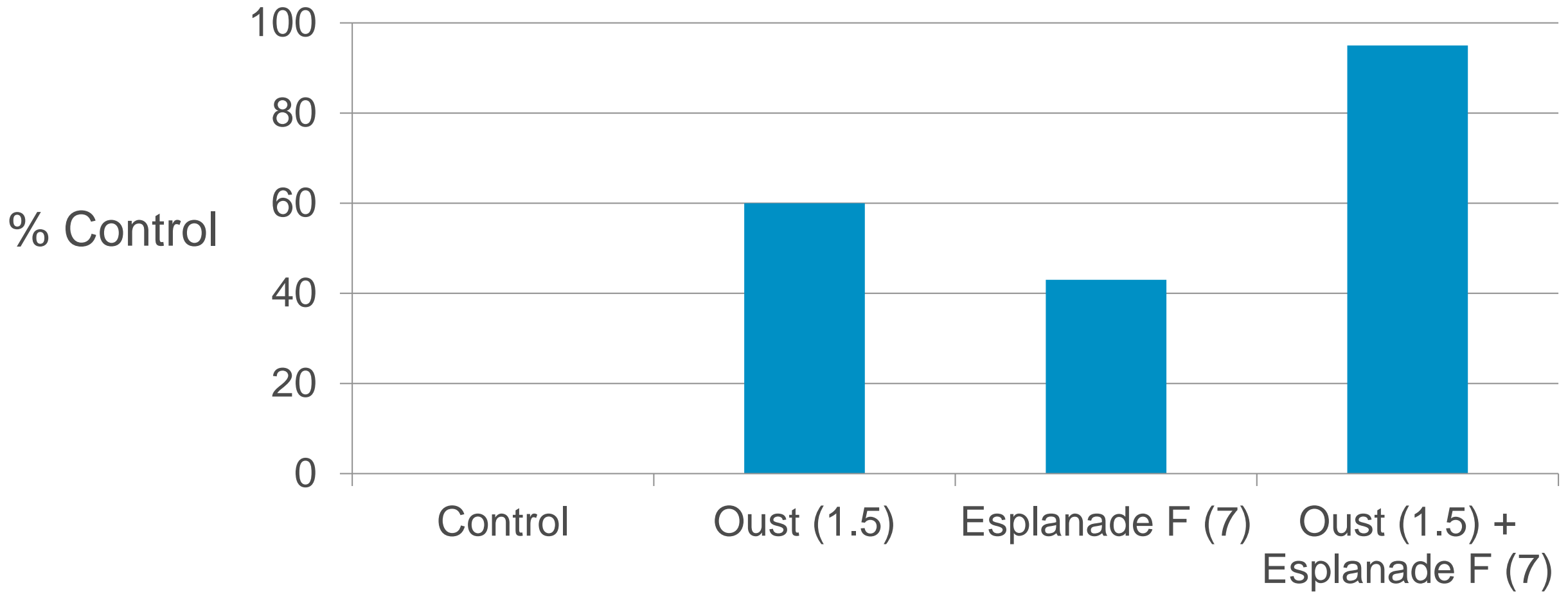


Medusahead control

12 months after treatment, Sprayed 3/20/08

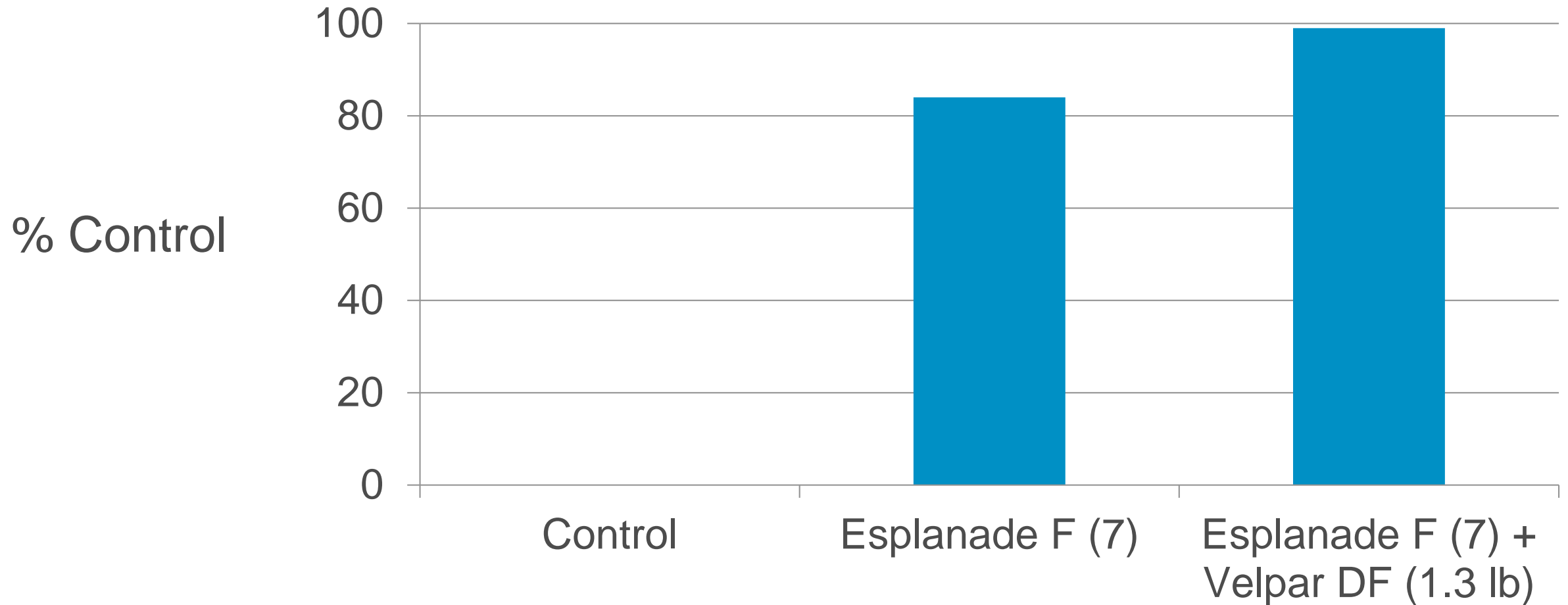


Vernal grass % Control 18 months after treatment

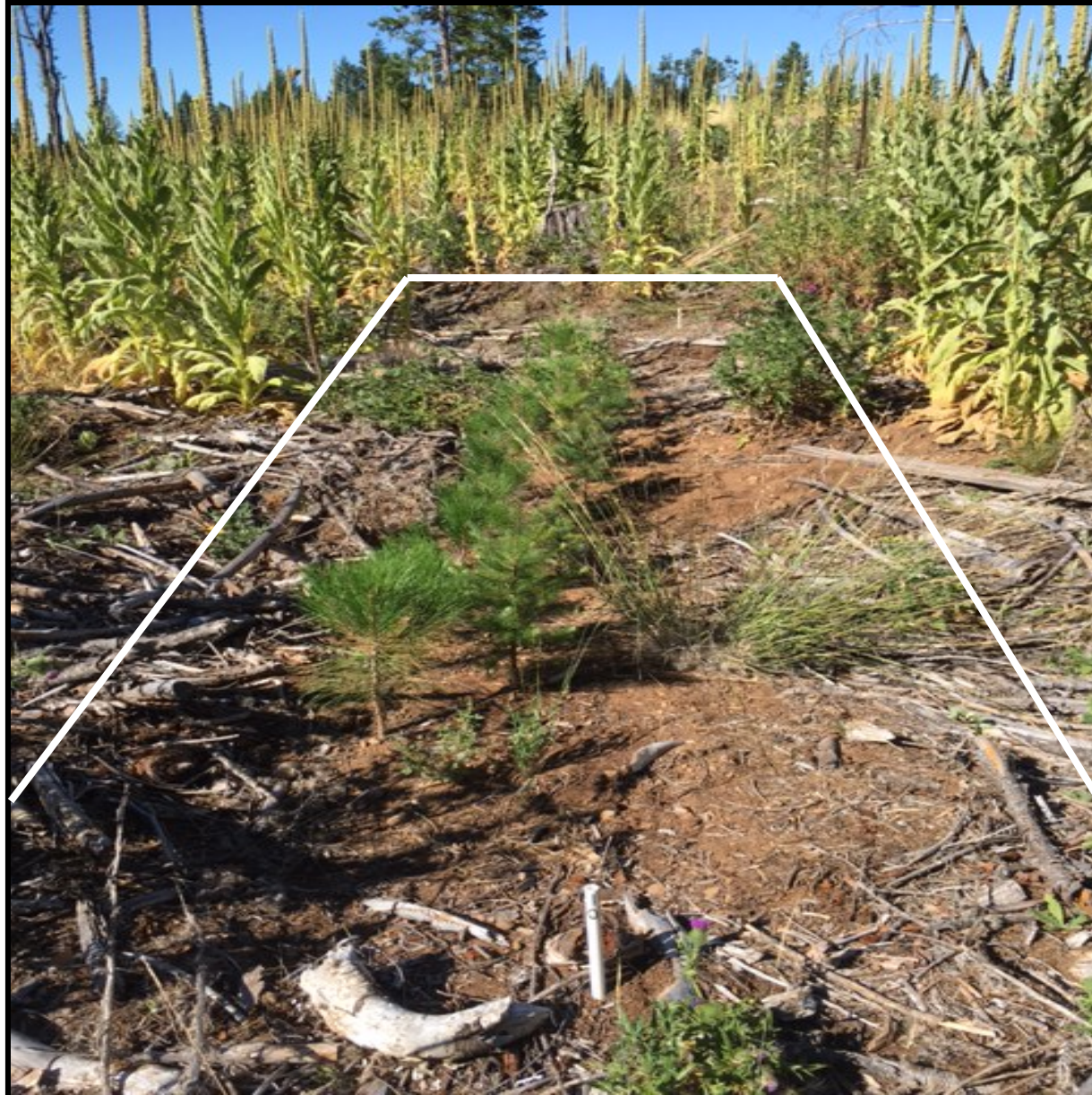


Common Mullein

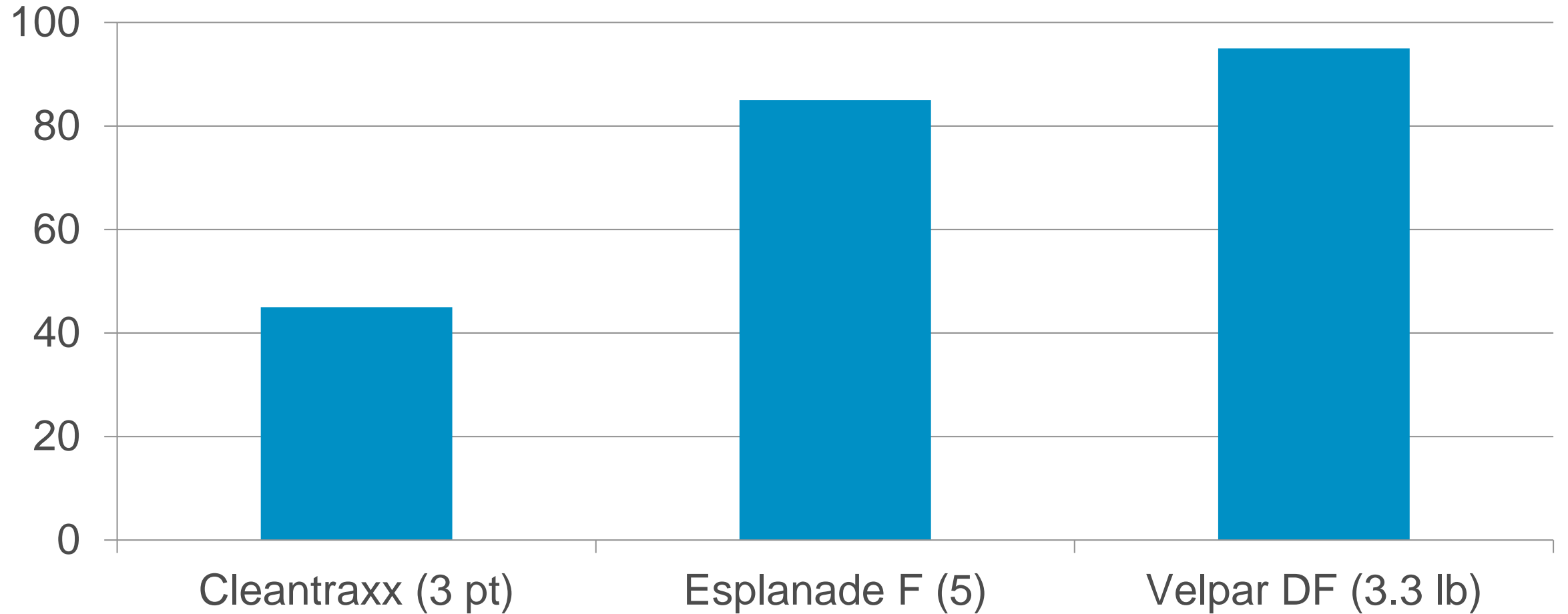
17 months after treatment, applied 4/20/2015



Common Mullein Control with 7 oz Esplanade F 17 months after treatment, applied 4/20/2015



% Bareground East side California, 10 months after treatment



Esplanade F (5 oz) – 2 Years after treatment – East Side Cascades



Esplanade[®] F - advantages



- Extended residual weed control
 - Can provide herbaceous control into the second year after treatment
- Very low use rate
- Low volatility and low photodegradation
 - Waits on soil surface until activated by precipitation

Esplanade® F - advantages



- New mode of action for conifer production areas - resistance management tool
- Not on FSC list of Highly Hazardous Pesticides
- Minimal Personal Protective Equipment
 - Long sleeved shirt
 - Long pants
 - Shoes plus socks
 - Chemical resistant gloves



Esplanade[®] F - advantages



- Excellent control of annual grasses
 - Cheatgrass
 - Medushead
 - Ventenata
- Substantial pre-emergence control of common mullein
- Root growth of conifers was examined
 - Zero negative effects

Esplanade[®] F – Current registrations



- Oregon
- Washington
- Idaho
- Montana

Site Preparation with Esplanade® F



- Conifers that can be planted:
 - Ponderosa pine
 - Coast redwood
 - Douglas-fir
 - Western larch
- Other tree species may be planted if user has prior experience

Herbaceous Weed Control with Esplanade[®] F



- Apply after transplanting
- Conifers that can be treated:
 - Ponderosa pine
 - Coast redwood
 - Douglas-fir
- May be applied on other species if user has prior experience
- Applications made over the top of white or red fir may result in severe injury



Oregon Coast Range

Entire unit treated with:
4 ozs Sulfomet™
+ 2 qts glyphosate

Above the yellow line:
**Added 5 oz
Esplanade® F**

Applied
• Sept 2016

Picture taken
• 11-July-2017

***90 – 100 inches of rain
following application***



Center of picture:
4 ozs Sulfomet™
+ 2 qts glyphosate
+ 5 ozs Esplanade® F

To the left and above
road:
4 ozs Sulfomet™
+ 2 qts glyphosate

Applied
• Sept 2016

Picture taken
• 11-July-2017

Oregon Coast Range

4 ozs Sulfomet™
+ 2 qts glyphosate
+ 5 ozs Esplanade® F



4 ozs Sulfomet™
+ 2 qts glyphosate



Mostly false dandelion
and senecio



Observations from 2016 operational applications

- Good conifer seedling tolerance, both in site prep and release treatments
 - Esplanade[®] F performed well under very high rainfall
 - Even in areas with near 100 inches of rain following application, treatment edges stayed intact and residual weed control was maintained
 - The most consistent weed control performance was noted on sites with less woody debris and/or duff layers
-



Observations from 2016 operational applications

- Residual control of grass species, false dandelion and other herbaceous weeds met operational objectives on most units
 - Results on woodland groundsel (senecio) were more erratic. Spray shadows from slash, heavy organic duff layers, and potentially mixing order issues are suspected causes in the variability seen.
-



Key learnings

- The 2016 limited launch of Esplanade[®] F showed that it can aid in cost savings and improve operational flexibility for western timber managers
- In most cases, results will be optimized if Esplanade F is paired with another residual herbicide partner in the site prep tank mix (Oust[®] Extra, Oust[®] XP, Opensight[®])



Key learnings

- Since Esplanade[®] F tends to be relatively immobile once it reaches the soil surface, good coverage is very important
 - Higher carrier rates are beneficial (10 gpa by helicopter).
 - Apply at 7 oz/A in areas with heavy woody slash
 - Help overcome interception
 - Efficacy reduced on sites with a thick organic duff layer or high soil organic matter percent
-

Mixing

- Esplanade[®] F is a suspension concentrate formulation with low water solubility. It mixes well but close attention should be paid to mixing order to ensure a uniform spray mixture:
 - Add half the water to the spray tank
 - Add dry flowable products such as Oust[®] Extra and mix thoroughly
 - Add Esplanade[®] F and mix thoroughly
 - Add soluble liquids such as glyphosate and mix thoroughly (note that some glyphosate formulations are known to be incompatible with Esplanade[®] F if added to the tank before the Esplanade[®])
 - Add surfactants last
 - Add remaining water and mix thoroughly
 - If the mix sits for more than a few hours, agitate thoroughly before spraying



Mixing

- 1 Oust XP, Outs Extra, Velpar DF
- 2 Esplanade F, Velpar L
- 3 Chopper, Arsenal, glyphosate
- 4 Surfactants



Science For A Better Life



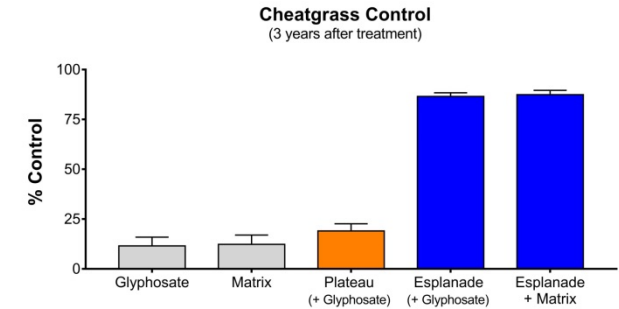
<http://www.bayervm.com>

Esplanade[®] 200 SC Benefits

A new herbicide for natural area restoration



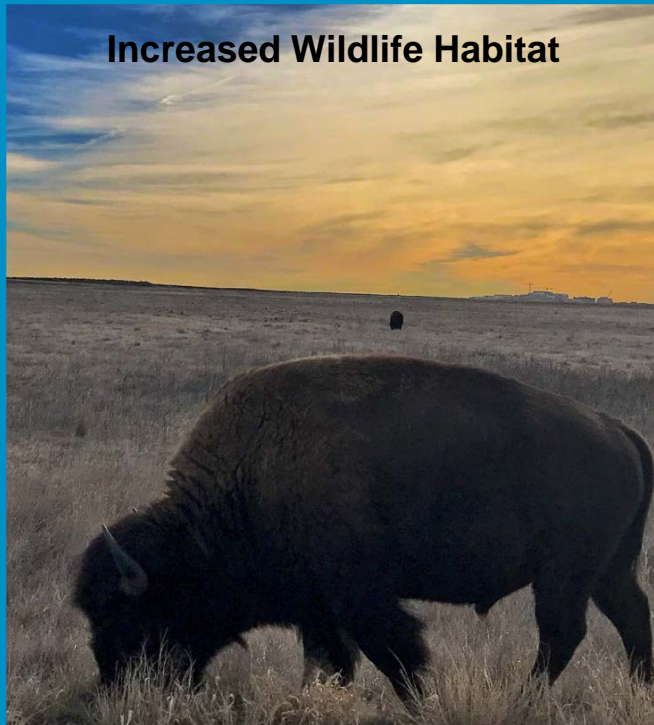
- Provides long-term control of invasive winter annual grasses including cheatgrass, ventenata, medusahead, red brome, feral rye
- 3+ years control



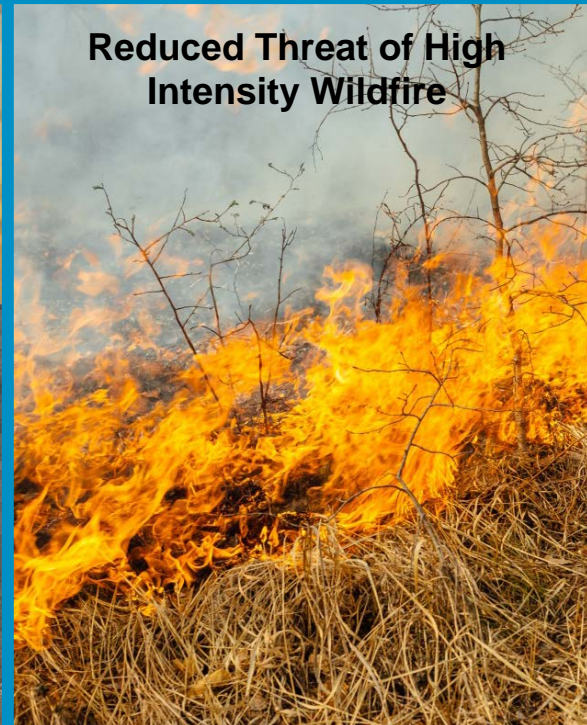
Increased Pollinator Habitat



Increased Wildlife Habitat



Reduced Threat of High Intensity Wildfire



Increased Diversity





Always read and follow label directions

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Accord and Opensight are registered trademarks of DOW

Roundup is a registered trademark of Monsanto

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