

Using Selective Herbicides to Control Invasive Annual Grasses

(while preserving native diversity)



Why focus on invasive grasses?



How to Use Grass Specifics

- Options: Fusilade II, Fusilade DX, Envoy Plus, Others
- Special use permit for Fusilade DX
- Application through backpack sprayer, skid sprayer, boom, aerial??



Fusilade DX – Directions for Use

- Mix at .75 oz/gallon
- Add nonionic surfactant at 0.25-0.5% v/v
- Add dye to taste
- Wear apron when mixing



Fusilade DX - Application

- Apply prior to start of seed set
- Optimal timing window...
- Effective against most* annual grasses
- Good for use on *Schismus* spp., annual *Bromus* spp., *Avena* sp., *Hordeum* spp., etc.



**Vulpia myuros* not {really} controlled by Fusilade or Envoy Plus

Fusilade DX – but wait, there's more!

- Fusilade DX also provides effective control of *Erodium* spp.



*Envoy Plus will not provide this benefit

Grass Reduction Trials



Goals

1. To confirm previous research that suggests that annual grasses of *Bromus* can be controlled over a two year period.
2. To determine potential differences in effectiveness between two different herbicides on grass cover and determine pros and cons of each.

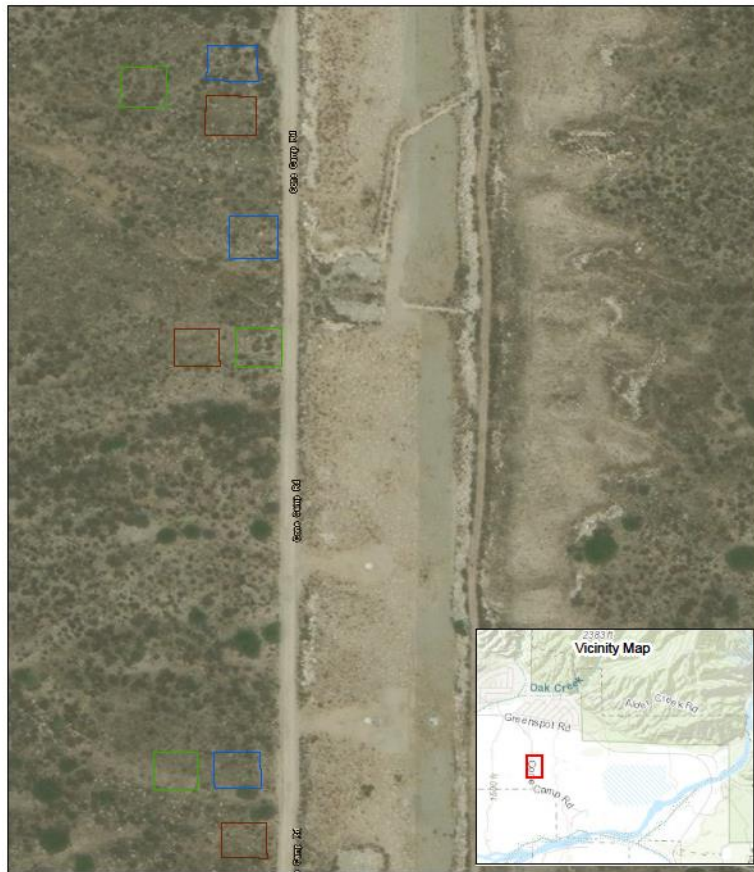
Summary of Methods

- Established Plots in 2017
- Recorded Percent Cover Estimates Baseline (2017), 2018, 2019
- Herbicide Treatments took place in 2017, 2018. Only a single treatment was applied at the beginning of grass flower stage.




Herbicides

- Aquamaster/Roundup
 - Active ingredient: Glyphosate
 - Broad spectrum herbicide
 - Applied at 2% in water
- Fusilade II/DX
 - Active ingredient: Fluazifop-P-butyl
 - Selective herbicide – controls grasses and select broadleaves
 - Applied at 0.68% in water

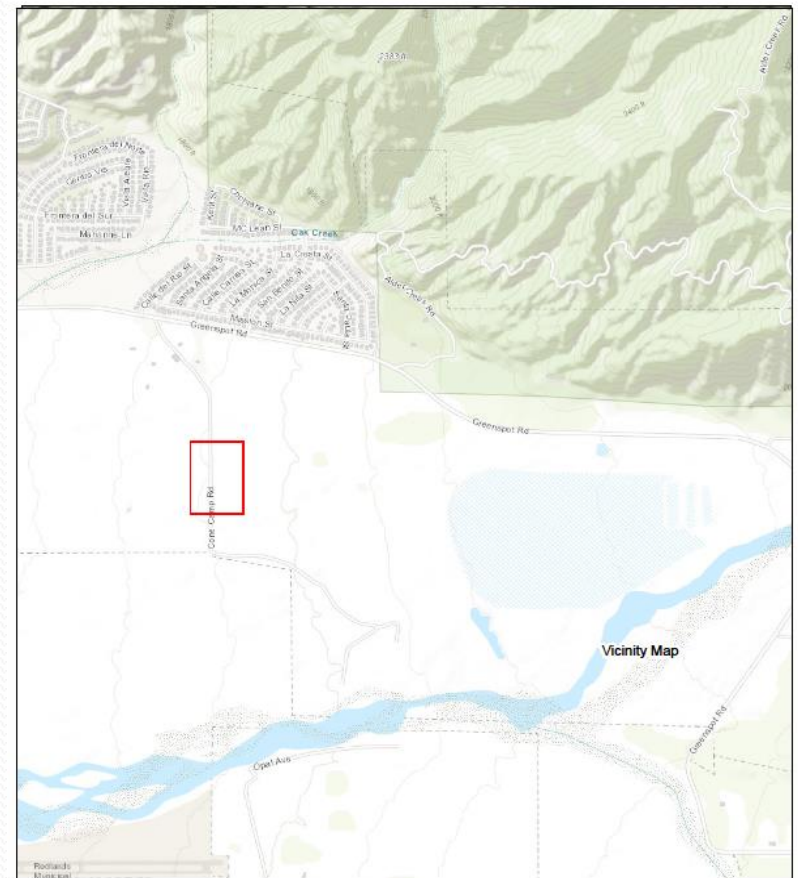
Experiment Area






SBVWCD Herbicide Grass Treatment Plots

	Aquamaster
	Fusilade II
	Control

Source: NAD83 UTM Zone 11N
Imagery: NAIP 2012
Map produced by SBVWCD 2018
Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors



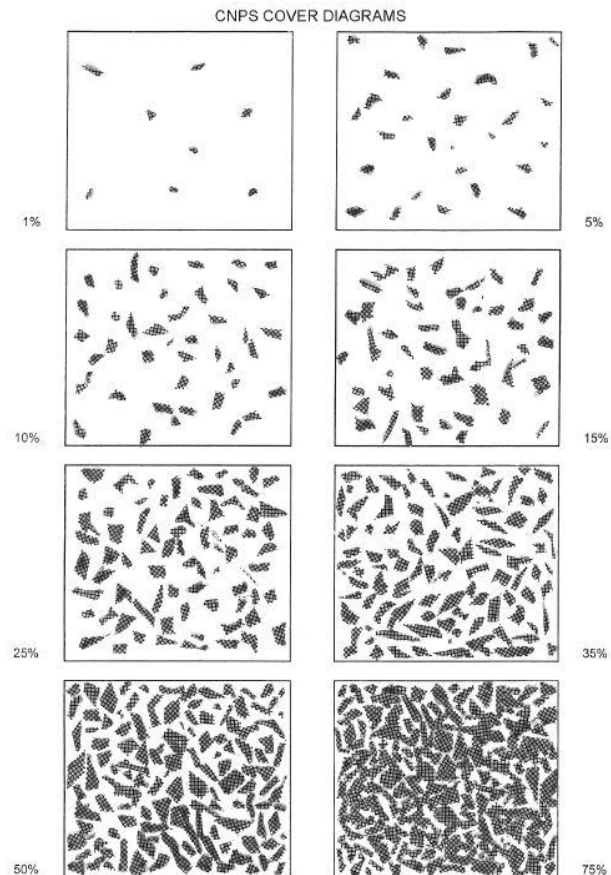
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Cover Estimation Method

Non-biased method of ocular estimation using California Native Plant Society Cover Charts as reference.



Application Method

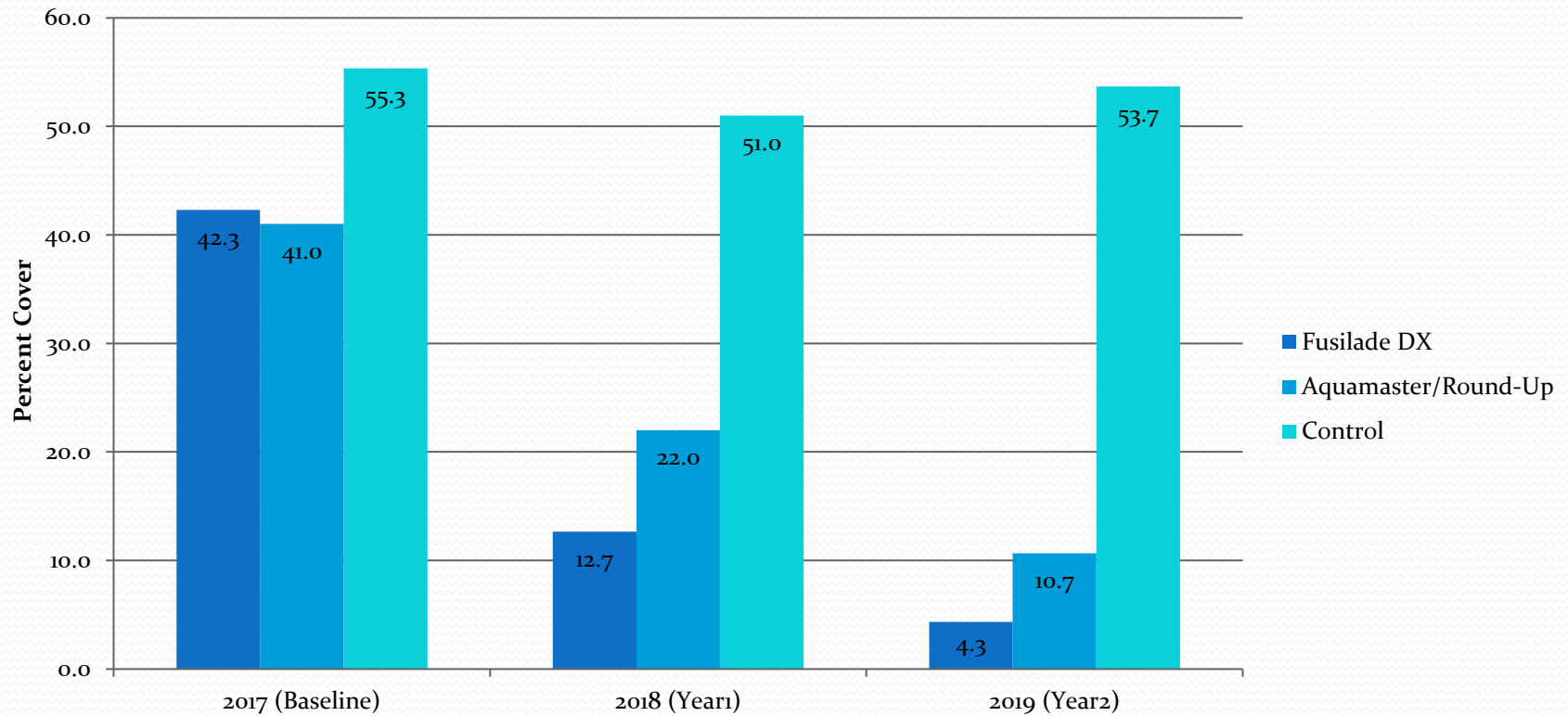


2017: Plot 5 and Plot 6



Results

Annual Grass Cover Across Time Using Herbicide Treatment



April 2019: Plot 6, Fusilade









Control Plot for Reference



Subsequent Toxicity Trials on Native Species

- 1x1 meter test quads for forbs
- GPS/flagged areas for large shrubs



Fusilade DX Non-target Tests

Species	Species common	Phenology at Treatment	4 Week Effect/Observation	Note
Annuals				
<i>Camissoniopsis bistorta</i>	california suncup	rosette/bolting	minimal to no effect	
<i>Phacelia distans</i>	common phacelia	leaf out/bolting	minimal to no effect	
<i>Erodium cicutarium</i> *	red stemmed filaree	rosette	dead/discolored, some with green	tried to produce flowers
<i>Bromus tectorum</i> *	cheat grass	cheatgrass	dead/discolored	no seed produced
<i>Encelia farinosa</i>	brittlebush	seedling	?	Control plants also wilted, frost?
<i>Eriogonum gracile</i>	slender buckwheat	rosette	no effect	
<i>Cyrtanthera</i>	popcorn flower	bolting	no effect	
<i>Schismus barbatus</i> *	mediterranean grass	in flower	dead/discolored	no seed produced
<i>Acmispon strigosus</i>	strigose lotus	leaf out	no effect	
<i>Crassula conata</i>	pygmy weed	leaf out	no effect	
<i>Pectocarya linearis</i>	sagebrush combseed	in fruit	minimal to no effect	
<i>Hypochaeris glabra</i> *	smooth cat's ear	rosette	minimal to no effect	
<i>Lepidium nitidum</i>	shining pepperweed	in fruit/flower	no effect	
<i>Senecio vulgaris</i>	common groundsel	leaf out/flower	no effect	
<i>Logfia filaginoides</i>	California cottonrose	flower bud	no effect	
<i>Chaenactis glabriucula</i> var. <i>glabriuscula</i>	common yellow pincushion	rosette	no effect	
<i>Brassica tournefortii</i>	saharan mustard	leaf out/ flower	no effect	
<i>Phacelia minor</i>	blue bells	leaf out/flower	minimal to no effect	
<i>Riccia trichocarpa</i>	hairy Crystalwort	liverwort	no effect	
<i>Bryophyta</i>	various mosses	leaf out/green	no effect	
Shrubs				
<i>Encelia farinosa</i>	brittlebush	mature shrub	no effect	
<i>Datura wrightii</i>	sacred datura	leafed out	?	Control plants also wilted, frost?
<i>Artemisia californica</i>	California sagebrush	mature shrub	no effect	
<i>Hesperoyucca whipplei</i>	chaparral yucca	mature rosette	no effect	
<i>Rhamnus crocea</i>	red berry	mature shrub	no effect	
<i>Ceanothus crassifolius</i>	hoary leaved ceanothus	mature shrub/in flower	no effect	
<i>Eriodictyon trichocalyx</i>	yerba santa	mature shrub	no effect	
<i>Cylindropuntia californica</i> var. <i>parkeri</i>	cholla	mature plant	no effect	
<i>Gutierrezia californica</i>	matchweed	mature shrub	no effect	
<i>Rhus ovata</i>	sugarbush	mature shrub	no effect	
<i>Acmispon glaber</i> var. <i>brevialatus</i>	deerweed	mature subshrub	no effect	
<i>Opuntia littoralis</i>	prickly pear	mature plant	no effect	
<i>Eriogonum fasciculatum</i> var. <i>foliolosum</i>	California buckwheat	mature plant	?	Control plants also wilted, frost?
<i>Miramirabilis laevis</i>	wishbone bush	mature/flower bud	no effect	

Summary and Next Steps

- The herbicide Fusilade DX is a very useful tool for controlling particular species of non-native annual grasses.
- Large scale broadcast applications of Fusilade would result in minimal damage to native flora.
- Need to determine various toxicities on native grasses likely to occur within the Santa Ana Wash; i.e., desert needle grass (*Stipa speciosa*) and salt and pepper grass (*Melica imperfecta*).

Aaron Echols

aechols@iercd.org



INLAND EMPIRE
RESOURCE
CONSERVATION DISTRICT

Thank you to: IERCD Natural Resources Team,
San Bernardino Valley Water Conservation
District

