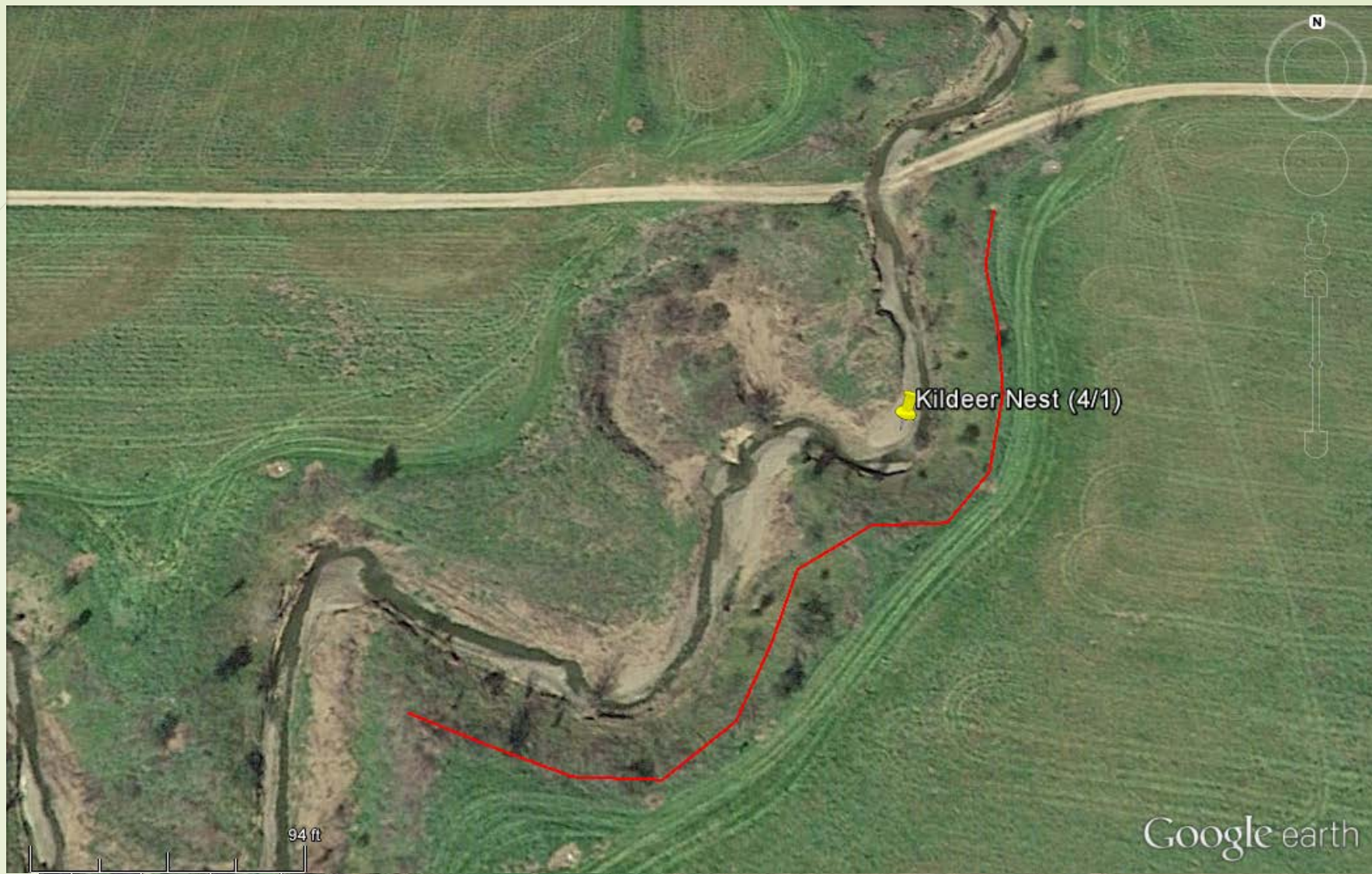


Creek Restoration & Native Grass Reestablishment

America Yamaguchi: SJSU Biology 198





Kildeer Nest (4/1)

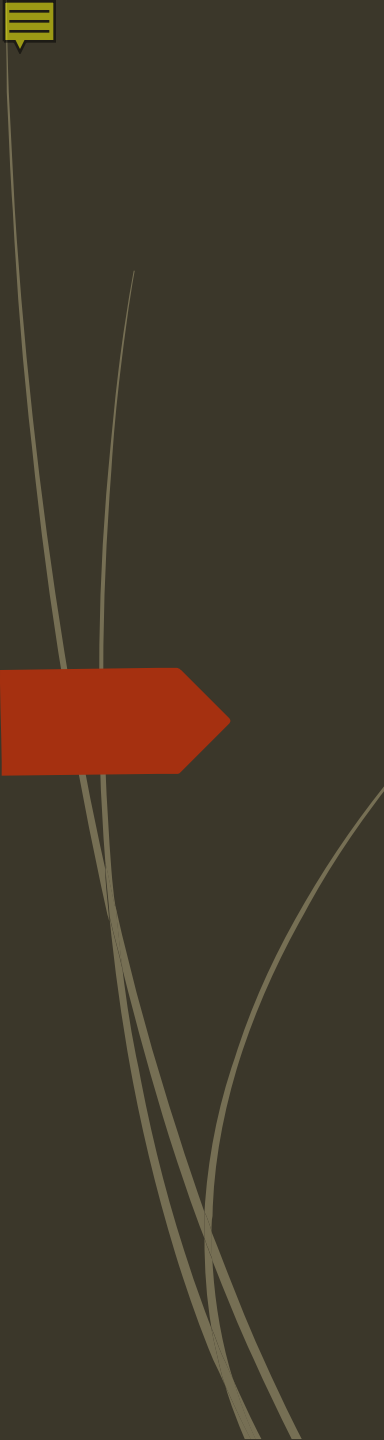
94 ft

Google earth



Research Questions:

- ▶ Did the grass restoration along the Canada de los Osos creek succeed?
- ▶ **What factors impact success rates?**
 - ▶ Thistle and other invasive taxa.
 - ▶ Interactions with nearby flat-field restoration (three more species of grass).
 - ▶ Interactions between grasses and woody bushes/trees.



Existing Literature Examples

- Stomberg and Kephart, 1996
 - Since 1700s, CA grasslands reduced from **8.9m hectares** (22m acres) to **800k ha** (2m acres).
 - “With proper management for 2-3 years, perennial grasses can effectively displace even the most obnoxious annual weeds, such as Star Thistle.”
- Zedler, 2005
 - Restoration projects often not designed/assessed in ways to ID **cause/effect** of success/failure.
 - “**Adaptive Restoration**” uses alternative approaches; while not used at CDLOER, the fact that we have a restored section, an unrestored section, and a nearby privately owned portion of creek may be able to inform us on cause/effect relationships.



(- Muhlenbergia) 1275



as Pilitas Nursery

Photos by
America
Yamaguchi

Field

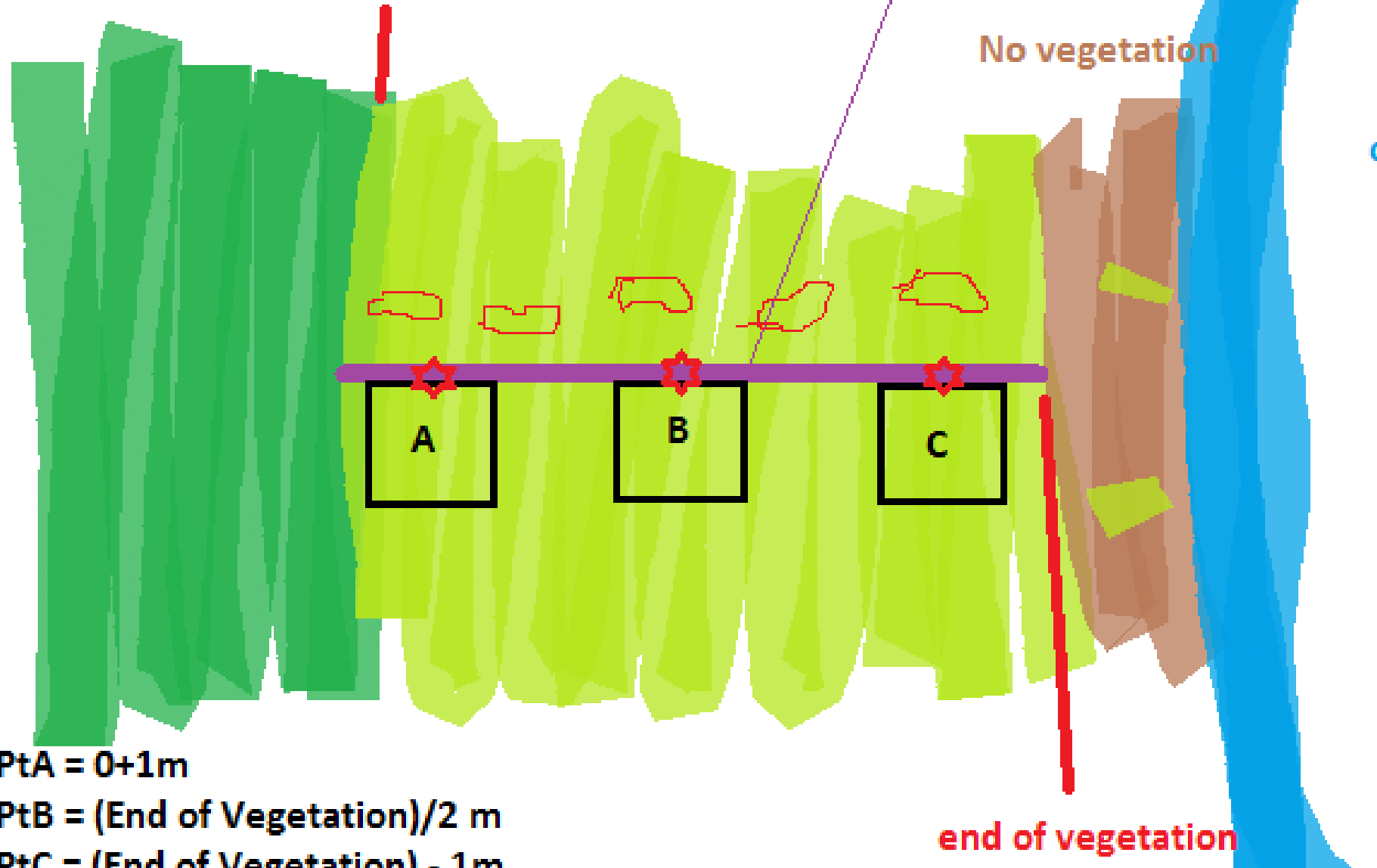
inflection point

Slope

Transect

No vegetation

creek





Statistical Methods

- ▶ Histograms to see general trends along transects (1m bins)
- ▶ Linear Regressions
 - ▶ Included any category observations made at least 10 times.
- ▶ Planned: ANOVA to compare slopes.
- ▶ Planned: PCA, comparing Presence/Absence of target species with:
 - ▶ Length of transect, richness, %cover of all species (including target).

Early lack of botanical training.

Agrostology is HARD:

“ [Grasses] grow everywhere, [are] probably the most important plants economically to humans, and yet were so difficult that only a relatively small number of botanists were able to identify them.” – Dr. James P. Smith, jr., *Field Guide to Grasses of California* (2014).

Sampling Alone

Weather and other Unexpected Issues

Major Obstacles

Results: Flora along Transects

Introduced/Invasive - 9

- Geranium
- Thistles
- Fescue/Festuca
- Foxtails
- Dandelion
- Mustards
- Scarlet pimpernel
- *Avena* spp. (oats)*
- *Vicia cracca* (Cow Vetch)

Native/Reintroduced - 9

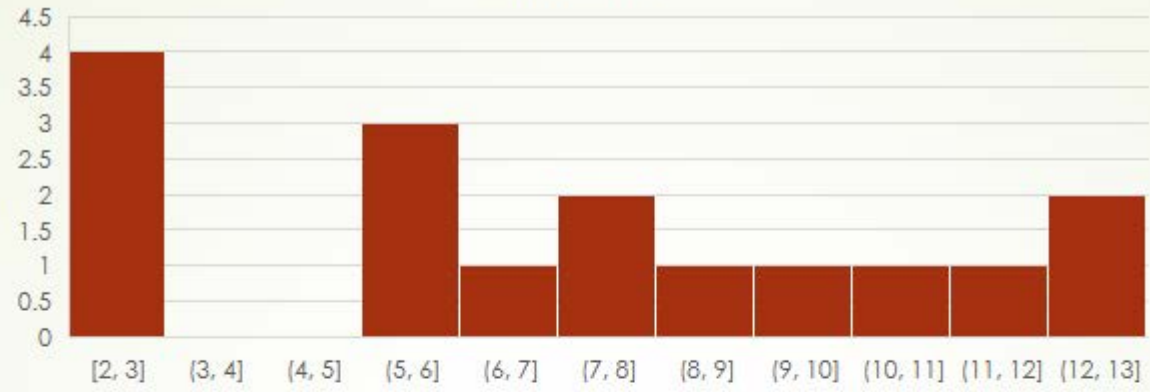
- *E. triticoides*
- *Bromus carinatus*
- California Poppy
- Fiddleneck
- California Coffeeberry
- Live Oak
- Mule's Ear
- *Artemisia douglasiana* (Mugwort)
- Coyote Brush

Unidentified - 3

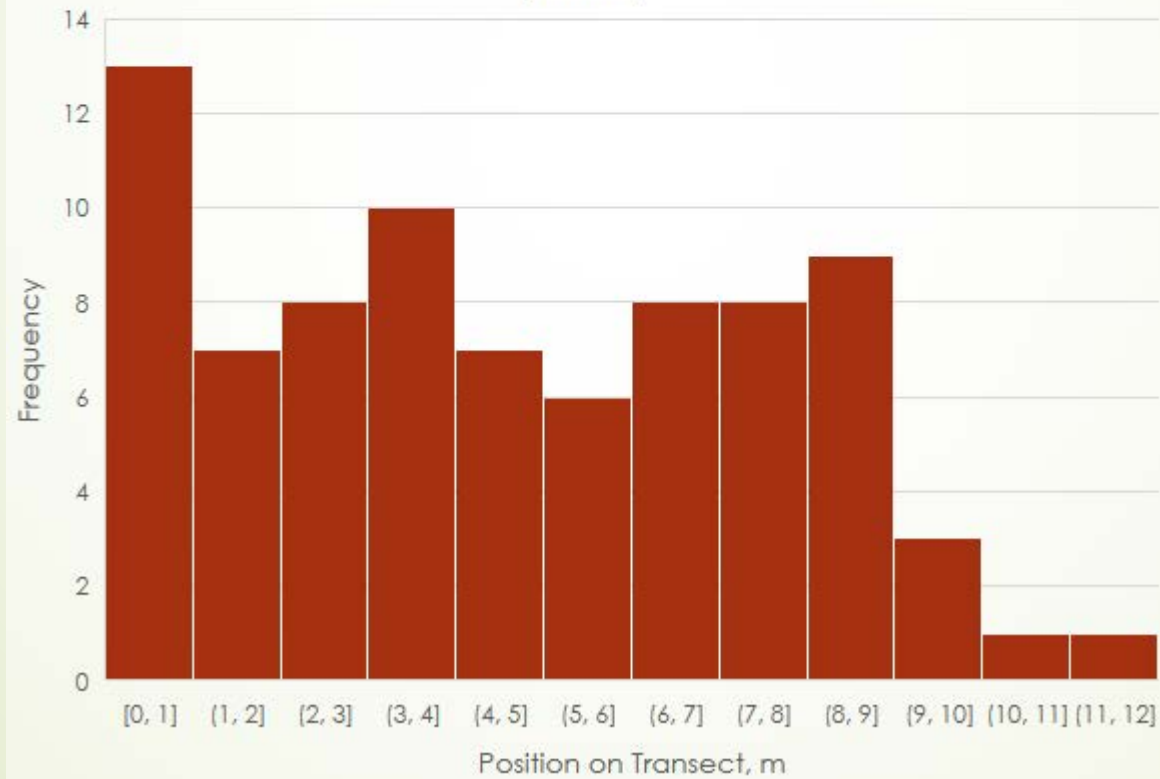
- "Spinach"
- Other Bromes
- Other Elymus/Leymus

Results

E. triticoides

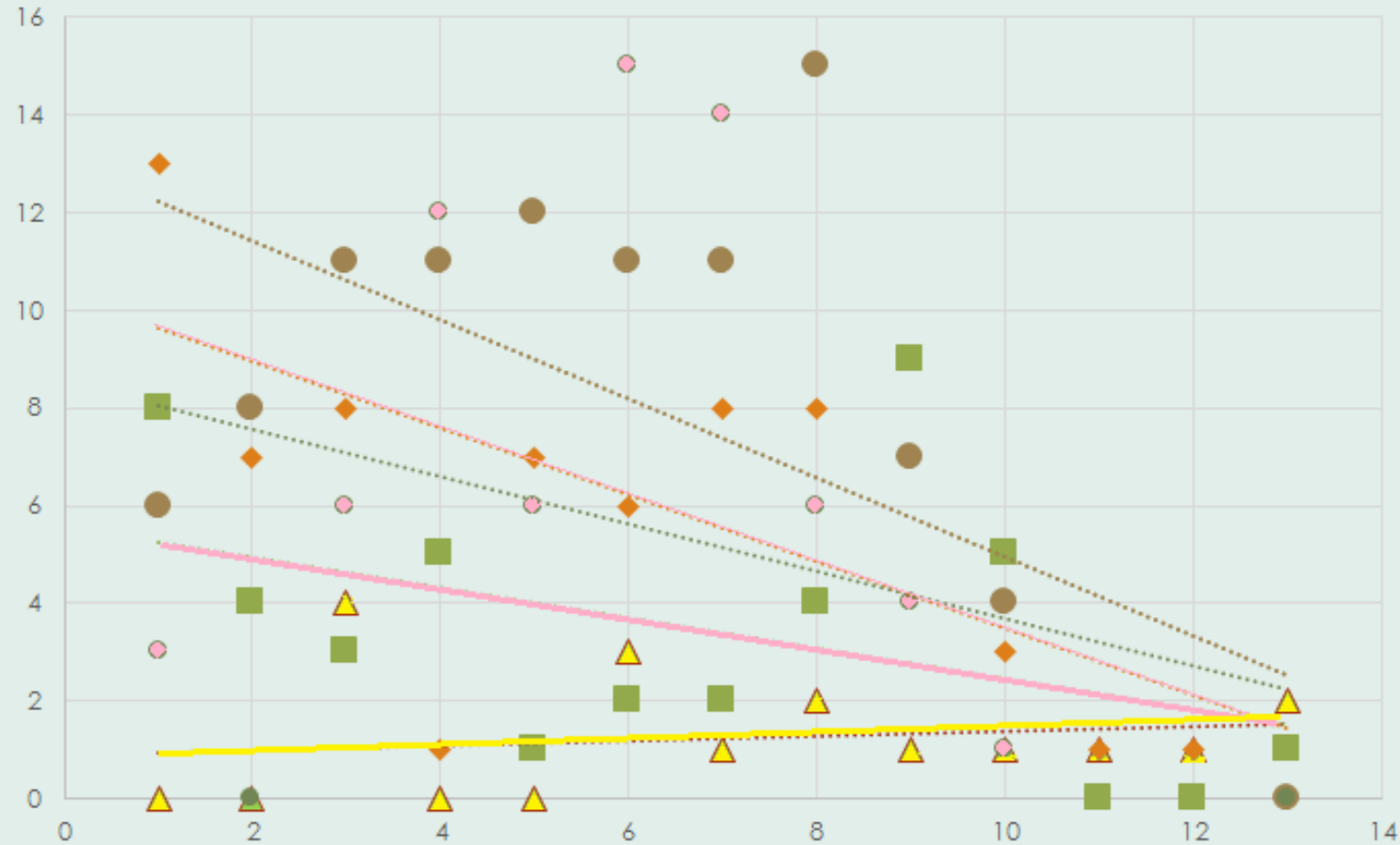


Thistle



Results

Distance from Top vs. Individual Count



- ▲ Elymus Triticoides
- ◆ Thistle
- Geranium
- Festuca
- Bromus
- Linear (Elymus Triticoides)
- Linear (Geranium)
- - - Linear (Festuca)
- - - Linear (Bromus)

(E. triticoides)
 $y = 0.0495x + 0.8846$
 $R^2 = 0.0243$

Geranium
 $y = -0.8077x + 13.038$
 $R^2 = 0.3841$

Bromus
 $y = -0.3077x + 5.5385$
 $R^2 = 0.1775$

Thistle
 $y = -0.6813x + 10.308$
 $R^2 = 0.4465$

Festuca
 $y = -0.8077x + 13.038$
 $R^2 = 0.3841$



Results

- ▶ Quantitative

- ▶ Found NO significant relationships between: position along transect and target species.
- ▶ Found NO significant relationship between presence/absence of THISTLE and target species, or among other relationships.

- ▶ Qualitative

- ▶ Observed: Clumping of *E. triticoides* close together, generally close to water
- ▶ Perpendicular to transects, thistle and *E. triticoides* noticeably grow together.



Discussion

- ▶ The Good
 - ▶ The high P value and low R^2 values suggest that *E. triticoides* grows throughout the sampled region relatively unhindered upslope.
 - ▶ Next time: Quadrats at random locations to get a side-to-side view to see if qualitative observations have any quantitative backing.
- ▶ The Bad: Overall, many more invasive species in the area,
 - ▶ 361 “stretches” of confidently identified plants, of which only 39 were native; only 16 stretches of *E. triticoides*.
 - ▶ Out of 122.24 total meters of plant material surveyed, only 8.6% of transect cover was composed of native species. Thistle = 26%, Festuca = 25%, Geranium = 20%.

(Sorry, no “The Ugly” category here, unless you count all the ticks that hitched rides on my clothes... and literally in my car.)

Future Research Plans and Ideas

- ▶ Continuing Creek Survey over Summer through Spring 2018 with updated methods.
 - ▶ Transect walk literally, and statistically too narrow.
 - ▶ Seasonal Comparisons?
 - ▶ Either find a reasonable way to use a quadrat, or target specific *E. triticoides* individual to get a broader picture.
- ▶ Related Interests:
 - ▶ Mycorrhizal associations helping/hindering? Differences among restored slope and restored fields?
 - ▶ Ending the chokehold: thistle, geranium, and *Festuca* eradication to aide in restoration and conservation of native taxa, with emphasis on methodology. (Adaptive Restoration)

Acknowledgments

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Mentors, Peers and Friends Lars Rosengreen, Brenda Natera, and Brian Jones

Photo by America Yamaguchi





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