

Controlling Harding Grass in a Grassland Setting

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Redwood National and State Parks

*Or, -this is our problem and how we
are dealing with it - we hope this
information will be useful to you*

Thanks and Acknowledgements

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- NPS Pacific West Region natural resources program
- The California Department of Food and Agriculture (CDFA)/Humboldt Co. Weed Mgmt. Area
- Redwood National and State Parks

Staffing partners have included:

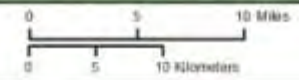
- Student Conservation Association (SCA)
- Humboldt State University (HSU)



Redwood National and State Parks

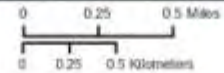


- RNSP Boundary
- Bald Hills Prairies
- County
- Highways





Bald Hills Prairies





Rare Plants

- Howell's montia CNPS 2
- Tracy's tarplant CNPS 4
- California globe mallow CNPS 1B
- Coast checkerbloom CNPS 1B

Notable Wildlife

- Roosevelt elk
- Black bears
- Mountain lions
- Fishers
- Threatened Coho in Redwood Creek



Harding grass, *Phalaris aquatica*



Project background

Problem definition

- Lands including the original Harding grass infestation acquired in 1992
- Harding grass monoculture centered on stock pond outflow
- Noticed spread in that and adjacent drainages in early 2000's
- Concerned about spread throughout BH if left untreated

Project background

Challenges to treatment planning

- Didn't know how much was out there, but knew it was scattered throughout approximately 2000 acres of prairie
- No experience with large scale herbicide project
- Difficult to detect a single grass species in a grassland setting (mapping and treatment)
- Short treatment window
- Funding limitations

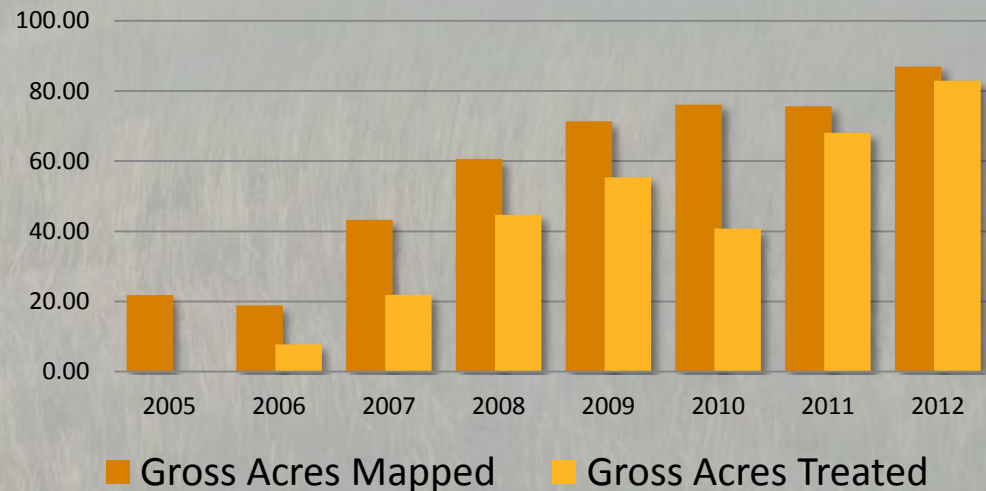




Treatment Strategy

- **Pilot (2005-6):**
mapping, testing
feasibility of control
- **Phase I (2007-9):** extensive mapping, treatment
of outliers and edges
- **Phase II (2010-11):** treatment of all known polys,
excluding the heart of darkness
- **Phase III (2012-14):** treatment of 90+% known
polys treated, incl. heart of darkness
- **Phase IV (2015+):** periodic maintenance

Gross Mapped and Treated
Acreage by Year



Treatment *Methods*

Considered:

- Manual
- Mechanical
- Mechanical / chemical
- Chemical only

Chosen:

- Foliar spray of glyphosate formulation, 1.5% herbicide (Aquamaster/ Aquaneat), .78% adjuvant (Target Pro Spreader/Inlet)



Treatment – *Labor*

- **Labor sources have included:**
 - Paid seasonal biological technicians
 - Student Conservation Association (SCA) interns
 - University students (wildlife, forestry, NR, range and ecological restoration majors mostly, not so much botany or biology)
 - Volunteers
 - Contractors
- **Labor challenges have included**
 - Recruitment for short-term project
 - Training – grass ID and herbicide application
 - Morale and motivation
 - Contractors



Non-Potable
Water

19800

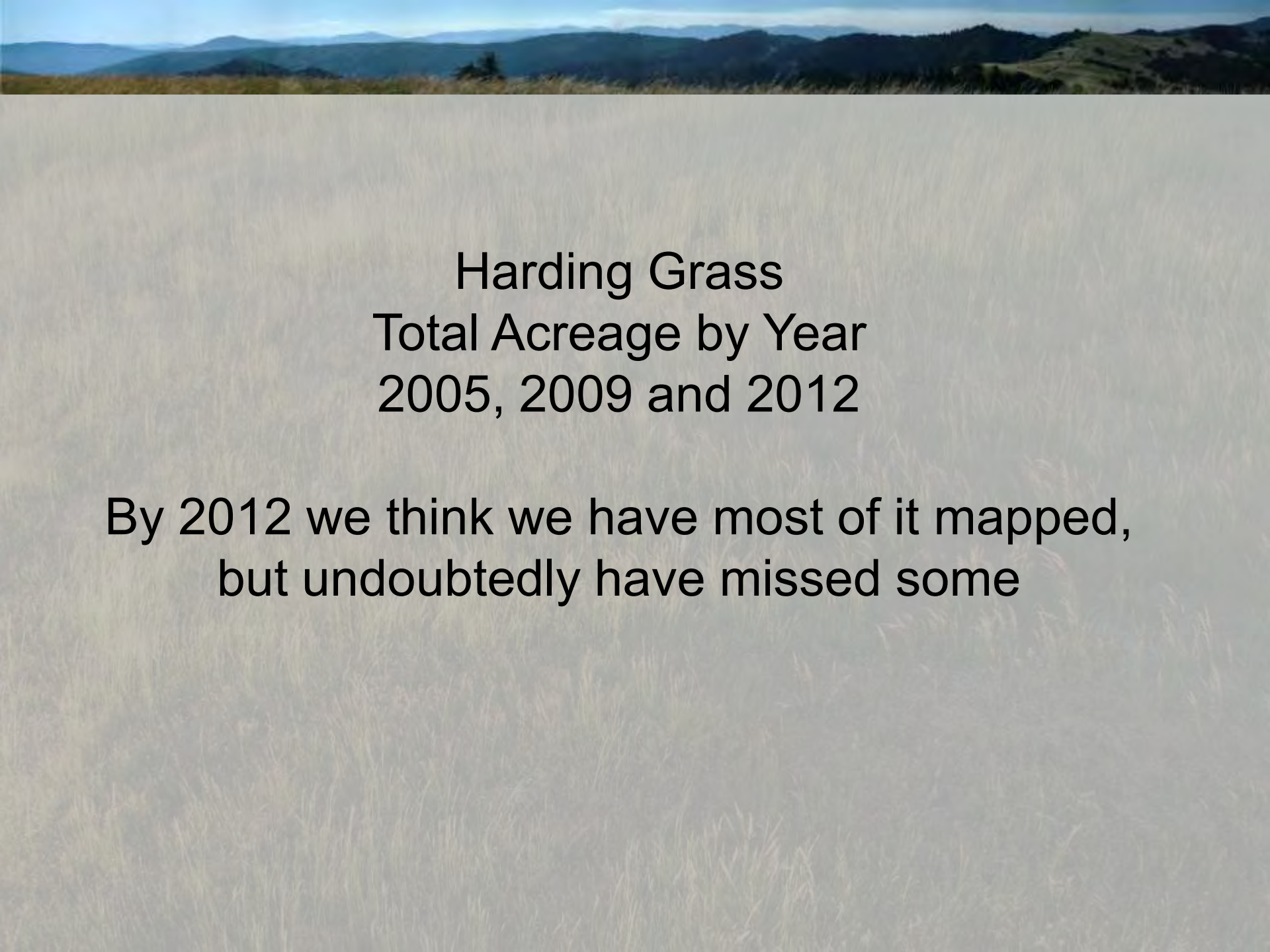
Mapping/Monitoring

- Scale of project- large
- Frequency plots, photo points - impractical
- Mapped every poly and assigned cover class using Trimbles and Garmins and our home-grown database, that crosswalks to WIMS etc
- Workers: given maps and GPS units to find polys and document new occurrences
- Significant effort but worthwhile
- Consistency of mapper important!

Intensive mapping allowed us to answer two questions:

Where is the Harding grass?
Is our treatment working?



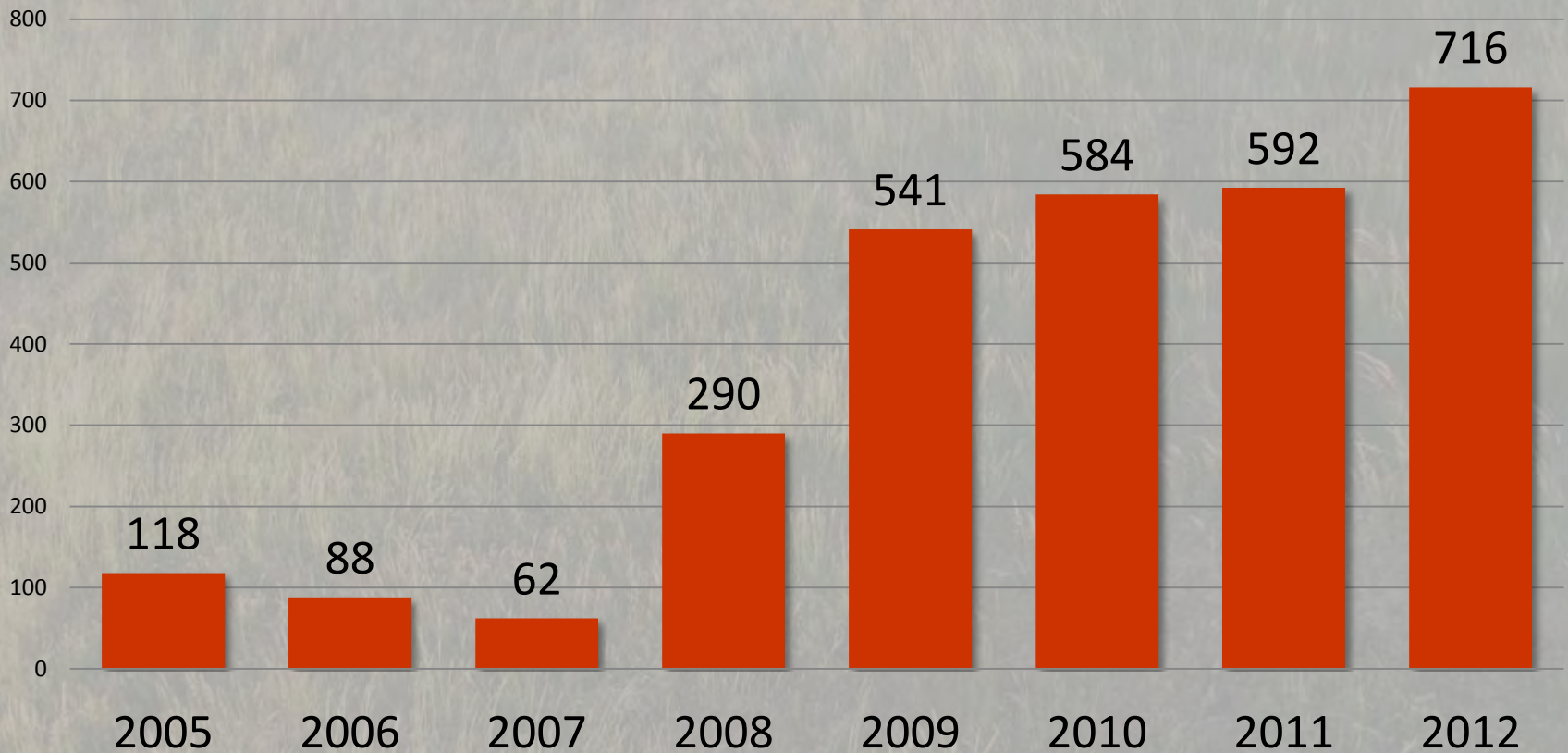


Harding Grass Total Acreage by Year 2005, 2009 and 2012

By 2012 we think we have most of it mapped,
but undoubtedly have missed some

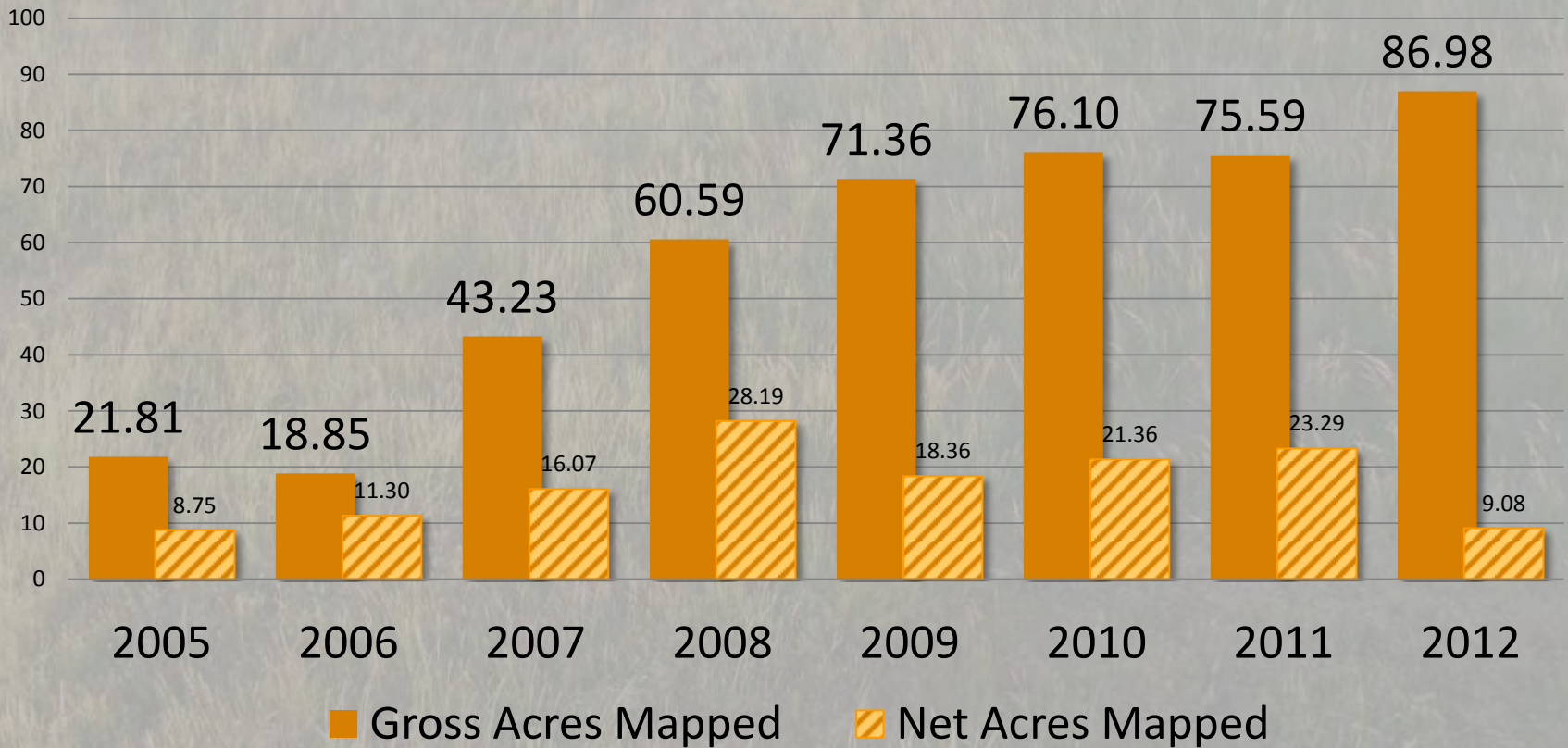
Results to date

Number of Mapped Polygons by Year



Results to date

Mapped Acreage by Year





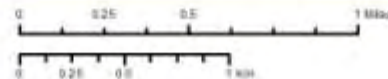
Harding Grass Infestations



Total Acres Harding Grass by Year
Gross acres / Net acres / # Polygons

2005: 21.81 / 8.75 / 118

Bald Hills Prairies
 Redwood National and State Parks
 Authorized Boundary (2006)










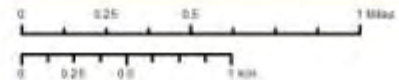
Harding Grass Infestations



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-  Bald Hills Prairies
-  Redwood National and State Parks
-  Authorized Boundary (2006)











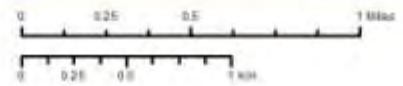
Harding Grass Infestations



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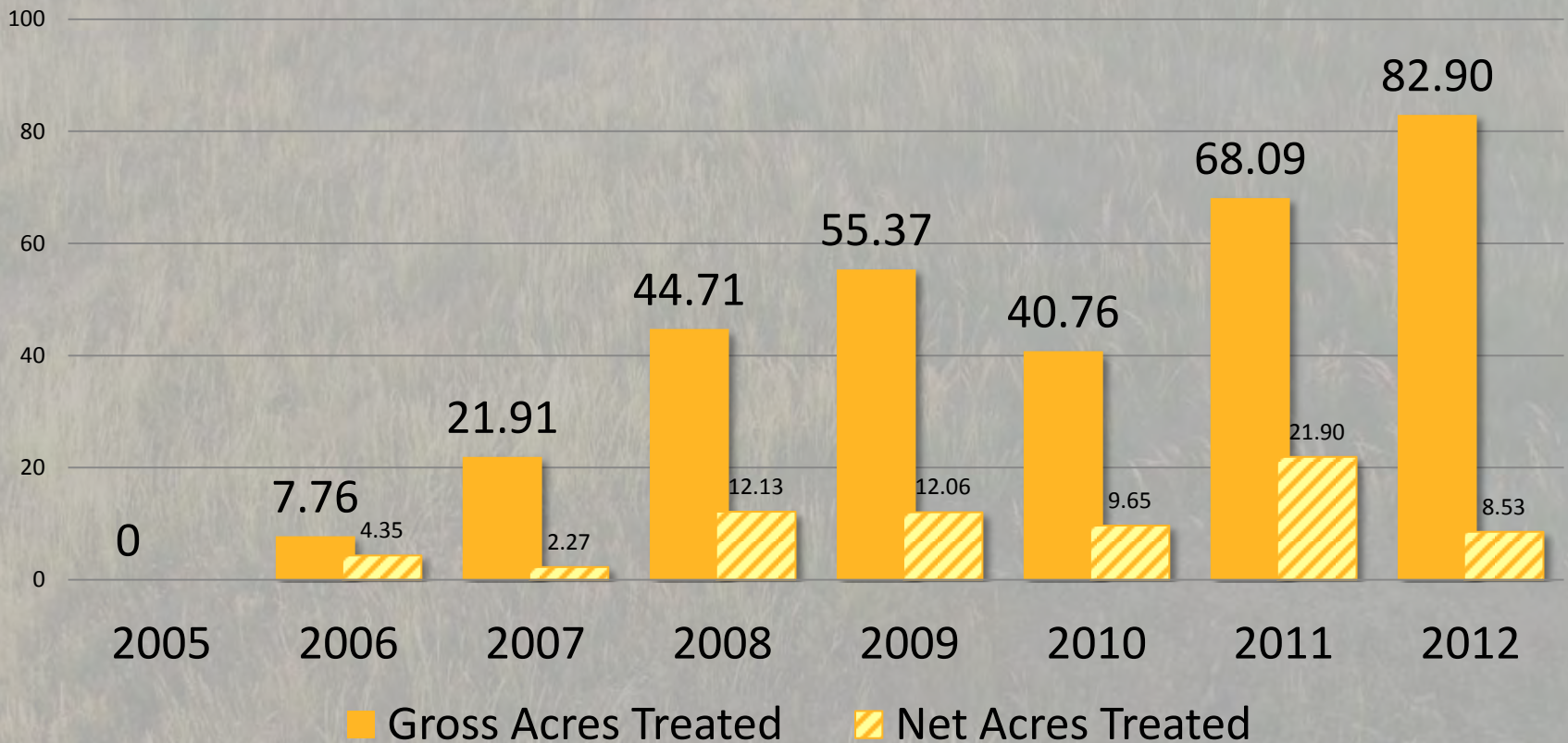
	2005: 21.81 / 8.75 / 118
	2009: 71.36 / 18.36 / 541
	2012: 86.98 / 9.08 / 716

 Bald Hills Prairies
 Redwood National and State Parks
 Authorized Boundary (2006)

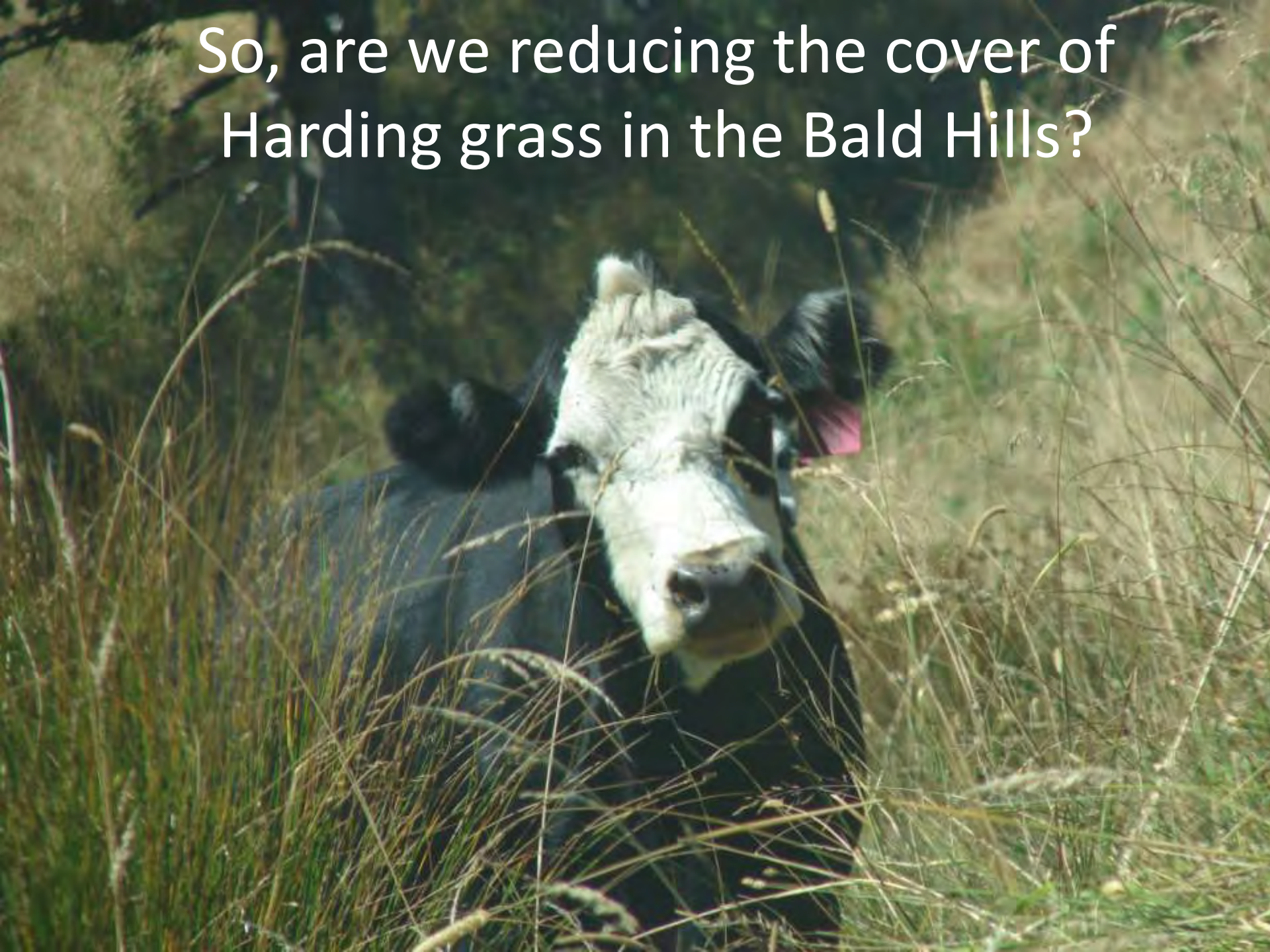


Results to date

Treated Acreage by Year

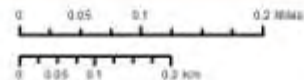
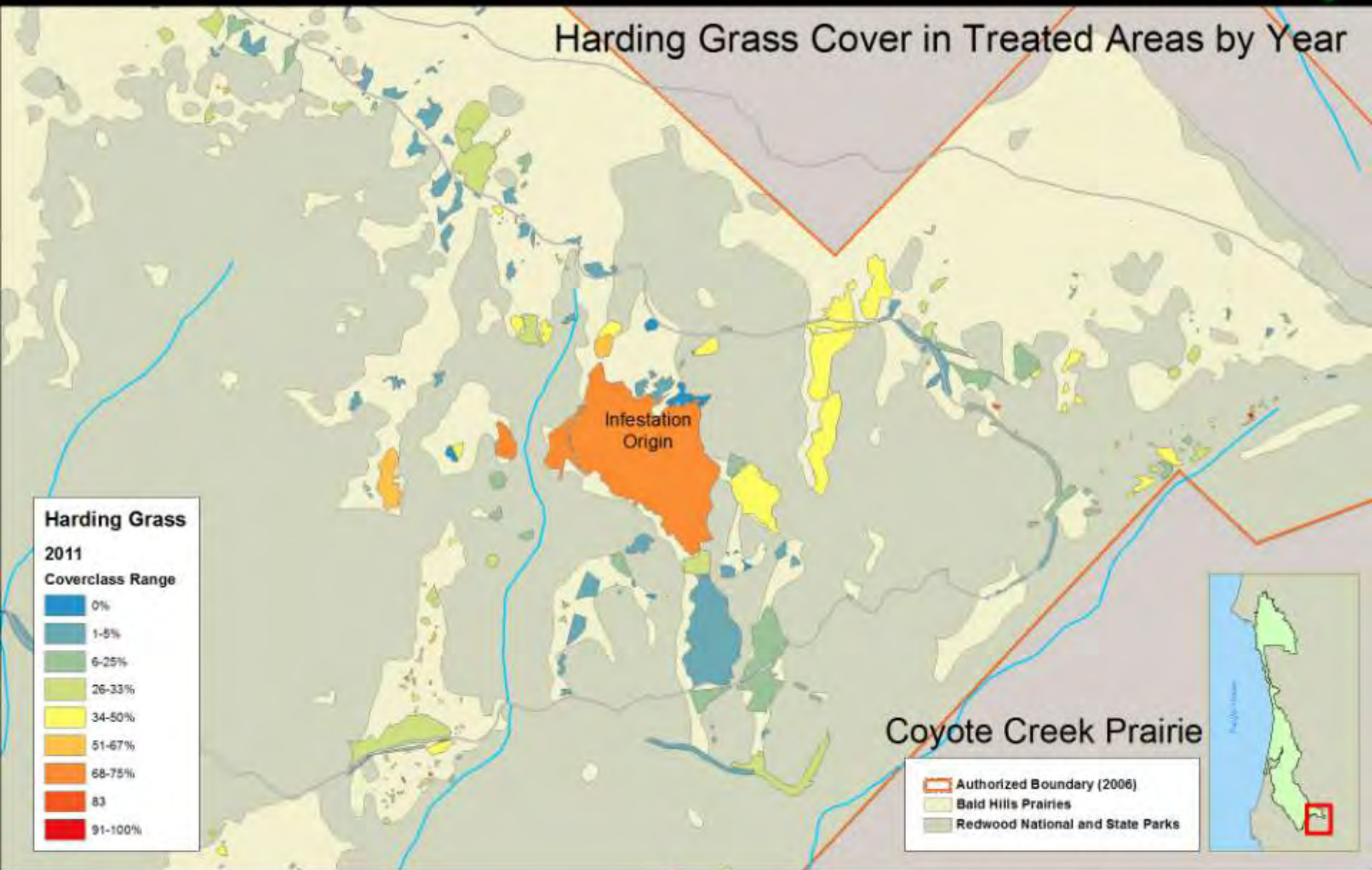


So, are we reducing the cover of
Harding grass in the Bald Hills?



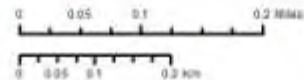
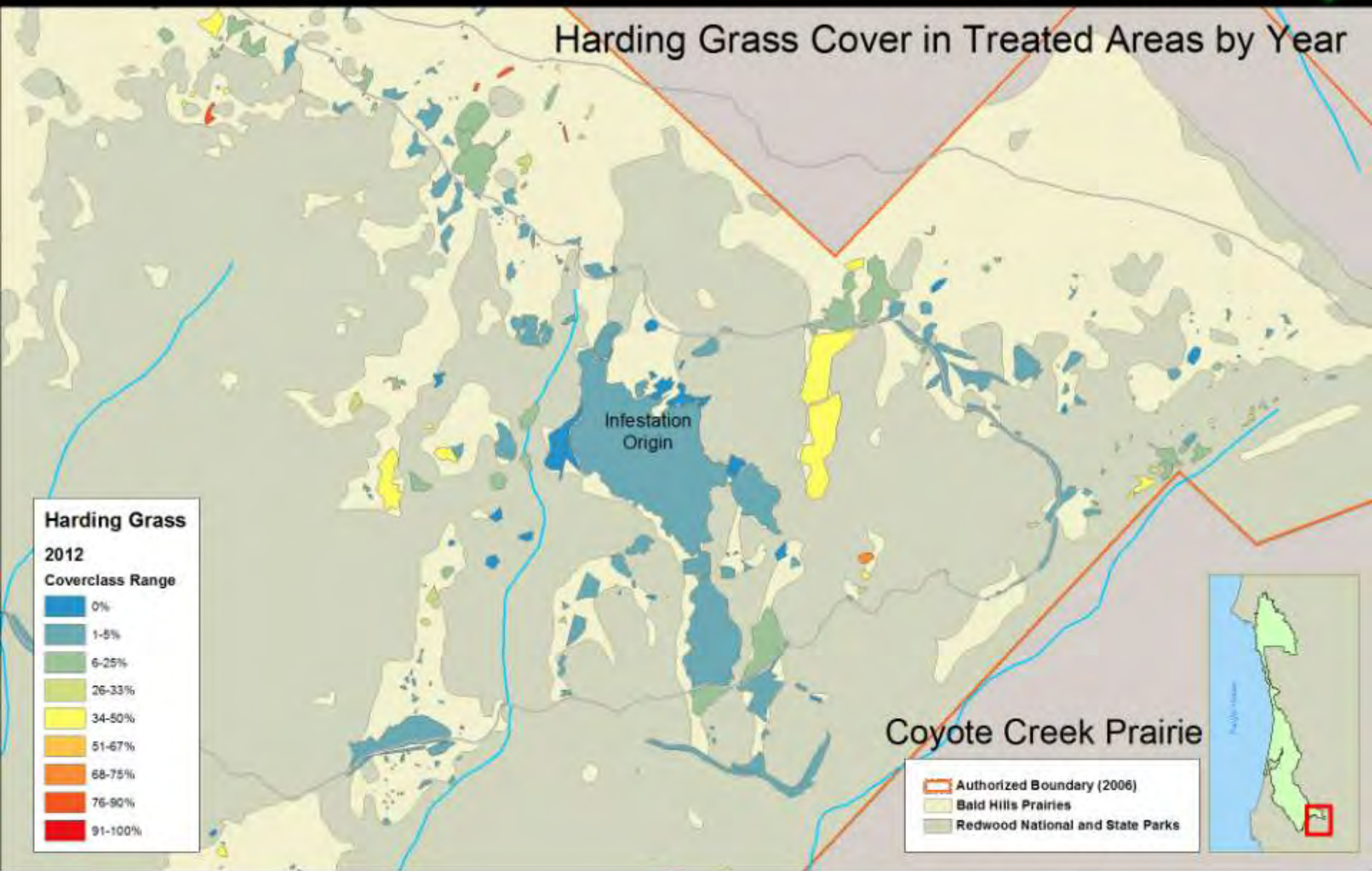


Harding Grass Cover in Treated Areas by Year



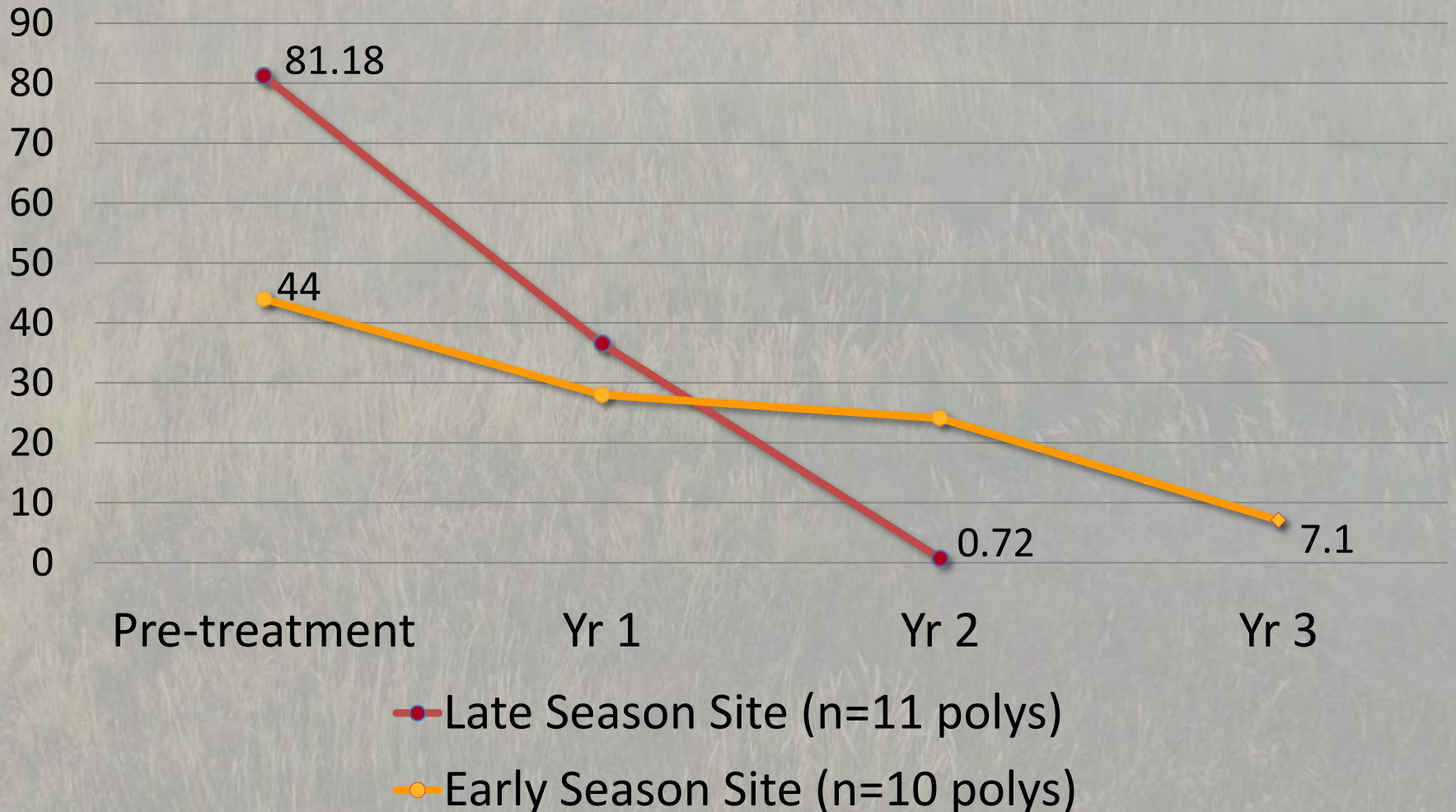


Harding Grass Cover in Treated Areas by Year



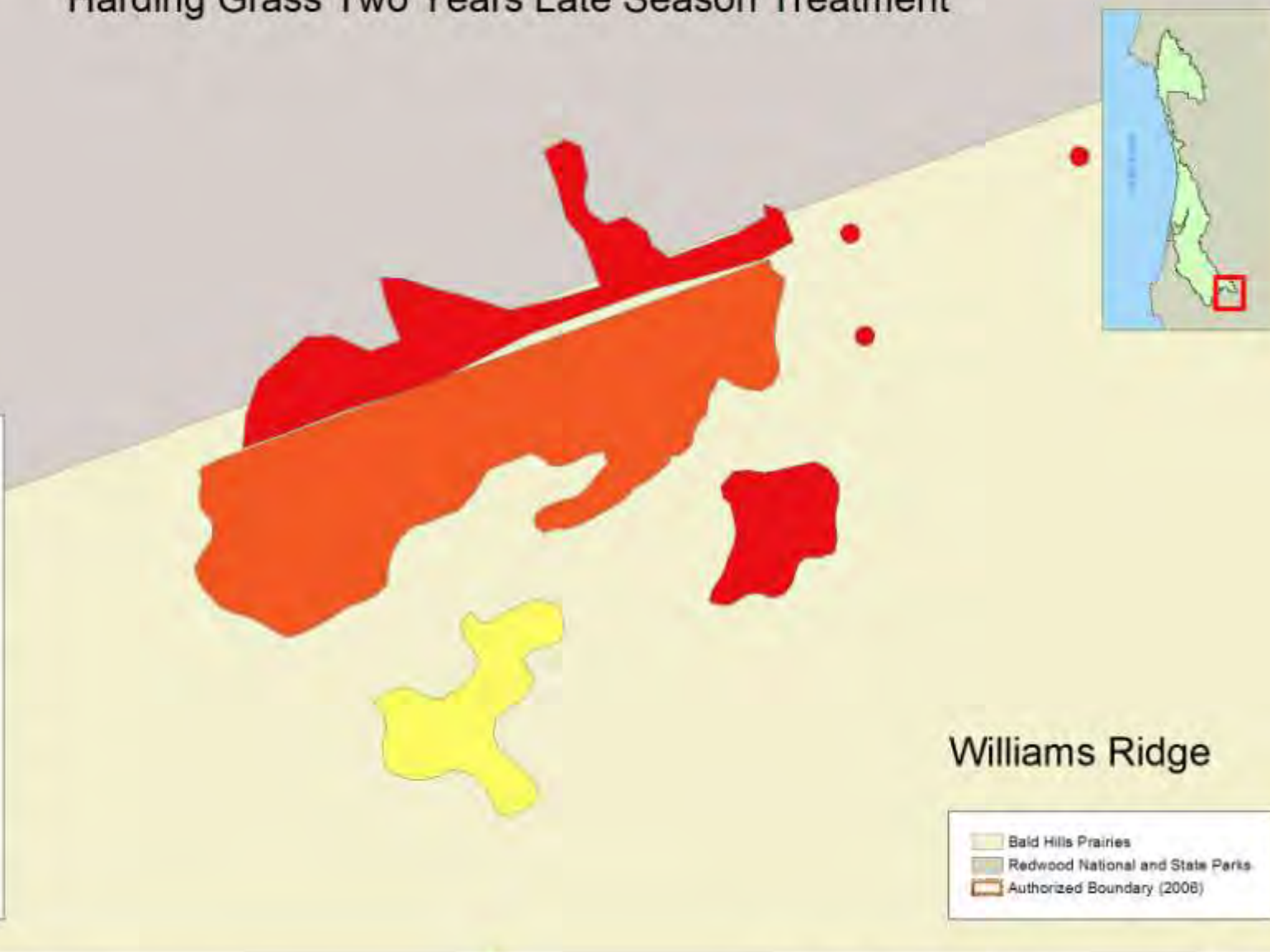
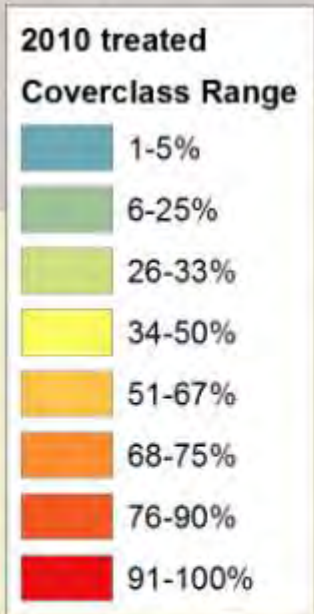
Results to date

% Cover of Harding Grass Over Time Late Season Treatment vs. Early Season

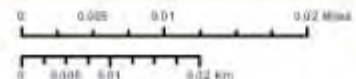
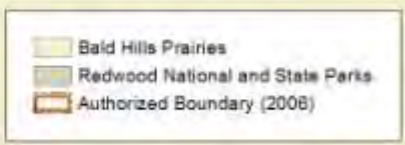




Harding Grass Two Years Late Season Treatment



Williams Ridge





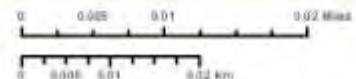
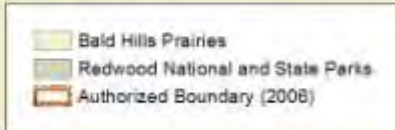
Harding Grass Two Years Late Season Treatment



2012 treated Coverclass Range



Williams Ridge



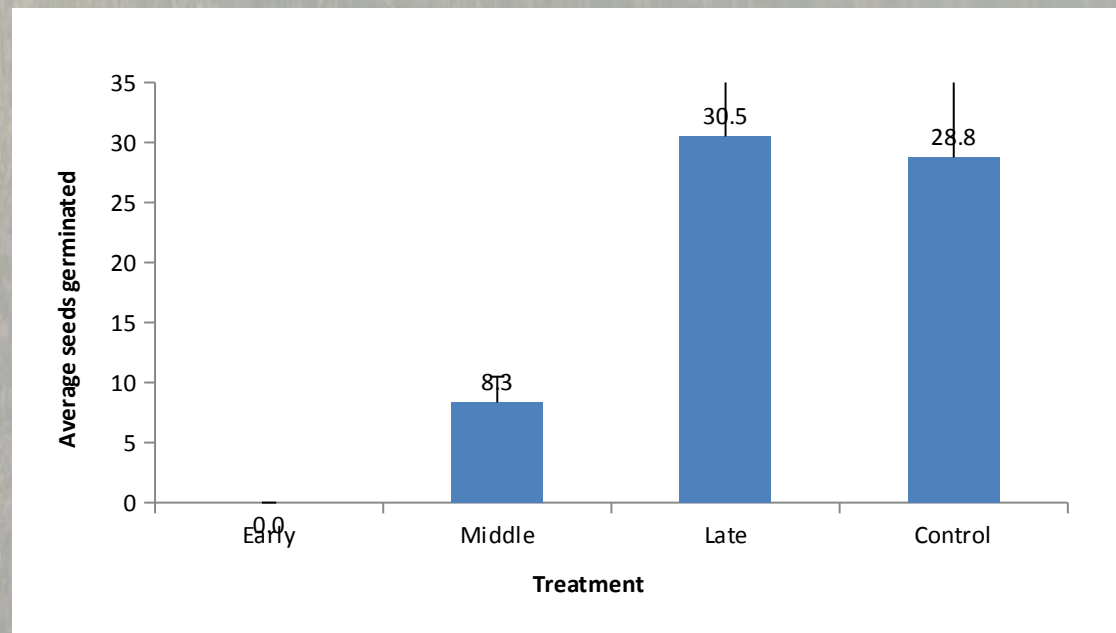
Seasonality of Treatment

- Late season treatments appear to be more effective in our ecosystem
- However, we were concerned that late season treatment hinders our ability to limit seed production

Lessons learned/bumps along the way

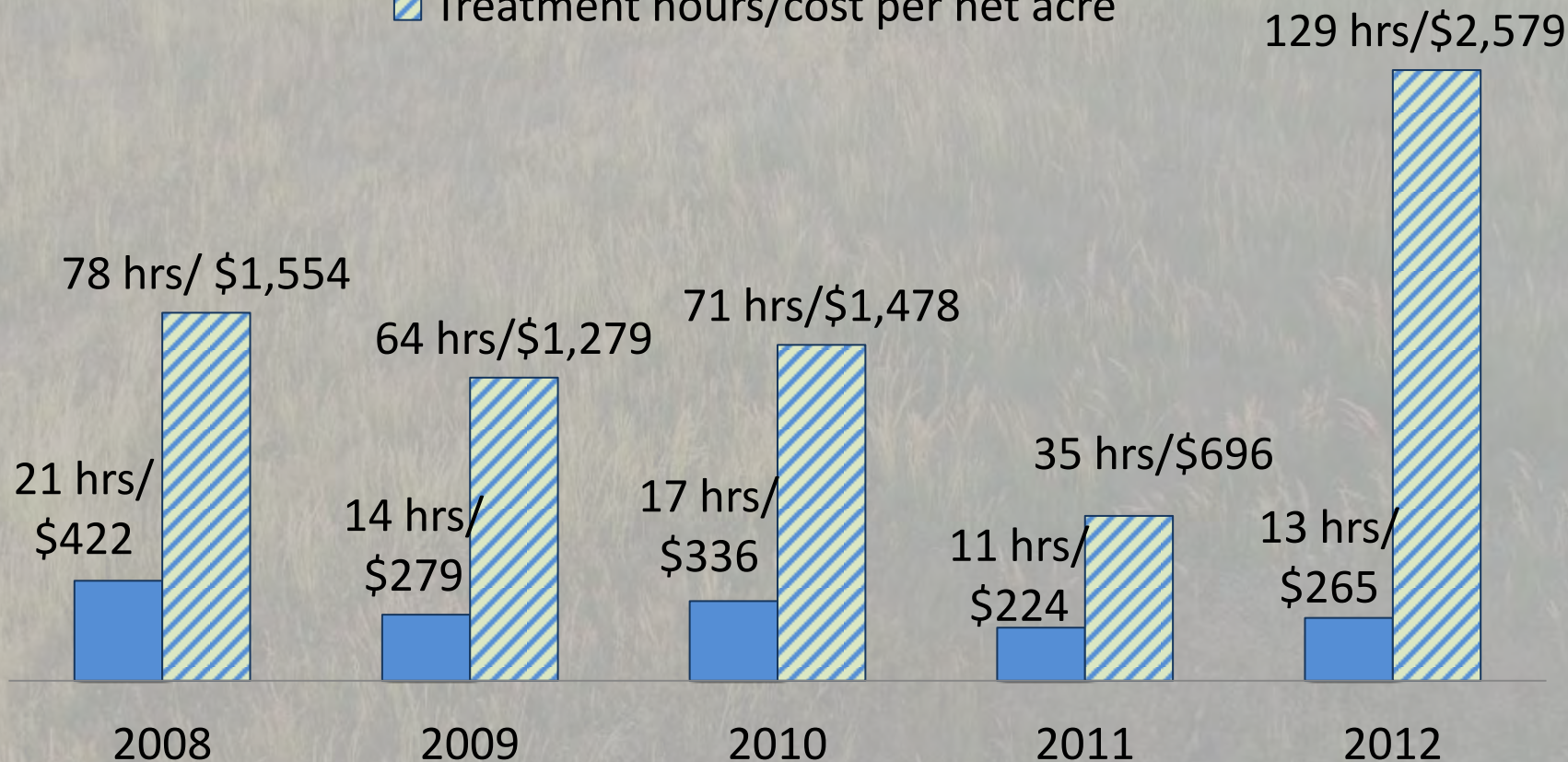
Seasonality of Treatment

- M. Shelley senior thesis confirms this
- If most plants we treat continue to produce viable seed, how can we ever get ahead of it?
- Harding grass seedlings are poor competitors



Treatment Hours and Cost Per Gross and Net Acre

- Treatment hours / cost per gross acre
- ▨ Treatment hours/cost per net acre



Moving Forward

- Post treatment vegetation succession
- Working with neighbors
- Maintenance mode by 2015?

