



Old World Climbing Fern
(*Lygodium microphyllum*)
a.k.a. “Land Hydrilla”
2013

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1. Background

2. Research

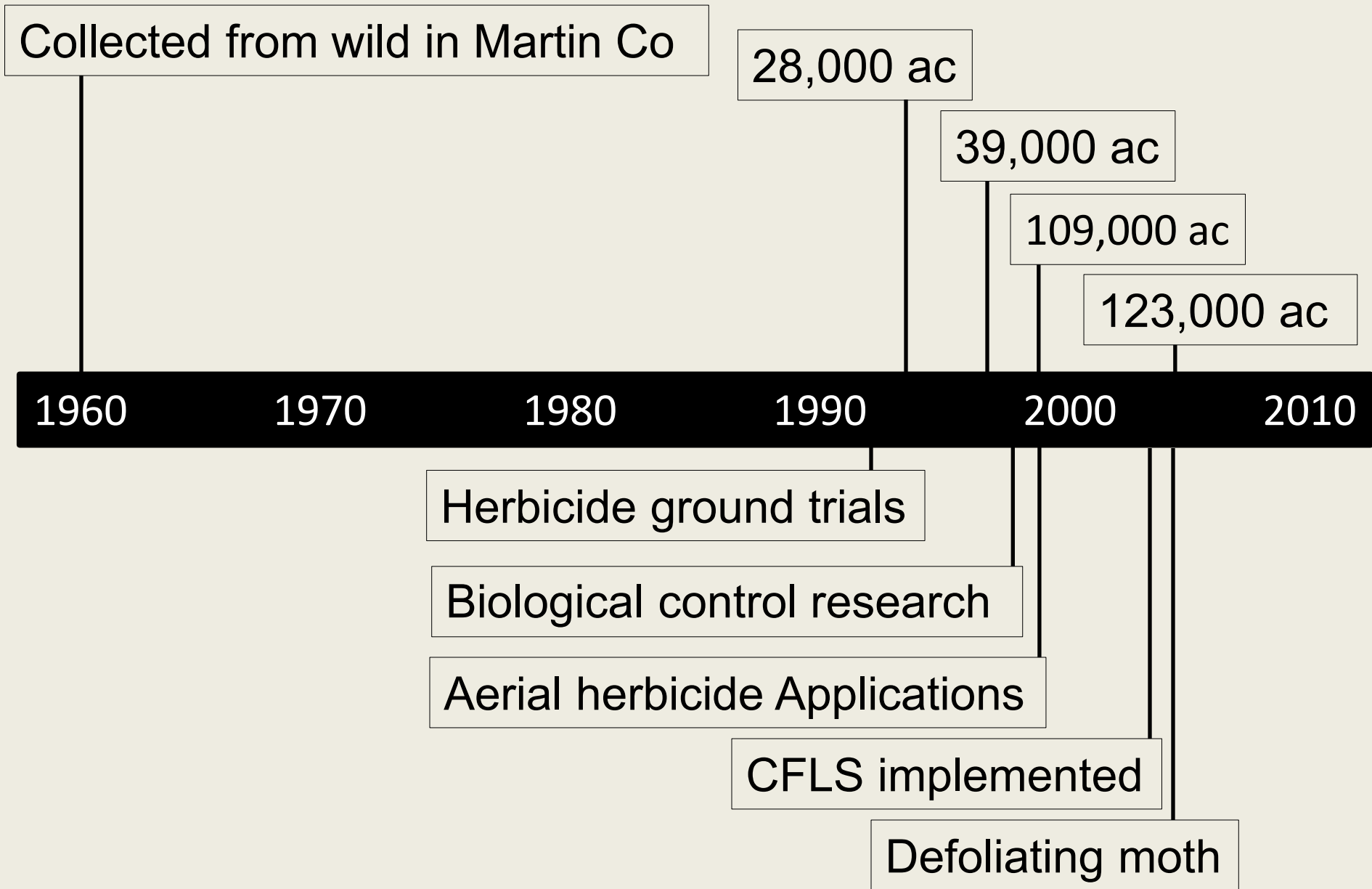
- A. Biological control
- B. Herbicides
 - A. Summarize Jeff Hutchinson's research

3. Operational

- 1. SFWMD
- 2. SJRWMD
- 3. SWFWMD
- 4. NPS



Old World Climbing Fern in Florida





Biological Control Progress

In February 2005, a defoliating moth (*Austromusotima camptonozale*) was released in southeast Florida but failed to establish in any of the release range.



Another defoliating moth, *Neomusotima conspurcatalis*, has established from releases made in 2008 and 2009.

Populations are thriving in several areas and have spread to other points beyond the initial releases.



A leaf-galling mite (*Floracarus perrepae*), released in 2007, has established in the Jupiter, Florida area.


Feeding damage from *Neomusotima conspurcatalis* larvae

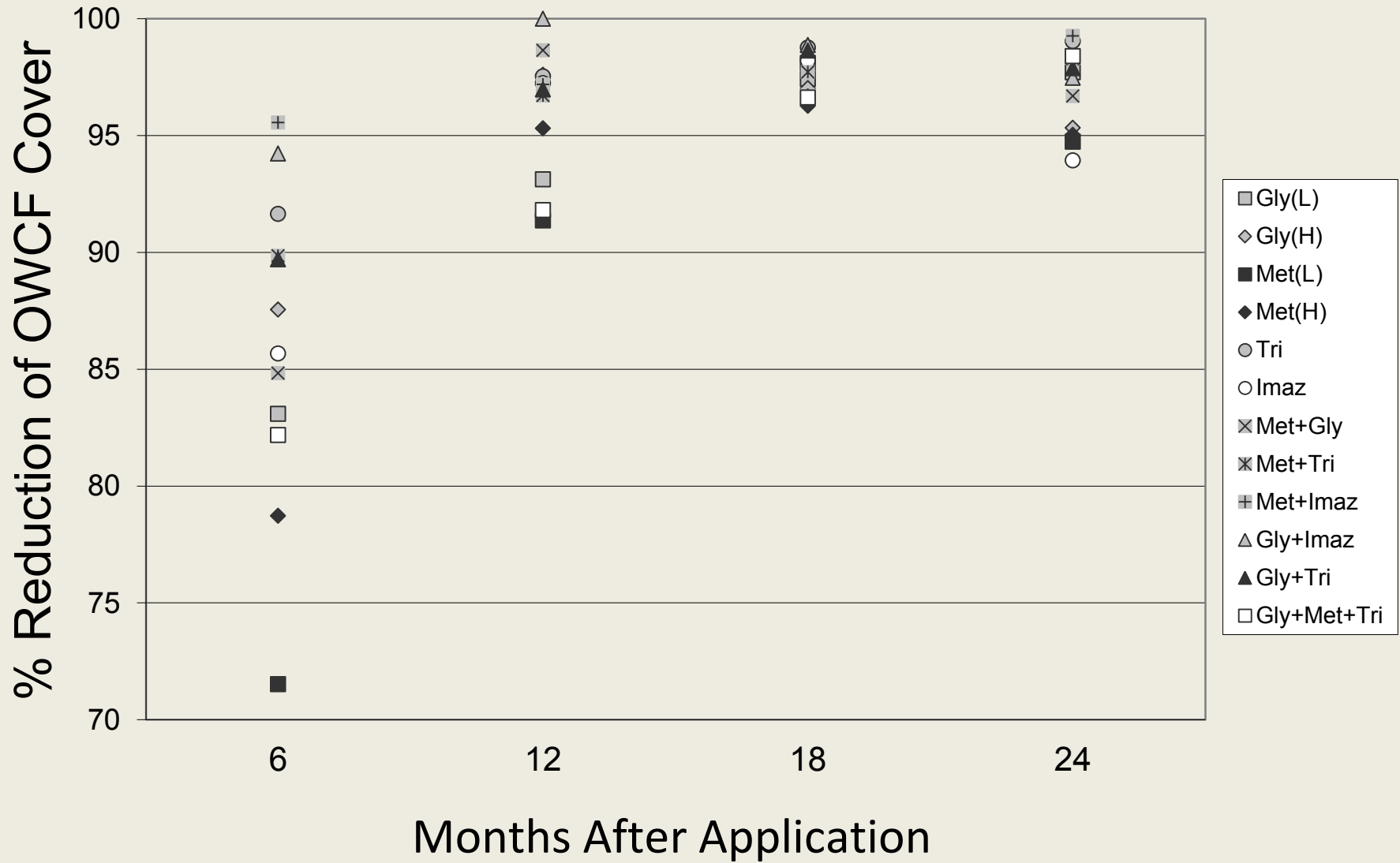


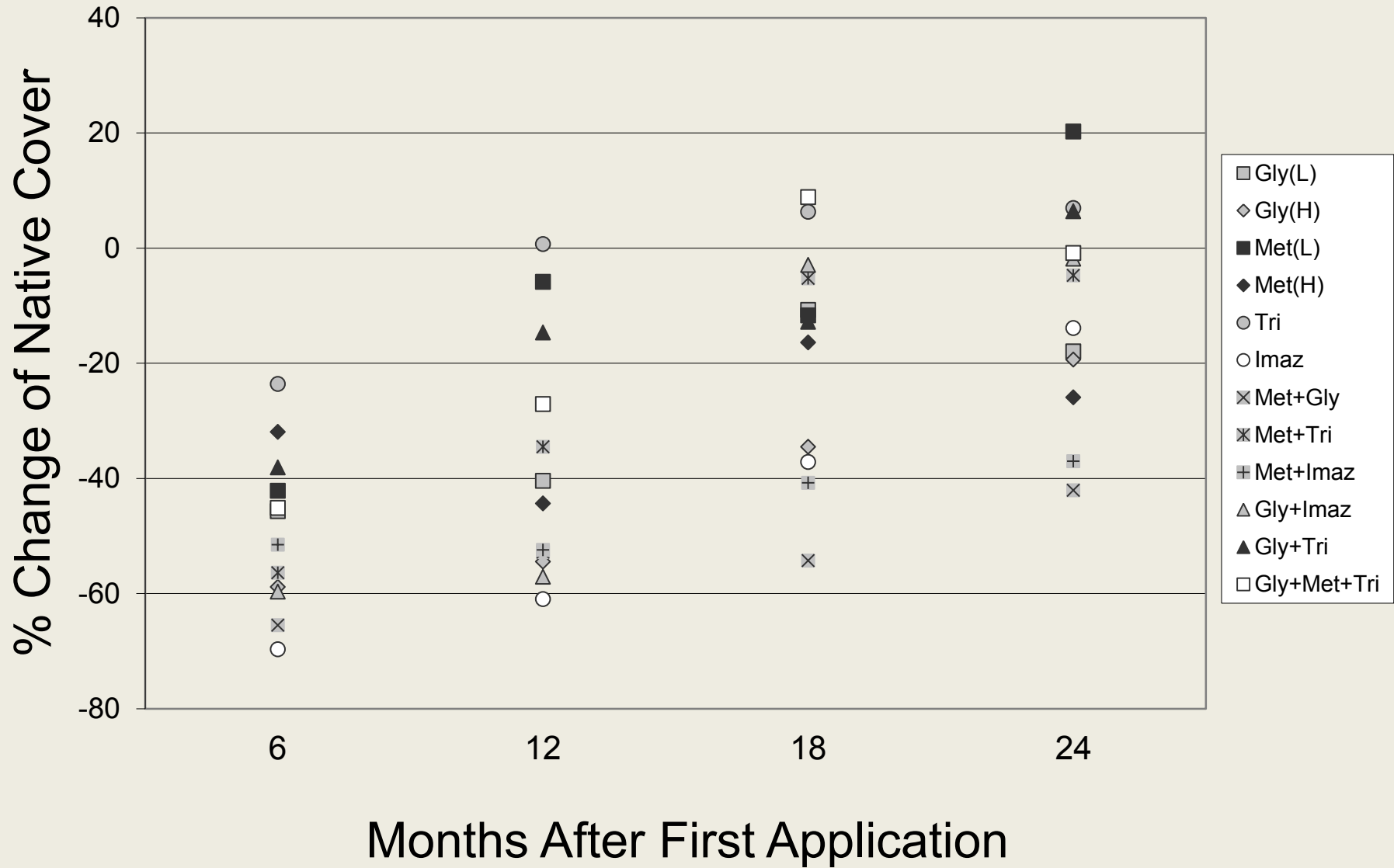
Two more insects are currently being tested for future releases: another defoliating moth within the same family as the previous two released moths, and a sawfly whose larvae are heavy defoliators. A discussion of these efforts is presented in the “Lygodium Management Plan”, which is available on at <http://fleppc.org>.

Evaluation of Backpack Applications

- ✓ 20 sq m plots
- ✓ 7 locations
- ✓ Four applications every 6 months

Product	Rate(s)	A.I./MOA
Rodeo	2% and 4%	Glyphosate/PEP
Escort XP	1 and 2 oz/100	Metsulfuron/ALS
Garlon 3A	2%	Triclopyr/PGR
Plateau	1.5%	Imazapic/ALS inhibitor
Escort + Rodeo	1 oz + 2%	
Escort + Garlon	1 oz + 2%	
Escort + Plateau	1 oz + 1.5%	
Rodeo + Plateau	2% + 1.5%	
Rodeo + Garlon	2% + 2%	
Rodeo + Escort + Garlon	1% + .7 oz + 1%	





Initial aerial and two annual ground applications in LNWR



- ✓ 5 tree islands per treatment
- ✓ +0.5% DLZ aerial
- ✓ +0.5% Sunwet ground

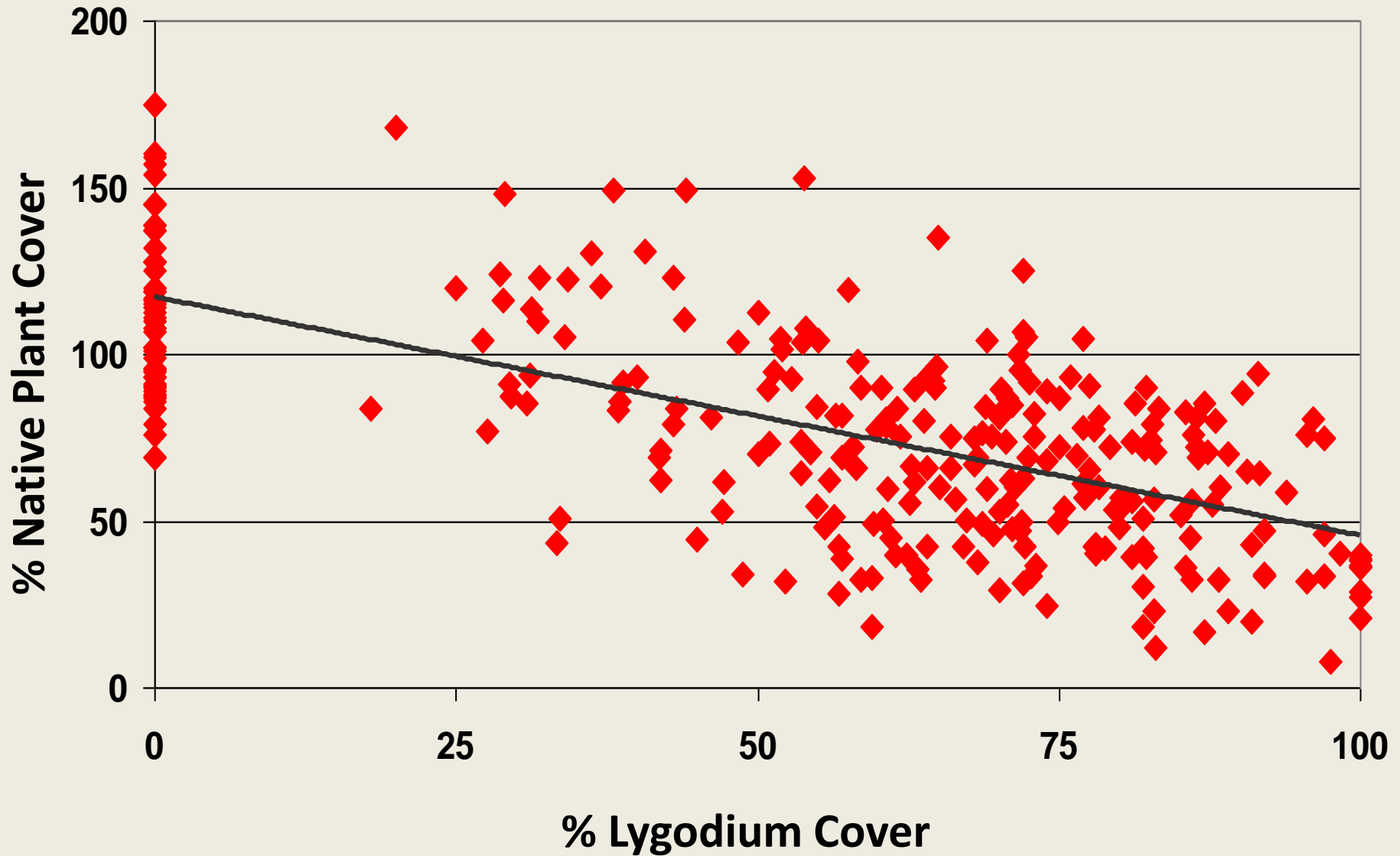
Product	Rate Aerial, Ground	<u>% Reduction</u> One year after aerial	<u>% Reduction</u> Aerial and two annual ground
Escort	1 oz/ac, 1 oz/100gal	99a	99a
Escort	2 oz/ac, 2 oz/100gal	99a	98a
Rodeo	3.75 pt/ac, 2%	86b	81b
Rodeo	7.5 pt/ac, 4%	88b	87b

Survival Rates of Non-target Woody Species 3 yr After Aerial Herbicide Application

	Rate	Dahoon	Swamp bay	Wax myrtle	Myrsine
Escort	1 oz	80	77 a	65 a	12 a
Escort	2 oz	89	93 a	81 a	18 a
Rodeo	3.75	75	6 b	18 b	88 b
Rodeo	7.5	70	20 b	17 b	58 b



Percent Cover



Re-growth After Herbicide Application



Sporophyte Development from Soil Samples

Site	Sporophytes per m ²	% Fertile Leaflets
1	3051	1.2
2	1811	4.2
3 (treated site)	2885	13.7
4	1694	7.7

at
6 Months



Spore Germination

- Germination rates can be as high as 96%
 - Spores can remain viable for at least 8 years
- This means that even if you kill the mature ferns, there will be re-growth from spore germination

Sensitivity of OWCF Spores to Herbicides

✓ 35,000 spores treated / Petri dish, containing herbicide treated agar solution

	I_{50}		I_{95}	
	g a.i./L			
Metsulfuron	0.01	a	0.06	a
Imazapyr	16	b	70	b
Triclopyr	18	b	78	b
Glyphosate	56	c	244	c

DON'T BE A VECTOR!



Operational

SFWMD

- ✓ Initial aerial applications with 1 oz Escort or 7.5 pt glyphosate product depending vegetation/season
- ✓ Maintain ~10,000 ac
- ✓ 3,800 ac treated annually (3-yr average)
 - 1-2 yr interval
 - ~80% Ground application
 - 3% glyphosate prod. or + 1 oz/50 gal Escort
 - Some treatments with triclopyr

SJRWMD

- ✓ Aerial application with 2 oz Escort every 2-3 yr
 - Most areas dominated by sawgrass
 - Areas (BCM) too remote for ground application
 - 10,000 acres treated annually (5-yr average)

Operational contd.

SWFWMD,

- ✓ 2012: 516 ac
- ✓ Ground applications only

NPS

- ✓ 2005: 1,700 ac treated aerially with glyphosate
- ✓ 2006: 1,159 ac treated aerially with glyphosate
- ✓ 2008: 840 ac treated with metsulfuron
- ✓ 2009-2012: > 20 ac/yr ground treatments only
 - ✓ Funding
 - ✓ Non-target
 - ✓ Concentrating on prescribed fire
- ✓ 2010: 2,006 acres present
- ✓ Concentrating on fire suppression

Private land

- ✓ CFLS

*Dead lygodium makes me
smile!*

*Yea, but don't turn you
back on it.*



Questions?

