

# Long-term Management Impacts on Plant Communities in Upland Prairies

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# Upland Prairies in the Willamette Valley

- Imperiled
- Home to many rare species
  - Kincaid's lupine
  - Fender's blue butterfly
- 100 Acres of occupied or potential habitat at Fern Ridge Reservoir, managed by USACE







Cherry Orchard

West Spires

North Eaton

East Shore

East Spires

South Eaton

West Shore

Big Spires NE

Big Spires

South Green Oaks



Google Earth




# Management at Fern Ridge

- Management of sites began prior to 2008
  - Goal of restoring a matrix of native prairie grasses with moderate native forb diversity for Fender's habitat
- Monitoring each spring by IAE (2008-2018)
- Long term dataset of detailed plant community data

**Objective: Examine the effectiveness of management treatments and trajectory of the plant communities over time**



A photograph of a grassy field with a dense line of trees in the background. The field is green and appears to be a meadow or pasture. The trees are tall and green, forming a thick line across the horizon. The sky is overcast and grey.

## **Specific questions:**

- What are the impacts of management treatments?
- How do the plant communities change over time?
- Are certain management treatments associated with target functional groups (native forbs or native graminoids)?

## **Analysis**

- Non-Metric Multidimensional Scaling (NMS) Ordinations (PC-ORD version 7.0)

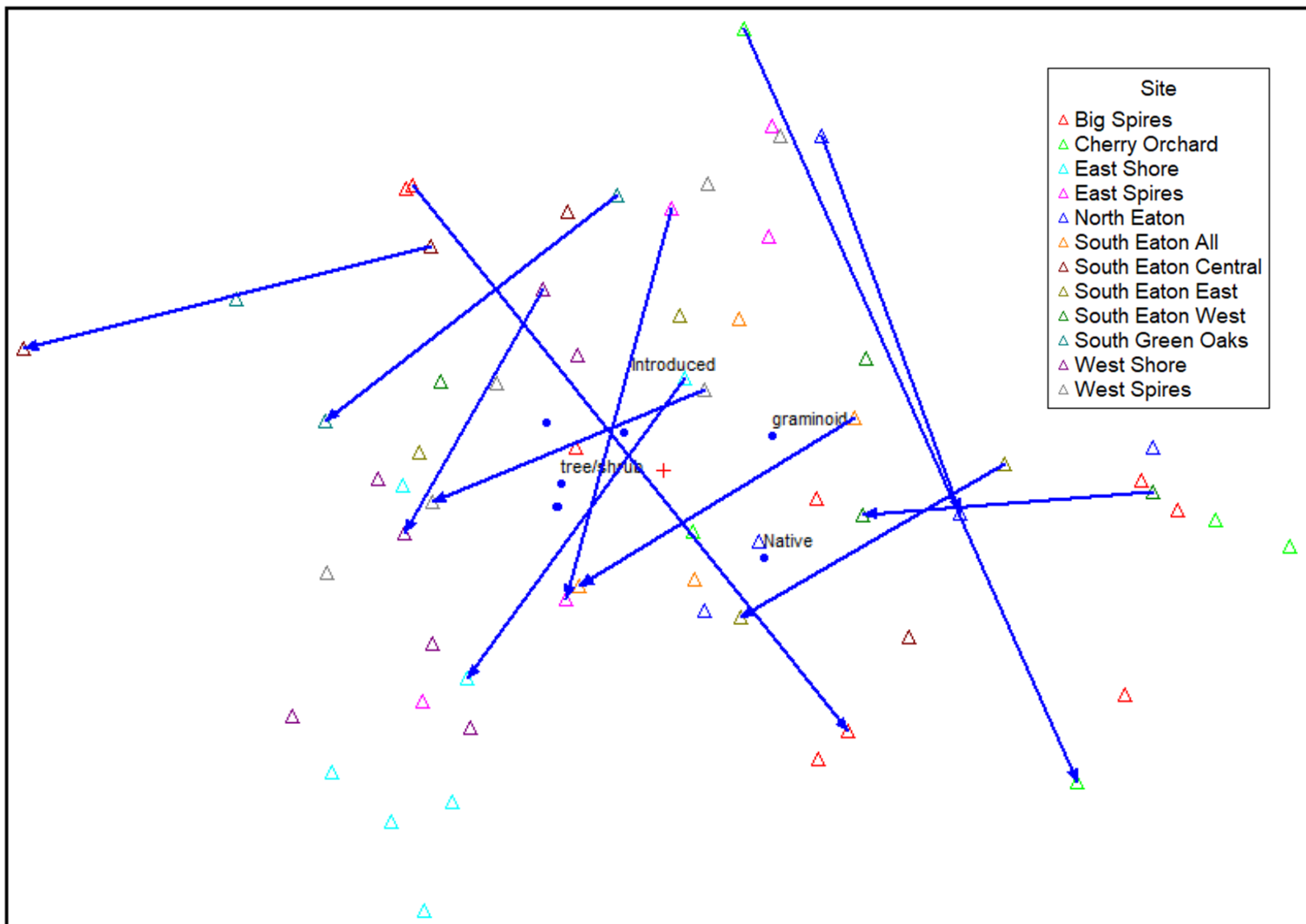


Introduced



Native

Axis 2



Axis 1

Forb



Graminoid

Introduced



Native

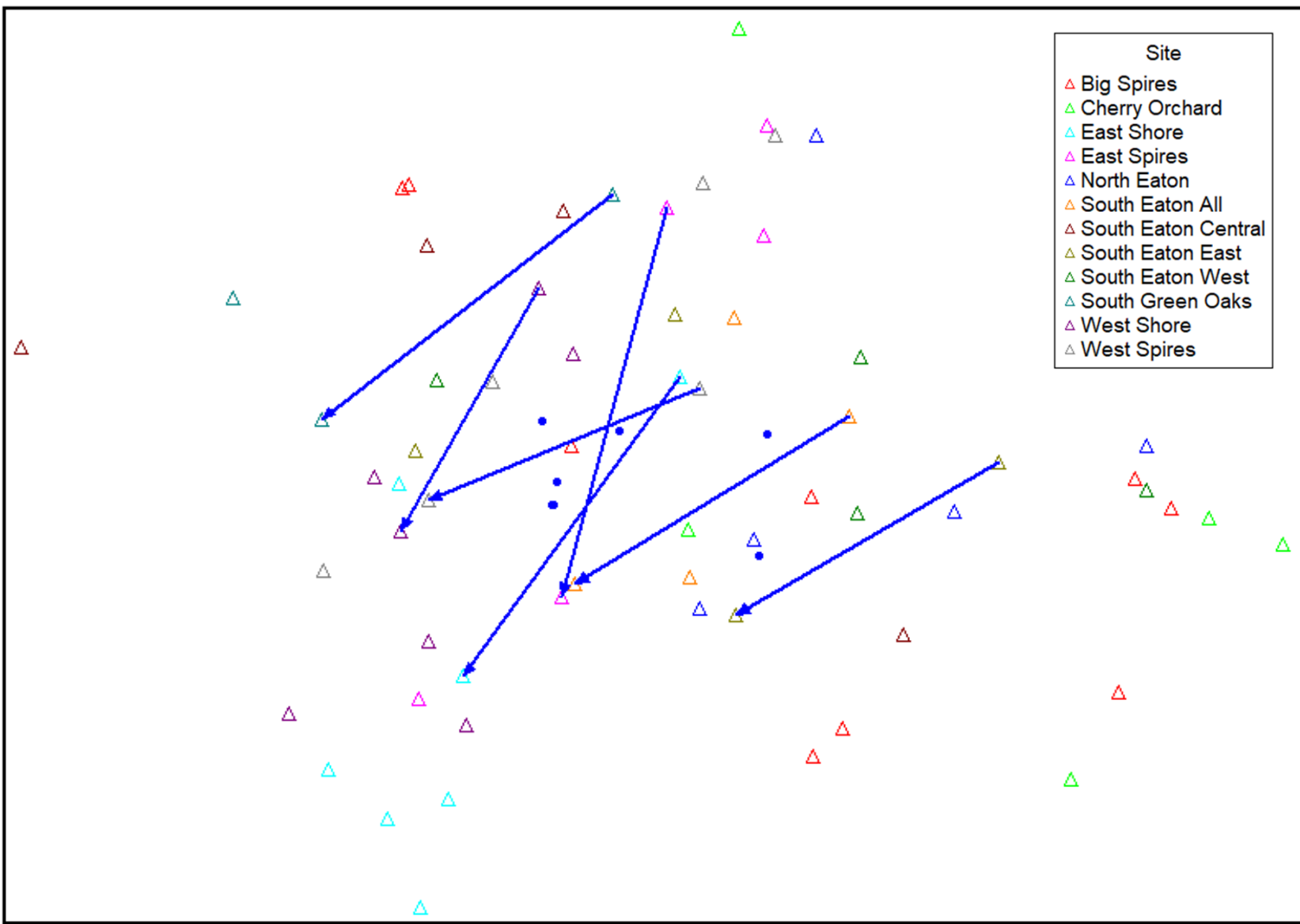
Axis 2

Axis 1

Forb



Graminoid

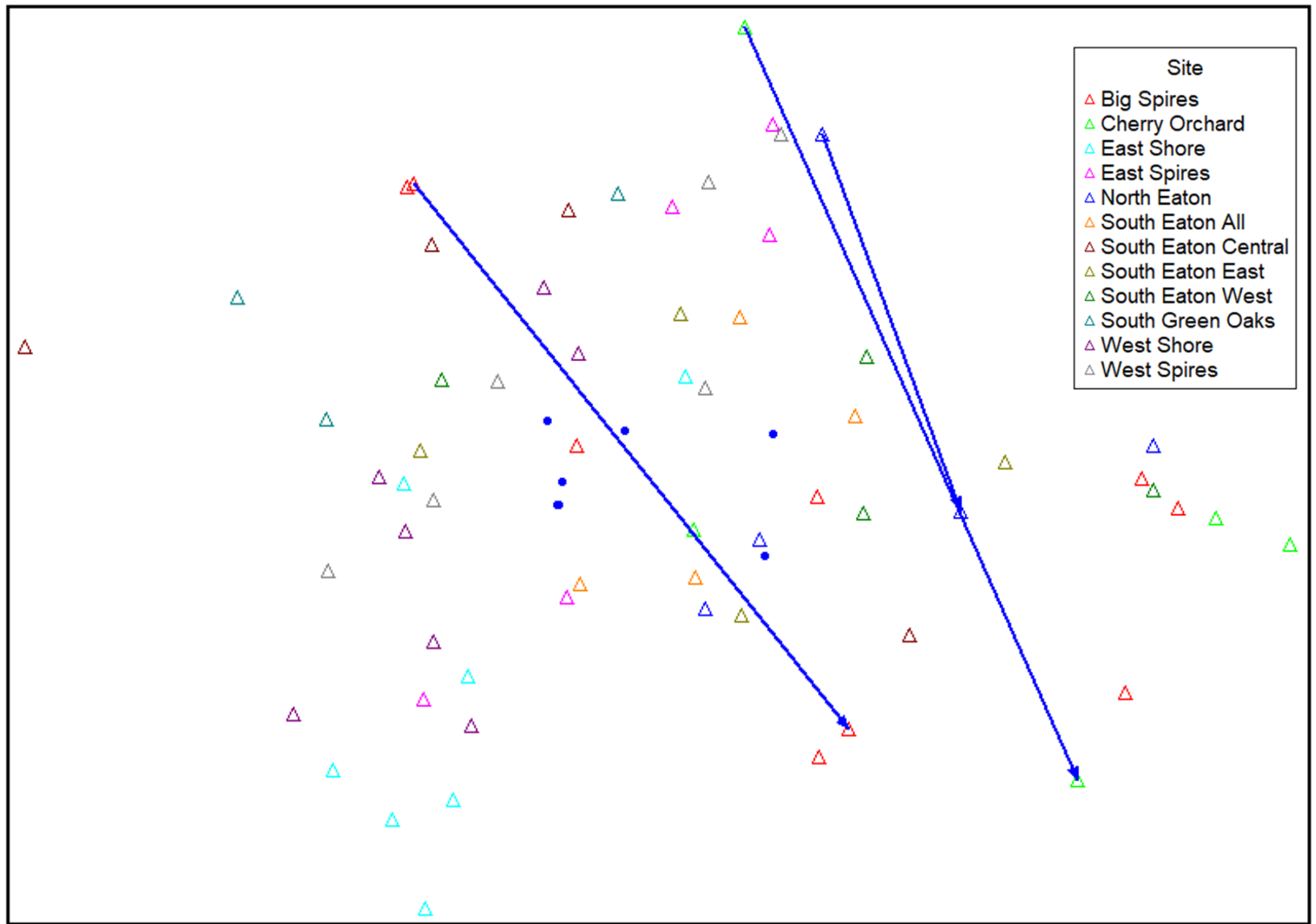


Introduced



Native

Axis 2



- Site
- △ Big Spires
  - △ Cherry Orchard
  - △ East Shore
  - △ East Spires
  - △ North Eaton
  - △ South Eaton All
  - △ South Eaton Central
  - △ South Eaton East
  - △ South Eaton West
  - △ South Green Oaks
  - △ West Shore
  - △ West Spires

Axis 1

Forb



Graminoid

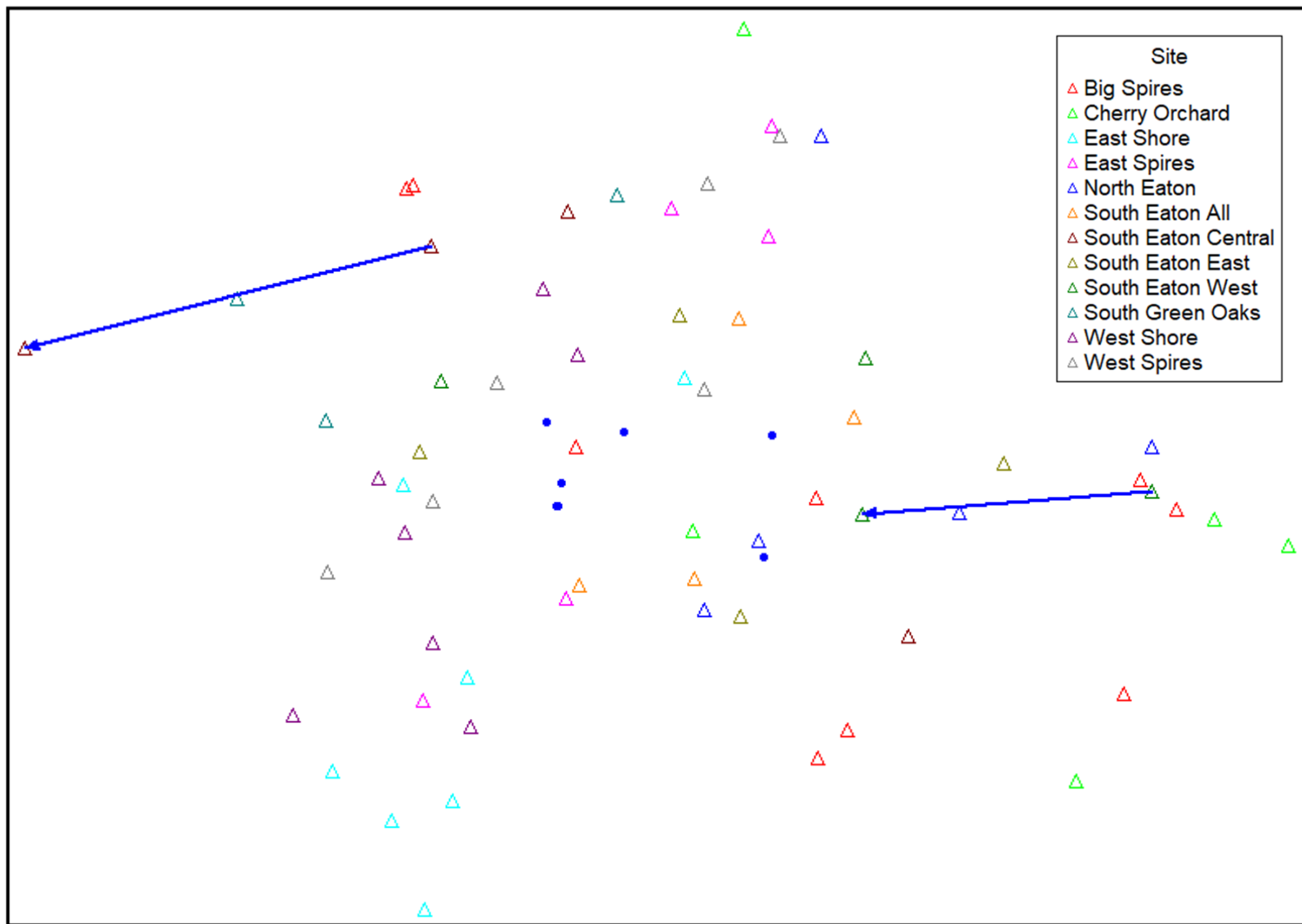


Introduced



Native

Axis 2

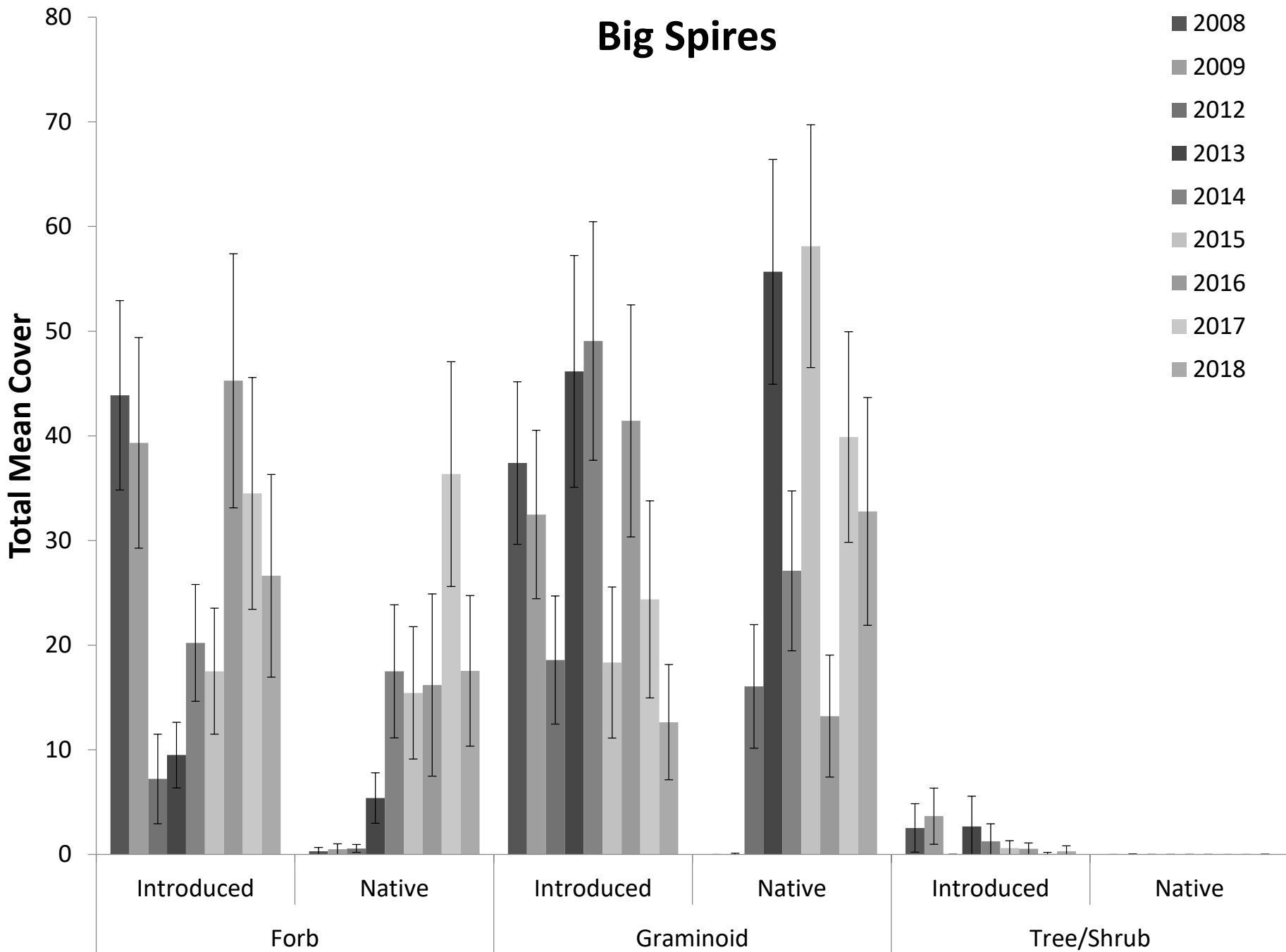


Forb



Graminoid

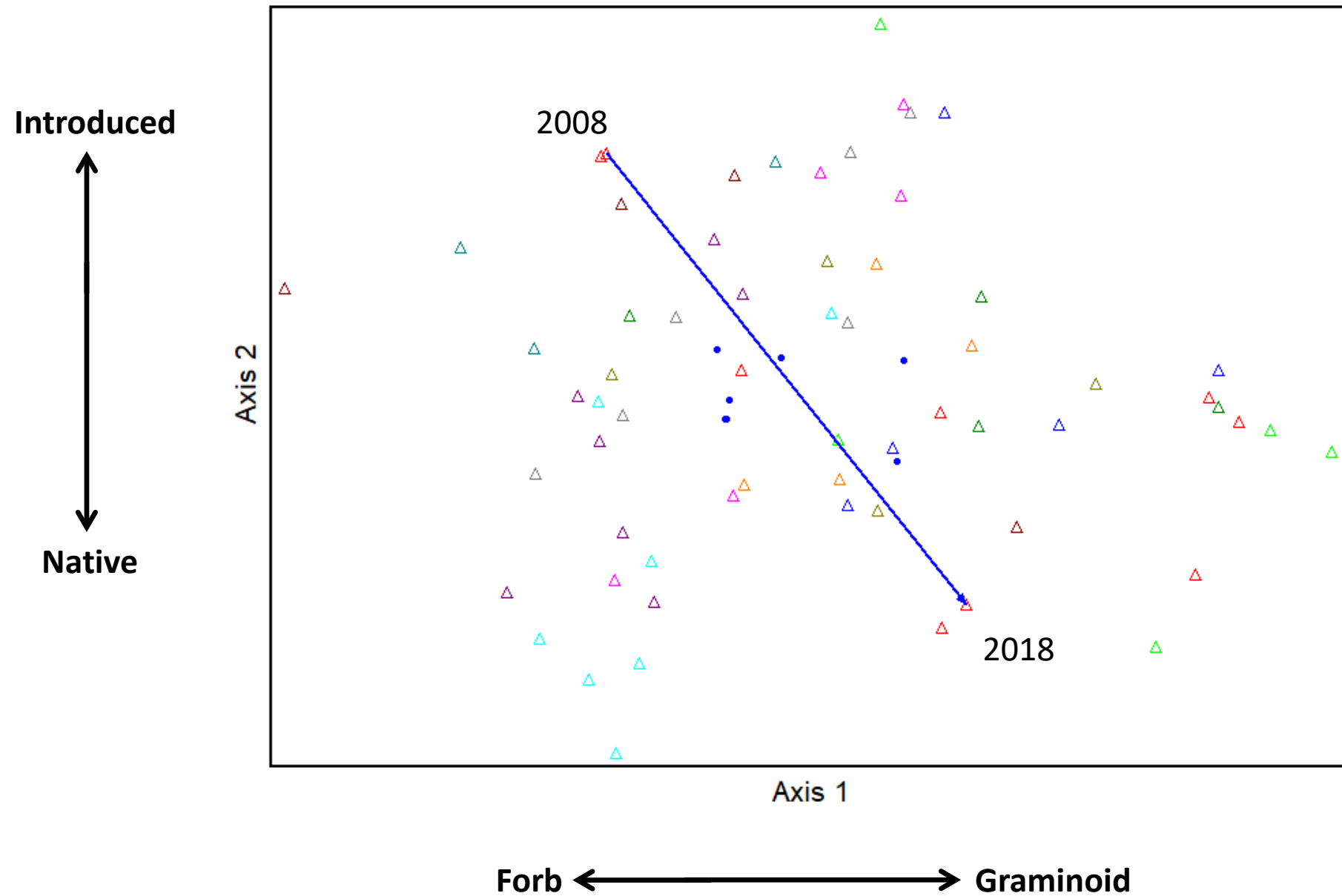
# Big Spires



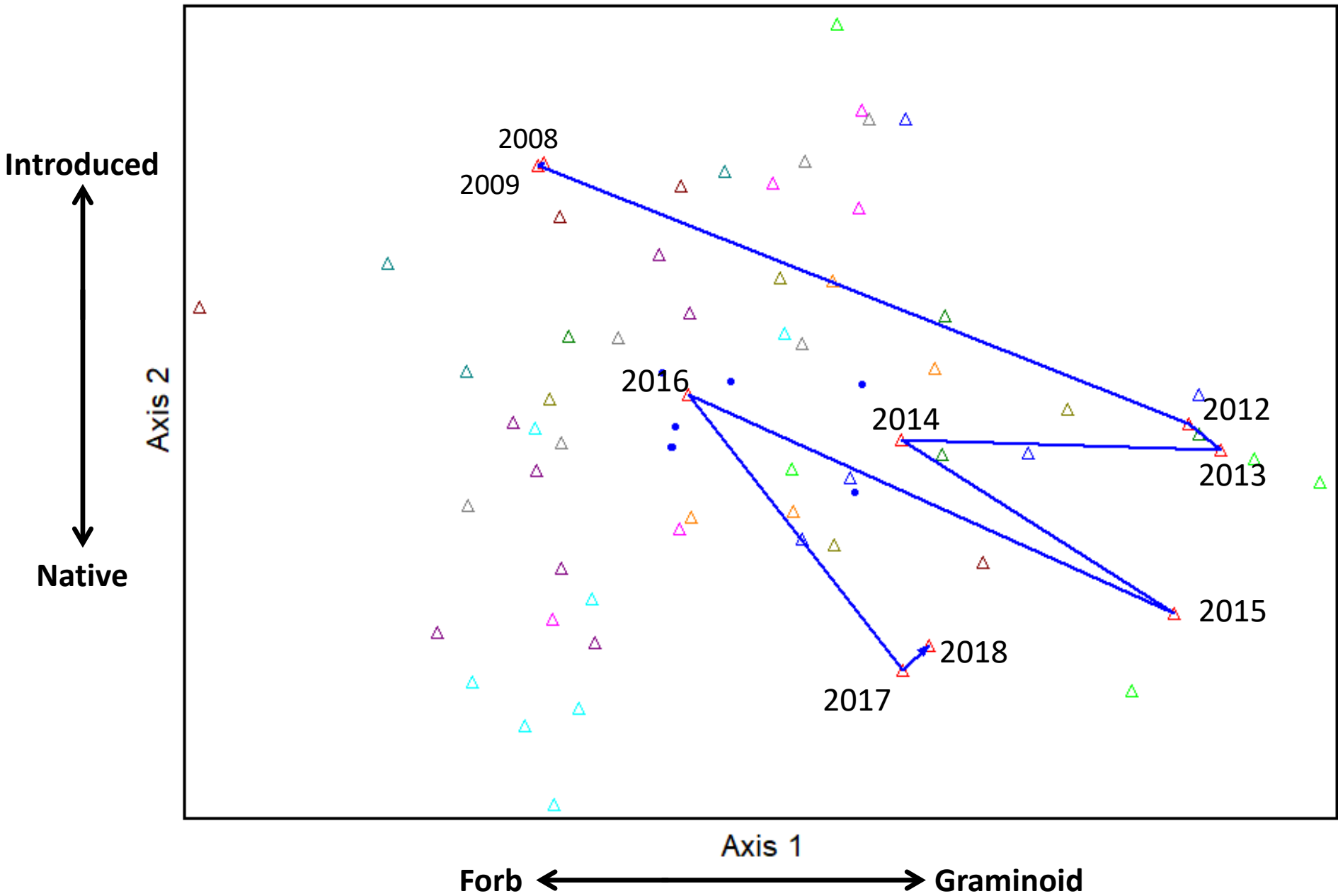


# Big Spires

Introduced forb to native graminoid composition



# Big Spires





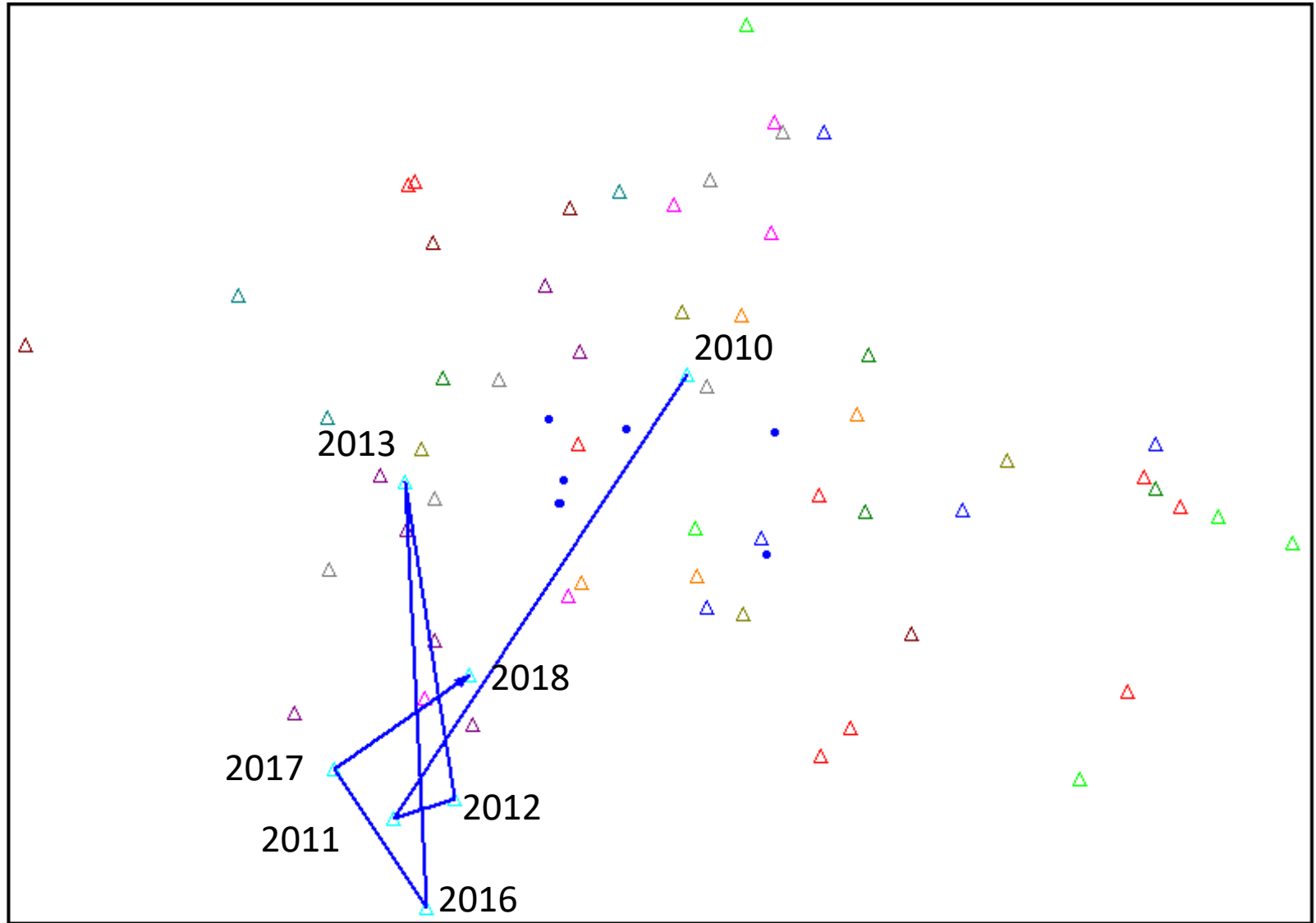
# East Shore

Introduced



Native

Axis 2



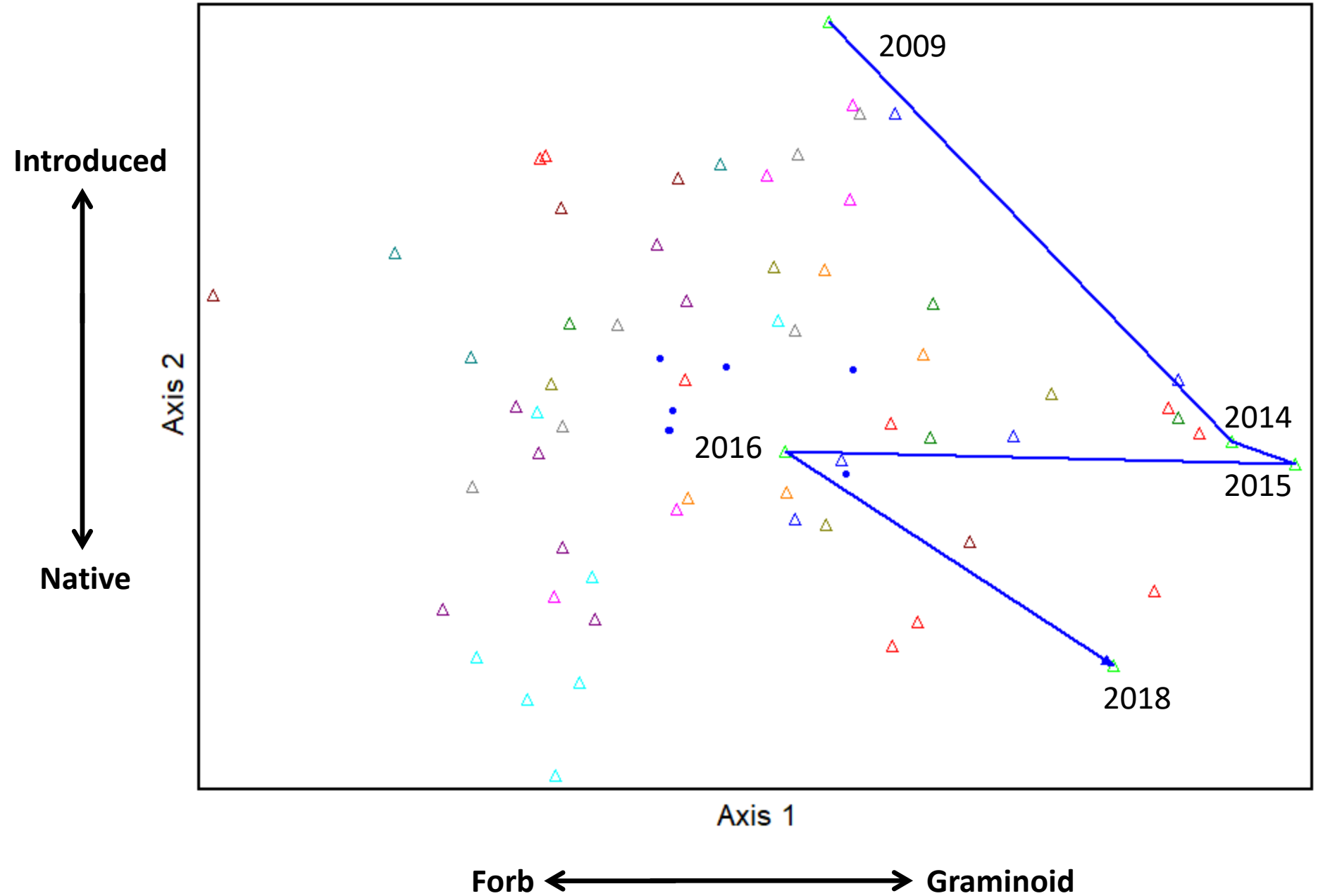
Axis 1

Forb



Graminoid

# Cherry Orchard





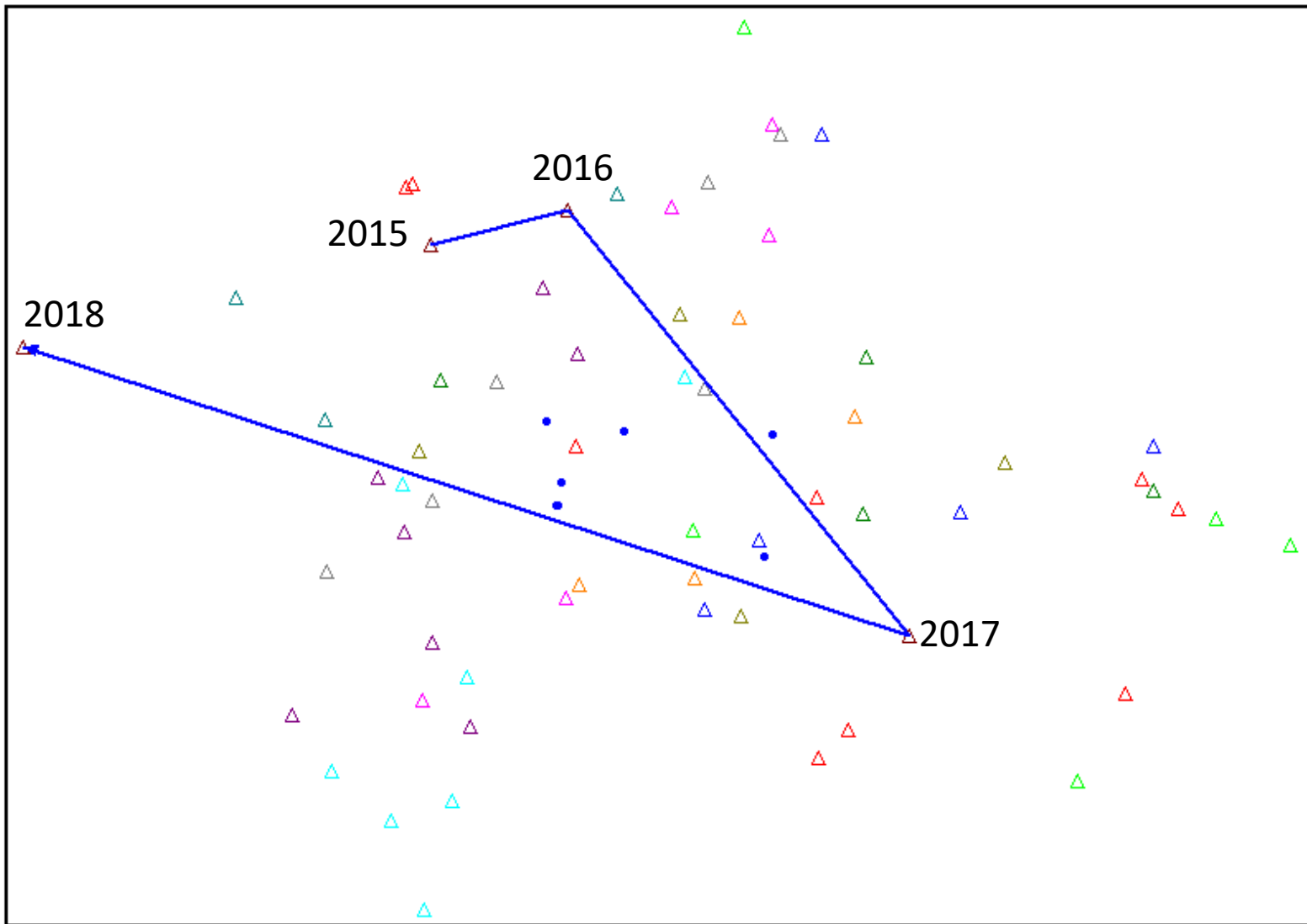
# South Eaton Central

Introduced



Native

Axis 2



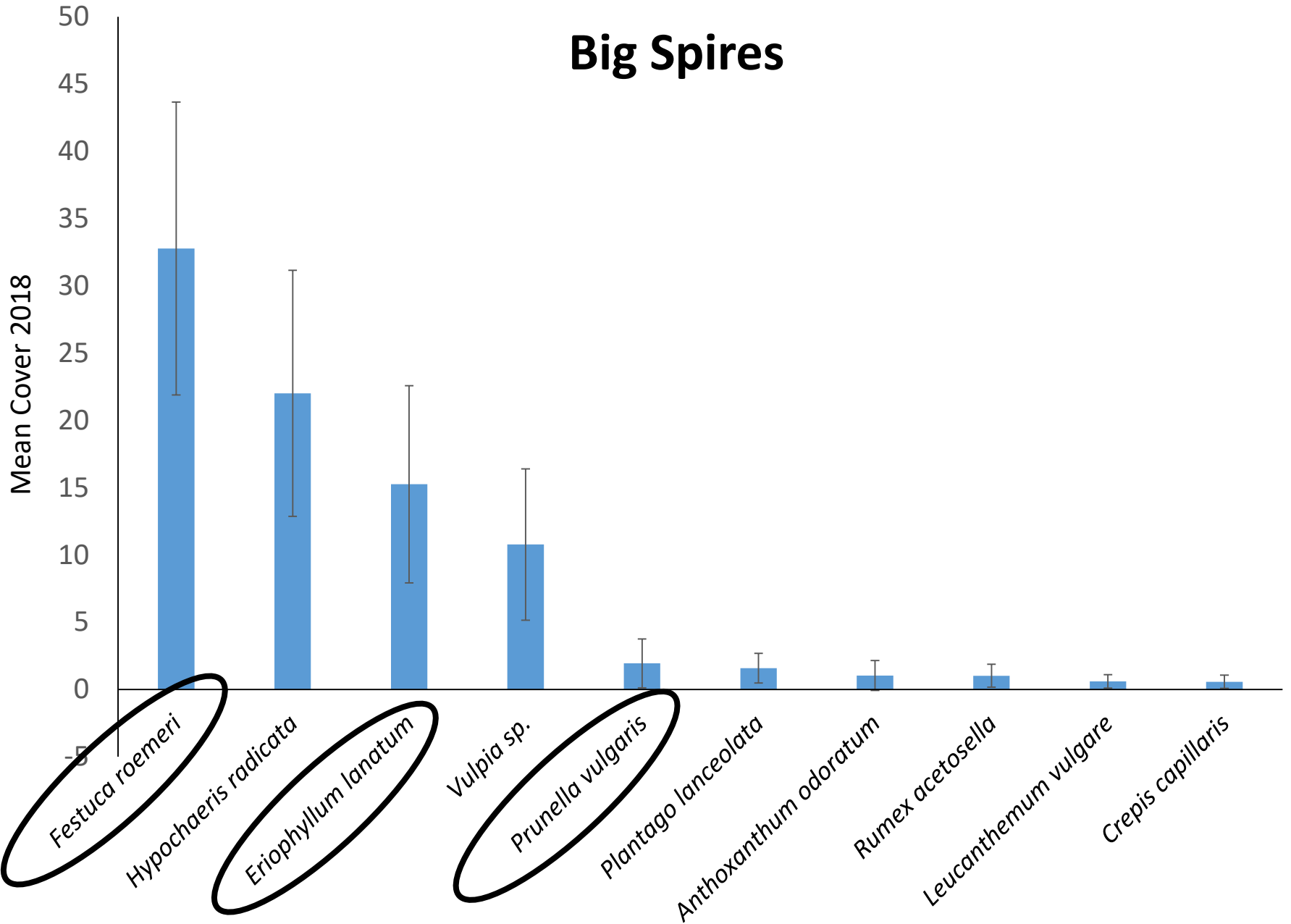
Axis 1

Forb

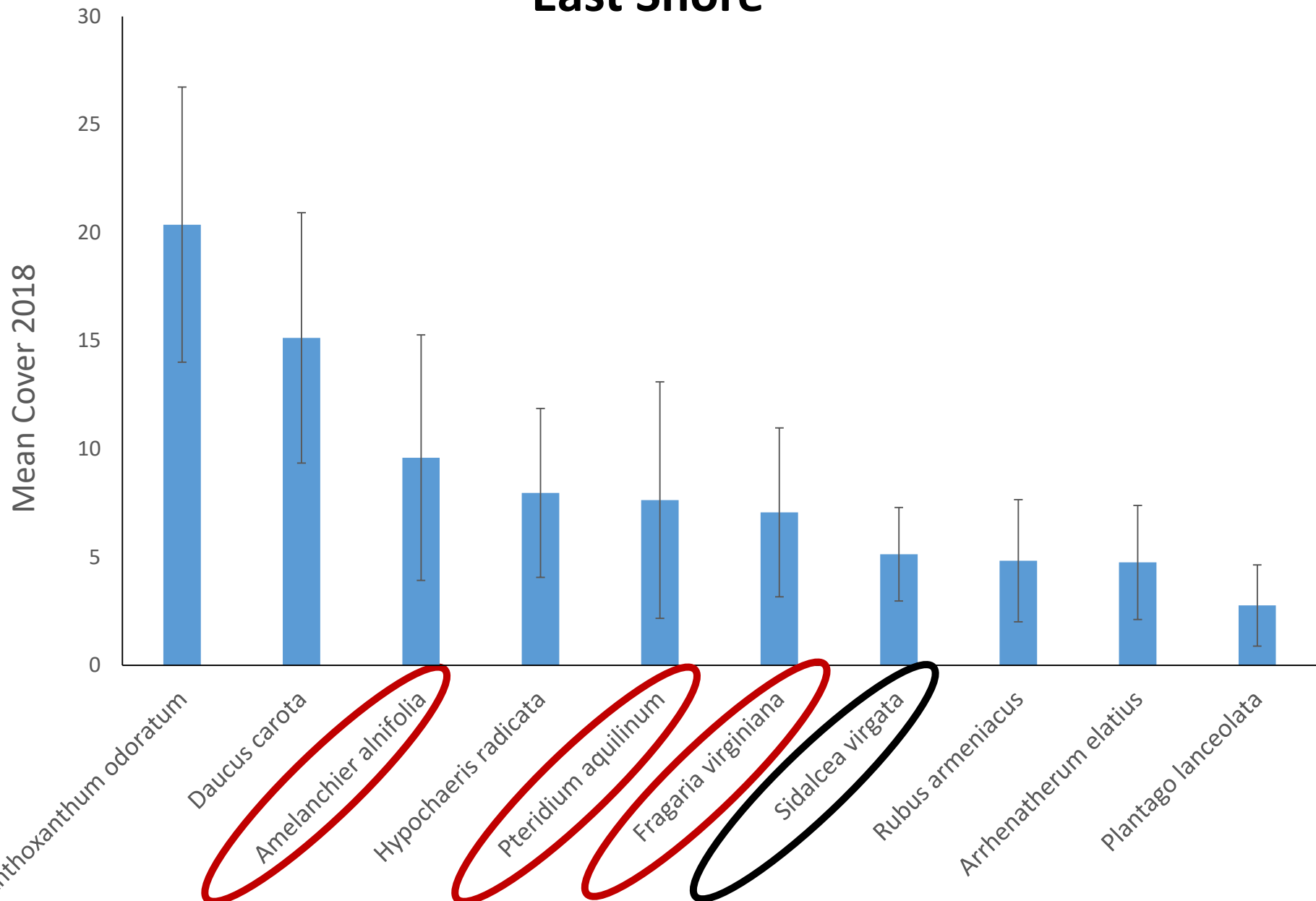


Graminoid

# Big Spires

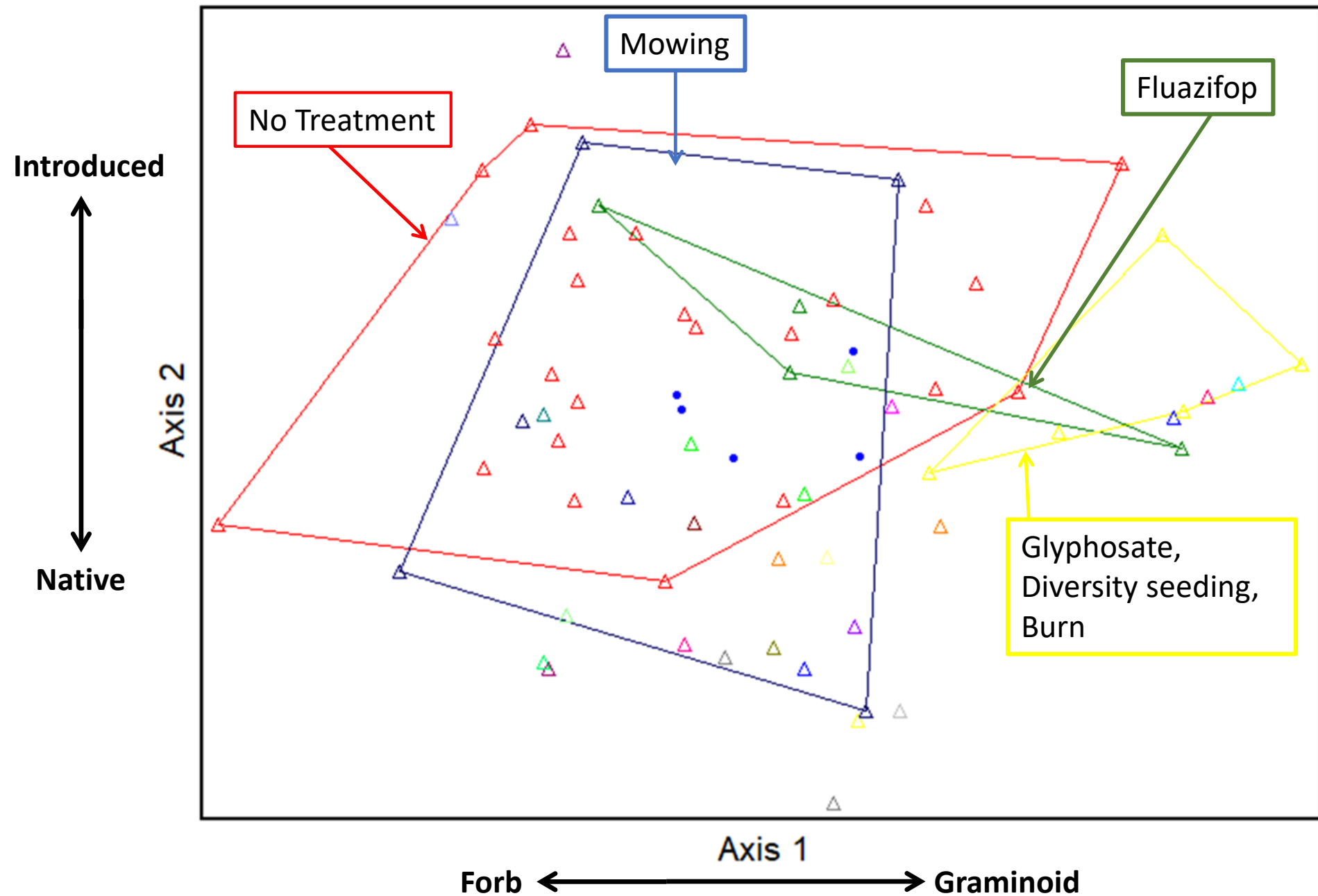


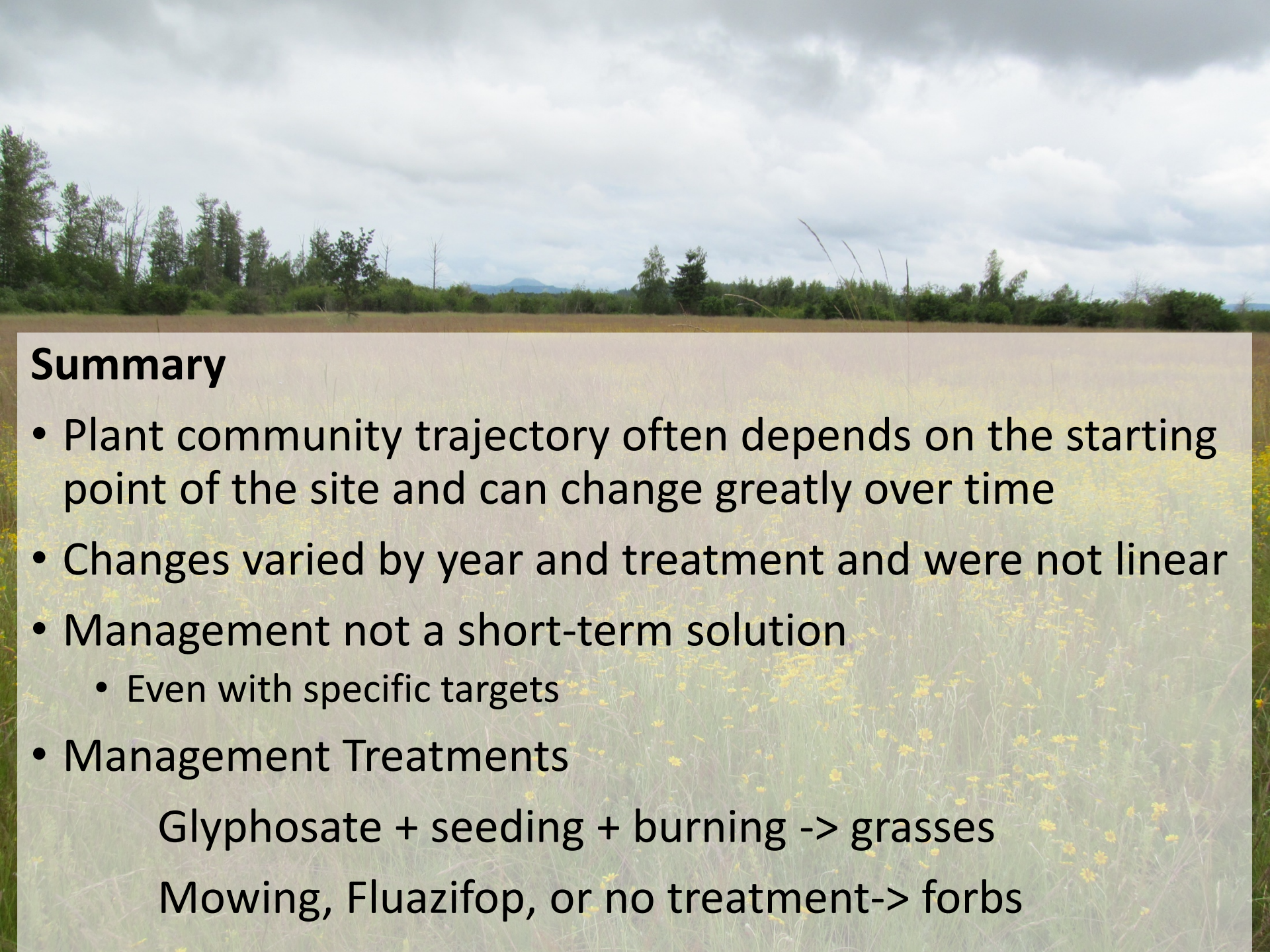
# East Shore





# Management Treatments





## Summary

- Plant community trajectory often depends on the starting point of the site and can change greatly over time
- Changes varied by year and treatment and were not linear
- Management not a short-term solution
  - Even with specific targets
- Management Treatments
  - Glyphosate + seeding + burning -> grasses
  - Mowing, Fluazifop, or no treatment-> forbs





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<b>Species</b>	<b>Nativity</b>	<b>Functional Group</b>	<b>Site</b>	<b>Indicator Value</b>	<b>P Value</b>
<i>Leucanthemum vulgare</i>	Introduced	Forb	Big Spires	35.9	0.05
<i>Holcus lanatus</i>	Introduced	Graminoid	Cherry Orchard	36	0.01
<i>Fragaria virginiana</i>	Native	Forb	East Shore	43.2	0.00
<i>Prunus emarginata</i>	Native	Tree/Shrub	East Shore	83.3	0.00
<i>Sidalcea virgata</i>	Native	Forb	East Shore	37	0.00
<i>Apocynum androsaemifolium</i>	Native	Forb	East Shore	36.2	0.02
<i>Luzula</i> sp.	Unknown	Graminoid	East Shore	39.3	0.02
<i>Crepis capillaris</i>	Introduced	Forb	East Shore	31.9	0.02
<i>Galium aparine</i>	Native	Forb	East Shore	48.5	0.05
<i>Elymus glaucus</i>	Native	Graminoid	East Spires	60.5	0.00
<i>Brodiaea</i> sp.	Native	Forb	North Eaton	65.9	0.00
<i>Cytisus scoparius</i>	Introduced	Tree/Shrub	North Eaton	43.8	0.01
<i>Quercus garryana</i>	Native	Tree/Shrub	North Eaton	62.9	0.03
<i>Bromus hordeaceus</i>	Introduced	Graminoid	South Green Oaks	74.7	0.00
<i>Festuca trachyphylla</i>	Introduced	Graminoid	West Shore	100	0.00
<i>Cerastium arvense</i>	Unknown	Forb	West Shore	45.2	0.03
<i>Festuca rubra</i>	Introduced	Graminoid	West Spires	100	0.00
<i>Arrhenatherum elatius</i>	Introduced	Graminoid	West Spires	21	0.00
<i>Rosa</i> spp.	Unknown	Tree/Shrub	West Spires	32.6	0.01
<i>Solidago canadensis</i>	Native	Forb	West Spires	60	0.01
<i>Prunus</i> sp.	Unknown	Tree/Shrub	West Spires	53.2	0.03