THE EFFECTS OF MICROCLIMATES ON THE INVERTEBRATES OF THE TROUT CREEK WATERS AND ITS RIPARIAN ZONES

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$1.1 Billion

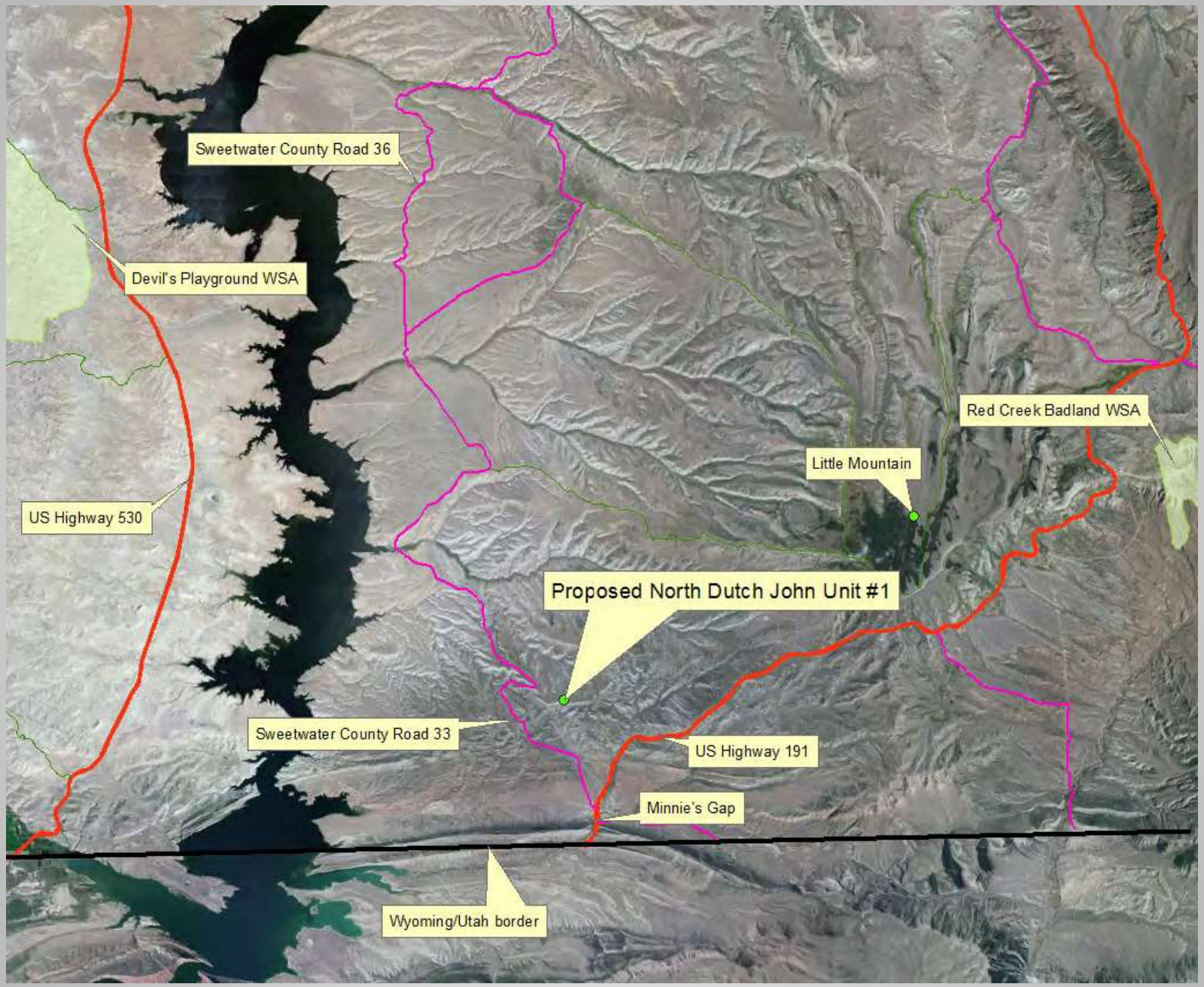
Wyoming 2011

- Hunting
- Fishing
- Wildlife watching

(US Fish and Game census bureau

Why Trout Creek?

- Perennial stream
- Alpine, original/untouched state
- Beavers (Stoffyn-Egli, Willison,2011)
- Grazing
- Shrub-steppe
- Fracking (BLM)


Sweetwater County Road 36
Devil's Playground WSA
US Highway 530
Red Creek Badland WSA
Little Mountain
Proposed North Dutch John Unit #1
Sweetwater County Road 33
US Highway 191
Minnie's Gap
Wyoming/Utah border


285

Alpine

Side
A

Side
B

Beaver

Side A

Side B

Sage

Side A

Side B

Methods:

Land

- Temperature
- Wind
- Relative humidity
- Invertebrate diversity

Water

Night Trapping

Predominant plants

Preserving:

- Terrestrial invertebrates
  - Plastic bags and frozen
  - Sorted/70% ethanol solution
  - Sorted and identified to family (15 orders-69 families)

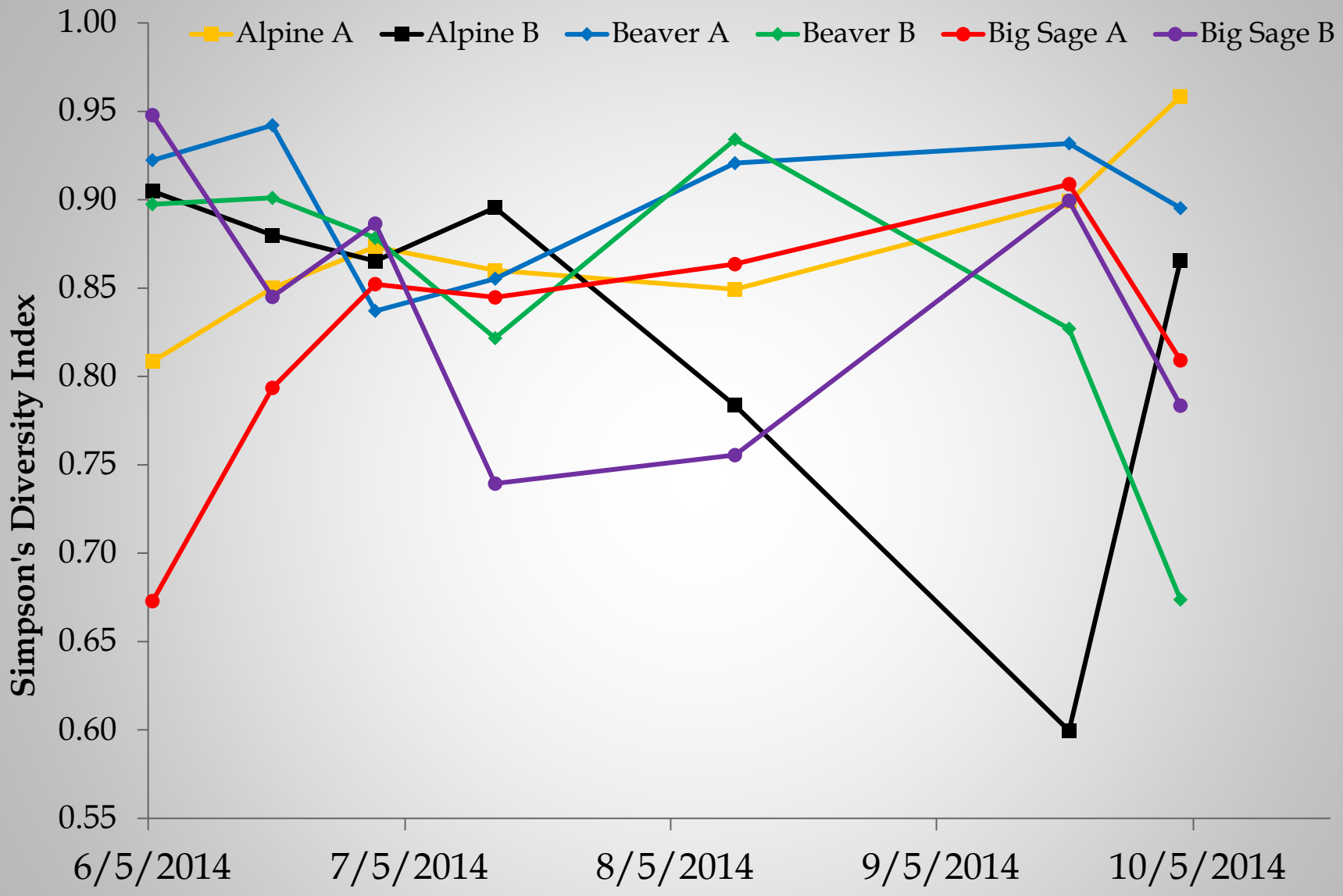
Invertebrates?

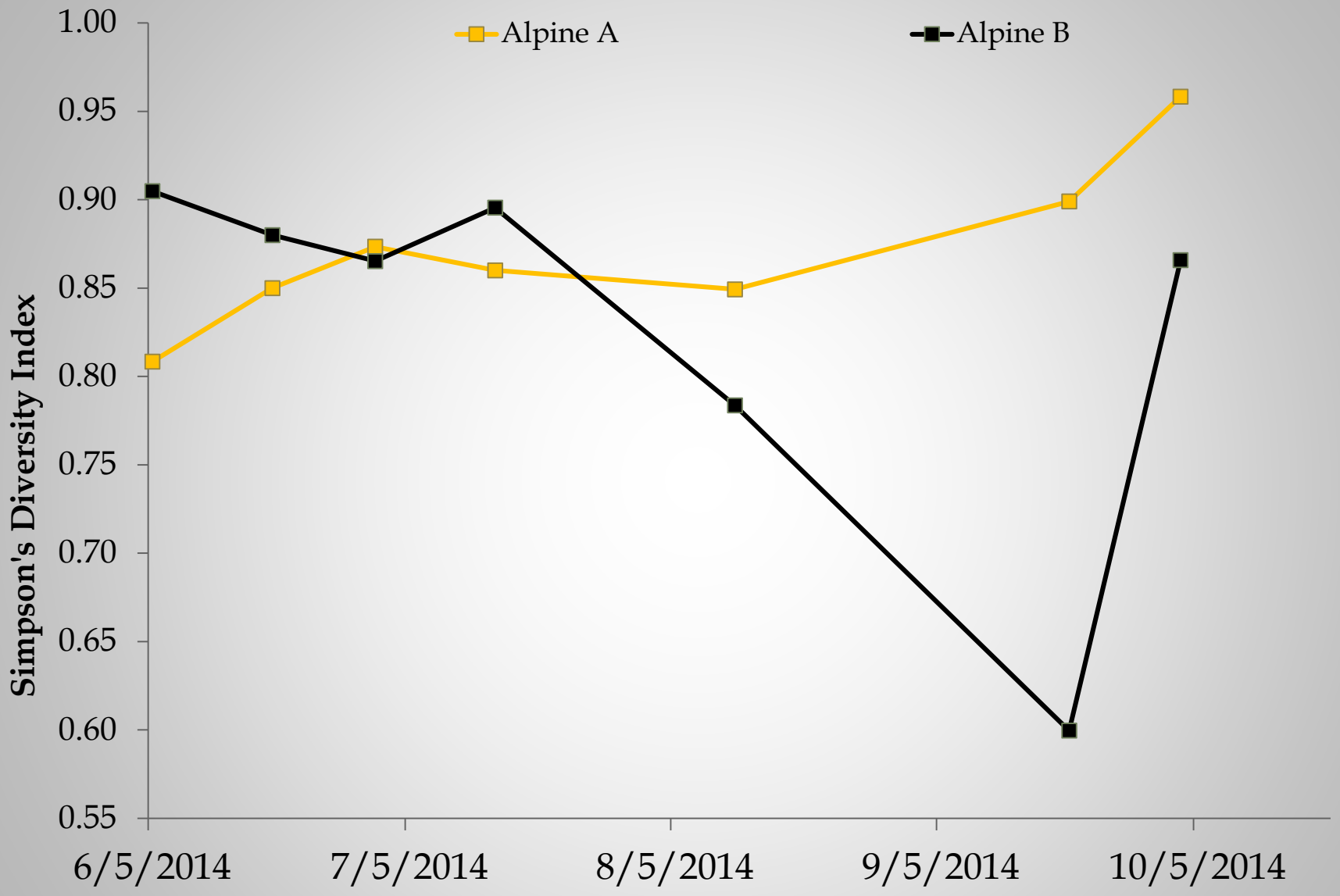
- Food Web (Masese, et al2014)
  - Plants
  - Soil
  - Birds
  - Fish

- Invertebrates are great bioindicators
  - Hymenoptera (McMahona, et al 2012. Bugalho, et al 2011)
  - Hemiptera (Wallner,et al. 2012)
  - Coleoptera (Jung, et al.2011.Thiele,1977, Wallin, 1985, Burel et al. 1998)

Simpson's Diversity Index

- Richness
- Evenness
- Scale 0-1.0


Alpine A
Alpine B
Beaver A
Beaver B
Big Sage A
Big Sage B
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
Simpson's Diversity Index
6/5/2014
7/5/2014
8/5/2014
9/5/2014
10/5/2014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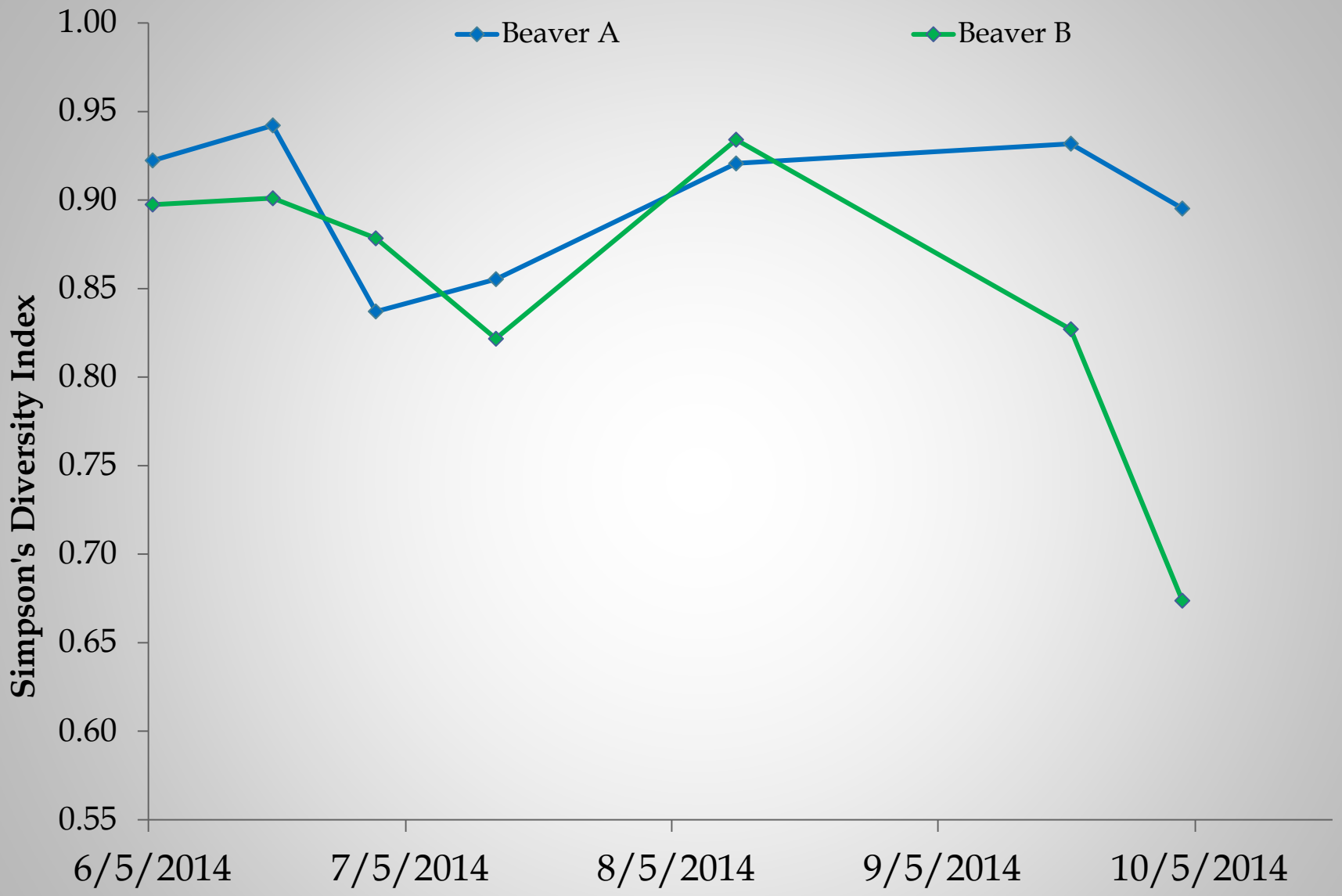
10/5/2014


Beaver A
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1.00
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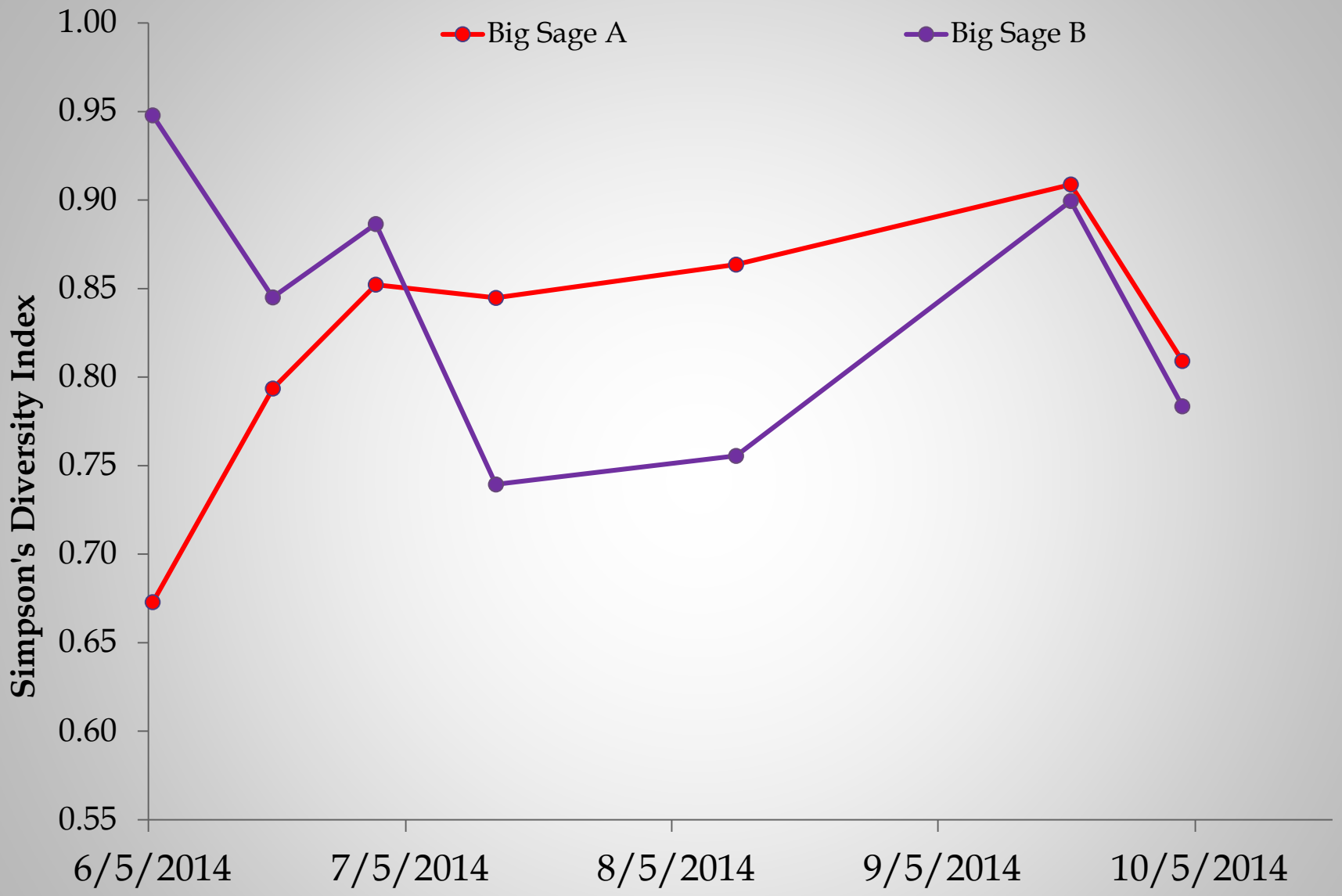
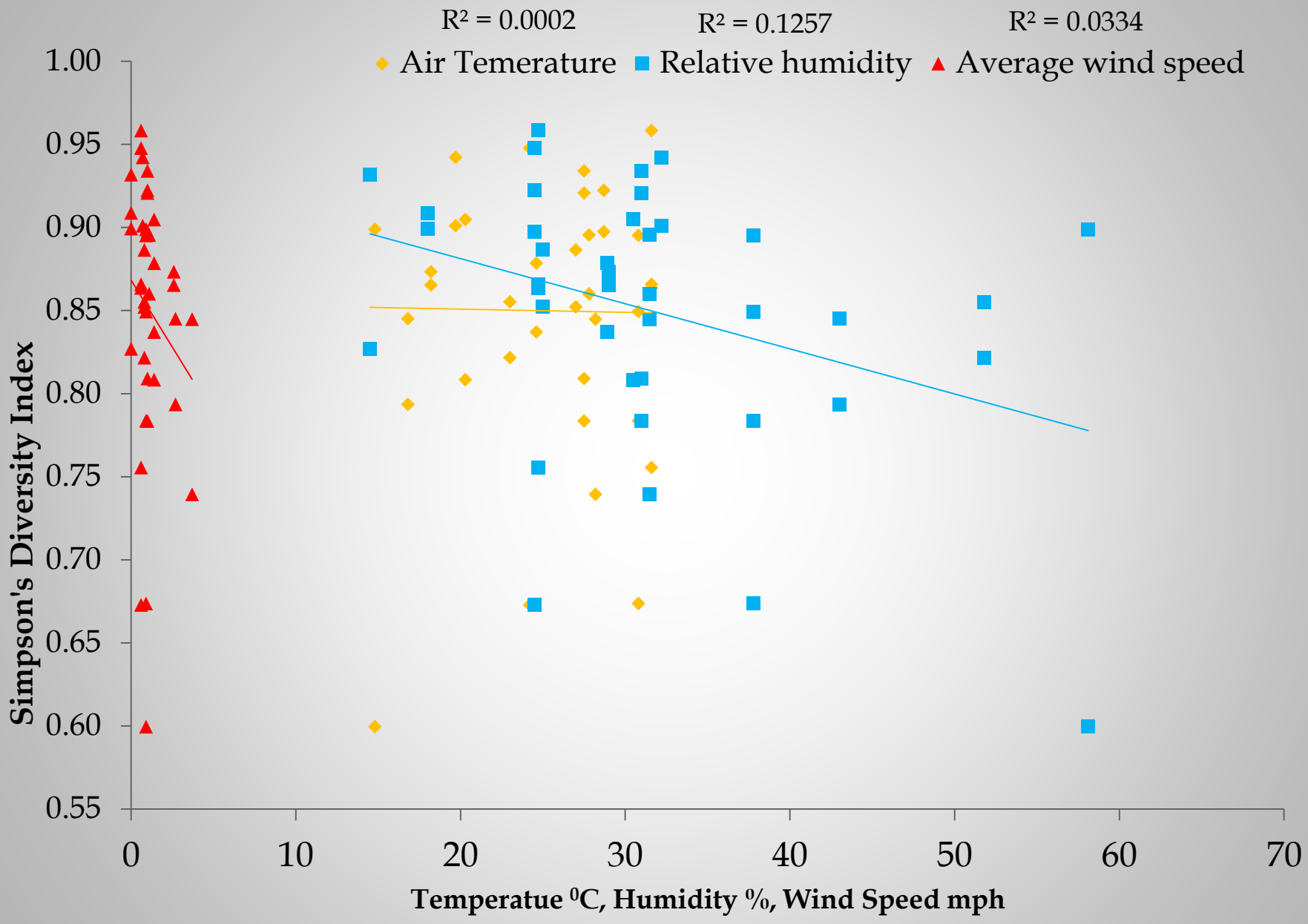
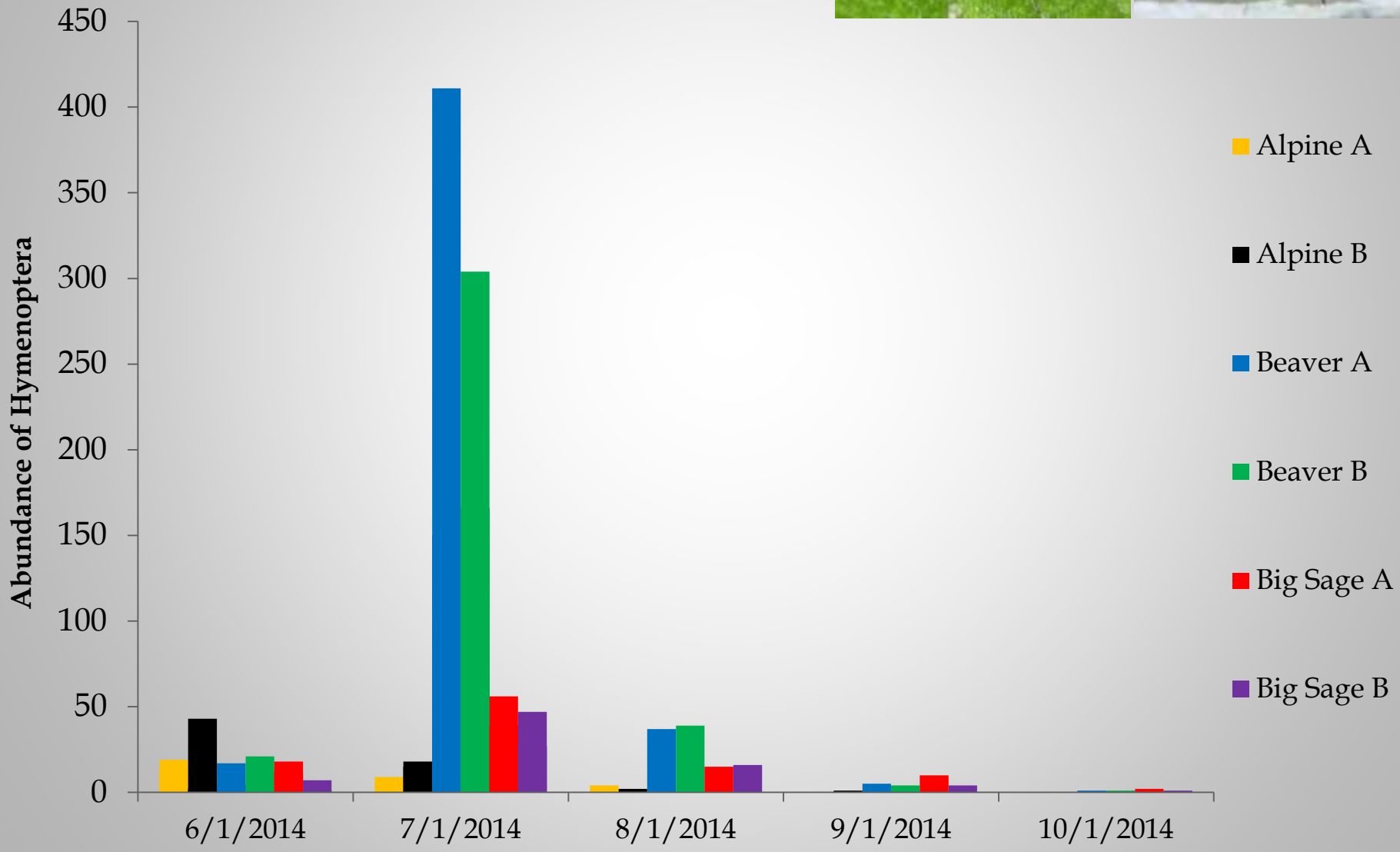
10/5/2014


Big Sage A
Big Sage B
Simpson's Diversity Index
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
6/5/2014
7/5/2014
8/5/2014
9/5/2014
10/5/2014


R² = 0.0002
R² = 0.1257
R² = 0.0334
Air Temerature
Relative humidity
Average wind speed
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
Simpson's Diversity Index
0
10
20
30
40
50
60
70
Temperatue ⁰C, Humidity %, Wind Speed mph


Abundance of Hymenoptera
450
400
350
300
250
200
150
100
50
0
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
Alpine A
Alpine B
Beaver A
Beaver B
Big Sage A
Big Sage B

Abundance of Hemiptera
400
350
300
250
200
150
100
50
0
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
Alpine A
Alpine B
Beaver A
Beaver B
Big Sage A
Big Sage B

Abundance of Coleoptera
50
45
40
35
30
25
20
15
10
5
0
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
Alpine A
Alpine B
Beaver A
Beaver B
Big Sage A
Big Sage B

Future Environmental concerns

Predictive Models

Positive effects

- Beaver
- Rotating grazing
- Willow plantings in shrub-steppe
- Thinning Forest
- Controlled burns (Kwon, Et al.. 2013)

Negative Effects

- Fracking
- Development of roads
- Stationary grazing
- Logging
- Mining

Conclusion:

It is hoped that the data collected in this study will contribute to informed decisions made about our stream and riparian zone management in Wyoming and other areas with similar climates.

My thanks go out to:

- WWCC
- INBRE
- John Henderson BLM
- Dr. Will Clark