

Submerged Aquatic Vegetation in Selected Spring Run Streams in the Middle St. Johns River



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Blue Spring Working Group
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Spring Run Stream Aquatic Plants

➤ Algae

- Diatoms
- Cyanobacteria ("blue green")
- *Chara* spp (Chlorophyta)
- Filamentous spp
- Red algae (Rhodophyta)

➤ Vascular plants (exotic)

- *Hydrilla verticillata*
- *Egeria densa*
- *Myriophyllum spicatum*

➤ Mosses

- *Fontinalis* spp

➤ Vascular plants (native)

- *Cabomba caroliniana*
- *Ceratophyllum demersum*
- *Najas* spp.
- *Sagittaria kurziana*
- *Vallisneria americana*
- *Potamogeton* spp
- *Myriophyllum* spp
- *Ludwigia repens*



Spring Run Submerged Aquatic Vegetation



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Photos – R. Mattson and PBS&J 2003

Ecological Values of Spring Run Stream SAV

- Substrate for epiphytic production
- Stabilize sediments
- Habitat for aquatic fauna
- Direct food source (turtles, manatees)
- Energy flow, detritus production, nutrient cycling
- Indicator of overall “stream health”



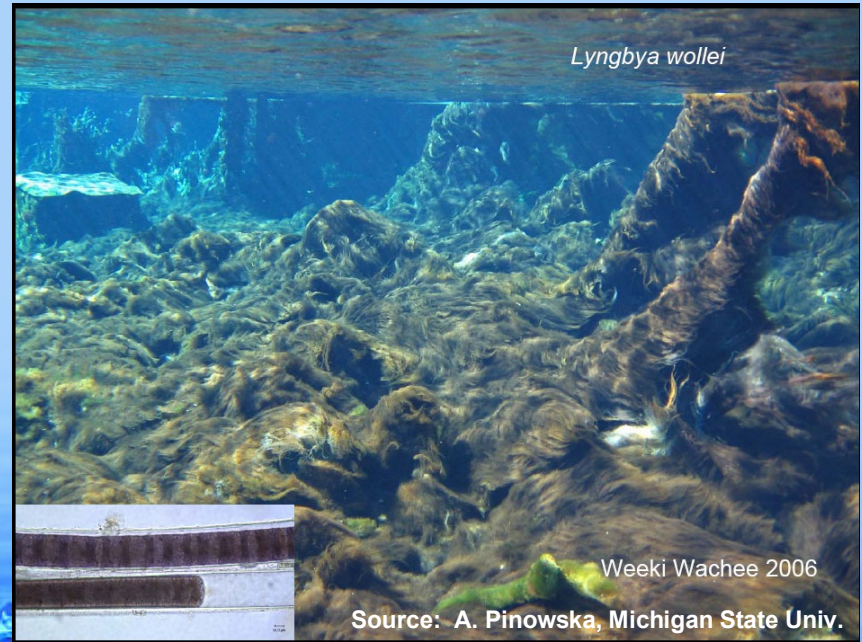
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Changes in SAV in springs

Weeki Wachee 1951



Weeki Wachee 2006



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STUDY OBJECTIVES

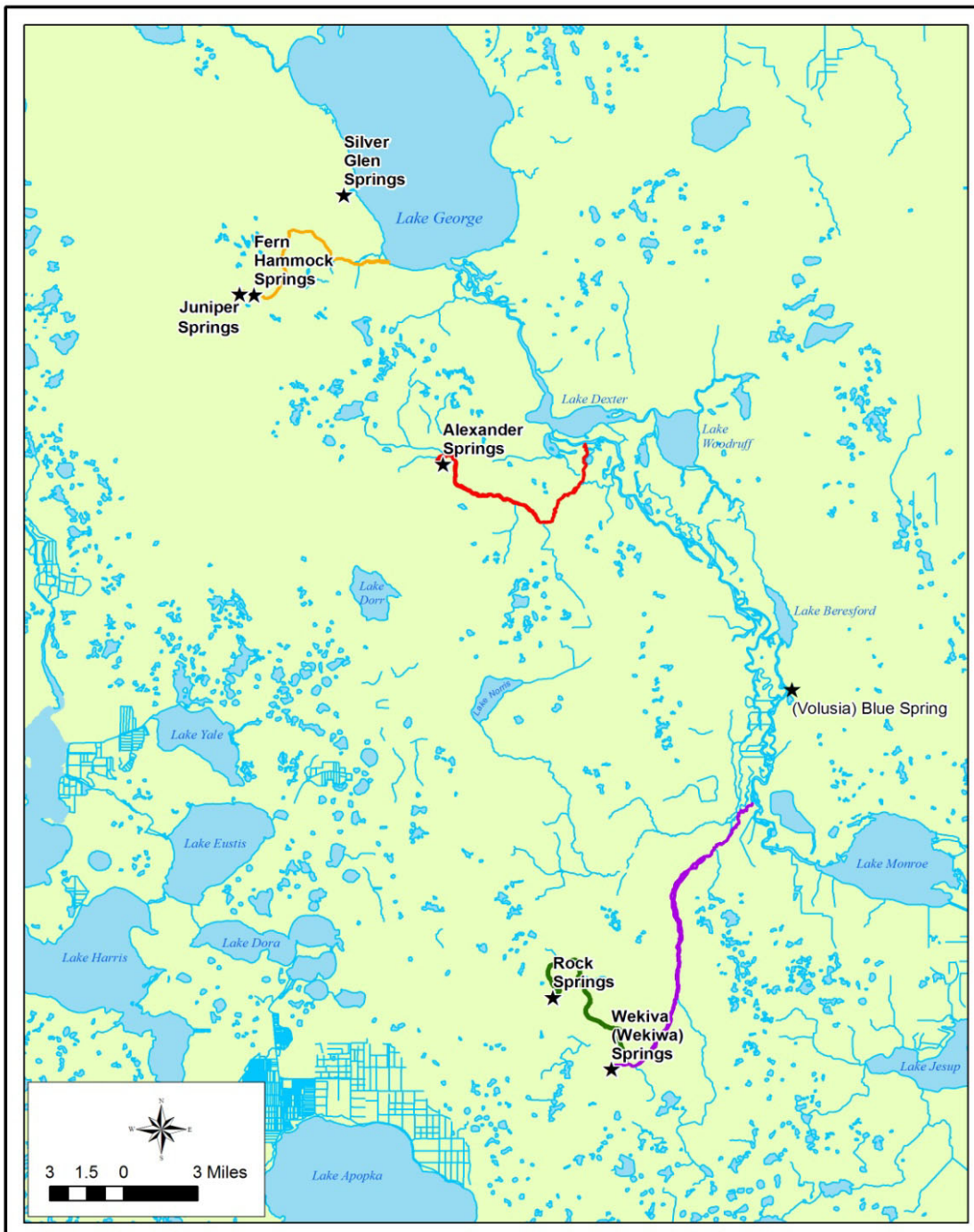
- Map distribution and acreage of SAV by species in six spring run stream systems
- Compare to prior mapping efforts
- Initiate field monitoring of SAV cover in five streams previously sampled for algal cover



Locations of study streams

- Silver Glen Spring Run
- Juniper Creek
- Alexander Spring Creek
- Volusia Blue Spring Run
- Rock Springs Run
- Wekiva River

Entire length of spring run mapped (headspring to confluence with 'X')



Mapping Methodology

Dial, Cordy & Assoc.

➤ “Map-in-the-field” technology

- Aerial photography not practical
- Relatively limited area to map
- Can map to species-level

➤ Delineate base map (shoreline)

➤ Map SAV cover

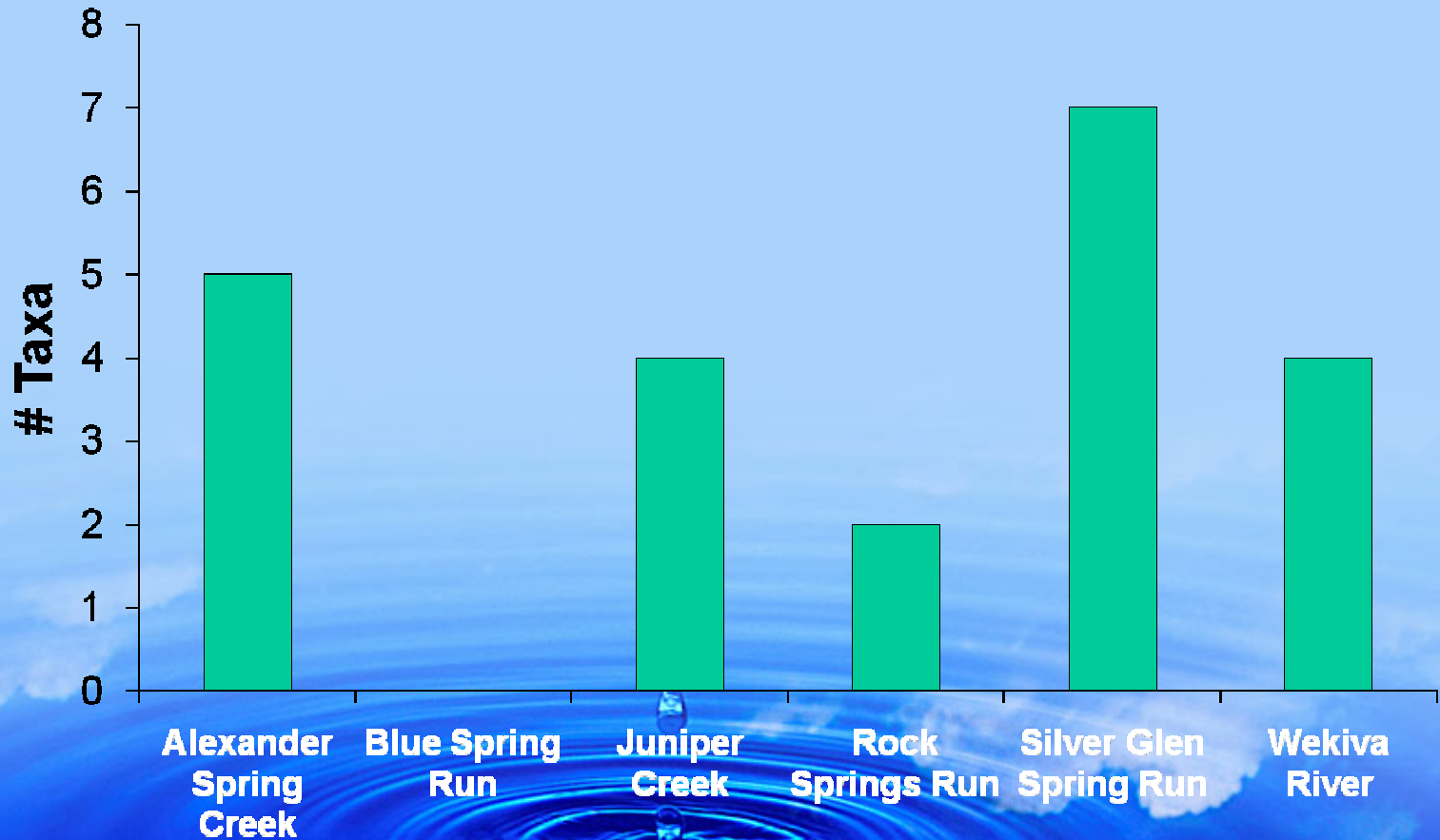
- Hi-resolution GPS receiver
- Linked to laptop with GIS software
- Delineate edge-of-bed



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Spring Run Plant Taxa Richness

Total SAV Taxa Richness

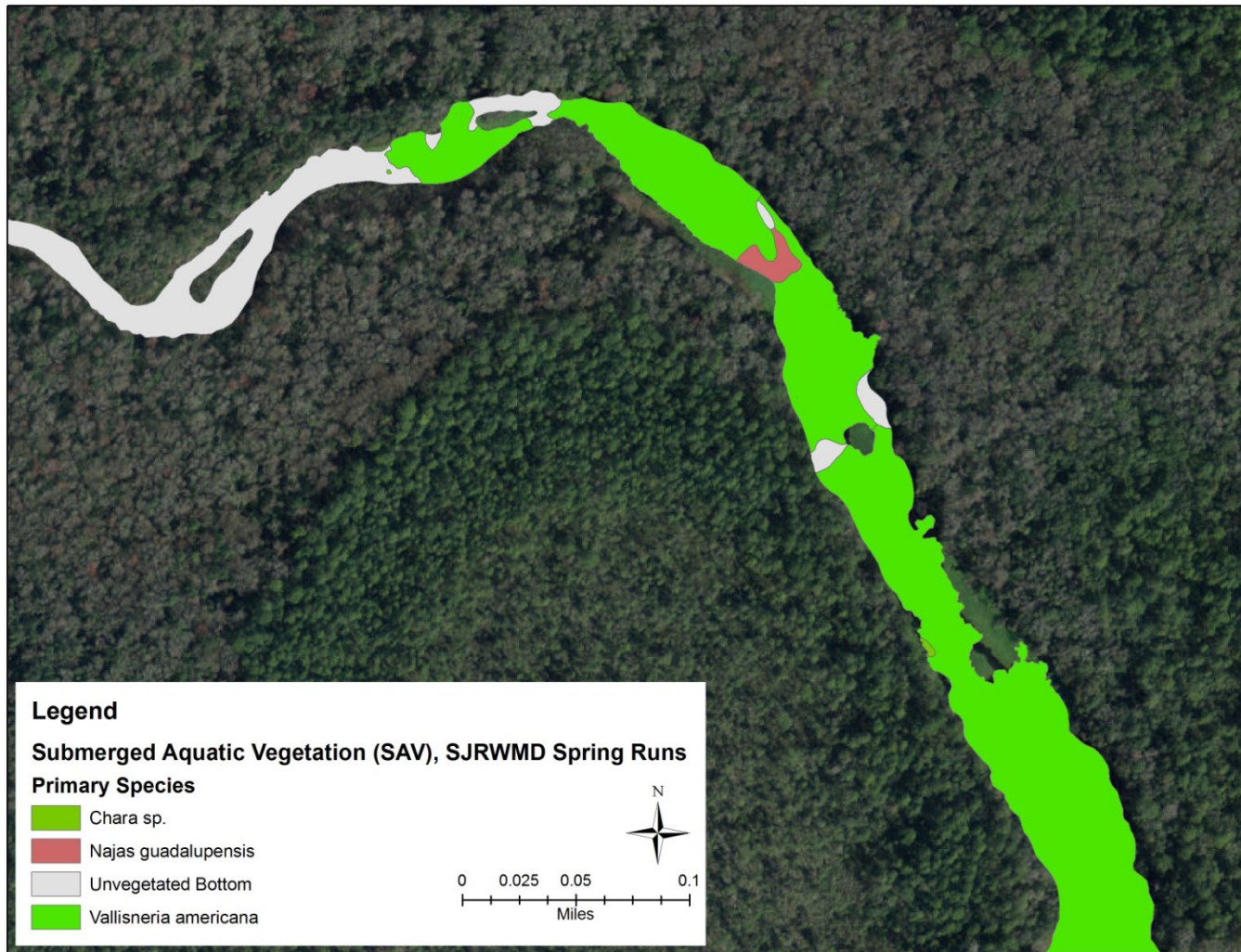


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Spring Run Plant Species

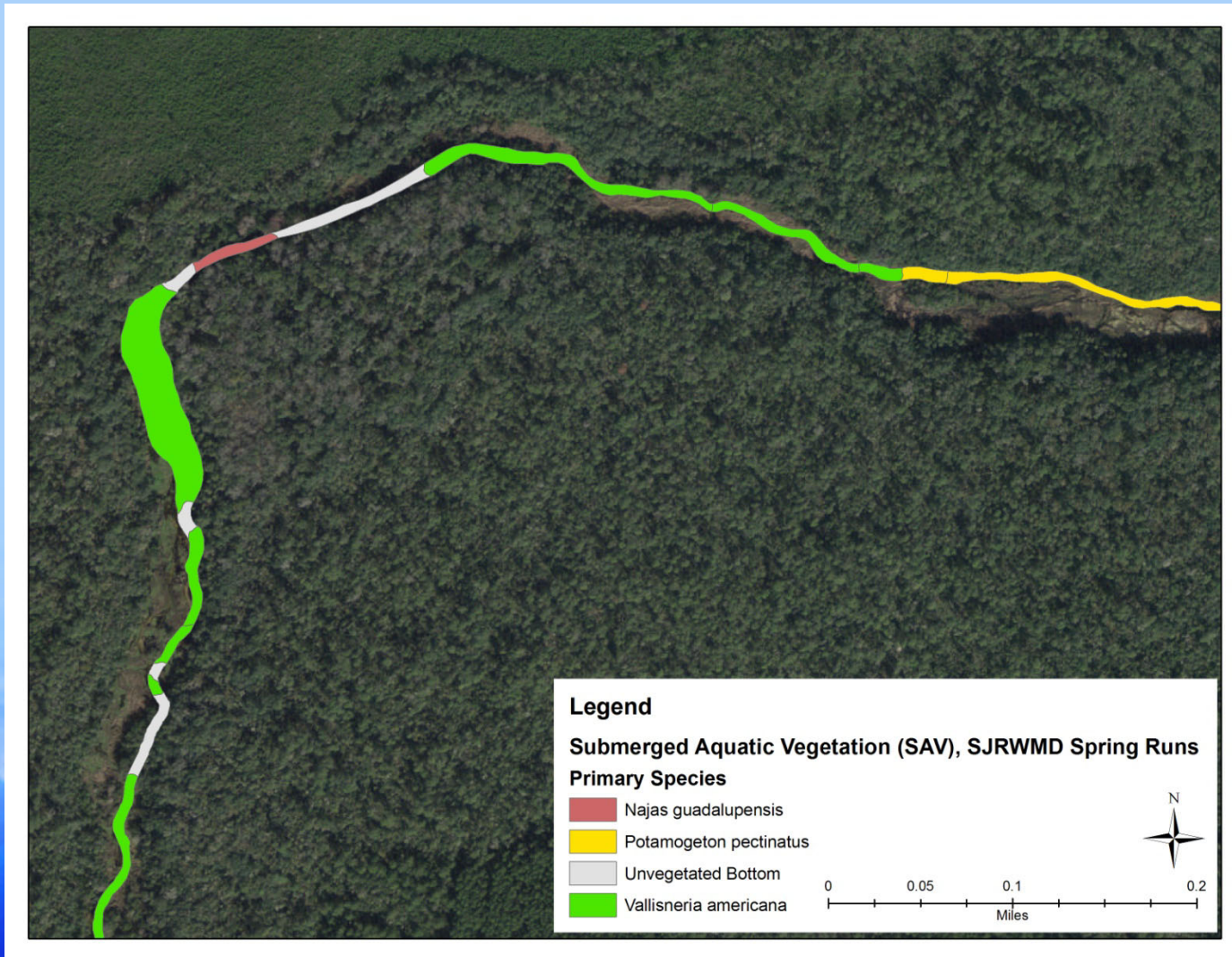
	Alexander Spring Creek	Blue Spring Run	Juniper Creek	Rock Springs Run	Silver Glen Spring Run	Wekiva River
<i>Ceratophyllum demersum</i>	XX			XX		
<i>Chara</i> sp.	XX		XX			
<i>Eleocharis</i> sp.					XX	XX
<i>Hydrilla verticillata</i>					XX	
<i>Micranthemum</i> sp.					XX	
<i>Najas guadalupensis</i>	XX		XX		XX	XX
<i>Potamogeton pectinatus</i>			XX			
<i>Ruppia maritima</i>					XX	
<i>Sagittaria subulata</i>					XX	
<i>Vallisneria americana</i>	XX		XX	XX	XX	XX
<i>Zannichellia palustris</i>	XX					XX
TOTAL TAXA	5	0	4	2	7	4

Alexander Spring Creek Upstream CR445



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Juniper Creek Upstream SR19



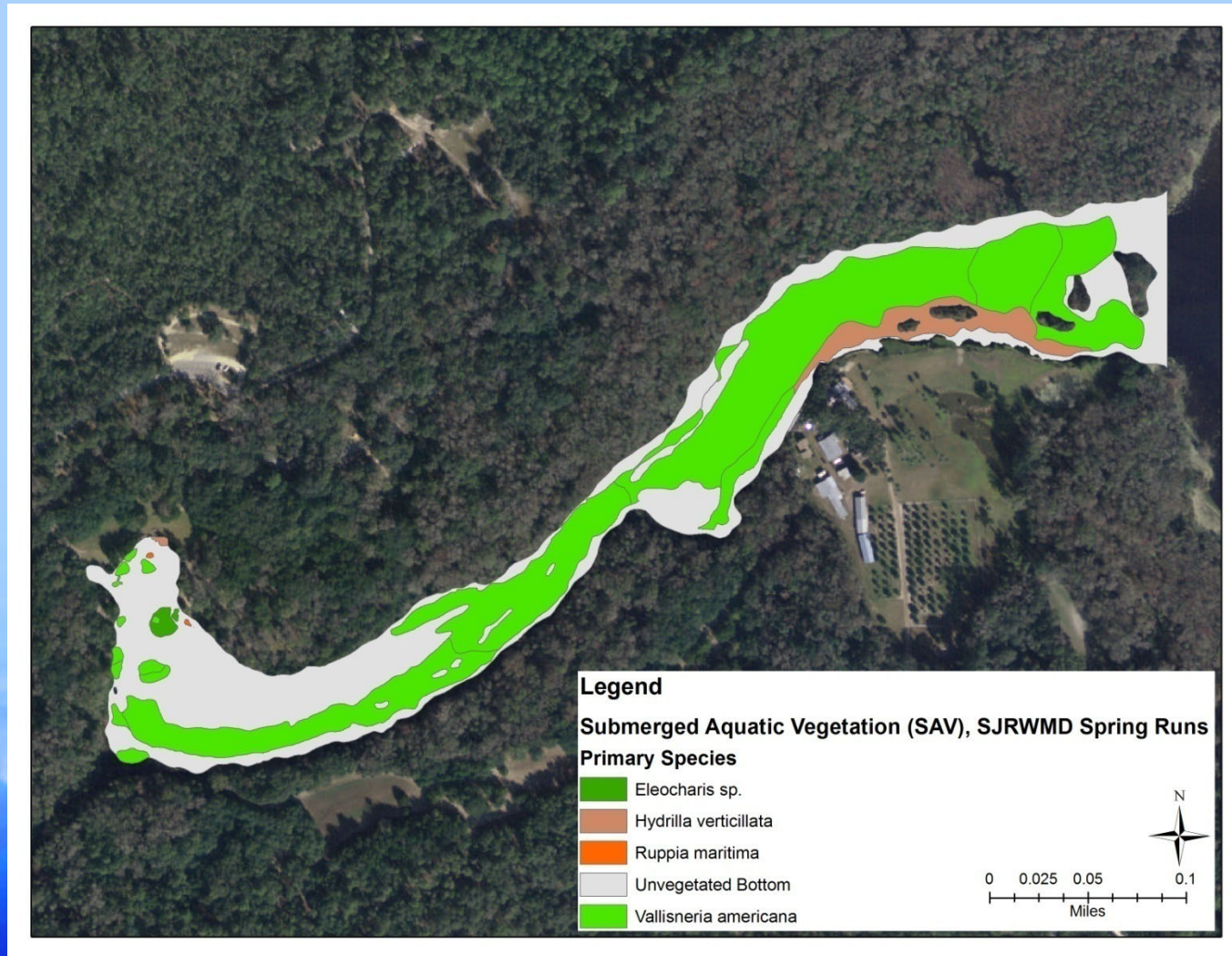
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Rock Springs Run Headspring area



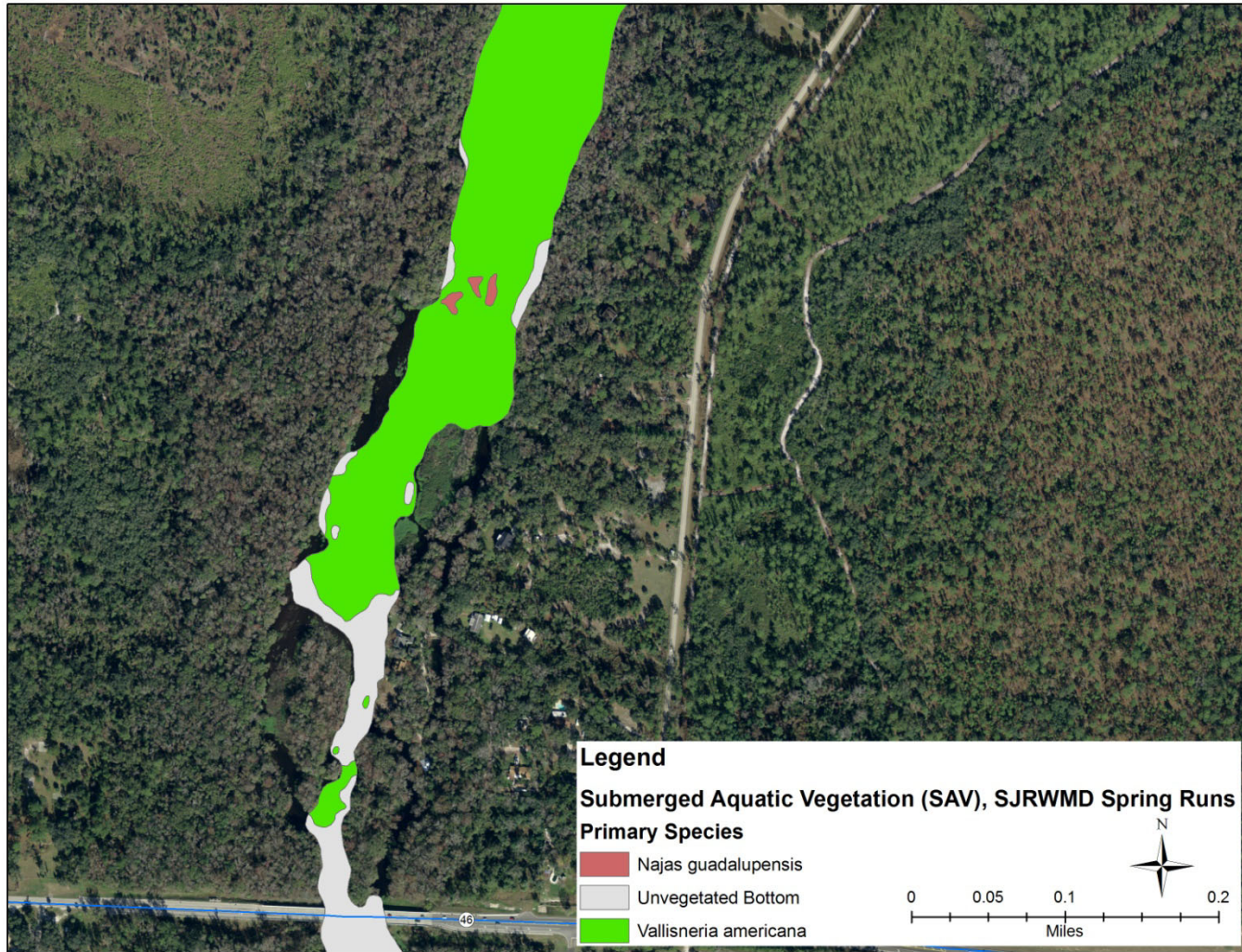
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Silver Glen Run



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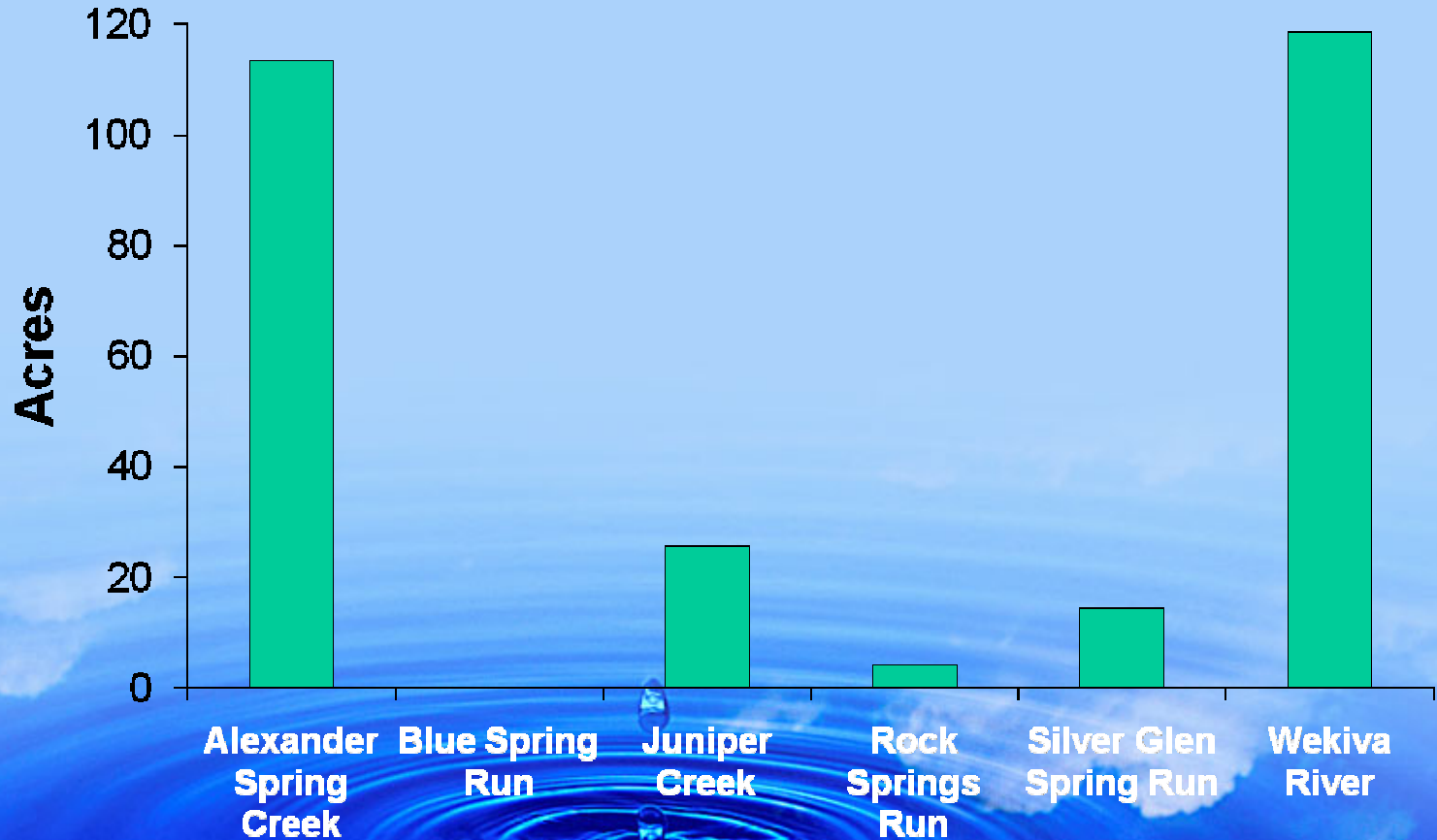
Wekiva River Downstream SR46



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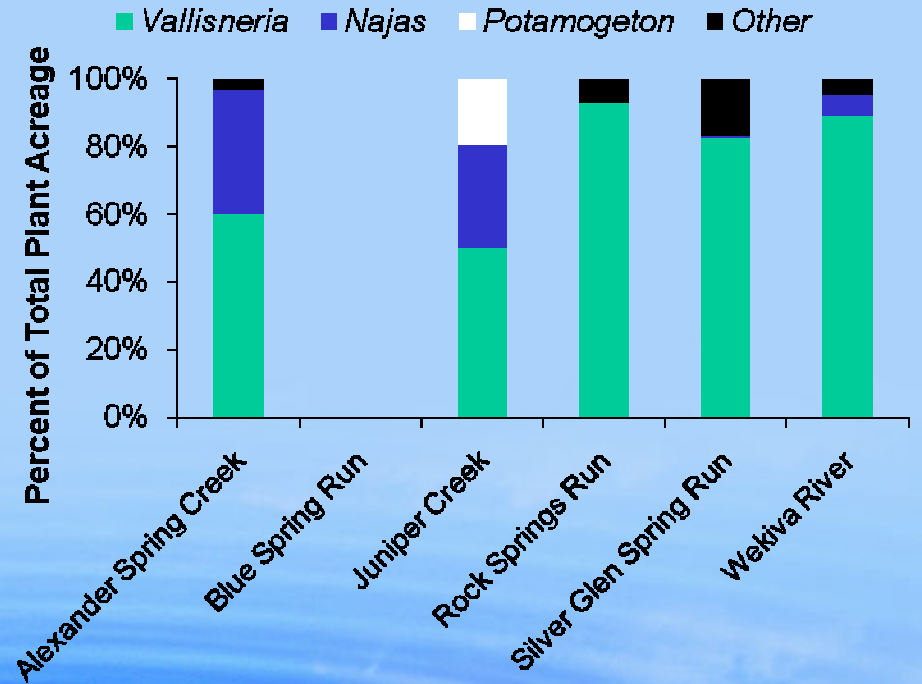
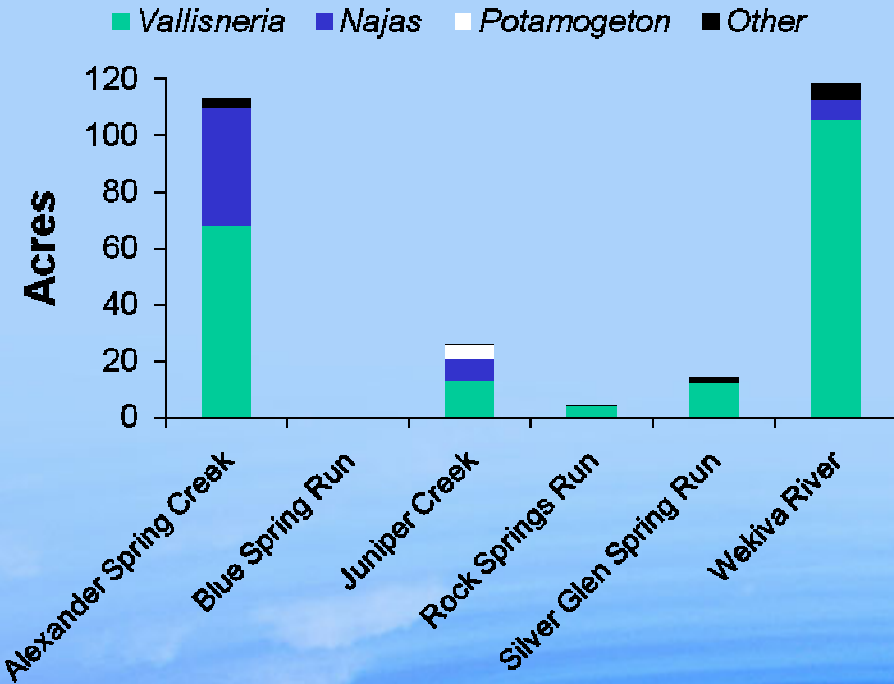
Spring Run SAV Acreage

Total SAV Acres



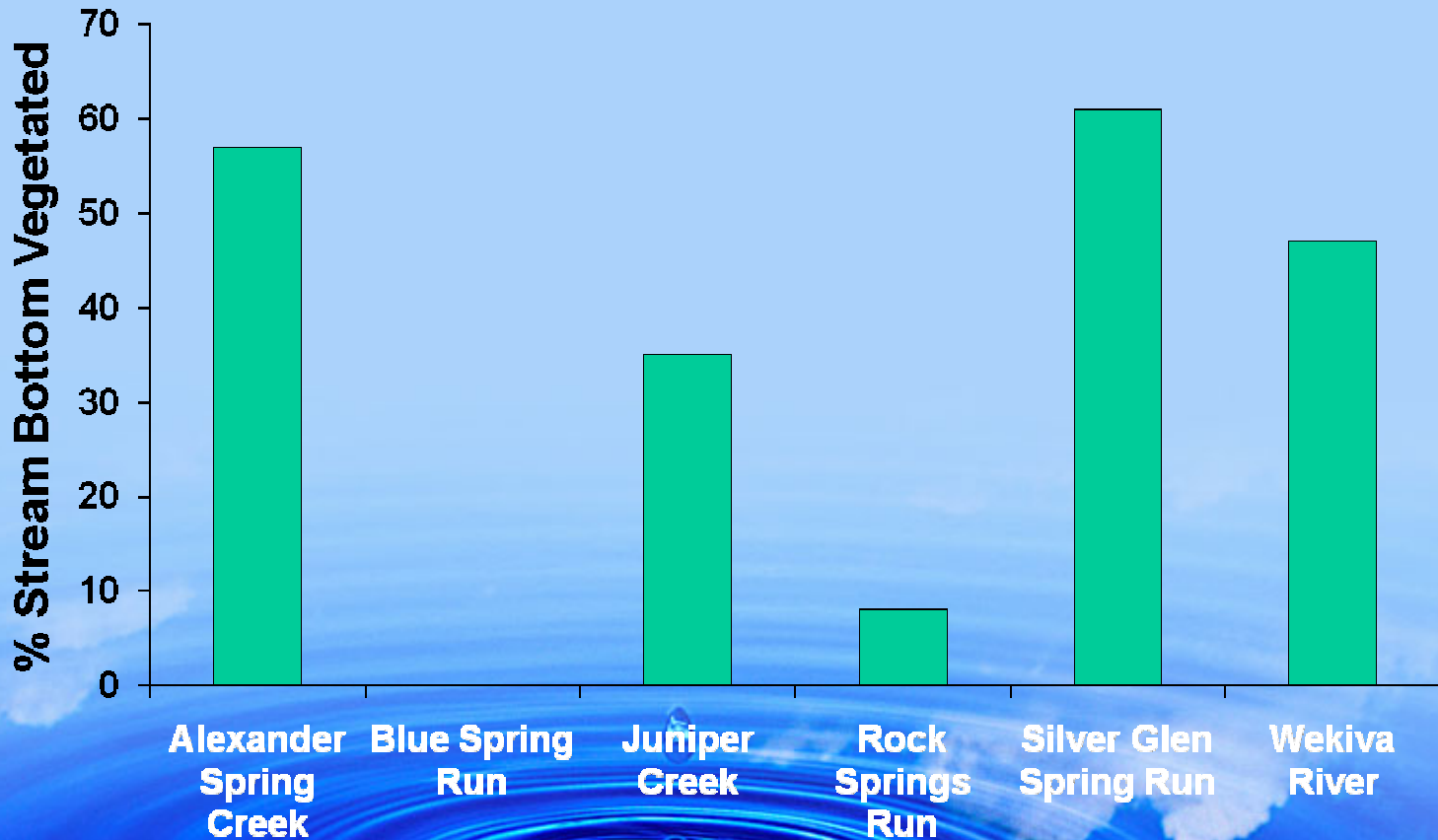
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Relative cover by plant species



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Percent of stream bottom vegetated by SAV



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**Ichetucknee River (2003) – 78.4%
Rainbow River (2005) – 95.3%**

2009 Field Study

In-house effort

- Continuation of annual algal surveys down the length of each spring run, conducted in 2007-08
- Include macrophytes in the survey (by species)
 - Quantify SAV and algae cover in 0.25 m² quadrat
 - Use Braun-Blanquet method to estimate cover



Braun-Blanquet Cover Method

Use 0.25 m² quadrat

- 5 – > 75% cover
- 4 – 50-75% cover
- 3 – 25-50% cover
- 2 – 5-25% cover
- 1 – < 5% cover



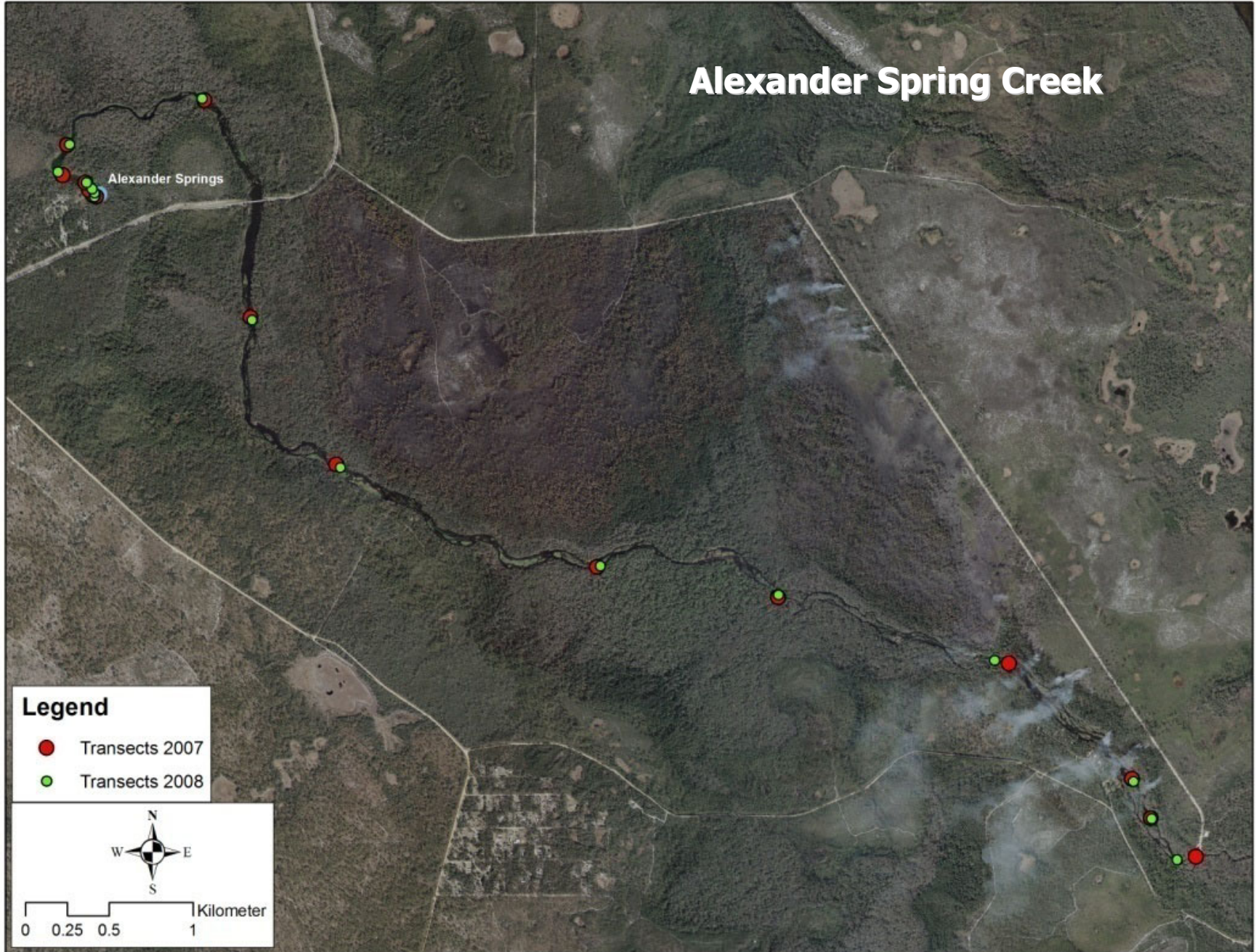
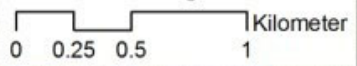
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Alexander Spring Creek

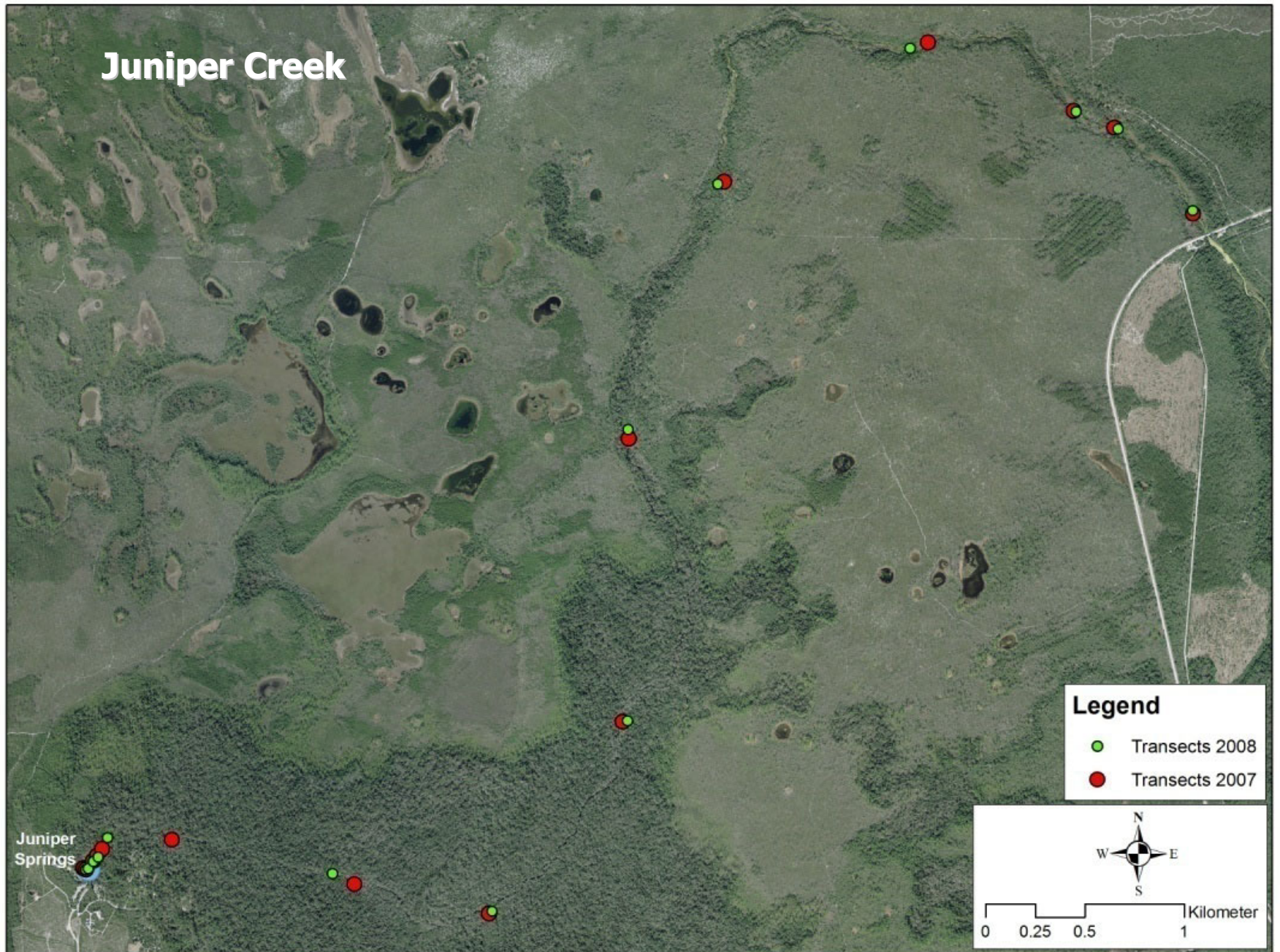
Alexander Springs

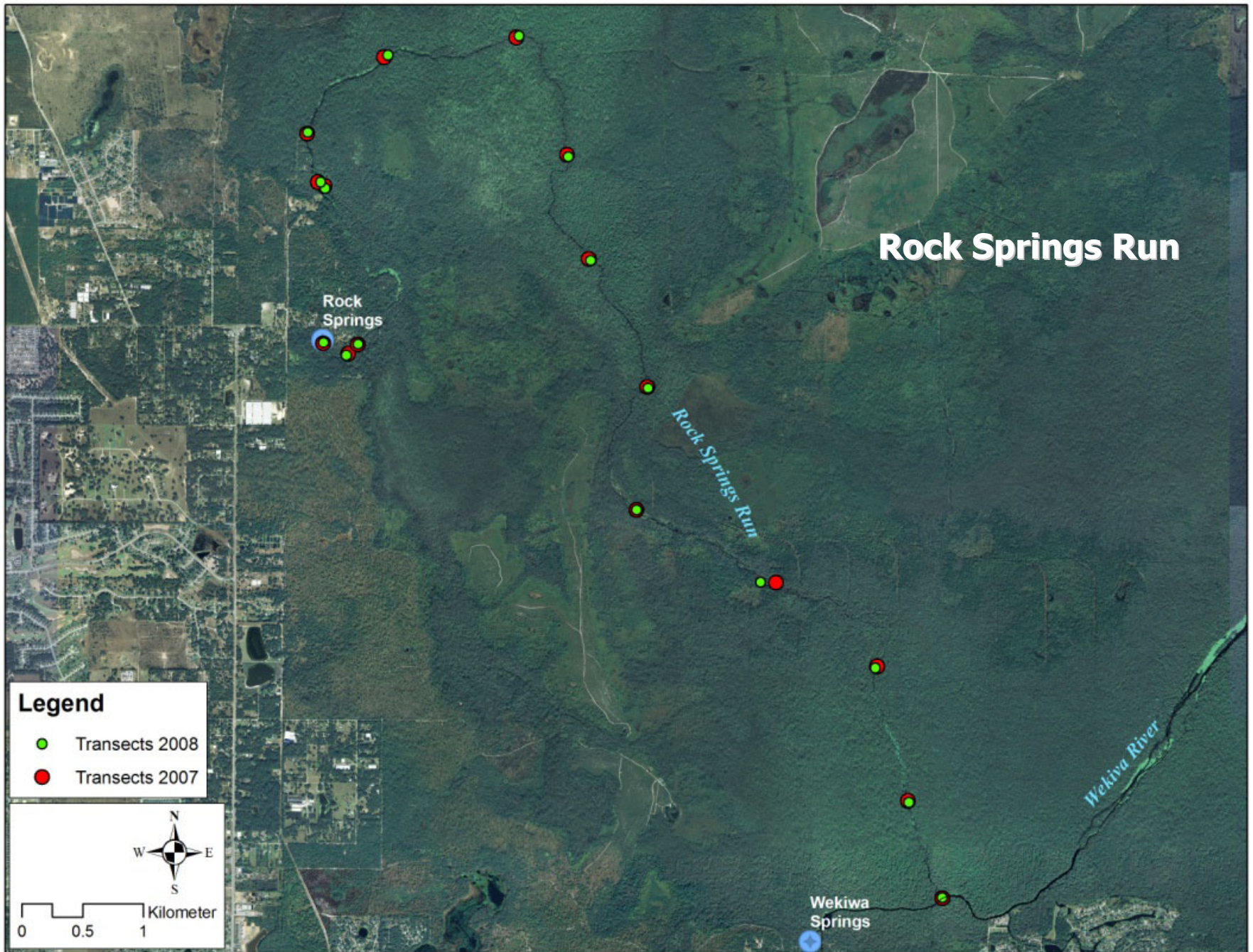
Legend

- Transects 2007
- Transects 2008

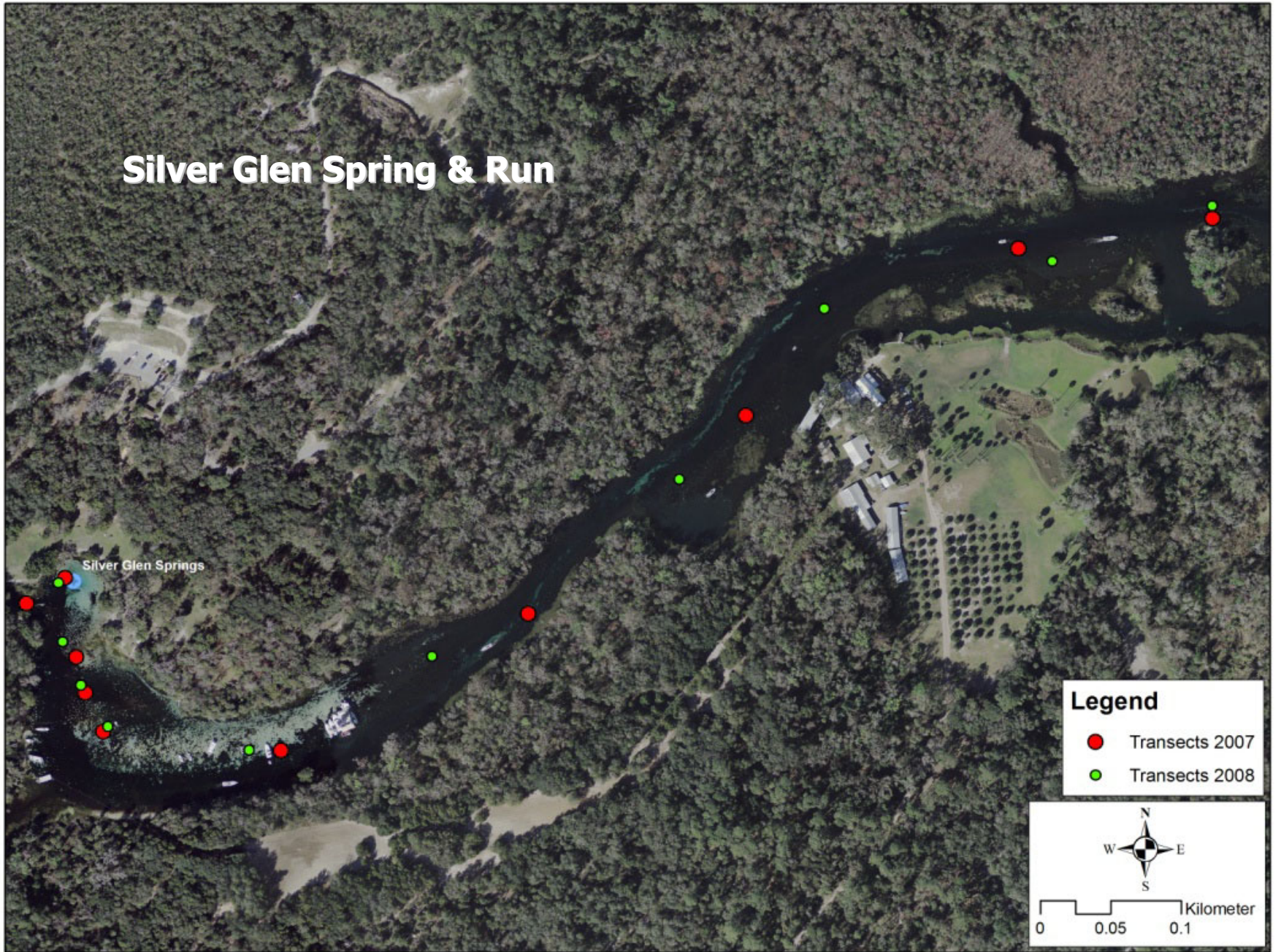


Juniper Creek

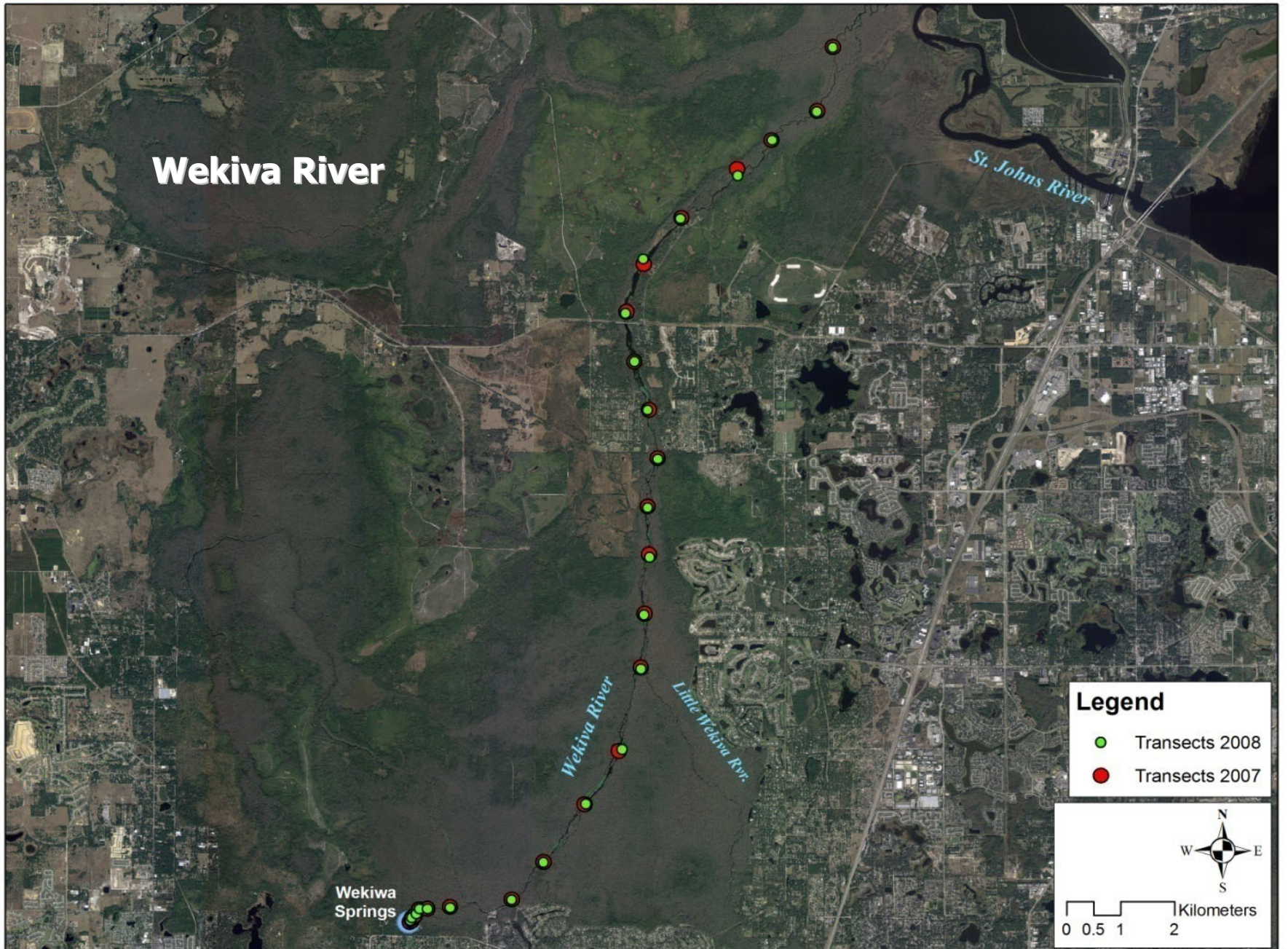




Silver Glen Spring & Run

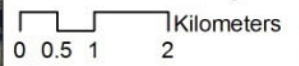


Wekiva River



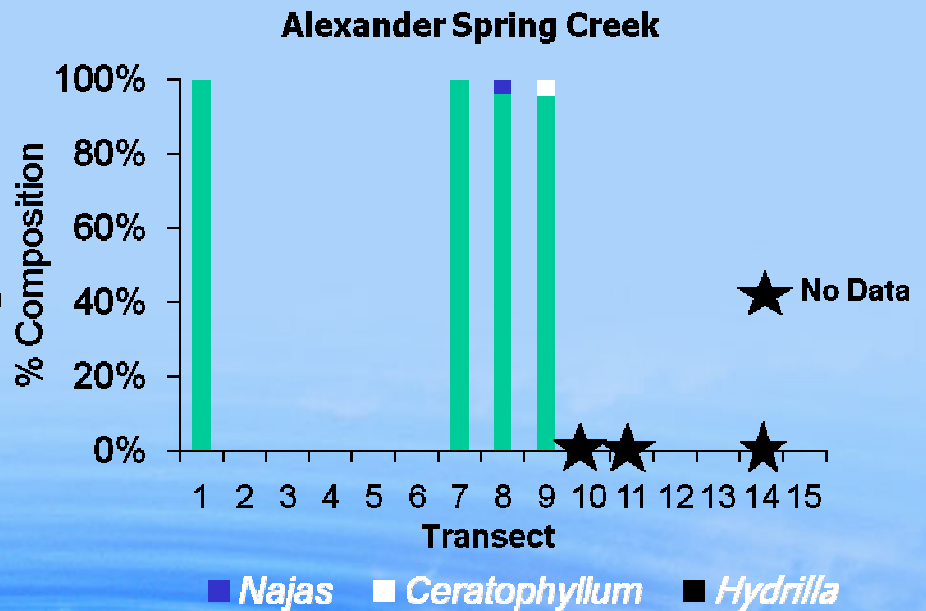
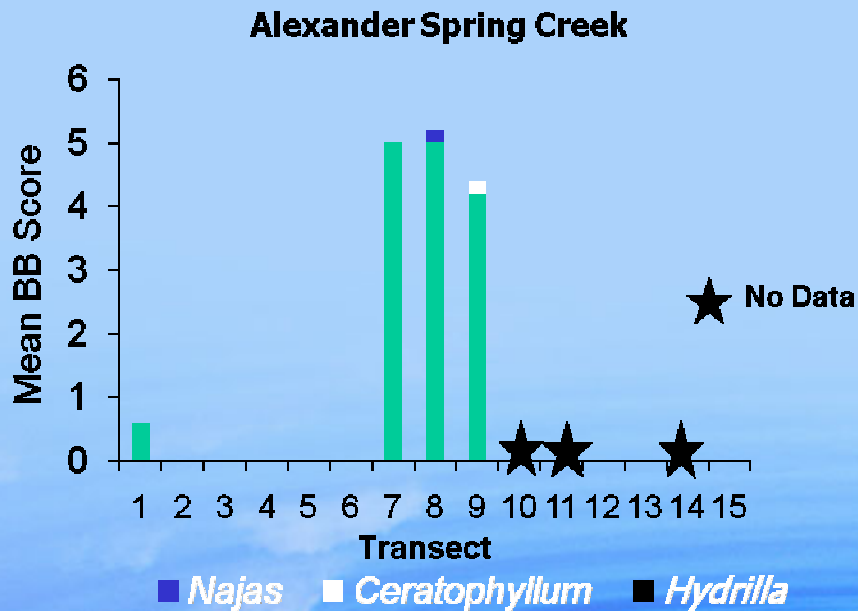
Legend

- Transects 2008
- Transects 2007



Alexander Spring Creek

SAV Cover

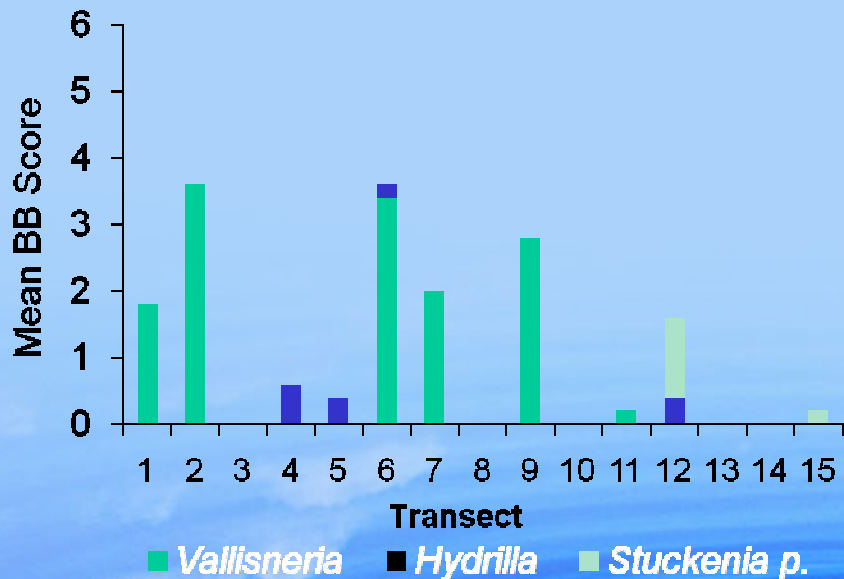


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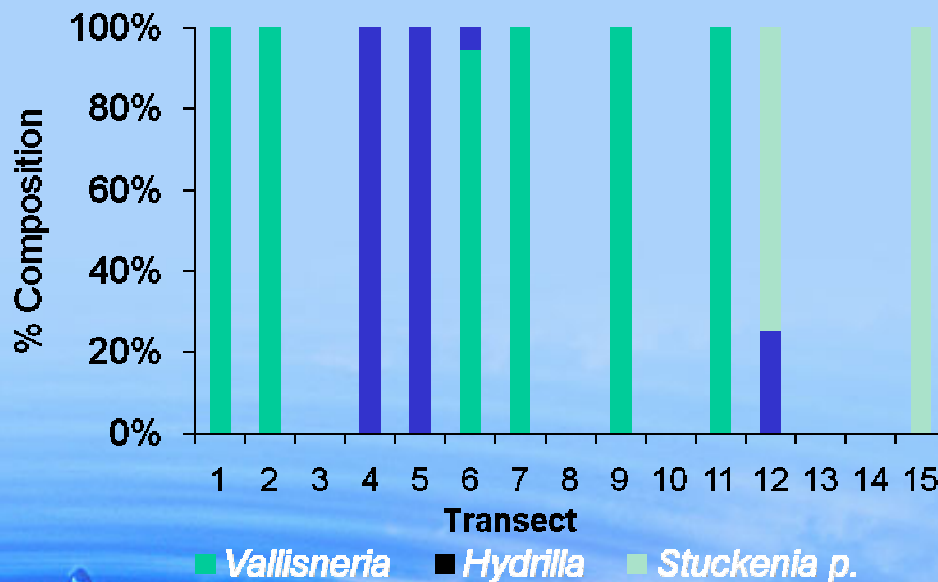
Juniper Creek

SAV Cover

Juniper Creek



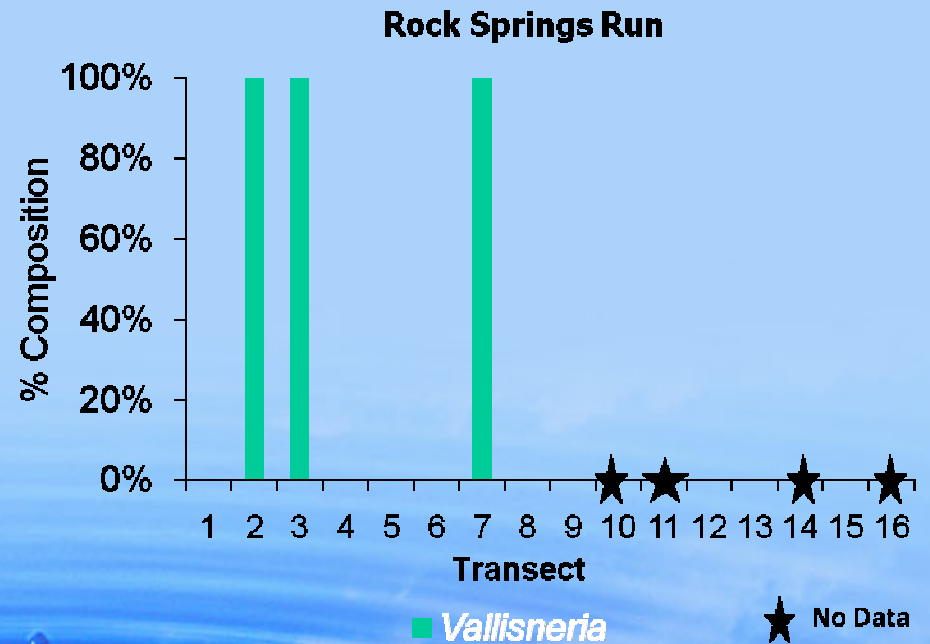
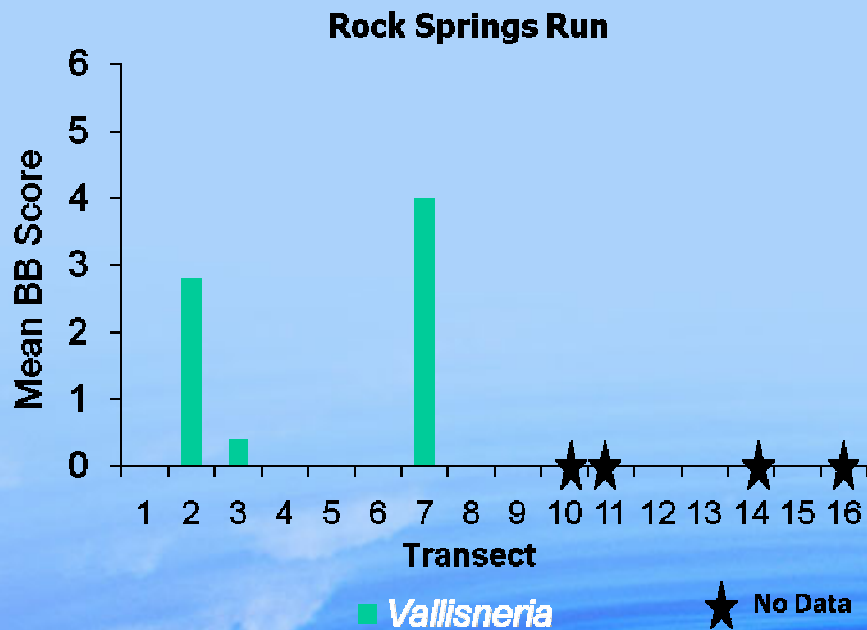
Juniper Creek



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Rock Springs Run

SAV Cover

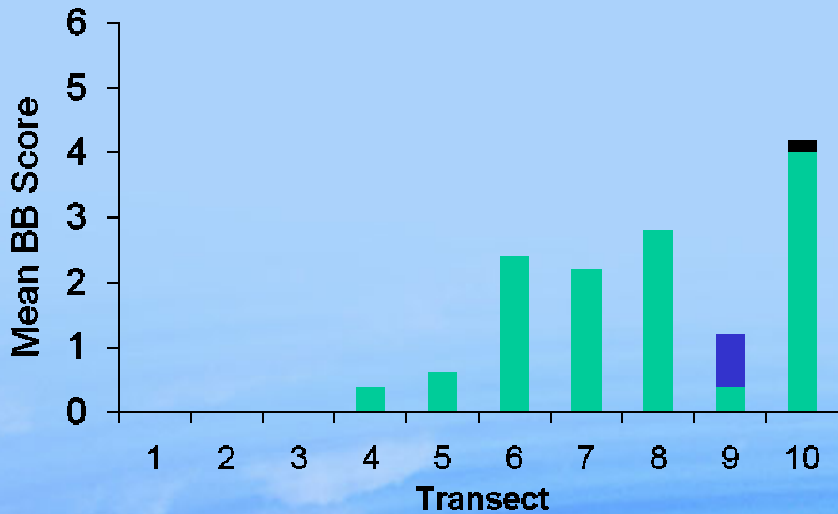


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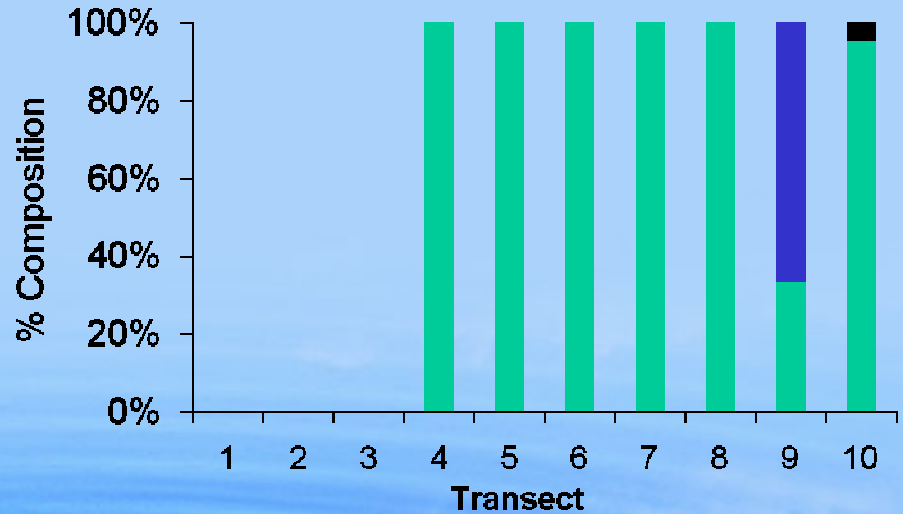
Silver Glen Run

SAV Cover

Silver Glen Run



Silver Glen Run



■ Vallisneria ■ Ceratophyllum ■ Hydrilla

■ Vallisneria ■ Ceratophyllum ■ Hydrilla

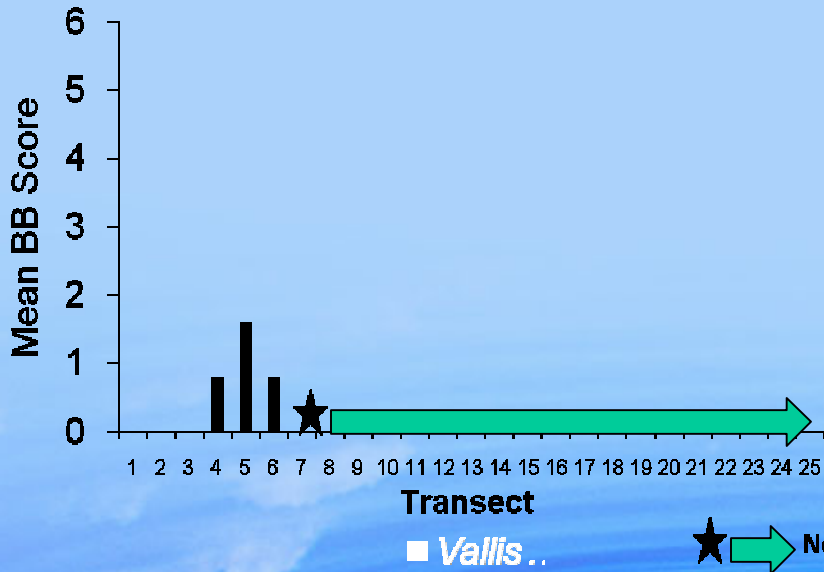


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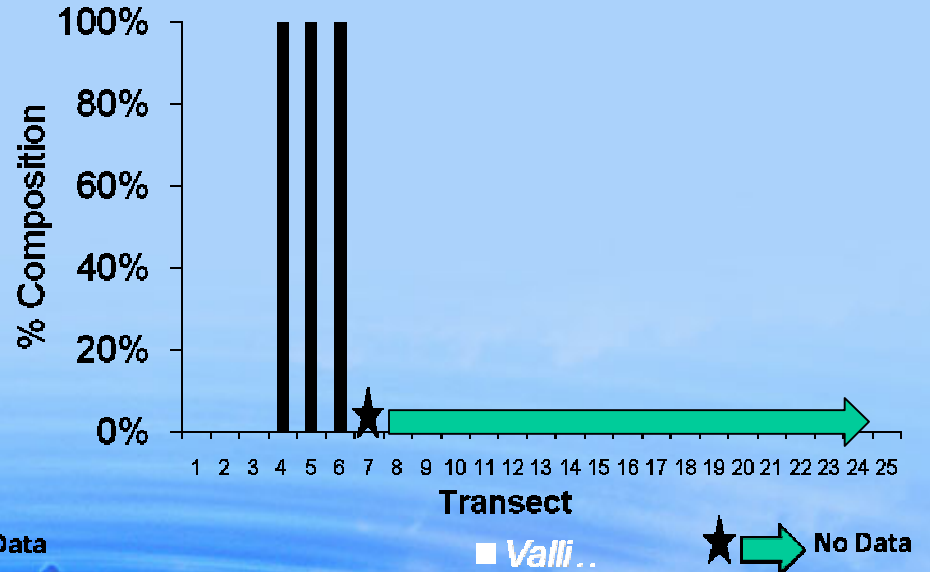
Wekiva River

SAV Cover

Wekiva River



Wekiva River



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Historic Comparisons

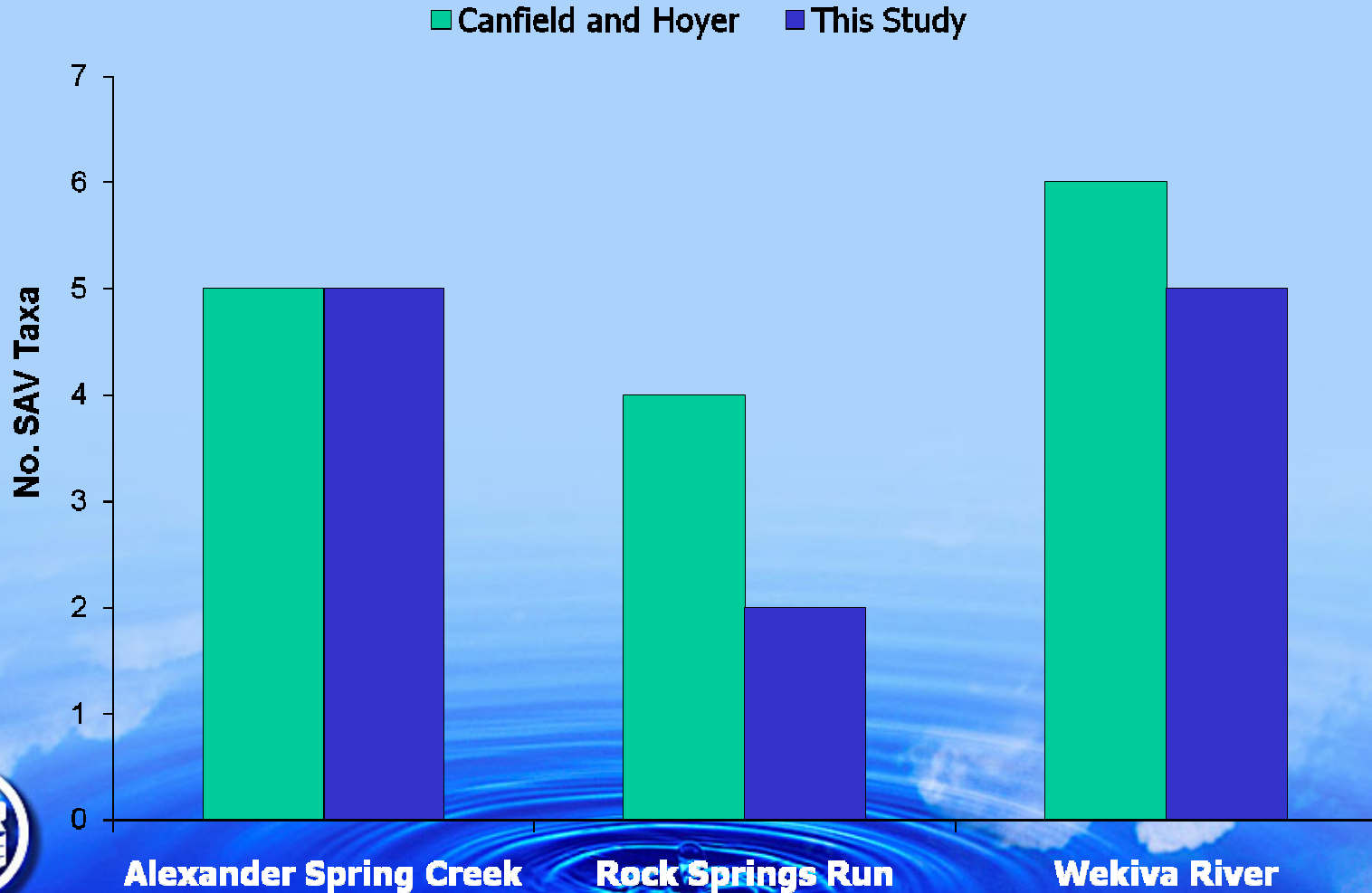
Sampled aquatic plant biomass in selected spring run streams (1985-86) – Canfield and Hoyer 1988

Mapped SAV in Silver Glen Spring Run (2003) – Pandion Systems 2003



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Selected Spring Runs



Plant Species Composition

1986=Canfield and Hoyer; 2008=This Study

	Alexander Spring Creek	Rock Springs Run	Wekiva River
<i>Sagittaria kurziana</i>		1986	1986
<i>Ceratophyllum demersum</i>	1986/2008	2008	
<i>Vallisneria americana</i>	1986/2008	1986/2008	1986/2008
<i>Najas guadalupensis</i>	1986/2008		1986/2008
<i>Potamogeton diversifolius</i>	1986		
<i>Egeria densa</i>		1986	1986
<i>Hydrilla verticillata</i>		1986	1986/2008
<i>Myriophyllum heterophyllum</i>			1986
<i>Zannichellia palustris</i>			2008
<i>Eleocharis</i> sp.			2008
<i>Chara</i> sp.	2008		

Silver Glen Spring Run

Plant Species	Pandion Systems 2003	This Study 2008
<i>Vallisneria americana</i>	10.02 acres	11.86 acres
<i>Eleocharis</i> sp.	0.04	0.10
<i>Hydrilla verticillata</i>	1.14	1.33
<i>Myriophyllum spicatum</i>	0.004	Not observed
<i>Najas guadalupensis</i>	Not observed	0.04
<i>Ceratophyllum demersum</i>	Present	Present
<i>Sagittaria kurziana</i>	Present	Not observed
<i>Sagittaria subulata</i>	Not observed	0.03
<i>Micranthemum</i> sp.	Not observed	0.95
<i>Ruppia maritima</i>	Not observed	0.05
Algae (loose and attached)	3.87	Not measured
TOTAL VEGETATION	15.074 acres	14.35 acres
TOTAL SPRING & RUN AREA	21.88 ac (68.9% veg.)	23.66 ac (60.7% veg.)

Blue Spring Run

"The spring boil is nearly devoid of rooted vegetation, but the spring run has thick growths of aquatic plants throughout its course ."



Fred Thompson, FLMNH, 1962



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Conclusions

- SAV present in all spring runs but Blue Spring
- Acreage range 4-118.5; % area vegetated w/ SAV 8-61%; SAV is a substantial habitat component in spring run streams
- *Vallisneria* dominant plant (by acreage) in 4/5 spring runs (\approx 50% in Juniper Creek)
- Many spring runs could not be sampled in the field in 2009 due to high water/no visibility
- SAV cover and composition similar in Silver Glen Run in 2003 & 2008



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QUESTIONS ?