

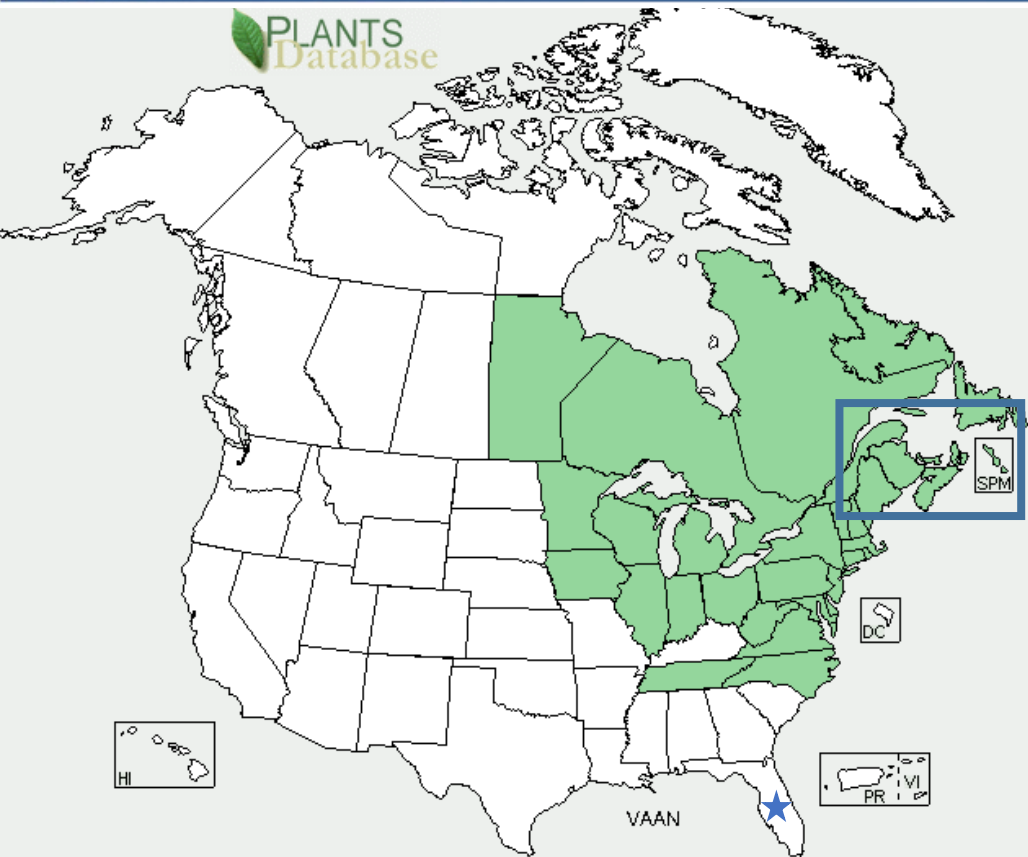
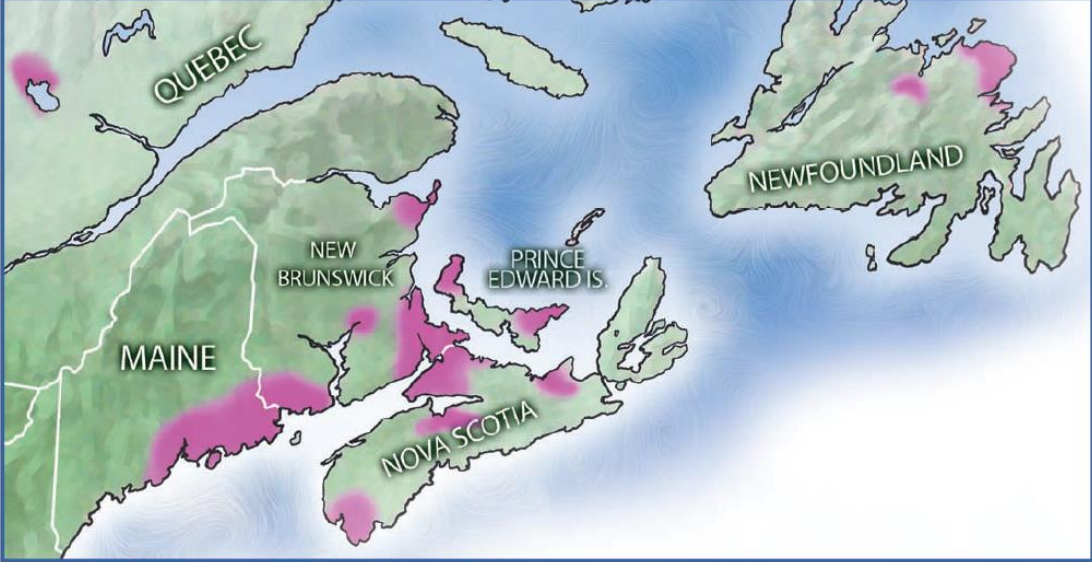
Wild bee communities in non-crop land cover in the Maine (USA) wild blueberry landscape

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*Vaccinium
angustifolium*



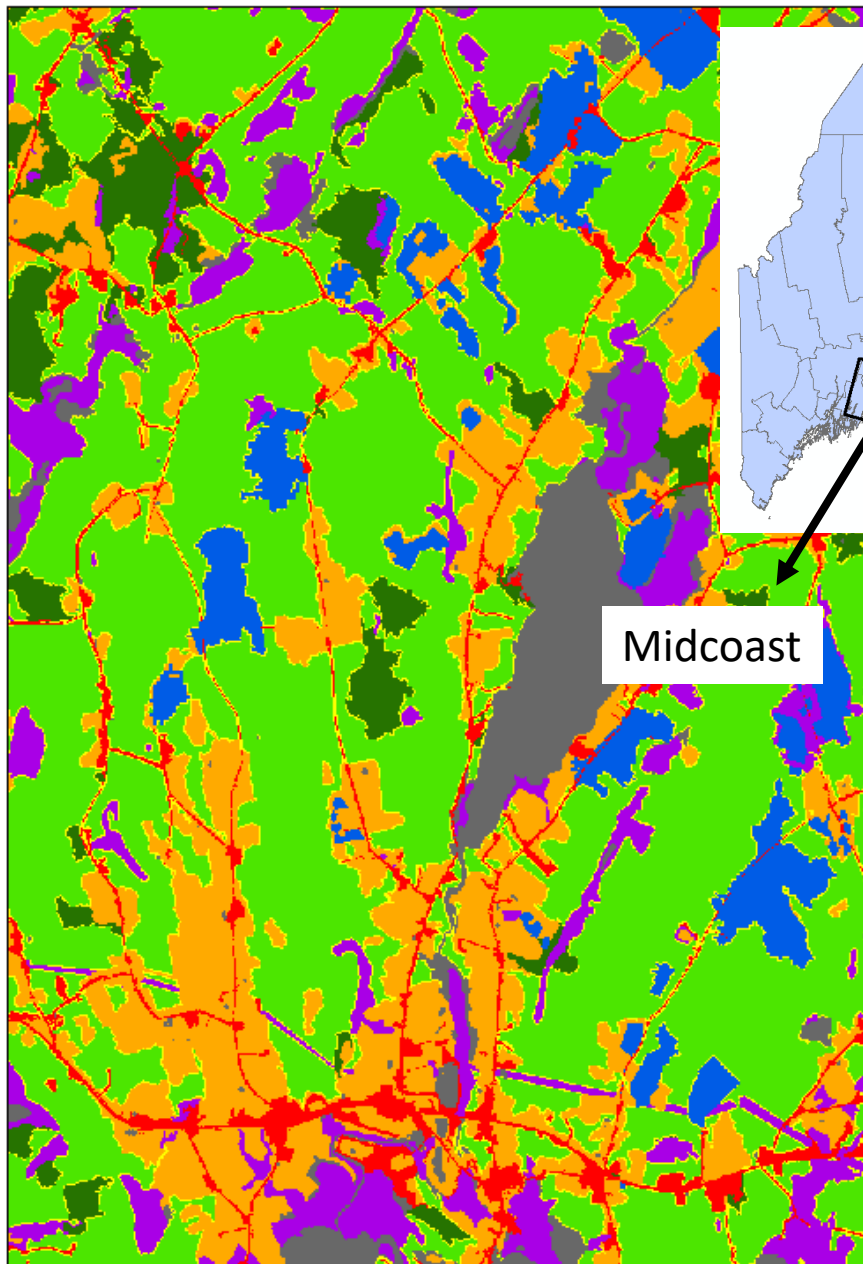
Javorek et al. 2002, Drummond 2012

InVEST

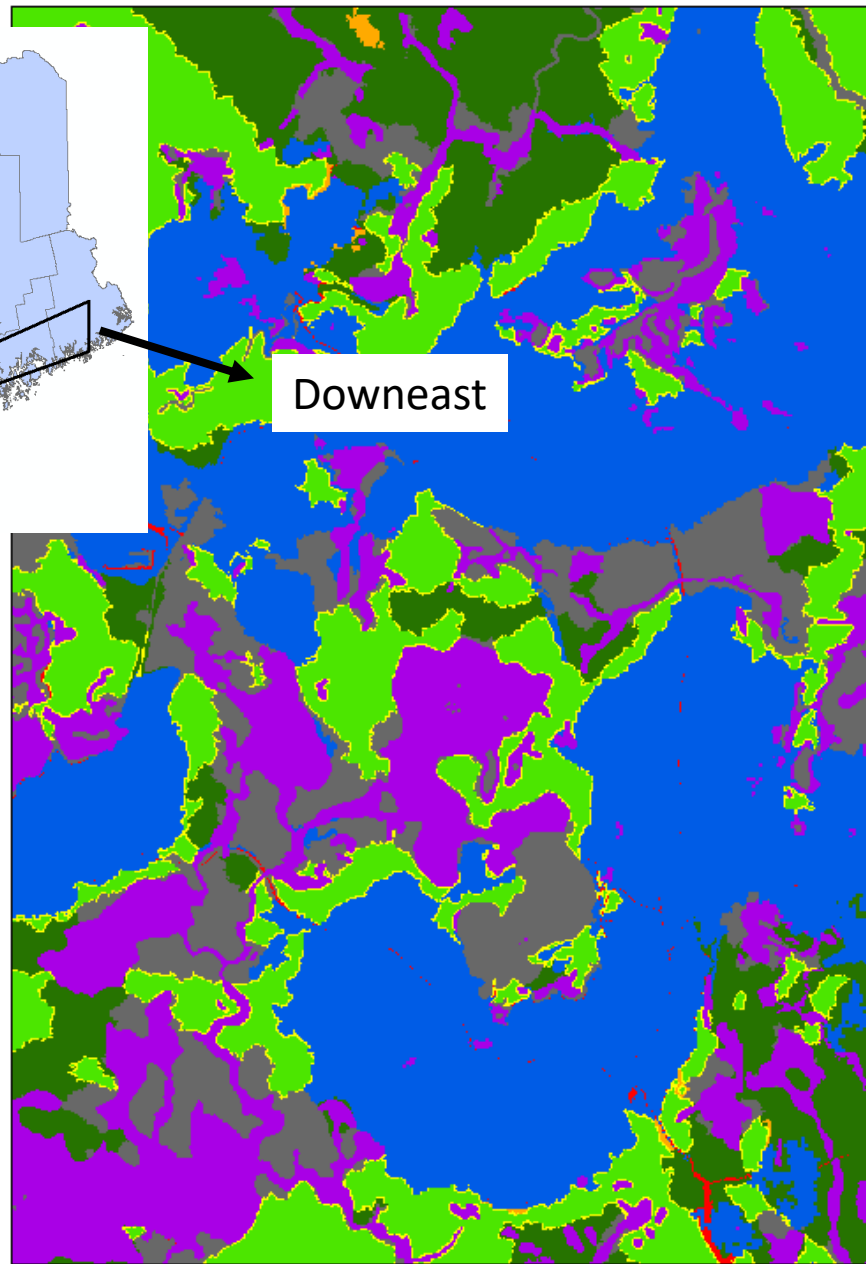
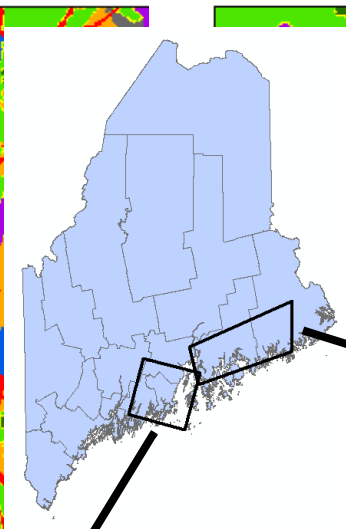
integrated valuation of
ecosystem services
and tradeoffs

-  Agriculture/field
-  Blueberries
-  Coniferous forest
-  Deciduous/mixed forest
-  Deciduous/mixed forest edge
-  Developed/other
-  Emergent wetlands/scrub-shrub
-  Wetlands/water

Groff et al. 2016



0 1.25 2.5 5 Kilometers N



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Downeast

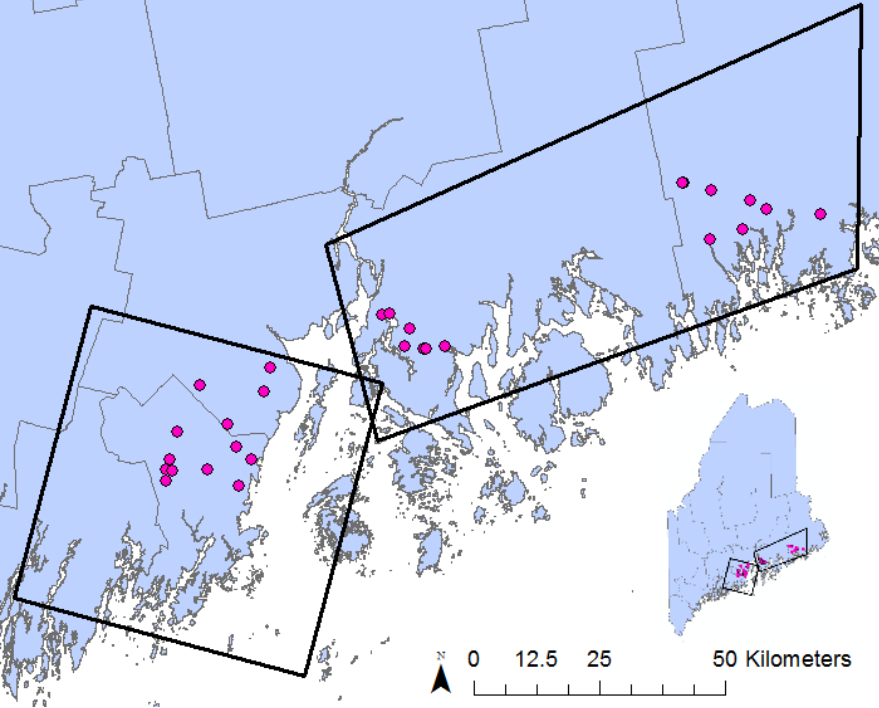
Midcoast

Research objective

Does bee community composition (species abundance and richness) differ by:

1. Land cover type?
2. Blueberry growing region?





- Agriculture/field
- Blueberries
- Coniferous forest
- Deciduous/mixed forest
- Deciduous/mixed forest edge
- Developed/other
- Emergent wetlands/scrub-shrub
- Wetlands/water



Statistical analyses

- Do bee communities differ by growing region and land cover type?
 - Non-metric Multidimensional Scaling (NMDS)
- What cover types have different bee communities? Does this vary by growing region?
 - Negative binomial GLMs
 - Main effects: Analysis of Deviance
 - Post-hoc: Multiple comparisons of means with Tukey contrasts

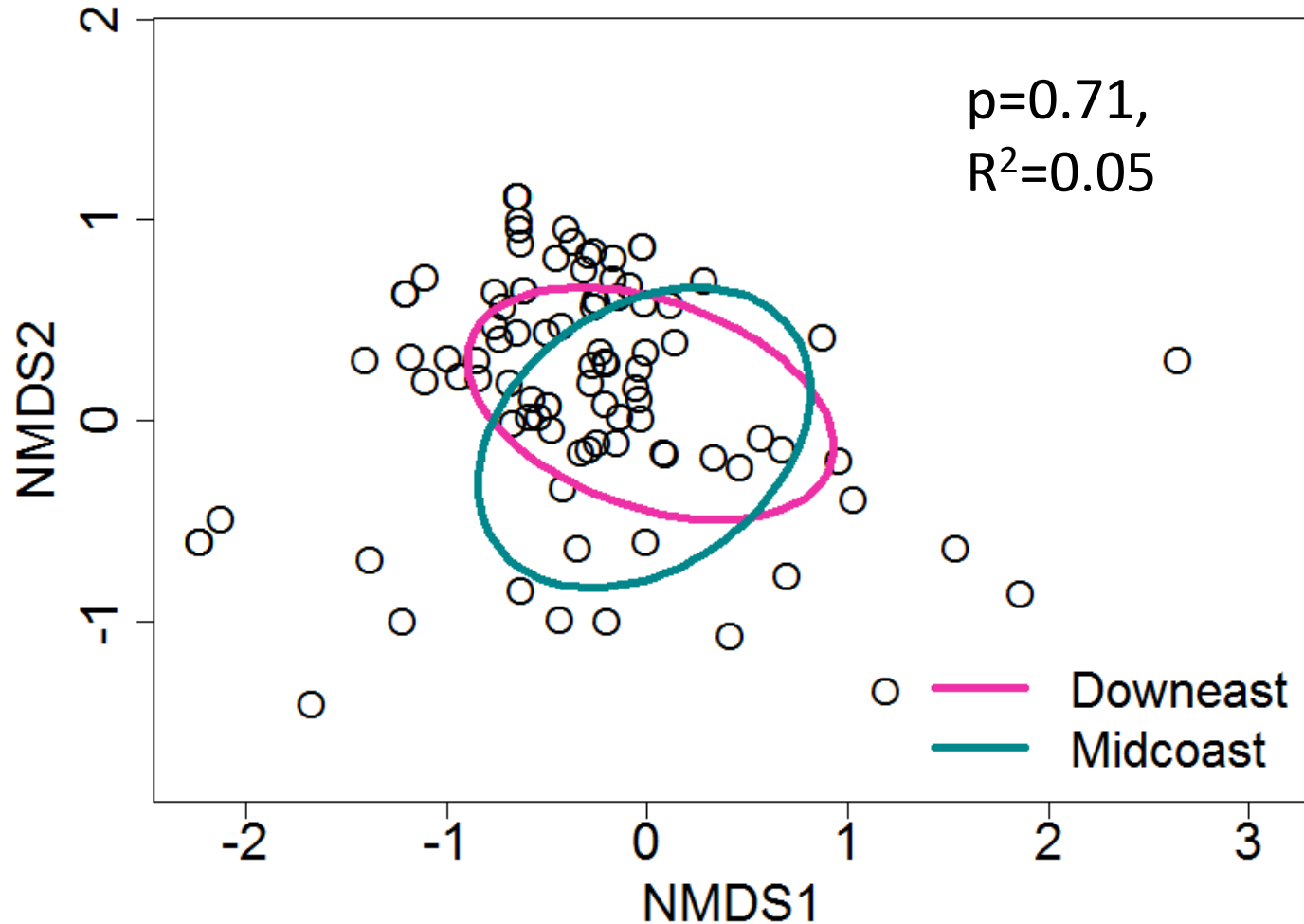


- 1370 individuals
 - 870 Downeast
 - 505 Midcoast
- 119 species
- 23 genera

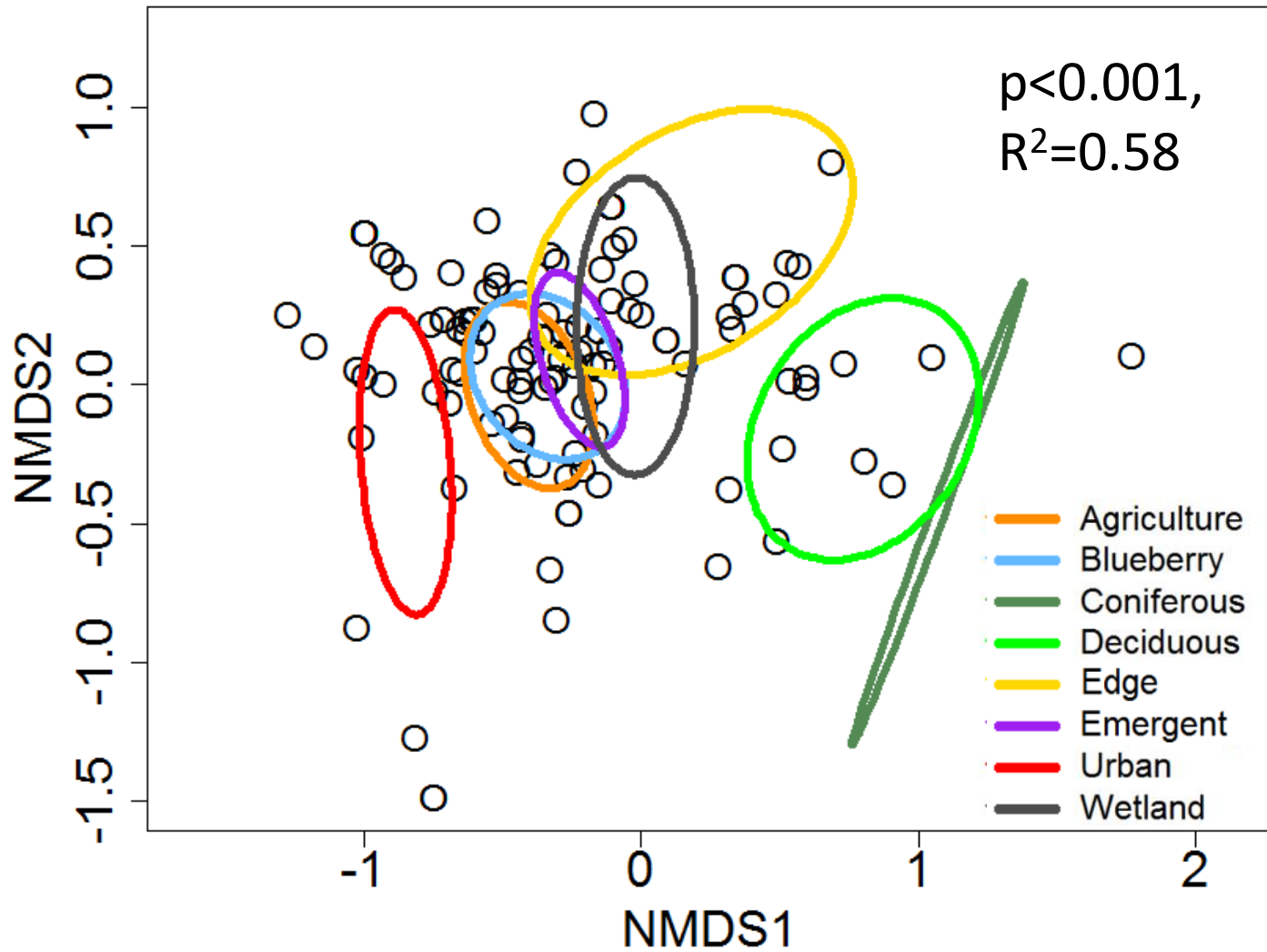


- Two state records:
 - *Andrena personata*
 - *Lasioglossum platyparium*

Wild bee community by growing region



Wild bee community by land cover type



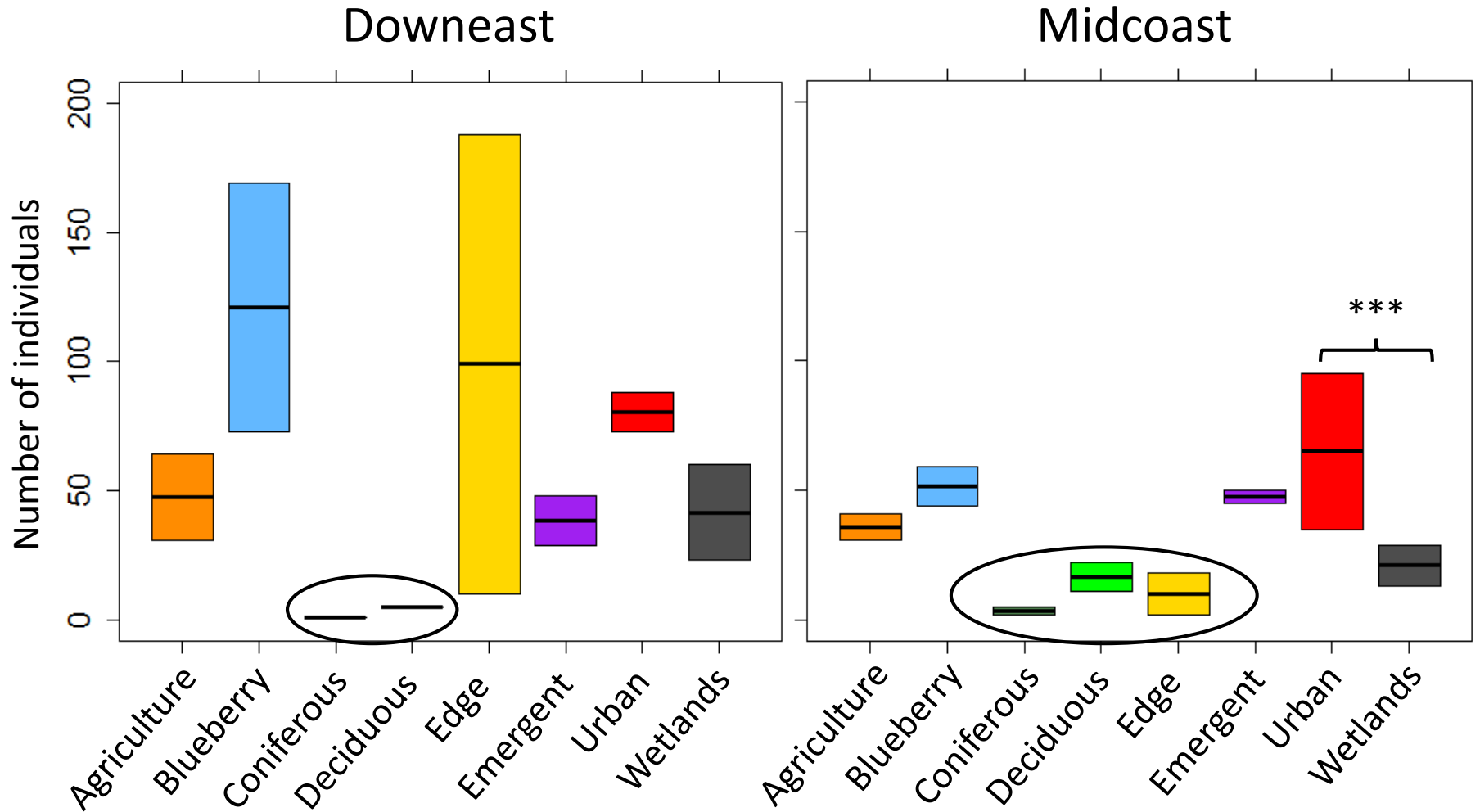
GLM results

Abundance	df	Deviance	p
Cover	7	95.615	<0.001***
Region	1	3.422	0.064
Cover*Region	7	27.272	<0.001***

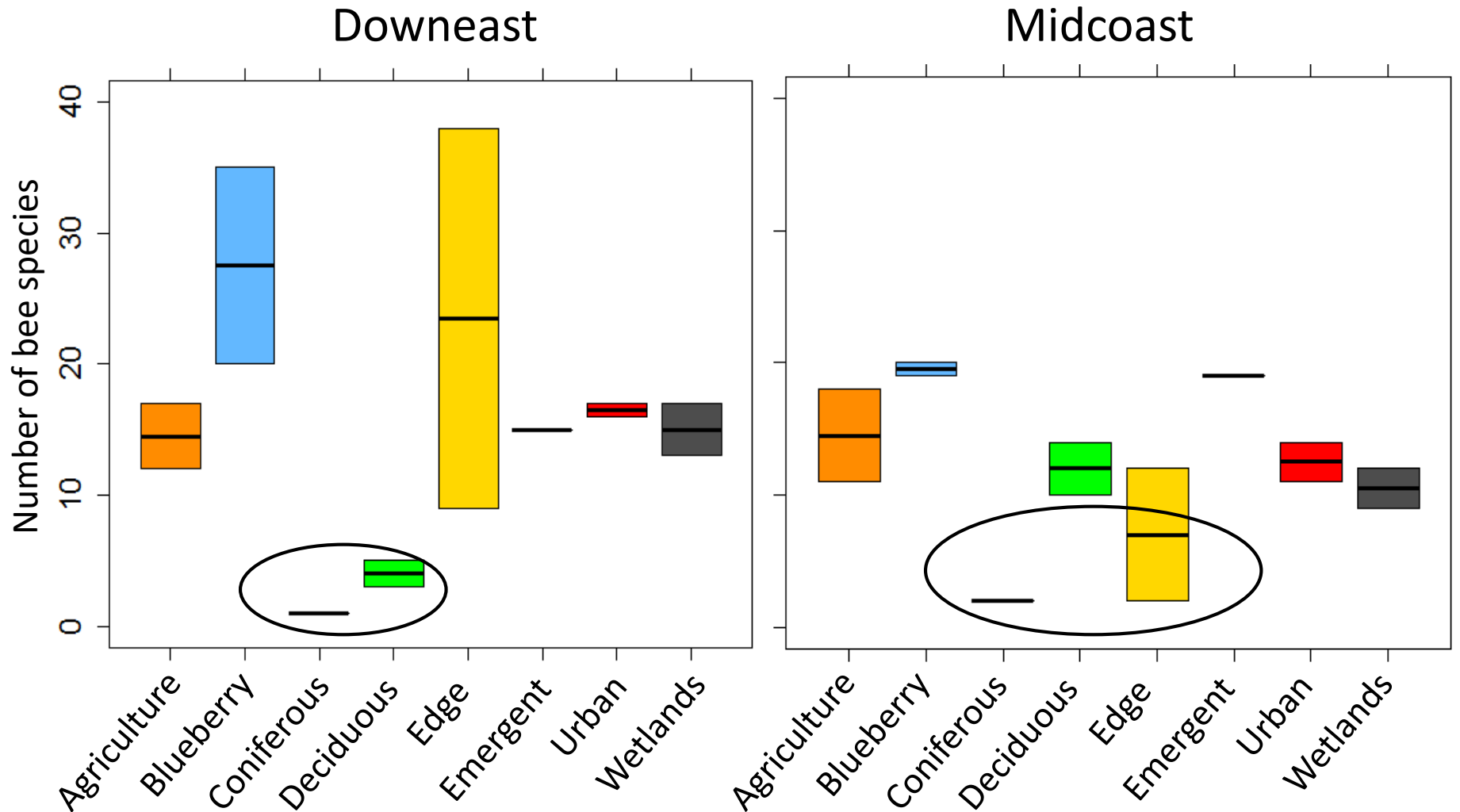
Richness	df	Deviance	p
Cover	7	89.539	<0.001***
Region	1	2.336	0.126
Cover*Region	7	24.620	<0.001***

- Multiple comparisons of means
 - Tukey contrasts, Bonferroni corrected

Abundance by growing region



Species richness by growing region



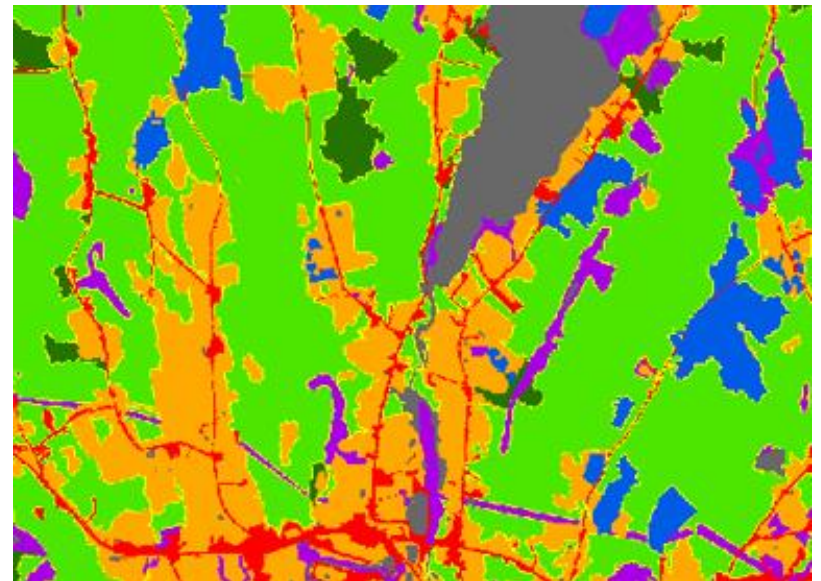
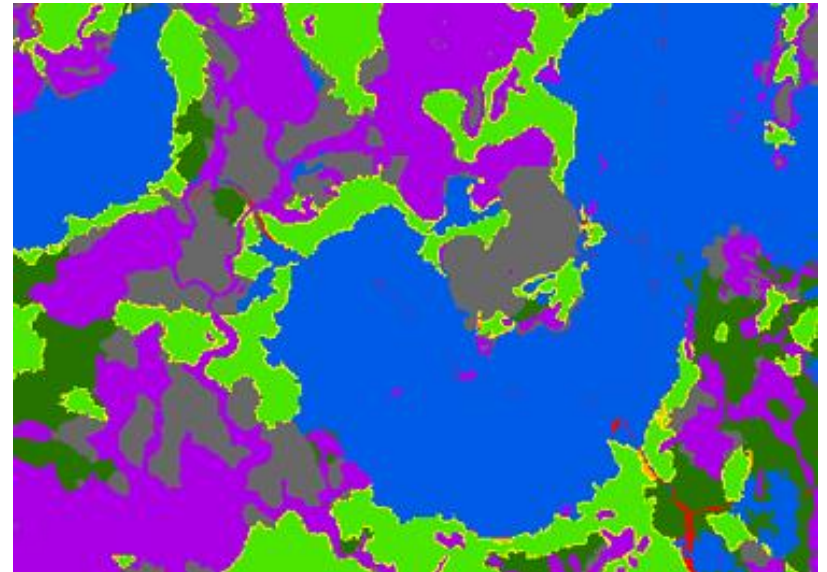
Conclusions

- Differ by land cover, but not growing region
- Influence of cover type differs by region
- Bee abundance more complex Midcoast
- Richness simpler overall
- High variation



Future directions

- Does landscape pattern influence bee community composition?
- Does field data align with expert opinion? Will it improve modeling accuracy?



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