Gah, you will rightfully want to stab me, but your discussion still feels a bit chaotic. I went back to your questions:

1. Are tidal freshwater marsh assemblages characterized by the same dominant species over a 40-year period? In the absence of significant environmental disturbance, we expect the same species composition to dominate each assemblage as identified by Bradfield & Porter (1982).
2. Is the mean species diversity (α-diversity) and variation (β-diversity) within and across assemblages constant between the three sampling periods (1979, 1999, 2019)? If the plant community is stable, we expect little change in α-diversity and β-diversity.
3. Are assemblages characterized by similar indicator species? If not, which species gained or lost are driving changes within each assemblage? We expect that increasing abundance of invasive species over time would result in greater net number of species lost (and fewer net species gained).

I think these are in the wrong order…I think it should go question one, and then three, and then two.

And THAT would mean you could shape your discussion like:

1. Dominant species results (currently in that first paragraph, looks good to me)
2. Changing indicator species
   1. Implication of shifts in the sub-dominants – is the functional group of the indicator species shifting? What does this mean for ecosystem function?
   2. Possible explanations – natural variation, OR your discussion of the potential abiotic drivers
3. Changing alpha diversity – decreasing richness and its implications; which species are being lost? What are their functions?
   1. What does this mean for functional redundancy?
4. Changing beta diversity – I think we should talk through what your specific beta diversity metric means
5. Your synthesis section

You’ve done a much better job of weaving the possible drivers in with the metrics, but now I’m having a hard time following the story you’re trying to tell. All of the content I suggest above is pretty much in there, but with some extra detail and reorganization, I think it would be much stronger.

For point 3:

Species lost vs gained

Bogbean

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Ecology | Clade | Root | Life | Function |
| *~~Alisma plantago aquatica~~* | -100.0 |  |  |  |  |  |
| *Alopecurus geniculatus* | -100.0 |  |  |  |  |  |
| *Deschampsia caespitosa* | -100.0 |  |  |  |  |  |
| *Equisetum fluviatile* | -100.0 |  |  |  |  |  |
| *Leersia oryzoides* | -100.0 |  |  |  |  |  |
| *Lilaeopsis occidentalis* | -100.0 |  |  |  |  |  |
| *Oenanthe sarmentosa* | -100.0 |  |  |  |  |  |
| *Poa trivialis* | -100.0 |  |  |  |  |  |
| *Sium suave* | -100.0 |  |  |  |  |  |
| *Equisetum arvense* | + |  |  |  |  |  |
| *Galium trifidum* | + |  |  |  |  |  |
| *Hypericum scouleri* | + |  |  |  |  |  |
| *Impatiens capensis* | + |  |  |  |  |  |
| *Juncus acuminatus* | + |  |  |  |  |  |
| *Lathyrus palustris* | + |  |  |  |  |  |
| *Lysichiton americanum* | + |  |  |  |  |  |
| *Salix lasiandra* | + |  |  |  |  |  |
| *Salix scouleriana* | + |  |  |  |  |  |
| *Typha latifolia* | + |  |  |  |  |  |

Fescue

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Ecology | Clade | Root | Life | Function |
| *~~Alisma plantago aquatica~~* | -100.0 | ~~Emergent~~ | ~~Forb~~ |  |  |  |
| *Alopecurus geniculatus* | -100.0 | Mesic | graminoid |  |  |  |
| *Bidens cernua* | -100.0 | Wetland/mesic | forb | fibrous | per |  |
| *Deschampsia caespitosa* | -100.0 | mesic | graminoid | fibrous | per |  |
| *Dulichium arundinaceum* | -100.0 | emergent | graminoid | rhizome |  |  |
| *Eleocharis palustris* | -100.0 | Mesic/emergent | graminoid |  | per |  |
| *Equisetum palustre* | -100.0 |  |  |  |  |  |
| *Galium trifidum* | -100.0 |  |  |  |  |  |
| *Hypericum formosum* | -100.0 |  |  |  |  |  |
| *Juncus articulatus* | -100.0 |  |  |  |  |  |
| *Leersia oryzoides* | -100.0 |  |  |  |  |  |
| *Lilaeopsis occidentalis* | -100.0 |  |  |  |  |  |
| *Mimulus guttatus* | -100.0 |  |  |  |  |  |
| *Oenanthe sarmentosa* | -100.0 |  |  |  |  |  |
| *Platanthera dilatata* | -100.0 |  |  |  |  |  |
| *Poa palustris* | -100.0 |  |  |  |  |  |
| *Poa trivialis* | -100.0 |  |  |  |  |  |
| *Polygonum hydropiper* | -100.0 |  |  |  |  |  |
| *Sagittaria latifolia* | -100.0 |  |  |  |  |  |
| *Salix sp.* | -100.0 |  |  |  |  |  |
| *Sium suave* | -100.0 |  |  |  |  |  |
| Symphyotrichum *subspicatum* | -100.0 |  |  |  |  |  |
| *Trifolium wormskioldii* | -100.0 |  |  |  |  |  |
| *Equisetum arvense* | + |  | Fern ally |  |  |  |
| *Juncus effusus* | + |  | gram |  |  |  |
| *Lysichiton americanum* | + |  | forb |  |  |  |
| *Myrica gale* | + |  | woody |  |  |  |
| *Salix scouleriana* | + |  | woody |  |  |  |

Sedge

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Ecology | Clade | Root | Life | Function |
| *~~Alisma plantago aquatica~~* | -100.0 |  |  |  |  |  |
| *Deschampsia caespitosa* | -100.0 |  |  |  |  |  |
| *Leersia oryzoides* | -100.0 |  |  |  |  |  |
| *Lilaeopsis occidentalis* | -100.0 |  |  |  |  |  |
| *Mimulus guttatus* | -100.0 |  |  |  |  |  |
| *Oenanthe sarmentosa* | -100.0 |  |  |  |  |  |
| *Platanthera dilatata* | -100.0 |  |  |  |  |  |
| *Poa palustris* | -100.0 |  |  |  |  |  |
| *Puccinella pauciflora* | -100.0 |  |  |  |  |  |
| *Sium suave* | -100.0 |  |  |  |  |  |
| *Equisetum arvense* | + |  |  |  |  |  |
| *Galium palustre* | + |  |  |  |  |  |
| *Galium trifidum* | + |  |  |  |  |  |
| *Hypericum scouleri* | + |  |  |  |  |  |
| *Juncus articulatus* | + |  |  |  |  |  |
| *Juncus oxymeris* | + |  |  |  |  |  |
| *Scirpus microcarpus* | + |  |  |  |  |  |