Understanding Oyster Population Connectivity and Adaptation in Narragansett Bay

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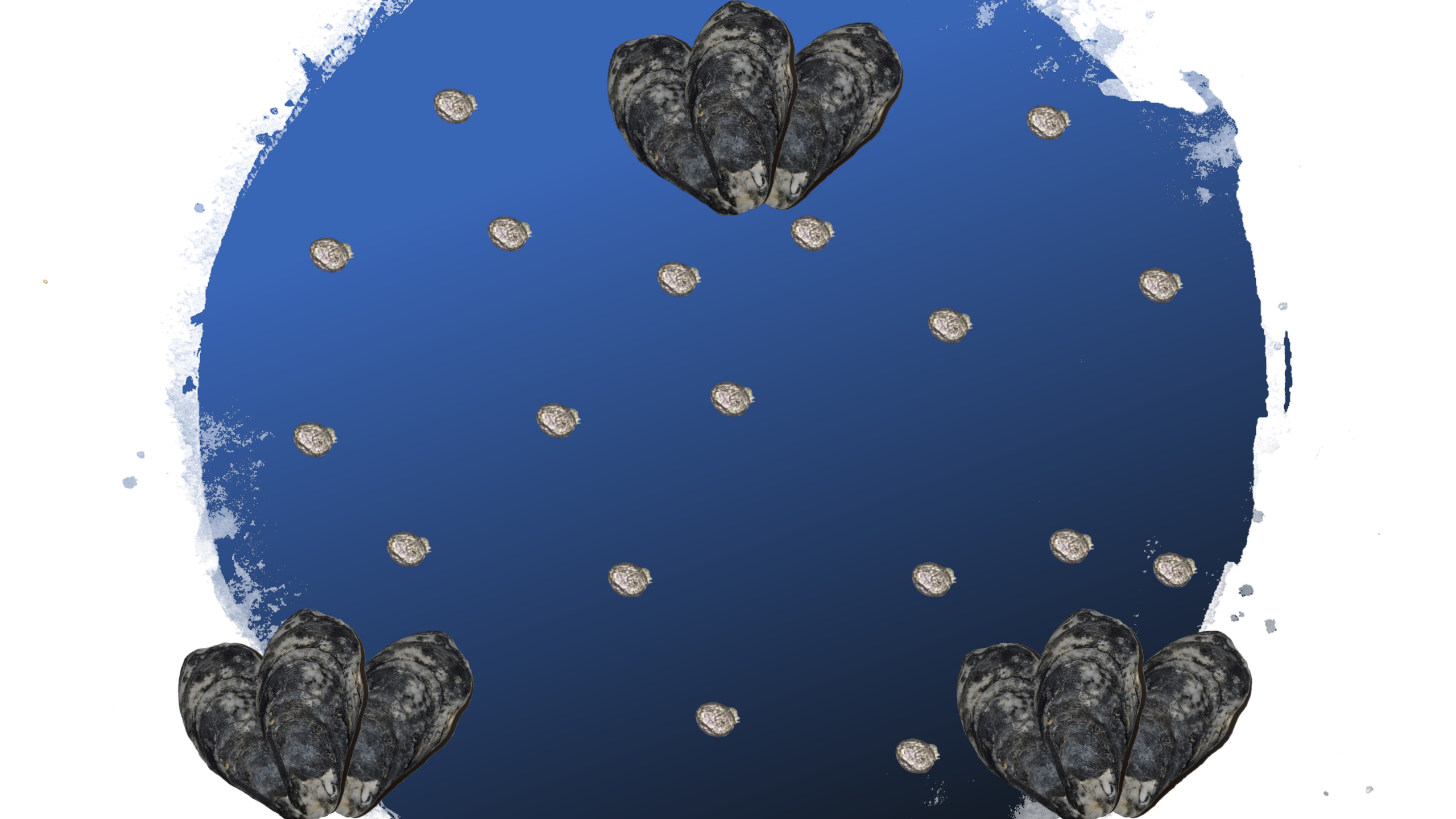
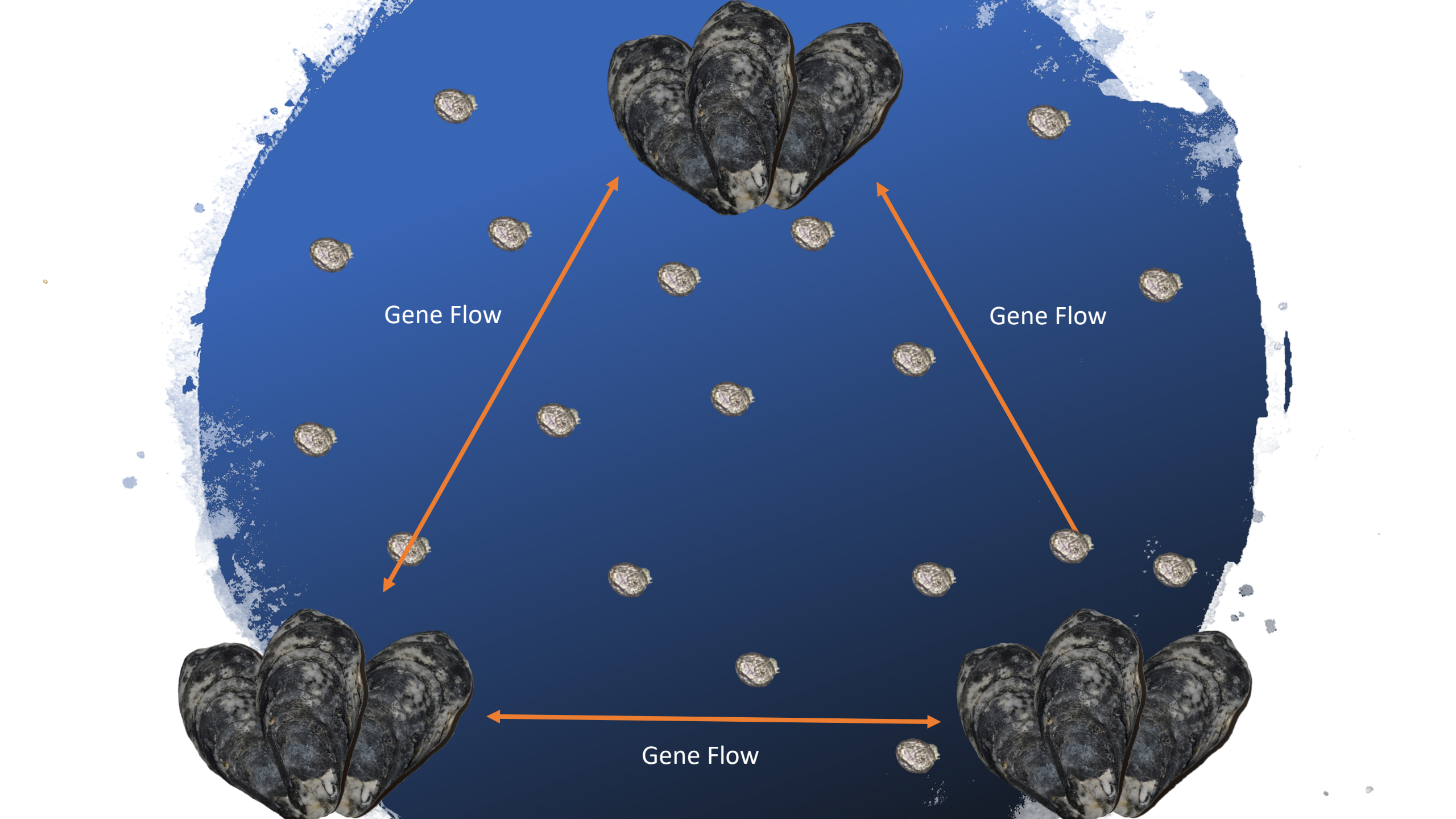
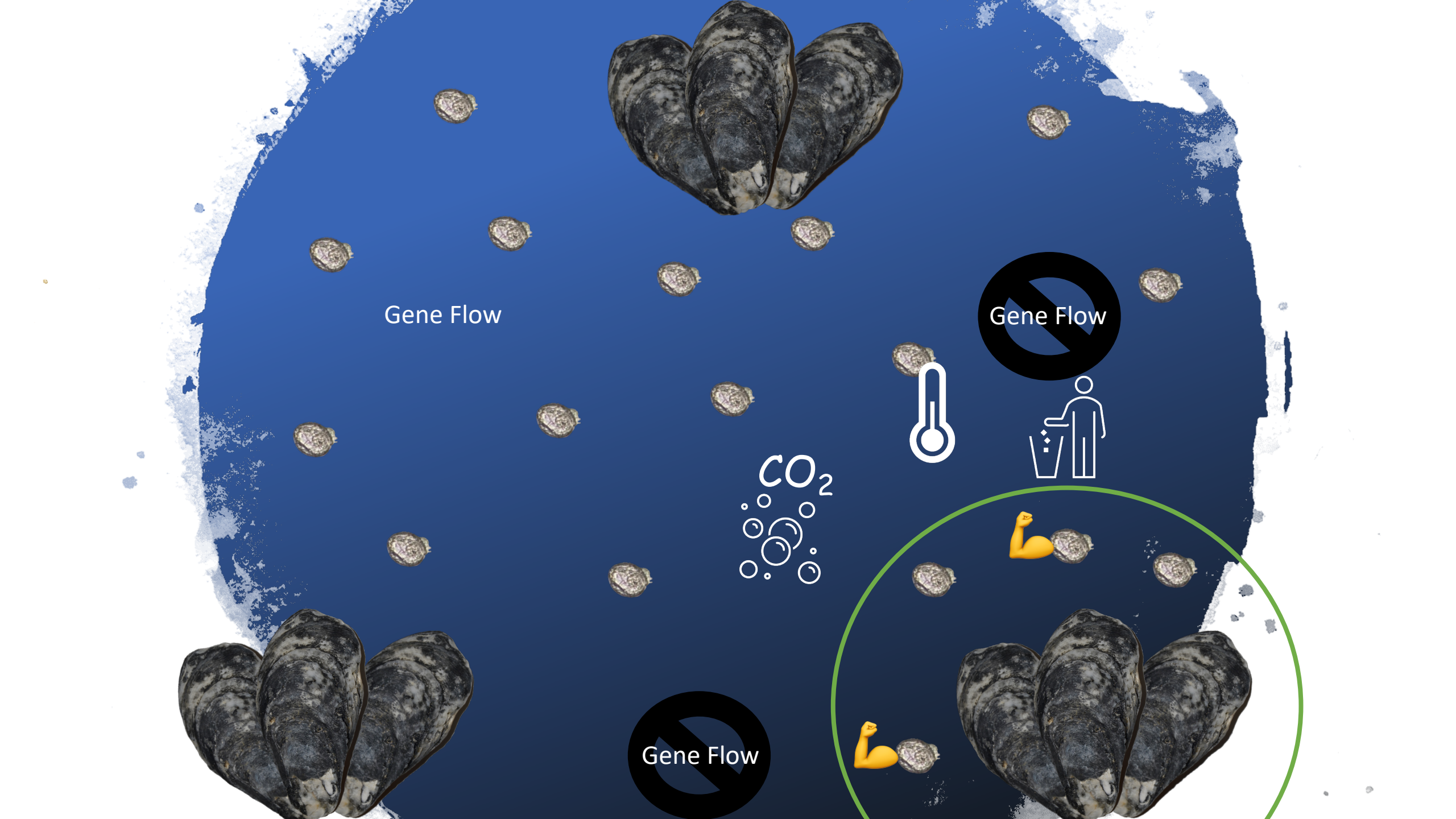



Gene Flow
Gene Flow
Gene Flow


Gene Flow
Gene Flow
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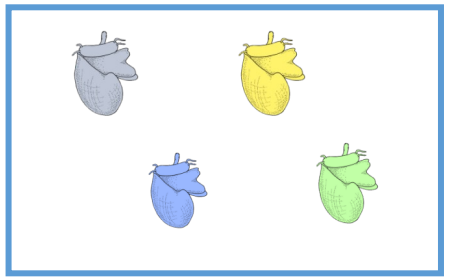
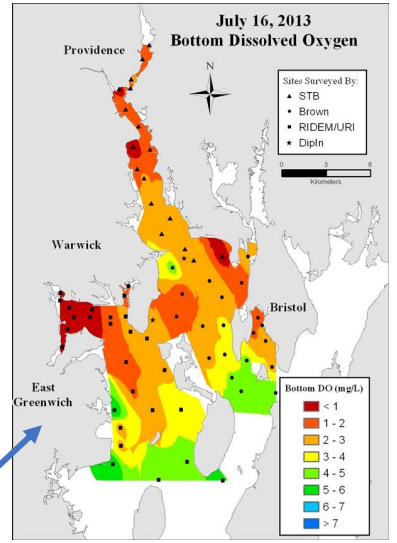
Gene Flow

Linking larval coastal stressor response to population connectivity patterns in adult oysters

Larval response to coastal stressors



Environmental data



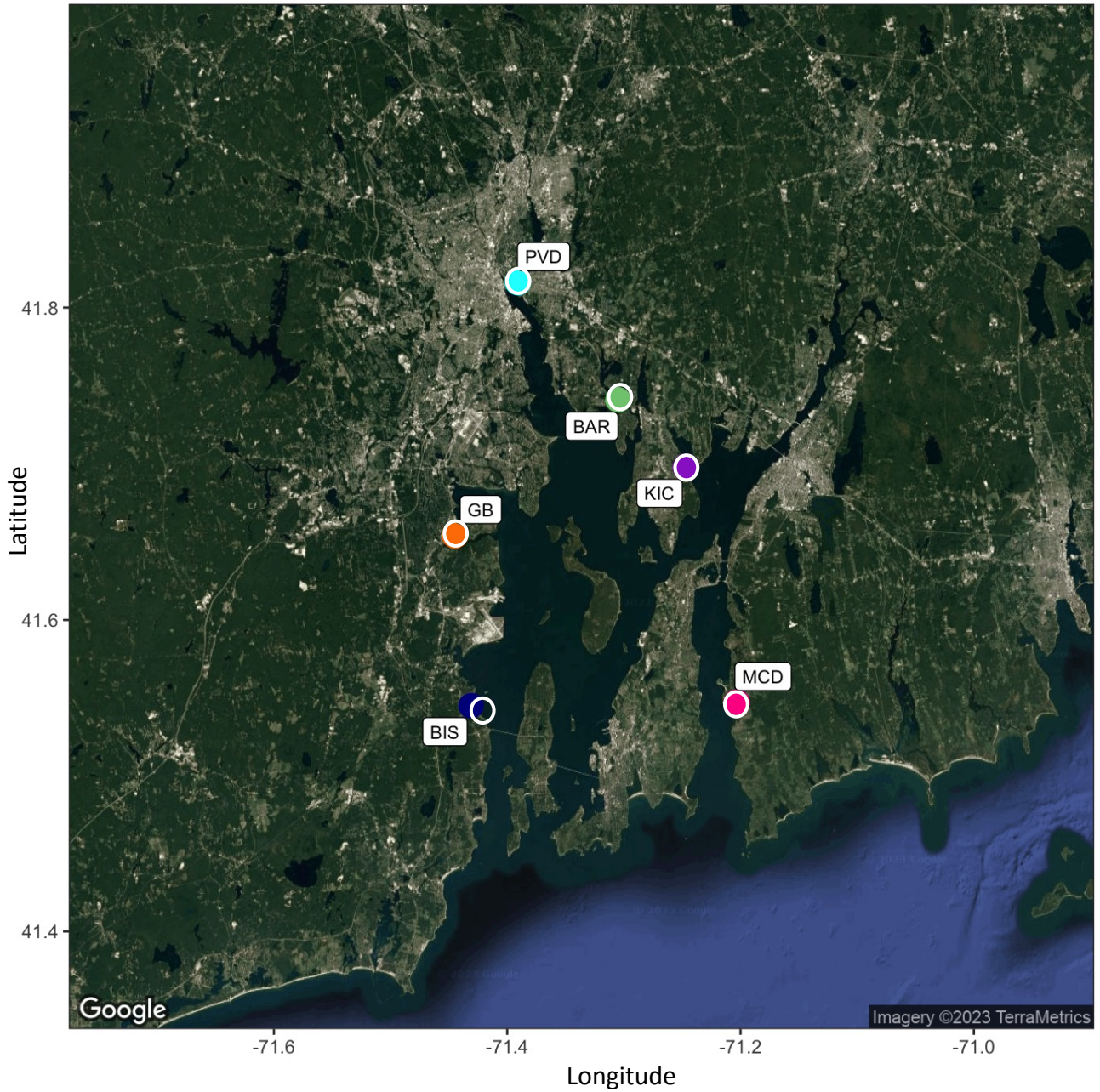
Population genomics

Oysters and environmental data collected from 6 sites

	Sewage Effluent*	Temperature (°C)	Salinity (ppt)	pH	Dissolved Oxygen (mg/L)
PVD	59.860	15.8	18.82	7.68	4.9
GB	14.596	22.27	29.58	7.67	4.57
BIS	8.825	21.39	27.32	7.94	7.05
BAR	17.881	22.08	29.08	7.69	5.37
KIC	56.313	21.5	28.31	7.84	6.07
MCD	12.111	22.24	20.68	7.69	8.76

PVD – Narragansett Bay Commission
GB, BAR, KIC – URI Watershed Watch
BIS, MCD – Onset HOBO data loggers

Summary data based on summer averages

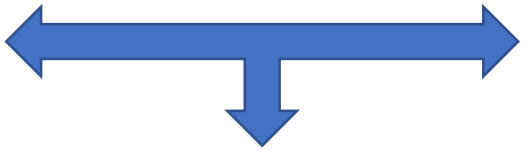


Expressed Exome Capture Sequencing!

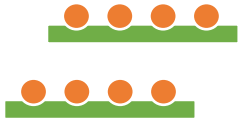
Exons

Non-target regions

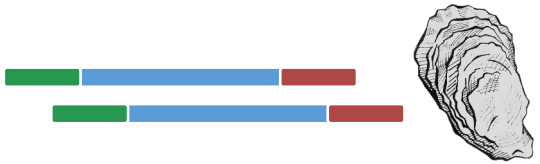
DNA



Probes (made from mRNA)

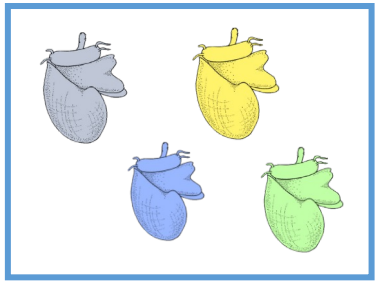


Selective enrichment of exon sequences of your study organism



Expressed Exome Capture Sequencing!

Larval oysters exposed to coastal stressors



Exons

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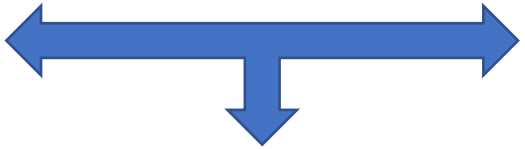
DNA



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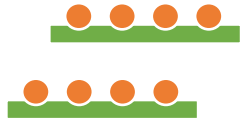
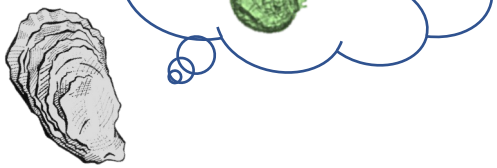
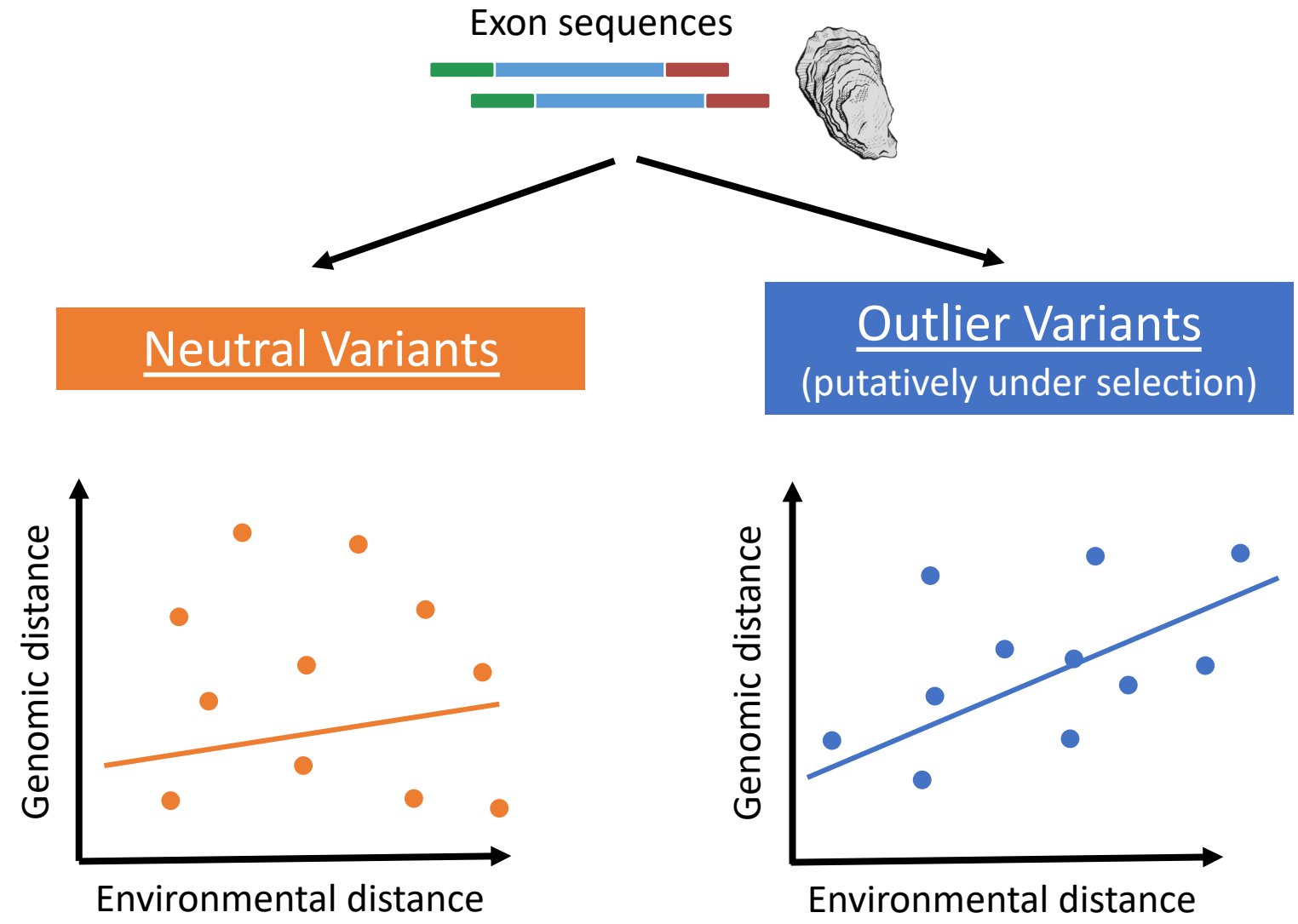


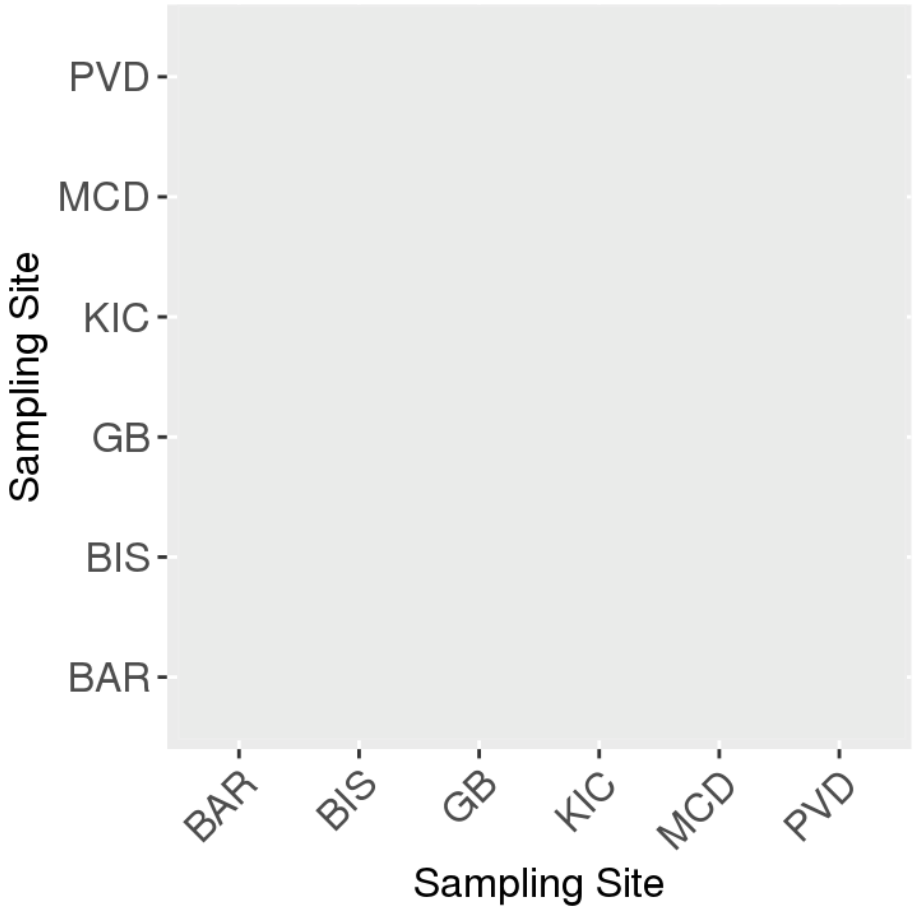
Selective enrichment of exon sequences of adult oyster DNA related to larval response to coastal stressors

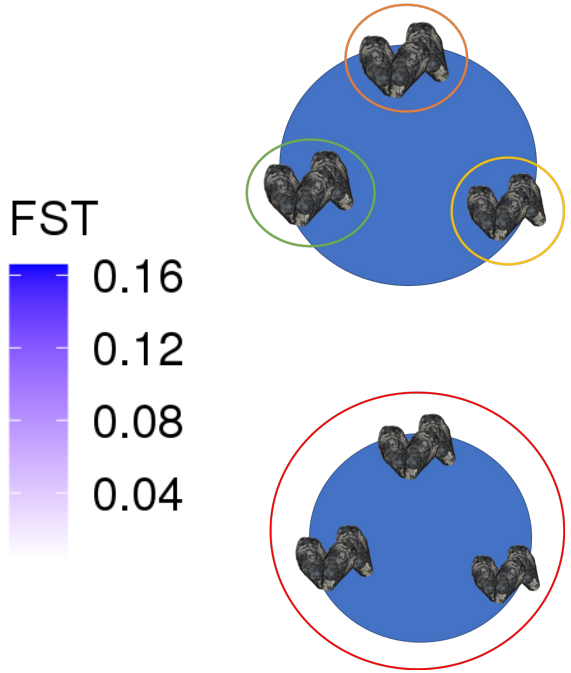


Population & Seascape Genomics Analysis



High levels of population differentiation in variants under selection





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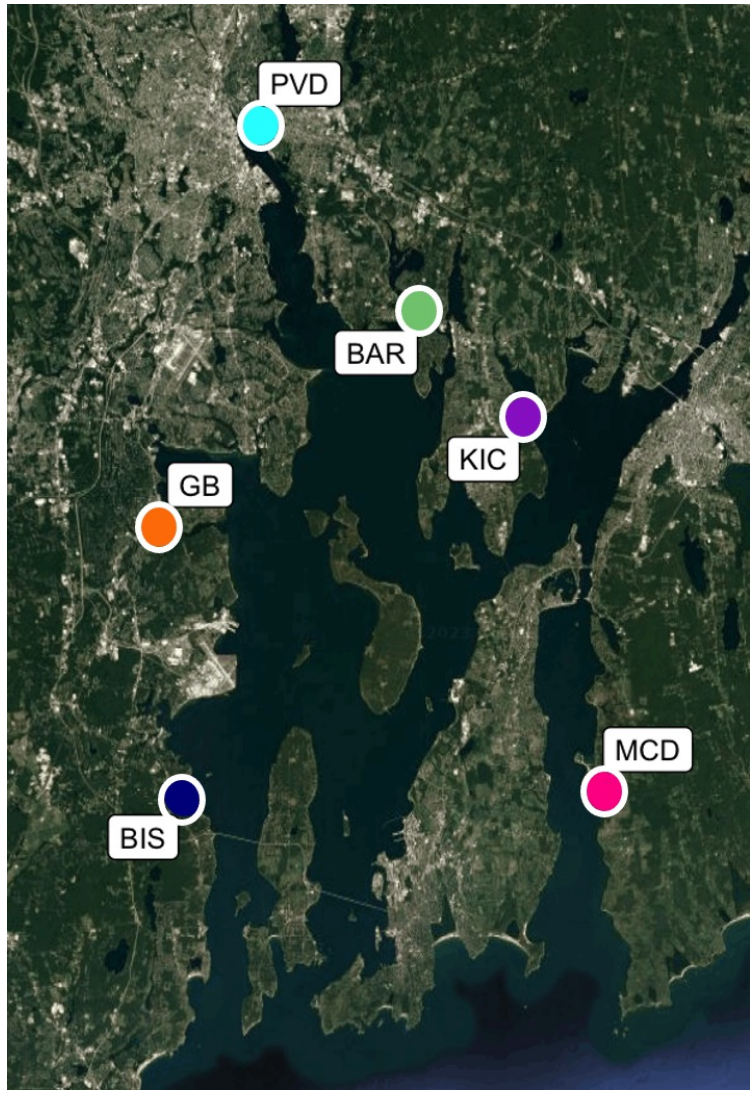
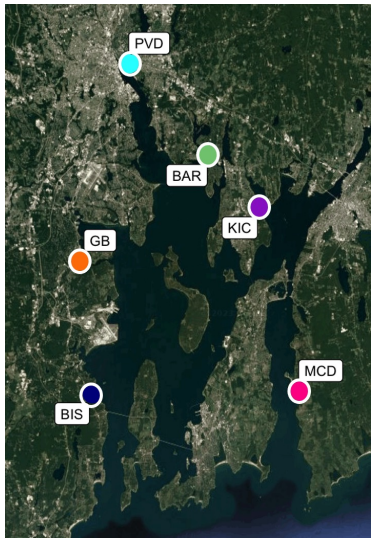
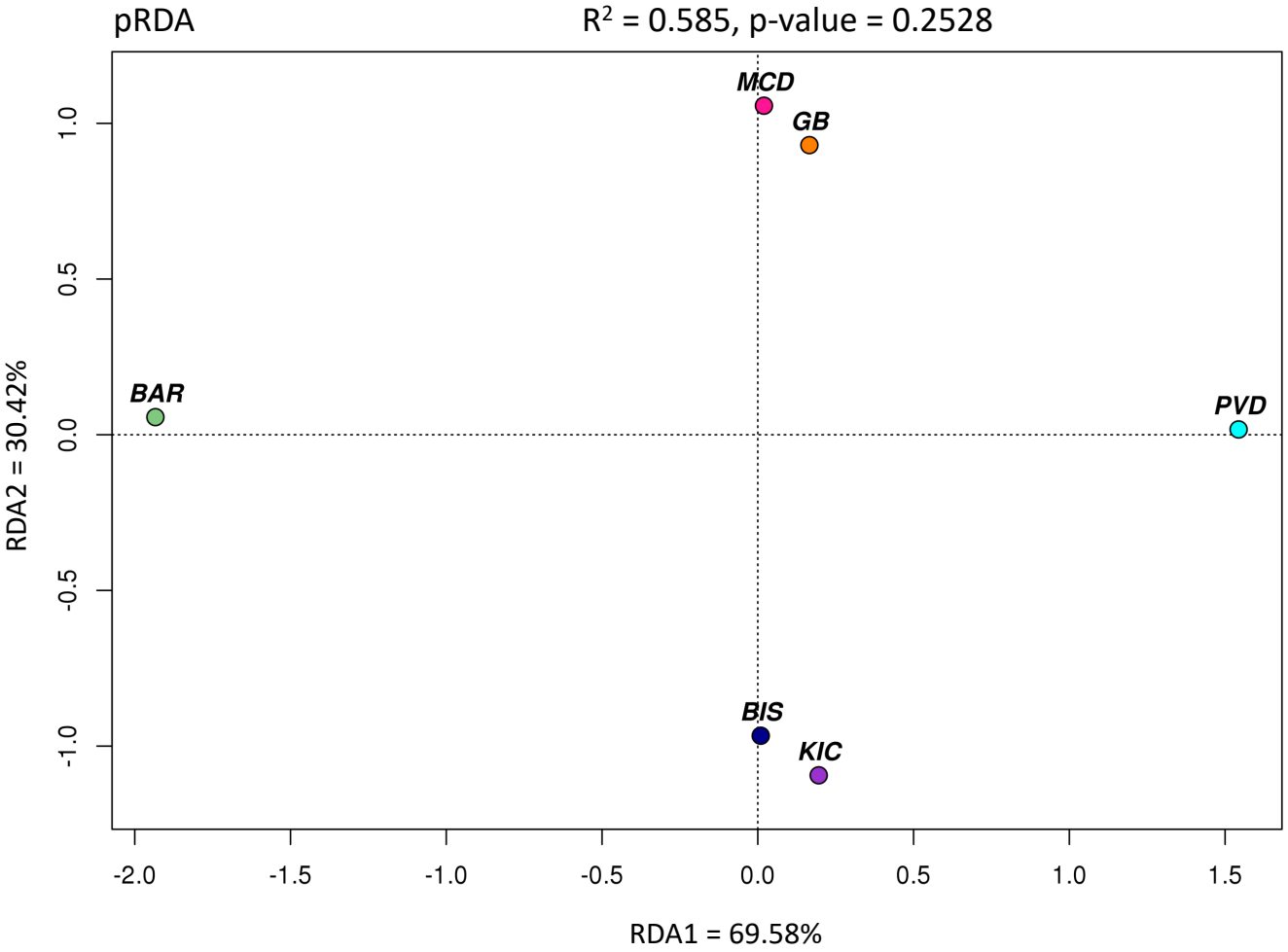
Fst = 0



Salinity & pH may explain population structure in variants under selection





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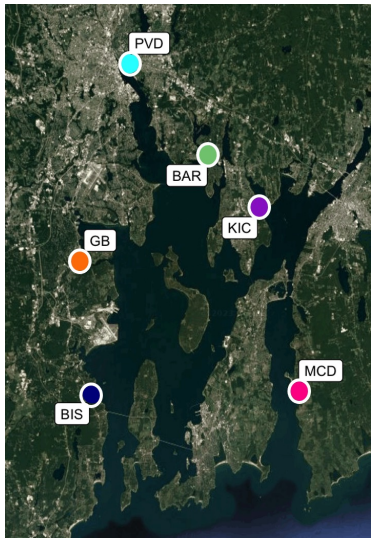

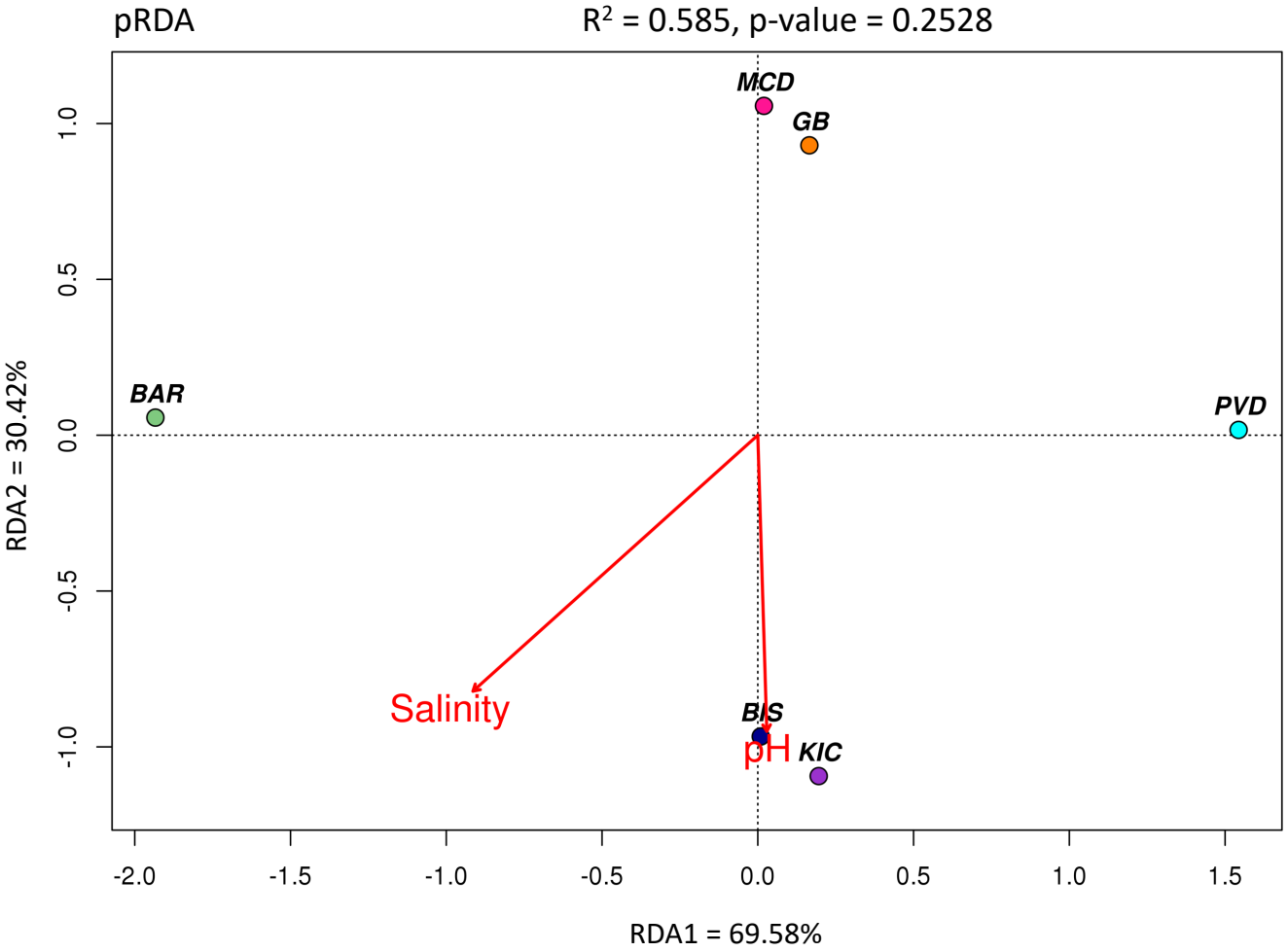

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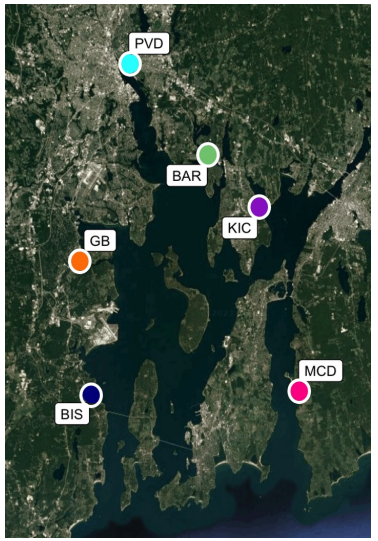

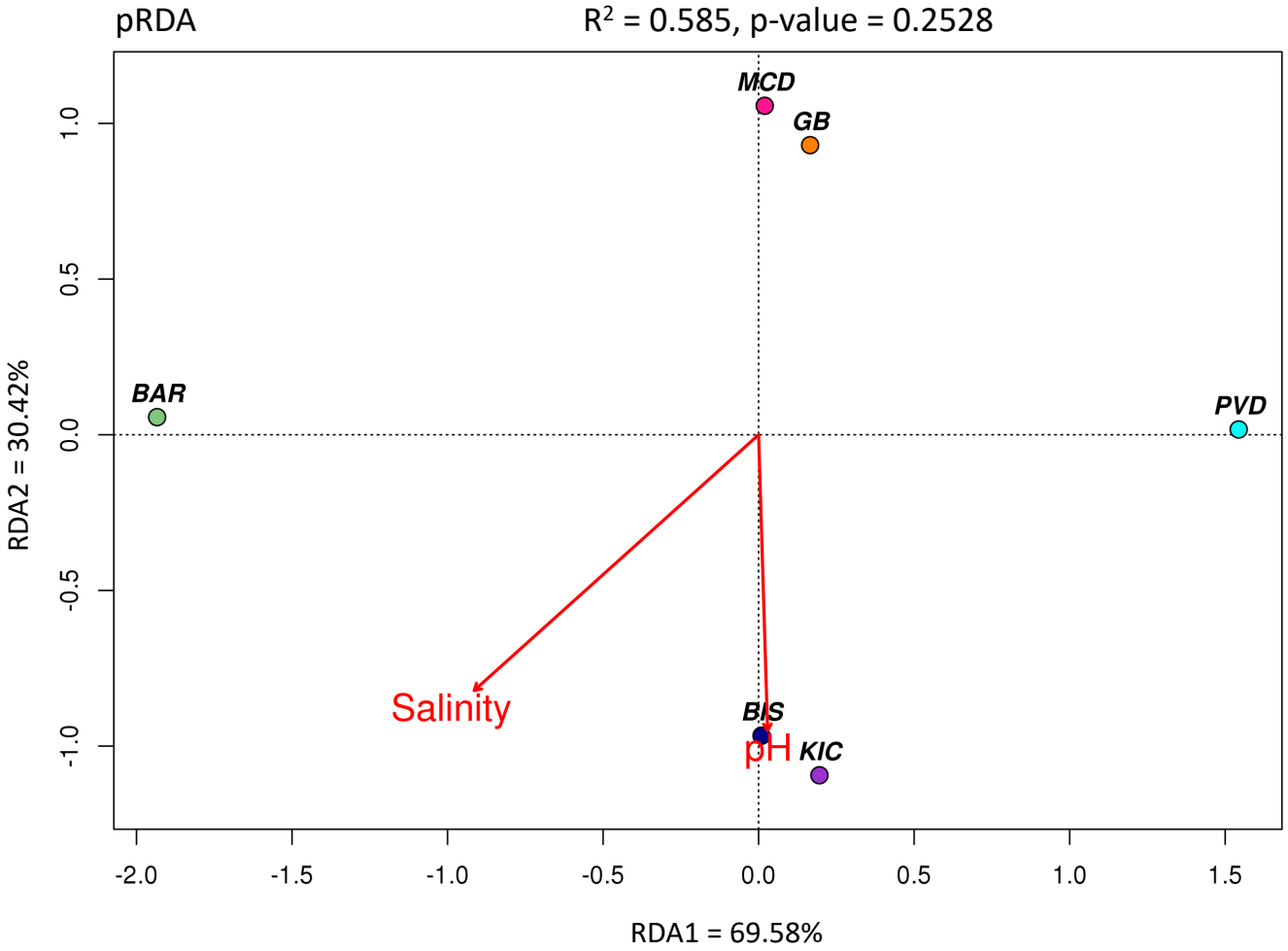

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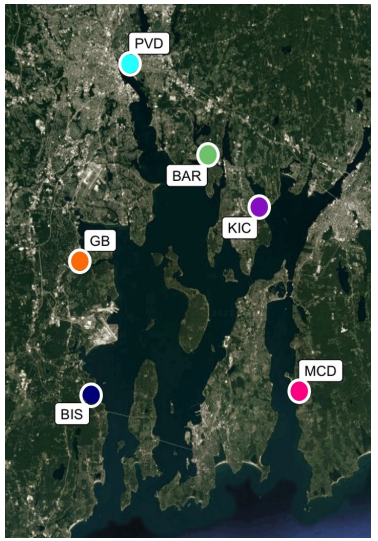
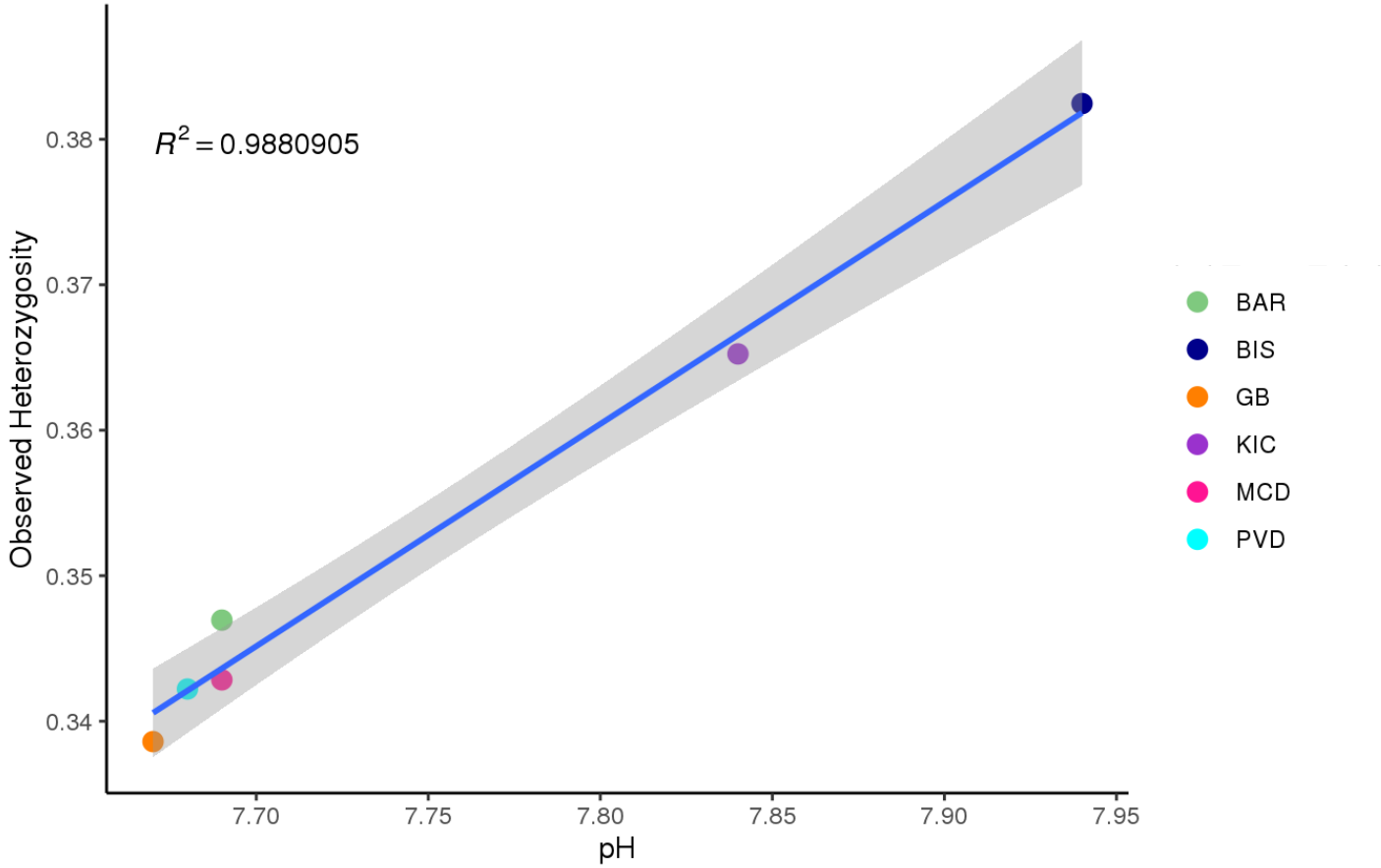
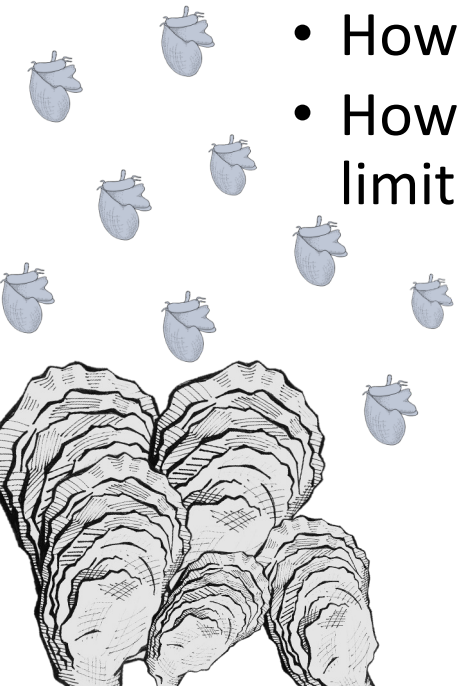
Observed heterozygosity increases with pH

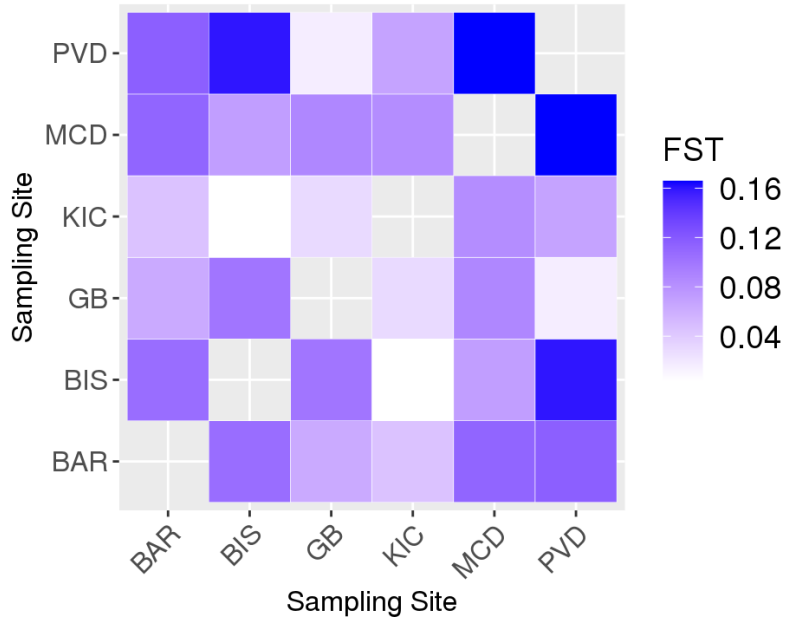


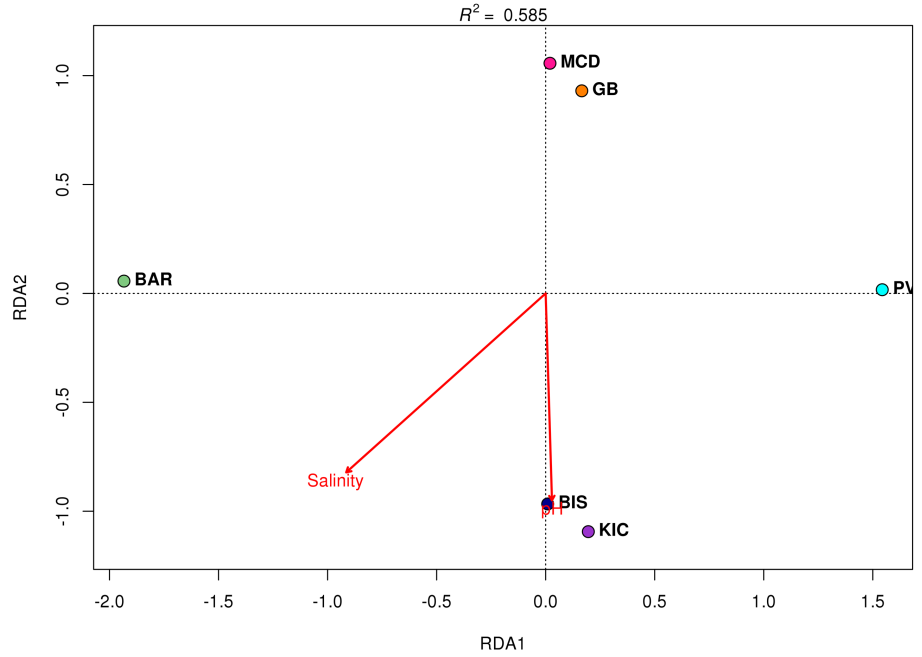


Application of genomic tools for oyster restoration

- Site selection is an important step in restoration
- It can be more accurately informed by understanding:
  - How populations are genetically connected
  - How environmental conditions promote or limit gene flow across populations







Bioinformatic pipeline and analyses

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Marine Evolutionary Ecology

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