



Apr 5th, 10:45 AM - 11:00 AM

If historic marine pollution ceases, will the natural intertidal community return? How exposure to and release from pollution disturbance shapes rocky intertidal communities in the Salish Sea

Shannon Bard
Hemmera, Canada, sbard@hemmera.com

Aaron Eger
Univ. of Victoria, Canada, aeger@uvic.ca

Julia Baum
Univ. of Victoria, Canada, baum@uvictoria.ca

Follow this and additional works at: <https://cedar.wwu.edu/ssec>



Part of the [Fresh Water Studies Commons](#), [Marine Biology Commons](#), [Natural Resources and Conservation Commons](#), and the [Terrestrial and Aquatic Ecology Commons](#)

Bard, Shannon; Eger, Aaron; and Baum, Julia, "If historic marine pollution ceases, will the natural intertidal community return? How exposure to and release from pollution disturbance shapes rocky intertidal communities in the Salish Sea" (2018). *Salish Sea Ecosystem Conference*. 157.
<https://cedar.wwu.edu/ssec/2018ssec/allsessions/157>

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.



If historic marine pollution ceases, will the natural intertidal community return? How exposure to and release from pollution disturbance shapes rocky intertidal communities in BC

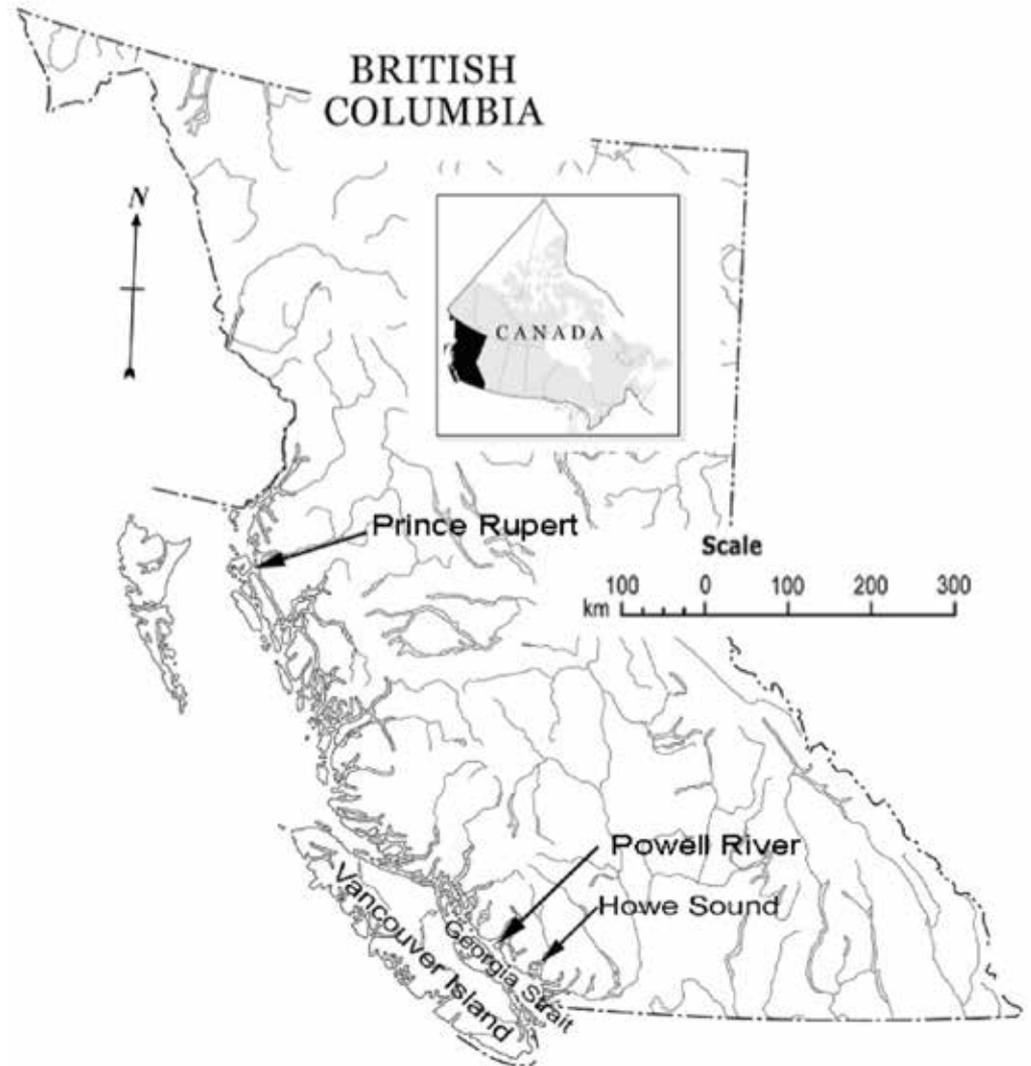
Dr. Shannon Mala Bard,
Practice Leader, Biological Risk Assessment & Science and Innovation
Hemmera, an Ausenco Company

Aaron Eger & Dr. Julia Baum,
Department of Biology, University of Victoria

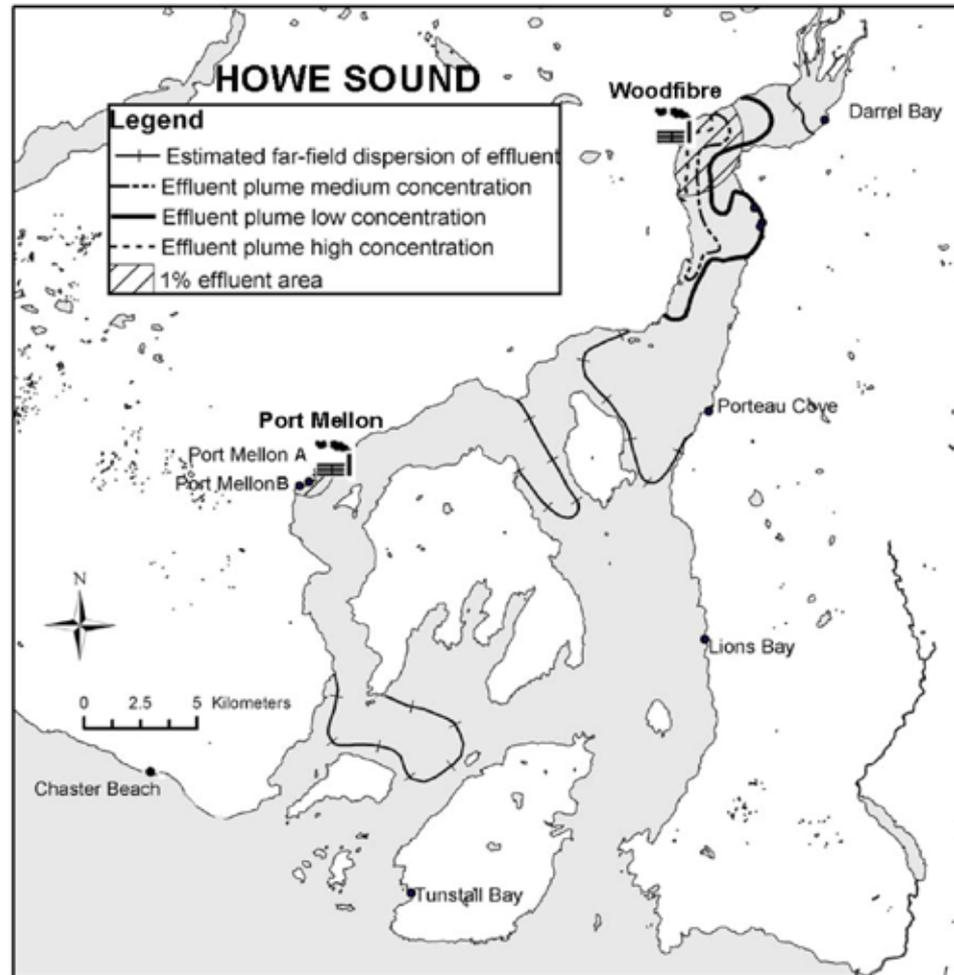
 **Hemmera**
An Ausenco Company



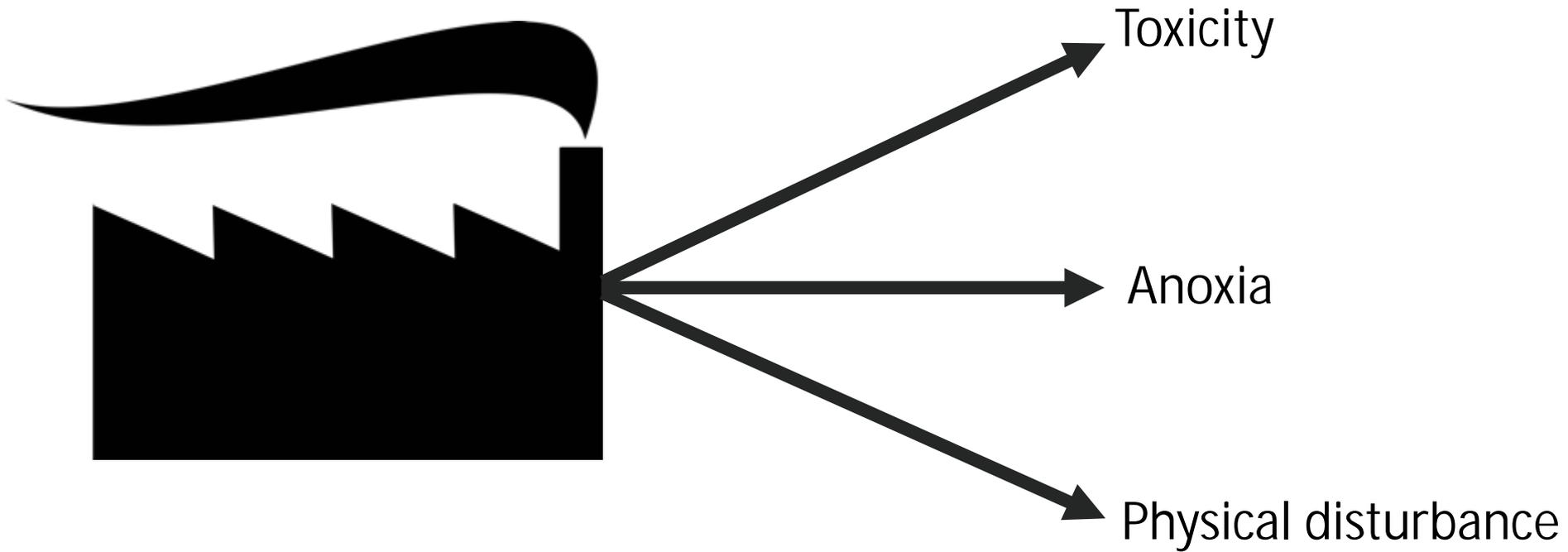
CSI Coastal Scene Investigation



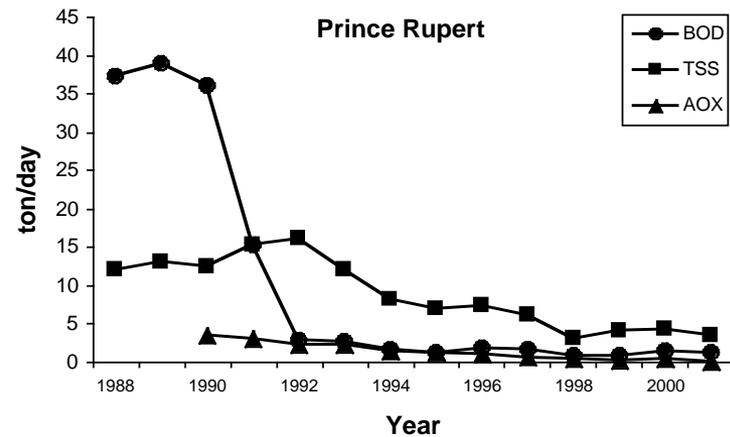
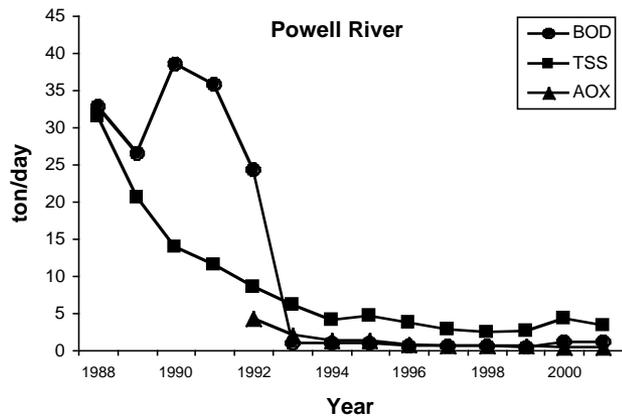
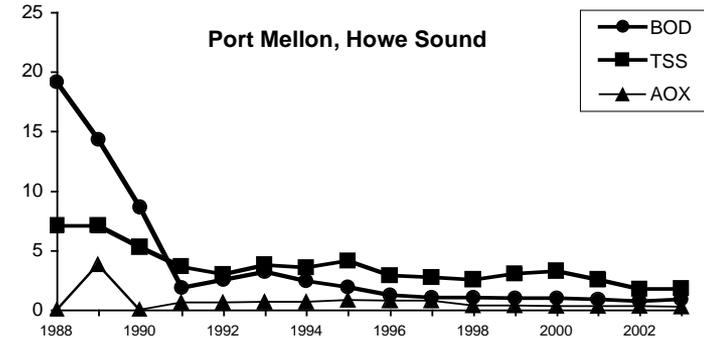
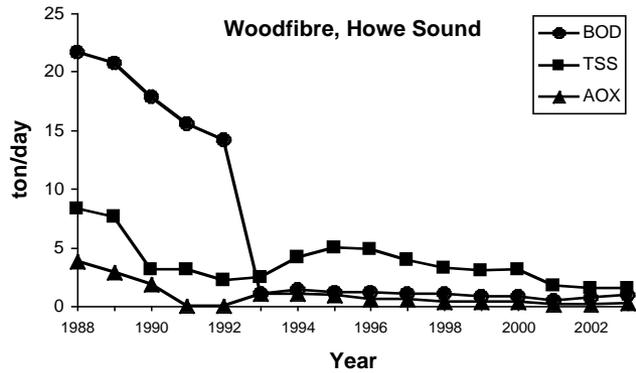
Sites selected along pollution gradient



Pulp and paper pollution



Improvements in Effluent Quality since EEM



Data kindly provided by Environment Canada and Hatfield Consultants, 2004

Economic shutdowns

- Prince Rupert mill closed 2001
- Woodfibre mill closed 2006
- Powell River, closure of 1 of 2 historic mills



Intertidal Quadrat Studies- faunal data



Percent (%) Cover

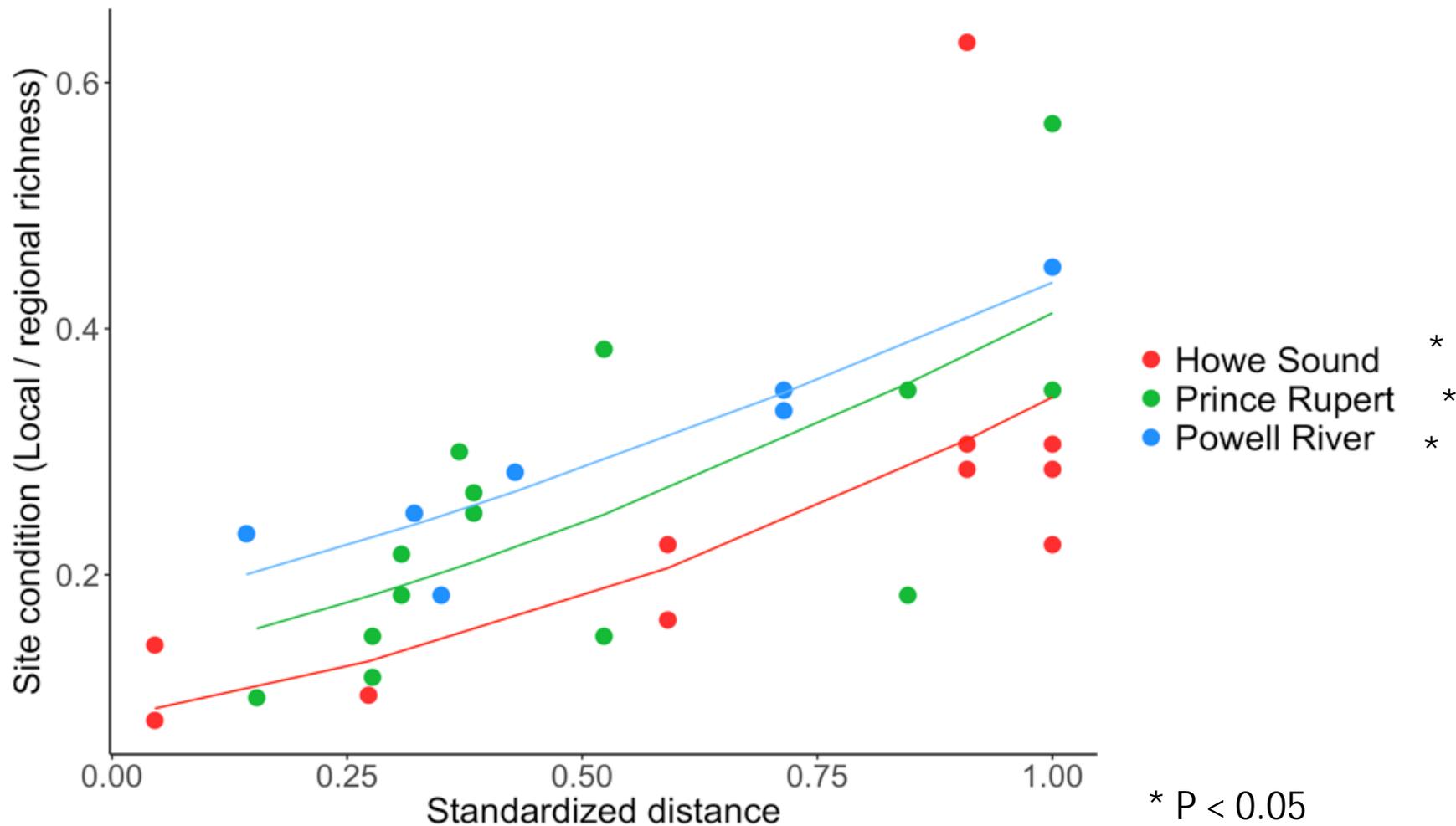


Under-rock Species Diversity

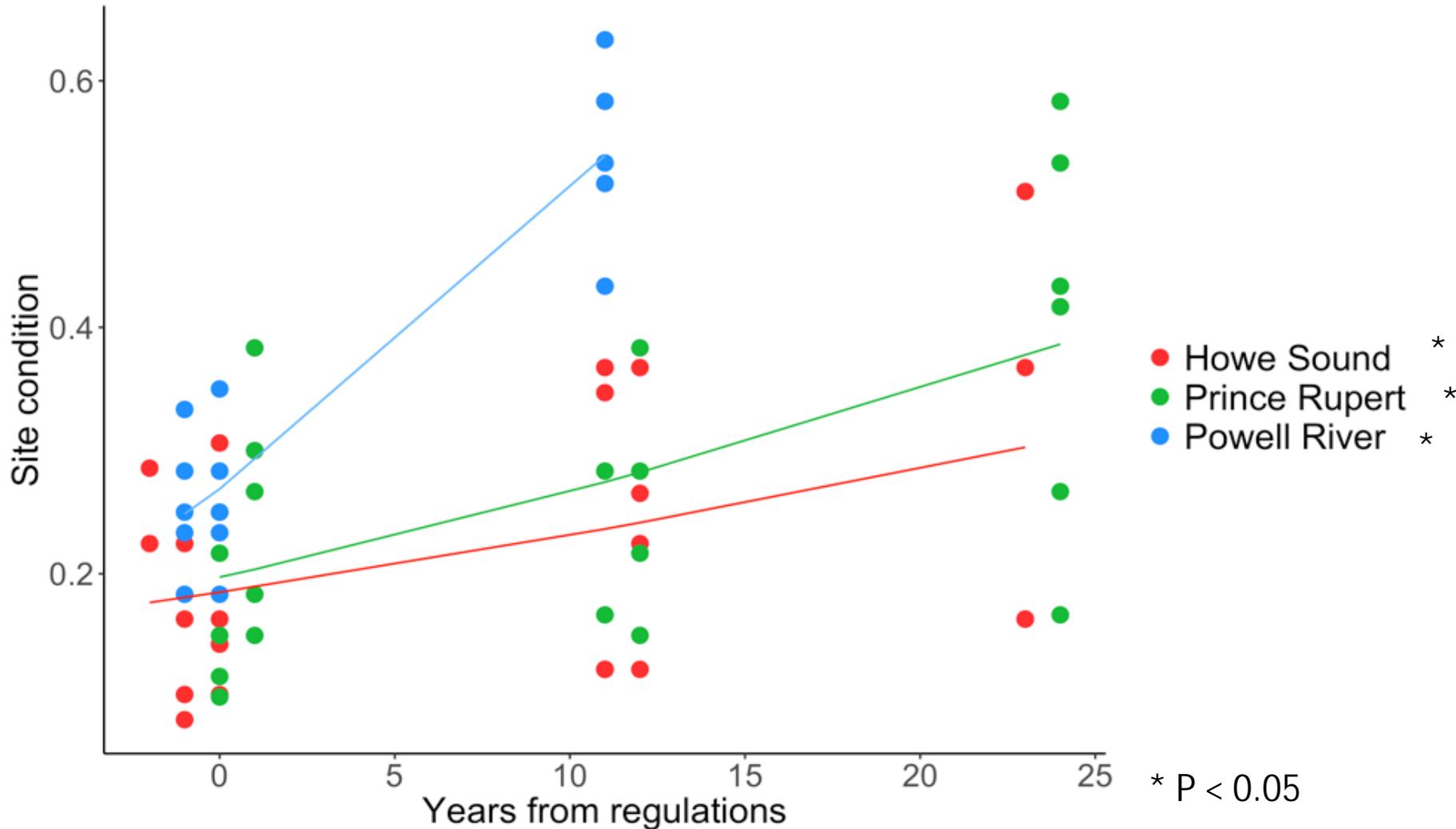
Questions



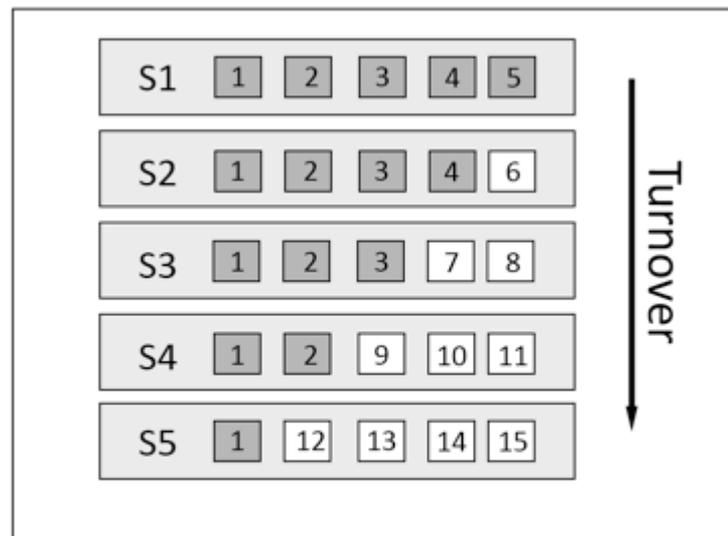
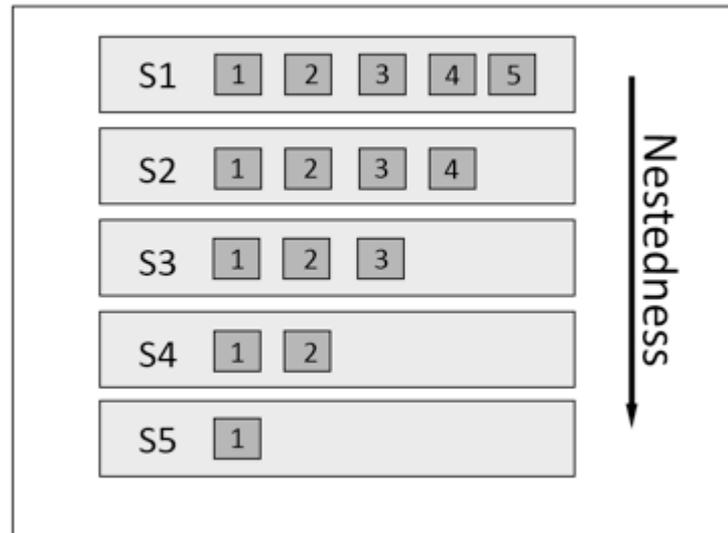
Q1: Initial impact - 1990s



Q1: Species recovery post regulations

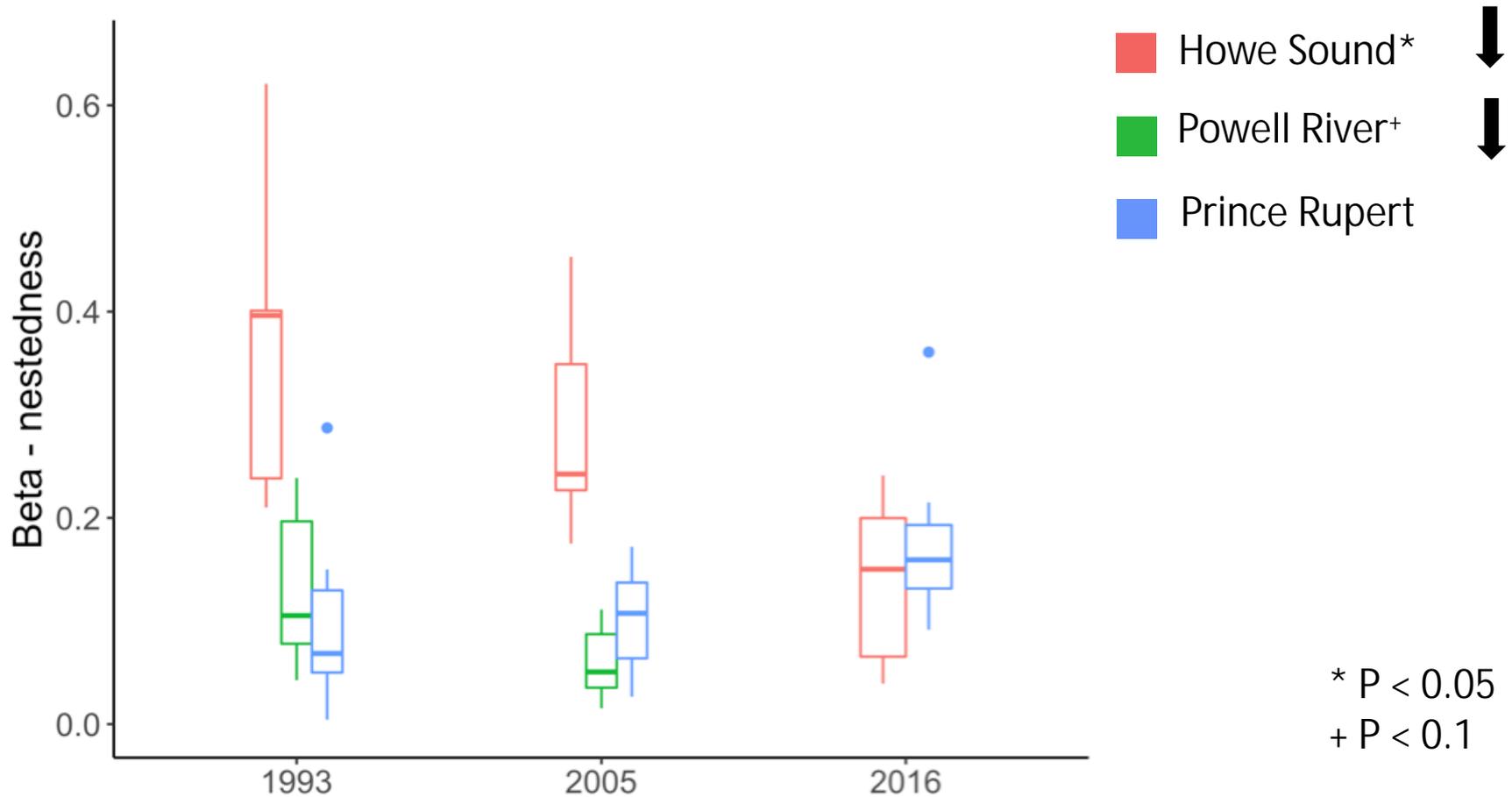


Q1: But how are they recovering?

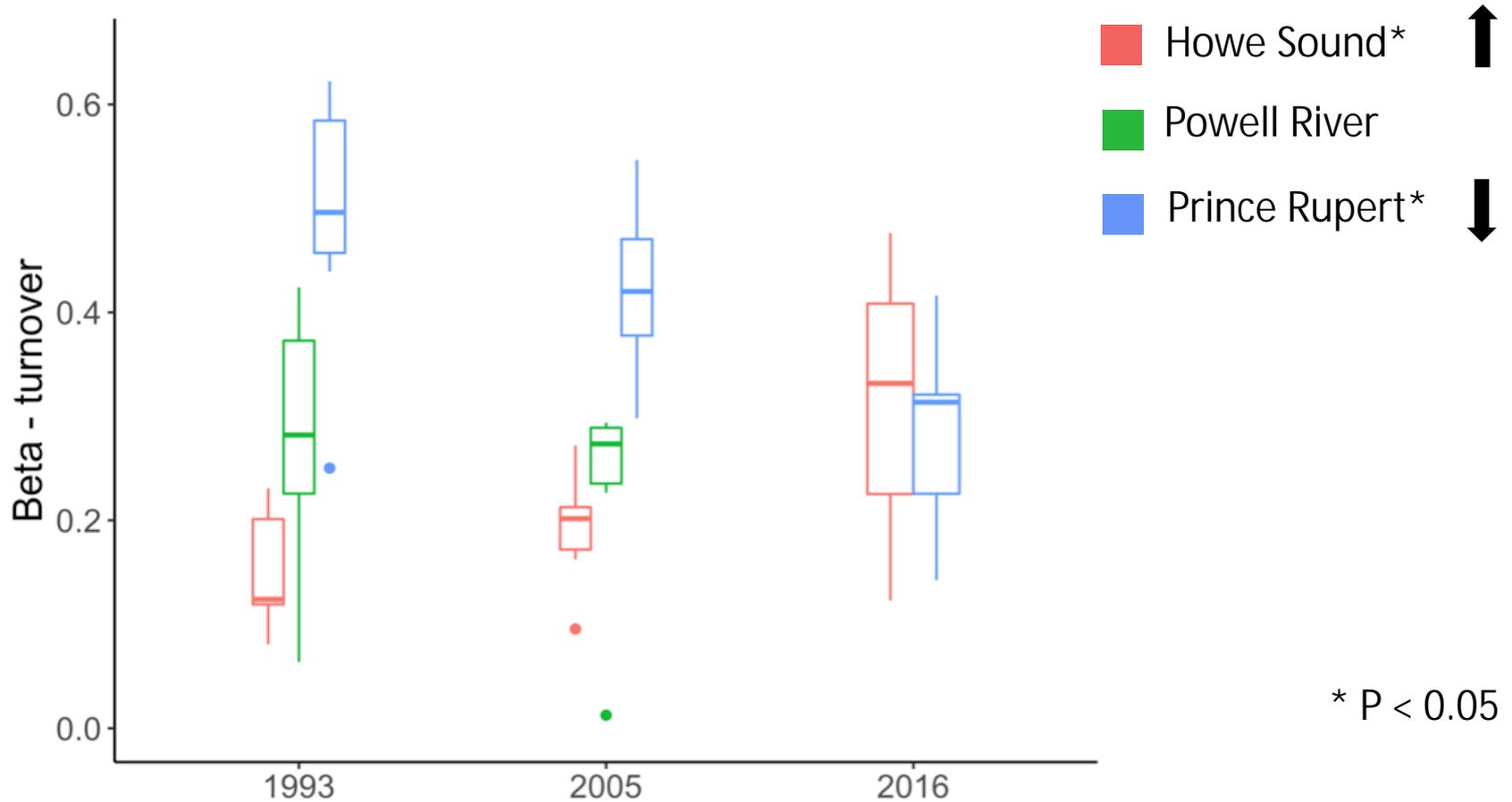


Adapted from
Baselga 2009

Q1: Species nestedness



Q1: Species turnover

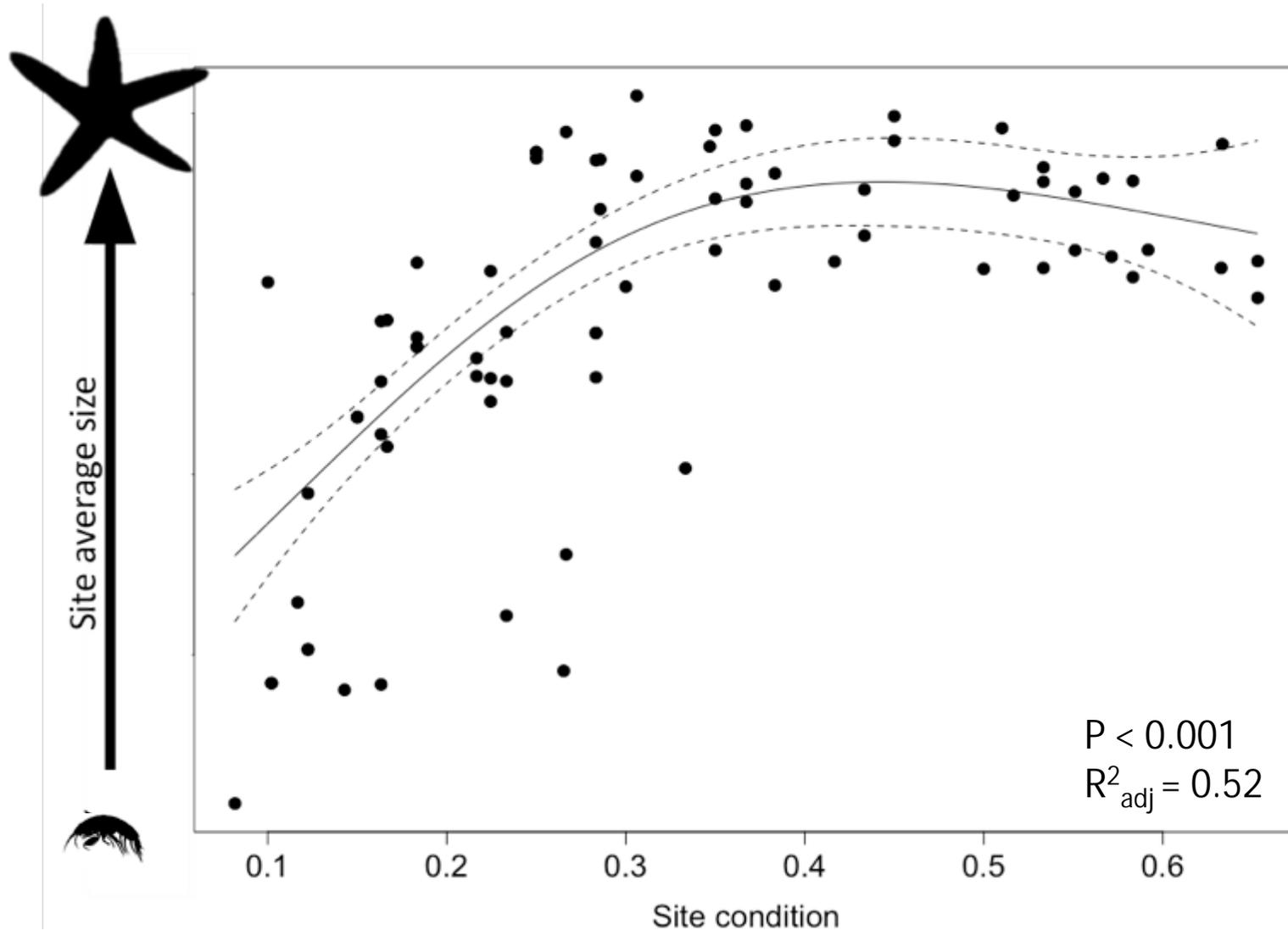


* P < 0.05

Q2: Trait assignment



Q2: Which traits thrive?



Q2: Trait implications

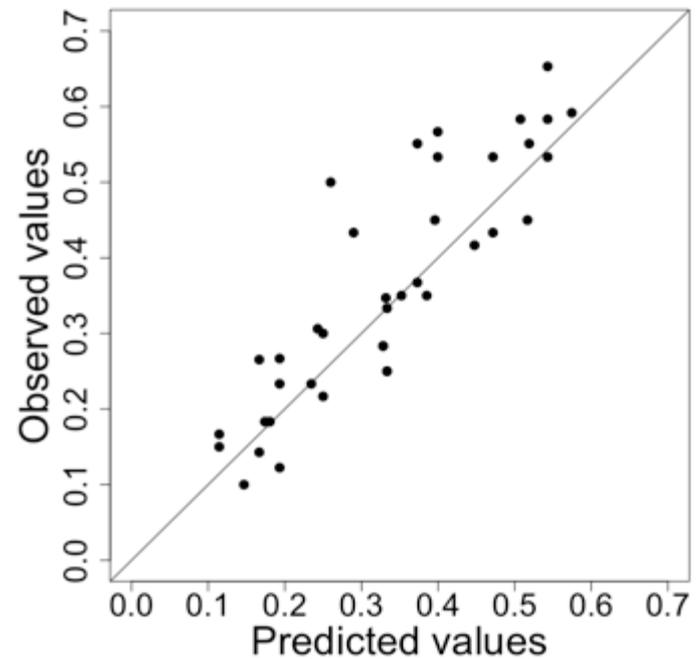
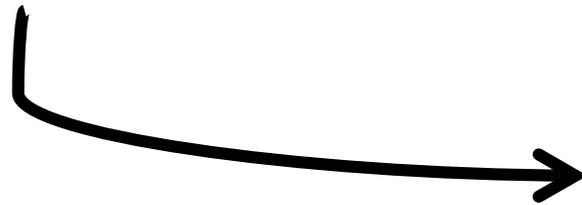


&

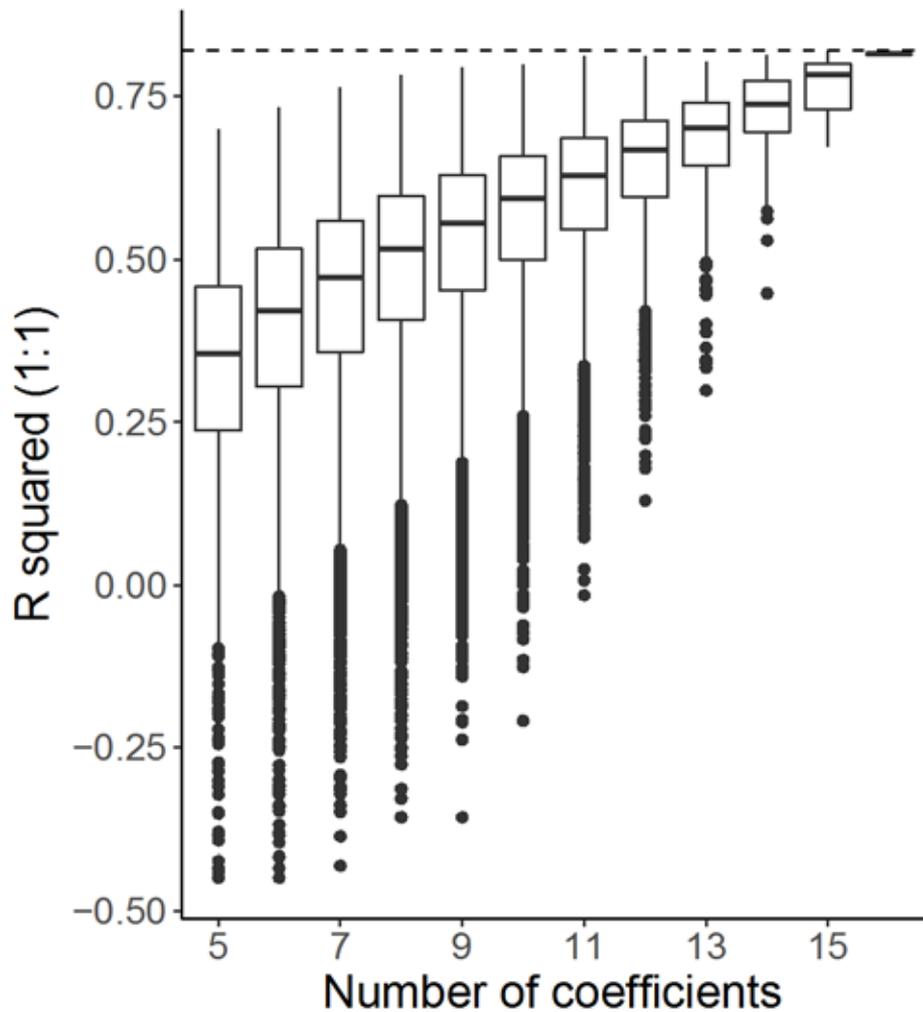


Q3: Determining indicator species

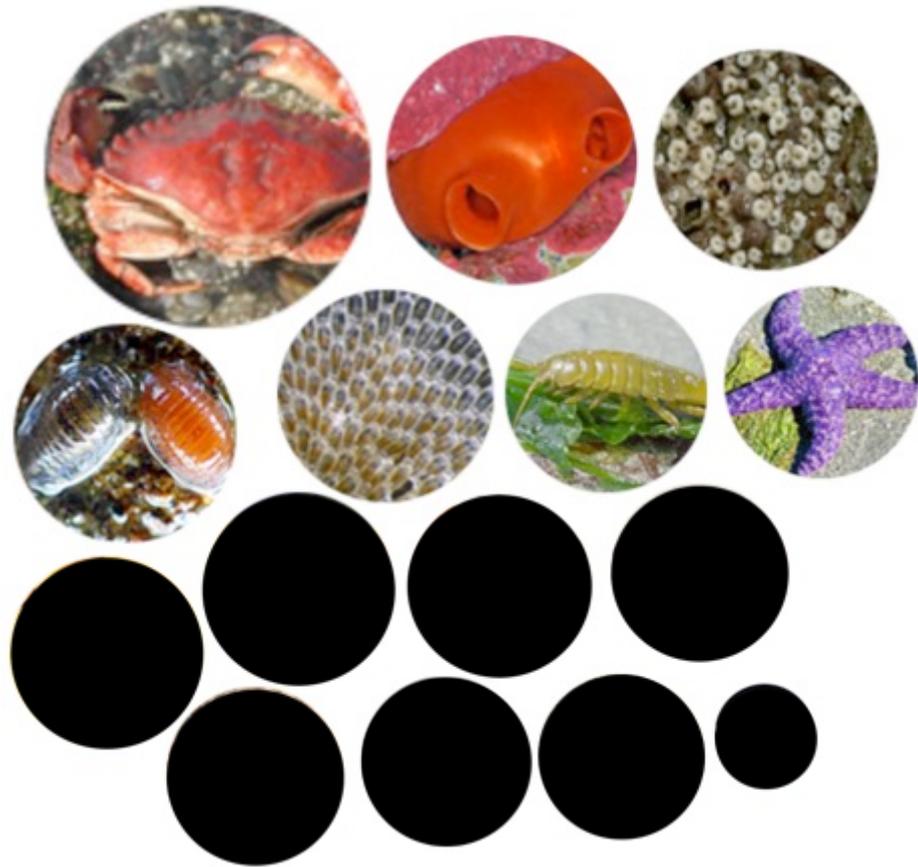
- 1) Split data into a) training set & b) test set
- 2) Build training models predicting condition with different combos of the 15 species as predictors
- 3) Assess predicted values against independent test data (R^2)



Q3: How many species?



Most common species coefficients



73 % "accuracy"



Take aways

- 1) Mill pollution reduced species richness
- 2) Recovery *can* occur naturally
 - Beta diversity provides additional insights
- 3) Pollution selects for smaller, mobile species
- 4) It is possible to assess the condition of a site based on a subset of species (with good accuracy)



Contaminated Sites Applications

- Use of community traits index more informative than presence/absence surveys- insight into **community health**
- Identify sites which are not recovering naturally, candidates for restoration efforts
- Shoreline Cleanup & Assessment Technique (SCAT)
 - Use indicator species survey technique for **oil spill** response baseline surveys - time restrictive, easily train volunteers

Acknowledgements

- UVic, Aaron Eger, Julia Baum, Quinn Lowen, Tella Osler
- SFU, Katerina Vassilenko, Chris Kennedy, Vicki Marlatt, Fabiola Ukah, Jeremy Jackson
- Eric Chiang, DFO

Funding

- NSERC Engage & Discovery Grants
- Dalhousie University Fac of Science
- Howard Hughes Medical Institute
- Stanford University URO
- Haas Public Service Fellowship
- Morrison Institute for Population and Resource Studies
- Nova Scotia Dept of Economic Dev.
- YTV Environment Award
- NSERC Engage Grant
- MITACS
- DFO



For more CSI info, go to www.ecotoxology.ca

All Coastal Scene Investigators
1985 – present

Acknowledgements

Consultation and logistics

- Metlakatla Nation
- Gitxaala Nation
- Lax Kw'alaams Nation
- Kitsumkalum Nation
- Kitselas Nation
- Northwest Community College
- Prince Rupert Port Authority





Thank you – Questions?

Dr. Shannon Mala Bard
sbard@hemmera.com

604.669.0424
www.ecotoxicology.ca

 **Hemmera**
An Ausenco Company

