

Indicates high priority

Piscataqua Region Estuaries Partnership Research Priorities

	Topic	Research Question	Help with Priority Setting or Decision Making
BIO-PHYSICAL SCIENCE QUESTIONS	Sediment Quality	What are the trends for key sediment parameters (e.g., organic chemistry, grain size, benthic community assessment and toxicity assessment)? What are causes and impacts?	Critical for management of both nutrient and toxic pollution, not covered by water concentration data
	Sediment Transport	What are the trends for sediment sources and movements within our estuaries? What are the causes and impacts?	Suspended sediments are important. Understanding sources helps to inform management decisions.
	Bio-Optical Modeling	What light-attenuating substances (e.g., TSS, CDOM, chl-a) are most limiting light, and how does this relate to forcing factors (e.g., storms, pollution) and eelgrass health?	Light a suspected issue. This work would guide whether interventions were achieving light goals.
	Nitrogen Budget, Part 1	How much of the nitrogen that goes into our estuary remains there versus being exported?	Builds a foundation for further understanding cycling of N within the estuary, critical for managing N
	Nitrogen Budget, Part 2	Building on above, how does N cycle through the system? What are the specific exchanges between different states and between sediments, water, organisms, and atmosphere?	Important for N management; currently, we only know what is "loaded" into the estuary
	Nutrient Flux from Sediments	Use verified hydrodynamic model and sheer stress data to come up with estuary-wide estimates of nutrient flux from sediments.	A specific component of the question in the above row: important for N management.
	Oyster Reef Mapping	Where are oyster reefs are in our estuaries and how big are they?	Currently track densities at 6 reefs; but also important to know other places oysters are.
	Emerging Contaminants (Amount)	What are the quantities of key emerging contaminants in our systems?	Critical for interventions such as: source control or wastewater treatment.
	Emerging Contaminants (Impacts)	What are the ecological impacts of emerging contaminants on our estuarine ecosystems?	Critical for motivating interventions such as: source control or wastewater treatment.
	Estuarine Residence Time	Use high-resolution hydrodynamic models to calculate more accurate residence times for the Great Bay estuary.	Important for nutrient management.
	Eelgrass Seed & Oyster Larvae Dispersal	Use high-resolution hydrodynamic models to better understand how currents in the Great Bay Estuary impact eelgrass and oyster restoration efforts.	Natural recruitment of larvae or seeds is important to recovery of oysters and eelgrass. Understanding currents will impact location of restoration efforts.
	Clams Ecology	What factors explain changes in clam abundance and health? (e.g., disease, predators, water quality, etc.)	Better understand intervention options for improving clam abundance.
	Lobster Abundance & Health	What factors explain changes in clam abundance and health?	Lobster info may add insight into ecosystem dynamics and also increase attention for interventions
	Green Crab Abundance	What are the trends for abundance of green crabs? What are the causes and impacts of these trends?	Help understand changes in other habitats; help understand if current interventions are working.
	Nitrogen Impacts on Plants/Algae	Is it possible to use seaweed, periphyton and/or eelgrass as a better and integrated measurement of water quality than water samples?	Studies show that seaweed and/or eelgrass analysis can add insight into N dynamics and impacts on habitats.
	N Impacts on Plants/Algae, P. 2	How are the sources of nitrogen in estuary changing in response to nitrogen management interventions?	Helps to target interventions based on source of N: freshwater, WWTP, etc.
Storms and N Loading	Study nutrient loading dynamics as they relate to storms, using high-res sampling	Help guide stormwater management practices and understand changes in system health	

Indicates high priority

	Topic	Research Question	Help with Priority Setting or Decision Making
BIO-PHYSICAL SCIENCE QUESTIONS (continued)	Wet Weather Bacteria and Stormwater	What is the best way to understand how stormwater management and changing precipitation patterns are affecting bacterial pollution of the estuary?	Relevant to shellfish consumption and public recreation concerns, and impacts stormwater management choices.
	Microbial Pathogens & Harmful Algae	Are the abundance and types of microbial pathogens (e.g., viruses) and harmful algae changing and why?	Relevant to shellfish consumption and human health concerns, and impacts land use and wastewater treatment choices.
	Commercial Oyster Aquaculture	What are the ecological impacts of current levels of oyster aquaculture?	Impacts how commercial oyster aquaculture is managed, areas that are permitted, etc.
	Biological Indicator Matrices	Are there organisms (e.g., planktonic species, or fish species such as smooth flounder) that are not currently being tracked, which could provide valuable and needed indications of estuarine health?	New indicators could provide more relevant and/or more sensitive information for particular parts of our estuaries.
	Atmospheric Toxic Pollution	How much of the toxic pollution in our estuaries is coming from atmospheric deposition?	Important for understanding source control of toxic contaminants.
	Biodiversity	How has biodiversity in the estuary changed and what is the impact on functions and values provided by estuaries?	Managing for biodiversity as opposed to one or two particular species could alter management interventions.
	Water Temperature	Is there evidence that rising water temperatures are occurring and what might the impacts be?	Rising water temperature may impact management of other parameters that are more controllable, such as nutrients.
	eDNA	How is the genetic material in our estuaries changing and what does this say about estuarine health?	Genetic assays may offer improved methods for understanding changes in biodiversity and other biological parameters.
	N:P Nutrient Ratios	How have Nitrogen:Phosphorus ratios changed over time? What has caused these changes and what is the impact on estuarine health?	A “two-nutrient” management approach may be required for certain places and times in the Great Bay Estuary.
	Septic Systems	Are there effective ways to change septic tank regulations or incentives to reduce nutrients to our estuaries?	Septic systems are an important source of nutrients, but approaches to reducing this source have not been widely attempted.
	Epiphytic Algae	What are the trends for epiphytic algae in rivers? What are the causes of these trends?	New indicators could provide more relevant and/or more sensitive information for particular parts of our estuaries.
	SOCIAL SCIENCE RESEARCH QUESTIONS	Why People Care	Why do the people who care about estuaries care about estuaries? How do they want their estuaries to function?
Tourism		What are tourism trends for our area and how they relate to estuarine health? Why do tourists visit?	A more specific aspect of the above question and management concern.
Willingness to Pay		Given attainable increases in ecosystems protection or resources, what are citizens willing to pay?	One very specific method for better understanding the above questions.
TMDL, Regulation and Estuarine Health		Would our watershed benefit from a TMDL? How to develop a TMDL that functions technologically, politically, socially and financially.	TMDLs are important components of regulatory and management systems, but have not been widely implemented in our estuaries.
Funding for Pollution Prevention		How much money is being spent on pollution prevention, for both points sources and non-point sources?	Could serve as an important gage of management intervention response.
Knowledge Use		How are people acquiring and using knowledge for the protection and management of estuaries?	Important for guiding outreach to critical audiences required for estuarine protection/restoration.

For questions related to the above priorities contact Dr. Kalle Matso, Coastal Scientist Kalle.Matso@unh.edu.