

## THE SCIENCE OF INDICATORS

The State of Our Estuaries Report features 22 indicators that have been color coded and explained. But, what exactly is an indicator and how does PREP come up with these 22?

Probably, without even realizing it, we all track indicators every single day. We get on the scale in the morning to see how we're doing on our diet. We hear about unemployment rates and the stock market indexes and gauge how the national economy is doing. We watch the weather to decide if we'll bring our raincoat. All of these things – the weight of our bodies, the unemployment rate, and



How we get our fish return data: Mike Dionne and Becky Heuss, from the NH Fish & Game Dept., prepare to tag a net full of herring below the fish ladder in Exeter, NH.

the chance of precipitation are all numeric representations of highly complex, intricate, dynamic systems. These things represent a much larger, more involved story that has multiple factors, inputs and variations and the science of simplifying it down to representative indicators is not simple at all.

PREP staff and our Technical Advisory Committee made up researchers, scientists, engineers and water and land managers are responsible for analyzing detailed scientific

One way we get our water quality data: Scientist Adam Baumann from UNH uses a syringe to collect a “grab sample.” This sample of water is then brought back to the lab to determine the amount of nitrogen in the water and other properties.



data and translating it into indicators that reflect the health of our region's environment. The four key criteria that they look for in an indicator are based upon US EPA guidance, these are: relevance to a management question, feasibility, sensitivity, and clear interpretation. A key factor is the indicator's relevance to answering important management questions that we have like, “how many acres of eelgrass exist on the floor of Great Bay? Is it decreasing or increasing?” or “How many fish swim upriver each spring to lay their eggs?”

Effective translation of data into indicators can help tell the story of how the Piscataqua Region watershed is doing overall in terms recognizable to us all. The 22 indicators covered in this 2013 report capture many sides of the complex story of the current state of our estuary – they provide a ‘snapshot’ in time of the condition of our waters and our environment.



When interpreting indicators, it is also extremely helpful to have measurements that have been collected over a long time. Research has been done in Great Bay for many years thanks to the scientists at UNH. We have some data from the 1970's on water quality in the Great Bay which is useful for knowing long-term trends. It's not the only thing to look at to determine decisions and management actions but it helps.

Indicators help to inform us of patterns or trends by distilling lots of data down to simple metrics. However, they cannot make management decisions for us. Often, more focused research and monitoring is needed, along with innovations in management techniques. Our estuaries and our environment are massively complex and so intertwined with our society and our economy – that is why they are infinitely fascinating to study, explore and enjoy.

Another way we get our water quality data: This is a datasonde buoy in Great Bay. Scientists deploy this buoy and instruments that are underneath it take measurements of the water around it on a consistent schedule. For example dissolved oxygen content is measured every 15 minutes, 24 hours a day, 365 days a year.