

State of Narragansett Bay and Its Watershed
2017 Technical Report

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Chemical Stressor Indicators

INTRODUCTION

Chemical contaminants have stressed Narragansett Bay and its Watershed since the Industrial Revolution, and new contaminants have become increasingly problematic with continued growth of the human population around the Bay. This section focuses on two indicators of chemical stressors: legacy contaminants and emerging contaminants. Legacy contaminants are substances such as metals, PCBs, and pesticides that have been recognized and regulated as pollutants for many years. Although they may no longer be used, they persist in the environment for decades after their release, and their concentrations are still measurable in sediment surface samples, sediment cores, and fin and shellfish in the Bay. In contrast, emerging contaminants are chemicals that are only now starting to be evaluated for their ecological significance and risks for public health or aquatic life. They tend to be from personal care products and pharmaceuticals, or associated with industrial practices, and they have no regulatory standards associated with them.

Legacy and emerging chemical stressors negatively affect estuarine and freshwater fish communities, benthic habitats, stream invertebrates, water quality, shellfishing areas, and other aspects of the Bay and Watershed. Many contaminants, particularly metals and PCBs, can biomagnify through the food web, meaning that organisms higher on the food chain build up higher concentrations of these contaminants. Human health risks do exist, and the states of Rhode Island and Massachusetts provide guidance on how much fin and shellfish to consume to reduce the risk of exposure, especially to mercury.



Population and wastewater infrastructure influence the amounts and locations of chemical contaminants in the Bay and Watershed. Both legacy and emerging contaminants are concentrated near urban centers, although the major sources of these contaminants differ. Climate change may affect the impacts of chemical stressors through temperature and precipitation.

In this section, the Estuary Program explores the spatial and temporal trends of legacy and emerging contaminants. These changes are discussed in the context of historical trends and climate change, when possible.



Photos: Narragansett Bay Commission Lab, Providence, RI (top); Providence River Shoreline, Providence, RI (above). Photos by Ayla Fox.