

A Damnable Choice

In Rhode Island, the age of certain parts of the freshwater-oriented infrastructure — dams, bridges, culverts and roads—is a very real concern. Dams have a design life of 50-100 years. Most dams in Rhode Island were built or modified in the mid-19th century and most are at the least past their design life by 100 years.

New England has more small dams than anywhere else in the country due to the region's early reliance on waterpower from colonial times to the early years of the Industrial Revolution, the birthplace of which is Pawtucket, RI. The vast majority of these dams are run-of-river, which means that they span the width of a river and during normal flow conditions typically have water flowing over the entire dam. As a result, they don't have an effect on the river's ability to hold back floodwater and can even make flooding worse upstream. These dams were also not designed for the huge flow fluctuations that we are now seeing with flood and drought cycles. The same problems are true for culverts and bridges, many of which are undersized.

Climate change is expected to change weather patterns so that we may have more rainfall in severe rain events with periods of drought in between. Also, rain may fall when snow is expected, the ground is still frozen and there are no leaves on the trees, increasing the intensity of the rainfall's effects. The combination of these factors contributed to the severity of the Great Floods of 2010.

Dams have a design life of 50-100 years. Many dams in Rhode Island are well over 100 years old and some are over 200 years old.

These shifts put added stress on infrastructure with freeze-thaw issues and rapid increases in streamflow. Another local factor is that most watersheds are so built-out that there is little capacity for floodplain storage. There is a need to store more water in the ground for times when the amount of rain decreases. Basically, when all the rain

comes in one day that, in the past, would have come over several weeks, we need to have a way to store that water and release it slowly into the ground rather than sending it on a one-way trip to the bay through the storm sewer. Fortunately, steps have already been taken to address this issue in Providence through its commitment to a multi-million dollar

combined sewer overflow storage system that is already beginning to pay a return on the investment.

The quick-and-dirty—but extremely important—take-home messages are:

- Dams do not help control flooding and can actually make it worse
- Most local culverts and bridges are undersized for the high river flows expected from climate change impacts
- Hydrology—the timing, duration and magnitude of weather events and river flows—is changing, and we need to adapt by removing or fixing outdated and undersized infrastructure

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The Rising Sun Mills Dam, on the Woonasquatucket River in Providence.

Photo Credit: Rhode Island Sea Grant