

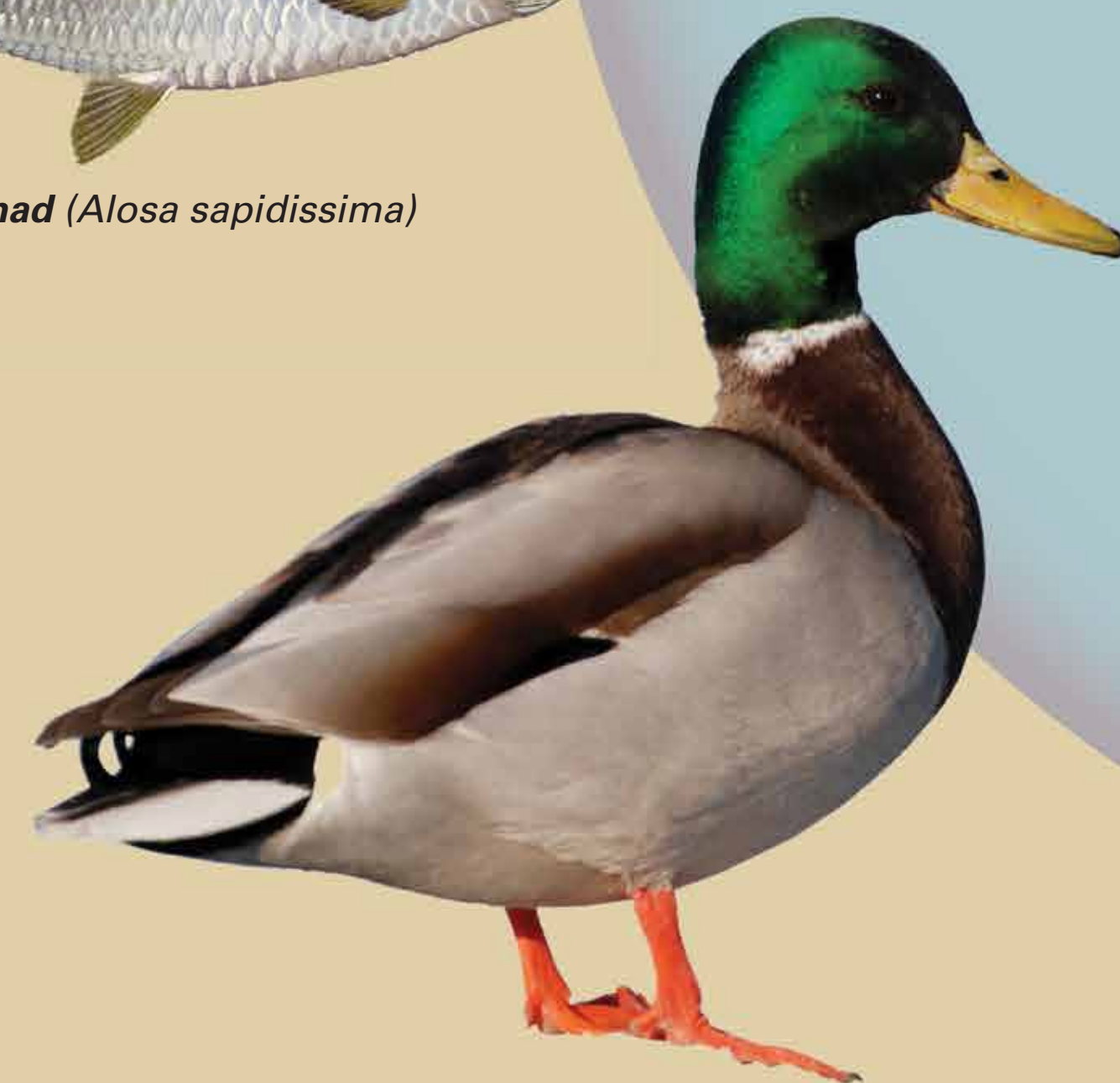
We All Need Clean Water

For years, development and growth have polluted our waterways, leading to environmental advocacy and the enactment of the Federal Clean Water Act of 1972. Before the Longfellow Bridge rehabilitation, sediment and pollutants, such as excess phosphorous, drained directly from the bridge into the Charles River. As part of the bridge rehabilitation, designers explored methods of improving storm water before it reached the river.

The solution? Construction of a “subsurface gravel wetland”, a type of green infrastructure, that uses natural processes to remove sediment and excess nutrients. Combined efforts like this can lead to a cleaner, healthier river!



American Shad (*Alosa sapidissima*)



Mallard (*Anas platyrhynchos*)



Wood Duck (*Aix sponsa*)



Common Green Darner
(*Anax junius*)



American Mink (*Neovison vison*)



Alewife herring (*Alosa pseudoharengus*)



Great Blue Heron
(*Ardea herodias*)



Caddisfly
(order: Trichoptera)



Riffle Beetle
(family: Elmidae)



American eel (*Anguilla rostrata*)



Black-crowned Night-Heron
(*Nycticorax nycticorax*)



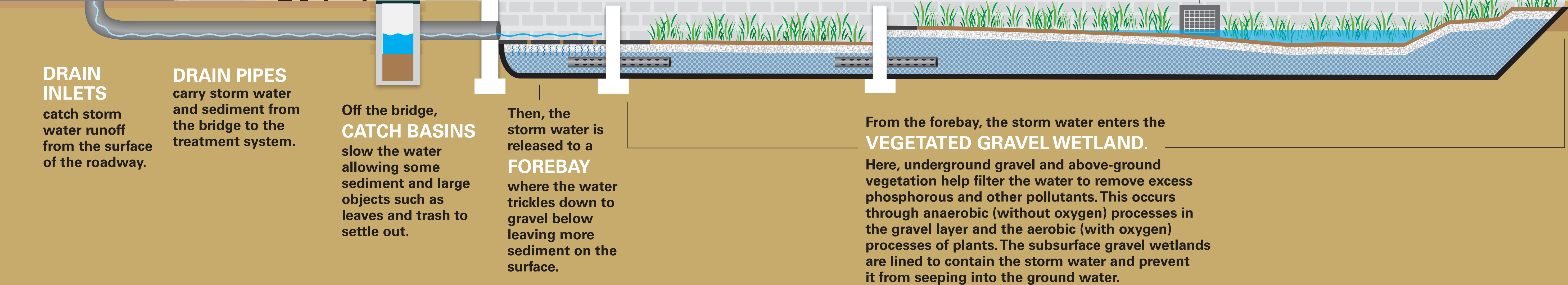
Fisherman with Striped Bass
on the Charles River

Mimicking Nature to Clean Water

Green Infrastructure for Storm Water Management

Whatever happens on land affects water. Phosphorous occurs naturally and is necessary for plant growth, but too much feeds fast growing algae that chokes out other life. Algal blooms can lead to lower oxygen levels resulting in fish kills, increased bacteria, and toxins that make humans and wildlife sick.

Sources of phosphorous include animal waste, fertilizers, detergents, and dirt deposited by vehicles. Rain water washes it all into the Charles River. The Longfellow Bridge Rehabilitation presented an opportunity to reduce this polluting nutrient. The subsurface gravel wetland system is an effective method of using natural processes to remove much of the phosphorous from the bridge runoff before it enters the Charles, contributing to the overall health of the River.



DRAIN INLETS
catch storm water runoff from the surface of the roadway.

DRAIN PIPES
carry storm water and sediment from the bridge to the treatment system.

Off the bridge, **CATCH BASINS** slow the water allowing some sediment and large objects such as leaves and trash to settle out.

Then, the storm water is released to a **FOREBAY** where the water trickles down to gravel below leaving more sediment on the surface.

From the forebay, the storm water enters the **VEGETATED GRAVEL WETLAND**. Here, underground gravel and above-ground vegetation help filter the water to remove excess phosphorous and other pollutants. This occurs through anaerobic (without oxygen) processes in the gravel layer and the aerobic (with oxygen) processes of plants. The subsurface gravel wetlands are lined to contain the storm water and prevent it from seeping into the ground water.

Finally, the cleaner storm water is released to the Charles River through an **OUTLET PIPE**.

