

## THE VALUE of Nature

massaudubon.org/valueofnature

#3 OF 5



# Wetlands & Waterways

Wetlands are among the most productive ecosystems in the world, and they often feed into local streams and rivers, playing important roles in water quality, surface and groundwater supplies, and prevention of flooding. These ecosystems range from vernal pools to large rivers.

### COMMUNITY SPOTLIGHT

Wetlands can be so effective at filtering water that they are engineered by humans to treat stormwater and protect water quality. The City of Cambridge created the Alewife Stormwater Wetland to relieve community flooding problems and enhance local water quality. This project was part of a \$117 million investment in ongoing construction that will reduce annual sewer overflows by 43.6 million gallons.<sup>1</sup>

### CARBON CAPTURE & STORAGE

**20-30%**

of global soil carbon is held by wetlands,<sup>4</sup> despite their occupying only 5-8% of global land surface.<sup>5</sup> Wetlands in the conterminous U.S. store the equivalent of four years of annual carbon emissions by the nation.<sup>6</sup>



Wetlands of the Eastern Mountains and Upper Midwest (includes Massachusetts/New England) store the most carbon, accounting for nearly half of the carbon stored in wetlands in the U.S.<sup>7</sup>

### CLEAN WATER



**\$157 million**

Annual filtration cost savings to New England communities provided by wetlands and forests combined<sup>2</sup> – see our Forests fact sheet for more on their benefits.

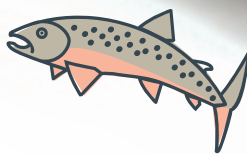
FOR EVERY \$1  
SPENT ON SOURCE  
WATER PROTECTION

**\$27**

SAVED IN WATER  
TREATMENT COSTS.<sup>3</sup>

### RECREATION & TOURISM

Wetlands and waterways support diverse food chains, which are important for commercial and recreational fishing.



**33%**

**INCREASE IN MONTHLY  
BROOK TROUT MORTALITY**

in New England if stream flows continue to decrease at current rates.<sup>8</sup>

**\$100M**

Wages, salaries, business earnings, and tax revenues brought in by Massachusetts freshwater fisheries, thanks to an enormous quantity and variety of fishing opportunities.<sup>9</sup>



*Painted turtle*

#### KEY TERMS

**Ecosystem Services:** Nature provides countless benefits to people, along with intrinsic values. These components of nature are enjoyed, consumed, or used by humans to support our wellbeing.

**Climate Resilience:** The ability of a natural or human community to prepare for and respond to the impacts of climate change.



# Wetlands & Waterways

## CLIMATE RESILIENCE



Wetlands function like sponges, storing water and slowly releasing it. This reduces flood heights and allows for groundwater recharge, which is important for resilience during periods of drought that have become more frequent amidst climate change.<sup>10</sup>

**Over 1M**

**GALLONS OF WATER CAN BE STORED IN ONE ACRE OF WETLAND.<sup>11</sup>**



**265** SPECIES OF THE GREATEST CONSERVATION NEED,

including the wood turtle and blue-spotted salamander, make their homes in Massachusetts' freshwater wetland and waterway habitats.<sup>12</sup>



*Blue-spotted salamander*



**\$450K**

The highest estimated annual value of flood mitigation services provided by Otter Creek wetlands and floodplains to Middlebury, VT. The wetlands and floodplains have reduced damage in this community by 54-78% across 10 past flooding events.<sup>13</sup>

## COMMUNITY SPOTLIGHT

In 2006, the Charles River Natural Valley Storage area significantly reduced flooding to a 2-year flood event while nearby rivers were suffering 40 and 100-year flood events. The storage area cost \$90 million less than alternative built infrastructure projects and has provided additional recreational opportunities. Mass Audubon's Broadmoor Wildlife Sanctuary is part of this natural open space network.<sup>14</sup>

## ECONOMIC & HEALTH

**75%**

return on investment, for every \$1 million spent, generated by the average Massachusetts Division of Ecological Restoration project to restore wetlands and waterways.<sup>15</sup>

**38%**

The cost savings to restore three culverts so stream flow could occur naturally, rather than replacing the culverts with identical structures and maintaining them over 30 years, according to one study of water quality improvement methods.<sup>16</sup>

## Threats

Climate change and development are two of the biggest threats facing wetlands and waterways.

### CLIMATE CHANGE



**2.9°F RISE IN TEMP** since 1895



**11" SEA LEVEL RISE** since 1922, as measured in Boston Harbor



**55% STRONGER STORMS** since 1958<sup>17, 18</sup>

Coldwater fish species are at risk from increased water temperatures and droughts drying out streams, and lakes may become stagnant and develop algal blooms more frequently.

### DEVELOPMENT



The development of upland areas, and the new stream crossings to access them, are fragmenting and degrading wetlands, and can add to excessive water withdrawals and existing water pollution.

*See our [Losing Ground](#) report and community planning resources for ways to reduce development impacts.*

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