



Economic Benefits from Aquatic Ecological Restoration Projects in Massachusetts

Summary of Three Phases of Investigation

Massachusetts Department of Fish and Game
Division of Ecological Restoration
April 2015



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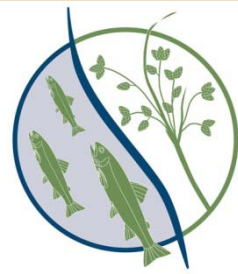
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Economic Benefits from Aquatic Ecological Restoration Projects in Massachusetts



DEPARTMENT OF FISH AND GAME

Division of Ecological Restoration

The Massachusetts Department of Fish and Game, Division of Ecological Restoration (DER) works with partners “to restore and protect the Commonwealth’s rivers, wetlands and watersheds for the benefit of people and the environment.” Restoration projects, such as dam removal, culvert replacement, streamflow enhancement, and urban river revitalization, provide many valuable benefits to local communities. These benefits stem from avoided infrastructure costs, reduced health and safety risks, decreased flooding and storm damage, enhanced economic activity, and many other gains generated by restoring degraded or lost ecosystem services.

DER’s work is driven by the core principle that **public funds spent on restoration should maximize the return on investment in terms of social, economic, and ecological benefits**. While the value of restoring degraded habitats has long been recognized in Massachusetts, until recently the economic effects had not been empirically evaluated. To address this information gap, DER has commissioned three studies since 2011 that evaluate and quantify the economic benefits produced by the Division’s projects. As summarized in this document, the findings demonstrate that investment in ecological restoration creates jobs, stimulates economic activity, and generates long-term economic value by improving ecosystem services.

Phase 1 Economic Output 2012 Key Finding:

Investment in restoration design and construction stimulates job creation and economic output that equals or exceeds other capital projects like water and transportation infrastructure.

Phase 2 Ecosystem Services 2013 Key Finding:

Improved ecosystem services, such as water quality and flood reduction, generate significant economic value and help communities avoid millions of dollars in future costs.

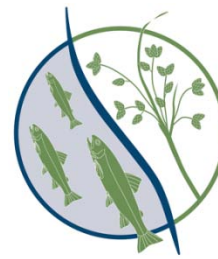
Phase 3 Cost Comparison 2014 Key Finding:

The average cost of 6 stream barrier removal projects was significantly less than the expense of repairing and maintaining existing structures over a 30 year period.



*Restored Former Cranberry Bog
Eel River Headwaters - Plymouth*

**Economic Benefits Study Phase 1 -
Economic Output**
Economic Impacts of Ecological Restoration (2012)



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To initiate Phase 1 of DER's Economic Benefits Study, Industrial Economics (IEc) was hired in 2012 to evaluate the regional economic benefits associated with increased economic activity resulting from restoration projects. Using the economic model IMPLAN Version 3.0, IEc examined direct, indirect, and induced economic effects of investments in four DER projects. These projects represented a diversity of project types and included tidal restoration, dam deconstruction, salt marsh fill removal, and holistic restoration of a retired cranberry bog complex.



Eel River Headwaters Retired Cranberry Bog Complex Restoration, Plymouth

The study results revealed extensive ripple effects in indirect and induced economic activity resulting from restoration project investments. The analysis found that, for every \$1 million spent, the average economic output of DER projects generates a **75% return on investment** and **creates or maintains 12.5 full-time-equivalent jobs**. These results equal or exceed those for other capital projects such as road and bridge construction, and replacement of water infrastructure.



Economic Benefits Study Phase 2 - Ecosystem Services

Estimates of Ecosystem Service Values from Ecological Restoration Projects in Massachusetts (2013)



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In 2013, DER contracted with ICF International to analyze the economic benefits of four ecosystem services enhanced by DER projects. The study found that restoration of aquatic habitats and the services they provide – including flood protection, improved water quality, climate change mitigation, and increased landscape appeal – can generate significant economic value. While these example ecosystem service values are impressive in their own right, they represent only one of many services improved by each project.



Damde Meadows Tidal Restoration, Hingham



Broad Meadows Salt Marsh Fill Removal, Quincy

The Value of Restored Ecosystem Services

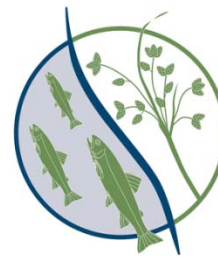
FLOOD PROTECTION – Salisbury businesses and residents will benefit from increased flood protection provided by the Town Creek Restoration Project that will **reduce economic impacts from flood damage and lost business by an estimated \$2.5 million** over the next 30 years.

WATER QUALITY – The planned Muddy Creek Estuary Restoration Project in Chatham and Harwich will help those two towns **save an estimated \$3.9 million** over 30 years to meet mandatory water quality standards by reducing wastewater infrastructure construction and operating costs.

CARBON SEQUESTRATION – The Damde Meadows and Broad Meadows salt marsh restoration projects in Hingham and Quincy are estimated **to prevent \$86,000 and \$138,000, respectively, in damages** caused by greenhouse gases through 2050. The projected increase in carbon storage resulting from restoration of these two wetlands is equivalent to avoiding the combustion of over **800,000 gallons of gasoline**.

LANDSCAPE APPEAL – In the towns of Wellfleet and Truro, the planned 1,000-acre Herring River Restoration Project is projected to **improve the value of over 1,400 properties** as a result of being closer to healthy tidal wetlands after restoration, generating a total estimated **property value increase of \$10.4 million**.

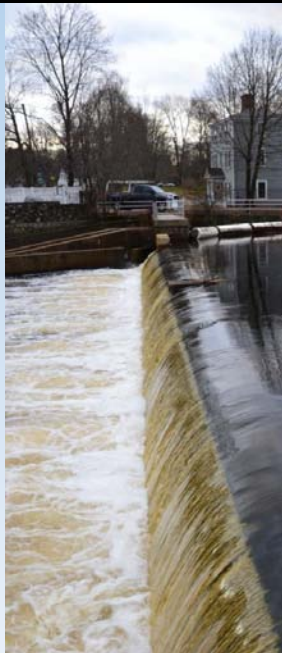
**Economic Benefits Study Phase 3 -
Cost Comparison Summary**
*Community Benefits from Stream Barrier
Removal Projects in Massachusetts (2014)*



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As part of our examination of the growing restoration economy in Massachusetts, DER contracted with Industrial Economics (IEc) in 2014 to conduct a cost comparison of alternatives facing owners of failing dams and undersized culverts. Costs for three dam removals were compared to repairing and maintaining the dams in place over 30 years. Similarly, the costs for replacing three culverts with identical structures and maintaining them over 30 years were compared with the costs of upgrading the crossings to meet the [MA Stream Crossing Standards](#).

On average, removal of the 3 dams in the study was **60% less expensive** than repair and maintenance over 30 years.



On average, upgrade of the 3 culverts in the study was **38% less expensive** than in-kind replacement and maintenance over 30 years.



\$1.2 Million

Saved by North Adams-based Cascade School Supplies in the removal of the Briggsville Dam.

\$1.5 Million

Estimated costs of 2005 evacuation of downtown Taunton due to Whittenton Dam (dam now removed and no longer a threat).

\$740,000

Estimated annual tax revenue from new development facilitated by the Hill Street culvert upgrade in Raynham.

Industrial Economic also provided guidance on DER's project tracking in order to facilitate future assessment of economic effects from projects. In addition, IEc identified **23** Commonwealth activities contributing to over **20** different ecosystem service benefits that make Massachusetts a better place to live and work.



To learn more about DER's work on the restoration economy in Massachusetts and to download full versions of the three economic reports, visit:

<http://www.mass.gov/eea/agencies/dfg/der/about-us/restoration-and-the-economy.html>

For an interactive map of DER project sites, visit:

<http://www.mass.gov/eea/agencies/dfg/der/der-priority-projects-map.html>

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The Hopewell Mill Dam Removal Project in Taunton, MA