

Project Profile:

Passaic River Natural Resource Damage Assessment and Restoration (NRDAR) Evaluation, Exposure and Risk Assessment, Urban River Restoration Initiative, and Environmental Justice Evaluation

Veritas Economics' (Veritas) staff have undertaken numerous efforts to evaluate Passaic River natural resource damages since 1998, culminating in Jason Kinnell and Matthew Bingham's Expert Report critiquing claims of recreation-based damages (Kinnell and Bingham 2014). Kinnell and Bingham's 2014 Expert Report is based on the extensive research and experience they and other Veritas staff have conducted to support the Passaic River's Natural Resource Damage Assessment and Restoration (NRDAR) Evaluation Cooperative Assessment, the Remedial Investigation and Feasibility Study (RI/FS) process including the Exposure and Human Health Risk Assessment, and the Passaic River's Urban River Restoration Initiative.

For the NRDAR Evaluation, Veritas staff researched the historical changes in the ecological and human-use services on the Passaic River from its role in supporting the foundation of America's industrial development through the present. Veritas staff conducted this research to help establish the baseline conditions for the Passaic River's NRDAR evaluation and published the results of the research in *A Common Tragedy: History of an Urban River* (Iannuzzi et al., 2002).

To develop quantitative natural resource damages and estimate the benefits of restoration projects, Veritas staff designed, administered, and evaluated the results of the 2000 New Jersey Outdoor Recreation Survey. Veritas staff used the results of the survey to develop models of angler and urban recreator's fishing and park visitation preferences, assess the damages associated with the presence of fish consumption advisories, and estimate the benefits of angling and park restoration projects. The survey, associated models, and restoration project benefit estimates are presented in Kinnell et al. (2006) and Bingham et al. (2011).

Veritas used the results of these models to estimate the benefits of restoration projects for offsetting damages as part of the Passaic River's NRDAR Cooperative Assessment. Veritas also developed and implemented a Habitat Equivalency Analysis (HEA) to estimate the amount of injured ecological services and the amount of ecological restoration necessary to offset the lost services. Veritas used the results of its human-use and ecological service models to scale the benefits of potential restoration projects to offset the lost human-use and ecological services. Veritas scaled the restoration projects across the types of services they produced, the value of their service changes, the nexus between each project's location and the damaged Passaic River Study Area, the timing of when restoration projects would begin and injured services would return to baseline, the relevant discount rates to use for past and future injury and future restoration, and the cost of each restoration project.

Based on the angling components of Veritas' work on the 2000 New Jersey Outdoor Recreation Survey and the role fishing plays in estimating natural resource damages, baseline risk fish ingestion, and human health risk, Veritas staff developed, designed, tested, administered, and analyzed the results of the 2000-2001 Passaic Creel/Angler Survey. Veritas used the results of the study to develop fish ingestion estimates for the Passaic River's Human Health Risk Assessment. The results of the study were published in Kinnell et al. (2007), Ray et al. (2007a), and Ray et al. (2007b). The study was also independently peer reviewed as described in Finley et al. (2003).

In 2010, the Passaic River Study Area was expanded to the 17 mile area from the river's confluence with Newark Bay to the Dundee Dam in Garfield, NJ. A new creel/angler survey was designed to cover the 17-mile Study Area, and Veritas participated in the design and analysis of the data. An on-site survey protocol was designed following the process described in Kinnell et al., 2007. To improve the study's ability to develop baseline risk fish ingestion estimates, Veritas designed, administered, and analyzed the results of the 2013 New Jersey Outdoor Recreation Survey. The survey included a discrete choice experiment designed to improve estimation of the effect that fish consumption has on angler's preferences, site choice, and fish

consumption. The results of the study estimate both natural resource damages as well as baseline risk fish ingestion and are published in Kinnell and Bingham (2014) and Bingham et al. (2014).

Because of the extensive historical legacy of environmental alteration, the Passaic River was chosen as one of eight pilot projects for the Urban River Restoration Initiative, a collaborative agreement between the United States Environmental Protection Agency and the United States Army Corps of Engineers to identify more efficient and effective methods to restore America's urban rivers. Veritas developed a conceptual framework and economic and ecological models to account for and integrate the economic and ecological benefits associated with potential urban river restoration alternatives for the Passaic River.

As part of this effort, Veritas estimated the economic benefits associated with changes in industrial, municipal, household, and recreational water use that would result from changes in water resources associated with various water-quality-improvement projects. Example projects include upgrades and removal of combined sewer overflows (CSOs), improvements to publicly owned treatment works (POTWs), creation of floodwalls and levees, development, and creation of wetland habitat to generate natural flood protection and water quality improvements, and creation of adjacent riverfront parks that increase the amount of waterfront open space for urban recreation.

In addition to estimating the economic benefits associated with potential improvements, Veritas also evaluated the set of alternatives that maximize benefits for a given expenditure under alternative evaluations of project benefits. The process Veritas used to conduct the analysis is highlighted in Deason, Dickey, Kinnell, and Shabman (2010) which received the 2011 Best Policy-Oriented Paper Award by the American Society of Civil Engineers (ASCE) and the Environmental and Water Resources Institute (EWRI).

Most recently, Veritas has collaborated with Darrick Hamilton of The New School's Institute on Race, Power, and Political Economy on a manuscript that develops a sophisticated approach for quantifying environmental justice and changes to it (Bingham, Kinnell, and Hamilton 2024). The paper focuses on outdoor recreation in Hudson County, New Jersey but is applicable to other locations and objectives. After quantifying the baseline utility associated with outdoor recreation opportunities in Hudson County, the analysis quantifies the value change and discusses the environmental justice implications of the new East Newark Riverfront Park. The park was developed as an offset for damages identified under NRDA requirements and is expected to improve environmental justice conditions in East Newark, New Jersey, which has limited access to public parks and green space.

References:

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