

July 2008

Minding the 3 R's: Response, Remediation and Restoration

Anthony Dvarskas

National Oceanic and Atmospheric Administration DARRP, anthony.dvarskas@noaa.gov

Follow this and additional works at: <http://digitalcommons.uconn.edu/wracklines>

Recommended Citation

Dvarskas, Anthony, "Minding the 3 R's: Response, Remediation and Restoration" (2008). *Wrack Lines*. 40.
<http://digitalcommons.uconn.edu/wracklines/40>

Minding The 3 R's: Protecting Connecticut's Coastal Resources Through Response, Remediation, and Restoration

Anthony Dvarskas

Oil spills and releases of hazardous substances from waste sites can cause many negative and long-term impacts to coastal natural resources. When oil or hazardous substances are released into the environment, wildlife species, fisheries, and habitat may suffer harm, beaches may be closed, and navigation may be curtailed. Dealing with harmful effects from these releases is a challenging undertaking, but federal trustee agencies, including the National Oceanic and Atmospheric Administration (NOAA), are available to assist Connecticut residents.

Trustees are stewards of the public's natural resources, designated by Congress and charged with protecting and restoring natural resources in the event of an oil spill or release of hazardous substances. NOAA is a trustee for coastal resources such as estuarine and anadromous fish and their habitats, including wetlands, mudflats, and coastal streams.

"NOAA's trustee authority directs us to work on behalf of the public to provide ecological and recreational compensation for the lost use of natural resources following a release of oil or other hazardous substances," explains Ken Finkelstein, an environmental scientist with NOAA.

In Connecticut, NOAA's Damage Assessment, Remediation, and Restoration Program (DARRP) tackles spills and waste sites with co-trustees including the Connecticut Department of Environmental Protection (DEP) and the U.S. Department of Interior. The trustees also coordinate their efforts with the public and responsible parties to ensure the protection and restoration of the injured natural resources.

State and federal laws such as the Oil Pollution Act and the Comprehensive Environmental Response, Compensation, and Liability Act require responsible parties to clean up the environment after a spill or release, and also to restore those natural resources and services that were injured. Response agencies like the U. S. Coast Guard and the Environmental Protection Agency and state counterparts manage the cleanup. Natural resource

continued next page



S. Gephard, CT DEP

continued from previous page

trustees coordinate with the response agencies to ensure (1) protective cleanups that promote recovery of natural resources occur and (2) the appropriate amount and type of restoration is achieved to compensate the public for injuries to the natural resources and the services they provide.

Public Losses from Oil Spills and Releases of Hazardous Substances

When the coastal environment is impacted by oil spills or releases of hazardous materials, there are multiple components of the ecosystem that may be detrimentally affected. Fish, mammals, birds, shellfish, and other species, and their habitat may be harmed. Ecological services provided by various species and habitats may also decrease (or perhaps disappear entirely).

“Primary production, such as the plant material attributed to salt marshes may be largely eliminated during the initial period for heavily oiled coastal sites” says Jim Turek, a restoration ecologist with the Restoration Center at NOAA.

Ecological services are physical, biological, and geochemical processes performed by species and habitat that benefit the entire ecosystem. For example, a functioning salt marsh provides shoreline stabilization and water filtration services and may provide habitat for fish and birds. A spill or release could impact these services, leading to losses to the public of some or all of the benefits provided by the marsh from the date of the spill until the marsh returns to its pre-spill functioning.

In addition to the ecological services provided by an ecosystem, coastal and marine environments provide the public with a variety of recreational services including beach use, swimming, boating, recreational fishing and shellfishing, and bird watching. The presence of oil or hazardous materials may prevent, deter, or alter public use and enjoyment of these recreational services. In the wake of a spill or release, issuance of public health and welfare advisories may prohibit or deter the public from using beaches, boating, and harvesting and/or eating fish and shellfish within impacted areas. Cleanup activities in an area may create a negative perception that leads the public to avoid participating in their usual recreational activities. If fish advisories prohibiting consumption are issued, those who fish for consumption are forced to choose other sites for fishing. Negative impacts on bird populations from a spill or release will diminish the benefits for those who are accustomed to visiting a given habitat to observe these species. All of these losses accrue from the date that an oil spill or hazardous material

release occurs, forcing the public to alter their behavior, to the date that the ecosystem is restored to its original functioning.

Addressing the Problem

The Natural Resource Damage Assessment (NRDA) process ensures that these damages to natural resources and services are assessed and that the public is fully compensated through the restoration of those injured resources and services to pre-damage conditions.

“The goal is quantifying ecological injury and the lost use of natural resources, including recreational losses, so that the public may be compensated fairly. This compensation takes the form of ecological and recreational restoration,” Finkelstein says.

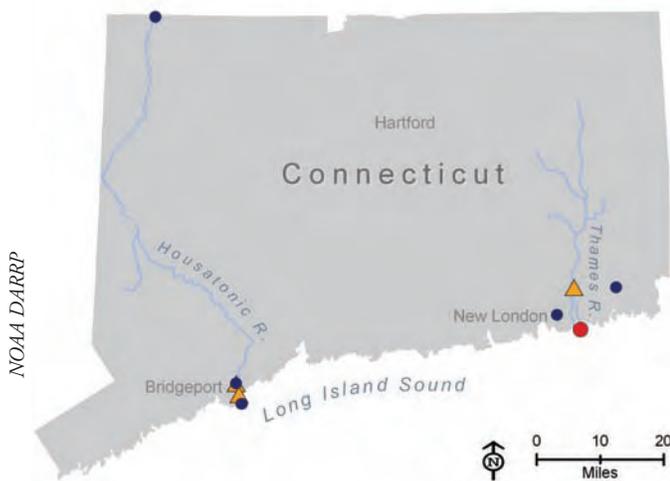
The NRDA process begins with the Trustees working with the response and/or remedial agencies to determine the most effective cleanup plan. The Trustees then undertake a “preliminary assessment” of potential damages to natural resources and determine whether restoration will be necessary. Natural resources include biota and their habitats, surface water and sediments, groundwater, uplands, and air. Activities undertaken during this initial assessment phase include collection and analysis of soil and water samples, evaluation of potential pathways for contamination to the natural resources, and a determination of those potentially responsible for the contamination. For example, this research would evaluate whether water quality and soil standards at the contamination or spill site met regulatory requirements as well as whether and to what extent the contaminant may have entered the ecosystem food chain. These data are used to determine if the spill or release potentially resulted in injury to the public’s natural resources.

If the trustees determine that natural resources have been injured by a spill or release, they evaluate the availability of appropriate restoration alternatives and select preferred restoration projects to compensate the public. The public has an opportunity to provide feedback on the restoration plans. The Trustees ensure that those responsible either implement and fund the selected projects or conduct the projects with Trustee oversight and monitoring. While the Trustees often cooperatively assess natural resources damages and implement restoration projects with responsible parties, sometimes a cooperative settlement is not possible, and the Trustees pursue their damage claims in court.

To determine the natural resource damages, NOAA and co-trustees use several tools. Chief among these is a

continued on next page

framework called a habitat equivalency analysis (HEA). The HEA is used to calculate the total number of acres of habitat that need to be provided to compensate the public for the damages to ecological services. For lost recreational services, surveys are often used to determine the monetary value that individuals place on recreational activities, such as fishing and swimming, within an impacted area. Values may also be transferred from studies conducted in similar areas to avoid the expense of survey administration. The use of these quantification methods results in a lost use value that assists in determining the appropriate compensation for the public.



Locations of DARRP activities in Connecticut.

Over the past 15 years, NOAA's DARRP program has worked cooperatively nationwide with state and federal agencies, tribes, industry, and communities to assure long-term protection of natural resources at over 500 waste sites. Settlements have generated more than \$437 million for restoration to: restore, create, and preserve wetlands; create shellfish habitat such as oyster reefs; restore coral reefs and seagrass beds; acquire, restore, and preserve coastal bird habitats; and provide or augment public access to the shore and other recreational opportunities.

Connecticut's Coastal Resources

Connecticut has 253 miles of coastline along Long Island Sound, and significant portions of this coastal area are highly developed. New Haven, for example, is a prime port for petroleum and Long Island Sound has multiple fuel storage and transfer facilities, raising the potential for spills into the marine environment. In Connecticut, NOAA and its co-trustees have been

involved in the achievement of protective remedies at eight sites, and the restoration and/or protection of 60 acres of estuarine habitats and 11 acres of freshwater and terrestrial habitats.

The Thames River and Housatonic River watershed areas have been particularly active locations because of the significant habitat value and, unfortunately, the high potential for contamination of these areas. The Thames River flows through Norwich and Southeastern Connecticut, entering Long Island Sound at New London and Groton. Historically, the River was an important habitat for a salmon run, with eggs laid in the upper tributaries of the river. The Housatonic River originates in the Berkshires of Massachusetts, flows through Western Connecticut and enters Long Island Sound at the Stratford/Milford town line. Below are several examples of projects that NOAA and co-trustees have worked on in these watersheds.

Southeastern Connecticut: RTC 380 Oil Spill

In December of 1992, the barge *RTC 380* ran aground east of the entrance to the Thames River near Avery Point, spilling approximately 22,000 gallons of diesel fuel into Long Island Sound. Diesel causes acute toxicity in animals that live in the intertidal zone. Damages occurred to migratory waterfowl, shellfish beds, and other fishery resources, and \$100,000 was secured by NOAA and the Connecticut DEP in settlement funds to address restoration of injured natural resources in Connecticut resulting from the spill.

Through the use of these settlement funds, two fishway projects, one in Waterford and one in Groton, were completed to provide unimpeded migratory passage by adult river herring and other migratory fish to access upstream freshwater habitats. Anadromous fish spend their adult lives predominately in the marine environment but migrate up streams and rivers to spawn. The damming of streams and rivers prevents anadromous fish from accessing upstream spawning and nursery habitats to complete their life cycle.

In Waterford, the restoration project at Jordan Brook involved the design, permitting and installation of an 85-foot long Alaskan steep pass structural fishway. The new fishway allows adult river herring migrating from Long Island Sound to swim through the fishway, passing over an 8-foot-high dam, and access the upstream habitat. This restoration site is located within a public park, providing a unique opportunity for public access and educational opportunities. The local community and

continued from previous page

NOAA DARRP



Fish Ladder at Jordan Mill Pond, Waterford, Connecticut, created using settlement funds from the *RTC 380* oil spill.

other visitors to the site can learn about the history of the dam and mill and the life cycle of river herring. Seeing springtime herring runs is an event that most people never forget.

"In our efforts to control the incremental impacts of upland development, we sometimes lose sight of the severity of major spills and their potential for catastrophic habitat and fisheries impacts," says Tom Wagner, Planning Director for the town of Waterford, who managed the fish ladder project for the town. "Projects such as the fish ladder at Jordan Mill Pond provide us with the opportunity to educate the public about the DARRP as well as the connection between chronic and catastrophic threats. The building of the fish passage facilitates a return to a more diverse ecosystem." Fish are already using the ladder, he adds.

In Groton, the trustees used settlement funds to improve an existing, partially functioning fishway on Whitford Brook. Monitoring by the Connecticut DEP indicates that river herring and sea run brown trout are successfully passing through the improved fishway and spawning in the upstream habitat.

New London Submarine Base

Along the Thames River, the New London Submarine Base in Groton is also an area where DARRP is assisting the Navy in its assessment of this site. Evaluation of potential contamination in the Thames River is currently underway.

Housatonic River GE Superfund Site

As a habitat for estuarine and anadromous fish and

other estuarine organisms, the Housatonic River estuary in the Western part of the state is another area of interest. In addition to its ecological values, the river provides a range of recreational uses including recreational fishing, boating, and swimming.

NOAA participated in preliminary NRDA activities related to releases of hazardous substances from the General Electric (GE) facility in Pittsfield, Massachusetts. Polychlorinated biphenyls (PCBs) were released into the Housatonic River from the GE plant between 1932 and 1977. This resulted in closure of approximately 140 river miles to fishing for consumption between Dalton, Massachusetts and the Derby Dam in Connecticut, approximately 12 miles north of Long Island Sound.

Under the terms of the natural resource damages settlement with GE, the company agreed to pay \$15 million to the states of Massachusetts and Connecticut. The \$15 million has been divided between Massachusetts and Connecticut so that roughly half will be spent on restoration projects in each state. The Connecticut Trustee SubCouncil, charged with overseeing restoration planning in Connecticut, is preparing a response to written and verbal comments received through the public review process and expects to have a plan for restoration in place by late 2008.

Lordship Point

NOAA has participated in the remediation of a former Remington Gun Club site that is located at Lordship Point in Stratford. Lordship Point is a peninsula at the mouth of the Housatonic River estuary, and the Gun Club site was a firing range where lead shot was used and entered the environment from the 1920s to



NOAA DARRP

Lordship Point, a peninsula at the mouth of the Housatonic River estuary, had a firing range for a gun club where lead shot was used and entered the environment from the 1920s to 1987. This photo shows the cleanup of contaminated sediments underway.

continued on next page

continued from previous page

1987. Lead concentrations in shallow subtidal waters were as much as 12 percent of the sediment volume prior to sediment remediation. Lead is a highly toxic heavy metal that can negatively impact fish populations and bioaccumulate in the tissues of organisms, leading to negative human health impacts in both children and adults.

A negotiated settlement for restoration was successfully secured in 2004. Connecticut DEP, in consultation with NOAA, negotiated a settlement resulting in the removal of lead shot in from the intertidal and subtidal environments in 2000 and 2001 along with restoration of small wetlands impacted during the remediation process. A total of 71,000 cubic yards of soil/sediment was removed and monitoring of the environment is ongoing. The responsible parties also agreed to conserve the 30-acre property, create an 8-acre coastal grassland, and provide \$250,000 for additional wetland restoration. NOAA and its co-trustees are considering restoring The Great Meadows Management Unit, an impacted salt marsh in the Stewart B. McKinney National Wildlife Refuge, with the wetland restoration funds.

NOAA's DARRP has also been active at the Raymark Superfund Site located near the Housatonic River estuary. Contaminants identified during an ecological risk assessment at Ferry Creek and the Housatonic River in 1996 included PAHs, PCBs, and dioxin. The settlement with the responsible parties provides approximately \$400,000 for restoration. Development of the restoration plan is ongoing, but may include salt marsh and intertidal flat restoration in the lower Housatonic River.

Through these specific projects, NOAA and its co-trustees continue to serve a vital role in the protection and restoration of natural resources in Connecticut. For more information on NOAA's DARRP program and updates on these projects in Connecticut and in other areas of the United States, go to the DARRP web site, <http://www.darrp.noaa.gov> or contact Ken Finkelstein by e-mail, Ken.Finkelstein@noaa.gov.

About the Author:

Anthony Dvarskas is a natural resources economist with the Damage Assessment, Remediation, and Restoration Program of NOAA in Silver Spring, Maryland. He is involved in the evaluation of the economics associated with natural resources injured by oil spills or releases of hazardous materials.