

INTEGRATING WATER MANAGEMENT TO MEET NEW IMPERATIVES

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Abstract

Water utilities in the 21st century are in the midst of changing profoundly from being utility service providers to becoming resource management agencies with environmental stewardship at the core of their missions. The European Union Framework Directive describes in broad terms an elegant vision of holistic water resource management. Seattle Public Utilities and other utilities in the Puget Sound region have, out of pragmatic necessity, arrived at a similar scheme of river basin planning, shared stewardship, and integrated resource management. While vision has played a role, reaction to the Endangered Species Act mandate for salmon recovery, urban growth, and increased environmental awareness have been powerful drivers toward change for utilities like Seattle Public Utilities. The utility is well along the way in transforming its mission from traditional utility service to holistic resource management. This paper tells the Seattle story and provides a glimpse into the pending challenges and opportunities for those intent on implementing the Framework Directive.

Keywords

Water supply, integrated water resource management, Framework Directive, salmon, ESA, Seattle, Seattle Public Utilities

INTRODUCTION

Water utilities in the 21st century are in the midst of changing profoundly from being utility service providers to becoming resource management agencies with environmental stewardship at the core of their missions.

Imperatives driving this change include increased environmental awareness, native species extinctions, and rapid urbanization. In response, utility service providers find an increasing share of their energy spent on protection and restoration of natural systems with enhanced investments in conservation, waste reduction and holistic management strategies.

Although this dynamic is being played out in both Europe and the United States, the context and available tools differ.

This paper describes the process and some of the challenges associated with shifting from a traditional utility service paradigm to a paradigm of holistic environmental management while continuing to meet the traditional service obligations of uninterrupted utility service to water, drainage and wastewater customers.

WATER MANAGEMENT FRAMEWORK

In the European Union, a new approach to environmental management is being launched through implementation of the Framework Directive. In the Framework Directive, the water quality focus for utilities has shifted from abating pollution to playing a key role in managing the aquatic environment.

In Seattle, one of the first major urban areas to be impacted by the Endangered Species Act (ESA), a similar transformation is taking place in the mission of Seattle Public Utilities, the primary regional water supplier, but under very different legal and political circumstances.

Declining populations of various species of salmon in the Seattle area have been identified as “threatened” under the Endangered Species Act. The ESA is propelling change towards a holistic, integrated approach to water resource management, much as the Framework Directive has for many European utilities.

What is similar to the Framework Directive is that river basin approaches are the building block in developing the plans, the needed consensus, and the funding sources that will produce successful outcomes.

What is different however is that the performance measure for Seattle – equivalent to the measure of the “good” condition in the EU Framework Directive – includes the successful recovery of runs of wild salmon in addition to the other environmental indicators. Also different is the fact that under US law, failure to meet the performance criteria of salmon viability opens water utilities to citizen lawsuits. Further, no federal agency can provide funds or issue a permit for any utility activity without first determining that the activity will not harm endangered fish.

Seattle’s experience provides a case study in one utility’s changing mission. As a provider of drinking water to 1.3 million people in the Seattle metropolitan area, and as the manager of stormwater and wastewater for the City of Seattle, Seattle Public Utilities’ experience derives from several key initiatives:

- a) regional planning and compact development on multiple river basins associated with Endangered Species Act response;
- b) source to outlet river basin management associated with the Cedar River Habitat Conservation Plan; and
- c) local sub-basin creek restoration within the City of Seattle.

The breadth of experience derived from these initiatives and the strategies developed by Seattle to respond to them, in terms of the variety of geographies, stakeholders, regulatory processes and participatory processes, makes Seattle an interesting laboratory for the opportunities and challenges associated with more holistic approaches to environmental management in highly developed urban areas.

The Endangered Species Act of 1973 was the first major US legislation to take a biological or ecological approach to the environmental impacts of human activity. Prior environmental regulation in the US had focused on protecting public health by preventing pollution. Chemicals and other pollutants were to be kept out of the air, cleaned up off the land, and in particular, kept

out of water. Water and wastewater utilities take our public health responsibilities very seriously, as reflected in the overwhelming emphasis of this conference. The ecological responsibilities presented by the ESA add a new dimension.

The ESA requires that plant and animal species at risk of extinction must be protected. When aquatic species are at risk, their habitat includes the waters in which they live. Anadromous fish, with lifecycles ranging from ocean to estuary up rivers to headwater creeks, depend on habitats directly impacted by utility service providers. Municipal water withdrawals and stormwater diversions can reduce streamflows, while point and non-point inputs degrade water quality.

Under the ESA, citizen lawsuits or regulatory agency enforcement can hold a utility directly liable for any activity that “takes” an endangered fish. “Take” includes not just direct capture or killing of the fish but any damage to the fish habitat, including degrading the water flow or water quality necessary to the success of the species.

The implications of this broad liability have caused Seattle and other governments in the region to create river basin management processes very like the model set forth in the Framework Directive. Following are six elements of comparison between the Framework Directive and Seattle’s experience.

1. Defining the appropriate geographic scale of river basin management in the Puget Sound region.

The federal agencies responsible for listing endangered species have identified genetically distinct runs of wild salmon in different river basins and sometimes discreet runs in sub-basins. The biologists’ belief is that successful recovery of Puget Sound wild Chinook salmon requires protecting this genetic diversity. That means each river basin, from saltwater estuary to headwaters, must be managed to restore the fish in that system. No stream is expendable, no matter how urbanized or degraded.

This imperative has brought the elected officials and stakeholders in the Seattle metropolitan area together in forums that represent each of the five river basins that flow from the Cascade Mountains through the suburbs and core cities to the marine waters of Puget Sound.

The state government formalized these basin-planning arrangements with official maps defining “Water Resource Inventory Areas” or watersheds and with very modest funding grants as an incentive for watershed planning.

For Seattle Public Utilities, the river basins defined by the state and the ESA requirement that specific salmon runs in each river basin be preserved created a series of challenges. First, several rivers run through the central city, each with its own planning forum. This makes for complexity. Second, there are several places where water supply for the metropolitan area is transferred across watersheds from surface water reservoirs in one river basin to municipal use in another. Third, there is no way to triage or prioritize salmon recovery efforts across watersheds to support the most effective interventions. A \$2 million restoration project in a rural basin might result in the return of a thousand fish while a \$20 million project in a highly urbanized

basin might produce little or no actual benefit. Unlike the EU Framework Directive, the ESA-based watershed-by-watershed approach to salmon habitat protection doesn't take into account cost-effectiveness.

Notwithstanding these system limitations, Seattle Public Utilities undertook to develop a source to outlet river basin management plan for its Cedar River water supply. Seattle owns 90 square miles of uninhabited forestland at the headwaters of the Cedar River which is the utility's primary municipal water source. Endangered birds such as the spotted owl live in the forests and endangered fish swim in its waters and are affected by water withdrawals and river flows.

Seattle undertook ten years of research to identify an optimum flow regime in the Cedar River below the drinking water diversion to protect various life stages of four species of salmon and trout. The utility was seeking a 50-year agreement with both state and federal natural resource agencies to permit continued reliance on the river for municipal water supply.

Eighteen months of intense negotiations resulted in an agreement signed by all but one of the relevant state and federal agencies, with significant caveats. One federal agency insists on continued study and negotiation over the flow requirements for one of the listed species. The native tribe and the county government have both refused to endorse the plan. Environmental activists insisted upon a "no-logging" commitment for the 90 square miles of second-growth forest, so all the costs of land management must be included in water utility rates.

Most significantly, in an effort to meet the demands of environmentalists and try to placate the tribe, Seattle agreed to forego half its municipal water claim on the river. There was intense pressure and even a lawsuit to limit withdrawals even further. The utility's insistence that water would be needed in other parts of the urban area beyond the Cedar River basin fell on deaf or hostile ears.

In the end, the politics of focusing on the ecology of one river and its watershed resulted in a process where municipal water supply had no advocates at the negotiation table other than the utility itself. Because potential Endangered Species Act liability was the driver of the process, essential infrastructure values were virtually ignored.

2. Developing multi-jurisdictional and multi-collaborative processes within river basins and sub-basins.

The salmon that swim through Seattle and up our rivers migrate through multiple jurisdictions. Over the last decade, city and county elected officials have come together voluntarily to improve environmental quality in the region's waters. One of the strongest incentives is the desire to maintain local autonomy. Local officials recognize that if they do not participate in voluntary regional problem solving, the state or federal government will appoint a Water Czar or salmon authority to tell local government what to do.

When the pending ESA listings of salmon were first announced by the federal agencies, local governments were advised that they might win exemptions from liability if they banded together and agreed to meet certain standards for aquatic habitat protection. The effort fell apart because

the federal agencies couldn't define the relevant standards; the agencies had only developed scientific standards for forestry practices, not for urban land use.

Still, regional officials have a high level of commitment to salmon recovery and a keen appreciation of the need to coordinate habitat restoration efforts. No one wants his investment in one section of the river to be lost because of action or inaction elsewhere.

Despite the lack of guidance from federal authorities, local elected officials came together voluntarily and developed watershed compacts or interlocal agreements so that each city or county in a river basin participates in funding and governance of the basin planning process.

Much like the river basin assessments and program of measures required by the EU Framework Directive, the watershed plans being developed by these forums will address water quantity and quality, withdrawals and beneficial uses, but with a focus on the life-cycle needs of salmon. Water utilities, state and federal agencies, business, environmental activists, scientific experts and elected officials are engaged in these planning processes.

To date, there has been considerable success in pooling local resources for priority research on salmon habitat needs and priority projects such as acquiring and preserving undeveloped lands and restoring critical habitat. The need to coordinate so many jurisdictions and interests has meant endless hours of discussion but has resulted in a broad regional consensus.

The elected officials draw on a strong base of citizen support. Every stream has its group of volunteers working to protect their creek and save the salmon. The tougher issues of balancing municipal water withdrawals with salmon streamflow needs have not yet been addressed in the watershed forums. The challenge for water utilities is to participate effectively and build broad public understanding and support for integrated resource management.

3. Defining the targets and measurement regimes that restorative efforts are expected to achieve.

The ESA target for salmon recovery could be simply a count of the number of fish returning to a river basin. Only Nature has control over ocean conditions, predation, and weather, and tribal, state, and federal agencies have control over harvest. Thus productivity of freshwater habitat is a more likely measure because utilities and local governments are responsible only for the freshwater portion of the salmon lifecycle.

The Framework Directive sets a standard of "good" surface water or groundwater status and requires river basin plans to achieve that status in 15 years. The Endangered Species Act on its own terms appears to require simply that local authorities do no further harm to endangered species and their habitats. However, federal officials implementing the Act have stated as their standard for aquatic habitat that "properly functioning condition" must be restored in all waterways all the time.

The Framework Directive acknowledges that some artificial and heavily modified bodies of water may need to be managed for “no further deterioration.” The ESA makes no explicit allowances for artificial or heavily modified waterways.

Seattle’s harbor area is a modern industrial port – one of the busiest on the west coast and the home of Boeing airplanes. The major rivers that run through the city have all been realigned. Two rivers that used to converge in the Green River that forms Seattle’s harbor were diverted long ago to other waterways. A ship canal was dug to link Lake Washington to Puget Sound, creating a new route for ocean-bound fish via the Ballard Locks. Properly functioning condition is not a likely near-term outcome for any of these waterways.

The overlay of salmon recovery goals is adding substantial complexity to even routine permit processes like replacing culverts under city streets to prevent flooding. Even if the stream has not supported fish for decades, we have to determine if the expanded drainage capacity will be good for fish. We have to think about natural systems and "properly functioning conditions."

As teams of scientists from agencies and utilities have begun their assessment of river basins and sub-basins, a more discriminating program is emerging. Some basins are identified as having significantly more potential for supporting Chinook salmon than others. Certain urban creeks will not play a role in Chinook recovery and will channel stormwater runoff as they continue to be amenities in city parks. Waterways that actually provide Chinook salmon migration or spawning grounds will be protected and restored. Developing a clear set of measurements and targets is an important challenge of our river basin processes.

4. Defining the role of utilities in achieving river basin goals.

The Framework Directive defines a special role for water and wastewater utilities by setting performance targets for withdrawals and discharges. ESA has no express role for local utilities. Under the Endangered Species Act, everyone is accountable. Private or public, citizen or government agency or business – whoever “takes” an endangered fish or degrades its habitat, is liable under the Act.

In the Seattle metropolitan area, numerous parties have a stake in salmon recovery. The native tribes, the port authorities, marine industries, local governments with land use and development responsibilities, sportsmen, environmentalists – all are engaged in river basin assessment, planning and restorative projects. Seattle Public Utilities has worked to create a forum of all water suppliers in the greater Seattle metropolitan area. The forum provides effective advocacy for regional water supply, cross-basin transfers, and a coordinated response to ESA.

Seattle Public Utilities is defining its role to include not only water quality and quantity, but important roles in regional funding and public information. Water and wastewater utilities can fund important measures through their rates. The State Accountancy Act prohibits utilities from using rate revenue to pay expenses of general government, but there is significant opportunity for utilities to fund salmon projects even where the land use or other authority is primarily responsible.

Similarly, much of the habitat improvement will require action by private citizens. The utility has a significant role in educating citizens about stewardship of our water resources to improve fish habitat. Many property owners along the waterway are voluntarily reducing their use of lawn fertilizers, for example, and preventing soil run-off from construction sites.

Seattle Public Utilities collaborates with other water utilities in the metropolitan area in major public information campaigns such as “salmon friendly gardening” to develop an environmental ethic around water conservation and reduction of pollution. This summer’s drought response targeted voluntary conservation messages to our customers and resulted in a 15% reduction in water use. Saving water for salmon was the core of the message.

5. Merging competing regulatory mandates and perspectives.

The Framework Directive aims to pull together the whole range of issues concerning water quality and quantity in a basin plan for integrated water resource management.

By contrast, water utilities in the Seattle area are struggling to coordinate a complex set of state and federal regulatory schemes without an overarching authority. The Clean Water Act, Safe Drinking Water Act, Growth Management Act, Shorelines Act, and state water rights are some of the laws we must deal with in an ESA context.

The Clean Water Act sets limits for point and non-point discharges. The standards for in-stream water quality may not be achievable in urban creeks. Domestic cats and resident geese, for example, cause much of Seattle's in-city water pollution.

Salmon require clean, cold water, adding urgency to the mandate to restore our streams. Seattle Public Utilities made a special Millennium Project of creek restoration, funding urban creek improvements in part to improve stormwater drainage and reduce flooding but also to engage citizens in ecological commitment. The return of salmon to several sub-basins was an anticipated bonus.

The Safe Drinking Water Act requires protection of source drinking water. Seattle Public Utilities for one hundred years has protected water above its diversion point on the Cedar River with a dam that doesn’t allow salmon upstream. Hundreds of thousands of sockeye salmon spawn and die in the Cedar each year. If they migrated upstream of the drinking water intake, their decaying carcasses would contaminate Seattle’s unfiltered water supply. The Endangered Species Act requires special protection to Chinook salmon, of which there are only several hundred in the Cedar River. They need access to the pristine river habitat above the water intake. Seattle Public Utilities reconciled its Safe Drinking Water Act and ESA obligations by building a fish ladder that will allow the Chinook salmon but not the much more abundant sockeye to bypass the diversion.

State regulations of land use such as the Growth Management Act and the Shorelines Management Act set up other conflicts. The shoreline regulations, for example, have historically allowed development that fisheries biologists now tell us is adverse to good stewardship of aquatic habitat. The Growth Management Act defines urban areas, in effect determining where

municipal water must be supplied. But growth management boundaries were set in the mid-1990's without regard to fish or river basins.

The State Department of Ecology administers the system of water rights and is charged with preventing drawdown of aquifers or surface water bodies that would impact fish. The State Department of Health approves utility plans to ensure reliable clean supplies of drinking water. Water utilities are accountable to both agencies.

There is no state or federal scheme for merging and reconciling these mandates and it essentially is left to the local utility to accommodate these conflicting demands. The ESA, with its imperative preference for fish over people, makes local utilities see collaboration as essential.

6. Forming formal partnerships within basin and sub-basins to achieve targeted actions.

The EU Framework Directive doesn't define the governance structure for river basin management plans. Rather, member states are encouraged to use existing structures or to develop the arrangements that best suit their needs.

Seattle Public Utilities and the other government agencies facing the salmon recovery challenge have developed several sets of processes and agreements that honor existing jurisdictions and their constituents while still meeting regulatory mandates.

For the first time, all the water utilities in the Seattle metropolitan area are working together for water supply planning. Altogether some 158 water utilities serve 2.5 million people. Many of the systems use groundwater, while the three major urban suppliers rely on four large mountain reservoirs. Linking the systems would provide opportunities for aquifer recharge, could ensure that salmon streams have adequate flows at key times of year, could reduce the need to drill new wells where saltwater intrusion or groundwater pollution is a risk, and could support urban planning under the Growth Management Act.

Working together throughout the metropolitan region, bilateral and multilateral agreements are being developed to guarantee reliability in water supply both for people and for fish. This effort has evolved in spite of traditional state water law to the contrary and without state or federal guidance.

CONCLUSION

In conclusion, the EU Framework Directive describes in broad terms an elegant vision of holistic water resource management. Seattle Public Utilities and other utilities in the Puget Sound region have, out of pragmatic necessity, arrived at a similar scheme of river basin planning, shared stewardship, and integrated resource management. While vision has played a role, reaction to the Endangered Species Act mandate for salmon recovery, urban growth, and increased environmental awareness have been powerful drivers toward change for utilities like Seattle Public Utilities. The utility is well along the way in transforming its mission from traditional utility service to holistic resource management. The Seattle story provides a glimpse into the pending challenges and opportunities of implementing the Framework Directive.