Stakeholders for Water Conservation

Background for Teachers

Questions to support student inquiry when thinking about each stakeholder…

- *What is this group's "stake" in the water system?*
- *How do they rely on water and why should they care?*
- *What are the systemic relationships among different stakeholders?*

Homeowner / Family: A typical home is hooked up to a water supply system that comes from underground pipes fed by gravity and water pressure from a huge water tank located on the top of the nearest hill. Some communities also pump water from underground wells. The pipes enter the house through a water meter which keeps track of how much water a family uses. The water is distributed through plumbing inside the home's walls and provides water to sinks, toilets, showers, dishwashers, clothes washers, and outside faucets. Homeowners pay a water bill to the City Water Utility. The bill increases if water usage exceeds the amount allotted per home by the City Water Utility. A typical contributor to excess water use are homes with lawns or gardens that require extra watering in the summer months. Because our summers have been hotter and drier the past few years, many cities require homeowners to use less water in the summer to conserve water.

Apartment Building Manager: Apartment buildings are hooked up to a water supply that comes from underground pipes fed by gravity and water pressure from a huge water tank located on the top of the nearest hill. Some communities also pump water from underground wells. The pipes enter the apartment building from the nearest street and the water flows through a meter which keeps track of how much water the complex uses. The water bill for the apartment complex is based on this measurement. All of the water used, whether it comes from a hose bib on the side of the building or from a faucet or showerhead inside the apartment, flows through the pipe and water meter prior to the end point where the water is used. The water is distributed through plumbing inside the apartment walls and provides water to sinks, toilets, showers, dishwashers, clothes washers, and outside faucets. Usually the rent charged for the apartments include a component to cover the water bill. If tenants use too much water, the apartment manager may increase rent for the complex to cover the cost of the water bill. It is important in apartment buildings that everyone conserves water since the water bill is split among each of the units influenced by the size of the apartment. It wouldn't be considerate to the apartment residents doing their best to conserve water, which also saves money, if other residents are wasting water. An Apartment Manager may inspect the apartments and grounds for water leaks regularly as it is important that leaks are reported or detected promptly. Apartment Manager's may also post signs and provide information to residents on the importance of conserving water and ask residents to report leaks they see.

Apartment Building Owner: The Apartment Building Owner owns the land the apartments are built on as well as the apartment buildings. Apartment buildings are hooked up to a water supply that comes from underground pipes fed by gravity and water pressure from a huge water tank located on the top of the nearest hill. Some communities also pump water from underground wells. The pipes enter the apartment building from the nearest street and flows through a water meter which keeps track of how much water the complex uses. Permitting is an

important step in the building process as it ensures there is enough water allocated for all of the homes, apartments, and other buildings in a given area. There are important permits and requirements for developing the land and building on the land. The Apartment Building Owner is responsible for ensuring that all of the appropriate permitting is completed as required by the City in which they are located. It is also the responsibility of the Apartment Building Owner to make sure all of the water fixtures are compliant with current building codes and installed as required. The Apartment Building Owner usually sets the rent in their apartments to include a component to cover the water bill. An Apartment Building Owner usually hires the Apartment Manager to manage the daily responsibilities at the apartment complex.

City Water Utility: The City provides drinking water either pumped from wells that reach down to underground aquifers or is purchased from Seattle Public Utilities (SPU) through Cascade Water Alliance, an association of regional water districts and cities. The water managed by Cascade Water Alliance typically comes from either the Chester Morse Reservoir in the Cedar River Watershed, or from the South Fork Tolt River Watershed in the Cascade Mountains. For this water source, SPU performs most of the sampling and treatment for a city's drinking water; however, most cities operate and maintain the City's water infrastructure.

Water Supplier - Cascade Water Alliance: Cascade Water Alliance (Cascade) provides water to meet current and future needs of its members in a cost-effective and environmentally responsible manner through partnerships; water efficiency programs; acquiring, constructing, and managing water supply infrastructure; and fostering regional water planning. Cascade is a municipal corporation comprised of seven municipalities (five cites and two water and sewer districts) in King County that joined together to provide a safe, clean, reliable water supply to 350,000 residences and more than 20,000 businesses. Cascade purchases water from Seattle Public Utilities and provides it to its member cities. The water comes from the protected watersheds of the Cedar and South Fork Tolt rivers in the Cascade Mountains, and meets or exceeds state and federal water quality requirements. Cascade purchased Lake Tapps in east Pierce County in 2009, and the state issued Cascade the official water rights to develop a drinking water supply. Cascade likely won't develop Lake Tapps for decades, but it is there as a valuable resource for the region when needed. Cascade is working to address current and future water supply efficiency needs through conservation programs. http://cascadewater.org/

Water Supplier – Seattle Public Utilities: Maintains the watersheds and the infrastructure that provide water to the residents of Seattle. These responsibilities are divided into four categories…

- URBAN WATERSHEDS: Seattle has four major receiving waters: Lake Washington, the Ship Canal and Lake Union, the Duwamish River and Puget Sound. Three urban basins, or watersheds, contribute to each of these receiving waters. Urban Watersheds

- CEDAR RIVER WATERSHED: The City of Seattle's Cedar River Municipal Watershed is carefully managed to support and supply clean drinking water to 1.4 million people in the greater Seattle area. The watershed covers 90,638 acres and is owned by the City of Seattle. Cedar River Watershed

- HABITAT CONSERVATION PLAN: The Cedar River Watershed Habitat Conservation Plan (HCP) is a 50-year, ecosystem-based plan that was prepared to address the declining populations of salmon, steelhead and other species of fish and wildlife in the Cedar River basin. Prepared under the Endangered Species Act (ESA), the plan is designed both to provide certainty for the City of Seattle's drinking water supply and to protect and restore habitats of 83 species of fish and wildlife that may be affected by the City of Seattle's water supply and hydroelectric operations on the Cedar River. Habitat Conservation Plan[1]

- TOLT RIVER WATERSHED: The South Fork Tolt River is the smaller and lesser known (than the Cedar River) but still essential second supply watershed in SPU's freshwater supply system. Located in the foothills of

[1] www.seattle.gov/util/environmentconservation/ourwatersheds/

the Cascades in east King County, it supplies about 30% of the drinking water for 1.3 million people in and around Seattle. Tolt River Watershed

School District: Schools use water for drinking fountains, toilets, science and art labs, the cafeteria kitchen, gym showers, and for the irrigating of sports fields and landscapes around the campus. Generally school budgets are limited, so ensuring that the water bill, which is based on water consumption, is kept to a minimum is important to School District Managers, as well as the local water supplier.

Local Business Owner – Farmer: Depending on the type of farm, a farmer can use a lot of water! Farmers generally receive their water from a well. Typically in rural areas where farms are located, there isn't a municipal water service that provides water to the farm. The farmer has a well installed by a well drilling company, then runs underground pipes to the irrigation system that is used to water the crops, or to the barns or fields where the animals are raised. It is required that the Farmer receive a permit from their local jurisdiction prior to installing their well. There are new high tech and innovative ways that farmers conserve water. Many now use a combination of equipment including soil moisture probes, low pressure irrigation lines, and drip irrigation. Conserving water and not allowing water runoff also preserves soil and the land that is farmed. There are an increasing amount of environmental regulations that restrict water waste and water runoff on farms. Even though most farmers get their water from a well, overall well water use in an area can affect the amount of water in nearby streams and rivers. Increasing attention is being put on maintaining a minimum water level for aquatic habitat such as salmon. Wells can also go dry, meaning that the water level in the aquifer has dropped below the depth of the well. If this occurs the farmer would not have water for their crops until either the aquifer recharged or the farmer was able to install a deeper well.

Local Business Owner - Car Wash Company: Car wash companies rely on water to run through their car wash system to clean customers' cars. They receive their water from a local water supplier through pipes that run into the building, through a meter, and into the car wash system. Their water bill is based on the amount of water used, so if there is the opportunity through innovative and high tech equipment to reuse water, that not only saves water, it also saves the business money. The more times the car wash company can reuse the same water by treating and recycling it, the more earnings potential for their car wash. Additionally a bi-product of washing cars is dirt and grime which often contains toxic materials such as metals from brake pads and liquids from the engine area. That dirt and grime can contaminate adjacent waterways or storm water if not collected and properly treated. There are important permits and regulatory requirements for car wash companies.

Local Business Owner – Industry: Depending on the nature of the industry, water can be an expensive operating cost. There is the cost to buy the water from the water supplier and there may also be an associated cost to treat the water prior to being able to discharge the water down the drain due to possible contaminants from the industry or manufacturing process. Many industries are required to install an expensive, on-site, high tech wastewater treatment system that treats the water prior to disposal. Additionally, these types of industrial discharges require a permit, usually from the Department of Ecology or King County depending on where the business is located. Industrial wastewater discharge permits have routine sampling, monitoring, and reporting requirements that must be complied with. An example Industry that might require a wastewater discharge permit would be the Aerospace Industry. Conserving water is important to Industry as the less water that is used, the less water has to be treated prior to disposal, and the smaller the on-site wastewater treatment system could be. All of which cost money for the local industry business owner. Many businesses have internal requirements or sustainability goals to conserve water.

Local Business Owner – Restaurant: Restaurants use water for customers to drink, to rinse and clean dishes, to prep the food that the restaurant serves, to flush toilets, and clean and mop the restaurant. They get their water from the City or Water District in which they are located. Typically there is a main water line under the ground near the main street where the restaurant is located. A pipe delivers the water from the pipe under the street to the restaurant. The water runs through a meter into the restaurant and records how much water is used. The City Water District reads the meter and sends a bill to the restaurant based on how much water is used. It is in the best interest of the restaurant to conserve water to ensure there is enough water available for their restaurant's needs

and all the other people and businesses in their neighborhood. Conserving water also saves the restaurant owner money on their water bill. The lower the amount of water used, the lower the water bill will be.

Local Business Owner - Plumbing Contractor: Plumbing Contractors are responsible for designing and installing plumbing anywhere plumbing is needed. They are responsible for ensuring that all city, county, or building codes and requirements are followed. They are also responsible for ensuring their employees are properly trained and licensed. A plumbing contractor fixes leaks, install and repairs plumbing equipment, and troubleshoots clogs or other maintenance issue that arise. They also assist businesses with plumbing preventative maintenance requirements as required by the County or the local Department of Health. An example would be testing and submitting test results to the Department of Health from back flow prevention testing done for the business by the plumbing contractor. Backflow prevention testing is very important as it ensures that wastewater does not co-mingle or back flow into fresh or potable water.

King County Wastewater Treatment: King County, Washington, protects water quality and prevents water pollution by providing wastewater treatment to 17 cities and 17 local sewer utilities. The County's Wastewater Treatment Division serves about 1.6 million people, including most urban areas of King County, and parts of south Snohomish County and northeast Pierce County.
http://www.kingcounty.gov/environment/wtd/About/System.aspx

King County's wastewater system includes:

- three large regional wastewater treatment plants (the West Point Plant in the City of Seattle, the South Plant in the City of Renton, and the Brightwater Plant near Woodinville);
- two small wastewater treatment plants (one on Vashon Island and one in the City of Carnation);
- one community septic system (Beulah Park and Cove on Vashon Island);
- four combined sewer overflow (CSO) treatment facilities (Alki, Carkeek, Mercer/Elliott West, and Henderson/Norfolk--all in the City of Seattle); and
- over 391 miles of sewer pipelines, 25 regulator stations, 47 pump stations, and 38 CSO outfalls.

Energy Utility: The energy utility provides a very important role in water conservation. Much of the energy in the Pacific Northwest is generated from a dam when water flows through the system to generate the energy to power our communities. Power is used to move water from wells deep in the ground, or through pipes from surface water in a watershed by providing the power to pumps at lift stations that move water through the system. The energy utility also provides the power at fresh water treatment plants as well as wastewater treatment plants. A region's efforts to conserve water and ensure there is enough water in the river to flow through and generate power is of high importance to the energy utility. We rely on the energy utility to provide us with power and, in many cases, the energy utility relies on the water in rivers to generate power at dams. Dams generate powers on many of our large rivers in the Pacific Northwest. This includes the Columbia River, the Snake River, and the Willamette River.

State Department of Ecology: The Department of Ecology (Ecology) consists of ten major environmental management programs from Air Quality, to Hazard Waste, to Water Systems including overseeing the State's water quality assessment, promoting healthy watersheds and managing stormwater laws and regulations. Ecology is given legal authority by the state legislature in Olympia to make rules, enforce rules, and educate people on how to protect our water resources. Ecology's water programs are working closely with Washington communities to clean up and protect water quality in Washington. They also work to ensure the state has clean, adequate water supplies that meet current and future drinking water needs, commercial and agricultural uses, and to sustain fish and the natural environment. http://www.ecy.wa.gov/water.html

Environmental Protection Agency: The Environmental Protection Agency (EPA) is an agency of the U.S. federal government that was created for the purpose of protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress. The EPA was proposed by President Richard Nixon and began operation on December 2, 1970, after Nixon signed an executive order. Within the EPA, The Office of Water

ensures drinking water is safe, restores and maintains oceans, watersheds, and their aquatic ecosystems to protect human health; supports economic and recreational activities; and provides healthy habitat for fish, plants and wildlife. The Office of Water is responsible for implementing the Clean Water Act and Safe Drinking Water Act, and portions of the Coastal Zone Act Reauthorization Amendments of 1990, Resource Conservation and Recovery Act, Ocean Dumping Ban Act, Marine Protection, Research and Sanctuaries Act, Shore Protection Act, Marine Plastics Pollution Research and Control Act, London Dumping Convention, the International Convention for the Prevention of Pollution from Ships and several other statutes. Headquartered in Washington, D.C., the Office of Water works with the ten EPA regional offices, other federal agencies, state and local governments, American Indian tribes, the regulated community, organized professional and interest groups, land owners and managers, and the public-at-large. The Office of Water provides guidance, specifies scientific methods and data collection requirements, performs oversight and facilitates communication among those involved. The Office of Water helps the states and American Indian tribes to build capacity, and water programs can be delegated to them for implementation. http://www.epa.gov/aboutepa/about-office-water

Local Native American Tribes: Today, many of our Local Native American Tribes use water for fishing to support their livelihood. Tribes are able to farm and harvest shell fish and salmon. The Department of Ecology monitors water quality, specifically the tide pools where shell fish beds are located and will close, or not allow, the harvesting of shell fish if the waters are dirty or contaminated. Salmon require clean, cool, salt water to survive. They spawn in fresh water, and return to the salt water to live and grow. The Local Native American Tribes rely on healthy fish to harvest to sell to make money to support their livelihood. Conserving water is of critical importance to Local Native American Tribes because if the oceans and tide pools become contaminated, or if there isn't enough water to support salmon, they lose their means to support their families.

Salmon: Salmon require ample clean, cool, fresh water to spawn, and clean, cool oceans to live and grow. Few animals have been as central to the Pacific human experience as salmon. Their annual migrations are a miracle of nature. They feed us and their presence tells us that our rivers are still healthy. From grizzly bears to orca whales, at least 137 different species depend on the marine-rich nutrients that wild salmon provide. The last intact salmon watersheds around the North Pacific are composed of free-flowing rivers and dense forests, which provide clean drinking water and absorb carbon to slow climate change. Pacific salmon fuel a $3 billion industry, supporting tens of thousands of jobs and local economies and communities around the Pacific Rim. Millions of people around the Pacific rely on salmon as a healthy and reliable source of protein. Native people have always seen the salmon as the life-sustaining centerpiece of their culture, dating back millennia.

In short, salmon are the key to protecting a way of life rooted in the North Pacific environment: protect salmon and you protect forests, food, water, communities, and economies. But our work over the last decade and a half has shown that only an aggressive, proactive approach on the strongest remaining salmon rivers can halt the decline of these iconic species and all the benefits we derive from them.[2]

Future Generations: Having access to clean, safe water is critical for future generations. It is up to us to protect and preserve this limited commodity for future generations. It is important that we protect watersheds, rivers, lakes, and oceans through preservation and regulations. By 2040 the Seattle area is expected to grow by 1.7 million people. [3]

[2] WildSalmonCenter.org
[3] 2015 World Population Review