



Water Savvy

Drinking Water Treatment Decision

In August 2008, the cities of Lake Oswego and Tigard formally endorsed a partnership agreement for sharing drinking water resources and costs. Lake Oswego's water supply system is near capacity and key facilities need expansion and upgrades. Tigard residents seek ownership in a water supply system. Both cities want to keep water affordable for their customers and sharing the cost of new infrastructure to serve both communities does that. The Partnership is planning to expand Lake Oswego's existing drinking water infrastructure to serve both communities.

Selecting the best drinking water treatment method is the first and most important decision in Partnership planning. The upgraded treatment plant will be in service for up to 50 years and represents a significant investment for both communities.

Clackamas River Provides High Quality Water

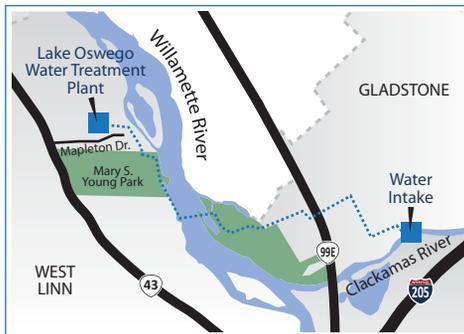
The Lake Oswego Tigard partnership will benefit from access to a high quality water source: the Clackamas River. The 950-square mile Clackamas watershed provides drinking water for the cities of Estacada, Gladstone, Lake Oswego, Milwaukie, Damascus, Happy Valley, Oregon City, and West Linn and several water service districts. The Clackamas River is one of Oregon's high-quality drinking water sources and is protected from new discharges through a state law called the *Three Basin Rule*.

The Three Basin Rule applies to the Clackamas River and two other rivers in the region – the North Santiam River (Salem's drinking water source) and the McKenzie River (Eugene's source). The rule recognizes the high quality of the three rivers, and prohibits any new surface water discharges (e.g., wastewater treatment plants).

Being considered a high-quality drinking water source doesn't mean it is free of all contaminants. Natural and human-made contaminants exist

in the Clackamas River water source but are found at low levels, well below the federal drinking water maximum contaminant level standards. Natural contaminants, which can be found in all rivers, include organisms such as harmful bacteria, viruses and protozoa (*Giardia* / *Cryptosporidium*).

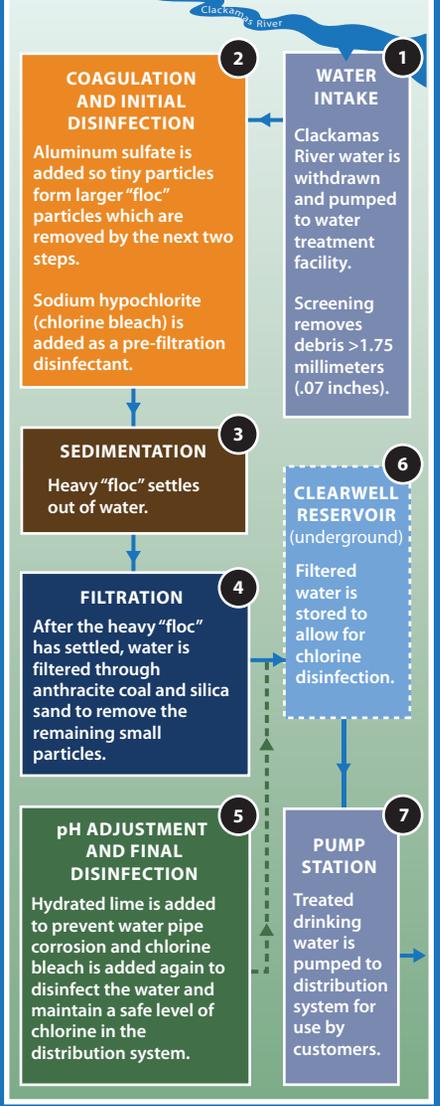
Human-made contaminants are products of industry, agriculture and other activities and include pesticides, herbicides, fertilizers and other compounds. Water treatment methods are designed to remove contaminants and produce safe and pleasant tasting drinking water.



Clackamas River water is withdrawn and pumped to the Lake Oswego Water Treatment Plant in West Linn.

Lake Oswego's Current Water Treatment Process

Lake Oswego's water treatment plant located in nearby West Linn has been producing clean, safe, and reliable drinking water since 1968. Water from the Clackamas River is treated through a process called *direct filtration*.



Drinking Water Regulations Protect Public Health



Lake Oswego Water Treatment Plant Manager, Kari Duncan, tests water daily to ensure quality.

The federal Safe Drinking Water Act (SDWA) sets standards for drinking water. Oregon's Drinking Water Program administers and enforces SDWA standards for public water systems across the state. SDWA standards are based on sound science to protect public health. They set maximum levels for contaminants in drinking water and require treatment of water to remove or inactivate contaminants.

The SDWA also sets rigorous water quality testing and reporting requirements. Results of testing must be reported to Oregon's Drinking Water Program and annually to customers.

Customer Expectations

Results of recent surveys conducted in Lake Oswego and Tigard water service areas confirm customers are satisfied with the current level of water service. They expect their drinking water to be safe and meet state and federal drinking water standards.

- 93% of Lake Oswego residents and 95% of Tigard water service area residents are very satisfied or satisfied with their drinking water service.
- 88% of Lake Oswego residents and 93% in Tigard's water service area say their city is doing a very good or a good job providing drinking water that is pleasant tasting.
- 86% of Lake Oswego/Tigard service area residents say it is very important or important to treat drinking water so it is safe to drink and meets all state and federal standards. Fewer residents – 62% – say it's very important or important to provide customers with the safest possible drinking water at any cost.
- 55% support the partnership approach to drinking water improvements. The 31% who oppose are chiefly concerned about rising costs.

Water Treatment Decision Factors



Source water quality



Current and future regulations



Customer expectations



Capital and ongoing operating costs

Water Treatment Decision

Under the water partnership agreement, Lake Oswego's existing water treatment plant will be upgraded to serve both communities' needs into the future. The upgraded facility will use a water treatment technology that produces safe, pleasant tasting water that meets / exceeds all drinking water regulations and can be adapted to meet future regulations.

National and regional experts in water treatment and public health are teaming up with staff and Citizen Sounding Board members from Lake Oswego and Tigard to evaluate different treatment methods. A subcommit-

tee of policymakers from Lake Oswego and Tigard will recommend the best treatment option to both City Councils for their consideration. An evaluation process will be used to compare drinking water treatment methods, focusing on the environmental and public health benefits, costs, community impacts and risks of each alternative treatment method.

The water treatment decision team will participate in workshops over a four-month period, March-June, 2010, concluding with a treatment recommendation forwarded to both City Councils by Fall 2010.

Treatment Methods to be Considered

There are many drinking water treatment methods available. The following methods were selected for further study because they are widely used and appropriate for treating surface water sources such as the Clackamas River. The methods differ in the type and size of contaminants removed as well as cost, complexity of operation, facility size, energy use and waste by-products. These are briefly described below and displayed 'at-a-glance' in the table below.

Filtration systems treat water by passing it through sand or other granular materials that remove the contaminants. Disinfectants are also added.

- *Direct filtration* (currently used by Lake Oswego) adds a chemical coagulant to the source water prior to filtration. The mixture is stirred to create tiny suspended particles that form larger and more easily removed "floc."
- *Conventional filtration* is similar to direct filtration, but uses sedimentation to allow the heavier "floc" to settle out of water prior to filtration.
- *High rate conventional filtration* process is a compact variant of the conventional filtration system that uses rapid flocculation and sedimentation processes prior to filtration.

Membranes are thin sheets of synthetic material that separate and sieve particulates based on size. Contaminants are separated out as water passes through the membrane.

Ozone is pumped into water systems to eliminate biological contaminants and to oxidize certain types of unwanted organic and inorganic compounds, primarily to enhance taste and odor and control disinfection by-products.

Powdered and granular activated carbon is an adsorption treatment process. As water passes through the carbon, contaminants that impart color, taste, and odor to water are adsorbed or captured. This process removes organic compounds like those described in the chart below.

Ultraviolet (UV) inactivates microbes like Cryptosporidium, Giardia, and bacteria.

Advanced oxidation uses a series of processes to treat water, e.g., ozone, hydrogen peroxide, and ultraviolet radiation. This treatment is useful for removing very difficult to treat organic compounds.

Comparing Drinking Water Treatment Methods

TREATMENT METHOD	TREATMENT METHOD REMOVES						COST COMPARISON	
	Particulates <i>(small particles)</i>	Microbes: <i>bacteria, viruses, algae</i>	Protozoa: <i>Cryptosporidium/ Giardia</i>	Inorganics <i>(nitrate, arsenic, mercury, etc.)</i>	Organics <i>(pesticides, herbicides, etc.)</i>	Taste and Odor	Capital	Operating
Direct filtration	●	●	●	●		●	Low	Low
Conventional filtration	●	●	●	●		●	Medium	Medium
High rate conventional	●	●	●	●		●	Medium	Medium
Membranes	●	●	●	●		●	High	High
Ozone		●	●		●	●	Medium	Medium
Powdered & granular activated carbon					●	●	Medium	Medium
Ultraviolet (UV)		●	●				Medium	Low
Advanced oxidation processes					●	●	High	High

● Primary benefit from treatment method ● Some benefit from treatment method

Learn More



**Lake Oswego · Tigard
Water Partnership**
sharing water · connecting communities

lotigardwater.org · 503-697-6502

For more information about the Lake Oswego Tigard Water Partnership and the water treatment decision visit www.lotigardwater.org or contact:

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Or you can go online to learn more about drinking water treatment:

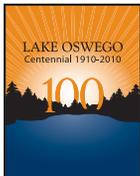
US Environmental Protection Agency
The Office of Ground Water and Drinking Water
www.epa.gov/safewater

City of Lake Oswego – Drinking Water
www.ci.oswego.or.us/wtp
Oregon Department of Human Services

Drinking Water Program
www.oregon.gov/DHS/ph/dwp

City of Tigard – Drinking Water
www.tigard-or.gov/city_hall/departments/water

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