

OPENING UP SMITH AND BYBEE LAKES TO NORTH SLOUGH

Metro Regional Environmental Management Dept.

Question: If the lakes are opened up to the slough system, will increased flow velocity in North Slough cause increased erosion of the St. Johns Landfill bank and of bottom sediments?

Answer: According to a 1999 report by Metro's engineering consultants, flow velocity in the North Slough arm of Columbia Slough will increase significantly when the lakes are opened to the slough system. Peak flow velocity in the North Slough arm is expected to occur when there is a rapid change in water elevation. A rapid change in Willamette River elevation is believed to be the driver of such a change in the North Slough arm. These rapid changes usually happen during the period November to April.

Increased flow velocity carries the risk that the rate of bank erosion will significantly increase over the current rate. Erosion of the landfill bank eats away at the physical barrier and contaminant filter between the solid waste and surface water. An increased erosion rate makes it necessary to repair the landfill bank sooner than if erosion were slower. Therefore, it is desirable to reduce the risk of increased erosion by reducing peak flow velocity.

It is recommended that barriers be maintained in one or more openings of the planned 4 opening water control structure to restrict or block flow between the slough system and the lakes between November and April. Flow restriction will lower peak velocity. Closure of all controllable openings may be advisable on occasion.

Question: Is Metro monitoring the erosion of the perimeter bank of St. Johns Landfill?

Answer: Metro is testing a monitoring and analysis method for bank erosion. Selected locations are surveyed to detect changes in bank slope each year. Also, the entire perimeter bank is photographed each year to detect changes. Periodically, a geotechnical consultant will analyze the erosion and other data, inspect the landfill perimeter, and make recommendations.

Question: How much would it cost to repair and stop erosion along the entire landfill bank fronting the North Slough arm of Columbia Slough?

Answer: It cost \$600 per lineal foot to repair 1150 lineal feet of perimeter bank. Of the 4600-foot bank fronting North Slough, a 1000 lineal foot section has been repaired at \$0.6 million. Another 1500 lineal feet will probably need repair at \$0.9 million. Another 1100 lineal feet may need repair in the more distant future at \$0.7 million. The timing of future repairs will depend on erosion rates.

Question: How does Metro monitor Landfill contamination in surface water surrounding St. Johns Landfill?

Answer: According to the 1995 City of Portland report, **Water Body Assessment, Columbia Slough TMDL Development**, there are about twenty known or suspected sources of water quality impact on the lower Columbia Slough. Among these are the Willamette River and the Upper Columbia Slough, which contribute most of the flow and most of the load from contaminants such as orthophosphate and lead. Seepage from St. Johns Landfill was estimated to contribute less than 0.05%. Because St. Johns Landfill contributes such a small percentage, it is not technically feasible to try to monitor surrounding surface water for contamination from St. Johns Landfill seepage.

Instead, Metro conservatively assumes that the concentration of a contaminant, found in groundwater monitoring wells between the buried waste and the surface water, represents the concentration currently seeping into surface water. This concentration is multiplied by a flow factor that comes from a groundwater contaminant transport model constructed by Dr. Shu-Guang Li of Portland State University. This yields a certain weight per day assumed to be entering surface water such as North Slough. These numbers were used in the City report, discussed above.

Professor Li's model was constructed using conservative assumptions, that is, it tends to over-predict the flow of liquid and contaminants from the waste, and thus how rapidly the liquid level in the waste will decline. Our monitoring data indicate that liquid level is hardly falling at all. This suggests that the model overestimates flow and contaminant transport from the solid waste.

As required by an NPDES storm water permit from DEQ, Metro monitors certain substances in storm water from the landfill cover system before it enters surface water. This storm water enters surface water without contacting the solid waste. As expected, storm water from the cover is relatively clean.

Question: What monitoring related to water quality does Metro carry out in the Smith and Bybee Lakes Natural Area?

Answer: For years Metro has monitored surface water in the slough and lake system in the management area and groundwater at the landfill. In 1997 Metro developed an **Environmental Quality Monitoring Plan for the Smith-Bybee lakes Wildlife Area including St. Johns Landfill** which guides current monitoring activity.

This plan sets forth the reasons and methods for monitoring ground water, storm water, surface water, sediment, and also landfill leachate that goes to the city sewer. Metro currently tests samples twice each year from 30 ground water wells near the landfill. Metro monitors storm water from 12 landfill out-falls twice each year. Surface water is currently monitored by collecting samples six times per year at five locations and by monitoring dissolved oxygen, pH, temperature, and salinity continuously at three locations. Leachate in the solid waste is tested twice each year at one location.

Surface water and sediment in the wildlife area are monitored to better understand this complex system. This monitoring is also intended to detect changes as the DEQ Columbia Slough TMDL standards are implemented and when the water control structure and hydrology of the area are modified.

Question: What is the impact of landfill leachate on water quality?

Answer: The Oregon Department of Environmental Quality is currently developing a draft permit and work scope for a remedial investigation and assessment of risk from St. Johns Landfill. When this risk assessment is complete we will know if contaminants migrating from the leachate (the liquid bathing the waste) is a significant hazard to health, safety, and the environment.

At present we know the following:

1. Screening level risk assessments by Metro and the City of Portland in 1995 indicated that the risk related to surface water and sediment in the wildlife area is similar to other parts of the Columbia Slough System.
2. Contaminated water seeping into North Slough from St. Johns Landfill will be diluted in the order of 1000 times by mostly Willamette River water if Smith and Bybee Lake are open to the North Slough Arm of Columbia Slough. This estimate comes from a model of the Columbia Slough constructed, calibrated, and run by Professor Scott Wells of Portland State University. Professor Wells' model is relied upon by the various agencies studying the Columbia Slough.
3. Visible seeps on the landfill bank, possibly containing landfill contaminants, have been reduced almost to nothing since Metro constructed a multi-layered cover system over the landfill. This compares to the large number and extensive areas of seeps visible before Metro constructed the cover system.

Question: How has impounding Smith and Bybee Lakes potentially affected water and sediment quality in these lakes?

Answer: When Smith and Bybee Lakes are impounded and separated from the slough system, they become sumps for rain, storm water runoff from adjacent areas, and groundwater seepage. Contaminants enter the lakes from these sources and from air pollution. If there is no exchange between the lakes and another water body, these contaminants accumulate in the sediments and in the water column.

Besides St. Johns Landfill, which abuts Smith Lake, there are at least 5 sites, adjacent to the lakes, that are, or have been, listed in the DEQ Environmental Cleanup Site Information System. Storm water from at least part of the N. Suttle Rd. industrial area, containing these sites, drains into Smith Lake. The **Smith and Bybee Lakes Environmental Studies** identified this area as a source for both ground and surface water contamination.

The Sediments in Smith Lake, Bybee Lake and in the North Slough arm of Columbia Slough have been tested for various contaminants since 1994. For example, the concentrations in sediments of contaminants such as the metals, Lead, Cadmium, Arsenic, and Chromium are about the same in the lakes and in North Slough.

In the water column the concentrations of Phosphorous and total dissolved solids are about the same in the North Slough and in Smith and Bybee Lakes. The concentration of Nitrate is about the same in North Slough and Smith and Bybee Lakes and is lower than in the main channel of Columbia Slough.

Question: What is known about a dioxin threat at St. Johns Landfill?

Answer: Pesticide manufacturing residues were said to be buried in quantity in St. Johns Landfill in the early 1960s. In 1985 the U.S. Environmental Protection Agency sponsored a search for the residues and dioxin compounds which may have contaminated them. After numerous borings at St. Johns Landfill insufficient concentrations of pesticide residues were found to justify tests for the dioxin compounds.

In 1994 Dr. William Fish of the Oregon Graduate Institute of Science and Technology examined the soil between the solid waste and the surrounding sloughs. He concluded that dioxins "will be virtually immobile in this environment."

In 1998 the Oregon Department of Environmental Quality issued a TMDL document for the Columbia Slough. This document stated that "Fish samples taken from the reach of the Slough near the landfill showed levels of dioxin comparable to levels in fish taken from other parts of the Slough and the Columbia and Willamette Rivers. This indicates that there is no local source of dioxin in the area of the landfill".