

MULTNOMAH CHANNEL MARSH WATER CONTROL STRUCTURES

The Marsh has two large water control structures located in the north and south tidal creek connections between the wetlands and the Multnomah Channel. Together, the WCSs are used to hold seasonal flooding over the two large wetland basins at the Marsh. Short descriptions and operation instructions for each structure follow below.

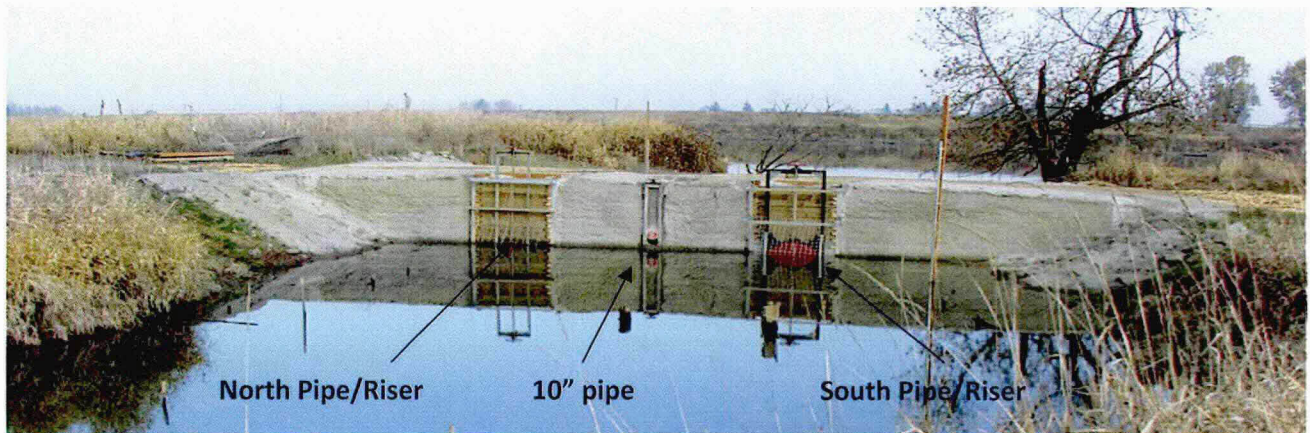
NORTH WATER CONTROL STRUCTURE

DESCRIPTION AND SPECIFICATIONS

Located near the confluence of the north tidal creek and the Multnomah Channel, this WCS has two 6' diameter pipes that allow flow of water through the WCS, each pipe is open at the eastern downstream end, and faced with a half-round riser on the western, upstream end. The risers are each equipped with slots that allow stacks of 6" x 6" x 6' stoplogs to be loaded into the upstream opening of the pipe, to control the flow of water through the structure.

The more southern of the two pipes/risers has a moderate sized reverse-tidegate installed at the base of the riser, which, when closed, allows one-way flow of water into the wetland (when water is higher on the Multnomah Channel than it is in the wetland) to facilitate filling of the wetland. The more northern of the two pipes/risers has a smaller reverse-tidegate installed for the same purpose.

Between the two pipes/risers, is a smaller full round riser (looks like a grated manhole when standing on the structure), containing a smaller set of flashboards that are stacked inside the riser. This riser is linked to a 10" pipe that passes through the structure a couple feet below the top of the structure. The 10" "undershot" pipe was installed to provide a small amount of fish passage, and is capped on the western, upstream side by a small waterman's gate connected to a very small turnwheel, which raises and lowers the gate and controls flow of water through the structure.



OPERATION

Flooding

- The North WCS is typically closed in late December or early January to capture water and flood the north wetland.
- Typically, flooding is initiated by manipulating the large turnwheel valves on the tidegate to lower the gate and totally cover the circular opening in the gate.

Dewatering

- Once the wetlands are filled, the structure is left largely unmanaged in the flooded state until late June/early July, when drawdown is initiated.
- Dewatering in July begins by opening the small gate on the 10" undershot pipe. When water has drained to the base of that pipe, the reverse tidegates are opened slightly (~8-12") to continue the slow drawdown of the pond.
- Once the water levels are the same on the Channel and wetland side of the structure, the gates are opened fully, and kept open until flood-up the following year.

SOUTH WATER CONTROL STRUCTURE

DESCRIPTION AND SPECIFICATIONS

Located on the south tidal creek, but farther upstream from the confluence than is the north WCS, the South WCS has two 8' diameter pipes that allow flow of water through the WCS. Each pipe is open at the northern, downstream end, and faced with a half-round riser on the southern, upstream end. The risers are each equipped with slots that allow stacks of 6" x 6" x 8' stoplogs to be loaded into the upstream opening of the pipe, to control the flow of water through the structure.

The more western of the two pipes/risers has a large sized reverse-tidegate installed at the base of the riser, which, when closed, allows one-way flow of water into the wetland (when water is higher on the Multnomah Channel than it is in the wetland) to facilitate filling of the wetland. The more eastern pipe/riser, has no reverse-tidegate, and is filled with stoplogs only.

East of the two pipes/risers, is a fishway made up of a sloped, baffled oval culvert. The fishway provides good egress for aquatic wildlife in the wetland, and is controlled via 3 sets of 2" x 4" flashboards and a central slot board.



OPERATION

Flooding

- The South WCS is typically closed in late December or early January to capture water and flood the north wetland.
- Typically, flooding is initiated by manipulating the large turnwheel valves on the large reverse tidegate to lower the gate and totally cover the circular opening in the gate. Boards are loaded progressively into the fishway, as the water levels increase, to allow modest spill-over of the central top flashboard.

Dewatering

- Once the wetlands are filled, the structure is left largely unmanaged in the flooded state until late June/early July, when drawdown is initiated.
- Dewatering in July begins by progressively removing flashboards in the fishway to facilitate a slow drawdown, until the water level is roughly at the bottom of the fishway riser. When water has drained to the base of that fishway riser opening, the reverse tidegate is opened slightly (~8-12") to continue the slow drawdown of the pond.
- Once the water levels are the same on the Channel and wetland side of the structure, the gates are opened fully, and kept open until flood-up the following year.

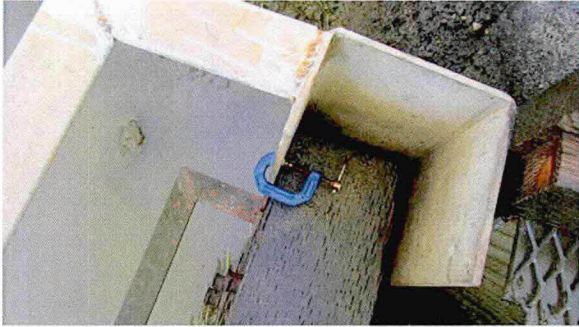
WEEKLY MONITORING AND MAINTENANCE

The WCSs should be checked regularly, at least weekly, to verify they are working properly and safely.

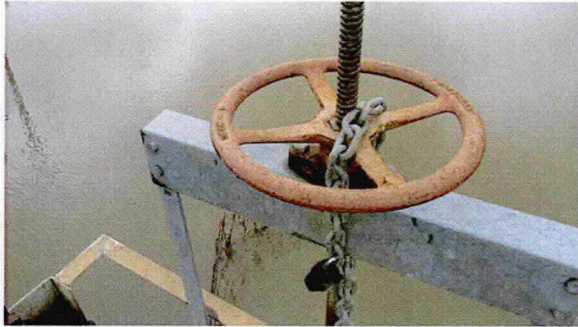
Weekly visits should involve the following tasks:

1. Ensure the structures are properly loaded with flashboards and stoplogs to accomplish the management objectives described above.
2. Ensure the flashboards and stoplogs are securely anchored into the risers to prevent them from floating out during high water events.
3. Ensure the turnwheels are removed from the structure and stored in a nearby secure location
4. Ensure the upstream portions of the structure adjacent to the half-round risers are free of debris.
5. If used, ensure the upstream debris cages or trash racks are properly installed and anchored to the structure.
6. Ensure the structure is free of live vegetation that might threaten its integrity
7. Remove any fishing gear or other debris found on the structure.
8. Verify that public signage is posted nearby the structure.
9. Check and maintain booms upstream (and downstream?) of the WCSs to reduce debris threats to structures

11/14 Immediate things to address:



Replace c-clamps with anchor bolts drilled into angle iron



Remove turn wheels (3 on N WCS, one on S WCS)



Load boards into central riser in NWCS



Clean out debris from NWCS



Reanchor debris rack on NWCS



Spray cottonwood taking root in NWCS



Repair downstream boom at NWCS



Broken glass on NWCS

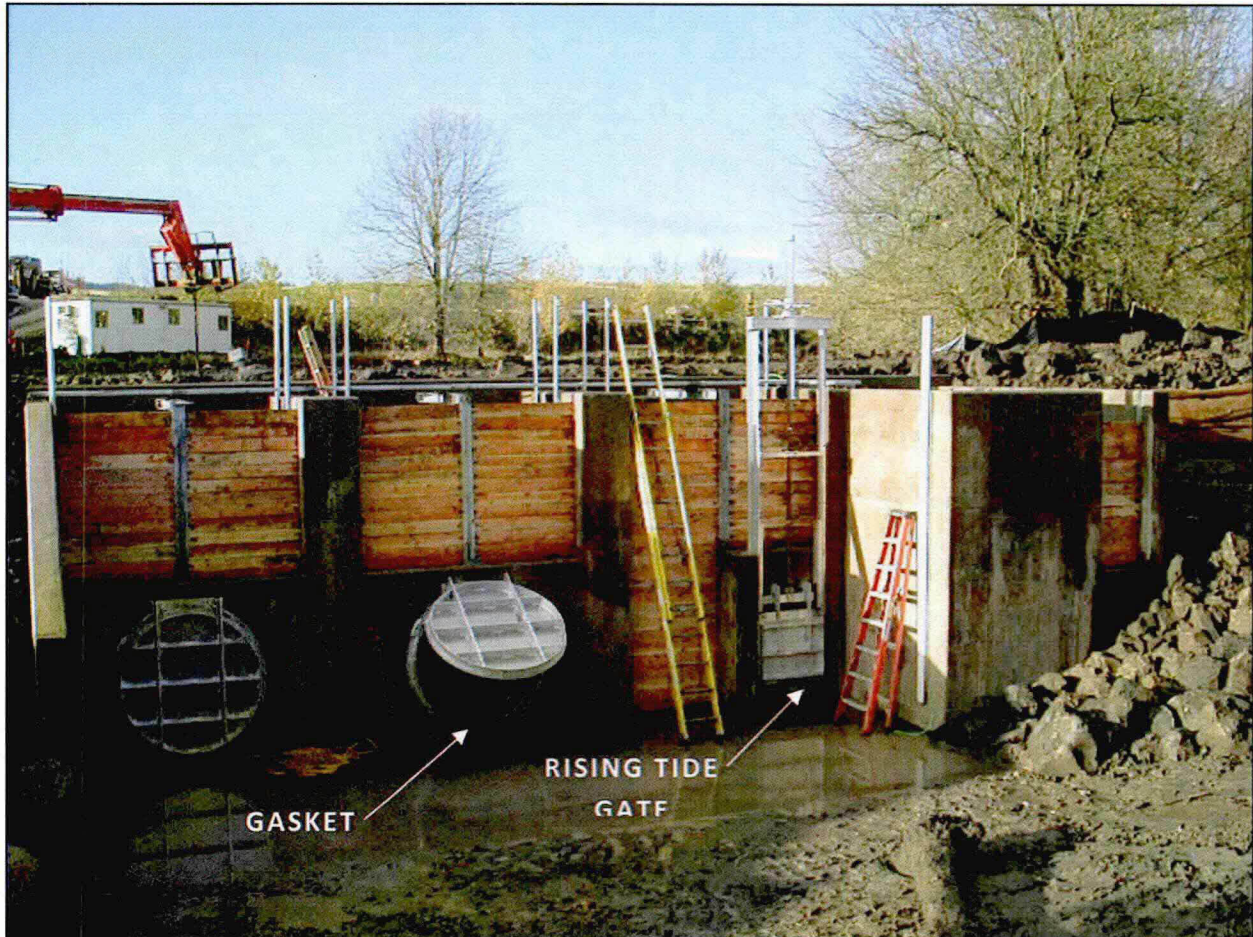


Debris on NWCS trash rack



Missing hinged door on NWCS (not immediate need)

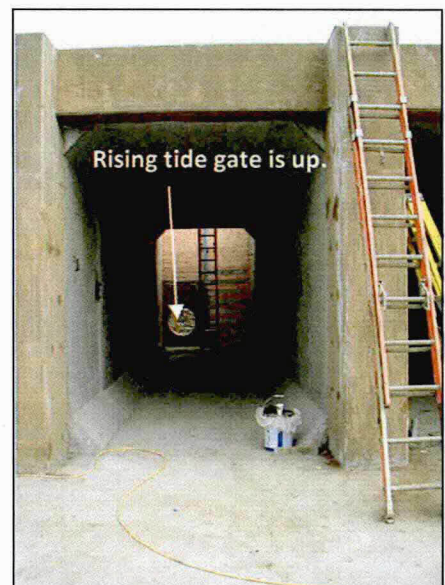
Water Control Structure Operations



TIDE GATES

Gaskets. Inspect yearly at low water to ensure that they are not cracked or damaged

Rising tide gate. Clean and lubricate stem yearly. This should be raised when the boards are removed from the adjacent row (right).



TRASH RACKS

Spring draw down (May/June/July). Remove trash racks (May/at Scientist confirmation) and store them to the side of the WCS. The landfill excavator is required to remove the racks and at least three people should work on the rack removal (one on excavator and two on ground). Racks go between the two L-brackets on the walls (key step).



Fall board installation (late Oct/early Nov - by Veterans Day – at Scientist Confirmation). Install trash racks to prevent logs and debris from entering the bays. Before racks go in, walk in the bays to make sure there are no logs or debris in structure and lube gaskets etc. See if it's possible to cut out the bottom boards that may be stuck there.

BOARDS

Special order boards from Parr Lumber or Milwaukie Lumber. Board specs are 3 x 6 double tongue and groove fir boards, 18 feet in length. (add model number and photo here) Smaller bays require ~11 boards and the large bay requires ~22 boards.



Boards need to be cut to size (bay dimensions vary) (add photo showing the sizes of each bay) and color coded (photo show which bay is which color – metal is

painted the correct color) for the correct bay.

Boards are currently cut with a circular saw at the Howell Barn. The Landfill staff may be open to us using the Landfill shop to cut boards for the structure.

Each board should be inspected annually (summer). Larger boards that show damage at the ends can be cut down and re-used in smaller bays.

During the “high-water” season, boards should be inspected as beaver, otter and carp can physically damage the boards.

Boards are stored at the Howell Barn when not in use.



Rebar picks should be on each board. Use 5/8” rebar – drill hole through and pound in. Cut rebar to 6” length and grind off ends.

Boards can be removed with a “board pick” (add photo) – stored in the container at the landfill. Wheel from tide gate is also stored in the container.

Boards need to be wedged into place to hold them during water fluctuations. A stock pile should be made and stored on site.

WATER LEVELS

Water levels should be checked each week on Monday (or whatever day maintenance is scheduled). The lake level should be sent via e-mail to the Regional Scientist, Land Manager, Program Assistant, Landfill staff, PES – rangers, Eastside NALM team, Friends of Smith Bybee (Troy Clark and Jeff Locke) for the site. Scientist logs the water levels. After boards are out water levels do not need to be checked.

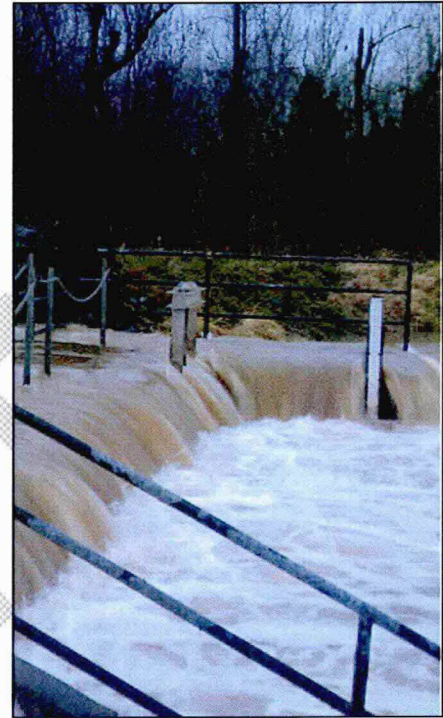
DRAWDOWN PROCESS

1. Pull the trash racks to avoid entrapment of wildlife.
2. Pull one row of stoplogs (boards) per week. This is approximate, but will draw down the wetlands by about 6 inches per week. As they get closer to full drawdown, the number of boards removed may increase.
3. Monitor flow in the fish ladder, ensure there is at least 1 inch of water over the highest board. This ensures proper flow rate for juvenile salmon to navigate the ladder.
4. The structure needs to be visited weekly during this time, but no more than that if things are going well. This is true when we are holding water too.



5. If water rises quickly in the slough, it may loosen the boards. Checking one of the NOAA websites for river levels can help with remote monitoring for this. I'll provide a link below. **This link doesn't work**
<http://water.weather.gov/ahps2/hydrograph.php?wfo=pqr&gage=vapw1&view=1,1,1,1,1,1,1>
6. Email the Bybee Lake level to Scientist weekly when you visit the structure, as you do during winter and spring.

This is where I go to see river levels. The North Slough arm of the Columbia Slough is essentially the same as the Columbia River at Vancouver, although there is a time lag on the tides. The Vancouver gage and the Bybee gage are within 0.1 feet of each other, I think.



Action	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Gasket annual inspection												
Rising tide gate annual cleaning & lubrication												
Trash rack removal (needs sci confirmation)												
Trash rack installation												
Summer board inspection												
High water board inspection												
Water level check (weekly, on Mondays)												

WATER CONTROL STRUCTURE CALENDAR

DRAFT