Story of the new water control structure at Smith and Bybee Lakes Wildlife Area

The Columbia Slough watershed's largest habitat restoration project is under way, after more than 10 years of preparation. Metro and Ducks Unlimited are replacing an earth dam with a new water control structure at Smith and Bybee Lakes Wildlife Area which will enable restoration of more than 1,000 acres of wetland habitat.

The new water control structure will allow the restoration of the natural hydrology to these large wetlands to the maximum extent possible. This water management approach will accomplish several objectives:

- Control of reed canarygrass on the fringes of the wetlands;
- Provision of more than a thousand acres of off-channel rearing and refuge habitat for juvenile salmonids;
- Support of native bottomland hardwood forest - approximately 350 acres of willow forest were lost with the conversion of the wetlands to impounded lakes and will naturally regenerate as the appropriate hydrology is re-instituted;
- Support of native emergent plant communities - hundreds of acres of emergent wetland plants will be restored;
- Provision of wintering habitat for waterfowl;
- Exposure of mudflats for migrating shorebirds in summer;
- Support of the aquatic plant community via control of non-native carp with an annual drawdown;
- Removal of Smith and Bybee lakes from Oregon DEQ's 303(d) list - parameters such as habitat modification and aquatic weeds are directly related to the earth dam; it should be noted that DEQ will consider the lakes part of the Columbia Slough system when the new structure is in place.

Why not just remove the existing dam? Successful ecological restoration depends on restoring underlying ecological processes to the extent possible. In wetland restoration, the key process is hydrology. Historically, the Smith-Bybee wetland complex was seasonally and tidally inundated and featured a mosaic of forested and emergent floodplain wetlands. The historic hydrologic regime was characterized by winter flooding that receded in late winter and early spring. Late spring rains and snowmelt caused water to rise again in the spring freshet. Water levels would drop dramatically in summer with the dry weather, exposing mudflats. Modifications to this hydrologic regime over the past 70 years, due to construction of dams and dikes on major rivers and filling of wetlands, have dramatically changed the frequency and duration of flooding in lower Columbia River wetlands. Simply opening the wetlands to the slough and rivers would not restore the needed hydrology.

Metro will use the new structure to mimic the historic water regime. During some periods of the year, the new structure will retain water within the wetlands for vegetation management. Reed canarygrass is an invasive, cool-season plant that starts growing earlier in the year than the wetlands' native plants. An unmanaged wetland would drain in February, and the subsequent reed canarygrass invasion would

effectively out compete native wetland species, resulting in a monoculture. The spring freshet will be simulated by holding water until late spring and prolonging the recession of floodwaters out of the wetlands. The long drawdown period imitates historic conditions by slowly exposing the shallow areas as mudflats in early summer, during the warming period that favors native plant communities.

The annual management cycle for the wetlands will begin in late fall or winter, with the first heavy rains of the season. The water control structure will be used to hold rising waters in the wetlands. The water will be held as high as possible. The speed with which the wetlands will fill depends on rainfall and on river management (Columbia and Willamette); it will vary from year to year. A built-in fishway will provide passage for juvenile Chinook and coho salmon in and out of the wetlands.

Water will be held in the lakes through spring until early summer, to provide habitat for waterfowl and juvenile salmonids, and to control reed canarygrass. Beginning in late May or early June, a slow drawdown will occur. The drawdown will continue until July or August, depending on the amount of water in the lakes.

Both wetlands (Smith Lake and Bybee Lake) will be nearly dry by the end of the summer. One part of the water control structure will remain completely open to tidal flow from this time until late fall or winter, when the first heavy rains of the season occur.

This management approach may be adapted as Metro gains experience with the new structure and observes how the wetland system responds. Metro and Ducks Unlimited will actively monitor the response of vegetation, fish and wildlife and will adjust water management as needed.

2. This piece was written for a local reporter:

Water Control Structure Background

Over recent decades, the Smith-Bybee wetland system has been profoundly altered and degraded by the construction of local and regional dams and dikes, deposition of dredge spoils and the introduction of exotic plants and animals. A new water control structure, completed in December 2003, enables water level management to restore functions and values to this wetland complex.

Water control structures are increasingly common tools for wetland restoration. They are used in our region to flood and control invasive species, encourage the growth of native emergent and bottomland hardwood plant communities and provide wetland habitat for a variety of fish and wildlife. The Columbia and Willamette rivers' flooding patterns have been radically altered with the installation of dams to generate hydropower and to provide water for irrigation and control flood events. One of the biggest changes has been the loss of the spring freshet, which occurred in most years

when melting snow pack combined with spring rains to produce a significant flood event, typically in late May or early June. Broad expanses of floodplain wetlands were flooded annually by the freshet.

The native plants in these floodplains are adapted to life with a spring freshet. Most are cool-season plants that do not emerge or break bud until June or July, when floodwaters would have receded. The loss of the spring freshet resulted in earlier drying of wetlands, often very early in the spring. The current water regime favors the non-native and invasive reed canarygrass (RCG), a cool-season plant that begins growing as early as February. RCG becomes well-established before native plants begin growing, and thus out-competes them to produce vast monocultures in wetlands such as Smith-Bybee.

The best method for restoring wetland systems in the lower Columbia River would be to restore the historic flooding patterns; however, this is not feasible. Water control structures are an alternative approach for wetland managers to mimic historic flooding patterns to the extent possible. The new structure at Smith-Bybee will allow the capture and retention of winter floodwaters through the spring growing season to control RCG growth. Because storm events and water releases from upstream reservoirs are unpredictable, and large releases in late spring are uncertain, management at Smith-Bybee is focused on capturing water from all events through winter and spring and holding as much water as possible until late May or early June.

The conceptual plan for managing the Smith-Bybee structure is:

- Capture and retain water during winter and through spring to provide high water during the spring freshet time of late May and early June.
- Draw down water in the wetlands from late spring through summer, finishing in August.
- Leave the structure open to tidal flow from late summer through fall.
- In late fall (typically November), close the structure to capitalize on high-water events and begin the cycle again.

This management approach is designed to provide many benefits:

- Control of reed canarygrass on the fringes of the wetlands;
- Provision of more than a thousand acres of off-channel rearing and refuge habitat for juvenile salmonids;
- Support of native bottomland hardwood forest - approximately 350 acres of willow forest were lost with the conversion of the wetlands to impounded lakes and will naturally regenerate with the appropriate flooding pattern;
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