

Wetland Management for Waterfowl in the Columbia Plain

The Columbia Plain extends north of the Great Basin in Washington, as well as much of Idaho and Oregon (Figure 1). Wetlands in this area provide important migration and wintering habitat for many species of waterfowl. Important habitat in the Columbia Plain for these waterfowl is associated with wetlands along the Columbia and Snake Rivers created by withdrawal of irrigation water from the Snake and Columbia Rivers. In addition, of particular importance to this area is a pothole region of 800-1,000 permanent and seasonal wetlands adjacent to and part of the Potholes Reservoir.

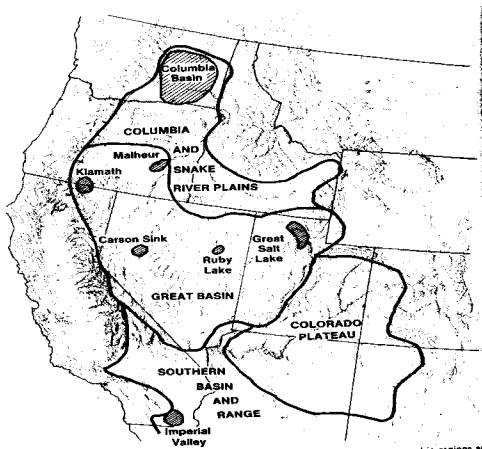


Figure 1. Great Basin (Smith et al 1989)

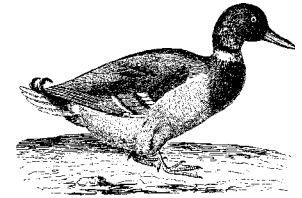
Two types of wetlands exist along the Columbia and Snake Rivers. The first are natural wetlands existing in the floodplain of the Columbia River or seasonally flooded potholes in eastern Washington. Large daily water level fluctuations resulting from management of Columbia River dams to produce power negatively impact these floodplain wetlands. During peak power production, water levels in the Hanford reach of the Columbia river fluctuate daily as much as 12 feet due to management of Priest Rapids Dam. The second type of wetlands are created in natural depressions or man-made basins and flooded with either irrigation water or irrigation runoff.

Waterfowl Use

Most of the waterfowl that winter in the Columbia Plain are part of the Pacific Flyway. The Pacific Flyway is a migration corridor used by waterfowl migrating between breeding areas in Canada and Alaska and the wintering grounds of the pacific coast states. A large number of these wintering species are dabbling ducks, which feed on seeds and aquatic invertebrates in shallow water. However, some of these waterfowl may also be from the inland western states.

More than 80% of the regional wintering habitat for Mallard species is in Columbia Plain. In addition to mallards, American wigeon, northern pintail, and gadwall species can also be found in high numbers.

From the mid 1960s to the early 1980s, agricultural crops, specifically corn and wheat, were the primary food source for dabbling ducks wintering and migrating through the Columbia Plain. Because of conversion of these grain crops to other agricultural crops such as vineyards and orchards during the 1980s, much of the food source for waterfowl disappeared. For this reason, both natural and created wetlands of this area are an important source of food for dabbling ducks that use the Columbia Plain.



For dabbling ducks, an ideal habitat is called a hemi-marsh. Hemi-marshes have open shallow water for waterfowl to feed in, and emergent vegetation for escape and protection from the elements (Figure 2). During the late successional stages of a marsh, emergent vegetation often chokes wetlands and leaves little open water for ducks to access. These areas are dominated by species such as cattail, bulrushes, and other perennials that produce few seeds.

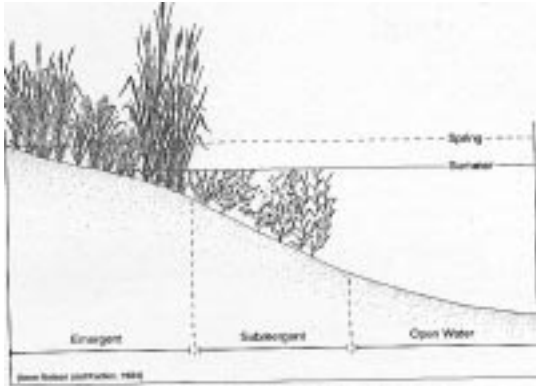


Figure 2 Vegetation profile of a hemi-marsh

To create or maintain a hemi-marsh, private landowners must consider three key factors: Water control, water supply, and vegetation management. Manipulating water levels can be an effective tool in wetland management, but only if the fluctuations are properly timed and controlled. A gradual elevation gradient that allows for drainage and provides shallow water is required to manage wetland for waterfowl. Water control structures, levees, pumps, and wells are important for controlled flooding and draining of wetlands (Figure 3). If private owners are unable to control water levels, then only natural water level fluctuations will be available greatly reducing the ability to management wetlands.



Figure 3. Water control structure

Wetland management requires an adequate water supply to flood wetlands in the fall. Areas with little input by rainfall like the Columbia plain rely heavily on surface waters like streams, rivers, irrigation water, and agricultural return flows for a water supply. Water pumped from wells is another possible source. After a water supply has been developed and proper control structures are installed, landowners must consider the seasonal drainage or drawdown of wetland areas.

The timing and speed of drawdowns are important in the production of moist-soil vegetation. Fast drawdowns cause soils to warm rapidly and if followed by little rainfall during the growing season often results in poor moist-soil productivity. This tactic should only be used in systems where the slow removal of water may increase the level of salt in the soil. Slow drawdowns usually take 2 to 3 weeks, allowing proper time to produce mudflats needed for the germination of common moist-soil plants (Table 1). After the variables of water supply and control have been accounted for, and the proper procedure for drawdown has been selected, landowners can annually manage to create moist-soil plants for foraging waterfowl. However, after several years of drawdowns, late successional emergent vegetation may eventually dominate these marshes, reducing foraging habitat. Cattails and bulrushes can be removed from wetlands and moist-soil plants can be set back to early successional stages.

Slow (> 2 weeks)

Fast (< 4 days)

Plant germination

Period of ideal conditions

Short

Long

Root development

Wet year

Good

Excellent

Dry year

Poor

Excellent

Seed production

Early season

Good

Excellent

Mid-late season

Not recommended

Excellent

Wet year

Good

Good

Drought year

Poor

Good

Invertebrates

Early season

Good

Excellent

Late season

Poor

Good

Period of availability

Short

Long

Waterfowl use

Early season

Good

Excellent

Mid-late season

Poor

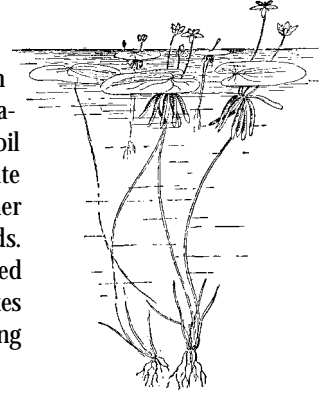
Good

Table 1. Responses of plants, invertebrates, and waterfowl to different drawdown rates.

Wetland Management

Key to understanding productivity of the Columbia Plain wetlands is the concept of moist-soil management. Moist-soil management is the practice of manipulating water levels to create mudflats from which certain plants germinate. These plants, called moist-soil vegetation, produce large numbers of seeds that are consumed by waterfowl.

The typical cycle for the production of mudflats is a slow drawdown of water levels during the spring. Moist-soil vegetation germinates during the late spring and matures during the summer producing large amounts of seeds. During the fall, wetlands are re-flooded to make seeds and aquatic invertebrates available for migrating and wintering waterfowl.



Common moist-soil plants provide the best nutrition for migratory waterfowl species. Plants such as barnyard grass (millet), smartweeds, and sedges are good examples of common moist-soil plants whose seeds are heavily fed upon by waterfowl. In addition, when these moist soil plants are re-flooded they provide habitat for an abundance of aquatic invertebrates, an important protein source for foraging waterfowl.

To create or maintain a high-productivity marsh you must create an early successional stage of vegetation. Succession is the progression of vegetative species from annuals to more perennial species. Annual vegetation germinates from seeds each year while perennial species grow from existing rootstalks or rhizomes. Late successional wetlands are typically dominated by emergent perennial vegetation, which may limit the amount of open water.

Methods of setting back succession

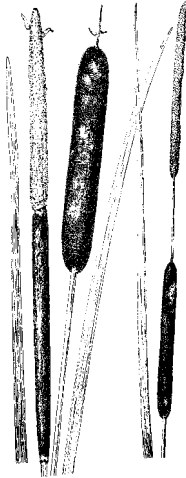
1. **Disking:** Disking involves the disturbance and mixing of the upper levels of soil. Farmers and Ranchers usually possess this common equipment and can accomplish this management quite easily. Disking should be done in the dry season, after wetlands are drained and soil is dry. Disking in the dry season ensures the best disturbance of the soil and enables exposed rootstalks and rhizomes to die through drying in the sun.

2. **Mowing:** Mowing can produce openings in overgrown marshes, but does not set back succession to bare soil for the production of moist-soil plants like disking does. Mowing only temporarily reduces vegetation such as bulrushes and cattails, which will re-grow during the following season.

3. **Deep flooding:** Covering emergent vegetation by deep flooding kills these species through drowning because they are not adapted to being completely submerged for long periods.

4. **Fire:** Fire should be used to manage wetlands in the dry season, when the fire can burn off thick vegetation in the wetland. Fire like mowing only temporarily reduces vegetation such as bulrushes and cattails, which will re-grow during the following season.

5. **Herbicides:** Herbicides can be used to kill perennial plants, creating bare soil for annual moist-soil plants to germinate. If a landowner wishes to use this type of management, they should first contact the nearest federal or state wildlife agency for assistance with selecting a herbicide as well as determining the appropriate rates and timing of application.



For more information on waterfowl habitat:

Eldridge, J. 1990. Aquatic invertebrates important for waterfowl production. Fish and Wildlife Leaflet 13.3.3:1-7

Fredrickson, L. H. 1991. Strategies for water level manipulations in moist-soil systems. Fish and Wildlife Leaflet 13.4.6:1-7

Fredrickson, L. H. and F.A. Reid. 1988. Preliminary considerations for manipulating vegetation. Fish and Wildlife Leaflet 13.4.9

Smith, L. M., R.L. Pederson and R. M. Kaminski. 1989. The great basin marshes. Texas Tech University Press, Lubbock, Texas, USA.

Or contact your nearest Washington Department of Fish and Wildlife Regional Office:

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