

Aquatic Resource Management



Assessing Functions and Values of Wetlands and Waterways

Aquatic resources provide a wealth of ecological services to Oregonians that are important to our quality of life: clean and healthy streams, diverse and abundant fish and wildlife, and resilience to floods. The Aquatic Resource Management Program in the Department of State Lands is directed to conserve these resources so the functions and values are not lost.

Because the contribution of different wetlands and waterways varies, it is important to have tools to identify these qualities at different sites. Assessment methods have been developed to identify and rate the capacity and the ability of a wetland or waterway to provide important ecological functions. The methods also rate the socio-economic importance of these functions depending on their location.

Examples of Aquatic Functions and Values

Water Storage and Supply

Many wetlands capture and temporarily store stormwater flows, which otherwise may reduce flood depths and streambank erosion in downstream or downslope areas. Preserving these wetlands reduces flood damage and the need for expensive flood-control devices such as levees. These wetlands may also slowly release stored water to stream systems, augmenting flows when the water is needed the most. Seasonal wetlands—the most common in Oregon and the most easily overlooked because they are dry in the summer—have great capacity to absorb

storm water as they “recharge” in the winter and spring.

Waterways provide temporary in-channel and floodplain water storage; sub-surface storage in porous substrate, and inter-flow with adjacent groundwater. Flows can vary daily with tides, in response to storms, seasonally and between years. These processes in turn provide habitat and migration pathways for fish and invertebrates, outlet for surface drainage and/or recharge of aquifers; exchange of nutrients and other chemicals; and habitat variability.

Food-web Support

Wetlands and riparian areas (areas bordering rivers and streams) are the foundation of many food chains. Ample water and nutrients allow these areas to produce diverse flora and fauna. Algae and other micro-organisms provide food for insects that feed amphibians, fish, birds and other wildlife.

Wildlife and Plant Habitat

Wetlands and waterways provide essential water, food, cover and breeding areas for many wildlife species. For example, nearly two-thirds of the commercially important fish and shellfish species are dependent on estuarine wetland habitats for food, spawning and nursery areas. Similarly, millions of waterfowl, shorebirds and other birds depend on wetlands. In semi-arid eastern region, riparian areas and springs are crucial to the survival of many birds, amphibians and mammals.

Water Quality Improvement

Wetlands and waterways help store, transfer and transform nutrients and chemicals, and help moderate water temperature. Wetlands are highly effective at removing nitrogen and phosphorus, sediment and other pollutants from the water that flows over or percolates through them. For this reason, artificial wetlands are often constructed for cleaning stormwater runoff. Natural wetlands and riparian areas bordering streams and rivers intercept runoff from roads, urban areas and farm fields, and provide this valuable service without the typical costs of engineering and infrastructure.

Aesthetics, Recreation and Education

Many wetlands and waterways provide opportunities for boating and paddling, fishing, hunting, photography and wildlife observation. They are also visually pleasing, interesting elements in the landscape, often increasing property values for nearby homes. Wetlands and waterways are also wonderful outdoor classrooms.

How Are Aquatic Functions and Values Assessed?

Because wetlands and waterways vary greatly by type and location, not all perform the same functions and not all are equally valued by society. Rapid assessment methods are based on observations and measurements of various characteristics that are known to correspond with certain functions. Some characteristics may indicate good migratory bird habitat. Another set of characteristics may indicate that a wetland is good at removing pollutants from water.

Rapid assessment methods compare the characteristics evaluated to a larger dataset or best available information to evaluate the extent to which a specific wetland or waterway may perform key functions, and the relative importance of those functions, in that location, to society (value).

DSL has developed rapid function assessment methods for wetlands and streams.

Assessment methods include the Oregon Rapid Wetland Assessment Protocol (ORWAP) that can be used for most wetland types and the Stream Functional Assessment Method (SFAM) that can be used on wadable non-tidal streams.

Functions—the ecological processes that occur in wetlands and waterways, such as nitrogen cycling

Values or Services—the benefits people receive from functions, such as water quality improvement, often dependent on location

Condition—the degree to which a wetland or waterway is altered or stressed, generally by human impacts; sometimes referred to as the “health” of a system relative to its potential

Reference site – a nearby wetland or waterway in the same landscape setting which is in the least-disturbed condition; used to identify biological communities and functions possible at a mitigation site