Urbani Fisheries, LLC

• Pond Design/Construction • Fisheries Enhancement • River/Stream Restoration

Pond and Wetland Restoration

Creating and Restoring
Aquatic Ecosystems

198 North Star Lane
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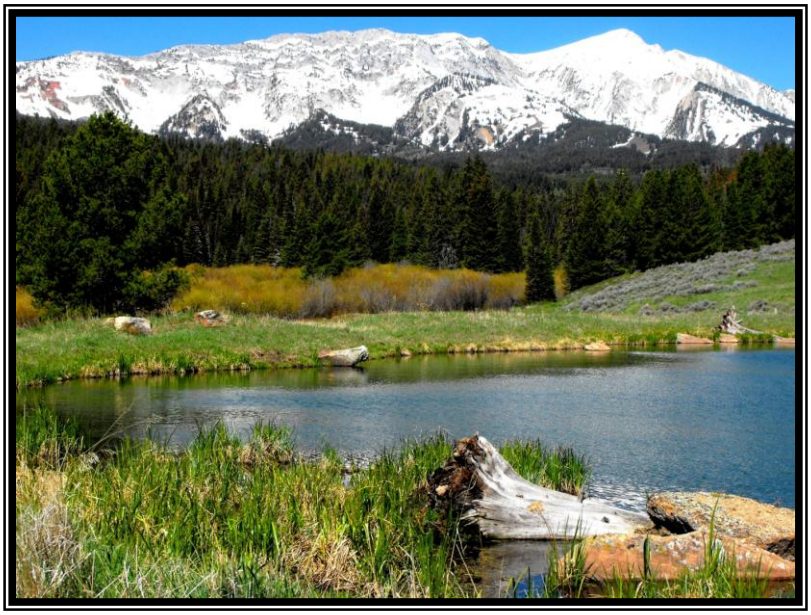
Methodologies

Lake, pond, and wetland systems are designed and constructed to function biologically and look like a natural aquatic habitat, blending seamlessly with the surrounding environment. The newly created environment will provide habitat for aquatic, wetland, and terrestrial wildlife, contributing to the overall productivity of the larger ecosystem. While focusing on overall wildlife habitat, our approach includes close association with deep water habitat in order to ensure the wetlands are robust and functioning optimally.



We construct our aquatic habitats to have a specific percentage of the total surface area of the pond to have a maximum depth of 12-16 feet which will provide sufficient holding water for year-round fish survival. This provides a safe haven of cool water below when surface water temperatures rise in the summer months. During the winter months the deep water will provide constant water temperatures when dissolved oxygen levels in shallower water begin to drop due to decay of aquatic vegetation.

The pond border will be designed to transition from the surrounding upland into shallow wetland habitat areas, where waterfowl and fishery food base organisms will thrive in native wetland grasses and forbs. The extensive shallow wetland perimeter will surround the pond, occupying at least 25% of the pond's water surface area. To effectively function as wildlife habitat the wetland is comprised of aquatic plants that survive well in submerged habitats as well as those that flourish along the upland fringe.

Specific species of native plants (e.g., Carex and Scirpus spp.) are chosen based on their efficiency in absorbing basic nutrients suspended in the water as well as their functional qualities as forage material and ability to provide quality habitat. Submerged wetland species provide cover and feeding areas for juvenile fish and aquatic insects. Smaller emergent plant species with edible seed heads are chosen to allow small mammals and waterfowl access to food and nesting areas. Taller species are chosen to provide food and cover for upland birds and other local wildlife.

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Waterfowl will also utilize these wetland areas to rest, loaf, preen themselves, pair bond, breed, and feed on protein-rich invertebrates. The wetland vegetation also absorbs basic nutrients in the pond water, helping to maintain good water chemistry, clarity, and help cool the surface waters. The wetlands in the 1 to 1.5 foot depth zones will transition into open water in 4 to 6 foot depth zones.

At least 30% of the aquatic system will be comprised of diverse habitat structures (boulders, root masses, etc.) at a depth of 4-6 feet to provide cover and foraging areas for fish & aquatic organisms. By adding specific sized gravels and larger rocks, as well as anchored complex features such as limbs and other woody debris, the diverse pond topography is such that it creates ideal habitat for fingerlings, aquatic insects, amphibians, crustaceans and organisms within the food web. Maximum depths in the open water habitat will be at least 12-16 feet deep over a specific percentage of the bottom to provide adequate holding water volume for fish through seasonal temperature extremes. These combined features offer a habitat that is biologically diverse, balanced, and naturally beautiful.

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Floating Wetlands

Wetlands are complex ecosystems that are among the most productive and biologically diverse of all ecosystems, serving as home to a wide range of plant, animal, and microbial life. The interaction between these organisms is how nature balances toxins and excess nutrients. Under the right circumstances, wetland benches and floating extensions of wetlands can take hundreds of years to be created. By installing pre-made floating wetlands, we can enhance the available habitat for organisms, increase diversity, improve bank stability, and increase wetland surface area to ultimately boost productivity to an extremely high level.

Floating wetlands offer a natural and economical solution to improve water quality, maximize habitat, and reduce bank erosion. They add great beauty and diversity to a waterscape, attracting more wildlife and providing a greater range of niches within the system. This increases the population and diversity of productive organisms which in turn interact to remove excessive levels of nutrients or pollutants that unwanted growth feeds on. This wetland effect restores and balances water ecosystems, effectively eliminating the need for the addition of chemicals and other cleansing products.

Floating wetlands provide a "green" solution to water system maintenance and eliminates the need for chemicals that damage the natural order of the aquatic ecosystem. Floating wetlands work by allowing the plant roots to grow into the water below, providing a biological haven for the creation of bio-films. Bio-films are the base of the food chain and as they develop, they utilize nutrients to provide the key food source that is essential for the growth of higher order organisms. The bio-film and root complex on the underside of the wetlands acts as a biological filter that maximizes surface area.

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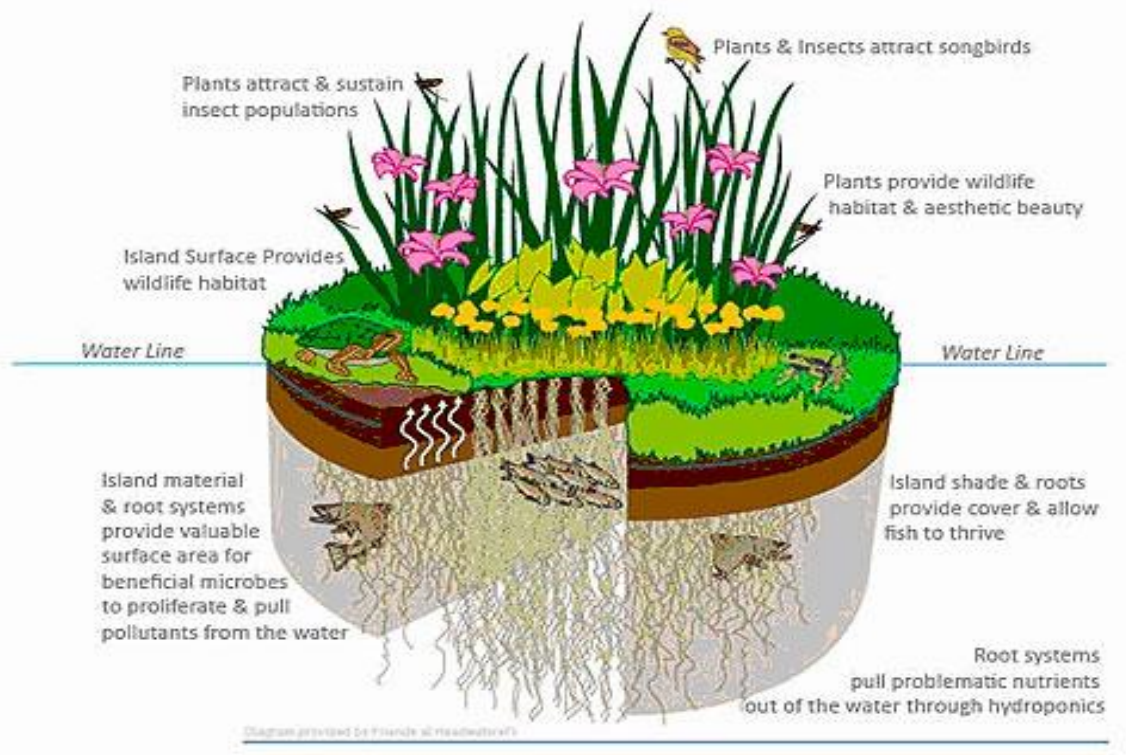
The unique design of the floating wetlands means that 250 square feet of floating wetlands is equivalent to one acre of wetland surface. This translates to 300 square feet of traditional wetland benches per cubic foot of floating wetlands. Instead of roots penetrating a large mound of dirt to feed on, the roots innervate the water and feed on available soluble nutrients. So by increasing the root surface area that is in contact with the water, more biological processes are happening at a given time, thus greatly increasing productivity.

The productivity level of floating wetlands is much greater than that of traditional islands. Although, they have the appearance of islands, they do not come with the setbacks of these normal islands. Unlike islands, floating wetlands are unaffected by fluctuations in water levels and will rise and fall with the water, making them more adaptable to changing water conditions. Further, islands in a water system create large amounts of shallow water which allows the sun to heat up the water quicker and gives grounds for unwanted aquatic weed and algae growth.



These wetlands can be designed to live above the waters where algae and aquatic vegetation normally thrive. This limits the growth of weeds and algae in 4-6 foot depths. So floating wetlands can be installed in deepwater where traditional wetlands would be unable to grow. This provides the opportunity for floating wetlands to cover a greater area of water than normally possible. Not only will this create habitat and cover for fish, but will also limit solar penetration, cooling the water temperatures, hindering aquatic weed growth, and creating ideal water conditions for fish and invertebrate growth.

There are many benefits that come from enhancing the food web with bio-film and wetland growth. Not only can chemical usage be eliminated, but the populations and diversity of aquatic organisms will strengthen. This represents an increase in the overall biological productivity of the ecosystem. Results observed are a higher carrying capacity of fish, larger adult sizes, and overall increased nutrient cycling. With an aesthetic appeal, the addition of floating wetlands represents biomimicry at its best, cleaning polluted waters and naturally restoring the balance to a more optimal level.

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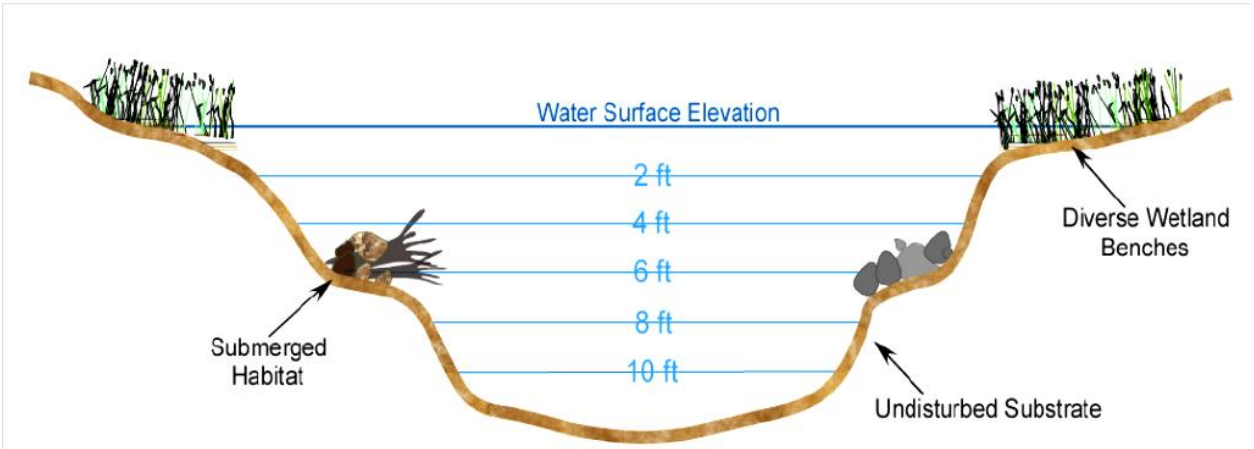
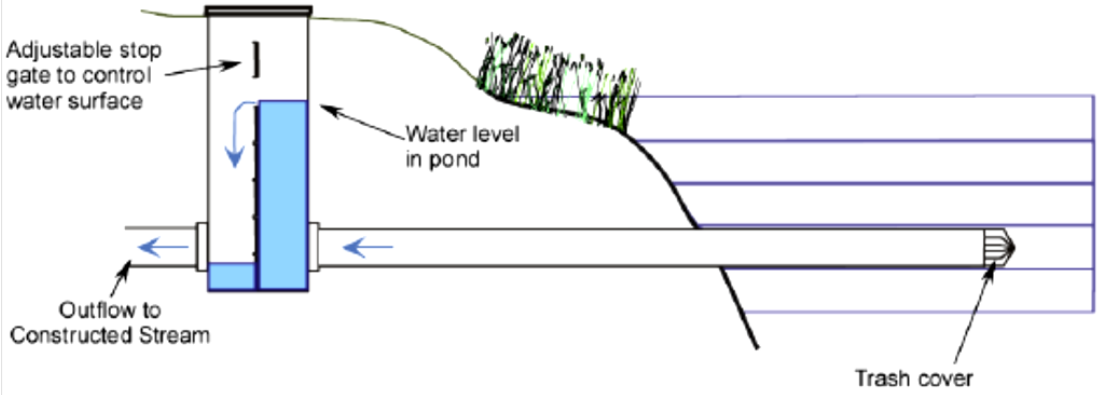
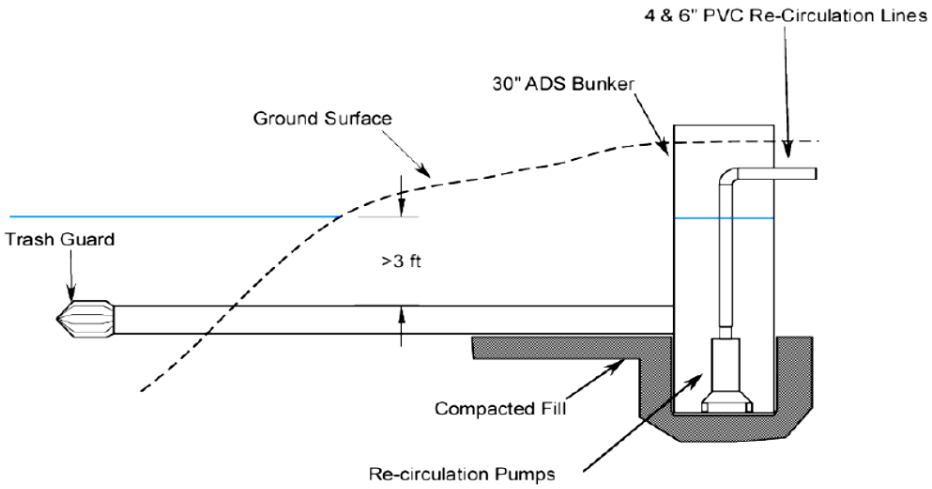


Groundwater Pond Cross-section





Water Level Control Structure

Re-circulation Pump Bunker

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