

Chapter 3

AQUATIC HABITATS

Aquatic habitats in Fort Collins consist of lakes, reservoirs, ponds, marshes, streams and ditches. In the arid west, water is precious. More than 70% of indigenous riparian resources have been eliminated for agricultural use, urban development, flood control and reservoir construction. Nearly all wildlife species are dependent upon water to some degree. Diversity of flora and fauna is generally higher in aquatic habitats and adjacent areas than in upland habitats.

Lakes and Reservoirs

Definition

Lakes are characterized by their size and depth. Lakes are bodies of water that exceed 20 acres; or if less than 20 acres, an active wave-formed or bedrock shoreline feature makes up all or part of the boundary; or the water depth in the deepest part of the lake exceeds six and a half feet. The lakes and reservoirs in Fort Collins range from nine acres to 450 acres.

Ecology

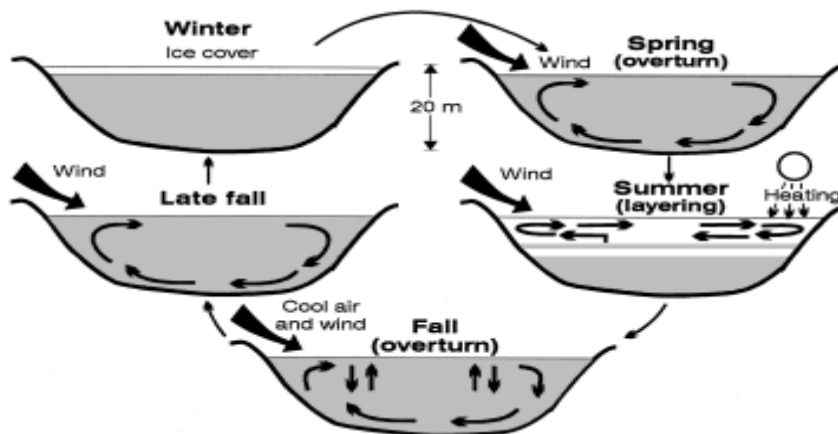
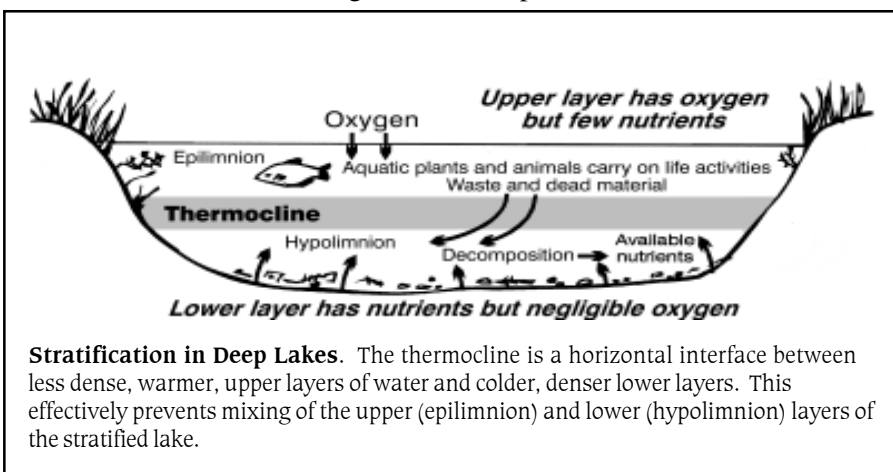
Naturally occurring lakes may have been formed by glacial movement (prairie potholes), oxbow effects, or by the activities of beavers. Most lakes and reservoirs in our area have been created by people for a variety of reasons: dams for water storage, hydroelectric power and flood control, irrigation of farm and ranch land, recreation, etc. Large seasonal fluctuations of the water level of lakes and reservoirs is

common due to these uses.

Water in lakes and reservoirs is layered. The upper layer is penetrated by sunlight and is therefore warmer and contains billions of microscopic plants and animals. This layer forms the basis of the food chain that supports all other life in the lake or reservoir. Beneath this layer is a colder layer where sunlight never penetrates and consequently little life is supported here. The colder layer is denser and heavier than warm water and little mixing of

the two layers occurs. As the aquatic plants die they filter down through the cold layer to land on the floor of the lake. Here life abounds again as bacteria, worms, and midges consume the debris.

Twice a year a phenomenon called "overturn" occurs which causes the barriers between the layers to break down so that the water and nutrients mix. In the fall, as temperatures decrease, the upper layer reaches the same temperature as the lower and the



Temperature Cycles in Deep Lakes. This schematic demonstrates how the seasonal change in water temperature results in a layering or mixing of water in deep lakes.

layering breaks down. As winds whip across the lake they stir up the water and mix the layers even down to the bottom. The same thing happens in reverse in the spring. The icy upper layer thaws and reaches the same temperature as the now warmer lower layer, and mixing again occurs. Overturn brings plant nutrients from the bottom to the top and fresh oxygen from the surface to the bottom.

Naturalized Ponds

Definition

Ponds are bodies of water less than 20 acres and no deeper than six and a half feet. Naturalized ponds have native vegetation in them and surrounding them, in the form of emergents, marsh or woody plants.

Ecology

Water entering ponds from streams and ditches carries silt and organic matter that is deposited on the bottom. Ponds with no through-current also have a layer of organic matter on the bottom. As aquatic vegetation and animals die their remains sink to the bottom and add nourishment to the system, which encourages more organisms to grow. As the bottom builds up with organic matter, vegetation can take root farther into the center. A pond could slowly become a marsh, then a wet meadow, then a grassland or shrubland. The natural cycle of-

ten includes years of low water levels followed by becoming inundated with water again in other years.

Oxygen in ponds can become depleted especially during winter when snow and ice prevent sunlight from penetrating into the water (this happens only occasionally in Fort Collins). Lack of sunlight prevents photosynthesis from occurring, resulting in a decrease in oxygen production. Sometimes fish populations experience a die-off during the winter months due to lack of oxygen. As the ice melts in the spring their carcasses become visible at the surface of the pond.

Ponds are not usually deep enough to experience water temperature layering, but they do experience daily temperature and oxygen level fluctuations. This can result in daily water mixing.

Ponds support rooted plants all the way across. The plants in the middle of the pond may not be visible because they are submerged. In varying water depths across the pond, varying types of plants adapted to that particular water depth and substrate are found. This gives the pond a "bull's eye" effect. In the shallows closer to shore tall slender emergents -are dominant. In the

mud surrounding the pond, willows and other bushes that tolerate wet roots form a transition zone from water to dry land.

Urban Ponds

Definition

Same as naturalized ponds but *hydrophilic* ("water-loving") and perimeter vegetation is generally lacking.

Ecology

Urban ponds are typically ornamental with a perimeter of mowed lawn. Lack of cover prevents most waterfowl from using urban ponds. Canada geese and mallards can be seen at most urban ponds.

Marshes and Wet Meadows

A dawn wind stirs on the great marsh. A single silence hangs from horizon to horizon.

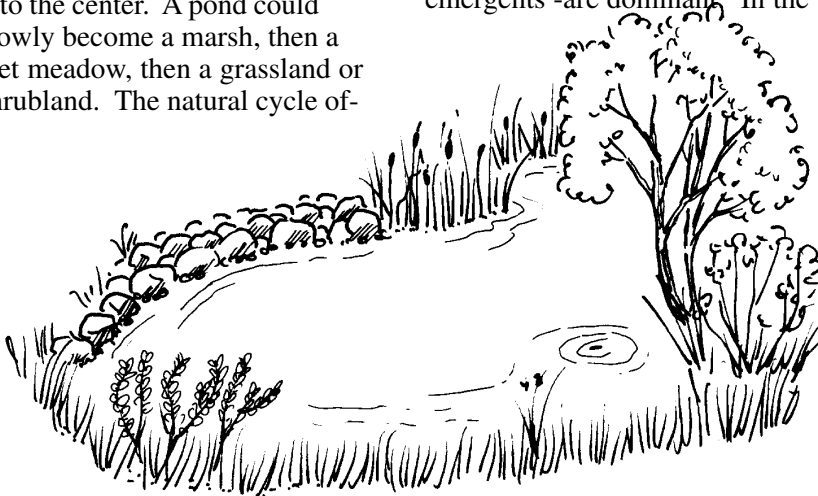
- Aldo Leopold

Definition

Marshes have at least 30% coverage of cattail or bulrush. A marsh can arise in any basin that holds water. The marsh may be soggy soil, open pools, or completely hidden by plants. Wet meadows have at least 30% coverage of sedges or rushes. Other plants are primarily grasses.

Ecology

Most marshes and wet meadows are associated with the edges of ponds, lakes, and rivers. At these shallower edges bulrushes, sedges and other emergent plants grow half in and half out of the water. Their mesh of roots and underground stems binds the soft oozy substrate together. Above the water they bend gracefully with the wind and waves, providing quiet shelters and eddies. In the





deeper, open water of the marsh, rooted submergents are established.

Permeating the water are millions of tiny suspended algae. Algae form the basis of the food chain in a marsh. Late in the summer when fertility in the marsh is high, the algae sometimes “bloom” creating the typical marshy smell as they decompose. The algae are sometimes artificially fertilized from organic and inorganic matter in the water entering the marsh. Over enrichment causes algae to proliferate, and as it dies and decays it depletes the oxygen supply. This chokes out many other plants and animals in the aquatic habitat.

After several years of low rainfall a marsh may become so shallow that the pools dry up completely. As the exposed bottom mud cracks in the sun, the stranded plants and animals die and decay. This nourishes thousands of seeds buried over the years. Clumps of sedges and grasses arise to form little islands as they become the dominate plants in a wet meadow. A green cover quickly covers the mud as upland and lowland plants compete for water, sun, space, and nutrients. If waters do not return the area may become a grassland or shrubland. If the waters do return, the basin is reflooded and the water-loving plants make their comeback. In some basins this cycle of wet and dry has continued for thousands of years.

Naturalized Ditches

Definition

Naturalized ditches are storm drainage, irrigation and other ditches that have associated riparian forest, shrubland or marsh vegetation.

Ecology

The ecology of naturalized ditches is similar to the intermittent streams. The trees and understory provide excellent wildlife habitat, serve as natural buffers and carry stormwater. Most of our ditches are used for irrigation purposes and remain dry for much of the year. During spring and summer water is released and flows through the city. The water is used for irrigation by Colorado State University, the City of Fort Collins, farmers in the Poudre basin, and other private citizens. As the need for water diminishes in the fall the gates are closed.

Streams

Local Natural Areas

Boxelder Creek, Dry Creek, Fossil Creek, Spring Creek *

** These streams were historically intermittent but may now have water most of the year. Some streams may not have flowing water only in certain sections.*



Definition

Some creeks contain flowing water for only part of the year. When water is not flowing it may remain in isolated pools.

Ecology

Intermittent streams may have a rich association of wetland vegetation, but riparian vegetation is usually sparse unless flows have been stabilized or the stream flows through developed areas.

Rivers and Riparian Areas

A river is more than an amenity. It is a treasure.

- Oliver Wendell Holmes

Definition

The lower Cache la Poudre River is characterized by a low gradient, with slow-moving water that flows throughout the year. It has a well-developed floodplain capable of supporting a wide zone of riparian vegetation.

Ecology

The common denominator of all perennial rivers is change. Water levels rise and fall, sandbars and mudflats are created and covered, and the vegetation reacts accordingly. A free-flowing river is constantly rearranging itself: It tears

vegetation from the outside of bends and deposits it on the inside; banks erode and widen; the river may jump its banks altogether when swollen with storm-water and create a stillwater pond in the shape of a “C” or oxbow.

Rivers have two beds: A narrow one that is used during normal water levels, and a wide one that is used when storms or snowmelt cause them to overflow their banks. People often build homes or plant crops in this wider bed, thus exposing their lives and livelihoods to “floods” that are actually a part of a river’s annual cycle. Natural cycles of western rivers have higher peaks and deeper valleys than eastern rivers. The flooding nature of rivers helps to shape the landscape by depositing the heaviest sediments on levees along the banks and the finer sediments on the forest floor farther back from the river. There are many benefits to this seasonal influx of nutrients in upland areas.

The vegetation that grows closest

to the river must be adapted to having wet root systems during parts of the year. Cottonwoods and willows have become so used to flooding that their seeds germinate only when covered by water or wet soils. When damaged by the force of a flood they resprout readily from their roots, trunks, and twigs.

Riparian Shrublands and Forests

Definitions

Shrubs are plants that are less than 20 feet tall, usually with several main stems arising from the ground level. Riverine shrublands occur adjacent to streams, ditches, and rivers and at least 30% is covered with low woody plants.

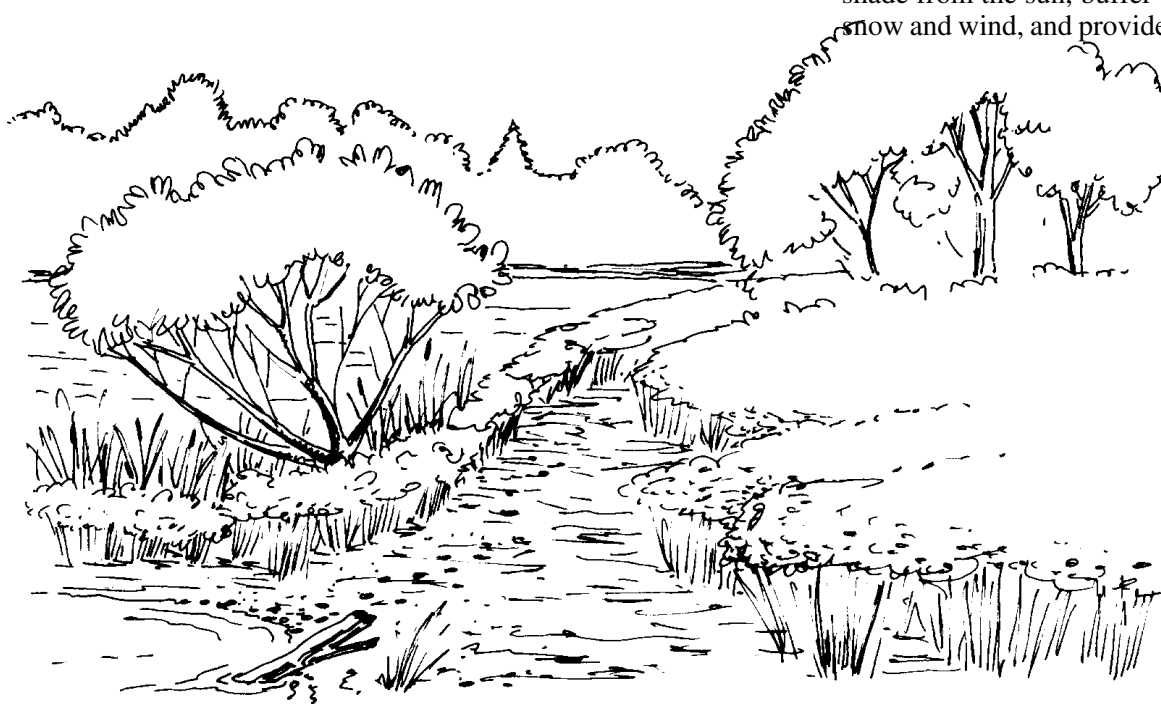
Riverine forests are located adjacent to streams, ditches, and rivers and comprise at least 30% of the vegetation. Trees are more than 20 feet tall and are depen-

dent on abundant moisture regimes.

Ecology

The relationship between a river and the adjacent land is an intimate one. The river provides moisture to parched landscapes, which spurs the growth of trees and shrubs along the banks. These in turn provide cooling shelter to the river, allowing life forms to survive that could not otherwise withstand the high water temperatures. The riverine shrublands and forests are a natural air-conditioning system. In addition to moderating temperature, forests and shrubs enrich the river’s fertility each autumn with leaves and twigs that fall into the water. These become saturated with water, sink to the bottom, decay and replenish the nutrients in the river.

Before European settlement in Colorado, riparian ecosystems were the only areas with deciduous trees. Large cottonwoods and flowering shrubs are oases in the surrounding sea of grasses or pines. The willows and cottonwoods, alder and birches provide shade from the sun, buffer the snow and wind, and provide food



not found in the adjacent habitats. The various vertical layers of tall trees and low shrubs offer wildlife an abundance of nesting, feeding, denning, foraging, and resting sites. Many species exist in this layered forest because they can use different zones of the vegetation strata without competing with each other.

Riverine shrublands and forests contain many edges where two habitats come together. In these *ecotones*, species from each habitat mingle resulting in a rich mosaic of wildlife.

The climate inside a riverine shrubland or forest may be different from the surrounding shrublands, grasslands or forests. Because of the influence of water it may be more moist, have more stable temperatures, and have a higher rate of transpiration. Wildlife is drawn to this microclimate seeking shelter, the lush vegetation, and drinking water. The insect life is more abundant in the riparian forest than in dryer areas, due to breeding sites in low wet areas. Leaf-eating insects have acres of broad surface available for consumption.

Aquatic Habitats and People

Reservoir, lake, and pond shorelines are among the most valued lot locations in the community for development. Buffer zones along undeveloped shorelines around reservoirs and lakes is more aesthetically pleasing and serves to protect adjacent homeowner property values.

Marshes and wet meadows, and to a lesser degree, ponds, have too often been considered wasteland, valueless expanses of murky water and sticky mud. However, there are few ecosystems as pro-

ductive as these. They continually produce many more tons of biomass than the most efficient farm.

Flowing water, in the form of streams, creeks, and rivers are an important part of our lives. There is a certain music to the movement of water that we, and wildlife, are attracted to.

Impacts and Issues Associated With Aquatic Habitats

Impacts on lakes and reservoirs occur on the lakes and from activities in adjacent areas. Bank erosion and stabilization practices, drawdowns from reservoirs for irrigation and drinking water, camping and boating, and fish introductions and stocking impact the nature of the lake and reservoir.

To many people a marsh is not nearly as attractive as a forest or a lake. Few people are aroused when a marsh is used as a landfill or filled in for other uses, but many people object to cutting down trees. As a result, many important wetlands have been lost. They have been drained for agricultural use and suburban de-

velopment.

Rivers undergo many natural changes, but they also are subject to many human caused changes: Trees and other vegetation are often removed along rivers with the purpose of increasing water flow; rivers are straightened and channeled; they are used as dumping areas; livestock is allowed to graze near them; and roadways are built next to them. Floods are viewed as insurance liabilities instead of natural processes. The taming of the river means that floodplain plants no longer receive their annual allotment of nutrient rich sediment from upstream, fish cannot forage among the flooded trees, and herons, cormorants, kingfishers, and people can no longer feast on fish in the shallow temporary pools.



