

SWEETWATER WETLANDS

WATER, WILDLIFE, AND PEOPLE



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WELCOME TO SWEETWATER WETLANDS

Sweetwater Wetlands is a *constructed wetland*, built to serve as a water treatment facility, urban wildlife habitat, and an outdoor classroom. Today, Sweetwater Wetlands continues to be an important facet of the City of Tucson's reclaimed water system, as it receives treated water from the Agua Nueva Water Reclamation Facility. The water is naturally filtered as it moves through Sweetwater Wetlands. It is then recharged in basins and reclaimed for use at city golf courses, parks, and schools. Many know Sweetwater Wetlands as a tranquil park where visitors can view wildlife in a lush, riparian habitat. The wetlands are also a natural laboratory where visitors can observe and study wildlife, water resources, and riparian natural history. This guidebook will help you understand and appreciate all the wonders of Sweetwater Wetlands.

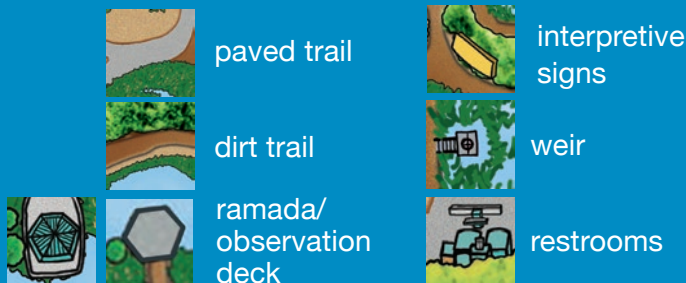
SWEETWATER WETLANDS TRAIL MAP

ACCESS AND TRAILS

HOURS — The gates to Sweetwater Wetlands are open from one hour before sunrise to one hour after sunset, seven days a week. On Mondays, gates do not open until 8:30 A.M. to allow for early morning mosquito control treatment.

TRAILS — There are over 2.5 miles of trails in Sweetwater Wetlands. This includes a 1,000 foot concrete path that is ADA-approved for wheelchair access. The rest of the paths are covered with gravel or decomposed granite and provide a secure walking surface. All paths are generally flat.

COURTESY — Dogs and bikes are not allowed on Sweetwater Wetlands trails to avoid disturbance of park inhabitants and visitors. Bike racks are provided at the entrances.





RECHARGE BASINS

TUCSON'S URBAN WATER CYCLE AND SWEETWATER WETLANDS

Most people are familiar with nature's water cycle (also called the hydrologic cycle) in which water continually circulates in its various forms in a predictable pattern. Typically, that pattern involves evaporation, condensation, precipitation, and other water processes in a continuous cycle. In urban settings however, our reliance on water means that we must engineer ways to move, use, and in the case of wastewater, remove water from our cities. Thus, the urban water cycle includes human actions and uses of water in the water cycle.

In a typical urban water cycle, water is sourced from surface or underground supplies, treated for human use, and sent to users via a system of delivery pipes. Next, it is used by people, conveyed to a wastewater treatment facility, and treated to remove the wastes and improve quality following human use. Ultimately, the treated water is delivered back to the environment (through discharge to surface or groundwater systems).

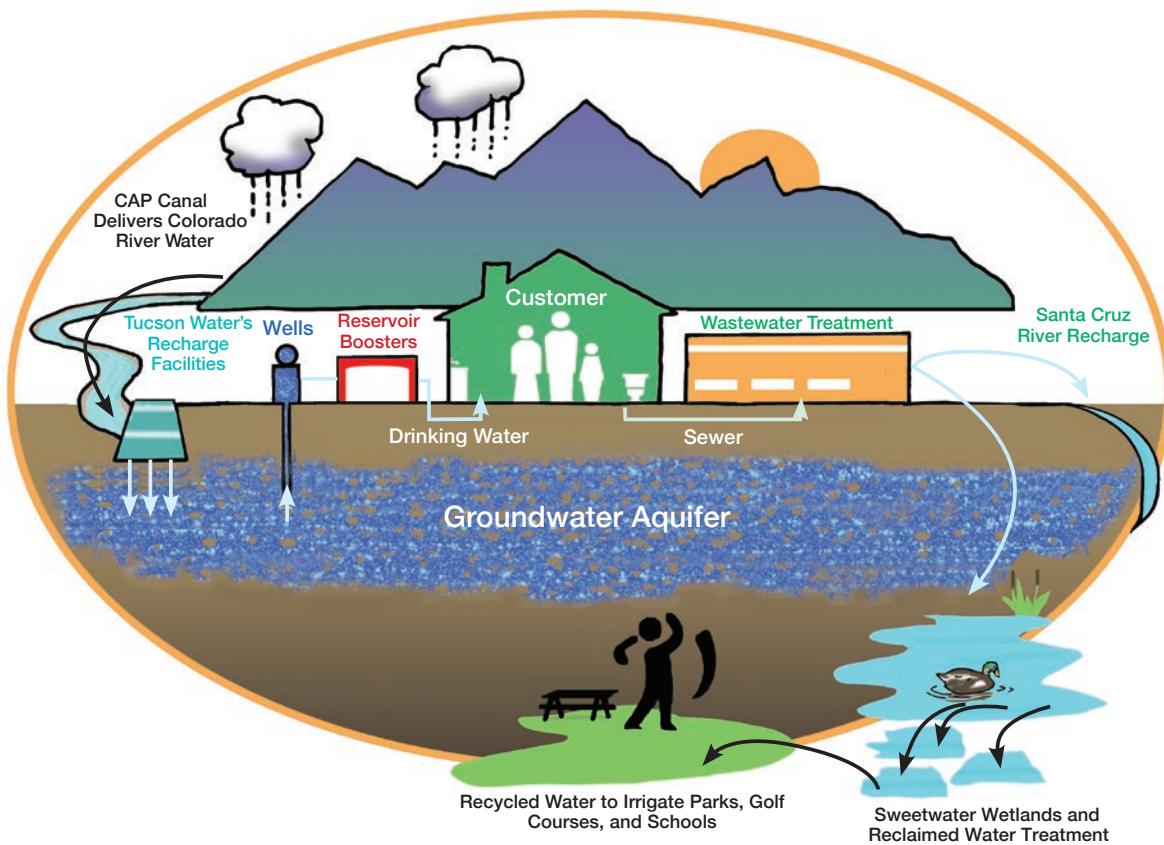
Here in Tucson, our urban water cycle is somewhat different from other cities, and Sweetwater Wetlands plays a role in that cycle. After our wastewater has been treated at Agua Nueva Water Reclamation Facility, it is discharged in three ways. Some of the water is released into the Santa Cruz River where it supports a riparian habitat and eventually infiltrates into the aquifer. Some of the water becomes part of our reclaimed water system and a separate system of pipes delivers this "recycled water" directly to parks, schools, and golf courses for landscape use. Additionally, a small portion of Agua Nueva's treated water is piped to Sweetwater Wetlands where it supports the wetlands system. After moving through the wetlands, the water is delivered to the nearby recharge basins where it slowly infiltrates to join the aquifer. The water is then pumped up and delivered as reclaimed water to city parks, schools, and golf courses. It is important to note that although mostly used by plants, some of that water again seeps into the soil and eventually reaches our aquifers. And the cycle continues.

RECYCLED WATER

The reclaimed water system through which we recycle water is an important part of our urban water cycle. Additionally, our reclaimed water is cycled on a time scale for immediate human use. Using recycled water for irrigation and other activities saves groundwater and Colorado River water (our other primary water sources) for uses such as drinking and bathing.

Water is a valuable resource, especially in our desert town. As Tucson's population grows, demand for water increases. While we have seen declines in our groundwater table and drought effects on the Colorado River system, we are constantly producing "wastewater." Recycling water is a sensible and sustainable solution to help meet our water demands.

TUCSON'S URBAN WATER CYCLE

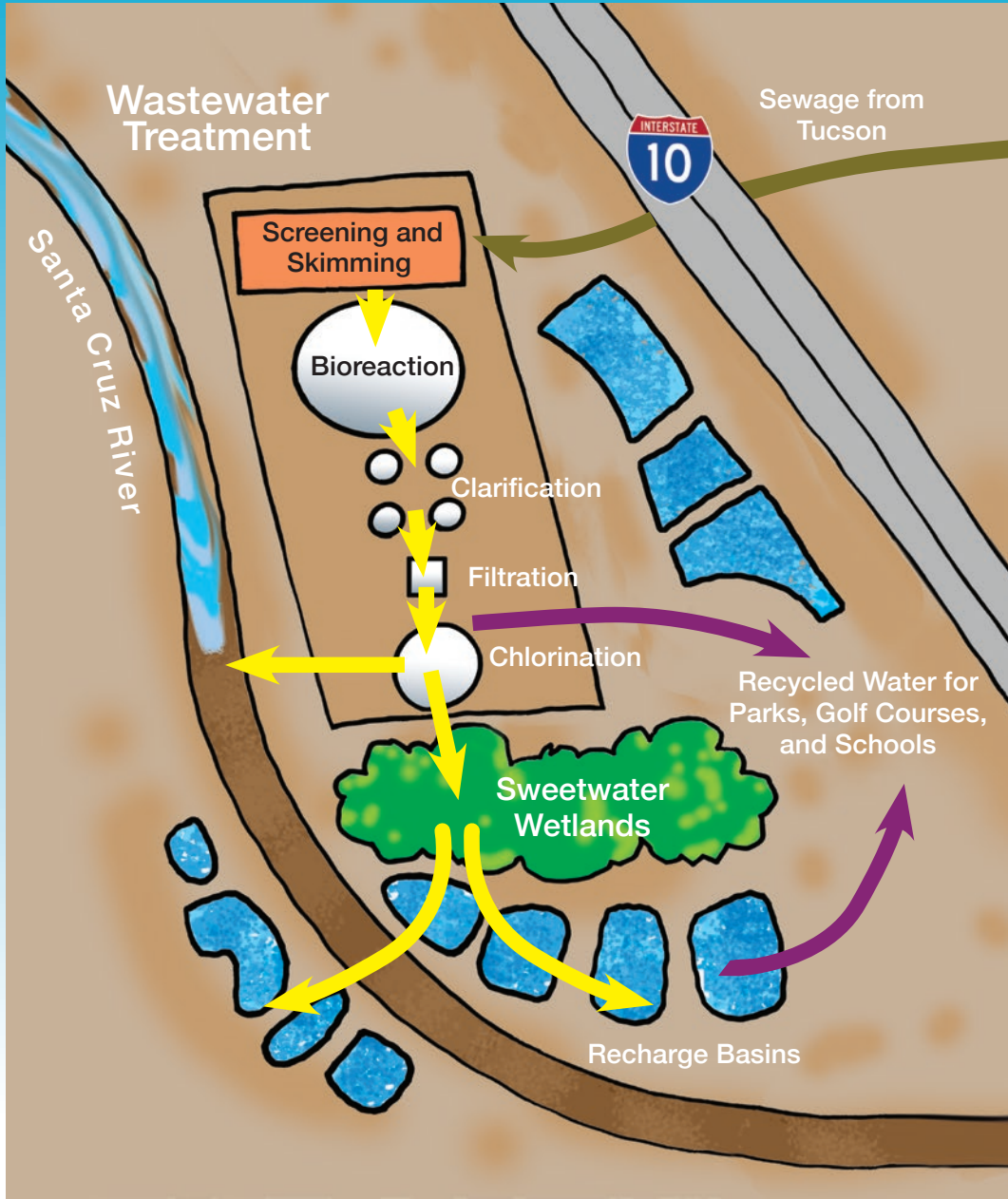


HOW SWEETWATER WORKS: AN AMAZING DESIGN FOR RECYCLING WATER

Sweetwater Wetlands was originally constructed to naturally treat backwash water from the filters at the now decommissioned Roger Road Water Reclamation Facility. Because that facility used older technology, Tucson Water was required to filter the water before delivering it to reclaimed water customers. The wetlands were used to treat water from the backwash process that cleaned the filters. Today, the Wetlands receive higher quality treated water from the new Agua Nueva Water Reclamation Facility, and frequent backwashing of the filters is no longer necessary. However, water from Agua Nueva is continually added to maintain the wetlands and the wildlife supported by the wetlands.

Water arriving from the Reclamation Facility is first piped to settling basins at Sweetwater Wetlands. Here, suspended solids drop out of the water and become trapped in the wetland plants and soil of the basin. The water then flows to the two large wetland ponds for further polishing. The water slowly filters through the wetland vegetation to the west end of the ponds. Throughout this process – which might take several weeks – more solids settle out and microbial transformations occur which remove a variety of contaminants including pathogens and heavy metals. The water is then directed to the recharge basins where it filters through soil sediments and replenishes the groundwater in the aquifer below. The flow of the water from the settling basins through the recharge basins is entirely directed by gravity as the water gradually moves downhill. When needed, this now recycled water is pumped up through extraction wells and delivered through a series of special distribution pipes to Tucson parks, schools, and golf courses.

TUCSON WASTEWATER TREATMENT FACILITY



MANAGING SWEETWATER WETLANDS FOR WATER, WILDLIFE, AND PEOPLE

MANAGEMENT PRIORITIES

Sweetwater Wetlands' management priorities are to maintain the characteristics that support wildlife habitat, environmental education, and water reclamation. Sweetwater Wetlands is modeled after wetland systems in nature. In addition to maintaining visitor facilities, this includes maintaining areas of deeper open water, shallow water, shorelines, and uplands. Each of these areas serves a particular purpose and provides specific habitat qualities for the variety of plants and wildlife supported by the wetlands. Thus, the wetlands cannot become overgrown with vegetation, the basins must be kept from filling up with muck, the shorelines must be regularly thinned, and water levels must be maintained.

Managers work both on site and remotely at computer stations to keep the wetlands, recharge basins, and reclaimed system operating smoothly. The amount of water that moves into and out of the wetlands is regulated by opening and closing special gates, called "weirs." Computers monitor and control the amount of water that is extracted from the groundwater and delivered to schools, parks, and golf courses throughout the Tucson Basin.

THE ANNUAL BURN

One of the more noticeable management practices at the wetlands is the annual burn. Each spring (usually in March), wetland managers from Tucson Water, together with the Tucson Fire Department, conduct a controlled burn at Sweetwater Wetlands to remove dead vegetation and facilitate mosquito control. The burn keeps vegetation from getting out of control at the wetlands, reduces mosquito habitat, and allows improved application of mosquito larvicides.

Bulrush and cattail roots are unharmed in the burn and grow back within a few months. The burn is also timed to avoid the nesting season of birds (such as redwing blackbirds) that nest among the wetland vegetation. Waterfowl and other wildlife at the wetlands typically leave during the burn and return when the fires subside that afternoon. Only one-third of the vegetation is burned each year to allow for plenty of healthy habitat for birds and other wildlife.

MOSQUITO CONTROL

It is widely known that mosquitoes breed in wetlands. This is also true at Sweetwater Wetlands, where the slow-moving water amid the bulrush offers habitat for mosquitoes. The most prevalent type of mosquito that breeds at Sweetwater Wetlands is *Culex tarsalis*, which is known to be a vector (or carrier) of Western Equine and St. Louis encephalitis, a disease which inflames the brain. *Culex sp.* are also known to carry West Nile virus. Also, although rarely occurring at Sweetwater Wetlands, the species of mosquito that can potentially carry the Zika virus, *Aedes aegypti*, is also attracted to this kind of habitat. Because of these health risks, mosquito control at Sweetwater Wetlands is taken very seriously.

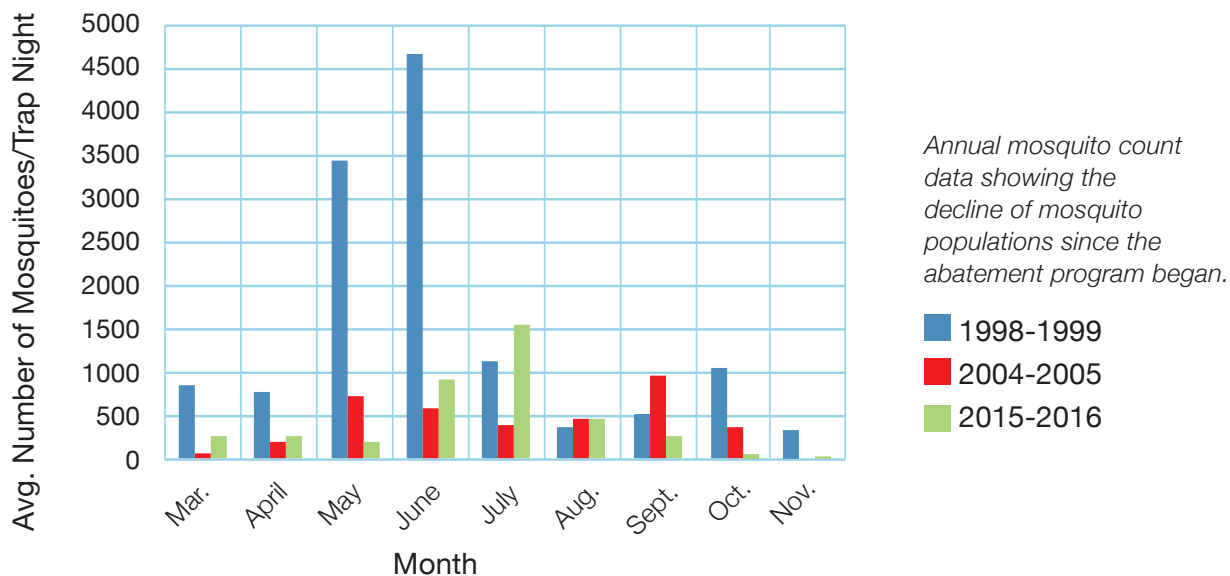
The managers at the wetlands have a very rigorous program for controlling mosquitoes. The Mosquito Abatement Program includes:

- weekly mosquito counts,
- annual vegetation removal (the yearly controlled burn),
- weekly applications of a larvicide during warmer months and when mosquito numbers are highest, and
- chemical fogging with a low-toxicity pesticide.

The bacteria-based larvicide that is used targets mosquito larvae and does not affect other organisms (including the larvae of other aquatic insects such as dragonflies). The pesticide used for fogging is approved by the Environmental Protection Agency for use in aquatic environments.

This aggressive mosquito abatement program has greatly reduced mosquito populations at the wetlands, and the weekly mosquito count data show the numbers of mosquitoes have stabilized at levels observed before the wetlands were constructed. However, managers are constantly working to find new and improved ways for controlling mosquitoes.

ANNUAL MOSQUITO COUNT DATA



WHAT YOU CAN DO TO AVOID MOSQUITOES:

- *Culex tarsalis* mosquitoes are nocturnal. During the day they are hiding out among the bulrush and cattails. Avoid going out at dusk or night near any mosquito breeding habitat.
- If you must go out at night, wear mosquito repellent.
- Wear long pants and long sleeves.
- When visiting Sweetwater Wetlands in the summer, do not enter the ponds or the shoreline vegetation. This is where mosquitoes hide during the day.

HABITATS AT SWEETWATER WETLANDS

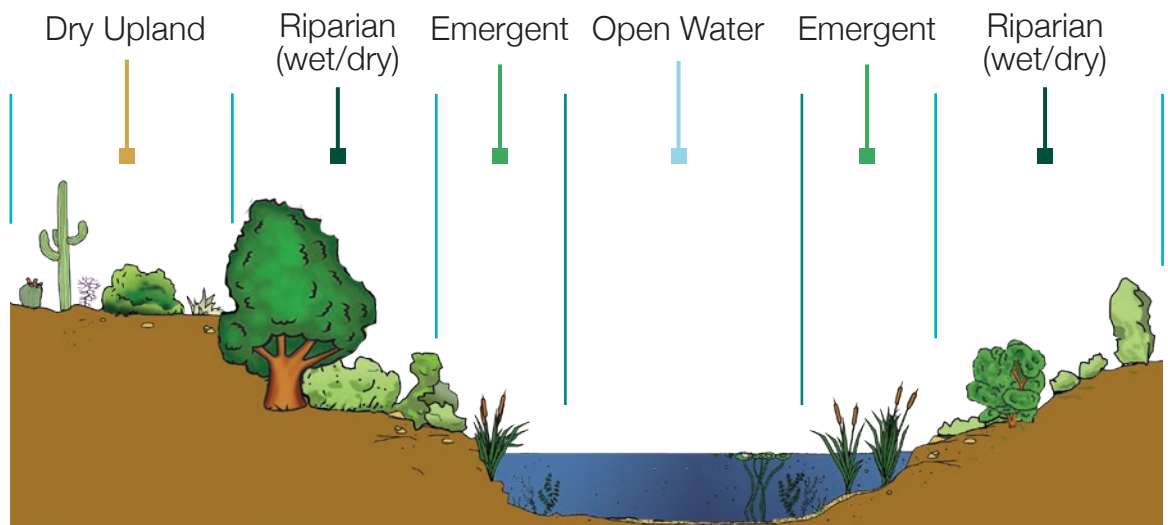
WETLAND HABITAT

The water we reclaim from the state-of-the-art Agua Nueva Water Reclamation Facility is higher in quality than water previously produced at the Roger Road Facility. It meets or exceeds Environmental Protection Agency (EPA) standards for use as reclaimed water and is considered safe for plants and wildlife. This is important because through this water, a habitat is created at Sweetwater Wetlands – a wetland habitat that supports a diversity of plants and animals once common along the Santa Cruz River.

Wetland habitats provide food, water, and shelter to a myriad of plants and animals that are specifically adapted to wetland conditions. Within wetlands are a variety of “microhabitats” including the open water zone, the emergent zone, the zone where the soil alternates between wet and dry, and the dry uplands. There are plants and animals that may be abundant in one of these areas but couldn’t survive in an adjacent zone.

RIPARIAN HABITAT

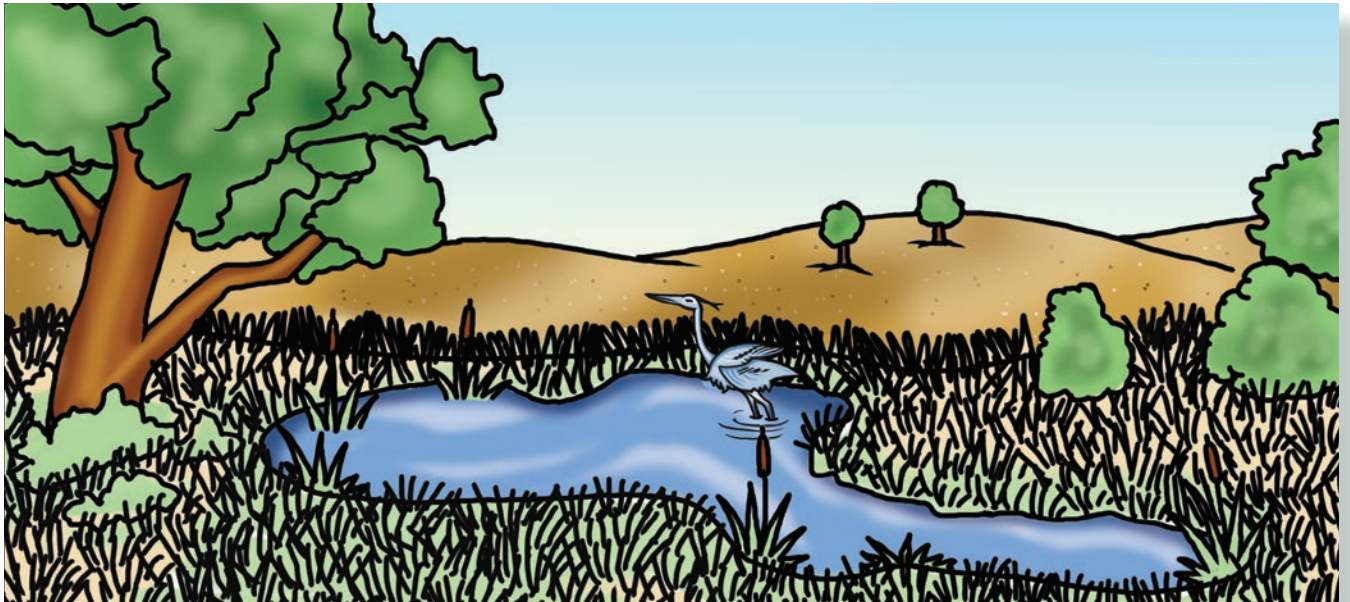
Although sometimes used interchangeably with wetlands, the term riparian refers to the habitat that is adjacent to and influenced by a body of water or wetland. Sweetwater Wetlands support a thriving riparian habitat that includes cattails, bulrushes, and large cottonwood and willow trees. In turn this vegetation attracts and supports a diversity of wildlife that cannot survive without wetland and riparian habitat.



WETLAND CONSERVATION

It is estimated that from 60 to 75% of Arizona's wildlife are dependent on wetland and riparian habitats for survival. However, wetland habitats are extremely rare in Arizona, comprising less than 1% of Arizona's total land area. As rare as they are, wetland and riparian areas are extremely important. In addition to supporting a diversity of plants and wildlife, they contribute to important hydrologic functions such as water storage, recharge, and reduction of floodwater runoff.

Over the past century, most of Arizona's wetland and riparian areas (estimates range from 33 to 90%) have been lost due to human impacts. These impacts include groundwater pumping, diversions, habitat alteration and degradation, and other land use changes. Fortunately, there are laws that protect the remaining wetlands including the Clean Water Act and Endangered Species Act (which protects habitat for threatened and endangered species), and people are becoming aware of the issue.



Places like Sweetwater Wetlands help by providing a wetland habitat and educating people. Sweetwater Wetlands is a refuge for wildlife. Besides the wildlife that live there year-round, it is an important rest stop for many wetland birds (including ducks and shorebirds) during their migration. Additionally, as an outdoor classroom, Sweetwater Wetlands is the perfect place to educate school students and the public about water, wetlands, and wildlife.

WETLANDS PRIMER

What are wetlands? There are a wide variety of wetlands worldwide all of which are influenced by topography, geography, and climate. All wetlands also exhibit specific, defining characteristics and provide unique environmental functions. Although Sweetwater Wetlands is a constructed wetland, it exhibits the characteristics and functions of a natural wetland.

WETLANDS TYPES

There are many different types of wetlands including:

- coastal wetlands (usually salt water – associated with marine estuaries and coastlines)
- inland wetlands (usually fresh water – associated with rivers, lakes, ponds, bogs, seeps, and cienegas)

WETLANDS CHARACTERISTICS

Three main characteristics are used to identify wetlands:

- The occurrence of saturated soils
- The presence of hydrophytic (water-loving) plants
- The occurrence of water

(Note: These conditions do not need to be year-round or constant. There may be periodic flooding or drying-up. Some wetlands change dramatically through the seasons or even through the day.)

WETLANDS FUNCTION

Wetlands serve several very important roles in the environment. These are called “wetland functions.” Wetland functions contribute to the physical, chemical, or biological health of the environment. Wetlands also have an economic value to humans.

Physical functions:

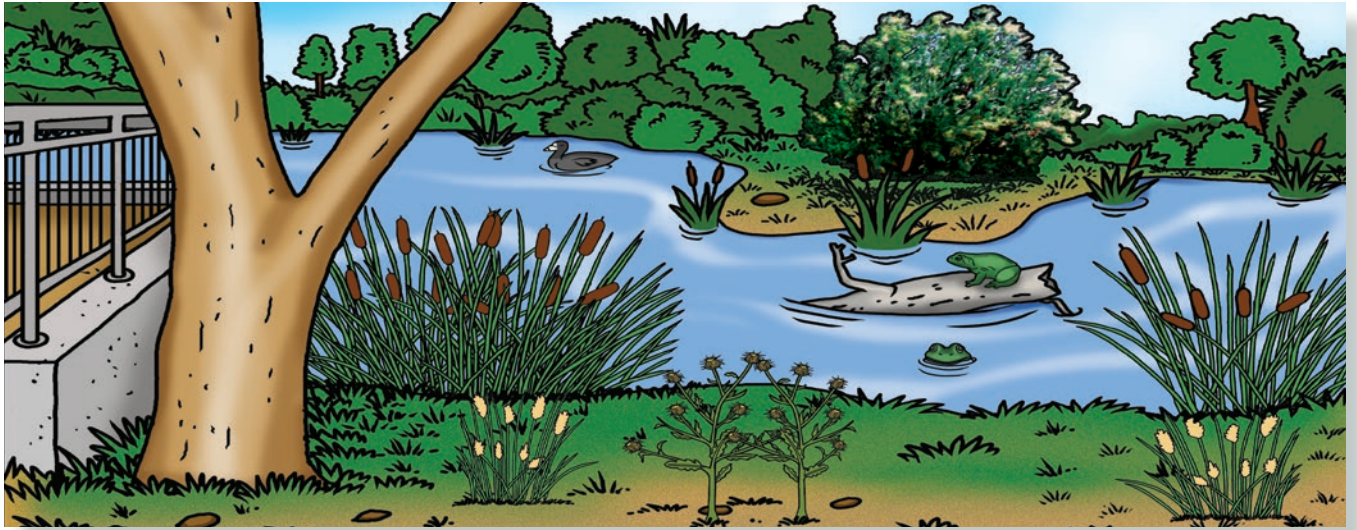
- Wetlands slow and control flooding.
- Wetlands contribute to groundwater recharge.
- Wetlands trap sediments that might otherwise impede water flow.
- Wetlands provide carbon storage.

Chemical functions:

- Wetland plants filter pollutants from water.
- Wetland plants help settle toxic residue.
- Over time, wetlands soils chemically neutralize pollutants.
- Wetland bacteria break down some pollutants making them less harmful.

Biological Functions:

- Wetlands provide resources and nutrients that support a diversity of living organisms.
- Wetlands provide important habitat.
- Wetlands serve as productive nurseries for a diversity of aquatic species.



CONSTRUCTED WETLANDS

Human-made wetlands are called constructed wetlands. Wetlands are primarily constructed to clean up wastewater and create wildlife habitat. Constructed wetlands naturally filter and treat wastewater and are often less expensive than traditional treatment plants. Constructed wetlands are also more appealing than other treatment plants because of the habitat they create and because of their ability to reduce odors. Sweetwater Wetlands is one of several constructed wetlands in Arizona.

FIELD GUIDE

TO COMMON PLANTS AND ANIMALS OF SWEETWATER WETLANDS

PLANTS OF SWEETWATER WETLANDS



Photo: Greg Clark

Fremont Cottonwood – *Populus fremontii*

Range – Riparian areas of Arizona and throughout the southwestern states from Texas to California.

Habitat – Found near water primarily in desert, woodland, and prairie riparian habitats. Often occur with willow trees.

Characteristics – These large, broad trees can grow to 60 feet high. Their seeds are covered with a soft “cotton” and are wind-carried. During the late spring at Sweetwater Wetlands, look for the cottony seeds flying through the air.

Other – Cottonwood trees need lots of water for their survival and reproduction. They have extensive roots for obtaining water. They provide important habitat for birds, insects, lizards, snakes, and small mammals. They lose their leaves in the fall.



Photo: Bruce Prior

Gooding Willow – *Salix gooddingii*

Range – From Texas to California north to Utah and south into Mexico.

Habitat – Found near water in desert, grassland, and woodland riparian habitats. Often occur with cottonwood trees.

Characteristics – These are fast growing trees to around 50 feet high. Like cottonwoods, these willows have a “cottony” seed that becomes airborne in the spring.

Other – They are also deciduous, losing their leaves in the fall. Along with cottonwoods, these trees line the banks of Sweetwater Wetlands.



Photo: Greg Clark

Saltbush – *Atriplex spp.*

Range – Depending on the species, saltbush may range west to California, east to Kansas, north to Washington, and south into Mexico.

Habitat – Desert shrub to juniper shrub habitats. Some species thrive in salt flats and coastal plains.

Characteristics – There are four species of saltbush at Sweetwater Wetlands. All are medium to large bushes. They are called saltbush because they can tolerate “salty” soils and because they exude salt onto their leaves, making them salty.

Other – Saltbush provides great habitat and forage for birds and other wildlife.

American Three-square Bulrush – *Scirpus americanus*

Range – Across most of the U.S. except the extreme north central states. North into Canada and south into Mexico.

Habitat – The edges of ponds, lakes, and wetlands. Grows mostly in the water but can tolerate some dry spells.

Characteristics – Bulrush is an emergent plant. It is rooted in the soil at the water's edge and grows up through water with its leaves and seeds "emerging" above the water. This bulrush is called three square because its stems are triangular in cross section.

Other – Bulrush are an important part of the wetland food chain. Their underwater stems (both when alive and when decomposing) provide important food and habitat for aquatic organisms. Many wetland birds eat the seeds of the bulrush.



Photo: Bruce Prior

Soft Stem Bulrush – *Scirpus validus*

Range – Widespread across the U.S. and into Canada and Mexico.

Habitat – The edges of ponds, lakes, wetlands, and ditches. Grows in shallow water and wet soils.

Characteristics – Soft stem bulrush can reach 8 feet high and tend to droop with the weight of their brownish flowers and seeds.

Other – Their seeds are important food for many wetland birds.



Photo: Bruce Prior

Giant Bulrush – *Scirpus californicus*

Range – Across all the southern U.S. as far north as Kansas.

Habitat – Grows in shallow water along wetlands and marshes and shorelines of waterways.

Characteristics – This is the tallest bulrush at Sweetwater Wetlands, reaching 10 feet in height.

Other – These tall, emergent plants provide important habitat and forage for a variety of wetland wildlife.



Photo: Bruce Prior

Cattail – *Typha spp.*

Range – Throughout the U.S. into Canada and Mexico.

Habitat – Standing water and wet soil of wetlands, marshes, ponds, and ditches.

Characteristics – There are several species of these tall, wetland grasses. They are named for their long, brown seed heads (resembling a cat's tail) which mature through the summer. In winter, they begin to release the individual seeds in cottony clusters that become windborne.

Other – Cattails are important food and shelter for many wetlands animals. Humans also use them as a food source. Like many emergent plants, cattails cannot grow in water more than three feet deep so are found at the water's edge.



Photo: Bruce Prior

Velvet Mesquite – *Prosopis velutina*

Range – Through Arizona, into New Mexico and south into Mexico.

Habitat – Although mainly a desert and grasslands dweller, mesquites also live in moist areas just up from the water edge, forming thick forests called "bosques."

Characteristics – These trees can grow to 30 feet. They have tiny, feather-like leaves. Mesquites also have very long "tap" roots which grow very deep into the soil to reach water.

Other – Mesquites provide food and shelter for a variety of animals. They bloom in the spring, attracting numerous species of insects. By summer, the pollinated blossoms produce the protein-rich, yellowish bean pods which are eaten by many animals. During the winter and times of drought, the mesquite will drop its leaves.



Photos: Bruce Prior



Photo: Bruce Prior

Wolfberry – *Lycium berlandieri*

Range – Southern Arizona east to Texas and south into Mexico.

Habitat – Desert scrub, rocky desert slopes, and desert plains.

Characteristics – A large, thorny shrub reaching over four feet in height. Wolfberry blooms sporadically and produces red berry-like fruits.

Other – Wolfberry produces its leaves in response to rain. It may be leafless during times of drought. Its fruit is eaten by a variety of desert birds and other animals.

BIRDS OF SWEETWATER WETLANDS



Photo: Paul Berquist

Cinnamon Teal – *Anas cyanoptera*

Range – From southwestern Canada, through the western U.S., and into Mexico.

Habitat – Ponds, small lakes and wetlands.

Food – Cinnamon teal eat a variety of aquatic plants and insects. They also eat snails and other aquatic invertebrates and some grains. They skim the water with their bills and also dip below the water to reach food items.

Other – The males of these striking ducks are easy to identify with their dark chestnut plumage. The females are a mottled brown color. Males go through an “eclipse plumage” stage in late summer during which they resemble the females. They are seen at Sweetwater Wetlands mostly during migration and through the winter.

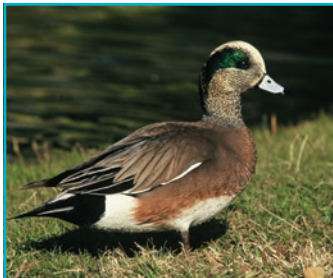


Photo: Paul Berquist

American Wigeon – *Anas americana*

Range – Breeds in Alaska, Canada, and the northern U.S. Winters in the southern U.S. and into Mexico.

Habitat – Ponds, lakes, wetlands, bays, and shorelines.

Food – These dabbling ducks mainly eat plant material, but will occasionally eat aquatic invertebrates.

Other – Male wigeons go through their “eclipse plumage” stage during late summer and early fall. Wigeons are seen mostly during the winter at Sweetwater Wetlands.



Photo: Paul Berquist

Northern Shoveler – *Anas clypeata*

Range – Throughout western North America. Winters in the southern states across the U.S. and into Mexico.

Habitat – Ponds, lakes, and wetlands. Sometimes winter in saltwater bays.

Food – Shovelers use their large bills to strain the water for plant matter and aquatic insects.

Other – Their large, shovel-like bills are distinct on both sexes. Males go through an “eclipse plumage” stage in late summer during which they resemble the females. During the winter, these ducks can be seen all over Sweetwater’s ponds as well as resting on the islands.

Mallard – *Anas platyrhynchos*

Range – Throughout most of North America south into Mexico. Also in Africa and India.

Habitat – Ponds, lakes, rivers, and wetlands. Common in ponds of city parks.

Food – Mallards eat plant material and some aquatic insects.

Other – These very common ducks are seen year-round at Sweetwater Wetlands. Males resemble females in the late summer during their “eclipse plumage” stage.



Photo: Paul Berquist

Ruddy Duck – *Oxyura jamaicensis*

Range – Breeds in the western U.S. and Canada. Winters in the southern U.S. into Mexico. Some populations occur in South America.

Habitat – Lakes, ponds and wetlands.

Food – Ruddy ducks are diving ducks, diving underwater to find their food. They eat aquatic invertebrates and plant material.

Other – These ducks have a distinct, perky tail. In breeding plumage during the spring and summer, the bills of the males are bright blue. Ruddy ducks are seen year-round at Sweetwater Wetlands.



Photo: Paul Berquist

American Coot – *Fulica americana*

Range – Throughout North and South America except in the coldest regions.

Habitat – Ponds, lakes, wetlands and urban parks with water.

Food – Coots mainly eat aquatic vegetation. They can be seen with their tails in the air as they forage in the water. They also dive deeper for aquatic invertebrates and some fish and amphibians.

Other – Coots are not ducks but are in the rail family. Instead of webbed feet, their toes are separated. They are year-round residents at Sweetwater Wetlands. They nest in the tall bulrush and cattails. Young coots with their red-orange heads can be seen in the spring.



Photo: John Sartin

Common Moorhen – *Gallinula chloropus*

Range – Locally in southern Arizona and New Mexico, and along the coast of California. Also in southern Gulf states of Texas, Louisiana, and Florida. South to South America.

Habitat – Freshwater wetlands and marshes, ponds and lakes usually with emergent vegetation.

Food – Moorhens primarily eat aquatic vegetation. They also eat a variety of invertebrates including insects and snails.

Other – Moorhens, like coots, are rails, not ducks. They can be seen year-round walking over fallen emergent vegetation and swimming in the ponds at Sweetwater Wetlands.



Photo: Paul Berquist

Cooper’s Hawk – *Accipiter cooperii*

Range – Breeds throughout the U.S. and southern Canada. Winters throughout the southern part of its breeding range, through Mexico, and into northern Central America. Found year-round in most central and southern states.

Habitat – Wooded areas from deep forest to parks and neighborhoods in suburban landscapes.

Food – Cooper’s hawks mainly eat birds, which they catch on the wing. They will occasionally eat small mammals.

Other – Over the years, Cooper’s hawks have nested in the tall cottonwoods at Sweetwater Wetlands. Their piercing cries can often be heard during their nesting season in the spring.

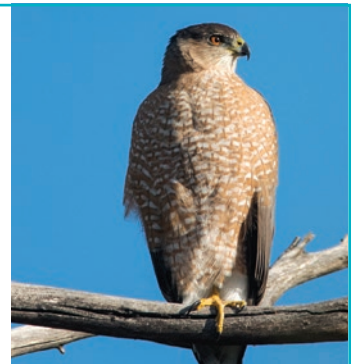


Photo: Francis Morgan



Photo: Earle Robinson

Harris's Hawk – *Parabuteo unicinctus*

Range – In the U.S., found only in southern Arizona and south-western Texas. South into mainland Mexico and Baja California.

Habitat – Desert scrub, cactus and mesquite forests, brushy fields, and open woodlands.

Food – These birds of prey eat small mammals, birds, and reptiles. They are known to hunt cooperatively, taking turns to chase down prey until the kill is made.

Other – Harris hawks are frequently seen at Sweetwater Wetlands. They often perch on the tallest trees in the area.



Photo: Paul Berquist

American Kestrel – *Falco sparverius*

Range – Throughout most of North America, through Mexico, and into South America.

Habitat – Open country, farm fields, roadsides, and urban parks.

Food – Kestrels eat small rodents, reptiles, birds, and large insects. They are also known to eat frogs and bats.

Other – These small falcons can be seen perched on fence posts and wires. They will bob their tails while perched. They often hover while hunting. Kestrels are cavity nesters (they nest in holes) and will use large nest boxes. They can be seen year-round at Sweetwater Wetlands.



Photo: AZ Game and Fish Department

Peregrine Falcon – *Falco peregrinus*

Range – Nearly world-wide but only in suitable habitat.

Habitat – Open country with nearby cliffs, rocky canyons, cities with tall buildings, and cliff faces along seashores.

Food – Peregrines primarily eat other birds, which they catch on the wing. They prefer ducks, quail, pigeons, doves, and other medium to large birds.

Other – Peregrines are known to reach speeds of up to 175 mph in a dive. They can be seen hunting around Sweetwater Wetlands during migration and in the winter.



Photo: Paul Berquist

Gambel's Quail – *Callipepla gambelii*

Range – Throughout the southwest deserts in Arizona, New Mexico, and Texas. Also in desert habitats of southern Nevada and Utah.

Habitat – Desert grassland and desert scrub.

Food – These quail feed on seeds, grains, some insects, berries, and succulent green vegetation. Gambel's quail also feed on the buds of mesquite flowers.

Other – In fall and winter, Gambel's quail can be seen in large coveys (groups) of up to 40 birds. In spring, the birds break up into pairs for courtship and nesting. They are ground-nesting birds, preyed upon by snakes, birds of prey, and coyotes.

Greater Roadrunner – *Geococcyx californianus*

Range – Southwestern U.S. from north-central California to east Texas. South to Mexico and Baja California.

Habitat – Desert scrub, chaparral, brushy areas, and some oak woodlands.

Food – Roadrunners are predators. They eat a variety of prey including snakes, lizards, mice, and insects. They typically chase down their prey. They will eat some seeds and cactus fruit.

Other – Roadrunners seldom fly. When surprised or startled, they usually run away. Roadrunner tracks are easy to identify. They have two toes facing forward and two backward, which helps them run fast. They build their nest of twigs in small trees or sometimes in cholla cactus.



Photo: Paul Berquist

Great Blue Heron – *Ardea herodias*

Range – World-wide in suitable habitat of temperate and tropical regions.

Habitat – Along the shorelines of most bodies of water including wetlands, seashores, lakes, and rivers.

Food – Great blue herons stand very still while hunting for fish, frogs, and large invertebrates. They jab their long bills suddenly into the water to catch their prey.

Other – These large herons are seen occasionally at Sweetwater Wetlands. Their tracks can be up to 8 inches long and can be seen on the muddy banks. Their tracks show three toes facing forward and one back.



Photo: Paul Berquist

Killdeer – *Charadrius vociferus*

Range – From Canada, throughout the U.S., and south into Mexico.

Habitat – Open fields, mudflats, airports, golf courses, grassy lawns, and flat, rocky shores.

Food – Killdeer primarily eat insects.

Other – They are named for their call which sounds like a loud “killdeer, killdeer.” They will pretend to have a broken wing in order to lure intruders away from their nests. Killdeer are common at Sweetwater Wetland’s recharge basins.

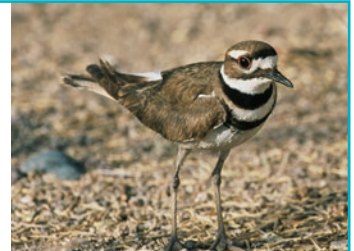


Photo: Paul Berquist

Mourning Dove – *Zenaida macroura*

Range – Throughout the U.S. into central Canada and south through Central America.

Habitat – In a variety of habitats including desert scrub, grasslands, farms, cities, parks, and open woodlands.

Food – These doves eat a variety of seeds.

Other – Mourning doves are year-round residents at Sweetwater Wetlands. Their mournful “cooo coo coo” is frequently heard.



Photo: Paul Berquist

White-winged Dove – *Zenaida asiatica*

Range – In the extreme southern portions of the U.S. Throughout Mexico to Central America.

Habitat – Saguaro forests, mesquite forests, fields, urban areas, and riparian woodlands.

Food – White-winged doves mainly eat seeds. They also eat berries and cactus fruit.

Other – These large doves are only seen during the warmer months as they fly south for the winter.



Photo: Paul Berquist



Photo: Paul Berquist

Gila Woodpecker – *Melanerpes uropygialis*

Range – Southern Arizona to Nevada and south into western Mexico and Baja California.

Habitat – Desert scrub mainly in habitats that include saguaro cactus. Also around riparian woodland and urban areas.

Food – Gila woodpeckers are primarily insect eaters, searching for prey on a variety of desert trees.

Other – Gila woodpeckers are cavity nesters. They use their strong, pointy bills to make holes primarily in saguaro cactus. They are the most common woodpecker in the desert and can be seen year-round.



Photo: Earle Robinson

Black Phoebe – *Sayornis nigricans*

Range – From northern California across the southwestern U.S. to west Texas. South into Mexico and Baja California.

Habitat – Streams, rivers, lakes, wetlands, and urban ponds. Often seen perched on branches by the water's edge.

Food – Black phoebes mainly eat flying, aquatic insects. They have keen eyesight and catch the insects in the air.

Other – Black phoebes are year-round residents at Sweetwater and are often seen near "Hidden Pond." Their nests are made of mud attached to a rock face near water. Their song is a repetitious "fee-bee".



Photo: Francis Morgan

Vermillion Flycatcher – *Pyrocephalus rubinus*

Range – In the U.S., found only in the southern parts of the western states from California to Texas. Also found year-round in Mexico and parts of South America. Winters in eastern Mexico and central South America.

Habitat – Prefer scrub habitat, cultivated lands, and riparian areas. Also, frequents suburban parks.

Food – As their name suggests, they eat insects, which they mainly catch on the wing.

Other – Vermillion flycatchers have increased in Tucson and are now commonly seen in city parks and at Sweetwater Wetlands.



Photo: Greg Clark

Cactus Wren – *Campylorhynchus brunneicapillus*

Range – Southwestern U.S. to central and northeastern Mexico, including Baja California.

Habitat – Desert flatlands and foothills where large cacti are found. They also occur in urban areas within their range.

Food – They feed on insects and other arthropods, fruits, and seeds.

Other – Cactus wrens are very busy and inquisitive birds. They usually build their nests among the spiny stems of cholla cacti but may use palo verde, acacia, or saguaro. They are known to build "decoy" nests, which may distract predators from the real nest with the young.



Photo: Earle Robinson

European Starling – *Sternus vulgaris*

Range – Across the U.S. north into Canada and south through Mexico. Also in Europe and Asia.

Habitat – Urban settings, fields, woodlands, grasslands, and farms.

Food – Starlings eat a variety of insects, fruits and seeds.

Other – Starlings were introduced into the U.S. from Eurasia. They have now spread across the country and are considered an invasive species. They are a cavity nester and will take nest holes that would otherwise be used by native species.

Red-winged Blackbird – *Agelaius phoeniceus*

Range – Across the entire U.S. through Canada and into western Mexico.

Habitat – Among the vegetation in wetlands, riparian areas, and fields near water.

Food – These blackbirds eat seeds, grains, and some fruits. They also eat insects and spiders.

Other – Red-winged blackbirds can be seen in large flocks, year-round among the cattails and bulrush at Sweetwater Wetlands. Their calls are very distinctive, sounding gurgling and metallic. The black males have prominent, red wing patches.



Photo: Paul Berquist

Yellow-Headed Blackbird – *Xanthocephalus xanthocephalus*

Range – Breeds in the mid-western U.S. into Canada. Winters in the southwestern U.S. and Mexico.

Habitat – Wetlands, ponds and lakes with lots of reeds, and agricultural fields.

Food – They eat seeds, grains, insects, and some snails.

Other – Yellow-headed blackbirds hang out in large flocks. They are mainly a spring, fall, and winter visitor to Sweetwater Wetlands and can be seen on emergent vegetation.



Photo: Paul Berquist

Great-tailed Grackle – *Quiscalus mexicanus*

Range – Southwestern U.S. from California to Louisiana. North to Nebraska and south through Mexico.

Habitat – Fields, farms, riparian areas, wetlands, and urban parks. Common around neighborhoods and parking lots.

Food – Grackles are opportunistic feeders, eating insects, small birds, a variety of invertebrates, and even small fish and frogs. They also eat seeds and berries.

Other – These large black birds have an iridescent purple sheen to their feathers. Males have long tails that they fold length-wise like a keel.



Photo: Paul Berquist

Song Sparrow – *Melospiza melodia*

Range – Across the U.S., through Canada and into southern Alaska.

Habitat – Riparian scrub, thickets, woodland edges, and brushy areas.

Food – Song sparrows eat a variety of insects, seeds, berries, and grains.

Other – Song sparrows are commonly seen and heard at Sweetwater Wetlands. They forage around the base of bushes and sometimes hop into the open on a higher perch to belt out their melodious tunes. Their distinct song starts with two or three clear whistles followed by a loud trill.



Photo: Doug Backlund

Abert's Towhee – *Pipilo aberti*

Range – Southern and western Arizona, north to southern Nevada.

Habitat – Brushy areas and thickets in desert scrub, riparian areas, and woodlands. Often near water.

Food – Abert's towhees forage on the ground by raking at underbrush to uncover seeds and insects.

Other – A shy, somewhat secretive bird that is usually detected by its call which is a high pitched "peek". They are usually alone or in pairs.



Photo: Earle Robinson

MAMMALS OF SWEETWATER WETLANDS



Photo: Paul Berquist

Coyote – *Canis latrans*

Range – Throughout the U.S. and into Canada and Mexico.

Habitat – Found in just about every habitat type, including suburban areas of cities. Prefer open desert plains, grasslands, high mesas, and open forests but are known to adapt to open, natural space in urban settings.

Food – Coyotes hunt both day and night. They are important predators of rabbits and rodents but will feed on larger mammals such as young deer. They will also eat small reptiles, insects and carrion. In early summer, they feed heavily on saguaro fruit, mesquite beans, and other vegetable matter.

Other – Coyotes may live alone, in pairs, or in small, territorial packs. Their dog-like tracks, showing four toes with toenails, can be seen along the paths at Sweetwater Wetlands. Coyote scat usually contains hair and bones and is often tapered at one end.



Photo: Young Cage

Bobcat – *Felis rufus*

Range – Throughout North America from mountains to deserts.

Habitat – Found in all kinds of habitats but prefer rocky hillsides with lots of vegetation.

Food – Bobcats are solitary predators. They eat small mammals including mice and other rodents, rabbits, bats, ground squirrels, and even newborn deer. They also eat birds such as doves and quail. They have been known to take domestic animals such as poultry and newborn livestock.

Other – Bobcats have been seen and even photographed at Sweetwater Wetlands. Their tracks, showing four toes and no toenails, are frequently seen on the trails at the wetlands. Bobcat scat is segmented into several small pieces. They are said to look like “Tootsie Rolls.”



Photo: Earle Robinson

Black-tailed Jackrabbit – *Lepus californicus*

Range – Throughout the western U.S.

Habitat – Deserts, prairies, pastures, and brushy areas.

Food – Jackrabbits eat a variety of plant matter including grasses, herbs, forbs and small bushes. They will eat woody material and dried plants during droughts and in winter.

Other – They are eaten by hawks, coyotes, bobcats, and owls. Because they have so many predators they are very wary. They produce several litters each year. The black-tailed jackrabbit has distinctive long ears tipped with black and a prominent black stripe that runs from its rump to the top of its tail.



Photo: Paul Berquist

Raccoon – *Procyon lotor*

Range – Fairly common throughout Arizona and across North America.

Habitat – Prefer brushy areas, almost exclusively near some type of water source. Also found in urban areas.

Food – They eat just about anything including crayfish, fish, insects, frogs, and the eggs of any animal they can find.

Other – Raccoons are nocturnal and usually solitary. At Sweetwater Wetlands, look for their distinct, hand-like tracks in the mud near the water's edge. Their scat is usually dropped in tubular pieces with blunt ends.

Desert Cottontail Rabbit – *Sylvilagus audubonii*

Range – Deserts and plains throughout the western U.S.

Habitat – Deserts, grasslands, and woodlands in areas with lots of brushy vegetation and hiding holes.

Food – They primarily eat grass but will eat other vegetation.

Other – Desert cottontails are an important prey species for many predators including hawks, foxes, owls, bobcats, snakes, and coyotes. They line their burrows with grasses and fur as bedding for their young. Cottontails are smaller than jackrabbits.



Photo: Earle Robinson

Round-tailed Ground Squirrel – *Spermophilus tereticaudus*

Range – Common inhabitants of the Sonoran Desert and throughout desert areas of the southwestern U.S. into Mexico.

Habitat – Found in desert flatlands where the soil is good for digging burrows.

Food – These squirrels feed on plant parts, including seeds. They are known to eat insects and even roadkill.

Other – They build underground burrows, tunneling into the desert soil. There may be several small openings to their burrows. Look for their burrows in the upland, desert areas around the wetlands at Sweetwater. They have many predators including hawks, snakes, bobcats, and coyotes.



Photo: Paul Berquist

Javelina – *Tayassu tajacu*

Range – Desert scrub areas throughout central Arizona, east to Texas, and south to South America.

Habitat – Brushy habitat along creeks, stream beds and canyons within desert mountains.

Food – Javelina are opportunistic feeders. They feed on flowers, roots, grasses, forbs, tubers, fruits, mesquite pods, and most succulent plants. They eat a lot of cacti, especially prickly pear.

Other – Javelina live in herds and mark their territories with their scent and droppings. Mountain lions and bobcats are the most common predators of javelina although coyotes, golden eagles, and even foxes are known to prey on young javelina.



Photo: Paul Berquist

Arizona Cotton Rat – *Sigmodon arizonae*

Range – Central and southern Arizona.

Habitat – Desert areas primarily along canals and stream banks thick with weeds, grasses and brush. They are strongly associated with the drainages and waterways of the southwest.

Food – Cotton rats mostly eat green plants and grasses and are known to occasionally eat insects. Unlike some rodents, they do not store their food.

Other – They are active both day and night throughout the year. At Sweetwater Wetlands, they can be seen scurrying between patches of cattail and bulrushes. They can have up to twelve young in a litter with numerous litters per year. They are important prey species for many predators including coyotes, foxes, hawks, and owls.



Photo: Paul Berquist

Mexican Free-tailed Bat – *Tadarida brasiliensis*

Range – Most free-tailed bats live in the western U.S. and Mexico.

Habitat – Occur in a variety of habitats from low-elevation deserts to pine-oak forests at 9,000 elevation. They live in colonies in caves, large hollow trees, abandoned mines, tunnels, under bridges, and in buildings. They will also use bat houses.

Food – They eat a variety of insects, especially moths. Free-tailed bats play an important role in reducing agricultural pests such as cotton boll moths and cut-worm moths.

Other – Their colonies can reach numbers in the millions.



Photo: AZ Game and Fish Department

REPTILES, AMPHIBIANS, AND FISH OF SWEETWATER WETLANDS



Photo: Earle Robinson

Western Diamond-backed Rattlesnake – *Crotalus atrox*

Range – Across the warm southern states from Arkansas west to California.

Habitat – Prefer deserts, rocky canyons, and foothills but found in a variety of habitats from the plains to the mountains.

Food – They feed mainly on small mammals such as rats, mice and even small rabbits. They will also eat small birds such as quail. They feed mostly at night. They have potent venom which they use to help subdue prey.

Other – Western diamond-backed rattlesnakes average 3 to 5 feet in length and are the largest rattlesnakes in the west. Like most rattlesnakes, they will lay in the sun to warm up their bodies and seek shade under rock crevices when they get too warm.



Photo: Paul Bernquist

Sonoran Desert Toad – *Bufo alvarius*

Range – Mostly occur in the Sonoran Desert but range west to California, and into central Arizona.

Habitat – Deserts and grasslands near a water source.

Food – These predators will eat just about anything they can catch including large insects and other frogs and toads.

Other – They spend winter underground and dig to the surface to become active throughout the summer. Sonoran Desert Toads lay their eggs in water, with the first weeks of their lives spent as tadpoles. The glands on their backs contain a toxin that can be harmful to animals (including humans). They are the largest native toad in the U.S.



Photo: Dennis Caldwell

Tree Lizard – *Urosaurus ornatus*

Range – From Arizona east to Texas, north to Wyoming and south into Mexico.

Habitat – Lives on trees and rocks in riparian, woodland, semi-desert, and urban areas.

Food – These small carnivores feed primarily on insects and spiders.

Other – Look for tree lizards doing “push-ups” on tree branches at Sweetwater Wetlands.



Photo: Paul Bernquist

Red-eared Slider Turtle – *Trachemys scripta elegans*

Range – From Georgia to New Mexico north to Illinois and Indiana. Not native to Arizona and those at Sweetwater Wetlands were introduced.

Habitat – Lives in fresh water ponds, lakes, and slow moving streams. Prefers muddy bottoms.

Food – They eat aquatic vegetation, invertebrates, and small fish. They also eat decaying vegetation.

Other – These turtles love to bask in the sun and are commonly seen on logs and on the banks of Sweetwater Wetlands.

Western Box Turtle – *Terrapene ornata*

Range – Across the mid-western grassland states north to South Dakota and in the southwestern states from Texas to Arizona.

Habitat – Grasslands, plains, and deserts. Prefers sandy soils for digging its shallow burrows. Although this is a land-loving turtle, it occasionally wades into water.

Food – These omnivores eat a variety of plant matter and insects.

Other – The western box turtle hibernates during the colder months.



Photo: xxxx

Sonoran Gopher Snake – *Pituophis catenifer affinis*

Range – Gopher snakes occur across North America into Canada and Mexico. The Sonoran subspecies occurs in the Sonoran Desert.

Habitat – Found in a variety of habitats from deserts to forests. Also found in cultivated fields and urban, open space. Prefers grassy and brushy areas.

Food – These predators kill their prey by constriction (squeezing). They eat small mammals, birds, lizards, and even other snakes.

Other – Gophers snakes are eaten by a variety of predators including hawks, coyotes, and foxes. They resemble rattlesnakes and even mimic rattlesnake behavior by coiling and shaking their tails.



Photo: Paul Bernquist

Bullfrog – *Rana catesbeiana*

Range – Native to the eastern and central states but now occur throughout most of the U.S.

Habitat – Warm ponds, lakes, wetlands, and watercourses. The bullfrog is purely an aquatic species.

Food – These voracious predators eat other amphibians, reptiles, fish, insects, and almost anything they can catch.

Other – This frog has been introduced in numerous states as a food source. It is hunted for its leg meat. It has become an invasive species, killing off native species through predation and competition.



Photo: Dennis Caldwell

Red-spotted Toad – *Bufo punctatus*

Range – East to Central Texas and Kansas and west to California. Also occur south into Mexico.

Habitat – Prefer riparian areas (near streams and small water courses) in otherwise arid habitats. Often hides among streamside rocks.

Food – They primarily eat insects.

Other – The cricket-like call of the males can be heard in desert riparian areas during the summer rainy season. They are prey to a variety of predators.



Photo: Dennis Caldwell

Western Mosquitofish – *Gambusia affinis*

Range – Native to south central U.S. but introduced into sporadic drainages and waterways across the U.S. Have also been introduced worldwide to control mosquitoes.

Habitat – Found in shallow waters that have sufficient hiding places from larger predators. Able to tolerate harsh conditions such as low oxygen and high temperatures and salt concentrations.

Food – Feed on tiny invertebrates, including larvae, at the top of the water column.

Other – These small fish (~2.5 inches) were indiscriminately introduced into Sweetwater Wetlands by an unknown source. They give birth to live young. They are thought to control mosquito populations because of their ravenous consumption of mosquito larvae.



Photo: NOZO – Wikimedia Commons

INSECTS OF SWEETWATER WETLANDS



Photo: Steve Prchal - ASAI

Dragonfly – Order: Odonata, Suborder: Anisoptera (dragonflies)

Habitat – Larvae are purely aquatic, living in ponds, lakes, wetlands, and slower moving streams. The adults occur both near water and around fields and grassy areas, including urban parks.

Food – Dragonfly larvae eat tadpoles, tiny fish, and the larvae of smaller insects. They grab prey with an extendible jaw. Adult dragonflies feed on other flying insects, including mosquitoes.

Life Cycle – There are many species of dragonflies. Most deposit their eggs on the surface of water or wet mud. The larvae that hatch are aquatic, living underwater and breathing with gills. After completing all its growth stages, the larva leaves the water (usually by crawling up an aquatic plant stalk). The adult emerges from the larval skin and flies away with newly formed wings. Adults leave the water and return only to mate and deposit eggs to continue the cycle.



Photo: Steve Prchal - SASI

Damselfly – Order: Odonata, Suborder: Zygoptera (damselflies)

Habitat – Ponds, wetlands, lakes, and streams.

Food – Damselflies are predaceous in both adult and larval stages. Like dragonflies, they catch prey with an extendible jaw. They eat other insect larvae, tadpoles, and small fish.

Life Cycle – Eggs are deposited in the water on aquatic plants. The larvae are aquatic, going through several growth stages before emerging from the water to molt into adults. Adults may fly away or stay near the water to mate.



Photo: Steve Prchal - SASI

Predaceous Diving Beetle – Order: Coleoptera (beetles), Family: Dytiscidae

Habitat – Ponds, wetlands, and slow moving water.

Food – Both the adults and larvae are voracious predators. They feed on other aquatic insects (including mosquito larvae), small fish, tadpoles, and even adult frogs. They inject a digestive fluid into their prey and suck out the juices.

Life Cycle – Eggs are laid in water, usually attached to an aquatic plant. The larvae, called water tigers, live entirely in the water until digging into mud at the water's edge to pupate into adults. Adults primarily live in the water but can emerge and fly to other ponds. Adults capture an air bubble behind their wings as their underwater air supply.



Photo: Steve Prchal - SASI

Giant Water Bug – Order: Hemiptera (true bugs), Family: Belostomatidae

Habitat - Slow moving streams or standing water habitats such as wetlands and ponds.

Food – The larvae eat mainly other aquatic insect larvae. The adults eat insects, small fish, tadpoles, and snails. Adults wait at the water's surface for their prey which they ambush and then subdue with a toxin.

Life Cycle – Eggs are laid by the females directly onto the male's back. The male will carry and care for these until they hatch. Larvae breathe air through a small snorkel-like device on their backs. Larvae go through several molts until they become adults. Adults are also aquatic but breathe air which they capture as a bubble under their wings.

Water Scorpion — Order: *Hemiptera* (true bugs), Family: *Nepidae*

Habitat – Among vegetation in slow moving water such as wetlands and ponds. Some are found under rocks in slow moving streams.

Food – Water scorpions are ambush predators, capturing their prey with their forelegs. They eat insect larvae, worms, and other invertebrates.

Life Cycle – Eggs are laid on aquatic vegetation and floating objects. Larvae molt through several stages before becoming adults. Adults tend to stay near the water's surface attached to some vegetation. They will breathe using a snorkel-like siphon and trapped air bubble. They are not great swimmers and instead tend to crawl around on aquatic vegetation.



Photo: Steve Prchal

Backswimmers – Order: *Hemiptera* (true bugs), Family: *Notonectidae*

Habitat – Ponds, wetlands, and other aquatic habitats, usually in slow moving water.

Food – Backswimmers prey on other aquatic invertebrates including the larvae of mosquitoes and other insects.

Life Cycle – Eggs are laid on the stems of aquatic vegetation. Larvae go through several stages before becoming adults. As their name suggests, they swim upside-down. As air breathers, they capture a bubble as an underwater air supply.



Photo: Steve Prchal

ADDITIONAL RESOURCES AND REFERENCES

Tucson Water

<https://www.tucsonaz.gov/water>

Tucson Water's webpage offers more information on Sweetwater Wetlands, Reclaimed Water, Drought Preparedness, Conservation, and a variety of other water related topics, listed on the left-hand side of the page. This booklet is also available in PDF format on the Sweetwater Wetlands page.

Sweetwater Wetlands Birding Checklist

https://www.tucsonaz.gov/files/water/docs/Sweetwater_Wetlands_Bird_Checklist.pdf

A downloadable checklist of birds seen at Sweetwater Wetlands.

Sweetwater Wetlands' Facebook Page

<https://www.facebook.com/Sweetwater-Wetlands-189523357744967/>

Like us on Facebook. See recent photos of wildlife seen at Sweetwater. Learn about upcoming events at the Wetlands.

Tucson Audubon Society

<http://www.tucsonaudubon.org/>

Tucson Audubon inspires people to enjoy and protect birds through recreation, education, conservation, and restoration of the environment upon which we all depend. This includes offering free, regular bird walks through Sweetwater Wetlands. Join their staff and volunteers for an easy walk through the Sweetwater Wetlands to see waterfowl in the hundreds, regular and visiting warblers, and several exciting species hiding in the reeds. Birders of all experience levels welcome! Contact Tucson Audubon Society for more information.

Arizona Game and Fish Department's HabiMap™

<http://www.habimap.org/>

HabiMap™ is a user-friendly, web-based, interactive data map that allows users to access information contained in the State Wildlife Action Plan. Users can see the occurrence and distribution of a variety of wildlife-related parameters including the locations of wetlands and riparian habitat. HabiMap™ was developed by The Arizona Game and Fish Department.

Pima County Mosquito Information

http://webcms.pima.gov/health/preventive_health/disease_control/mosquitoes

Useful information on mosquito related disease outbreaks and tips to prevent bites. For more information, call (520) 724-7908.

GLOSSARY

- Anaerobic** – A condition with little or no available oxygen.
- Aquifer** – An underground geologic formation that contains water.
- Condensation** – The process of a vapor changing to a liquid (as when clouds form).
- Constructed wetlands** – Human-made wetlands.
- Effluent** – Water that is treated and released by a wastewater treatment facility.
- Evaporation** – The process of a liquid changing to a vapor.
- Groundwater** – Water found below the earth's surface.
- Infiltration** – The process of water seeping into the soil and moving through cracks and pore spaces.
- Microhabitat** – An area within the habitat that presents a different set of living conditions from the area right next to it.
- Percolation** – The process of water moving down through the ground between the spaces of soil and rock particles.
- Precipitation** – Water that falls to the earth in such forms as rain or snow.
- Recharge** – The addition of water to an aquifer.
- Reclaimed water** – Effluent that is highly treated and can be used again.
- Riparian** – On or relating to the land just beside a river, stream, or wash.
- Riparian habitat** – The typically lush area next to a river or stream that is home to a variety of plants and wildlife.
- Runoff** – Water that flows downhill over the earth's surface.
- Surface Water** – Water found on the earth's surface (as in runoff, rivers, or lakes).
- Water Table** – The highest level of groundwater.
- Watershed** – The total land area that drains to a specific river, wash, or lake.
- Wetland** – Land that is covered with water for at least part of the year; only plants adapted to very wet soils can live in wetland habitats.

ACKNOWLEDGMENTS

This booklet is the product of many individuals and organizations:

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Doug Backlund
Paul and Joyce Berquist
Young Cage
Dennis Caldwell
Greg Clark
Francis Morgan
Steve Prchal
Bruce Prior
Earle Robinson
John Sartin

*The Sweetwater Wetlands Activity Book and Field Guide was originally
developed for Tucson Water with funding from the Arizona Game and Fish
Department Heritage Fund.*

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SWEETWATER WETLANDS



Directions: From I-10, exit at Prince Road and travel West beneath the freeway. Turn right onto Business Center Dr., left onto River Park Dr., then right onto Commerce Dr. Turn left onto Benan Venture Dr. (before the Emissions Facility) and then turn left onto Sweetwater Dr. Travel about 500 feet to the Sweetwater Wetlands parking lots on both sides of the street.

For more information call (520) 791-4331.

