

# Restoring & Maintaining Healthy Playas



Photo courtesy of Christopher Rustay

## What Is a Healthy Playa?

A healthy playa has an intact clay basin — without excavated pits or ditches — that is not buried by sediment from nearby fields. Water from the surrounding watershed freely enters the basin through a native vegetative buffer without being diverted from the playa by roads, terraces or other impediments.

Playas — also called mud holes, buffalo wallows, and lagoons — are round, shallow depressions at the lowest point of a watershed. They fill with water from rainstorms and run-off, which then slowly moves toward the Ogallala aquifer or evaporates. These temporary wetlands recharge the aquifer and support many kinds of wildlife.

While playas provide critical habitat for wildlife, they also provide important benefits for the people who live in this region. When healthy, playas provide a sustainable water source for communities and rain-fed operations, water filtration, flood control, livestock forage, and recreation.



GROUNDWATER RECHARGE



CLEANER WATER



FLOOD CONTROL



RECREATION

## How Do Playas Work?

Playas have an unpredictable and rapidly changing wet-dry cycle, which is essential to how they work — and provide benefits including groundwater recharge and wildlife habitat. Since playas depend on rainstorms to fill with water, it is not uncommon for a playa to be dry for long periods, years even, or to be wet several times during a growing season. No matter the amount of water — whether dry, moist, saturated, or flooded — playas are still working. In fact, without this natural cycle, they wouldn't be as effective.

When dry, the clay soil in the playa basin contracts and forms large cracks. Then, when it rains, the first flush of water from surrounding uplands flows toward the playa. As water moves through the grasses surrounding the playa, sediment that may carry contaminants from farm fields is trapped and stopped from entering the playa. The water continues into the playa and into the cracks — beginning its journey to the underlying aquifer.

Once the clay becomes saturated, the cracks close allowing the playa to hold water. Some of the water in the playa is used by plants or evaporates. Even when the clay basin is sealed, water continues its journey through the clay along roots and other small channels. When the playa is full, water also flows around the clay, through surrounding porous soil.

After the water is gone and the soil dries, prairie winds scour the playa basin, blowing out some of the sediment that has found its way into the playa. Over time, cracks reappear in the clay, and the playa awaits the next big storm when the cycle will repeat.

Plants and animals have adapted to this cycle and respond rapidly when playas become wet. Tiny seeds and eggs lay dormant in the soil, sometimes for several years, waiting for a heavy rainfall to germinate and hatch. The variable nature of playas enhances the plant diversity, which in turn leads to increased wildlife diversity. Birds and other prairie wildlife use wet playas for much-needed rest stops, water and food.

# Put Playas Back to Work

Playa restoration reverses past modifications to playas by removing accumulated sediment, filling drainage features, redirecting water back into the playa, and protecting the playa with a buffer composed of native vegetation. Use the questions on the insert to make a restoration plan.

## Establish a Native Prairie Vegetation Buffer to Keep Sediment and Contaminants Out

Playa buffers — areas of permanent vegetation surrounding a playa — protect the playa by preventing sediment which may carry contaminants from surrounding farm fields from reaching the basin and should be a part of every restoration project when the playa is in cropland. Buffers provide habitat for many species of wildlife, while improving the quality of the water entering the playa basin and, in turn, the water that reaches the aquifer.

The buffer width is dependent on many factors, some biological and others more practical in nature. Studies have shown that a buffer width of at least 130 feet can effectively trap the majority of sediment and contaminants from reaching the playa; however, that is dependent on the plant species chosen. Since many playas are found within crop fields, considerations for buffer size and shape are often determined by the most efficient method of farming the rest of the field.



A playa with sediment plumes from runoff from surrounding fields

The seed mix should be determined based on management goals. Diverse mixes with native grasses, forbs, and legumes increase biodiversity for wildlife and provide diverse forage for livestock. Restoring historic plant communities offers the best chance of success. Predominant native grass species that are suitable for playa buffers and adapted to the high plains include blue grama, buffalograss, sideoats grama, and little bluestem, while numerous species of forbs and legumes native to the region can be included in the seeding mix.

Sedimentation is usually caused by issues within the surrounding watershed. To keep sediment out of a playa, determine where and how sediment is deposited in the basin and what can be done to prevent sediment accumulation in the future.

## Remove Accumulated Sediment

Once the sources causing sedimentation have been identified and addressed with buffers and other conservation activities, planning for sediment removal can begin. Other than excavation, wind is the only other way sediment is removed from a playa; but wind alone cannot remove all the excess sediment that is often found in modified playas and those without a grass buffer. Sediment accumulation in playas is usually not evenly distributed across the playa basin, with sediment depth related to where it came from and how it was deposited.

Even sediment depth of a few inches can have severe consequences for playas and the many benefits they provide. Accumulated sediment from adjacent uplands affects the volume of a playa, decreasing the amount of water it can hold, and may also alter plant communities within the playa. Playas in cropland, where sediment loads are higher, often have an increased number of exotics and annuals. Sediment can also bury seed banks of native wetland vegetation which typically occur in playas, as well as bury invertebrate egg banks, too.

**Why Do Playas Stop Working?** Accumulated sediment and modifications to the playa and surrounding watershed can dramatically reduce the available water surface area, change the composition of wetland plants, make the playa more susceptible to invasive species, disrupt aquifer recharge, and impact the hydrology of a playa. For example, pits and ditches concentrate water; channels or gullies leading to the playa deposit sediment in the basin; and diversions, terraces, bar ditches and roads can keep water from reaching the playa.

Sediment accumulation has a significant effect on playa hydrology, with sediment removal being one of the most commonly needed restoration activities. When there is excess sediment on top of the clay soil, it can act like a sponge, soaking up and holding the water, so it takes larger amounts of rain and runoff to see water in the playa. Excess sediment also reduces the volume of water a playa will hold and the length of time a playa stays wet, which significantly affects the plant and wildlife community supported by the playa. Sediment accumulation in playas can lead to increased exotic plant species, decreased water availability, and diminished habitat for desired wildlife.

When addressing sediment issues, the soil type within the watershed should also be considered, especially in surrounding fields that do not have adequate vegetative cover throughout the year. Since medium textured soils are more easily eroded than fine soils, playas in areas with medium textured soils often have nearly twice the excess sediment of those in areas with fine soils. Also, sediment carried by water flowing in through a channel may travel farther into the playa than sediment transported by normal overland flow. Sediment removed from the playa should be spread out in areas that won't create new sources of sedimentation. Spoil areas within the buffer area will need to be vegetated.

## Fill Drainage Features

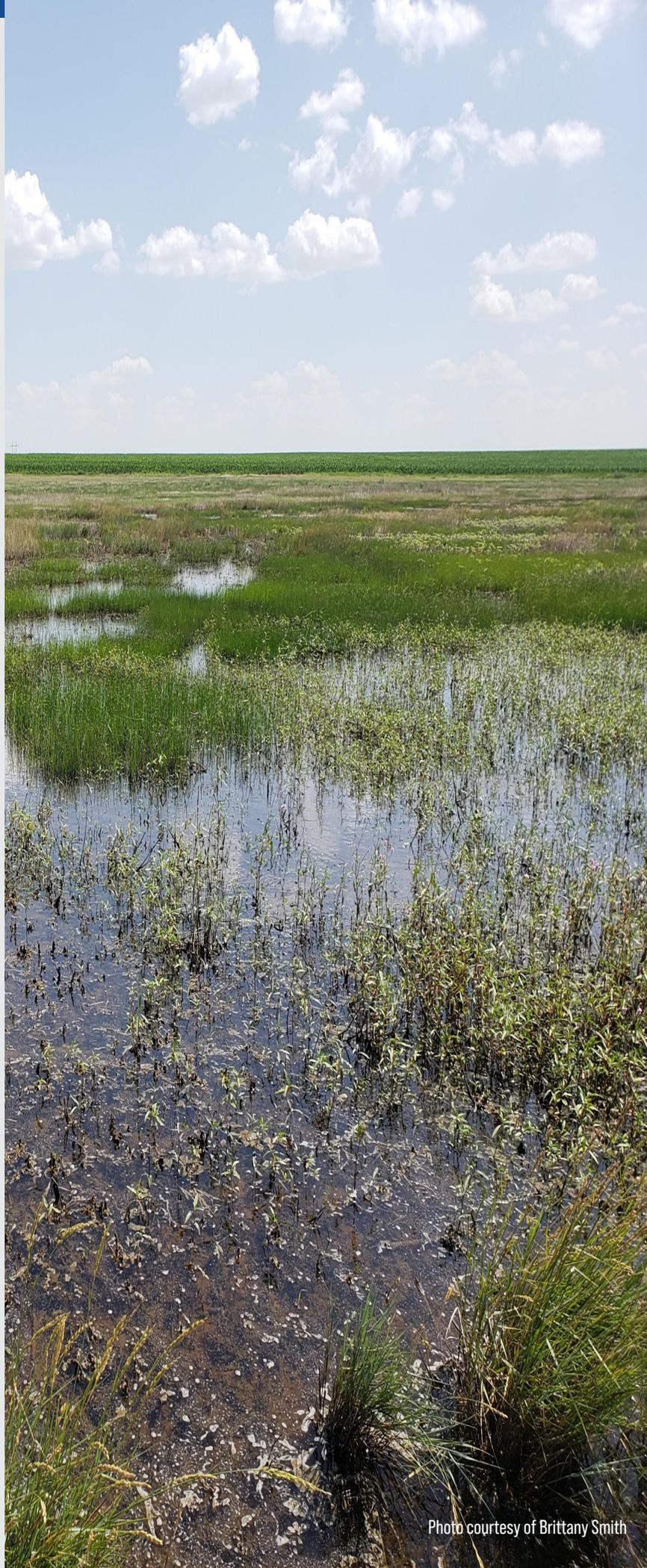
Pits and ditches concentrate water into a small area and keep the playa from going through its normal wet and dry cycle. While a pit may trap and hold water for a longer period of time, it comes at the cost of keeping the rest of the playa functional since it cannot go through the critical wet-dry cycle, which reduces habitat for wildlife and affects groundwater recharge.

Filling pits allows rainwater and runoff to reach all the large cracks in a dry playa — which is essential for recharge to occur — rather than collecting in the pit. A pit may also break through or remove part of the clay soil, which will circumvent the cleaning function of the playa. In most cases, the spoil pile from the original excavation is present and should be used to refill the pit. Although the pit may not be completely filled or level when using the soil from the spoil pile, it will smooth out once the playa has been filled with water several times.

Channels are often cut into playas to facilitate draining the water within the playa. Removing these channels can be a matter of simply filling them in with appropriate materials and stabilizing the site of disturbance with vegetative cover.

## Restore Water Flow

Redirecting water diverted from the playa is a critical but often overlooked part of playa restoration. Terraces, diversions, roads, clogged culverts, and other modifications to the area surrounding a playa have likely changed the water flow and may be preventing water from reaching the playa basin and reducing playa function. To fully restore playa function and recharge potential, include the surrounding area in your planning process. Sometimes, these modifications or diversions are located on a neighbor's property and may require a collaborative effort to address.



# Keep Playas Working

A restored, healthy playa — with excess sediment removed, water redirected into the playa and protected by a vegetative buffer — will function effectively; however, there are management activities which can be used to help maintain and improve the playa.

## Grazing Management

Grazing has always been an important component of the prairie landscape, and it can be used to manage the vegetation in playa buffers and basins. This can provide additional forage for livestock, especially during drought when the only moisture supporting plant life is often found within a playa, as well as better wildlife habitat. Prescribed grazing, along with prescribed fire as appropriate, will help maintain both the playa and surrounding uplands in the best condition for both cattle and wildlife.

While playas can be part of a grazing system, utilization rates should be carefully planned and monitored so the vegetation height within the buffer can continue to effectively trap sediment from reaching the playa basin. Playas within cropland can also be grazed as part of an effort to utilize crop residues for forage during the grass-dormant season.

## Future Modifications

Because water is the primary driver influencing most natural functions in playas, any future modifications within the catchment area — such as road maintenance, terrace rebuilds, and ditch clean outs — may impact playa health and need to be carefully planned with that in mind.

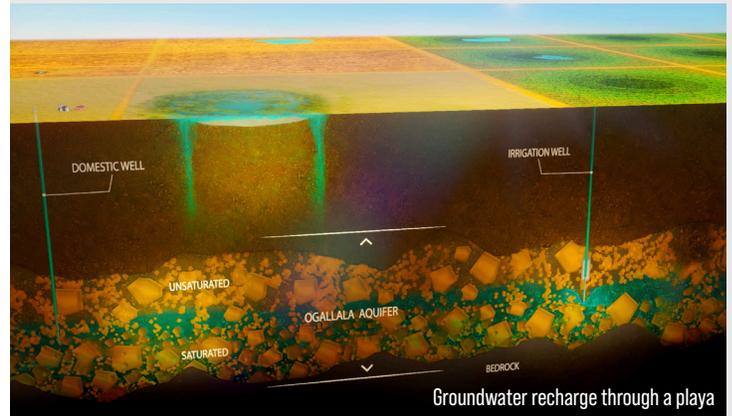
## Recreational Management and Stewardship

Wet playas attract thousands of waterfowl and shorebirds which provides opportunities for local hunting and birdwatching. They are also a living laboratory where people can learn about wetlands, geology, and the history of the region. Maintaining playas for recreation can provide financial incentives as well as a long-term legacy for future generations.

There are state and federal programs that can help landowners incorporate these goals into their playa management plan. Some programs offer financial incentives for public access on private lands and others offer long-term or permanent easements, ensuring the landowner's conservation values are carried forward.

## More Information

See the Playa Restoration Process insert to learn more about what to expect during the restoration process, as well as how to get financial and technical assistance for your playa restoration project.





# Playa Restoration Process

Once you've decided to restore your playa, what happens next? This document provides some general information about what to expect as you work with conservation delivery staff to determine what needs to be done to restore your playa and as the restoration work happens.

## Technical Assistance

Planning a playa restoration may seem overwhelming, but there are playa experts who can help guide you through the restoration process and help identify the best conservation program to meet your individual needs. In addition to working with your local USDA Service Center, consider contacting your local Conservation District for information about conservation programs. Another option is to talk with a private lands biologist. You'll find their contact information on one of the state-based playa websites listed below.

## Conservation Programs

Private lands biologists will meet with you and discuss the various conservation practices and programs available for playas. They can help you identify funding sources to help with restoration costs and provide income when taking the playa and surrounding land out of production.

There are many options to restore wetlands available through USDA conservation programs such as through the Continuous Conservation Reserve Program, Conservation Stewardship Program, Environmental Quality Incentives Program, and Agricultural Conservation Easement Program. Program availability varies by state, so check with your local USDA Service Center. Other funding is available through state wildlife agencies and other non-profit conservation partners. For more information about the conservation programs in your state, visit one of the state-based playa websites listed below.

## More Information

To learn about available playa conservation programs and find a local expert to help you plan your playa restoration, visit one of our state-based playa websites.

## Playa Restoration Plan

During the planning process, you'll meet with conservation staff from USDA and/or one of the other partners listed above. Together you will determine the scope of the work needed to restore playa function and recharge potential and to ensure future sedimentation is prevented. The following is a list of questions which will help guide your playa restoration efforts and can be discussed with conservation staff.

### Remove Accumulated Sediment

- » Where is the edge of the playa basin?
- » What is the sediment depth in different areas of the playa basin? What is the depth of the clay layer?
- » Is there an area where the removed sediments can be placed or used to address erosion issues?

### Fill Drainage Features

- » Is the spoil pile with the original clay soil still present? If not, is there appropriate clay soil available?
- » Are there roads or other high use areas, which will be impacted when normal water surface area is restored, that may need modifications? If so, who else needs to be involved (neighbors, local road departments, etc)?

### Restore Water Flow

- » Are there terraces above the playa that hold or redirect water which could be modified to restore hydrology and not cause additional erosion or sediment concerns by creating a concentrated flow area?
- » Are there fencelines, diversions, roads, field edges or other features that keep water from reaching the playa?
- » Are there water conveyance features which no longer function as designed or are a source of erosion — such as ditches, culverts or waterways — which can be rebuilt or repaired, and who needs to be involved?
- » Are there water impediments on neighboring properties? If so, is there an opportunity to collaborate in the restoration project?

### Establish a Native Prairie Vegetation Buffer

- » What plant species were historically found on your soils?
- » What is the best buffer configuration so the surrounding field can be efficiently farmed?
- » What are my objectives for creating wildlife habitat?
- » Are there areas where additional buffer width may be needed to slow concentrated water flows and reduce sediments reaching the playa?
- » Are erosion control practices that reduce playa sedimentation, such as reduced tillage and cover crops, being used?
- » Are there highly erodible or unproductive portions of the field which contribute sediment to the playas that would be better suited to permanent vegetation?
- » Are there channels that concentrate and direct water flow and sediment into the playa that are unvegetated?

## Playa Restoration Work

A typical playa restoration project will include hiring a contractor to remove sediment or perform other restoration activities, planting a native grass mix into existing crop residues or a planted cover crop, and controlling weeds while the grass becomes established. In theory, restoration practices could be completed in the spring, a cover crop seeded in the summer, and the grass mix planted the following spring; however the timeline for these activities varies due to contractor availability and variable weather conditions.

