



MEMORANDUM

Date: March 13, 2019

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

A handwritten signature in black ink, appearing to read "CHH", is written over the printed name "C.H. Huckelberry".

Re: **Roy P. Drachman Agua Caliente Pond Rehabilitation Update**

Attached is a memorandum from Director of Natural Resources, Parks and Recreation (NRPR) Chris Cawein regarding an update on the Roy P. Drachman Agua Caliente Park and rehabilitation of the Park's aquatic resources.

As you know, NRPR recently offered open fishing on Pond 1 based on the construction and rehabilitation that was to take place in the near future. That time is now since the pump providing water to keep the pond's surface water elevation stable has now been shut off. The pond will now begin to dry which allows the next phase of rehabilitation to start. This next phase is to dredge, re-contour and line the pond.

Agua Caliente Park is one of the more environmentally sensitive assets of Pima County where there is strong community interest in any activity that occurs at the Park; hence, the need to provide this update to the Board of Supervisors on rehabilitation and the return of full aquatic resource value to Agua Caliente Park.

CHH/anc

Attachment

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Chris Cawein, Director, Natural Resources, Parks and Recreation



MEMORANDUM

To: CH Huckelberry, County Administrator

Date: March 12, 2019

From: Chris Cawein, Director

A handwritten signature in black ink, appearing to read "Chris Cawein". The signature is written in a cursive style and is positioned to the right of the "From:" field.

Subject: Agua Caliente Pond 1 Rehabilitation

Natural Resources Parks and Recreation (NRPR), working with our internal partners, the Regional Flood Control District (RFCDD) and Office of Sustainability and Conservation (OSC), is continuing the process of pond rehabilitation and redevelopment at the Roy P. Drachman Agua Caliente Park, which was originally described in a memorandum to you in April 2016.

As you recall, due to the failure of the natural spring to continue to produce appreciable artesian groundwater flows, the pond system consisting of three interlinked ponds (Ponds 1, 2 and 3), began to dry up several decades ago. Overflow Ponds 3 and 2 first went dry, and then Pond 1 began to dry up as natural flows from the spring continued to drop to near zero. NRPR developed a new groundwater extraction well in the early 2000s and began to actively pump groundwater into Pond 1 so that the water levels could be maintained in at least one of the historic ponds. Although this approach to management of the site is costly and therefore not ideal given the significant amount of groundwater extraction required to keep Pond 1 full (approximately 28 million gallons in 2017), it was determined that the historical, aesthetic, and wildlife value of at least some open water at the Agua Caliente Park site should be maintained via continued groundwater pumping for public enjoyment. Otherwise, without that continued pumping of groundwater, Pond 1 would dry up and no open water would exist at the iconic park site.

In 2016, a phased approach was developed to plan for the future of the Ponds at the Agua Caliente Park site. The initial portion of that plan, which was articulated in the April 2016 memo to you, consisted of the regrading and shrinking as well as the synthetic lining of Pond 2. That first phase of the project was completed in April 2017 in partnership with RFCDD. Although this initial step in the approach required an increase in groundwater pumping to fill and keep filled Pond 2, it was deemed an appropriate incremental step so that when Pond 1 was reconstructed with a liner system, which would require that the pond be fully drained, wildlife would have a sustained source of water for their use during the Pond 1 rehabilitation period.

After completion of that Pond 2 restoration project, planning began for the rehabilitation of Pond 1. Because Pond 1 has been kept full for nearly two decades primarily via groundwater pumping, the rehabilitation of this pond was expected to be much more impactful to visitors to Agua Caliente Park than Pond 2 rehabilitation which was empty prior to rehabilitation. Therefore, the planning and public

involvement process was determined to be more critical for this stage of Pond redevelopment when compared to Pond 2 rehabilitation.

Planning for rehabilitation of Pond 1 was initiated early in 2018. An interdisciplinary project team consisting of biologists, hydrologists, landscape architects, cultural resource and historic preservation specialists, environmental education specialists, public outreach specialists, and engineers, representing NRPR, RFCD and OSC was assembled and biweekly meetings were held starting in summer 2018. Initial discussions were also held with the Friends of Agua Caliente Park (who have been engaged in the project since inception) in order to facilitate contact with friends and neighbors of the park and gain their support for the project. Initial project signs were installed at the Park to begin the public education process. Team meetings have been regularly conducted for the last year and the project elements have been defined and are in progress.

A public informational Open House for this phase of the project was completed on Thursday, November 8, 2018 at the Kirk-Bear Canyon Public Library. As explained during the public Open House, the primary focus for the Pond 1 rehabilitation project is to reduce the pumping of groundwater at the site (approximately 28 million gallons in 2017) thru installation of an underlying liner system, while retaining the aesthetic, historic and cultural character of the Agua Caliente Park site. In addition, secondary benefits of the project include the improvement of the pond ecosystem by reducing invasive aquatic species and removing proliferating vegetation which is choking the pond, as well as restoring the historic character to the area in the vicinity of Pond 1. With the exception of one commenter, who also followed up with a letter, all attendees were highly supportive of the approach to Pond 1 rehabilitation so that groundwater pumping could be significantly reduced and the ecological and aesthetic health of the pond restored.

Attached to this memorandum you will find a series of graphics panels that were used at the November 8 Open House. These are being used to guide public education and summarize in pictures the issues associated with the Pond 1 rehabilitation process, the associated reasoning behind the project, and the conceptual process and associated schedule for the rehabilitation project. As illustrated in the attachments, although the rehabilitation and lining of Pond 1 will not remove the on-going and continual need to pump groundwater to maintain an open water presence at Agua Caliente Park, it is expected that the project will result in a net reduction of at least 14 million gallons per year in groundwater pumping once completed.

The Pond 1 rehabilitation project is generally divided into four main categories for planning purposes. Those consist of:

1. Management of Aquatic Species,
2. Management of Cultural Resources,
3. Management of Aquatic and Terrestrial Vegetation, and
4. Pond Dredging and Lining

An outline of the project approach for each of these categories is briefly discussed below.

Management of Aquatic Species

Over the many decades that Agua Caliente Pond 1 has been in existence, an interesting mix of aquatic species have developed and are presently identified within the pond. Some of those species, such as

Grass Carp, have been specifically introduced for an intended biological purpose (to control aquatic vegetation) and others have appeared via other unknown means. The pond is known to host populations of blue gill, bass, tilapia, koi, catfish and mosquito fish, all non-native fish. Additionally, several species of turtles, predominantly red-eared sliders and soft-shelled, are dominating the Pond. Various native and non-native toad and frog species, including a population of invasive bullfrogs who typically dominate any native species present, are also known to proliferate at the pond.

The project team has been working on a strategy to selectively reduce the populations of various species within the pond before construction is initiated, including recently capturing and relocating over 35 red-eared sliders to a turtle sanctuary in the Phoenix area. Because the species of fish present within the pond are non-native, we are working towards removal as appropriate. In order to incorporate a recreational element into the non-native fish reduction process, NRPR opened the pond to recreational fishing for the month of January 2019. Fish present in the pond 1 population that may have some aesthetic or biological value, such as Koi or Grass Carp, will be captured and relocated to the extent possible; carp will be transferred to Pond 2 or another suitable location and Koi will be donated to Koi rescue groups or their members in town to the extent feasible. Additional fish removal via physical methods, will likely occur in partnership with the University of Arizona as the water level in the pond is drawn down in spring 2019. It is also anticipated that as Pond 1 water levels are reduced as part of the lead-up to construction, remaining turtles will voluntarily move to Pond 2. The draining and rehabilitation of Pond 1 will also allow for the opportunity to reduce the population of bullfrogs at Agua Caliente Park.

Although the pond rehabilitation process will disrupt the existing biota at Pond 1 and there may be some casualties during project execution, the project team has designed our aquatic species management program to reduce negative impacts to select species to the extent possible, while reducing invasive species populations, so that a more robust, ecologically stable habitat can be created within the pond system at Agua Caliente Park. Once established, that enhanced habitat will likely be populated with select native fish species to be determined in consultation with our partners at the Arizona Game & Fish Department and US Fish and Wildlife Service.

Management of Cultural Resources

After the County acquired the Agua Caliente Ranch site in 1984, a public park was created shortly thereafter. In 2009, Agua Caliente Park was listed on the National Register of Historic Places, given the documented prehistoric and historic significance of the site. All activities conducted at the site to date have been completed in order to ensure preservation of the historic features of the landscape and to restore others.

Rehabilitation of Pond 1 will continue to follow this philosophy and the Office of Sustainability and Conservation has provided and will continue to provide appropriate input as the project is designed and completed. A cultural resources monitor has been providing input into the scoping of the work to be completed, and will be present during all construction activities, to ensure that all cultural resource laws and ordinances are properly obeyed.

Several historic views will also be restored as the pond rehabilitation occurs. Although the vegetation at Agua Caliente has always been lush, in recent years palms have overtaken the landscape thereby damaging historically significant views. Therefore, some thinning of vegetation around the pond is being

completed primarily for that purpose. Additionally, this project is expected to reconstruct a footbridge leading from the eastern shore of the pond near the ranch house to an island within the pond. That bridge was a contributing feature of the National Register landscape for this site but had to be removed in 2006 due to severe deterioration and associated risk of public use.

Management of Vegetation

Included with the project to rehabilitate Pond 1 will be the removal of select aquatic and terrestrial vegetation in or near the pond. Specific and targeted removal actions will be completed and will focus on select culling of approximately 88 palm trees and several invasive tamarisk trees, as well as the removal of significant amount of cattail that has continued to grow and reduce open water within the Pond 1 footprint as illustrated in the attached Exhibit. Select palm removal will occur in two phases, the first of which (palm skirt removal) was just recently completed in February, so as to reduce the impact to Yellow Bats during nesting season.

Palm removals are targeted for areas along the eastern shore of Pond 1 where historic view shed restoration as described above, construction accessibility, liner integrity assurance or other aesthetic improvements are necessary. The removal actions will still leave nearly all of the Date Palms at the site intact and will leave over 80 percent of the nearly 500 fan palms (which will continue to proliferate) intact in the vicinity of Pond 1.

Cattail proliferation has continued to encroach into open water at Pond 1 in an uncontrolled manner over the years. Reduction of the cattail mass will increase the open water at the site and will allow us to regain controls on the proliferation of that species. Some measured reintroduction of cattail is planned in Pond 1 once rehabilitation is completed, but that reintroduction will occur in containment vessels to prevent their uncontrolled spread.

The anticipated results of the vegetation management to be completed during the project is illustrated in the attached Concept Plan. This exhibit illustrates both the terrestrial and aquatic vegetative proliferation at Pond 1 as well as how the proposed project will enhance the pond. The project team intends to have a biological monitor present during palm removal activities to monitor the process and ensure it is completed in an ecologically sensitive manner.

Scope of Construction Services

The main components of the construction services contract for Agua Caliente Pond 1 rehabilitation are expected to consist of: Palm Removal, Pond Drying, Pond Excavation and Re-contouring (including enhancement and creation of island), Installation of Synthetic Liner, and Installation of the historic bridge.

Palm Removal: As described above, removal of select palm trees and a few tamarisk trees will be required to facilitate construction site access, restore historic view sheds, and enhance liner integrity. Removal is occurring in two stages with palm skirt removal first which began in February, followed by tree removals during heavy construction activities.

Pond Drying: The first stage in Pond 1 drying is to shut down the groundwater well outflow to Pond 1. That process was initiated on March 1, 2019 and given the high infiltration that presently exists at Pond 1, is expected to lead to a steady lowering of water levels in that pond. Over the first 10 days, the water

level in Pond 1 has dropped over 5 inches. Once water levels recede to a certain level and the wetted footprint of the pond shrinks, further harvesting of various aquatic species at the pond will be considered and initiated as required. Depending on the speed of water level drop, which is partially contingent upon weather, it is possible that active pumping of the remaining water within Pond 1 will be initiated to speed up the process and facilitate drying of the pond base. Solar drying of the pond base will continue until such time as heavy equipment can access the site safely and effectively to begin excavation. Although the project has been well-advertised on line and at the site, there is a possibility that certain park users may become upset as the water level in Pond 1 drops.

Pond Dredging, Re-contouring, and Lining: Once Pond 1 is sufficiently dry, Agua Caliente Park will be shut down to the public and the Pond 1 excavation, re-contouring and lining process will begin. That shut down period is intended to occur during the hot, dry months of 2019, during low park use season, and will be limited to the extent necessary to complete the heavy construction work. Shut down of the park is required due to the accessibility constraints at the site for heavy equipment and safety of individual park users. Generally, the pond will be deepened with cattail root masses as well as accumulated silt and sediment removed. A new wildlife island will be formed and the existing mainland-connected island will be retained and connected by a newly-constructed footbridge. A new polymeric soil blend liner will be installed at the newly excavated base of Pond 1 to significantly reduce infiltration. Then Pond 1 will be refilled and the park reopened to the public. The closure period is expected to last several months with closure of Agua Caliente Park expected to begin in May and last thru July or early August, 2019.

During the completion of this project, it is possible that park users or other residents may voice their concerns about the activities undertaken to your office and/or members of the Board of Supervisors. Those concerns may be due to the removal of select vegetation, the temporary drying of Pond 1, possible aquatic species casualties, or the required several month closure of the park that is required to ensure public safety. We have attempted to mitigate these concerns via engagement of the Friends of Agua Caliente and the public thru our public open house, as well as the posting of the park with signage educating current park users. Additionally, we will be completing another public open house prior to the initiation of heavy construction activities at the site this summer in order to address more fully park closure and traffic considerations associated with the project.

Although these public concerns are understood, the project that is presently underway has been developed to reduce to the extent practicable the impacts on wildlife and park users, yet still accomplish the ultimate benefit of significant reduction of the amount of groundwater pumped and energy used, and the improvement of the aesthetics of the park and the ecological health of the aquatic system at Agua Caliente.

Please do not hesitate to contact me should any questions arise on the status of the content of this memo or the status of the overall Agua Caliente Park improvement project.

Attachments

C: Carmine DeBonis, Deputy County Administrator
Suzanne Shields, Director, Regional Flood Control District
Linda Mayro, Director, Office of Sustainability & Conservation

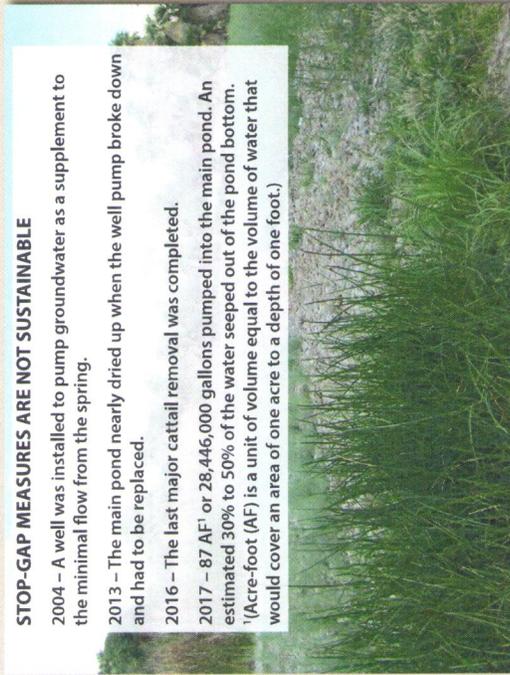
Trouble in Paradise

Water conservation is the focus of a multi-stage process to address the long-term sustainability of the pond.



THE PROBLEM

The spring has not produced measurable flows since 2014. The pond is too shallow as the result of erosion and a buildup of sediment. Shallow water contributes to the spread of invasive cattails. Water loss through seepage out of the pond bottom.

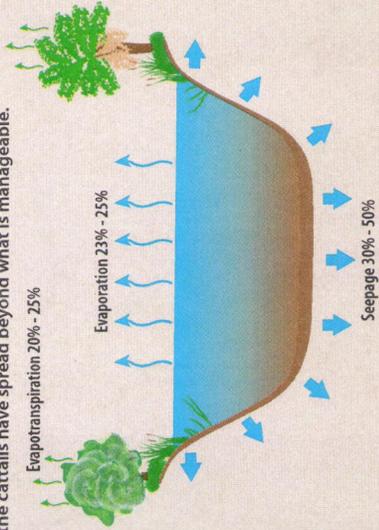


STOP-GAP MEASURES ARE NOT SUSTAINABLE

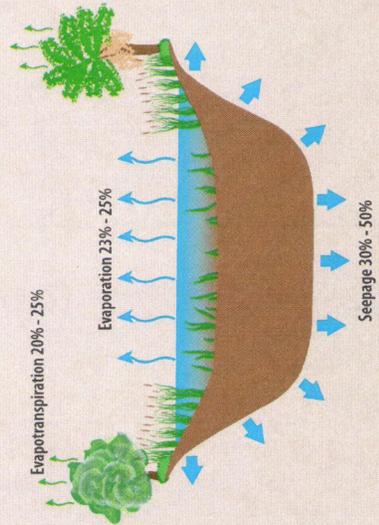
2004 - A well was installed to pump groundwater as a supplement to the minimal flow from the spring.
 2013 - The main pond nearly dried up when the well pump broke down and had to be replaced.
 2016 - The last major cattail removal was completed.
 2017 - 87 AF¹ or 28,446,000 gallons pumped into the main pond. An estimated 30% to 50% of the water seeped out of the pond bottom. ¹(Acre-foot (AF) is a unit of volume equal to the volume of water that would cover an area of one acre to a depth of one foot.)

THE TIME HAS COME TO RENOVATE THE MAIN POND

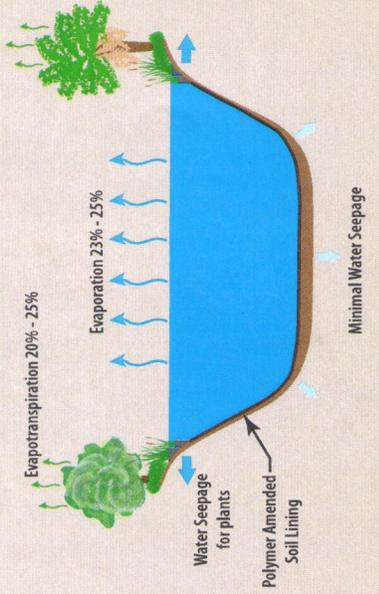
The main pond at Agua Caliente Park has been managed in ways that slow the spread of cattails and sediment in order to maintain open surface water, vital riparian and aquatic habitat, cultural and historic resources, and natural beauty. Despite these efforts, the main pond has been filling with sediment and decaying plant material and the cattails have spread beyond what is manageable.



As ponds age they fill with sediment and organic matter.



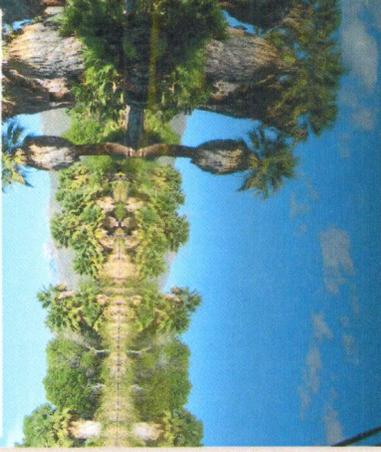
They become smaller and shallower ponds. This is the stage where the main pond is today.



After Renovation - Water conservation goals are achieved when seepage from the pond bottom is near zero and cattails are contained.

PATH TO SUSTAINABILITY

2016 - Pond 2 renovated with impermeable liner.
 Summer 2019 - Renovate main pond
 • Dredge pond to increase depths.
 • Reduce water loss from the bottom with a polymer amended soil lining.
 • Replant cattails in containers and increase water depth at edge of cattails to control spread.



▲ August 2013 main pond nearly dry

Water Conservation

Water loss due to seepage has long been an issue at Agua Caliente Park, a more efficient strategy is needed.



A Brief History

- In 2002, the Tucson community supported "take no action" over the alternative to create a wetland or cienega.
- At that time, the spring sustained the pond system.
- The spring dried up; now groundwater is used to fill Pond 1.
- Too much groundwater is required.
- Add losses due to seepage; "take no action" is no longer feasible.
- The County will curtail the water loss, but will maintain Pond 1 and Pond 2.

Pond System Modifications

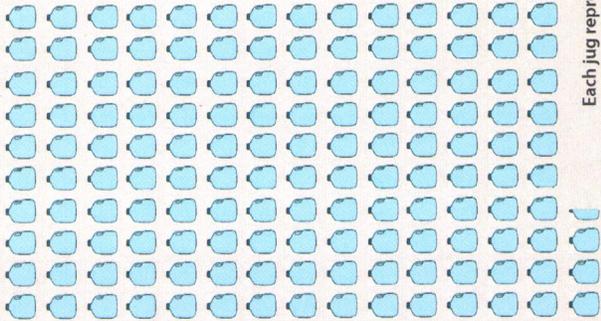
- In 2016, Pond 2 was renovated to prevent seepage.
- A black High-Density PolyEthylene (HDPE) liner was installed in Pond 2.
- In 2019, a liquid polymer emulsion liner will be applied to Pond 1.
- Seepage losses will be dramatically curtailed.

Benefits

- Pumping of groundwater will be significantly reduced because seepage from Pond 1 will be minimized.
- Because overall water losses will be minimized, Pond 2 will also be kept full.
- Greater visibility of the pond surface will result from the removal of selected palms and cattails.
- These changes will result in wildlife habitat improvements and provide more open water for migrating waterfowl.
- The historic character of this Tucson treasure will be restored.



CURRENT: 14,337,444 Gallons Annual Water Seepage Loss

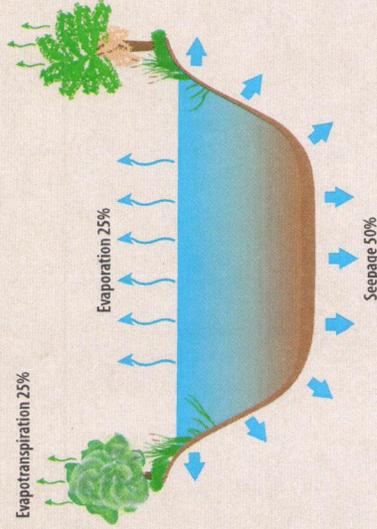


PROPOSED: 325,851 Gallons Estimated Annual Water Seepage

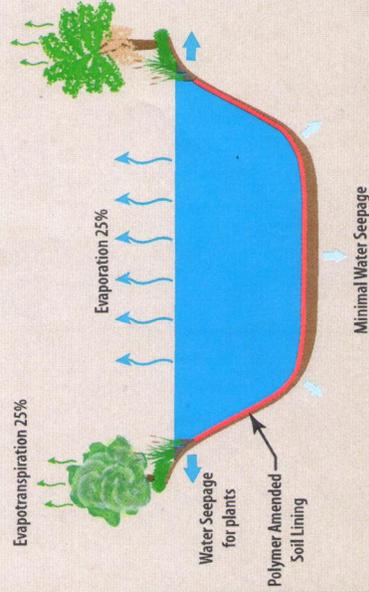


Each jug represents 100,000 gallons

The Path to Sustainability



CURRENTLY: 14 million gallons of water annually seep out of Pond 1



SEAL THE POND: Save millions of gallons of groundwater

Concept Plan – Changes to Come

Water conservation is the focus of this restoration project.



View from entry seating



View along north path – Native trees have more space to grow



Unobstructed view from Ranch House to Island



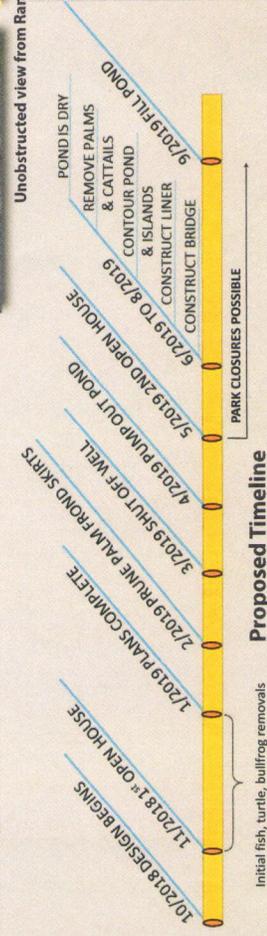
Widened viewshed

Clevega

Shoreline vista

Cattails contained in concrete planters

- Pumping of groundwater will be significantly reduced because seepage from Pond 1 will be minimized.
- The underlying water table, that is currently falling, could recover some volume.
- Greater visibility of the pond surface will result from the removal of selected palms and cattails.
- These changes will result in wildlife habitat improvements and provide more open water for migrating waterfowl.
- The historic character of this Tucson treasure will be restored.



Construction Activities



NOTES

1. All construction areas have cultural clearance.
2. Soil source for material to mix with liner polymer may be Pond 1 or Pond 3.
3. Large loaders and scrapers will frequent the Haul Route during construction.

Pond Restoration – What about the Wildlife?

Agua Caliente Park is an important wildlife sanctuary.

Just as humans flock to the park for its cool shade and water, wildlife does too, which makes the park a haven for hundreds of species of mammals, birds, reptiles, amphibians, and fish. The pond restoration project will disturb the habitat for many of these species, but Pima County has been working to ensure that the disturbance to wildlife is minimized or mitigated during the restoration.

Timing – the drawdown of the pond's water level will begin after the spring migration for birds, thereby ensuring that migratory ducks and other waterfowl will have left for their breeding sites to the north.

Meanwhile, water will continue to be delivered to keep Pond 2 full so any of the resident waterfowl could move to Pond 2.



American Wigeon
Photo by Doris Evans

In the summer monsoon you will see that the ponds at the park provide habitat for scores of native toads. Unfortunately, there is also a thriving population of invasive bullfrogs that have a voracious appetite (they even eat bats). The pond renovation provides a rare opportunity to reduce or eliminate bullfrogs from the ponds.



American Bullfrog
Photo by Doris Evans

Currently, all the fish in the pond are non-native, meaning they have been introduced to our region. The pond hosts populations of introduced blue gill, bass, tilapia, koi, catfish, and mosquito fish. As we prepare for the renovation, all of these fish will be permanently removed from the pond.

Pima County intends to introduce native species to the pond after renovation. Native species to be reintroduced include the native Gila topminnow, which performs the important job of consuming mosquito larva. An exception to the native-species focus will be Pima County's continuation of a program to stock the pond with sterile, non-reproducing grass carp that serve an important function of eating aquatic vegetation. The grass carp currently at the park will be moved to Pond 2 during the restoration of Pond 1.



Red-eared Sliders
Photo by Susan Knoll

The dead "skirts" of palm trees are habitat for one of the uncommon bat species in our area, the yellow bat. Because a few dozen palm trees must be removed as part of the restoration project, Pima County is looking to reduce harm to the yellow bat by trimming the palm skirts during the winter when yellow bats are not known to be residing in the park.



The heron can't do it all! Pima County is exploring several options for removing non-native fish before the pond is drained for restoration.

Great Blue Heron
Photo by Doris Evans

A popular feature at the park are the dozens of red-eared sliders basking in the sun, but too much of a good thing has become a problem. Starting in the Fall of 2018, Pima County staff will begin live-trapping turtles, with the intention of relocating some individuals to a turtle rescue facility in Phoenix.