

December 2, 2023

To: U.S. Fish and Wildlife Services

From: Bushy Lake Eco-Cultural Restoration Project, Dr. Michelle Stevens (CSU Sacramento),  
Alexandra von Ehrenkrook and Becky Rozumowicz (Area West Environmental)

Subject: Support for the Listing of the Northwestern Pond Turtle (*Actinemys marmorata*) and  
Southwestern Pond Turtle (*Actinemys pallida*) as Threatened Under the Federal  
Endangered Species Act. Docket number **FWS-R8-ES-2023-0092**,

Dear Whom It May Concern,

We are writing in support of the listing of both the northwestern pond turtle (NWPT) (*Actinemys marmorata*) and southwestern pond turtle (*Actinemys pallida*) as threatened under the federal Endangered Species Act. In this letter, we will provide information from our research on the NWPT at Bushy Lake and make recommendations for conservation and management practices ([BushyLake.com](http://BushyLake.com)). Our turtle research was initiated in 2020 as a component of the Bushy Lake Eco-Cultural Restoration Project which is located near Cal Expo on the lower American River in Sacramento, California (38.588839, -121.434479). Our first goal designated in the Bushy Lake Conceptual Restoration Plan is to “protect, enhance, and restore a sustainable habitat refuge for northwestern pond turtles (*Actinemys marmorata*).” A complete report of the research methods, results, and inferences of the NWPT surveys can be found on the Bushy Lake website ([BushyLake.com](http://BushyLake.com)). The project team includes Co-PI’s Dr. Michelle Stevens (CSUS Environmental Studies Department) and Becky Rozumowicz-Kodsuntie (President, Area West Environmental, Inc.), Dr. Jamie Kneitel (CSUS Biology Dept), Dr. Tim Davidson (CSUS Biology Dept), Dr. Kevin Cornwell (CSUS Geology Dept), Christine Flowers (CSUS Environmental Studies Dept), Dan Williams (Sacramento Audubon), Lexi von Ehrenkrook (CSUS Masters student) and many CSUS students and alumni. We have all been provided the guidance and training of Jeff Alvarez, a herpetologist, and the founder of The Wildlife Project.

We are studying the population dynamics of NWPT and non-native turtles. We have a scientific collecting permit from the California Department of Fish and Wildlife and have permission to conduct this study without euthanizing non-native turtles. In June 2021 a wildfire burned through the Bushy Lake area, providing an opportunity to observe the immediate impacts of the burn in 2021, as well as post-burn impacts after Year 1 and Year 2 in 2022 and 2023.

This project is funded by the CA Wildlife Conservation Board for \$350,000.00. Other grants and grantors include the CSUS President’s Circle Bushy Lake Restoration Grant; CSUS Anchor University Grant 2022; Sacramento Zoo Grant 2021, 2022 and 2023; The Sierra Club; The Green Incubator; and Save the American River Association (SARA).

The purpose of this letter is to support the NWPT listing and provide recommendations for the NWPT listing based on the extensive 4 years of research at Bushy Lake. Our data is based on the following information: a) three years of visual basking surveys documenting turtle emergence from brumation and basking site utilization; b) four years of monthly mark-recapture data documenting relative abundance of NWPT and non-native population sizes and characteristics, including the proportions of male to female, and adult to juvenile; and c) three years of seasonal, daily nesting surveys (approximately late April through the end of July).

### **Bushy Lake Research Overview**

We have conducted 4 years of detailed turtle surveys following USGS guidelines (2006a, 2006b) under the guidance of Jeff Alvarez, a herpetologist and the founder of The Wildlife Project. These detailed surveys highlight the need for increased protection of the northwestern pond turtle (NWPT) populations and their habitat. We also have specific recommendations for monitoring and management for the conservation of the NWPT.

The mark-recapture surveys at Bushy Lake have identified a northwestern pond turtle population of 7 individuals which includes 6 males and 1 female. At least 2 of the males have been identified as residents of Bushy Lake based on multiple capture-and-release occurrences over the 4 years. All pond turtles observed in this study are healthy adults. The mark-recapture data also identified a population of 290 adult non-native turtles, of which there are 288 red-eared sliders (*Trachemys scripta elegans*), 1 painted turtle (*Chrysemys picta*), and 1 Peninsula Cooter (*Pseudemys peninsularis*). The Peninsula cooter was captured in 2020 and the species was not identified until after its release. The sex ratio for non-native turtles is two females per one male. We additionally captured 89 juvenile non-native red-eared sliders.

The daily nesting surveys conducted at Bushy Lake identified turtle nesting activities in the form of active turtles and predated turtle nests occurring in all directions around the lake. Biologists conducting nesting surveying were trained by Jeff Alvarez; their ability to detect nests and determine nest characteristics was very well-tuned from the experience of daily surveys. Observations include nests identified as potential NWPT based on smaller and shallower nest sizes, fewer eggs, and smaller eggshell fragments than what is typical for a non-native turtle. No actively nesting NWPTs have been observed, however, red-eared sliders have been observed actively nesting, including 27 in the 2023 nesting surveys.

In 2021, all nests within the footprint of the wildfire were burned. The fire additionally impacted vegetation. The first vegetation species to naturally recruit were the native species that have been culturally tended and managed for thousands of years (*Carex barbarae*, *Elymus triticoides*, *Artemisia douglasiana*, *Sambucus Mexicana*, *Salix* species, etc.). However, after being unmanaged, invasive non-native vegetation species reemerged, making it difficult for turtles to navigate and dig through for nesting. These observations suggest that using Traditional Fire Management as a long-term management strategy would be beneficial to turtle populations.

## **Recommendations for Conservation Implementation Strategies and Best Management Practices**

1. Continue to monitor turtle population trends. We observed a tremendous amount of variability and environmental stochasticity from year to year(2020-2023). Determining turtle movement patterns between the American River and Bushy Lake is unknown, and essential information for conservation. Also, there is more fragmentation of habitat over time. We plan to contribute our data to the Western Pond Turtle Rangeland Conservation Coalition (RCC) for true population size, sex ratios, demography, growth, reproductive success and survivorship.
2. Develop consistent and comparable monitoring standards for western pond turtle population assessments. We plan to use mark-recapture trapping and nest surveys for long term data collection.
  - a. Mark-recapture studies at Bushy Lake have been found to be the most comprehensive and representative method for assessing turtle populations and population dynamics. Nesting surveys and basking surveys were beneficial for identifying and assessing habitat quality. We have not found basking turtle surveys to provide reliable data. Trying to say is there is need for detailed and intensive turtle surveys.
  - b. Conduct daily nesting surveys through nesting season. Protect active nests from predation through wire covers or other mechanisms.
  - c. Use of wildlife cameras and artificial basking sites to monitor turtles year-round (outside brumation season).
  - d. Determine turtle movement patterns. In the future, use telemetry studies to help determine local movement patterns
3. Prevent road mortality and bike strikes. Collect monitoring data on the potential impacts of recreational activities on nesting turtles and consider implementing seasonal use guidelines.
  - a. At Bushy Lake, approximately 26% of all turtles and 66% of all female turtles (native and non-native) exhibit shell pitting consistent with turtle-bicycle collisions. Vehicles and lawnmowers can be fatal to nesting turtles, especially if the lawnmower is not raised to at least 6 inches (Alvarez, et al., 2017).
  - b. At Bushy Lake, the turtle nesting season occurs from late April to the end of July, and in collaboration with Sacramento County Parks, signage is posted to alert bicyclists to watch for nesting turtles.
  - c. Collaborate with local organizations to inform and educate community members on what to do if you see a turtle (heading to terrestrial habitat to lay eggs primarily). For example, the Bushy Lake Project's collaboration with the American River Parkway Bike Patrol has been valuable for outreach with the local bicycle and recreational communities.
  - d. Determine the potential for recreational impacts, such as bicycle strikes or other human impacts, on turtles who are basking or nesting activities.
  - e. Place signs around roads and bike paths during nesting season.

- f. Provide public education, especially among bike or running or other recreational groups, on how to handle turtles.
4. Provide high-quality basking habitat by adding large woody debris and artificial basking platforms in areas where there are high concentrations of turtles.
  - a. At Bushy Lake, these areas were identified through the weekly basking surveys during times of high solar exposure. We observed maximum basking activity occurring on the north side of Bushy Lake (south-facing slope).
5. Restore and maintain accessible, quality upland nesting habitats for turtles.
  - a. Manage accessible nesting habitat by continuing to implement managed seasonal mowing and grazing practices. Implement continued oversight to ensure that activities take place outside of turtle nesting season and that mowing equipment is set at least 6 inches above the ground to avoid adverse impact on nesting turtles (Alvarez et al. 2017).
  - b. Mowing and grazing activities at Bushy Lake have been followed by immediate use by nesting turtles, likely due to the increased accessibility for traveling and digging.
  - c. Remove non-native vegetation, particularly those with dense foliage or rhizomatous root systems that impede turtle movement and obstruct nest-building activities. Black mustard, bermuda grass, star thistle, poison hemlock, barnyard grass, tall whitetop, and bull thistle came back strong after the fire at Bushy Lake and were observed impeding turtle access to nesting sites.
  - d. Plant native, fire-resilient, and culturally significant vegetation. In June of 2021 during peak turtle nesting season, Bushy Lake experienced a fire that burned approximately 60% of the Project area surrounding the lake. Native, fire-resilient, and culturally significant vegetation will support nesting turtles by providing a traversable habitat for nesting turtles and access for hatchlings to water.
  - e. Implement Traditional Fire Management (TRM) to maintain native, fire-resilient, and culturally significant vegetation as well as support indigenous communities' tending, gathering, and ceremonial practices (Eriksen and Hankins 2024; Hankins 2013; Stevens 2020; Zedler and Stevens 2018). Traditional Fire Management stimulates native plants and reduces invasive species, builds the soil, and increases water holding capacity and permeability.
6. Monitor habitat quality, degradation, and fragmentation. Implement monitoring and adaptive management to maintain the quality of site conditions.
7. Prevent predation of hatchlings. Develop implementation plans that aid population recovery, including nest protection, captive rearing, and head starting.
8. Incorporate plans for identifying and managing shell rot disease. Monitor for and treat shell rot disease in turtles in natural environments and programs for population manipulation. Conduct shell rot disease research as needed.
  - a. Personal communications with members of the Sacramento Zoo have identified that consistent application of Vaseline on pond turtle shells has been beneficial in treating and preventing shell rot disease.
9. Integrate conservation measures for other wildlife in pond turtle habitats, such as beavers. A resident beaver population at Bushy Lake has been found to have a commensal

relationship with turtles. Beavers create channels (beaveways) giving turtles easier access to terrestrial habitat; turtles have been observed utilizing these channels for increased access to suitable nesting habitats. The increased wetland area due to beaver activity also increased fire resiliency on the site, thus protecting turtle habitat.

10. Manage invasive species posing significant threats to pond turtle hatchlings.
  - a. **We do not advocate for any mandatory euthanasia of non-native Red-eared sliders.** In locations such as Bushy Lake, ample basking sites, food supply, and nesting sites reduce competitive pressure between the two species.
  - b. Eradicate bullfrogs and non-native fish to reduce predation threats to hatchlings.
  - c. Eradication of non-native crayfish is not recommended at places like Bushy Lake; eradication would have adverse impacts on the entire aquatic ecosystem. Also, crayfish are additionally a beneficial food resource for turtles.
11. Develop significant policy changes to prohibit the sale and release of non-native turtles, particularly Red-eared Sliders.
  - a. Create policies to prohibit the sale and import of non-native turtles. The only way to manage long-term negative impacts and competition between released turtles and pond turtles is to prevent the continued introduction of non-native turtles.
  - b. Educate the public and existing owners of turtles on the adverse environmental impacts of non-native turtles.

Thank you for considering our comments and recommendations in listing the north and southwestern pond turtles under the federal Endangered Species Act. We are happy to share more about the turtle research and observations to support this listing.

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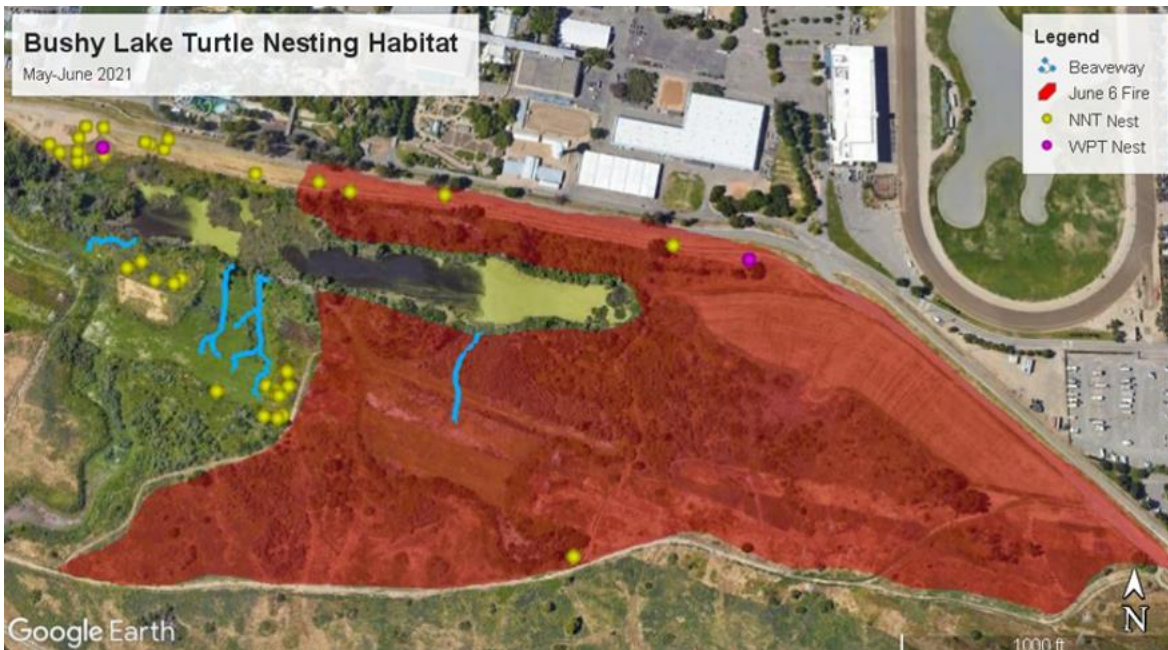
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**Figures**



*Bushy Lake Conceptual Restoration Planning Area (38.588839, -121.434479) is located within the lower American River Parkway, south of Cal Expo and north of the lower American River.*



*Nesting activity of 2021 turtle nesting surveys overlaid with the footprint of the June 6, 2021, wildfire at Bushy Lake, and the beaver-made channels “beaveways” (May 1 – June 30, 2021)*





*Nesting activity of 2022 turtle nesting surveys (April 4, May 6 – July 25, September 3 and 17, 2022)*



*Nesting activity of 2023 turtle nesting surveys (May 21, May 26, June 1 – July 3, 2023)*





*Adult female northwestern pond turtle (left) and red-eared slider (right) exhibiting pitting indicative of bicycle strikes at Bushy Lake.*



*Seasonal turtle crossing signage posted along recreational trails adjacent to Bushy Lake. Signage posted by the Sacramento Department of Parks and Recreation.*