



Turtle Observer Program Report 2018:

Biological survey results and community science strategies

Marin Municipal Water District

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2018

Introduction

The western pond turtle (*Actinemys spp.*) is the only native aquatic turtle in California, and was recently split into two different species: the northern western pond turtle (*Actinemys marmorata*) and the southern western pond turtle (*Actinemys pallida*) (Nafis 2018a). Their ranges meet at the Golden Gate. Years of habitat degradation and invasive competition have reduced western pond turtle populations to a critical level. The International Union for the Conservation of Nature (IUCN) lists the western pond turtle as ‘Vulnerable’ (IUCN, 2016), and the California Department of Fish and Wildlife lists it as a “species of special concern.” Populations in the San Francisco Bay Area have struggled, but effective management strategies can allow this species to persist in tandem with human use of its habitat.

Persistent western pond turtle populations exist in Marin Municipal Water District’s (MMWD) reservoirs in Marin County, California. Due to the proximity to suburban areas, pet releases are common and non-native turtle species are in the majority throughout the watershed (MMWD, 2017). The Water District’s Aquatic Ecologist and Watershed Volunteer Coordinator have developed an observational survey designed to provide the District with an annual snapshot of the population dynamics in four reservoirs. The survey is designed with community science in mind - dedicated volunteers provide hours of monitoring that would not be possible otherwise. The goals for the 2018 observer program were two-fold: 1) to establish population estimates for native and non-native turtles in each reservoir and determine the proportion of native to non-native turtles and 2) to educate the public about native turtle species and the importance of not releasing pets into the wild.

Methods

On February 24th 2018, community scientists attended a three-hour lesson covering the observational survey techniques, turtle species identification, and methods for public engagement. The identification techniques were taught using photos of western pond turtles (WPT) and red-eared sliders, as well as a live slider to show distinguishing field markings. One of MMWD’s rangers came to address our volunteers about interactions with watershed visitors and appropriate public engagement.

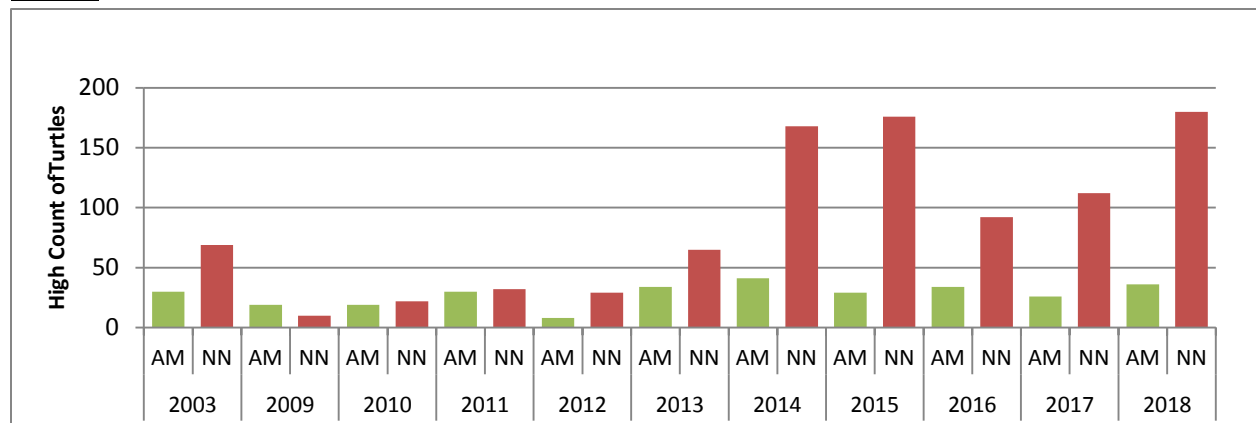
Our volunteers were invited to observe at any survey site at any time between February 24th and June 4th. One of our most seasoned volunteers began observing January 28th and collected six days of data prior to the training.

MMWD provided all equipment necessary for the surveys, including binoculars and spotting scopes, and provided training on the use of the optics during the orientation on February 24th. The Watershed Stewards Program (WSP) Member assisting with the program curated and logged the data forms submitted by volunteers into Excel, and performed quality assurance by altering species identifications where necessary.

Surveys occurred at one or more of four locations on MMWD’s reservoirs – Alpine Lake (ALP), Bullfrog Trail (BFT), Phoenix Lake (PHX), and Lake Lagunitas (LAG). Each site was chosen due to previous years’ success in observational surveys, but participants were also encouraged to scout out new areas. Surveys lasted between 0.25 and 5.5 hours, and observations recorded at the same location on the same date were reduced to only the high count of each species for the day. Populations were estimated using the high count for each site.

Observations were recorded on a paper data sheet which included the volunteer name, date, time interval, and weather. Volunteers were asked to record qualitative observations for each turtle including: the observing location, whether the turtle was basking or swimming, if the head was visible, if the turtle had a red stripe behind the eye, if the turtle had yellow facial stripes, if the throat was noticeably lighter than the face, and if there were yellow markings on the shell. Based upon these observations, volunteers could then classify the turtle as a western pond turtle (AM), red-eared slider (TS), unidentified non-native (NN), or an unknown species (U). WSP Members were also able to use this information to identify species classification errors when doing quality assurance.

Results



Bullfrog Trail

Volunteers conducted 25 observational surveys at Bullfrog Trail through the 2018 season and observed 11 western pond turtles (AM) and 88 non-native turtles (NN) at the highest count. The peak date for basking was April 14th.

Alpine Lake

Volunteers conducted 15 observational surveys at Alpine Lake below Bon Tempe Dam through the 2018 season. Volunteers observed 13 western pond turtles (AM) and 53 non-native turtles (NN) at the highest count. The peak date for basking was March 11th.

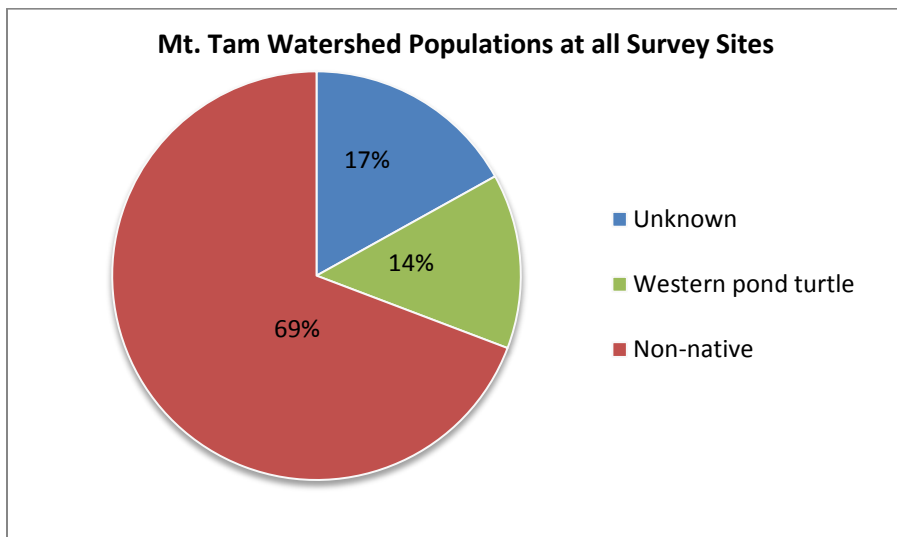
Lake Lagunitas

Volunteers conducted eight observational surveys at Lake Lagunitas through the 2018 season. Volunteers observed six western pond turtles (AM) and 13 non-native turtles (NN) at the highest count. The peak date for basking was April 14th.

Phoenix Lake

Volunteers conducted 11 observational surveys at Phoenix Lake through the 2018 season. Volunteers observed six western pond turtles (AM) and 26 non-native turtles (NN) at the highest count. The peak date for basking was March 31st.

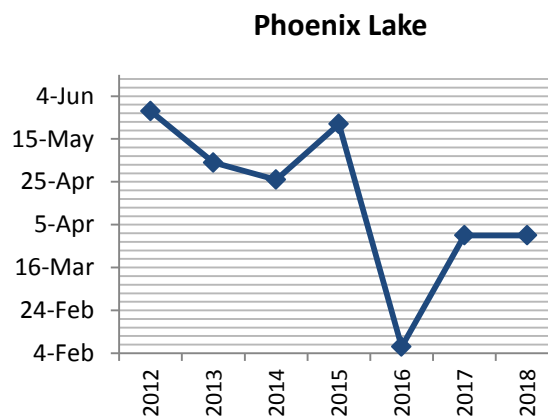
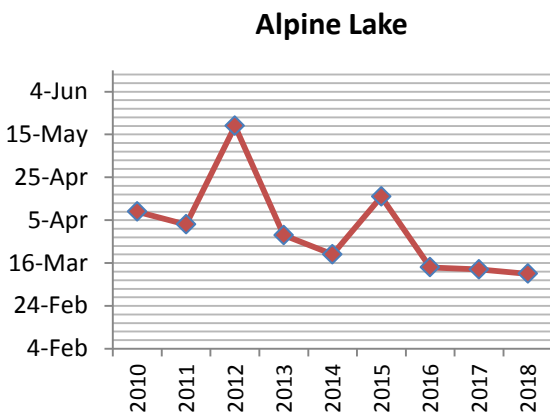
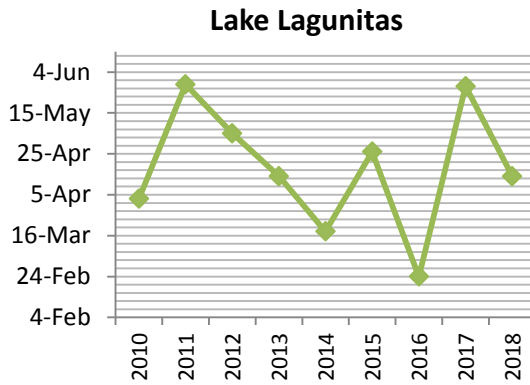
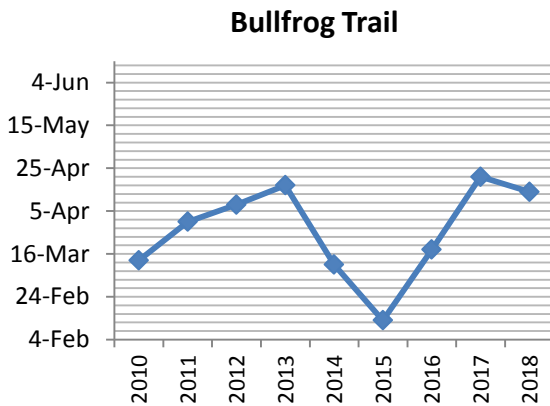
Total Population Composition



There were 44 unknown observations, and almost half of those were from Bullfrog Trail. Unknown species accounted for 17% of the total observations, western pond turtles accounted for 14%, and non-native turtles accounted for the other 69%.

The 2018 population estimates for all lakes, based on single-day high counts, were 36 western pond turtles (up from 25 individuals in 2017) and 180 non-native turtles (up from 112 individuals in 2017).

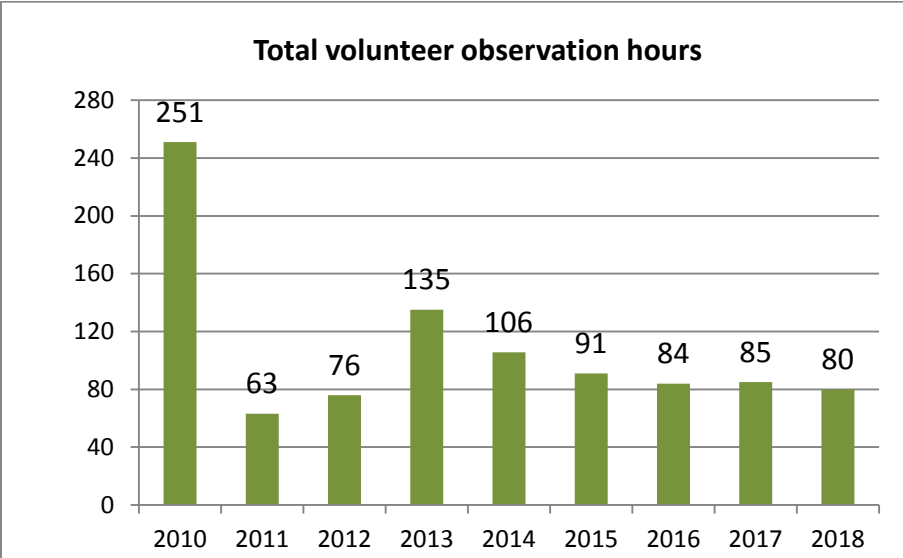
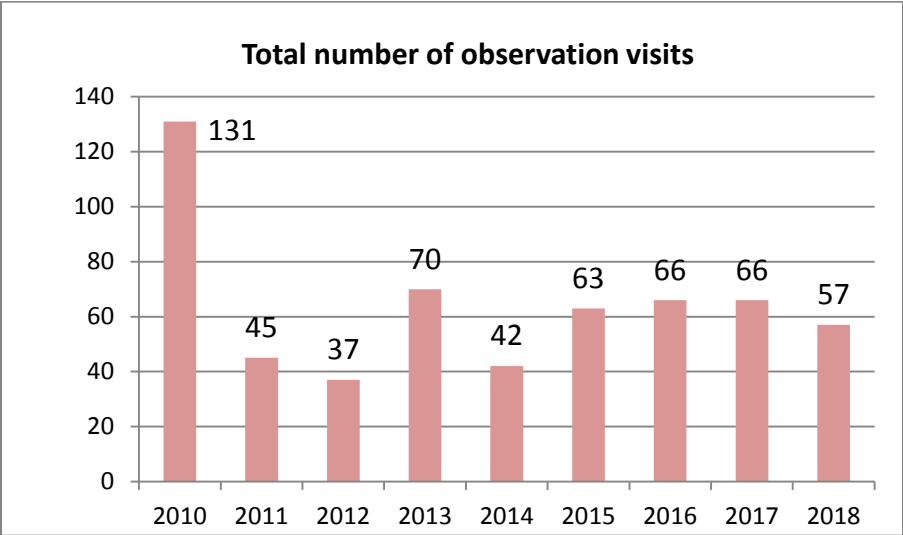
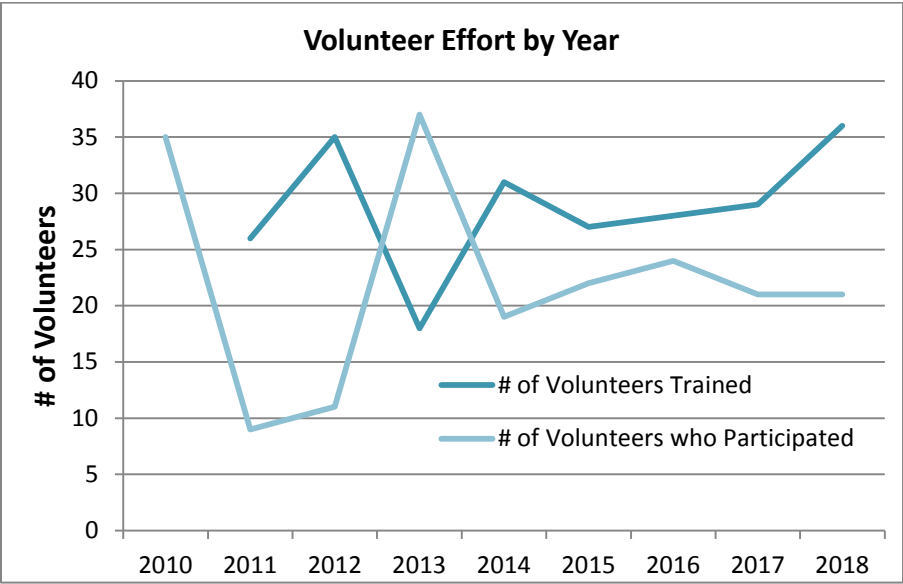
Peak Basking Dates



Over the course of all turtle observer seasons, basking peaks at the four sites have ranged between February 2nd and May 29th. Peak basking dates appear to be shifting earlier at Alpine and Phoenix Lakes, but no trend has been seen at Bullfrog Trail or Lake Lagunitas.

Volunteer Statistics

MMWD's Turtle Observer Program orientation/training was attended by 36 individuals, 21 of whom provided survey data during the season. Four of those volunteers were return volunteers. Surveys were conducted on 30 of the 101 total available days between February 24th and June 4th. An additional six surveys were provided by Kathy Tama from January 28th to February 10th. Volunteers contributed a total of 80 survey hours over 57 surveys. Volunteers made 1373 individual turtle observations.



Discussion

The 2018 Turtle Observer season was successful in providing a snapshot of the population dynamics between native and non-native residents on the Mount Tamalpais Watershed. The number of non-native turtles observed this year was the highest recorded on our watershed, with non-native turtles outnumbering our native western pond turtles (WPT) by more than 4:1. The non-native population also appears to be increasing at a faster rate, which supports the fact that WPTs have a lower recruitment than the non-native turtles. Red-eared sliders reach sexual maturity at a younger age than WPT and have higher fecundity, so this trend is likely to continue if there is no intervention.

Both native and non-native turtles are utilizing the same basking sites, egg laying sites and food sources. There is concern that as the non-native population continues to increase, competitive displacement of our native WPT could occur. While reducing the population of non-native turtles through the use of trapping has been a goal in past years, there were no efforts made to trap turtles this year. There were 18 red-eared sliders that were passively captured and brought to a local reptile rescue.

One recommendation to increase numbers of native turtles is to engage with the Western Pond Turtle Head-start program created by the Oakland Zoo, San Francisco Zoo, and Sonoma State. WPT eggs are collected from native populations, the hatchlings are reared at the zoo until they are large enough to better avoid predation (one year old zoo-reared turtles are the size of three or four year old wild turtles), and then they are released back into the wild. Entering into a partnership with these agencies could increase native turtle population numbers at a greater rate than would occur naturally. This, in tandem with invasive turtle removal efforts, could help native turtles become the majority in the future.

Community Science: Training, Statistics and Strategies

The continuation of this program is completely dependent on our community scientists who volunteer their time. Based on the range of dates for peak turtle observations, it is recommended that Turtle Observer Training take place in mid to late January. At the latest, training should take place in early February. The number of participating volunteers remained about the same in 2017 and 2018, but the number of observation visits and hours observed decreased. Only 60% of the volunteers trained actually went out to observe, but that percentage appears to be the norm every year.

Some of the data sheets turned in were missing information or were confusing to interpret. This can be attributed to not explicitly showing volunteers how to fill out the data sheet during training. It would be beneficial to do this in next year's training to avoid confusing or incomplete data sheets in the future. If the data sheets had been processed and entered at the beginning of the season instead of the end, this issue could also have been potentially mitigated.

Increasing volunteer hours and improving the cohesiveness of the program could be achieved by hosting small group observation days. Utilizing the Volunteer Program's outreach sources or a site such as Meetup could accomplish this. Offering small prizes when certain thresholds are met (for example – a volunteer shirt on your first observation day, a cool sticker after doing two hours of survey, etc.) could also improve participation. In addition, Turtle Tuesday emails could be sent out every other week and a fun, informational graphic or video could be sent out on alternating weeks to keep volunteers engaged.

Important considerations for future years include determining the minimum number of hours or individual observations necessary for accurate population estimation and predicting the best dates to conduct surveys through the analysis of past high count dates and historical weather data. By reducing the number of variables present, more statistically significant results could be generated.

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