

Movement Patterns and Habitat Use by the Western Pond Turtle (*Actinemys marmorata*) in the East Bay Regional Park District

ABSTRACT

The western pond turtle (*Actinemys marmorata*) has been declining throughout its range due to a number of stressors including: habitat degradation and loss, spread of exotic competitors, non-native predators, and epidemic disease. Our only native California turtle is currently listed

as a California Species of Special Concern. Through the use of small radio-telemetry devices we tracked the seasonal movement patterns and habitat use of western pond turtles in freshwater ponds that are subject to livestock grazing at Clayton Ranch in eastern Contra Costa County, California. Preliminary research findings

will be shared that shows how western pond turtles use the surrounding landscape for winter hibernation, nest building, and as dispersal corridors to other sites. This type of new, locally obtained information is critical in maintaining habitat for this special status species. To our knowledge, this is the first long-term research effort

on East Bay Regional Park District lands to study, manage and implement habitat enhancement projects that are designed to improve conditions for the western pond turtle and support the East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan.

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STUDY AREA

Clayton Ranch is the site of our study to evaluate the movement patterns and habitat use of western pond turtles in freshwater ponds containing submerged and emergent vegetation that are subject to livestock grazing in eastern Contra Costa County, California (Fig 1). Annual grasses and forbs dominate the landscape and trees generally comprise less than 10% of the canopy cover. Introduced annual grasses, including wild oats (*Avena spp.*), brome grasses (*Bromus spp.*), and annual fescues (*Vulpia spp.*) are the dominant grass species. The associated herbaceous cover includes native and nonnative forbs and native wildflowers. The dominant tree species primarily include blue oak (*Quercus douglasii*), valley oak (*Q. lobata*), and scattered interior live oaks (*Q. wislizenii*).

This site operated by the East Bay Regional Park District has a robust turtle population, provides year-round access, and offers opportunities for public involvement and volunteerism (Fig 2).

METHODS

Turtles are captured using a variety of techniques (floating hoop nets, floating sundeck and solarium turtle traps). Upon capture, individuals are sexed using morphological characters. Males possess a slightly concave plastron, thicker tail, and a cloaca that extends posterior to the edge of the carapace. Females generally have a flat plastron, and the cloaca is anterior to the edge of the plastron (Fig 3). In addition, adult females have dark flecking on the throat while males tend to have pale throats. Turtles are weighed with a 1,000 gram Pesola hand scale, and maximum carapace length and width, shell height and maximum plastron length measurements are taken with a 200 mm caliper. Turtles are fitted with ATS R1850 transmitters, each weighing 12 grams (ATS Tracking Systems, Isanti, MN), with five-minute waterproof gel epoxy. We glued transmitters to the third pleural scute to avoid interference during mating (Boarman et al. 1998) and the antenna is left free to prevent snagging on vegetation. Turtles weighing over 320 grams are fitted with transmitters in order to remain within the suggested 3-5% body weight ratio to avoid alteration of turtle behavior.

We locate turtles using an ATS R410 model hand-held receiver (Advance Telemetry Systems, Isanti, MN) with three element antenna. Currently, from March through May we attempt to triangulate the positions of all turtles and record their movement patterns within the pond environment once a week. Relocations are attempted almost daily from June until mid-August to document turtle migrations to and from the ponds, dispersal corridors, and nesting sites. During the fall and winter (September through the end of February) turtles are located twice a month to document migrations and verify hibernation locations and habitat features associated with overwintering hibernacula. In addition to monitoring data, we collect the habitat features used by western pond turtles (plant abundance, height, % cover and RDM values).



Figure 1. Ponds are subject to livestock grazing at Clayton Ranch in eastern Contra Costa County, California.



Figure 2. Volunteers observing a young western pond turtle (*Actinemys marmorata*).



Figure 3. Morphological characteristics of adult western pond turtles: female (left) and a male (right).

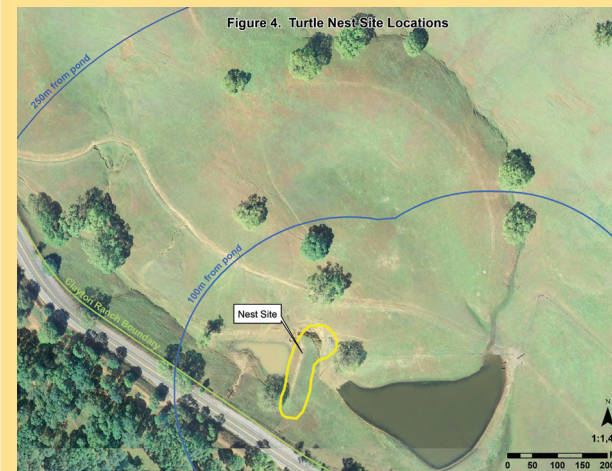


Figure 4. Distance from pond to 2012 nest locations.

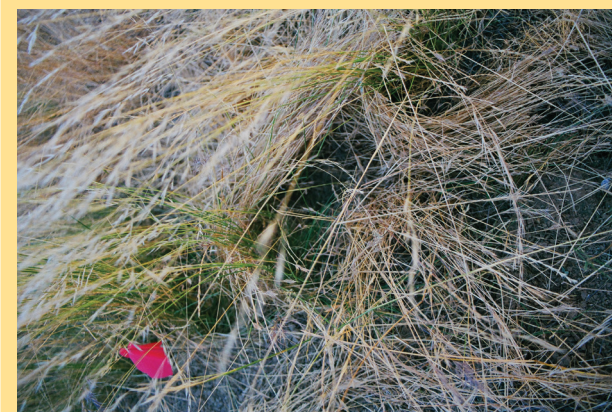


Figure 5. Typical nest site characteristics.

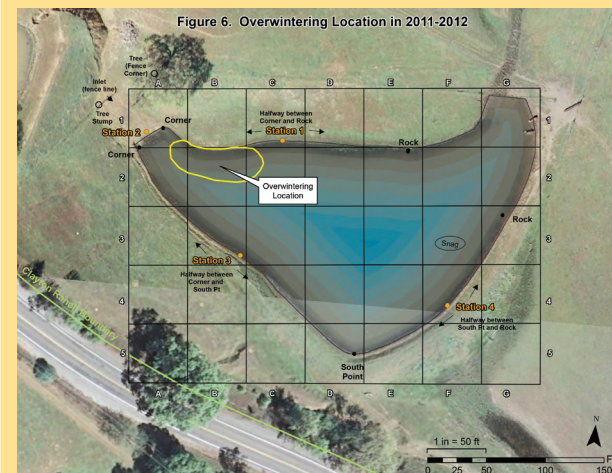


Figure 6. Overwintering locations during the 2011-2012 season.

PRELIMINARY RESULTS

- Females (n=6) moved an average of 45.8 meters from water to nest site locations (Fig 4).
- Nest building sites (n=6) were located in ungrazed and seasonal grazed areas with good sun exposure containing the following characteristics: residual dry matter (RDM) = 1,889 lbs/ac. (2144. kg/ha), grass height = 50 cm., and % vegetation cover = 85% (Fig 5).
- Overwintering, telemetry marked turtles (n=12) remained underwater forming an aggregation at the inlet to the pond (Fig 6).
- Habitat use patterns of largest female (#9) and male (#3) (Fig 7).

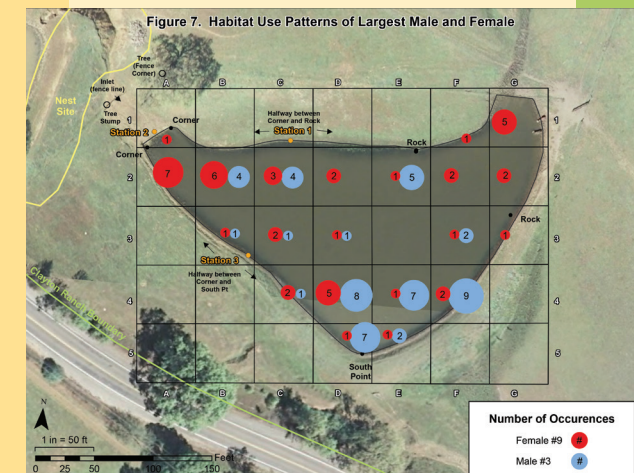


Figure 7. The habitat use patterns of the largest female (#9) and male (#3) western pond turtle (*Actinemys marmorata*).