A.14 WESTERN POND TURTLE (*ACTINEMYS MARMORATA*)

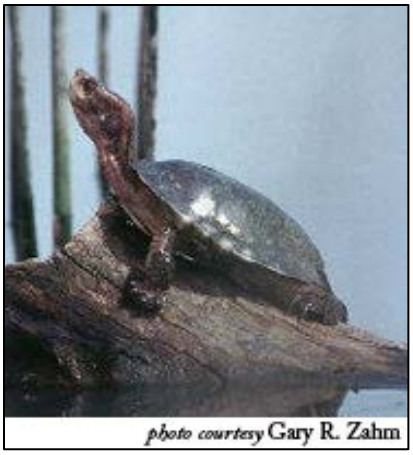


photo courtesy Gary R. Zahm

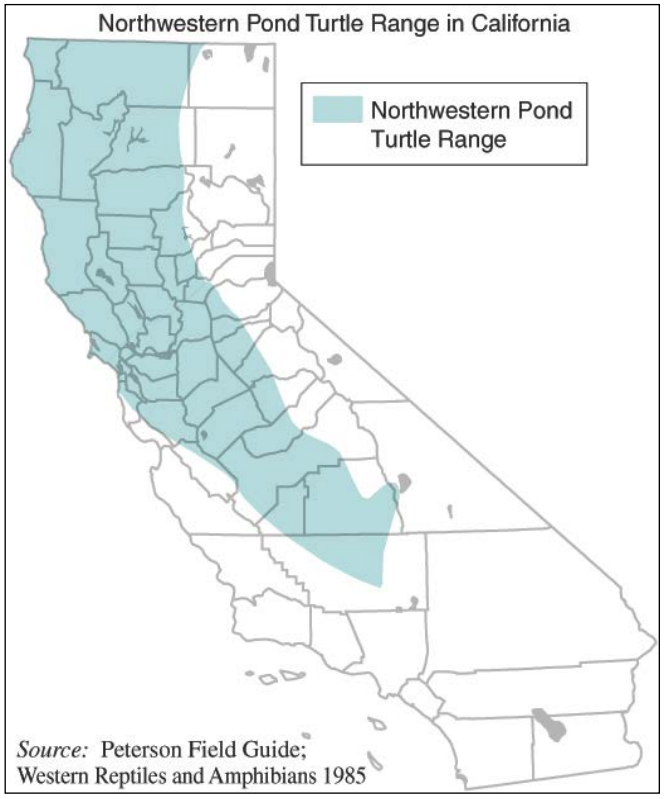
A.14.1 Legal and Other Status

The western pond turtle previously included two subspecies, the northwestern pond turtle (*Clemmys marmorata marmorata*) and the southwestern pond turtle (*C. m. pallida*). Both were petitioned for federal listing as endangered or threatened on January 29, 1992. In 1993, the U.S. Fish and Wildlife Service (USFWS) determined that there was insufficient information to propose listing. Recent phylogenetic research combines the two subspecies into a single species (*A. marmorata*) (Bury and Germano 2008, Spinks and Shaffer 2005). The western pond turtle is a California Species of Special Concern.

A.14.2 Species Distribution and Status

A.14.2.1 Range and Status

Historically, the western pond turtle was relatively continuous in most Pacific slope drainages from Washington along the Columbia River to northern Baja California, Mexico (Jennings and Hayes 1994). In California, this species historically occurred in most Pacific slope drainages between the Oregon and Mexican borders and in only two drainages on the desert slope: the Mojave River (San Bernardino County) and Andreas Canyon (Riverside County) (Jennings and Hayes 1994). The northwestern pond turtle is the subspecies present in the Plan Area.



Populations throughout the western pond turtle range have shown declines. Bury and Germano (2008) report declines in the northernmost and southernmost portions of western pond turtle range, but not in the core of the range from central California to southern Oregon. Hays et al. (1999) also report stable populations in southern Oregon while northern Oregon populations have suffered severe declines. Most populations in the state of Washington have been extirpated; however, some progress has occurred through implementation of the Western Pond Turtle Recovery Plan (Hays

et al. 1999). The California distribution of the western pond turtle currently extends from the Oregon border to the San Francisco Bay Area through San Joaquin and Tuolumne County to the east and Santa Clara County south to the Mexican border. The elevation range for this species extends from near sea level to 4,690 feet (1,430 meters) (Jennings and Hayes 1994).

A.14.2.2 Distribution and Status in the Plan Area

California Department of Fish and Game has five records of the western pond turtle within Butte County (CNDDB 2006). Two records are located west of Gridley, one within the Gray Lodge Wildlife Area and the other in the Butte Sink area southeast of Butte Creek.

The remaining three are located near Oroville; one is 0.5 mile north of the Thermalito Diversion Dam, and another is north-northeast of South Table Mountain in the ephemeral Chevereaux ponds. The final record is located along Gold Run Creek, east of Highway 99, north of Cottonwood Road, and about 7 miles northwest of Oroville (see Figure A.14-1, *Western Pond Turtle Modeled Habitat and Recorded Occurrence*).

A.14.3 Habitat Requirements and Special Considerations

The western pond turtle requires stagnant or slow-moving water in aquatic habitats. This species is uncommon in high gradient streams most likely due to low water temperatures, high current velocity, and low food resources, which may limit their local distribution (Jennings and Hayes 1994). Habitat quality may be dependent on the availability of basking sites, such as locations along the bank or in shallow water where the turtles can bask in the sun. Local populations of western pond turtles can increase according to the availability of basking sites (Jennings and Hayes 1994). Hatchlings forage in shallow water areas with dense submergent or short emergent vegetation, where small aquatic organisms are likely to be in abundance.

For reproduction, the western pond turtle requires upland habitat adjacent to the aquatic habitat for oviposition (egg-laying). Suitable oviposition sites must have the proper thermal and hydric environment for incubation of the eggs (Jennings and Hayes 1994). The eggs are best suited for development in dry, warm places because of their thin shells. The female typically digs the nest in soil with high clay or silt content on an unshaded slope. The slope with the nest is most likely south-facing to ensure that the substrate temperatures will be warm enough from the direct sunlight to incubate the eggs (Jennings and Hayes 1994). Proximity of the nesting site to aquatic habitat is reliant on availability, and the nest site is generally within 656 feet (200 meters) from the aquatic habitat, but can be up to 1,319 feet (402 meters) away (Storer 1930, Jennings and Hayes 1994).

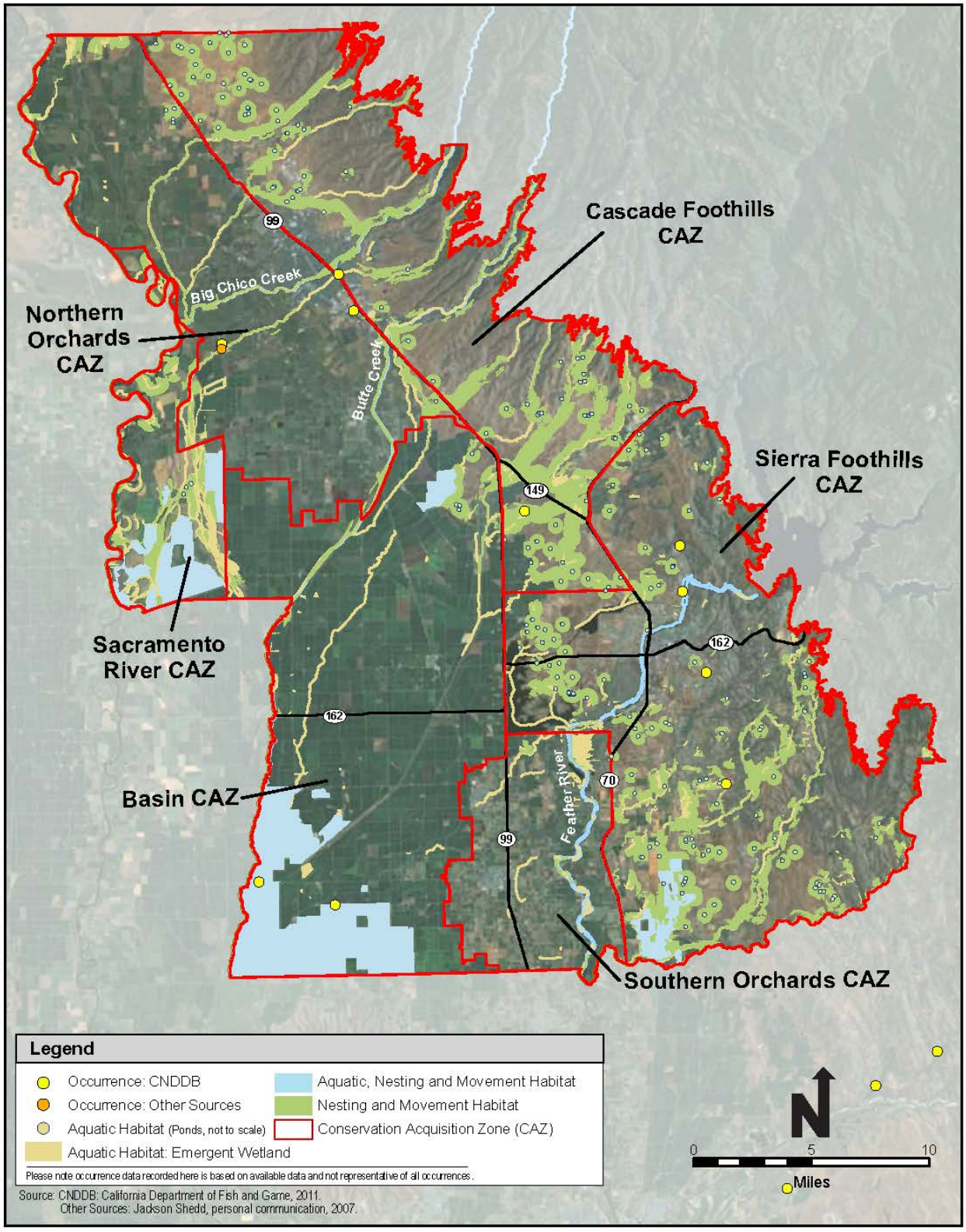


Figure A.14-1. Western Pond Turtle Modeled Habitat and Recorded Occurrences

A.14.4 Life History

The western pond turtle is primarily aquatic and leaves the water only to reproduce, aestivate, and to overwinter (Jennings and Hayes 1994). The activity level of the western pond turtle dramatically increases when the surface water temperature reaches 15°C (59°F) consistently (Jennings and Hayes 1994); in northern California, this temperature regime occurs in March or April. In October or November, the turtles disappear to find adequate sites to spend the winter. Daily behavior of the western pond turtle revolves around thermoregulation. Turtles consistently bask on logs and other objects protruding from the water surface when the air temperatures are warmer than the water temperatures (Holland 1985, Jennings and Hayes 1994). Mats of submergent vegetation also create good water basking locations because the dense vegetation traps surface water allowing higher surface water temperatures (Holland 1985). When air temperatures rise above 40°C (104°F), western pond turtles typically bask in the warmer surface water (Holland 1985). Turtles tend to avoid water with temperatures greater than 39°C–40°C (103–104°F) (Jennings and Hayes 1994).

Mating usually occurs in late April or early May and oviposition can occur as early as late April and as late as early August, but most eggs are deposited during May and June (Jennings and Hayes 1994). Females leave the aquatic habitat to find an upland location to nest. The female will construct the nest about 3.9–4.7 inches (10–12 centimeters) deep and deposit one to 13 eggs with a thin, hard outer shell (Jennings and Hayes 1994). Females can lay more than one clutch a year (Jennings and Hayes 1994).

After the eggs hatch, the hatchlings appear to remain in the nest through the fall and winter because there have been very few observations of hatchlings during this time (Holland 1985). Most hatchlings will emerge in the spring from the nest and move to aquatic habitats. The young turtles will spend most of their time feeding in shallow waters with dense vegetation on small aquatic organisms. Young turtles tend to grow slower when food resources are scarce and at higher latitudes and altitudes. Typically, hatchlings will double in size during the first year and continue to increase in size over the following four to five years (Storer 1930, Holland 1985). Turtles reach sexual maturity at seven to 11 years of age. Turtles in Northern California mature later and at a larger size compared to turtles in the south. Western pond turtles are thought to be long-lived.

Western pond turtles are dietary generalists and highly opportunistic and will consume almost anything that they are able to catch and overpower (Jennings and Hayes 1994). The turtles pursue their prey relatively slowly, thus their diet typically consists of relatively slow-moving aquatic invertebrates (e.g., the larvae of many aquatic insects), carrion, and aquatic vegetation (Jennings and Hayes 1994).

A.14.5 Threats

The main factors contributing to the decline of the western pond turtle population include loss of aquatic and nesting habitat from urban development and conversion of native habitats to agricultural lands; the increase of introduced nonnative predators (i.e., exotic turtles); predation on young, especially by raccoons; and commercial harvest (Jennings and Hayes 1994, Gale 2004).

A.14.5.1 Habitat Loss and Fragmentation

In California, Jennings and Hayes (1994) consider the western pond turtle as endangered from the Mokelumne River south and threatened elsewhere within the state. Loss of habitat is the most significant factor in western pond turtle declines. Over 90 percent of the historical wetlands in California have been drained, filled, or diked to support agricultural and urban development (Frayer et al. 1989).

Habitat loss and fragmentation produce small populations that are increasingly isolated and limited in space, thus reducing the movement of individuals and genetic exchange between populations. These small, isolated populations are highly susceptible to extinction caused by catastrophic or stochastic events. Isolation limits the ability of the population to recolonize areas with suitable habitat where western pond turtles may have been present in the past.

Agricultural practices such as disking, intensive livestock grazing, and trampling have degraded many remaining vernal pools and wetland habitats, as have off-road vehicle use and contaminated runoff. Turtle nests may be inundated during floods and irrigation of agricultural fields. The egg shells absorb water and can crack or explode from internal pressure (Feldman 1982). Therefore, nest success and recruitment may be reduced in flood-prone or active agricultural areas.

Roads can create barriers to dispersal movements of western pond turtle and contribute to the isolation of populations. Contaminants from road materials, leaks, and spills could further degrade aquatic habitats used by this species. Corridors from aquatic habitat to historical and long-term nesting sites can be blocked by roads and development. Movement of adult females to and from the nesting location and the movement of hatchlings from nests to aquatic sites can be impeded and impacted (Jennings and Hayes 1994).

A.14.5.2 Predation

Predation, especially of hatchlings and eggs, is a major mortality factor for western pond turtles (Holland 1994). Raccoons (*Procyon lotor*), bullfrogs (*Rana catesbeiana*), largemouth bass (*Micropterus salmoides*), gray fox (*Urocyon cineroargenteus*), coyote (*Canis latrans*), and feral and domestic dogs (*Canis familiaris*) are known to be major predators of western pond turtles (Holland 1994). Other known predators include osprey (*Pandion haliaetus*), bald eagle (*Haliaetus leucocephalus*), river otter (*Lutra canadensis*), and mink (*Mustela vison*) (Manning

1990 in Holland 1994). It is though that many other fish, amphibian, bird, and mammal species also prey on western pond turtle (Holland 1994). Raccoons, in particular, are known to depredate nests, sometimes destroying all nests in an entire communal nesting area (Yolo Natural Heritage Program 2009). In urban areas, litter and pet food can increase the presence of some predators, potentially leading to increased predation on turtles.

A.14.5.3 Exotic Species

Western pond turtles can be crowded out of suitable aquatic habitat by invasive, nonnative turtles. These exotic turtles are the descendants of released household pets (Gale 2004). "Red-eared sliders" and spiny softshell turtles can introduce diseases to the western pond turtle and compete for resources. Bullfrogs and nonnative large predatory fish (e.g., largemouth bass) compete with western pond turtles for invertebrate prey. Carp alter or eliminate emergent vegetation needed as microhabitat by hatchlings (Holland 1994).

A.14.6 Relevant Conservation Efforts

Conservation efforts for the western pond turtle are largely limited to those proposed under habitat conservation planning efforts. Conservation actions can include preservation of occupied and potentially occupied habitats; management of watercourses and water bodies to protect existing populations and encourage reestablishment of populations; and restoration or enhancement of channel, riparian, and adjacent upland habitats to benefit pond turtles. The western pond turtle is a covered species under several plans, including the Placer County Conservation Plan, the Natomas Basin Habitat Conservation Plan, the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, and the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan, and is proposed for coverage under the South Sacramento County Habitat Conservation Plan, Yolo County Natural Heritage Program Plan, Solano County Multispecies Habitat Conservation Plan, and Bay Delta Conservation Plan. DFG recently commissioned the U.S. Forest Service's Redwood Sciences Lab to prepare a conservation strategy for the western pond turtle in California.

A.14.7 Species Habitat suitability Model

A.14.7.1 Aquatic Habitat

Foraging habitat for the western pond turtle includes the following land cover types and conditions:

- Perennial streams, excluding the Sacramento and Feather Rivers;
- Managed wetland (Aquatic, Nesting, and Movement Habitat);
- Emergent wetland; and

- Stock ponds located in blue oak savanna, grassland, and grassland with vernal swale complex land cover types.

A.14.7.2 Assumptions

Western pond turtles reside in stagnant or slow-moving water in aquatic habitats. Portions of perennial streams internal aquatic habitat have not been included within the model because this linear extent is accounted for by the land cover type that encompasses the stream feature.

The species is uncommon in high gradient streams (Jennings and Hayes 1994). High gradient streams, however, cannot be distinguished from low gradient streams in the GIS database. Consequently, the model likely overestimates the extent of stream habitat. The Sacramento River and Feather River are excluded from the model because, with perhaps the exception of low velocity backwater areas, flow velocities are considered to be too high to provide habitat. Perennial stock ponds also provide habitat when located within blue oak savanna and grassland land cover types that support nesting habitat (see below). The model overestimates the extent of stock pond habitat because stock ponds that maintain water perennially cannot be distinguished from ponds that maintain water intermittently in the GIS database.

A.14.7.3 Nesting and Movement Habitat

Nesting habitat for the western pond turtle includes blue oak savanna, managed wetland (designated as Aquatic, Nesting, and Movement Habitat), grassland, grassland with vernal swale complex and associated vernal and altered vernal pools, cottonwood-willow forest, valley oak riparian forest, and willow scrub adjoining and within 500 meters of aquatic habitat (see above). Portions of perennial streams internal aquatic habitat have not been included within the model because this linear extent is accounted for by the land cover type that encompasses the stream feature.

A.14.7.4 Assumptions

The western pond turtle is primarily aquatic and leaves the water only to reproduce, aestivate, and overwinter (Jennings and Hayes 1994). Females leave the aquatic habitat to find an upland location to nest; proximity of the nesting site to aquatic habitat is dependent on availability, and the nest site is generally within 200 meters from the aquatic habitat, but can be up to 402 meters away (Storer 1930, Jennings and Hayes 1994). A distance of 500 meters from aquatic habitat was selected to better ensure that all likely habitat used for movement among aquatic habitat areas as well as nesting habitat was encompassed in the model. Agricultural, urban, disturbed, orchard and vineyard land cover types are not considered to support nesting habitat because they are subject to regular disturbances that could destroy nests.

A.14.8 Recovery Plan Goals

A recovery plan has not been prepared for the western pond turtle because it is not federally listed as threatened or endangered.

A.14.9 References

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