SHORT ARTICLE

Herpetofauna of Mare Island, Solano County, California

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Mare Island is a peninsula alongside the city of Vallejo, in Solano County, California, about 37 km (23 miles) northeast of San Francisco. The Napa River forms its eastern boundary as it enters the Carquinez Strait juncture with the east side of San Pablo Bay. Mare Island is considered a peninsula because no full body of water separates the "island" from the mainland. Instead, a series of small sloughs cause seasonal water-flows on the so-called island. The habitat associated with these sloughs is tidal and non-tidal wetlands dominated with pickleweed (*Salicornia virginica*) and other salt-tolerant species. At one time, Mare Island was an actual island—artificial build-up of the island was accomplished by creating a series of dredge ponds by the US Navy over the past century—to accommodate their use of the island as a shipyard. The original island still exists and is the only portion of the peninsula with any significant relief (Figure 1).

During 2009 and 2010, I had the opportunity to work on Mare Island as a biological monitor for several endangered species, including the salt marsh harvest mouse (*Reithrodontomys raviventris*) and the California Clapper Rail (*Rallus longirostris obsoletus*). During my monitoring work, I kept track of the various reptiles and amphibians I encountered and took natural history notes. Although technically attached to the mainland, the large expanses of pickleweed and tidal action in the northern portion of the peninsula seem to form a barrier for herpetofaunal movements. Therefore, I believe that most of the herpetofauna populations are in semi-isolation, and some species may actually be relictual remnants of mainland populations. Herein I list the species I have observed and provide my notes on the species. List order based on Jennings (2004) and range based on *www.calherps.com*.

Literature Cited

Frost et al. 2006. The Amphibian Tree of Life. Bulletin of the American Museum of Natural History 297:1–371.

Jennings, M. R. 2004. An annotated check list of the amphibians and reptiles of California and adjacent waters. California Fish and Game 90:161–213.

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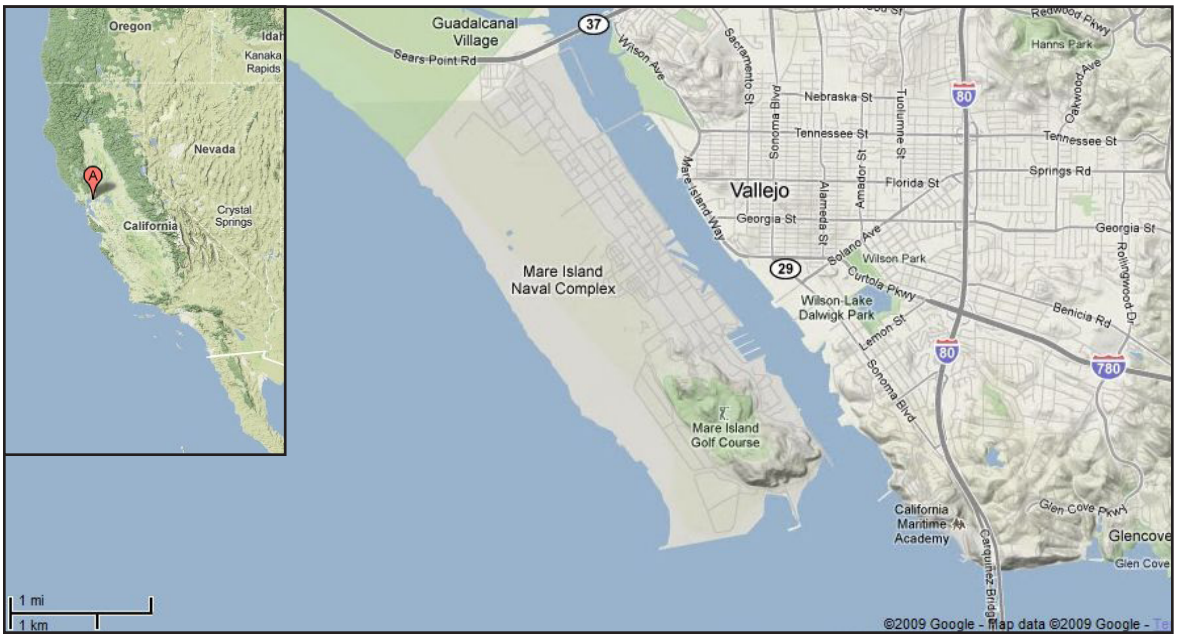

Figure 1. Map showing Mare Island, near Vallejo, Solano County, CA. Note the area labeled "Mare Island Golf Course". This high relief area is the orignial island. The Mare Island Golf Club was established in 1892 and is the oldest golf course west of the Mississippi River. Highest elevation is 86.6 m (284 ft). Mare Island History: In 1775, a Spanish explorer, Perez Ayala, became the first European to land on what would become Mare Island. This area became part of Rancho Suscol, deeded to General Mariano Guadalupe Vallejo (Mexican Commandante for Northern California) in 1844. Originally named *Isla de la Plana* by Ayala, the island became a waypoint for early settlers. In 1835, whilst traversing the Carquinez Strait, a crude ferry transporting men and livestock capsized in a squall, among the livestock feared lost in the wreckage was General Mariano Guadalupe Vallejo's prized white mare. Several days later, General Vallejo's mare was found on the island, having swam ashore. The island was renamed by Vallejo to *Isla de la Yegua*, Spanish for Mare Island in her honor. The red marker labeled "A" in the vicinity map marks Mare Island. Maps by Howard Clark using Google.

CLASS AMPHIBIA—Amphibians
ORDER ANURA—Frogs and Toads

FAMILY BUFONIDAE—True Toads

California Toad—*Anaxyrus boreas halophilus*

Although not seen directly, I detected the tracks of the California Toad after a rain event on 23 December 2009. Toad populations likely occur in the nearby upland habitat vegetated with coyote bush (*Baccharis pilularis*) and fennel (*Foeniculum vulgare*). The genus *Anaxyrus* was split from *Bufo* by Frost et al. in 2006. Most references still use the long-established *Bufo*.

FAMILY HYLIDAE—Treefrogs and Their Allies

Sierran Treefrog—*Pseudacris sierra*

There are three subspecies of treefrogs in California, with the Sierran Treefrog represented on Mare Island. The first treefrog I found was in a storage trailer and green in color (18 September 2009). I found two additional frogs that were beige (8 January 2010). I encountered the beige frogs during the removal of a stand of fennel. I often hear the calls of the treefrogs during my silt fence inspections.

CLASS REPTILIA—Reptiles
ORDER SQUAMATA—Lizards and Snakes

FAMILY PHRYNOSOMATIDAE—Zebra-tailed, Rock, Horned, Spiny, Fringe-toed, Tree, and Side-blotched lizards

Coast Range Fence Lizard—*Sceloporus occidentalis bocourtii*

Six subspecies of Western Fence Lizard occur in California, with the Coast Range Fence Lizard (Figure 2) present on Mare Island. I commonly saw this lizard crawling on silt fence installed to exclude salt marsh harvest mice from work areas. I conducted 3 daily inspections of the silt fence over the course of several months and took special note of the fence lizards. I was able to recognize individuals based on tail regrowth patterns. I encountered the same lizard along the same panel of silt fence for several weeks during August and September.

Figure 2. Coast Range Fence Lizard (*Sceloporus occidentalis bocourtii*) detected on 10 September 2009. Photo by Howard Clark.

FAMILY ANGUIDAE—Alligator and Legless Lizards

Southern Alligator Lizard—*Elgaria multicarinata*

There are two species of alligator lizard in California, with the Southern Alligator Lizard (*E. multicarinata*) likely occurring on Mare Island (Figure 3). The Southern Alligator Lizard range overlaps the Northern Alligator Lizard (*E. coerulea*) range in the San Francisco area. The Southern Alligator Lizard is rather common, as I've encountered 20 to 25 individuals during vegetation removal activities. They occurred within non-tidal pickleweed patches, as well as within swaths of fennel. I've mainly seen adults, with a single juvenile observed in late September. Both species of alligator lizards have four subspecies each, with the San Francisco Alligator Lizard (*E. c. coerulea*) and the California Alligator Lizard (*E. m. multicarinata*) potentially occuring on Mare Island.

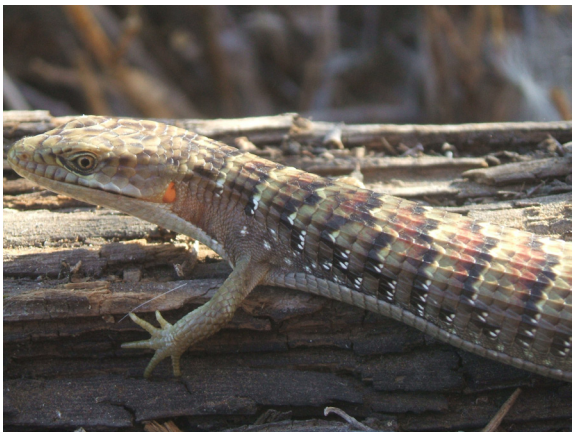

Figure 3. Southern Alligator Lizard (*Elgaria multicarinata*) detected on 10 September 2009. Photo by Howard Clark.

FAMILY COLUBRIDAE—Colubrids

Western Yellow-bellied Racer—*Coluber constrictor mormon*

California only has one subspecies of racer – the Western Yellow-bellied Racer (Figure 4). This encounter is only my second with this subspecies. During the late summer months juvenile racers appeared everywhere. I was catching them on a regular basis in September; however, I found only one adult.

Figure 4. Juvenile Western Yellow-bellied Racer (*Coluber constrictor mormon*) detected on 17 September 2009. Photo by Howard Clark.

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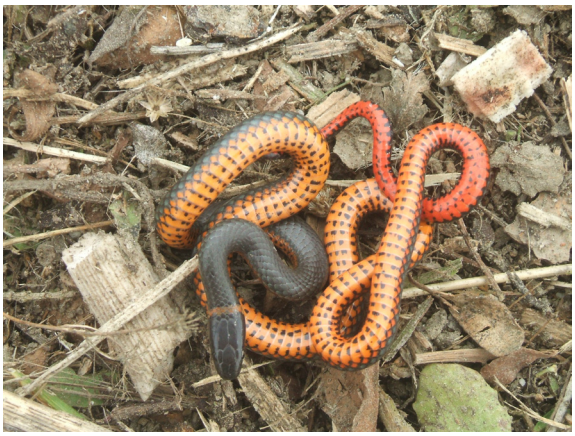

Figure 5. Pacific Ring-necked Snake (*Diadophis punctatus amabilis*) detected on 15 October 2009. Photo by Howard Clark.

Pacific Ring-necked Snake—*Diadophis punctatus amabilis*

California has seven subspecies of the ring-necked snake, and the Bay Area harbors the Pacific Ring-necked Snake (Figure 5). My encounter with this species on the island is my first. On 15 October 2009 we were clearing upland vegetation which mainly contained coyote bush and fennel where these snakes appeared in the recently cleared areas. Approximately 10 to 15 individuals were observed by the crew. I handled one specimen and took note of its defensive posture—the exposure of the bright red belly. A few days later I found another ring-necked snake, and it discharged a foul-smelling fluid out of its cloaca. On 16 February 2010, another ring-necked snake was found along a strip of silt fence near a pickeweed wetland. It was rather cool that day (10-15°C [50-59°F]) and the snake was not active.

Figure 6. Pacific Gopher Snake (*Pituophis catenifer catenifer*) detected on 29 April 2010. Photo by Howard Clark.

Pacific Gopher Snake—*Pituophis catenifer catenifer*

California has five subspecies of gopher snake, with Mare Island supporting the Pacific Gopher Snake. The only place I was able to find this common species was near a concrete loading platform (17 October 2009) and next to silt fence near an excavation site along several buildings (Figure 6; 29 April 2010). The concrete slab was raised off the ground a few inches providing excellent cover for snakes. I was able to capture one juvenile near this platform in mid October. Other crew members have observed several gopher snakes taking cover in small concrete electrical and plumbing vaults.

FAMILY VIPERIDAE—Vipers

Northern Pacific Rattlesnake—*Crotalus oreganus oreganus*

There are three subspecies of western rattlesnakes in California, with the Northern Pacific Rattlesnake occurring on the island (Figure 7). I personally have not seen this species, but crew members on the island provided photos (photographed on 14 April 2005). It mainly occurs on the original island rather than in the dredge pond build-up areas. The snake has been observed on the golf course which spans over a large portion of the high relief areas. The original island area has thick patches of shrubs and vegetation, which is ideal cover for the rattlesnake. It would be interesting to determine if the Mare Island population shows signs of genetic isolation from mainland populations.

Figure 7. Northern Pacific Rattlesnake (*Crotalus oreganus oreganus*) detected on 14 April 2005. Photo by Cirilo Lacson.

General Comments: All of these species were found in the artificial built-up areas of Mare Island, except for the rattlesnake. I have not had the opportunity to thoroughly inventory the original portion of the island, but suspect that there are a few more species that likely occur. I predict that Skilton's Skink (*Plestiodon skiltonianus skiltonianus*) is present on the island as well as the American Bullfrog (*Lithobates catesbeianus*). The Sharp-tailed Snake (*Contia tenuis*) and the California Nightsnake (*Hypsiglena ochrorhyncha nuchalata*) have the potential to occur on the original portions of the island. The Bay Area is within the range of three species of gartersnake; these include Diablo Range Gartersnake (*Thamnophis atratus zaxanthus*), Coast Gartersnake (*T. elegans terrestris*), and California Red-sided Gartersnake (*T. sirtalis infernalis*). Gartersnake occurrence on the island is unknown, although suitable habitat may occur on the golf course. Mare Island falls within the range of the California Legless Lizard (*Anniella pulchra*) and the Northern Rubber Boa (*Charina bottae*) but the potential of occurrence is remote. Although within the range, the California Red-legged Frog (*Rana draytonii*) and the Foothill Yellow-legged Frog (*R. boylii*) are not likely to occur due to lack of habitat (i.e., flowing streams). Five species of salamanders and newts could potentially occur on the island: Arboreal Salamander (*Aneides lugubris*), California Slender Salamander (*Batrachoseps attenuatus*), Yellow-eyed Ensatina (*Ensatina eschscholtzii xanthoptica*), Rough-skinned Newt (*Taricha granulosa*), and Coast Range Newt (*T. torosa torosa*). I searched for salamanders and newts during the early spring in oak leaf litter within the original portions of the island but made no detections.

All of these species were found in the artificial built-up areas of Mare Island, except for the rattlesnake. I have not had the opportunity to thoroughly inventory the original portion of the island, but suspect that there are a few more species that likely occur.