Western Pond Turtle
Shell Disease in Washington

Background

Western Pond Turtles (Figure 1) historically occurred in two regions in Washington: South Puget Sound and the Columbia Gorge. They were once locally common to abundant in South Puget Sound, but had become essentially extirpated from the region by the 1980s. Little is known about the history and sizes of populations in the Columbia Gorge, but only two populations remained by the mid-1980s (Figure 2). The turtle was listed as endangered by the state of Washington in 1993. In 1994, the entire Washington population was estimated at about 156 turtles and occurred at two sites in the Columbia Gorge.

Figure 1. Basking Western Pond Turtles, including marked animals with transmitters.

Recovery Efforts

A primary recovery strategy for Western Pond Turtles in Washington has been head-starting the turtles in a captive environment and then releasing them back into the wild at one of the six sites established for the recovery of this species. WDFW works with Woodland Park Zoo and Oregon Zoo to raise the turtles from the egg or hatchling stage (Figure 3) for approximately 9-10 months, when the accelerated growth rates result in turtles large enough to avoid predation when released back into the wild. The very successful 25-year old collaborative head-start program has helped reverse the fate of the Western Pond Turtle in Washington. More than 800 turtles now occur at six sites, well on their way toward achieving recovery objectives. Wild turtles still persist at two of the Columbia Gorge sites, but nearly all of the turtles in Washington were head-started. In addition to head-starting, WDFW and partners work to protect and restore habitat, manage invasive plant and animal species, conduct research to enhance recovery, and provide information to the public regarding the plight of this species.

Figure 2. Sondino Pond in Columbia River gorge – one of last two known wild occurrences at the time of listing

Figure 3. Hatchling Western Pond Turtle

Shell Disease - an Emerging Threat

Shell disease has emerged as a major concern for the Washington populations of Western Pond Turtles in recent years. Though there are few documented incidences of shell disease in wild turtle populations, there are numerous accounts of shell disease in individual captive pet turtles. In these cases the cause of the disease is frequently associated with a fungal or bacterial infection secondary to poor husbandry, water quality, improper lighting, nutrition, or other stressors of captivity. The clinical signs include small pitting lesions, soft spots, fluid under the scutes (the keratin layer), and foul odor. In Washington our situation is different than what is seen in pets. The Western Pond Turtles with shell disease have defects in the scutes and often deep pitting lesions (Figure 4) that expose the underlying bone and frequently penetrate into the body cavity. Based on photo archives dating back to 2003, we have evidence of shell disease in the earliest photos.

Research efforts in 2013-2014 found that 29- 49% of examined turtles in each of the six populations had gross evidence of shell disease. Severity of the disease varied from minor discoloration of the keratin or few small pitting lesions to multiple severe, deep lesions with extensive damage to the shell. Subsequently, the use of CT scans has revealed that some turtles with no clinical or gross signs of shell disease do have subclinical (internal) indications of the disease (Figures 5-7), thus suggesting an even higher prevalence of turtles in Washington with the disease. The scans have also shown that the disease in some turtles is much more extensive than indicated by external examination. Further, irregular appearance in bone has been noted in CT scans of head-started turtles as young as two years old – it remains unknown if these irregularities are lesions associated with shell disease. Though the disease is primarily observed in head-started turtles, it has also been documented in a small number of wild Western Pond Turtles.

Figure 4. Above, shell disease lesions clearly visible on plastron of this individual.

Shell disease in captive pet turtles is often related to poor water quality and can frequently be effectively treated by a veterinarian. However, for Western Pond Turtles water quality does not appear to be an issue and treatments may be relatively unsuccessful, as there have been documented recurrences in several treated animals. It is unclear how shell disease is affecting turtle lifespan, reproduction and recruitment. We continue to extensively monitor our population to understand the effect of the disease.

Figure 5. Above, a different individual than seen in Figure 4 exhibits discoloration on back left side. This is revealed on CT scan to be lesions that are through the lateral edges of the carapace (see figures below).

The Way Forward

Though there remains many unknowns about shell disease in Western Pond Turtles in Washington, investigations are underway to increase our understanding of the etiology, pathology, epidemiology, and demography and ecology of this disease. Such research will help determine how best to proceed in effectively treating the diseased turtles and continue the recovery of this endangered species. A diverse Health Team has been assembled, with experts in epidemiology, veterinary medicine, pathology, reptile disease, herpetology, and wildlife biology, who are working together to find solutions. The possibility that a fungal pathogen may be involved is being investigated, but the causative agent for this potentially devastating shell disease has not yet been identified.

Figure 6. Above, lateral CT view of Figure 5 individual. Dotted red line indicates where the CT scan through the animal is taken in the image below.

We are also working with our Zoo partners to diligently examine husbandry practices to understand if the rapid growth rate experienced in captivity, or other aspects of husbandry, may be contributing to the development of shell disease in these turtles. Should a relationship to captivity prove to be involved with shell disease in Western Pond Turtles in Washington, the very effective recovery tool of head-starting may be severely limited or unavailable for this species. Without head-starting as a potential recovery strategy, the importance of maintaining and enhancing robust populations in the wild is elevated.

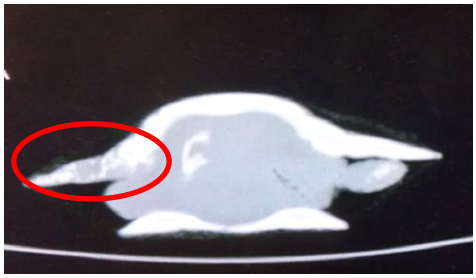

Figure 7. Above, the non-uniformly dense appearance on the left side of the image (red circle) indicates changes in the bone structure. Compare this to the right side of the image, where the bone has a normal appearance. The boney changes are subclinical lesions that are not grossly apparent other than the mild discoloration of the carapace (as noted in Fig 5).