



25th Anniversary Article Series: 25 Years of Newts on the McKenzie

Article Contributed by Julie Vance with introduction by Rodney Olsen

“It is an honor to have been asked by Sierra Foothill Conservancy (SFC) to introduce a longtime friend and fellow biologist Julie Vance. Julie and I go back at least twenty years to our college days as budding biologists at CSU Fresno. Our common interest in oak/foothill woodland systems, made us frequent acquaintances in the field while working on our separate projects. Julie’s ties to SFC are deep, going back to her graduate research on Sierra newts on the McKenzie Preserve, and her follow-up studies after being awarded her degree. I recall passing Julie and her research assistants many times while leading field classes on the McKenzie. She was always happy to discuss her research and the significance of her findings to a more complete understanding of the species and the system as a whole. Over the years, I have sent several students Julie’s way to gain field research and monitoring experience in support of their early careers as field biologists and resource professionals. Julie’s passion for wildlife and conservation has always been evident and is something that I admire deeply of her. This passion has led to an impressive career with the California Department of Water Resources and California Department of Fish and Wildlife (CDFW). Julie is currently the CDFW Central Region Manager where she manages regulatory programs for twelve counties spanning from Tuolumne to Kern counties, westward to Monterey and San Luis Obispo Counties. These counties include some of the most disturbed landscapes in California and have a number of pressures weighing on the fragmented habitats that remain. Julie’s strong background in regional conservation matters and the respect held for her by the numerous stakeholders in the region support her in this very important role.” – Rodney Olsen

In 1997, I was a graduate student at CSU Fresno in the Biology Department, and it was time to pick my thesis topic. Ideally, I wanted to work on salamanders, because well, they are cool. One of my instructors at the time was involved with a newly formed local non-profit organization, the Sierra Foothill Conservancy (SFC). Introductions were made, and I soon found myself at the beautiful McKenzie Preserve. Located only about a half hour’s drive from Fresno, it is a beautiful landscape of interesting geologic formations (“tables”) and all the wildlife diversity expected in a healthy blue oak woodland. And best of all (to me), the intermittent stream that runs through the McKenzie Preserve supported a robust breeding population of the Sierra newt (*Taricha sierrae*). It was especially exciting to be able to study this species, because all the published studies on newts within this genus are on different species occurring in the Coast Range or closer to the Bay Area, and in habitats that are different from that found in our local foothills. During the winter of 1998-1999, I spent many cold and rainy days studying the instream ecology of the Sierra newt, specifically their habitat preferences and instream movements during the breeding season (their aquatic phase). To recognize newts as individuals, I tattooed the newts with a unique dot pattern. However, due to the amazing regenerative properties of newts (and salamanders in general), these marks only lasted a season or two. During this study, I learned that individual newts typically exhibit high site fidelity (stay in the same place) within the stream, but can move significant distances (including upstream), especially after storm events. Newts were also more numerous in deeper parts of the stream,

especially pools. However, unlike other California newt species, the Sierra newt will lay eggs in areas outside of pools as well, specifically under large cobbles in riffles.

In 2003, a couple of colleagues and I got together to discuss a subsequent newt study at the McKenzie Preserve and in and adjacent to the same study stream reach as my thesis. Between 2004 and 2010, using a pitfall array (sheet metal fencing with paint cans as “traps”) set up at varying distances from the stream, we evaluated the upland habitat use of the newts (where they spend their time outside of the breeding season). We also marked 633 newts with Passive Integrated Transponder (PIT) tags. This is the same technology used to “chip” your dogs and cats and gives each animal a unique number. We learned that the newts use a lot of upland habitat from the stream; on both sides of the stream, we captured adults and juvenile newts at our furthest pitfall arrays; these were about 400 m upslope of the stream on each side. We also surveyed the stream during the breeding season to evaluate which marked individuals were present. We stopped the pitfall array part of the study in 2011. However, each winter and early spring since that time, I have been coming to the McKenzie Reserve to see which of our marked newts show up to breed. Incredibly, I continue to capture newts that we marked during 2004-2010. That means that the marked newts have been breeding for at least 10 years, longer for those marked at the beginning of the study. It is thought that newts don't likely breed until they are around 5 years of age, meaning that the marked newts now being captured at McKenzie are at least 15 years of age! It was interesting to conduct a long-term study over very different water year types, including a prolonged period of drought. Based on the data collected since 2004, precipitation during December-February seems most critical for good Sierra newt breeding conditions, whereas late precipitation (Mar-April) has little benefit for their breeding conditions. This is concerning since climate change models generally predict a shift in precipitation to later in the winter/early spring. I also learned that Sierra newts can skip breeding during dry years (including consecutive dry years) and return to breed in comparable numbers when breeding conditions improve. Some newts went 10-12 years between detections in the stream, whereas other individuals seemed to show up every year. The biggest breeding years were 2010 and 2016, and very few newts were observed during 2012-2015 and 2018. The good news is that many newts showed up to breed in 2016 following 4 years of drought, meaning they can survive dry conditions in the upland environment and take advantage of good stream conditions when they occur. This is an adaptation that works well for longer lived species like newts but would be more problematic for aquatic species (like some frogs) with only 2-3 year lifespans.

During my visits to study the newts, I have encountered many of SFC's organized hiking groups and ended up giving impromptu “newt talks.” Most people that I encounter are fascinated by newts and are happy to talk about them at length. Over the years I have become known to some as “the newt lady.”

We cannot take for granted that our beautiful foothills will remain in their natural state; during the past 25 years, development has marched further and further into the foothills. Each spring that I travel to the McKenzie Preserve, I see more and more of a human footprint encroaching on what

used to be natural areas; ranches and rural settings are slowly being replaced with housing developments. This is why SFC's role in conservation and stewardship of natural lands is so important. Since my first introduction to SFC, the organization has significantly grown in terms of staff, membership, and acres conserved; SFC has acquired an impressive 7,440 acres in the form of 9 preserves (including McKenzie), and SFC holds Conservation Easements on an additional 35,916 acres. My career as a biologist ultimately landed me at the California Department of Fish and Wildlife (CDFW), where I now enjoy working with SFC as an important conservation partner. SFC has a thoughtful vision for conservation in our local foothill areas, which closely aligns with our conservation goals.

The McKenzie Preserve will always be a very special place for me. Every spring, I look forward to seeing things like the golden eagles soaring over the tables, the mating rituals of red-tailed hawks, the noisy woodpeckers, beautiful wildflowers, cool fungi, and of course, the mating rituals of the Sierra newt. Despite my many visits to the Preserve, there is always something new to marvel upon with each visit. I am thankful that SFC has embraced allowing the McKenzie Preserve to serve as a living laboratory; I know that over the past 25 years, many students, teachers, professors, hikers, and other outdoor enthusiasts have been inspired and amazed by things they experience and learn at the McKenzie Preserve. Those of us that live in this region are lucky to have SFC diligently working to conserve so much of our beautiful valley and foothill landscapes; because of their actions, those habitats will be available in perpetuity for many future generations of wildlife and humans.