

Chapter Introduction: Vernal Pools

Vernal pools are seasonal wetlands which fill with rain water during the wet season and dry up during the dry season. In the Rogue Valley, these pools can be found on top of both Upper and Lower Table Rock, as well as on the valley floor in the Agate Desert. In Latin, vernal means spring, indicating the season when water is present in the pools. Vernal pools form as a result of shallow depressions on top of an impermeable or hard pan surface such as the andesite (lava rock) that caps the Table Rocks. When it rains, the lava cap acts like a bathtub, holding the water in place.

Vernal pools go through a cycle consisting of the following three phases each year: wet, flowering, and dry. The wet phase occurs during the winter and early spring. Rain fills the pools with water enabling many species to begin their life cycles. The flowering phase occurs in spring when resources are most available for reproduction and as pools begin to dry. During the summer and fall when all the water has evaporated and plants and aquatic life have died, the pools are in the dry phase. Seeds, eggs, and cysts are left behind to begin the cycle again the following wet season.

The plant community or habitat found on the top of the Table Rocks is referred to as the "Mounded Prairie/ Vernal pool." Mounded prairies are generally flat, grassy areas with small hills or mounds surrounding the vernal pools. They are covered with both perennial and annual, native and non-native grasses and forbs (wildflowers).

In contrast, the flora surrounding and growing within the vernal pool depressions are mostly native annuals. Non-native grasses are able to thrive on the upland mounds, pushing out the native species, but cannot invade the vernal pools due to the extreme wetting and drying cycle found in this microenvironment. The plants that do survive in the pools have adapted to benefit from these extremes. Some of the plants adjusted to the short and intense life in the vernal pool world include the dwarf woolly meadowfoam (*Limnanthes floccosa* ssp. *pumila*), water starwort (*Callitriche marginata*), and coyote thistle (*Eryngium petiolatum*). The dwarf woolly meadowfoam is an endemic species that grows nowhere else in the world. It has a short life cycle coinciding with the wet seasons of the Table Rocks. After the flower completes its cycle, it drops seeds rich with a special oil able to withstand very high temperatures, ensuring survival of the next generation through the hot summer. The water starwort begins life with the first rains. As the pools fill with water, the stems lengthen so the leaves are able to float on the surface. Coyote thistle has a similar strategy; it has one set of hollow leaves that float to the top of the water to photosynthesize and one set of thinner leaves underwater to stabilize the plant. (For additional activities on vernal pool plants see the Botany section).

In addition to plants, several species of macro-invertebrates have developed amazing adaptations for survival in this hostile environment. The most notable of these, the vernal pool fairy shrimp (*Branchinecta lynchi*), a federally listed threatened species, can complete their life cycle in as little as 16 days. These tiny crustaceans lay their cysts (embryos encased in hard shells) which survive the hot, dry summers buried in the ground where the vernal pools form. The adults live for only one season, during which time they feed on detritus (organic matter on the bottom of the pools), algae, and other

macro-invertebrates (such as copepods and water fleas) that live in the water. Other macro-invertebrates, including seed-shrimp and flatworms, have similar adaptations for survival in the vernal pools. Due to the seasonal nature of the pools, fish do not inhabit them. Migrating ducks, Pacific treefrog tadpoles, and predaceous beetle larvae are examples of vernal pool predators.

The life cycle stages of the Pacific treefrog (*Pseudacris regilla*) coincide with the availability of water in the vernal pools. These amphibians lay their eggs when rain fills the pools, metamorphose into tadpoles as the water warms, and hop away as frogs to find shelter in the tall grasses once the pools have dried. Other animals playing an important role in this ecosystem include the black-tailed jackrabbit (*Lepus californicus*), the Western rattlesnake (*Crotalus viridis*), and the coyote (*Canis latrans*). All creatures living in and around these seasonal pools are an integral part of a tightly-woven food web.

Due to urban expansion and agricultural impacts, vernal pools are becoming an increasingly rare plant community. Consequently, species like the vernal pool fairy shrimp are also rare. The vernal pool fairy shrimp, found on the Table Rocks, were classified on September 19, 1994 by the US Fish & Wildlife Service as a federally threatened species due to habitat loss. Until 1998, when the vernal pool fairy shrimp were discovered in the Agate Desert, the species was not known to exist north of the area around Mt. Shasta. Today, efforts are being made to protect fairy shrimp habitat. The Bureau of Land Management and The Nature Conservancy have joined efforts to protect this habitat and its unique residents. A large portion of Lower Table Rocks is owned, managed, and protected as a Nature Conservancy preserve. The portions of Upper and Lower Table Rocks that are managed and protected by the Bureau of Land Management are designated as an Area of Critical Environmental Concern (ACEC). To protect this ACEC the areas are closed to timber harvesting and off-highway vehicle use. The trails are also closed to horses, dogs, and other domestic animals.