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## Ellicott Slough National Wildlife Refuge - Home of the Santa Cruz Long-Toed Salamander

by Diane Kodama

*Editor's Note: In March 2003, the National Wildlife Refuge System will be celebrating its 100<sup>th</sup> anniversary. This system is the world's most unique network of lands and waters set aside specifically for the conservation of fish, wildlife and plants. President Theodore Roosevelt established the first refuge, 3-acre Pelican Island Bird Reservation in Florida's Indian River Lagoon, in 1903. Roosevelt went on to create 55 more refuges before he left office in 1909; today the refuge system encompasses more than 535 units spread over 94 million acres.*

*Leading up to 2003, the Tideline will feature each national wildlife refuge in the San Francisco Bay National Wildlife Refuge Complex. This complex is made up of seven Refuges (soon to be eight) located throughout the San Francisco Bay Area and headquartered at Don Edwards San Francisco Bay National Wildlife Refuge in Fremont. We hope these articles will enhance your appreciation of the uniqueness of each refuge and the diversity of habitats and wildlife in the San Francisco Bay Area.*

Tucked away in the rolling hills on the coast of southern Santa Cruz County lies a little known refuge that several endangered species and native flora and fauna call home. Here, the unique and increasingly rare interface of oak woodland, coastal chaparral, grassland, willow thickets and ephemeral, or temporary, ponds combine to create ideal habitat for a special critter, the Santa Cruz long-toed salamander.



*Santa Cruz long-toed salamander*

The Santa Cruz long-toed salamander, *Ambystoma macrodactylum croceum*, was included on the first Federal Endangered Species List in 1976. At the time, only two populations were known to exist, one in Valencia Lagoon and the other in Ellicott Pond. Threatened with development, Ellicott Pond was purchased by the California Department of Fish and Game in 1973 and was designated as an Ecological Reserve. Recognizing the surrounding habitat as equally critical to the salamander's survival, the U.S. Fish and Wildlife Service established Ellicott Slough National Wildlife Refuge in 1975. Because of the salamander and the habitats' sensitivity to disturbance, both the Reserve and the refuge are closed to the public and both are cooperatively managed to protect and restore salamander habitat.

Over the years, the refuge grew to 201 acres, and now includes a second ephemeral pond, Calabasas Pond. Efforts are underway to acquire more habitat with the help of organizations such as the Trust for Public Land. Biologists have also discovered nine new salamander breeding locations in the Santa Cruz and Monterey Counties since 1976. Although this is good news for the salamander, the species still faces grave survival odds. Many locations are surrounded by agricultural fields and are threatened by land development. A constant battle must be waged against non-native,

invasive species such as Italian thistle, hemlock, pampas grass and eucalyptus to prevent upland habitat degradation.

Why, might you ask, does a small salamander depend upon such a diversity of native habitat types for its survival? The answer lies in its life cycle, as each habitat is critical for different life stages. The loss of the ephemeral pond with its' willow thickets, or the upland habitat (oak woodland, grassland, and chaparral) would deal a crippling blow to a salamander population. By managing these habitats through restoration and increasing the number of breeding ponds, refuge staff and volunteers work to improve existing habitat, thus ensuring the continuation of the Ellicott and Calabasas populations. Concentrating on habitat restoration encourages other native flora and fauna to prosper, leading to a healthier ecosystem.

During late summer and early fall, the refuge's seven to 10 acres of open meadow, bordered by slender willow trees, appears like any other meadow. As summer lingers and vegetation slowly turns from green to brown, black-tailed deer are seen foraging in the field. But the clouds in the sky and scattered autumn showers herald a change about to take place. As the rains continue to saturate the earth, pools of water merge with the onslaught of winter storms, and reveal the habitat's true nature - an ephemeral pond. Aquatic vegetation such as spike rush and smartweed once again flourish along the edges of the pond. Mallards glide across the surface, occasionally tipping into the water to nab choice morsels, and great blue herons stalk along the shores searching for prey to spear. The territorial song of the redwing blackbird reverberates across the pond during the day, and a mighty Pacific tree frog chorus fills the night air. It is underneath the water's surface that life truly teems. Here, the adult long-toed salamanders converge, migrating during night-time rains from their summer retreats. Males first, followed by the females, slip into the water one by one to continue the cycle of life.

The female salamander deposits several hundred eggs, typically attaching them to the stalks of submerged vegetation. Once breeding is finished, usually by March or April, most adults leave the pond and return to their upland burrows. The unattended eggs hatch within two to four weeks, and the resulting larvae join the denizens of the pond, California tiger salamander larvae, tree frog tadpoles, and aquatic insects, in foraging and growing.

As the pond begins to dry out in early- to mid-summer, the three- to four-month old salamander larvae undergo metamorphosis. The gills disappear, the body shape changes, the head becomes defined, and the trademark toes elongate. Equipped to move onto land, the juvenile salamanders burrow into the drying pond bottom or move into the surrounding willow thickets. There they await the first autumn rains and a chance to move upland to find a new home. Abandoned, the pond slowly dwindles, until it is a sleeping meadow once more.

The upland habitat surrounding Ellicott Pond makes up the vast majority of the refuge. Red-tailed hawks soar in the thermals above the hillsides searching for gopher snakes and cotton-tailed rabbits. California quail scurry by with their broods. A flash of black, white and a hint of red proves to be an acorn woodpecker in the tree-top. The song of the wrentit echos in the wind. Occasionally, California voles flush, diving into nearby holes, and garter snakes slither through the grass with a dry rustle.

A drive up the entrance road reveals coast live oak, coffeeberry, California blackberry, coyote brush, sticky monkey flower and poison oak. As you walk through the fields or up the hills, the abundance of plant life becomes apparent. During the spring and summer, small clumps of orange-yellow flowering deerweed and blueish-purple lupine dot the grassland, and the endangered robust spineflower, *Chorizanthe robusta* var. *robusta*, quietly unfolds its petals. It takes careful searching in the dry grass along the foothill trees to spot this annual herb, a member of the buckwheat family. Mature spineflower plants form small ground level mats, upon which the flowers appear as tiny, fuzzy whitish red clumps surrounded by spines. Like the salamander, the primary threat to this plant is habitat loss.



*Robust Spineflower*

It is here, the uplands, that juvenile long-toed salamanders migrate during the first fall rains. Their goal is to find root systems or small mammal burrows in which to estivate over the hot summer. These juveniles will not return to the pond again until they are mature, approximately three years later. When they emerge from their shelters to migrate back to the breeding pond, they will sport the glossy black coloration and distinctive, metallic orange/yellow back pattern that identifies them as a Santa Cruz long-toed salamander. It is fortunate that they are long-lived (up to 8-10 years), because the fall and winter rains are not always sufficient to fill the ponds. During the drier winters, the adult salamanders remain in their upland hide-outs until the next adequately wet year beckons them out into the night.

With the salamanders safely under ground during late spring through early fall, refuge staff, volunteers, and partners, the California Department of Forestry (CDF), go to work, restoring and improving the upland habitat. Over the past five years, the majority of the mature eucalyptus stands, which quickly become monotypic stands that out-compete native vegetation, have been mechanically removed by CDF work force crews and contractors. Few native wildlife species use these eucalyptus stands. The refuge also began the labor intensive process of removing the pampas grass infestations that have spread throughout the hillsides. Herbicide treatments and weed whacking are other tools used to control the spread of invasive non-natives. This project has taught us much about the endurance of the native plant species. Given a chance, natives have made a comeback in several cleared areas. As time passed, glimpses of diversity in the initial covering of coyote brush and poison oak are visible. Here and there, the pink petals of California wild rose and the dark berries of native currents peep through.



In other areas, refuge staff and volunteers assist the re-vegetation process by gathering acorns, seeds and berries and propagating them in the Native Plant Nursery located at the refuge Complex headquarters in Fremont. Nursery volunteers nurture the resulting seedlings until they are ready for out-planting the following winter. Through rain or shine, volunteers of all ages and backgrounds participate in numerous planting parties, tirelessly planting hundreds of coast live oak and coffeeberry seedlings, along with willow cuttings. Many times, by the end of the day, the planters are soaked through to the bone from chilly winter rains and are massaging their sore back muscles from their efforts of digging into heavy soil. But weary smiles glow on everyone's faces as they proudly look across a field of waving flags marking each newly planted seedling. There is a quiet sense of satisfaction that with our own two hands, we have made a difference in protecting and restoring a unique wildlife oasis that many call home.

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