

“Every Time You Turn on a Tap, You Should Thank a Meadow”

by Joe Devney '93

With its granite cliffs and dry climate, the eastern slope of the Sierra Nevada bears only a passing resemblance to the hilly urban haven that is the Holy Names College campus. This is where Julia Smith spends much of her time away from campus, discovering how the eastern Sierra ecosystem works, and why it is important both to wildlife and to the humans living at lower altitudes.

Julia Smith, PhD, is an Associate Professor of Biology at Holy Names. She earned her PhD at the University of California nine years ago, and has been at Holy Names ever since. At about the same time she started at Holy Names, she began spending her summers near Truckee, Nevada, on a joint project with The Nature Conservancy. While working on the project, she lives at a field station operated by UC Berkeley, along with several graduate students. In 2002, she took a six-month sabbatical from teaching to devote more time to studying the Sierra's high-altitude meadows.

The long-term study was started 1990 by Julia's friend and colleague, Mark Reynolds of the Nature Conservancy, as a part of the U.S. Forest Service "Partners in Flight" program. The study now has several more participants, including Holy Names College and San Francisco State University. Julia joined the team in 1994.

The Treasures of the Sierra Nevada

The objects of the team's study "stand out like jewels on a string amid the barren granite peaks of the Sierra," says Julia. The researchers have been studying 50 alpine meadows in an area of nearly 60 square miles. (Julia says that the meadows range in size "from your living room to several golf courses.") The meadows are popular with many kinds of wildlife, as sources of food, water, and shelter. The study focuses on the bird life to be found in the meadows, in an effort to learn about the health of the ecosystem as a whole. Birds are good indicators of ecological health because "they nest on the ground, in shrubs, in trees—all sorts of habitats," she explains. The canary in the coal mine is an apt analogy.

Julia and the other team members understand that the meadows are also valued by real estate developers, especially the meadows at lower elevations: they are among the flattest and driest land available on the slopes, good for shopping centers and golf courses. The researchers are gathering their data so that government and private agencies can determine the success of conservation strategies, and communities can make informed decisions about the future of these important bits of land.

Learning from the Birds

The research includes four kinds of meadows, classified by whether they are wet or dry, and whether the dominant vegetation is woody or not. To gather their wildlife data, the researchers catch the birds in large, fine-mesh nets, thirty feet wide and ten feet tall. The

birds are counted, weighed, and measured, and their health is evaluated before they are tagged and released.

The study looks at birds classed as “neotropical migrants,” meaning that they breed in North America and over-winter in Central and South America. The researchers have found an astonishing consistency in the populations during the course of the study. The birds “don’t just return to the Sierras, or to the Tahoe area, or to the Sagehen Basin,” she says. “They return to the same hundred-square-meter area along the Sagehen creek. We catch the same individuals in the same net year after year.”

This makes for a fragile population, one very sensitive to changes in the environment. “If you cut down or alter even a small patch of forest it will probably result in the death of the individuals who rely on that specific piece of property; they don’t know where to find food or shelter anywhere else.”

In studying the ability of the meadows to support the birds, the team found that moisture is the limiting factor. The wetter meadows—those with streams running through them or that hold more moisture for other reasons—are the most popular with wildlife, and the species population and diversity is fairly constant year-to-year. The populations of the drier meadows fluctuate, and are smaller in drier years. The wet meadows support more species overall, and more species classed as “threatened.” Julia and her colleagues also found that “bigger is better:” large meadows are the most species-rich, and they contain all the species found in smaller meadows. The “wet woody” meadows also have the most stable bird populations from year to year. The researchers have concluded that conservation efforts should be concentrated on the larger, wetter meadows.

Bringing the Benefits Home

Saving the meadows is important not just for the birds and other mountain wildlife. The meadows of the northern Sierra Nevada regulate the water flow to the flatlands on both sides of the range. They slow down the snow runoff and filter the water. Many of California’s cities depend on this natural process of water treatment. As Julia explains it, we get our water in a “very artificial” method from snowmelt. If it weren’t for the meadows slowing down the flow of water from the Sierra, our reservoirs would quickly overflow, and much of the drinking water destined for Oakland and Berkeley would run downhill into the Pacific Ocean.

Her sabbatical is over, but Julia plans to continue spending summers at the Sagehen Field Station, and sharing what she learns with her biology classes at Holy Names.