A photograph of a forest landscape. In the foreground, there are several tall, slender evergreen trees, possibly redwoods or sequoias, with some showing signs of autumn color. The middle ground is dominated by a thick layer of white mist or fog that obscures the lower parts of the trees and the ground. In the background, more trees are visible through the haze, and a faint horizon line suggests a distant body of water or a valley. The sky is a pale, overcast blue.

Save the Redwoods League

Fall Bulletin 2007

*Sinkyone Wilderness State Park
Photo: Don Briggs*

Better from the Executive Director

When I walk through an ancient redwood forest I often get the shivers. Not just because they are beautiful, but usually because the misty, foggy trails leave their visitors a bit damp and cold. Fog is the life-blood of the redwood forest, providing up to 40% of the trees' water during the driest months of the year. It is therefore no coincidence that the redwoods grow more massive where the winters are wet and the summers foggy.

The future vitality of the coast redwoods will depend in part on the fog, and the complex interplay of air temperature, sea surface temperature, atmospheric and ocean currents.

Eighteen years ago, sitting in the geography library at the University of Cambridge, I read reams of research on climate change. The evidence showed some temperature changes taking place throughout the world, but was it a natural cooling/warming cycle? Or the result of human impact? Today symptoms of change are visible everywhere, from Britain, where flowers are blooming earlier each year, to Chile where glaciers are receding. Most scientists now agree that these changes are driven by increasing carbon dioxide in the atmosphere, caused by human activity. A scientific, political, and public consensus has developed, spurring action to avert catastrophic change. In this Bulletin, you will read about League Councillor, Todd Dawson, and his work to understand the impact of climate change on the redwood forest.

For almost 90 years, Save-the-Redwoods League has worked to protect the ancient redwood forest, resulting in the creation of a system of more than 51 redwood parks and reserves. In the late 19th and early 20th century, the coast redwood and giant sequoia inspired some of the earliest citizen-driven conservation efforts. In those days the primary threat to the millennia-old forests was the "axe and shake." Our Master Plan for the Coast Redwoods guides our protection and restoration work to ensure these places are large enough to sustain natural processes and are connected to a resilient ecological network. However, today's threats to the coast redwood



photo: Paolo Vescia

Executive Director, Ruskin Hartley

and giant sequoia forests are more complex and insidious and require a more sophisticated response.

We still need to work collectively, through organizations like Save-the-Redwoods League, to protect and restore land (in this issue of the Bulletin you'll read about some critical park additions), but we must also take personal responsibility for our actions. We can do so by reducing, re-using, and recycling, and by speaking up and letting everyone know we care about wonderful places like the ancient redwood forests.

How can we take action as individuals? I gave up my daily coffee shop trip, opting for the communal pot in the office. We replaced home lightbulbs with energy saving compact fluorescents. With a newborn child, facing the diaper-dilemma and endless laundry, we opted for cloth and a new energy efficient washer and dryer. We also walk as much as we can, or take the bus. These are all small things, but I hope that collectively they will make a difference

I encourage you to talk with your family and friends and identify actions you can take to be part of the solution. Gain inspiration by visiting the redwood parks, explore volunteer opportunities, get involved with your communities in leading the charge to help protect our environment. Please write and share your stories with me and other League members. Ultimately it is our individual actions that will save the redwoods.

Ruskin K. Hartley

Casting a Long Shadow: Redwoods and Climate Change

BY STEPHANIE JAKOB

From the highest point atop a lofty peak in Germany near the turn of the nineteenth century, there exists a detailed account of an immense, magnificent figure created in the mists. Enveloped in shimmering sunlight, it hovered phantom-like, but for a moment, over its chronicling climber. The figure was in fact nothing more than the momentarily lingering shadow of the climber, assuming a deceptive grandeur in the sun. The phenomenon, called the Broken Spectre, would later be described as a curious incident which occurs when a person sees his shadow—projected onto air filled with snow-mist—as a grand, ethereal figure looming before him. The Spectre has remained fascinating to explorers throughout history, revered as an instance of man finding within the elements of nature, quite literally, his larger self.

Over 200 years later, the idea finds its modern-day counterpart perched high amid the coastal fog, over 200 feet above the ground. This time, however, the shadows cast are significantly more imposing, for today Todd Dawson and his group of researchers are placing sensors high in the foggy canopy of the redwood forest. For years, Dawson's research teams have ascended trees in Sonoma and Santa Cruz, installing nearly 30 pounds of gear to monitor the moisture which giant redwoods absorb from fog. Climbers of a different sort, Dawson and company are making their own unique observations—and doing so from a spectacular vantage point.

Dawson, a UC Berkeley professor and Save-the-Redwoods League Councillor, has spent much of his career studying the intricate relationships between the physiological and ecological characteristics of plants and their dynamic environments. His prior studies in Amazonian forests described the elaborate manner in which trees use water, distributing it upward, while



Anthony Ambrose, research team member, placing wireless sensor node in Sonoma County redwood photo: Kevin Simonen

amplifying both carbon uptake and atmospheric cooling. A few years ago, Dawson showed that fog is a crucial source of water for redwood forests. Perhaps most importantly, he has also noted how increases in air temperature reduce coastal fog in California. Having made this chain of key discoveries, Dawson now wants to know how the forests will be affected by global climate change—a study supported by Save-the-Redwoods League's research

grants program. “What happens if our climate ends up changing?” he asks. “How might that influence water intake? And, in turn, how might that affect the forest?”

Global warming has, since its initial emergence into the public consciousness, been fundamentally associated with the basic functions of trees. As anyone who has made a terrarium in grade school knows, it is the photosynthesis of trees and plants which converts carbon dioxide (CO₂) to oxygen. On the one hand, live trees absorb atmospheric CO₂, which they store as biomass (“carbon stocks”) for hundreds or—in the case of an ancient redwood—even thousands of years. However, when disturbed (by cutting, or natural disturbances such as fires and floods), forests release this stored carbon back into the atmosphere as CO₂. Forests, therefore, play a multifaceted role in climate change, at once providing a reservoir or “sink” which collects atmospheric carbon dioxide, producing a “buffering” influence on overall climate, and effectively “recycling” CO₂ and water from forest soil back into their respective cycles.

So, while a tree is essentially a reservoir which can hold carbon and thereby protect the atmosphere, its relationship to overall climatic change is difficult to predict due to the complex interaction of the carbon cycle, the water cycle, and other environmental cycles.



Todd Dawson, UC Berkeley professor and Save-the-Redwoods League Councillor
photo: George Koch

“...forests...fix more carbon than they release, essentially ‘cooling’ the surrounding atmosphere with their own transpired water...”

It is believed that, while forests do contribute to global CO₂ emissions, they generally do not contribute to global warming because they fix more carbon than they release, essentially “cooling” the surrounding atmosphere with their own transpired water. For these and other reasons, Dawson claims, trees and forests ultimately contribute to the solution, minimizing overall effects of climate change. Or, as he puts it, plants act as “this skin on the Earth, pulling carbon dioxide out of the atmosphere and letting water go in a dynamic way which has climatic implications.”

Already, forest lands have faced daunting challenges to their survival. Over the millennia, natural climate fluctuations restricted the range of redwood forests from the entire

northern hemisphere to the coast of Northern California. Deforestation and development of the coast since the 1850’s have added to the risk of the forest’s survival. Today, the remaining ancient redwood forests, including both the coast redwood (*Sequoia sempervirens*) and the giant sequoia (*Sequoiadendron giganteum*) are but a mere fraction of what they once were. Both species have fallen prey to overzealous logging and development. Likewise, both of California’s redwoods are likely to be impacted by climate change, just as they have in the past. The pivotal question then becomes: how will global warming alter these redwood forests?

At present, the answer remains unclear. While the forest science community believes coast redwood

and giant sequoia forests will be altered by climate change, exactly what will happen is subject to further study and debate. Existing models provide conflicting predictions about California’s future climate.

What is clear, however, is that the forest will change. Any hope of protecting it will require studying the changing forests relative to a normal baseline and developing specific models for assessing these changes. Unfortunately, there are currently few available baseline values and parameters against which the changes may be measured and monitored. Since no “climate response” baseline has yet been established for either the coast redwood or giant sequoia, it is first necessary to conduct basic research on the ecology of redwoods.

This is essentially what Dawson is developing today. Using new stable isotope methods along with innovative molecular and physiological techniques, Dawson’s research group is building a working model of the redwood’s basic biological functions—including how



Fog interception collector
photo: Todd Dawson

trees breathe, use fog, and process energy. With the aid of several years of climate records and tree ring data, the group has explained the climate variations which have affected redwoods in the past. By measuring tree rings, researchers are able to

gauge yearly growth and, comparing this to climate data, reveal connections between, say, fog



Fog condensation
photo: Kevin Simonen

frequency and tree growth. Collectively, these efforts will provide the necessary linkages between our disparate bits of knowledge: connecting carbon uptake to water usage, temperature to fog, fog to growth, and ultimately, climate change to forests.

In addition, a separate research program, under the direction of fellow Berkeley professor John Battles, is currently underway in the giant sequoia groves. Battles and his team are exploring how this most massive of living species on earth regenerates under different environmental conditions.

And yet, any assessment or plan for the forest also requires a practical response to potential threats. It is perhaps unreasonable to attempt to restore forests to their past conditions in light of rapid climate change. It also remains unclear what the climate changes brought upon by carbon accumulation, such as increased temperatures, might mean for carbon sequestration.

Even so, Battles's and Dawson's work is rapidly painting a clearer picture of these areas. Initial research suggests that, as average global air temperatures increase, so too will sea surface temperatures.

Consequently, rising sea surface temperatures will diminish the fog in the coastal redwood's habitat. Altered temperature regimes and warmer oceans will likely reduce rain and fog, creating more intense summer droughts and causing severe stress to forests. The pivotal window of opportunity for action, therefore, is now.

All the efforts of Dawson, the League, and conservationists everywhere are lost, however, without an appreciation of what something immense as the redwood forest ultimately signifies. Though the studies primarily focus on

climate factors, they take as their underlying force the eminent, constant entity which the redwoods embody. Like the oceans on whose edge they prosper, redwoods are vast, wild treasures to behold not simply for their inherent beauty, but also for their unknown and perhaps untapped potential to buffer climate change. It is something Dawson, held high aloft in the canopies, realizes daily. This—considered with their stately permanence, timeless appeal, and all-encompassing presence—is enough to elicit the most inspired awe, even from ground level.

THE LOW-CARBON DIET: REDUCING YOUR CARBON FOOTPRINT

A low-carbon lifestyle begins within one's own walls. While the United States alone accounts for over 20 percent of the world's annual CO₂ emissions, individuals are responsible for approximately 55 percent of these. In fact, the average American lifestyle creates 20 metric tons of CO₂ every year.

While this is the individual equivalent of less than one millionth of one percent of all GHG emissions, it is, put globally, considerable. The World Development Movement, for instance, estimates each American "emits" more CO₂ in just two weeks than the average resident of Nigeria, Pakistan, or Vietnam does during the entire year. We therefore have the wherewithal to effect significant change by choosing low-carbon options in our daily lives.

The following are steps you can take to reduce your carbon footprint, from small measures to more sweeping ones.

BEGINNER:

- Recycle papers, bottles, and cans. (100g carbon saved per item)
- Rather than leave appliances and chargers on standby, turn them off when not in use. (300g)

INTERMEDIATE:

- Turn down the thermostat by one degree for the entire year. (240kg)
- Replace your boiler with an eco-friendly model. (100kg)
- If you own a car, make alternative transportation arrangements (public transit, walking, cycling) for seven days. (60kg)

ADVANCED:

- Buy only local, seasonal fruits and vegetables. (480kg)
- Replace at least five light bulbs in your house with compact fluorescent bulbs. (300kg)
- Reduce the number of long-haul flights taken. When possible, travel by train or other means. (Reduces emissions to 1/10 of original value)

Recent Acquisitions Protect Eel River Habitat and Endangered Species

HUMBOLDT REDWOODS STATE PARK

In April, the League acquired a 10-acre parcel in Humboldt County located on the southern stem of Humboldt Redwoods State Park. This property offers expansive views of the Eel River valley and the redwood forest. It is surrounded on three sides by parkland and located up-slope from a pristine grove of ancient redwoods inside the park. The acquisition halted the construction of a cabin, and will allow for restoration of the forest habitat thereby protecting the trees below.

BUTANO STATE PARK

Four years of effort finally paid off when the League acquired 100 acres of redwood forest in the Santa Cruz mountains in late July. This rich forestland straddles the watersheds of two key tributaries of Pescadero Creek, an important resource for steelhead spawning and a target for restoration of coho habitat. The purchase links Butano State Park to a prior acquisition now owned by California State Parks and its marbled murrelet nesting grounds.

Sale of the Hartsook Inn Preserves Gateway to the Redwoods

A different kind of transaction, completed in late May, marks the culmination of many years of League work. In August 1998, the League purchased the 33-acre Hartsook Inn property. The Inn, located in a grove of majestic old growth redwoods on Highway 101 just outside Richardson Grove State Park, had served since the 1920's as the "gateway to the redwoods." The Inn suffered financial hardship for many years, and it seemed likely that the old growth trees would be harvested to help defray debts. The League made the purchase to protect the trees, but with an eye to fostering a continuing role for this key juncture on the redwood highway.

In the fall of 2006, the League found a prospective buyer who shares the League's vision of maintaining the integrity of the ancient forest, while planning to make use of the celebrated Inn as a wellness center. The League's sale of the property, protected by a stringent conservation easement, frees the League from maintaining the Inn buildings, provides funds for future acquisitions, and ensures that the ancient trees at this gateway are preserved for all time.



Map by GreenInfo Network www.greeninfo.org



These towering redwoods grace the League's latest acquisition at Butano State Park
photo: Jed Manwaring



Hartsook Inn on the Redwood Highway circa 1930

Muir Woods to Send Bay Area Students on Redwood Quest

In mid-April, the education staff at Muir Woods National Monument hosted 15 Bay Area environmental educators for a two-day *Questing* workshop. The goal was to create a new place-based program that deepens the redwood forest experience for local students, using an interpretive tool called *Questing*.

In a typical quest, participants follow a series of clues (often in rhyme) which help them to explore more deeply a unique natural or cultural setting. A quest usually ends with finding a special treasure, but most people find the quest itself to be the greatest reward.

Growing Communities: A Quest at Muir Woods is an extension of Muir Woods' popular *Into the Redwood Forest* curriculum; Save-the-Redwoods League has provided funding for school bus transportation to Muir Woods for the last 6 years and is fully funding the new *Questing* program.

"Without Save-the-Redwoods League's encouragement and support, we could not have reached out to inner-city and low income students, affording them the

*...A log ahead creates a small waterfall
From there take giant steps, about 15 in all
Step through an arch of bay laurel trees
A wonder of different life and light you'll see
In the opening spin around
How many types of trees can be found?*

*Sun kissed you are now, but that was not always so
A giant bay laurel tree here did grow
As it stretched for the sun, over it blew
Opening a gap so light could shine through...*

- excerpt from Growing Communities: A Quest at Muir Woods, encouraging visitors to fully appreciate a light gap in the forest

opportunity to experience the wonders of the redwood forest," said Park Ranger Jim MacDonald. "Now, with the *Questing* component, we can broaden our impact by inviting *Into the Redwood Forest* 'graduates' to return and share their experience with family and friends."

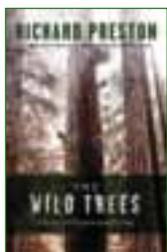
Steve Glazer, Director of the Valley Quest Program in Vermont, facilitated the workshop. His quests have inspired people of all ages in New England towns and parks.

Muir Woods National Monument looks forward to hosting up to 400 students on their quest this summer. All park visitors will be able to enjoy the Muir Woods quest sometime this fall.



Exploring at Muir Woods

BESTSELLING AUTHOR RICHARD PRESTON REVEALS THE REDWOOD CANOPY



The Wild Trees: A Story of Passion and Daring, written by bestselling author of *The Hot Zone*, Richard Preston, is a spellbinding account of courage in one of the last great unexplored realms on earth: the giant redwoods' canopy. In the 1990's, a handful of climbers and naturalists began exploring the topmost reaches on the coast of Northern California, where the last remaining giant redwood trees are hidden. Richard Preston tells the story of Dr. Steve Sillett, a four time recipient of research grants from Save-the-Redwoods League, and Marie Antoine, botanist, both climbers who open to human knowledge the secrets of the world's tallest forests.

Richard Preston is the author of seven books, a writer for *The New Yorker* since 1985, and winner of numerous awards. He mastered the techniques of tall-tree climbing and has worked as a professional expedition climber. He accompanied Dr. Sillett on the expedition organized by the League last year to measure Hyperion, the world's tallest living thing.

REDWOOD GROVES
DEDICATED BETWEEN
JUNE 15, 2006 AND
JUNE 14, 2007

Butano State Park

- The Haynie-Samuel Grove

Grove of Old Trees

- The David Charles Johnston Memorial Grove
- Don and Louise Johnston Grove

Jedediah Smith Redwoods State Park

- Barbara Knowles Anderson Memorial Grove

Pfeiffer Big Sur State Park

- Smith Family Grove - Benjamin Steen Smith, Ellen Lott Smith & Bristlecone

Prairie Creek Redwoods State Park

- The A.S.W. Grundy Grove, in memory of Doris (Ulrich) Grundy
- Illes Family Grove - Sandor, Etel, Theodora & Rex

Purissima Creek Redwoods Open Space Preserve

- The William and Hazel Gilman Memorial Grove

Sinkyone Wilderness State Park

- Carl Moseley Grove

Wilder Ranch State Park

- Mandello Maxwell Family Grove

 Dedicating a redwood grove through a gift to Save-the-Redwoods League allows your family to enjoy a special place in the forest while supporting ongoing protection efforts.

The Honor Tree with the Scar

League supporter Sheila Baumgartner did not envision that her \$10,000 bequest gift to the League for a tree in the Humboldt Redwoods State Park Honor Grove would result in such a memorable experience for her nephew, Matt Darling, and his family. Last Labor Day, the family met Humboldt Redwoods State Park Ranger, Dan Ash, to choose the perfect 10' diameter tree to memorialize Matt's aunt and uncle. Matt's sons loved making their way through the undergrowth, comparing the available trees and finally selecting a tree with a visible scar – the result of an attempt to cut it down over 100 years ago. Matt particularly liked this tree because he said both the tree and his aunt had survived a loss. Just as the tree had healed itself, so did Aunt Sheila after her husband Richard's death in 1985. Ranger Ash helped Matt then spot and mark the tree so that family members will be able locate it easily.



Robbie, Richie and Matt Darling

photo: Dan Ash

 For more information about dedicating a tree or grove please contact Andrea Tyler, by calling toll free: (888) 836-0005, ext. 328 or email at at Tyler@savetheredwoods.org.

2008 Annual Membership Renewal

We'd like to thank you for your 2007 membership gift to Save-the-Redwoods League – your membership contribution is vital to our work protecting the trees we all love. We know there are many non-profit organizations deserving of your financial support, and we hope that you will continue to support the programs of Save-the-Redwoods League by renewing your membership when your renewal notice arrives this fall.

GIVE THE GIFT OF REDWOODS THIS HOLIDAY SEASON

PLANT A REDWOOD

SEEDLING: Truly the gift that keeps on giving – for a donation of \$50 or more, the League will honor or memorialize a friend or family member by having a redwood seedling planted in one of California's redwood parks. We will also send a beautiful commemorative card to the specified beneficiary or his/her family.

 To make an honor or memorial gift, visit our web-site or call the Membership Department at (888) 836-0005.



To receive email updates about our work, send your email address to membership@savetheredwoods.org.

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