



CA&ES
Outlook

How we're
helping conserve
a natural resource

WATER
WISE

UC Davis
fisheries professor
Peter Moyle

CA&ES Outlook

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CALIFORNIA DEPARTMENT OF WATER RESOURCES

UC Davis research on the Delta will help Californians make difficult decisions about water.

COVER STORY

UC Davis experts share new approaches
to promoting water conservation, preserving
water quality, and protecting watersheds.

INTRODUCTION	4
CONVEYANCE	6
IRRIGATION	8
FOOD & DRINK	10
QUALITY	12
FISH & WILDLIFE	14

COVER PHOTO: Fisheries professor Peter Moyle is one of many CA&ES faculty members studying California's water needs. Moyle and students in his fisheries biology class documented the scientific information necessary to establish more fish-friendly flows in Putah Creek near the UC Davis campus.

Photo by John Stumbos/UC Davis

DEAN'S MESSAGE	3
STUDENTS & STUDIES	18
ALUMNI SPOTLIGHT	21
MAKING A DIFFERENCE	22
HONOR ROLL	24
AROUND THE COLLEGE	26
COLLEGE CELEBRATION	27
DEAN'S CIRCLE	28

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HOW REFRESHING

By working together, we can solve our state's water woes

NO OTHER NATURAL RESOURCE IS MORE important to California than water. Water is the lifeblood of our cities, farms, and natural systems. Its importance to our economy, to our capacity to produce food, and to the healthy functioning of our diverse ecosystems has never been greater.

Demand for water keeps growing, while the challenges to its supply are many. Our faculty are engaged in numerous projects that address issues of water quality, supply, and conservation. Doug Mosebar, the president of the California Farm Bureau Federation, told me recently his organization's top three priorities are: "Water, water, and water."

Lack of sufficient water for agriculture has caused significant hardship for regions already struggling with high unemployment. Agricultural and resource economics professor Richard Howitt estimates land taken out of agricultural production in the San Joaquin Valley in 2009 cost 21,000 jobs – 16,000 attributed to drought and 5,000 from environmental restrictions.



ANN FIMMER/UC DAVIS

Dean Neal Van Alfen and Kathryn Phillips, a policy advocate for the Environmental Defense Fund, discuss air and water quality issues in the California dairy industry while visiting the campus livestock facilities.

Helping stretch limited water supplies are researchers like biometeorologist Richard Snyder and irrigation specialist David Goldhamer, who are exploring new ways to fine-tune irrigation strategies. Our faculty also developed

a drought management website for growers of valuable tree crops like almonds, walnuts, and stone fruits.

Food and beverage processing has enormous potential for more efficient water use. For instance, the new teaching and research winery now under construction on campus will be the most water-efficient winery in the world and will model water-saving techniques for the California wine industry.

Groundwater is one of the most important, yet fragile, sources of water in California. Hydrogeologist Thomas Harter has created a highly regarded groundwater

I contend there is a growing willingness among our agricultural and environmental interests to work together on solutions to our water problems.

program that is helping California's dairy industry and others protect this valuable resource.

California's once-abundant salmon and steelhead runs have declined to perilously low levels. Scientists in our college are contributing to important preservation and restoration efforts. Fisheries professor Peter Moyle helped water managers design new fish-friendly flows for the San Joaquin River. Specialist Lisa Thompson provides knowledge about salmon, steelhead, and trout for land managers and decision-makers, and Professor Gregory Pasternack is helping re-engineer spawning sites on major rivers.

It's been said that water is for fighting over. I contend there is a growing willingness among our agricultural and environmental interests to work together on solutions to our water problems. UC scientists have provided guidance to many watershed groups consisting of farmers, ranchers, conservationists, and land and water management agencies.

While the university copes with challenging times financially, I assure you that our work on water will continue to be among our top priorities. California's future depends on it.

NEAL VAN ALFEN, DEAN
COLLEGE OF AGRICULTURAL AND
ENVIRONMENTAL SCIENCES

How UC Davis scientists are helping California find new ways to conserve and protect a precious natural resource.

By Robin DeRieux, John Stumbos, and Ann Filmer

PATRICK HILTON/UC DAVIS

UC Davis students visit O'Shaughnessy Dam, part of the Hetch Hetchy system that provides water to 2.4 million people in the San Francisco Bay Area.

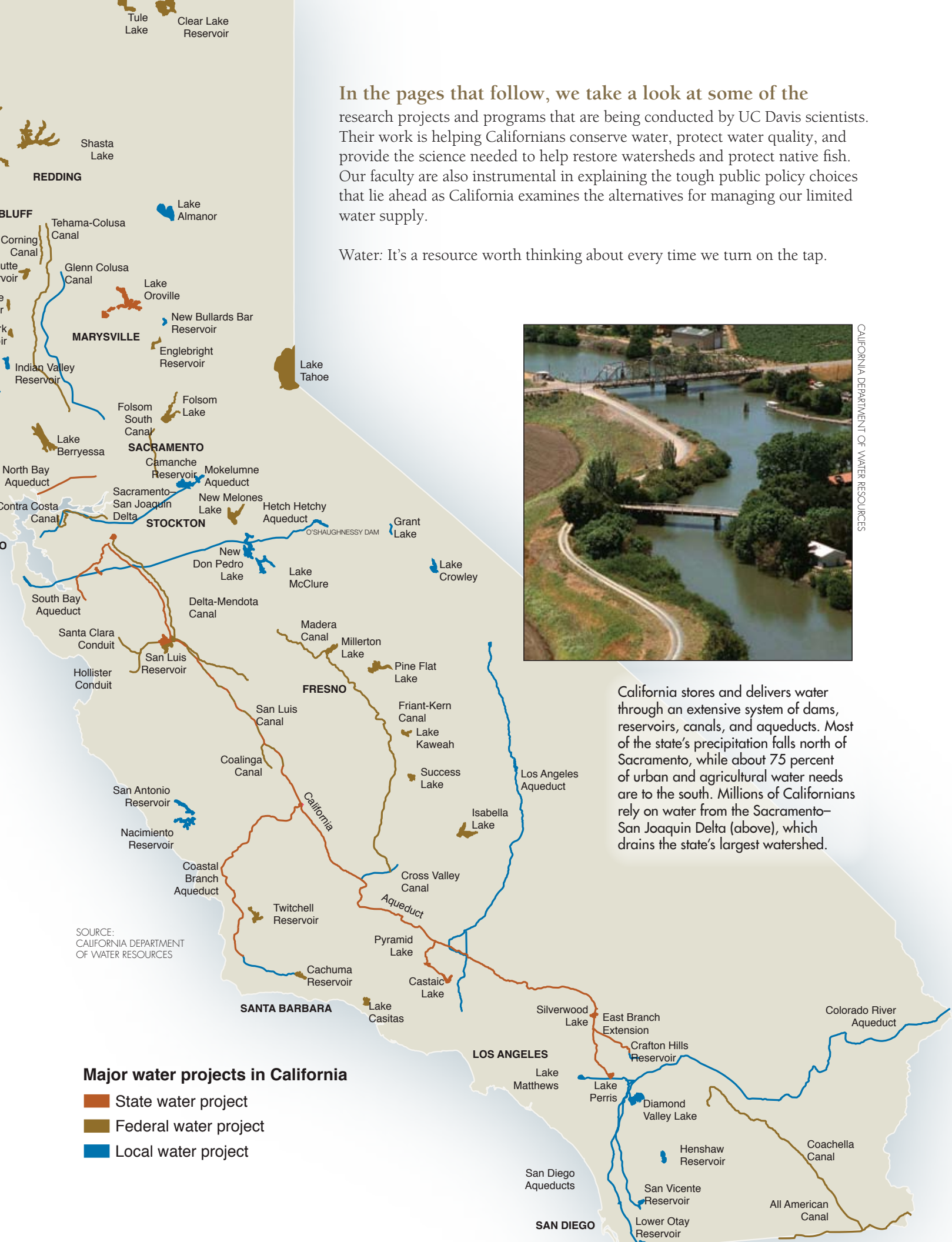


Californians face a water crisis that will shape the future

of the Golden State for generations to come. After three years of drought and new environmental restrictions on water exports from the Sacramento–San Joaquin Delta, urban and rural residents alike have a deeper appreciation for the value of this essential resource.

Water wise

Demand for water has surged along with California's burgeoning population. Urban and environmental demands for water compete with the state's \$37 billion agricultural industry, which is largely dependent on irrigation, and produces more than half of the nation's fruits and vegetables. A steady increase in water exports from the Delta over the past several decades has drastically altered the Delta's environment, resulting in an ecosystem hostile to native fish. Recent court orders have increased stream flows to help native fish species, whose populations have declined dramatically in recent years. In addition, the future of California's highly variable water supply is threatened by the effects of climate change and the potential for levee failure in the Delta.



In the pages that follow, we take a look at some of the research projects and programs that are being conducted by UC Davis scientists. Their work is helping Californians conserve water, protect water quality, and provide the science needed to help restore watersheds and protect native fish. Our faculty are also instrumental in explaining the tough public policy choices that lie ahead as California examines the alternatives for managing our limited water supply.

Water: It's a resource worth thinking about every time we turn on the tap.



CALIFORNIA DEPARTMENT OF WATER RESOURCES

California stores and delivers water through an extensive system of dams, reservoirs, canals, and aqueducts. Most of the state's precipitation falls north of Sacramento, while about 75 percent of urban and agricultural water needs are to the south. Millions of Californians rely on water from the Sacramento-San Joaquin Delta (above), which drains the state's largest watershed.

SOURCE: CALIFORNIA DEPARTMENT OF WATER RESOURCES

Major water projects in California

- State water project
- Federal water project
- Local water project

Moving water shaped our history

CALIFORNIA STATE LIBRARY, SACRAMENTO



California gold miners claimed water rights even if they didn't own the land next to a stream.

Since the Gold Rush, Californians have adapted to life in a semiarid state by diverting water away from its origin and using it elsewhere. Miners were the first residents to establish “appropriative” water rights, the right to use water by people who don't own the land immediately adjacent to a waterway.

“One of the reasons California has such a fascinating economy is because we pick up large amounts of natural resources, and we move them,” said Professor Richard Howitt, chair of the Department of

Agricultural and Resource Economics. “We move water, energy, information—it's become the de facto model of development in the state.”



Conveyance

Through federal, state, and local water projects, California has met the challenges of its natural hydrology by engineering a complex system of storage and conveyance systems. The state's largest “reservoir” is the Sierra Nevada snowpack, with snowmelt providing a slow release of water from late spring through midsummer. Recent decades with less snow and more rain have raised concerns about

the impact of climate change on the Sierra snowpack and the implications for water management.

California has 1,400 dams and reservoirs to store surface water, along with a vast system of aqueducts and canals to distribute it. Water exports through the Delta supply drinking water to two-thirds of the state's population and irrigate farms in much of the San Joaquin Valley. In addition, California uses groundwater—natural subterranean reservoirs—to meet about one-third of the state's water needs. But the water supply system has serious problems.

California's water projects, many built more than 40 years ago, were designed to manage seasonal variations in precipitation to guarantee water supply, with little consideration given to environmental impacts. Alterations to natural waterways have damaged habitats for native fish and wildlife and contributed to a rise in invasive species. A crash in native fish populations has emphasized that California's ecological crisis is also a water-supply crisis. Californians face difficult decisions ahead as we seek to manage the state's limited water supply in a sustainable way that provides for the people, the economy, and the environment. — R.D.

Decision on the Delta is crucial to California's future

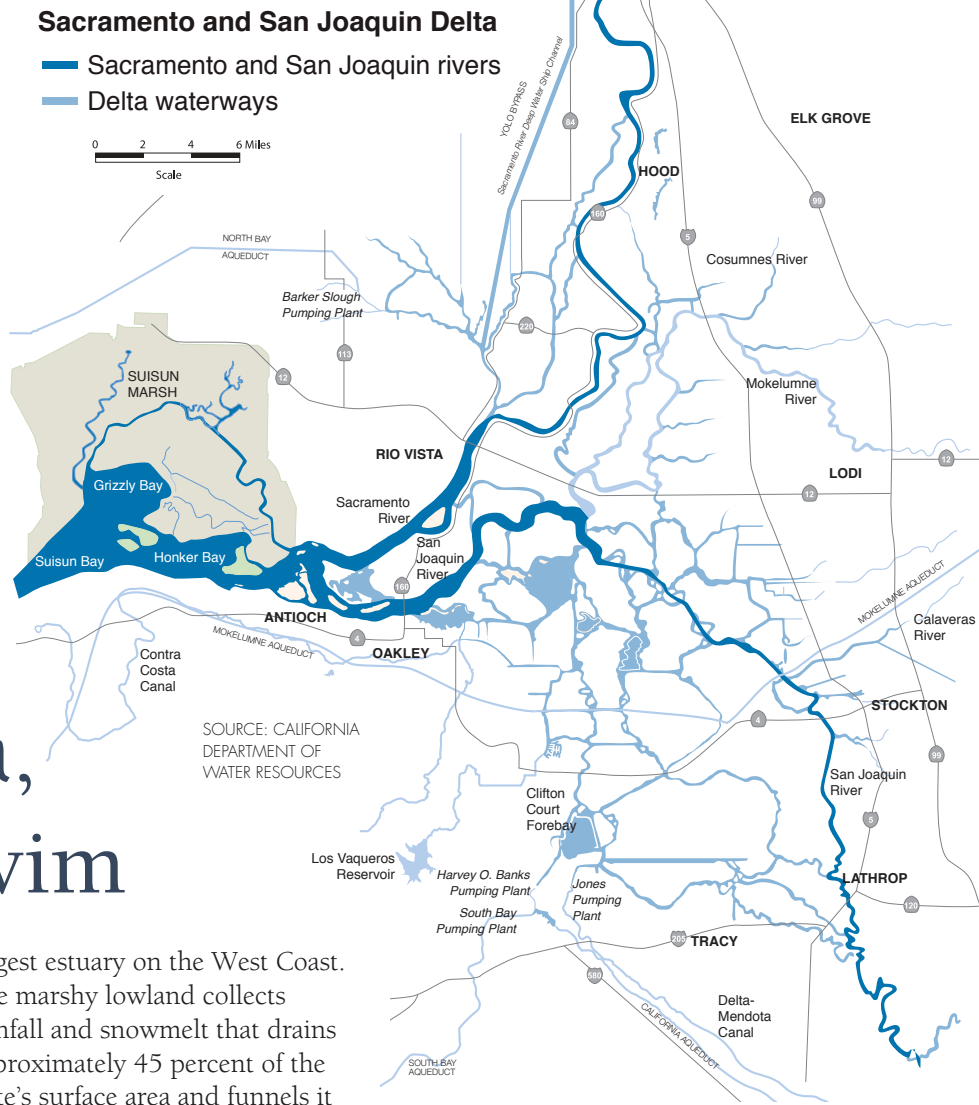
A multidisciplinary team of six UC Davis scientists, along with an economist from the Public Policy Institute of California, recently completed two reports examining long-term alternatives for managing Delta water exports. Professor Jay Lund, civil and environmental engineer; research engineer William Fleenor; research biologist William Bennett; Professor Richard Howitt, agricultural and resource economist; Professor Jeffrey Mount, geologist; Professor Peter Moyle, biologist; and PPIC economist Ellen Hanak collaborated on

“Comparing Futures for the Sacramento–San Joaquin Delta,” published in 2008. One conclusion the authors reach is that building a peripheral canal to carry water around the Delta would be the best approach to ensure a stable water supply and a sustainable ecosystem.

“Sea level rise, earthquake risks, soil erosion—these forces will change the nature of the Delta, regardless of what we do,” said economist Howitt. “The question is, do we aim for a soft landing, or a crash landing? It's very clear that soft landings are cheaper.”



The Harvey O. Banks Pumping Plant in the south Delta is the starting point of the California Aqueduct, the world's largest water conveyance system, which delivers water to the Bay Area, the San Joaquin Valley, and Southern California.



For the Delta, it's sink or swim

The hub of California's water supply is in crisis.

The Sacramento-San Joaquin Delta, with its web of waterways, levees, and islands south of Sacramento, is a rapidly changing ecosystem that faces a two-thirds chance of catastrophic levee failure by mid-century due to earthquakes or flooding from rising sea levels.

"The Delta is a pivotal issue for California," said soil biogeochemist William Horwath, a professor and J.G. Boswell Endowed Chair in Soil Science in the Department of Land, Air and Water Resources at UC Davis, who conducts research on Delta soils. "It is the major supply of freshwater for the state. Anything that interrupts that supply will have widespread consequences for drinking water and irrigation."

Formed by the confluence of the Sacramento and San Joaquin rivers, the Delta is part of the

largest estuary on the West Coast. The marshy lowland collects rainfall and snowmelt that drains approximately 45 percent of the state's surface area and funnels it to the Pacific Ocean via the Suisun, San Pablo, and San Francisco bays.

In the 1850s, settlers began diking and draining the Delta. Today, it has more than 50 islands used for farming and 1,100 miles of man-made earthen embankments, or levees, keeping the islands dry. Over time, the farmed islands have subsided from oxidation and erosion of the Delta's unique peat soils, causing them to sink below sea level, some by more than 20 feet. Subsided islands are essentially hollowed-out bowls protected from flooding by levees. According to geology professor Jeffrey Mount, founding director of the UC Davis Center for Watershed Sciences, "There are two kinds of levees: those that have failed, and those that will fail."

Levees and freshwater releases from reservoirs upstream help protect the Delta from saltwater intrusion. For decades, water managers have maintained the Delta as more of a freshwater lake than its natural condition as a brackish estuary, improving water quality for Delta farmers and for water exports. Native fish species, adapted to seasonal fluctuations in salinity, have declined dramatically, and six are listed as threatened or endangered. Enormous pumps at the southern end of the Delta deliver drinking water to the Bay Area and Southern California, as well as irrigation water to farmers in the San Joaquin Valley. Since 2007, Delta water exports have been reduced for the benefit of declining native fish populations. — R.D.



Cameras mounted in this experimental drone helped analyze irrigation patterns in San Joaquin Valley orchards and vineyards.

Water management soars to new heights

UC Davis scientists

continue to fine-tune methods of growing quality fruit, vine, and nut crops with less water.

“Regulated deficit irrigation” reduces the amount of water applied through a season compared to what a crop is capable of utilizing. In winegrapes and some tree crops, it can actually improve crop quality. A study on winegrapes grown near Lodi, for instance, found deficit irrigation produced better quality fruit and wine with 30 percent less water.

“It seems counterintuitive, but properly executed regulated deficit irrigation can actually improve harvest quality while reducing



Irrigation

consumptive water use,” says UC Davis water management specialist David Goldhamer.

Goldhamer, based at the Kearney Agricultural Center in the San Joaquin Valley, was an early pioneer of the technique. He has been exploring new ways to build

upon regulated deficit irrigation strategies to help growers produce higher profits while using less water.

The researcher is especially enthusiastic about the next wrinkle in irrigation management: aerial imagery. In June and July 2009, he and a team of Spanish researchers flew robotic aircraft equipped with specialized cameras over pistachio



UC website helps in drought fight

UC Davis irrigation specialists Terry Prichard and Larry Schwankl have compiled current knowledge about managing limited water supplies, including deficit irrigation and irrigation scheduling into a “UC Drought Management” website. The online information—at ucmanagedrought.ucdavis.edu—is intended to help California growers maintain production quality with increasingly limited water supplies. It currently contains information to develop crop irrigation strategies for almonds, pistachios, stone fruits, walnuts, and alfalfa. The specialists are working on adding irrigation information on winegrapes, olives, avocados, and corn.

and almond orchards, as well as table grape vineyards.

The cameras recorded detailed plant canopy temperatures and other parameters that can be used to quantify water stress, nutrition status, and insect and disease damage. The tests showed the potential to conserve significant amounts of water—20 percent in pistachio trees.

“This technology is the future of farm-water management for trees and vines,” Goldhamer says. — J.S.

Irrigation gets more efficient

A quarter century ago, scientists from UC Davis and the state Department of Water Resources created the California Irrigation Management Information System (CIMIS), which has saved growers millions of dollars in water and energy costs. Now, CIMIS information is being leveraged into a Web-based advisory service that will give California growers an even greater capacity to improve water use efficiency and maximize production returns.

“This new approach is in its infancy, but it really is the wave of the future.”

The approach originated in Oregon and is being adapted in other western states with the same water efficiency concerns. Currently, a network of 120 CIMIS weather stations throughout California generates regional plant water need

USDA NATURAL RESOURCES CONSERVATION SERVICE



Water use in California orchards has become much more efficient with advances in application technology and improved irrigation scheduling.

predictors called evapotranspiration (ET) rates. This “optimum irrigation scheduling” project combines ET with information about crops, soils, salinity, field configurations, irrigation system design, and farm management preferences to create a farm-specific blueprint for the best way to irrigate.

“This will give California growers more precise and more flexible irrigation scheduling abilities,” said

UC Davis biometeorology specialist Richard Snyder, one of the project directors. “This new approach is in its infancy, but it really is the wave of the future.”

The project was test piloted during the 2009 growing season with cooperating farms in the Sacramento and San Joaquin valleys. For additional information, contact Snyder at rlsnyder@ucdavis.edu. — J.S.

SAMUEL METCALF/UC DAVIS



Probing to keep almonds alive

UC Davis pomologist Ken Shackel is leading an experiment at the Leslie Nickels Soil Laboratory in Colusa County to determine how much water almond trees need to survive. Last spring, technicians Mike Mata and William Stewart (left) installed soil-monitoring tubes. These probes will generate soil- and plant-based measures to be used as benchmarks for judging the severity of orchard water stress. “In terms of survival, the trees have done surprisingly well so far, even with no irrigation, although we have seen clear reductions in nut size and some twig dieback,” Shackel said.



Zhongli Pan, an adjunct professor in the Department of Biological and Agricultural Engineering at UC Davis, treats tomatoes with infrared heat to remove peels prior to processing.

Reducing water use in tomato processing

The secret to peeling

tomatoes is a quick dip in hot water to loosen the skins, but it takes a lot of water and heating energy to peel three million pounds of processing tomatoes in California each year. New UC Davis research is fine-tuning a novel way of peeling all those tomatoes with almost no water—using infrared heat.

Two methods are used to



Food
& Drink

remove skins in processed tomatoes—a hot water/lye dip, or steam. Not only is a lot of water and energy used, but the dip-water containing lye must be neutralized prior to discarding, which creates high levels of salts—and a disposal problem. Steam treatment of tomatoes avoids lye, but it heats too much of the tomato, resulting in some tomato flesh removal with the peel, thereby reducing yield and quality.

“The tomato processing industry has long been interested in finding a better way of peeling tomatoes,” says Zhongli Pan, a USDA-ARS research engineer at the Western Regional Research Center in Albany, Calif., and an adjunct professor in the Department of Biological and Agricultural Engineering at UC Davis. He and his colleagues found that peeling tomatoes with infrared heat eliminates lye use, greatly reduces water use, and results in better quality tomatoes.

Infrared heat is similar to heat from the sun. It allows for efficient heat transfer from the source to the product. “The real advantage is that infrared heat doesn’t penetrate the product very deeply, so the tomato skins can be heated and removed easily while maintaining firmer, higher-quality peeled tomatoes,” Pan explains.

Another advantage is that the removed peel is purer and more concentrated, allowing it to be used in other ways, such as added back into tomato paste or as a new food additive. Infrared heat has promising potential not only for dry-peeling tomatoes, peaches, and other produce, but also for blanching many fruits and vegetables before freezing, such as apples and “baby” carrots.

With financial support from the California League of Food Processors, the California Energy Commission, and six tomato companies, Pan and his colleagues are now building an automatic pilot-scale infrared tomato heating device. Pan’s ultimate goal is to develop commercial-scale guidelines for peeling tomatoes and other products with infrared heat.

Higher-quality pizza, tomato sauces, and many other food products may appear on our tables if infrared heat can be adopted by the food-processing industry. The secondary impact on water conservation will benefit us all. — A.F.



Viticulture and enology professor Roger Boulton examines discarded cleaning water from a tank in the old campus winery. His goal is to develop practices to reuse and recycle the water.

Creating a sustainable future for wineries

“The future of the

California wine industry hinges on water,” says viticulture and enology professor Roger Boulton. His mission is to show that water use in wine production can be reduced by a whopping 80 percent or more, using the new campus winery as a model.

It takes a lot of water to grow grapes, but it also takes a lot of water to produce wine from grapes. Most agricultural/food businesses use substantial amounts of water *after* harvest—water for washing, sorting, cooling, and lots of water for cleaning (including cleaning tanks in the winemaking, brewing, and dairy industries).

Sodium-based products are

widely used in tank-cleaning water, but high sodium levels limit the reuse of the wastewater for irrigation on many soils. “To be sustainable in a world short of water, businesses and individuals will have to use their water more than once,” notes Boulton.

The new campus research and teaching winery will not use sodium cleaning products, but will adopt green cleaning chemistries and CIP (clean-in-place) technology, practices widely used in the dairy and brewing industries. CIP technology allows for better capture of cleaning solutions, and less water use.

“It’s possible,” says Boulton,

“to reduce water use by 80 percent, or even 90 percent, if it is captured, filtered, and reused. Currently, many wineries would be pleased with a 10-percent reduction in water requirements.”

“To be sustainable in a world short of water, businesses and individuals will have to use their water more than once.”

Eventual goals for the LEED-certified campus winery include being self-sustainable in both on-site water and energy. One goal is to use solar power to run the winery at peak load—the winery would be completely “off the grid” each day when it is running.

Another goal is to use rainwater from the adjacent Robert Mondavi Institute buildings in the winery and the brewing and food science laboratory. It would be the first UC building to use rainwater to achieve water sustainability. With storage tanks, enough water from winter rains could be collected from the buildings to wash the winery and the brewing and food science laboratory, and still have enough to help irrigate the vineyard, water landscapes, and flush toilets.

But it comes at a price, and in this tough budget era, the self-sustainability components will be added in stages. Upon completion, the campus winery will be the world’s first example of a combination of self-sustainable water and energy systems. This has enormous implications for wineries and food-processing plants. As Boulton notes, “sustainability is the future of California.” — A.F.



ALAN FULTON, UC COOPERATIVE EXTENSION

Citizen groups are helping monitor and maintain water quality in California rivers and streams.

Joint efforts improve rural water quality

Farmers, ranchers, and concerned citizens throughout California have joined together to adopt new practices that protect water quality, often with the help of UC Cooperative Extension (UCCE) and other public agencies.

The Rangeland Watershed Program at UC Davis was created after the livestock industry 20 years ago identified water quality as a high priority issue and began discussions with the state Water Resources Control Board, UCCE, resource conservation districts, and USDA's Natural Resources Conservation

Service (NRCS). UC Davis Cooperative Extension range specialist Melvin George, working with UCCE county advisors such as John Harper in Mendocino County, developed a shortcourse that showed rangeland owners how to create ranch water quality plans.



“Grazing and associated ranch practices may pollute surface water if not properly managed,” George says. “We wanted to give ranchers hands-on tools to systematically prevent aquatic and streamside habitat degradation.”

From 1997 to 2004, more than 800 ranchers took the shortcourse,

developing plans for more than 1.5 million acres of private rangeland. A follow-up survey showed that two-thirds of the participants implemented “best management practices” to improve water quality—dirt road management, fencing near streams, improved livestock distribution, and other measures.

“The course has also been a catalyst for the development of several landowner watershed management groups and has been used as a model to address water quality on Central Coast farms,” George adds.

Today many groups, such as the Central Coast Agricultural Water Quality Coalition and the Agricultural Water Quality Alliance in Monterey Bay, are vital to improving the state's water quality.

But the effectiveness of voluntary watershed groups is threatened by declining investments in public institutions that facilitate the “diffusion” of technical information, research shows. Mark Lubell, a professor in the UC Davis Department of Environmental Science and Policy, cites the loss of more than 100 county Cooperative Extension positions statewide between 2002 and 2004 as an example of eroding capacity to accomplish water quality goals.

Lubell and fellow investigator Allan Fulton, a UCCE irrigation and water resources advisor, documented the value of local “policy networks” in a study of more than 400 orchard growers in the Sacramento Valley Water Quality Coalition (SVWQC). Their research found that producers' exposure to policy networks increased the probability of adopting best management practices.

“The irony is that at the same time agriculture is being asked to increase awareness of environmental issues, the very policy networks necessary to create such change are being dismantled,” Lubell said. — J.S.



Specialist Thomas Harter (below) has helped California dairies monitor groundwater.

Expert builds support from the ground up

Groundwater is an

important source of water for millions of Californians. All but 900 of the state's 8,700 public water-supply systems rely on groundwater, and thousands of privately owned wells supply almost all the domestic water outside municipal and metropolitan areas.

However, this fragile resource is threatened by agricultural and urban contaminants and by excessive groundwater pumping. The UC Cooperative Extension Groundwater Hydrology Program, begun at UC Davis in 1995, provides a focal point for scientific research and educational outreach on groundwater. Thomas Harter, UC's only hydrogeology Cooperative Extension specialist, runs the program.

"Our novel program works with a broad range of people in the scientific community, in agriculture, and with local, state, and federal planning and water management agencies and groups," Harter says. "Our goal is to improve the understanding of how agricultural operations affect water quality and



CHRIS CORBETT/UC DAVIS

"Our goal is to improve the understanding of how agricultural operations affect water quality ..."

to lay a scientific foundation for good management and regulatory decisions."

Dairies in Stanislaus and Merced counties, for instance, have nitrate and salt problems in their groundwater because soils are predominantly sandy and the depth

to groundwater is shallow. Dairy operators have been working with Harter on a monitoring program. They established nearly 100 monitoring wells on eight dairies representative of dairies throughout the San Joaquin Valley.

"We are developing nutrient management practices that will allow operators to fertilize crops with liquid manure without reduction in crop yield, while minimizing nitrogen and salt losses to shallow groundwater," he said.

Similar studies have been conducted in the southern San Joaquin Valley, where groundwater is deeper, and the problem not as severe. Harter's group is developing the data processing and groundwater modeling tools in conjunction with these monitoring programs to evaluate long-term implications for groundwater quality.

Other research has studied how nitrates and pathogens like *Cryptosporidium parvum* move through soil, whether in an orchard, in a corn field, or under a lagoon. In 2007, the California Groundwater Resources Association honored the program for its efforts to improve understanding of groundwater quality and its role in developing better dairy management practices.

Harter, holder of the Robert M. Hagan Endowed Chair in Water Management and Policy, has developed publications such as "Basic Concepts of Groundwater Hydrology" (UC ANR Publication 8083) to help the public understand more about this important resource. "Watersheds, Groundwater, and Drinking Water" (UC ANR Publication 3497) is a comprehensive, practical guide for resource managers, planners, and decision-makers.

To learn more about groundwater research and education and to find information and publications, visit the program's website at <http://groundwater.ucdavis.edu>. — J.S.



Professor Peter Moyle says restoring flows to the San Joaquin River will be good for many native fishes, like this Sacramento pikeminnow.

San Joaquin River coming back to life

In the fall of 2009, an extraordinary event took place on the San Joaquin River. Water managers began returning flows to about 60 miles of dry river bed for the first time in more than 60 years, a historic step in the most ambitious river restoration project in California history.

Without UC Davis fisheries professor Peter Moyle, this day may never have arrived. Moyle has studied the San Joaquin River for 40 years, first as a professor at California State University, Fresno, and since 1972 as a member of the UC Davis faculty. One of California's leading authorities on freshwater fish, he has been a vocal advocate for protecting



Fish & Wildlife

many native fish species and helped engineer the successful restoration of Putah Creek water flows, a model for bringing new life to the state's second longest river.

"The San Joaquin River once probably had in the neighborhood of a half million salmon going up there to spawn," he said. "When Friant Dam was built, it essentially shut off the river and large portions became dry. The last run—about 50,000 salmon—was left to die. It was a very different era in the 1940s."

Moyle published numerous papers on the river's fish, so he wasn't surprised when the Natural Resources Defense Council (NRDC) contacted him 20 years ago.

California Fish and Game code section 5947 requires the owner of a dam to maintain downstream fish in good condition. NRDC tapped Moyle's published papers for background in a lawsuit and asked for his help modeling river flow requirements to sustain native fish, especially salmon.

"You need a regime that mimics natural flows with their ups and downs in spring and fall," he says.

"A living river will help bring back other native fishes, restore vegetation, provide habitat for migratory birds and help other species in trouble."

The lawsuit was settled in 2006 with the understanding that self-sustaining fish populations would be restored below Friant Dam to the confluence with the Merced River. Moyle is confident the San Joaquin River Restoration Program, which will implement the agreement, can succeed. Increased stream flows helped bring back chinook salmon to Putah Creek in 2003 for the first time in half a century. Nearly 150 miles of San Joaquin River habitat will be restored and salmon will be reintroduced by the end of 2012.

"A living river will help bring back other native fishes, restore vegetation, provide habitat for migratory birds and help other species in trouble like the riparian brush rabbit, Yellow-billed Magpie, and ring-tailed cat," Moyle said. "This will become a place where you can swim, take your kids, or paddle your kayak. Once the river starts flowing, you'll see a beautiful transformation." — J.S.

Native fish get a fighting chance

Three native California fish

that depend on access to adequate fresh water to complete their life cycle all face an uncertain future. Central Valley spring chinook salmon, Central California coast steelhead, and Eagle Lake rainbow trout are protected by state or federal agencies. And all have been the subject of research by UC Davis scientists and county-based UC Cooperative Extension (UCCE) advisors working with a mix of private landowners, public agencies, and citizen groups.

The healthiest remaining population of threatened Central Valley spring chinook exists in Butte Creek, a tributary to the Sacramento River that winds its way through farmland, past cities and towns, into the foothills of the Sierra Nevada. The fish, one of four distinct types of chinook in the Sacramento Valley, migrate upstream in the spring, hold in cold pools during summer, and spawn in the fall.

“We’re looking at the potential effects of climate change on spring-run chinook,” said Lisa Thompson, an inland and anadromous fisheries specialist at UC Davis. “These fish are potentially quite vulnerable to climate change because summer flows are predicted to get lower and warmer.”

The project, funded by the U.S. Environmental Protection Agency, seeks to determine how water managers could compensate for future climate change impacts. These chinook may also serve as brood stock to repopulate the San Joaquin River.

Thompson, working with advisor Royce Larsen, specialist Bill Tietje, and UC Davis fisheries professor Peter Moyle, also studied the

CHRISTOPHER MOSSER/UC DAVIS



Aquatic biologist Lisa Thompson radio tracks spring-run chinook salmon, a threatened species, on Butte Creek, near Chico.

“From this study we were able to show landowners the value of large wood in streams.”

role of woody debris in forming habitats for threatened Central California coast steelhead in the upper Salinas River watershed. With the cooperation of private ranchers, the team examined 15 sites.

“From this study we were able to show landowners the value of large wood in streams,” Thompson said. “It provides cover, scours deep holes during high flows, and creates shade that keeps stream temperatures down.”

In northeastern California, UCCE advisor and county director

David Lile, UC Davis specialist Ken Tate, and Peter Moyle teamed up with Thompson to evaluate stream habitat restoration efforts for Eagle Lake rainbow trout, a species of special concern. The trout are dependent on hatchery reproduction and face competition from non-native brook trout. The group has been tracking migrating spawners to provide resource managers and concerned citizens with sound science for management of the Pine Creek watershed.

The plight of these fish is not atypical. A UC Davis review of California’s 31 salmonid species found that 65 percent of them are facing potential extinction if present trends continue. The review was commissioned by the conservation organization California Trout and is available at www.caltrout.org. — J.S.

Growing food for waterfowl

California's Central Valley

is one of North America's most important wintering areas for migrating waterfowl. More than 60 percent of the Pacific Flyway's ducks, geese, swans, and other birds fly here each fall and fatten up before the trip north to nesting areas in Canada and Alaska. With increasing urban growth and demands for water, however, the food supply from agricultural land and wetland areas in California may soon be inadequate to meet the birds' energy requirements.

"This is really farming for wildlife."

A novel research project by Professor John Eadie, a UC Davis waterfowl expert, and graduate student Brian Olson, seeks to alleviate the imbalance by giving wetland managers the science to grow cost-effective, productive stands of waterfowl food—"moist-soil" plants with large, abundant seeds rich in nutrients.

"This is really farming for wildlife," says Eadie, who holds the Dennis G. Raveling Endowed Professorship in Waterfowl Biology. "We wanted to learn how to use water more efficiently to produce food plants for waterfowl, but this work also stands to benefit many other plant and animal species."

The project, in its third year, is taking place on about 60 acres of Roosevelt Ranch in Yolo County.

JOHN STUMBOS/UC DAVIS



UC Davis graduate student Brian Olson is investigating how to grow food for wildlife with minimal water use. Sampling for the presence of mosquitoes is part of the study.



The project is a model partnership between landowners, the university, agencies, and conservationists on how to best provide water for wildlife needs.

The ranch was owned by Peter Stent and Chris Steele, supporters of UC Davis waterfowl and wetland research, who offered the parcel for Eadie to use with students. Stent and Steele even provided irrigation pipe and labor to set up the experimental site. The ranch's new owners—Tom Patterson and Bill Patterson—have been equally supportive.

"Their support has been absolutely phenomenal," Eadie says. "This is one of only two or three large-scale experimental wetland systems in the nation and the only one in California."

Olson is evaluating specific wetland management strategies on 21 research plots, each 1.5 acres in size, at Roosevelt Ranch. Without summer irrigation, production of moist-soil seed plants can be severely limited. Olson's research examines how to produce this critical food source consistently while addressing concerns about water efficiency and mosquitoes.

Nearly two-thirds of California's remaining wetlands are in private hands, Eadie says. "If we're going to do anything for our waterfowl or endangered species—whether it's a plant or a bird or a mammal—it's going to have to involve the private sector," he said. "Roosevelt is more than an experiment on water efficiency. It's also a model partnership between landowners, the university, and state and federal wildlife organizations."

Olson, an avid waterfowl hunter from rural Northern California, is philosophical about the nature of his research. "It's about lining up the wants of humans with the needs of wildlife," he said. — J.S.

Reviving California's rivers

Rivers need more than

water to be healthy. They need pools, riffles, bars, chutes, and backwaters—areas where water varies in depth, surface slope, and velocity due to the submerged channel bed and the landscape along the banks of the river.

Over the last 150 years, human activity has degraded California's rivers. Gold and gravel mining, logging, dams, and flow diversions have contributed to a general decline in the complexity of river channels, eliminating spawning habitat for salmon and other anadromous fish that migrate from the ocean to reproduce upstream in freshwater rivers.

To reclaim habitat for native species of fish and wildlife, hydrologist Gregory Pasternack is leading research efforts on river rehabilitation in California's Central Valley. "In our research, we've shown that restoring channel geometry and substrate has a significant impact on restoring habitat," said Pasternack, a professor in the Department of Land, Air and Water Resources.

"Typically, people want to hit a home run. But one of the lessons we've learned from this work is that incremental improvements can have a significant cumulative benefit."

Pasternack and his research group use cutting-edge mapping techniques to analyze the complex hydrogeomorphic processes that control the creation of diverse channel features in rivers. They have devised models to predict how physical modifications of a river will affect water flow. They redesign river sections in collaboration

JOSHUA WYRICK/UC DAVIS



For a study of the lower Yuba River, Professor Gregory Pasternack (front) measures velocity at the riverbed of a rapid with the help of graduate students Aaron Fulton and Scott Fulton Jr. (back).

with stakeholders, then direct heavy equipment operators to scrape away substrate or dump gravel, boulders, and wood to meet design specifications. After a

portion of the river has been re-engineered, Pasternack and his graduate students monitor the site to determine the effect on fish.

From 1999 to 2007, Pasternack worked with the East Bay Municipal Utility District to improve salmon habitat on the lower Mokelumne River, which has been severely degraded by damming and land use.

"We've found that more than half the fish on the lower Mokelumne are using the rehabilitated sites we've constructed to lay their eggs, and that the embryo survival rate is much higher," said Pasternack.

More recently, Pasternack has been involved in a comprehensive study of the lower Yuba River to determine whether river rehabilitation actions would help create spawning habitat below Englebright Dam. Ideally, Pasternack would like to undertake river rehabilitation on a systemic scale—re-engineering degraded rivers throughout the entire Central Valley.

"I'm looking for technical solutions to societal problems," said Pasternack. "Typically, people want to hit a home run. But one of the lessons we've learned from this work is that incremental improvements can have a significant cumulative benefit." — R.D.

Research in the **RAPIDS**

Students get their feet wet
doing watershed research

UC Davis students Matt Young, on the far shore, and Nick Buckmaster string a net across the Clavey River to learn more about the fish species inhabiting the central Sierra Nevada stream.

PATRICK HILTON / UC DAVIS

A CAREER IN WATERSHED AND STREAM

analysis requires intense preparation and specialized knowledge of river and stream health to forecast how ecological and geological factors may impact management.

At UC Davis, the ecogeomorphology class (GEL136) is designed to prepare students for that kind of work. Advanced undergraduates and beginning graduate students from different backgrounds tackle the major issues of watershed restoration and management faced by California scientists and policymakers.

This class is not for the faint of heart. Students must apply to take the class, and only the top applicants get accepted. A few times during the quarter, for three to four days at a time, the students and professors Peter Moyle and Jeffrey Mount set out into the wilderness to observe the ecological and geological features in river canyons in California, Utah, Colorado, and even Alaska.

“The focus is geology and biology and everything in between,” says Moyle. “We study the factors that create a living river, and for that you need expertise in many different areas. Engineering students, biology students, geology students, all come to the table with different aspects of the river system that they specialize in, and we all learn from each other.”

During their field research, the class spends up to four days at a time out on the river they are studying. They mix whitewater rafting with in-depth research and create a detailed picture of the river system, how it functions, and when it thrives.

Class projects with a dual purpose

As a project for the most recent class, students produced field guides for the Tuolumne and Clavey rivers. Students broke into groups to research and document different aspects of the rivers and then incorporated that information into individual sections of the guide.

These guides were designed for river use, with the goal of providing useful information about the complex facets of the river system.

Environmental biology and management major Denise De Carion’s eyes light up as she explains “I’m really into sturgeon. That’s my passion.” However, De Carion chose to be part of the group identifying aquatic insects and amphibians along the Tuolumne River to broaden her experience and learn from others who knew more about the subject.

“It’s fascinating seeing all the pieces of a river’s ecosystem and how they all fit together,” De Carion says. “I’ll never look at rivers the same way again.”

Students are encouraged to write “flogs,” field logs, about their research and experiences in the class. They

spend time contemplating the impacts of different factors on the ecosystem around them and then post their ideas and observations online.

Some flogs, such as one student’s observations of the diving habits of Canada Geese, have sparked discussion in the scientific community. De Carion, who worked all summer with the California Department of Fish and Game, is in the process of writing a flog about the O’Shaughnessy Dam and the Hetch Hetchy Valley.

CARSON JEFFRES/UC DAVIS



Students and professors in the Spring 2009 Ecogeomorphology class, offered to a select group of UC Davis students, pause for a class picture at Wards Ferry on the Tuolumne River.

A view from all angles

“The field experience as a whole was irreplaceable,” says Nick Buckmaster, double majoring in wildlife, fish and conservation biology, and in geology. “It’s rewarding to see for yourself that things you’ve been predicting in the classroom are actually true in the environment.”

The best part of the class, say Buckmaster and De Carion, was the chance to work with and learn from students and professors specializing in areas different from their own. “This was one of the most educational courses I’ve taken at UC Davis,” says Buckmaster, also a National Science Foundation grant recipient. “Working with people who come from different disciplines gave me a completely different way of looking at things.”

The collaboration experience is the key to the class. “The problems of watershed restoration and management are impossible to solve if worked on from only one perspective,” Moyle says.

Professor Mount, a geologist, and Moyle, a biologist, model the concept of multidisciplinary collaboration by teaching the course together. “Working with a team of people who come from very different disciplines is not only productive, it’s fun,” says Moyle.

— Elisabeth Kauffman



COURTESY PHOTOS



Student Ryan Billing has made key contributions to a joint project between UC Davis and Cal Poly.

SPRAYING TOGETHER

Student team engineers new spray rig that conserves water while improving coverage

IN A COLLABORATIVE venture, agricultural engineering students at Cal Poly, San Luis Obispo, and UC Davis have built a better pesticide sprayer.

Ryan Billing, a graduate student working with Professor Ken Giles in the UC Davis Department of Biological and Agricultural Engineering, was a senior at Cal Poly when he first became involved with the project to create a multi-fan, 48-nozzle sprayer to apply crop protection chemicals to orchards and vineyards. Billing was part of a four-person team who helped design and construct the sprayer under the guidance of Cal Poly engineering professor and UC Davis alumnus Mark Zohns.

Here on the UC Davis campus,

Billing is conducting research on the technical aspects of the sprayer fans for a master's degree. Graduate student David Leinfelder, who recently arrived from Cal Poly, will base his doctoral research project on creating computer controls for the sprayer that allow it to adjust automatically to variations in the density of foliage within a field. The goal of the experimental sprayer is to achieve better uniformity of chemical coverage while using less water in application.

“By being more targeted and achieving better coverage, we can reduce the amount of chemicals applied,” said Giles. “We can also reduce the amount of water used in mixing the chemicals, which saves treated, drinking-quality water that

is often used in spray mixes. Plus we improve our surface water quality by minimizing the runoff of pesticide residues.”

The sprayer project grew out of cooperation with the chemical application industry in California, which is helping finance the research, along with state and federal funding. The collaboration between UC Davis and Cal Poly, San Luis Obispo, utilizes the complementary qualities of both schools.

“Our Cal Poly colleagues are especially strong in equipment design and fabrication,” said Giles. “We have strengths in fluid handling, atomization, and the science of spraying.”

“By being more targeted and achieving better coverage, we can reduce the amount of chemicals applied.”

Billing, who grew up in Davis, used to work as an aircraft mechanic and is especially adept at engineering things in tight spaces. The experimental sprayer will test the efficacy of several different mixtures, which requires that multiple tanks fit into a spot that normally might hold just one. “There was a lot of teamwork that went into meeting the engineering challenges in this effort,” said Billing. “No single person thought of everything.”

— Robin DeRieux

NATIONAL PARKS PROTECTOR

Ecology alumna leads center watching over ‘America’s best idea’

GAIL DETHLOFF (PH.D., '98, Ecology) has an important role in an organization advocating for “America’s best idea”—our national parks.

The National Park System is a diverse collection of national parks, monuments, seashores, recreation areas, historic sites, military parks, battlefields, and other park lands. A significant portion of the nation’s biodiversity and important historic structures, archaeological sites, cultural landscapes, and archives are preserved within the system.

“The breadth of this system, called ‘America’s best idea,’ is amazing,” Dethloff says. “It preserves astonishing natural beauty and a fascinating heritage.”

Dethloff directs the Center for State of the Parks at the National Parks Conservation Association (NPCA). For much of her four years with NPCA, she managed natural resource assessments and served as an expert on resource issues.

The center has documented numerous threats to national park resources— adjacent land development, air and water pollution, invasive species, inadequate storage facilities, maintenance of historic structures, and insufficient funding and staffing.

“The center assesses resource conditions in selected national park units,” she explains. “We provide objective, fact-based information to park supporters, stakeholders, Congress, and other policymakers. This helps us tell the story of the parks and the National Park Service staff, the challenges they face, and their successes.”

As a graduate student in ecology at UC Davis, Dethloff developed an expertise in aquatic systems. She routinely applies that knowledge

ELIZABETH MEYERS/NATIONAL PARKS CONSERVATION ASSOCIATION



Gail Dethloff developed “a real-world perspective” at UC Davis that has helped her become an important conservation leader. Photo taken near Fort Collins, Colo., where she lives with husband Chris Myrick, another UC Davis graduate.

“The breadth of this system, called ‘America’s best idea,’ is amazing. It preserves astonishing natural beauty and a fascinating heritage.”

in resource assessments—even in parks without major marine or freshwater components. The multi-disciplinary nature of her graduate studies has helped her maintain a broad focus.

“The students and faculty I interacted with at UC Davis had diverse interests, and exposure to that diversity definitely made the leap into investigating all types of ecosystems at various levels smoother,” she says. “I also learned about the roles of stakeholders, negotiation, and conflict in protecting resources. It was a real-world perspective and a good

primer for the kind of work I do now, which can involve complex political and legal realities that impact the resources we assess.”

She lives in Ft. Collins, Colo. with husband Chris Myrick, a fellow UC Davis alumnus (M.S., '96, Ph.D., '98, Ecology) and now a Colorado State University associate professor. “We have been both diligent and lucky,” she says. “He is fulfilling his calling, doing research on the conservation physiology of fishes, while I enjoy a position I wouldn’t have envisioned for myself 10 years ago.”

— John Stumbos

LESLIE ROCHE/UC DAVIS



Kenneth Tate works with ranchers to create the science necessary for good stewardship practices and regulatory decisions.

WHAT IS A SPECIALIST IN COOPERATIVE EXTENSION?

The College of Agricultural and Environmental Sciences serves as one land-grant component of the University of California. Specialists in UC Cooperative Extension are faculty members based primarily at UC Davis, UC Berkeley, or UC Riverside. They are part of a statewide network of scientists who generate information to improve the quality of our lives. Rather than teaching students on campus, Cooperative Extension specialists provide educational programs to the broader community to move research knowledge into the hands of those who need it.

STEWARDS OF THE FUTURE

Targeted investments leave lasting legacies

THE WORD PHILANTHROPY IS derived from Greek and means “love of humanity.” Philanthropists may realize some personal gain—a tax deduction or words of thanks—through their charitable contributions. But most of the gain is shared with all of us.

Four donors have made targeted investments in the college to help our faculty concentrate on water-related issues. These donors include a retired professor, parents of a UC Davis staff member, and a Lake County rancher. The generous gifts of Robert Hagan, Alexander and Elizabeth Swantz, and Russell

Rustici have endowed faculty positions focused on an issue we all care about—water.

Robert M. Hagan Endowed Chair in Water Management and Policy

Bob Hagan was associated with the university for 50 years, many of them in the Department of Land, Air and Water Resources (LAWR). He was world-renowned for his irrigation expertise and became a university liaison with California agriculture. Although he retired in 1987, Hagan remained a key link between the science and the practice of efficient irrigation.

Bob Hagan passed away in 2002. He bequeathed a wonderful gift that established an endowed faculty position to continue his work, and he challenged his water industry colleagues to match it. They did. The inaugural holder of the Hagan chair is Thomas Harter, an LAWR specialist. Harter is continuing Hagan's tradition of working with water users to find solutions to groundwater issues (See the profile of Harter's work on page 13).

"This endowed position is helping continue Bob's service," says Rita Schmidt Sudman, executive director of the Water Education Foundation. "Bob was the link between the university and the people in the water community who used science to make good decisions. We still need that."

Alexander and Elizabeth Swantz Endowed Specialist in Cooperative Extension

Alexander and Elizabeth Swantz endowed a Cooperative Extension specialist position focused on water. "Water is the key to agriculture in the West," said Alex, an agricultural economist. "I knew that at some point, water would be more valuable than oil."

The Swantzes chose to support a specialist in Cooperative Extension with their endowment at the recommendation of their son, former CA&ES development

"I knew ... water would be more valuable than oil."

director Rick Swantz. According to Alex Swantz, "Rick told me that Cooperative Extension specialists don't typically receive endowed positions and I believe they do important work communicating with people." Rick Swantz is proud that UC Davis is the nation's leader

in endowed specialist positions.

Edwin "Ted" Grosholz is the inaugural holder of the Swantz chair. Grosholz, a specialist in the Department of Environmental Science and Policy, focuses his efforts on the challenges facing coastal habitats, including invasive species. The endowment has enabled Grosholz to provide sound science to public agencies, community groups, and industries such as aquaculture and tourism that rely on healthy coastal habitats.

Russell L. Rustici Endowed Chair in Rangeland Watershed Science

Russell L. Rustici Endowed Specialist in Cooperative Extension in Rangeland Watershed Science

Russell Rustici understood the value of good science. A cattle rancher in Lake County, Rustici worked with several UC professors and UC Cooperative Extension farm advisors and specialists who study cattle and rangeland ecosystems. Together, they create the science to support sound water quality regulations.

Two of the people with whom Russell Rustici worked are at UC Davis. Professor Randy Dahlgren met Russell in 1991 at the Sierra Foothill Research and Extension Center, and Cooperative Extension specialist Ken Tate met him four years later at a presentation to local landowners. These meetings developed into research collaborations and friendships that continued until Rustici passed away in October 2008. According to his friend Stephen Leveroni, Russell Rustici came to think of Randy and Ken "like family." As a result of this relationship, Rustici made gifts to UC Davis to establish two endowed positions the college is close to filling with individuals who share Rustici's passion for rangeland and watershed science.

— Christine Schmidt

Many ways to give

Each of the donors mentioned in this article made a gift in a different way. Bob Hagan bequeathed his gift through a will. Alexander and Elizabeth Swantz turned an income-producing charitable remainder trust into a cash gift. Russell Rustici contributed cash. Charitable gifts can be structured to fit your financial situation. What are your objectives?



Tax benefits

An outright gift of \$25,000 may provide tax savings of \$8,750 (35% tax bracket-state and federal).



Capital Gains

Gifts of appreciated assets like stocks and real property have potential multiple tax benefits.



Estate taxes

Since your assets are not taxed when given to UC Davis, each dollar is preserved to achieve your philanthropic goals.



Lifetime income

A charitable gift annuity provides potential tax benefits with annual payments from 4.4% to 9.5% based on age.

Careful gift planning can help you meet these objectives while making a difference at UC Davis. Contact Christine Schmidt (cmschmidt@ucdavis.edu or 530-752-6414) to explore how a charitable gift can help you achieve your philanthropic—and financial—goals.

This list of donors reflects gifts of \$1,000 or more that were made to the College of Agricultural and Environmental Sciences during the fiscal year 2009 (July 1, 2008 – June 30, 2009). Pledge payments to the college and gifts made elsewhere to UC Davis are not included in this list. If you notice an error, please call us at (530) 754-8961.

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Maxine L. Schmalenberger
SePro Corporation
Solazyme, Inc.
Marjorie and Herbert (Ph.D. '63) Stone
Target
Wilbur-Ellis Company

\$1,000 – \$2,499
A. P. Moller-Maersk A/S
Absogor SA
Acadian Seaplants Limited
Aceto Agricultural Chemicals Corporation
Advanced Microbial Solutions, LLC
Robin Affrime and Jim Gray ('80)
Agrotain International, LLC
Almond Board of California
Annual Reviews
Joy S. Baltaxe
Bancroft-Clair Foundation
BHN Research
Marcia and Karl ('78) Blackmun
California Alfalfa and Forage Association
California Creamery Operators Association, Inc.
Susana A. Cardenas
Om Parkash Choudhary
Civic Garden Club of San Carlos
MaryLou Cockcroft
Marjorie and John Compton
Constellation Wines U.S., Inc.
Carol ('66) and Stephen Cooper
Davis Fresh Technologies
Ellen (M.S. '81) and Devon Zagory – Devon Zagory & Associates
EMD Crop BioScience, Inc.
Loretta and Frank Endres – Endres Family Farm
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Molly Lam
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Constance ('82) and Jon ('82) Moramarco
Netafim USA
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Toki K. Niitta
Kirk E. Norris (M.S. '84)
Nunhems USA, Inc.
Sang-Suk Oh (M.S. '85, Ph.D. '90)
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Judith L. Ozment ('80)
Parker Family Foundation
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Joan R. Platt
Stephanie ('77) and Michael ('77) Poley
Vinette and Beatty Ramsay
Rice Research Trust
Robert Mondavi Corporation
Lisa ('85) and Marc ('86) Roberts

Jennifer A. Rogers ('84)
Becci and Ernest ('96) Roncoroni
Janet F. Roser (M.S. '78, Ph.D. '82)
Patricia and Michael ('71, J.D. '74) Rue
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Sacramento Audubon Society
Sakata Seed America, Inc.
Heath (M.A. '88) and Marc Schenker
Kathleen (Ed. Cred. '90) and Norman ('67) Schoening
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Laurel ('61, Ed. Cred. '62) and Ronald ('60) Schuler
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Roberta and John ('80, M.S. '83) Serbia
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*Chancellor's Laureates, a campus-wide giving club comprised of individuals and corporations who have each cumulatively donated \$1 million or more to UC Davis.



Mary Delany



Jan Hopmans

NEW ASSOCIATE DEANS

Delany, Hopmans assume leadership posts, while Van Alfen agrees to third term

PROFESSORS MARY DELANY and Jan Hopmans have been appointed to replace three long-serving associate deans who are returning to faculty work. Dean Neal Van Alfen has been reappointed to another five-year term as dean, his third term.

Executive Associate Dean Jim MacDonald has also been reappointed, along with Diane Ullman, Associate Dean for Undergraduate Programs, and Jim Hill, Associate Dean for International Programs.

Delany and Hopkins chaired their respective departments: Delany in animal science and Hopmans in land, air and water resources (LAWR).

Lovell “Tu” Jarvis, Michael Parrella, and Randal Southard will return to faculty assignments after 10 years of administrative service leading college divisions for human, agricultural, and environmental sciences.

“Tu, Michael, and Randy have been incredible partners and friends, and we will certainly miss them,” Van Alfen said. “But I am delighted that Mary and Jan have joined my office.”

The new associate deans will have the same academic and programmatic responsibilities, but the change to two individuals necessitates department assignments that do not align with the three college divisions.

Hopmans was born and raised in the Netherlands, spending his teenage years on one of the delta islands in Zuidholland. He graduated with a master’s degree in hydrology from Wageningen Agricultural University in 1981 and received his doctoral degree in soil physics from Auburn University in 1985. He became a professor in water management in LAWR in 1988 and served as department chair from 2005 until his recent appointment as associate dean.

Hopmans’ research and teaching focus on the fundamental processes controlling soil water flow and chemical transport. Recent studies include an analysis of the sustainability of irrigated agriculture in California’s San Joaquin Valley, and the impacts of climate change on the valley’s soil and groundwater salinity.

Delany was raised in New Jersey. Her graduate work at Cornell University (M.S. 1984, Ph.D. 1987) concentrated on animal genetics. She joined UC Davis as a professor in avian developmental genetics in 1995 and served as the animal science department chair from 2005 to 2009. She holds the John and Joan Fiddymont Endowed Chair in Avian Genetics.

In addition to undergraduate animal genetics courses, Delany also teaches a graduate course in integrated animal biology. Her research examines avian genome organization and its role in growth, development, aging, and disease. This work uses the chicken model because of its agricultural importance and its significance as an animal model for human development and disease.

— John Stumbos



UPDATED LOGO PART OF UNIVERSITY BRANDING STRATEGY

To strengthen the UC Davis brand, University Communications has implemented a distinguishing icon for each college and school to use in tandem with the university logo. CA&ES’s new icon (at left) is the result of a joint effort with the dean’s office design team. “The sun has long been a symbol of life, and it’s a fitting symbol for a college that has life at the very core of its mission,” said senior artist Eric Rohr, a co-designer on the project.

WHERE OLD MEETS NEW

A celebration
of our college's
rich heritage
and bright future

More than 400 people filled Freeborn Hall on Oct. 9, for the 21st annual College Celebration, an awards ceremony combined with an evening of good food, good beverages, and good friends. The event celebrates the accomplishments of the College of Agricultural and Environmental Sciences. It also honors individuals whose contributions and achievements enrich the image and reputation of the college and enhance its ability to provide public service.

Get the full story at the News & Events section of our website: caes.ucdavis.edu.

Pictured in the adjacent photo are (left to right) UC Davis Chancellor Linda Katehi, CA&ES Dean Neal Van Alfen, and award recipients Gurdev Khush, Howard-Yana Shapiro, Martha Guzman Aceves, John Bruhn, Tom Kaiser, Fritz Maytag, Mary Patterson, James Lugg, and Ann Veneman.



CA&ES Outlook

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THE RAMSAY FAMILY

In appreciation of a quality education

Dean's Circle members Chip and Vinette Ramsay hoped their youngest daughter, Christina, would attend a college close to their San Francisco Bay Area home. When Christina and her physician father visited a prestigious agricultural university back East to discuss her interest in food science, a professor mentioned that UC Davis was their biggest competitor.

"After that, we kept our fingers crossed that Christina would be admitted to UC Davis," says Vinette. "We appreciate how competitive it is."

"I don't feel we give a lot, but we give what we can," she added. "We're grateful for the high quality of education our daughter receives, especially compared



Chip, Stephanie, Vinette, Christina, and Andy Ramsay

to a private school. We feel we're getting more than a private school could offer."

Through the Department of Food Science and Technology, Christina has had the opportunity to work in the student garden giving tours to children, learn the delicate nuances of olive oil tasting, and spent the summer conducting food sensory tests for Tulocay and Company in the Napa Valley.

"She absolutely loves it," says Vinette. "Experiences like this have given her the opportunity to explore her interests and find her calling. We're pretty jazzed about UC Davis."

— Dawn Spinella

JOIN THE CA&ES DEAN'S CIRCLE

As a CA&ES Dean's Circle donor, your financial support enhances the academic environment for the next generation of Aggies and creates opportunities for our faculty to achieve higher levels of excellence in teaching, research, and public service.

ABOUT CONTRIBUTING

The CA&ES Dean's Circle is open to donors who wish to make unrestricted annual gifts of \$1,000 or more to the College of Agricultural and Environmental Sciences.

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Donors to the CA&ES Dean's Circle are invited to campus events such as an annual briefing with the dean. Donors also receive recognition in college publications.

HOW TO CONTRIBUTE

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