1914 2014

Celebrating 100 Years

COLLEGE OF NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA, BERKELEY
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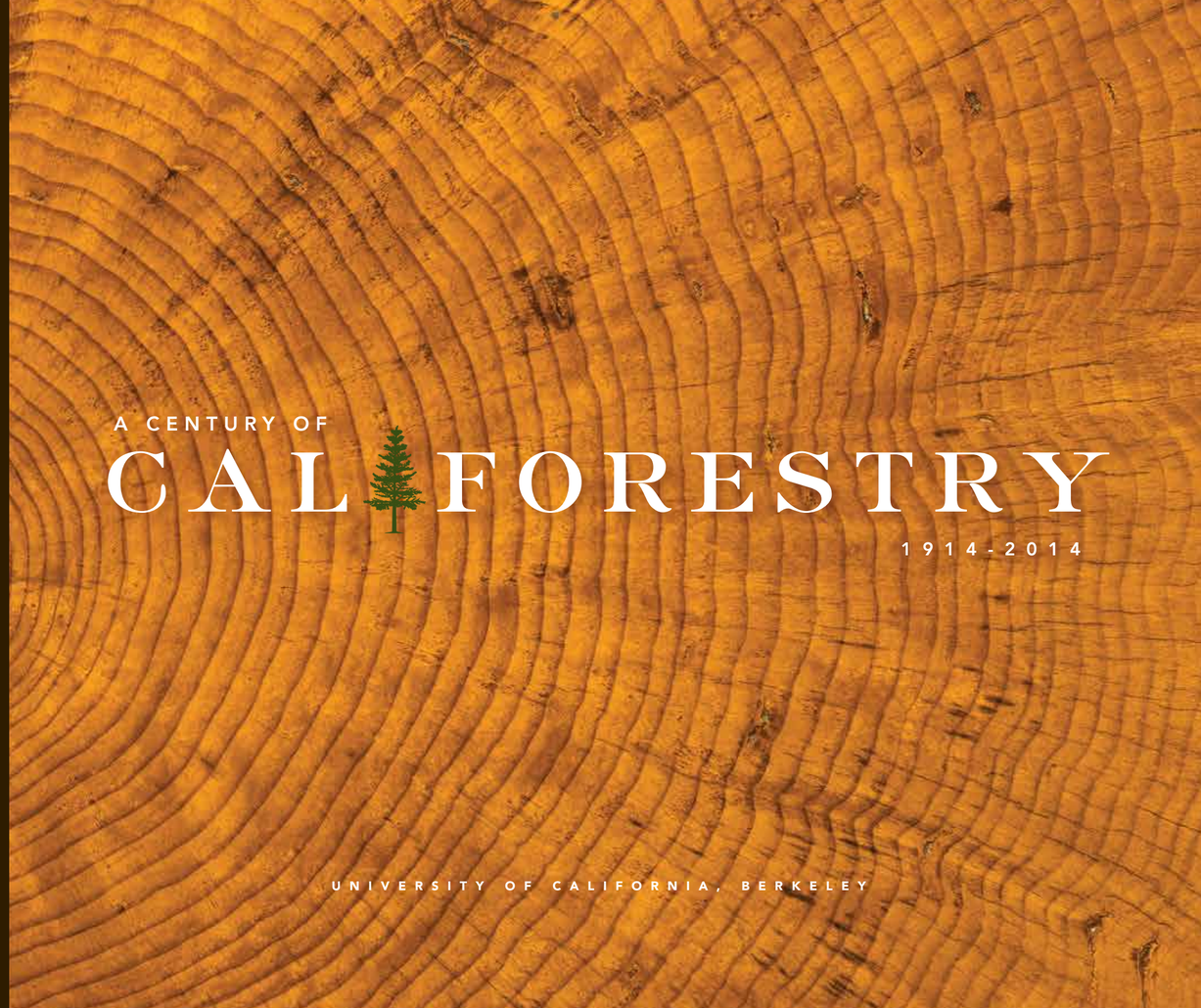

A CENTURY OF

CAL FORESTRY

1914-2014

UNIVERSITY OF CALIFORNIA, BERKELEY

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A CENTURY OF

CALFORESTRY

1914-2014

Cover: Detail of the sugar pine cross-section displayed on the second floor of Mulford Hall, part of the "Woods of the World" exhibit. Photo: Paul Kirchner Studios, all rights reserved.

Inside front cover and end-sheet: Five-year-old cypress plantings, viewed from the top of the ridge south of Strawberry Canyon, 1917. Photo: Woodbridge Metcalf; courtesy of the Marian Koshland Bioscience & Natural Resources Library. Overlay at left: Detail of the original constitution for the Forestry Club, handwritten in 1913.

DEAN: J. Keith Gilless

MANAGING EDITOR: Ann Brody Guy

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CENTENNIAL ADVISORY COMMITTEE: Richard B. Standiford (Chair), Kathryn Moriarty-Baldwin, Neal Ewald, Kass Green, John Helms, Erin Johnson, Sasha Keller, Joe McBride, Jason Moghaddas, Al Stangenberger, Ryan Tompkins

PUBLICATION SUBCOMMITTEE: Richard B. Standiford, Erin Johnson, Joe McBride, Al Stangenberger, Norma Kobzina

DESIGN AND PRODUCTION: Cuttriss & Hambleton

COPY EDITING: Anne Canright

EDITORIAL ASSISTANTS: James Dunn, Sara Lafleur-Vetter

PRINTING: Dome Printing

WRITERS: J. Keith Gilless, Ann Brody Guy, Erin Johnson, Brita Rustad, Nate Seltenrich, Richard Standiford, Al Stangenberger, Bill Stewart, Rob York

PHOTOGRAPHERS: Anthony Ambrose, Cathy Cockrell, Martin Dee, John Dingman, Emanuel Fritz, Ann Brody Guy, Lynn Huntsinger, Alex, Javier, Chuck Johnson, Bonnie Ketchersid, C. J. Kraebel, Jena Krause, Sara Lafleur-Vetter, Lauralyn Curry-Leach, Paul Kirchner, Matthew Luskin, Steve McConnell, Woodbridge Metcalf, Kevin O'Hara, Nancy Peluso, Peg Skorpinski, Ken Somer, Scott Stephens, A.E. Wielslander, James Wilson, Eva-May Wong

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"May the ideals fostered here play a worthy part in the conservation of the beauty and usefulness of our forests."

–QUOTE FROM THE PLAQUE ON THE ORIGINAL
1921 FORESTER'S CIRCLE BENCHES (UNATTRIBUTED)

ACKNOWLEDGMENTS

A project of this size and complexity always has many invisible hands pushing it forward. We are truly grateful to everyone who answered a call or an email, talked to a writer or smiled for a photographer, allowed us to buttonhole you in a hallway or at a meeting or social event, or helped us get a task done.

Particular thanks go to a few who went the distance with us. J. Keith Gilless and Joe McBride generously allotted many hours of their brain-power and institutional knowledge, from initial research to page proofs. Erin Johnson lent her editorial eye and alumna perspective from initial research through editing and production. Al Stangenberger has been a consistently helpful and available resource for photos and documents, including finding some gems in the archives. Kathryn Moriarty-Baldwin stewarded the entire centennial process and all its attendant details, including the book project.

The late Norma Kobzina led the Marian Koshland Bioscience & Natural Resources Library's successful three-year campaign to organize, identify, digitize, and preserve the Fritz-Metcalf Photograph Collection. Her efforts created previously unavailable access to the collection that bore fruit in this publication and for generations to come.

Finally, a huge thank you goes to Rick Standiford for endless meetings, reviews, phone calls, questions, and other forms of harassment we devised to get his invaluable input throughout this process.

— Ann Brody Guy and Laura Oftedahl

Preface

The great forester Aldo Leopold once wrote, "To those devoid of imagination a blank place on the map is a useless waste; to others, the most valuable part."

In the hundred years since the founding of the forestry program at Berkeley, the blank places on our maps have disappeared as we assembled incredible knowledge of the surface of the earth.

When the forestry program at Berkeley was established in 1914, mapping tools were primitive, fire was considered a menace to be extinguished, and climate warming was only discussed in reference to the end of the last ice age. The concept of "sustainability" was not yet central to public policy.

Berkeley foresters have been at the forefront of change in each of these areas, playing a pioneering role in the development of modern mapping, remote sensing and geographic information systems. Classes have gone from all male to more than half women. Fields like forest ecology have evolved to focus on complex concerns like biodiversity and climate change.

The traditions of Aldo Leopold and John Muir have become our traditions. As Leopold wrote, "No matter how intently one studies the hundred little dramas of the woods and meadows, one can never learn all the salient facts about any one of them."

On behalf of the State of California, I salute the forestry program at Berkeley for 100 years of scholarship and science that have enhanced our ability to inhabit and enjoy this land of California.

Governor Edmund G. Brown, Jr.
BA CLASSICS, 1961
UNIVERSITY OF CALIFORNIA, BERKELEY

CONTENTS

About This Book

No one appreciates the line between use and conservation better than foresters. This special centennial publication is a keepsake of highlights that tell the story of forestry at UC Berkeley. It does not seek to be comprehensive, and it also includes a variety of multimedia content. For additional stories, alumni notes, and our Forestry Camp video series, go to nature.berkeley.edu/forestry100.

Photo: Courtesy of the Marian Koshland Bioscience & Natural Resources Library

INTRODUCTION

A Cultural and Philosophical History

BY RICHARD B. STANDIFORD

In his 1899 inaugural address, University of California president Benjamin Ide Wheeler said, "Not only the naked hills of California, but the whole desert western slope of the continent call for special study of the forest problem. A school of forestry is an earnest and instant need." This vision for forestry in the land-grant university system raised the prominence of early scientific studies and was part of a growing national interest in forest conservation.

The young Berkeley campus met the new demand with a series of 10 field lectures on various forestry subjects, held in Idyllwild, California, in the summer of 1903 and led by noted professors **Willis Jepson** and **Arnold Stubenrauch**. Summer field study in forestry education can trace its roots to this period, and became formalized in 1915 with the first forestry field camp (see page 44).

1903 Berkeley-sponsored Jepson-Stubenrauch summer field lecture forestry series in Idyllwild, California.

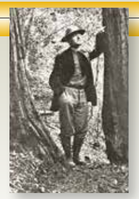
College of Engineering establishes timber-testing laboratory with the Federal Bureau of Forestry.

The California Club of San Francisco introduced the first legislation to establish a West Coast school of forestry. The California Federation of Women's Clubs, whose forestry committee was chaired by California Club founder Ruth Boericke White, strongly backed the bill.

Photo: Courtesy of the Ralston White Retreat

1912 First meeting of Forestry Club – 26 students and 4 faculty.

1913 President Wheeler authorizes funding for a Professor of Forestry position as first step toward a Division of Forestry.



Merritt Pratt appointed Asst. Professor of Forestry and on January 9 teaches first forestry course in Budd Hall. MS degree in forestry authorized. Whitaker Forest bequeathed to UC for forestry program.

Photo: Courtesy of the Marian Koshland Bioscience & Natural Resources Library

1914

Walter Mulford appointed as Professor of Forestry and Chair of the Division of Forestry.

The California Federation of Women's Clubs, the California Club of San Francisco, the California Water and Forest Association, and various forest products industries lobbied the California legislature to fund a forestry program at Cal in the early 1900s, but it took a group of highly motivated students to make it happen. Early practitioners of Berkeley's hallmark activism and bold support of new ideas, these students were taking forest entomology and botany classes when they launched the Forestry Club in 1912. They urged then–Cal president Wheeler and College of Agriculture dean **Thomas Hunt** to start a forestry program, then played a direct role in getting the state legislature to support it. President Wheeler authorized recruitment for the first professor of forestry in 1913 as the initial step toward the formal establishment of a Division of Forestry in the College of Agriculture.

Walter Mulford, a major force in the forestry programs at both the University of Michigan and Cornell University, was recruited to chair the new division, establish a curriculum, and recruit a faculty. The first forestry class was actually taught in the semester before Mulford's arrival, on January 9, 1914, by assistant professor of forestry **Merritt Pratt**.

Philosophical Road Map

Mulford's first curriculum decision was whether to have a graduate program only, as at Yale University, or to focus on an undergraduate degree, as many of the land-grant universities had done. He settled on a bachelor of science curriculum as the primary avenue for professional forestry education. Mulford believed strongly in the importance of general education: provide a solid grounding in the humanities and basic sciences for the first two years; devote the last two years to specialized coursework in professional forestry. He considered exposure to the campus's broad range of science, engineering, and humanities offerings to be essential. This general approach to forestry education at Berkeley continues to this day and distinguishes Berkeley foresters from others around the country.

Mulford selected a faculty with specialized scientific disciplines to ensure a broad approach. Among notable early faculty, **Donald Bruce** was hired to teach logging engineering (1916), **Emanuel Fritz** was chosen for his expertise in forest products (1919), and **Arthur Sampson** started the first university program in range management (1922). Mulford also sought the best intellectual leaders in the field, those who were both strong scientists and excellent teachers. "I hope that every man on the forestry faculty may become an investigator and the authority in his part of the work for this section of the country," he said in his faculty recruitment letter. These standards for academic excellence and diverse intellectual leadership are still hallmarks of the Berkeley experience.

The administrative structure of the forestry faculty is also a philosophical one. Forestry professors have always held joint appointments, serving both on the faculty and as researchers in the Agricultural Experiment Station. This approach ensures that the research programs relate directly to problems faced by policy makers, forest landowners, and resource management agencies. **Woodbridge Metcalf**, one of the founding faculty hired by Mulford in 1914, transferred his appointment to Extension forester in 1926—one of the first Agricultural Extension appointments (now known as Cooperative Extension, or CE) in forestry in the country. Extension's

1915 First summer camp held on the outskirts of Quincy.
Photo: Professor and Mrs. David Mason relax outside their tent in 1915. Uncredited.

1917 Second summer camp held, relocated to permanent location in Meadow Valley.

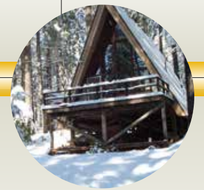
1922 First meeting of the California Alumni Foresters.

1926 Woodbridge Metcalf becomes first Extension forester.
Photo: Metcalf gives the Santa Cruz Farm Bureau's Forestry tour in June 1927. Uncredited.

1925 USDA Forest Service California Forest and Range Experiment Station (now Pacific Southwest Research Station) established on the Berkeley campus.

1927 Edward C. McCarty becomes first forestry graduate to earn a PhD, in botany and biochemistry.
Alice Craig becomes first woman to earn BS in forestry in the United States.

1933 Blodgett Forest donated to UC by Michigan-California Lumber Company.



1939 Department of Forestry established as one of four teaching units in College of Agriculture.

1946 School of Forestry established and Walter Mulford appointed first Dean of the School; Master of Forestry authorized.

1948 Forestry Building built and still serves as center of forestry activities on campus. Renamed Walter Mulford Hall in 1955.
UC acquires Baker Forest adjacent to Forestry Summer Camp.
Photo: Steve McConnell

1953 MS in Range Management authorized. Emily Shideler first woman to attend UC Forestry Summer Camp.

1955 Forest Products Laboratory completed at Richmond Field Station; Fred Dickinson appointed its first director.
Photo: Courtesy of Dickinson family

1956 MS in Wood Technology authorized.

1958 Henry Vaux appointed first Director of the Wildland Resource Center 1960. PhD in Forestry authorized by Graduate Division. PhD in Wood Science authorized.

link to Berkeley was further strengthened when, in 1988, Extension foresters went from affiliation with the statewide CE system to appointments in the Department of Forestry and Resource Management in the College of Natural Resources.

Intellectual Trajectory

Although Mulford chose to develop the bachelor of science as the key professional degree, a master of science in forestry was also started in 1914 to advance graduate training in forest science and prepare students for research and teaching. The ensuing changes to that program constitute a primer in the evolving emphases of the field.

The professionally oriented Master of Forestry was authorized in 1946, the Master of Science in Range Management in 1953, and the Master of Science in Wood Technology in 1956. The PhD in forestry was authorized in 1960, broadened and renamed Wildland Resource Science in 1969, and then, in 1993, renamed again to Environmental Science, Policy, and Management (ESPM), also the name of the newly formed, broadened department that encompassed the fields of forestry, soil science, plant pathology, and entomology. The ESPM PhD continues today and reflects the interdisciplinary nature of contemporary forestry and natural resource science and management. The Forestry and Natural Resource major, accredited by the Society of American Foresters, continues to reside in ESPM.

The changing names of the forestry program itself likewise reflect the scientific and resource management trends of the past century. Starting out as a division (1914), then becoming a department (1939), in 1946 it was elevated to a separate School of Forestry; in 1969, it was renamed the School of Forestry and Conservation following a merger with the wildlife-fisheries program of the Museum of Vertebrate Zoology, led by Professor **A. Starker Leopold**. In 1974, the school merged with the College of Agricultural Sciences to become the College of Natural Resources. The newly formed College incorporated the Conservation and Resource Studies major, which is more popular than ever today.

A Contemporary View

Today, forestry at Berkeley is a college-wide enterprise. Forestry research and outreach are coordinated by the Center for Forestry, which oversees Berkeley's four research forests and is a hub for interdisciplinary research collaborations on forestry topics. Technological advances characterize the field—including remote sensing, environmental monitoring, and genomics—and interact with social sciences such as policy, economics, and social dynamics. Berkeley has been a leader in converting a once all-male arena into one where women flourish as students, faculty, and leaders.

Even after a century, Berkeley forestry is still characterized by its strong foundation in science and its emphasis on societal problems, with faculty and students tackling some of the most difficult issues of the day. Berkeley foresters, trained to be problem solvers and managers, have been influential throughout California, the West, and the world. Many of the key leaders in industry, state and federal agencies, nongovernmental organizations, and allied natural resource fields are part of our distinguished community. Today, forestry at Cal is as strong as it has ever been.

1967 Transfer of Wildlife-Fisheries program from the Museum of Vertebrate Zoology to School of Forestry.

1968 Name changed to School of Forestry and Conservation.

1969 MS and PhD in Wildland Resource Science established, replacing the MS and PhD in Forestry.

1973 Forest Engineering option established at UC Davis in Agricultural Engineering, in cooperation with Cal Forestry.

1974 John Zivnuska completes service as last dean of the School of Forestry and Conservation. School of Forestry and Conservation merges with the College of Agricultural Sciences to become the College of Natural Resources. Departments of Forestry and Natural Resources (undergraduate) and Forestry and Conservation (graduate) established. Rudy Grah (pictured left, uncredited) becomes the first chair of the two new departments.

1979 Undergraduate and graduate administration combined into a single Department of Forestry and Resource Management.

1984 Louise Fortmann appointed first woman faculty member in forestry at Berkeley.

1985 Geri Bergen, BS Forestry, MS Botany, only the second woman to attend Summer Camp, becomes the first female forest supervisor in the U.S. Forest Service, overseeing the Tahoe National Forest.

1993 Department of Environmental Science, Policy, and Management is formed; home to forestry research, extension, and teaching. MS and PhD in ESPM replace Wildland Resource Science.

1995 Forestry Library merges with Bioscience Library.

1996 Establishment of the Center for Forestry and Associate Dean for Forestry position to coordinate forestry research and Extension in CNR.

2004 Forest Products Laboratory closed.

2005 Bachelor of Science degree renamed Forestry and Natural Resources.

2011 Two new research forests, in Shasta and Nevada counties, awarded to the College of Natural Resources, doubling UC's research acreage.

2012 Centennial celebration of Forestry Club: "Bean Feed of the Century."

2013 Department of Environmental Science, Policy, and Management celebrates its 20th anniversary.

1914 2014

2014 Centennial Celebration of Forestry at Berkeley.

Cal Foresters in Management

BY NATE SELTENRICH

Cal forestry alumni are currently in leadership positions in the firms that manage approximately 95 percent of California's industrial forests, and that staggering statistic includes responsibility over much more than just trees. Their role in the management of our public forests is just as influential.

As a regional forester with the U.S. Forest Service in the 1970s, **Doug Leisz**, BS Forestry '50, learned the complexities involved in overseeing 20 million acres in California. His Berkeley education served him well those years, he says, particularly when it came to balancing a broad range of resources and values including wildlife, recreation, and water. "Berkeley was among the very early forestry education facilities that taught the process of integrated management of resources," said Leisz, who went from working in a remote Forest Service nursery to later representing the agency in Washington, D.C. "That was extremely important to me in my career."

Green Diamond wildlife field coordinator Carol Gress calls an owl, while Neal Ewald looks on.
Photo: Chuck Johnson

Managing for multiple values remains critical in California today, and it's certainly important to **Neal Ewald**, BS Forestry '78, who in early 2014 assumed responsibility for all of Green Diamond Resource Company's assets in California, encompassing 400,000 acres in Humboldt and Del Norte counties.

In 1992, Green Diamond became the first company to acquire a Habitat Conservation Plan (HCP) for the protection of a wildlife species, the threatened northern spotted owl. The company now has three such HCPs, including one for various species in the Northwest and another for aquatic species in California. "Our objective was to be able to manage all of the resources on this landscape, not just the timber resources," Ewald said.

As chief forester for Soper-Wheeler, **Paul Violett**, BS Forestry '82, MS Wildland Resource Science '84, manages an exceptional amount of diversity: 98,000 acres in 10 California counties, from the Sierra Nevada to the coast, including nearly every commercial forest type to be found in California and a full transect of ecosystems, geologies, and soils. **Mike Jani**, BS Forestry '74, meanwhile, serves as president and chief forester of Humboldt Redwood Company and Mendocino Redwood Company, two entities under one umbrella that together own about 440,000 acres, all certified by the Forest Stewardship Council. Forest restoration, water quality, and long-term planning are guiding principles for both companies.

Paul Violett in a 60-year-old forest in Strawberry Valley, in Yuba County.
Photo: Bonnie Ketchersid

A tiny sampling of other Cal Foresters who have held important leadership positions within the state includes **Hank Trobitz**, BS Forestry '38, who joined Simpson Timber Company 10 years after graduating, became chief forester of its California holdings, and rose to the rank of California resources manager a decade before retiring in 1981; and **Gaylord Briggs**, BS Forestry '67, who launched a consulting company, appropriately named Golden Bear Forestry, after retiring from Roseburg Lumber Company, where between 1979 and 2003 he helped double the company's holdings in northeastern California from 320,000 to 640,000 acres.

It may come as little surprise, Briggs says, that he was hired in his first forest-management position by **Hal Bowman**, BS Forestry '43, another Berkeley alum, one of the first registered professional foresters in California and, at the time of his death in 2009, possibly the oldest practicing professional forester in the state.

Red River Lumber Company, Westwood, California, sends a flat car loaded with packages of lumber en route to the yard for piling (undated).
Photo: Uncredited; courtesy of the Marian Koshland Bioscience & Natural Resources Library

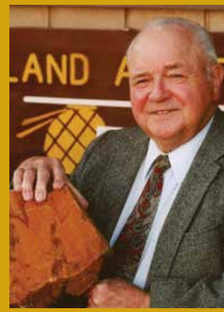
PROFILE

Forestry Pioneer Bill Beaty

Among Cal Foresters in management, **Bill Beaty**, BS Agricultural Science '38, holds a unique place in state history. Beaty began his career in 1938 as a forester for the U.S. Forest Service, but was hired away in 1950 by the Shasta Forests Company, a nonprofit lumber company established by the heirs of Minnesota lumberman T. B. Walker to manage the family's extensive holdings under the Red River Lumber Company name in northeastern California. In 1962, Beaty was appointed the company's general manager and assumed responsibility for all of its roughly 750,000 acres of pine-dominated forests.

Another eight years down the line—already 22 years into his career—Beaty was just getting started. Because management of the Walker holdings had become increasingly complex, family members decided to partition the lands. They asked Bill to establish his own for-profit company, W. M. Beaty and Associates, to assume management of the remaining holdings and maintain an emphasis on sustainable forestry and long-term planning.

Beaty remained at the helm of the new company until 1985, when, in an interesting echo of the multigenerational family ownership of the lands themselves, he passed the management torch to his son, **Don Beaty**, also a Berkeley forestry alum (1968), who remains CEO of W. M. Beaty and Associates.



Bill (top) and Don Beaty.
Photos: Courtesy of the Beaty family

Under Don, the company continues to practice the targeted single-tree selection regimen that Bill initiated. "We've been blessed with working for people who look at this with a very long-term view," Don said, "and who want to pass it on in better shape than what they got it in."

Cal Forestry Alumni Across the Globe

The influence of Cal Foresters extends far beyond both California and the United States. Here are just a few of alumni who are working internationally in forestry-related and other careers.

University of Montana forestry professor Ron Wakimoto teaches about prescribed burns in Bhutan and Nepal (see Fire, page 28)
Photo: Courtesy of Ron Wakimoto

Emily E. Moghaddas (far left) works with Japanese contractors to relocate endangered orchids before a new construction project begins.
Photo: Courtesy of Emily Moghaddas

Charalambos Alexandrou, MS Wood Science and Technology '88

Acting Director, Department of Forests
Ministry of Agriculture and Natural Resources
Nicosia, Cyprus

I work in Nicosia, Cyprus, for the Department of Forests in the National Authority for Forests.

Matthias Diemer, MS Wildland Resource Science '84

Director, International Program
World Wildlife Federation
Zurich, Switzerland

I am responsible for the programmatic engagement of WWF Switzerland in places like the Amazon, Mekong, Madagascar, and Caucasus. In addition to managing general conservation issues, my specialties are multi-stakeholder initiatives for soft commodities [items, such as corn and coffee, that are grown, not mined], as well as standards and certification. I am also a lecturer in environmental sciences at the University of Zurich.

Fernando García-Robredo, MS Wildland Resource Science '85

Associate Professor and Chair, Department of Forest Economics and Management
School of Forestry, Technical University of Madrid
Madrid, Spain

I teach courses to both graduates and undergraduates, including Forest Mensuration, Forest Management, Economic Analysis of Watershed Protection Projects, and Economic Analysis for Environmental Management. My research is focused on forest management modeling, forest valuation, and forest economics and planning.

Gunnar A. Gundersen, MS Wildland Resource Management '82

Member of Parliament, Government of Norway
Oslo, Norway

I am a member of Parliament in my third four-year term in Parliament. I am now on the committee of commerce and trade and the spokesperson on these matters for the Conservative Party in Norway.

Kani Isik, PhD Forestry '74

Professor Emeritus, Plant Biology and Genetics
Akdeniz University
Antalya, Turkey

I have been working primarily on genetic improvement of *Pinus brutia*, a native pine species in the eastern Mediterranean basin. I have also worked on the genetics of *Picea abies*, *Cedrus libani*, and *Cupressus sempervirens*. One of my recent hobbies includes planting seedlings of Giant Sequoia, a noble and magnificent Californian. I planted the seedlings at several places in the Taurus Mountains in southwestern Turkey to contribute to human-assisted migration of the species.

Tom Lakusta, MS Wildland Resource Science '84

Manager, Forest Resources Forest Management Division, Government of the Northwest Territories
Hay River, Northwest Territories, Canada

I work with a small team of forest professionals and technicians to sustainably manage the forests of the Northwest Territories, an area of roughly 70 million hectares.

Ben S. Malayang, III, PhD Wildland Resource Science '90

President, Silliman University
Dumaguete City, Phillipines

I oversee the overall operations of the institution, ensuring a collective and strategic direction in the pursuit of whole-person education and an institutional advocacy in social development and environmental sustainability.

Emily E. Moghaddas, BS Resource Management '95, MS and PhD Environmental Sciences, Policy, and Management (ESPM) 2000/2007

Natural Resources Program Manager
United States Air Force

I manage the natural resources on Air Force installations, with responsibilities to survey and protect endangered species, eradicate invasive species, mitigate impacts of soil erosion, and provide community outreach. My work is focused in Okinawa, Japan, and Oahu, Hawaii.

Jason J. Moghaddas, BS Resource Management '95, MS ESPM '99

Research Scientist, Spatial Informatics Group
Pleasanton, Calif.

Spatial Informatics Group (SIG) works both in the United States and internationally, primarily in Southeast Asia. My work involves coordinating project teams and running internal operations for SIG.

Domingo M. Molina Terrén, MS and PhD Natural Resource Sciences '91/'94

Chair, masterFUEGO
Professor, University of Lleida
Lleida, Spain

I am the chair of a postgraduate degree-training program in wildland fire science and integrative management, called masterFUEGO. I am also a professor in the Department of Crop and Forest Science at the University of Lleida in Spain.

Danai Thaitakoo, PhD Environmental Planning '98

Lecturer, Department of Landscape Architecture
Chulalongkorn University
Bangkok, Thailand

I cover specialties ranging from landscape ecology to urban ecology to hydro-ecology.

Yu-Chun Wang, MS Wildland Resource Science '86

Counselor, Ministry of Education
Taipei, Taiwan, Republic of China

I work as counselor to the Ministry of Education in the Republic of China in Taiwan. I give advice and get involved in education policy and measures.

Fritz-Metcalf Photograph Collection

The Fritz-Metcalf Photograph Collection contains approximately 9,000 photos taken from 1906 to 1984 relating to forestry, conservation, and the lumber industry in California and the United States, with a rich trove of documentation of UC Berkeley's School of Forestry. Early Cal Forestry faculty members Emanuel Fritz and Woodbridge Metcalf collected the photos, many of which they shot themselves. The collection was digitized and placed online in 2011 by the Marian Koshland Bioscience & Natural Resources Library at Berkeley. To enjoy the whole collection, go to www.lib.berkeley.edu/BIOS/fmpc/.

CLOCKWISE FROM ABOVE: Portland Lumber Company commissary at a Washington logging camp; undated and uncredited. Rear view of the new six-wheel rural fire truck of Riverside County, 1930. Photo: J. P. Fairbank. Tree planting by the Department of Landscape Gardening in Strawberry Canyon, 1917. Photo: Uncredited

FACING PAGE: Students in the Michigan Agricultural College Department of Forestry in the summer of 1910 measure felled timber on the holdings of the Salling and Hanson Company. Photo: Woodbridge Metcalf

Continued on next page

Fritz-Metcalf Photograph Collection, continued

CLOCKWISE FROM TOP: UC Berkeley's Department of Landscape Gardening hauls tree transplants to Strawberry Canyon for a spring 1917 planting. Photo: Uncredited. Students ready to leave Summer Camp, 1922. Photo: Emanuel Fritz. A woman poses in front of a logging camp house in Cheboygan County, Michigan, circa 1909. Photo: Woodbridge Metcalf

FACING PAGE: Fallers making an undercut, May 19, 1915, in Humboldt County. The crew was clearing a right-of-way for an extension of the logging railroad. Photo: Woodbridge Metcalf

Blodgett: The Crown Jewel of UC's Research Forests

BY BILL STEWART AND ROB YORK

The University of California is fortunate to have four research forests where faculty, students, Cooperative Extension specialists, and other researchers conduct studies on forestry topics. In addition to Blodgett, Baker, and Whitaker forests and the Russell Research Station, comprising 5,131 acres in four Northern California counties, a 2011 donation of PG&E lands will, when finalized, add another 4,584 acres of Northern California mixed-conifer forest to UC's research forests.

Blodgett Forest is surely the crown jewel of these lands. It is one of the few locations in California where a variety of forest management approaches are applied and evaluated within a long-term experimental framework. UC Berkeley–affiliated researchers have been managing the 4,270-acre Blodgett Forest since Michigan-California Lumber Company gifted the core property to UC in 1933. A primary focus of our management the past 50 years has been to achieve and document sustained timber yields while also protecting and enhancing wildlife, water, soil, archeological, and visual resources, as required by the California Forest Practice Rules.

A contemporary objective has been to increase forest resilience to the uncertain yet inevitable effects of climate change. By maintaining a high diversity of forest ages and structures, Blodgett will be well positioned to help scientists determine what types of management will and will not work in the future climate. As the long-term management experiments play out, rigorous research in the fields of vegetation ecology, physiology, soil properties, and wildlife will continue to improve forest management decisions throughout the Sierra Nevada. In an era with numerous competing viewpoints about appropriate objectives and best means for meeting those objectives, Blodgett acts as a sort of Rosetta stone, allowing us to assess how different forest attributes respond to different management approaches and thus providing a source for new knowledge that goes beyond hard-to-prove anecdotal findings.

Blodgett is a forest that mitigates rather than contributes to climate change, and harvesting forest products continues to be part of that process. The greatest climate benefit comes from harvesting sawlogs that are processed in California's efficient sawmills, the resulting products then incorporated into long-lived buildings. Life-cycle research has estimated that the carbon storage benefits of using wood rather than cement or steel in buildings doubles in terms of the fossil-fuel energy savings of making fewer nonrenewable building products.

Robert Moore climbs a giant sequoia at Whitaker Forest Research Station to collect cones for seedling restoration projects.
Photo: Ken Somer

In 2013, ESPM PhD candidate Stella Cousins collects a sample of decaying wood to inform her research on forest carbon dynamics based at Blodgett Forest Research Station.
Photo: Alex Javier '13

Blodgett has demonstrated sustainable harvesting continuously for more than 50 years and has yielded more than 400 publications and dissertations. By supporting research projects and applying active adaptive management to anticipate the challenges of the climate-change era, our research forests—and those of us at the UC Berkeley Center for Forestry who manage them—try to live up to our motto: We harvest knowledge.

Bill Stewart is a Cooperative Extension specialist and the co-director of the UC Berkeley Center for Forestry. Rob York is the manager of Blodgett Forest and an adjust assistant professor of forestry.

A Computer Lab in the Woods

Dedicated and opened in 2010, Zivnuska Hall has already become an integral part of the Summer Camp experience (see page 44). The center was named for John Zivnuska, 1916–2002, an alumnus (BS Forestry '39), a professor emeritus, and the last dean of the School of Forestry before it merged with the School of Agriculture to become the College of Natural Resources.

Known as one of a handful of forest scientists who first applied the rigors of classical economics to forestry, Zivnuska developed a reputation as a strong and well-respected voice in forest economics over his 35-year career and helped form the foundation upon which research and education in the economic aspects of modern forest policy and management are based. Over the decades he authored or co-authored approximately 190 publications on topics ranging from forest taxation to forestry education.

Camp 2011 students in Zivnuska Hall.
Photo: Richard B. Standiford

Zivnuska's family, together with the Cal Alumni Foresters and numerous donors including several timber companies, donated the funds for the new center.

The building on ribbon-cutting day, July 17, 2010.
Photo: Richard B. Standiford

Alumni Memories

In these highlights from the Forestry100 website (nature.berkeley.edu/forestry100), alumni share memories from campus life and Forestry Camp. Original submissions have been excerpted and lightly edited.

Harry Camp models the new 1940 Forest Service dress uniform.
Photo: Courtesy of the Camp family

Two thousand fourteen: a truly remarkable year! University of California Forestry becomes 100 years old, my class of 1933 becomes 81 years old, and I shall reach the ripe old age of 104 the day after the celebration. I guess I must claim to be the oldest living Cal Forester! My mind is crowded with memories of my student years at Cal, including being elected by the students as Summer Camp manager in 1932, and as president of Cal Alumni Foresters. My more than 75 years as a member of the Society of American Foresters included a term on the national council. I also had the honor of serving as chairman of the 50th UC Forestry Celebration. I wound up my official employment at the Pacific Southwest Experiment Station, where I started as a researcher in Forest Influences. After many assignments across the United States, I retired as director of the station. Cal Forestry prepared me well for my 42 years of employment with the U.S. Forest Service.
Go Bears!

Harry W. Camp, BS Forestry '33

Andrew Wallace (left), with friends at the Quincy County Fair.
Photo: Jena Krause

The summer I attended Forestry Camp is one full of memories for me. Chopping firewood, coring trees, panning for gold, star gazing, bird watching, getting stung by yellowjackets, visiting lumber mills. . . . What really sticks, though, is the intense fellowship and camaraderie we developed: sitting around the fire at night, playing guitar, singing "Fast Car" by Tracy Chapman; or visiting the hot springs at night and watching satellites blink past. What a summer. A summer to remember. A summer of youth. FC05 for LIFE!

Andrew Wallace, BS Environmental Sciences '06

As I recall, our Summer Camp class was split about evenly between men and women. When Camp started, lo and behold, there was only one bathroom for the women. So one day we decided to take over one of the men's bathrooms. At first the guys were not very happy about it (professors included), but what could they do? A women's bathroom it remained. I should add that one of the most interesting aspects of the takeover was reading the graffiti!

Katrina (Katy) Marshall (Mallams), BS Forestry '80

The Camp of '76 was the biggest Camp, but it was also the last to enjoy the decades-old tradition of the Silver Lake Swim. Coming down from Spanish Peak on a hot afternoon, reaching the lake, within less than a minute all clothes were off and everyone was in Silver Lake *au naturel*! Photos in the archives show this tradition went back to the 1930s. The next year, the tradition was gone.

Bill "LK"Apger, BS Forestry '78

In Memoriam In 2011, foresters **Jere Melo**, BS Forestry '64 (left), and Matthew Coleman were murdered in Mendocino County while investigating illegal drug growing. A letter from forestry leaders to the California Board of Forestry and Fire Protection helped spur a "Take Back the Forests Movement" that still continues.

A skinny dipper (foreground) in 1939 represents a now-lost tradition at Crystal Lake.
Photo: Emanuel Fritz; courtesy of the Marian Koshland Bioscience & Natural Resources Library

It felt like hallowed halls within Mulford Hall. Names on the door were doctors Ed Stone, Dennis Teeguarden, John Helms, A. Starker Leopold, John Zivnuska, Harry "the Torch" Biswell, and many others. We were ranked No. 1 forestry school in the nation. I was a research assistant to Dr. Stone, helping put together a taxonomic key of Sierra wildflowers. I got to play with all kinds of advanced equipment like electron microscopes and had an entire greenhouse at my disposal for a plant nutrition class. After Cal I established forest tree nurseries in three states, growing over 45 million seedlings. It was a great experience!

Steve Schalla, BS Conservation of Natural Resources '76

The last segment of Camp [1970] was interrupted by a wildfire. They conscripted all of the students from Summer Camp, and when the five girls showed up, the fire boss said, "Women will not be allowed on the fire line. It's Forest Service policy." Most of the girls took this on the chin, but there was one young woman … she tucked her long hair under her hard hat, got on her fire suit, and went out on the fire line with the rest of us. Nobody realized there was a woman on that crew until payday came around. They called our names off to pay us. When they got to "P. Dame"—she'd used her first initial; she didn't give the full name Peggy—she grabbed her envelope, took off her hard hat, let her hair fall down, and said, "Congratulations, you just hired your first woman fire fighter."

Steve Merlo, BS Forestry '72

SITES + SOUNDS VIDEO LIBRARY

"We came off of Spanish Peak, and we're sitting down having a Coke and a forest fire started! One of our guys started it! So our class was famous—probably the only class to start a forest fire. But that piqued my interest in fires and I spent much of my career on national fire teams."
—RAY JOHNSTON, CAMP 1963

"I showed up at Camp and I'd brought decorations, and a duvet cover, and, like, many changes of clothing . . . I wasn't really sure what I was getting into. But going to Forestry Camp totally changed my life trajectory—after I came here I ended up changing my major and getting a job in forestry."
—LAUREN GOSCHKE, CAMP 2003

"We had Professor Ed Stone as faculty for that first segment, and he took us on the hike to climb Spanish Peak. When we were at the top, Professor John Zivnuska gave us an overview of the area. I really just felt like I was part of the tradition at Cal and at Forestry Camp. And . . . then coming back to campus having so many new friends and a greater appreciation for the degree—it made the big Berkeley campus so much smaller."
—THOMAS SUTFIN, CAMP 1974

Go to **nature.berkeley.edu/forestry100/media** to enjoy the entire video collection.

One Hundred Years of Thought Leadership

BY J. KEITH GILLESS

The concept of forestry was still novel when it took root at UC Berkeley a century ago. Although forestry in this hemisphere borrowed liberally from European models and institutions in the early years of the academic discipline and professional practice, the intellectual linkages that have subsequently defined the American approach quickly emerged. UC Berkeley has consistently been at the forefront of the American problem-driven, adaptive management method.

This history is reflected in the way Berkeley forestry faculty have long been simultaneously locally focused but internationally engaged, training foresters from other places who would go home to become thought leaders in their own countries, partnering with various university peers at universities while working with organizations like the United Nations Food and Agriculture Organization to advance forestry practice and knowledge, and experimenting with ideas developed elsewhere. Whether work was conducted on the north coast of California, in the Sierras, or in South Asia, one hallmark of Cal Forestry has consistently been the integration of problem-driven research with contributions to the underlying disciplines, such as genetics, economics, statistics, ecology, or sociology, while at the same time seeing the bigger picture of how forests influence and are influenced by the social context in which they are utilized, protected, revered, contested, and sustained.

Our graduates were shaped by the interdisciplinary worldview of the faculty, contributed to the program's development, and reflected the Berkeley ethos in their own careers. It wasn't long after I joined the Berkeley faculty that I realized one of the reasons it had instantly felt like home here was that my own mentor at the University of Wisconsin–Madison, **Joseph Buongiorno**, PhD Forestry '72, had been so profoundly influenced by his Cal Forestry education.

Looking northwest across the San Antonio River in Monterey County. From the Wielsander Vegetation Type Maps & Photographs collection.
Photo: Albert E. Wieslander; courtesy of the Marian Koshland Bioscience & Natural Resources Library

When we look across the field of thought leaders who influenced or were influenced by Berkeley, the most obvious similarity is their lack of similarity. Some had an immediate impact on the field early in their careers, some only after they had time to acquire and integrate knowledge spanning diverse domains. Some seemed to have a plan of where they were going intellectually and professionally before they came to Berkeley in their late teens; others arrived here only after early careers in fields as far-flung as cabinet making, dance, and firefighting. Some worked alone, while others found and nurtured inspiration by working with teams, whether of intellectual fellow travelers or teams as diverse as the problems they were formed to address. Some left a written legacy of enduring value; others achieved equivalent impact through the actions of those they inspired as teachers and mentors.

What they shared was a willingness to challenge conventional wisdom, a need to understand how the parts fit together to make the system, and a sense that forestry mattered, even to people who didn't understand the discipline.

Trying to call out even a small fraction of Berkeley's forestry thought leaders is an exercise in sampling that would challenge even the best of Berkeley's many distinguished forest biometricans. And yet, the enormity of our role in shaping the field across 100 years demands at least a modest accounting. Thus, each of those mentioned in the pages that follow has influenced the way in which we—forestry professionals working around the world—conceptualize problems or employ knowledge to solve them, develop or refine the techniques by which we extend the frontiers of our knowledge about the biotic or abiotic world, and seek to guide the interactions of human society with the forest environment in a way that sustains both it and ourselves.

Those who aren't visible on these limited pages are beyond reckoning. All who care about forests and forestry owe intellectual debts to Berkeley thought leaders named and unnamed, as they will someday to those currently toiling away as graduates and undergraduates studying in our labs and research forests.

J. Keith Gilless is the dean of the College of Natural Resources and a professor of forest economics.

Wildland Fire

BY NATE SELTENRICH

The story of forest fire research at Berkeley is, in a sense, the story of **Harold Biswell**, a professor of fire ecology and management from 1947 until his retirement in 1973. More broadly, it's the story of changing perceptions of fire's ecological role in forests throughout the West, a tale still unfolding to this day.

Biswell's research into the role of fire in forests in the 1950s and 1960s—along with that of his friend and colleague Harold Weaver, who championed the use of fire as a silvicultural tool in ponderosa pine forests as early as 1943—flew boldly in the face of conventional wisdom at the time, established Berkeley's reputation in the field, and set the tone for decades of research into how prescribed and natural fires can benefit forests, rangelands, and ecosystems.

At a time when standard practice across the board was to snuff out wildfire as quickly as possible, Biswell inspired considerable antagonism by his willingness to light a match, using controlled fires to test and demonstrate his ideas. Eventually, attitudes began to shift, and today, thanks to the ongoing work of Biswell's protégés at Berkeley and elsewhere, his once-incendiary ideas have evolved into official policy on many public and private lands throughout the West. But the consensus is that there is still more work to do.

Ronald Wakimoto, BS Conservation of Natural Resources '70, MS Forestry '71, PhD Wildland Resource Science '78, was Biswell's last PhD student at Berkeley—"I was in graduate school at Berkeley at the right time," he said. Wakimoto is now a professor of forestry at the University of Montana, Missoula, where he continues to teach many of the same concepts first championed by Biswell more than 60 years ago. Throughout Montana, with its expansive stands of lodgepole pine adapted to low-frequency, high-intensity fires, the Forest Service has integrated natural fire programs into all of its major wilderness areas, Wakimoto said. As a result, he's turned his attention overseas, where he is now working to introduce prescribed burning programs to such countries as Bhutan and Nepal.

Above: Harold Biswell,1953. Photo: Uncredited; courtesy of the Marian Koshland Bioscience & Natural Resources Library. Left: Prescribed burn in Blodgett Research Forest. Photo: Scott Stephens

Scott Stephens in Glass Creek, Calif.

Biswell's second-to-last PhD student, **Jim Agee**, BS Forest Management '67, MS Range Management '68, PhD Wildland Resource Science'73, became another influential figure who today serves as lead editor of the journal *Fire Ecology* (borrowing a term that first came into use during Biswell's tenure). Agee retired in 2007 from a 30-year teaching career at the University of Washington, after having worked as a fire ecologist with the U.S. National Park Service.

Coming just before Agee was another of Biswell's most influential students, **Jan van Wagtendonk**, MS Range Management '68, PhD Forestry '72, who even before leaving Berkeley began developing one of the first fire management prescriptions for Yosemite National Park. As a PhD student, he sought to translate Biswell's art of prescribed burning into quantitative measures that any land manager could use. The park was amenable to implementing his research, which turned into a job and eventually a 40-year career. Yosemite is still using essentially the same fire prescriptions that van Wagtendonk devised in 1972, and thanks to park officials' willingness to adapt, Yosemite continues to be a leader among park, land, and forest agencies nationwide. "I imagine that more areas will start doing it, because it just makes ecological sense," van Wagtendonk said.

After Biswell retired in 1973, his ideas continued to be taught at Berkeley—a sort of passing of the torch. **Robert E. Martin** joined the Berkeley faculty in 1982 with 20 years of distinguished fire research and teaching already behind him, and offered an undergraduate course in wildland fire science and behavior and a graduate seminar on fire as an ecological factor. And, closing the circle of education, the Association of Fire Ecology honored van Wagtendonk, Agee, and Wakimoto with the prestigious Biswell Lifetime Achievement Award, in 2009, 2012, 2014 respectively.

More recently, **Scott Stephens**, PhD Wildland Resource Science '95, joined the faculty in 2000 and now instructs a new generation of foresters about the role of fire in forests. In addition to teaching, as a researcher and co-director, with Cooperative Extension Specialist **Bill Stewart**, of both the UC Berkeley Center for Forestry and the UC Center for Fire Research and Outreach, Stephens has sought to advance the discourse around fire by studying how to create resilient forests and examining the relationship between fires and climate change, invasive insects, and hydrology. **Mark Finney**, PhD Wildland Resource Science '91, now a research forester with the Forest Service's Rocky Mountain Research Station, overlapped with Stephens at Berkeley in the 1990s and over the last 20 years has helped develop modeling and computer-simulation tools that allow land managers to view fire as a landscape process and, more recently, to understand the physics of how fire spreads.

Jan van Wagtendonk (left) is presented the Forest Service's 2002 Excellence in Wilderness Stewardship Research Award by Forest Service Chief Dale Bosworth. Photo: Courtesy of the National Park Service

"Berkeley has probably educated more people about the true nature of wildland fire and its ecological and physical aspects than any other university in the United States," Biswell said. Decades after Biswell's pioneering work, Finney noted, there are still challenges to having this science become universally accepted.

Nate Seltenrich is a Bay Area–based writer covering science and the environment.

Remote Sensing and Geographic Information Systems

BY NATE SELTENRICH

Technology has transformed the fields of remote sensing and geographic information systems (GIS) in ways that could never have been foreseen by their progenitors, including **Albert Everett Weislander**, BS Forestry '14, a member of the very first Cal Forestry class, who practiced GIS before the field existed, and **Robert Colwell**, BS Agricultural Science '38, PhD Molecular/Physio Plant Biology '42, who, after joining the faculty of the School of Forestry in 1947, developed one of the earliest programs in photographic interpretation in forestry.

Maggi Kelly

At that time, just a single satellite, crude by modern standards, was available as a source of imagery. Today there are around a dozen, with a wide range of capabilities. "It's radically changed the way we do our work," said professor and Cooperative Extension specialist **Maggi Kelly**, BA Geography '88. In just a few decades, hardware and software advances have transformed how imagery and data are collected, visualized, and shared. The explosion of new kinds of high-resolution remote sensing technologies—like Lidar, which can assess the height of a forest canopy and measure changes over time, and unmanned drones to collect images—offers researchers and land managers ever more tools with which to accomplish their goals.

On campus, Kelly has further democratized mapping technology through her work at the Geospatial Innovation Facility (GIF), which she helped develop in 2005 to bring geospatial technology to Berkeley and which she now runs. The GIF offers a central place for all Berkeley students and faculty to access software, hardware, and advice for their own mapping projects.

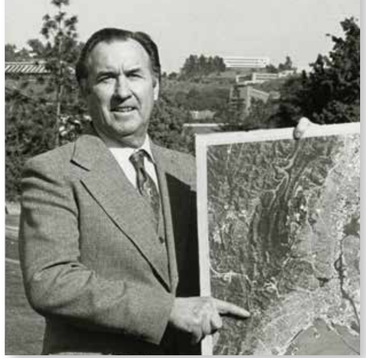
Forestry professor **Greg Biging** contributed to the development of an important computer simulation model of forest growth and yield for the mixed conifer forests of Northern California. CACTOS (California Conifer Timber Output Simulator) rolled out in the early 1980s and is still employed today, although advances in computing technology have necessitated software updates. Biging now focuses on remote sensing applications to forestry. He works on forest measurement and monitoring, including accuracy assessment in mapping, a statistical field that seeks to compare what map producers say exists versus what is actually there. As map data becomes more detailed, the demands of forest management increase, he said. "The more you know about your forest, the better job you can do with managing it."

Peng Gong joined Berkeley's geography faculty in 1994 to develop new algorithms for improving measurements of forests, thereby enabling better management recommendations. He has also become involved in a major effort to improve global land-cover mapping, capitalizing on technological leaps in cameras and satellites that offer dramatically improved aerial views of the planet's surface. Between 2011 and 2012, his team developed the world's highest-resolution land-cover map, providing ten times more detail than the one it replaced. This added resolution allows scientists to better understand the Earth's ecosystems and land-use patterns, information with a range of applications from human health to wildlife conservation.

Now, in recognition of Cal Forestry's centennial, Gong is working with students to delve into previous generations of remote sensing technology and data to stitch together a map characterizing 40 years of forest extent and change in California—dating all the way to 1972, when the very first land-oriented satellite program was established in the United States.

Left: Detail of a California forest change map (1986–2011) based on the research of Yanlei Chen, a PhD student of geography professor Peng Gong

Field mapper at work with aerial photos, looking south to Emigrant Gap from north of Bear Valley. From the Wieslander Vegetation Type Maps & Photographs collection.
Photo: Albert E. Wieslander; courtesy of the Marian Koshland Bioscience & Natural Resources Library



Robert Colwell, professor emeritus of forestry, was a pioneer in the acquisition and interpretation of aerial photographs.

PROFILE

Kass Green

Kass Green, BS Forestry '74, never took a class with remote sensing pioneer **Robert Colwell**—whom she still deems a "god" of the field—although they did briefly overlap at Berkeley. She also overlapped with **Gene Forsburg**, BS Forestry '75, whom she first met at Forestry Camp and later married. In 1988 the couple co-founded Pacific Meridian Resources, an influential force in both remote sensing and GIS. Its first project was to map endangered species habitats in Oregon and Washington forests, including those of northern spotted owls, but the forward-looking company later moved into mapping agriculture, wetlands, urban areas, and other resources worldwide.

Thanks to the couple's ability to innovate, the company thrived for years, growing to seven offices nationwide by 2000, when they sold Pacific Meridian to Space Imaging. Kass and Gene stayed on for another three years, with Kass as president, before she launched the consultancy Kass Green and Associates, where she continues to implement cutting-edge remote sensing and GIS technologies to monitor and manage the Earth's natural resources.

Green also chairs the Applied Sciences Advisory Committee at NASA and the Department of Interior's Landsat Advisory Group. In 2005, she and Gene donated the funds to launch Berkeley's Geospatial Innovation Facility.

Throughout her career, Green has made her mark by seeing what others don't, but technology has always been the means to achieve a broader goal. "Democracy and capitalism are strongly based on the idea that we have open knowledge, that information is available to people," she said, "and that's what GIS and remote sensing bring—information about the landscape and about natural resources."

Above: Map from Wieslander Vegetation Type Maps & Photographs Collection, Marian Koshland Bioscience & Natural Resources Library.
Left: Kass Green.
Photo: Sara Lafleur-Vetter

Forest Ecology & Silviculture

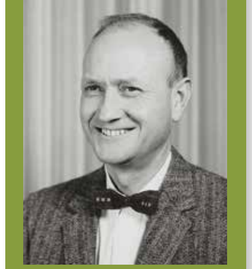
BY NATE SELTENRICH

Forest Ecology

Today's forest ecologists face a considerably more speculative landscape than their predecessors did. In the 1950s, '60s, and '70s, prevailing wisdom held that the forest behaved and responded predictably, according to certain rules. During this era, scientific research tended to center on species succession and timing in a system that was complex, yet knowable.

In the decades since, however, the field has shifted toward a less predictable and more random model. This is due to a range of factors, including increased computing power, new visual data available through remote sensing, a gradual change in perspective on nature and ecology, and the growing prevalence of impacts from air and water pollution, climate change, and invasive species. "You're going from a deterministic to a probability-based system," explained forest ecology Professor **John Battles**, who consults with land managers including the Forest Service and National Park Service on the current best-practice known as adaptive management.

Most recently, this fundamental shift has progressed even further, toward an "unpredictable and unprecedented" era in forest ecology, Battles said, in which "tipping points" and "thresholds" have replaced equilibrium as core concepts. Instead of studying species succession, scientists in the field now perform sophisticated analyses of large data sets, including biometric measurements of trees, in order to arrive at probability-based answers about forest behavior and response.



Edward Stone taught ecology for 39 years. His pioneering research on root regeneration capacity of forest seedlings revolutionized tree planting in California, including changing the planting season from fall to spring.
Photo: Uncredited, 1969; courtesy of Marian Koshland Bioscience & Natural Resources Library

This new perspective also harks back to the empirical approach of **Joseph Kittredge**, who came to Berkeley in 1932 as a professor and ecologist. As a specialist in forest influences, Kittredge grasped early on the scope of interactions occurring within forests. At Cal, he offered the first, and for many years the only, course in forest influences nationwide, and he authored the subject's first textbook, published in 1948 by McGraw-Hill.

Current Berkeley researcher and PhD candidate **Chuck Striplen**, MS Environmental Science, Policy, and Management '11, adds another element to this complex web of relationships by studying humankind's historical role in shaping forests, particularly through fire. Striplen believes that evidence of human manipulation of forests extending back more than 10,000 years should encourage scientists and laypeople alike to reconsider terms like "pristine," "untrammeled," and "natural." As he put it, "Ecosystems move in one direction: forward. They don't go backward."

Integrative biology professor Todd Dawson climbs into a giant sequoia tree crown in Giant Forest, Sequoia National Park, to collect samples as part of a statewide project focused on redwood tree and forest response to climate and climate change.
Photo: Anthony Ambrose

Gerrit Fenenga, a CALFIRE archeologist, shows a Camp 2011 group artifacts from a nearby archeological site.
Photo: Kevin O'Hara

Silviculture

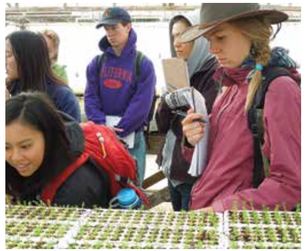
Behind silviculture's straightforward directive—the term means "the growing of trees"—is a set of concepts drawing from an array of biological, ecological, managerial, quantitative, and social sciences. In 1979, *Principles of Silviculture*, co-authored by **John Helms**, a professor emeritus, and Utah State University's Ted Daniel, became the first—and still the only—book to address all of these concepts, including forest classification, eco-physiology, tree growth, soils, stand dynamics and growth, genetics and tree improvement, regeneration, intermediate treatments, and harvesting methods.

In the decades since, the field's perspective—particularly at Berkeley, and in large part thanks to Berkeley—has only grown broader, to the point that a 500-page text would be incapable of covering it all, Helms said. The biggest change has been a shift from a focus on timber management at the stand level to an approach addressing more diverse and sometimes conflicting societal needs and values like wood, wildlife habitat, water, aesthetics, recreation, and conservation—all in the context of climate change.

Over the past two decades, this transition has been manifest in the work of **Kevin O'Hara**, a professor whose research in mixed-age and mixed-species silviculture based on dynamics of leaf-area development represents a more ecological approach to forest management. "It's coinciding with major changes in the industry," O'Hara said. "People are recognizing that they have more flexibility than they did in the past. Instead of following rigid mathematical equations, they can go look in the woods and see what exists in the stand, and modify their management to accommodate what's there."

Norm Johnson, BS Forestry '64, a longtime professor at Oregon State University, started in forest economics but now advocates for grounding forest management in ecological principles—and is putting his ideas into practice in Oregon. "We're much more worried about conserving biodiversity and our environmental effects on forests than we are on wood production, at least in federal forestry," he said.

Throughout silviculture's evolution from calculated to almost artful, Cal has been at the forefront, both in principle and in practice. "Silviculture instruction at Berkeley has historically been more innovative, comprehensive, and integrative than programs at other forestry schools," Helms said. Arguably, "Berkeley's leadership in silviculture and management has … changed the way in which vast areas of California's forests are structured and managed."



Students in Silviculture 185.
Photo: Kevin O'Hara

Forests and People

BY NATE SELTENRICH

Wherever forests are, people are nearby. And the interactions between them can be complex, with both sides giving and taking.

Berkeley researchers have dedicated their careers to understanding these relationships in various places around the globe, shedding light on the policies and practices that bind forests and people. In doing so, they've broadened forestry's perspective on people from a recreation-centric focus to what's been called a global sociology of forests.

Professor **Louise Fortmann** has focused her work in Africa, where she first developed the concept of "tree tenure"—the idea that there are property rights connected to trees, which in many cases are distinct from property rights in land. This resonates in Africa, where people have traditionally acquired land rights simply by planting trees, as well as in California, where past U.S. Forest Service timber sales have included rights to trees but not to the land from which they grew. Since she introduced the idea, she said, "tree tenure has become a standard part of the literature—it's a concept everybody uses, and nobody has to put my name on it anymore."

Nancy Peluso, the Henry J. Vaux Distinguished Professor of Forest Policy, has focused her research and fieldwork in Southeast Asia, primarily Indonesia, seeking to understand the complicated links among forest communities, forest products,

LEFT: Men from the village of Kernyanyan on the Wahau River in East Kalimantan, Indonesian Borneo, transport Borneo ironwood. Professor Nancy Peluso was part of a 1980 research project on non-timber forest products in the region. RIGHT: A woman weaves rattan, an economically important forest product, for a traditional cap like the one she is wearing. Taken in 1980 in Apo Kayan, East Kalimantan.
Photos: Nancy Peluso

In 1992, a woman in Bagak Sahwa Village, near Singkawang, West Kalimantan, Indonesian Borneo, enjoys a bumper-crop of durian fruits. A book on Professor Nancy Peluso's continuing research in the region is due out in December 2014.
Photo: Nancy Peluso

property rights, resource claims, and policies and institutions, and how they affect changes in land use. "We're really thinking about landscape transformation and landscape preservation in one way or another, and how people fit into that, and which people get to decide—which people get to maintain control of those landscapes," she said.

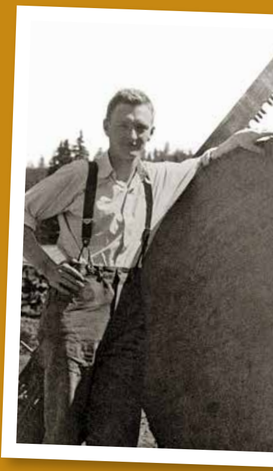
After beginning his career as a forester and joining the Berkeley faculty in 1980, **Jeff Romm**, BS Forestry '64, played a critical role in steering the social side of forestry away from a focus on recreation and toward an examination of the broader relationship between forests and people. He described it as "a coming together of ecological and social forces," including the role of policies and institutions. In the 1990s, he began to focus on policy—"what it excludes and who it excludes," he said—and to examine related issues of social and environmental justice in settings as diverse as inner cities in California and rural regions of India.

Forest policy and how it impacts human relationships with forests, particularly on public lands, has long been the domain of professor emeritus **Sally Fairfax**. In the 1970s, she authored the second edition of the textbook *Forest and Range Policy*, still a well-regarded history of the field. More recently, she has become a proponent of working landscapes, particularly for food production. "You can't maintain a forest by putting a fence around it," she said. "If there's no way to live off the land, it's hard to protect it."

PROFILE

Forestry Giant Henry Vaux

One of Cal Forestry's most revered figures worked at the intersection of three distinct yet interconnected areas: people, policy, and economics. He had a particular passion for the first two. Trained as an economist, **Henry Vaux**, MFor '35, PhD Agricultural Economics '48, later parlayed a commitment to the nature and people of the West into a six-year stint as chairman of the California Board of Forestry. In that role and as an ex officio board member from 1955 to 1965, he shaped much of modern forest policy. The majority of forest policy in California still bears his stamp today.



Henry Vaux, undated.
Photo: Uncredited; courtesy of the Marian Koshland Bioscience & Natural Resources Library

His intellect was matched only by his way with people, and forestry leaders continued to seek his advice until the last days of his life. As a member of the Berkeley faculty from 1948 to 1978, and as dean of the School of Forestry from 1955 to 1965, when he developed a faculty and program that ranked as the best in the nation, it was said that he remembered every student he ever had.

"He was equally enamored of teaching and research, and he was equally good at both," said his son, Henry Vaux, Jr. "He could look at a scatter of data and pick out what was most meaningful without using a lot of statistical techniques." Throughout his career, Vaux Sr. operated on a simple principle that guided his way with forests, economics, policy, and people, said his son. "'Any job worth doing is worth doing well.' I heard those words a thousand times."

Cross section of a pine stem, just over two years old.
Photo: Shutterstock

Forest Genetics

BY NATE SELTENRICH

To understand a tree, you must understand its genes—the written code of instructions telling it how to grow, how to respond to stress, how to reproduce. By the same token, the most effective way to manipulate, shape, and ultimately improve a forest may be from within, through genetics (though this notion has grown somewhat controversial in recent years).

Beginning around World War II, UC Berkeley played an instrumental role in developing and applying these ideas, producing the very first forest geneticists—not just in the country but in the world. These early figures were products of Cal's genetics and botany programs rather than of the Forestry Department, which had yet to formally assimilate genetics. Among them was **Bill Critchfield**, BS Forestry '49, PhD Botany '56, who merged the two worlds in his dissertation, and later made significant contributions to our understanding of genetic variation, hybridization, growth and development, and taxonomy of forest trees.

Bruce Zobel, BS Forestry '43, MS Forestry '49, PhD Forestry '51, was another prescient leader in the field and is considered the father of modern forest genetics worldwide. After receiving his doctorate, Zobel headed a new tree-improvement program in Texas funded by major forest-product companies, Texas A&M University, and the Texas Forest Service. The science he practiced was still far from mainstream, but beginning in the 1960s, genetics gained ground in forestry, as it was making similar gains in medicine. Zobel went on to teach and launch a worldwide center of tree improvement at North Carolina State University.

Despite Zobel's successes developing "better" trees for industrial forestry throughout the South, forest genetics and the notion of tree improvement in forests have fallen from favor in recent years, said **Bill Libby**, MS Forestry '59, PhD Genetics '61, who studied under Zobel and joined the Berkeley Forestry Department as its first geneticist in 1962.

Bill Libby, circa 1960.
Photo: Uncredited; courtesy of the Marian Koshland Bioscience & Natural Resources Library.

By the time Libby retired in 1994, forestry had undergone a shift—at Berkeley and around the world—from a focus on production to an ecosystem-based approach. Reducing forests to genes and characteristics in targeted trees no longer conformed with prevailing attitudes about forestry. Yet the achievements of Berkeley's genetics pioneers continue to reverberate through the field, thanks to their own innovative ideas and those of their students practicing today, many of whom left Berkeley to populate large agencies around the world.

After retiring, Libby himself launched second and third acts in forest genetics, spending a decade using clones to improve productivity in New Zealand forests and then another 10 years on the board of the Save the Redwoods League, where he oversaw a change in focus from saving old-growth redwoods to managing the entire range of redwood forest. "That's been one of the most important things I've done, if not the most important," he said. "And of course that came out of being in a forestry school, where one worries about how to manage a forest."

ESPM professor **Richard Dodd**, credited with the development of DNA analysis in forest genetics, has also done considerable work understanding the diversity of California's redwoods.

A number of Libby's few dozen graduate students have adapted their skills to today's shifting environment in influential ways. **Sally Aitken**, MS Wildland Resource Science '86, PhD Wildland Resource Science '90, now oversees large-scale genomics projects at the University of British Colombia, aimed at understanding how tree populations adapt to climate. It's an increasingly in-demand area of study. "The problem is, the climate's changing so fast that 'local' [referring to seed stock] no longer means 'well adapted,'" she said. "So decisions have to be made about where to get seed from for reforestation." She's also evaluating whether natural populations have sufficient genetic diversity to adapt to new conditions without intervention.

Sally Aitkin.
Photo: Martin Dee; courtesy of the University of British Columbia

Steve Strauss, PhD Wildland Resource Science '85, a professor at Oregon State University, landed in a somewhat more controversial corner of the field, using direct genetic modifications (as opposed to breeding and culling) to create new genes and produce "better" trees. After the first genetically engineered plant was produced in 1985, and the first tree in 1987, Strauss arrived at Oregon "right in the middle of a wave of innovation," he said. Two decades later, although far fewer funding opportunities exist, Strauss remains active as a researcher, instructor, and advocate. Studying genetics at Berkeley equipped him to adapt and persevere in this cutting-edge field, Strauss said. "My experience with Bill and with Cal in general really prepared me for the social upheaval that GMOs represent."

Another of Libby's students, **Connie Millar**, MS Wildland Resource Science '79, PhD Genetics '85, now works for the U.S. Forest Service as a paleoecologist. She uses genetics to study the role of historic and ongoing climate change in high-elevation forests. It's another application of forest genetics that its pioneers may not have foreseen, yet that can contribute important findings to both forestry and science in general.

Aldo and Starker Leopold making a fire at campsite, circa 1938.
Photo: Courtesy of the Aldo Leopold Foundation

Wildlife and Rangeland Science

BY NATE SELTENRICH

Wildlife When some university forestry departments refer to "wildlife," they still mean big-game species. But Berkeley's approach has been more inclusive ever since 1946, when **A. Starker Leopold,** PhD Zoology '44, the eldest son of the famed ecologist and forester Aldo Leopold, began planting the seeds of the field's transformation. Tellingly, he launched an influential 30-year career at Cal in the Museum of Vertebrate Zoology.

Starker's influence is reflected in the work of conservation biology professor **Steve Beissinger**. "I look at forestry in the way that we've redefined it in our department, which is forest science in terms of forested ecosystems," he said. His research projects have investigated the influence of climate change on the distribution of birds and mammals throughout California, from the Sierra to the desert; parrot populations in tropical Venezuelan forests; and wetland bird species in the oak woodlands of the Sierra foothills. About 10 years ago he studied risk factors in the decline of the marbled murrelet, work that influenced how some old-growth forests along the Pacific coast are managed.

Wildlife considerations first began to appear in forest management plans on a large scale in the late 1970s, thanks in part to **Hal Salwasser**, PhD Wildland Resource Science '79. Even before his dissertation was complete, he took a job with the U.S. Forest Service helping biologists to integrate wildlife considerations into forest management plans for all of California's national forests. Using modeling developed in his dissertation, he was able to assess population dynamics for wildlife planning, particularly among at-risk species.

Salwasser later served as dean of Oregon State University's College of Forestry, where he supported the development of wildlife analytics. In 2002, he co-authored the textbook *Population Viability Analysis* with fellow Cal alum and then-professor of wildlife biology **Dale McCullough**, PhD Zoology '66. Variations on some of the early models he pioneered are still in use today. "They're essential tools in every environmental impact statement where wildlife is one of the resources being addressed," Salwasser said.

ESPM PhD candidate Matthew Luskin captured this image of an orangutan family as part of his fieldwork setting 80 motion-activated camera traps throughout each of Sumatra's three remaining jungles to understand how tigers are coping with their quickly shrinking habitat.

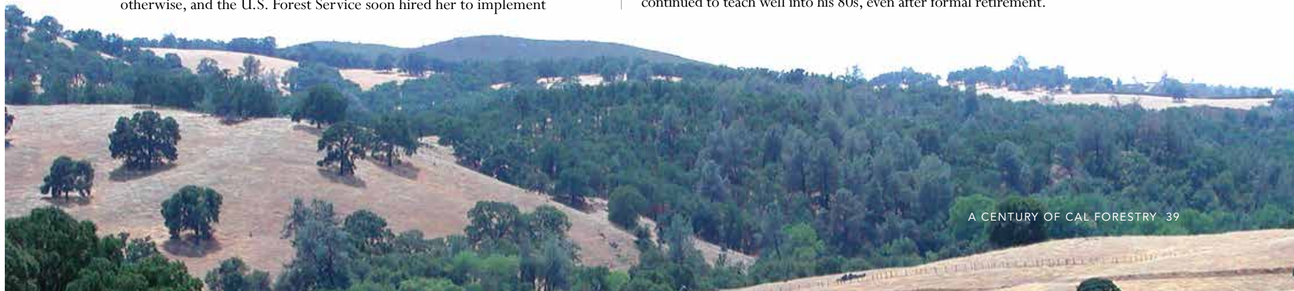
Reginald Barrett, PhD Zoology '71, has been teaching about wildlife at Berkeley since 1975, and continues to watch the field evolve—both technologically, as GPS radio collars, camera traps, and smart phones revolutionize what scientists can accomplish in the field, and philosophically, as the definition of wildlife has expanded to encompass plants, invertebrates, and all wild creatures.

Rangeland Science Add rangeland science to the long list of fields in which Berkeley researchers have upset the status quo. In fact, doing so has been a way of life for **Barbara Allen-Diaz**, BA Anthropology '75, MS Range Management '78, PhD Wildland Resource Science '80. A student of influential grasslands scientist **Harold Heady**, who launched the educational programs in range management at Berkeley and encouraged women and minorities to enter the field, Allen-Diaz became the nation's first female professor of range management when she joined the Berkeley faculty in 1986. Over the previous decade she had already become accustomed to tackling thorny issues, using science to challenge—and debunk—assumptions that others took for granted. For her dissertation she studied the use of livestock as a management tool in forest plantations, a controversial merging of forestry and grazing practices. "The belief was that they were incompatible," Allen-Diaz said. However, her data proved otherwise, and the U.S. Forest Service soon hired her to implement her ideas on its lands using both cows and sheep. (See also Cooperative Extension and Outreach, page 42.)

Lynn Huntsinger
Photo: Peg Skorpinski

ESPM professor **Lynn Huntsinger**, MS Wildland Resource Science '83, PhD Wildland Resource Science '89, has made waves of her own by merging social sciences with rangeland science. She and professor **Jamie Bartolome**, MS Range Management '69, PhD Conservation of Natural Resources '76, under whom she once studied (and who himself studied under Heady), were the first to implement the state-and-transition model in California, with Bartolome handling the biological science and Huntsinger providing the social-ecological framework, including a consideration of what motivates ranchers' decisions. "What I brought in is the human factor, or social relationships, and a lot of that comes out of having gone to school here," Huntsinger said, citing Berkeley's excellent social science faculty. Her ideas are spreading, too; today Huntsinger teaches the largest forestry class on campus, Americans and the Global Forest.

Providing a foundation for Bartolome, Allen-Diaz, and Huntsinger were innovators like **Arthur Sampson**, **Arnold Schultz**, **Harold Biswell**, and Heady. Sampson, hired at Berkeley in 1922, essentially invented range ecology, Bartolome said, and wrote the first textbook on how to do it. He retired in 1951 and was replaced by Heady, another creative thinker whose "residual dry matter" model is still in use on California ranges today. Schultz began teaching in the School of Forestry in 1958 and became a somewhat subversive force who rejected prevailing grasslands models and sought new ways of thinking. In the early 1970s he coined the term "ecosystemology," the integrated study of how ecosystems work, and developed a new course around it—one he continued to teach well into his 80s, even after formal retirement.



A worker washes logs on a jack chain for Spanish Peak Lumber Company in Plumas County (undated).
Photo: Woodbridge Metcalf; courtesy of the Marian Koshland Bioscience & Natural Resources Library

Forest Economics and Management

BY NATE SELTENRICH

Forest economics has a particularly rich tradition of formal instruction at Berkeley, and has been populated by some of the forestry field's leading lights. Two of the most prominent are **Henry Vaux**, also widely recognized for his work on forest policy (see profile, page 35), and **John Zivnuska**, BS Forestry '38, MS Forestry '40. Both taught undergraduate- and graduate-level courses at Berkeley, and both were well known nationally and internationally for their contributions to the field. Not only did they essentially invent forest economics, putting Berkeley out in front of other institutions, but they also defined it for decades.

While Vaux focused on regional economics and taxation in addition to policy, Zivnuska's work addressed commercial forestry, long-term supply-and-demand trends, forest evaluation, and international forestry. Their perspectives and influence were so far-reaching that more than a half-century after they began their work here, their names are still integrally tied to everything from fire to management to sociology.

Even before Vaux and Zivnuska, however, **Horace Josephson**, MS '33, PhD Agricultural Economics '39, was the first formally trained forest economist to teach classes in the subject at Berkeley, from 1940 to 1945. He later served with the U.S. Forest Service as chief of the Division of Forest Economics Research, before returning to campus in 1974 as a lecturer in forestry.

The next generation of forest economics scholars at Berkeley drew directly upon the leadership of Vaux and Zivnuska. After completing his Berkeley studies, **Dennis Teeguarden**, MS Forestry '58, PhD Agricultural Economics '64, became a forestry professor here, serving from 1978 to 1986 as department chair. He was inspired to focus his attention on economics, he said, after taking classes with Vaux and Zivnuska that opened his eyes to the complexities of sophisticated forest management. Fittingly, Teeguarden went on to help develop new methods for analyzing land-management decisions in forestry, known formally as "decision analysis," and his work on forest property taxation revolutionized the way forests are taxed in California. He retired in 1996.

William McKillop, MA Statistics '65, PhD Agricultural Economics '65, left the Canadian Department of Forestry in 1961 for Berkeley, which at the time, he said, he and other professionals viewed as the best forestry school in the world. "The attractive thing for me was that it had a good system for handling PhDs in forest economics," McKillop said. "We got a very good disciplinary background." He began teaching forest economics as an assistant professor in 1966, taking over some courses previously taught by Zivnuska. His research interests, meanwhile, focused on the development of econometrics in forestry; his dissertation on the subject, published in 1967, made an impact internationally. He retired in 1994.

Larry Davis, PhD Agricultural Economics '64, was of the same generation of influential economists at Berkeley. In addition to economics, he applied mathematical tools to evaluating fire—his dissertation addressed the costs and benefits of a fuel-break system in the Sierra Nevada—and to the non-market values of timber. Davis remains well known for his 1987 textbook *Forest Management*, now in its fourth edition. "In my view, Larry Davis produced the best forest management text that ever existed," Teeguarden said.

This second wave of forest economists at Berkeley remained active through the 1990s and played a role in mentoring and supporting the next generation, today's faculty. When **Peter Berck**, BA Economics '71, BA Mathematics '71, first came to Cal, Teeguarden, McKillop, and Zivnuska were all still active. "My early work on models of the forest economy in many ways picked up themes that had been important to Dennis Teeguarden," he said. "I was lucky that Bill McKillop took an early interest in me and helped me to learn the forestry field from a totally different viewpoint than my MIT economics training." In the decades since he obtained his doctorate, Berck said, forest economists have broadened their horizons to encompass finance, ecology, and the relationship between forests and climate. "Yet it still all boils down to forest management: Just when and how should we act in forested landscapes?" Forest economists today must be well versed in species preservation, land-use changes, and traditional management prescriptions for profits, he said.

Forestry Field Camp students tour a sawmill.
Photo: Kevin O'Hara

John Zivnuska collecting field data at the Wind River Experimental Forest in Washington, circa 1952.
Photo: Uncredited

Current College of Natural Resources Dean **J. Keith Gilless** trained as a forest economist and joined the Berkeley faculty when Teeguarden was the department chair. Gilless co-authored the textbook *Decision Methods for Forestry Management* and, like McKillop, wields econometrics as his primary tool to help forecast forest-product markets, analyze resource-dependent local economies, schedule forest harvests, evaluate the economics of fire suppression, and generally better understand today's forest-resource management issues.

All these connections embody a living legacy reaching back from today to the late 1930s and to the very origins of forest economics.

Cooperative Extension and Outreach

BY ANN BRODY GUY, ADAPTED FROM A *BREAKTHROUGHS* MAGAZINE ARTICLE BY SUSAN PIPER

Since its 1868 inception as the College of Agriculture, the College of Natural Resources has been driven by the mission to link the University of California's research capabilities to the practical needs of the community. For the past 100 years, that link has been Cooperative Extension (CE).

"Cooperative Extension is the College on the front line," said CE forest management specialist **Richard Standiford**, MS Wildland Resource Science '78. "It takes the results of academic research and adapts it to people's needs. It directly interacts with a broad array of people—from legislators and policymakers, to industry and professional groups, to landowners and homeowners—all the people who can benefit from our work." Because of that crucial working relationship, "our research is dynamic and practical."

Woodbridge Metcalf uses the exhibit "How Forest Trees Grow" at the 33rd annual 4-H Club Convention in 1953 on the UC Davis campus.
Photo: C. J. Kraebel

Even before the Agricultural Extension Service was officially inaugurated in 1914, outreach and education were integral to the University's College of Agriculture. As far back as 1875, when **Eugene Hilgard** began his long career as dean, fostering positive relationships with local citizen was critical in defining the research agenda of the fledgling college.

When **Woodbridge "Woody" Metcalf** was named Extension forester at UC Berkeley in 1926, he joined the first group of forestry specialists in the nation and began the expansion of Agricultural Extension (which later became Cooperative Extension) to include forestry. Metcalf helped Extension coordinate work with rural communities to strengthen volunteer forest fire fighting before there was state or federal protection.

Since those early beginnings, Berkeley's Extension foresters—now part of the Department of Environmental Science, Policy, and Management—have been leaders in the field on many fronts. Contributions from the mid to late twentieth century, covered in detail in the Cal Forestry 75th anniversary book *Shaping Forestry's Future*, include numerous milestones still relevant today. For example, **Rudy Grah,** who later became a professor and chair in forestry, brought the concepts of managed forests and investment analysis to landowners, and developed the first continuing education program for foresters. **Ed Gilden** led the organization of California's Christmas tree industry by working closely with county farm advisors. **Jim Laacke** worked closely with the Society of American Foresters to build a strong professional continuing education program that laid the groundwork for today's national Continuing Forestry Education program. His research and outreach also led to the formation of the non-industrial Forest Landowners of California organization. Forest products specialist **William Dost** was instrumental in improving sawmill efficiency, lumber drying techniques, and efficient use of wood.

Extension foresters working today bring leadership and scholarship to an equally diverse set of challenges. Forest pathologist **Matteo Garbelotto**, working with UC Davis colleague Dave Rizzo, discovered the organism responsible for sudden oak death. Garbelotto has continued to be a leader in combating the deadly disease that affects western forests, both through published research and by organizing numerous community-based "blitzes" to track the disease.

Max Moritz, a CE specialist in wildland fire, studies the dynamics of fire at broad scales, and his outreach work involves applying this information to ecosystem management. He has co-authored several headline-grabbing studies as he tracks the relationship between climate change and the increasing frequency and severity of forest fires.

Bill Stewart, PhD Wildland Resource Science '93, studies the linkages between managed forests and climate change, the interaction of land management and fires in western interior forests, and succession planning with family forest owners. He is the co-director, with fire science professor **Scott Stephens**, of the UC Berkeley Center for Forestry and the UC Center for Fire Research and Outreach.

Rick Standiford with a future Cal Forester—his grandson, Richard Standiford VI.

Richard B. Standiford works on creating outreach materials for forest landowners; he also helped develop and lead the Integrated Hardwood Range Management Program, which focused on sustainable use of the state's oak woodland resource.

The University of California Division of Agriculture and Natural Resources (UCANR) is the hub of Extension and outreach in the state. **Barbara Allen-Diaz** (see page 39), on leave from her faculty appointment, is the vice president and chief administrative leader at UCANR, bringing a Cal Forestry perspective to this important statewide program. "Cooperative Extension foresters make key connections with the people whose lives and livelihoods are integrated with California's forests," Allen-Diaz said. "My own perspective as a rangeland ecologist and longtime Cal Forester helps me see the bigger picture of how people managing our forests and agricultural fields can work together for the benefit of California's food supply, natural environment, recreation, and economic sustainability."

Barbara Allen-Diaz
Photo: Courtesy of UCANR

Ann Brody Guy is the communications director at the College of Natural Resources and the editor of *Breakthroughs* magazine.

A farm advisor's fire truck in front of the Solano County courthouse in Fairfield, Calif., from an Extension slideshow on fire prevention presented statewide circa 1918.
Photo: Courtesy of Al Stangenberger

Forestry Summer Camp

BY ERIN JOHNSON, BS FORESTRY '84

For Cal Forestry students, the eight-week summer field program, usually completed between the sophomore and junior years, marks the beginning of their formal forestry education. Despite infrastructure improvements across a century and the changing culture that its seasonal inhabitants bring from the city, Summer Camp has managed to retain its original utility, character, and charm.

Students arriving for Camp in 2015, wondering how they will adjust to a lack of 24/7 online access to social media for eight weeks, will find themselves deep in the quiet woods with a d-tape and a clipboard, not so different from their long-ago predecessors in 1915. Like generations of Camp attendees before them, they'll find that this place takes hold of them, and the bustle of city streets and technological stimulations and comforts of the day will quickly fade into the background.

Continued on page 42

Camp sign designed and painted by Daniel B. Langford and carved by Howard E. French in 1939.
Photo: Emanuel Fritz

Clockwise from top left: Camp 2007 students, from left: Theo Slomoff, Yamile Colque, Sarah Ismail, Melissa Chun. Photo: Cathy Cockrell. The Zivuska Hall white board adorned with student artwork at Camp 2011. Photo: Richard Standiford. Students from Camp 1923, uncredited.* Students from Camp 2011. Photo: Eva-May Wong. A log of wildlife species observed by Camp 2007 students. Photo: John Dingman. The Metcalf tent, Camp 1922. Photo: Emanuel Fritz.*

*Courtesy of the Marian Koshland Bioscience & Natural Resources Library.

PROFILE

Joe McBride

BY NATE SELTENRICH

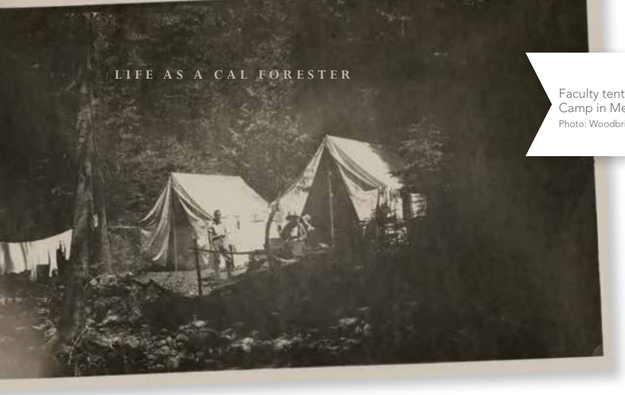
When the idea arose in the early 1990s to close Forestry Camp one summer and then switch to an alternating-year schedule, **Joe McBride**, MS Forestry '64, PhD Botany '69, argued steadfastly against it. His voice held influence, given that he was then chair of the Forestry Department—and, perhaps just as important, so personally committed to Camp that, by the time he retired from teaching this June, many colleagues and alumni had come to think of him as its very soul.

McBride's perspective prevailed. Forestry Camp never missed a beat, and attendance soon recovered. "I was concerned that if we ever stopped for a year it might be very difficult to start it up again," he recalled. "It's the hallmark of our program that we still have a summer camp."

His first appearance at Camp was as a young graduate student instructor in 1963. McBride's major professor was on sabbatical, and he stepped in to help. After joining the Berkeley faculty in 1970, he returned two more times to substitute-teach an ecology course. Finally, in 1985, he assumed responsibility for the course himself. Every year since—28 in all—his three-week class "The Ecology of the Sierra Nevada" has served as an introduction to Camp, and to fieldwork in general, for countless young foresters.

But academics are only half the story. McBride has been at Camp for the students' pick-up basketball games, mess-hall pranks, and late-afternoon dips in the creek. Each summer on the first weekend, students hike to Spanish Peak to meet the previous year's class. Once, when a student was injured in a fall, McBride watched as the others carried their new acquaintance six miles to the nearest road. "It was so gratifying to see the students come together," he said.

For him, the soul of Camp has always been the students. "I will certainly miss them," he said.



Faculty tents at 1917 Summer Camp in Meadow Valley.
Photo: Woodbridge Metcalf

Forestry Summer Camp *continued*

The summer instructional camp that Walter Mulford first envisioned in the early days of the Cal Forestry program was a place where students could train in their craft in a wooded environment similar to where they might eventually pursue their career. The first camp of seven students was held on a piece of private land on the outskirts of Quincy in 1915. By the time the second camp opened in 1917, it had moved west eight miles, near the hamlet of Meadow Valley, where it remained an unassuming collection of tents pitched along Schneider Creek until rising enrollment in the 1930s led to the construction of current "Upper Camp" facilities, which are still home to Camp today.

"You see people here who were in Forestry Camp 40-plus years ago. It's something that stays in . . . not just your social life but your career. It's something that sticks, and that's really special. —SAANA DEICHSEL, CAMP 2002, FROM THE SIGHTS+SOUNDS VIDEO LIBRARY

Go to **nature.berkeley.edu/forestry100/media** to enjoy the entire video collection.

Jeff Oldson, with Alvaro Casanova, examines a piece of wood during a presentation by U.S. Forest Service personnel at Camp 2007.
Photo: Cathy Cockrell

The curriculum's twentieth-century emphasis on efficiently growing and harvesting tree crops has evolved with changing times and new science. Today, there is a broader mandate of growing and harvesting trees while taking into account a variety of other forest values. Classes incorporate equal elements of ecology, mensuration, silviculture, and forest management, culminating in a project to develop intensive forest resource planning.

For our part, we former students have become the returning alumni who converge on the premises one Saturday each summer for the California Alumni Foresters picnic, as others before us did when we were Camp residents. We pull into the long, sloping parking lot below Camp and are transported back in time as we make our way up the dusty red path to the familiar cluster of cabins and outbuildings we called home decades earlier. While the current crop of youthful residents eye us curiously as they go about their Saturday activities, we once again become those campers of decades past returning from a day in the field, shedding hard hats, cruiser vests, and notebooks full of newly gleaned knowledge, to clean up for dinner and the evening's social agenda.

In the end, what connects Cal Foresters through generations begins with that summer in Meadow Valley, where we arrive with excitement and curiosity and leave with newly acquired skills and enduring friendships.

Erin Johnson is an editor at Island Press and member of the Centennial Committee

Love in the Woods

Put healthy, bright young college students deep in the woods together for two months, and there's bound to be a little romance. Here are just a few of the marriages that first blossomed at Summer Camp.

Chris Ketcham & Jheri Donchin Ketcham (1)

Louis Sciocchetti & Rebecca McClean (2)

Dan Howell & Tracy Jensen Howell (3)

Dan Tomascheski & Jeanne Heintz Tomascheski (4)

Frank Barron & Kathie Arnold Barron (5)

Gene Forsburg & Kass Green (6)

Jon Dvorak & Bridget Tracy (7)

Daniel M. Perrot & Laurie Scharninghausen Perrot (8)

Paula & Russell Sunn (9)

Robert Davenport & Janice Blasdale Davenport (10)

Frieder Schurr & Kip V. Freytag (11)

Joseph Restaino & Christina Lyons-Tinsley Restaino (12)

Russ Forsburg & Kathleen Mullen Forsburg

Jake Winn & Lisa Madsen Winn

All photos courtesy of the families

Want to tell us about your Summer Camp romance? Go to the Memories tab at **nature.berkeley.edu/forestry100**.

Cal Forestry Club

BY BRITA RUSTAD

In the original constitution, the founding members summarized the goals of the Cal Forestry Club: "to promote the general and academic interests in forestry among the students and faculty of the University and the people of California and to maintain a closer fellowship among the students interested in forestry." This still holds true today.

The Cal Forestry Club is so much more than a weekly extracurricular activity. It is a dynamic space that nourishes its students academically and socially. It is a place to learn from others, share ideas, make memories, and build lasting friendships. It is a place to panic before a silviculture exam and to reminisce about Summer Camp. It is a place to listen and to ask questions. It is a place to grow as an intellectual and to joke with friends. It seems to our members that the community and camaraderie fostered here are unparalleled by any other student group at Cal.

The club also serves as a gateway to practicing forestry in California, just as the founders intended. Students are provided with many opportunities each year to network with inspirational alumni, knowledgeable professionals, and the local forestry community.

Cal Forestry Club was the tiny seed that later grew to be the mighty UC Berkeley Forestry Program. Clubbers take pride in being a part of the organization that started it all and still uphold the dedicated spirit of the founders. After its first century of glorious existence, the club stands tall with intention to live on for centuries to come.

Brita Rustad, BS Forestry '14, was president of the Cal Forestry Club from 2013 to 2014.

1 Students from the 2008 Forestry Club's logging sports team compete in a sawing contest. 2 New benches were carved and installed in 2013 in honor of the Forestry Club's centennial. Photo: Ann Brody Guy 3 Students measure a tree at the 2013 Christmas tree sale. Photo: Laralynn Curry 4 Left to right: Meredith Jacobson, Allegra Mautner, Brita Rustad, Audrey Taylor, and Natalie Holt served up chili at the Bean Feed of the Century. Photo: Tammy Dong. 5 Foresters' Circle in the Eucalyptus Grove on campus. Built by students in spring of 1922, with logs donated by the Union Lumber Company. In honor of the club's 2012 centennial, new benches were carved and placed outside Mulford Hall, with lumber donated by the Humboldt Redwood Company.

Background, from left: Detail of the lyrics from "The Forester's Song," from the *Woodman's Warblings* songbook of Cal Forestry songs. Sawing contest at Camp Califorest field day, 1939.

Photo: Fritz Metcalf; courtesy of the Marian Koshland Bioscience & Natural Resources Library.

California Alumni Foresters

BY AL STANGENBERGER

In 1921, the Forestry Club suggested the formation of an alumni association for its fledgling degree program. On November 24 of the following year, nearly half of the alumni—10 of 23 graduates—attended the first meeting of the California Alumni Foresters (CAF). Following dinner at the Faculty Club, the group joined the Forestry Club in the Eucalyptus Grove for the dedication of benches that the Forestry Club members had made from logs donated by the Union Lumber Company.

The new association soon drafted its constitution:
The purpose shall be to create bonds of friendship and common interest among members, to disseminate information on activities and accomplishments of members, and to assist the faculty . . . in maintaining the highest scholastic and professional standards in order that graduates benefit to the fullest extent from their university training and be equipped to serve the forestry profession honorably and with distinction.

Al Stangenberger at the 2013 CAF picnic.

The group's first activity was to publish a newsletter to help alumni stay in touch with each other and with the program. The original mimeographed newsletter changed to an annual magazine format in 1941 and has been published almost every year since.

Supporting current forestry students has been a hallmark of CAF since it established the Walter Mulford Loan Fund in 1925 to help students pay for Summer Camp. The $326 collected that year helped three men attend that Summer Camp session and continued for four decades. In 1969, the Schwabacher family created the S. Donald and Bernice Schwabacher Fund, which still subsidizes Summer Camp students each year. The Walter Mulford Scholarship Fund, established in 1953, continues to support undergraduates, and the CAF Professional Forestry Scholarship Endowment offers cash scholarships for both graduate and undergraduate students who demonstrate a professional career path in forestry or natural resource management.

Quincy residents Pete Hochrein, BS '78, and his wife Julie attended the 2014 CAF Picnic at Forestry Camp.
Photo by James Wilson; courtesy of Feather Publishing Company

CAF has been a strong supporter of Summer Camp in other ways. In 1980, a large contribution from CAF helped fund the campus-sponsored remodeling of the 1939 mess hall, adding a modern kitchen and an expanded dining area. Together with the family of **John Zivnuska** BS '38, MS '40, Forestry, members of CAF also contributed the funds to build the new Zivnuska Hall (see page 23) at Summer Camp. In addition, alumni have contributed money to purchase vans for use at Camp and for field trips from Berkeley. The Foresters Teaching Fund is used to fund field trips, sponsor travel to the Society of American Foresters convention, and other items outside the budget. Two annual events are mainstays of the CAF social calendar: a banquet during Homecoming Week and a picnic at Summer Camp. And, since 1969, the annual S. J. Hall Lecture in Industrial Forestry, endowed by Hall's widow, has attracted alumni and professional foresters from around the state and beyond. These events, together with the alumni magazine, fund-raising efforts, and a commitment to their community, make CAF one of the most active alumni groups on campus today.

Current CAF president Christina Restaino, left, with Brita Rustad, former Forestry Club president and new CAF member.

Al Stangenberger, BS Forestry '65, MS Forestry '68, PhD Wildland Resource Science '79, has been Executive Secretary of CAF from 1988 year through the present.

George Craig, BS Forestry '39, and his late wife Viola, BA Public Health '39, established the Craig California Forestry Association Endowment Fund in 1980 to help undergraduate forestry students gain experience in the field. Several scholarships a year have been awarded, totaling more than $50,000 to date. At left, he's joined by 2007 forestry grant recipient, Danielle Fuchs, BS Forestry '07. Craig was also a major donor to the construction of the Zivnuska Hall computer lab, which opened in 2010 at Camp. Craig led the Western Timber Association, which eventually became the California Forestry Association, from 1957 to 1980.

Phase I of 2014 Alumni Weekend begins at Gold Lake.
Photo: Lisa Vogler, BS Resource Management and Environmental Economics & Policy '97

Cal Forestry: The Next Century

The Future of Forestry

BY J. KEITH GILLESS

UC Berkeley hosted a North America Summit on Forest Science Education in the spring of Cal Forestry's centennial year. Forestry employers, professionals, students, and faculty—thought leaders from around the world—came together to chart a course forward through the social, cultural, and political issues that both influence and motivate our scientific efforts.

The task of the summit was formidable: Instigate a forestry renaissance that will attract students in large numbers and with diverse demographics, produce graduates who can think broadly and apply knowledge across disciplines in a variety of cultural contexts, and generally strengthen the position of forestry across a broad spectrum of educational institutions.

Results from "The Promise and Performance of Forestry Education in the United States," the Pinchot Institute for Conservation's preliminary report on the 2014 survey, set the tone for the effort. The report's key finding was the importance of human dimensions and professional skills in the forestry-related workplace. Maureen McDonough, a professor of forestry at Michigan State University and a co-presenter of the report, said that while not new, the finding was still critical information. "We've known that since 1914, but we're not doing anything about it," she said.

To address the summit's goals, working groups focused on eight themes relating to educational and pedagogical approaches, professional concerns, and scientific thrusts. By design, they produced actionable recommendations, including:

- Explicitly include the science of social systems in our curricula and modify Society of American Foresters accreditation standards to more robustly emphasize human dimensions, public outreach, and other people-related knowledge and skills.
- Ensure that accreditation standards include exposure to practicing professional foresters as part of the curricula.
- Increase our knowledge about on-the-job experiences of recent forestry graduates.
- Expand the international dimension of curricula, strengthen relationships with international partners such as the UN Food and Agriculture Organization, and develop multi-university international field courses.
- Foster diversity by mentoring minority students, doing K-12 outreach, rigorously applying social science to better understand minority cultures in relation to forests and natural resources, and creating more effective partnerships with minority institutions such as historically black colleges.

The results produced at the summit can help prepare our community to stay relevant in a changing economic and social environment, but only if we act on them. Or, as UC Berkeley forestry professor Kevin O'Hara put it: "as society changes, so must forestry education." Thus, both collectively and individually, we must have a sense of urgency about identifying *and implementing* the adjustments that will keep us a relevant, vibrant, and productive profession and scientific discipline.

Whether we are considering new education models like online classes, growing our community outreach efforts, or working to facilitate international collaboration, the big picture for the future of forestry is clear: We need to balance people and social skills with science and technology. In the end, it's about the people as much as it is the trees.

caption TK NOT FINAL

Silviculture professor Kevin O'Hara's Applied Forest Ecology class examines a specimen in the field.

Photo: Kevin O'Hara

"Going to the woods is going home."

—JOHN MUIR

View of Strawberry Canyon, 2014.
Photo: Sara Lafleur-Vetter

Spine: To be dropped in by printer

A CENTURY OF CAL FORESTRY: 1914-2014 UNIVERSITY OF CALIFORNIA, BERKELEY

OPTION ONE

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