

environment YALE

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The Coming **WATER** Crisis

By John Mitchell



Photos by Harold Shapiro

Left to right, Dean Speth, Rick and Mary Jane Kroon and Yale President Rick Levin stand beside renderings of Kroon Hall, which will rise alongside Osborn Memorial Laboratories that appears in the background.

Dignitaries gathered for a groundbreaking at the site of the future Kroon Hall in May to officially mark the beginning of construction for what Yale hopes will be the “greenest” building in the world.

Dean Gus Speth, who presided over the ceremony, told an audience of nearly 200 people including donors to the building, that Kroon Hall will be an “architectural gem and a true aesthetic landmark; a pacesetter in sustainable design, certified at the highest level, LEED platinum, and climate neutral; and an environmental center for Yale, a magnet for all those at Yale with environmental interest, including both undergraduate and graduate students and faculty from all departments.”

Rick Kroon said that he and his wife, Mary Jane, developed an appreciation for the environment through the influence of their children, four of whom graduated from Yale. “They gave us an awareness of the pressing need to change the pattern of human endeavor and human priorities in order to save this wonderful world of ours for future generations,” he said.

Yale President Richard Levin predicted that Yale’s efforts to green the university will inspire other Ivy League schools to do the same. Yale has pledged to reduce its greenhouse gas emissions to 10 percent below 1990 levels by 2020, “at a cost that is one-half of 1 percent of our operating budget,” he said. “That’s a small tax. Who wouldn’t pay that price for the safety of the planet?”

Ed Bass, a major donor to the construction of the building, said that Kroon Hall would serve as a gateway to Science Hill and that landscaping featuring footpaths through Sachem’s Wood, two courtyards and the Prospect Street plaza at the entrance of the new building will be more like the pedestrian-friendly quadrangles that define the rest of the campus.



Ed Bass said it was more like a “bottom-up ceremony” than a groundbreaking. “We can only go up from here,” he said, as he stood near the pit (above) that will hold the foundation for Kroon Hall.

Corrections

The phrase “known as the Yellowstone-to-Yukon Initiative” was erroneously inserted into the Dean’s Message (Fall 2006). The correct presentation of the sentence should have been: “And in the United States today, an area the size of California has been set aside as forever wild in a magnificent system of national wilderness areas.”

Heidi McAllister did not write a Peace Corps environmental-education manual; she was the editor. (“Renewable Natural Resources Foundation Honors Educator,” Fall 2006)



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Anne Sommer

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Design


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Dean

James Gustave Speth

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e-mail: david.defusco@yale.edu
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Dean James Gustave Speth

Protecting Creation a Moral Duty

In January of this year I participated in a fascinating meeting of top U.S. scientists and leading evangelicals, about 15 of each. Being neither, it was not clear what I was doing there! But I'm glad I was, because it was an extraordinary and very hopeful experience.

The two-day session, held in Thomasville, Ga., was convened by the Center for Health and the Global Environment of the Harvard Medical School and the National Association of Evangelicals. The meeting was inspired, in part, by E.O. Wilson's good new book, *The Creation: An Appeal to Save Life on Earth*, which is his epistle to an imaginary Southern Baptist pastor. Wilson was raised a Baptist in Alabama; he was among the scientists with us in Thomasville.

A number of potentially divisive issues, such as evolution, were discussed mostly over meals and in the halls. The real focus was the environment, and the goal was to see if the two groups, spanning devout Christians to confirmed atheists, could unite to protect the Creation, a word we all agreed to use.

Two very interesting things happened at the lovely conference center outside Thomasville. First, this diverse group truly came together, and we were able to capture that agreement in a powerful statement, which I reproduce below. And, second, the two groups did not merely agree, they found that they liked, enjoyed and respected each other. Some real bonds were formed during those two days, so much so that the post-meeting e-mail traffic and book sharing has been hard to keep up with. Most important, we are all committed to working together to carry our conclusions to political leaders and the public.

And now, enjoy the statement. It was released by the group – all of whom signed it – at the National Press Club in Washington, D.C., on January 17, and received considerable attention.

An Urgent Call to Action: Scientists and Evangelicals Unite to Protect Creation

Scientific and evangelical leaders recently met to search for common ground in the protection of the creation. We happily discovered far more concordance than any of us had expected, quickly moving beyond dialogue to a shared sense of moral purpose. Important initiatives were already underway on both sides, and when compared

they were found to be broadly overlapping. We clearly share a moral passion and sense of vocation to save the imperiled living world, before our damages to it remake it as another kind of planet. We agree not only that reckless human activity has imperiled the Earth – especially the unsustainable and short-sighted lifestyles and public policies of our own nation – but also that we share a profound moral obligation to work together to call our nation, and other nations, to the kind of dramatic change urgently required in our day. We pledge our joint commitment to this effort in the unique moment now upon us.

Background

This meeting was convened by the Center for Health and the Global Environment at Harvard Medical School and the National Association of Evangelicals. It was envisioned as a first exploratory conference, based on a shared concern for the creation, to be held among people who were in some ways quite different in their worldviews. It now seems to us to be the beginning point of a major shared effort among scientists and evangelicals to protect life on Earth and the fragile life support systems that sustain it, drawing on the unique intellectual, spiritual, and moral contributions that each community can bring.

Our Shared Concern

We agree that our home, the Earth, which comes to us as that inexpressibly beautiful and mysterious gift that sustains our very lives, is seriously imperiled by human behavior. The harm is seen throughout the natural world, including a cascading set of problems such as climate change, habitat destruction, pollution and species extinctions, as well as the spread of human infectious diseases and other accelerating threats to the health of people and the well-being of societies. Each particular problem could be enumerated, but here it is enough to say that we are gradually destroying the sustaining community of life on which all living things on Earth depend. The costs of this destruction are already manifesting themselves around the world in profound and painful ways. The cost to humanity is already significant and may soon become incalculable. Being irreversible, many of these changes would affect all generations to come.

We believe that the protection of life on Earth is a profound moral imperative. It addresses without discrimi-

nation the interests of all humanity as well as the value of the nonhuman world. It requires a new moral awakening to a compelling demand, clearly articulated in Scripture and supported by science, that we must steward the natural world in order to preserve for ourselves and future generations a beautiful, rich and healthful environment. For many of us, this is a religious obligation, rooted in our sense of gratitude for Creation and reverence for its Creator.

One fundamental motivation that we share is concern for the poorest of the poor, well over a billion people, who have little chance to improve their lives in devastated and often war-ravaged environments. At the same time, the natural environments in which they live, and where so much of Earth's biodiversity barely hangs on, cannot

survive the press of destitute people without other resources and with nowhere else to go.

We declare that every sector of our nation's leadership – religious, scientific, business, political and educational – must act now to work toward the fundamental change in values, lifestyles and public policies required to address these worsening problems before it is too late. There is no excuse for further delays. Business as usual cannot continue yet one more day. We pledge to work together at every level to lead our nation toward a responsible care for Creation, and we call with one voice to our scientific and evangelical colleagues, and to all others, to join us in these efforts. ■

Rev. Jim Ball, Ph.D.
*Executive Director,
Evangelical Environmental Network*

Steven Bouma-Prediger, Ph.D.
*John H. and Jeanne M. Jacobson Professor
of Religion, Hope College*

Eric Chivian, M.D.
*Director, Center for Health and the Global
Environment, Harvard Medical School;
Shared 1985 Nobel Peace Prize*

Rev. Richard Cizik, D.Min., M.Div.
*Vice President for Governmental Affairs,
National Association of Evangelicals*

Rita Colwell, Ph.D.
*Distinguished University Professor,
University of Maryland College Park and
at the John Hopkins University School
of Public Health*

Judith Curry, Ph.D.
*Professor and Chair of the School
of Earth and Atmospheric Sciences,
Georgia Institute of Technology*

Calvin DeWitt, Ph.D.
*Professor of Environmental Studies,
University of Wisconsin-Madison;
President, Academy of Evangelical
Scientists and Ethicists*

Rev. Daryl Eldridge, Ph.D.
President, Rockbridge Seminary

Paul Epstein, M.D., M.P.H.
*Associate Director, Center for Health
and the Global Environment,
Harvard Medical School*

Howard Frumkin, M.D., Dr.P.H.
*Director, National Center for Environmental
Health, Agency for Toxic Substances and
Disease Registry, U.S. Centers for Disease
Control and Prevention*

Rev. David Gushee, Ph.D.
*University Fellow and Graves Professor of
Moral Philosophy, Union University*

James Hansen, Ph.D.
*Director, NASA Goddard Institute
for Space Studies; Adjunct Professor,
Columbia University Earth Institute*

Bernd Heinrich, Ph.D.
Professor of Biology, University of Vermont

Rev. Joel Hunter, D.Min.
*Senior Pastor, Northland,
A Church Distributed*

Randall Isaac, Ph.D.
*Executive Director,
American Scientific Affiliation*

Cheryl Bridges Johns, Ph.D.
*Professor of Christian Formation
and Discipleship, Church of God
Theological Seminary*

The Rt. Revd. James Jones
The Bishop of Liverpool

Nancy Knowlton, Ph.D.
*Director, Center for Marine Biodiversity
and Conservation; John Dove Isaacs
Professor of Natural Philosophy,
Scripps Institute of Oceanography*

James McCarty, Ph.D.
*Agassiz Professor of Biological
Oceanography, Harvard University*

Peter Raven, Ph.D.
*President, Missouri Botanical Garden;
George Engelmann Professor of Botany,
Washington University*

Carl Safina, Ph.D.
President, Blue Ocean Institute

Peter Seligmann, Ph.D.
*Chair and CEO,
Conservation International*

Joseph Sheldon, Ph.D.
*Distinguished Professor of Biology and
Environmental Science, Messiah College;
Professor of Environmental Studies, The Au
Sable Institute of Environmental Studies*

James Gustave Speth, J.D., M.Litt.
*Dean and Sara Shallenberger Brown
Professor in the Practice of Environmental
Policy, Yale School of Forestry &
Environmental Studies*

Rev. Eric Steinkamp, Ph.D.
*Chair of the Department of Natural
Sciences and Math and Professor of
Environmental Sciences, Northwest University,
Professor of Environmental Studies, The Au
Sable Institute of Environmental Studies*

Loren Wilkinson, Ph.D.
*Professor of Philosophy and
Interdisciplinary Studies, Regent College*

Edward O. Wilson, Ph.D.
*University Research Professor Emeritus,
Harvard University*

Ken Wilson
Senior Pastor, Vineyard Church of Ann Arbor





The Coming **WATER** Crisis

By John Mitchell

Once upon a time in California, I lived near a river that knew exactly where it wanted to go, but couldn't get there. The river was the Kings, and where it wanted to go was Tulare Lake, 700 square miles at peak, the largest bowl of fresh water in the western United States. This was at a period in our history before irrigators came to divert the river into ditches and canals that would help turn the state's great Central Valley and the lakebed itself into a sea of fibers and fruits the likes of which this world had rarely seen before. In the short time I lived there, I felt no particular connection to the greening of the valley, even though one of those diversions, the People's Ditch, flowed opaque and sluggish at the edge

of my backyard. But later I began to wonder about the future of the valley, as it became apparent that the diverted Kings, among other rivers, could no longer do all the agricultural work assigned to it, that additional water would have to be imported from distant hydrologic regions and that wells would soon be sinking ever deeper into shrinking aquifers to slake the thirst of the region's growing towns and cities. This was half a century ago. Over the years since, little has changed except for the region's burgeoning population and a proliferation of irrigated fields. And perhaps the most sobering thought is that the fate of Tulare Lake is hardly the big deal I once thought it was, but rather just a tiny parochial drop in the bucket

of a worldwide frenzy to secure fresh water. In fact, more than a few observers already see water eclipsing oil as the most precious and fought-over natural resource of the 21st century.

That was the clear message delivered in April in F&ES' Sage Hall by Rohini Nilekani, chair of the Arghyam Trust, which promotes sustainable access to water in her native India. "The oil crisis we face around the world is looking very much like what the crisis in water will look like," she said, citing the inevitability of unequal distribution, rising costs and increasing conflicts. "We have seen that the uncontrolled and rapacious exploitation of oil has led to unintended consequences," she said. "If we continue on a similar trajectory with water, then

More than 5 million people die each year from diseases caused by unsafe drinking water, lack of sanitation and insufficient water for hygiene.

I'm afraid the oil crisis is going to look just like the trailer of some horrible disaster movie.”

IN TAKING THE MEASURE OF WATER, many jugglers of statistics prefer to deal with acre-feet rather than gallons, a formula that is designed to simplify the numbers but instead winds up simply confusing the layperson. An acre-foot? What is it? I am informed that it is enough water to cover an acre of land to a depth of one foot (about 320,000 gallons). Or, to parse it more graphically, an acre-foot is the amount of water you'd need to flush about 100,000 toilets simultaneously.

As photos from outer space can attest, the Earth – our blue planet – is mostly

water. The oceans embrace 97 percent of it, effectively withdrawing almost all of that saline wet stuff from human uses.

That leaves, according to some accounts, about 28 trillion acre-feet of fresh water, two-thirds of which is solid, locked into glaciers and icecaps. The other third, about 9.7 trillion acre-feet, is liquid, and most of that is out of sight in underground aquifers. Of the remaining “smidgen of the world's liquid fresh water,” the science writer Fred Pearce counts 71 billion acre-feet in lakes, 71 billion in soils and permafrost, a bit more than 10 billion in atmospheric water vapor, 9 billion in wetlands, 1.6 billion in rivers and 800 million in living organisms “from rainforests to you and me.”

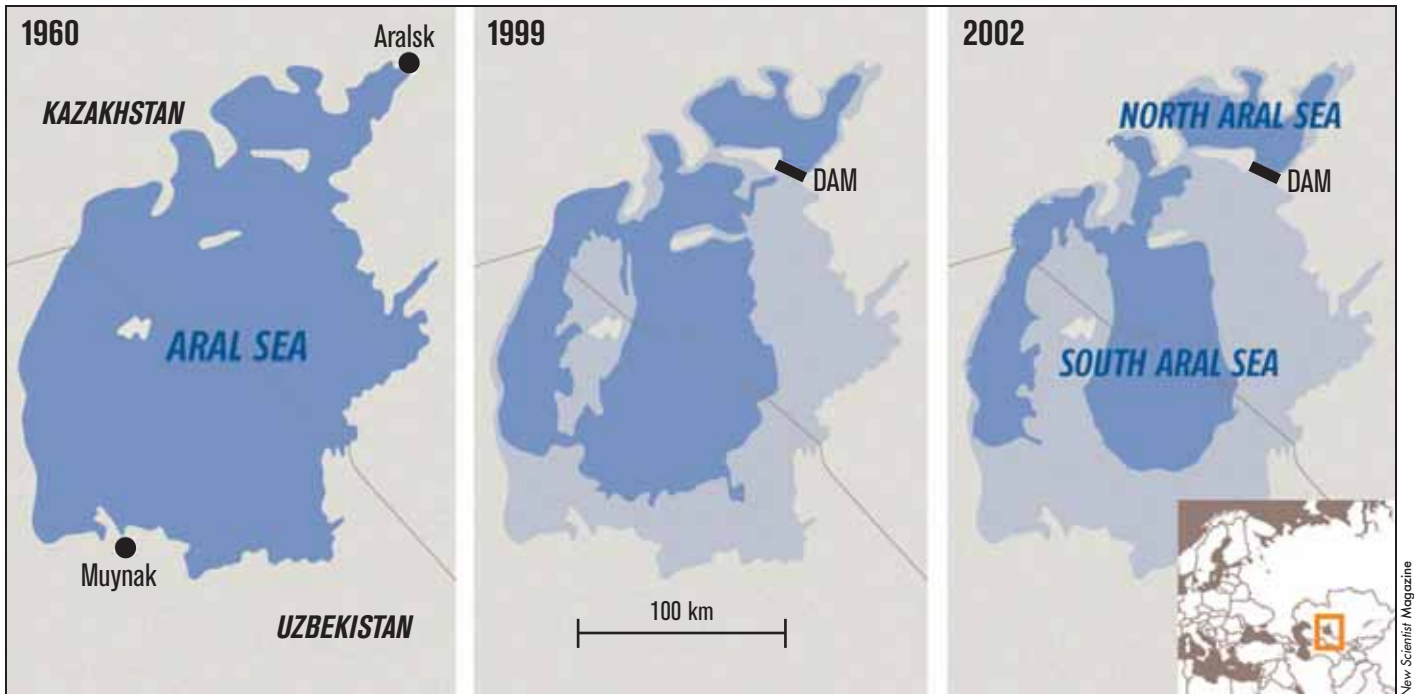
So what do “you and me” consume to get through another day? For this we revert to gallons. In round numbers, we conservatively consume 100 gallons a day per capita in the United States. That's our domestic household use only and does not reflect the full agricultural and industrial take of about 1,300 gallons per capita needed to feed and clothe each one of us. For example, we need at least 250 gallons of water to produce a pound of rice, 130 gallons for a pound of wheat and 2,000 gallons for one gallon of milk. And the number of mouths to feed keeps growing.

Sandra Postel is director of the Global Water Policy Project in Amherst, Mass., and Brian Richter is director of the Sustainable Waters Program of The Nature Conservancy. As collaborators on *Rivers for Life: Managing Water for People and Nature*, published by Island Press in 2003, they wrote:



David McNew/Getty Images

The 100-foot-wide ring of bleached sandstone, the result of a six-year drought that has dramatically dropped the level of the reservoir, is evident under the red Navajo sandstone cliffs of Llewellyn Gulch canyon near Page, Ariz.



The changed shape of the Aral Sea since 1960.

Within a generation, some 3 billion people will be living in countries that hydrologists classify as water stressed based simply on the amount of water available per person. Is there hope for rivers and freshwater species in those places? Between 1950 and today, 3.5 billion people were added to the planet; 3 billion more will likely be added over the next half century. ... We are rapidly moving toward a freshwater world of greater ecological degradation, species extinction, and loss of natural ecosystem services. This may not be the world we want for ourselves or our descendants, but it is the one that is coming if no course corrections are made.

Among the many threats to freshwater resources and the services they provide, Postel, Richter and other scientists cite the construction of dams and levees, which impede the crucial connections between rivers and floodplain habitats;

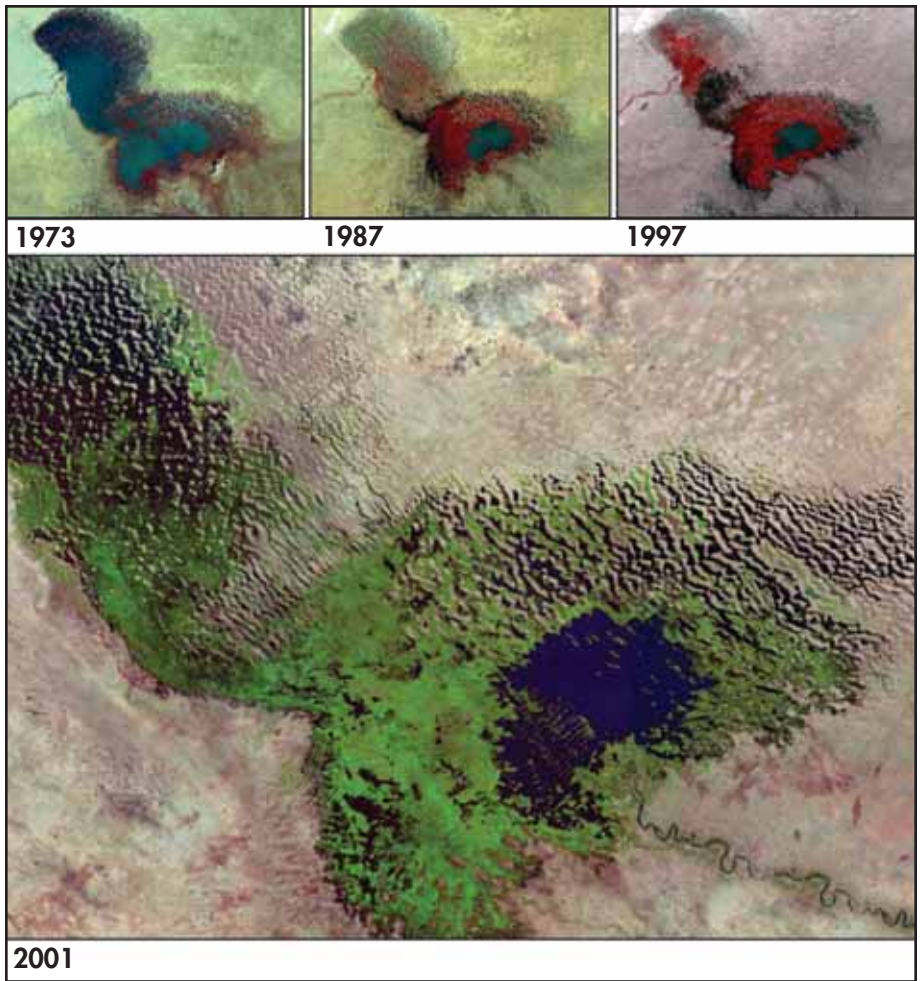
drainage of wetlands and deforestation, which destroy natural water purification processes; and unbridled pollution, with its multitudinous impacts on human health. The United Nations World Summit on Sustainable Development, held in Johannesburg in 2002, reported:

More than 5 million people die each year from diseases caused by unsafe drinking water, lack of sanitation, and insufficient water for hygiene. In fact, over 2 million deaths occur each year from water-related diarrhea alone. At any given time, almost half of the people in developing countries suffer from water-related diseases.

Diseases caused by the ingestion of water polluted by human or animal wastes can include typhoid, cholera, dysentery and diarrhea. Parasites in unclean water can infect humans with such diseases as schistosomiasis, said to plague more than 200 million people in over 70 countries

around the world. And finally one must consider the rampant mischief caused by insects that breed in contaminated water, principally the vectors of malaria and dengue fever.

That's the bad news. The good news, as Fred Pearce notes in his classic *When the Rivers Run Dry: Water – The Defining Crisis of the Twenty-First Century*, published by Beacon Press last year, "is that we never destroy water. We may pollute it, irrigate crops with it, and flush it down our toilets ... but somewhere, sometime, it will return, purged and fresh. ... Each day more than 800 million acre-feet of water rains onto the earth. Water is the ultimate renewable resource. And there is, even today, enough to go around. The difficulty is in [ensuring] that water is always where we need it, when we need it. ..."



Satellite images show that Lake Chad, which once straddled the borders of Chad, Niger, Nigeria and Cameroon, has shrunk by an estimated 95 percent since the mid-1960s because of the growth of agriculture and declining rainfall. Red and green areas indicate dry lakebed.

NO DOUBT THE MOST VISIBLE SIGN OF OUR FRESHWATER CRISIS is reflected in the loss or shrinkage of major lakes – the Tulare syndrome that I mentioned earlier. For tragic consequences, nothing on Earth quite matches the drying out of Central Asia’s Aral Sea. Once the fourth-largest lake in the world, holding 800 million acre-feet of fresh water spread across a bed almost the size of southern New England, the Aral now takes top billing as the largest *saltwater* lake in the world. In the last 30 years, it

has shrunk by more than 60 percent. The United Nations has called the demise of this resource the greatest environmental disaster of the 20th century.

Starting in the 1960s, in what is now Uzbekistan and Kazakhstan, the Soviet Union proceeded to divert the lake’s two principal feeders, the rivers Amu Darya and Syr Darya, to grow vast quantities of cotton and rice. Within 30 years, the lake was receiving but a trickle of water and then, from the Amu, none at all. Salt concentrations began to rise. Fish harvests

plummeted, species disappeared. By and by, an industry that had employed 60,000 fishermen and fish processors was dead in the brine and the dust. And dust would indeed be one of the malevolent side effects, for the dry lakebed was now exposed to the powerful winds of the region. Particulate air pollution was affecting the health of millions of people downwind, while salt-laden fallout dusted the arable lands roundabout. As if that weren’t sufficient cause for grief, one had only to look upstream, where global warming and precipitation of Aral dust were combining to shrink glaciers at the headwaters of the Amu and Syr.

After the Aral Sea, Africa’s Lake Chad emerges as the runner-up in the vanishing-lakes sweepstakes. Located at the interface of four of the continent’s fastest-growing countries – Chad, Niger, Nigeria and Cameroon – the ancient lake, once the size of North America’s Erie, has shrunk some 95 percent over the past 40 years, depleted by massive irrigation projects along the two main rivers feeding it, as well as by huge withdrawals from the lake itself to offset the effects of a long sub-Saharan drought.

Dams and reservoirs, once viewed as panaceas for the world’s freshwater crisis, are finally showing some hurtful disabilities, though many to this day continue to be planned and built. Over the last 50 years the number of large dams (50 feet or more) has grown worldwide from 5,000 to 45,000. Yet the reservoirs behind these dams are losing water through evaporation at an alarming rate. In arid and semiarid regions, the annual loss is often equal to 10 percent of the reservoir’s storage capacity. Evaporative losses from

large reservoirs in the United States are said to represent a volume of water almost sufficient to meet the municipal needs of all the major U.S. cities combined. Evaporation from Lake Powell alone sops up a tenth of the annual flow of the Colorado River, which only on rare occasions in rare years ever reaches the sea. The Yellow River in China is now a sometime stranger to the Yellow Sea. The Nile barely makes its way to the Mediterranean.

And then there is global climate change, which perversely promises in decades ahead to put a further spin on things – withholding rainfall in drier regions while increasing it in wetter precincts. Three of the planet's most capacious riverine arteries – the Amazon, Orinoco and Congo – will therefore pump even more water through sparsely populated lands, where there is already an unusable surfeit of water. Meanwhile such thirsty, drought-prone places as northeastern China and the North American Southwest will have to cope with increasing evaporative losses and the specter of rivers running dry.

North America's most endangered river system is, of course, the Colorado's. Its 1,450-mile main stem drains into seven states, generating hydroelectricity along the way, supplying hundreds of irrigation projects and delivering water by tunnel and aqueduct to such profligate municipal sprawls as Phoenix and Tucson. But now the entire region rests on the cusp of what the U.S. Geological Survey believes may be the worst drought in 500 years, and upstream users increasingly wonder why they should have to share their modest allotments with California and Arizona in order that those

lower states might continue sprinkling their golf courses and filling their desert swimming pools. This interstate tug-of-war is moving inexorably toward the courts, even as the water hustlers both upstream and downstream look for relief among the unseen and hard-to-reach waters that lie beneath their feet.

GIVEN THAT AQUIFERS ARE AN INVISIBLE RESOURCE, it is almost impossible to measure with any accuracy the impacts of groundwater pumping on total available water supplies. Unlike surface flows, the scientist Marcus Moench has observed, wells tend to be dispersed, small-scale, variable and privately owned and operated, thereby masking the rate at which their levels are declining. Moreover, there are some aquifers slowly replenishable by rainfall (within the span of a human lifetime) and some that are not – unless, of course, society has the patience to leave the aquifer alone and then wait a couple of thousand years for it to fill up again. Every year, in China, India and Pakistan, several hundred million people are subsisting on foods grown with underground water that rain cannot immediately replace. The writer Fred Pearce estimates that overdraft at about 120 to 160 million acre-feet a year. And this, he warns, “is a crisis that has not yet registered on the radar screens of government or aid agencies.” Only the farmers seem to understand that if they are to go on farming, they will have to drill deeper and deeper into the Earth – until they hit the dry bottom.

The crisis in China is especially severe. Lester Brown, a MacArthur Fellow who

“The difficulty is in
[ensuring] that water is
always where we need it,
when we need it.”

Fred Pearce

“Whiskey’s for drinking”
and “water’s for
fighting over.”

*Menachem Elimelech,
quoting Mark Twain*

heads up the Earth Policy Institute, said that the level of a deep aquifer under the North China Plain is now falling at the rate of 10 feet a year, and then goes on to quote a World Bank assessment that some deep wells near Beijing are now plunging more than half a mile to tap fresh water. The Bank forecasts “catastrophic consequences for future generations” unless use and supply can be brought into some kind of balance. Wheat farmers in the semiarid regions of northern China are now obliged to pump from depths of a thousand feet, the cost of which is forcing some of them to abandon irrigation altogether and return to less-productive dryland farming techniques. Not surprisingly, between 2000 and 2005, China’s wheat harvest declined by more than 20 percent.

India likewise suffers from groundwater deficits. Aquifers virtually feed India, supplying farmers with two-thirds of the water needed for irrigation. By some accounts, the recent availability in India of inexpensive pumps has brought on a groundwater boom, with as many as a million new pumps added to the national inventory every year. At the same time, less-prosperous farmers are staring at the dry bottoms of hand-dug bore holes. Whole districts in arid states like Tamil Nadu and Gujarat are said to be losing significant numbers of their rural inhabitants.

Aquifers face hard times in the United States as well, especially under the High Plains, where the great Ogallala, named for the Sioux who once hunted there, reaches under parts of seven states, from South Dakota into Texas and New

Mexico, in stratified thicknesses ranging from an arm’s length to 1,300 feet. Pumping this resource went big-time after World War II. As a result, water levels have been falling in some areas at the rate of more than six feet a year. With drawdowns like that, and scant recharge to offset the loss, the fabled resource that once helped the United States produce three-quarters of the wheat on the world market could run dry within a baby boomer’s lifetime.

IN THE YEARS AHEAD, it will take something like a miracle to fix the global water crisis. The old solutions – large dams, huge reservoirs, humming pumps – just won’t work anymore and shouldn’t, since they have become to a large degree a part of the problem. Peter Gleick, Yale College Class of 1978, a MacArthur Fellow and co-founder and president of the Pacific Institute in Oakland, Calif., believes that the “hard path to water” pursued in the 20th century must be supplemented in the 21st by decentralized institutions and practices that “pay attention to what communities need.” For example, Gleick sees shifting from flood irrigation to drip irrigation to produce the same or higher crop yields with less water. And in an interview last year, he suggested that the western United States would do better growing less water-intensive cotton, alfalfa and rice, and more crops, such as vegetables and fruits, that require less water. More-crops-per-drops is becoming a popular movement, especially in regard to rice, the world’s most widely sought grain. Pearce reports that a volume representing one-third of all water drawn

from rivers and aquifers worldwide is used solely to flood the rice paddies of Asia. Drip irrigation could help reduce that staggering drain on the resource.

No review of possible solutions would be complete without taking a look at seawater desalination and the reclamation and reuse of wastewater. In many developing nations, of course, there is no attempt at reclamation; raw sewage simply pours from an urban pipe to irrigate (and not so incidentally fertilize) croplands on the urban fringe. But here and there a few communities are recovering contaminated wastewater and actually turning it into a potable substance. At Yale, Menachem Elimelech, Roberto C. Goizueta Professor of Environmental and Chemical Engineering and founder of Yale's Environmental Engineering Program, is a long-time advocate of extracting potable water from non-traditional sources. To illustrate the possibilities, Elimelech likes to point to the city of Windhoek, the capital of Namibia, reportedly the most arid of all the sub-Saharan countries. The only perennial rivers are more than 400 miles from the capital city; average annual rainfall is 14 inches and evaporative losses from the nearby Goreangab Reservoir run as high as 140 inches a year. The solution? The Goreangab Reclamation Plant, the world's first facility to blend reservoir water with secondary effluent subjected to coagulation, dissolved air filtration, sand filtration, carbon absorption and chlorination. Financed by loans from European banks, the facility is now in its fifth year of operation and is said to

supply more than a third of Windhoek's potable water.

Israel is heavily dependent on wastewater reuse, but predominantly for irrigation. For potable water supplies, the country is looking at construction of a number of seawater desalination plants along its Mediterranean coast. One of the largest is approaching completion in the southern city of Ashkelon, and is expected to produce 100 million cubic meters of potable fresh water a year.

Increasingly throughout the world, but especially in the Middle East, water

scarcity looms as a powerful deterrent to regional stability. "Whiskey's for drinking," Elimelech likes to quote Mark Twain as having said, and "water's for fighting over." Since ancient times, the rights to and allocation of water have triggered numerous conflicts in the arid Middle East. Israel's Six-Day War with Syria and Jordan in 1967 was not about land; it was about access to the Jordan River and its headwaters in the Golan Heights. In the Sudan and Somalia, according to Mohamed El-Ashry of the United Nations Foundation, much of the violence can be



James Yang



Diego Azabell/epor/Corbis

People walk on a nearly dried-up area of the Jialing River in central China. Wheat farmers in the semiarid regions of northern China have been forced to pump from depths of a thousand feet, the cost of which is forcing some of them to abandon irrigation and return to less-productive dryland farming techniques. Not surprisingly, between 2000 and 2005, China’s wheat harvest declined by more than 20 percent.

“If poverty is bad, my friends, poverty without water and sanitation is hell on earth.”

Rohini Nilekani

traced to the migration of refugees fleeing drought-wracked lands in search of water and tillable soils. Water hasn’t brought on blood and thunder in the United States – not yet, anyway. But Montana is in court claiming that Wyoming is swiping too much from the Tongue and Powder rivers; South Dakota is battling the Army Corps of Engineers over Missouri River reservoir drawdowns; and Kansas and Nebraska are scrapping over irrigation uses along the Republican River.

HALF A CENTURY AGO, give or take a few years, more than a few prognosticators predicted that widespread famine would soon be knocking at the doors of the developing world, such was the disparity between increasing human numbers and the ability of existing agricultural practices to feed them. Then foundation-funded science and technology intervened in what came to be known as the Green Revolution. Soon high-yield grains were sprouting in the fields, doubling the production of cereals in some poor countries and pumping up the daily per capita ingestion of calories by as much as 25 percent. As a result, in many regions of the world, famine was deferred. But there was a catch, for in delivering more calories, the Green Revolution was obliged to keep the calories afloat on more and more water. Not surprisingly, water is now scarcer than ever in many of the world’s poorest countries.

“We have taken water far too much for granted,” Nilekani said in April at Sage Hall. “If poverty is bad, my friends, poverty without water and sanitation is hell on earth.”

So what’s next? A Blue Revolution to purge the excesses of the Green one? Perhaps, though no one appears prepared to explain exactly how that might play out. Harvesting rainwater to use where it falls could provide a good start in regions blessed with precipitation. In arid regions, no doubt, governments will have to invest heavily in desalination and the reuse of wastewater. For this revolution, there can be no single – or simple – solution. There will be many. Seeking them out and putting them all to work may prove to be the biggest challenge of the 21st century. ■

Faculty Research Reflects Complexity of Global Water Issues

By Rhea Hirshman

For most of us, paying water bills is just one more household task. But for Sheila Olmstead, those bills say something about how we think about water. “Historically, we consider water as something we have a right to,” she says, “especially here in the United States, and that perspective dictates how we allocate and manage it.”

An assistant professor of environmental economics, Olmstead researches and teaches environmental and natural resource economics and policy, with a particular focus on market mechanisms controlling the distribution of drinking water. One of the central questions she explores is, “What should be the role of water pricing as part of water management?”

Hers is one of many inquiries into the biology, chemistry, physics, economics and politics of water currently being pursued by the school’s “water faculty,” who specialize in areas related to water science, policy and management.

“The range of research on water issues that our faculty is engaged in reflects the complex nature of global water problems,” said Gaboury Benoit, professor of environmental chemistry and environmental engineering and co-director of the Hixon Center for Urban Ecology. “As the global population increases and becomes more urbanized and the demand for water resources becomes more acute, there will be an increasing need for the type of interdisciplinary approach that we offer at Yale to the development of water management and restoration activities.”

Olmstead illustrates her question by comparing how we deal with water in the marketplace to how we deal with oil. “Oil consumption is managed primarily through market forces. We may turn off lights when our energy bills increase, but the government doesn’t require us to do so. On the other hand, during a drought, a city might issue regulations

to limit water use, but in most parts of the country, the price of water won’t rise.”

While she notes that “no one recommends that we manage water strictly via the market,” Olmstead believes that “efficient water management would require clear price signals for consumers.” However, in most of the United States, water pricing is largely a political issue. She points out that the common notion of water access as a “right” influences a host of policy concerns; one of the examples is the placement and subsidizing of water-intensive industries in areas with limited water supplies – for instance, the growing of rice in Texas or cotton in California or the creation of golf courses in Arizona.

“I am interested in the issue of how market-based approaches to water management can increase social welfare.”

Sheila Olmstead

Olmstead’s research also examines water markets in developing countries. “One commonly asserted reason for public regulation of water rates around the world,” she says, “is to ensure the affordability of drinking-water services. However, poor communities, particularly in developing countries, are frequently left out of central water service networks and wind up relying, in some cases, on neighbors selling water from trucks. I am interested in the issue of how market-based approaches to water management can increase social welfare, since public regulation of water has not necessarily ensured affordable drinking-water services to the most impoverished.”

Brad Gentry, another faculty member who focuses primarily on the economics of water, asserts that private investment is a necessity to encourage both the improved quality and equitable distribution of water.

“Many who believe most strongly in the public’s right to water believe that there is no role for business,” he says. “But in virtually every water system I’ve encountered, private investment helps the government meet its responsibility for making water safe and available. Even in the United States, where water supply systems are mostly public, private investors buy the municipal bonds issued to support water system improvements.”

Gentry, who is a senior lecturer in sustainable investments and a research scholar, is co-director of the Center For Business and the Environment at Yale and director of the Research Program on Private Investment and the Environment. “My work,” he says, “is finding the links between financial and environmental performance, and investigating the tools that can be used to attract more investment in better performance.”

In his “Emerging Markets for Ecosystem Services” course, co-taught with Mark Ashton ’85, Ph.D. ’90, Gentry asks: “How can we encourage consumers of ecosystem services to pay the producers of those services, thus creating market incentives to sustain intact biologically diverse areas?” He has students examine questions such as: “If you are a forest manager, how would you manage the land to supply clean water and how can you get people to pay you for doing that, rather than cutting the timber for profit? Who is affected by a lack of quality and quantity of water, and do they have incentives to pay you to improve both? What are the economic incentives not to waste water? And what are the best ways of getting governments to create and enforce appropriate regulations?”

Gentry has been studying these and other issues in relation to locales ranging

from New Haven, to megacities in developing countries, to wilderness forest systems. He notes that the most effective balance between public- and private-sector responses to environmental challenges depends on social and political realities, as well as the availability of resources. “Water is a concern around the world,” he says, “but the issues are intensely localized.”

Local issues of a different sort find their way into the work of Shimon Anisfeld, a senior lecturer and research scientist in water resources and environmental chemistry and an expert on coastal and marsh areas. Anisfeld’s research focuses primarily on tidal marsh dynamics and riverine water quality and the human impact on streams and wetlands, with the goal of improving watershed management. His laboratories are Long

Island Sound and Connecticut’s rivers, particularly the Quinnipiac. reflects the relationship between the input and output of a substance or element through a region. He explains: “There is increasing pressure on urban ecosystems, and we can learn about the health of an urban environment by studying the flow of water and nitrogen into and out of a city. Most nitrogen comes into a city as food and leaves as waste. Seeing where water and nitrogen are coming from and where they’re going can help us more effectively manage both water resources and waste disposal.”

But the question that Anisfeld is most actively investigating is why so many area marshes are drowning. “Normally,” he says, “tidal marshes can accumulate sediment and organic material and rise as sea levels rise. But marshes in our area – on Long Island Sound, in the lower Quinnipiac River and at Sherwood Island in Westport – are not keeping up. They get too wet, and they turn into mud flats that can’t support their native vegetation.”

Anisfeld is testing the theory that an excess of nutrients, particularly nitrogen (from sewage, fertilizer runoff and fuel combustion) and phosphorus (from sewage), affects the natural processes that keep marshes healthy. He has taught a course called “Managing the Coastal Nutrient Problem: The Case of Long Island Sound” with colleague Peter Raymond, assistant professor of ecosystem ecology, who focuses on the biogeochemistry of natural systems – the

study of the cycle in which chemical elements and simple substances are transferred between living systems and the environment.

“My lab looks particularly at the carbon and nitrogen cycles within aquatic systems,”

“All of my work is based on a desire to understand the human impacts on rivers and wetlands.”

Shimon Anisfeld

Raymond says. His research investigates major sources, sinks and ages of various carbon and nitrogen pools in the natural environment. “Our burning of fossil fuels is consuming an increasing amount of organic matter from a world that used to produce more carbon than it was consuming. My current research includes determining how carbon pools are transformed in estuaries; the physics of air-sea CO₂ exchange; nitrogen cycling in temperate watersheds; and the flux, age and composition of carbon being transported from land to the ocean.”

Anisfeld is also studying factors influencing river water quality throughout Connecticut, and testing methods used for evaluating that quality. “We know, for instance, that there is nitrogen overload in many areas because of development and sewage treatment plants,” he says. “Excess nitrogen from human activities results in problems ranging from fish die-offs, to diminished soil fertility, to toxic algal blooms. Even the most pristine waters are affected because of the deposits from our burning of fossil fuels.”

Anisfeld is examining the relative importance of different sources of nitrogen pollution, and in a related project, he is collecting data in order to evaluate the accuracy of the state’s current water quality sampling program. “All of my work,” he says, “is based on a desire to understand the human impacts on rivers and wetlands and to carry out research with direct relevance to watershed management.”



Shimon Anisfeld



Gabe Benoit



Brad Gentry



Sheila Olmstead



Peter Raymond



Jim Saiers

Island Sound and Connecticut’s rivers, particularly the Quinnipiac.

In addition, Anisfeld is working with Olmstead on a project examining the water and nitrogen budgets for New Haven; a budget

All photos by Harold Shapiro, except Brad Gentry's by Michael Doolittle

Questions of watershed quality and management also figure prominently in the work of Gaboury Benoit. He describes his research as falling into “two broad areas: the environmental chemistry of trace metals, and watershed-based studies of water quality and its relation to land use and other human-environment interactions.”

Understanding how metals behave in aquatic environments is important, Benoit explains, “both because of their biological significance as possible toxicants or micronutrients, and because some can act as tracers of environmentally important processes.”

Benoit said that certain metals, such as copper and cobalt, tend to interact with humic substances, which are the natural waste products created when plants die on land. Bacteria break down these substances, which then leach into the water naturally. “But,” he says, “people discard a lot of substances that resemble humic substances – for instance, additives in food and personal-care products – and the substances end up in sewage treatment plants and lakes. These are much more powerful binding agents than natural humic substances, and their presence could wind up reducing the availability of certain micronutrients in ecosystems. In turn, this micronutrient limitation may be affecting bacterial action that is essential to the health of those ecosystems.”

In his watershed-based studies, Benoit is looking at nonpoint source pollution and techniques for pinpointing pollution sources. “We’ve done a good job in the United States of restricting pollution that comes from discrete points, like sewage treatment plants and industry,” he says. “But we have done very badly at minimizing water pollution from uses, like agriculture and urban development, that spread across landscapes.”

At the same time, novel ideas are being developed in the pinpointing of pollution sources. “Every kind of land use leaves a fingerprint related to the chemicals it’s

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Dams Bad for Habitats but Here to Stay

By Alan Bisbort

Proponents of dams have cited their many benefits over the past two centuries, including flood control, irrigation, transportation and hydropower, but one they may be reluctant to claim is that dams helped foster the conservation movement in America. Indeed, heated opposition to dams has inspired grass-roots movements worldwide, many of whose adherents – as well as some dam proponents – participated in a three-day conference last November at F&ES, “Global Perspectives on Large Dams,” organized largely by F&ES students.

Dams large and small were examined from every conceivable angle – technical, political, ecological, economic, even spiritual.

Former U.S. Secretary of the Interior Bruce Babbitt set the conference tone with his provocative keynote address, “Do We Need More Dams? Or Fewer?” After being introduced by Dean Gus Speth as “one of my heroes,” Babbitt called F&ES a “sweet spot” for environmental studies. Then he turned to the subject at hand, noting that two things are now happening in the world simultaneously – one hopeful, one not so: “We are learning to take dams down in the United States even as elsewhere in the world we are going in the wrong direction, building more and bigger dams.”

The subject of “dam busting” – the removal of outmoded dams – seemed to energize Babbitt, chair of the board of

directors of the World Wildlife Fund. “I’m astonished at how far we’ve come since 1994 at Yosemite, when I told an audience that I intended to tear down a couple of dams,” he said. “That almost ended my career. President Clinton later took me aside and said, ‘What’s all this stuff about tearing down dams?’ I kept my mouth shut until he was re-elected in 1996.”

At that point, Babbitt helped negotiate the removal of a small (6-foot-high) dam in North Carolina (Quaker Neck) that

“From a cultural perspective, dams are seen as eternal.”

Bruce Babbitt

blocked shad runs on the Neuse River. Removing that dam opened upstream spawning waters, and shad returned in large numbers. This successful effort spawned something else – an inventory of U.S. dams that revealed 75,000 still standing. “Nobody will miss one or two or even half a dozen,” said Babbitt, laughing. “[Dam busting] is a wonderfully blossoming field.” He suggested that the biggest obstacles to dam removal – and habitat restoration – may be psychological.

“From a cultural perspective, dams are seen as eternal,” he said. “But along

the East Coast, most dams are obsolete, having been built for grist mills and now decommissioned. Local people fight taking them down out of nostalgia, and see dam removal as government encroachment.”

Babbitt said he was disturbed that no consensus has been reached on criteria by which we can plan and “understand” large dams. He cited the “melancholy” examples of the Columbia, Colorado and Missouri rivers. “The upper Missouri River is a template of failure from which other countries must learn. The destruction wreaked by Hurricane Katrina began in the 1930s, when the first dam was built at Fort Peck.”

After the dam at Fort Peck was built, the U.S. Army Corps of Engineers built 20 more dams. In the process, native peoples were dispossessed, cultures destroyed, farmland lost and habitats ruined. “This was done in the name of flood control. . . . Sixty million acre-feet of water were created, 80 percent of the sediment collected behind dams; the river no longer exists and the delta is disappearing. Let’s not create another Missouri River elsewhere,” Babbitt warned.

Hetch Hetchy Valley and the End of the Big-Dam Era

Babbitt was not the only conference participant voicing concern about the expansion of dam-building worldwide. This was, in fact, a predominating view.

The roots of such opposition reach back to 1913, when an Act of Congress led to a dam being built on the Tuolumne River, flooding the Hetch Hetchy Valley in Yosemite National Park. Though the approval of this 364-foot-high dam, according to environmental engineer Laura Wildman ’04, director of river science at American Rivers, “was said to have killed [Sierra Club founder] John Muir,” it also led to what photographer and writer Tim Palmer called “the first great environmental debate.”

“The conservancy movement began with rivers and dams,” said Palmer. “Muir lost that great battle, but a movement began.” While Muir’s motivation was to protect a national park, Palmer said, anglers, wilderness supporters and landowners slowly merged into a great people’s movement that crested in the 1970s, when several large-dam proposals were defeated. “That movement brought down the big-dam era,” said Palmer.

Prior to this movement, the people most negatively affected by big dams in the United States were Native Americans. Offering this perspective were Raymond Cross, a Yale Law School graduate and law professor at the University of Montana, and Rebecca Miles, chair of the Nez Perce Tribal Executive Committee. Cross represented his tribal people, the Mandan, Hidatsa and Arikara Nation of the Fort Berthold Indian Reservation (N.D.), in their battle for compensation against the United States for its 1949 taking of over 156,000 acres of reservation land to build Garrison Dam, the world’s fourth-largest rolled-earth dam. Garrison created the longest reservoir in the United States, Lake Sacagawea, named for the Indian woman who aided Lewis and Clark.

“Who built it?” said Cross. “Indians were used as the labor force. It was built for power, flood control and navigation, but the real cost was the breach of a treaty and the destruction of Indian culture.” In 1992, Congress awarded the tribes \$149.2 million in compensation.

Miles reflected on the impacts that large dams have had on her people in Washington state. She is now trying to retain Nez Perce treaty rights to the fish and water of the Snake River, a fight shared by another panelist, Gilly Lyons of Save Our Wild Salmon. Their goal is the removal of four dams on the Lower Snake River and restoration of the salmon and steelhead to “harvestable” levels.

Offering a cautionary note was John Williams, a scientist who directs the Riverine Ecology Group for the National Oceanic & Atmospheric Administration. “Restoring fisheries is different from saving a species from extinction,” he said. “That is the question here: Can we have both? Salmon and dams?”

While much of the discussion focused on the negative impacts of the dams, nearly all participants accepted that dams, in some capacity, are here to stay. David Skelly, F&ES professor of ecology, moderated a panel discussion of the ways in which environmentalists strike a balance between the economics of building dams and protection of the natural world.

George LaPointe, commissioner of the Maine Department of Marine Resources, described successful dam removals on the Kennebec and Penobscot rivers. He called the projects on the Penobscot River – whose basin makes up one-third of Maine’s landmass – examples of “smart hydro” that balance renewable energy with fish restoration. The Penobscot has nine dams, two of which (Veazie Dam and Great Works Dam) are likely to be removed. The obstacles are the price (\$25 million to buy the dams and \$15 million for follow-up) and peoples’ fondness for the artificial lakes created by the dams.

LaPointe cited the successful removal of Edwards Dam on the Kennebec River. “This project benefited all 11 species of anadromous fish in the river,” he said.

Stephen Gephard, a biologist with the Connecticut Department of Environmental Protection’s Marine Fisheries Division, detailed fish-passage technology and the pros and cons of models currently used around the world (pool and weir, roughened chute, fish lifts, seminatural bypass channels). He and LaPointe both stressed that fish ladders, or passages around dams, are not totally efficient.



Adria Eliskus

The only obstacles to the likely removal of the Veazie Dam on the Penobscot River are the price and peoples' fondness for the artificial lakes it has helped create.

“Fish-passage technology is not the panacea for restoring species,” said Gephard. “Dam removal would be the preferable way. Fishways are a compromise; politically we can’t just remove dams.” Therefore, he recommends, where possible, removing old dams, limiting the height of new dams, building dams upstream and not downstream, advocating for the best fishways and demanding that maintenance be part of any dam project.

Jeff Powell, a biologist with the U.S. Fish & Wildlife Service, and Paul Johnson, a zoologist with the Alabama Department of Conservation and Natural Resources, jointly offered an overview of efforts to mitigate dam impacts and recover imperiled species in the Tennessee and Mobile river basins. The Tennessee is the third-largest river in North America, with 11,000 miles of shoreline, and the Mobile River is the sixth-largest basin in the country. Both are global hotspots for biodiversity. Within the Tennessee basin, for example, the tiny Conasauga River is home to 76 native fish species, and the basin itself contains more species of freshwater mussels (297) than anywhere else in the world. It also has the

world’s second-highest extinction rates (only the Amazon rainforest’s rates are higher). The main culprits are the Tennessee Valley Authority dams built in the 1930s – 3,000 small dams and 50 large hydropower dams are found in the basin.

“These dams have done profound damage,” said Johnson, who collaborated with Powell’s office on a long-term project to restore mussel species on a stretch of the Duck River Basin in Tennessee. Fishways and mitigation efforts were initiated by the power company and state agencies. Ten years after the changes, the impact on the mussel population has been significant. “There have been major increases in numbers and species. Even endangered species like the snail darter have returned,” said Johnson. “It’s a dramatic recovery.”

When dam proponents and opponents do battle, a courtroom is the usual setting. Brad Gentry, F&ES senior lecturer and research scholar in sustainable investments, moderated a panel of environmental lawyers who discussed cases they’ve litigated. Zygmunt Plater, a Yale Law School graduate and a law professor at Boston

College, litigated the Tellico Dam case in Tennessee, cited many times during the conference. The Tellico Dam, he said, should never have been built.

“It could never pay for itself,” said Plater. “This dam offered 23 cents worth of benefits for every dollar spent on it, and it was placed in the heart of the Cherokee reservation, the oldest site of known human habitation in North America.”

Plater represented the native peoples against the government. Because of the Tellico case, the Endangered Species Act was augmented with a “God Squad,” a committee that signs off on whether a species can be allowed to go extinct. The God Squad has been invoked in only three cases: the Tellico Dam (in regard to the snail darter), the Gray Rocks Dam in Wyoming (which affected the habitat of the whooping crane along the Platte River in Nebraska) and Pacific Northwest logging (spotted owls).

On the last day of the conference, the participants focused on international dam construction, with representatives discussing controversial projects in India (Ramachandra Guha, Ramaswamy Iyer), Thailand (David Woodruff), Costa Rica (Rodrigo Rojas), Belize (Ari Hershowitz) and Lesotho (Yvonne Braun). Also discussed were the roles of the World Bank and corporations and the social and political impacts of large dams.

After three days, the conference seemed to circle back to something that former Secretary Babbitt said in his opening remarks: “If we must have hydropower, let’s put it in logical places and let’s have real mitigation and land use planning.” ■



Chad Oliver

Fire and the Nuclear Forest

By Richard Conniff

In the fall of 2004 in the rotunda of Marsh Hall on the Yale campus, a forester from Alaska gave a talk about the worst fire season in his state's history. Driven by record-breaking temperatures and drought, intense fires had raged across 6.5 million acres of forest, easily triple what Alaska expected even in a bad year. Despite the latest fire-fighting technology, the fires burned too big and too hot to control. At one point, a change of wind direction blanketed the city of Fairbanks in smoke, reducing visibility at times to a quarter-mile. Air quality was rated very unhealthy or hazardous for 10 days straight, forcing people to stay indoors or even evacuate the city. NASA later reported that the smoke plume had worsened air quality as far away as Houston.

In the audience that day at Yale was an associate professor from the National Agricultural University of Ukraine named Sergiy Zibtsev, who was visiting from Kiev as a Fulbright scholar. As the speaker's photos played across the screen, he contemplated the catastrophic scale of the fires and wondered, "What if it happened at Chernobyl?"

A 50-year-old Scotch pine plantation five miles from the Chernobyl nuclear power plant. The stand has been devastated by insects and is now at an extremely high risk for fire.

Zibtsev, a tall, almost ectoplasmically thin 46-year-old, with a slight stoop and thick hair just starting to go gray, knew the forests around the Chernobyl Nuclear Power Plant as well as anyone. Kiev, where he teaches at the Institute of Forestry and Landscape Architecture, is a two-hour drive to the south. Starting in 1993, he'd spent five summers working four hours a day in the so-called exclusion zone, a fenced-off area of almost 650,000 acres around the power plant. The human population there had been hastily evacuated after the April 26, 1986, explosion at nuclear reactor number four. What

remained behind, apart from the empty cities of Chernobyl and Pripyat, were grassland and forest, largely Scotch pine, with some birch, aspen and oak mixed in, now abandoned and unmanaged. Or, as Zibtsev put it, “completely nature without people, just wind and forest.”

It was, and remains, in some ways an inviting forest. “Usually in Ukraine you never meet wildlife, because of the pressure from hunting,” said Zibtsev, on a return visit to Yale this past February. He cradled an imaginary rifle in two hands, by way of explanation. But wolves have come in from Russia, he said, and there are now moose, red deer, wild boar, lynx and beavers. Endangered Przewalski horses and European buffalo have been released there.

People leave the animals alone because Chernobyl is, of course, also a deeply scary forest. The accident at the nuclear power plant released roughly 100 times the amount of radioactive material produced by the atomic bomb at Hiroshima. Much of that radioactive material got trapped by the surrounding forest, helping to limit the geographic spread of the disaster. But it remains there still, in the leaves, needles and bark of the trees and in the upper layer of soil, largely in the form of cesium-137 and, to a lesser extent, strontium-90. Plutonium-239 also contaminates the area nearest the plant, including a 3,700-acre stand now known as the Red Forest, because the needles on the Scotch pine died, turned a rusty brown and dropped off soon after the accident. (Much of the original Red Forest was buried on the site. More radiation-resistant aspen and birch grow there now.)

Like any other forest, the exclusion zone is vulnerable to fires set off by lightning strikes or by the handful of farmers who have crept back to their old homes. The worst such fire, in 1992, burned through 12,500 acres of forest crown, but in an area with relatively low radiation.

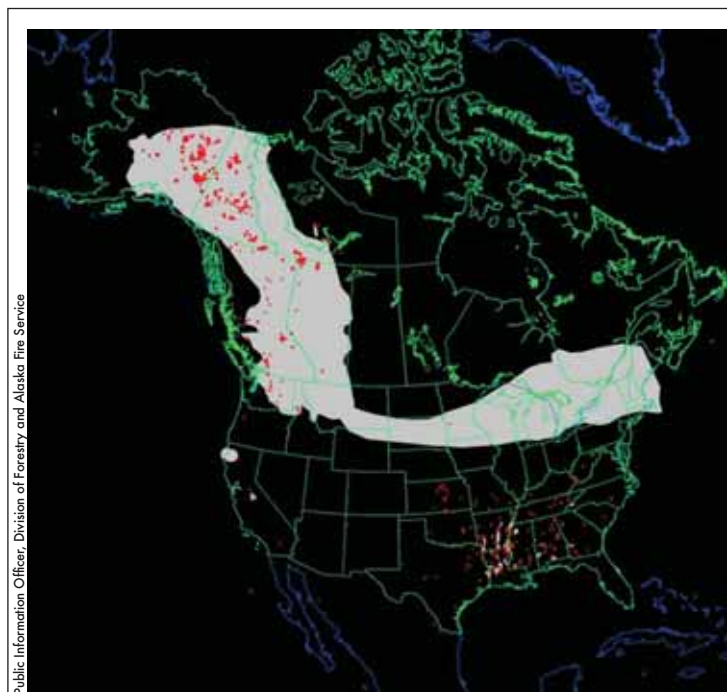
The plume from another fire, in 2003, reached Kiev, which has a population of 2.7 million people. The exclusion zone has a firefighting force equipped to deal with the problem, at least in theory. But as Zibtsev listened to what had happened in Alaska in 2004 and thought about the increasing tendency of extreme weather conditions to occur in unexpected places, he realized that people in the Ukraine had no idea how to prevent or control a catastrophic forest fire. Moreover, the radioactive potential of such a fire could be equal, as an article in the January/February issue of the *Journal of Forestry* put it, “to a series of new explosions.”

Zibtsev went home to spread the word. But in his absence, the Ukraine had gone through the most tumultuous period in its post-Soviet history. The attempted assassination of presidential candidate Viktor Yushchenko, by dioxin poisoning, had made headlines worldwide. Then a series of mass protests and acts of civil disobedience, dubbed the Orange Revolution, had forced a closely monitored election runoff. (During one meeting in New Haven to discuss the dramatic events, someone draped an orange scarf around Zibtsev’s neck. He treasured it, until it eventually vanished. “You know, for revolutions somebody always have to pay,” he remarked, in a characteristically droll e-mail, “and scarf in general is not bad solution, in compare with October 1917.”) Finally, Yushchenko took office as president, promising a program of economic and anti-corruption reforms. Chernobyl was largely out of sight, out of mind.

“They don’t have time for this,” Zibtsev conceded. “After a fire, they’ll give us money. But then it may be too late. The important thing is to get the attention. We already have lots of meetings,” he said. Then, with a hometown-Cassandra shrug, he added, “They don’t believe me.” What he needed was an expert, traditionally defined as “an s.o.b. with a briefcase from out of town.”

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Zibtsev had come to Yale at the invitation of Chad Oliver ’70, Ph.D. ’75, a mild, thoughtful figure with a soft Tennessee accent, watery blue eyes and a trim salt-and-pepper beard who carries the formidable title of Pinchot Professor of Forestry and Environmental Studies at F&ES. He also carries a briefcase or, at least, a laptop bag. Oliver is an expert on forest dynamics, particularly as influenced by human actions. His father owned a



Public Information Officer, Division of Forestry and Alaska Fire Service

In August 2004, smoke from fires originating in Alaska, the Yukon Territory and the Pacific Northwest made its way to the East Coast. There is concern that radioactive smoke from forest fires in the Chernobyl exclusion zone could have catastrophic consequences for the 2.7 million inhabitants of Kiev.

forest management company in the Southeast, and from high-school age on, “when there was a fire, we all went out and fought it.” As a college student, he also worked a summer as a firefighter in the forests of the Northwest. He went on to earn his Ph.D. from F&ES in 1975. Later, he joined the faculty at the University of Washington and served as an advisor to the U.S. Forest Service and other land management agencies around the world. Then, in 2002, he returned to F&ES as part of a concerted effort by the school to broaden its international reach. He now heads Yale’s Global Institute of Sustainable Forestry.

At Zibtsev’s invitation, Oliver made his first trip to the Ukraine in the summer of 2005, and what he saw in the exclusion zone was disconcertingly familiar. Until 1986, the state forestry agency had managed the forest intensively for timber, typically leaving no more than 12 cubic meters of dead wood, a couple of stems, per acre. Locals also picked over the fuel

wood, berries, mushrooms and game. Then the forest had been abandoned for 20 years, with no plans for increased management any time in the future. “So the trees were extremely crowded, which leads to trees dying and the buildup of fuel for fire,” Oliver recalled recently. On a laptop, he showed a photograph of a stick forest of skinny, unstable conifers, some of them already broken and tilted. The soil was also sandy, prone to drying out quickly in a drought. “And when it dries out, you have a real mess on your hands.”

In the early 1980s, Oliver had seen a similar buildup of fuel wood in the American West and helped predict the catastrophic forest fires that later ravaged the forests there. The causes of that buildup were, of course, completely different: A misguided federal policy of suppressing all fires through much of the 20th century had turned the forests into a fuel dump. Even when the danger became alarmingly evident, actually doing something to fix it proved difficult, in part, says Oliver, because environmentalists objected to almost any logging.

When the inevitable conflagration finally came, said Oliver, “the main thing it showed us was that our concern about and our ability to predict catastrophic fires are not like Chicken Little saying the sky is falling. These catastrophic fires really do occur, and once they occur it’s too late to try to put them out. You have to be proactive. It just confirmed our worst fears.”

But how to convince Ukrainian officials of that? And how to do it with the requisite urgency – and yet not raise the sort of alarm that might jeopardize Kiev’s political and economic revival? It is, said Oliver, a delicate challenge: “If there is

Much of the radioactive material produced by the Chernobyl accident contaminates a 3,700-acre stand now known as the Red Forest, because the needles on the Scotch pine died, turned a rusty brown and dropped off soon after the accident.

the possibility for radioactive smoke to float over a city and for the people to breathe it, then the viability of foreign investment in Kiev immediately goes down. And if it really does happen, you’re in for a health disaster.” (Dmytro Melnychuk, rector of the National Agricultural University, put the problem far more starkly in a letter last year to F&ES Dean Gus Speth: “In the event of a catastrophic fire of over 50,000 hectares in the Chernobyl zone, radioactive smoke will cause millions of dollars in health and economic loss to Kiev and other parts of the Ukraine. Such a fire is currently likely. . . .”)

On the other hand, the tools for managing forests to prevent catastrophic fires are already available. In addition to his expertise, what Oliver brought to the task was a remarkable computer program, the Landscape Management System (LMS), which he began to develop in the late 1980s as a way to think through the competing values in managing a piece of land. At the time, the major conflict in the Pacific Northwest was about logging versus protection of endangered spotted owls. But LMS allows policy makers to look at any stand in any forest and ask “What if . . . ?”

One day last February, in a fluorescent-lit corner of Greeley Memorial Lab, Zibtsev and a team of LMS mavens put a 7,900-stand sample of Chernobyl forest through its paces. It was the sort of room where lots of people work briefly, then go away, leaving the blackboards and glass partitions covered with diagrams and scratchings that look like a cross between a Cy Twombly painting and a football playbook. They might have represented the dynamics of a forest anywhere from Florida to Alaska. Here and there, a legible term leapt out – “remote sensing” or “Holdridge Life Zones” or, somewhat cryptically, “Michelle 17.”



Igor Kostin/Sygma/Corbis

“In the event of a catastrophic fire of over 50,000 hectares in the Chernobyl zone, radioactive smoke will cause millions of dollars in health and economic loss to Kiev and other parts of the Ukraine.”

Dmytro Melnychuk

Jim McCarter, a software development coordinator for the University of Washington, worked at his keyboard, and every now and then, after a whirring of hard drives, he announced the results of an alternative management scheme. Sometimes the analysis came up as a series of graphs representing relative fire risk. In a high-risk scenario, 60 percent of the trees in a stand would be destroyed. The goal was to get to the low-risk scenario, where less than 25 percent of trees would die in a fire. At times, LMS served up a visualization of a tree stand, then showed how a particular management strategy would make it look in five, or 25, years. The visualizations, said McCarter, were a useful tool for helping laypeople and policy makers see forests grow before their eyes – at a rate of 50 years in 20 seconds.

LMS could help to show Chernobyl firefighters the scale of the problem they face as the forest changes. Asked about fire risk now, said Zibtsev, they tend to say, “No problem. We can control any fire. We have helicopters and trucks. ...”

“It’s the confident attitude of the action agency,” said Oliver. “To do this kind of thing, you need a can-do attitude.” But catastrophic fires have an alarming power to remind people of human limitations, often when it’s too late. “The U.S. Forest

Service, they don’t have that attitude anymore,” said Oliver, and McCarter added, “They sort of had that drummed out of them.” At Chernobyl, much of the fire-fighting equipment Oliver saw in 2005 and on a return visit in 2006 was outdated or poorly maintained. The tires on the fire trucks were bald and the 808 miles of forest roads were untended, often with trees growing up in the middle. A USFS team of fire management experts who visited in 2006 found that the use of lookout towers and reconnaissance helicopters was “very effective” in detecting fires. But the city of Kiev would be far better off if firefighters had access to real-time satellite data for spotting fires and monitoring smoke plumes.

Fires in the exclusion zone tend now to stay close to the ground, where the hazard is relatively contained. There’s usually not enough underbrush or other ladder fuels to carry the flames to the treetops. But that’s changing as the forest matures and as insects and disease flourish in crowded stands of Scotch pine. On his laptop, Zibtsev produced an aerial photo of a forest stand pockmarked with purple blemishes. “These are forest patches with root rot from fungus,” he said. As dead trees begin to fall there and saplings grow up in the new openings, it creates a fuel ladder. “When ground fire hits, it could leap up into the crowns.”

With LMS, it becomes practical to keep track of these pockets, along with a daunting assortment of other variables, and to manage them to minimize the risk. It might make sense, for instance, to cut down a stand and create a firebreak. Likewise, the software can point out when all stands in a cluster will reach their fire peak at the same time, enabling foresters to create a break ahead of time and make a crown fire drop down to the ground. “You want to break it up, you want to change fire behavior,” said Ann Camp ’90, a senior lecturer and research

scientist in stand dynamics and forest health at F&ES who has worked on forest fires in the dry landscapes of the American West. “It will still be burning, but you have a chance to fight it. When it’s in the crown, you can’t do much of anything, unless you have airplanes.”

“You need to have a constant dynamic, a mosaic of structures,” said Oliver. “As one stand changes and grows to a new structure, you create another stand that has the old structure. The secret is to put the forests in a condition so that fires don’t get started or don’t have enough fuel to develop in a catastrophic manner.”

At Chernobyl, the variables include all of the ordinary considerations in managing a conventional forest. Experience in the Ukraine suggests, for instance, that fire risk decreases dramatically when hardwoods like birch and aspen make up more than 30 percent of the trees in a stand. As in any forest, thinning out weaker trees would also make for healthier stands, enabling the remaining trees to become thicker and more stable.

But as Oliver, Zibtsev and the others chatted around the computer, the conversation veered into unorthodox territory, like the tendency of plutonium to vaporize at a temperature of 400 degrees Celsius and cesium at 700 degrees Celsius. “That’s not an extreme data point,” said Camp. “In a landscape-scale fire, 400 degrees is a normal temperature.” The radioactive decay rate of these substances also figured largely in the conversation. Cesium-137 has a half-life of just 30 years, meaning that fire management needs to focus mainly on what happens in this century. But with plutonium, which takes 24,000 years to lose half its radioactivity, the challenge will be to minimize fire risk effectively forever.

Why not just cut down the forest, prevent all fires and be done with it? During the five summers Zibtsev worked in the Chernobyl forest, his job was to

collect soil samples and tree parts to track the circulation of cesium, as the radioactivity cycled back and forth between the trees and the soil. “The idea of management there is to not allow the forest to die,” he said, “because when it dies, the cesium migrates into the ground water,” contaminating the drinking supply. Like other workers in the exclusion zone, Zibtsev wore special clothing, including radioactivity tags. Afterward, doctors pronounced him clean and in good health. But he added, “Who knows? That’s the problem with radiation. No threshold. Radiation can impact at low doses or high doses. Nobody can predict.” The one thing everyone accepts is that they don’t want people drinking water contaminated with radiation.

Another complication is that the wood is basically worthless, meaning that there is no self-sustaining source of income for cutting trees to create

firebreaks or for thinning. Some of the less-contaminated tree trunks can serve as props in underground mines. But most may have to be stacked at the site and left to rot. In dry weather, it might be necessary to hose down the stacks periodically as a fire precaution.

“It would be nice to have a shredder,” Ann Camp suggested.

“But you don’t want to breathe the dust,” said Chad Oliver. Material that’s harmless on the skin can be deadly in the lungs.

At that point, after a flurry of activity from the LMS software, McCarter turned around and offered yet another risk-reduction strategy on his computer screen: “Every stand is thinned to 250 trees per acre, and for stands where that still doesn’t decrease the fire risk, you convert to hardwood. Just flip it off, and let birch regrow.” On the screen, the graphs showed three-quarters of the forest at high risk at the start, with as many as 800 trees per acre in neglected stands, and three-quarters at low risk at the end.

Would it work on the ground? To get to that point, LMS will eventually need data on all 40,000 tree stands around Chernobyl. Because there is currently no information on dead and down trees, foresters will also need to visit sample areas throughout the forest and run transects, recording every twig on a series of 50- or 100-meter lines. After that, according to Oliver, it will become relatively easy to investigate different management strategies, with LMS showing how much a given strategy will reduce fire risk and at what cost and then directing people exactly where to go to take action on the ground.

The real objective for now, said Zibtsev, is simply to “open up the situation” so people have a way to think about – and visualize – the possibilities. “We have a lot of information, a lot of scientific monitoring. But we have no tools to do analytic work [using] this information. That is why LMS is useful. It’s not just an

impression, but scientific calculation. My task is to use the simulation to attract the attention of donors, the international community and people responsible for fire issues and radioactive safety.” The next step will be a conference in Kiev this summer among stakeholders and experts to persuade people, said Zibtsev, “that a continuous investment in reducing the hazard would be much better than the alternative.” George Chopivsky, Yale College Class of 1969, has agreed to fund the conference.

Forest management in the exclusion zone currently costs about \$2.2 million annually. No one knows yet how much more it will take to update the basic fire management plan and to undertake the sort of detailed projection of forest structure and health that’s really needed, incorporating questions like biodiversity and radionuclide emissions. Tony Brunello, a member of of the U.S. Forest Service team that visited the site last year, estimated that establishing a satellite receiving station, which would also provide flood warning and other services for the entire country, might cost up to \$1 million. In any case, Brunello suggested, the cost is small relative to what’s at stake.

“Everybody is looking at the sarcophagus of the power plant at Chernobyl. And hardly anybody is thinking about the forests,” said Brunello. Construction has begun on a “New Safe Confinement” to replace the deteriorating 300,000-ton concrete-and-steel tomb placed over reactor number four in the immediate aftermath of the accident. That project, including surrounding infrastructure, will cost upwards of \$900 million. But forest management, now largely forgotten, is the “low-hanging fruit” in the effort to prevent further disasters. A little money there, said Brunello, “would go much further than all the millions we are now pouring into Chernobyl. Nobody’s paying attention, and somebody needs to pay attention to this.” ■



Audit Reveals Logger's Malfeasance and Certification's Weaknesses

By Cathy Shufro

F&ES doctoral student Janette Bulkan had just returned home to Guyana in February 2006 when the World Wildlife Fund (WWF) made a groundbreaking announcement: the group had helped the largest of the Asian-controlled timber companies logging in Guyana to gain certification from the Forest Stewardship Council (FSC). The Barama Company Limited had promised to hew to rigorous international standards for responsible forest management and fair labor practices as it harvested trees in the vast Guyanese rainforest.

The 1.4 million acres covered by the agreement is only a third of the government-owned land on which the Barama Company has a renewable 25-year logging concession. Still, certification by the FSC was an important step forward: this 2,200-square-mile tract would have been the world's largest certified stretch of natural tropical forest.

To announce the agreement, the Barama Company joined the WWF in a ceremony at a hotel in the Guyanese capital of Georgetown. "With this milestone," said WWF Guianas official Patrick Williams, "Barama not only serves as a catalyst for improved forest management systems," but also ensures that "the national patrimony is protected for the benefit of present and future generations." Barama General Manager Girwar Lalaram said that FSC certification "opens the door to new buyers in Europe and North America that demand forest products from well-managed forests."

The word *milestone* seemed legitimate: on a planet that has lost more than half its natural tropical moist forests, the Guiana

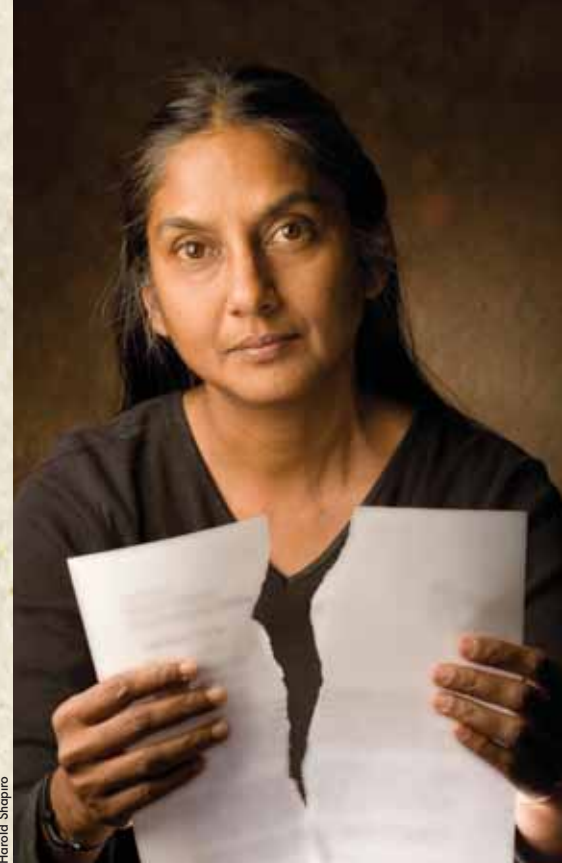
Shield forest is one of only four that remain relatively undisturbed by human activities. (The others are in the Amazon, the Congo and Papua New Guinea.) The United Nations Development Programme had backed efforts to preserve the forests in this emerging democracy, which is east of Venezuela and north of Brazil. Most of Guyana's 750,000 inhabitants live on the coast, and forest covers about 80 percent of the country.

Certification sets standards for a wide range of environmental and social factors, as well as for technical forestry, including

"I thought, 'I have a choice. I can simply plod on with my fieldwork and thesis – the easier road – or I can publicize my findings.' I decided that I didn't just want to be a Yale student."

Janette Bulkan

minimizing erosion and keeping water sources clean; hiring local workers and treating them fairly; and respecting the rights of indigenous forest-dwellers to control harvesting in their traditional territories. The FSC imprimatur should please manufacturers courting conscientious consumers, who would prefer Barama's certified timber to logs (or furniture and flooring) of unknown provenance.



Harold Shapiro

Janette Bulkan called it "a shocking travesty" when the Forest Stewardship Council awarded certification to Barama, an Asian logging company, in March 2006.

This was the sort of agreement that Janette Bulkan had been working toward for years. Before coming to New Haven to study in 2004, she had served as first chair of the Guyana National Initiative for Forest Certification. And yet the certification of Barama angered Bulkan. Her fieldwork in the Guyanese forests and her family's involvement in timber processing had acquainted her with the Barama Company. She said that Barama gave the best-paying jobs to imported Asian workers, not locals; it owed back taxes to the government; it encroached on Amerindian lands; and it cut too many of the most valuable trees, threatening their commercial survival. As Bulkan put it, she knew "something of what was hidden behind the showcase."

Environmental groups, including the WWF, had long criticized the logging practices of Barama's Malaysian parent company, Samling Global. Samling operates the second-largest timber company in Malaysia, and it logs in the Sarawak, one of two Malaysian states on the island of Borneo. The Penan aboriginal people in

Sarawak live mostly off the land in an area that a WWF forester described as “off the biodiversity scale” in its richness. For two years, some of the Penan blockaded the forest that they claimed as theirs. The Penan asserted that loggers had polluted their rivers, causing fish to die, and that sacred sites had been damaged. Police removed the blockade in February 2007, and Samling has brought its bulldozers to the forest.

Given what Bulkan knew about Barama and about Samling’s record, she saw certification as “a shocking travesty.”

last.) The FSC could provide some leverage against such corruption, said Bulkan. “We depend on the FSC to represent and protect social justice, equity, a place at the table for workers and respect for national laws and worker rights. When they would then close their eyes to the egregious behavior of this company, clear violations of FSC principles and criteria, we felt that all hope was lost.”

Bulkan had known the forest since childhood. Although her great-grandparents had come to Guyana from India as indentured sugar cane cutters, their children –

her grandparents – had established a succession of sawmills in rural areas. Bulkan was born in a sawmill compound, and she tells people: “I have sawdust in my veins.”

That sawdust comes from a forest that is home to nearly 800 species of mammals, reptiles, amphibians and fish, including sharp-toothed black caimans, critically endangered trunkback turtles, giant anteaters, anaconda snakes as long as 30 feet, the carnivorous wimple piranha and the 10-foot-long arapaima, and 500 bird species, from the agile crimson topaz hummingbird to the

ungainly and primitive-looking hoatzin – a chicken-sized bird with a blue face and a spiky crest of feathers whose young have claws on their wings.

The Guyanese forest comprises 1,100 species of trees. Commercially desirable species include the greenheart, purple heart, locust and mora, which have exceptionally durable and attractively colored wood that is prized worldwide for decking, flooring and furniture, hence the attraction for Barama and the other international timber companies. Barama was originally

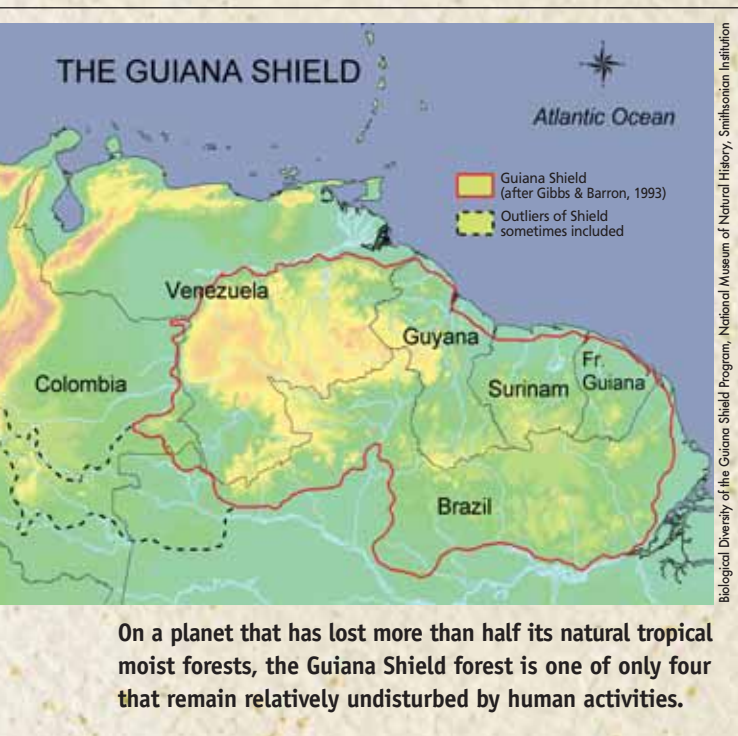
attracted to Guyana for the medium-density baromalli timber to make utility plywood. The wood used for flooring is very dense, because trees grow slowly in the infertile soil that is the product of weathering of Proterozoic rocks. Unless these trees are harvested sustainably, said Bulkan, “this is a world treasure that will be destroyed.”

Bulkan soon realized that even though Barama was certified, she could still play a role in protecting the forest. Because the certification system requires routine audits, an audit could provide a forum for local voices. In early November, the Guyana Citizens’ Initiative invited Bulkan to speak on the issue at the same hotel in Georgetown where the certification had been announced months earlier. About 80 people attended, and the two independent local newspapers reported on the talk.

Bulkan joined with eight other Guyanese activists (including three representatives of the Amerindian Peoples Association, which is the leading indigenous NGO) to press for a meeting with the auditor, a South Africa-based company called SGS Qualifor.

When SGS visited Guyana in late November, Bulkan’s group asked the company to respond to a list of 36 questions and concerns about Barama and the certification process itself. Bulkan’s group also gave the list to the FSC accreditation authority, the Germany-based Accreditation Services International (ASI), which was, in turn, assessing how well SGS was evaluating Barama. That audit found significant problems, and SGS suspended Barama’s certification on January 9. The public summary of the report, issued that same month by ASI, cited nine “major nonconformities” with evaluation procedures.

Bulkan called the suspension of Barama’s certificate “a huge victory.” The process, she said, validated the FSC procedures and pointed out the weaknesses in the application of law and regulation in Guyana. “It will send a signal to local companies in places like Guyana, where civil society is weak and regulatory agencies are corrupt, that you have to do it



On a planet that has lost more than half its natural tropical moist forests, the Guiana Shield forest is one of only four that remain relatively undisturbed by human activities.

She explained that, “in a small place like Guyana, we can only save tropical forests with collaboration from the global North.” Guyana needs such collaborations, she said, in part because corruption is widespread. In its annual surveys of perceptions of corruption by the Germany-based non-profit Transparency International, Guyana does poorly. In its 2006 list that rated countries from least to most corrupt, the group ranked Guyana as 121st among 163 countries. (Finland had the top ranking, the United States was 20th and Haiti was

right. You have to obey the law, regulations and FSC requirements if you want to sell your timber under the label of responsible forest stewardship.”

The ASI report asserts that Barama harvested trees on Amerindian reservations outside its concession without informed consent from the indigenous communities, and that a Barama subcontractor had not paid the Amerindians for wood cut there; that Barama failed to provide workers with basic health care and adequate safety equipment; that it neglected to prepare a public summary of its management plan for more than half the land it controls and lacked required plans to control erosion; and that it improperly disposed of oil and other hazardous waste. The audit gives SGS until June 2007 to correct all the problems. The public summary of the SGS evaluation report has not yet been published, perhaps because SGS has indicated that it will appeal the ASI findings. SGS has not yet responded to the 36 points raised by Bulkan and her colleagues.

Shortly after the suspension was announced, Barama officials wrote to the WWF saying it was committed to correcting problems and restoring certification. Still, the suspension was a setback for the conservation group. “Was the suspension of the Barama certificate disappointing? Yes, to all involved parties, including the CEO of the parent company, Samling, by his own admission,” said Bruce Cabarle ’83, the managing director for the WWF Global Forest Program. “There’s no question that they had done some serious things wrong. Does this mean that all hope is lost? Not yet. The acceptance of the problems and the willingness to address them, by all involved parties, is a source of hope. The FSC system, after all, was designed to find and fix problems.”

Cabarle said that the WWF would push hard to make sure that Barama also agreed to stricter guidelines for logs taken from outside the areas of forest that were certified.

He added that the WWF chose to engage with Barama despite Samling’s

Tackling Forestry’s Biggest Challenges With Talk

By Jackie Fitzpatrick

It starts with a packet of seedlings, a patch of land and unyielding terrain, where it is difficult to farm traditional crops. With the seedlings and an interest-free loan, subsistence farmers from the KwaZulu-Natal Province of South Africa begin to grow trees. The process takes time; the first crop will not be ready for about five to seven years, but the tree growers can rely on experts from Sappi, a global pulp and paper company based in Johannesburg, to help them nurture the trees. Sappi also guarantees a market for the timber. The workers are part of Project Grow, a program that unites private business, non-governmental organizations (NGOs) and people from local communities who are in need of work. Project Grow had three participants at its inception in 1983. Today, more than 9,800 small farmers provide the company with 124,000 tons of timber each year.

Challenges in the region are many. A second phase of the program, creating entrepreneurial opportunities for local people to harvest and transport the timber, has been problematic because of the high cost of equipment and the lack of local access roads. The region is also riddled with high rates of HIV/AIDS and other health problems.

Still, life has improved for the impoverished growers, 80 percent of whom are women. Families have seen their incomes increase, and many have been able to put their children through college. More than 80 families have used the tree income to start other small businesses in the area, and one man built a church for his com-

munity with the money that came from his timber sales.

Last year, 27 representatives of major paper corporations, government, family tree farms, organized labor, forestry concerns, investment firms and NGOs, including conservation groups like The Nature Conservancy, gathered in Richards Bay, South Africa, for a “scoping” dialogue convened by The Forests Dialogue (TFD) to discuss poverty and how it could be ameliorated by the sustainable use of forests. TFD is an ad hoc group of indi-

“You get good people in a room and they start to see each other’s points of view, and they start to see solutions.”

Cassie Phillips

viduals from diverse interests and regions that is committed to the conservation and sustainable use of forests. The Global Institute of Sustainable Forestry at the Yale School of Forestry & Environmental Studies hosts the Secretariat of TFD, according to Executive Director Gary Dunning ’96. The participants in the scoping dialogue heard from a representative from Project Grow, and they visited the small tree farms to see firsthand how the project has helped people in the region.

Reducing poverty through commercial forestry is the most ambitious goal of TFD to date. TFD’s steering committee had addressed other issues in the past,

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including forest certification, illegal logging and the biodiversity of forests, but it kept returning again and again to the questions: “Could poverty be reduced through commercial forestry? If so, how?”

“It’s certainly an ambitious goal and an important one,” said Cassie Phillips, who along with Justin Ward, vice president of business practices at Conservation International, is the co-leader of TFD. Phillips, vice president of sustainable forests and products for Weyerhaeuser, added, “It is the biggest topic we have tried to tackle, and it has gotten a lot of support from many different stakeholders.”

Phillips said having so many divergent points of view in the room “catalyzes people to do things. You get good people in a room and they start to see each other’s points of view, and they start to see solutions.”

For example, during a dialogue in Hong Kong on illegal logging in 2005, the Environmental Investigation Agency screened a video that it had created about how illegal logs from Papua, Indonesia, were ending up in Chinese mills that shipped flooring to the United States and Europe. Dunning said representatives of the Chinese government attending the dialogue saw the film, and a month later the Chinese government shut down every mill in the towns where those logs were being used. “They felt compelled to clean up the supply chain, to keep illegal logs out of the mills,” Dunning said.

Until the TFD was formed, a radical

environmental group that works undercover and the Chinese government would never have attended that kind of forum together. The dialogue gave them the chance to communicate with each other in private, without the press recording their every move.

“Yale is an academic institution with an international presence and a strong program on forests and the environment,” said Dunning. “So it was uniquely equipped to host the neutral Secretariat.”

Dean Gus Speth said that TFD is also a unique teaching tool for graduate students, who research the dialogue topics, write background papers that lead to summary reports and work with the many different constituencies represented at the dialogues. “Yale has a lot of expertise and knowledge to bring to the table in these discussions, but perhaps one of the most compelling reasons that we are involved is for the perfect training ground it provides for our students.”

The TFD went to South Africa, as Phillips and other steering committee members pointed out, to highlight how, in many impoverished communities, forests are “the one resource that they’ve got.” They visited Project Grow and the forestry company Mondi’s programs. They listened to speakers, including Inviolata Chinyangara, who represents the Building and Wood Workers’ International union, and Rosane Monteiro Borges of Aracruz Brazil, who addressed the company’s efforts to use local farmers to grow Eucalyptus trees. They heard from Chris Mkhize of the Uthungulu Community Foundation in

South Africa, who said in a report to the committee that when poverty is extreme, such as in some rural South African communities, “the poor do not have the ability – by themselves – to get out of the mess.” Education and training in commercial

forestry are the keys to relieving poverty there.

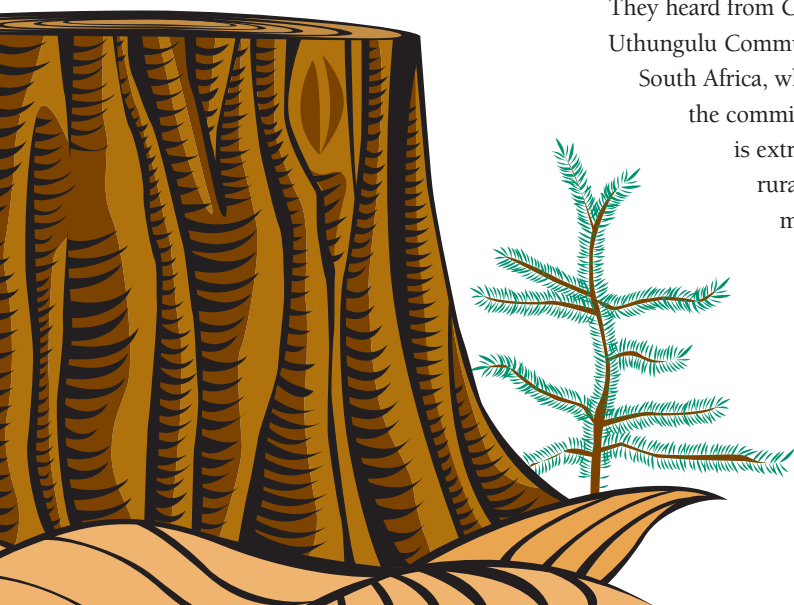
The summary report said the group found that “demand for a wide range of sustainable forest products and ecosystem services, including fiber and wood, conventional nontimber forest products, biomass and green energy, and recreation and biodiversity, presents opportunities for many levels of society, especially the rural poor, to earn sustainable incomes.” At a full dialogue scheduled for June, the invited parties will work to take advantage of these opportunities.

William Ginn, managing director of the Global Forest Partnership of The Nature Conservancy, said, “For us to see the change we want to see in the world, we have to engage with others, especially in the economic sector,” adding that his organization has many important partnerships with industry, including one with Weyerhaeuser that grew out of the dialogues. In 2006, Weyerhaeuser and the Weyerhaeuser Company Foundation pledged a million dollars to The Nature Conservancy, teaming up to develop forest conservation and biodiversity projects in the Northwest and Southeast United States, where the company owns and leases 6.4 million acres of managed forest.

Gerhard Dieterle, the forests advisor of agriculture and rural development for the World Bank, who attended the scoping dialogue, said the World Bank will work to put programs into place after seeing the “visionary approach” of disparate groups working to solve the problems of poverty. The World Bank plans to support more dialogue on poverty and to firm up the role the private sector can play in alleviating it. Current plans include holding a forum in 2008, where heads of corporations and representatives from NGOs will work together to launch a charter and bring their ideas for change to the public.

Bringing a diverse group of stakeholders together has been the hallmark of TFD since its inception in 1999. TFD was created

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Donor's Faith in F&ES and Its Students Results in \$4 Million Gift

By Stacey Stowe

When he was a young man, Gilman Ordway chose the land over law, buying a spread in Wyoming and opening a ranch, rather than pursuing the Colorado bar exam after graduating from law school.

Yet while he maintains a lawyer's penchant for thoughtfulness and order, Ordway's passion is conservation. A steadfast and generous supporter of the Yale School of Forestry & Environmental Studies (F&ES), he has pledged a total of \$4 million for the study center and library that will bear his name on the first floor of the Kroon Hall, the new F&ES home scheduled to be completed in early 2009. The gift is a manifestation of his love of the land and his belief in the importance of sound environmental stewardship.

The gift also represents his faith in the mission of the school. "I am especially impressed with the quality of the graduates that the school produces," said Ordway, Yale College Class of 1947. "And what Gus Speth has done as dean for the environment is just very admirable."

Ordway owns Fish Creek Ranch in Wilson, Wyo., a 382-acre property that includes almost one mile of Fish Creek, with spawning areas for native cutthroat trout. Rustic cabins for vacationers are riverside. The pine-dotted, mountain-framed landscape is home to the bald eagle and great blue heron. Winter brings out the ungulates: moose and deer. A conservation easement held by the Jackson Hole Land Trust, on whose board Ordway sat, protects the ranch in perpetuity.

Ordway has also supported the Yale

Institute for Biospheric Studies, whose focus is research and teaching in the environmental sciences, and he is a member of F&ES' Leadership Council. In addition to the Jackson Hole Land Trust, he has served on almost a dozen boards, including those of The Nature Conservancy, the American Farmland Trust, the World Wildlife Fund and the Wilderness Society.

Ordway is so steeped in environmental causes that it is something of a surprise to learn that he grew up in Manhattan and attended the Buckley School there and the Avon Old Farms Prep School in Avon,

"I am especially impressed with the quality of the graduates that the school produces."

Conn., before coming to Yale. "We weren't particularly outdoorsy," he said, although the family did travel out West. His father was a lawyer for the International Telephone and Telegraph Company. Ordway was born in St. Paul, Minn., where his grandfather was a founder of 3M, and he still has many relatives there whom he visits frequently.

After graduating from Yale, Ordway taught history and French at a private school in Montclair, N.J. In 1952, he enrolled at the University of Colorado Law School in Boulder. During the summers, he would travel with friends, prompting what would become a lifelong affection for the Rocky Mountains and Jackson Hole,



Pablo Mason

Gil Ordway

now a chic ski destination that he described as "a cow town in the '50s."

Ordway was so enamored of the unspoiled landscape that he abandoned his original intent to take the bar exam. His visits to the Western forests and mountains with law school classmates ignited an interest in environmental issues, and he soon found himself immersed in books, such as Rachel Carson's *Silent Spring*, and articles about global warming, the vanishing rainforests and other conservation-related matters.

He bought property in Wyoming, eight miles outside of Jackson, and created a vacation site that was "part cattle and part dude ranch" in close proximity to Grand Teton and Yellowstone national parks.

"It was just so beautiful and relatively underdeveloped," he said. "At that time, there were no condos. Skiing was much smaller."

Today, Fish Creek Ranch is no longer a dude ranch. The trails, where horses carried would-be cowboys, now lead to private homes. The ranch's cabins with kitchenettes are still rented by vacationers or leased by people working in the area.

continued on inside back cover

Third World to Bear Brunt of Global Warming

By Richard Conniff

There was a time when global warming looked like a deeply egalitarian sort of nightmare, promising bad news for everybody on the planet. If you could say nothing else good about it, at least we were in this mess together. But almost any problem can be broken down into costs and benefits, and it now looks as if global warming will be handing them out in a distinctly unfair, if familiar, pattern: The poorest nations on Earth will bear the brunt of the costs. And the wealthiest nations, which are the main source of the problem, will in some cases actually benefit.

That's the discomfiting conclusion of a recent paper in the journal *Environment and Development Economics*. And the decisive factor turns out to be latitude, specifically proximity to the equator.

"One of the things that we were shocked by," says lead author Robert Mendelsohn, Ph.D. '78, Edwin Weyerhaeuser Davis Professor of Forest Policy, "is that basically if you are in the middle to high latitudes, climate change is going to have no effect on you, on net. That is, there are going to be good things and bad things that are going to happen to you, and by and large, if you added them together, you've got no serious consequences.

"But if you go to the low latitudes, they're very dependent on agriculture, and agriculture is going to be harmed by any kind of warming. And it's going to

happen right away, by 2020. What's worse is that these are the poorest countries in the world. So there's this gigantic equity effect that needs to be considered."

Other prominent voices in the global-warming debate have expressed increasing alarm about that possibility. Ian Pearson, Britain's climate change minister, recently warned of an "urgent need" to help developing countries adapt to the impacts of climate change. Indonesia's Environment Minister recently warned of rice shortages due to climate change as early as next year, and predicted that rising sea levels could inundate 2,000 Indonesian islands by 2030. The Pacific Island states recently cited the fear that they will be inundated by rising seas, as an argument for pressuring Australia to accept more guest workers. And Tearfund, a British charity, predicted that there may be up to 200 million

"climate refugees" in developing nations by mid-century.

For Mendelsohn, the disparity of global warming impacts on rich and poor countries became apparent because of a line of research he has been pursuing for more than a decade. It's research that has sometimes gotten him a reputation in the media as an apologist for global warming, beginning with a 1994 article in which he projected that a warmer future might lead to an overall increase in productivity for U.S. agriculture.

Past studies had generally assumed that countries would incur global-warming costs more or less in proportion to their income. So most costs would end up being paid by the largest, wealthiest nations. But in U.S. agriculture, Mendelsohn found that latitude made a huge difference: Farmers in lower-latitude areas that are already relatively warm would do worse if the climate got even warmer. But farmers in middle- to high-latitude areas that are now cool would benefit from warmer temperatures and a longer growing season.

"It was really the first study to show that climate change could be beneficial in some circumstances," says Mendelsohn, who is a natural resources economist. "At that time, the mantra was that climate change would be bad, and that it would be bad for everybody and in every way.

So it was a huge surprise and upsetting to people who were trying to advocate strong policies.” But he adds, “Common sense would tell you that if you’re going to change the climate across the entire world, and all sorts of different things are going to occur, there would be some things that have to get better, in addition to some things getting worse.”

The 1994 paper on U.S. agriculture caught the eye of Ariel Dinar, a natural resources economist at the World Bank. He wondered whether latitude might also affect the distribution of global warming impacts internationally. Dinar and Mendelsohn have been collaborating ever since, with funding from the World Bank and the Global Environment Facility, a United Nations/World Bank program focused on the developing world. Preliminary studies by Dinar and Mendelsohn in India and Brazil seemed to confirm the latitude effect. That is, it seemed as if farmers in low-latitude countries, on either side of the equator, would suffer under global warming, for the simple reason that the climate there is already too hot.

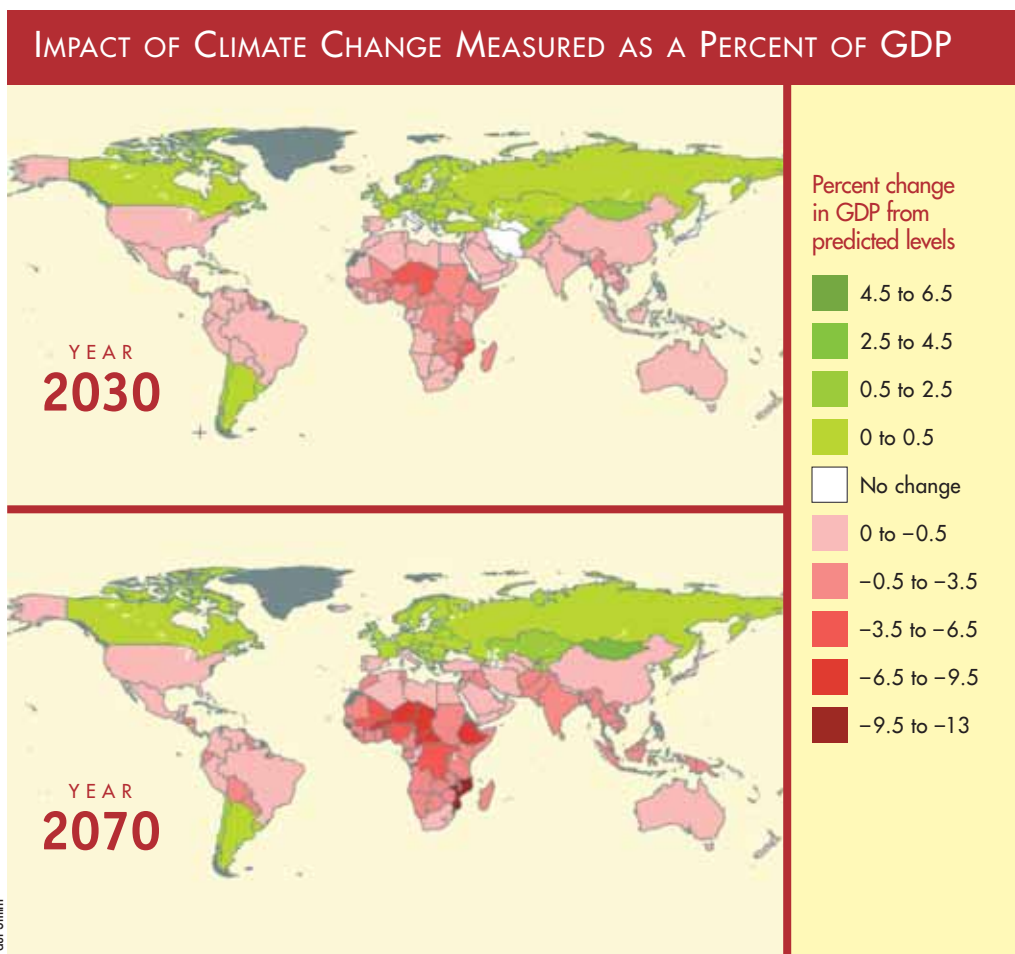
For their current study, Mendelsohn and Dinar, together with Larry Williams of the Electric Power Research Institute, looked at three separate forecasts for global warming in this century, predicting global temperature increases of 2.5, 4.0 and 5.2 degrees Celsius by 2100, along with changes in atmospheric carbon dioxide, precipitation and sea level. (To date, global warming has produced only a 0.5 degree Celsius increase in temperature. But carbon dioxide lingers in the atmosphere for decades or even centuries, with a cumulative heat-trapping effect; hence the forecasts for more dramatic warming in this century.) Then the researchers analyzed how each scenario might affect

different economic sectors from country to country, considering variables like the length of the coastline and the amount of land used for agriculture. The bottom line was an estimate of the aggregate impact for each country.

The researchers put special emphasis on agriculture in part because crops are so vulnerable to climate change. Agriculture also typically accounts for 27 percent of gross domestic product (GDP) and 50 percent of employment in developing countries. (In developed countries, it’s just 5 percent of GDP.) But information on agriculture and climate in Third World nations is often incomplete or unreliable. So the researchers turned to weather

satellites to measure local wetness and temperature. They also devised a questionnaire and collaborated with local research teams to do the legwork of interviewing farmers – more than 10,000 of them in Africa and close to 2,000 in Latin America – typically spending 90 minutes per interview, not counting travel time or social niceties.

The questionnaires didn’t ask about how farmers are currently adapting to climate change, because the effects so far are too subtle. Instead, the aim was to record how farmers from one district to another have adapted to existing climate variations. With that information, the researchers could then project how they



Robert Mendelsohn believes that farmers in low-latitude countries, on either side of the equator, will most likely suffer the most from global warming.

would probably adapt if climate change gave them another district's weather. For instance, if local precipitation decreased by 10 percent or the average temperature went up 2 degrees Celsius, farmers might need to shift from wheat to maize or from maize to millet.

"Climate change is going to happen, and people are going to have to adapt to it," says Mendelsohn. "Earlier studies assumed that people would continue growing a crop that fails year after year, and that would be a disaster. What we're saying is that, no, farmers will switch to crops that will do better. But they will be shifting from high-value crops to lesser-value crops. So there will still be damage." Adapting to global warming will also entail introducing government programs to make irrigation more widely available and to allocate water more efficiently. In areas where snowfall will give way to rain, he says, governments will need to build dams to reduce flooding and store water for summer.

Does Mendelsohn's inclination to view the problem in shades of gray or in terms of costs and benefits risk encouraging a do-nothing approach to global warming? "I never said, 'Do nothing,'" he says. "I said, 'Do modest things.' That is, don't spend too much money on this problem – yet." From an economist's point of view, it makes sense for spending on abatement to increase at a measured rate, in step with the increasing cost of the damage being experienced. But he adds that this modest approach "is not a forecast of what should be done

indefinitely." The optimal strategy "is to have increasingly severe abatement policies over time." Any plan, he says, should also include a mechanism for "quickly, automatically" tightening regulations if the problem turns out to be much worse than expected.

Some critics argue that the peculiar character of global warming makes this go-slow approach risky. Because carbon dioxide accumulates in the atmosphere over such long periods of time, it may be too late to correct the problem once serious damage starts to appear. John Reilly, a senior research scientist at MIT, also worries that economic models of the likely damage "have little to do with what we'll actually see. They do not really anticipate the widespread ecological changes that are likely to occur."

Gary Yohe, a climate economist at Wesleyan University, says the analytic tools Mendelsohn relies on and his

emphasis on adaptation tend to minimize the effects of global warming. In the real world, says Yohe, the "magic" of adaptation sometimes works, and sometimes doesn't. But it's a mistake to regard Mendelsohn as an apologist for global warming, Yohe adds. He's an "honest scientist" asking "rigorous" questions and setting up a useful benchmark. If Mendelsohn sees the

minimum likely impact of global warming increasing, says Yohe, that's cause for everybody to be concerned.

Mendelsohn's idea of "modest" action would still entail a significant change from the status quo. We should currently

be spending \$5 or \$10 per ton of fossil fuels on the abatement of greenhouse gas emissions, he says, either in the form of mandatory emission controls or a carbon tax. In fact, the United States now spends nothing on abatement, and past attempts to impose a fuel tax have met fierce opposition. But he points out that the cost of such a tax would be trivial in the context of the recent run-up in oil prices.

Mendelsohn also suggests that it's time to start talking about a system through which the countries that are causing the problem with their greenhouse gas emissions could compensate the countries that will suffer the damage. "You're getting rich people benefiting from emissions, and poor people being hurt," he says. But the damage will be gradual, subtle and hard to quantify. So it's not going to be possible to say, "You show us the damage, we'll send you a check." Instead, he recommends anticipating the damage and compensating for it in advance, particularly through programs that develop local economies and move people out of vulnerable sectors like agriculture.

Will developed nations step up to pay the bill? Mendelsohn notes that the signatories to the Kyoto Protocol are already struggling with the sacrifices needed to control global warming. As they come to terms with the unequal distribution of costs and benefits from global warming, they may become even less willing to accept the sacrifice. "First World countries have never shown a tremendous interest in the Third World," he says. If people realize "that, more or less, they're not going to get anything out of it and that, in fact, somebody in some very distant country is the primary beneficiary, enthusiasm for abatement may go way down." ■

"You're getting rich people benefiting from emissions, and poor people being hurt."

Robert Mendelsohn



Students Leaving Their Imprint

on the New England Landscape

By Alan Bisbort

Last December in Marsh Hall, 12 members of the Class of 2007 stopped being students for an afternoon and assumed the role of, in the words of Professor Mark Ashton, “apprentice professionals.” That is, these second-year students presented their first land management plans to some noteworthy clients, including a private school whose Yale connections span more than a century and the city of New Haven.

The plans were the culmination of the six-credit capstone course called “Management Plans for Protected Areas,” taught by Ashton ’85, Ph.D. ’90, professor of silviculture and forest ecology, and Thomas Siccama, professor in the practice of forest ecology, and assisted by David Ellum, a doctoral student; Amity Doolittle

’94, Ph.D. ’99, a lecturer in social science and research scientist; Timothy Gregoire ’82, Ph.D. ’85, J.P. Weyerhaeuser Jr. Professor of Forest Management; Ann Camp ’90, a senior lecturer and research scientist in stand dynamics and forest health; John McKenna ’00, GIS specialist and coordinator of certification and extension for the school forests; and David Hobson ’04, manager of school forests.

“It’s called *capstone* because it is a six-credit terminal course that brings together disciplines in the social and natural sciences that a student should have learned,” said Ashton. “With the skills they’ve acquired, they focus on an assessment of a property with its user conflicts and ecological problems and suggest solutions based on gathering and analyzing primary information – *primary* meaning that students obtained as much information as possible from field

and social surveys.”

In short, they did work that F&ES grads-turned-professionals do on a regular basis for nongovernmental organizations, private landowners, land trusts, governments and others. The students formed three four-member consulting teams, and each team was responsible for one plan. The three properties under review were Fairfield/Blum Farm at the Hotchkiss School in Lakeville, Conn.; the William Dudley Preserve in Guilford, Conn.; and Beaver Ponds Park in New Haven.

To create their plans, students compiled land use and zoning histories of their site; mapped it; documented the types of rock, soil, forest, wetland and species (including invasive species) found there; and gave clients recommendations for its future stewardship. Judging by the reactions of those assembled in Marsh Hall, the three plans were successes.

For example, after vowing to implement many of the recommendations, Hotchkiss School representative Rosina Rand said, “We are thankful for the exceptional students who worked for and with us.” Cristin Rich ’88, the school’s environmental consultant, said, “We were so gratified to have these students, because they offered terrific information that we don’t have the manpower to get.”

Greener Pastures for a Friend of Old Blue

Hotchkiss has had a close relationship with Yale since the school’s founding in 1891. The school’s goal from the start was “to prepare young men for Yale” (and, after 1974, young women too). Many Hotchkiss students go on to Yale, and many Yale alumnae sit on the Hotchkiss board of directors. In 1996, the school made a commitment to environmental stewardship, and it now uses 500 acres of woods, wetlands and fields, including Fairfield/Blum Farm, as part of the learning experience.

The management plan was created specifically for the 260-acre farm, which

abuts the Hotchkiss campus and was purchased from the Blum family in 2004. The land is located within the Housatonic River watershed and bordered by Nature Conservancy property (Beeslick Brook Wetland). Christopher Craig, Avery Anderson, Tamara Muruetagoiena and Ariane Lotti created the plan, under the banner CATA Consulting. They surveyed

“We are thankful for the exceptional students who worked for and with us.”

Rosina Rand

the land and worked with the farm’s stakeholders, including faculty, students, the dining hall manager, The Nature Conservancy, the Audubon Society chapter in Sharon and the Fairfield/Blum Farm Committee, which is composed of faculty, staff and consultants and makes decisions about how the farm will be utilized by the school.

CATA Consulting noted that 70 years after the land was cleared for farming, forest has returned to 80 acres of the farm and is broken into two parcels at the north and south ends. A diversity of trees, including the dominant species white pine, maple, ash and cedar, were found, as was “a veritable study in invasive species.” Such introduced species as autumn olive, honeysuckle and multiflora rose have expanded exponentially, overwhelming native species and making the forest at the south end impenetrable; other invasive species (*Phragmites*, purple loosestrife) are also choking the wetlands.

Among CATA’s recommendations were to adopt the invasive-species management plan used by The Nature Conservancy on the adjoining land; set up a 50-foot buffer zone to keep cows from a neighboring

farm from eating native plants and soiling the water; clean up a dump that includes old cars; and create a trail through the forests and a boardwalk over the wetlands for students and birdwatchers. To address the Audubon chapter’s concerns about preserving habitat, the team recommended installing bird houses to increase species diversity and implementing a new mowing regimen in which only one-third of the hayfield would be mowed annually in order to avoid the destruction of habitat that results when the entire hayfield is cut. To curtail the danger of Lyme disease, the deer population would be thinned by hunting.

Because 150 of the 260 acres are still potentially farmable, CATA recommended that Hotchkiss consider a poultry and vegetable farm with a community supported agriculture component – that is, an arrangement in which members of the community pay an annual membership fee to cover the production costs of the farm and, in exchange, receive a weekly share of the harvest during the local growing season. The immediate goals, as presented by CATA, are to get basic information about the farm to all Hotchkiss students, faculty and staff; hire a full-time farm manager who also teaches at the school; and include a farm component in the science curriculum. The farm, CATA concluded, “is important for experiential learning. . . . teaching students where their food comes from, how to work and manage resources and deal with complex issues of the natural world.”

Striking a Balance Between Conservation and Public Use

The second management plan was created for the William Dudley Preserve, a 141-acre parcel that when purchased by the town in 2002 became Guilford’s third-largest open space. The land had been in the Dudley family for 10 generations; in that time, it was both a farm and forest. The students who created the plan, calling themselves the “Hancock Group,” were

Matthew Brewer, Richard Campbell, Todd Gartner and Hannah Murray. The Hancock Group looked at the ecological, aesthetic and historical aspects of the property and conducted species abundance and diversity surveys. They also distributed 70 questionnaires to neighbors and stakeholders of the property to elicit their ideas on how they would like to see the land used. Of these, 44 were returned, indicating an unusually high level of community interest.

Overall, the Dudley Preserve was deemed “a beautiful property in good health.” Its most prominent feature is a wetland created by Munger Brook and two other streams that run through the woods. Two stands of trees, valued at \$115,000, are ready for timber harvesting. However, because of the cost of overstory removal and logistical impediments, the profit realized from harvesting would be negligible. The final recommendation, said Brewer, was to “leave the forest alone; it isn’t broken, so there’s no need to fix it.”

As for the full preserve, the Hancock Group suggested that passive recreational use (hiking, cross-country skiing) would be enhanced if a hiking trail was cut through its most interesting natural features. A proposed trail was mapped, in case the town chooses that option. Hancock evaluated a large (16.5-acre) field for recreational use, suggesting that practices for athletic teams were feasible without the need for permanent structures, but that any more substantial use, such as for horses or athletic league activities, would necessitate building large public parking areas. The survey indicated that stakeholders were vehemently opposed to such construction.

One of the immediate concerns was to curtail the harm being done by all-terrain vehicles (ATV), which enter via a neighboring trail in North Branford. Since enforcement of an ATV ban would be difficult, preventing access to the preserve was suggested. “The only way to keep ATV users out is to put up barriers or to

allow the landscape to be its own prohibitive barrier,” said Brewer, citing his past experience as a steward of a similar property in Colorado.

The Hancock Group also noted the need for a monitoring program for invasive species. The edges of the property are already dominated by autumn olive, though the most harmful invasive species found was garlic mustard, which kills soil microbes essential to healthy tree growth and has a long growing season. The Hancock Group recommended hand-pulling it or using an herbicide, such as Roundup, to eradicate it. The second most harmful invasive species is Oriental bittersweet, which grows into the tree canopy, making it top-heavy and susceptible to the destructive weight of snow and ice.

Members of the Guilford Conservation Commission who attended the Marsh Hall presentation expressed their appreciation for Hancock’s “striking a balance” between conservation and public access.

One Urban Park With Many Stakeholders

The third management plan, for Beaver Ponds Park in New Haven, was created by Roderick Bates, Margaret Carmalt, Rachelle Gould and Krishna Roka.

This site presented challenges not faced by the other two, as it has what Mark Ashton called a “huge social and ecological context.” The park is located in a densely urban spot midway between the city’s signature ridges, East Rock and West Rock, adjoining two neighborhoods, a police academy and several schools. It includes 86 acres of natural areas and 21 acres of playing fields. The park’s core – most actively used by the public – is a 1.5-acre manicured area.

Beaver Ponds Park, the team concluded, is vital to the life of New Haven. Since its creation as a park in 1893, it has provided “connectivity” socially, as part of two distinct neighborhoods, and ecologically, as a conduit through which much of a 1,200-acre watershed’s stormwater drains. It purifies water, enhances habitat and provides education and recreation to city residents.

Despite its urban surroundings, the park has eight vegetation zones, including a 6-acre forest along Sherman Avenue, with impressive stands of oak and maple. The forest has wildlife value, its snags providing habitat for woodchucks and salamanders. The team noticed that the water table has risen in recent years, slowing tree growth but enhancing a unique 7-acre red maple swamp, a model riparian zone for turtles.

There is another cattail marsh on one-third of an acre, though *Phragmites* have moved into it.

The team walked the area to get input from park neighbors and noted five issues of importance to stakeholders: conservation, human use (e.g., hiking), wildlife, activities for children and recreational use (e.g., sporting events, ATV use). The most immediate concern was the police academy’s firing range, which abuts the park, obstructs access and startles residents with the popping of discharging ordnance. Another concern was the trash that collects in the ponds. To address these and other issues, the Yale team organized a forum after its Marsh Hall presentation to which all parties were invited. A group called Friends of Beaver Ponds Park drew the largest contingent, many of whom came to Marsh Hall for the management plan presentation.

The team organized its recommendations by category.

Hydrology: If nothing is done, the ponds will silt in eventually, leaving no marsh and no ponds. The city could dredge 10 acres of the ponds to make it better for fishing and boating, at a cost of \$4 million. Or, it could drain the ponds, take away the dam that created them and allow the area to revert to a system of streams and a healthy marsh. The team favored the latter idea.

Invasive species: The Norway maple and euonymous should be removed, and the area should be replanted with native species like pokeberry. The city should also apply for the state *Phragmites* removal program through the Department of Environmental Protection.

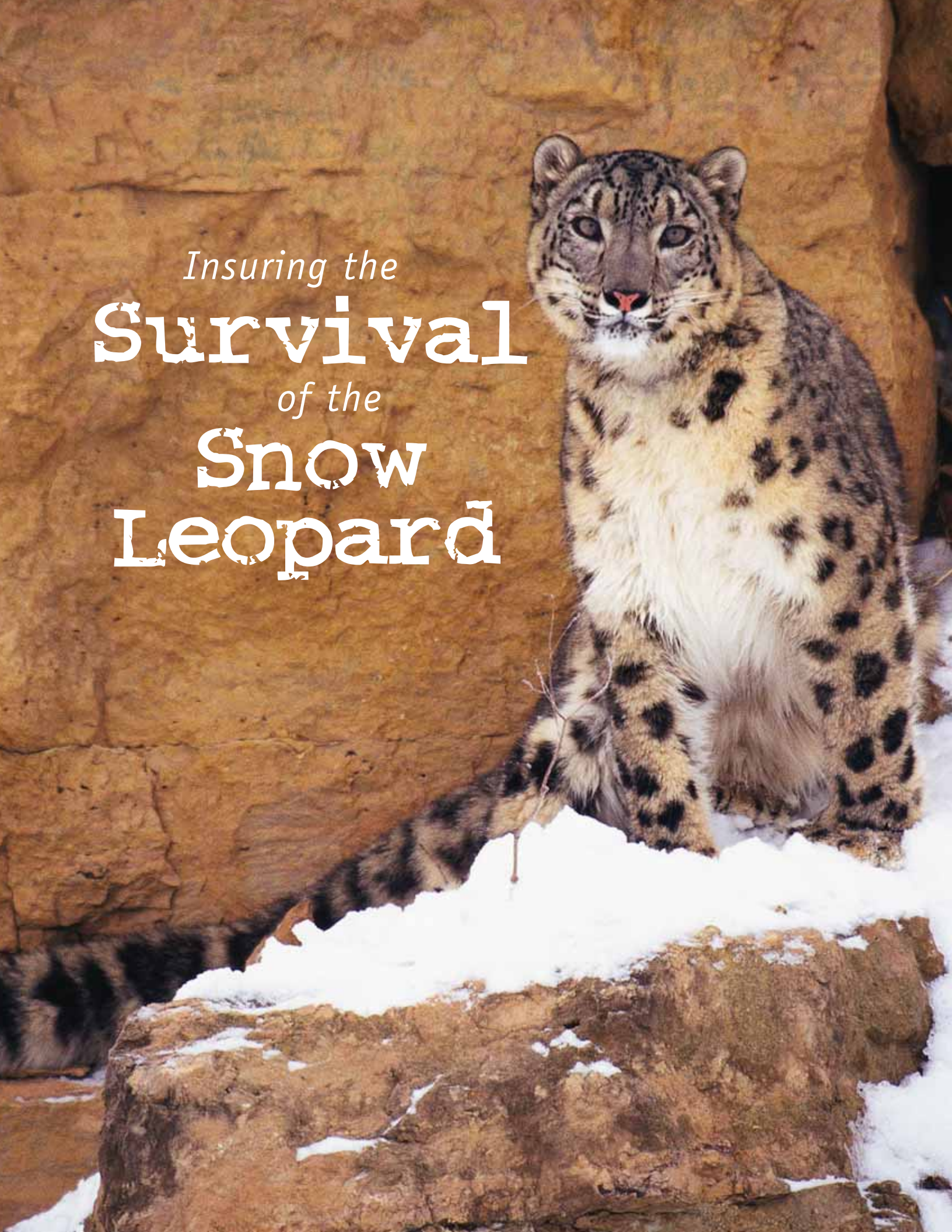
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Red flags mark a trail proposed by students in the Dudley Preserve in Guilford, Conn. The trail will maintain the three most popular uses of the preserve – hiking, walking and cross-country skiing – while limiting its accessibility to all-terrain vehicles.



Hannah Murray

Insuring the
Survival
of the
Snow
Leopard





By Heather Millar

When he first came across a paw print of a snow leopard, Shafqat Hussain was hiking high above the tree line in what's often called "Little Tibet," the Baltistan region of Pakistan's Northern Areas near Kashmir. The track, large and wide like the snowshoes used to manage the snows of Central Asia's high peaks, was but a few hours old. Hussain bent down to press his face to the indentation.

"I still don't know why I did it," says Hussain, an economist-turned-environmental-activist who is a Ph.D. candidate at F&ES and in the anthropology department. "I just got this wonderful feeling, to connect, to see that 'Oh, this animal was right here.' The snow leopard has a mythical feel to it."

Generations from now, people may still be able to have that sort of experience, thanks in part to an inventive insurance program Hussain designed to protect the cats, which have been on the World Conservation Union (IUCN) list of endangered species since 1972. The plan seeks to discourage villagers from killing snow leopards that occasionally attack their herds. Many studies have concluded that these retaliatory killings of snow leopards remain one of the greatest threats to the survival of the species in the wild.

Last October, Rolex SA, the Swiss watch company, recognized Hussain's Project Snow Leopard as truly innovative, naming him one of five associate laureates of the Rolex Awards for Enterprise. The awards, presented every other year since 1976, recognize and support pioneering work that advances human knowledge and well-being. The 2006 awards committee picked Hussain's project from a pool of 1,671 entries from 117 countries, also granting him \$50,000 to continue his work. Five laureates received \$100,000 awards.

Left, a snow leopard in captivity.

"Shafqat Hussain's project deserves support, because it touches a worldwide issue – predators versus human attempts to preserve their livestock," says Mark Shuttleworth, a South African technology entrepreneur and one of the 2006 Rolex judges.

As they roam the forbidding peaks of Central Asia, snow leopards face threats from many fronts. Though trade in snow leopards is banned by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, their pelts bring high prices on the black market, often equivalent to an entire year's income for a mountain villager. In booming East Asia, their various body parts are increasingly prized as ingredients for traditional medicines. At the same time, subsistence herders with growing families push their animals higher and higher up the mountain slopes to find more forage for their flocks. This has the effect of taking food away from wild prey species like blue sheep (bharal).

As wild prey populations decrease, leopards sometimes have no choice but to venture down from their mountaintops to hunt at village elevations, especially in winter when food is scarce. Occasionally, a leopard will get into a pen and become frenzied, killing dozens of animals at once. Understandably, these losses enrage villagers, who live close to the edge both physically and economically and for whom the taking of even one goat or sheep is a devastating blow.

Around the world, various insurance schemes have attempted to insure locals against livestock killings by endangered predators like lions

and snow leopards, with little long-term success. "There's a history of insurance programs failing," explains Brad Rutherford, executive director of the Seattle-based International Snow Leopard Trust.

"Typically, they're set up by the government, underfunded and undermonitored. Soon there are too many claims and not enough money. Then the program goes bust, and villagers end up being even more angry at the animal you're trying to protect."

To try to move beyond this flawed dynamic, Hussain hit upon an original, two-pronged strategy: first, he set up a village-administered, livestock co-insurance arrangement that discourages fraud; then, he linked the insurance system to a snow leopard ecotourism venture. The pooled money from locals, plus income from the tourists, helps make the program self-sustaining. In good years, the funds may even support community improvement projects like building wells and upgrading sheep corrals.



Shafqat Hussain's Project Snow Leopard was introduced near Skardu and his doctoral research takes place near Gilgit. Both towns are located in the Northern Areas of Pakistan.



Thierry Grobet

Shafqat Hussain, second from right, talks to the members of the Hushey community in the Baltistan region of northern Pakistan about his insurance program and their views about the conflict between snow leopards and humans.

“We got all the villagers to participate,” Hussain explains. “And we’ve had no complaints that losses were not verified or that claims have been fraudulent.”

Project Snow Leopard has been so successful in the villages of the Skoyo and Basha valleys, where it has been instituted, that Hussain is fielding inquiries from all over the world. He juggles these calls while also finishing his thesis at F&ES, writing an historical analysis of the changing conception of nature and society in the Hunza region. Organizations in India, Nepal and Mongolia are either cooperating with Project Snow Leopard or starting their own programs modeled on his approach.

The snow leopard, if you can catch a glimpse of one, is a graceful predator, with a luminous soft grey coat marked with rosettes of black on brown and a long tail that helps it to balance and also doubles as a muffler in bitter weather. A bridge species between smaller felines like bobcats and great cats like lions and tigers, the leopard rules at the top of the food chain in the mountain ecosystems that include famous peaks like K2 and Mount Everest.

No one’s sure exactly how many snow leopards (*Uncia uncia*) remain in the wild. The accepted estimates range from 3,000 to 7,000. Only two population studies of the animals in Pakistan have ever been attempted – one in 1974 by noted biologist George Schaller (now director of science for the Bronx Zoo-based Wildlife Conservation Society) and another by Hussain in 2003.

Most scientists believe that the snow leopard’s numbers are decreasing mainly because of poaching and reprisals from locals. That’s difficult to prove definitively, though, since populations are estimated by indirect evidence, such as tracks, interviews with locals and the remains of kills.

The cat is so reclusive and hard to track that it has taken on an aura of myth. Only two Westerners have seen snow

“Shafqat Hussain’s project deserves support, because it touches a worldwide issue – predators versus human attempts to preserve their livestock.”

Mark Shuttleworth

leopards in the wild since 1950. Author Peter Matthiessen wandered around the Himalayas with Schaller for a year hoping to see one. He ended up with a famous book, *The Snow Leopard*, but never set eyes on the object of his search.

“It’s so incredibly rarely seen, so elusive,” says Rodney Jackson, founder and director of the Snow Leopard Conservancy, based in Sonoma, Calif. “But if you protect a few snow leopards, you also protect everything in their large habitat – the plants, the mammals, everything.”

Hussain, who grew up the son of a civil servant in Lahore, Pakistan, didn’t set out to crusade for the snow leopard. He came to the United States to study economics at Indiana University of Pennsylvania. After graduation, he returned to Pakistan to work in the Northern Areas for the Aga Khan Rural Support Program (AKRSP). He lived in Skardu, a town of 50,000 that mountaineers and trekkers use as a staging area for expeditions to the many 26,000-foot peaks in the nearby Western Himalaya, Hindu Kush and Karakorum ranges. In addition to tourism, the local economy depends on the production and trade of dried apricots, walnuts and almonds.

AKRSP, Hussain says, focused on small infrastructure projects that would increase agricultural productivity: better water channels, better varieties of seeds, better farming practices. Hussain worked as a monitoring and evaluation officer, traveling through the region and judging the success of various programs. “My job was to go out in the field and talk to villagers,” Hussain says. “I would get their feedback, ask them whether programs were working or not. Villagers often complained about the depredations of wild animals. But our work had nothing to do with that.”

At the same time, in the late 1990s, the IUCN began a multimillion-dollar, seven-year project to conserve wildlife in the area. In concert with the wildlife department of the Northern Areas region, the IUCN focused on large ungulates, like the Himalayan ibex (*Capra ibex sibirica*), markhor (*Capra falconeri*) and a local species of wild goat. The goal was to blend conservation with a trophy-hunting program that would show locals the value of



saving these species.

That was great for the public appreciation of these wild grazing animals, Hussain noticed, but not so great for the snow leopard. As Hussain traveled through the stone, mud and wood villages of this dry, remote region, he kept hearing that locals were amazed by how much foreign trophy hunters would pay: up to \$5,000 to bag an ibex and up to \$50,000 for a markhor.

“Of course, if a snow leopard killed one, the villagers got nothing,” Hussain explains. “The villagers said, ‘This animal kills not only our goats but these precious animals, the ibex and markhor.’ They started persecuting the snow leopard. Of course, it was illegal. But in those remote regions, who’s going to know? I asked the villagers about the snow leopard. They said, ‘We have nothing against it, but if it attacks our goats, we lose a substantial part of our livelihood. If someone compensated us for our loss, then we would leave the leopard alone.’”

Hussain tried to get conservation and development groups to incorporate the snow leopard into their plans, but he got nowhere. Then, in 1998, he got a grant from the London-based Whitley Fund for Nature at the Royal Geographical Society. That money allowed him to start Project Snow Leopard the same year. He chose to focus on the Skoyo valley, where about 400 Balti people carve out a living, tilling fields and orchards in the valley and herding goats and sheep on the nearby mountain slopes, which are also ideal snow leopard habitat.

Hussain consulted with the villagers, and together they devised a locally supported insurance plan. “We asked the villagers to pay a small annual premium for livestock, 15 rupees, about 1 percent of

the value of the goat. Each year, the village loses 1 to 2 percent of the herd from snow leopard attacks. When we told them that Project Snow Leopard would also chip in money, they all agreed. Villagers administer the funds and investigate claims.”

With input from the villagers, Hussain designed clever checks and balances to discourage cheating and encourage cooperation. The Village Insurance Committee rotates membership every two years, so that no one family or person can dominate. All the premium money goes into a pot called “Fund 1,” where each villager’s contributions are recorded and kept separate. Meanwhile, Hussain founded an ecotourism company, Full Moon Night Trekking, to market snow leopard treks. A portion of the money from that venture – 70,000 Pakistani rupees, or \$1,151, in 2007 – goes into another pot, called “Fund 2.” All the money in Fund 2 is held in common by the village. The trekking company also employs two villagers as guides.

If a villager loses a goat to a snow leopard, the system springs into action this

way: “First villagers have to verify the kill and the value of the animal. Then they look to Fund 1 and see how much that person has contributed. The person first gets reimbursed from his own contributions. If he’s put in 300 rupees, he gets back those 300 rupees. The balance, if any, of the value of the lost animal comes from Fund 2, which everyone owns in common,” Hussain explains.

“It’s a psychological thing,” he continues. “The villagers monitor each other. It’s not in their interest to verify a fraudulent claim, because they would have to draw from Fund 2. They would not want to do that, because they’d be making someone rich by making themselves poor.”

Word of Hussain’s insurance plan has spread through the mountains, and he’s gotten lots of inquiries from village leaders. “We got so much enthusiasm from the villages, but we didn’t have the resources and manpower to expand,” Hussain says. With the Rolex award money, Project Snow Leopard can expand into six more

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Hussain called this photograph of a snow leopard eating a dead goat “remarkable,” given the elusiveness of the species. The photograph was taken by a remote camera in the Hushey village.



class notes



1942 **65th Reunion Year**

1946

Class Secretaries

Paul Burns

pyburns@lycos.com

David Smith

david.m.smith@yale.edu

Paul Burns, Ph.D. '49, is still up to winning medals in the 85-to-89 age class of the Louisiana Senior Olympics, as well as to being active in community affairs in Baton Rouge. He writes: "In January 2007, I was pleased to serve as one of the local hosts of the Yale Glee Club. This group of 65 singers was taking a midwinter tour in the South, and they performed at a church in Baton Rouge the night of January 6. I took in three young men for the night – after they sang. Although I have heard the Whiffenpoofs sing, this was my first time at a Yale Glee Club performance. They were excellent, and I noticed that there were women in the group. They led off with "Gaudemus igitur," one of my favorites. They each left an eloquent thank-you note on the pillow Sunday morning. I learned that one of them had the surname 'Yoder,' which is my middle name and the surname of Clara Yoder, my mother's mother. The Yoder student came from Partridge, Kan., in an area where several Yoders related to me reside. I told this young man that in the South this possible relationship permits each of us to call the other 'Cuz.' There are only four of us still alive in the F&ES Class of '46: Dave Smith, Ph.D. '50, Cliff Bryden, C. Don Maus and me. Bob 'Bamber' Marshall also took classes with us while we were at Yale."

1947 **60th Reunion Year**

Class Secretary

Evert Johnson

swede-doc@mindspring.com

1948

Class Secretary

Francis Clifton

fhcpbyfor@webtv.net

On February 2, Francis Clifton wrote from DeLand, Fla.: "The tornados missed me by a mile. No damage in immediate area. Everything OK with me."

1950

Class Secretary

Kenneth Carvell

kencarvell@aol.com

1951

Class Secretary

Peter Arnold

arnoldp@nccn.net

Ben Bryant, D.F. '51, founder and CEO of Appropriate Technology Briquettes, writes: "The concept of making briquettes from fibrous material evolved from a research grant I obtained while a professor of wood utilization technology at the University of Washington College of Forest Resources. Having worked as a consultant in more than 22 developing countries during my 38 years at UW, I became keenly aware that the greatest single use of wood in the world is for firewood and charcoal. The shortage of fuel wood has reached crisis proportions in many semiarid and wood-deficient countries. Where population growth has exceeded economic growth, overcutting of trees has created social, ecological and environmental conditions that adversely affect the livelihood of about 500 million disenfranchised rural and urban poor families." Ben has supported the work of Richard Stanley in adapting the briquetting process to the cultures and traditions of developing nations in Africa, Latin America, India, Sri Lanka, Nepal and elsewhere. By working as a catalyst, strategist and publicist, he hopes to help alleviate the fuel wood crisis and the ecological damage caused by unsustainable tree-cutting.

1952 **55th Reunion Year**

Class Secretary

Milton Hartley

redheded@olympus.net

1953

Class Secretary

Stanley Goodrich

slgmyg.good@quest.net

1954

Class Secretary

Richard Chase

rachase@aol.com

Dick Chase writes: "Finally I have had a full year of retirement after a challenging and diverse 40-year career

with the U.S. Forest Service, followed by a dozen years part-time with a small consulting firm assisting federal and state agencies with fire management planning and budget analysis. My wife and I now live in the Piedmont of North Carolina, where we can dote on grandchildren and I can enjoy unlimited golf." ■ Jack Mullholland writes:

"After graduation, I spent the next 34 years working in the panel manufacturing area of the waste wood industry – primarily hardboard. I retired in May 1989 and spent the next 10 years consulting in the United States, Canada and New Zealand. I am still married to my high school sweetheart; we have lived in Barrington, Ill., for 38 years, and we are still in touch with Barbara and Bob Bond '52, with whom I shared the bathroom while at Yale. Since 1999, I have been taking it easy, traveling, working with our church and visiting our grandchildren. (We just returned from California to see our grandson play high school basketball – he was voted MVP in his league.) Life is good."

1956

Class Secretary

Jack Rose

jackarose@sbcglobal.net

Jack Rose writes: "I am no longer skiing or cross-country hiking, which has something to do with having had three lower-back surgeries. I intend to drive this fall from my Sun Valley, Idaho, home to Winthrop, Wash., for the reunion of Smokejumpers from 1950."

1957 **50th Reunion Year**

1958

Class Secretary

Ernest Kurmes

ernest.kurmes@nau.edu

Doogie Darling writes: "I have published a 68-page booklet, *A History of the Mills, Logging Camps, and Early Forestry Operations of The Crossett Lumber Company*. It is a compilation of photographs, maps and interviews with oldtimers, and it traces the movement of logging camps in the virgin timber days. It also addresses the beginning of the world-renowned forestry program by Crossett Lumber Company. The Yale School of Forestry was deeply involved in this, and a lot of alumni came through the Yale camp during the 21 years it was active here.

Some, like me, worked most or all of their careers at Crossett or at the sister company, Fordyce Lumber Company. **Herb Winer '49, Ph.D. '56**, of course, came to this Yale camp for five-week periods for a number of years to teach harvesting and manufacture of the timber. **Dave Smith '46, Ph.D. '50**, was here in the original Yale class at Crossett and is familiar with the whole operation. **Don Bragg, Ph.D.**, the manager of the Crossett Experimental Forest for the U. S. Forest Service, was interested in my paper and has redrafted it for submission to *The Arkansas Historical Quarterly*, a publication of the Arkansas Historical Commission."

1959

Class Secretary

Hans Bergey
hberg16@aol.com

1960

Class Secretary

John Hamner
jhamner1@bellsouth.net

Gregory Brown was elected a fellow of the Society of American Foresters in the 2007 elections, as reported in the society's newsletter, *The Forestry Source*.

1961

Class Secretary

Roger Graham

1962 45th Reunion Year

Class Secretary

Lary Safford
lsaffordnh@earthlink.net

1963

Class Secretary

James Boyle
forsol40@comcast.net

1964

Frank Bock writes: "I had a delightful New Year's celebration with the Rev. **Gary Steber** in Mobile (Ala.) and did a lot of reminiscing!" ■ **George Nagle, Ph.D. '70**, writes: "Mary and I are retired and live in Summerland, B.C., and spend winters in Palm Springs. Our sons, David and Geoff, young mascots of the 1965 Yale camp, are working out of Whistler and West Vancouver, B.C. David's two kids are rushing into teenhood; Geoff's three are 7, 9 and 11 years old." nawitka@aol.com

1965

Class Secretary

James Howard
jhoward@sfasu.edu

1966

Class Secretary

Howard Dickinson Jr.

1967 40th Reunion Year

Class Secretary:

Robert Hintze
bclues@aol.com

Robert Hintze writes: "The Yale Tree Things' gathered for a class reunion and visit at Pete and Jan Ludwig's new home in Newport, R.I., during the last weekend of August. Among those attending were Elise and Gordon Enk '70, Ph.D. '75; Penny and Reg Elwell; Sue and Brad Wyman; Wyllis Terry and good friend Marianne; and Barbara and I. We got caught up and recalled our great moments with Professors Smith, Lutz, Worrell and others."

■ **Brad Wyman** was elected a fellow of the Society of American Foresters in the 2007 elections, as reported in the society's newsletter, *The Forestry Source*.

1968

Class Secretary

Gerald Gagne
gerald.gagne@sympatico.ca

1969

Class Secretary

Davis Cherington
cheringvt@aol.com

1970

Class Secretary

Whitney Beals
wbeals@newenglandforestry.org

Bill Lansing retired in April 2006 from being in charge of management of forests, mills and other operations of Menasha Corp. in the Coos Bay area of Oregon. He is busy writing about local history. He is on the corporate boards of a bank and a timber company and chair of an energy company, traveling to various parts of the country.

1971

Class Secretary

Harold Nygren
trnygren@juno.com

1972 35th Reunion Year

Class Secretary

Ruth Hamilton Allen
ruth.allen@aehinstitute.com

1973

Roy Deitchman writes: "I am vice president of environmental health and safety at Amtrak in Washington, D.C. Recently, we have been working on projects to find more efficient diesel locomotives, including conducting a trial on a diesel hybrid switcher engine and installing automatic start-stop devices on locomotives to limit idling; restoring seven wetland areas in Connecticut by improving water flows through railroad culverts; and reducing PCB discharges from historic contamination at railyards. We were very pleased to host two F&ES students in January during the job fair in D.C., and were impressed by their description of course work and activities at the school."

1975

Carol Harlow writes: "My life and work have taken a number of turns that have included project manager work in renewable energy in the Philippines for USAID; service as an internal environmental advocate within a major electric utility company; and several years as an independent consultant, the high point of which was a major advisory project with the government of Brazil involving their bioenergy program and the problem they then faced in dealing with Daniel Ludwig's 'Projeto Jari' in the Amazon Basin. I also spent nearly a decade during the 1990s in the Foreign Service, with postings in Washington, Paris, Manila, Yokohama and Sapporo. I'm now with Dartmouth's Thayer School of Engineering, representing the school to its 'leadership' constituency in the United States and abroad. I'm married to Dr. Jerry Lineback, a consulting environmental geologist. My two children, Nicholas and Jonathan Harlow, graduated from Milton Academy and Stanford, and Exeter and Harvard, respectively."

■ **Suzanne Reed** writes: "On January 4, I started working on the Center for Clean Air Policy's (CCAP) California Anchor for Domestic Climate Change Policy. My focus is assisting in the implementation of California climate-change policy, specifically the development of programs and regulations to

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School of Forestry
& Environmental
Studies website at
environment.yale.edu



reach the greenhouse gas emission reduction goals established by legislation enacted this year. CCAAP is an environmental think tank that has a substantial presence in national and international activities related to climate-change policy.”

1977 30th Reunion Year

Class Secretary:

James Guldin
jguldin@prodigy.net

Dave Hall writes: “My son, Brooks, and I visited **Bill Hanson** and **Kate Troll** in Juneau, Alaska, in August. Along with flyfishing for salmon, we kayaked to the face of Mendenhall Glacier, watched humpback whales bubble netting and fished in Bill’s skiff. Our family also rented Bill and Kate’s house on the Yucatan Peninsula in Mexico earlier in the year.”

1978

Class Secretaries:

Susan Curman
curman@brandeis.edu
Marie Magleby
lomamag@aol.com
Regina Rochefort
regina_rochefort@nps.gov

Bob Gipe and his wife, Betsy; **Tom Rumpf** and his wife, **Loring (LaBarbera)** and **Andy Schwarz**; and **Kate Troll** ’77 and **Bill Hanson** ’77 are on schedule for the Second Western F&ES Class Reunion in Turkey this spring. After touring Istanbul and the Aegean coast, they will then charter a sailboat and sail for a week under the steady helm of designated Captain Gipe (erstwhile member of the U.S. Navy). ■ **Nickie (Dominique) Irvine** writes: “I set down roots in the Bay Area after getting my Ph.D. in anthropology from Stanford 20 years ago. I’ve combined working with nonprofits with teaching anthropology at Stanford. After working with indigenous federations in the Amazon setting up forest management programs, I helped to found the Forest Stewardship Council and put in many, many years of my life on that! I’m currently contemplating a research project on people living with redwoods in the Bay Area (using an historical ecology/land use change approach), so if any of you have suggestions or interest in that or could share contacts, I’d be very grateful.” ■ **Tom Kuekes** is district ranger of the Mt. Pinos District, Los

Padres National Forest. In May 2006, he was named Ranger of the Year for the Forest Service’s Pacific Southwest Region. Fire season in Tom’s district began with a vengeance last June and culminated in October with the 163,000-acre Day fire. At its peak, more than 4,500 firefighters and 40 aircraft engaged in suppression efforts. He is proud and grateful that every firefighter got to go home safely.

■ **Michael Rees** writes: “I’ve been working as a planner at the Denver Service Center for some 16 years now. I’m working on a variety of projects, including general management plans for Channel Islands National Park (California), Chickasaw National Recreation Area (Oklahoma), John Day Fossil Beds National Monument (Oregon), Apostle Islands National Lakeshore (Wisconsin – with Superintendent **Bob Krumenaker** ’82), a wilderness management plan for Lake Mead National Recreation Area and an EIS on restoring natural quiet to the Grand Canyon.” ■ **Tom Rumpf** and his wife, Annee, recently moved to Brunswick, Maine, to do their part to lower their carbon footprint. They now walk to stores, restaurants and shops, and Tom walks or rides his bike to work at The Nature Conservancy. Tom continues to work on large projects, like the Penobscot River Restoration Project to restore 1,000 miles of diadramous fish habitat by taking out three dams on the Penobscot. He’s also working on the controversial Plum Creek Moosehead Project, where TNC led a partnership with AMC and the Forest Society of Maine to negotiate a voluntary agreement with Plum Creek to protect over 400,000 acres of forestland around Moosehead Lake through the so-called Conservation Framework agreement. ■ **Andy Schwarz** writes: “Greetings from Sudbury, Mass. **Loring (LaBarbera) Schwarz** and I have been living here for 15 years since moving from Washington, D.C. Loring is the deputy director of the Massachusetts Office of The Nature Conservancy, and has been with the organization for most of the time since we left Yale. Over that time, she has worn many hats, including that of director of the National Heritage Program and of TNC’s Caribbean Program. She has spent time in Italy learning the language and re-establishing roots. This spring she is

taking some time off to work on some TNC and World Wildlife Fund projects in Rome. I have been working for the past 13 years for Industrial Economics, an environmental and economic consulting firm in Cambridge, Mass. There are a number of F&ES alumnae on staff here, and several of our research analysts attend the school after leaving here. We have two kids who have largely flown the coop. Our daughter, Devin, lives in New York City and is an events planner for Morgan Stanley, and our son, Ted, is a senior at Colgate. We keep in touch with a number of F&ES folks, including **Ed Becker**, **Phil Hoose** ’77, **Pam Kohlberg** ’77 and **Tim Glidden** ’77. Last summer I took a two-week canoe trip in Alaska with my son, **Chuck Hewett** ’77, Ph.D. ’82, and Jackie Kennedy. I look forward this spring to the Aegean cruise with Bob Gipe and crew. Preferring terra firma, I remain somewhat ambivalent, but all are looking forward to the adventure.” ■ **Luke Umeh** has retired from the African Development Bank.

1979

Class Secretary:

John Carey
carey@aya.yale.edu

1980

Class Secretary:

Sara Schreiner-Kendall
sara.kendall@weyerhaeuser.com

Susan (Suey) Braatz moved back to FAO headquarters in Rome in January after being based for 15 months in Bangkok as program coordinator of a regional forestry project for rehabilitation in the Asian countries affected by the 2004 tsunami. She is now the forests and climate change officer at FAO. ■ **Star Childs** writes: “Last fall, I accepted the position of chair of the external advisory board of the Global Institute of Sustainable Forestry at F&ES!” ■ **Ellie Lathrop** writes: “I changed jobs in 2006, though I remain in the same Weyerhaeuser organization. I now manage our commercial thinning program, which is quite large, as many of the replanted stands within the Mount St. Helens blast zone are growing into thinning age. I do the stand selection and permitting, and manage the contractors who actually thin out the trees. It is a great combination of silvicultural stand improvement and pro-

duction, i.e., making money. I was happy to shed my land use functions after 14 years and do something new. On the home front, come this September, Al and I will be empty-nesters, when our son joins his older sister at college, likely somewhere in the Northwest. We'll be able to devote even more time to our main nonwork pursuit – golf.” ■ **Peter Lewis** writes: “I had the good pleasure of escorting **Kent Olson** (Ollie) around Yosemite National Park last summer. The last time our paths crossed in that magnificent landscape was right after Mount St. Helens blew 26 years ago, and he had brought me a jar of fresh volcanic ash as a gift. This time the gift was his good humor, a glass of gin and an enduring friendship. Ollie was on contract with the Yosemite Fund, helping them raise millions for a Trail Restoration Capital Campaign, and I was visiting with a pair of CCC trail crews that I had sent there to repair winter storm damage.” ■ **Patricia Millet** writes: “I’m still working as a silviculturist for the Forest Service, but I am looking at a potential career change, possibly becoming an entrepreneur in Cape Breton – absolutely fell in love with the place on a visit there. Nathan is 22 and studying environmental engineering at Humboldt State, has worked seven seasons for the Forest Service – guess he has the ‘green underwear,’ as they say. Emma, 20, has been a tall ship sailor for five years and recently got her captain’s license. Jack is working on getting his contractor’s license, home-building being better at paying the bills than was consulting forestry.” ■ **Fran Rundlett** writes: “I can’t believe it’s been more than 12 years that I’ve served the school as chair of class agents. It’s been wonderful to see the Annual Fund grow over those years and to see the school’s development team grow too. I keep busy teaching botany at Georgia State University and environmental science at the Savannah College of Art and Design. The best part of my jobs is taking the students on field trips to nature preserves around Atlanta. And, of course, my third job is enjoying two active teenagers, Sasha and Irina; my terrific husband, Stuart; my grown kids, Patrick and Sharon; and four grandchildren.” ■ **Jane Sokolow** writes: “I am coordinating and consulting for OASIS – Open Accessible Space

F&ES Water Program...

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exporting,” Benoit says. “We’re looking for individual chemicals that have single sources, so that we can say, ‘That’s where this pollution is coming from!’ Increasingly, we are using caffeine and ibuprofen as markers, because they come only from sewage. Once perfected, this tool could be used to identify defective septic systems, leaking sewer lines or illegal discharges.”

With Diana Balmori, a lecturer in landscape and urban history at F&ES, Benoit recently authored *Land and Natural Development (LAND) Code: Guidelines for Sustainable Land Development*, whose target audience is architects, engineers, land developers and government officials. He says, “I also want to have an impact outside of research by designing recommendations for developing land in a way that will cause the least environmental harm.”

Like Raymond, James Saiers, a professor of hydrology, is working on how chemicals move through the environment, and like several other colleagues, he is working to understand the impact of development on ecosystems – in his case, the Florida Everglades.

Saiers is involved in two areas of hydrologic research related to how water moves and carries chemicals, including pollutants, on and below the Earth’s surface. “The Department of Energy manages sites contaminated with radionuclides from weapons and spent commercial fuel,” he says, “and inorganic chemicals, released inadvertently from liquid and solid waste sources or as a result of mining operations, have polluted ground waters across North America and Europe. We’re looking at the effects of geochemical and hydrological processes on the migration of metals such as cobalt, chromium and cesium, so that we can design strategies for the remediation of polluted ground water.”

Saiers is also researching how organic and inorganic microscopic particles move through soils. “Viruses and pathogenic bacteria represent a risk to human health if they are transmitted to ground water

aquifers that provide drinking water,” he says. “And inorganic colloids, such as clay particles, can absorb and accelerate the transport of dissolved contaminants. We’re using laboratory work, field experiments and mathematical models to identify the physical and chemical factors governing the interaction of these substances within geologic systems.”

In his work in the Florida Everglades, Saiers notes that he is “looking at an enormous wetland ecosystem whose hydrologic functioning has been devastated.” Begun by planners in the late 19th century and advanced later by congressional action, the scheme for developing the Everglades for agriculture produced a 70 percent reduction in the region’s water flow, sending 1.7 billion gallons of fresh water a day into the ocean and resulting in a decimation of the bird population and threats of extinction for dozens of plant and animal species. Saiers is part of a team of scientists working on a massive 30-year plan to restore, protect and preserve the Everglades. “Part of the restoration plan involves removing levees and canals to restore the system’s natural behavior,” he says, “and my colleagues and I are creating ground water and surface water models that we hope will allow us to project how the system will respond to proposed changes.” But he adds this cautionary note: “The health of this ecosystem is still to be determined. There are never guarantees.” ■

Snow Leopard...

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valleys, improve guarding pens and maintain a system of unmanned cameras to try to better monitor the population of snow leopards.

Jackson, of the Snow Leopard Conservancy, says he is optimistic that Hussain’s model can be used throughout the snow leopard range. “Hussain talks to the villagers,” Jackson says. “What’s most important about his work is that he thinks in anthropological terms. That’s an area that’s been sorely neglected by biologists designing conservation programs.” ■



Information System (www.oasisnyc.net). This integrated, layered online mapping project of New York City area green space and related issues puts the power of GIS in the hands of anyone with a computer, and provides a common, free and online open space inventory. In my spare time, I am working to keep gambling casinos out of the Catskills.”

1981

Class Secretaries

Fred Hadley
mrm@evansville.net
Carol Youell
envstew@snet.net

1982

25th Reunion Year

Class Secretaries

Barbara Hansen
Kenneth Osborn
forstman@fidalgo.net
Michael Dowling writes: “I am serving on a recently constituted statewide panel on reducing Colorado’s contribution and vulnerability to climate change.”

1983

Class Secretary

Stephen Broker
ls.broker@cox.net

Mary Ann Fajvan was elected a fellow of the Society of American Foresters in the 2007 elections, as reported in the society’s newsletter, *The Forestry Source*.

1984

Class Secretaries

Therese Feng
Therese_feng@yahoo.com
Roberta Tabell Jordan
rjordan@clinic.net

1985

Class Secretary

Alex Brash
abrash@npca.org

Alex Brash, senior director of the Northeast Regional Office of the National Parks Conservation Association (NPCA), writes: “The Yellowstone to Yukon’ conservation initiative links the great national parks stretching from the Yellowstone in the Rocky Mountains to the Yukon peninsula in Alaska. NPCA has been a partner in the effort. We are considering starting something similar for the Atlantic Coast’s barrier islands. In the past two

years, we established a regional office in New York City and have made significant strides. In spring of 2006, we hosted an evening with Lowell Thomas Jr. at the Explorers’ Club in order to build a coterie of support for Alaska’s national parks, and we are at the moment carefully scrutinizing and critiquing the general management plan for Fire Island National Seashore. We spent a great amount of time battling profound changes to the National Park System’s management policies.”

1986

Class Secretary

Caroline Norden
cnorden@maine.rr.com

1987

20th Reunion Year

Class Secretaries

Christie Coon
cacoon7@aol.com
Melissa Paly
mpaly@aol.com

Jean Brennan, Ph.D., joined Defenders of Wildlife as an international conservation scientist in the international conservation program based in Washington, D.C. She brings to the job over 10 years of professional experience across a range of technical areas, including wildlife conservation, forest ecology and natural resource management, climate-change science and international environmental policy. Jean was previously employed by the U.S. Agency for International Development (USAID), where she served as a senior science advisor. Among her duties, Jean helped the environment staff and NGO implementing partners overseas carry out strategic planning and program design, including establishing performance monitoring plans and conducting follow-on evaluations. Her most recent work in Asia focused on issues related to wildlife trade and forest governance and illegal logging. Prior to joining the USAID technical staff, Jean was employed as a science officer for the U.S. Department of State, Office of Global Change, where she represented the Office at Federal Interagency working groups before other bilateral donor and U.N. organizations. She has served as a member of the U.S. delegation at international negotiations under the U.N. Framework Convention on Climate Change and of

the Intergovernmental Panel on Climate Change. She has provided technical and policy briefings to senior U.S. Administration officials and congressional staff on issues related to conservation programs overseas. ■ **Andy Brower** writes: “I’m working in the Middle Tennessee State University biology department.” abrower@mtsu.edu ■ **Eric Schenck** resides in Canton, Ill., with his wife, Jackie. They have two girls who are freshmen in college. Eric serves as the Illinois regional biologist for Ducks Unlimited, with responsibility for acquiring and restoring critical wetland habitats along the Illinois River and throughout the state. He also helps his dad with the family farming operation.

1988

Class Secretaries

Diane Stark
salserad@yahoo.com
Philip Voorhees
pvoorhees@npca.org

1989

Class Secretaries

Susan Campbell
susan.campbell@comcast.net
Jane Freeman
jane@ewalden.com

Anthony Boutard writes: “Carol and I own and operate Ayers Creek Farm in Gaston, Ore. Established in 1998, our farm is fully Oregon Tilth Certified Organic, and we have about 100 acres under cultivation. The farm includes 20 acres of mixed orchard land, predominantly chestnuts and plums, 20 acres of cane fruits and currants, 12 acres mixed vegetable production, a one-acre test plot of table grape varieties and an acre or so of specialty small grains. The balance is in clover for seed and hybrid poplars. The hallmark of our farm is its diversity. Our first Tilth certificate in 1999 identified a single crop, blackberries. The 2007 certificate covers approximately 75 crops, represented by more than 175 individual varieties. We have also diversified our outlets. In 1999, we had one buyer for our berries, and they were all processed. In 2006, our accounts included 12 retail stores, 12 restaurants and Bon Appetit Cafeterias at Intel and Reed College. We also pack about 250,000 pounds of blackberries for Cascadian Farm, all high-quality, hand-picked fruit.” ■ **Kyle**

Datta writes: “I am now the chief executive officer of U.S. Biodiesel Group, a nationwide biodiesel company funded by private equity. We have over 50 million gallons of biodiesel plants under construction, and our goal is to build over 300 million gallons by the end of 2008. Our company is committed to whole-system sustainability, and will be the first major U.S. player to purchase only feedstock that was grown based on Sustainable Roundtable Principles. I am living in Hawaii, coaching my daughter Ariana’s soccer team and am on the Board of Hawaii’s Sierra Club.” ■ **The Class of 1989** mourns the passing of classmate **Alice Eichold**, who died on August 23, 2006. ■ **Jane Freeman** writes: “I am the special legislation program manager for the Bureau of Land Management in Reno, Nev. I am still enjoying the change and new challenges after 15 years with the EPA. I was saddened to hear of Alice Eichold’s passing; I always appreciated how much she embraced life. The world was a more interesting place with her in it.” ■ **Laurie Lynn Kelly** writes: “When Alice’s mother came to visit, she made us laugh by telling us how Alice used to stay in her room, reading and oblivious to the calls, ‘Come join the company, Alice!’ Alice would invite you along to Professor Scully’s architecture lectures just because she thought you might like them, or explain the advantages of her computer mouse, which she operated by nodding and shaking her head. Her resume details Alice’s career as an architect. It is good reading at http://pweb.jps.net/~gangale/opsa/cv_frm_aje.htm.” ■ **Claudia Martinez** writes: “I just came back from a great trip in Los Roques, Venezuela, a real paradise. We rented a sailing boat for five days and had the best vacation my two sons can remember. I remembered Alice while in the boat, because she had a very small and efficient apartment that was like a small boat or a spaceship, but with a piano. Her ideas about life on Mars and her great imagination and futuristic sense always impressed me. She had a great smile and sense of humor. Her spirit will remain in my thoughts.” ■ **Mary Nelligan Robbins** writes: “I was saddened to learn of the death of Alice. As someone who went to F&ES straight from college, I was fascinated by the depth of academic and working experience that she brought to our classes.

I have always remembered our field mods, when she carried a leaf around all day, only to find out the very hard way that it was poison ivy! I remember that day for her determination to hold onto that leaf until she could correctly classify it. At the time, I had not the maturity nor the wisdom to take my classes, and things I could really learn from them, as seriously as she did.” ■ **Laura Simon** writes: “I’m the field director of Urban Wildlife for the Humane Society of the United States. My office is in Woodbridge, Conn., minutes away from our beloved F&ES. I am having fun watching my 3-year-old, Jack, grow; already he has helped me on many wildlife rescues. We had a great time in the summer of 2006 visiting Kate Heaton and her 4-year-old (Hans) and daughter (Kaya) in Vermont.”

1990 Class Secretaries

Judy Olson Hicks
Carolyn Anne Pilling
capilling@gds.org

Seema Bhatt writes: “I am an independent consultant on biodiversity issues. My focus in the last year or two has shifted to looking specifically at the links between conservation and livelihoods. I have just finished co-authoring a book on ecotourism, which should be published sometime this year. I live in Delhi, India.”

■ **Alan Haberstock** writes: “I live in Canaan, Maine, with my wife, Carrie (a New Haven native), and 3-year-old Charlie. I work for a water resources consulting firm, Kleinschmidt Associates, doing wetlands assessments, stream and riparian buffer restoration, hydroelectric relicensing and environmental work associated with dam removals and modifications. I’m a founding board member of the Sebasticook River Watershed Association, and am on the board of supervisors for the Somerset County Soil and Water Conservation District. I work too hard, but still get out to enjoy Maine and my 26-acre wood lot.”

1991 Class Secretary

Richard Wallace
rwallace@ursinus.edu

J. Creed Clayton writes: “I’m doing well working for the U.S. Fish and

Wildlife Service in Glenwood Springs, Colo. I’m in the new energy office, which was set up last year to process oil and gas permits on federal land. I’ve been working for the FWS for the past five years. Prior to my current position, I was a fire ecologist for the FWS in Ventura, Calif. In Ventura, I would occasionally run into **Peter Schuyler**. Otherwise, I’ve been largely out of touch with my F&ES friends – not good!” ■ **Timothy Donnay** writes: “After a stint with the Institute for Sustainable Communities in Vermont, I decided to go back into government. I joined USAID in 2002, spent two years in Washington, two years in Ghana as the program officer, and last August started a four-year tour in Macedonia as program officer. Although Ghana was great, I must admit I really like Macedonia – a beautiful country, great people and in a wonderful location. (There is lots to see and do in south-eastern Europe, and transport routes are easy.) Work is challenging in the Balkans, particularly as countries work toward NATO membership and European Union accession. Thus, I am kept very busy with projects in economic growth, agriculture, education and democracy. The USAID program is scheduled to end in 2011, so this is an important time to complete initiatives prior to close-out. I enjoyed playing softball with a group of Ghanaians, who had been taught baseball by volunteers at an American company.” ■ **Sean Gordon, Ph.D.**, writes: “I started a Ph.D. program at Oregon State, and the so-called terminal degree almost proved interminable, but I finally finished last July (a sociology/policy study of the use of computer models in forest decision-making). A big punctuation in our equilibrium was James, who just turned 5 and is usually found in superhero attire. I’m now doing a post-doc with the Forest Service in Portland.”

■ **Alicia Grimes** writes: “I continue to work at the USAID in Washington, D.C., fighting to maintain natural resources, conservation and the environment in U.S. foreign assistance and development strategies. I coordinate with U.S. government agencies on illegal logging and trade, and play an active role for the United States in the International Tropical Timber Organization. Life is wilder now with daughters Julia, 4, and Nelle, 18 months, both highly active blonde bombshells!”

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Logger's Malfeasance...

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record “because it represented the first wave of foreign investment in a relatively intact area of forests of global significance (the Guiana Shield). We felt it important to set a precedent, early, if we were to have any influence on subsequent waves as the tropical timber trade moved out of Malaysia due to dwindling log supplies. The Samling representatives running the operation at that time were willing to engage, reached out and did everything we asked of them (albeit not without delay or difficulty) to get Barama certified. We took, and still maintain, the long view on this.”

The Barama Company reiterated its intention to work toward reinstatement of certification at a February meeting in Bonn, Germany, with representatives of the FSC and its accreditor and the WWF. The company website states: “As a responsible and responsive company, we have assigned the resources to take the necessary actions to lift the suspension. These include: conducting the necessary tests, conducting refreshment training on first aid treatment, installing the necessary facilities at the camp sites within our concession, and procuring and upgrading the necessary equipment recommended by the independent assessor. ... Barama is committed to sustainable forest management and practices. ...” (Neither Barama nor Samling officials could be reached for comment, despite attempts to contact them in Guyana and in Asia, both directly and through Hill & Knowlton in Malaysia, which handles public relations for Samling.)

Bulkan believes that news of the process of suspension and negotiation will resonate with citizens' groups worldwide that are trying to protect local resources: “It means that marginal voices will be heard.”

The Guyana story is part of a much bigger picture, said Lisa Curran, professor of tropical resources and director of the Tropical Resources Institute at F&ES. Curran has observed the gap between policy

and practice while visiting remote logging camps in Indonesia, which she said are “hemorrhaging wood.” She has seen Asian timber companies “trying to greenwash and co-opt the (certification) system,” even buying out the newspaper in Papua New Guinea to stem bad publicity.

Where totalitarian regimes dominate, she said, companies don't expect much regulation. “In these remote frontier cultures where there's no real rule of law, there's not a lot of accountability.” And because low-level officials are often very poor, “there's a lot of incentive to look the other way with a little *baksheesh* (bribe).”

Because of that corruption, even the most conscientious American shopper can be duped. Curran recently spied a good-looking and inexpensive bookcase at a Marshalls store near New Haven. It carried a sticker proclaiming that it was made from “Indonesia plantation wood,” but Curran recognized that the wood had to have been harvested in the wild. “If I wasn't in the field, I would have looked at the bookshelf and said to myself, ‘Great, it's wood grown on a plantation.’” (She didn't buy the shelf.)

This sort of consumer uncertainty is the weak link in the certification process, said Benjamin Cashore, professor of environmental policy and governance and of political science. “The largest benefits of certification have yet to accrue,” said Cashore, who specializes in sustainable forest policy. “They require consumers to know about the system.” He recommends a single universal label for all products that are in some way certified, whether they are organic apples or Yale T-shirts not made in sweatshops.

At this point, he said, certification serves more as an insurance policy for industries worried that an advocacy group will target and embarrass them. Cabarle agrees, calling certification more of a mechanism “for managing a potential risk than it is for marketing some environmental attribute.” Certification can also attract capital. “If you are positioning your company to be socially responsible or environmentally

responsible or to access capital from socially responsible investment funds, this is a tool you can use to substantiate that.”

Indeed, Bulkan and her Guyanese colleague, Jocelyn Dow, both suggest that Barama's move toward certification may have been calculated to bolster its initial public stock offering on the Hong Kong Exchange on March 7. Even before the offering, Reuters reported that the company had sold more than a billion shares, raising \$280 million. The Samling website cites two certified operations, one in Malaysia under the Malaysian Timber Certification Council (less stringent than FSC), and the other in New Zealand, an 86,000-acre plantation called Hikurangi Forest Farms (HFF), with FSC certification. “With the FSC certification, HFF now has an edge in the market to deliver quality and certified wood products,” the website states.

Bulkan remains in Guyana, writing her thesis. Her research is on the relationship between forest policy and what actually takes place in the forest, an issue that she said is vital not only in Guyana but also in other fragile nation states in Latin America, Africa and Asia that are threatened by “the draining of the world's resources for the emerging economies of China and India.”

Her role in pushing for scrutiny of the certification system in Guyana grew out of her academic work, but it required her to step beyond it. “I was finding out these amazing things, and I thought, ‘I have a choice. I can simply plod on with my fieldwork and thesis write-up – the easier road – or I can publicize my findings; I can tell this monumental story of slippage between written policies and actual practices in the forest; and perhaps I can galvanize some public response to the hemorrhaging of prime timbers in Asia.’ I decided that I didn't just want to be a Yale student.” ■

■ **Bram Gunther** writes: "I am the deputy director of forestry and horticulture for the New York City Parks Department. My boss is an F&ES graduate, and my colleague is **Jennifer Greenfeld**. I live with my wife, Kate, and son, Eli Zane." ■ **Erin Kellogg** writes: "We adopted a love of a little boy, Satjee, from India. Rod and I went over to Pune, a few hours southeast of Mumbai, last summer to bring him home. He is a happy, curious, very busy little 2-year-old. His big sister, Keelia, 5, has been fantastic given the major change to her life. Now that he is walking, they have a ball together. We are happily ensconced on Bainbridge Island, just a half-hour ferry ride from Seattle, but worlds away. We live on the south end of the island, where we can walk to two or three sweet little beaches and hear sea lions barking from our front porch most nights. I am a full-time mom, while Satjee adjusts to his new life and enjoys seeing the remarkable changes since we picked him up eight months ago. I also very much enjoy the company of **Jennie Wood Sheldon** and **James Sheldon** and their two kids, who live about three miles from us as the crow flies!"

■ **Chris Rodstrom** writes: "I work with quite a few F&ES alumni at The Trustees of Reservations, but they are from different classes. My wife, Jen, and I have two small children at home, and I've been with the same organization for 10 years." ■ **Kalyanakrishnan (Shivi) Sivaramakrishnan** writes: "I rejoined Yale on January 1 as a professor of anthropology." ■ **Rich Wallace, Ph.D. '00**, is living with his wife, Shannon Spencer, and their two sons, Tucker, 8, and Jonah, 5, in Collegeville, near Philadelphia. He is in his fifth year at Ursinus College, an undergraduate liberal arts institution, where he is an associate professor and the founding chair of the environmental studies program. At Ursinus, he has been busy building a program that provides leadership and scholarly opportunities for its students in the mold of F&ES. Prior to joining the Ursinus faculty, he spent three years as co-director of Eckerd College's environmental studies program. He loves being in touch with two of his former students, who are now also F&ES alums: **Kim Mortimer '04** and **Patty Ruby '06**. Rich has also had the pleasure of working with **Ted Wong '94**, who is an occasional

adjunct professor of environmental studies at Ursinus. Rich also enjoys working closely with a host of F&ES folks in the policy sciences community, including **Matthew Auer, Ph.D. '96**; **Murray Rutherford, Ph.D. '03**; **Peter Wilshusen '96**; **Dave Cherney '05**; **Christina Cromley, Ph.D. '02**; and, of course, faculty member Susan Clark and visiting scholar Dave Mattson.

1992 *15th Reunion Year*

Class Secretary

Katherine Kearse Farhadian
farhadian@aya.yale.edu

1993

Class Secretaries

Dean Gibson
deang@duke.edu
Molly Goodyear
bvidogs@cox.net
Heather Merbs
hmerbs@aol.com

Chip Darmstadt is the executive director of North Branch Nature Center in Montpelier, Vt. It's actually the same nature center he's been running for the last 10 years, but it splintered from the parent organization, after it decided to cease operations in Montpelier. You can check them out at NorthBranchNatureCenter.org. On the home front, Chip and Alisa are busy with their three boys, Brandon, 10, Sammy, 7, and Charlie, 5. **Jon Garen** is director of business development at Forest Laboratories in New York City. Jon and Nieves live in Weehawken, N.J., and have two children, Amanda, 1, and Tomas, 2.

1994

Class Secretaries

Jane Calvin
jcalvin@prospeed.net
Cynthia W. Henshaw
chenshaw@newenglandforestry.org
Jane Whitehill
janewhitehill@hotmail.com

Brooke Barrett writes: "I decided to take some time off after working many, many hours for about a year in post-Katrina New Orleans, with occasional trips to my home in Seattle. The inner strength, courage and religiosity of the people of the Gulf region are inspiring. It was a privilege to experience this culturally unique city. I am enjoying a three-month respite in Rapa Nui (Easter Island), Chile, Argentina and,

eventually, Peru." ■ **Oliver Barton**, New Haven Ecology Project and Common Ground High School director, was honored last fall by the Volvo for Life Awards. These awards "recognize individuals who are courageous, dedicated and committed to helping others." Selected from more than 4,000 applicants in the environment category, Barton received \$25,000 to be donated to the organization of his choice (and he chose Common Ground). ■ **Eliza Cleveland** writes: "I am still living in Branford and working at the Peabody Museum. There are some fantastic exhibits for kids. Both my kids are grown and live nearby, which is wonderful. Gusty is getting her master's in teaching math, and Tommy is a hydrographer. I am still racing Hobie Cats, and Bob and I won the U.S. trials for the Pan American Games for the Hobie 16. So we'll be competing in the games down in Rio de Janeiro in July after training during the spring and summer." ■ **Chris Cosslett** writes: "I've spent the last year working out of Tirana, Albania, where my wife, Gulden, is the United Nations resident coordinator. I am an independent consultant, mainly formulating biodiversity projects for submission to the Global Environment Facility. I worked in Morocco, Egypt, Albania and Turkey last year, and began developing a project in China in March." ■ **Tad Gallion** writes: "I am working in the U.S. Senate with the new majority there. I miss all you old forestry chums." ■ **Erik Kullesei** writes: "I am the deputy commissioner for open space protection in the New York state Office of Parks, Recreation and Historic Preservation. I'm excited about the move, but sad to leave my colleagues at the Trust for Public Land, where I've been New York state program director since 1999. I'm also relocating with my family from our beloved Upper West Side of Manhattan to Albany." ■ **Sherry Login** writes: "In August, we had our second child, Gal. He is now 16 months old, and his brother, Ziv, is 3 years old. In November, we took a five-week camping vacation to Australia with the two boys. We rented a campervan and drove from Sydney, up the coast to Cape Tribulation and then to Cairns. Eli and I managed to get in a few dives on the Great Barrier. It was quite an adventure camping with two kids. Our next family vacation

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podcast/](http://environment.yale.edu/1000/environmentyale_podcast/)



was to Israel for three weeks in March. ■ **Jessica Eskow McGlyn** writes: "I got married in September to Paul McGlyn. We live in D.C. with two dogs and a cat. I am a senior program officer at WWF." ■ **Dave Moffat** writes: "I am thrilled that the F&ES alumni executive committee is being taken over with '94s, as **Jane Calvin** rejoined **Javier Dominguez** and me on it, and now we are lucky to have **Oliver Barton** and **Jessica Eskow** as new members. The Class of '80 is now out-numbered, and we will have a critical mass for a '94 reunion in May. Speaking of reunions, rumor has it that **Diana Wheeler** and **Don Redmond** are organizing a Great Mountain get-together this summer. I can only hope that they will show up with Texas BBQ, which they have gotten into a wonderful habit of shipping to Carol and me in BBQ-deprived New Hampshire. We had a wonderful time seeing **Lindsey Brace Martinez '95** and Peter a few weeks back, and I too infrequently run into **Ted Diers '93**, who is doing a great job protecting New Hampshire's coast."

1995

Class Secretaries

Marie Gunning
mjgunning@aol.com
Giara O'Connell
cmoconnell@comcast.net

Gregory Dicum writes: "As recently as 10 years ago, it was unheard of and, in fact, illegal for solar-powered houses in California to connect to the grid. Now power companies are legally required to credit their customers for the excess power they produce." Some California installers are expanding nationally, including PowerLight and Akeena Solar. In the Northeast, New York state's incentive program, in place since 2002, covers 40 to 70 percent of the cost of a home solar system. New Jersey, he says, started offering rebates to homeowners for photovoltaic systems in 2001, and now ranks as the second-largest market in the country. Connecticut's rebate program pays up to \$25,000 per solar photovoltaic installation. ■ **Michelle Gottlieb** writes: "I am working with Health Care Without Harm (www.noharm.org)."

1996

Class Secretaries

Kathryn Pipkin
kate@goodisp.com
Julie Rothrock
jarothrock@juno.com

Jen Pett-Ridge writes: "My husband, Logan, baby Ellie and I had a wonderful time at a reunion gathering hosted by **Peter Yolles '97** and **Dave Ganz** in Marin County. Thanks so much to Kath in F&ES Alumni Affairs for helping out with the funding. It was great to reconnect with folks I hadn't seen in years – it may have helped Logan in his job search!" ■ **Pam Weiant** writes: "I work for The Nature Conservancy in Hawaii in the marine program. I am the statewide marine coordinator and in charge of planning and other statewide initiatives (community-based projects, invasive species, recreational fishing, among others). I graduated from the University of California at Santa Barbara in 2005 with a Ph.D. in marine science." pweiant@tnc.org

1997 10th Reunion Year

Class Secretary

Paul Calzada
pcalzada@eco.org

Christina Cromley Bruner writes: "I got married in June 2006 to Dave Bruner. I'm living in Herndon, Va., and am director of external audits in the inspector general's office at the U.S. Department of the Interior. I'm going to Ireland for two weeks." ■ **Paul Calzada** writes: "I moved to New Hampshire and did some environmental education with a local nonprofit and 4-H. I taught junior high school science for a year in Lawrence, Mass., and then worked for an environmental consulting company for several years. I'm with the Environmental Careers Organization (www.eco.org), based in Boston, though I still live in New Hampshire. We recruit college students for environmental internships. I owe a special thanks to **Sharon Katz '96** for introducing me to contra dancing, which I've been doing now just about every weekend for the past several years." ■ **Carlos Gonzalez, Ph.D. '03**, writes: "I am a foreign service officer with the USDA's Foreign Agricultural Service. I am in the first year of a four-year tour as the agricultural attaché at the U.S. Embassy in Lima, Peru, with regional responsibility for Ecuador and

Bolivia. I am married and my first child, Sebastian, was born in Lima last December." cag8@cornell.edu

■ **Shalini Ramanathan** writes: "I'm based in Nairobi, Kenya, and working for Africa Clean Energy, a renewable-energy project development company owned by U.K.-based Energy for Sustainable Development. We're developing a number of commercial ventures in East Africa, including a wind farm, biofuels project and biomass fuel substitution business. In 2004, I married **Chris Tomlinson**, who is, like me, a University of Texas alum. He's the Associated Press' bureau chief for East Africa." shalini@esd.co.uk ■ **José Juan Terrasa-Soler** will receive a master's degree in landscape architecture from the Harvard Graduate School of Design in June 2007. After graduation, José will return to Puerto Rico to resume his career as an environmental consultant and also offer landscape planning and design services. José is married to **Alicia Olmo**, a clinical psychologist, and they have a 2-year-old daughter, **Sara Lauren**. ■ **Cristin Tighe** writes: "I am in D.C., about two-thirds through a Ph.D. at John Hopkins University School of Advanced International Studies. My focus is international health and environmental policy, researching malaria. My fiancée is Czech and works for the European Commission, based in Brussels. I also own a yoga center (www.spiralflightyoga.com) in D.C." ■ **Peter Yolles** is director of water resource protection at The Nature Conservancy in California. He's working on restoration of the Klamath River Basin. His wife, **Jill**, is returning to work in internal medicine. His kids (**Sam**, 4, and **Amanda**, 2) are enjoying frequent trips to Stinson Beach. Peter and **David Ganz** hosted an informal gathering of Bay Area F&ES alumni from classes 1995 to 1997 to celebrate their 10-year reunion, including **David's** wife, **Be**; **Tim Bishop**; **Arah** and **Erik Wohlgemuth**; **Greg Dicum '95** and **Nina Luttinger '95**; **Jonathan Kaplan '96** and **Sarah Malarkey**; **Tom Baginski**; **Anna** and **Alexis Harte '94**; **Janet** and **Tolan Steele**; **Jessica Hamburger '98**; **Kassia Grisso '96**; **Chris** and **Derek Denniston**; **Marsha Tobin '96**; and **Jennifer Pett-Ridge '96**. The group thanks **Kath Schomaker** and F&ES for supporting our Bay Area alumni network.

1998

Class Secretaries

Nadine Block

nadine.block@verizon.net

Claire Corcoran

corcoran_claire@verizon.net

Kimberly (Strum) Baymiller writes:

"For over a year now, my husband and I have been living in Shanghai, China, where we were transferred for my husband's work. Being an expat limits my career. I am a part-time employee of International Paper, though in communications rather than forestry and environment. Everything has an upside, and I have much more time to study Mandarin, do yoga and volunteer. I have become active in Roots and Shoots, which is part of the Jane Goodall Institute. Through them, I am able to keep my foot in the environmental arena and help educate future generations of China's environmentalists. My husband and I have been able to hike some truly amazing landscapes – the Great Wall, rice-terraced mountains and Shangri La."

■ **Claire Corcoran** writes:

"I have a new baby boy, Robin, born November 11. Life is busy, but good – big brother Richard, 3, and big sister, Sylvia, 5, are loving their new baby." ■ **Antonio Del Monaco** writes: "After 12 years working in the environmental field, I have established my own financial planning practice with two partners and manage over \$5 million of client assets. I began managing my own finances many years ago, and investing became a fascinating hobby. After several years successfully doing this, I began doing it for others. This allowed me to see the great need that people have for financial planning and also the need for trusted independent advice. I graduated from the financial planning program at Georgetown University in 2005, while still working full-time for the Global Environment Facility. Although currently our core focus is on individuals and families, I hope to use my financial and environmental experience to extend our asset management services to some environmental endowments in the near future." www.duswealth.com

■ **Todd Forrest** writes: "Elizabeth Pratt Forrest, Eliza to us, was born on August 31. She is now fat and happy and the source of endless amusement to her

brothers, Jack and Will." ■ **Joseph Guse** writes: "My wife, Lucy Lyons, and I moved to Lexington, Va., from Madison, Wis., in the summer of 2005. I'm in my second year at Washington & Lee University, where I enjoy teaching undergraduates a variety of courses in microeconomics. Lucy gave birth last May to Greta Katherine Guse, a very curious and generally happy baby girl. Our favorite local activity is hiking with Greta and our two dogs in the nearby Blue Ridge Mountains."

■ **Jessica Hamburger** writes: "I'm enjoying my new job working on sediment management and wetland restoration at the San Francisco Bay Conservation and Development Commission, a state agency based in San Francisco. Those soil science classes are really coming in handy." ■ **Vanessa Johnson** writes: "At the end of 2006, I decided to relocate to the East Coast, and I am a land protection specialist with the Massachusetts Department of Conservation and Recreation." ■ **Brad Kahn** traveled nearly two months in Africa and three months in Southeast Asia. Brad writes: "If you'd like to read about some of our Africa experiences, visit the blog at the Web address below. You will also find a link on the blog to recent photos posted on Treemo."

www.bradanderintravel.blogspot.com

■ **Jennifer Kefer** writes: "I continue to work as a litigation consultant for Environmental Defense in Washington, D.C. I am expecting my second child this spring. My 2-year-old, Ari, is confident that mom is having another boy; however, he also believes that he is pregnant with a baby sister, so his credibility is questionable." ■ **Laurie Koteen** writes: "In 2006, Gilbert William Bade was born."

■ **John Kuriawa** writes: "We moved to Severna Park, Md., so that I could try my hand at regional coastal management from NOAA's Chesapeake Bay Office in Annapolis. I hope to learn to sail this summer with the neighborhood racers. At work, we're trying to help Virginia and Maryland communities prepare for inevitable growth in the face of a rising Bay." ■ **Katherine Lieberknecht** writes: "I'm finishing my doctorate at Cornell University this spring; this summer, my husband, daughter and I are moving to Eugene, Ore., where my husband and I will join the University

The Forests Dialogue...

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after the International Institute for Environment and Development wrote a report encouraging people from industry, environmental agencies and others to set "globally acceptable guiding principles for sustainable forest management." At the same time, the World Business Council for Sustainable Development, the World Bank, the World Wildlife Fund and the World Resources Institute were seriously considering this vision. "So many people were talking about the same thing that it was obvious they needed to talk," said R. Scott Wallinger '61, an advisor in forest sustainability and one of the co-founders and first co-leaders of TFD. What they needed, as it turns out, was time together around a conference table to hear each other's points of view.

"A decade of open warfare had existed between the forest industry and NGOs," Wallinger said. "What caused the change was that TFD for the first time provided a format and a forum in which some of the leading figures in these communities could meet face-to-face in a private setting and begin to talk to each other in facilitated sessions that were off-the-record and unstructured. Equally important was the opportunity for participants to eat meals together, to socialize with one another over drinks in the evening, to take a walk together. Previously, the only contact had been in public forums, where each party or person was sort of duty bound to assert the organizational position, and organizational pressures didn't allow debate or the ability to concede any points. Communication was characterized as 'throwing bombs from a distance into each other's castles,' with the objective to destroy the other party, not build consensus."

Today, Dieterle, Phillips, Ginn and others describe the dialogues as "thoughtful," "energizing" and "positive."

At each dialogue, there is always a visit to a forest, such as a Eucalyptus plantation in Brazil or the Project Grow site in KwaZulu-Natal Province, South Africa. "Everyone carries in their head a different vision of a forest," Phillips said. "It's important to see it."

Typically, they walk and observe until they find a clearing. They gather there and talk some more. ■



of Oregon faculty.” ■ **Nayo Parrett** writes: “I am an environmental project manager at American Transmission, a public utility, in Wisconsin, and I work on environmental permitting and licensing for transmission line projects. I live in Milwaukee.”

1999

Class Secretaries

Jocelyn Forbush

jforbush@ttor.org

Jennifer Garrison Ross

jennifermgarrisonross@yahoo.com

Christiana Jones

christiana@jonesfamilyfarms.com

Erik Hellstedt will finish his M.B.A. at the University of Southern Maine this spring. He left the world of public policy consulting last fall and joined his brother in timber framing. Their current project is a series of structures for a new park in Freeport, Maine. **Megan Shane Hellstedt** is the environmental affairs manager for Hannaford Bros., a Northeast supermarket chain based in Maine. While working on a sustainability agenda, she also handles the recycling programs, composting and customer environmental education.

■ **Christiana Soares Jones** works part-time for the Connecticut Department of Environmental Protection. She and her husband, Jamie, have a 2-year-old son and another baby due this spring. Working and living on her husband’s family’s 400-acre farm has given her a new way to connect people to the land and sustainable land practices through supporting local agriculture. ■ **Jacob Masenior** and his wife, Heather, live in Massachusetts. They have a 21-month-old daughter, Elliaand, and another baby due on April 20 (Jacob was hoping for April 22nd on Earth Day). Jacob enjoys shaping the minds of future leaders in his work as a high school environmental science teacher. He and his students have developed a school-wide recycling program, planted native species and are implementing a cafeteria composting program. ■ **Noah Matson** has been in D.C. since graduating, working for Defenders of Wildlife on public lands policy. Noah has two daughters, 6 years old and 3 years old. He recently met up with **Drue DeBerry**, **Marty Kearns**, **Jamie Shambaugh** and **Steve Bosak**, who also live in D.C.

■ **Allyson Brownlee Muth** and **Norris Zachary Muth** are living in Pennsylvania,

where Allyson is a forest stewardship extension associate at Penn State and Norris has a postdoctoral research fellowship at Muehlenberg College in Allentown. ■ **Zeon Nam-Jin** writes: “I am in Rome and am minister at the embassy of the Republic of Korea.”

■ **Jennifer Garrison Ross** writes: “My husband, Darren, and I work in Los Angeles and live in North Hollywood with our son, Carter (7 months).”

■ **Dan Shepherd** works at the Multilateral Investment Fund (MIF) of the Inter-American Development Bank (IDB) in Washington, D.C., focused on new areas for private-sector development in the Latin American and Caribbean region. Dan and his wife, **Deb (Weiner ‘97)**, have two wonderful girls, Haley and Lucy. All are excited about their upcoming move to Ecuador, where Dan will continue his work with the MIF/IDB, which is part of the institution’s efforts to decentralize activities from its headquarters in Washington, D.C. ■ **Sarah (Shaw) Tallarico** writes: “I love reading the class notes section of the magazine. I’m living in Rochester, N.Y., with my husband, Frank Tallarico, and our two boys, Will, 3, and Matt, 1. I miss everyone. I look forward to the next *environment: YALE*.” ■ **Tommy Trexler** writes: “Suz and I are well. Our kids are 7 and 5. I’ve been at this environmental consulting firm for nearly five years and it’s going well. Some of the projects are mundane, but every now and then I get a chance to make a difference in the outcome of a potential environmental impact.” ■ **Julie True** writes: “I have been working for the Santa Fe National Forest in Pecos, N.M., for the last six years. My primary job is planning, but my duties on the district range from lighting prescribed burns to rounding up cattle. I live on 12 acres in a little community with a lot of barn-raising spirit. Cypress, the chocolate lab, is still with me, and I have a palomino quarter horse named Amigo. I got married to the most wonderful man, Mike Bain, in August and am just very happy about life!”

■ **John Wickham** writes: “I am working independently as an environmental consultant in Washington, D.C., while working part-time as a waiter at The Tabard Inn, a well-known restaurant (one of the first to offer organic ingredients in the 1970s) and where I meet

a surprising number of F&ES grads and faculty. I am also co-chair of the environment committee at my church, St. Columba’s Episcopal, in the city, where there’s a very green and socially active congregation that buys 100 percent renewable power. I saw Megan Shane Hellstedt at an EPA Conference in Arlington, Va. She is doing well.”

2000

Class Secretaries

Erica Shaub

easffe@hotmail.com

Zikun Yu

2001

Class Secretaries

Leigh Cash

leigh@cultureearth.com

Adam Chambers

achambers@aya.yale.edu

Jennifer Grimm

jennytheforester@yahoo.com

Leigh Cash is living and working in New Canaan, Conn. Finally, she has her dream commute – walking everywhere. She, her husband, James, and their dogs took an extended beach camping trip for the month of May. Nothing like sun, sand and dogs to make life great. ■ **John Daly** writes: “I am program director for the Alliance for Puget Sound Shorelines (a collaboration of The Nature Conservancy, The Trust for Public Land and People for Puget Sound). Also, my wife, Joy, and I had a baby boy, Kieran, in February 2006.” ■ **Dong-Young Kim** earned a Ph.D. in public policy and environmental planning at MIT in 2006, he got a job at the KDI (Korea Development Institute) School of Public Policy and Management as an assistant professor in May 2006. He is living with his wife, Younsun, and lovely 3-year-old daughter, Sooahn, in Seoul, Korea. ■ **Pia Kohler** finished her Ph.D. in January 2006, and in August she took a tenure-track position at the University of Alaska, Fairbanks. She is in the political science department and teaching mostly international relations courses. She is planning to continue her research on the science-policy interface in international environmental negotiations, and also to study the incorporation of traditional and local knowledge into international environmental policy. ■ **Jeff Luoma** finished a contract job as an extension forester

through Cornell for upstate New York north of the Adirondack Park. He's done some theater (El Gallo in the *Fantasticks* last year), taught salsa classes and is even picking up the guitar again. His partner has an 11-year-old daughter he's been helping to raise for several years now. Jeff@LuomaForestry.com

■ **David Ellum, Ph.D.** '07, is finishing up his run at the school. He defended his dissertation in March 2006, and is now looking for a faculty position. His son, Townes, is 4 years old and a great kid. He also had a little girl, Seija, in October. ■ **Maria Fandino** writes: "After graduating from F&ES, I worked for a year at the University of Connecticut in the Laboratory for Earth Resources Information Systems, with a new Arc Views extension for city planning and management called Community Viz. Upon returning to Colombia in December 2002, I was coordinator of the policy and legislation research program with the Humboldt Institute of Biological Research, responsible for a number of projects that deal with the conservation and sustainable use of biodiversity. In 2005, I had my second son, Jeronimo."

■ **Mary Ford** moved back to Washington, D.C., in March to be the manager of education at the National Audubon Society. She is excited to be with F&ES friends in D.C., although very sad to be leaving behind her F&ES friends in California. **YinLan Zhang** and **Matt Fladeland** live in San Francisco. YinLan just had a baby girl, named Willow, last September. **Mary, Ray Wan** and **Colin O'Brien, J.D.** '03, who is an attorney with the Natural Resources Defense Council's Clean Air Program, got to see Willow in the UCSF hospital right after she was born. Fortunately, Mary arrived in D.C. just in time to be there for the birth of another baby girl belonging to **Kerry Cesareo** and **Jim Woodworth**. Her new job will take her all over the country. maryelizabethford@gmail.com

■ **Katy Guimond** writes: "I'm living the grad student life again in Berkeley, Calif., where I'm in the second year of a Ph.D. in geography, focusing on tsetse fly control and the production of space in Tanzania. It's a far cry from what I was doing before, running a nature center in the South Bronx, but somehow it all fits together. I'm riding a bike regularly for the first time since

I was a kid, and I love Berkeley's greenery and amazing produce. I miss living in New York City, but I visit often to see my boyfriend and my family."

■ **Stephanie Jones** writes: "In April, I moved to Oberkirch, Switzerland, with my husband, **Chris Binggeli** '02, and Hanna, 2, from Boston, where we lived for five years. I continue consulting in energy efficiency and learning Schweizerdeutsch. Chris is a forester for the Canton of Lucerne." stepherjones@gmail.com

■ **Barry Muchnick** and **Kate Harrison** '08 appeared in *The New York Times* on February 11 for their "green" wedding plans. "It's well worth it to start your life together in a way that's in line with your values and beliefs," Kate told the reporter. "You don't want this event that is supposed to start your life together to come at the expense of the environment or workers in another country." Barry and Kate's plans included a rehearsal barbecue at an organic farm in Garrison, N.Y., a ceremony at a state-owned 19th century castle in a scenic trail area and a reception at a golf club restaurant that serves organic food. ■ **Chie Nakaniwa** writes: "I received the Environmental Business Woman Award at the Eco Japan Cup 2006, which was organized by Japan's Ministry of the Environment. Since I graduated, I have been involved in industrial ecology, especially LCA-related issues." ■ **Diane Russell** writes: "I work with F&ES students on publications and help out where possible. This year, two publications are forthcoming in the *Journal of Sustainable Forestry*. I am always interested in seeing F&ES grads in Washington, where I am a biodiversity and social science specialist in the natural resource management office at USAID. I'm also chair of the conservation committee of the social science working group of the Society for Conservation Biology and actively seeking new members for the committee." dirussell@usaid.gov

■ **Abby Sarmac** and **Matt Clark** are creating a superhuman army of Caucapino Clarmacs (half Filipino/half Caucasian). The first prototype, Rowan Sarmac Clark, arrived on December 20, weighing in at 7 lbs., 12 oz., with a 110 percent adorability factor. Three months prior to Rowan's birth, Abby and Matt enjoyed a mini-reunion with **Luis Rodriguez** and **Silvia**

Benitez '00 in Quito, Ecuador. ■ **Lisa Schulman** and her husband, Dotan, welcomed their beautiful baby boy, Asher Gabriel Ziv, into the world on June 2, 2006. Lisa is a project engineer in support of environmental risk assessments at Merck & Co.

■ **Michael Sterner** writes: "I am enrolled at the University of Washington Law School. My wife, Blair, and I have two daughters, ages 4 and 1. We will probably go back to Portland, Ore., when I finish with school." ■ Our deepest sympathies and condolences go out to **Tracy Triplett**, whose husband, Adam Estreicher, 33, died from injuries sustained in a car accident. Tracy described Adam as fiercely devoted to the study of acupuncture and Chinese medicine. "He really listened to people, and just by nature he was a healer," she says. "I spent 15 years of my life with him. We were planning to buy a house with a garden."

■ **Christian Wippermann** writes: "I have been with McKinsey & Company for almost three years now. Surviving a bunch of projects not related to any green thing whatsoever, I am now fully involved in very interesting topics around the pulp and paper industry, as well as renewable energy. I'm still dreaming about a long vacation in the U.S. West."

2002 5th Reunion Year
Class Secretaries
Catherine Bottrill
cbottrill@hotmail.com
Roberto J. Frau
rfrau@aya.yale.edu

Sofie Beckham and **Kelly Droege** are living in Sweden, where Sofie is the forestry coordinator for IKEA, and Kelly is a forester for an international forest investment firm. Sofie is expecting her first child in June! ■ **Ryan Bennett** is living in and loving San Francisco. He does a lot of biking in Marin. He's working at a boutique private equity firm called Greenrock Capital, which invests in renewable-energy projects, including wind, solar, geothermal, biopower and biofuels.

■ **Sarah Canham** is in Jackson, Wyo., skiing, canoeing and otherwise cavorting, when she's not working on the digital vegetation map of the Bridger-Teton National Forest. ■ **Vic Edgerton** has been an advisor to Congressman Dennis Kucinich in Washington, D.C.,

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for the past three years. ■ **Scott Fenimore** continues to work for the U.S. Forest Service in Washington, D.C. He is working for the Fire & Aviation Management staff, focusing on ecosystem restoration and community protection through the hazardous fuels reduction program. He regularly bumps into **Meg Roessing '03** and **Beth Egan '04** while wandering the halls of Forest Service headquarters. Scott and his wife, Lindsey Adams, welcomed their second son, Lucas, in October. Their older son, Wesley, just turned 2, and is becoming quite the soils expert. ■ **Rachel Fertik** returned from a yearlong journey around the world with her boyfriend, Jon Pattee. Along the way, she worked for the IUCN on Mekong River wetlands conservation in Cambodia. She also convinced **Becky Tavani** and **Colleen Ryan** to join her in Laos, where they kayaked down the Mekong. In Washington, D.C., she is developing Clean Water Act policy at the EPA.

■ **Derik Frederiksen** works for Sealaska and gets to travel a good deal. He bought a house in Seattle. Ella is 8 and in second grade. ■ **Michael Funaro** and **Zhanna Beisembaeva** are still in NYC, and Michael still works for the Department of Health on the GIS team, although he is a project manager now. Zhanna is home with two kids. Danna is in the fourth grade and Kair was 10 months on March 16.

■ **Molly Kate Giese** and **John E.B. Wofford** were married on October 21 in Greenville, S.C. Molly is the director of conservation at the Wood River Land Trust in Hailey, Idaho. ■ **Shalini Gupta** is the senior energy associate at the Izaak Walton League of America, doing policy research and advocacy on domestic renewable-energy policy and climate legislation. Shalini got married and had a green wedding in Minneapolis. Her husband is Jim Kleinschmidt, who works on sustainable agriculture issues with the Institute for Agriculture and Trade Policy. She's still dancing, taking flamenco dance classes and yoga, and enjoying being the proud new owner of a 100-year-old house with an energy-efficient boiler. ■ **Robin Kriesberg** works on the restoration and stewardship of Long Island Sound at Save the Sound. She enjoys being back in New Haven three days a week and working from a satellite office in Greenwich for the rest of the week. ■ **Clayt Lauter**

married **Kimberly** in 2004, and they now have a beautiful son, Atticus, born in April 2006. Clayt was with GE for six years, before joining FP&L Energy's strategic policy group in Juno Beach, Fla., and will be relocating from Erie, Penn., to Palm County, Fla. Clayt stays in regular touch with **Elizabeth Ban** and **Liam Carr '01**, who are engaged. ■ **Jay McLaughlin** is director of Mt. Adams Resource Stewards. Life is a little scary when living between grants, but he's loving most every minute of the work. **Bridget**, **Liam**, 4, and **Willa**, 22 months, are great. "We had a fun gathering in Glenwood, Wash., with **Kelly Droege**, **Sofie Beckham** and **Brad Hunter** over the New Year." ■ **Laura Meadors** is with Evolution Markets in San Francisco, but has transitioned from brokering renewable-energy credits and emission credits into helping launch a new venture, which is providing investment banking services to the renewable-energy and green-business sectors. She finished the Chicago Marathon in 3:02. ■ **Josh Zaffos** is the news editor for the *Rocky Mountain Chronicle*, a new independent weekly newspaper in Fort Collins, Colo. (online at rmchronicle.com). He's also had some freelance articles in *Trout* magazine, *Orion*, *High Country News* and *Land & People*.

2003

Class Secretaries

Brian Goldberg

brian.goldberg@aya.yale.edu

Scott Threadgill

michael.threadgill@aya.yale.edu

Word on the street is that **Bryan Goldberg** slowed down long enough to get married. ■ **J. Bishop Grewell** is living it up for the year in Denver, working as a clerk for the 10th Circuit and living downtown. ■ **Krithi Karanth** is in the third year of her Ph.D. at Duke. She and her husband are expecting their first child, a girl, in early April. ■ **Pete Land** and **Willy the Dog** enjoyed winter in Burlington, Vt., following the second biggest blizzard on record. Pete and **Bill Finnegan** are increasingly busy with Tamarack projects, including six short films they submitted to the "Convenient Truths" contest. Visit the new website (tamarackmedia.com) for details. ■ **Ted Lanzano** is working for

the EPA in Denver. ■ **Carlos Linares** left his post with UNDP in New York at the end of 2006. He is working at Camp Dresser McKee, a consulting firm in Arlington, Va. He recently won a contract in Mozambique and served there for several weeks as team leader.

■ **Andres Luque** is working in London with the engineering firm Arup. He works as an urban designer on a team that uses sustainability methods in the design of cities and neighborhoods. They are the team behind Dongtan, near Shanghai, the first carbon-neutral city in the world. It's a beautiful project that is changing the way the world thinks about cities, and they are working to develop similar projects in many other cities and countries. andres.luque@aya.yale.edu ■ **Flo Miller** spent the winter digging herself out of snowdrifts in Vermont. She organizes retreats and workshops for environmental leaders (wholecommunities.org). She and **Bill Finnegan** are planning a wedding for this September. ■ **Wei-Shiuen Ng** has been working at the World Resources Institute Center for Sustainable Transport since 2004, and still enjoys developing and managing urban transportation and energy projects in Washington, D.C. She got engaged to **Evgeniy "Eugene" Gladyshev**, and they are planning to get married in early 2008, which is also when Evgeniy will complete his Ph.D. in molecular and cellular biology at Harvard. ■ **Bryan Petit** recently received the Chief's Award for Interagency Partnership for the work he's doing in southern California.

■ **Soni Pradhanang** is preparing for her upcoming qualifying exam at SUNY, and enjoyed the snowy winter in upstate New York. Her big field season is approaching too, and she can't wait to go out to her research sites. ■ **Love** recently drove **Liz Shapiro** to move to College Station, Texas. In the meantime, she is inching toward finishing her Ph.D. ■ **Scott Threadgill** is still in D.C. with **Paula**, **Sageboy**, 3, and **Kai**, 1. ■ **Nicole Vickey** is still with The Nature Conservancy, and is getting a seagrass protection and enhancement project under way with the Gulf Islands National Seashore. **Jesse**, **Elle** and **Nicole** are planning a move this summer to Jacksonville, Fla. ■ **Guoqian Wang** writes: "I finished my two-year tenure

at the World Bank, and the time came for me to move on. In December, I relocated to Beijing and joined the small group of people at the newly opened company of Louis Berger Group in China.” louisberger.com ■ **Jason Wilmot** and his family spent the winter in a remote cabin in the Yellowstone area. Jason is director of the Northern Rockies Conservation Cooperative and research manager for the Absaroka Beartooth Wolverine project. ■ **Andrew Winston's** book (with Professor Dan Esty), *Green to Gold*, was published in the fall. He's having a blast marketing the book and speaking and consulting about green business. Andrew launched Winston Eco-Strategies. He and his wife welcomed a baby, Jacob, on September 1. They and the two boys, including Joshua, 3, moved out of New York City to Riverside, Conn., in Fairfield County, where they both grew up.

2004

Class Secretaries

Keith Bisson

keith_bisson@yahoo.com

Daniela Vizcaino

daniela.vizcaino@aya.yale.edu

Jennifer Vogel

jen.vogel@aya.yale.edu

Laura Wooley

le.wooley@gmail.com

Irene Angeletti writes: “I finished my contract with the European Commission in October. I began a new job with the Wildlife Conservation Society in Ecuador in March.” ■ **Jessica Barnes** writes: “I am in the third year of my Ph.D. in sustainable development at Columbia. I live in Brooklyn with Sarah Vogel '03, but am heading off soon to rural Egypt for a year's fieldwork on water resources management for farmers in the Nile Delta.” ■ **Keith Bisson** is managing the Northern Heritage Development Fund for Coastal Enterprises, a \$10 million privately and publicly funded community development financial institution that supports livable-wage jobs, green affordable housing and other community benefits in Maine's historically forest-dependent rural regions. ■ **Marco Butazzoni** writes: “Valerie Craig and I are about to move to Italy, because I am the working field manager for the energy and climate-change strategy team at Ecofys-Roma. Valerie will continue to

work from Italy with Seafood Choices Alliance. We are organizing the move and looking for a new roof in Rome.”

■ **Amanda Farris** is engaged to Kevin Mahaffey. She writes: “Give us about 30 years to send the next generation of Loggerrhythms to F&ES!” ■ **Kathleen (Campbell) Frangione** got married over the summer to Chris Frangione, a Duke/Nicholas school grad. They are living in D.C., where Kathleen is the press secretary for Trout Unlimited. She is learning to fly-fish, which she is lucky enough to count as “work.”

Jennifer Vogel married Gordon Bass last August. She works at the Rainforest Alliance's New York office as the communications manager for North America. ■ **Betony Jones** writes: “I'm still in the lovely Sierra Nevada, fiddling around with ecosystem services markets to find a way to provide landowners some incentive to refrain from selling their precious acres to developers. I went to London over the holidays to finish identifying ethnobotanical specimens that I collected in Borneo when I was at Yale. I was lucky enough to see Jessie Barnes and her delightful family, and I also got to spend some time at festive holiday parties in the home of the very glamorous Catherine Bottrill '02.” ■ **Woon Kwong** writes: “After three years in the United States, I have moved back to Asia. I recently transferred from New Jersey to Shanghai for an assignment with Honeywell.” ■ **Christopher Riely** writes: “Having concluded my stint at Seattle's Cedar River Watershed, I am in the Northwest and doing some work for a regional consulting forestry firm with projects around the 'wet' side of Washington state.” ■ **Nalin Sahni** writes: “I am studying environmental law at the University of Toronto.”

■ **Neha Sami** writes: “I'm in Ann Arbor, Mich., doing my Ph.D. in urban planning. I'm hoping to take my qualifying exams this summer and begin fieldwork in a year or so. I'll be in India for most of 2008.” ■ **Corrina Steward** works with Grassroots International in Boston and is about to head to Mali for the first-ever global conference on food sovereignty: Nyeleni 2007 – Forum for Food Sovereignty. She writes: “In other exciting news, my boyfriend and I have just gotten the cutest Golden Retriever puppy. His name is Lord Tucker Prince of Somerville (Tucker, for short). We

moved from Cambridge to Somerville recently, hence Tucker's name.”

■ **Brynn Taylor** is living in Noe Valley in San Francisco and is working on the environmental causes of breast cancer at the Breast Cancer Fund. She loves being back in the West. brynn.taylor@aya.yale.edu ■ **Maria Teresa Vargas** writes: Teresa's daughter, Maite, is 3 years old, and she is talking all the time. Teresa is executive director of Fundacion Natura Bolivia, which received a \$30,000 Innovation Marketplace Award from CGIAR. The award winners included Fundacion Natura Bolivia and the Center for International Forestry Research for Water for Life. This partnership pioneers the use of payments for environmental services to conserve threatened rainforests and protect watersheds in the Santa Cruz area of Bolivia. In a unique arrangement, upstream landowners receive an artificial beehive and training in honey production for every 10 hectares of cloud rainforest conserved for a year. Downstream users, who have suffered severe economic losses from reduced water flows, contribute to the payment scheme to improve water management. ■ **Daniela Vizcaino** writes: “I am working with Conservation International Venezuela, and I get to travel often to Canaima National Park and some of the most beautiful places in the world. I'm also studying photography on the side, and I am enjoying every second I have to take photos.” ■ **Baohui (Bonnie) Zhang** writes: “I am doing fine in Boston. Kind of busy all day working 30 hours a week as a statistician and part-time student in biostatistics at the Harvard School of Public Health. I am married, happy and busy.”

2005

Class Secretaries

David Cherney

david.cherney@colorado.edu

Dora Cudjoe

dora.cudjoe@aya.yale.edu

Virginia Lacy

virginia.lacy@aya.yale.edu

Benjamin Urquhart

bnurquhart@gmail.com

Brett Golden writes: “The National Fish and Wildlife Foundation's Columbia Basin Water Transactions Program provides funding and technical support for water trust-type organizations,

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podcast/](http://environment.yale.edu/1000/environmentyale_podcast/)



including the Deschutes River Conservancy, in the Columbia Basin. We meet several times a year to share ideas and coordinate our work. We met in Portland at the end of 2006. I had my F&ES water bottle at the first meeting, and the woman sitting next to me told me that she was also an F&ES alum – **Rosemary Furfey '84** of NOAA Fisheries. At the next break, the man sitting on my other side said that he was another F&ES alum – **Greg McLaughlin '02**, with the Oregon Water Trust. Turns out that one of the consultants evaluating the program was **Jared Hardner '96**, and **Peter Yolles '97** of TNC in California was also at the meeting to learn more about our group's work. We've finally achieved our goal of taking over the world. (I also met up with **Laura Bozzi '04**, and **Michelle Lichtenfels** and her husband, but that was planned.)"

2006

Class Secretaries

Krista Anderson Mostoller
anderson_kb@yahoo.com

Flora Chi
ying.chi@aya.yale.edu
Reilly Renshaw Dibner
reilly.dibner@aya.yale.edu
Jill Savery
jill.savery@yahoo.com

Jen Adler writes: "I am a botanist, working on wetland delineations, restoration plans and rare-plant surveys for WRA Environmental Consultants. I recently went to Costa Rica for a vacation, where I bumped into **Elizabeth Deliso**." ■ **Jessica Albietz** writes: "I have been living in Quincy in northern California since last June. I am working on watershed protection and restoration as a project manager for the Feather River Coordinated Resource Management Group. The Feather River provides about 20 percent of the state's water supply. Last winter, I went cross-country skiing and tried my hand at telemark skiing in Lassen." ■ **Dada Bacudo** went home to the Philippines thinking that it would be easy to find employment in the environmental management sector. But lo and behold, development projects for the Philippines have moved to neighboring countries like Cambodia, Vietnam and Laos. So, she decided to offer her services as a fund-raising consultant for a coastal resource man-

agement NGO called **Tanggol Kalikasan** (or Environmental Defense) in northern Philippines, where she established public-private partnerships in support of environmental awareness campaigns for several coastal areas. In June, Dada will most likely head off to Uganda for the Uganda Environmental Protection Forum for two years. ■ **Saima Baig** writes: "I am coordinator for the IUCN's environmental economics and business programs. One of my first assignments is to conduct an economic valuation of a stretch of mangrove forests near the Karachi coast. The other part of my job entails working with the private sector on corporate social and environmental responsibility." ■ **Patricia Buah** has a job at the New Jersey Department of Environmental Protection. ■ **Mohamad Chakaki** writes: "I now live and work in Washington, D.C." ■ **Flora Chi** writes: "I have worked for three months with Environmental Resources Management, a consulting firm that boasts the world's largest provider of environmental, health and safety and risk consulting, with services ranging from strategic, board-level advice to site audit, permitting and decontamination. Most of our clients are in manufacturing, pharmaceuticals, chemicals, oil and gas, but we also cover government, transportation, energy, water and entertainment, to name a few. Located in Hong Kong, we have engagements in Asia, Australia, the Middle East and Europe. But as China's economy skyrockets, more projects are pouring in from the Mainland. In the past few months, I helped prepare project proposals, traveled extensively doing site audits and then wrote reports back in the office. It was very much like going on Marian Chertow's field trips in her course, 'Greening Industrial Facility,' though the learning curve was quite steep. Toward the report deadline, everybody works around the clock, which reminds me of finals weeks at Yale. Very challenging." ■ **Joel Creswell** writes: "I'm in my second semester of a Ph.D. in environmental chemistry at the University of Wisconsin in Madison." ■ **Jim Cronan** is somewhere in Seattle. ■ **Jessica Darling** is in Boston. ■ **Rishi Das** writes: "I started my Ph.D. at the University of Virginia (environmental sciences) last fall after spending a month during the summer in Costa Rica at La

Selva, setting up an experiment for my advisor, Deborah Lawrence. I'm getting ready for my first summer of research, and have started some research on phosphorus cycling in dry tropical forests. I hope to submit at least a paper this semester." ■ **Reilly Dibner** writes: "I have been in Ireland for six months now and am enjoying my time very much. Frog season has begun, so I'm busy counting spawn, getting stuck in bogs and comparing the conifer plantations to Yoda's Dagobah. I'm out working in the field, training for the Connemara ultramarathon, meeting up with the Galway Triathlon Club or hanging out with my lovely Irish housemates. The Fulbright grant will carry me through the summer, until I begin a Ph.D. back in the United States. I haven't decided where I'll be, but I have to choose soon." ■ **Diana Dimitrova** started an internship with the environmental department of Brown-Forman Corp. in Louisville, Ky. She writes: "I really liked the job and the people, so I decided to stay on for a while. Now I am an environmental performance coordinator, coordinating the corporate greenhouse gas inventories and energy audits throughout the company, and am working on other environmental stewardship initiatives. Louisville also turned out to be quite a nice place to live; there is always something going on, and the neighborhood where I live reminds me a lot of the grad ghetto around Orange. So, in a way, it feels like I have not left F&ES." ■ **Kostis Drakonakis** writes: "I am evaluating new and innovative renewable-energy technologies as potential equity investments and project financing for the Connecticut Clean Energy Fund." ■ **Jenny Frankel-Reed** writes: "I am at the United Nations Development Programme working on adaptation to climate change, and enjoying New York." ■ **Ross Geredien** writes: "I've managed to string together a few different projects, including some GIS work on mountaintop removal. I recently returned from searching for the Ivory-Billed Woodpecker with the Cornell Lab of Ornithology's search team. Julie and I got engaged on the Appalachian Trail in Vermont in October, and we're hoping to settle down in a place like Portland, Maine, or Ithaca, N.Y." ■ **Gonzalo Griebenow**

writes: "I am working with the Peruvian Mission at the United Nations. I am working on a couple of presentations overseas, one on climate change impacts over the tropical Andes and the other presentation at Cambridge University on conservation science. I am receiving support and feedback from Professor Dave Skelly on both presentations."

■ **Jesse Grossman** writes: "I started a renewable-energy company that develops, owns and operates solar renewable-energy generation stations across the Northeast United States. I am living over the river from Manhattan in Jersey City." ■ **Gudmundur Ingi Gudbrandsson** writes: "I have been fighting land degradation and desertification in Iceland. I am working with the Soil Conservation Service, and have been doing mostly plant ecology research, as well as working in the international environmental arena for my institute. In addition, I am leading the first Society for Environmental Scientists and Managers in Iceland."

■ **Kate Hamilton** writes: "After traveling during the summer, I'm working on carbon markets at Ecosystem Marketplace in Washington, D.C." ■ **Maren Haus** writes: "I'm having fun working for the New Jersey State Sustainability Institute and the Rutgers Center for Green Building as a coordinator for a sustainable-communities project in West Windsor Township." marenhaus@gmail.com ■ **Emily Hicks** writes: "I am based in Hanoi, Vietnam, and am working for TRAFFIC, a joint program of IUCN and WWF. I'm coordinating a project funded by the World Bank that is examining the social and economic drivers of trade in four countries – Cambodia, Indonesia, Laos and Vietnam." ■ **Stephanie Horn** writes: "I'm an urban forester with New York City's Department of Parks and Recreation. I'm responsible for planting street trees in the Bronx after surveying citizens' and local organizations' requests. Plantable sites must meet Parks guidelines, and a hired contractor will plant the trees."

■ **Yukiko Ichishima** started a job with TetraTech. ■ **Dan Jones** writes: "I'm in Louisville, Ky., serving as the CEO of a nonprofit called 21st Century Parks. We are working on the creation of a 4,000-acre addition to the Louisville metro parks system. It's a lot of work and a lot of fun, and it's going great."

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It's nice to be home, although I miss the stimulation of classes. I'm going to be teaching an honors seminar at the University of Louisville in the fall of 2007 called Reading the Natural Landscape: Tools and Perspectives on Environmental History and Planning. It will combine fieldwork on 'reading' and understanding cultural and ecological landscapes, with a seminar project interpreting those landscapes, which will become input for our parks project." ■ **Kyle Jones** writes: "I am working in London at Morgan Stanley in its energy banking group. We are doing lots of renewables work, especially in biofuels." kyle.jones@morganstanley.com or kyleelizabethjones@gmail.com

■ **Alder Keleman** writes: "I'm in Mexico City on a Fox International Fellowship doing research with the Colegio de Mexico on the impacts of free trade on maize diversity." alder.keleman@gmail.com ■ **Laura Kiernan** writes: "This past summer, I went on a whirlwind tour of the national parks on the West Coast. I am an environmental scientist in the transportation department of RKK, an engineering consulting firm in Fairfax, Va. I am living in an apartment in Falls Church, Va." LauraDKiernan@gmail.com ■ **Linda Kramme** writes: "In January I moved to Richmond, Va., to take a job as a chain-of-custody associate with SmartWood, a program of the Rainforest Alliance. I'm working with about 100 companies in the United States that want to sell and market wood products from FSC-certified forests." artemis_llk@yahoo.com

■ **Wei-Chien Lai** writes: "I am a research assistant in the Research Center for Biodiversity, Academia Sinica. I am helping to develop the management plan of Dongsha Atoll ecosystem, which is the first marine national park in Taiwan." wei-chien.lai@aya.yale.edu ■ **Krista (Anderson) Mostoller** is researching the health effects of indoor mold and what the federal government is doing to minimize and mitigate exposure in Boston for the Government Accountability Office. She writes: "In December, I married Matthew Mostoller and spent two weeks in Hawaii on our honeymoon." krista.anderson@aya.yale.edu

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■ **Shuichi Ozawa** writes: "I am an environmental consultant at Pacific Consultants in Tokyo, mainly doing

research on climate change and consulting." ■ **Perrine Punwani** writes: "I moved to Washington, D.C., in January to continue my search for the 'dream job,' and I began working at the Post Conflict Development Initiative of the International Rescue Committee at the end of March. The position is based in D.C., with regular travel to the IRC's New York headquarters and stopovers in Nairobi, Bangkok and Istanbul to conduct training."

■ **Rebecca Sanborn** writes: "I'm back in Vermont, living with my fiancée, Andy, and our two dogs. We are furiously planning our June wedding, and trying to find more time to enjoy the mountains at our doorstep. I've been working for the Orton Family Foundation since graduation, doing land use planning and communications work, but will be making a change this spring." ■ **Jill Savery** writes: "I am now working for PMC, a municipal consulting company, where I am starting a sustainability services division. I am based in Sacramento."

■ **Catherine Schloegel** writes: "I am working for a community-run forestry enterprise called Ecomadera in Ecuador. I will be working with community members to help them create forest management plans, as well as plans for social and economic development." ■ **Caroline Simmonds** writes: "I am a program officer for the Coastal Eastern Africa region for WWF-US. It is based in D.C., with travel to Mozambique, Kenya and Tanzania." ■ **Critter Thompson** writes: "I'm living in Seattle and working at Mithun. I got married on San Juan Island in September."

■ **Yue Wang** has temporarily settled in West Virginia to help The Nature Conservancy answer fundamental questions about and guide planning in the Western Allegheny Plateau. Supported by TNC, F&ES and the Armbricht Family Fund, Wang is studying large, intact stretches of forest and assessing what threatens them. It is hoped that her findings will help direct future conservation actions in the region. ■ **Xizhou Zhou** writes: "I enjoy my job as an environmental consultant for the International Electrotechnical Commission. I saw Seth Cook '98, Ph.D. '04, who is heading IUCN's China program in Beijing."

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Thomas Batey Jr. '49 (1919-2006) died on November 21 in Tacoma, Wash., in the care of his family and hospice. Tom was a graduate of the University of Massachusetts and received his M.F. from Yale. After graduating, he moved with his family to Longview, Wash., to take a job with the Long-Bell Lumber Company. Three years later, in 1952, he moved to Tacoma to begin what would become a 30-year career as a wood products researcher for the American Plywood Association. In retirement, he maintained his affiliation with the Society of American Foresters and the Forest Products Research Society. He was preceded in death by his son, Thomas Batey III, and his sister, Dorothy Ernenwein. His wife of 63 years, Eleanor, survives him, as do his daughter, Beatrice, of Tacoma and his sister, Harriet Fisher, of Natick, Mass.

Howard Coe '46 (1914-2006) died on October 19 in Boston at age 92. Born on September 20, 1914, in Fair Haven, Conn., Howard formed a love of boating long before receiving a B.F. at the University of Connecticut. He worked as a forester for the Saltonstall Division of the New Haven Water Company until serving as a naval officer in World War II. Upon his return to civilian life, he married Helen Reilly, and earned his M.F. from Yale. Stanley Works Corporation hired him the same year and moved him to Vermont, where Howard put his vast knowledge of wood to use in the mill production of Stanley's woodworking tools. He also took charge of the mill's conversion from water to electrical power. In 1951, he returned to Connecticut to assist in building the Salmon Fishway at the Rainbow Power Plant. He went on to help establish the Sloane-Stanley Museum in Kent, Conn., and played a leading role in the conservation of land along the Housatonic River,

including Kent Falls and St. John's Ledges. Throughout his career and into retirement, he participated actively as a member of the Society of American Foresters and the Connecticut Forest and Park Association in Middletown, Conn. He also served as a board member of Connwood in Rockfall, Conn., and as the chair of the Farmington Recreation Association, he helped establish Winding Trails, a nature center. He was predeceased by his wife, Helen. His survivors include his children, GiGi Coe Robinson and Carol Coe Fowler of Grand Junction, Colo., and Kathy Coe of Washington, Conn.; seven grandchildren, Philip and Chas Hollinger, Ryan and Anita Robinson and Meg, Helen and Andrew Fowler; and a brother, Robert, of Branford, Conn.

John Ledyard Hill '47, D.F. '54 (1919-2006), died on December 15 in Portsmouth, N.H. John served in World War II as a lieutenant in the 10th Mountain Division of the Army, participating in the Allied invasion of Italy in 1943. He went on to graduate from Colorado State University, after which he earned his master's degree and doctorate from Yale. He promoted the use of wood products for the National Lumber Manufacturers Association in Chicago and Washington, D.C. In 1964, he did research and taught at the University of New Hampshire's Department of Natural Resources in Durham, a position he retained until his retirement. After retirement, he pursued his passion for teaching and consulting part-time, while conducting research on the kiln drying of wood at his lab at UNH. Friends and colleagues recall him as a consummate gentleman, a selfless man, a dedicated scientist, a faithful member and deacon of the Community Church of Durham and a beloved professor

known to one and all as "Doc" Hill. He is survived by his wife of 62 years, Doris Elaine Hill; his three children, Katharine Hill Wentworth, John Hill Jr. and Christian Hill; six grandchildren, Jonathan and Hillary Wentworth and Lindsay, Eliza, Nick and Adrian Hill; and three nieces and two nephews.

William Klein '59 (1928-2006) died in Ogden, Utah, on November 14 at the age of 78, surrounded by his family. William served in the U.S. Merchant Marine and in the Army Infantry, stationed as a second lieutenant in Germany. He graduated from John Muir College in Pasadena, Calif., in 1949 and received a B.S. in forest management from Oregon State College and an M.F. in entomology from Yale. He was a firefighter in the mountains of California and enjoyed a long career with the U.S. Forest Service. In retirement, he developed remote sensing methods for forestry and, in the 1980s, taught remote sensing at Stephen F. Austin University in Nacogdoches, Texas. He published widely and was honored by his students with the university's award for best teacher. He went on to travel and learn German. He successfully spearheaded the placement of a commemorative plaque at a Utah ski resort honoring John Paul Jones, a Utah native and member of the U.S. Army's 10th Mountain Division, who died in the battle of Belvedere in Italy during World War II. Active in the civil affairs of both Davis, Calif., and Ogden, Utah, he focused on initiatives to preserve the natural beauty and environment of California and northern Utah. Until the end of his life, he enjoyed skiing, hiking, fishing, camping and riding his motorcycle. He is survived by his wife of 33 years, Marilyn Rita; a daughter, Norma Jean Klein; a son, William Hugh Klein Jr.; and a grandson, Caleb William Eddy.

John Noyes '39 (1914-2006) died on December 22 in the town of his birth, Old Lyme, Conn. John was a direct descendant of the first minister of Lyme and Old Lyme, the Rev. Moses Noyes. He received his undergraduate education at Connecticut State College and earned his M.F. from Yale. He began his career as a civilian construction inspector for the Army Corps of Engineers, but he left his position during World War II to serve as a staff sergeant in the U.S. Army Amphibious Corps in the southwest Pacific, operating large landing craft. After the war, he assumed broad responsibilities in multiple-use land management with the U.S. Forest Service in the White Mountains, Daniel Boone and George Washington national forests. After a stint in a regional office of the U.S. Forest Service in Pennsylvania from 1955 to 1957, he was named professor of forestry and Massachusetts state extension forester at the University of Massachusetts. He distinguished himself as a writer and leader, publishing more than 100 bulletins and articles and receiving numerous awards, and helped form the Massachusetts Christmas Tree Growers Association, Massachusetts Wood Producers Association and Massachusetts Land League. He is survived by his wife of 58 years, Werneth; a son, John Noyes; a daughter, Susan Noyes Hollifield; four grandchildren, Cassie Hollifield Knight, John Hollifield, Sarah Noyes and Ellen Noyes; and a great-grandchild, Harrison Knight.

Trevor O'Neill '82 (1951-2007) died on January 3 at age 55 of lung and brain cancer at New York-Presbyterian Weill Cornell Medical Center. Trevor was born in Westport, Conn., and was a graduate of the Hotchkiss School, Dartmouth College, F&ES and Yale Law School. After graduating from law school in 1985, he went on to work at the U.S. Commerce

Department in Washington, D.C., and in the California governor's office on coastal zone management and water-pollution issues. At the time of his death, he had been a partner for 12 years at the law firm of Kasowitz, Benson, Torres & Friedman in New York City. An environmentalist and a dedicated student of geology and marine biology, he wrote articles on offshore oil drilling and its associated pollution. He was a history buff, devouring volumes on World War II and the Civil War, and enjoyed reading biographies and spy thrillers. He loved playing the guitar and piano and listening to jazz and songs from musicals. At Dartmouth, he was co-captain of the rugby team; played soccer, baseball and hockey; and enjoyed sailing the Maine coast. As a youngster, he was dubbed "The Next Mickey Mantle" on the front page of the local Westport newspaper for his feats on the baseball diamond. He is survived by his wife of 15 years, Ellen Marjorie Iseman; a son, Alexander Trevor Iseman O'Neill; his mother, Cornelia Rockwell O'Neill; three brothers, Bracken, Denis and Christopher; his aunts, Rowena and Jean; several in-laws; and numerous cousins, nieces and nephews. In lieu of flowers, donations may be made in Trevor's memory to the Trevor O'Neill Arboretum, c/o Dr. Steven Tobolsky, head of the Lower Division, The Horace Mann School, 4440 Tibbett Avenue, Riverdale, N.Y. 10471.

Cesar Perez '56 died on June 20, 2005. After receiving an M.F. at Yale, Cesar moved to Medellin, Colombia, to become a faculty member in the Forest Science Department at the National University of Colombia, a position he held from 1957 to 1993. He was esteemed by colleagues as a great professor and a pioneer in ecology and land use studies in Colombia.

William Reifsnyder, Ph.D. '54 (1924-2006), of Lama, N.M., died on November 3. A professor emeritus of forest meteorology and biometeorology, Bill held a joint appointment in the Department of Epidemiology and Public Health of the Yale School of Medicine. He joined the Yale faculty in 1955 and taught courses in biometeorology, climatology, air pollution meteorology and forest fire control. Prior to joining the Yale faculty, he worked for the U.S. Forest Service's California (now Pacific Southwest) Forest and Range Experiment Station as a research forest fire meteorologist. He participated in the early atomic bomb tests, evaluating the effects of nuclear explosions on forests. At that time, he also wrote and narrated a series of programs on meteorology for the Berkeley radio station, KPFA. In Connecticut, he was an on-air weather forecaster for the local NBC-TV station and served as chair of the National Research Council's Committee on Climatology. His listings in *Who's Who in America* and *American Men and Women of Science* highlight the far-ranging effect of his life achievements. He had been a visiting professor at the Meteorological Institute of the University of Munich and at the Swedish University of Agricultural Sciences in Uppsala. He served as a visiting lecturer in biometeorology at the Max Planck Institute for Meteorology in Hamburg, Germany; senior research scientist at the Environmental Research Laboratories of the National Oceanic and Atmospheric Administration in Boulder, Colo.; corresponding member of the Connecticut Academy of Science and Engineering and chair of its committee on atmosphere; vice president of the International Society of Biometeorology; and chair of the committees on biometeorology and agricultural and forest meteorology of the American Meteorological Society. He held a B.S. degree in meteorology

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from New York University, an M.F. degree from the University of California, Berkeley, and a Ph.D. from Yale. He served as a second lieutenant in World War II. He was preceded in death by his wife, Marylou Reifsnnyder, an artist and author of children's books who co-authored with him a hiking guide to the Alps. He is survived by a son, Gawain; two daughters, Rita Hall and Cheryl Lama; four grandchildren; and six great-grandchildren.

Ricardo Tarifa '95 (1962-2006), a Brazilian forestry specialist with the World Bank and former Fulbright Scholar, died on September 29, when a GOL Airlines plane crashed en route from Manaus to Brasilia. Ricardo held an M.F.S. in tropical forestry from Yale, a certificate in organic agriculture from Emerson College and a B.S. in tropical agriculture from Faculdade de Agronomia de Pinhal in Sao Paulo. Prior to joining the World Bank, he served at the School for International Training and the Instituto do Homem e Meio Ambiente (IMAZON) in Brazil. His tenure with the World Bank Group began in September 1995 in the Brazil Rain Forest Unit. An avid cyclist, he was finalizing plans at the time of his death for a two-year bicycle trip to visit the world's major forests. Colleagues remember Ricardo for his love of the field, his passion for conserving the forests and his quest to better the lives of the people of the forests.

Joseph Andrew Tosi Jr. '48 (1921-2006), died in December in his home near San José, in San Ramón de Tres Ríos. Joseph was a geographer and ecologist known for his defense of Costa Rica's natural environment. He earned a B.S. at the University of Massachusetts, an M.F. at Yale and a Ph.D. in ecology at Clark University. He lived in Peru with his wife and

three children for several years, then moved to Costa Rica in the early 1960s. In 1962, he co-founded the Tropical Science Center, which brought under its wing the Monteverde Cloud Forest Biological Preserve in north-central Costa Rica in the early 1970s. A pioneer in fighting deforestation with the creation of national parks and private reserves, he studied and proposed a long list of protected areas. Many of these eventually were set aside as national parks or refuges, including Corcovado National Park, Caño Negro Wildlife Refuge, Cahuita National Park, La Amistad International Park, Barra del Colorado Wildlife Refuge and Diría National Park. A colleague at the Tropical Science Center said, "The noble mission that Joe Tosi set for himself as a young man in the wilderness is being accomplished today in Costa Rica, as key biological areas come under protection in one of the highest biodiversity regions of the globe." He was honorary president of the center at his death. He was preceded in death by his brother, Charles Tosi; a son, Jonathan Tosi; and a grandson, Sergio Andre Tosi. He is survived by his wife, Mary Lu; a son, Alexander; a daughter, Lucinda; a brother, Peter; a sister, Beatrice; two grandchildren, Joseph Tosi Cascante and Kesia Tosi de Kocak; and several great-grandchildren, nieces and nephews.

Earl Haven Tryon, Ph.D. '45, grew up in Maine and held a B.S. in forestry from the University of New Hampshire, an M.S. in forestry from Oregon State University and a Ph.D. from Yale. Earl had a long career in forest ecology as a professor of silviculture and as a forester with the Agricultural Experiment Station at West Virginia University in Morgantown, where he and Ken Carvell '50 collaborated on a program

of research on hardwood silviculture. He was made a fellow of the Society of American Foresters in 1979. In 1995, Earl and his wife, Opal, moved from Morgantown to Florissant, Mo., to be closer to their daughter. He remarked in 2005 that he considered his research during World War II as his nonmilitary contribution to that national effort.

Richard Arnold Williams '50 (1923-2006) was born on Long Island and received a B.S. in forestry from the University of Massachusetts and an M.F. from Yale. Dick was a veteran of World War II, serving in the China-Burma-India Theater. A forester for Georgia-Pacific Corp. for 37 years, he served on numerous committees of the Ozark and Ouachita sections of the Society of American Foresters (SAF). In 1988, the year he retired, he was elected a fellow of the SAF. He served on the University of Arkansas at Monticello Forestry School advisory committee, the Arkansas State Plant Board, the advisory committees of the U.S. Forest Service Crossett Experimental Forest and the Southern Hardwood Lab at Stoneville, Miss. In addition, he was Georgia-Pacific's representative on the forest industries telecommunications board of directors for 10 years. He had been a registered Boy Scout since 1955 and worked with numerous local Cub packs, Scout troops and troop committees. Beginning in 1954, he maintained an active membership in the Crossett First United Methodist Church. After retirement, he pursued an interest in drawing and watercolor painting. He is survived by his wife, Alice; a daughter, Lynne Williams Jenkins; a son, Richard Williams; and two granddaughters, Emily Herrin and Madeline Claire Williams.

Gregorio Torio Zamuco '29 (1901-2007) was born in 1901 in Aguilar, Pangasinan, the Philippines. Greg studied forestry at the UP College of Forestry in Los Banos (UPLB) and graduated at the top of his ranger class in 1921. From Los Banos, he was sent as a government "pensionado" to the University of Washington in Seattle, where he earned a B.Sc. forestry degree in logging engineering. He went on to obtain a master's degree in forest management and forest products from Yale. In the early 1950s, when the United Nations Food and Agriculture Organization set up a training program in logging engineering for middle-management officers from the various countries in the Asia-Pacific Region, he was appointed program leader. At UPLB, he was a professor and the registrar before becoming dean in 1958. His greatest legacy was his success in getting approval of the (Philippines) Congress of Republic Act 3523 in 1963, which placed the entire Makiling Forest (formerly the Makiling National Park) under the jurisdiction of UPLB. It also established within that area a National Botanical Garden and an Experimental and Demonstration Forest, which have served as permanent field laboratories for forestry and natural-resources research. His placement of this forest under the jurisdiction of UPLB probably saved Mt. Makiling from destruction. When he passed away on February 17, he was just 81 days short of his 106th birthday.

Students' Imprint...

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Firing range: This facility should be moved; it deters people from using the park.

Recreation: The creation of trails with signs and the removal of a fence near the police academy (if the shooting range is moved) are recommended.

Trash: Catchment basins should be added to collect all the detritus in one place.

The final plan, in the form of a 150-page report, was presented again in February, to 30 park neighbors who met at the police academy. Nan Bartow, head of Friends of Beaver Ponds Park, thanked "the four very industrious and capable students from the Yale School of Forestry and Environmental Studies, Professor Ashton and the adjunct professors who worked with you."

Since Thomas Siccamo informally started the "Management Plans for Protected Areas" course in the 1960s, over 110 management plans have been produced for properties throughout New England, 70 since the course was formalized in 1993. Ashton says that the clients cheerfully pay for all expenses that the students incur, because in the end they avoid the fees charged by environmental consulting firms. And the students get invaluable practical experience by putting their education to work in creating the plans and in learning the art of political compromise.

"This is the second time we've availed ourselves of help from F&ES students," said Rich, of the Hotchkiss School. "Three years ago, students from Professor Ashton's class created a plan for Beeslick Brook that codified a base of knowledge that has proven instrumental in generating interest in the woods along the brook. We've since reprinted additional copies of that report. Partly based on that positive experience, we contacted the school again when we purchased the Blum Farm."

Ashton says there is a long queue of clients waiting to take advantage of the expertise of F&ES students, ensuring that the students will be leaving their imprint on the New England landscape for decades to come. ■

Donor's Faith...

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Ordway lives in Wyoming during the warmer weather with his wife, Margaret Doria, but since 1985 they have spent winters in California. Margaret is a watercolorist and the two share philanthropic endeavors and a love of reading. Ordway's two daughters are full-time mothers, one living in Paris, the other in Montana. His son works for Boeing in Long Beach, Calif. Each summer, Fish Creek Ranch is a meeting ground for his five grandchildren.

During his Yale years, Ordway considered F&ES to be an "industry school," to train people for the U.S. Department of Agriculture or the U.S. Forest Service.

"It has completely changed its emphasis," he said. "The graduates have contributed so much to these nongovernmental organizations and nonprofits, and there are so many of the staff of these organizations who come from the school," he said. "Because of the effectiveness of the programs, I began to contribute. I also got to know the school through others in environmental organizations, and they were all enthusiastic about the school."

Ordway said one of the pleasures of contributing to scholarships at F&ES is receiving letters from the students who benefit from the contribution. "They tell me about their projects," he said, "and many say that they are only able to be at F&ES with help. It is there that they become very accomplished in solving environmental problems." ■



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Yale School of Forestry & Environmental Studies

205 Prospect Street
New Haven, CT 06511 USA
tel: 203-432-5100
fax: 203-432-5942