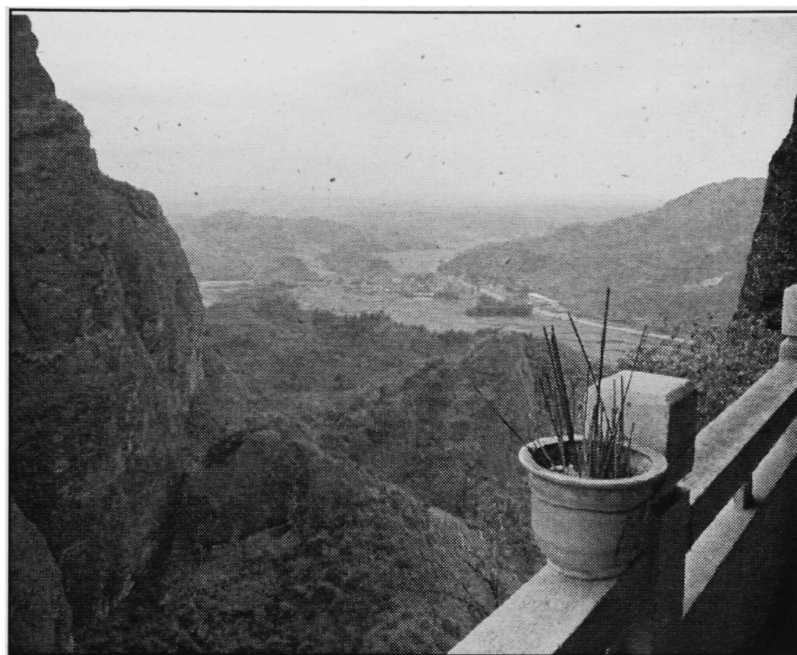


# THE ECOTONE

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Fall 2000, The Journal of Environmental Studies, The University of Oregon

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# EDITOR'S NOTE

*ECOTONE: a transition zone between two adjacent ecological communities, such as forest and grassland. It has some of the characteristics of each bordering community and often contains species not found in the overlapping communities. An ecotone may exist along a broad belt or in a small pocket, such as a forest clearing, where two local communities blend together. The influence of the two bordering communities on each other is known as the edge effect. An ecotonal area often has a higher density of organisms and a greater number of species than are found in either flanking community.*

This issue of *THE ECOTONE* contains the voices of the graduate students at the University of Oregon's Environmental Studies Department. Recent past issues have focused around a topic and presented the many voices and viewpoints in regard to that focus. The new editors of The Ecotone recognize the past success of bringing disparate views surrounding a subject together in one publication. However, we also recognize the variety of interests and views within our own program, and for this issue, sought submittals solely from our graduate students.

Many students are new to the Environmental Studies program and to The Ecotone. It is our belief that this issue presents a wonderful opportunity for members of our department to express their voices and share them with the environmental community. At the same time this is an opportunity for students to share experiences and perspectives on issues from close to home and around the world. This issue offers stories, essays, journal entries, photographs, poems, and drawings. The entries were largely inspired by the overarching and age-old subject of "what I did over my summer vacation." Subjects range from aquatic issues to land management to cultural impressions.

**Cover Photograph:**  
*Dragon Tiger Mountains, China*  
**Brian Thomas**

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## THE ECOTONE

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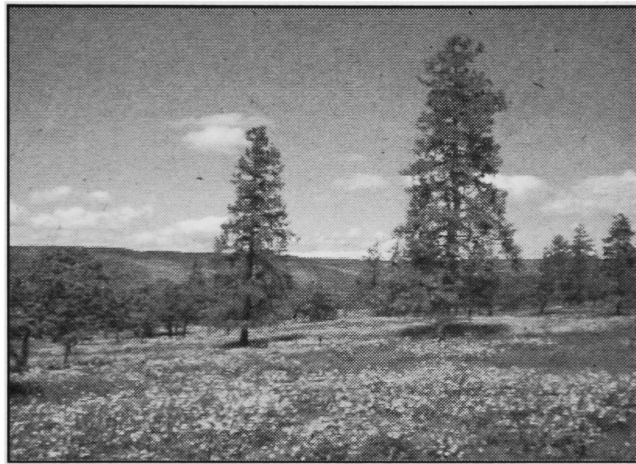
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*The new editors would like to recognize Tony Leiserowitz who has stepped down as editor of The Ecotone. As the founding editor, Tony shaped The Ecotone into a quality newsletter that gives voice to many perspectives on important environmental issues. We hope to continue where he left off.*

# CONTRADICTIONS IN OREGON'S LAND USE PLANNING

BY PATRICK HURLEY

On June 9, 2000, Oregon's state land use planning administrator, the Department of Land Conservation and Development (DLCD) promulgated a new administrative rule relating to Goal 14 (Urbanization) of the statewide land use planning system. The new rule set out to legally define the notion of rural residential development in Oregon. The concept of rural, like many in the American psyche, carries with it numerous images: rolling fields of wheat in the Midwest, small trailers or cabins in the hills of Appalachia, old-style Spanish adobe homes amid the pinion and juniper in the Southwest, the large and isolated ranches that dot the interior basins of southeastern Oregon, and even closer to home, the grass farms and old farmhouses built next to an old grove of Oregon white oaks in the Willamette Valley.



Patrick Hurley

Beyond their aesthetic values, and often overlooked, is the fact that rural areas are important harbors for a rich diversity of plants and animals. In their recent book, *Precious Heritage*, The Nature Conservancy estimated that private lands nationwide support at least one population of two-thirds of all federally listed endangered species. Given the role of habitat fragmentation in threatening so many native species, addressing the question of what constitutes rural and how these areas will be developed from a zoning standpoint has tremendous ecological significance.

Oregon's land use system largely sees the landscape through one of two lenses; either an area is urban or it is recognized for its raw productive capacity. Resource lands, as the latter are termed, refer to lands that have agricultural or timber value. They are historically the driving force behind ensuring that Oregon's cities are limited in their growth through the use of Urban Growth Boundaries (UGBs). The problem with this dualistic approach, as a number of authors have

pointed out, is that it neglects a third class of lands, namely those that lie outside of urban areas and do not have traditional resource value. These areas are precisely the lands in question under the new administrative rules.

Quantifying the definition of rural within a zoning framework by assigning minimum or maximum lot sizes is obviously not an easy task. How does one transfer the endurable images described above to a policy document that carries the weight of law? Despite a decision by the Oregon State Supreme Court in 1986 (*1000 Friends of Oregon v. LCDC*) that directed the Land Conservation and Development Commission to address how rural should be defined in county comprehensive plans, the State of Oregon had until June ignored this question.

While the new administrative rule only applies to approximately 700,000 acres of land (a relatively small area for such a large state) and would only determine the future division of parcels, in at least one case, the areas subject to the new provisions contain relatively large blocks of native habitats. Development under the provisions outlined by the new administrative rule would ensure the fragmentation of habitats identified by the Oregon Biodiversity Project as important areas for conservation action.

One example of such areas is in the Oregon white oak savanna and Ponderosa pine woodlands in the northern part of Wasco County, Oregon. Just south of the Columbia River Gorge, oak habitats on the Rowena Plateau lie within an ecological transition zone between wetter Douglas-fir forest and the sagebrush steppe of the Columbia Plateau to the East. The narrow belt of oak woodlands and Ponderosa pine forests, which are home to a number of sensitive species such as Lewis' woodpecker, include large

areas where native wildflowers paint an almost unimaginably vibrant landscape in the springtime. Open fields, some interspersed with lone oaks or pines, and woodlands of oak are awash in the yellow of balsamroot, Indian paintbrush, lupine, and numerous others. This is the landscape that stands to be fragmented by Oregon's new administrative rule.

The irony in the policy discussion over the meaning of rural is that under a system that strives to maintain large parcels of land outside of urban areas from being subdivided into small lots, the new rule favors houses evenly scattered across the landscape. Depending on the county in question, DLCD has determined that a two-acre parcel is the smallest allowable lot for development. Anything greater would be considered urban density. In most cases though, the minimum lot sizes are larger: 5 to 10 acres. These parcel sizes are not allowable within lands zoned for resource use, as the resulting fragmentation is seen as a hindrance to the productivity of these lands. Thus, the new rule encourages fragmentation of rural landscapes while simultaneously discouraging clustering beyond the two-acre limit in situations that might include large open space protection scenarios. Results from fieldwork this spring show that areas developed at densities of five to ten acres have fewer total numbers of wildflower species than in areas with large undeveloped blocks. General observations also suggest lower densities of native wildflowers on smaller parcels scattered across large areas.

While I imagine most Americans would accept that a few houses situated on ten-acre lots could be considered a rural residential setting, I imagine that just as many would accept a few enclaves of more densely settled clusters space widely apart as rural too. However, the latter alternative is strongly limited by the new provisions set out by DLCD. In an effort to avoid anything that might look urban, or worse, suburban, the agency has probably ensured the fragmentation — and resulting ecological consequences — of important native habitats in at least one part of Oregon. In so doing, DLCD has potentially missed a clear opportunity to link Goal 14 to Goal 5, the goal in the system that addresses protection and conservation of unique ecological areas. The either it's-urban-or-it's-not mentality not only ignores this other component of the statewide land use system, it flies directly in the face

of many principles of conservation biology and landscape ecology. Moreover, these simplistic quantitative rules may well discourage innovative, incentive-based solutions for addressing the conservation of ecosystems and their species.

Research conducted this summer across 24,000 acres of northern Wasco County and including portions of the Rowena Plateau serves to illustrate the potential for making the link between Goals 5 and 14 discussed above. By developing a methodology that uses the citizen watershed assessment as a model, this effort attempts to provide a simple yet helpful assessment of native habitat types at a scale commensurate with traditional and newly emerging land use planning approaches. Using a framework that allows for the concentration of development in poor quality habitats, while simultaneously safeguarding against sprawling development, this work aims to suggest alternative approaches to development in rural areas in Oregon that are consistent with multiple goals in the Oregon planning system while also providing for the involvement of local citizens in the planning process.

*Funds from the Donald R. Barker Fund contributed to this research.*



*Patrick Hurley*

# ANOTHER LOOK AT FIRE

BY MELYNDA COBLE

---

Dirt settled around my boots as the late June sun pulled beads of sweat from my forehead. Shading my eyes with my hand, I squinted through the smoke. The view from where I stood at Photographer's Point was gray. Gray and hazy. My Hiking Wyoming's Wind River Range guide had promised a grand view of the face of the range. I'd spent the early morning hiking for four miles, en route to Photographer's Point, and the sliver of sky where the trail split the dense lodgepole forest was the only view I saw. Then I emerged onto the granite promontory and gazed down into a valley that dropped over 2,000 feet in front of me. Between the steep walls of the valley below Fremont Creek connected Gorge Lake, Suicide Lake, Upper Long Lake and Long Lake. From the overlook I'd expected to see pyramid-shaped Temple Peak, rugged Mount Bonneville, and the range's second highest summit, Fremont Peak rising above glacier carved valleys and sparkling turquoise lakes. Instead, I saw smoke, the result of a fire near Triangle Lake about two miles to the northwest.

Throughout the summer of 2000, fires blazed across the West. When I was visiting friends in Bozeman, Montana in August, the air smelled burned and in the morning I brushed ash off my silver truck like a light snow. The Tetons, only a couple of miles from my home in Jackson, Wyoming, disappeared into the haze for much of August.

Fires are an integral part of the ecosystem in north-western Wyoming, and the organisms that live there have adapted to and coevolved with fire. Once, periodic fires of varying size and intensity helped create a heterogeneous landscape, but 100 years of aggressive fire suppression has more recently led to fuel build up and homogenous vegetation. Before fire suppression efforts, many trees were left unburned during blazes through these forests. Occasional fires created patches and clearings that shade intolerant plants could colonize.

This year a La Nina system ushered dry, hot weather to the West. High temperatures, low relative humid-

ity, little or no precipitation, high winds, and fuel build-up combined and led to the largest fire season in fifty years.

But weather systems were not the only process to blame. Ironically, our fear of fire, and consequent fire suppression, was also partially responsible for catastrophic blazes. In Yellowstone National Park, large stand-replacing fires in persistent lodgepole forests, much like the one I hiked through in the Wind Rivers, may be more common now than in presettlement times when low-severity fires maintained a forest with structural variety (patches, clearings etc.) and a low level of fuel (dead and downed wood, as well as low branches and a shrubby understory). Fire suppression allows fuels to form fire ladders: a vertical build-up of fuels that encourage fire to move upward, into the forest canopy. Low-intensity fires, which would naturally burn close to the ground in the absence of excessive fuel, climb the fire ladders and explode into the treetops, extensively damaging or killing the trees.

The Triangle Lake Fire in the Wind Rivers, which I saw from Photographer's Point in August, burned primarily through lodgepole pine forests, like the dense, viewless forests I passed through on the way to Photographer's Point. As I hiked along Pole Cat Trail to the overlook, dust from the dry trail coated my legs. I peered into the trees. An almost pure stand of Rocky Mountain lodgepole (*Pinus contorta* var. *latifolia*), a tall, slender tree with needles two to a bunch and thin, scaly bark, surrounded the trail.

Every forest reacts differently to fire, and I considered how this particular lodgepole forest would be affected. The trees were packed so close together that little light fell to the forest floor. Because of the low light, these lodgepoles self-pruned and their branches started about half way up their trunks. Based on the denseness of the trees, I guessed this stand had not experienced fire for some time. Persistent lodgepole forests are generally open, with occasional dense patches. Fire is an essential process in maintaining this forest's structure and composition. Stand-replacing fires are

possible during drought and with high wind, but more commonly low-severity or patchy fires thin the stand. Resin seals closed some of the lodgepole's cones and high temperatures are required to melt it and release the seeds. Fire also prepares the ground by burning organic matter on the forest floor, exposing the bare mineral soil the seeds need to sprout.

For me, the fires were merely an inconvenience; the air was smoky, views were obstructed, and much of the National Forest and National Park lands I enjoyed hiking in were closed for at least part of the season. In fact, the trailhead I used to get to Photographer's Point, and beyond, closed about two weeks after I hiked out. For other people, the fires were more than just an inconvenience. Some people lost their houses, and others, their lives. The magnitude of their loss should not be underestimated, but we have to understand the consequences of living in a landscape formed by fire, and dependent on fire.

*The Environmental Studies Program hosts a speaker series. The following is a sampling of the lectures that will be held on campus this winter & spring. Keep an eye out for these and other speakers.*

**Winter:**

Date TBA: **Chet Bowers**, of the University of Oregon, has written several books about ecological education and the role of technology and computers in globalization and the environmental crisis.

March 5: **Stan Boutin**, of the University of Alberta, researches lynx-snowshoe hare cycles, conservation biology, and wildlife management.

**Spring:**

April 9: **George Roderick and Rosemary Gillespie**, of UC Berkeley, research spider populations and species invasions in Hawaii.

April 23: **Sid Goodloe**, a New Mexico rancher who has done ecological restoration and is working towards sustainable ranching practices, is part of a sustainable ranching and watershed group.

Date TBA: **John Cubit**, of NOAA, works to determine compensation for toxic spills, a field that deals with many environmental justice issues.

## STELLER'S JAY

BY JANET FISKIO

*All day I have watched it rain, and then  
the sun comes out, and then the clouds shift  
and it rains again.*

*This is what the sages advise: to observe  
the kaleidoscope of my longings, to fall  
out of love with my life to save it.*

*The sun comes out. Under the dripping trees,  
I turn over the compost. Pill bugs and centipedes  
burst in all directions. I grip the shovel and breathe,  
not maggots, not maggots, not maggots, breathe until  
I can see again. I raise the shovel and dig  
into the rotting squash spilling seeds, the slippery  
leaves, steam rising. An earthworm, exposed to the air,  
looks raw and purple-red, like a vein. I breathe,  
earthworm. It pushes back into the wet dirt.*

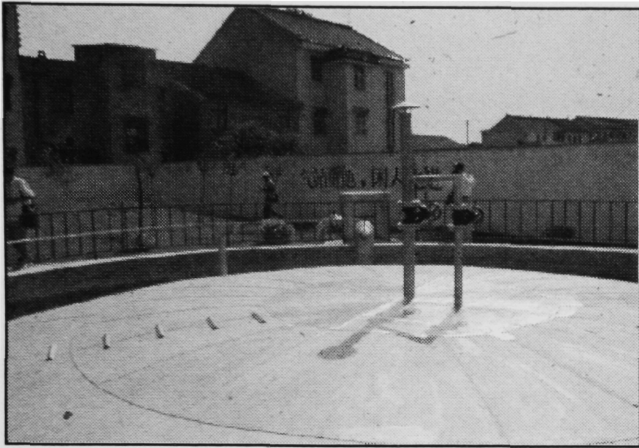
*My feet are dirty in their sandals.  
I drip my way across the floor.*

*A Steller's jay shrieks from the Douglas-fir.  
He flattens his Mohawk of black feathers,  
swells his indigo breast, and screams again. I return  
with a handful of peanuts in the shell, step out  
onto the deck, and balance them on the railing.  
Then I sit down.  
He flies to a lower branch.  
I promise not to move.  
He takes one and flies away, but  
each time he comes closer.*

# THE APPLICATION OF ECO-AGRICULTURAL SYSTEMS IN CHINA

BY BRIAN THOMAS

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*Brian Thomas*

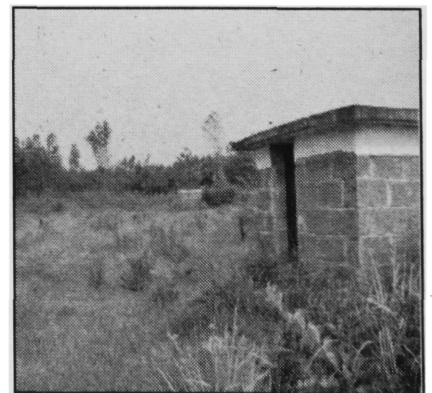
I came to China with the purpose of learning the principles behind the research and application of Chinese eco-agricultural systems. I hoped to observe the components of these complex agricultural systems and to discuss with researchers how these systems were being applied. Eventually, I planned on evaluating the potential of these systems to meet the economic and social needs of rural China without compromising the condition of the environment. Utilizing the principles of holism, harmony, regeneration, and cycling, Chinese eco-agriculture is in many ways fundamentally different from the large, simple, production oriented systems characteristic of American agriculture. In the same way, research in this area involves researching several subsystems and identifying how they are related instead of isolating and quantifying a handful of variables.

My focus has changed considerably from its original goal of the quantification and modeling of the material inputs and outputs of a rural Chinese village. Increasing awareness of the social, political, and economic forces that are influencing rural China has led me to a more holistic interest in the relationship between agricultural practices and environmental degradation. Although ecological agriculture (also called integrated farming systems, eco-agriculture, and ecological engineering) is far from a predominant method of managing agricultural systems, it nonetheless shows great potential for meeting the diverse economic, environmental, and social needs of rural China.

In order to gain experience with Chinese ecological agricultural systems, I spent a month in China meeting with researchers and visiting ecological communities. I visited the Soil Science Research Institute in Nanjing where I met with scientists and learned about their research and opinions regarding current challenges to the Chinese agricultural sector. After one week, I went to the Red Soil Ecological Research Station in Yingtan, Jianxi. This is the location of the agricultural field station operated by the Soil Science Research Institute. After several days visiting experiment plots, I went to Hangzhou and participated in a two-week training course on Biotechnologies for Sustainable Agricultural Development. This course was put on by the Ecoagriculture Institute in Zhejiang University and focused on the use of Chinese ecological agriculture and intensive farming systems. This course consisted of one week of lectures and one week of field trips to ecological agricultural systems.

The techniques implemented in Chinese ecological agricultural systems are not entirely revolutionary and are very similar to low-input or organic practices in other regions. They involve practices that combine animal husbandry and crop production, utilize multi-cropping and intercropping regimes, and reduce the amount of synthetic chemicals used. The idea is to integrate past practices, such as organic fertilizers, and combine them with more modern technologies such as biogas tanks. The uniqueness of this management paradigm is not in the individual techniques involved. It is in the principles behind these systems that we see the true potential of ecological agriculture to help improve rural China.

Initially, I was disappointed by the quality of most



*Brian Thomas*

of the research being conducted on these agricultural systems. Many standard variables, such as plant nutrient levels and soil quality were not being carefully monitored. There was little information on individual components of the systems. Research tended to focus on the entire system without breaking it down into parts. This, I thought to myself, was not terribly good science. On the other hand, I began to see, part of the difference was in the focus of these agricultural systems. Instead of trying to isolate and quantify each of the variables involved in the system, researchers were trying to examine the relationships between different parts of the system. This was the case in the forest/fruit tree/rice paddy/pond system being studied at the Red Soil Ecological Research Station. Here nutrient flow between subsystems was measured, but the nutrient movement within each subsystem not examined. Instead of using one or two intensely studied sets of

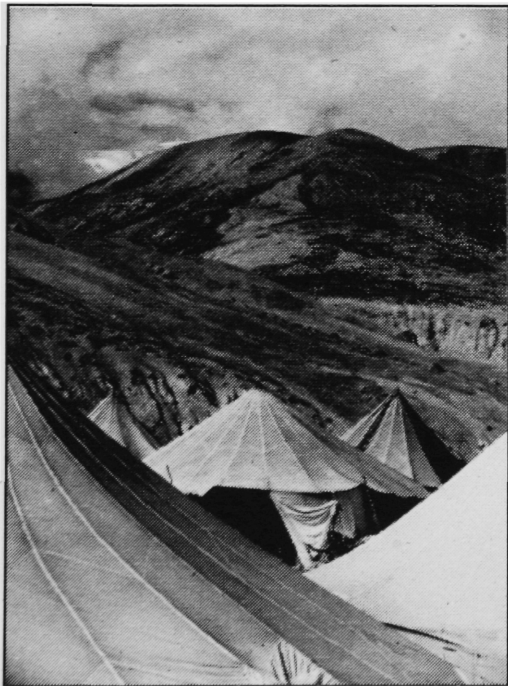
variables and extrapolating them to make management recommendations for the whole system, Chinese ecological agricultural researchers were simply experimenting with management of the entire system.

The political, social, and economic forces that are influencing changes in China's agricultural sector are complex. Even in the short time that I was there, it was evident that there was little interest in small, labor-intensive agricultural systems despite the possible environmental benefits. It seems unlikely that the specific systems I saw will spread very far beyond the demonstration communities where they currently exist. Nonetheless, the principles of holism, harmony, regeneration, and cycling have the potential to be applied elsewhere. Chinese ecological agricultural systems are certainly not the key to solving China's rural environmental problems, but they can be a step in the right direction.

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## YURTS IN LADAKH

### STEVE MITAL



During the summer of 1999, I worked as an intern for the World Wildlife Fund for Nature in India on an eco-development project. While there, I had the opportunity to travel through northern India and took this photo while in Ladakh. The fragile landscape is often called "Little Tibet" because of its physical and cultural resemblance to the Tibetan Plateau. Tibetan refugees living in yurt villages like this one cater to travelers on the road to Leh, the capital of Ladakh. The white coverings on the yurts are decommissioned parachutes. The Tibetans purchase them for \$20 each from a nearby Indian military base that defends Ladakh from Pakistani and Chinese invasion.



# DEEP IMMERSION: THOUGHTS ON WATER MANAGEMENT

BY TODD MILLER

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"I hereby name this 'Sandwich Lake'" proclaimed Brian. Maggie and I mumbled and nodded in agreement, our mouths full with lunch. We readily consumed our well-earned nourishment and contemplated how long we would tolerate digestion before we ventured into the water. Sandwich Lake, unnamed on the maps, was one of six glorious, snow-melt filled lakes we would immerse ourselves in that weekend. From atop Grouse Ridge one can spot dozens of lakes through the glacially-carved western Sierra Nevada. The view climaxes with the peak of Mount Lassen, far to the northwest, just visible above numerous, closer ridges. Patches of snow remained in defiance of the late August sun. To the south, somewhere out of view and mind, Interstate 80 climbs up Donner Summit and dips down into the Lake Tahoe basin.

For years, vehicles have descended that highway hauling motorboats and jet skis. Mobile homes wafting asbestos joined them en route to Tahoe's shores. Their drivers have cursed me as I braved the thin, white line at asphalt's edge on my bicycle for the seventy-six miles around the famed lake. The jet skis and boats screamed atop the water on my right as SUV's sporting "Keep Tahoe Blue" bumper stickers zoomed by on my left. But this year, at Sandwich Lake, a place accessible only by a six-mile unimproved logging road and a several mile hike from there, I left that behind. I scooted through the deep, cool water and reveled in the wondrous granite bowl holding the pure, clean, goodness of nature. Until I noticed the defunct dam.

A crude barrier of boulders and wood debris, the dam had been breached by time and held the lake at what appeared to be a natural level. The stain of the former waterline was visible on the granite blocks another ten feet up. No jet skis, but the intrusion of human hands was evident — even at this remote lake. The impounded water could have been put to use for logging flumes, I reasoned, or perhaps for ranching. Both activities were still employed on this "land of many uses:" the National Forest. Cow bells roused us from

our tents in the mornings — not bird songs. Felling timber was out of sight and earshot, but the perfunctory equipment was evident along the road leading up to Grouse Ridge.

I didn't take much offense at the crude dam, actually. There was another, more solid dam of concrete in a lake down-valley that we would find the next day. It held pure blue, clear water in clean rock walls — no muck; I jumped on in and suspended my body in its shimmering brilliance. But the evidence of human manipulation did make me reflect on the health of lakes. I wondered if the shallower, algae-filled water we saw in the meadows was enhanced by the waste from nearby grazing cattle. I thought about the motorboats on Tahoe, the legal struggle over the ban on jet skis, the runoff from the highways. I thought about the many lakes I had been to this summer. Most were gorgeous, mountain lakes that were a joy to swim in. Many were open to motorized water craft. Only one was the foul-smelling Onondaga Lake of Syracuse, New York. Over a century's worth of industrial, pollution and urban sewage has taken its toll on the lake.

But I am still troubled by the prevalence of motorboats on the pristine alpine lakes. Certainly I am concerned about the logging and grazing effects on water quality, but the repeated exposure of fuels and exhaust to the water take precedence in my mind. Declines in the once renowned visibility of Lake Tahoe have prompted the debate to get the worst offenders — like jet skis — off the lake. Bans are already going into effect on some state reservoirs. The recreational watercraft manufacturers have protested such "draconianism." Of course, they will only attempt to delay rulings long enough to build a craft worthy of regulatory approval. Then they will welcome the regulations because of the enormous, instant market the new units will enjoy. Ah, the gentle balance of socially-checked capitalism.

The bans may not have been ushered into legislative circles so quickly if it were not for MTBE. Known commonly by this acronym, methyl-*tert*-butylether has been the subject of heated debate over the past several years. This fuel additive – an oxygenate – was a boon to air quality and the bane of water quality. Although other oxygenates are available, the petroleum industry chose MTBE, a refining by-product, as the most economical additive. Unlike most other petroleum ingredients, which have more favorable qualities of attenuation once released into the environment, MTBE races unhindered into water supplies. While experts debated whether it was carcinogenic or not, whether it would biodegrade readily or not, whether costs to water quality were more than compensated by benefits to air quality or not, MTBE became a ubiquitous contaminant.

The South Tahoe Public Utility District, once proud of its high-quality aquifer, had to shut down its main supply wells and look for alternative water supplies. Its aquifer has been contaminated with MTBE from local service stations. In the worst case, a station owner had dismantled the alarm systems signaling leaking tanks. Negligence is not the only cause of contamination. I recently performed geologic analysis in a study for a water district in the San Francisco Bay Area to determine if fuel stations with state-of-the-art equipment and no history of spills showed contamination from MTBE. Many of them did.

Floating on my back in an alpine lake this summer, I regarded motor recreation on the waters more than a nuisance. It is a threat to our water resources. I don't think of MTBE as only a tragic happenstance of chemistry or a failure in policy making. It is a harbinger of what will happen to our water supplies if we don't take steps to minimize chemical and waste exposures up front.

There are ethics questions I must weigh: How much pollution is the right amount? At what point are the problems caused by one technology compensated by the benefits? As for MTBE, the chemical helps

attain air standards, but at a cost to water quality; eventually, I reason, air quality levels will be held in check at the limit of the standards, thereby achieving the same result in air quality but with the added aquifer degradation.

These are issues I consider while attempting to formulate what I consider to be a sustainable water resource policy. Such policy must devise the mechanisms to provide ample clean water for ecological and human needs. Conservation and protection are necessarily cornerstones. Technological assistance has a secondary role. Such diverse issues as organic agriculture, mass transit and alternative transportation, growth restrictions, and water efficiency are all important to a protracted potable water supply. These obviously aren't easy issues. But removing unclean, recreational craft from water bodies seems to be a simple, straightforward task. The opposition posed to such measures indicates that this unfortunately is not so.

Political solutions aside, I wonder if the expanding numbers of humans alone preclude a pure water outcome. Waste from hikers and sparse rural populations, not chemical plants, have made waterborne diseases like giardia and cryptosporidium common problems. Indeed, how many people like me can these mountain lakes endure before their quality is noticeably degraded? Perhaps I should just enjoy it while I can. Alas, this is not an acceptable option. Neither is the notion that technology has prevailed in reversing degradation — some critics suggest that successful cleanups mean that we need not worry nor expend much effort on environmental protection. I take past failures and successes as ingredients for both optimism and challenge. A proactive stance to thwart future problems must be coupled with a reactive stance that heals present ones.

My time at Sandwich Lake had expired. I pulled myself out of the chilly water to warm up on a flat rock in the sun. It would require hiking a few miles to completely recover my body heat. But by the time I reached the next lake, I would be ready for another immersion. And I will be for years to come.

# A FISH TECHNICIAN'S JOURNAL: CORDOVA, ALASKA

BY BECKY CLAUSEN

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Working as a Fisheries Technician in Cordova, Alaska for the past two years has led me to places I never would have expected. As my field journal can attest, this past summer proved to be just as unpredictable and just as wonderful as my previous experiences on the Copper River Delta. In May, I collected data on juvenile coho smolts that were migrating out to sea. Most of my work in June focused on a revegetation project to stabilize a sockeye spawning channel. In the midst of this project, I was unexpectedly sent out to join a fire crew in Idaho. All projects were put on hold due to the extensive fires of this past summer. Just as I returned to Alaska, the first runs of salmon were starting to return to their spawning grounds. My final projects of the season focused on estimating the number of salmon that were making it back up the streams.

## *May 10, 2000 Green Island*

First overnight field camp of the year. Merlyn and I went out to Rocky Bay to check on the fish pass. Boated all the way across Prince William Sound — whales, eagles fishing, tufted puffins, murrelets, a half mile of surf scoters, sea otters, sea lions — all with the backdrop of bright blue water and glaring white peaks. Amazing. The fish pass survived the winter just fine.

## *May 16, 2000 Cordova*

More and more juvenile coho showing up at the weir. 580 today, probably more tomorrow. Scanning for pit tags, taking scale samples, weighing and measuring. It may get repetitive over the next few weeks, but nothing can beat a sunny day spent outside on the Delta.

## *May 28, 2000 Cordova*

Excited to hear that I'm going to be working on the Sheridan Project — seeding and revegetation on a 25 acre glacial outwash area. We'll be trying to stabilize the river channel with native grasses, alder, willow, and spruce so the sockeye have a better chance of getting up to the spawning area.

## *June 20, 2000 Sheridan Glacier*

Many long days of measuring one acre plots, spreading seed and fertilizer, digging through rocky banks to plant the willow starts. The rain has set in, too, so we're usually drenched. Luckily, Robby and I are making the best of it. Next week we start cabling old stumps so that they can be helicoptered in to the stream and placed along the banks.

## *July 18, 2000 McCall, Idaho*

Spent the past 36 hours traveling and have arrived at our fire station in Idaho. Incredible to think that two days ago I had no idea I'd be here. Woke up at four am, met the rest of our 20 person fire crew, loaded up trucks, packed MRE's, and got the "speech." I feel like I'm going into battle.

## *July 25, 2000 Weiser, Idaho*

Just arrived at the Weiser fire, our crew boss informed us that it will be 105 degrees, limited supplies, and rattlesnakes. A long day of 'mop-up' ahead.

## *August 5, 2000 Cordova*

Back from fire duty to beautiful, SUNNY Cordova. Just in time... coho are just starting to pack the streams and Dirk is helping me with my fly-fishing. Ken's been teaching me all the edible mushrooms on the forest floor as we walk the streams and do coho escapement counts.

## *Aug 21, 2000 Cordova*

Sam and I have been trying to calibrate the fish counter on the mile 18 stream, we need to have an accurate count for Fish and Game. First Northern Lights — fall is here. Awesome display from Dirk's front porch with live bluegrass in the background. Potluck with the whole crew. Even though I'm excited to see what's in store in Oregon, it will be incredibly sad to leave this wild place and the wonderful people.

# FISHING FOR ANSWERS IN COASTAL OREGON

BY LOREN McCLENACHAN

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It's standing room only when I make my way to the Oregon Institute of Marine Biology boathouse — a one room building that generally hosts marine biology lectures for students at this small Charleston, Oregon campus. Today it has a different function: a public review process is underway for the Pacific Fishery Management Council's (PFMC) proposed new Groundfish Harvest Rate Policy. The room is packed with marine biologists, fisheries managers, and Charleston area fishermen and women. Two men from PFMC stand at the front of the room waiting for the crowd to settle in. It will be their job to present the plan and take public comments, and based on the snippets of conversation that float in the air, there are plenty of comments to be made.

The plan in question is the agency's attempt to reduce the downward trend in the populations of groundfish — those species of fish that spend their lives at or near the bottom of the ocean, such as rockfish, flatfish, whiting, and sablefish. Populations have declined severely, as have many fish stocks around the world, and it is PFMC's job to ensure that they do not follow their Northeastern counterparts into a collapse. The idea is to reduce fishing pressure, rebuild stocks, and transition into sustainable fishing — a term not easily translated into regulation. For the moment though, it means a reduction in the number of licensed fishing vessels by at least 50%, a severe hit to the livelihoods of many in this room. The once prosperous fishing industry has many lives invested in the extraction of this living resource. Besides the 2,000 licensed West Coast commercial fishers, a shoreside support network of businesses — including processing plants, boat yards, machine shops, marine supply stores, motels, and restaurants — has grown up along the coast. In the words of PFMC, “the industry and coastal communities are facing an economic and social crisis.”

To many of the Charleston residents who have shown up for the public meeting, it is a forced crisis, an effect not of the declining fish stocks, but rather of government officials and scientists driving them out of an industry that is not in danger of collapse. When the managers finish presenting their proposed plan, public

comment begins. Several local commercial fishers refute the PFMC data that show a decline in numbers of fish. They're out there, someone insists, the problem is that stock assessment scientists don't know how to find them. The people who spend their days out on the water looking for fish consider themselves better qualified to speak to the health of the fisheries than are agency scientists in part because they utilize better technologies and possess knowledge of “fish hot-spots.” Groundfish often aggregate on patchy reefs and finding vast numbers of fish is often a matter of locating the reefs. Scientists do not pay attention to the geography of the ocean floor and they do not use ultrasonic fish finders or other high tech fishing gear. Differences in ways that industry members and scientists find fish are largely due to the scientists' sampling methods. In the name of consistent sampling methodology over time, stock assessment scientists cannot upgrade gear, and must use randomly chosen points to collect data. The random sampling methods that constrain scientific surveys force them to potentially overlook large numbers of fish.

Further frustrating citizens at this meeting is a clear resentment for the fact that they will be most affected by the outcome of this plan, but do not have a meaningful voice in the process. The sentiment that the “decisions have already been made” and the feeling that the public comment period is just a formality makes many feel a sense of powerlessness. The public review and comment phase — consisting of public meetings in Washington, Oregon, and California — occurs after the PFMC Technical Teams, Scientific and Statistical Committee, Advisory Panels, and Enforcement Consultants have helped to draft the plan. The small scale commercial fishers that are here to voice their opinions today are largely doing so with the qualification that they understand the process is largely complete. The comment that “only big industry has a voice” points to the frustration that the agencies are not doing an adequate job of representing the people whose communities depend on the fish. It is more than an esoteric argument over the role of the public in managing natural resources to people who

have built their careers and lifestyles around fishing. "We deserve a right to earn a living," one man comments, and cutting the number of fishing vessels in half could leave half of the people in the fishing town of Charleston without many options.

There are no obvious answers to the question of how to reconcile the perspectives and degree of power in decision making of fishers with that of fisheries scientists. In management scenarios that have allowed industry members a greater voice in determining catch limits and management of fish stocks, collapses have occurred. The fish in question here, particularly overfished species of rockfish whose levels of fecundity increase dramatically with age, could very well become so overfished that they are not able to rebound. As the largest and oldest fish are removed from the population, the reproductive potential of the population drops, making it harder and harder for the population to survive fishing pressures. Ultimately, the question returns to, who bears the burden of proof? One woman at this public forum commented, "The industry should not have to prove that the fish are there. The scientists should have to prove that they're not there." To take the precautionary route in management means that the opposite must be true; managers should err on the side of caution when available data indicate populations are declining.

As the meeting was breaking up, one man remarked that "forcing communication between science and fisheries is a waste of time." Given the differences in perspectives and feelings of alienation from the process that were expressed at this meeting, not only does communication between industry members and technical experts need to occur, but it must begin long before impending crises loom. The potential for regional economic and ecological collapses have put both fishing communities and government agencies under enormous pressure, highlighted the dichotomies that exist, and precluded a real dialog. No solutions emerged from this August meeting, and in October, PFMC presented its final Groundfish Harvest Rate Policy, which included a recommended reduction of at least 50% in the number of fishing vessels. While this action represents a strong commitment on the part of fisheries managers to the

health of the groundfish populations, it will further deepen the resentment for government that many fishers have expressed.

Perhaps these dichotomies and resentments are inevitable. This fishery has been historically open and free of government regulation. In fact, the history of fisheries in the United States is one that has promoted American exploitation of offshore fish stocks, as well as the image of the independent fishing lifestyle. Alongside a fear of losing lifetimes of investments, rugged American individualism based on the assumed right to fish can be seen as the basis for many anti-regulation attitudes in fishing communities. As is the case in the extraction of many natural resources, the people who have historically exploited the resource have come to believe that it is their right to do so, and further, to regulate the industry is un-American. In many ways, fishing represents the last frontier, and those who fish the last cowboys. Not only does this particular way of life feel threatened by current regulations, but also there is the feeling that another portion of the spirit of the American West becomes subject to government regulation. This August forum on groundfish management highlighted the fact that communities in the Pacific Northwest will have to continue to address both ideological and practical differences between technical experts and individuals in resource based communities. As we move from an era of unregulated exploitation into one that recognizes the need to conserve resources, clashes such as these continue to demonstrate the immediate issues of the role of scientists and stakeholders in the political process, as well as the more deep-seated cultural issues that underlie environmental conflicts.



*Karen Barrows*

# THE IMPORTANCE OF MUTUALITY IN RESEARCH DESIGN

BY KAREN BARROWS

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Spending the summer at a marine station gave me an opportunity to think deeply about the nature of scientific research in the larger context of the current environmental situation. I have become convinced that at the present time a good deal of scientific research is conducted without sufficient attention to the impact that global environmental degradation and loss of biodiversity is having on research subjects. I think the root of the problem lies in the traditional design of scientific experiments.

The experiments most likely to procure funding and peer review for researchers are those containing hypotheses that typically mandate at least some degree of intervention on the part of researchers in the natural life cycles of the subjects under investigation. Consideration of the impacts of research on the subjects appears to dictate restrictions on investigator disturbance only if the species is considered threatened or endangered (and not always even in these instances). A small sample of the literature involving research on penguins and gulls indicated that in all cases, successful experiments designed to measure effects of investigator disturbance and attachment of various devices involved capture of subjects (followed at times by prolonged captivity), and physical restraint. Also evident in these studies was animal subjection to forced ingestion of and/or removal of food, foreign articles or devices; tampering with or removal of offspring; and frequently, attachment of tags and recording devices of various kinds and sizes. (This list is by no means exhaustive). The underlying commonality in these projects is an unquestioned assumption that, in order to conduct a successful experiment, there is a necessity for physical intervention.

Even to conceive of research not involving intrusive practices is a challenging task for the scientist. Because experiments are predicated on hypotheses requiring supporting evidence, and because Cartesian tradition and anthropocentric worldviews have inculcated the sciences with a predilection toward physically invasive research, it is difficult to devise a valid experiment that does not compromise or stress

the subjects under investigation, regardless of the research goals. Unfortunately, the nature and funding potential of many scientific experiments tends to foreclose opportunities to conceive of different styles of experimentation. In light of abundant data on the state of the planet, particularly with regard to the effects of climate change on biodiversity loss, it is important both for purposes of accurate data collection and for purposes of ethics that the environmental milieu in which subjects are living be taken into account in all research projects. Furthermore, scientific research should evolve such that primary goals come to include investigation of the manner in which species are coping with and adapting to unprecedented change in their environments, as well as conservation of those species. Such research should categorically assume a drastic reduction in investigator disturbance of any kind, whether such disturbance involves territorial or physical intrusion.

One way to proceed is to streamline or eliminate many research projects in accordance with changes previously suggested, by subjecting proposals to a common sense test. Research that attempts to show, for example, that the stress levels of adult penguins (as measured by indicators involving the use of stomach-pumping techniques) rise when they are captive, and when they forced to observe their chicks undergoing stomach-pumping, is a hypothesis with a fairly certain foregone conclusion. Is the quantified data from such an experiment truly essential to understanding the response of the penguins to such research, especially in light of the other stresses to which Antarctic species are now subject as a result of global warming? To insist that research "for the sake of knowledge" is viable at a time during which human activities have rendered ominously close the collapse of many ecosystems is highly questionable. In light of the fact that knowledge itself has obviously not proven sufficient to avert potential upcoming catastrophic consequences, a "business-as-usual" approach in scientific research is rapidly becoming anachronistic.

I propose that the overarching question influencing research decisions and methodology should be: "Is the proposed research project designed in such a way as to forge a mutually enhancing relationship with the species under investigation?" This question will guide research on the John Griffith Ames, a two-masted schooner/schoolship that a dedicated staff and I will be operating in the Puget Sound area within the next two years. One of our slated projects is to conduct studies to obtain quantifiable analyses of the extent to which environmental changes have been included or excluded in the design of research projects. With this information it may be possible to begin formulating methods for systematic inclusion in research designs a realistic, "big-picture" assessment of the global forces impinging on research subjects. Such data will be more reliable, will lead in the direction of much more ethical relationships with research subjects, and will simultaneously lead to more accurate scientific assessment of specific measures that might be taken to cope with drastic environmental change, and to slow loss of biodiversity.



Loren McClenachan

## ABANDON-BY-THE-SEA

BY TODD MILLER

*The Sea fog  
nature's whisper  
enhances as it erases  
Motionless, uniform, perfect  
visible silence*

*A pavement of sand  
drawn flat by the futile grasp  
of a retreating tide  
Hosts rivulets that laugh  
at their abandon  
My feet laugh, too  
as canvas soaks through*

*Ghost dreamships of Fellini  
beckon from the mist  
they draw me alongshore  
I am bosun of the sea stacks  
(Stalking each other in the  
stillness of eons)*

*Bare rock exposures - an untidy world  
of growth - naked from the sea  
a tidal world*

*A starfish, persistent  
works on mussel  
Barnacle and mussel both  
even more persistent  
amongst anemone  
shut like disapproving lips  
against the pounding waves  
and quiet fog  
The rock most persistent yet  
And I,  
like sea,  
must also retreat.*