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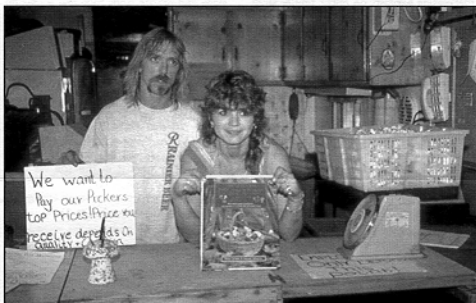
Science

FINDINGS

issue twelve / march 1999

"Science affects the way we think together."
 Lewis Thomas

MUSHROOMS IN THE MIST: STALKING THE WILD CHANTERELLE



A Prices for chanterelles are extremely volatile, varying from \$1.50 to \$5 per pound. Buying stations are routine gathering places for commercial pickers, whether they are in homes or along roadsides.

*I think those are poisonous.
 Better give 'em to me.*

Mushroom Patrol T-shirts © Morell Mania

What on earth could a comfortable Seattle suburbanite have in common with a low-income seasonal worker recently immigrated from Southeast Asia? Not much, according to stereotype. Quite a lot, according to research.

You can stalk a wild chanterelle, as people from both these groups do, for the thrill of the hunt with your mycology club on occasional weekends, or you can stalk it daily

throughout its August-November fruiting season to supplement your income and diet. Either way, you probably love being in the forest and far from the madding crowd, are a keen observer of the prey and its likely locations, are mildly to completely suspicious of government agencies and researchers, and would never want to hunt the resource to extinction.

Deep in the woods and often down on their knees across Washington's Olympic Peninsula, a team of researchers has uncovered many common values among the widely divergent ethnic and social groups who harvest chanterelles in the forest. Along the way they have added to their knowledge of the habitat and productivity

IN SUMMARY

Commercial, recreational, and subsistence harvesting of chanterelle mushrooms in Washington's Olympic Peninsula has long been an issue for managers and harvesters alike. What guidelines should be used to manage nontimber products?

Is there concern about possible increased commercial harvesting? Pacific Northwest Research Station scientist Leon Liegel and botanist David Pilz initiated a study to help public and private forest land owners interested in cooperative management of the chanterelle resource. Liegel's and Pilz' study offer insights into who is harvesting and possible guidelines to help the various stakeholders involved work together towards common goals.

The study showed that the productivity of chanterelles varied widely around the Olympic Peninsula. Knowledge of these differences can help define future sampling designs. The selling price of the chanterelle varies greatly depending on the time of season and imports. Ultimately, Liegel and Pilz discovered that the harvesters of non-timber products have common interests and this knowledge can help avoid future conflict and alleviate existing tensions.

Chanterelle harvest has proven to be an excellent example of adaptive ecosystem management. It ultimately demonstrates how complex issues may be resolved by incorporating public participation, monitoring, research, and decision making.

of the mushroom, often courtesy of long-time harvesters.

"Too often the mushroom harvest is associated with low income people, to whom little attention is paid, but there are generations of knowledge here that should be looked at and interpreted," says Leon Liegel, resource analyst for the PNW Research Station, and team leader on the man and the biosphere (MAB) mushroom study. "Federal land managers seem to have neither the time nor the experience to communicate in any depth with these folks, who actually have far more in common than stereotypes or occasional tensions suggest."

The study had cross-disciplinary objectives: to determine biological productivity of chanterelle mushrooms across diverse habitats on the Olympic Peninsula; to develop socioeconomic profiles of harvesters; and to assess management strategies that conserve, maintain, or enhance mushroom or other nontimber resources throughout the Pacific Northwest.

CAN THE RESOURCE HANDLE THE PRESSURE?

Concern about increased commercial harvesting pressure on the Olympic Peninsula had been raised most vocally by recreational harvesters, who feared the loss of their favorite hunting grounds if productivity declined. Indeed, they had gone so far as to press for and achieve increased state regulation, invoking the anger of those harvesters who resented the time and expense that were added to their efforts to make a living from the forest. Indeed many commuting harvesters no longer include the Olympic Peninsula on their itinerary.

"The question of whether productivity is declining, or even increasing, really hasn't been answered, but this study will help streamline and establish the longer term monitoring needed to address it," says David Pilz, a botanist with the PNW Station who led the biological segment of the study. "We now have a much better grasp

KEY FINDINGS	
• All harvester groups—commercial, recreational, and subsistence—have a common interest in sustaining the chanterelle resource and use various informal methods to foster continued harvesting.	
• Productivity of chanterelles differs greatly around the Olympic Peninsula and across ownerships. Knowing these productivity differences across forest types and stand ages will help refine future sampling designs.	
• Prices paid to harvesters are quite volatile, depending on international competition and time of season. Chanterelle harvesting supplements annual income but is not lucrative.	
• All public and private forest landowners on the Olympic Peninsula are interested in cooperative management of the chanterelle resource, regardless of land management goals.	

Decreasing harvests on public timber lands have created economic hardships for Northwest rural communities that previously relied on timber-related jobs, Liegel says. Nontimber forest products, including chanterelles, can and do ease some of the burden, but resource managers on Federal,

state, and private lands have few guides for evaluating sustainability of specific products. Few nontimber forest products have been actively managed.

of efficient and effective sampling methods, we know our plots have to cover at least an acre to be useful, and we have begun some preliminary estimates of productivity over large areas." Eric Jones, who headed the field program for the social side of the project, adds that lack of active management of chanterelles has prevented knowledge of its natural productivity in undisturbed forests. Jones is a Ph.D. student in anthropology at the University of Massachusetts, Amherst.

The edible part of the chanterelle is actually the fruiting body of a fungus that lives in the soil, in a mutually beneficial, or symbiotic, relation with tree roots. The fungus grows over the tips of tree roots, invading the cells just enough to help provide the tree with water and nutrients. The tree, in turn, provides the sugars the fungus needs to live. Although chanterelles can and do reproduce by windborne

spores, they persist in the soil via their one-cell-wide hyphae (vegetative threads) according to Pilz.

Purpose of PNW Science Findings

To provide scientific information to people who make and influence decisions about managing land.

PNW Science Findings is published monthly by:

Pacific Northwest Research Station
USDA Forest Service
P.O. Box 3890
Portland, Oregon 97208
(503) 808-2135

Sherri Richardson, Editor
srichardson@rpnw@fs.fed.us

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<http://www.fs.fed.us/pnw>



One colony can persist in the same place for a long time, but would more concentrated picking affect subsequent fruiting?

"Our initial belief is that harvest will not affect productivity, that the edible part of the chanterelle is like fruit on a tree," Pilz says. "But there's only one related long-term study in the United States that we know about, and we have a lot to learn."

The study found that productivity differed from 14 to 478 chanterelles per acre during 2 years on 11 sites around the peninsula, including two forest types, three stand ages, and five landowners. Such data allow land managers to design appropriate programs and regulations.

"For instance, the Olympic National Park can track long-term trends in the efficacy of their conservation regulations, the Olympic National Forest and Washington Department of Natural Resources can design more informed commercial harvest regula-

MANAGEMENT IMPLICATIONS	
•	Chanterelle harvest provides an excellent case example of adaptive ecosystem management, showing how complex issues can be addressed in ways that incorporate public participation in monitoring, research, and decisionmaking.
•	Landowner support is widely available for cooperative interdisciplinary research and resource decisions that cross ownership boundaries.
•	Recognition and understanding of common interests among harvesters of nontimber products will help alleviate existing tensions and avoid future conflict, as will efforts to engage in nontraditional communication forums for interaction with stakeholders.
•	Using volunteers as research collaborators significantly expands research capabilities but presents unique training challenges.

tions, and private timber companies can judge the relative benefits and risks of allowing mushroom harvest on their properties," Liegel says.

Harvest, conservation, regulation, benefits, risks. Who inhabits the intriguing world of chanterelle hunting, and what does it look like?

PEOPLE OF THE FOREST

Anthropology has an eclectic bag of methods well suited to this project, in which there were poorly known and hard to reach groups, and stereotypes about thieving locals and violence, neither of which, of course, was correct," says Tom Love, professor of anthropology at Linfield College in McMinnville, Oregon. "So the project became ethnographic—who's out there harvesting chanterelles, and how do we sample them?"

Most harvesters are multigeneration local Caucasians or recently immigrated Southeast Asians commuting from Tacoma and other Puget Sound cities. Researchers, however, identified 15 ethnic groups, including Native Americans, participating in commercial chanterelle harvesting. Ethnic categories include Euro-Americans, Latinos, Mayans, Native Americans, Vietnamese, Koreans, Cambodians, Laotians, Filipinos, Malaysians, Japanese, Chinese, Canadians, and Europeans. Principal groups are Cambodian and other Southeast Asian, Euro-American, with a growing Latino contingent.

Chanterelles are not harvested just for commercial reasons: subsistence and recreational gathering are also common, both dominated by Euro-Americans. Both the last two groups consume almost all they pick,

whereas recreational pickers typically belong to mycological societies often involved in organized field forays. Recreational and commercial harvester groups are kept apart by their group and class distinctions, according to Love, who headed the sociological segment of the study.

"Buying stations and campsites are the main sites for fostering commercial mushroom subculture, whereas mushroom shows, field forays, and club meetings are the main sites for sustaining the recreational mushroomer subculture," he says. "They rarely participate in each other's groups, or in the daily minidramas or rites of solidarity associated with them." Subsistence pickers remain aloof from both.

Why do people pick mushrooms? Field researchers spent time in casual conversation over campfires and around the buying stations, as well as conducting some formal surveys, tracking 79 individual cases. Surprisingly, noneconomic factors are important for all three harvester groups, according to Love. Economic factors are important for commercial harvesters, but only 27 percent of them reported earning more than a 4-month seasonal average of about \$30 a day, he says. Despite the low numbers, nontimber forest products—often discounted in forest valuations—can

approach timber values when all the forest products from a stand are considered.

Many commercial harvesters rely on a diversity of nontimber forest products to make a living. These include the more valuable matsutake mushrooms, floral greenery, and Christmas trees. So chanterelle harvesting supplements annual income but is certainly not a lucrative business on its own. The volatile prices paid to harvesters at buying stations in the field differed from \$1.50 to \$5 per pound, depending on intended market, time of season, and international competition.

But researchers found that mushroom harvesting offers a quality of life that all pickers love, and a level of independence for the commercial harvesters. "One of the most important values of the mushroom picker culture, commonly expressed by both commercial and recreational harvesters, is love of, and respect for, nature. It's about the joy of being in the woods, working through unmarked landscape, and stalking wild mushrooms," says Love.

That's not all they have in common. They value their independence, and they resist interference from outsiders—including private timber companies, researchers, and government regulators.

"We were so sensitive to this resistance that we may have lost some time to caution," he recalls. "We really didn't want to just barge in and create the wrong impression, that we had all the answers and

could disrupt their world any way we wanted. The result was we weren't able to involve commercial harvesters as co-researchers right at the beginning of the project. We're also painfully aware that we

still know very little about the Southeast Asian community and Native American concerns, and their relationship to chanterelles and their internal concerns."

MANAGING FOR A SUBCULTURE

How do public and private managers approach the challenges of managing a minor resource sought after by a diverse, traveling, and only partially visible population of pickers?

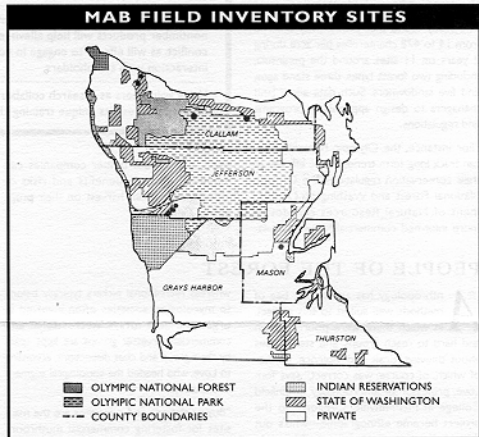
"The complex issues of land tenure, permission for harvest, resource damage, property rights, vandalism—these are what land managers have to consider, not just for chanterelles, but for all special non-timber forest products," says Pilz. "Knowledge of biological productivity, harvest rates, and market prices will help managers estimate the value of chanterelles on their property, and make access decisions."

Low prices for chanterelles limit the distance that harvesters are willing to drive to their hunting grounds, and affects where buying stations are located in homes for extra income, or along roadsides if an area is "hot" and prices are good.

Describing these factors will allow land managers to differentiate among areas to be managed for commercial chanterelle harvesting, recreational harvesting, conservation of undisturbed chanterelle populations, and forest management activities that are inconsistent with chanterelle production, according to Pilz. "If we can expand the range of compatible and sustainable forest uses, we can reduce the pressure that expanding human populations put on a shrinking forest land base."

Understanding the extent and nature of cultural differences among harvesting groups also will help land managers minimize problems associated with competition for a limited resource. The discovery that different groups actually have much in common, centered on a strong conservation ethic, should help smooth the management decision process.

Love notes that the greatest gap between any of the groups is that between harvesters and management agencies. No surprise: gating of roads, designated



A Project inventory sites were spread across five ownerships, three stand ages, and two forest types on the Olympic Peninsula.

research plots, allocated long-term leases on some private lands, and limited picking areas in National Forests have all reduced access. "In effect, harvesters feel that a giant 'enclosure of the commons' is underway, forcing more people onto a more limited public land base," he says. He observes that the lack of voice and unity among pickers also helps explain why policy is being shaped without their input.

In a classic sociological twist, however, the mushroom study itself may have played a central role in improving understanding between all stakeholders, and even altering the tenor of management of the chanterelle resource.



A The edible part of the fungus is the fruiting body of a fungus that lives in the soil, in a symbiotic relation with tree roots.

CHANGING CULTURAL PERCEPTIONS

Volunteers from the Puget Sound Mycological Society greatly expanded the number of field sites the biological team could sample, Pilz says. Most research scientists were based in western Oregon, far from the field area. Some two dozen volunteers made single or multiple visits to four collection sites in fall 1994 and 1995. One volunteer, Ron Post, was trained by Pilz and thereafter became the coordinator and trainer for other volunteers.

"A fringe benefit of this interaction was that Mycological Society members acquired new insights by participating in a research study that examined commercial and subsistence harvesting, and likewise research biologists gained new understanding of recreational pickers," says Pilz. Love noted that the volunteers complicated the

social side of the project: coresearchers became both subject and object of research, he says.

Despite cautionary notes from agencies and landowners, researchers found that commercial harvesters were cooperative and interested in the study; some told researchers they would have participated in harvesting field research plots had they known about the study sooner.

Scientists built on this interest by using several nontraditional outlets for communicating their project objectives and their ongoing results. Face-to-face meetings and slide talks outside normal business hours reached recreational pickers. Casual meetings in the field—"meeting people where they are"—helped establish trust with commercial and subsistence harvesters.

To present overall findings at the end of the project in 1996, a public forum was held at the Mason County Fairgrounds, in Shelton, Washington, designed to allow both information and feedback to be considered in an informal setting. Over 100 people attended, a promising expression of ongoing interest. Especially effective at this meeting were facilitated, circle-seated discussions of pertinent topics. (Transcripts are available from Love.)

Jones, who set up the Mason County meeting notes that having a public meeting that is a safe and effective environment in terms of gender, ethnicity, and class is a complex undertaking but can be done when scientists and managers care enough to put serious thought into its design and implementation.

ADAPTIVE MANAGEMENT IN ACTION

We learned that local knowledge is critically important for adaptive management, but because it depends so heavily on context, it is less transferable," says Love.

Scientists became more sensitive during the course of the project, both to team members from other disciplines and to those affected by their research, according to Rebecca McClain, a graduate student at the University of Washington. McClain was lead author for a case study of the project, with teaching materials, for the Sustainable Forestry Partnership at Oregon State University.

"There's a tremendous challenge in trying to mesh the social with the biological," she says, "and we took a while to come to terms with that within the research team. Some of it starts simply with the different kinds of publication protocols each discipline has. We all felt a lot could have been added to the project by involving stakeholders from the very beginning, to select plots and design research, even though it's extremely time-consuming to do so."

All parties in the project added greatly to their previous knowledge about each other, about the resource, and about the workings of scientific research. Adjustments were made to research design and sampling

methods to allow volunteer involvement, to reach as many harvesters as possible, and to communicate methods in order to involve stakeholders.

"The biological, social, cultural, economic, regulatory, legal, and forest management dimensions of chanterelle harvesting make it an excellent case example of adaptive ecosystem management theory and practice," says Liegel.

He notes that the internal structure of many agencies simply does not allow input from the people affected by their rules and regulations. "The fact is, all public and private forest landowners on the Olympic Peninsula, regardless of their land management goals, are interested in cooperative management of the chanterelle and other nontimber resources."

The MAB mushroom study findings, he concludes, should encourage future projects to blend the natural and social sciences, and illustrate the danger of letting negative generalizations influence how cooperative studies start and proceed.

Jones concurs. "It is important to realize that this project was an exploratory study into a relatively unknown universe for scientists. The findings should not be seen as the final word, but more of a foundation, an opening of the door, for future research."

"For our discussion is on no trifling matter, but on the right way to conduct our lives."

Photo c.429-347 B.C.

FOR FURTHER READING

Kessler, E.; Ganning, B. eds. 1998. *The biological, socioeconomic, and managerial aspects of chanterelle mushroom harvesting: the Olympic Peninsula, Washington State, U.S.A.* *AMBIO: A Journal of the Human Environment*. [Unknown]: Royal Swedish Academy of Sciences: Spec. Rep. 9.

WRITER'S PROFILE

Sally Duncan is a science communications planner and writer specializing in forest resource issues. She lives in Corvallis, Oregon.

Science FINDINGS

U.S. Department of Agriculture
Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, Oregon 97208-3890

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SCIENTIST PROFILES



LEON LIEGEL grew up on several dairy farms in south-west Wisconsin in the 1950s-1960s and frequently picked berries, nuts, asparagus, and mustard found in nearby oak-hickory stands or along trails leading to them. His passion for foreign languages and different cultures evolved while stationed in Puerto Rico and the Caribbean at the Institute of Tropical Forestry, 1973-85. His efforts there covered genetics, nursery, nutrient cycling, mensuration, silviculture, and soils research plus training of foreign nationals. From 1985-91, he worked on acid rain and global climate issues while stationed at the Environmental Research Lab of the Environmental Protection Agency in Corvallis. From 1993-97 he was Regional Coordinator for PNW's Forest Health Monitoring Program and is now a resource analyst in PNW's Pacific Resources Inventory, Evaluation, and Monitoring Program. His interests are using natural resource databases to foster long-term sustainability of both natural and human systems.

LIEGEL can be reached at
Pacific Northwest Research Station/USDA Forest Service
3200 S.W. Jefferson Way
Corvallis Oregon 97331
Phone: (541) 750-7299
E-mail: lliegel/r6pnw_corvallis@fs.fed.us



DAVID PILZ is a botanist working with the mycology team at the PNW Research Station in Corvallis. His reforestation background developed into a general interest in non-timber forest products, including Pacific yews harvested for the anticancer drug Taxol. He currently heads the research program on productivity and sustainable harvest of commercially-harvested edible forest mushrooms. His work on developing efficient monitoring protocols will lead to a regional research and monitoring program designed to involve all stakeholders in efforts to ensure harvest sustainability.

PILZ can be reached at:
Pacific Northwest Research Station/USDA Forest Service
3200 S.W. Jefferson Way
Corvallis, Oregon 97331
Phone: (541) 750-7362
E-mail: dpilz/r6pnw_corvallis@fs.fed.us

COLLABORATORS

Tom Love, Linfield College, OR
Eric Jones, University of Massachusetts/Amherst
Ron Post and 15 field volunteers, Puget Sound Mycological Society
Will Little, Weyerhaeuser Company
Ken Russell, Jim Arthurs, Washington Department of Natural Resources
Cat Hoffman, Ed Schreiner, Olympic National Park
Joe Simpson, Simpson Timber Company
Joan Ziegeltrum, Martha Kruger, Olympic National Forest
Rebecca McClain, University of Washington
Bettina VonHagen, Ecotrust