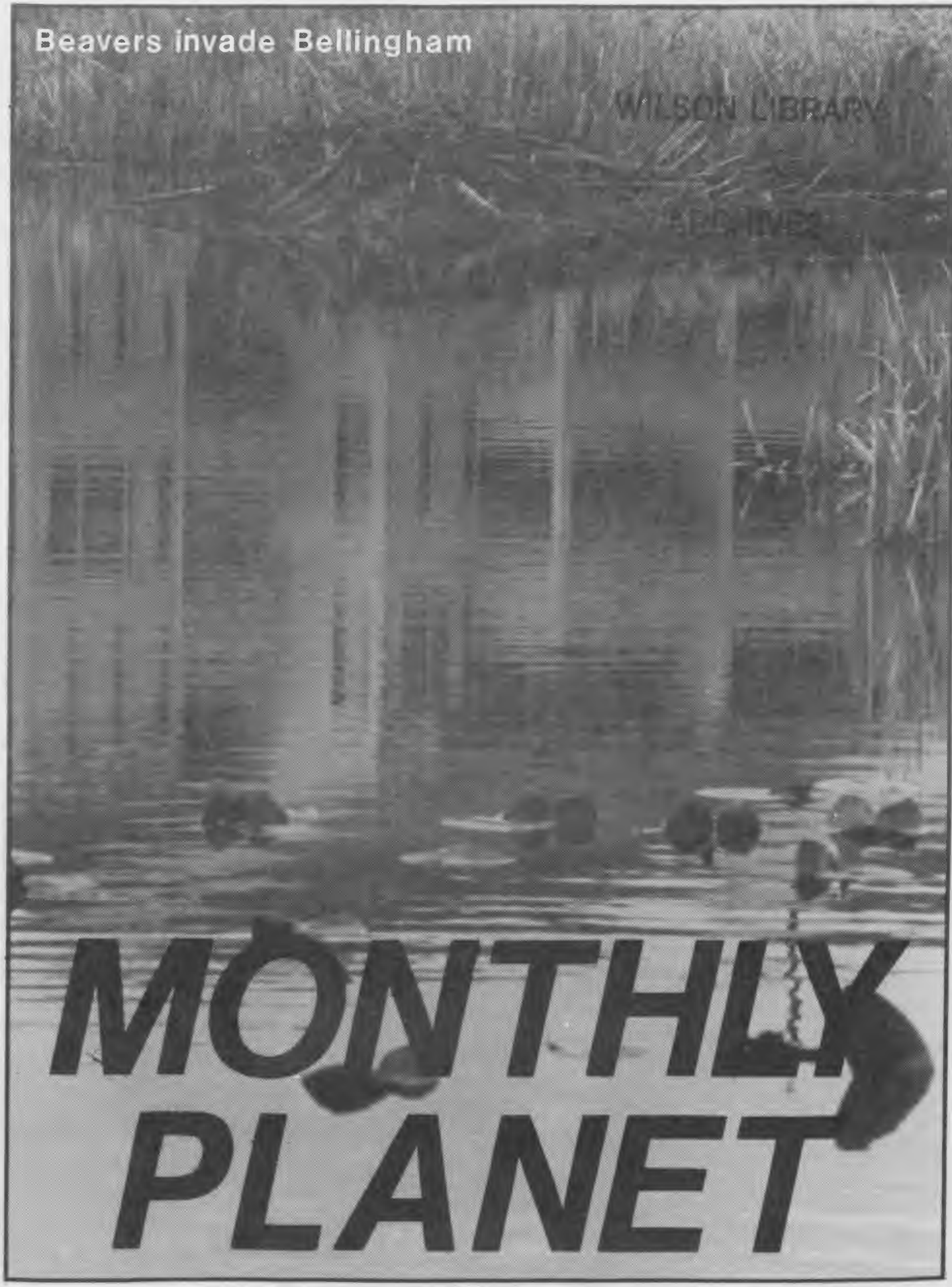
5-1987

Monthly Planet, 1987, May

Amy Morrison
Western Washington University

Huxley College of the Environment, Western Washington University

Beavers invade Bellingham



MONTHLY PLANET

A publication of the A.S. Environmental Center, Western Washington University

volume VIII number v May 1987

Sacramento and Tali Santoyo harvest wheat by hand. The village of San Pedro Chicacauro appears in the background. See story p. 10.

Michael Kane

Planet folks: Amy Morrison, editor; Claire Cdebaca, Alice Panny, Chris Stirling, Scott Williams, staff; Ken Bennett, Michael Kane, contributors; N.S. Nokkentved, photographer and student adviser; Lynn Robbins, faculty adviser.

Cover design and photographs by N.S. Nokkentved

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Bellingham Beaver Colonies

Nature's Conservationists fell, construct, and dredge near condominiums and nature trails

by Claire Cdebaca

One of the unique features of living in Bellingham is beaver colonies existing within city limits.

The area used by a colony is modified into three distinct types of ponds: upper or flood control ponds, a lodge pond, and a lower or foraging pond. The lifespan of a beaver is nearly 20 years, and some of the colonies in Bellingham have existed for several years.

One colony, located in the 3700 block of Alabama Avenue, is in close proximity to several condominiums and single family homes. While the residents of the Lakeview Condos and several single family homes near the lodge pond get to see the "cute, cuddly and furry" creatures at work and play, the residents of the Sunrise Condos on Birch Street near the upper ponds view the beaver's work as damaging. This view of the beavers has developed into a controversy. Should the beavers be trapped and the ponds drained or do the beavers have the right to reside where they choose?

Planners of the Bellingham Parks and Recreation Department and local residents have been debating the issue and intend to decide the fate of these animals, but the people involved have failed to take the animals' future plans into account.

Human land use has always had priority over beaver land use. When the condos and homes were built no consideration was given to the pre-existing colony, even though the manager of the Lakeview Condos uses the lodge pond as a beneficial feature of renting one of the condos.

Beavers choose habitat based on food availability and determine site preference on water availability in order to modify the landscape to promote their lifestyle.

Aspen, alder and cottonwood are dietary favorites along with cattail roots and other spring shoots. Beavers are vegetarians and consume the cambium (inner bark) layer of trees. The size of a tree is not a significant deterence to beaver attempts of foraging. Taste is definitely a deterrence. Beavers will taste most trees in the vicinity of the colony, but they will only fell trees which taste good.

Beavers are ideal conservationists. The branches and trunks of the trees they fell are used to construct the dams they need to control their waterways. Branches are also used to build colony lodges in climates where the pond freezes. This allows the beavers access to the pond below the ice layer. Beavers dig burrows in the bank of the main pond where temperatures are higher during the winter months.

The female usually handles the construction of the lodge and, together with the "kits", strips the branches of the edible layer for consumption. The male does most of the tree felling and branch trimming. He uses the water system to float large tree materials to the lodge, dam construction or repair sites.

Condominium residents enjoy the view of the beaver's lodge pond.

Beavers are also good soil dredgers. They dredge deep channels on the route from their upper flood control ponds to their lodge pond in order to facilitate movement and transportation of food and building materials. The dredged soil is used like a levy to build higher banks. The channels can be three or more feet deep but are usually a little shallower.

Flood control ponds are a series of ponds higher in elevation and upstream from the lodge pond. They store water during storm events to prevent flooding of the lodge as well as retain water during dry periods to insure a constant water flow.

These flood control ponds have the capability of storing tremendous quantities of water. The ponds in Bellingham may store several hundred thousand gallons.

Downstream and adjacent to the lodge pond is a third major pond used by the beavers. The water pressure from this pond is used to support the lodge pond dam, and is the main source for foraging.

The beaver colony on Alabama Avenue does not have a lower pond. It uses the lagoon area of Lake Whatcom which leads to Whatcom Creek. This colony has a serious problem. Due to poor supporting materials which have been exposed by beavers and otters sliding into and out of the pond, the bank of the main lodge pond is eroding rapidly at one location due to poor supporting materials which has been exposed by the beavers and otters sliding into and out of the pond. It is less than half the width of the rest of the bank.

The Bellingham Parks and Recreation owns this bank which also has a nature trail on it. A breach in the bank could drain the pond within a few days if not repaired.

Despite loud water movement sounds, a breach during daylight may go unnoticed by the beavers . The water level of this pond dropped nearly two feet without beaver response after two 24 inch culverts were cleared during early daylight hours this spring.

The Parks and Recreation Dept. has proposed to repair the bank and build a wider nature trail using heavy equipment. Tenants of the Lakeview Condos are concerned that the beavers may leave due to construction noise while the trail is repaired and widened.

The beavers have continued to inhabit the area despite several construction periods in the last fifteen years. Concern over construction activities necessary to widen and maintain the bank may be unfounded, judging from their past acceptance of human activities.

When the beavers decide to relocate, it will probably be due to lack of food availability. Being territorial, they will have to find an unsettled area. The flood control ponds have been zoned as a "green area" which prohibits development and insures that the area will regenerate its flora. The owner of the lodge pond is agreeable to selling ownership to the City of Bellingham for a reasonable fee of approximately $3,000.

Left to themselves, the alder stands will regenerate and beavers will recolonize the area when there is enough food available to support their colony for several years.

Environmental Ethics

Do we have a responsibility to future generations?

by Ken Bennett

Our growing impact on the environment has raised the question of our responsibility to future generations, sparking the idea of earth stewardship and stressing the need for environmental ethics.

The complexity of environmental ethics has divided opinions over the issue of extending present moral values to future generations. Some people argue that it is proper for societies to extend their ethics to future generations. They contend that society assumes ethics from previous generations, and therefore, is obligated to transfer those ethics to subsequent generations.

Opponents argue that it is impractical to extend ethics to future generations because yet-to-be-born persons are literally non-existent, and therefore, have no rights or claims to present ethics.

Edmund Burke, eighteenth century British philosopher, wrote, "Society is indeed a contract. It is a partnership in all science; a partnership in all art; a partnership in every virture, and in all perfection. As the ends of such a partnership cannot be obtained in many generations, it becomes a partnership not only between those who are living, but between those who are living, those who are dead and those who are to be born." (Reflections on the Revolution in France; London: Dent, 1910.)

John Miles, dean of Huxley College of Environmental Studies at Western

"Past generations cared for me and therefore, I care for future generations."

Washington University, agrees with Burke's philosophy. "Past generations cared for me and therefore, I care for future generations," he said. "We have a responsibility to look at the future, and we need to justify our legacy to future generations."

Miles said he believes that today's problems of overpopulation, resource depletion, and ecological exploitation will continue as the magnitude of those problems increases.

Empirical studies confirm that we are damaging the planet, Miles said. "We don't have to destroy the planet to survive. We can share the planet with other organisms. We just have to control our lust for wealth."

Ruth Weiner, professor of environmental studies at Huxley, said she believes that the present generation is doing the best it can. "Our responsibility is no greater or less to future generations because we are free as individuals to make choices of what is right for the benefit of society. I believe in the Jeffersonian philosophy which states an adequately informed society will make the right decisions. The obligation we have (as scientists) is to accurately record our impact (on the environment), and to tell the truth. We are rational creatures and, thus we are able to make the right decisions concerning the ecosystem," she said.

It is not possible to leave all of the exhaustable natural resources for future use, Weiner said. She also said environmentalists cannot be certain about the extent of the impact the energy industries have on the environment. "We cannot say with certainty whether nuclear energy is worse or better than coal burning. The half-life of coal slag is essentially forever - organic hazardous wastes don't go away."

Viewing the earth from a stewardship perspective, Weiner said, is a relatively new concept. "Twenty-five years ago, no one was talking (stewardship) about the earth. We have to get away from the parochial attitude that my domain doesn't extend past my backyard. I would be happy to see people taking a more global view of the domain in which they live."

"We have to get away from the parochial attitude that my domain doesn't extend past my backyard."

John Miles,
Dean, Huxley College

Ruth Weiner,
Professor, Huxley College

Tim Douglas,
Mayor, Bellingham

"We need to look holistically at our environmental problems."

According to Tim Douglas, mayor of Bellingham, the city is attempting to incorporate a holistic approach in its environmental policies. When logging firms propose to cut trees in areas adjacent to property owners' lands, the city notifies those owners and the public. Bellingham also initiates environmental-systems analysis reports when it proposes to build new streets and install new utilities, Douglas said.

"It is impossible to have a zero human impact on the environment," he said. "But, we need to look holistically at our environmental problems. Bellingham is considering building a secondary-waste treatment plant. We will purify the waste-water, but then we have to dispose of the sludge that process creates. Where are we going to distribute the sludge? Do we distribute it in the forests of the Nooksack watershed, the source of our primary water supply? It is one of the problems we need to address."

David Clarke, professor of political science and environmental studies at Western, said he believes our natural environment is deteriorating from our excessive consumption of natural resources. "The immense acceleration of our present impact on the environment is alarming," Clarke said. "We have the capability to lay waste the planet - and we are doing it."

Clarke said he favors strategists using stewardship roles when they implement policies. "We have reached a stage in our evolution where we have to decide whether we are going to be good or bad stewards. We can't turn back now.

"We have an obligation to leave future generations a good habitat," Clarke said. "The majority of people, though, live as if there is no responsibility. They question 'what has posterity done for me?' They also believe that the problem in sustaining a livable habitat is too big, and now it's God's problem."

The responsibility of stewardship still remains, however, and is essentially a balance between consumption of natural resources, economics, and environmental values.

David Clarke,
Professor, Huxley College and Political Science

"We have an obligation to leave future generations a good habitat."

At the Crest of the Wave:

An Interview with Ron Kendall, director of the Institute of Wildlife Toxicology

by Alice Panny

Two months ago the Institute of Wildlife Toxicology (IWT) at Western Washington University received a $244,306 grant from American Cyanamid company to research the insecticide Counter 15-G.

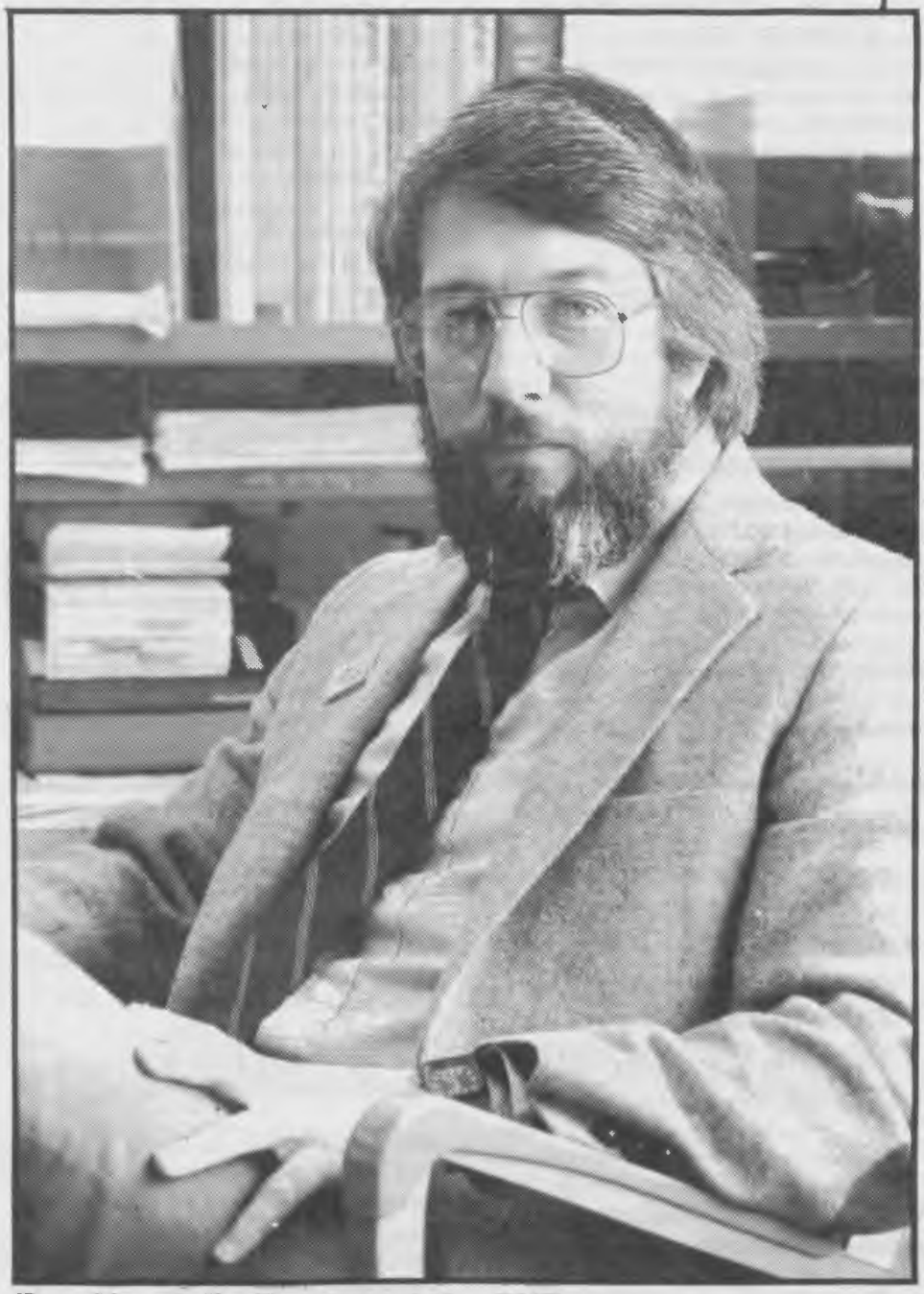
The Institute works with and is located in the building of Huxley College of Environmental Studies. The purpose of the wildlife toxicology program is to identify potentially hazardous chemicals before they cause environmental damage.

The grant from the chemical manufacturer has allowed growth within the Institute including research facilities, staff, graduate and undergraduate enrollment, funding and wildlife toxicology research.

To find out more, the Monthly Planet *set up a personal interview with Kendall.*

***MP:** Why did you decide to become a professor instead of taking a job with one of the major chemical companies?*
RK: I have always wanted to be a university professor. I felt that it would let me grow and develop in the field of environmental toxicology.
It would let me pursue and achieve my own goals, rather than the goals of the chemical industry.

***MP:** What is the purpose of wildlife toxicology? Who does it benefit?*
RK: The purpose of wildlife toxicology is manifold. Since the sixties we have revolutionized our thinking about us as coexisters with other life forms on the planet. For that reason, the aspect of chemicals affecting the health, reproduction and well-being of wildlife is very important as a sentinel to ourselves that there could be problems



Ron Kendall, director of the IWT

out there that are not too far removed from us. In addition, wildlife is a very important component of the ecosystem. We don't know how important because we don't know how to measure and understand ecosystems. But where is the limit? How many species do we have drop out before the bottom falls off ecosystem stability ? Another aspect is economics. Just in Washington state alone, fish and wildlife recreation represents a multibillion dollar per year industry. In fact, one of the big reasons I'm here is the quality of our environment and the tremendous wildlife resources we have. I think it's a wonderful state to live in, and I think we've got to protect that. So who benefits from it? I think we all do, everyday, we benefit from wildlife.

***MP:** Do you consider yourself an environmentalist?*
RK: I consider myself an environmentalist who has a conservative, quantitative approach to environmental problems and their solutions. If you're going to attack a situation or problem, you'd better have a counter ability to make some suggestions for solutions. I think that has been the downfall of many environmental activist movements. They criticize industry, they criticize development, yet they like to go home and watch TV and cook a TV dinner, and have air conditioned homes. It's almost two faces, and I have a real problem with that.The bottom line is we live in a chemical world and we've got to realize it. Chemical industries are responding to demands placed on them by people, o.k.? And so we go shaking our fingers against spraying all these pesticides , at the same time, you as an individual or myself may require a product that takes such extraordinary effort and energy to get to that high quality so we'll buy it, that we force that. We've created the market. So, yes I consider myself an environmentalist, an effective environmentalist, very effective. It's quantitative, it's repeatable, and it works, It's not the B.S. that gets impact, it's good quantitative science that helps the regulators make decisions. It's controversial. It's not like teaching beginning spanish or how to cook a rutabaga. This is stuff that people don't know the answers to and they're worried about it. You say the word pesticide anymore and they go crazy, yet they go down to the food store and they're eating all kinds of pesticide residues. They don't realize it.

***MP:** When you do research for a company like Ciba Geigy do you see yourself and your staff as supporting their interests, in conflict with the interests of the environmental community?*
RK: Well, no I don't. I see my role here in terms of the IWT as being one of good science, high quality research, good experimental design, and the facts are the facts. Now the regulators are doing the regulating (EPA), and the chemical industry is doing the producing, in this case Ciba Geigy, and there has got to be some objective group in the middle that can do some or all of the research. I've taken great pride in being able to work with both groups, and successfully. It's my right as a faculty member with academic freedom to pursue controversial issues. If we get muscled out of this by the environmental community, or the EPA, or Ciba Geigy, then I've lost, all of us have lost. We are a bastion of open research on controversial issues.

***MP:** So the reason you accept money from the chemical industries, as opposed to money from environmental organizations, is that they are the only ones able to pay you for wildlife toxicology research?*

RK: O.K. You've got to understand that chemicals are still a big part of our agricultural system. In the meantime if we have a chance to evaluate and investigate the harm of these chemicals to the environment and publish it, then what more can we do? I do strongly support the concept of integrated pest management *(IPM is a way of controlling pests using a minimum of pesticides.)* but it has not yet been perfected for the large scale agriculture of today. In the meantime, there are a lot of chemicals being used out there, and there are very few groups in the country who do what we do, we're talking a couple.

***MP:** So if it turns out that, for instance, Diazanon is no good for the wildlife,*

Starling nestlings are part of IWT res

"To ride the wave you've got to get in the right place, you've got to get on top...It's a very competitive business. There is no room for seconds. Seconds don't get funded."

arch.

then regardless of the fact that you work for Ciba Geigy, you tell them 'That's it I Don't use it !'
RK: Absolutely. In general my goal is to provide more hard facts on what are the amounts of chemicals in the environment relative to the exposure, and the effects they have on the animals. If there is a problem with a chemical, then we should get rid of it, or curtail its use.

***MP:** What about the clash between scientific researchers and animal rights activists? Have you had any problems in this area?*
RK: I have not had any problems with animal rights activists on this campus. I have met consistently over the years with animal rights groups. They have shown an extraordinary amount of understanding. I think they understand that if we don't have the opportunity to do this kind of work, we are all going to suffer. I think we have a very high quality animal colony.

***MP:** Why all the action and growth at the IWT lately?*
RK: You have to achieve the crest. It's like riding a wave, really, I'm serious. To ride the wave you've got to get in the right place, you've got to get on top. We've made it to the top, and we are recognized and supported across the country. The achieving of grants has become easier. It's a very competitive business. There is no room for seconds. Seconds don't get funded.

***MP:** Tell us about the recent American Cyanamid grant.*
RK: It will be a large scale effort to investigate wildlife populations over three years in a corn-agro-ecosystem (in Iowa) being treated with an insecticide, and only that insecticide. It's going to be a wonderful opportunity to understand how populations are affected over time in the context of a full scale field study. It will employ a lot of people from the IWT, and will allow us to write a book on how chemicals affect wildlife populations in an agricultural environment.

***MP:** So you are studying more than just one species.*
RK: It will be the systems we will be looking at. And there may be an opportunity to establish a field station for Huxley College in the Midwest. We've got a farm rented. We've got over 2,000 acres of land tied up for our research.

***MP:** Are you anticipating a move from animal research to research on the cellular level in the future?*
RK: Absolutely! What we are doing now is absolutely fundamental. We have to look at the organism as the main entity to understand how chemicals are affecting reproduction and health . I do see an immediate opportunity to begin studying tissue culture, cell toxicology, and biochemical toxicology. We can't do everything with these techniques, but we can do a lot.

***MP:** What do you see as the ultimate future for yourself and for the IWT?*

> ***"You say the word pesticide anymore and they go crazy, yet they go down to the food store and they're eating all kinds of pesticide residues."***

RK: The ultimate future for the IWT is to be a highly recognized, highly regarded center associated with the college, for the encouragement of students and research development in the field of environmental toxicology. My goal here is to bring this to maturity, to a solid program. I think we've got a long way to go. I think we're on the crest now. We're riding the wave, and it's exciting. I think it benefits us all. I would like to be with winners. It's nice to be winning in this field because it creates an opportunity for us to affect how decisions are being made.

***MP:** How do you expect students to reconcile the ethics they learn in the Huxley core course Environmental Ethics (concepts such as the inherent worth of all beings, as well as a questioning of the supposed dominance of humans over animals.) with the ethics they learn in a research lab such as the one you have at Huxley?*
RK: My gut feeling is that unless the student is a total vegetarian, any argument they could give about killing animals is a moot argument. If they are a total vegetarian, I'll talk to them about it . I may sacrifice 50, or 30, or 100 birds in the lab for research, but there are millions being exposed on environmental levels. We are trying to find out under what conditions and on what levels of exposure they are having problems. I'm sensitive to people who are concerned and have good questions. I'm not sensitive to people who are accusing, condemning, and have no good recommended solutions.

Life and technology in San Pedro Chicacauro

Children of the Santoyo family,

by Michael Kane

Sacramento stood in the rocky courtyard with a worn serape wrapped around his shoulders against the morning breaze and a cup of Mezcal-tainted coffee in his left hand. The cows were milked and Guillermo and Tali, Sacramento's sons, were herding them back to the harvested corn field. The sun worked its way into the sky, shortening the shadows cast by the surrounding volcanoes, while Salia braided six-year old Louisas hair in preparation for school. Sacramento and I sipped our coffee and waited for breakfast.

So began a day like many others in the small village of San Pedro Chicacauro, where I spent the month of February living with the Santoyo family, learning about village life and technology in the Central Highlands of Mexico.

With a population of about 300 campesinos, San Pedro Chicacauro rests on a hillside at 6000 feet above sea level in the state of Michoacan. Michoacan is an important agricultural area for Mexico due to the temperate climate and potassium rich soil. The inhabitants of San Pedro, like the majority of rural Mexicans, grow subsistence crops of corn, beans and squash, and many of them own chickens, pigs and cows.

Huxley faculty member, Ernst Gayden created the Village Technology Internship as a means for students of Human Ecology to get a taste of life in a Third World village. When I first learned of the program, it immediately appealed to my On The Road -inspired dreams to travel to Mexico, and it offered an opportunity to learn about people. I had discussed problems confronting people in Third World countries in different Huxley courses, and

eft to right: Louisa, Salia, Mela, Tali, Guillermo. *Michael Kane*

even possible solutions to those problems, yet I had never lived in such a country.

The first four weeks of the quarter I lived with a family in Morelia, the capital of Michoacan, and studied Spanish. Western Washington University has a foreign study program in Morelia at a language school called CECCEMAC and this was where I expanded my vocabularly beyond "Dos mas cervezas, por favor." The Morelia experience is a story in itself, but suffice it to say I enjoyed the city life and learned a lot from my "family" and new friends.

After a month of conjugating verbs, La Libreria, preparatory seminars in the local coffee shop, and digging the city, I was ready for the village. On a sunny February day, Chester Zeller, another village intern, and I were driven into the mountains outside of Morelia and left in our respective villages, myself in San Pedro Chicacauro and Chester in El Resumideroz, a neighboring village.

Though I had found most of the Mexican people extremely helpful, I was surprised at the friendliness of the Santoyo family. They were patient with my limited vocabulary and went out of their way to answer my questions about food and agriculture, using words and signs I could understand.

The kids, ranging in age from six to twenty-two, were helpful and, after a couple of days, very talkative. The rest of the villagers were also friendly. The men attempted to include me in their frequent jokes, during the afternoon conversations in the shade. And if nothing else I was usually good for a couple laughs with my cultural naivete. The women were somewhat reserved, contrasting with those I had met in Morelia.

In this country of ours there exists a myth about the lazy Mexican, which is just that, a myth. The people I met in San Pedro Chicacauro were hard workers, especially the women. Their day started well before I rose and was not over until around 9:00 pm, when the evening snack was finished and the leftover tortillas fed to the dogs. Between preparing meals and caring for the kids, they hauled water and washed clothes.

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Though their busiest times of year are in May and June for the planting and in October for the harvesting of corn and beans, the men were kept busy harvesting wheat for the animals, gathering firewood, building new structures and a variety of other tasks that come with working the land and keeping animals.

I usually accompanied Sacramento when he went to harvest the wheat and could barely maintain the pace of this fifty year old man. The wheat was harvested by hand every couple of days and carried the two kilometers back to the house on our backs in burlap sacks. Though I had worked in the woods for seven summers doing physically demanding labor, working with Sacramento was a humbling experience.

One morning after breakfast he handed me a machete and two 12' lengths of rope, tossed a huge single bit axe over his shoulder and we proceeded down the rocky path leading down to the valley. He explained that the axe had belonged to his grandfather and that at one time the surounding forests were much larger. Rather than fall a tree, Sacramento cut the thin gnarly Yerba from the stumps, while I used the machete to strip off the excess twigs and cut the long pieces down to size. Once we had gathered enough for two large bundles we slung them over our shoulders and hiked back to the house. For someone who was accustomed to woodcutting trips that included a pickup loaded with chain saws, gas, oil, wedges, splitting mauls, tool kit and a thermos of coffee, this was a needed lesson in simplicity.

The food served in the Santoyo house was excellent. Beans and tortillas were the main staple, but rice and a meat broth were also served with dinner and two or three times a week we had meat and eggs. Fruit and fresh vegetables were a treat. If I went to the city for the weekend, I brought back a sack of oranges, apples or bananas. Knowing that the Santoyos had grown the majority of the food served at their table was reassuring, but left me questioning my lifestyle more than ever.

A month and a half has passed since I left the village. By now the campesinos of the Central Highlands are preparing the ground for the rains that will come next month - that critical time when thirsty corn is planted along with beans and squash. Though many of those who can afford them use tractors and fertilizer for their crops, the majority of farmers in the region practice a modified version of traditional agriculture. Sacramento still uses animals for plowing and even the burros are often used for hauling wood, water and wheat.

I plan on returning to the Central Highlands of Mexico in December to learn more from the locals and to assist in one of a few possible projects. The projects are still in the planning stages and waiting for the necessary energy to turn them into reality. If this type of learning appeals to your curiousity and you want to learn more, leave a note in my mailbox at the Huxley office or contact Ernst Gayden.

The Center for Applied Human Ecology/ Appropriate Technology at Huxley College

This Center serves faculty and students interested in the technologies appropriate to applied human ecology.

Applied human ecology is the inter-disciplinary effort of refitting human activities into an environment of finite resources and of returning government and economy to human scale.

Appropriate technologies meet human needs for basic goods and services with minimal environmental disruption. They include use of sun, wind, water, and biomass for energy; use of greenhouses and organic farming for food; use of cooperatives for production and distribution; and development of settlement patterns appropriate for these uses.

The Center exists to encourage faculty members to share their research, ideas, information and points of view, and to help students design interdisciplinary programs of study.

Beginning Winter Quarter, 1988, the Center will initiate a Third World Study element in the State of Michoacan in Mexico. Students without prior experience in the Third World will have an opportunity to study Spanish and live with both an urban and a rural family. Students with conversational ability in Spanish and practical experience in farming/gardening, construction, electricity, etc., will have an opportunity to work on a Village Development Project.

For more information, write Professor E.L. Gayden, Huxley College of Environmental Studies, Bellingham, WA 98225.

Wetlands management

Ordinance facilitates development of Cherry Point, north of Bellingham.

by Scott Williams

An ordinance to facilitate development of Cherry Point will be enacted May 9 by the Whatcom County Council. The main focus of the ordinance is the resolution of environmental concerns that have hampered development of the area's shoreline, located north of Bellingham.

The ordinance was written by the Cherry Point Working Group, a committee formed in December 1985 to come up with ways to hasten development of the area.

The area directed for the ordinance is 6,000 undeveloped acres between the existing ARCO and Intalco facilities. This area is especially attractive for development because it has deep water close to shore, making it suitable for pier facilities accommodating ocean going ships. It is considered to be one of the last undeveloped deep water ports on the entire west coast.

Currently the land is owned by a number of corporations including Burlington Northern, Standard Oil, Atlantic Richfield Company, Puget Sound Power and Light, Intalco Aluminum, and Chicago Bridge and Iron. Whatcom County, development companies and citizens have wanted to develop the site but have been blocked because of state environmental concerns.

The State Department of Ecology (DOE) has declared the Cherry Point shoreline to be of statewide environmental significance, primarily due to the herring that feed and spawn in the area's waters. Herring is a major food source for salmon. The DOE's concern is of the dredging accompanying development and its potential to damage the spawning beds.

The new ordinance involves state agencies from the beginning of the development process. It mandates that anyone wishing to develop the area design and carry out a study that will provide the state with information in order to evaluate environmental impacts of the applicant's desired project, which must be okayed by the DOE. The state agency retains veto power throughout the process.

Wayne Schwandt of the Fourth Corner Development Group and chair of the Cherry Point Working Group says the ordinance also provides for giving some of the land to Whatcom County for public access in exchange for public improvements to the surrounding area. The result is that the potential developer can determine whether or not it would be allowable to develop the area without wasting large amounts of time and money.

The Cherry Point area is now home to three dock facilties operated by ARCO, Mobil, and Intalco Aluminum. Before the docks were built, the area was marginal farmland.

In 1977, Chicago Bridge and Iron proposed to build oil drilling rigs on the site, promising that 1,000 jobs would be created. The plan included extensive dredging of the tideland to facilitate floating the rigs out when they were completed. They proposed to dredge the tideland and some of the upland area so that water from Georgia Strait would run in and fill the dredged area to a depth of about 20 feet. A wall then would be built and the water pumped out. Construction of the rigs would take place behind this wall, and when they were completed, the wall would simply be removed and the rigs floated out. This plan was vetoed because of the damage that would occur to the herring beds.

Aquaculture evolves into a highly

by Chris Stirling

Physically extracting marine life from its natural habitat, known as aquatic harvesting or aquaculture, provides 10 percent of the world's aquatic produce. The widespread use of aquaculture is largely the result of rapid population growth and ecosystem degradation worldwide. More mouths to feed and degrading aquatic habitats, as well as potential profits in the business, have been factors in the development of aquaculture.

In his book Farming the Waters, Robert Linberg defines aquaculture as, "(The) raising of water-dwelling life-forms for profit or subsistence, much as livestock is raised." These water-dwelling life forms include many types of fish: mollusks such as oysters, crustaceans such as shrimp and crayfish, certain varieties of seaweeds, and non-edible commodities such as pearls and pet tropical fish.

In the face of a world population predicted to top six billion at the turn of the century, aquaculture has a favorable chance to be developed into a large scale, highly mechanized industry worldwide.

Contributing to this chance is the degradation of habitats essential to several kinds of marine organisms. Coastal ecosystems such as mangroves, seagrasses, and coral reefs are threatened by a variety of circumstances.

Mangrove forests are one of the most productive and biologically diverse ecosystems in the world, providing habitat for more than 2,000 species of fish, invertebrates, and plants. Threats to this valuable ecosystem comes from clear-cutting of the forests, diversion of freshwater from upland watersheds, and reclamation of the land for agricultural use. Other factors leading to mangrove degradation are urban developments, industry, ports, siltation from land runoff, mining, and various pollutants. Current trends show severely depleted mangroves by the year 1990.

Coral reefs and their associated communities cover 600,000 square kilometers of shallow marine environments. Approximately one-third of all fish species live on coral reefs. Sediment pollution from mismanaged upland areas and destruction by mining or blast fishing are the primary threats to reef ecosystems. Additional pressures include dredge and fill operations, over fishing, water pollution, large volumes of freshwater from river diversion and storm runoff, and destruction by collectors and tourists.

Seagrasses, salt-tolerant plants that thrive in clear, calm, and shallow waters, is the other threatened ecosystem. Seagrass communities are known for their ability to trap and bind sediments, thus retarding erosion of shallow water sediments. Most importantly, seagrasses provide habitat and food for fish and other marine organisms. Direct destruction from trawling, siltation from land runoff, and industrial pollutants threatens seagrass ecosystems.

Recent trends show the threats mentioned are extremely serious to the overall inter-relationship between these

three coastal ecosystems. Extensive sub-marine meadows of seagrass usually provide the link between the seaward coral reef and landward mangroves. The migration of fish and animals to and from these ecosystems for feeding and shelter is ecologically essential for survival. It is the continuing degradation of these interconnected ecosystems that has been a factor in aquacultural development in the world.

For countries like Japan and China, on-going aquacultural activities have stemmed from population growth and aquatic habitat degradation, intensive fishing, pollution, destruction of fishing grounds, and increased operating costs of fishing vessels.

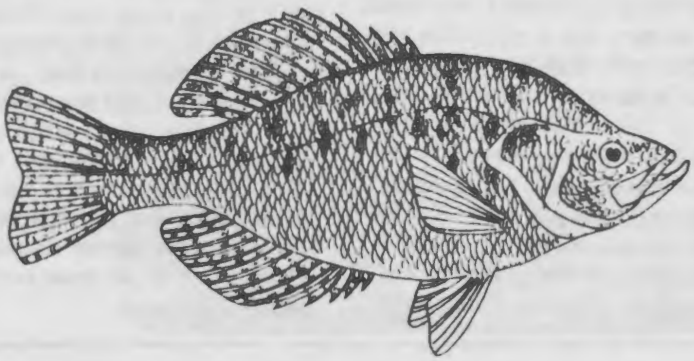
The average Japanese person eats approximately 70 pounds of fish per year, six times the amount eaten by an American. With half the population of the United States in an area smaller than California, and with their agricultural land less than 20 percent arable, the Japanese have adapted aquaculture as a means of providing food and commodities.

The Japanese government has invested substantially in aquaculture, making it a multibillion dollar industry.

Raising pearls is also part of Japanese aquaculture.Oysters are taken from man-made floating habitats and are surgically implanted with a nucleus to which calcium will bind over the subsequent three years.

Japan's neighboring country, China, has led the world in pounds of cultivated fish produced per year. Fish farming in China has developed into a highly efficient method of raising food; primarily used is the method of polyculture, the raising of more than one species within the same area.

Unlike the subsistence motives for aquaculture in Japan and China, the aquaculture business in the United



developed industry

States focuses on the profit angle.

The first significant development of aquaculture in the U.S. was largely the result of a failing southern soybean industry. By using the same workers and the same tractors, (slightly modified) once-soybean farmers are turning to catfish farming. Nearly 200 million pounds of catfish were produced by the Catfish Farmers of America (CFA) in 1983.

It only takes 18 months before catfish can be harvested. Catfish feed contains soybeans, wheat, fish meal, and corn. Despite this seemingly expensive diet, one pound of fish feed will produce one-half pound of catfish meat, whereas one pound of nutritious cattle feed yields only one-fifth pound of cow meat.

The CFA has sought to standardize product quality and find new markets for catfish. Despite its enormous popularity in the southern states, catfish is not a major part of American diets. Thus it has been the goal of CFA to convince the public of this cheaper, tastier, highly nutritional and plentiful food.

In the Northwest corner of the U.S., particularly in Alaska, Pacific salmon have held a strong position in the worldwide salmon market. This industry,though, has not been without major adjustments; many of the rivers which have served as spawning grounds have been cut off by hydroelectrical dams and other developments.

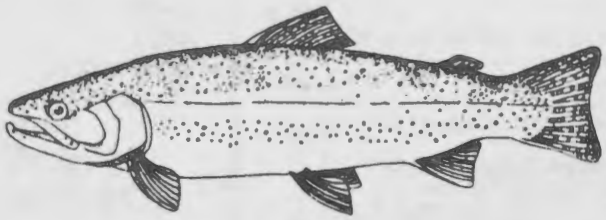
James E. Lannen, professor at the University of Oregon, said, "We produce juveniles quite inexpensively in hatcheries, then we release them into the marine environment. By virtue of their migratory behavior they will move to productive feeding grounds and harvest energy from natural production and return it to us in the form of fish flesh."

By interrupting the salmon's quest to climb the rivers, hatcheries are able to extract and mix eggs and sperm, thus starting the process described by Lannen.

However ingenious this process may be, a pure form of aquaculture is seriously competing with the Pacific Northwest salmon market. In Scotland, the Golden Sea Produce Company produces one million pounds of Atlantic salmon per year. The salmon is raised all of its life in a floating pen; the efficiency of this process is much greater than its Pacific counterpart. Salmon can be harvested with relative ease when the market is strongest, when fish are ready to be harvested and when the processes are ready.

Survival rates of these cultured Atlantic fish surpass those of the Pacific hatchery-started salmon. Both, though, have at least a 75 percent survival rate, compared to that of nature who assures less than 10 percent survival.

The decline in valuable ecosystems and the rise in population gives aquaculture a dominant place among the highly developed industries of the modern world.



Booklet describes germs and chemicals in the food supply

The Center for Science in the Public Interest (CSPI) has just published a booklet describing the problems of germs and chemical residues in the American food supply. Guess What's Coming to Dinner focuses on the contaminants in fruits, vegetables, meat, and fish.

According to the booklet,

*Food poisoning sickens more than 20 million people and kills about 9,000 in this country every year. An increasing number of these cases are caused by germs resistant to antibiotics.

*Antibiotic-resistant germs have been traced to livestock. More than 50 percent of all beef cattle, dairy cows, poultry, and swine are given low doses of antibiotics in their feed to make them grow faster and to prevent disease.

*At least one-third of all chickens sold in the United States are contaminated with Salmonella bacteria.

*At least 70 percent of all animal drugs have not been tested well enough to assure safety to consumers.

*In 107 out of 179 cases involving fruit and vegetable shipments found to contain illegal pesticide residues, the government took no action to keep the food off the market.

*At least 60 percent of pesticide ingredients have not been properly tested for toxicity, and the amount of insecticides used today is 10 times what it was 40 years ago.

Michael F. Jacobson, executive director of CSPI, says, "Consumers feel betrayed. Food that otherwise would be wholesome is often tainted, and government regulation amounts to little more than a false promise of protection.

"Only about 1 percent of all fresh meats and produce are tested for illegal residues. To make matters worse, the legal limits themselves are questionable; government lab tests cannot detect many widely used pesticides and animal drugs and by the time the results are back from the lab, the food has usually been sold anyway."

According to a survey by the supermarket industry, three out of four consumers are concerned about food contaminants.

Guess What's Coming to Dinner is available for $3.80, including postage and handling. Checks should be made out to "CSPI" and sent to 1501 16th St., N.W., Washington, D.C. 20036. Bulk rates are available.

Correction to last issue:

The Whatcom Hills Waldorf School was founded by a board consisting of four persons, contrary to the statement in the last issue that Kent Ratekin was the sole founder. The board includes the following people:

Jeff McKenna
Kent Ratekin
Josiane Schantz
David Steege

— Update —

Spotted Owl Management

Last fall, the Pacific Northwest Regional Forester began accepting public comment on the U.S. Forest Service's proposed management policy for Northern Spotted Owls. Thirteen alternatives were offered with a department preferred alternative.

Nearly 42,000 responses were received from individuals and organizations from 49 states, the District of Columbia and British Columbia. 30,793 responses were from Oregon and 6,721 from Washington State.

Alternative F, the department preferred alternative, would have allocated 2,000 acres per pair of birds but 800 acres would have remained part of the timber harvest base. This alternative received the least approval from all respondents.

Alternative L proposed allocating 4,500 acres per pair in Washington State, 2,500 acres per pair in Oregon and 1,500 acres per pair in California with all of the acreage removed from the timber harvest base. This alternative received the most approval.

Alternative A proposed leaving the current acreage allocation of 1,200 acres alone which included leaving all acreage on the timber harvest base. This would have allowed the current harvest level of 4,000 acres per week to continue. Alternative A received the second highest approval.

Three new alternatives were proposed by respondents. The Northwest Forest Research Council proposed deferring the decision until enough data is collected to make an informed decision, but no reduction in the timber harvest should be considered.

The Audubon Society proposal included the protection of 1,500 pairs of birds minimum throughout the owl's range. Also part of the proposal were establishment of a habitat network system, government agency accountability, and intensive, as well as extensive, research.

The Wilderness Society suggested that 1,000 Spotted Owl Habitat Areas be established in Washington and Oregon clustered together in groups of three areas within 1.8 miles of each other. Timber harvest should be shifted from old growth to second growth and mature trees, and each region's economy should be helped to shift from timber to some group of alternatives based on the specific needs of the area.

The Draft Environmental Impact Statement has been altered to reflect the documented dependency of Spotted Owls on old growth stands. Said the Regional Forester, "In developing the Final Supplement, every effort will be made to use the best information on the environmental, social, and economic aspects related to the issue of habitat management for the Spotted Owl."

The relative health of these Northwest forests depends on the survival of the Spotted Owl species.

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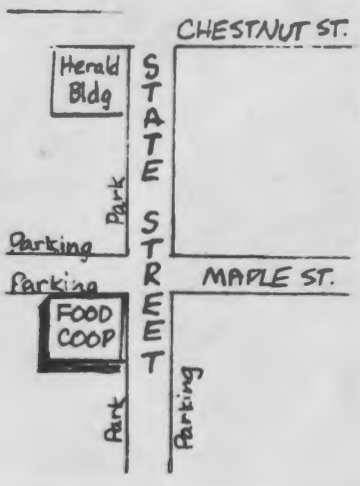


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