

STARKER LECTURES 2001

VISIONS OF NATURAL RESOURCES

Peeking into the Neighbor's Yard



TABLE OF CONTENTS

Acknowledgements2

Dedication3

FILM, FORESTRY AND OUR GLOBAL BACKYARD

Monty Bassett4

GENTRIFYING ECOTOPIA: A BROWN GIRL LOOKS AT HOME, LANDSCAPE AND POWER

Debra Salazar18

IISAAK: RESPECTING FOREST VALUES—FROM PROCESS TO PRODUCTS

**Iisaak Panel:
Linda Coady,
Eric Schroff, and
Alton Harestad36**

URBAN FORESTRY: FORESTRY’S FINAL FRONTIER

Gregory McPherson60

ACKNOWLEDGMENTS

Natural resources are a crucial part of our world. This year’s Starker Lectures theme, “Visions of Natural Resources, Peeking into the Neighbor’s Yard,” offers a unique attempt to look at complex resource issues among neighboring boundaries. Our speakers come from a variety of backgrounds and offer diverse and thoughtful views.

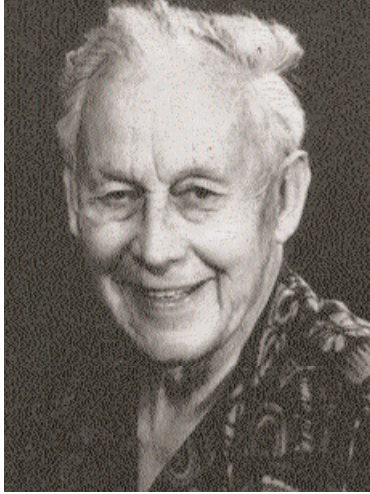
This lecture series requires a major effort on the part of the Starker Lecture Committee. I thank Norm Johnson, Phil Humphreys, Jeff McDonnell, Lisa Ganio and Sandie Arbogast for the dedication and creativity that turned disparate ideas into a coherent theme and an outstanding group of speakers.

Manuscripts were edited by Rosanna Mattingly, PhD, Portland, OR, and designed by Sandie Arbogast, Forestry Communications Group.

We recognize the encouragement and commitment of College of Forestry administrators, students, and friends who support the lectures.



DEDICATION



T. J. STARKER

Thurman James Starker, known to all as T. J., was born in Kansas and spent his childhood in Burlington, Iowa. He moved with his family to Portland in 1907 and began working in and studying forestry. T. J. graduated in the first class of foresters at Oregon Agricultural College (OAC), now Oregon State University, in 1910. He then studied two years for an MS degree in forestry at the University of Michigan and returned to Oregon to work for the USDA Forest Service. Subsequent employment with the forest-products industry and a variety of summer jobs while he was teaching forestry at OAC/Oregon State College (OSC), gave T. J. broad and thorough experience in all aspects of forestry.

In 1936, T. J. began purchasing second-growth Douglas-fir land, the beginnings of Starker Forests. Through his work experiences and teaching forest management, T. J. had a major influence on sound forestry and community development in Oregon.

Bruce Starker studied forestry at OSC, earning a bachelor's degree in 1940 and an MS in 1941. After service with the Coast Guard, Bruce joined his father, T. J., in acquiring and managing Oregon forest land, always with an eye for careful management, sound reforestation, and conservation for multiple benefits and values. He worked with private industry and university, state, and federal forestry agencies to improve reforestation and management, and developed taxation systems that improve forest practices. Bruce continued the family tradition of active community service in many ways, including participating in civic activities and regional forestry work and contributing to the Oregon Forest Practices Act.

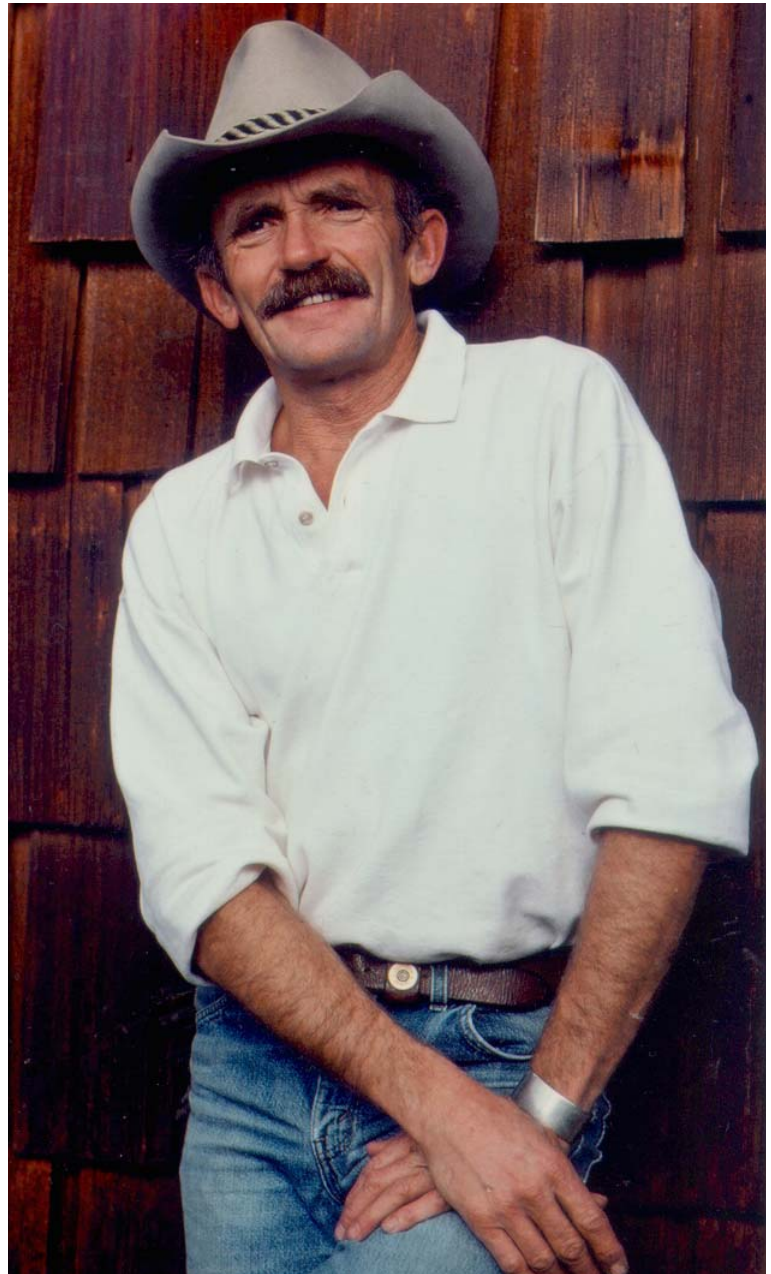
Forestry in Starker Forests has changed with advances in knowledge, technology, and public environmental issues. But the constant value of tending the land remains unchanged. The community spirit and sound progressive forestry of T. J. and Bruce Starker continue today.



BRUCE STARKER

WATERSHEDS OF TIME: FILM IN FORESTRY

Monty Bassett,
Natural Resources
Filmmaker, Out-
Yonder Productions,
Smithers, B.C.,
Canada



I'd first like to say what an honor it is to be invited to speak at the Starker Lectures. I had the opportunity to see the Starker Family Forest today, and I was very impressed. It is an inspiration to see a family dedicated to the use and preservation of the land. Also, I'd like to thank Bo Shelby. Bo and I first met when he came north to run the Grand Canyon of the Stikine. Bo stands high in my esteem for many reasons, not the least of which is that he has the strength of character to know when to paddle and when not to suit up.

Opening film clip, from the documentary "Life on the Vertical" shows various scenes along the narrow vaulted walls of Canada's Grand Canyon on the Stikine River.

It has been called Canada's Grand Canyon, yet its location is so remote and wild—so dangerous and unforgiving—that more humans have walked on the moon than have traveled its length!

Making documentaries is a very recent vocation. My formal education was in biology and philosophy. Today, I'm going to craft my talk from both disciplines. And if that isn't enough to put you to sleep, I'll be taking my examples from a couple of recent films.

So: "Watersheds Of Time: Film In Forestry." What does film have to do with forestry in the first place? Well, one correlation that comes immedi-

ately to mind is education. And ironically, it was because of forestry that I first became involved in film.



The story began 7 years ago in a region of northern British Columbia called the Cassiar, after a range of mountains that form the backbone of the area. At the time, I was the director of a biological research foundation, and we were radio collaring wildlife to collect data on how many of what went where, and other such types of information.

The Cassiar is British Columbia's largest roadless wilderness, encompassing one-sixth of the province. It's alpine and boreal regimes support

"Perched high on pewter cliffs, they contemplate the steep drop below and seamless sky above, at peace in an environment where one wrong step means certain death. Welcome to the raw and mystical world of "Life on the Vertical."

the world's largest population of mountain goat, mountain caribou, stone sheep, and grizzly. Over half of the bird species found in B.C. are found in the Cassiar.

Still, although it is prime habitat for raising critters, it is poor terrain for wood fiber for production. A single 6-inch pecker pole takes 150 years to grow; a single logging truck carries, on the average, 30,000 growth-years. Consequently, everyone in the north was dismayed when, in the mid-1990s, the B.C. provincial government introduced an industrial logging program in the slow growing, boreal forests. In the Cassiar alone, the annual allowable cut was escalated by 300 percent.

The response of all of the region's stakeholders was immediately and unanimously against the proposal. Many of us felt that the absurdity of the idea was enough to stop it, so it was decided that a short film should be made on the Cassiar issue, and I was asked to write a script, which cinematographer Myron Kozak would shoot.

In a sudden tragedy, however, Myron was killed in a bush plane accident and I inherited his footage. As they say, the rest was history. A film called "Cassiar at the Cross Roads" was produced, with the generous help of a number of film makers who knew the area. When the dust settled, industrial logging of the Cassiar had become a political hot

potato. Suddenly, the Forest District was disbanded, and today their offices are occupied by Fish and Wildlife and by the Ministry of Environment and Parks.

But my talk today is *not* about how I got a job, or about film and forest politics. Rather, I'd like to discuss a second, more pertinent application of film to forestry, and that is what we are learning about our planet's forests from satellite pictures.

It occurred to me, while I was recently making a documentary about satellites, that time is merely a measure of change. And all things in change—which *is* all things—share two ingredients: direction and speed. By direction, I mean merely that no event occurs without a cause; even seemingly random events are offspring of the moment before. The past sculpts the direction of the present, into the future.

But is this to say that the direction of a particular change is purposeful? Yes and maybe! If "purposeful" means divine ordination, well "maybe," but this is not a question for science, but for an individual's own spirituality. On the other hand, if we mean—given all the circumstances leading up to a moment—that an event couldn't be otherwise, then it seems to me that yes, all change *is* purposeful. If I drop a pen, it falls with absolute predictability, according to the influences of gravity

upon its mass. That is what I mean by purposefulness, which is most apparent in biological systems.

It seems to me that science discovers. And what we discover when we examine the intricacies of living systems is that they violate the Third Law of Thermodynamics. Instead of becoming more random, more chaotic, biological systems have evolved with *more* sophistication, more complexity—retaining, not losing information—and eventually becoming self-cognitive. The reason this happens is that an organism is but a pre-programmed script, written in the ink of causality, change with purposeful direction. Ontogenesis recapitulates phylogenies.

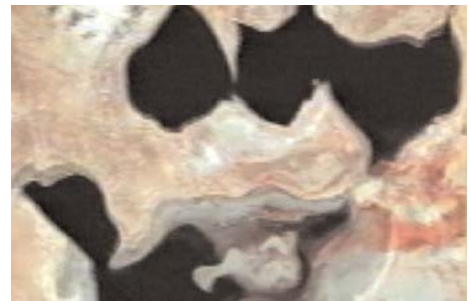
Besides direction, there's a second component of change—speed, or rate. And just as we discover in nature the mechanisms of change, we are beginning to see the next level of intricacy, the clocks. Again, this is most apparent in biological systems. Pregnancy is an example. The development of a fetus is an intricate orchestration of both sequentiality and tempo—a concert of interconnected clocks triggered to kick in, in precise, chronological order. In fact, it's my belief, that a science of the future will be bio-chronology, the study of biological clocks.

Let us return now to “Watersheds of Time.” Nature, as we've said, is a complexity of systems in a state of flux. And “natural history” is but a

map of change—the surging and ebbing rates of evolution over watersheds of time. From the standpoint of the development of species, crossing these watersheds of change can be as slow as an ice age, or as immediately cataclysmic as a meteorite strike to the Yucatan.

But today we stand on the knife edge of a watershed of greater consequence than the earth has ever known. For at no time in the history of our planet has biological change been accelerated so fast, nor the factors influencing its direction been so powerful as the last 4 decades. In short, nature, once the master of humankind, is suddenly at our mercy. We are probing and altering the very genetic coding of organisms, while inadvertently driving the consequences of millennia of evolution to extinction.

To illustrate this point, let's return to the second application of film to forestry, the use of earth observation satellites, and what they are telling us about our biosphere. Because satellites can take pictures from exactly the same place, time after time, using time-lapse photography, we can now reduce years into minutes, months into seconds. And suddenly we see, with irrefutable evidence, the influence of humanity upon both the direction and the rate of ecological change.



Aral Sea, Kazakhstan

1973

2000



Lake Chad, Africa,
Top 1973,
Bottom 1997

“Saturn’s Eyes: Satellites Taking the Planet’s Pulse.”

The first clip shows a number of time sequences of human-induced change to the planet: the desertification of Lake Chad in Africa, the shrinking of the Aral Sea in Kazakhstan, and finally, the permanent destruction of the jungles of Vietnam, 30 years after the spraying of Agent Orange.

Satellites have become the microscopes of the new millennium, with humanity and our habitat on the examining table.

And because satellite science can time-lapse years into minutes, we see our long-term impact upon the environment.

In North Africa, for example, the desertification of Lake Chad is a stark example of changes to the planet’s great water bodies related to irrigation and global warming.

Similarly, the Aral Sea in southern Kazakhstan, once the planet’s fourth largest inland sea, is a but a fraction of its original size.

It is no longer capable of sustaining life!



Vietnam

1960s



Vietnam

1990s

Sometimes human impact upon the environment is immediate, destroying an entire ecosystem with a single act. The spraying of Agent Orange in Vietnam is an example.

These intelligence satellite pictures taken in the early 1960s show defoliation lines after the spraying of 11 million gallons of Agent Orange.

On the ground it was Armageddon.

Thirty years later, as shown in gray on these recent satellite images, the spray lines are still vivid.... The primary jungle has never returned!

The second clip illustrates human influence upon the rate and direction of forestry. It shows how satellite imagery is used in forestry: for monitoring the rates of regeneration, for fire alert systems that save millions of cubic meters annually. But satellites also reveal how fast we are harvesting our primary old growth forests, first in the Amazon, second in the Queen Charlottes.

Through the changing seasons, satellites mirror the very air we breathe. From winter green to summer red, oxygen production is reflected by the leaf growth of our forests' canopy.

For example, with detailed satellite land use maps, we can monitor forestry practices over time, comparing clearcuts with new regeneration.

In a similar manner, we have developed, through satellite tech-

nology, early fire detection systems, saving *millions* of acres normally lost to natural fires.

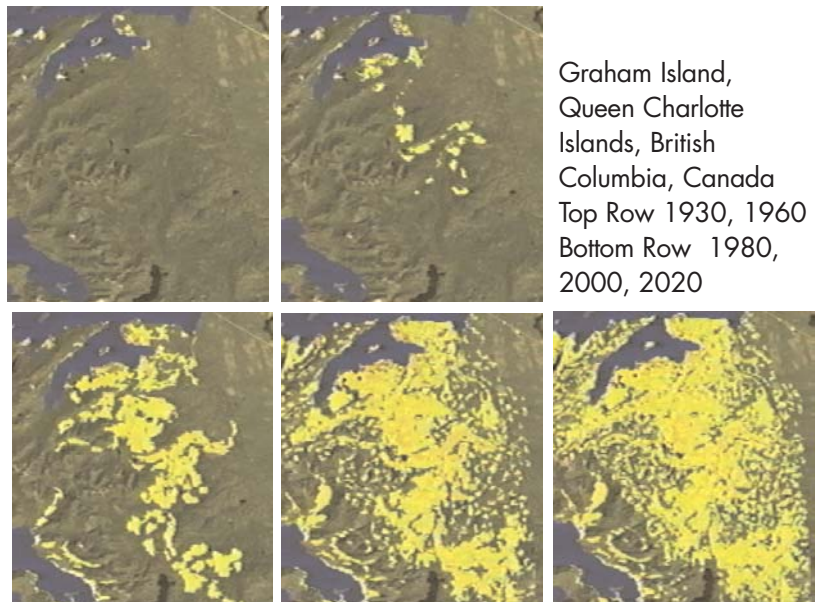
But the most important application of satellite forestry is the monitoring of the rate we are destroying our primary old growth trees.

What we are discovering from space is that one of the critical problems we face in our future is the loss of our planet's forest cover due to over-harvesting.

It was only when satellites began detecting fires in the Amazon jungle that the world suddenly realized we were destroying too much, too fast, of our old growth forests.

But it isn't just South America. In Borneo, Russia, and Canada, the planet's rainforests are disappearing at an alarming rate.

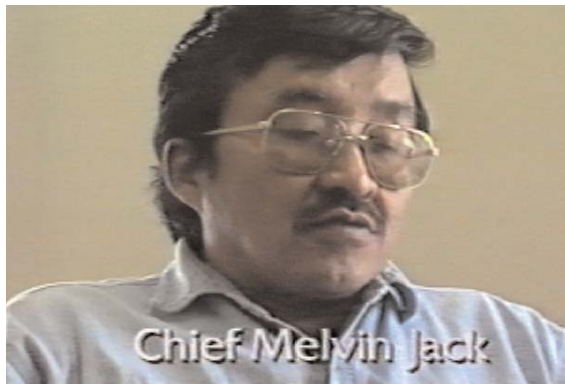
The Queen Charlotte Islands off the Canadian west coast, is an example of the accelerated rate of clearcutting in our primary forests.



Graham Island,
Queen Charlotte
Islands, British
Columbia, Canada
Top Row 1930, 1960
Bottom Row 1980,
2000, 2020

Using early forestry maps and up-to-date satellite imagery of Graham Island, we see the rate of old growth cutting from 1910 to the end of the 2nd millennium. Based upon current cutting permits, Graham Island's primary forests will look like this by the year 2020.

I'd like to leave you with this thought. Not only does the present set the direction for the future, it sets the pace. The most immediate challenge today is slowing down the rate of human influence upon the planet—our rates of consumption, pollution, propagation, and aggression. And to this end, resource management must be time management—decisions that buy the biosphere more time, which means management of ourselves. "Natural resource management" is an oxymoron; it's humankind that needs managing.



I'd like to end with a clip from "Cassiar at the Crossroads." The narrator is David Suzuki; the native elder speaking is Chief Melvin Jack of the Yukon Tlingit Nation.



The final film clip begins with a mother bear and two cubs carrying salmon, the smallest cub is dragging the largest fish. In the next scene, against a backdrop of a pastoral, wilderness lake, two children are dancing on the tops of large blocks of wood.



An ecosystem is a living entity, an organism far more than the sum of its parts.

Chief Melvin Jack: You cannot put the forest back the same way it is today. A tree takes 205 years to grow, and then eventually dies and serves the forest for another 200 years. The valley floor works in harmony with the caribou, with the moose, with the mice, with the bear, with everything.

When you take part of that away, you are taking away parts that you can never put back together.

In closing, I'd again like to thank the Starker family and Bo Shelby for the opportunity to speak to you today.

QUESTIONS AND ANSWERS

Monty Bassett: Okay. Now, the best part: Questions. Yes, sir.

Question: I don't think you're being fair to British Columbia. For instance, you did not say that the Queen Charlotte has been turned into a national park. You didn't say a word about the Great Bear Wilderness Area, which is the biggest rainforest in the world. You didn't say a word about B.C. setting aside 12 percent of its land area for nothing but national parks and recreation. Now, parts of it have been over-logged. There's no question about that. But B.C. has done a very good job of coming into what you might call the 21st century, and its current forestry standards are far better than Oregon's.

Monty Bassett: After going to the Starker plantations, I would question that. Did everyone hear his statement? He was saying that I was really quite unfair to B.C. We have created a national park, but it's only half of the Queen Charlotte—the southern half, South (Moresby) Island. The 12 percent he spoke of—most of it is in parks. There are a few new parks.

That's not my point. My point is to focus on the areas that we have not done well in. But, you're right; I have used too broad a brushstroke here. But I still feel that there's a lot of room in British Columbia to expand, and I would still fill up a bus with foresters and bring them down and introduce them to Barte Starker.

Question: Well, you seem still to be hearing the effects of a little conflict, or you've had some in the past, judging by some of your comments. And I was going to ask how things had been received, how your work had been received in British Columbia, but Denny's already given some indication of that. He's got quite a history there. But on a more general level, how has your work been received in British Columbia, and what kind of conversations has it promoted?

Monty Bassett: Here again, it has to do with the audience. There are some people who would say that my observations are either trivial, or not germane. And yet the ideas developed in my films have also been very well received.

Question: Well, your work hits us at various levels. Obviously it's very pictorial, and it's easy to look at, but there are also some messages in there that people can take and use in various ways. And you're talking to a group of people from the College of

Forestry here who are interested in your own thoughts about... This seems to be the kind of thing that goes over very well with the general public, and I was wondering, from the general public standpoint, whether you've had success in extending the conversation or promoting conversation about what to do with natural resources in B.C.

Monty Bassett: What I hope to do with that is to move people away from the clichés. We slip into the habit of taking arguments and making them superficial, and literally reducing them to “no action in the future”; that is, we fight all the time over logging versus no logging. But that's not the issue. It's not even a question of practices. It's the rate. It's a question of science. It's a question of opening up the canopy to get more trees. Do you see what I'm saying? And I have always been very apprehensive that I have trivialized some very, very important factors, and I probably am a little gun shy. If I come across a little defensive, it's only from years of scar tissue.

Question: You showed a progression of how the old growth has disappeared. In Canada, do they just leave that land and never replant it? We have a lot of replanting here within 2 years. And what is your view between the new growth coming on against the old growth that is dying down and not producing any wood?

Monty Bassett: Absolutely. When you take out the old growth, you have new growth canopy coming in; you have a new environment. Our point there was, where there was old growth, we definitely do have reforestation. We definitely do have regeneration. But we have a situation that you have here. West of the Cascades would probably be a wonderful area for growing trees. East of the Cascades, however, or the east slope of the Rockies, or the east slope of anywhere, it's very tough to grow trees. Regeneration has not happened there. We are planting, but we're not getting successful regeneration.

The reason that I showed this, the Queen Charlotte Islands, is not sensationalism. You have to remember that this film was made about the satellites and what they're showing. It doesn't show a perspective of that second generation coming up. But, for the most part, we have only known one type of forestry, and that's large-block clear-cutting and monocultures. There are lots of places where we're doing small block now, but everything is very recent. We were doing monocultures for a long, long time, not diversities. For a long time our forestry was not even the indigenous species that were there. So, to answer your question, yes, there is regeneration on the Queen Charlotte Islands. Those yellow spots still stand out, but what they're showing is other generations coming up.

Question: Then you really couldn't apply what you're showing there to what we do here in Oregon and make a true comparison?

Monty Bassett: No. No. And that's not my point.

Comment: Well, that's what the message might be to somebody who doesn't ask a question, like an old guy like myself.

Monty Bassett: My point is about the *rate* of a single type of extraction. And to tell you the truth, I don't know about Oregon methods of harvesting, but I know that you've got a lot more arrows in your quiver than we do right now.

Comment: I was just going to say, is it not true that British Columbia has divided its land into three classes: one class for intensive forests, one class for in between, and one class for recreation wildlife preservation, etc.? And it's still working on drawing the lines? This is a more efficient way of running forestland than trying to get everything off one area, because a lot of uses are virtually incompatible. So, if you're setting aside blocks, which B.C. can do because it owns all of the land, then you've got a chance of running your forests more efficiently for all the uses you want. And the other thing I would say is that I did my research in the interior of British Columbia, and we [inaudible]

regeneration there, but 90 percent survived on our plantation.

Monty Bassett: Where in the interior was that, if I might ask? What area?

Comment: Prince George, mostly. St. Saint John and Williams Lake and...

Monty Bassett: Well, there's no way that I—and I certainly don't mean to contradict you here—but one of the places they use for oriented satellites is that area. They clearcut towards Bowren Lakes out of...

Comment: Yes, that was spruce kill, beetle kill.

Monty Bassett: Well, possibly.

Comment: Everybody knows that, and we recognize it. It was a tremendous opening, but the trees were all killed by insects.

Monty Bassett: Yes, sir.

Comment: I was going to say, I really appreciate the use of satellites and change detection to show what's happening over large landscapes. And maybe, based on this discussion, whether it's in the Saturn's Eyes documents or a new one, it would be good to show globally that forests change and how areas that are more productive or where regeneration is high change over time, and compare that with places where you don't see the regrowth.

Monty Bassett: Yes.

Comment: There's a real opportunity to educate the public on global...

Monty Bassett: Exactly. This is one of the real aspects of the application of satellite imaging that we use daily in forestry—monitoring regeneration. Every forest district buys tons of satellite imagery just for that reason. And we were talking about it. I think this show is going to generate a series, and one of the areas that we want to explore is Russia and what's happening there.

Question: You mentioned consumption and that it's part of the equation of the rate of change that your documentary seems to focus on. Is there any plan in the works to deal with that consumption issue in a kind of documentary?

Monty Bassett: You know, if I could say something about consumption... Right now we're in a crisis situation in British Columbia with our forests. The market has just collapsed. And consumption has two aspects. One, are we taking too much? Actually, three. Are we utilizing it in the best way? The third factor that I think we really have to focus on is consumption, and I'm not just saying this because you've invited me to your luncheon. I honestly am so impressed with this idea of taking

out the consumptive element, that is, providing product without doing it at the expense of that particular region.

We stood in areas where there's been thinning, and the trees are much, much larger. I mean, everybody has got to go out to the Starker forest, because thinning allows vegetation to grow. It allows the trees to grow. My point is that we could level off that "crash, abundance, and crash" kind of cycle that seems to correspond with our resource management, particularly in forestry. I think that's one area that we have to look at.

I think that we also have to ask, are we utilizing the wood in the best way? And are we taking more than is sustainable in a lot of places? I think these are legitimate questions. I don't want to conclude that everybody is over-harvesting. But you said yourself that there are companies using practices that a person feels are not the best procedure, not the best way. But then, demand of a resource is ultimately what's going to drive the way that that resource is extracted, it seems to me.

Comment: I guess what I was more getting at is our consumption habits of going to Home Depot and wanting more and more and more of various products. That's what drives a lot of this—the demand... and whether there's a process by which we can

educate ourselves about using these products more wisely so that we don't over-consume.

Monty Bassett: You know, we talked about this, and it occurs to me... I'm embarrassed to say this, but I think when the fear level becomes so high that people suddenly have to integrate into their own lifestyles the concept of resource extraction, *then* I think we'll start evaluating. I don't mean to be sanctimonious here. I live out in the middle of nowhere, and we burn snags for firewood. I do try to avoid habitat that flickers are in. I certainly don't mean to be evangelical and say, "Okay. There's that outside world, and they're consumers, but, hey, I have control of it." I don't. It's a global problem.

Comment: Well, actually, this is sort of along the lines of what you all were saying, but going back to that word *philosophical*... When you were talking about time and change, you made a statement that nature used to control humanity, and now humanity is pushing and changing nature. And I guess you've all answered the question... The rubber band can be pulled only so tight and we're not holding onto it anymore. Now nature is controlling humanity again.

Monty Bassett: Yes.

Comment: I always hear that technology is going to save us. People still

have this vision that technology is going to pull us out of the fire.

Unfortunately, I have a pessimistic viewpoint that until we're getting burnt badly we're not going to make the changes in consumption that we need to make. Because nature will... I mean, we can (my own personal opinion) push it only so far. We can't push it anymore (inaudible). I guess you sort of answered my question before, that...

Monty Bassett: And, as you know, it's clichéd. Everybody says you change the masses by changing the individual. Maybe when—I love that analogy—when the rubber band gets stretched too tight... Okay.

Question: You have a unique perspective in that you're a scientist and a filmmaker. How you process your words, how you put your scripts together, is different from, say, how the scientists here would put their reports together. Would you speak briefly on how you managed to make those two worlds cross and how you work as effectively as you can?

Monty Bassett: The one thing that I'm very self-conscious of is that the film "Cassiar at the Crossroads" was done as a bit of a sensationalist film. In doing scientific papers, it's "the facts and just the facts, ma'am." When you're doing a documentary, your first criterion is, can I educate and entertain and keep the person

from going “blip” with the remote control every time the commercials come up? And so there’s your balancing act. There’s another element in that balancing act: keeping your science accurate without becoming so detailed that you lose your audience. I own a television set, but we only get one and a half channels. I think that’s probably done more for me in film than anything else.

Question: As a follow-up, you mentioned working sort of with a soundbite approach. Do you have to be careful of this? Because these ideas are usable currency that we’re all used to, very sweeping in scope, and yet you sound like you still have to use those little elements of thought in order to get these stories across to the lay audience.

Monty Bassett: And you have to be very, very careful, because the cliché is a fast way to get from A to B, but you also lose all of the detail that was in that journey from A to B. So you have to be very careful. One trick is to coin phrases, to give a different perspective of what you’re trying to say. For example, you *can* see the forest through the trees

Mr. Shelby: Thanks, Monty. That was terrific.



GENTRIFYING ECOTOPIA: A BROWN GIRL LOOKS AT HOME, LANDSCAPE, AND POWER



Debra Salazar, Ph.D.
Forest Policy Analyst, Professor of Political Science and Affiliate
Professor of Environmental Studies, at Western Washington University,
Bellingham, Washington

During 10 years of studying in forestry schools, 3 years of measuring trees, and 5 years of professing forestry, on many occasions I encountered the look that said, “What’s a girl like you doing in a place like this?” I became an expert at interpreting that look, and I can say with some confidence that it was not my apparent innocence or purity that provoked the question.

Eventually the look grew tedious and I moved on, and got myself a job in a political science department. That is one way of explaining my decision to leave forestry, and it does account for a big chunk of that decision. Another, related, factor was my interest in the environmental justice movement¹ and the seeming lack of fit between the largely urban/industrial focus of that movement and the rural/land-based concerns that dominated forestry.

Freed from the constraints of a 1980s college of forestry, my interests wandered until the social scientist made peace with the brown girl. That peace has allowed me to dispense with the pretense of disinterest and to study the things that matter most to me: my family, this place, and two abstractions—justice and democracy. I have indulged these passions through research on the environmental movement. I want to understand how environmentalists might work with human rights, social justice, and labor groups to forge a

broad-based progressive agenda for American politics. I also want to know what factors get in the way of that kind of coalition politics. During the last 5 years, I have spent as much time as I could wandering around the Northwest, interviewing environmental activists. From Ashland to Powell River, BC, from Depoe Bay to the Palouse, I have placed my tape recorder in front of environmentalists and listened to stories about their lives, homes, and hopes. Along the way, I have attempted to understand what this place means to these activists, how they understand social justice, and how their identities and experience have shaped their perspectives. Many issues and themes have emerged from my conversations with activists, among them: immigration, citizen monitoring, spirituality, globalization, indigenous sovereignty, and gentrification.

My initial interest in gentrification preceded these interviews, but the interviews have reinforced my belief about the importance of the phenomenon and stretched my understanding of it. Today I want to share with you some reflections about gentrification on the Pacific Coast. These observations are shaped in unequal parts by my reading of social science literature, my research on the environmental movement, and my personal and family history. All of this is to say that, rather than

a set of graphs to display, I have a few stories to tell.

I grew up in California. Both sides of my family have been in the state since the 1920s, initially migrating with the harvest, later settling in the Santa Clara Valley, where I was born. My life has taken several trajectories that seem to me emblematic of social change in this region during the last 20 or 30 years. Among these are movement north, continued study, more microprocessors in my house, and an increasing capacity to discriminate with regard to coffee. I have spent most of the last 20 years in the Northwest. These years have brought me material comfort, love, proximity to death, and a sense of home. Indeed my home is extraordinary.

I live in paradise. From my desk, I look out at 50-year-old western red cedar and grand fir, with 10-year-old red alder filling the gaps among the conifers. It is a sheltered spot, although some days the wind roars through the treetops—breaking up the canopy, an irritation for a used-to-be forester trained to see beauty in normal forests populated by straight stems penetrating symmetric crowns; but I am working to appreciate chaos. On the ground, though, life is benign. In the spring, pregnant does browse their way through the snowberry and salal that come up under the alder. Sometimes the deer are a distraction, as when I marvel at

how many thimbleberry leaves a doe can consume in a minute, or imagine how striking a red-nosed deer would be. But they move on, and my attention returns to screen and keyboard. Beyond the trees, a cove interrupts the south shore of Chuckanut Bay. The sun sets over that cove, and I covet days I can be at my desk in the late afternoon, warmed by spots of light reaching through the chaotic branches of my coniferous canopy.

There is a Puget Sound version of a beach just down the road from my house, a strip of gravel, sometimes sand, and a wide tideflat. My dog and I used to walk down to this beach every morning for our rendezvous with a seal. She (the seal) would swim along the shore, stopping occasionally to be sure she had our attention, while Saña (my dog) gave mock chase, running back and forth between the seal and me, my herding dog trying to keep everyone going in the same direction.

We call it a community beach. Membership in our community is open to property owners occupying a designated area on a map (reminds me of citizenship in the early years of the republic). I have a copy of the map, with my little plot highlighted, and a key to the gate. A sign warns non-members to keep out. I have heard that paradise is gated.

The best coffee in the north Puget Sound is a thirty-minute bike ride

from my door. I bust my butt riding to town in the mornings, so that I can sit with my double-americo and biscuit with raspberries, watching the Railroad Avenue traffic. There is the crazy white supremacist, in his trench coat and blond beard, who sells crystal meth and hate to the street kids on the corner of Railroad and Holly. But thirty-something men in Nike clogs and a sense of self importance irritate me more. This morning the man ahead of me in line pulled out a roll of one hundred dollar bills, drawing my attention to his coffee-bead choker and too stylish glasses. But most of the Railroad Avenue folks are unobtrusive, if not uniformly crunchy.

After my leisurely coffee, I race up to campus. Once there, I am supposed to dismount and walk. The university administration has created a no-pleasure zone, banning skateboards and in-line skates, and limiting the domain of cyclists. Out the south window of my office, mixed coniferous forest on Chuckanut Mountain fills the foreground and, in the distance, the Olympic Mountains sometimes sneak through the clouds. To the north, the Canadian Coast Range stretches toward Alaska.

During the dark months, I wear tights and long-fingered gloves, and install a 32-watt lighting system on my bike. I ride home along Chuckanut Bay, sharing the road and the silence

with a few automobiles. There are enough hills to remind me I have a body. And on moonless nights, there are only my body, my bicycle, and the bay. I live in paradise.

But paradise is changing. Perhaps the most obvious change, the one most noted by the environmentalists I interview, is growth. There are more and more people, cars, and houses along Bellingham Bay. The agglomeration of structures and roads we call development stretches north toward the Canadian border and east up the Cascade foothills. Whatcom County residents now negotiate traffic jams on their way to superstores. I plan my evening ride to avoid sharing the road with neighbors heading home from work.

In this regard, my lush corner of Ecotopia is no different from the Central Puget Sound, the Willamette Valley, or the San Francisco Bay Area where I grew up. Population on the west coast has grown rapidly, as jobs, landscape, and climate have lured people from east to west and then from south to north. Oregon's population doubled during the last 40 years, reaching nearly 3 million in the 2000 census.² During the same period, California gained more than 18 million residents, with my cousins accounting for a substantial number of those, and Washington's population grew by a little more than 3 million.

Coming to grips with the causes and consequences of growth perhaps has been the defining struggle of the environmental movement. Four years ago, Robert Liberty, of 1000 Friends of Oregon, offered a Starker audience a compelling portrait of the extent to which population growth and suburban sprawl are transforming the Willamette Basin, the forest policy debate, and the forest landscape at the edge of the basin.³ Fragmented forests serve neither those who believe in horse logging of selectively marked, mixed-species stands, nor those who envision an armada of feller-bunchers slicing through a sea of Douglas-fir plantations. Pavement appears in neither vision.

But another change is also transforming our paradise in the Northwest. As I pedal into downtown Bellingham, I observe this change in the value of the cars passing me, the size of new homes, the spread of fancy restaurants, and yes, the proliferation of coffee shops. The houses and automobiles grow larger, the size of servings in the restaurants shrinks, and the foam on top of my espresso shot thickens. Why is this an environmental concern? I will do what I can to answer that question. But perhaps a more important question is: why should those who care about environment and natural resources in the Pacific Northwest—about the integrity of this place—be

concerned with the geography of trendy restaurants and good espresso?

Ten years ago, as part of a project on how environmental justice activism might take shape in the Northwest, one of my graduate students interviewed African American community activists in Seattle. Before there were any environmental justice organizations in the region, before many people had heard of the movement or the idea, she worked her way through black activist networks in Seattle, asking people how they defined environment, what they thought of environmental groups, and what environmental problems were important in their community.⁴ Surprising to both of us were several responses that gentrification was an important environmental problem for black residents of Seattle. As one interviewee remarked, “The gentrification issue...is an environmental issue because [people] are getting displaced...out of the environment that is wanted, and needed, and home...[into] an environment that is vulnerable to diseases and other environmental problems.”⁵ This response reflected an understanding of environment as the place one lives, works, and plays.

In Seattle during the late 1980s and early 1990s, middle class whites were buying homes at the edge of the Central District, a neighborhood that had been home to most blacks in

Seattle. I will forgo elaboration on the political geography of racial segregation in our happy Northwest cities.⁶ As property values (and rents) in the area increased, less affluent blacks were pushed south into the Rainier Valley. For those unfamiliar with Seattle geography, the attractive attribute of the Central District was—its centrality. It offered ready access to stores, parks, schools, and other city services. Bounded by Madison Park and then Lake Washington on the east, Capitol Hill on the west, and the university arboretum on the north, and within easy bus rides of downtown and the University of Washington, the neighborhood that used to constitute the northern section of the Central District was a good place to live. It had its imperfections, but these were minor compared to the environmental deficits of the Rainier Valley.

This shift in Seattle geography was, of course, not unique. The term *gentrification* was first used in 1964 to refer to the transformation of working-class neighborhoods in London.⁷ Sociologist Ruth Glass documented the movement of middle-class people into neighborhoods where property values were low. New residents then rehabilitated houses that had fallen into disrepair and created a climate favorable to additional middle-class migration. For the last 30 years, urban geogra-

phers and sociologists have variously defined gentrification as:

- the “reinvansion”...of the central city by affluent young “urban pioneers,” who displace the less affluent from urban locations⁸
- the process by which working class residential neighborhoods are rehabilitated by middle class homebuyers, landlords, and professional developers⁹
- the widespread emergence of middle- and upper middle-class enclaves in formerly deteriorated, inner-city neighborhoods¹⁰
- the physical renovation and social-class upgrading of inner-city neighborhoods¹¹
- a process of spatial and social differentiation in which a new middle-class segment rejects suburbia for a consumption-oriented lifestyle in the city centre¹²

Though scholars have argued vigorously about the causes and extent of gentrification,¹³ they tend toward consensus with regard to a view of gentrification as an urban phenomenon, with the neighborhood as unit of analysis.¹⁴ Neighborhoods subject to gentrification often have physically deteriorated because of dis-investment, both by private investors and the public sector, and gentrification brings re-investment in houses, com-

mercial structures, and infrastructure. The displacement of poor people from inner-city neighborhoods is a consequence of gentrification.

Scholars commonly describe at least two stages of gentrification.¹⁵ The first stage of gentrifiers often comprises artists, gays, hippies, and single mothers—slightly marginal groups who are at the forefront of cultural change and who value urban location. These gentrification pioneers invest their own labor to rehabilitate homes, open new businesses, sometimes integrate themselves into local community networks, and create the cultural infrastructure that attracts the less adventurous gentrifiers of the second stage. The second stage migration tends to be dominated by affluent young professionals—on the Pacific Coast, software engineers and other high-tech professionals. The increasing gap between the financial resources of newcomers and those of long-time residents, as well as the investment of additional private and public funds in “urban redevelopment” at this stage, tends to give rise to displacement. As gentrifiers invest in structural improvements, and more affluent people migrate to newly cool areas, rents increase and many previous residents, including some of the first-stage folks, must look elsewhere for housing.

The economic dynamics of gentrification have been central to scholarly

mud wrestling, but the cultural aspects of the transformation have generated a less combative discussion. Some scholars disposed toward cultural analysis, especially the post-modern kind, emphasize the lifestyle associated with gentrification—its mix of consumption, aesthetic, environmental, and political values.¹⁶ Scholars observe three kinds of change: the transformation of the urban landscape from a site of production to a site of consumption, the expressive use of consumption, and the privatization of public spaces.

As for the first change, the transition to a landscape of consumption might not necessarily be a *consequence* of gentrification. Factory closings often precede the in-migration of new urban gentry. Indeed, the de-industrialization of the US has been widely studied. One consequence of de-industrialization is the loss of union jobs paying a living wage.¹⁷ It is no wonder that in locales where the factories have closed, residents are especially vulnerable to competition for housing. It is also not surprising that a city without smokestacks might attract those who value ambience and whose employment is not tied to factory production. Nevertheless, gentrifiers re-inforce the loss of productive enterprise through their political and economic behavior. They organize to protect their new neighborhoods from undesirable land

uses and they provide a ready customer base for new businesses—for example, natural food stores, body work professionals, and the ubiquitous coffee houses.¹⁸

In the second change, gentrifiers' consumer behavior is cited as a means of expressing their identities. In what political scientist Benjamin Barber has called "McWorld"¹⁹—with Starbucks, the Gap, Planet Hollywood, and McDonalds in cities around the globe, with trans-national corporations marketing a numbing, global sameness—it is no wonder that people use whatever means are available to express their individuality. One mode of expression is through things—clothing, homes, automobiles. The irony of this expressive effort is that it too has reached a stage of global uniformity.²⁰ The hip hop kids' dangerously baggy pants now permeate the suburbs; the pierced, tattooed, DIY²¹ punk is now barely recognizable from the high-tech scenester. Even our identities are commodified, marketed, and soon to be patented.

The third change associated with gentrification is the privatization of public space. In the cities, privatization occurs when security guards patrol stores, gates block access to neighborhoods, affluent families decline to send their children to public schools, and so-called civility laws prohibit sitting on downtown sidewalks.²² These and other measures

create an atmosphere of unwelcome to those without the right pedigree, credentials, or clothing.

Of course, those on the verge of displacement often are not pleased, and their displeasure may be expressed through lobbying to preserve low-income or affordable housing. But other, less genteel, responses also occur, including squatting to resist eviction and other protests to reclaim public spaces.²³ The 1980s bumper sticker, "Die Yuppie Scum," was a clear, if unseemly, expression of resentment toward gentrifiers. But resentment has not slowed gentrification of the Pacific Coast.

The outlines of this phenomenon probably are familiar to many. In Portland, first the inner southeast neighborhoods went espresso and became increasingly unaffordable to working-class whites. More recently, blacks in north and northeast Portland have been feeling the pressure of gentrification. The Coalition for a Livable Future (CLF), a network of organizations working at the intersection of social justice and environmental protection in the Portland metropolitan area, sponsored a study of displacement in Portland. Their report, published in 1999, documented substantial increases in house values, rents, and median income in inner eastside neighborhoods during the 1990s.²⁴ The report also showed a shift in the geography of poverty in

Portland; the percentage of households below the poverty level declined in the inner neighborhoods and increased in the outer eastside neighborhoods. CLF, attempting to build a broad-based constituency for protecting urban environments, has made affordable housing in ecologically rich communities a key priority. Their proposals to stem displacement include community land trusts, inclusionary zoning, and a requirement that commercial developers provide low cost housing.²⁵ CLF's examination of gentrification preceded, by several years, attention to the issue by the environmental justice community in Seattle.

In Seattle, a multi-racial group of activists organized the Community Coalition for Environmental Justice (CCEJ) during the mid-1990s. Like many other environmental justice groups, the organization's first campaign focused on hazardous waste, specifically hospital incineration of medical waste in the Beacon Hill area of Seattle.²⁶ After a successful effort mobilizing neighbors and forcing the hospital to shut down its incinerator, the organization proceeded to do battle with a paint company located in the middle of a residential neighborhood, one that was home to mostly low-income residents.²⁷ Residents complained bitterly about the toxic substances regularly emitted by the paint plant, forcing the government to cite

the company. After several years of concentrating its organizational resources on issues related to hazardous substances, CCEJ has turned its attention to gentrification. Incensed with city and federal housing policies that reinforce the ability of the affluent to displace people of color from their homes, CCEJ is organizing a drive focused on the gentrification/displacement issue. In planning their campaigns, activists in the Northwest have paid attention to the California experience.

Urban Habitat, an environmental justice group in the San Francisco Bay Area, completed its own study of gentrification and displacement in 1999,²⁸ demonstrating that the problem in the Bay Area has become regional, rather than neighborhood linked. The scale of gentrification in the Bay Area is staggering. I saw the early years of this phenomenon in San Francisco during the late 1970s. The first-stage artists and activists who had joined working-class families in the Haight were then being forced out by rising rents and the new urban professionals. A decade earlier, gay men had initiated gentrification of the Castro neighborhood by rehabilitating Victorian houses purchased from older, working-class Irish people.²⁹ The Castro is adjacent to the Mission District, the neighborhood with the best weather in the City and long the home of Latinos. More recently,

trendy cuisine and designer clothing establishments have spread east toward the Bay, edging into the heart of the Mission. The Castro predictably has become more exclusive; only very affluent gay men can afford to buy homes there now. Wealthy straights have moved into adjacent neighborhoods, contributing to gentrification of the Mission. The *vatos* in low-slung khakis, who worked in automobile repair and lunched in the taquerias, are becoming scarce on Mission Street. There is now a billboard announcing the discovery of the last Mexican in the Mission, subsisting in a park on “roots and berries, focaccia crumbs, and leftover bits of antipasti.”³⁰

The Latinos still residing in the Mission could soon face long commutes to their jobs in San Francisco restaurants and hotels. The entire Bay Area is becoming unaffordable for all but the most affluent. The President of Stanford University engaged in a very public fight to stop the expansion of a golf course, in order to preserve affordable housing for university faculty. Silicon Valley affluence squeezes upwardly mobile college professors and pushes up against even the poorest communities.

When I return to the Bay Area to visit my family, I am struck by how wealth has reshaped the Santa Clara Valley landscape. The places where my uncles and aunts worked are

buried under condominiums and corporate campuses. It doesn't matter though, because the wages that allowed them to buy houses in the valley would no longer suffice. With each visit, my personal paradox sharpens: my people are being pushed out and people like me are doing the pushing.

Two of my aunts died last spring. The younger one had lived nearly her whole life in the Santa Clara Valley. In the early 1980s, she put together enough money to purchase a small trailer and lived in it until about 3 years ago. In her mid-fifties, my aunt Elisabel saw that she would never be able to buy a house anywhere near the garden her mother had tended for 30 years, the prune orchards her older sisters had picked, or the canneries that had consumed her own teenage summers. Land in the Silicon Valley had become too valuable to house middle-aged women earning middling paychecks. So, like her parents had 80 years before, she migrated.

Elisabel López journeyed over the Diablo Range, into the heat of the Central Valley, where her civil servant salary would suffice to get her name on the title of a house in a Merced subdivision. During the last year or so of my aunt's life, she spent 4 to 5 hours a day on the road, commuting to and from her job in San José, capital of the Silicon Valley. She was not alone on her daily pilgrimage along the valley highways.

Thousands of Californians who work on the periphery of the Silicon Valley economy have moved (been pushed) east, leaving their home to find houses. My aunt would have had much company as she maneuvered her Ford sedan south on old highway 99 and then west on state route 152, past the women's prison, over the Chowchilla gas field, through downtown Los Baños, and along the San Luís Reservoir. Then, as the road started to climb, she would have crossed from Merced County into Santa Clara County, over Pacheco Pass, with Pacheco Peak to the south and Elephant Head to the north. After an hour or so, she would have reached Highway 101 at Gilroy, where she would have turned north, joining even more drivers (in nicer cars) for the final crawl into downtown San José.

My aunt's experience as one of the displaced—and she is not the only member of my family in this category—has compelled me to study gentrification. The transformation taking place near my home in the north Puget Sound, at the foot of the Cascades, suggests parallels between the gentrification of urban and rural places. Though geographers have yet to study it, gentrification is occurring outside of major metropolitan areas. Let's return to California for a moment.

Santa Cruz County is at the southern end of the Bay Area sprawl. Much of the county is still agricultural, but

it is also home to an increasing number of Silicon Valley commuters and to a University of California campus. Watsonville, south of Santa Cruz, has been a service center for the region's agricultural economy; it is also where many Latino farmworkers have found housing.³¹ But recently, the high-tech professionals have invaded even lowly Watsonville, taking up agricultural land outside of town as well as developed areas within it. Farmworkers increasingly must look elsewhere for housing. However, the artichoke farms also may soon disappear from the area. The gentrification of Watsonville, with its accompanying displacement and exacerbation of rural poverty, exemplifies a set of development problems common to rural California's agricultural and timber regions.³²

Northwest timber communities have been even more attractive to gentrifiers. Beverly Brown's 1995 book, *In Timber Country*, describes the gentrification of southwest Oregon and argues that land-use planning, migration of wealthy urbanites to forested regions (the dread *Californians*), and declining employment in the wood products sector combined to displace rural, working people from desirable landscapes in southern Oregon.³³ In addition to jobs, these landscapes had provided sites for low-cost housing, access to berries, firewood, game, and rivers for fishing and recreation, and a setting for the development of

community. Similar observations can be made about the effects of affluent urban migrants on historically resource-dependent communities throughout the Northwest, including British Columbia.

These changes do not perfectly parallel the model developed to describe gentrification in urban areas, but there are some striking similarities. First, the kinds of places created by gentrification in urban and rural settings are similar. The transformation to a consumption-based landscape/economy also occurs in the rural context. The shops in downtown Bellingham could fit easily into the Kitsilano neighborhood of Vancouver or the exceedingly hip Fremont neighborhood of Seattle. Tofino, a village on the west coast of Vancouver Island, boasts a sophisticated bookstore and an array of expensive restaurants. For the last couple of decades, downtown Corvallis, Oregon, in the Willamette Valley, also has increasingly served the new consumptive economy rather than the old resource extraction economy. Landscapes throughout the Northwest reflect this economic transformation. The commercial fishing boats and lumber mills that once dominated these landscapes exist now as remnants.

Second, working-class people are being displaced and many public spaces have become private. A volu-

minous literature has emerged during the last two decades, analyzing the threats faced by resource-based communities.³⁴ Rural sociologists have documented displacement, job loss, and family disruption as these communities cope with political economic change. But these studies tend not to confront a key aspect of the political economy of this transformation: it is wealth that gives one the power to define and shape the landscape.³⁵ The more money I have, the more choice I have about the place in which I live—not only where it is, but what it will be. Beverly Brown's study of southwest Oregon demonstrates this fact, as local people describe over and over again the ways in which they have been pushed to the margins of their communities—physically, economically, and politically. Brown records the local way of referring to the gentrification that has transformed those communities: "people with money moving in and taking over."³⁶

Gentrification can be defined as the purchase and occupation of desirable places by affluent people and the consequent displacement of the less affluent. Many environmentalists with whom I have spoken have difficulty seeing gentrification as an environmental issue. To them I make the case that when people have to move far from their jobs, they spend more time in automobiles and

increase their contribution to air pollution. Moreover, poor people driving older cars pollute disproportionately.

Based on my admittedly dated knowledge of the forestry community, it seems likely that forest managers and policy makers, often oblivious, if not hostile, to cities, also might be skeptical of the relevance of gentrification to their world. Thus, for a forestry audience, I could argue that those who are concerned about sustaining natural resource industries on the west coast ought to take seriously the consumption economy and landscape that accompany gentrification. Rural gentrifiers, without subsistence or employment ties to these industries, are likely to oppose resource extraction that disturbs their ideal landscape.³⁷ Moreover, they have the wealth and power to enforce their ideals.

But I prefer not to focus on either of these arguments. Gentrification is important because of its implications for environmental justice and democracy. Those of us who care about this place, about this land of gray and green, must care too about the people who live and work here. Gentrification changes where people live, diminishes the quality of some people's environments, and can create conflict based on racial and cultural differences. Gentrification confronts working people in both urban and rural settings. It indicates the power

of the affluent not only to occupy, but also to shape landscapes. Thus gentrification is more than an economic phenomenon, though it has very much to do with the distribution of wealth. Gentrification has political dimensions. The process that is transforming ecotopia is about more than the residential choices of affluent professionals; it is about the political economy that supports *their* choices while limiting the opportunities available to others. Thus the legitimate interests of the displaced will not be served by scapegoating affluent gentrifiers, (though there is no harm in having a little fun with them). Rather we ought to focus on the structural conditions underlying gentrification and displacement.

At least three political economic phenomena shape this process. Our governments are unlikely to adopt effective policies that minimize displacement, as long as we fail to confront the discursive and institutional elements that give rise to environmental injustice in a variety of contexts.

First is the distribution of wealth and income. Since the 1970s, the United States has experienced growing inequality in the distribution of income.³⁸ While real wages of the top 20 percent of earners have grown, the bottom 80 percent have lost income. The decline has been greatest at the low end of the distribution. Given this increasingly skewed income distribu-

tion, it is no surprise that the less affluent have been unable to compete in dynamic housing markets. The growing disparity in income thus facilitates the creation of a geography in which the most desirable locations in urban and rural settings become the exclusive province of the wealthy.

The second phenomenon is the consumer mentality that dominates our political discourse, along with the associated dominance of “the market” as a distributive mechanism. A key premise of this discourse is that individuals control their material destiny; hard work leads to wealth and comfort. The quality of one’s environment is seen largely as a matter of private initiative and choice. Money, of course, is the instrument of choice in nearly every sphere of human endeavor.³⁹ The idea that some things—health care, education, magnificent landscapes, housing in desirable settings—ought not to be distributed solely through the price system goes almost unvoiced in public discussion. Politicians venture into this territory at their peril. Taxes and regulations are considered no more than burdens, ineffective and unjust. And yet, we will not break the chain linking displacement to gentrification if we do not even discuss limiting the domain of markets. Unless we agree that housing, indeed community, in even the most desirable locales, should not go exclusively to

the highest bidder, displacement will continue. Public and private capital will create beautiful central cities with skylines dominated by million-dollar condos, while rural landscapes will be parceled out so that Ted Turner wannabes can acquire viewscapes for the rustic homes they construct.

Finally, our unwillingness as a polity to grapple with the concept of “public-ness” constrains policy choice in many domains. Public space is essential for democracy. American thinkers from Frederick Jackson Turner to Robert Marshall have cast this relationship in a particularly American light.⁴⁰

Contemporary political theorists argue more generally that public space creates an arena for discussion and for confrontation.⁴¹ Moreover, democracy is strengthened by opportunities to engage our fellow citizens. This nation, this region, includes many kinds of peoples and the differences among us often create conflict. To the extent that we live our lives in homogeneous enclaves, buffered from the pluralism that is a fact of American society, we limit our capacity to understand, much less effectively engage in, democratic politics. Thus neither justice nor democracy are served when the poor are excluded from the best places and the rich are able to fence the sunset.

Those who seek environmental justice seek to democratize access to

good places. Such an expansion of democracy requires grappling with the increasingly skewed distribution of wealth, the power of money in nearly all areas of social life, and the importance of sustaining public spaces in our communities. These issues overlie the problem of growth. I have not discussed the question of how much we will constrain growth, though I certainly have some answers to that question. But regardless of the level of such constraint, let us avoid displacing the less affluent from Ecotopia.

This brown girl has had the good fortune to make a home in a beautiful place. But I cannot help but be troubled by the gates excluding so many others from this corner of paradise. If we must have gates, perhaps the keys need not be plated in gold.

Thank you.

Notes

- ¹ The environmental justice movement emerged during the late 1970s and early 1980s, as working people and communities of color challenged inequities in the distribution of environmental pollutants. The movement has since expanded its scope to address inequities in access to natural resources. The central empirical claim of the environmental justice movement is that one's political economic status is a key determinant of the quality of one's environment. The normative position the movement takes is that a just society ought to provide a healthy environment for all. Thus environmental "bads" (pollutants) and goods (natural resources) ought to be fairly distributed through decision-making processes that are open to all citizens. Debra J. Salazar, "Environmental Justice and a People's Forestry," *Journal of Forestry* 94 (1996), 32-36.
- ² US Bureau of the Census, *Statistical Abstract of the United States: 2000* (2001); available online at <http://www.census.gov>. Last accessed August 2, 2002.
- ³ Robert Liberty, "The Future of Eden's Hedge: The Forests of the Willamette Valley Basin in the 21st Century," in *Natural Resources & the 21st Century: Where Are We Headed?*, compiled by Bo Shelby and Sandie Arbogast (Starker Lecture Series, Oregon State University, 1997), 6-35.
- ⁴ Lisa A. Moulds, *Race, Social Justice, and Environmental Politics: A Case Study of African American Leaders in Seattle* (unpublished masters thesis, Western Washington University, 1993).
- ⁵ Debra J. Salazar and Lisa A. Moulds, "Toward an Integrated Politics of Social Justice and Environment: African American Leaders in Seattle," *Society & Natural Resources* 9 (1996), 622.
- ⁶ But for a general analysis of segregation in the urban United States, see Douglas S. Massey and Nancy A. Denton, *American Apartheid: Segregation and the Making of the Underclass* (Harvard University Press, 1993). For a discussion of racial exclusion policies and practices in Oregon, see Elizabeth McLagan, *A Peculiar Paradise: A History of Blacks in Oregon, 1788-1940* (Georgian, 1980).
- ⁷ Cited in Jan van Weesep, "Gentrification as a Research Frontier," *Progress in Human Geography*, 18 (1994), 76.
- ⁸ John R. Logan and Harvey L. Molotch, *Urban Fortunes: The Political Economy of Place* (University of California Press, 1987), 115.

- ⁹ Neil Smith, "Gentrification and Uneven Development", *Economic Geography*, 58 (1982), 139.
- ¹⁰ Bruce London, Barrett A. Lee, and S. Gregory Lipton, "The Determinants of Gentrification in the United States: A City-Level Analysis," *Urban Affairs Quarterly*, 21 (1986), 369.
- ¹¹ Robert Kerstein, "Stage Models of Gentrification: An Examination," *Urban Affairs Quarterly*, 25 (1990), 620-639.
- ¹² John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 173.
- ¹³ For examples of contention regarding these issues, see Blair Badcock, "Notwithstanding the Exaggerated Claims, Residential Revitalisation Really is Changing the Form of Some Western Cities: A Response to Bourne," *Urban Studies*, 30 (1993), 191-195; Steven C. Bourassa, "The Rent Gap Debunked," *Urban Studies*, 30 (1993), 1731-1744; Neil Smith, "Gentrification and Uneven Development," *Economic Geography*, 58 (1982), 139-155.
- ¹⁴ For reviews of this literature, see Jan van Weesep, "Gentrification as a Research Frontier," *Progress in Human Geography*, 18 (1994), 74-83; John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 173-182.
- ¹⁵ Loretta Lees, "In Pursuit of Difference: Representations of Gentrification," *Environment and Planning* 28 (1996), 454-455; John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 175, 180-181.
- ¹⁶ Juliet Carpenter and Loretta Lees, "Gentrification in New York, London and Paris: An International Comparison," *International Journal of Urban and Regional Research*, 19 (1995), 286-303; John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 173-182; Loretta Lees, "Rethinking Gentrification: Beyond the Positions of Economics or Culture," *Progress in Human Geography*, 18 (1994), 137-150; Loretta Lees, "In Pursuit of Difference: Representations of Gentrification," *Environment and Planning* 28 (1996), 453-470.
- ¹⁷ William Julius Wilson, *When Work Disappears: The World of the New Urban Poor* (Knopf, 1996); James K. Galbreath, *Created Unequal: The Crisis in American Pay* (The Free Press, 1998).
- ¹⁸ Juliet Carpenter and Loretta Lees, "Gentrification in New York, London and Paris: An International Comparison," *International Journal of Urban and Regional Research*, 19 (1995), 286-303; John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 173-182.
- ¹⁹ Benjamin R. Barber, *Jihad vs. McWorld: How Globalism and Tribalism are Reshaping the World* (Ballantine Books, 1995), 12-20.
- ²⁰ Juliet Carpenter and Loretta Lees, "Gentrification in New York, London and Paris: An International Comparison," *International Journal of Urban and Regional Research*, 19 (1995), 298-299.
- ²¹ DIY (do-it-yourself) rejects the marketing of adornments (and art more generally) in favor of cutting your own (or your friends') hair, doing your own tattoos, making your own music.
- ²² Juliet Carpenter and Loretta Lees, "Gentrification in New York, London and Paris: An International Comparison," *International Journal of Urban and Regional Research*, 19 (1995), 299; John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 180.

- ²³ John A. Hannigan, "The Postmodern City: A New Urbanization?" *Current Sociology*, 43 (1995), 178-179; Rebecca Solnit and Susan Schwartzenberg, *Hollow City: The Siege of San Francisco and the Crisis of American Urbanism* (Verso, 2000), 54-58.
- ²⁴ "Displacement: The Dismantling of a Community," A Study Commissioned by the Coalition for a Livable Future (Portland, 1999), 12-16.
- ²⁵ Sheara Cohen, "Solutions to Displacement: How we get from here to there," *Connections*, 4 (2001), 4-5, 10.
- ²⁶ <http://www.ccej.org/campaigns.shtml>. Last accessed August 6, 2002.
- ²⁷ <http://www.seattleweekly.com/features/0134/news-anderson.shtml>. Last accessed August 6, 2002.
- ²⁸ Cameron Y. Yee and Julie Quiroz-Martínez with Torri Estrada and Catalina Garzón, *There Goes the Neighborhood: A Regional Analysis of Gentrification and Community Stability in SF Bay Area* (Urban Habitat Program, 1999).
- ²⁹ Rebecca Solnit and Susan Schwartzenberg, *Hollow City: The Siege of San Francisco and the Crisis of American Urbanism* (Verso, 2000), 60.
- ³⁰ Rebecca Solnit and Susan Schwartzenberg, *Hollow City: The Siege of San Francisco and the Crisis of American Urbanism* (Verso, 2000), 63.
- ³¹ Ted K. Bradshaw, "In the Shadow of Urban Growth: Bifurcation of Rural California Communities," in Thomas A. Lyson and William W. Falk, *Forgotten Places: Uneven Development in Rural America* (University Press of Kansas, 1993), 223-224.
- ³² Ted K. Bradshaw, "In the Shadow of Urban Growth: Bifurcation of Rural California Communities," in Thomas A. Lyson and William W. Falk, *Forgotten Places: Uneven Development in Rural America* (University Press of Kansas, 1993), 218-256.
- ³³ Beverly Brown, *In Timber Country: Working People's Stories of Environmental Conflict and Urban Flight* (Temple University Press, 1995).
- ³⁴ See, for example, Patricia Marchak, *Green Gold: The Forest Industry in British Columbia* (University of British Columbia Press, 1983); Robert G. Lee, Donald R. Field, and William R. Burch (editors), *Community & Forestry: Continuities in the Sociology of Natural Resources* (Westview Press, 1990); Jo Ellen Force, Gary E. Machlis, Lianjun Zhang, and Anne Kearney, "The Relationship Between Timber Production, Local Historical Events, and Community Social Change: A Quantitative Case Study," *Forest Science*, 39 (1993), 722-742; Christine Overdeest and Gary P. Green, "Forest Dependence and Community Well-Being: A Segmented Market Approach," *Society and Natural Resources*, 8 (1995), 111-131; Thomas M. Beckley, "The Nestedness of Forest Dependence: A Conceptual Framework and Empirical Exploration," *Society and Natural Resources*, 11 (1998), 101-120.
- ³⁵ Marchak is a notable exception in this regard; Patricia Marchak, *Green Gold: The Forest Industry in British Columbia* (University of British Columbia Press, 1983).
- ³⁶ Beverly Brown, *In Timber Country: Working People's Stories of Environmental Conflict and Urban Flight* (Temple University Press, 1995), 258.

³⁷ Though research suggests that environmentalist ideals are strongly rooted in rural as well as urban places, those with direct experience of particular ecosystems and those whose livelihood depends on resource extraction tend to have different perspectives on resource management than those whose lives are not closely intertwined with ecosystem management. See Andrea M. Brandenburg and Matthew S. Carroll, "Your Place or Mine?: The Effect of Place Creation on Environmental Values and Landscape Meanings," *Society and Natural Resources*, 8 (1995), 381-398; Brent S. Steel, Peter List, and Bruce Shindler, "Conflicting Values About Federal Forests: A Comparison of National and Oregon Publics," *Society and Natural Resources*, 7 (1994), 137-153.

³⁸ William Julius Wilson, *The Bridge Over the Racial Divide: Rising Inequality and Coalition Politics* (University of California Press, 199), 23-29.

³⁹ Michael Walzer argues that different distributive mechanisms (e.g., price, merit, membership, lottery) ought to be used for different types of goods. These mechanisms reflect the social values attached to particular types of goods. To sell (price mechanism) our friendship would destroy its meaning; *Spheres of Justice* (Basic Books, 1983).

⁴⁰ Frederick Jackson Turner, *The Frontier in American History* (Holt, Rinehart and Winston, 1962); Robert Marshall, *The People's Forests* (Harrison Smith and Robert Haas, 1933).

⁴¹ See, for example, Iris Marion Young, *Justice and the Politics of Difference* (Princeton University Press, 1990).

IISAAK: RESPECTING FOREST VALUES—FROM PROCESSES TO PRODUCTS

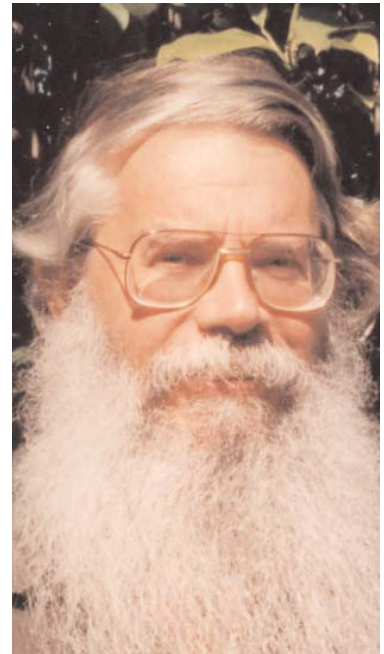
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Eric Schroff, General Manager, IISAAK Forest Resources; B. C., Canada.



Linda Coady, Ph.D. Vice-President, Weyerhaeuser, B.C. Coastal Group



Alton Harestad, Ph.D. Associate Professor of Wildlife Biology, Simon Fraser University

This panel is composed of participants in the recent PBS, Bill Moyers' special, "Earth on Edge": a timber operation designs commercial harvest to mimic the forest's natural processes. Panel member not present at the Starker Lecture is Larry Baird, Chief, Ucluelet First Nations, Central Region Chiefs, Nuu-Chah-Nulth Tribal Council.

T*his story of forest management in Clayoquot Sound and the formation of Iisaak Forest Resources, Ltd., has three parts, presented by a panel composed of Linda Coady, Eric Schroff and Alton Harestad. Each person describes different aspects of the Iisaak story, from the company's history to its future, and from its ideals to its reality.*



History and Creating Solutions through First Nations and Community Involvement

Linda Coady

I've worked on the Iisaak project in Clayoquot Sound for almost 10 years. I was there for the protests and for the collapse, and I'm still part of the scene. I guess this is proof to many people who are watching the

Weyerhaeuser-Willamette negotiations that even after the Weyerhaeuser takeover in British Columbia, the company has continued with the critical projects that were underway at the time of consolidation. There are continuing opportunities for people like me to work on things they like to do. I love this project. I think it's very important and I'm certainly dedicating the rest of my career to working with the other groups involved to make it successful.

We titled our presentation, "Iisaak: Respecting Forest Values—from Processes to Products," because the development phase of the Iisaak experiment has been very "process heavy," in terms of both the social controversy and the scientific rethinking of forestry and logging in Clayoquot Sound. It has been a very long road. Now, suddenly, we are at the point of bringing products to market.

These are not your average products. For me, working from a company perspective, this is a very interesting and incredibly exciting stage of corporate development for our fledgling business. Two kinds of products are emerging from Clayoquot Sound. One, of course, is the timber products, which we hope will be a very high-value type of solid-wood product that can be made from the sawlogs harvested. The



Biodiversity



other types of products we are working to create in Clayoquot Sound are conservation-based financial investment instruments based on water, biodiversity, and carbon. There are significant challenges associated with developing financial mechanisms, or models, around these values so they can be sold as conservation “credits.”

We are proposing to develop a very different mix of products for lisaak than would be expected to flow from an average forestry operation on the British Columbia coast. Our mission is to create a viable business strategy based on timber and nontimber products in Clayoquot.

We believe lisaak is a symbol, an evolutionary and evolving experiment that we hope will signal that the time is right for the emergence of an approach to conservation and sustainable forest management in Clayoquot. Bill Moyer’s video presen-

tation, “Earth on Edge,” shown at the beginning of this presentation, portrays lisaak as the result of a political negotiation among stakeholders to end a very difficult conflict

that went on for a long time.

The conflict resulted in the arrest of more than 800 people in Clayoquot Sound during the 1990s;—the largest mass arrest for civil disobedience in Canadian history. Large-scale demonstrations and arrests are neither common nor taken lightly in our part of the world.

I’m not sure how much is known about the Canadian and British Columbian context, so I will provide a little background material to develop the policy and historical context. In British Columbia, forest lands are mainly publicly owned. There is a small amount of private forest land, but it is not significant from a timber-harvesting perspective in terms of volume.

Forest policy in British Columbia once was primarily the realm of three groups: government, industry, and labor. That started to change in the 1980s and 1990s as various groups, including the World Resources Institute, began to inform the public that our coastal old growth forests were rare at a global level. The availability of “new,” well-packaged infor-

mation catalyzed the involvement of new organizations. There are now many different players in the provincial policy arena, including the original big three, environmental groups, First Nations, and local communities.

For some time now, you have achieved treaty settlement in the United States' Pacific Northwest. We have not completed comprehensive treaty settlement in British Columbia. Aboriginal rights have been recognized and there is a modern-day treaty process underway to define and delineate aboriginal rights and associated titles to portions of the provincial land base. We are, in many ways, just beginning a negotiated transition to a post-treaty world. In Clayoquot Sound, we are ahead of many other locations in B.C. because there is an "Interim Measures" extension agreement in place that provides a framework, or "bridge," to treaties among the five Nuu Chah Nulth First Nations and the provincial and federal governments.

An important backdrop for any discussion of forestry on the B.C. coast is an acknowledgment of the degree of change occurring in the industry. The Weyerhaeuser purchase of MacMillan

Bloedel 24 months ago was just one deal within the bigger picture of the ongoing and somewhat unpredictable restructuring and consolidation now taking place within the coastal forest industry.

It is a time of uncertainty and change. Every forest company must expect protracted land-claim negotiations and treaty development; we must deal with excess milling and pulp capacity in the industry; and, to top off the mix, we must continue to deal with the ongoing Canada-U.S. softwood lumber dispute. Many changes are occurring in British Columbia's forest industry. This environment of change creates opportunities to craft new solutions.

On a positive note, In May 2000, Clayoquot Sound became British Columbia's first UNESCO biosphere reserve. The area is now formally recognized as a world heritage site

Clayoquot
Sound





40
First Nation
Elders

from a biodiversity perspective. One result of the controversy and the accomplishments is that Clayoquot Sound has international name recognition.

This is the big-scale overview within which the lisaak model is emerging. In many ways, this process was very much a political one. The company is now trying to make the huge leap from a political solution and a negotiated settlement into something that actually works viably on the ground—from a business perspective, from an ecological perspective, and from the perspective of local communities and First Nations in the area.

lisaak is a model being pieced together in Clayoquot Sound to address some of the aboriginal, envi-

ronmental, and economic issues associated with multi-value resource management in coastal old growth forests. Tree Farm License 57 (TFL 57) is the first tree farm license on the coast of B.C. to be controlled by First Nations. Forest resource management within TFL 57 is guided by a

unique set of recommendations formulated by a panel of scientists and First Nations elders. Alton Harestad will explain the role and guidance of the Scientific Panel. He was one of the scientists who worked with the aboriginal elders to review past practices and formulate new guidelines for harvesting in Clayoquot.

“lisaak” is Nuuchahnulth for “respect.” It took 4 years to negotiate multi-party support for the company, and the importance of “respect” is not to be taken lightly. lisaak and “hishuk-ish ts’ awalk,” which is also from the Nuuchahnulth language and translates into “recognize the limits for what is extracted and interconnectedness of all things,” are core values of the company. We are promoting the evolution and develop-

ment of a model of ecosystem-based forestry that goes beyond what the environmental movement would call benign industrial forestry.

The company is owned 51 percent by the five First Nations that live in Clayoquot Sound and 49 percent by Weyerhaeuser (originally by MacMillan Bloedel). I am one of two Weyerhaeuser personnel on the five-member Lisaak Board of Directors. The First Nations have three directors on the board, who represent the collective interests of the central region First Nations. The First Nations shares are held by their economic development corporation.

I said earlier that we were endeavoring to develop a business strategy based on timber and nontimber values. That strategy is really what differentiates Lisaak from any other company on the B.C. coast. Of course we have timber in our product mix. Sometimes we go to so many meetings that people forget that we are also in the timber harvesting business. We think the key phrase is “conservation forestry,” but sometimes it’s “conversation forestry”. We have had years and years of meetings!

We do have timber in our business strategy. We have harvested within Clayoquot Sound. But it is timber harvesting based on what Bill Cafferata, the former chief forester of MacMillan Bloedel, who I think graduated from this school, described as

an ecosystem-based approach to logging—an approach designed to maximize value from production volumes and create brand value from the forest to the end user.

We recently received FSC (Forest Stewardship Council) certification for our operation; however, we see FSC as just the “floor” to what we are doing. We plan to go beyond basic certification and build a reputation for innovation and conservation-based forestry, which Eric Schroff will describe in more detail.

Obviously we are not a huge company. For the first 2 years, we ran the business out of Eric’s truck. Now we have an office in the backyard of an ostrich farm in Ucluelet, B.C. We are looking for a niche market position and we are deadly serious about looking for a premium on our wood. Not a single person at Weyerhaeuser



believed we could ever do this—that we are looking for a 100 percent premium on the Vancouver log market price for our high-end wood. That’s where we’ve got to be if we’re going to stay in business.

Coincident with achieving a premium on high-end timber products, we need to develop some investment products from the nontimber values, so that we can demonstrate to auditors and to the satisfaction of others that we are actually maintaining or enhancing the forest ecosystem in Clayoquot Sound. We are exploring two potential business segments in our nontimber business strategy. One is “nontimber commercial,” with opportunities for enterprises based on botanical forest products, recreation, and eco-tourism. We’re not going to go into these businesses as Lisaak. We’re not going to be into mushrooms or salal or tours. However, our management will create and enhance opportunities for locally based entrepreneurs.

We need to recruit the money we are investing de facto in those nontimber values, and we hope to do it through the third business element, which we call our “nontimber conservation” business segment. The goal of this part of the business is to develop and market an investment product based on conservation values. Our primary focus is on exploring opportunities associated with carbon and biodiversity.

Developing and marketing an investment product of this nature in British Columbia is a complex task. We are negotiating with the B.C. government to see if we can develop a revenue-sharing mechanism around carbon and biodiversity values that would enable us to expand our markets beyond our current range of timber products. Obviously there is no shortage of work or challenge facing our small company.

I conclude by passing on some observations from the *State of the World’s Forests 2001* report recently put out by the United Nations Environmental Program. Two sentences in the report captured exactly what we’re trying to do with Lisaak and, more generally, precisely what we’re trying to do in Clayoquot Sound. I’ll paraphrase:

While parks and protected areas have long been considered a cornerstone for conserving important environmental values, new developments and understanding of conservation biology are shifting the emphasis away from islands of protected areas and toward a greater emphasis on the integration of conservation and development needs at the local community level. This increased understanding encourages a greater emphasis on ecosystem management

and the adoption of a bioregional approach whereby protected areas are considered within a wider geographic and land use context.

Planning and Implementing Conservation-based Forestry

Eric Schroff

I thank the sponsors and the organizers for the opportunity to be here today. It is great to be back in Oregon, and it's also wonderful to be back at OSU.

I will outline some of the key operational elements affecting the company. When working in forestry, particularly in the Clayoquot Sound, we cannot isolate the actual operations (i.e., what we do on the ground) from the context within which we operate. During my part of this collective presentation, I will touch on issues that Linda raised, present new details for consideration, and introduce a few ideas that Alton will cover comprehensively. I will focus on four components of our conservation-based forestry: relationships, planning, operations, and certification.

Conservation-based forestry; what the heck is that? We spent, as Linda mentioned, hours in “process,” including a fair bit of time discussing how to mesh “conservation” with forest management. I must say that the

“process” part of developing the company was relatively easy compared to the daunting task of getting a bunch of diverse people with divergent “world views” together at one table to talk about a wide range of sensitive issues.

Our working definition of “conservation-based” forestry is: forest resource management planning, practice, and operations that are designed and conducted to achieve conservation as a primary management objective.

In very simple terms, there are two components:

- the ecosystem-based forestry component, which includes the ecological values
- the sustainable forest management component, which incorporates the social and economic values

I'm sure everybody's thinking, “Ah, if it were only that simple.” Your critical evaluation is justified. We have spent considerable time discussing this matter and it is definitely not simple! Please grant me this little bit of editorial license.

The ecosystem-based forestry component includes consideration of soils, water, slope stability, wildlife, and so on. We do our best to anticipate how the forest will function—as a forest—after our harvesting is completed. The maintenance of wildlife habitat across the landscape is also a

very important consideration. Rather than the old adage of “build it, and they will come,” our approach is, “keep it, and they will stay.” Hence, we keep the habitat within our operating areas. We do not focus on individual species or individuals of a species, but rather we strive for maintenance of habitat across the landscape. This approach is based on the premise that, given appropriate habitat availability, the various species found within the forests of Clayoquot Sound will persist over time.

The sustainable forest management component—the social and economic values—includes consideration of visuals; the cultural, recreational, timber commercial, and timber non-commercial values (including nontimber conservation values); biodiversity; carbon; and water.

Conservation-based forestry was, at the very least, anticipated by Aldo Leopold. Jim Boyle, of OSU, deserves credit for my introduction to the work of Aldo Leopold, whose description of a conservationist goes like this: *“I’ve read many definitions of what is a conservationist and written not a few myself, but I suspect that the best one is written with an ax. A conservationist is one who is humbly aware that with each stroke he’s writing a signature on the face of the land.”* I feel that is a very powerful description of what we’re trying to do at lisaak, as we endeavor to make

this conservation-based approach to forest management operational.

We’re working with several stakeholder groups in the area to ensure there is a shared vision of what conservation-based forestry is and can be. Linda mentioned these relationships earlier: formal, civil relationships, embedded in memoranda of understanding with two primary sectors of the local community: the environmental NGOs (nongovernment organization) and forest-dependent community interests.

I tie this back to Bill Moyer’s video. It is telling that some of the folks whose faces appeared early in the video presentation during the period of conflict, confrontation, and anti-logging demonstrations also showed up later, sitting around the lisaak boardroom table talking with us about how to market our products—*the same people*. For many of us, there has been a real shift in attitude.

The formal agreements between lisaak and the stakeholder groups were negotiated “up front” to provide additional certainty for the groups involved. We find the agreements very useful in defining relationships between signatories. There are defined expectations for the environmental groups, the community-based groups, and for lisaak. It is critically important to understand where everyone “sits” at the table before you start logging.

For the NGOs, forest certification under the FSC was important. Iisaak also agreed to operate in “eehmiis” areas (another Nuuchah Nulth word, meaning areas that are very, very precious) with an emphasis on non-timber activities and products. The eehmiis units remain in our management land base.

The memorandum of understanding with the community interest group (primarily non-aboriginal, but including some aspects of the aboriginal component), was basically an employment protocol. The document describes how we will work together to build Iisaak as a business providing economic and employment opportunities for local people. To be more specific, the document formalizes the opportunity for the community group to negotiate a future ownership position within Iisaak, and offers support for the establishment of community forest. We also jointly considered broad issues affecting community stability.

Moving from relationships and corporate vision to the elements of Iisaak, I'll talk a little bit about multi-scale planning. Clayoquot Sound includes approximately 262,000 hectares, or about 700,000 acres, of land area. Iisaak operates a Tree Farm License, a timber concession with a 25-year renewable term license from the Provincial Government, on about 87,000 hectares, or 200,000 acres. In

1993, the Provincial Government made a land use decision that was intended to settle the conflict. The Clayoquot Land Use Decision set aside about 35 percent of the 262,000 hectares for protected area status and put the rest of the area into an integrated management zone. A portion of the integrated management zone is rocks, swamp, and one thing or another, but in broad terms, 65 percent of Clayoquot Sound was “made available” to be managed for forestry uses.

The Clayoquot Land Use Decision did not resolve the conflict. Nobody was completely happy with the “solution.” The timber companies and loggers felt that less area should be protected. Members of the environmental community felt that more area should be protected. Some members of the First Nations community said, “What is this ‘protected areas’ idea anyway? You're restricting our opportunity for future livelihood.” Nobody was happy with this decision imposed on the local area from the “outside.”

In 1995, the Clayoquot Sound Scientific Panel established recommendations to guide forestry operations on the land area outside the protected areas of the Sound. Very briefly, the recommendations were founded on an ecosystem-based approach, with the primary objective being to sustain the productivity and natural diversity of the Clayoquot Sound region. The Panel observed that

the rate and geographic distribution of timber harvest should be given greater emphasis than volume targets.

The Panel recommended that we begin at the landscape level or the sub-regional scale of planning—considering connectivity, land use, and natural disturbance patterns—then move down to the level of watershed unit. The whole of Clayoquot was divided into 15 watershed units, each of which contain a number of watersheds. Within those 15 units, the government funded comprehensive resource inventories identifying cultural resources, timber inventories, vegetation inventories, and so on. An incredible database, unique in British Columbia in scope and in detail, was developed.

A community-based process was designed to take the inventory information and mesh it with the recommendations of the Scientific Panel. For example, in Clayoquot Sound planning must consider:

- old growth requirements recommended by the Panel: a minimum of 40 percent of any watershed unit has to be in old growth at any given time
- rate of cut, which says no more than 5 percent of a watershed can be cut during a 5-year period
- visual, recreational, cultural, timber resource, and other values

It is a daunting task to take all the inventory information and approximately 100 Panel recommendations and create a multi-sector planning process. It was a great idea, but we're still waiting for the plans to be delivered. There has been much progress, but it's a very lengthy process. We are learning that it takes a long time for community-driven processes to come to fruition.

Under the Clayoquot planning regime, we next move to the site level. At the site level, it is the responsibility of the licensee to take all of the recommendations and the Forest Practices Code (forest practices rules in British Columbia), and manage within those bounds. When our on-the-ground plans are complete, our goal is to create a continuous reserve network integrated to the site level. We plan to weave a network of reserves that protects recognized forest values. The area outside of reserves is what we call the "operational matrix" and it is potentially available for harvesting.

Once the area potentially available for harvesting is determined, we can examine maps for the area and ask, "Is there any ground there that has trees on it where we can log, or not?" If the answer is, "No," well, we don't go there. We don't try to fit a cutblock into an area and push other values out. If we identify a planning unit where significant area is

available for harvest, then we ask the question—again, a simple question—“Should we log there or not?” If the answer is, “We should,” then we go through the complex process of defining how we are going to do it. Guided by forests values, the key is “listening to the land”—letting the land “talk” to you about where to log, how to log, and ultimately whether you should be there at all.



This past summer, I was out in the woods with Doug Chadwick, a writer from National Geographic. We spent the day wandering around one of the areas we logged in last year. We discussed many things, including “values” protection, logging methods, planning, and cultural resources. Near the end of the day, I asked Doug, “What do you think about our harvesting in this area? How does this area where we have harvested, using variable retention, fit with your definition of a forest?” He stopped, was really quiet for several long minutes, and then said, “It sounds like a forest to me.” It was raining and the rain was being intercepted by the trees; the wind was blowing and we were protected by the trees; birds were chirping in background. I

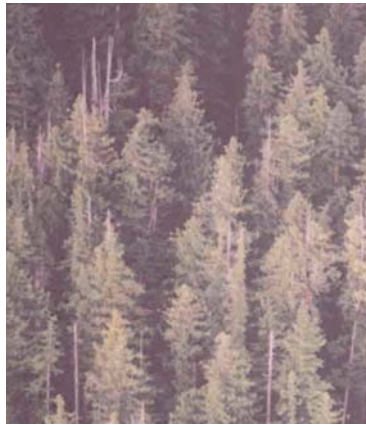
thought that Doug’s response was a good way of assessing things. “It sounds like a forest to me.”

When we were out this morning with Bond Starker, we stopped at a spot along the walking tour on part of the tree farm, and he said, “We have the students stop here and be real quiet and listen. You can hear the water in the brook down below, and you can hear birds, and you can hear the wind.” We were quiet and listened. It sounded like a forest to me. Starker forest and Clayoquot Sound are different places and have very different management histories, but both areas are forests. I think having folks take the time to pause and to listen is an effective way of connecting people to the forest, and helping them understand what we do as foresters.

As part of Lisaak’s operational activities, we are implementing what is

called “variable retention harvesting.” We’re focusing on the trees remaining in the forest after harvesting, rather than only on the ones we take. This is a very powerful shift in the way we view forests when we’re out there operationally. Instead of walking into the woods and determining, “Gee, there’s a nice stand of timber; let’s put a ribbon line around it and log it,” you walk in and you think, “What are the values out here? Are there cultural resource values? Are there riparian areas that need to be protected? Are there sensitive soils? Are there special ecosystem units?” Our planning is designed to protect the range of values first, and then focus upon the trees that can be removed. It is truly a paradigm shift.

We’ve implemented a monitoring program to learn from our experiences. We have to be diligent with monitoring so that we can measure change and adapt our practices accordingly. The things we’re measuring include the amount of residual-tree damage associated with the falling and helicopter yarding, soil compaction, and stream water quality. We are also monitoring soil disturbance, the abundance and distribution of large organic material before and after harvest, and tree regeneration. We have designed



this formal monitoring program to complement and guide our planning and operations.

We have extended this focus on the trees one step further, to anticipate the forest remaining rather than the trees removed. On June 15, 2001, we achieved Forest Stewardship Council certification. Alton is going to talk more about that process. There

are business opportunities associated with certification. We can connect with the public and with customers out in the marketplace. By virtue of a recognizable “label,” and given the credible assessment process associated with the FSC label, lisaak provides assurance to the

public and to our customers that lisaak’s products are coming from a well-managed forest.

We are producing a range of products, primarily logs. We have done some custom milling. Our focus, however, is round-log production, and the sale of those logs into the marketplace in a way that supports our connection with the final customer. We market our wood as “wood with respect”: respect for the land, for the people, and for communities associated with the land. This special wood is available because of the hard work of many people and is the result of some very interesting processes.

Scientific Panel Recommendations, Implementation and Forest Certification

Alton Harestad

Part of the British Columbia Government's response to the "troubles" or protests at Clayoquot Sound was to convene a panel of experts to provide the government with recommendations on how the forest resources of the area should be managed. They convened the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. The Clayoquot Scientific Panel was a team that included First Nations members. There were three elders, a hereditary chief, scientists, and managers of various resource specialties. All of us were strongly committed to developing a vision for a new way of doing forestry.

The Premier of the province gave us a mandate to recommend forest practices in Clayoquot Sound that were not only the best in the province but the best in the world. What a charge! I remember from our first few meetings that our thoughts and questions initially were along the lines of, "Should the road culvert be 24 inches, or should it be 16 inches or 18 inches in diameter? How big should that culvert be?" We worried about that; we argued about it; we thought about it. Then we realized that the most important question was, "Should there be a culvert at all?"

A culvert is a consequence of a road. A road is a consequence of logging. The first question should be whether forest products should be extracted from a piece of land. The next questions are all context dependent, with the size of culvert way down the list. So don't think about the culvert. Focus on the processes that influence water. Think about the forest values, such as salmon and things that are tied to water, and then determine ways to either adapt the forest practices to water or manage water. You have to think about those processes first. Then the size-of-culvert question becomes relevant. That was a real change in perception. We shifted the way that we thought about the forest and forest management.

The Clayoquot Scientific Panel had many recommendations. Eric reported over 100, but I've never counted. The Panel finished its report, and we waited for the government to deal with the report and give us comments or feedback or questions. Then, the government accepted all recommendations. To appreciate the significance of this action, you've got to remember where we came from in British Columbia. In the 1970s and '80s and early '90s, sometimes even today, although not in Clayoquot Sound, the forest management approach in British Columbia was to "plan to get the wood out,"

then afterwards “plan to minimize the impact of getting the wood.” What the Clayoquot Scientific Panel recognized is that you have to plan for all of the forest values up front. You’ve got to identify the values you want to maintain, then focus on those values and on how to achieve them. Finally you conduct forest planning to meet that goal. You focus on the trees retained and you identify the land that is not needed for those values. Then, on this operational land, you can cut some trees.

The Scientific Panel’s second most important observation was its recognition of cascading scales. Think about the subregion, then the landscape, the watershed, the stand, and the site, and imagine them as levels in a little waterfall—well, a big waterfall. The water is cascading down and the order of the cascade is important. You cannot go out and deal effectively with issues and values at the stand level without understanding the larger scale processes and issues.

Throughout the Panel’s deliberations, the First Nations elders constantly reminded the team of the big picture, the big spatial scale, and the big temporal scale. At times we drifted, because as scientists, it’s so easy to look into issues in extreme detail. The big-picture view that the elders brought to the Scientific Panel was very important to the success of our work.

As a member of the Scientific Panel, I got to go out to Clayoquot Sound and tell forest managers what to do by specifying new standards for forest practices. Then the Ministry of Forests, the Ministry of Environment, and the companies that were involved did their best in terms of planning, and with some measure of judgment, implemented operations. These people faced reality. Members of the Panel were the theoreticians.

When I learned about Lisaak and its goal to achieve FSC certifications, I had some questions. “Well, first, did they do what we told them?” The sobering question was. “Did we tell them to do the right things?” I was asked to be the ecologist on the FSC certification team. As a member of the team, I got to examine the whole operation. It’s like an environmental audit. I never knew Eric before, and at the first meeting with the team, he was in his chair looking like he was sitting through an IRS investigation or something similar. The process is an intensive environmental and management practices audit. The FSC has a comprehensive list of principles supported by a list of criteria. The entire field team works through those criteria to assess and determine the extent that the forest values are present in the area under review. We then examine how well the company is maintaining and managing those forest values.

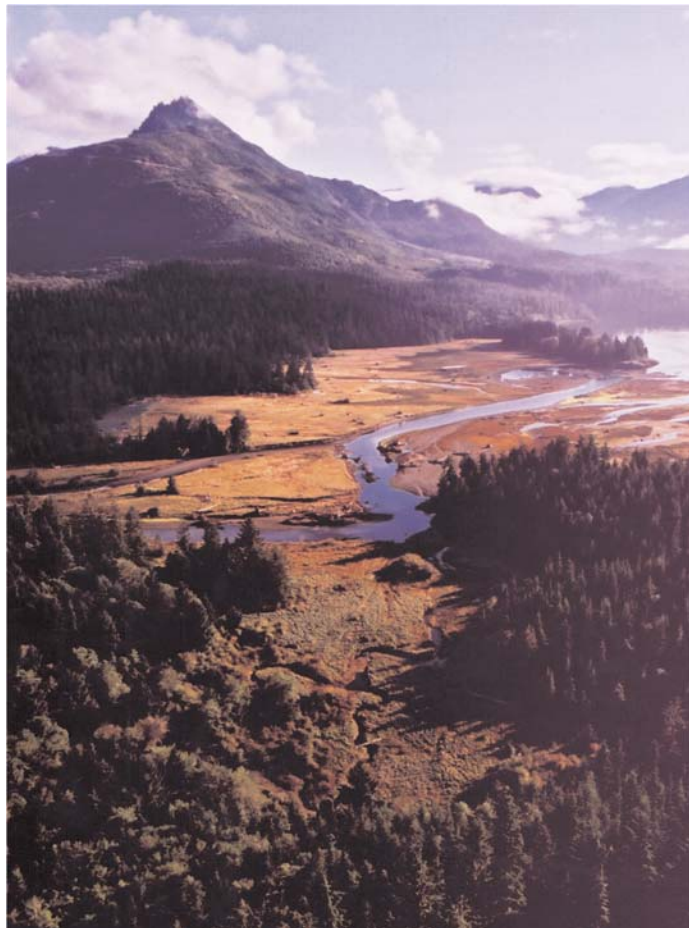
I'll give you one example, for biodiversity, contained under Principle 6, Environmental Impacts. "Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and by doing so maintain the ecological functions and integrity of the forests." The criteria (the things you measure) to assess if the operation are consistent with the principle:

- Is the number of reserves adequate for the represented ecosystems?
- Is there riparian protection? How good is it?
- Is there a provision of wildlife habitat for various species?
- Is there retention of snags?
- Is there sufficient dead and down material on the ground to provide requisite habitat for all sorts of organisms?

As a member of the Clayoquot Scientific Panel, I got to use ecological theory to bound and identify the planning and practices that would be done. Then I was fortunate to be able to revisit Clayoquot during the FSC certification and see the results for myself. That was the exciting part. I got to see my science in action. The scary part was, "What if I was wrong?" Carrying this worry, I went to the FSC assessment thinking, "Oh,

gee. If it were a typical laboratory, I could just throw the test tube out and start over again."

We weren't wrong, but we weren't perfect, either. The Scientific Panel contributed to the evolution of forest management and practices, but it's the hard work and cooperation of the communities, the First Nations, the agencies, Weyerhaeuser (or MacMillan-Bloedel in those days), and the environmental NGOs that has resulted in change. Lisaak's corporate core principles, applied at the operations level by staff and managers



who devised the management plans and demonstrated the innovative practices, ultimately satisfied SmartWood, the Forest Stewardship Council accredited certifying agent, and led to lisaak's certification.

lisaak is still learning, but part of lisaak's plan is to learn through adaptive management. Yes, there are a few warts and blemishes, as you will always see when you view your neighbor's backyard. But that's just the way life is, especially forestry life.

As a scientist, I have in mind some issues that still need solutions. First, with the variable retention harvesting system, there are opportunities for maintenance of the many forest values in that matrix among the reserved areas. Although many forest values can be maintained, I worry about that "Swiss cheese" problem. Imagine that forest ecosystems are like a slice of Swiss cheese. Does variable-retention harvesting create a stand that is ecologically spongy? Openings, even small ones, remove canopy, and so, is there a threshold below which old-growth forest no longer functions as old growth? Does this threshold vary for different resource values (e.g., each species of wildlife, visual quality)? At what point does the swiss cheese droop after additional holes are added? This ecosystem functioning is being examined in some of the research conducted by Weyerhaeuser.

The second big issue is that we have to learn to do better. Part of this process is FSC certification. It's one incentive to do better. The pursuit of certification parallels agency initiatives to manage old growth forests, and that's a worry that I have. We might be supplanting one management system with another. I don't want to supplant our own governmental processes, because those people are doing a good job. Collectively, we just have to do better.

When you peer into our backyard, there is lots to see. There are many approaches to old growth forest management across Canada: you preserve some, you restore some, and some you tinker with; that is, in some stands in the operational matrix, you can harvest by thoughtfully modifying the stand to extract part of the needed timber while retaining trees to meet other forest values.

When the FSC team first viewed the harvesting area from the air, I asked the pilot to fly over the area again because I hadn't seen the logging. After a second pass, I began to see the logging—a small opening here, another over there—and scattered through the forest, a few stumps showing where trees had been felled and the logs lifted through the canopy. This was application of the variable-retention system in a very measured way. Further evidence for careful management was

lisaak's practice of on-site revisions. Forest managers first view the site and walk the area thoroughly; then they make their plans. As the cut-blocks are being prepared in situ, continual feedback between the field operations and the planners occurs and, if needed, boundaries are moved to ensure that objectives for forest values are met. This approach requires teamwork and trust in terms of flexibility in the management and harvest permitting system.



lisaak—Its Future in Clayoquot Sound

The lisaak story isn't over. It is a young operation. It has learned a lot, but it has much more to learn. lisaak will continue to learn because it has the right corporate attitude. lisaak is going to improve processes and practices because of its approach to forest management and because of the scrutiny that it is under. lisaak also is examining avenues of green investment. It is pursuing future development and plans include quests for solutions.

lisaak Forest Resources was forged from the same issues that many forest-based communities face around the world. Solutions are team generated, by First Nations, Weyerhaeuser, the Provincial Government, and environmental groups. lisaak is a new way of doing forestry in Clayoquot Sound; that is, in part, why we are excited about it.

The communities and forest companies in Clayoquot Sound also are still learning. They're struggling with the past while they proceed toward the future. There are many issues to face in Clayoquot Sound, and in some ways, uncertainty clouds the future. lisaak's flexible approach and commitment to adaptive management ensure that there will be options and opportunities in the future. lisaak doesn't have all of the answers, but it has the will to find the solutions and to implement them.

The title of our presentation is “Iisaak—Respecting Forest Values: From Processes to Products.” Iisaak is increasing its understanding of the ecological processes that underpin its “conservation-based” forestry. Iisaak uses the processes of community consultation, multi-scale planning, on-site revision, and adaptive management to guide its operations. It is respecting forest values through these various processes. We hope this approach will allow Iisaak to produce products and achieve sustainable forest management.

Questions and Answers

Question: I have two comments and one question. I’ve read the Clayoquot Sound report that the Scientific Panel prepared and have, as well, thoroughly reviewed other inventories and reports pertaining to the forests of that area, and I’ve listened to you people, but nowhere did the term “dwarf hemlock mistletoe” appear. Now, dwarf hemlock mistletoe is the worst disease of hemlock, and the center of it is in Clayoquot Sound. If you cut the way you suggest you’re going to cut, your harvesting practice is absolutely guaranteed to create a mass of seedlings with dwarf mistletoe on them. If that’s what you want, that’s fine. You wind up with nothing but a cedar forest, rather than a forest comprising 70 percent hemlock and 30 percent cedar and other species.

My second comment is that one report gave a cruise of the areas that they looked at, and at least a third of all of the biomass on the area was lying underground. When the question of cutting windthrow came up, the statement was made, “No, we can’t let you harvest the windthrow because we need coarse woody debris on the ground.” There’s already too much coarse woody debris on the ground. That’s one of the reasons that trees are growing



much more slowly than they are down on the Oregon and Washington coasts, where there is very little carbon for bacteria to live in and make productive soils.

Question: My question is, I want to ask, Alton, if you or anyone made inventories of things like millipedes, centipedes, and springtails, etc.? How many species do you get per square yard in your forest?

Mr. Schroff: Alton, would you deal with the last question first? I'll deal with the mistletoe question.

Mr. Harestad: The question concerned biodiversity, especially of the smaller organisms, in these forests. There have been studies in coastal British Columbia in which inventories of vertebrates and invertebrates have been conducted. Some work has been done in the canopies of old trees on southern Vancouver Island.

Question: But have you done it in this area?

Mr. Harestad: Not that I'm aware of.

Question: Then how are you going to be able to judge the effects of your forest practices?

Mr. Harestad: This management system is based, in part, on the assumption that you should provide the appropriate habitat and have forest structures similar to forest structures

found in old-growth forests. Some of these structures are the dead and downed wood in various amounts. If you provide these structures and these habitats, then organisms will occupy them. The research has yet to be done to verify this assumption. Some research on this topic is being conducted in the province.

Weyerhaeuser, in some of its operations on Vancouver Island, is monitoring in controlled experiments that examine the effects of variable retention. Some of that work is being done, but I am not sure if any is being done in Clayoquot Sound.

Mr. Schroff: There have been a number of baseline studies around organisms in streams, and very detailed inventories of the various aquatic components. Dr. Lavender, would you like a comment about the dwarf mistletoe issue, or were you making an observation?

Question: Well, it's more than an observation, because the plans that you're showing on your tape are bound to propagate dwarf mistletoe, particularly on hillsides.

Mr. Schroff: To restate the question: have we considered the issue of dwarf mistletoe infestations of the hemlock expected to regenerate in small openings, and what are we doing about it?

We have considered dwarf mistletoe and the issues associated with implementation of variable retention harvesting and harvest planning that includes small openings. There are requirements under the Forest Practices Code Act that mandate managing stands to minimize the adverse effects of insects and disease. We're required to address these issues in our silvicultural prescriptions. We have recognized the potential for infestation of new stands by dwarf mistletoe and we considered the challenge when we were designing our management plans and strategies. We are looking at long-term, uneven-age management at the landscape scale. This broad look at the forest is based on maintaining landscape-level function and processes over time. We are not managing on a timber production maximization model.

The harvesting methods and the configuration of the harvest units are designed to mimic the patterns resulting from the natural disturbance regimes. Alton mentioned the single tree falling over and taking three or four more with it, small windthrow events, small openings resulting from root-rot pocket, and small open areas resulting from trees being blown over. The thought is to mimic, or attempt to mimic, those types, sizes, and configurations of disturbance within a forest.

Dwarf mistletoe is endemic in most hemlock stands across the landscape of Clayoquot Sound. We are operating in a primary forest that hasn't been logged before. Mistletoe has been part of that ecosystem for a long time. We anticipate dwarf mistletoe will remain part of that ecosystem. If we go in and harvest a small area, we get a lot of hemlock reproduction in the area and we're going to get dwarf mistletoe. Over time, some of the infected hemlock will die and drop out of the stand. We believe that, in the long-term view of the forest resulting from our proposed management, we're going to end up with a stand that looks very much like what exists today. The existing stand is very suitable for timber production, but also provides many other forest values.

In some ways, we are quite content to let the natural processes continue, including the infestation of dwarf mistletoe, because we're moving away from a timber maximization model. If we were going to go in there and try to grow the best quality timber in the shortest possible time, we would have to have an aggressive process for minimizing the infestation by dwarf mistletoe. It's a long answer, but it's a very difficult question to deal with.

Question: In one of my classes, we've been discussing certification and all of the different options for certifying bodies and standards. I thought that SFI was Weyerhaeuser's standard or process of choice. Why was FSC chosen in this case?

Ms. Cody: The question is, "Why was FSC chosen in Clayoquot?"

Because it's not possible to operate in a forest that has the conservation values that Clayoquot Sound has in a manner that is not supported by environmental groups. That is a political, economic, and social reality. The environmental groups wanted us to go for FSC, and as part of our agreement with them, we agreed to do that. The alternative in Clayoquot is no operation at all. So, if we went down that path as a company, we could not operate. Because of environmental issues, we had no operation there for 5 years.

I guess it depends on your views as to whether or not there should be any harvesting in Clayoquot. It is very difficult to harvest in Clayoquot. It is very expensive. It is something that the local community, with the First Nations that live there, wants to see. The jury is out as to whether or not a viable business can be created around it, but we think that the FSC certification starts moving us towards a branding strategy around a

certain type of product line, both timber and nontimber.

Question: Do you know what your average annual growth per hectare is and how that relates to average annual allowable cut on this system?

Mr. Schroff: The question was, "What's the annual increment on a volume-per-hectare basis and how does the incremental growth factor into the average allowable cut for the tenure?"

It's difficult to give you an average, but I'll try. It ranges from about 1.8 cubic meters per hectare per year to around 14 cubic meters per hectare per year.

Arbitrarily, let's pick 6 cubic meters per hectare per year. If we assume 6 and have a productive forestland base of just over 40,000 hectares, this gives about 240,000 cubic meters of annual increment. We've got a standing volume of about 16 million cubic meters on the tree farm license.

These numbers are based on pretty rough inventories, so I ask that nobody hold me to them. The allowable annual cut for all of the tree farms and most other tenures in B.C. is determined by the chief forester. The allowable annual cut is a determination rather than a calculation. I just did a quick calculation that showed a potential allowable cut, based on incremental growth, of

240,000 cubic meters. However, a determination takes into account social issues, anticipated environmental issues, and things such as potential reductions in harvests for insect, disease, and fire.

The chief forester takes into account many things, some quantifiable and some much more subjective, and determines the allowable annual cut. For TFL 57, the harvest level is approximately 123,000 cubic meters per year. In Clayoquot Sound, we have a unique situation in that the chief forester has decided that that allowable annual harvest level will be an upper maximum.

What we're dealing with now is that the allowable harvest level in Clayoquot Sound is influenced much more by the social elements at play in the area than by the biophysical productivity. We've got plenty of standing inventory. We've got plenty of increment. If we go to a harvest level that is too high, we'll be shut down because of not meeting the demands or expectations of protest groups or society.

Our 3- to 5-year plan is to be somewhere in the range of 50,000 cubic meters per year. Then we have to ask some additional questions. Does that get us above the economic threshold? Is the company viable at that level? Is this harvest level socially

appropriate? Have there been changes in the forest practices rules that would mean we could not sustain that level of harvest? Harvest levels are just one more component of the ever-changing landscape of Clayoquot Sound.

Question: Speaking of numbers, can you give us the magnitude of the increasing cost that's involved in these planning and harvesting techniques?

Mr. Schroff: The question is, "Can you give us some idea of the additional costs that are associated with this type of operation?"

The biggest increase in cost is in planning, and planning includes some of these social processes that we have spoken about. The multi-scale planning hierarchy, going out and hanging the ribbons in the woods, adjusting the ribbons to meet site-specific requirements that we notice on the ground—all of those things combine to add about \$20 per cubic meter to our overall cost burden.

Standard B.C. coastal cost for planning is about \$6 a cubic meter. Ours is closer to \$26 a cubic meter. So there is a huge increase. We've been able to be very cost-efficient in our harvesting phases and have kept our cost either at or below the industry average.

If you look at our operations and our cost structure in the larger context,

through all of this planning and the way we're logging, we are internalizing some of the things that were, in economic speak, "negative externalities." In Clayoquot Sound over the past 5 years, huge amounts of money have been spent on restoring watersheds, taking out old roads, reconfiguring the landscape, and dealing with issues around streams—in short, repairing the damage done by past logging practices and consequent erosion. Those costs weren't on the balance sheet for the logging. Our planning and our approaches to management are designed to protect the environment and maintain the social and cultural values inherent in the forest. We will incur additive costs. We are building the costs into our ledger. But we are not leaving a costly liability to be dealt with later. A significant challenge facing the company remains how to pay for those costs up front. We believe that the answer is to be successful in developing our conservation-based business within Clayoquot Sound. This brings us back to having a multi-product conservation-based business.

Question: You're obviously into managing adaptively and making adjustments on a day-to-day basis, but do you have a plan to do an in-depth review at certain intervals of time, in terms of how the operation is going, so you can have a big picture assess-

ment of successes and adjustments that might be needed?

Mr. Schroff: Do we have a plan and a monitoring process to assess our achievement and track our progress?

We do in some ways. We have to write silviculture prescriptions for every area prior to harvesting. The silviculture prescriptions have very specific references to what we expect to do on each area over time and how we expect the managed stands to develop. We can be measured against the prescriptions; this is standard practice in B.C. We have made commitments in our management plan and in our forest development plan—plans specific to operations in B.C. The Ministry of Forests monitors compliance with all required plans. We also have made commitments as part of our FSC certification. Periodic audits will test actual performance against stated intent.

We have plans, and reviews of performance can be based on the content and intent of those plans. At this time, there is no opportunity for "one stop shopping" when it comes to assessment and adjustment. Along with our plans, we are working in partnership with the Long Beach Model Forest on the design and implementation of a monitoring program with specific timelines for reporting on a range of indicators.

URBAN FORESTRY: FORESTRY'S FINAL FRONTIER?

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Although forestry and urban forestry share the word “forestry,” they seem to occupy different worlds. Forestry connotes sylvan environments—timber, streams, wildlife, and a close connection with the land. Urban forestry evokes cognitive dissonance; the image of cities with buildings and pavement seems inimical to forests. Equally bizarre is the idea of forest management in cities. How can silvicultural practices applied in forest stands be adapted for specimen trees in cities? As America’s population becomes more urban, answers to questions such as these are important to the future of forestry and urban forestry.

This paper describes what forestry and urban forestry share in common. By working together, both professions can become stronger and benefit from a shared sense of purpose. Constructing healthier habitats for humans could provide a focus for such collaboration.

The first section of this paper introduces urban forestry as an emerging institution. Although the public no longer regards trees as solely ornamental, and funding for tree planting has increased dramatically, implementing successful urban and community programs has not been particularly successful. This section identifies some obstacles to success.

The second section discusses concepts of forest structure, function, value, and management, and their application in urban forestry. Like foresters, urban foresters manipulate the composition of species, stand density, and structure to achieve management objectives. Although management concepts, such as forest stand and stocking level, have relevance in both fields, economic rotation is not useful in urban forestry, because public attitudes often make it difficult to remove healthy trees. Aspects in which expertise in forestry can enhance the science and practice of urban forestry are described as cross-over areas.

The final section summarizes the ways in which forestry can benefit from expertise shared by urban forestry, and vice versa.

Urban Forestry: From Frontier to Emerging Institution

Seventy-five percent of Americans live in metropolitan areas, and the urban forest is where most of them work and play. It is the forest that they experience on a daily basis. Urban forestry is the planning and management of trees, forests, and related vegetation in our communities to create or add value. Urban

forests are important because they account for about 25 percent of the total tree canopy cover in the United States and contain approximately 75 billion trees (Dwyer et al. 2000). These trees clean the air we breathe and the water we drink, protect us from the elements, and heal us emotionally, spiritually, and psychologically. They are integral to the quality of life in our communities.

One definition of frontier is “a new or unexplored area of thought or knowledge.” Compared to forestry, urban forestry is a frontier. Silvicultural theory and the profession of forest management are hundreds of years old, and forestry is an established institution worldwide. Urban forestry is young in theory but old in practice (Miller 1997). Although people have managed trees in cities for eons, academic and scientific interest didn’t reach a critical mass until the 1970s. For example, in 1978, over 100 papers were delivered at the nation’s first National Urban Forestry Conference (Hopkins 1978). Now more than 50 universities offer courses in arboriculture and urban forestry within departments of forestry or horticulture (Wingate et al. 1995).

Interest among professionals in urban forestry is growing. Membership in the International Society of Arboriculture (founded in 1924) is 14,000, only 4,000 less than

membership in the Society of American Foresters (founded 1900). Although urban forestry is a relatively new area of thought and practice, it continues to deepen and broaden its base of human interest, professional participation, and intellectual capital (Bradley 1995).

During the past decade, there has been a shift in the way many people perceive trees in their communities. Trees have always been viewed as ornament and beautification, but they are now seen as providing social, economic, and environmental benefits as well. This shift has led to new partnerships, such as the tree planting program between Portland General Electric and Friends of Trees. They are training 40,000 volunteers to plant 350,000 trees to reduce atmospheric carbon dioxide (Friends of Trees 1995). In the process, residents realize a new sense of empowerment and satisfaction from the positive influence they have on their environment.

Rapid urbanization and increased affluence is driving the development of our urban forests. Population growth in the Pacific region increased 8 percent in central cities and 15 percent in the urban-rural interface areas during the 1990s (U.S. Census Bureau 2000). Because of sprawling cities, fragmentation of habitats and loss of critical natural resources have occurred. This gradual chipping away of the natural resource base has led

to urban growth boundaries and smart growth initiatives.

Many Americans have experienced greater affluence and increased standards of living during the past several decades. At the same time, they have experienced increased air pollution, more congestion on our highways, loss of biodiversity, and occasional shortages of energy, water, and other resources. And pockets of poverty still exist within inner cities and rural communities. Because urban forestry is integral to land use planning, environmental quality, economic growth, and social justice, it has the potential to mitigate some of these problems.

In 1995, for example, California's urban forest contributed \$3.8 billion to the state's annual sales, about one-third of the \$12.5 billion contributed by the state's forest product industry (Templeton and Goldman 1996). However, California cities spent \$70 million annually on problems created by conflicts between street tree roots and hardscape (McPherson 2000). That expenditure (\$2.68/capita) was more than half the total average annual amount (\$4.36) cities spent on their tree programs (Thompson and Ahern 2000). The green industry is an important part of the economy, but when trees are unwisely selected or mismanaged, they can create costly problems for communities.

California's 177 million shade

trees in cities reduced annual air conditioning energy use by 6,400 GWh, equivalent to 7.3 100-MW power plants and \$500 million in wholesale electricity purchases (McPherson and Simpson 2001). Yet, some species of trees emit highly reactive hydrocarbons that are involved in the formation of atmospheric ozone. In southern California, an estimated 15 percent or more of total hydrocarbon emissions come from landscape trees (Corchnoy et al. 1992). This level of emissions could make it impossible to achieve ozone attainment after other hydrocarbon emission reduction measures are instituted and the relative contribution by trees increases to 40 percent. Trees can be part of the answer to our environmental problems, but they can create problems if we fail to understand or consider how they interact with the urban environment.

During the past 20 years, U.S. Forest Service spending on urban and community forestry programs has increased from \$2 million to \$36 million. Despite greater support at local, state, and federal levels, many of the same obstacles that limited development of healthy and extensive urban forests 20 years ago still hinder efforts today.

Available growing space is limited in city centers, and this problem is compounded by pressure to convert greenspace, parks, and vacant lots

into building sites. Studies by American Forests and others indicate that as cities in temperate climates sprawl outward, there is loss of tree canopy cover. Land around Puget Sound, Washington, once heavily forested, now has less than 20 percent tree cover (American Forests 1998). This de-greening has resulted in a loss of critical natural areas and the ecological services they provide. Constraints to planning and managing healthy urban forests include:

- Inadequate funding for municipal tree care programs, which includes resources for responding to natural catastrophes (e.g., ice storms, hurricanes), conducting urban forest inventories, developing management plans, enforcing ordinances, and monitoring tree health
- Inadequate space for trees within the urban infrastructure
- Overuse of park and natural spaces
- Harsh growing conditions that make tree survival a challenge
- Lack of information on the tolerances of urban tree cultivars to environmental constraints, such as de-icing salts and ozone
- Poor tree selection, which creates maintenance problems
- Poor nursery stock and failure to provide adequate care after planting
- Domination of many municipal urban forests by relatively few species, along with limited genetic diversity
- Poor tree care practices by citizens and untrained arborists
- Too few communities with working tree inventories; very few with urban forest management plans
- Limited adoption and enforcement of ordinances that regulate street tree removal and types of species planted, protect trees during construction, preserve heritage trees, and require planting with new development
- Jurisdictional complexity that frequently results in agencies working at cross-purposes or duplicating each other; lack of development of regional policies and standards for best management practices
- Limited outreach to professionals and residents
- Limited grass-roots participation in tree planting and stewardship
- Lack of public awareness about the benefits of healthy urban forests

Although urban forests can mitigate a variety of problems associated with development, several obstacles must be overcome before significant urban forest benefits can be realized. These constraints run the gamut from loss of planting space to lack of funding for tree programs. Resolving these limitations will require coordinated efforts among cities, regions, and states.

Structure, Function, Value, and Management: Cross-Over Areas

Structure

Forest structure refers to species composition, age diversity, and the spatial arrangement of trees and associated vegetation in the landscape. Forest structure is determined largely by natural factors such as climate, soil types, seed sources, and dispersal processes. Just as influential in urban forests, however, are development patterns that create space for trees, and human management that determines what is planted and removed, as well as how vegetation is manipulated (Sanders 1984). Street tree populations are intensively managed, while forest stands on urban vacant land develop in ways similar to rural forest stands (Rowntree 1984). Urban environments are heterogeneous, a complex

mix of different land cover types and uses. Growing conditions for trees are highly variable. Where trees are well-adapted and sites are favorable, growth rates of city trees can be twice those of nearby forest trees, because of watering, fertilizing, and reduced competition (Jo and McPherson 1995).

Species richness, the number of species in a population, is usually greater in urban forests than in rural forests. In southern California communities, open-grown street tree populations frequently contain over 200 species. Richness decreases in colder climates, where minimum temperatures reduce the numbers of broadleaf evergreen and palm species (McPherson and Rowntree 1989). However, species composition is similar in both forests and cities when the distribution of individuals among species is considered. In both cases, a few well-adapted species tend to dominate (Richards 1982/1983).

Ecologists have found that forest structures vary along urban-to-rural gradients that extend from city centers, through suburban development, and into the rural hinterlands (McDonnell et al. 1993). Significant variations in climate, soil, flora, and fauna along the gradient reflect the influences of pre-settlement vegetation, people, development patterns, and natural factors (McBride and

Jacobs 1984). Our urban ecosystem studies in Chicago and Sacramento revealed that tree density, basal area, and canopy cover increased along the urban-rural gradient in Chicago but decreased in Sacramento, where surrounding rural lands were largely grassland communities instead of forests (Nowak 1994, McPherson 1998).

Most ecological measures applied to forests can be fruitfully applied to urban forests. For example, urban forestry studies have described canopy cover, species composition, species diversity, age diversity, dominance, importance, stocking level, and health (McPherson et al. 1999). Many instruments developed by foresters are also used by urban foresters to measure basal area (diameter tape), tree height (altimeter, clinometer), and tree spacing (range finder). Urban foresters also apply remote sensing, GIS, and GPS technologies to measure land cover, identify tree types, and detect canopy cover change.

Our research focused on understanding the growth and architecture of open-grown trees. We developed new techniques for measuring leaf area with digital photography and image processing (Peper and McPherson 1998). To better estimate how much rainfall different tree species intercept we measured gap fractions and surface detention storage capacities (Xiao et al. 2000). We

used measurements of crown density to estimate the effects of tree shade on building energy use. In Longview, Washington, we developed data on growth rates and corresponding dimensions of different street tree species to project benefits from time of planting to removal for communities in western Oregon and Washington (McPherson et al. 2002).

Preliminary results suggest that the architecture of open-grown trees differs fundamentally from that of forest trees. Open-grown trees have substantially more above-ground biomass in their foliage and branches, whereas forest trees have more biomass in their boles. If this is the case, applying forest-derived biomass equations and deposition velocities to calculate air pollutant uptake by urban forests could lead to inaccurate findings.

Cross-Over Areas Related to Structure

Characterizing the urban-wildland interface. Very little is known about the structure of this frontier between forest and city. For example, we need information on relations among population density, building density, and tree density to better assess the cost-effectiveness of fuel management strategies. Also important is the use of remote sensing to detect the location of critical and threatened habitats. Field studies would help us understand how the structure of these habitats is affected by urban

processes such as development, introduction of exotic species, and management practices.

Canopy change detection. Forests abound in the Pacific Northwest, and nowhere is it more imperative to know how they are changing in both extent and health. Foresters are familiar with the new generation of satellites that obtain hyperspectral, high-resolution data, but this technology has not been applied in cities. We need specific studies to determine the feasibility of using different types of imagery to identify urban tree species, vegetation height, and leaf area.

Disturbance mapping and restoration. Foresters and ecologists study the effects of disturbance in forests and natural communities on structure and function, but we know very little about disturbance and restoration in urban environments. There is no taxonomy of urban disturbances by disturbance agent and community type, and little understanding of effects on vegetation structure. Understanding the impacts of disturbances on structure is the first step towards developing restoration strategies. There are no better laboratories for studying disturbance ecology than our cities.

Function and Value

Function refers to the dynamic operation of the forest. It includes biogeochemical cycles, gas exchange,

primary productivity, competition, succession, and regeneration. In forests, these functions largely are natural processes. Intervention is usually limited to silvicultural practices. In urban environments, forest functions frequently are related to the human environment. Trees are usually selected, planted, trimmed, and nurtured by people, often with specific intentions. For example, a red oak is planted in a front sideyard to shade the driveway and frame the residence. The functional benefits provided by this tree depend on structural attributes such as species selected and location, as well as management activities that influence its growth, crown dimensions, and health. The value of these benefits is highly personal and may be quantifiable (e.g., cooling savings) or intangible (e.g., increased satisfaction). Urban forest functions frequently are oriented toward human outcomes, such as shade, beauty, and privacy (Rowntree 1986).

Perhaps the most fundamental difference between forestry and urban forestry is the way trees are valued. Most people believe that city trees are more valuable alive than dead, whereas trees in forests obtain their greatest market value after they are cut. Trees in cities are imbued with meaning; some are landmarks, others are memorials. People develop emotional attachments to trees that give

these trees special status and value. Removing hazardous trees can be difficult when it means severing the connection between residents and the trees they love. For many, feelings of attachment to trees in cities influences feelings for preservation of trees in forests.

Cross-Over Areas Related to Function and Value

Waste-wood utilization. Model waste-wood utilization programs exist in some cities. Lompoc, California, for example, uses a portable mill to make lumber for picnic tables, benches, and tables from urban saw logs. Nevertheless, most urban waste wood is chipped for mulch or taken to landfills. Foresters with expertise in wood science, forest products, and economics could assist urban foresters in developing new products from this resource, identifying new markets, and building a substantial consumer base.

Water and soil relations. We know little about soils in cities, how they are altered during the development process, and how development influences relations among soil, water, plants, and atmosphere. Foresters could assist with research aimed at restoring urban soils to conditions resembling forest soils.

Water is the lifeblood of our cities. Principles of watershed management applied in forests also apply to catch-

ments along the urban-rural gradient. Foresters can help urban hydrologists develop and test the effectiveness of new ways of planning and managing urban forests to reduce runoff, improve water quality, and decrease flooding.

Urban wildlife. People enjoy seeing wildlife in cities. Wildlife provides a connection for people with nature. How are urban forest landscapes designed and managed to nurture desirable urban wildlife and prevent certain species from becoming a nuisance? Salmon is a key species because of its very high recreational and commercial value, as well as its endangered status. The streams it inhabits link urban and rural environments. Foresters who manage forest lands with salmon in mind can help urban foresters develop management plans for wooded riparian areas near cities. Also, they can assist in developing realistic guidelines for landscape design and management that will restore salmon to the area's streams.

Tree improvement. The Willamette Valley is one of the nation's largest producers of landscape trees. Many nurseries have selected new introductions for their ornamental or aesthetic attributes, such as flower color, fall leaf color, and crown shape or size. There are other attributes, however, that might reduce the costs associated with maintaining trees in cities. For example, deep rooting pat-

terns could reduce conflicts with sidewalks. Trees that drop their leaves within a short period of time could reduce clean-up costs and local flooding caused by clogged drains during the fall. Increased tolerance to heat stress might reduce loss rates.

Foresters working in the field of tree improvement could work with local growers and other members of the green industry to develop improved trees for urban environments.

Forest Management

Forestry has a rich tradition of theory and practice related to forest ecosystem management. Urban forestry has borrowed and adapted some concepts from this body of knowledge. Silviculturalists view a forest as a collection of stands managed as an integrated unit (Smith 1962). Forest stands are relatively easy to identify because of their distinctive structure and species composition. They are more difficult to discern in cities because the boundaries between plant communities are vague, seldom following environmental gradients as they do in forests. Urban forest stands can coincide with neighborhoods developed during similar time periods (Palmer 1984). Trees in the same neighborhood are usually planted at approximately the same time and tend to reflect the horticultural preferences of that era (Whitney and Adams 1980).

Much like a forester, urban foresters manipulate the composition of species, stand density, and structure to achieve management objectives. They strive to obtain optimal stocking levels for each stand, recognizing that conditions can change from site to site within an urban forest stand (Richards 1992). One forest management concept that has not been very useful is rotation, or economic rotation. The urban forestry analog to economic rotation is “useful lifespan,” the idea that after a species reaches a certain age, the annual cost of maintaining it will exceed the value of benefits it produces. Urban forest plans have recommended planting tree species with different useful life spans to promote age diversity. However, this notion has failed in practice because the public seldom allows managers to remove healthy trees solely because they have reached the end of a predetermined useful lifespan.

Managing costs is particularly important in urban forests because of the many potential conflicts between trees and the surrounding infrastructure. In California, municipal programs spend, on average, \$19 per tree each year to plant, trim, protect, and remove public trees (Thompson and Ahern 2000). However, annual benefits from a large tree can exceed \$100 (McPherson et

al. 1999). Like foresters, urban forest managers face trade-offs between short-term economic interests and long-term ecological issues. Short-term interests are frequently the time between elections or budget cycles, but net benefits from trees increase as they live 30 to 50 years or more.

The concept of sustained yield of benefits from the urban forest has theoretical application but is difficult to measure (Clark et al. 1997). Yield of benefits, measured as board feet of timber harvested, watershed values, or wildlife habitat has been more successfully quantified in forests than in cities.

A vision statement for a sustainable urban forest incorporates these concepts of benefits, costs, and sustained yield. An example vision statement is “providing for the cost-effective planting, management, and preservation of trees to promote public safety, control costs, and maximize the social, economic, environmental benefits produced for current and future generations.”

Cross-Over Areas Related to Management

Small stand management. Most Pacific Northwest communities have been sculpted from a forest matrix. As a result, there are scores of small, relict, forest stands. In many cases, people and the development process have had heavy impacts on these stands. There is a need for foresters

to develop principles and practices of silviculture for application to small stands. The linear shape of these small stands and their roles as connectors and refugia for native plants and animals will influence management prescriptions.

Decision support for planning.

Foresters have developed sophisticated decision support tools such as GIS mapping, stand growth models, visual assessment simulations, and economic analysis programs. Although some urban foresters use tree inventory and management systems, these programs lack the decision support technology and visualization capabilities needed to project the future impacts of alternative management strategies.

Forest health monitoring. Urban trees are susceptible to threats from pests and disease and are subject to a variety of abiotic disorders. Although the U.S. Forest Service and partnering states spend millions of dollars annually to monitor forest health, they spend very little monitoring urban forests. Protection efforts are mounted in reaction to local crises, and remedies are often too late to curb the damage. Many of the concepts developed to monitor forest health apply to trees in cities. Foresters can help urban foresters develop statistically valid sampling approaches for urban areas.

Hazard tree reporting is relevant to foresters in high-use recreational

areas, as well as in cities (Costello and Berry 1991). Data from tree failures are recorded in a central database. Species profiles are developed that describe how, where, when, and why each species is likely to fail. This volunteer-based program deserves greater support from the forestry and urban forestry community.

Watershed restoration. Watersheds link the city with the surrounding forests and provide a definable organizing structure for study of a region's ecosystem. Foresters and urban foresters could work side by side to determine how the quality of water, air, soil, vegetation, and wildlife habitat changes from the headwaters of rivers to their confluence with downstream water bodies. To address this issue, we need to understand the individual and cumulative effects of urbanization and land management practices on land, air, and water resources (e.g., watershed health) along the urban-rural gradient. A second issue is determining the best management practices for sustaining healthy watersheds in urban, suburban, and rural lands.

Conclusions

As Americans become increasingly urban, urban forests become increasingly important. These forests where we live provide benefits related to local, regional, and global issues. Stewardship of urban forests con-

nects people to nature and to each other. If a new land ethic is going to emerge during the 21st century, it will spring from our cities.

Although the paths of forestry and urban forestry might appear to be diverging, they are actually converging. Forest management will continue to be influenced by the changing attitudes, perceptions, and lifestyles of urban residents. This convergence offers mutual benefits to forestry and urban forestry.

Forestry can benefit from an urban public that is more accepting of management. Urban forestry can make residents more aware of why tree trimming and tree removal are necessary management activities. This awareness can translate into greater acceptance of forest management practices that reduce fire hazards and increase tree health.

Forestry can benefit from urban forest stewardship because it fosters a connection between people and nearby nature that can be a pathway for reinvestment in forest management. People who develop respect and love for nature in cities might adopt similar feelings for forests near their communities and thereby become better stewards and supporters of forest resources.

Forestry can benefit from the expertise that urban foresters have acquired working with diverse stakeholders in the public arena. Different

attitudes about trees come from different visions about how society should be organized. Many urban foresters have learned that understanding these attitudes helps articulate goals in ways that avoid misunderstandings and enlist support for their efforts. Finally, forestry can benefit from urban forestry that makes our cities more livable. By creating more livable cities and reducing sprawl, urban forestry can indirectly reduce the loss of forest land and the natural resource base it supports.

Urban forestry has a great deal to gain from convergence with the field of forestry. Forest management theory and practice, in many cases, applies to urban forestry. Most municipal arborists have little training in forestry. They apply horticultural and arboricultural practices to individual trees, but seldom plan these applications from a forest management perspective. There is need for more forest management theory in urban forestry.

Forestry has developed an impressive range of scientific expertise and technological sophistication. Because of the careful development of forest science over the last century, urban forest science has been able, in three decades, to achieve a comparable level of theoretical and empirical refinement. Further developments could be of mutual benefit to forestry and urban forestry.

Urban forestry could benefit from increased support by the forest products industry and the academic community. Both these groups have significant resources that, if brought to bear, could benefit both urban and community forestry.

The final frontier is where forestry and urban forestry join together to construct healthier habitats for humans. It is the nexus of forest ecology and human ecology, and from it will spring environments that nurture the human soul. Creating forests within our cities might well be one of the least expensive and most effective means of promoting our own health and well-being. Managing growth will increase population densities and reduce overall greenspace. We will need to meet the challenge of maximizing benefits from every square meter of greenspace by engineering trees and other vegetation into the infrastructure. We will have to argue persuasively for new greenspace, which cannot be done alone by foresters or urban foresters. We will need each other, as well as landscape architects, horticulturalists, planners, engineers, and developers. It will take a collaborative effort to turn cities of gray into cities of green. By spearheading this effort together, foresters and urban foresters will strengthen their professions and gain a new, shared sense of purpose.

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