Overview:

Spruce Bark Beetle / Southcentral Alaska

Testimony before House and Senate Resources Committees of the Nineteenth Alaska Legislature

I'm Tom Boutin, State Forester and Director of the DNR Division of Forestry. Thank you for inviting me to talk with you today. I want to specifically thank you for inviting all of the players to the table. DNR asked that the United States Fish & Wildlife Service, the University, the Mental Health Land Trust and other landowners be invited. We also wanted the Department of Fish and Game to come because we look to them to answer questions such as what will be the impact of the bark beetle on fish habitat, wildlife habitat and water quality; and we work with them to mitigate the effects of logging on those values since logging followed by reforestation is the only large-scale response that has been available to DNR. Also, Fish and Game and the United States Fish and Wildlife Service have participated in a group of scientists and land managers called INFEST that has been looking at the infestation and I think the perspective that Fish and Game has is important here today.

DNR also wants to thank you for inviting the environmental community. Environmental interests have had a key role in determining what options are available to public land managers who are trying to respond to the bark beetle.

There's a briefing paper in your packet that the Division of Forestry updated for this hearing. We have briefing papers on most of our initiatives and issues. We began updating this one when we happened to learn that the Society of American Foresters had planned meetings on this issue.

The State of Alaska owns about 2.1 million acres of land in the Kenai Peninsula Borough. Half of that is in state parks, refuges and critical habitat areas. Of the 1.1 million that is in the public domain, 449,000 acres are forested land. Of that 449,000, over half is West of Cook Inlet and 201,000 is on the Kenai Peninsula and Kalgin Island. Most of that forested land is in Lutz, Sitka and white spruce and most of the spruce is heavily impacted by the spruce bark beetle.

The goals that DNR has had in its bark beetle program are to accelerate reforestation, maintain diverse forest types and ages to support a wide variety of public uses, and capture the economic value from infested trees before they decay. The key feature of our program has been timber sales.

Out of the 201,000 acres on the Kenai Peninsula and Kalgin Island, timber sales for fiscal years 94, 95 and 96, totaled about 8,750 acres in 25 sales. Our 5 Year Schedule for the Kenai Borough proposes sales on about 28,000 acres. Of that acreage, 19,000 is on the Kenai Peninsula. Prior to 1994, DNR sold an average of 200 acres of timber sales per year on the Kenai Peninsula. In timber volume we've sold between 30 and 40 million feet of salvage timber on the Kenai since 1994, up from a program of less than one million feet per year.

This sort of increase in a public timber sale program has required additional public process. We asked Borough Mayor Don Gilman to put together a panel of citizens to review our 5 Year Schedule. We committed to complying with every recommendation upon which the panel reached a consensus (of which there were 18). We addressed concerns underlying other recommendations on which there was no consensus as best as we could. We transferred money to the Alaska Department of Fish and Game so that a habitat biologist could be on the ground during the silvicultural prescriptions and the timber sale lay-out. We borrowed a silviculturalist from the United States Forest Service. We committed to having a public meeting in communities near every timber sale and the habitat biologist and the silviculturist came to every one of those meetings and explained our program. We met with media in Anchorage and on the Peninsula. We had most of the Peninsula media on our timber sales. When a large sale, Kalgin Island, received no bids, we got together with the timber industry to design a sale that would sell, got an okay from the Department of Fish and Game on that design; and then it did sell. We asked the United States Forest Service to bring research people up from Portland to record how timber in different stages of beetle-caused decay held up for conversion to lumber, chips and veneer. We provided the logs and most of the staff for the recovery study. We passed the study results on to the Alaska industry and used them in our sale appraisals.

We have programs that do not include timber sales and we have also used those programs to respond to the bark beetle. Our forest stewardship program helps private landowners determine objectives for their forested land and what must be done to meet those objectives. As you might imagine, the bark beetle is a major feature of that program on the Kenai Peninsula. Our Urban and Community Forestry program holds meetings and workshops, and distributes information for homeowners to use in combating the beetle. Our fire prevention program has held numerous defensible space workshops for rural homeowners on the Peninsula. We produced a paper for the tour companies on the Kenai Peninsula to use to explain the beetle epidemic to their customers.

With this record Mr. Chairman, you could think that everyone cheered us on. But there has been some unhappiness. On September 22, 1994, Trustees for Alaska and four other groups appealed our 5 Year Schedule in Anchorage Superior Court. The case is known as Alaska Sportfishing v. DNR. For a period of time the plaintiffs asked for a stay on each of our timber sale auctions but the stays were denied. I think there were 10 sales altogether for which the judge said we had done a good job and that the plaintiffs were unlikely to win on the merits of their case.

Individual sales have been added to the complaint and the list of appellants has expanded to nine groups. For the first 18 months there was constant churning of motions and filings; DNR had to catalog, index and file over 10,000 pages of documents. On June 5, 1995 the Court ruled in DNR's favor on a motion to recover expenses in the case and Trustees sent a check for good funds. Final oral arguments are now scheduled for next month and a decision could come this year.

We have also had a number of administrative appeals of our Kenai Peninsula timber sales, which have all been denied, and one appeal of our coastal consistency finding on the Falls Creek Sale, for which the Coastal Policy Council ruled in DNR's favor. I cannot honestly say that these administrative and judicial appeals have materially delayed any timber sale or our program as a whole but we certainly have spent time on them that would have been spent on another part of the program had they not come.

Mr. Chairman, I think DNR has figured out how to responsibly and efficiently meet the new statutory public process requirements that came at the same time as the update of the Forest Resources and Practices Act. I don't think anyone in the timber industry believes that DNR could be doing more to respond to the bark beetle given the funding and responsibilities we have. But I want you to know that 5 Year Schedules, Forest Land Use Plans (which are required for every timber sale), public meetings and field trips, appeals and litigation amount to significant expense for the sale of dead and dying spruce trees that are also short, sparse, small and a great distance from much of a market.

I need to mention the market from a land manager's perspective. Jack Phelps will talk about the market in some detail, and I share his long-term optimism, but right now owners of low grade timber are suffering. Pulplog prices have dropped from 35 to as much as 75 percent since the very high prices of last fall. Companies that were actively buying Alaska wood for Lower 48 pulpmills have gone home. The remaining Alaska pulpmill is reported to be in very serious trouble. There are large decks of unsold low grade logs in Southeast and within the Kenai Peninsula Borough.

DNR has had a number of timber sale auctions at which there were no bids. In the Interior those sales seem to be picked up later, but beetle-killed timber sales in Haines are not selling and one sale on the Kenai did not sell.

Mr. Chairman, DNR's timber sale program as a whole returns more money to the state than it costs. The state has no deficit timber sale program. But salvage sales do not usually pay for themselves. In particular, Kenai sales only pay for part of the reforestation costs and usually do not pay for all of their preparation and administration. Reforestation of salvage sales is not required by the Forest Resources and Practices Act and private landowners requested and DNR recently completed regulations that set out the procedure for exempting salvage sales from reforestation. However, DNR has committed to reforesting all timber sales to the stocking standards in the law even in the case of salvage sales.

On the Kenai we have one buyer for beetle-killed timber but all landowners are very fortunate to have that

one. Because if that firm had not developed their market, I doubt that anyone would have done so and the market would have completely shut us down at the present time. As it is, I know of a number of firms in Southeast and in Southcentral that have extraordinarily large decks of low-grade logs. In this sort of market, Lower 48 pulpmills will not give a new supplier an order at any price. Markets always change but I don't know that we can find a good market in time for much of the dead and dying spruce that can be offered.

I would like to cover just a few more topics. One is fire and the bark beetle. While the situation is not simple at all, and you have probably heard that, there is one simple fact. The Miller's Reach fire, the fire in Big Lake last June, was in no way involved with the spruce bark beetle. The spruce bark beetle was not a feature of that fire. Our briefing paper includes an attachment that describes the wildfire implications of the bark beetle epidemic.

I need to make it clear that DNR has not accomplished this alone. The Alaska Legislature enacted HB121, sponsored by Representative Bill Williams, to allow expedited sale of salvage timber. HB212, introduced by Representative Jeanette James and throroughly worked on by both Resources Committees, allows a more expedited public process. Both of the bills were signed into law by Governor Knowles. Governor Knowles put money for salvage timber sales on the Kenai Peninsula into his capital budget. Governor Knowles' office has helped DNR work out some timber sale issues in a way that allowed us to proceed when some of those same issues on earlier timber sales had come to wreckage three years ago. We now get together in the Governor's office and work these things out.

The United States Forest Service has given DNR money and expertise that it just could not have found any other place. Funding to do the job came along with the Forest Service silviculturalist that I mentioned a moment ago. That silviculturist went right to court with us and you cannot ask for a better partner than that. The Forest Stewardship and Urban and Community Forestry programs are totally federally funded.

The Alaska Department of Fish and Game has helped at critical moments. Commissioner Frank Rue weighed in on our Falls Creek timber sale in a way that allowed it to proceed. He told the very new administration that sale had been done well and should proceed. Therefore, the appeal sitting on my then new boss' desk was denied and I think Trustees were put on notice that what they had begun in court would be concluded in court. I hope you can appreciate how important that was to the Division of Forestry at that point in time.

The timber industry, and particularly the Alaska Forest Association, has provided expertise, support and patience, especially patience, for our timber sale program. They have provided affidavits on a moment's notice time after time to help in our defense against Trustees. They've stood with us on our initiative to move to operator reforestation with our best customer, the firm that found a market for Kenai timber that I talked about earlier, showing all foresters some innovation in meeting reforestation requirements. I need to also mention that that firm is reforesting areas that it is not required to reforest even while experiencing a severe market downturn. When a judge makes an example out of a timber operator that showed a wholesale disregard for the law and the environment I say great. But I cringe when the media beats up the timber industry in general because I think of firms like this one, a firm that found a market for dying timber that we public land managers are stuck with and is now accomplishing reforestation on the Kenai out of its own profits.

The DNR Commissioner and his office have provided constant support for our Kenai program. Deputy Commissioner Marty Rutherford has traveled to countless late-night public meetings on the Kenai to explain our timber sales. She has brought her baby to more than one all day Saturday meeting.

The Department of Law has been an exceptional partner in our timber sale program. The attorney assigned to us is a professional forester and he worked in the woods before going to law school. Our foresters believe in him and he works at least as hard as we do. Last spring we gave the Attorney General a gallon of maple syrup and told him the Division of Forestry would see that he never runs out so long as this Assistant Attorney General is assigned to us.

Finally, I need to say that I am quite proud of the Division. Going from 200 acres a year to several thousand while being sued in court is not easy. And I think we've lost six or seven foresters to budget cuts during the same period of time while forest practices on private land has required greater and greater amounts of work. During the same period we have improved our documents to where I think they are becoming both responsive and bullet proof. We'll see what the judge tells Trustees and us later this fall.

There are some things that we have been unable to do. One of those is that we have not been able to find a wildlife manager who believes that the spruce bark beetle epidemic will be detrimental to wildlife in the long term. Likewise, we have not been able to find a fisheries biologist that believes that the epidemic will have a long term impact on fish habitat or water quality. Also, the wildlife managers and fisheries biologists we know are reluctant to say that logging, even if done well, will have fewer impacts than letting the epidemic run its course.

I have an excerpt here that I want to read. It comes from a memo that Fish and Game Commissioner Frank Rue wrote to the Governor last July, and while it's probably not good to take it out of context, I think it summarizes very well what fish and wildlife managers have been telling foresters about the beetle epidemic on the Kenai for some time. He wrote:

However, from a fish and wildlife perspective, the loss of large mature spruce trees will not have an impact on fish and wildlife species of primary interest to Alaskans. Fire and bark beetles are an integral part of the boreal forest and the animals that live there depend on the periodic renewal of the forest. We are not aware of any state strategy to deal with bark beetles, other than logging the trees before or after they are dead. However, this has its own problems.

Mr. Chairman, I think you can see why DNR has not relied on impacts to fisheries or water quality, lost wildlife habitat, or for that matter lost tourism dollars, danger to recreation sites and real estate devaluation to justify our Kenai salvage timber program. DNR produces net revenues as well as jobs from state resources but it has to deal in the real world of appeals and litigation. If we don't have at least a consensus among credible professionals for what we propose then we head in another direction. As stated a moment ago and at the top of our briefing paper, our goals for the state's bark beetle program are to accelerate reforestation, maintain diverse forest types and ages to support a wide variety of public uses, and capture economic value from infested trees before they decay. Only Trustees and their clients seem to disagree with that.

I'll wrap this up Mr. Chairman by telling you where DNR will go from here. We will continue to prepare and offer the sales in the 5 Year Schedule of Timber Sales as the budget permits so long as there are buyers for our sales. That includes the Kenai Peninsula salvage sales in the Governor's capital budget that was signed into law last summer. We will continue to reforest all of our timber sales including salvage sales. At the same time, the prospects for doing as much timber production in the future as we have done in the past are quite small. As I stated earlier, we've lost six foresters to budget cuts since FY94 when our Kenai salvage program began. We lost a total of seven positions, not all of them foresters, in this fiscal year alone. At the present time I have been directed by the Legislature to come up with a way to replace Division of Forestry foresters doing Forest Practices Act inspections with a program in which timberland owners would hire certified consultants. Budget realities faced by this state government dictate these sorts of examinations even if I had not been specifically directed to do so by the Legislature. The estimated 5 or 6 forester positions that we would be able eliminate (all but one of them currently filled by the way) once the program of certified consultants is up and running also lay out timber sales from Ketchikan to Kenai. So our timber sale program, including Kenai salvage sales, is definitely not on the increase and may decrease significantly in the future.

We will continue to participate with the United States Forest Service in their annual forest insect and disease survey. We will continue to contribute to the group of scientists called INFEST that is looking at the bark beetle epidemic from an historic and scientific perspective. We will continue to distribute information to homeowners and landowners on bark beetle remediation and defensible space. These efforts are pretty much all federal funds so I cannot choose to cut them instead of timber sales.

Over the years I have talked to many groups in public meetings about the beetle infestation and our program - the Exxon Valdez Oil Spill Trustee Council, the Resource Development Council, the Board of Fisheries, various chambers of commerce and many others - and I will continue to do that. We will continue to keep the Board of Forestry involved. We will continue to defend the state vigorously in court.

Finally, Mr. Chairman, along with what we are doing on state land, DNR is also directly involved in silvicultural responses to the bark beetle infestation on private and municipal land because we have responsibility for the Forest Resources and Practices Act. And therefore the private landowner response has brought an increased workload to DNR.

Thank you again Mr. Chairman. I would be happy to answer any questions you might have.

State of Alaska

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NEWS RELEASE

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FOR IMMEDIATE RELEASE: October 16, 1996 96-282

KNOWLES RESPONDS TO CONCERNS OF KPC MILL WORKERS

Proposes Change to Protect Severance Pay, Unemployment Insurance

Following through on the comments of Ketchikan mill workers, Gov. Tony Knowles has proposed a change in the unemployment insurance program to protect the workers' severance pay and unemployment insurance benefits. Knowles heard the comments when he met in Ketchikan last week with workers affected by Louisiana Pacific's (LP) planned closure of its pulp mill.

"The existing rules effectively penalize workers who receive severance pay and that's wrong," Knowles said. "When I met with mill workers in Ketchikan last week, they asked me if anything could be done. Yes, there is. This change will help timber workers affected by LP's decision to close its mill work through this transition and find new jobs."

Under current regulations, lump sum severance payments are deducted from weekly unemployment insurance benefits over a number of weeks based on the worker's weekly wage. This effectively precludes the payment of unemployment insurance benefits for that number of weeks. Knowles' proposal would treat severance payments the same as other lump sum separation payments, and deduct them only in the week it is received. This would allow affected workers to receive unemployment insurance benefits for all weeks in which they are otherwise eligible.

The new regulation is subject to public comment, but in order to speed up the process, the proposal has been included with other regulatory changes already under review. Public hearings are scheduled for Oct. 28 in Fairbanks, Oct. 29 in Anchorage, and Oct. 31 in Juneau. The comment period ends Nov. 5.

The proposed regulation change stems from the work of the governor's ongoing Coordinated Response Partnership between the state and local leaders in Ketchikan. The partnership is assessing needs of Ketchikan workers, families and small businesses following LP's announcement of a March closure of its pulp mill. Knowles also formed a task force to draft a regional business plan for a viable, sustainable timber industry as part of a diversified Southeast economy.

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Contact: Veronica Slajer: 907-225-5500 in Ketchikan or 907-465-2503 in Juneau

Alaska State Legislature

Official Business

State Capitol
Juneau, AK 99801-1182

SENATE RESOURCES COMMITTEE

AGENDA
Joint Senate/House Resources Committee
1:00pm - 3:00pm
Friday, September 27, 1996

STATUS OF SPRUCE BARK BEETLE INFESTATION IN SOUTHCENTRAL ALASKA

1. Call to Order by **Chairman Leman**

2. Introductions
   by **Jerry Boughton**, Chairman, Alaska Society of American Foresters

3. Overview by **Dr. Ed Holstein**, U.S. Forest entomologist and forest health specialist

4. International Perspective by **Dr. Patrick Moore**, Director of the Forest Alliance of British Columbia and **F.L.C. Les Reed**, President, F.L.C. Reed and Associates Ltd.

5. Organization Perspectives: Status/Responsibilities
   Dept. of Natural Resources - Alaska - **Tom Boutin**
   Ninilchik Native Corp - **Greg Encelewski**, Forester
   U.S. Forest Service - ~~**Larry Hudson, Forest Supervisor**~~ Jim Caplin, Deputy Regional Forester
   Alaska Center for the Environment - **Cliff Eames**
   UAF - Alaska Coop Extension - **Mike Faustibend**
   Alaska Forest Association - **Jack Phelps**, Executive Director
   DF&G Division of Habitat - **Lance Trasky**, Division Director

6. Open Discussion and Questions

7. Adjourn

9/26/96
H/S (RES) hrg.

000 Call to order Rep. Green
009 Senator Leman
019 Jerry Boughton - Introductions
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135 Rep. Phillips.
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360 Dr. Patricia Moore, Director, Forest Alliance of ~~British~~ Columbia
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500 Dr. Les Reed, President, F.L.C. Reed & Assoc. Ltd.
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976 Lance Trasky DF&G Dir. of Habitat, Div. Director
075 Greg Encelewski, Forester, Asst. to Pres. of Nimilchik Native Corp
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Rep. Pete Kelly

Pete Kott
Scott Ogan
Rick Halford
Loren Leman
Joe Green
Pete Kelly
John Davies
Sen. Taylor
David Finkelstein

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Testimony of Jack E. Phelps
Executive Director, Alaska Forest Association

Regarding Beetle Killed Timber in Alaska
Offered before the
Joint House and Senate Resources Committees
September 27, 1996

Mr. Chairman, members of the committee:

My name is Jack Phelps and I am Executive Director of the Alaska Forest Association. I am a member of the Society of American Foresters, and I have worked in the forest products industry off and on since 1969. The Association represents the timber industry throughout Alaska. To that end, we support efforts that enhance economic opportunities by making the forest resources of Alaska available for sustained harvest. We believe that timber harvests are an appropriate management tool for public land managers to maintain forest health and provide public benefits from publicly held land.

Today I will be discussing with you the market situation with respect to Alaska timber generally, and beetle killed and beetle damaged timber in particular. I also want to talk about the constraints that complicate the problem of marketing beetle killed timber from public lands in Alaska, and offer some thoughts on what you might be able to do about them.

As you have heard from the various experts who have testified today, and as you can learn from reading some of the printed material that has been distributed to you, the spruce beetle problem in Alaska is widespread and crosses all ownership boundaries. As you might expect, the private landowners have been the most responsive to this forest health situation. Regional and village Native corporations own large tracts of beetle-infested land. Those firms have been logging and reforesting their beetle-infested land for the last six to eight years. They have been able to sell into several niche markets for both round logs and chips.

Alaska white spruce has some qualities that make it a very desirable commodity in some markets. For example, the principle purchaser of white spruce on the Kenai peninsula today is Anchorage based Circle DE Pacific which has a chip handling facility on Homer Spit. The company sells wood chips to two Japanese paper companies for use in newsprint and high quality bond paper. Since 1993, the company has progressively increased its shipments from 100,000 Bone Dry Units (BDUs) in that year, to 135,000 BDUs this year. It expects to increase shipments yet again in 1997, to 150,000 BDUs. The port facility is capable of handling twice that volume.

Circle DE Pacific's customers find the Alaska chips particularly desirable because of their white color. There are economic and environmental advantages to using chips that do not have to be bleached. Alaska has an advantage in this market, in that the year round, ice free port of Homer is 2.5 days closer to Japan than the U.S. west coast is. A potential competitor for this market is Russia, and it behooves Alaska to develop the market as much as possible, so that we can maintain a competitive edge. One factor important to that purpose is timely timber sales. To be best suited, the spruce must be harvested soon after its demise if it is from a beetle infested stand.

The Alaska Forest Association has recently released a study of the Pacific Rim market for Alaska timber which I have provide for you today along with my written comments. It shows that the countries of the Pacific Rim are expected to increase imports of timber and lumber over the next several decades. It shows that the traditional sources of supply for this market, particularly the Pacific Northwest, are not in a good position to respond to the growing market. It also shows that the often predicted increase in supply from the American Southeast is unlikely to develop, leaving a significant opportunity for another American region, such as Alaska, to step to the plate. Our geographic position is a decided advantage. Direct competition from countries like New Zealand and Chile is likely to be minimal, since the type of timber available from them differs considerably from that grown here. Scandinavia and Russia, however, are direct competitors. Given our geographic advantage over the former we should be able to compete effectively, if other constraints do not hamper our efforts.

All is not rosy, however, on the market side. As you are probably aware, currently the market is in a serious slump. Pulp prices, especially, have been extremely low in recent months. Those companies, such as Circle DE Pacific, who have long term agreements with purchasers can weather such a slump. It is tougher on others. Nor is the price of chips the only problem. Low quality sawlogs have experienced as much as a 2/3 drop in market value since last. But the market is cyclical, and to whatever degree we can avoid it, we ought not to allow short term problems to dissuade us from working to develop long term markets for Alaska's timber.

Artificial constraints (that is, non-market constraints) placed on developing timber resources on public lands in Alaska remain a concern to the industry. Most people believe that higher logging costs in Alaska are at least partly to blame for our inability to take full advantage of the market opportunities. Part of the problem is that beetle-caused deterioration in the wood reduces its value, but it is also true that environmental protections are greater in Alaska and those protections cost money. Right now the entire cost of the protections is absorbed by the owner of the tree.

Due to changes in state law made in 1990, state timber sales are subject to incredibly burdensome and expensive public process. The state estimates that it has one public meeting and produces about 50 pages of new documentation for every million board feet of timber it offers. Now bear in mind that this isn't Tongass National Forest old growth, so what we have done is add huge extra costs to what is often extremely marginal timber. The Nineteenth Legislature took some steps in the last two years with HB 121 and HB 212 to provide some relief to this problem, and we especially appreciate the work your respective committees did on those bills, but the problem still remains. Protect the timber sale program w/in Div. of Forestry.

Let me point out something about scale here. Legislators deliberated about whether the Forest Land

Use Plan exemption in HB212 should be 10 acres or 20 acres. There's little doubt in my mind that an exemption of 20 acre timber sales or an exemption for salvage sales would have brought a veto. But at the same time, some people who want more treatment of the spruce bark beetle epidemic talk about logging hundreds of thousands or even millions of acres. I think public support for an increase of that magnitude is going to be difficult to generate. But even if you could get the public support there certainly will be strong resistance from the Alaska Department of Fish and Game. Then again, you will have to look at some fundamental changes in the law because it is the law that gives direction to managers of public land. The law also gives public land managers a place to hide from decisions, which is what they often seem to want.

On the Federal side, we have an even bigger problem. The Chugach National Forest suffers from the same inertia that has paralyzed timber sale programs in national forests all across the country. Congress provided an opportunity to change that recently when it passed the salvage timber law late last year. Instead of responding and addressing a widespread forest health problem, the Clinton Administration chose to find a legal way to avoid obeying the law. The result here in Alaska was that the Forest Service got a lot of people excited about sales that never happened, and which I personally doubt were ever intended to happen.

The problem on Federal lands is complicated by the fact that much of the spruce beetle infestation on federal land occurs on lands which are not managed for timber resources at all (park lands, wildlife refuges, and other BLM lands). One action I think Alaska should take is for the Legislature to work with Governor Knowles to press the federal government to take action on its lands that will aid in restoration of forest health while creating some economic opportunities for Alaskans. It is time for Alaskans to speak up with a loud and consolidated voice. My association stands ready assist you, even as we are working with the governor to get a better recognition by the national administration of the needs of Alaska's forests and her people. Recent actions by the White House have been less than encouraging, but we are not yet ready to give up.

I am available to answer any questions you might have.

Timber Supply From the Tongass National Forest: Meeting Market Demand

for

The Alaska Forest Association

Prepared by

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July 30, 1996

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Executive Summary

1. Global demand for wood products is expected to continue expanding in the future, based on population growth and economic growth, and the associated demand for housing, furniture, paper, and other wood products. Growth in consumption of forest products in the Asia-Pacific Rim region is expected to be particularly strong.

2. Timber harvesting in traditional supply regions has been decreasing rapidly. The Pacific Northwest and Russia have experienced dramatic reductions in timber harvesting, and Southeast Asia and British Columbia are expecting similar futures. The U.S. South, long viewed as a possible source of replacement for PNW timber, may have reached a plateau. Global demand for wood products is expected to increase much faster than supply from traditional regions, creating a "gap" which must be filled through increased supply from other regions, increased consumption of substitute products (non-wood) and greater conservation efforts. Shortages in timber supply in other regions are expected to increase the demand for forest products from Southeast Alaska.

3. Japan is by far the major market for Alaska's forest products exports. Japanese demand for wood imports is expected to remain strong in the future, with increased lumber imports replacing log imports in many cases. Other Asian markets, such as Korea and China, also present good possibilities for expanded exports of Alaskan wood products in the future.

4. The wood processing industry in Southeast Alaska is almost totally dependent on the Tongass National Forest for supply of timber.

5. The forest products industry is extremely important to the economy of Southeast Alaska, and the KPC pulp mill is critically important to the survival of the industry in that region.

6. "Meeting market demand" for timber in Southeast Alaska means much more than simply supplying timber to the currently operating mills. To meet market demand, the Tongass National Forest must provide some level of security of future timber supply, provide a mix of logs that fits the needs of the existing processing facilities (both closed and currently operating), and make available timber at delivered costs which permit manufacturers in the region to operate at a profitable level over the course of the business cycle.

7. The Tongass National Forest has had an Allowable Sales Quantity (ASQ) of 450 million board feet, sawlog volume, in the past. This is a maximum volume, not a target volume, and since 1980 the TNF timber sales program has actually achieved only about 2/3 that amount. The ASQ level in the Preferred Alternative is only about 65% of the former level, when adjustments are made for inclusion of utility logs. If past failures to sell a volume equal to the ASQ are continued in the future, the much lower ASQ being considered in the Revised TLMP Supplement is expected to produce less than half of the volume in the previous ASQ, at best.

8. The Forest Service has repeatedly acknowledged the need for timber processors in Southeast Alaska to maintain a 3-year supply of timber, in order to be able to operate profitably over the course of the business cycle. In spite of this acknowledgment, the volume remaining under contract at the end of FY1995 was only about 321 MMBF, including volume which was unavailable because of litigation. This is equivalent to only about one year's consumption for KPC and the independent mills, based on average consumption rates during 1985-1994.

9. Uncertainties due to legal actions and the actual performance of the Forest Service in meeting the FY1996 timber sales objectives make it difficult to perform precise calculations, but we estimate that the Tongass National Forest would have to sell or release approximately 480 MMBF per year (spruce and hemlock, sawlog plus utility) during FY1997-FY2000 in order to build a 3-year supply of volume under contract. This assumes operation of the Wrangell mill, and all other existing mills, at average operating rates for the last decade, but does not include plans for an MDF plant or any other new facilities or expansions of existing facilities. This also assumes that the TNF fully achieves the FY1996 timber sales targets, and that all volume currently under contract is released from litigation. Because of the cedar component (assumed to be only 12%, based on Forest Service estimates), the TNF would have to sell or release about 540 MMBF per year during FY1997-2000, to achieve a 3-year supply of timber under contract by the end of that period. Achieving the 3-year supply target sooner would require a more aggressive sales program.

10. The Forest Service has expressed concerns over protection of other resources if it adopts an ASQ above the 357 MMBF per year described in the Preferred Alternative. Note that even this level of ASQ contains about 60 MMBF of timber which is unlikely to be economic to harvest at current market conditions or those expected in at least the coming decade. Because full achievement of any level of ASQ is doubtful, based

on past experience, the only way that the Forest Service can build a 3-year supply of timber under contract, and thus stabilize the industry in Southeast Alaska, is to adopt an accelerated ASQ for the first decade.

11. While an accelerated ASQ for the first decade would result in a slightly lower long-term sustained yield, it is essential for survival of the wood products processing industry in Southeast Alaska. Besides, if the industry does not maintain its competitiveness in the near term, if the KPC pulp mill and sawmills and several independent mills cannot survive, then the "long-term sustained yield" is meaningless. Sustained yield must be based on both biologic and economic criteria. Without a stable supply of economically priced timber which is available to meet the pricing cycles (i.e., a reasonable supply of timber under contract), the industry in Southeast Alaska will collapse, and the "sustained yield" will drop to zero.

END OF SUMMARY

Demand for Timber in Alaska

Introduction

The following paper has been prepared to provide the reader with an understanding of the demand for timber in Southeast Alaska. Rather than focus on the number and capacities of surviving mills in Southeast Alaska, we first review the international markets for timber and forest products. By placing demand for Southeast Alaska timber in the context of the expected global supply of and demand for wood products, it becomes obvious that market demand will be more than adequate to absorb any expected level of production from Southeast Alaskan producers. The second half of this paper focuses on consumption of timber in Southeast Alaska, and in particular the supply problems facing the industry there due to inadequate timber under contract, and the inability of the Forest Service to meet the established goals of their timber program.

Problems with Global Timber Supply

During the last 5 to 7 years, there has been growing concern among industry experts that the future world supply of wood will not be adequate to meet anticipated demand. Of particular relevance to the Alaskan forest products industry has been the huge decline in timber harvests in the U.S. Pacific Northwest and the anticipated decline in timber production in British Columbia. The U.S. South, long viewed as having the potential to greatly increase timber production, appears to have reached its peak potential already. The decline in timber production from traditional regions such as the U.S. Pacific Northwest is expected to put increasing pressure on forest ecosystems in other, less protected regions. In addition, these large reductions in timber supply are expected to result in increased prices for timber; this will hurt consumers, but will likely make the Alaskan producers more competitive in global and regional markets.

Pacific Northwest Timber Supply

Available timber supplies have been significantly reduced in the U.S. Pacific Northwest over the last 6 years. Because this situation has deteriorated so quickly, we believe that the earlier forecasts of demand for Southeast Alaska timber by the Forest Service underestimated the impact from PNW timber supply reductions.

In the five state region of Washington, Oregon, Idaho, Montana, and California, timber harvests fell by more than 10 billion board feet between 1989 and 1995, a 44% reduction. By far the greatest decline was on federal lands, where harvest volumes dropped by 82%. Timber harvest on state-owned lands in the same region also declined significantly, falling by about 35%. Contrary to popular belief, harvesting on private lands has not accelerated to offset the decline in public timber harvests, despite much higher log prices. In fact, private harvests fell by almost 19% on private lands in this region over the same time period.

In British Columbia, timber harvests have not fallen nearly as drastically. Although the 76.5 million cubic meters harvested in 1995 was about 16% below the peak year of 1987, this was only about 5% below the average volume harvested during the past decade. However, most forecasts of timber harvesting in B.C. (see later section) anticipate a reduction of another 10-20% over the next 5 years or so.

The Tongass Land Management Plan Revision[1] states: To establish expectations about demand over the planning cycle, this analysis relies principally on market studies by Forest Service

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[1] USDA Forest Service. 1996. "Tongass Land Management Plan Revision: Revised Supplement to the Draft Environmental Impact Statement", Alaska Region, R10-MB-314a, March 1996— hereafter referred to as the "Revised Supplement".

economists (Brooks and Haynes, 1994)[2]. In that report, Brooks and Haynes stated "...changes in PNW timber harvests can be expected to have only a slight positive impact on Alaska in the 1990s." However, this report used actual data only through 1992, and the timber supply situation in the Pacific Northwest worsened considerably after that date. For example, total timber harvest in the 5-state Pacific Northwest region declined about 28% between 1989 and 1992; between 1992 and 1995, the total harvest dropped an additional 23%. More importantly, timber harvests from federal lands, which is primarily older, fine-grained timber, declined by about 50% between 1989 and 1992; between 1992 and 1995, federal harvests again declined, dropping 64%!

Timber harvest on the Tongass National Forest has also fallen in recent years, dropping from a peak of 471 million board feet (MMBF) in FY1990 to only 211 MMBF in FY1995. In addition, private timber harvests in Southeast Alaska have declined sharply from the record 532 MMBF harvested in FY1989, to only 254 MMBF in FY1995. Total timber harvest in Alaska peaked at just over 1.1 BBF in FY1989, and declined to 752 MMBF in FY1995

Environmental Consequences of Reductions in Pacific Northwest Timber Harvest

Greatly reduced timber harvesting in North America may have unintended negative environmental consequences in other parts of the world. This view is supported by two recent studies. John Perez-Garcia (1995)[3] used the Global Trade Model at CINTRAFOR[4] to estimate changes in global trade patterns in response to habitat preservation in the U.S. Pacific Northwest and British Columbia. Using the model, Perez-Garcia estimated that 60% of the reduced wood production would be replaced with logs from other regions. Because of the relatively high stocking levels in the Pacific Northwest (i.e., large volume of timber per acre harvested), a larger land area "-anywhere from 12% to 80%-may be harvested in other regions to compensate for the reduced timber production in the PNW and BC regions." Perez-Garcia also noted that "Greater harvest coming from other regions indicates that perhaps greater environmental degradation will occur in those regions, particularly if forest management techniques practiced in the substitute regions do not consider other environmental factors in their implementation."

Looking at the same issue, Roger Sedjo (1995)[5] used a different Timber Supply Model, one

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[2] Brooks, David J. and Richard W. Haynes "Timber Products Output and Timber Harvests in Alaska: Projections for 1992-2010", USDA Forest Service, Pacific Northwest Research Station, General Technical Report 334, June, 1994.

[3] Perez-Garcia, John M. "Global Economic and Landuse Consequences of North American Timberland Withdrawals", Journal of Forestry, Vol. 93, Number 7, July, 1995, p. 34-38.

[4] CINTRAFOR is the Center for International Trade in Forest Products at the University of Washington in Seattle.

[5] Sedjo, Roger A. "Local Logging Global Effects", Journal of Forestry, Vol 93, Number 7, July, 1995, p. 25-28.

developed by Resources for the Future, a Washington, D.C.-based think tank. Sedjo's model indicated that in the first 20 years of the forecast period, 1990-2010, about two-thirds of the harvest shortfalls created in the Pacific Northwest would be offset by increased harvest in other regions. Sedjo suggests that two areas in which timber harvests may increase are Russia and the Amazon region of South America, increasing the potential for environmental damage in these regions. As noted in the CINTRAFOR study, a much greater area of land must be harvested in Russia to produce an equivalent volume of timber which might be produced in other areas, such as the Tongass National Forest, because of the much lower volumes per acre in Russia. Logging in the tropical rain forest, while not the primary cause of deforestation in this region, can open access for shifting cultivation, which is generally regarded as the primary culprit in deforestation. Again, the point is that if well-regulated log harvesting on the Tongass Forest is replaced with logging in areas with less environmental safeguards, the potential for damage to endangered habitat and species may increase.

Both Sedjo's and Perez-Garcia's models assumed that increased harvesting of timber in other regions would offset only 60-70% of the expected decline in timber harvest in the Pacific Northwest and B.C. In other words, the forecasted supply of timber in the global markets is expected to be less than market demand, and prices for timber and wood products are likely to increase. Increased prices harm consumers of wood products, and make it more difficult to produce needed housing for the growing world population. In addition, higher prices can induce greater substitution of non-wood materials in construction, which generally have been shown to require much greater inputs of energy, and hence place a greater burden on global resources than does the use of wood.

Since both of these studies were done, the federal timber sales program in the U.S. West has continued to decline, to levels even lower than forecast in these studies. If the harvest of timber in Alaska from the Tongass National Forest also decreases below the level of the early 1990s, this will simply exacerbate a bad situation.

U.S. South Sawtimber Supply Also Under Pressure

Another disturbing point in Sedjo's analysis is that one region which is expected to increase its harvest substantially to offset declines in the Pacific Northwest is the U.S. South. This is not unusual. For years, the U.S. Forest Service has been forecasting continued expansion in timber harvests in the U.S. South. For example, as recently as 1995, the Forest Service forecast that softwood timber harvests in the U.S. South would increase from 5.28 billion cubic feet in 1991 to 6.27 billion cubic feet in 2000 and to 7.08 billion cubic feet in 2020.[6] In fact timber harvesting and production of wood products in the U.S. South has expanded dramatically during the

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[6] USDA Forest Service. "The 1993 RPA Timber Assessment Update", Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-GTR-259, March, 1995, p. 38.

last 10-15 years. However, recent research has called into question the ability of the Southern U.S. pine forests to support continued increases in timber harvests, particularly in the larger sawtimber category.

Recent research by Frederick Cubbage of North Carolina State University (1996)[7] found that:

> "Annual removals of softwood timber exceeded annual growth in most of the large softwood producing states, including Alabama, Arkansas, Georgia, Louisiana, Mississippi, South Carolina, and Texas.....Urbanization, water quality protection, wetland protection, endangered species restrictions, public opinion, and landowner objectives also may limit the availability or increase the costs of timber supply in the South. ....These data indicate that the South is experiencing increasing softwood timber scarcity..."

Consultants D.A. Neilson & Associates and Resource Economics Inc., in a private multi-client study, put forward the proposition that softwood timber supply in the U.S. South has likely peaked. In 1993, they predicted that softwood timber removals in the South would increase from 145 million cubic meters (MMCM) in 1990 to 153 MMCM in 1995, but then fall off to 147 MMCM by 2000.[8]

The well-known consulting firm Resource Information Systems Inc. (RISI) also has been pessimistic on the possibility of increasing timber harvests in the U.S. South. Their annual forecast summary (December, 1995) stated that "Over the next five years, the South's pine sawtimber resource is expected to become even more constrained, and the competition for wood will remain intense." Because of this competition, RISI believes that sawtimber prices in the U.S. South will close the gap with Pacific Northwest timber prices, thus losing part of their competitive advantage.[9]

An even more pessimistic view was put forward by Colberg (1996). He asserted that since the forest inventory data analyzed by Cubbage is collected only once per decade for each state (on a rotating basis), the situation is actually much worse in some states than assumed by Cubbage and others. Because of his research involving close scrutiny of timber supply in smaller woodsheds, Colberg found that in counties with greater competition for timber supplies in the South,

> "Removals are often twice the amount that is growing, with calculated growth/drain

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[7] Cubbage, Dr. Frederick. "Timber Supply and Prospects in the South", in Proceedings: International Woodfiber Conference, May 13-14, 1996, Omni Hotel at CNN Center, Atlanta, Georgia.

[8] D.A. Neilson and Associates and Resource Economics Incorporated, Pacific Rim Wood Supply and Demand: A Global Perspective, 1993 Multi-client study.

[9] Resource Information Systems Inc., "Annual Forest Products Review", December, 1995, Boston, MA

ratios for pine sawtimber averaging 0.55 to 0.70....In many of the South's major timber producing areas, we see an emerging gap between softwood supplies, and demand. The trees we will need for the next fifteen to twenty years are not in the ground, and growing.... In areas where competition is greatest, a softwood shortfall will occur between the years 2005 and 2010. Thereafter, the decline will be dramatic, with as much as a 50 percent reduction in softwood volumes available for industry use."[10]

Timber Production in British Columbia

Because so much of British Columbia's timber is owned by the Provincial Government (approximately 95%), it is difficult to predict how much timber will be available in the future. However, virtually all experts believe that the volume available in the future will be significantly less than that harvested during the early 1990s.

RISI predicted that the Annual Allowable Harvest (AAC) in B.C. would fall to 68 MMCM in 2000, a 4.3% reduction from 1994 levels (note: AAC does not include private harvest).[11] Haver forecasted provincial harvests at 67 MMCM in 2000.[12] Apsey and Reed forecasted that B.C. timber supply will drop from more than 79 MMCM in 1993 to 63 MMCM in 2010.[13] Taylor (1996) predicted a B.C. timber harvest of 65.3 MMCM in 2000, while Neilson and REI (1993) were the most pessimistic, expecting a harvest of only 58 MMCM in 2000. A recent study by Price Waterhouse estimated that the AAC in British Columbia would drop to 59 MMCM over the next 5-10 years.[14] Given the current uncertainties facing the industry in B.C., and the various political initiatives being developed, the harvest level in B.C. could go even lower. Promnitz (1995) asserted that "...there is little rational to argue against the provincial harvest going from 75 to 50 million cubic meters per year."[15]

This expected drop in timber production in B.C. should have a significant impact on the de-

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[10] Colberg, Ralph E. "Emerging Trends in Southern Timber Supply and Demand Relationships", in Proceedings: International Woodfiber Conference, May 13-14, 1996, Omni Hotel at CNN Center, Atlanta, Georgia.

[11] RISI, 1995, ref. cited.

[12] Haver, Jerry. "U.S. Pacific Northwest and Pacific Rim Wood Trade" in Proceedings: 2nd Annual Pacific Rim-World Wood Products Marketing Conference", Hyatt Regency Hotel, Vancouver, B.C., March 31 - April 2, 1996.

[13] Aspey, Mike and Les Reed. 1994. "World Timber Resources Outlook: Current Perceptions, A Discussion Paper", Council of Forest Industries, December, 1994.

[14] Price Waterhouse, 1995. "An Analysis of Recent Forest Policy and Land Use Initiatives in B.C.: Implications for Timber Supply, Jobs and Provincial GDP", prepared for the Forest Alliance, Sept., 1995.

[15] Promnitz, Lawrence C. "Solid Wood Products Markets: A View From the North", in Proceedings: Marketing Lumber, Chips, and Other Manufactured Forest Products of the Pacific Rim", Jay Gruenfeld Associates 12th Annual Seattle Conference, Marriott Hotel, Sea-Tac Airport, December 6, 1995.

mand for Alaskan forest products in Japan. B.C. has greatly increased lumber exports to Japan in recent years, jumping from 1.7 billion board feet in 1990 to 2.4 billion board feet in 1995. Reduced timber supplies in B.C. mean that less lumber will be produced. Even with the potential re-direction of some lumber supplies from the U.S. market to Japan (due to the lumber import quota imposed by the U.S.), the volume of lumber available for Japan from B.C. will be lower in the future. One possible substitute for this supply could be increased lumber exports from Alaska— dependent, of course, on the existence of a stable supply of timber to support the mills in Alaska.

Some Regions Do Have Potential to Increase Supply

Another area often cited as having the potential to greatly expand its timber production is Scandinavia. However, despite having substantial growth in excess of harvesting, the potential to expand timber production in this region is relatively insignificant in comparison with the reductions in timber harvest in western North America in the first half of the 1990s. For example, Pelkonen (1996)[16] estimated that timber harvests in Finland may increase from 37 million cubic meters (MMCM) in 1990 to 39.5 MMCM in 2000 and to 41.5 MMCM in 2010. In Sweden, softwood harvests are expected to increase from 42 MMCM in 1990 to 46 MMCM in 2000 and to 50.5 MMCM in 2010.

This potential increase of 14 MMCM pales in comparison with the anticipated drop in timber supply in other regions. For example, Aspey and Reed[17] predicted that timber supply in western North America will decline by 93 MMCM between 1992 and 2010. In addition, the increase in timber production in Scandinavia has only limited relevance to the Asia Pacific markets, despite the recent impressive gains in shipments of logs and lumber to that region. Because of the very high freight costs, Scandinavia will tend to remain only a marginal supplier to the Asia Pacific markets.

Because of its huge standing inventory of timber, Russia is often cited as one nation which has great potential to increase its timber harvests and exports to the international markets in the coming decade. Forest Service economists Brooks and Haynes speculated on the possibility of increased Russian timber production by the mid-1990s, stating that this weakens the case for expectations of expanded lumber production in Alaska. Other experts disagree on the outlook for Russian timber production, believing that the political and economic instability, as well as the formidable challenges in trying to develop the infrastructure in the Russian Far East, make it doubtful that Russia can even maintain its timber production at historical levels. For exam-

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[16] Pelkonen, Arno. "Scandinavian Market Outlook", in Proceedings: 2nd Annual Pacific Rim-World Wood Products Marketing Conference", Hyatt Regency Hotel, Vancouver, B.C., March 31 - April 2, 1996.

[17] Aspey and Reed, 1994, ref. cited.

ple, Kudryashov (1996)[18] reported that the annual harvest in the former Soviet Union dropped to only 160 million cubic meters in 1994, down 59% from a recent peak of 386 MMCM in 1990.

Apsey and Reed forecasted that Russian wood output will bounce back to 230 MMCM in 2010 and 285 MMCM in 2020. However, McKenzie disagreed, believing it will take at least another 20 years for the situation to stabilize in Russia. A considerable number of U.S. companies have explored the possibility of developing log and/or lumber export projects in Siberia and the Russian Far East, but with few exceptions these projects have all ground to a halt. Weyerhaeuser's failure in this region is perhaps the best known example. In addition to the problems frequently mentioned with trying to develop Russia's forest sector, international environmental groups have targeted this region as an important battleground in trying to preserve the world's forest ecosystems. This will serve as a further barrier to development.

New Zealand and Chile are typically cited as countries with great potential to increase their timber harvest in the coming decades, and there is little doubt that this will occur. The increase in harvest in New Zealand and Chile is expected to be about 20-22 MMCM by 2010, and by perhaps another 10-15 MMCM by 2020. However, these radiata pine producers do not compete directly with Alaska timber in most markets, because, as Haynes and Brooks pointed out, they generally supply lower quality logs and lumber.[19] And as pointed out in the section on Market Demand below, global demand is expected to far outpace even these significant increases in supply.

Market Demand

In The Irland Group's report to the Tongass National Forest[20] in 1992, they stated:

> "The Pacific Rim market for wood products is huge and will grow in size through the year 2011. Markets are so large that Alaska's industry will not be constrained by market size or long-term growth trends."

We concur with The Irland Group's (TIG) analysis, that the constraining factors on Alaska's exports are the availability and reliability of timber supply and the costs of production in Southeast Alaska. However, given the Forest Service's past efforts to quantify demand for Alaskan

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[18] Kudryashov, Valentin. "Wood Products Development in Russia", in Proceedings, 2nd Annual Pacific Rim-World Wood Products Marketing Conference, March 31-April 2, 1996, Vancouver, B.C.

[19] Brooks and Haynes, 1994, ref. cited., p. 12.

[20] The Irland Group. "Timber Demand Scenarios for Tongass national Forest 1991-2010." Report to Alaska Region USDA Forest Service, June 23, 1992.

wood products in terms of the outlook for forest products in the major markets, we feel that it is important to review the outlook for demand for softwood lumber and other forest products.

Global Timber Demand Expected to Increase Faster Than Supply

The most widely quoted forecast of global wood demand has been one made by the Food and Agricultural Organization (FAO, 1991).[21] Based on the past relationship between population growth and world wood consumption (1950-1990), they forecasted that total global wood demand would increase from 3.4 billion cubic meters in 1991 to 5.1 billion in 2010. According to a recent study by the international consulting firm Jaakko Poyry, 55% of the total demand for wood is for fuelwood, 30% is for sawlogs, and 15% for roundwood pulpwood.[22]

The FAO report indicated that industrial wood consumption, (includes sawlogs and pulplogs), both softwood and hardwood, is expected to increase from 1.6 billion cubic meters to 2.7 billion cubic meters, or an average increase of about 55 million cubic meters per year. Total wood consumption, including for fuelwood, is expected to increase by an average of 86 million cubic meters per year. Dr. Wink Sutton (1993) pointed out that this is greater than the total annual timber harvest of British Columbia, and that effectively this means that "... in each of the next 19 years we will need to find globally the equivalent of an extra British Columbia just to satisfy the increasing wood demand."[23] Sutton suggests that "the future demand for wood could be even higher than the FAO has predicted....due to the improving global economy, especially in Asia, and a possible move to more bio-energy."

A number of studies have been completed over the last 5 years, by industry experts and government agencies, almost all of which indicate a growing deficit between global timber supply and demand. For example, Apsey and Reed, in their comprehensive 1994 study, used a more conservative approach in forecasting timber demand. Where the FAO forecast an annual increase in industrial roundwood consumption of about 2.7 percent, Apsey and Reed assumed only a 1.5% increase.[24] For softwood, this indicates an increase in global demand of more than 340 MMCM, from 1.04 billion cubic meters in 1992 to 1.38 billion in 2010. Even this conservative approach proves impossible to fill, however, as they forecast that softwood supply in 2010 will only be around 970 MMCM. This would leave a "gap", or shortfall in supply, of approximately 410 MMCM.

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[21] FAO, 1991. "1989:2010 – Wood & Wood Products", Rome, 1991, 39 pp.

[22] Jaakko Poyry Consulting. "Solid Wood Products Competitiveness Study Report", prepared for the American Forest and Paper Association, 1995.

[23] Sutton, Dr. W.R.J. (Wink). "The World's Need for Wood", in Proceedings: The Globalization of Wood: Supply, Processes, Products, and Markets," Forest Products Society Proceedings No. 7319, November 1-3, 1993, Portland, Oregon

[24] Apsey and Reed, 1994, ref. cited.

In an earlier study, Neilson and REI (1993) analyzed the Pacific Rim wood supply and demand outlook, including all of North America in the "Pacific Rim".[25] They forecasted a 20% increase in demand for timber in their study region between 1991 and 2001. However, they estimated a total wood supply for this region of only 1.17 BCM in the year 2001, compared to a demand of almost 1.5 BCM. This deficit of 327 MCM, pointed out the authors, was equal to 78% of the total current U.S. industrial wood harvest. According to the authors, there is simply no available resource which can offset this magnitude of decline.

Not all timber supply forecasts are quite so pessimistic as those just cited. Nilsson (1995)[26] summarized 19 international studies of wood supply forecasted to 2010 for regions which comprised approximately 70% of the world's timber supply. The average pessimistic outlook forecast a net reduction in supply of 144 MMCM by 2010, while the average optimistic outlook forecast an increase in supply of 310 MMCM. However, even the optimistic supply forecast would be inadequate to keep pace with increases in wood demand, which were forecast to increase by an average of 375 MMCM by 2010.

Virtually all recent studies of global wood supply and demand agree that demand for wood products is expected to increase faster than supply. Other recent studies which document the very positive outlook for demand include:

– An analysis of Pacific Rim roundwood supply and demand (international trade in logs) has recently been completed by the international forest consulting firm Jaakko Poyry. McKenzie (1996)[27] summarized their findings with the following figures:

Pacific Rim Roundwood Balance

Year	Import Demand	Export Supply	Balance
	Volume in million cubic meters		
1990	53.0	48.5	- 4.5
1996	70.5	34.0	- 36.5
2002	98.0	34.0	- 64.0

[25] D.A. Neilson & Associates and REI, 1993, ref. cited.

[26] Nilsson 1995, as quoted in Wood Markets Quarterly, Third Quarter, 1996, International Wood Markets Research Inc., Vancouver, B.C., Canada.

[27] McKenzie, Colin. "Trends in the Global Supply and Demand of Wood", in Proceedings: Marketing of Forest Products: competing in the global markets, May 7 & 8, 1996, Santiago, Chile. Jay Gruenfeld Associates and Fundacion Chile.

— Pelkonen analyzed trends in the global lumber trade, and forecasted a substantial increase in demand.[28] He believes that global lumber consumption will increase from 300 million cubic meters in 1993 to 369 MMCM in 2005. More relevant to Alaska is his forecast of increased lumber imports in the Far East (Japan, China, Korea, etc.), which are expected to grow from 8.7 MMCM in 1993 to more than 14 MMCM in 2005. North America, which exported 14.7 MMCM in 1993, is expected to be a net importer, of some 2 MMCM of softwood lumber, by 2005. This represents a dramatic shift from past trade patterns, and points out the potential difficulty in forecasting future wood demands based on past trends.

It is interesting to note that the average value of Alaska's lumber exports in FY1995 was $702 per MBF, which surpassed the previous year's record high. At the same time, the volume of lumber exports from Alaska fell by 40% compared with the previous year.

— While it is always difficult to forecast pulp and paper markets, there are a number of experts who believe that the near term outlook for pulp is relatively bullish, despite the downturn in prices in early 1996. For example, Roger Wright (1995)[29] pointed out that in this cycle, there are a number of factors limiting new investments in capacity (typically, new capacity oversupplies the market, leading to lower prices):

- Limited fiber supply in many regions
- Environmental impact statements or assessments, which are now lengthy and expensive.
- High real interest costs.
- High capital costs compared with current stock prices.
- Senior executive remuneration systems that are based on value creation (and short-term performance).

— A number of studies have been done on the increasing demand for paper during the coming 5 to 15 years. Haggblom (1995)[30] forecasted that world paper consumption will increase from 253 million tons in 1993 to 402 million tons in 2010, an average annual increase of 2.8%. Other studies indicate a demand for pulpwood increasing from 2.2-2.5% per annum, because of increasing demand for pulp and paper products.

In the past 2 years, global pulp prices have been on a wild roller-coaster ride, moving from very low levels in mid-1994 to record highs in the first half of 1995, only to fall back again in late 1995 and early 1996. While the pulp markets currently appear to be strengthening again, these

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[28] Pelkonen, 1996. Ref. cited.

[29] Wright, Roger. "The Outlook for Pulp & Paper in Global Markets", in Proceedings, Alberta's Forest Industry: Competing in a Global Economy, Sept. 21, 1995.

[30] Haggblom, Rainer. "The Future of Paper", in Proceedings, Pacific Paper '95, October 15-18,

wild fluctuations point out the need for Alaskan pulp producers (now only Ketchikan Pulp Company) to maintain an adequate supply of uncut timber under contract, so that they can respond quickly to market changes. In order to survive the low periods of the price cycle, KPC must have the ability to make greater than average profits during the market peaks.

Outlook for Alaska's forest products markets

Japan is by far the largest market for wood products from Alaska. The 1995 ANILCA Sec. 706(a) Report[31] pointed out that in FY1995, "Japan received 96 percent of the total value of Alaska's lumber exports." In addition, "Japan also received most of Alaska's log exports, accounting for 74 percent of the total dollar value in FY1995." While Japan has experienced a prolonged economic recession in recent years, the long term outlook for forest products exports to this market is quite positive.

Japan has long depended on wood imports, but lately that dependence has increased. For example, Japan's imports of lumber increased from 5.2 MMCM in 1985 to 11.8 MMCM in 1995, an increase of 128%. Over that same time period, Japan's reliance on imported wood has grown from 64% of total consumption to 78% of consumption. Widman points out that there is little reason to anticipate increased domestic production of timber in Japan, despite the fact that 67% of the land base is forest. Since 1990, timber harvests in Japan have fallen 18%, from 29.3 MMCM to just over 24 MMCM in 1995.[32] A study by the University of Washington's CINTRAFOR Group reinforces this outlook. They pointed out that because of rapidly rising wages in the forestry sector, and the aging work force, "It is unlikely that Japan can economically secure the labor force it needs to maintain current production levels, much less increase harvests significantly in the future."[33] Perhaps more importantly, they also stressed that "Timber production, however, is viewed as less and less important by the Japanese people relative to competing resource values such as recreation, environmental conservation, and watershed management."

It is significant to note that housing starts in Japan have remained relatively high over the last 4-5 years, despite a severe recession in the Japanese economy. Housing starts in calendar year 1995 in Japan totaled 1.47 million units, down only 4.4% from the average of the past decade (1.54 million). However, wooden housing starts in 1995 represented 45.3% of the total, slightly higher than the average of 45% during the past decade. Because the average house in

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1995, Vancouver, B.C.

[31] USDA Forest Service, Alaska Region. "Timber Supply and Demand 1995", ANILCA 706(a) Report to Congress Number 15, January, 1996.

[32] Widman's World Wood Review. "Japan: Imported Wood to Increase!", June, 1996, p. 6

[33] Robertson, Guy and Tom Waggener. "Japan's Forest Production for Increasing Self-sufficiency: A Reassessment of Near-term Capacity and Economic Potential. CINTRAFOR News, Vol. 9, Number 1, March, 1994.

Japan has been increasing in size, total area of wooden housing construction in 1995 was 73.8 million square meters, or about 4% above the decade average.[34]

While most Japanese houses still use the post and beam construction method, the production of homes using the 2x4 platform method has been increasing rapidly. Powles (1995)[35] pointed out that with the rapid growth in 2x4 platform housing in Japan, that market will soon be larger (in terms of annual housing starts) than Canada! Most industry analysts assume that increased use of the 2x4 construction method in Japan will lead to greater demand for North American produced forest products.

Most forecasts of Japanese wood demand estimate even greater dependence on imported forest products, and greater reliance on imports of processed products, rather than raw logs. For example, Haver (1996)[36], forecasted that Japanese domestic timber production will decline from an estimated 24 MMCM in 1995 to 22.0 MMCM in 2000. Imported logs are expected to decline slightly from the 20.9 MMCM imported in 1995 (down sharply from 29.1 MMCM in 1990) to 20.5 MMCM in 2000. The decline in log imports and domestic log production in the next five years will be made up through greater imports of softwood lumber. Haver forecasts that lumber imports will increase from 10.8 MMCM in 1995 to 12 MMCM in 2000, an 11% increase. [Note: Haver's forecast on lumber imports is conservative compared with Brooks and Haynes (1994)[37], who forecasted that softwood lumber imports would increase 23.7% between 1995 and 2000.]

At the same time that Japan is expected to become increasingly dependent on imported lumber, the supply of lumber produced in the Pacific Northwest and Canada is decreasing. This decrease in lumber supply, is based on a decreasing trend in timber supply. Haver forecast that by 2000 timber harvest would drop to 8.4 BBF in Oregon and Washington (from 10 BBF in 1990) and to 13.4 BBF in British Columbia (from 16.5 BBF in 1990).

While Japan has been the dominant market for softwood lumber exports from Alaska, there are indications that demand for solidwood products in other rapidly expanding Asian markets may also increase in the future. Currently, Korea and Taiwan receive only 2% of the volume of Alaska's lumber exports, although these markets account for 4% of the value, because the average price per MBF is much higher, especially for Korea. Note: a good portion of this lumber is higher value spruce, used for making musical instruments. There are good indica-

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[34] Japan Wood-Products Information and Research Center (JAWIC). "Wood Supply and Demand Information Service, March, 1996.

[35] Powles, John. "The Outlook and Future Trends for Global/Offshore Lumber Markets", in Proceedings, Alberta's Forest Industry: Competing in a Global Economy, Sept. 21, 1995.

[36] Haver, 1996, ref. cited.

[37] Brooks and Haynes, 1994 ref. cited, Table 4, p. 19.

tions that demand in Korea may be expanding in the future. For example, Powles [38] stated that "Korea has a tradition of living in wooden housing, largely quashed in the post-war period, and today 90% of the houses are made from cement. But there is still a desire on the part of Koreans to have a wooden house." Jaakko Poyry also expect expansion in wood product imports in Korea: for example, they forecasted that softwood lumber imports will increase from 120,000 cubic meters in 1993 to 540,000 cubic meters in 2004.[39]

China is also viewed as a market with great potential for forest products imports, fueled primarily by China's rapid economic growth and inadequate domestic wood supply. China used to be a major importer of unprocessed logs. For example, as recently as 1988 China imported a total of approximately 9.5 million cubic meters of logs, including 5.0 MMCM (over one billion board feet) from the USA. Because of limited wood supply, they are expected to be a major importer again in the future, both of logs and other products. For example, Jaakko Poyry forecasted that China's imports of softwood lumber will triple, from 0.5 million cubic meters in 1993 to 1.5 million meters in 2004.

To summarize on Asia, most experts agree that there will be an increasing demand for lumber imports in the Asian markets, and there will be decreasing supply available from western North America. Thus, the demand for softwood lumber from Alaska should certainly be much greater in the future than it has been in the past, provided a stable source of economic raw material supply for the industry can be assured.

[38] Powles, 1995 (ref. cited)

[39] Jaakko Poyry Consulting, 1995, ref. cited.

Timber Supply in Southeast Alaska

In analyzing market demand, much of the previous work by the Forest Service has focused on the existing capacity for processing logs in Southeast Alaska, and in estimating the amount of timber which must be supplied to keep those mills operating at current levels. As we have demonstrated in previous sections, the limiting factor on demand for wood products from Alaska in the future is not a lack of demand in Alaska's primary markets. As pointed out by The Irland Group and many others cited previously, the level of global demand for wood products, and in particular the Pacific Rim demand, is much greater than the likely available supply. The major impediment to greater production of wood products in Southeast Alaska is the availability and cost of timber to supply mills in that region, as well as operating costs. This applies both to existing mills and other mills which might be built/re-opened if a reliable supply of timber was available.

Dependence on Tongass National Forest Timber

The sawmills and existing pulp mill in Southeast Alaska depend almost entirely on timber from the Tongass National Forest. Timber from the Tongass accounted for only 42.7% of the total harvest in Southeast Alaska in FY1995, but was the source for almost all logs processed domestically. Only about 3% of the forest land in Southeast Alaska is privately owned, but these lands have supplied about 50% of the timber supply in this region in recent years.

Private timberlands in Alaska, with very few exceptions, are owned by Alaska Native Corporations. Of the timber harvested from lands owned by these Corporations, virtually all sawlogs and most of the pulp logs are exported. Exports of unprocessed logs from the Tongass are not permitted (except for cedar), but there are no restrictions on exports of logs from private or state lands in Alaska. This "split" market permits exporters to offer much higher prices than the Alaskan mills, and the situation is not likely to change in the future. Besides the fact that most logs from private lands are exported, the harvest on these lands in Southeast Alaska has been decreasing in recent years, from a high of 522 MMBF in FY1989 to only 254 MMBF in FY1995. The third source of timber, State of Alaska timber sales in Southeast Alaska, has produced only small volumes in recent years, with harvests averaging about 9 MMBF over the last 5 years. In FY1995, only 5.8 MMBF of timber was harvested from these lands.

We believe that Morse (1995a)[40] is correct in pointing out that "...other timber supplies are expected to be available only intermittently and in small quantities." If there is to be a viable forest products industry in Southeast Alaska, it will have to be based on a reliable supply of economically priced timber from the Tongass National Forest.

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[40] Morse, Kathleen. 1995a. "Tongass National Forest Timber Sale Program Market Assessment", USDA Forest Service, Region 10, Alaska, Ecosystem Planning and Budget, December, 1995.

Volume Under Contract

One of the primary reasons for the decline in lumber production in Southeast Alaska has been the failure of the Forest Service to sell sufficient timber to allow manufacturers to maintain an adequate volume of timber under contract. The Forest Service claims that it has attempted to provide a supply of purchased but unharvested timber (volume under contract) equal to about 3 years of timber consumption. For example see Morse[41] and the 1995 ANILCA Report.[42] Arrasmith (1995)[43] points out that Section BO.62, of the Ketchikan Pulp Company (KPC) Long-Term Timber Sale Contract requires that "Forest Service shall seek to specify sufficient offerings to maintain a current timber supply in all offering areas that totals at least three years of operations."

The Forest Service cites several reasons for seeking to provide industry with the opportunity of maintaining a supply of timber under contract equal to about three years consumption, including:

- First, this allows the industry ample time to plan an orderly and systematic harvest schedule that meets all timing restrictions and permit requirements.
- Second, it allows the industry to better manage its financial resources and to secure financing on the basis of longer term timber supply.
- Third, it allows time for the necessary infrastructure (roads, log transfer facilities, and logging camps) to be put in place prior to timber harvest.
- Finally, an ample timber supply gives the industry more opportunity to sustain itself through market cycles.[44]

Maintaining a three-year supply of timber under contract is especially important in Alaska, which has a lengthy permitting process for timber harvesting and infrastructure development. And of course, adverse winter weather can add extensive delays to logging projects. We concur with the Forest Service's opinion that a 3-year supply of timber is necessary to maintain a healthy industry in Southeast Alaska, and point to Oregon and Washington as a region where failure to supply sufficient quantities of timber has resulted in the closure of a great number of sawmills and plywood mills.

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[41] Morse, 1995a, ref. cited, p. 9.
[42] USDA Forest Service, 1996, ref. cited, p. 3.
[43] Arrasmith, Dave. "Offering Volume to KPC from the former APC Contract Area in Relation to KPC Long Term Contract Timber Volume Needs", USDA Forest Service, Region 10, Alaska, Ketchikan Area, Tongass National Forest, July, 1995
[44] Morse, 1995, ref. Cited, p. 9-10.

An analysis of timber supply in Washington and Oregon indicates the delicate balance between federal timber volume under contract and mill closures. Table 1 and Figure 1 show that the volume of uncut timber remaining under contract from federal lands in Oregon and Washington has fallen from 12.8 billion board feet in 1986 to only 1.4 billion board feet in 1995. Dividing the volume remaining by the total harvested from federal lands during that year gives an approximation of the number of years of volume remaining. Despite the huge decrease in volume remaining under contract, the number of years of harvest remaining has remained relatively steady, averaging just under 1.9 years of harvest over the last decade. Of course, years of harvest remaining has remained steady because of the continuing closure of sawmills and plywood mills in the region. The industry in this region has adjusted capacity, keeping a relatively constant supply of federal timber under contract while increasing its dependence on private and state timber supplies.

In Southeast Alaska, as previously stated, alternative sources of timber are simply not available. If the industry is unable to maintain the necessary volume of timber under contract (in Alaska's case, both industry and the Forest Service agree that maintaining 3 years of timber consumption under contract is necessary), then some adjustment in consumption, through mill closures, should be expected. This is exactly what has happened in Southeast Alaska, and what will continue to happen unless more timber is made available in a timely manner.

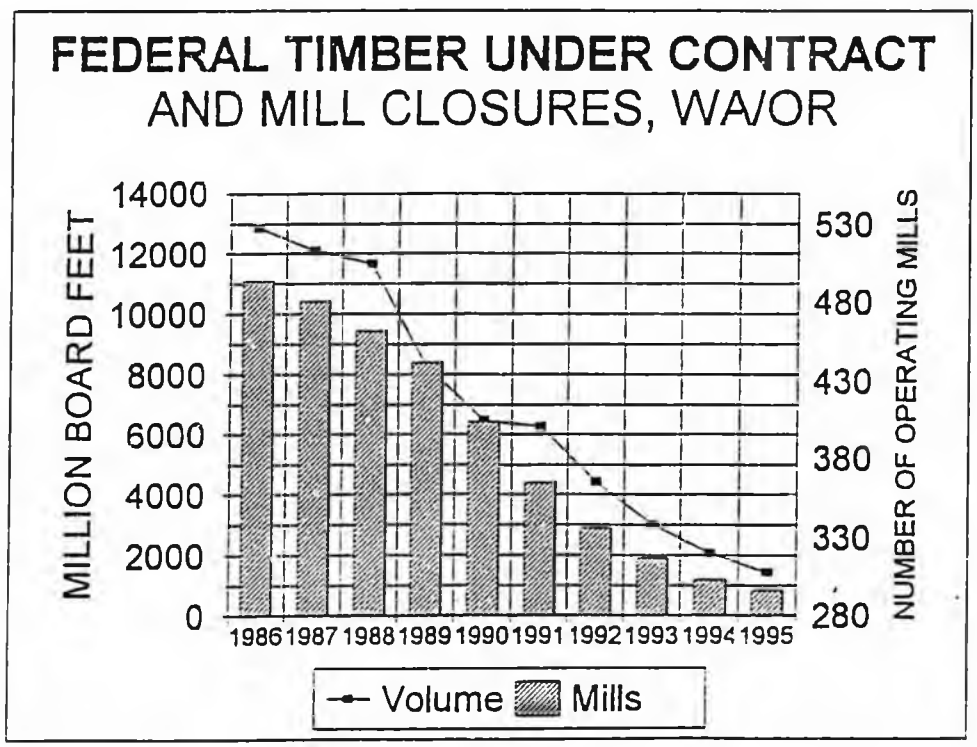
Ketchikan Pulp Company's maximum harvest rate is 192.5 MMBF per year (under section BO.52 of the Long-Term contract), although the actual average harvest rate for the period March 1, 1989 through February 28, 1994 was 185.4 MMBF. Arrasmith estimates that a three year supply of timber for KPC's operations should be between 556.2 to 577.5 MMBF. As of June 1, 1995, KPC had only 193 MMBF under contract, or about 33% of the needed supply. As of November, 1995, KPC had only 187 MMBF under contract, and 40.9 MMBF of that total was enjoined in the AWRTA v. Morrison lawsuit. Thus, KPC had only about one-fourth to one-third of the volume under contract, and available, that the Forest Service considers necessary.

The independent mills in Alaska have been in a similar situation. Morse (1995b)[45] calculated the volume needed to supply the independent mills at capacity, and their FY1995 log consumption. Including the Wrangell mill, the independent mills needed 256 MMBF of sawlogs to operate at capacity, and consumed approximately 144 MMBF in FY1995 (includes the estimated processing rate if Wrangell was re-opened). Morse estimated that the Wrangell mill could process roughly 50% of the average timber sale (the remaining being pulp logs), while the other independent mills could process 75%. According to Morse, this means that the total

[45] Morse, Kathleen. 1995b. "Tongass National Forest - Independent Sale Program Market Assessment", USDA Forest Service, Region 10, Alaska, Ecosystem Planning and Budget, June, 1995.

Table 1. Volume Under Contract and Mill Closures, Washington and Oregon								
Year	Volume Remaining		Total Volume Remaining	Washington	Harvest Oregon	Total	Years of Harvest Remaining	Mill Closures (number)
	For. Serv.	BLM						
	MMBF	*MMBF*	*MMBF*	*MMBF*	*MMBF*	*MMBF*		
				1128	4371	5499		
1986	10749	2104	12853	1232	4892	6124	2.10	3
1987	9967	2129	12096	1423	4566	5989	2.02	13
1988	9960	1700	11660	1486	4926	6412	1.82	19
1989	7073	1189	8262	1141	4333	5474	1.51	20
1990	5455	1013	6468	817	2718	3535	1.83	38
1991	5345	925	6270	704	2554	3258	1.92	39
1992	3817	616	4433	461	1886	2347	1.89	29
1993	2824	175	2999	322	1463	1785	1.68	19
1994	1947	125	2072	200	688	888	2.33	14
1995	1307	116	1423	150	654	804	1.77	7
							1.88726132	
Source: Harvest and Volume Remaining from D. Warren, Production, Prices, etc., January, 1996								
Mill Closures from Paul F. Ehinger & Associates, 1996								

Fig. 1



timber sales volume needed for one-year's operation of these mills was 414 MMBF at capacity, or 238 MMBF at FY1995 operating levels. A three year supply of timber under contract would then be equal to 1240 MMBF at capacity, or 714 MMBF at FY1995 operating rates. At the time Morse's paper was written (as of May, 1995), the independent mills had only 127.3 MMBF under contract, or between 10% to 18% of what the Forest Service believed to be an adequate, 3-year supply.

Incredibly, the actual situation facing these independent mills was even worse, as 53.9 MMBF of the 127.3 MMBF under contract was enjoined pending appeal in the AWRTA v. Morrison lawsuit. This means that only 6 to 10% of the necessary volume under contract was actually under contract and available to the independent mills at that time. It is no wonder that a potential buyer for the Wrangell mill broke off negotiations! What rational business person would conceive of purchasing a mill with such an unstable timber supply?

Note: A later paper by Morse[46] provided a lower estimate of timber sales volume needed to meet the 3-year supply goal. In that report, Morse estimated that a 3-year supply for all mills, including KPC mills, would range from 1.69 billion board feet (at capacity) to 912 MMBF (at average consumption rates for the past decade). We believe that this approach of going back a full decade presents too low of an estimate of volume needed to meet actual consumption. Morse's argument is that by going back a full decade, one accounts for business cycles in both the lumber and pulp markets. We would suggest that a historical perspective such as this should go back even further. For example, the total timber harvest from the Tongass National Forest averaged 495 MMBF during the 1970s, and for the period 1970-1994 averaged 408 MMBF (Fig. 2).[47]

We would argue that the much lower volume of harvest from the Tongass during the early 1990s, (311 MMBF per year average for the period FY1991-1995), does not indicate that demand for Tongass timber is much lower than in the 1970s. Certainly, total consumption of wood products in the world is at least as high as during the 1970s, and alternative sources of timber supply are much less available. Rather, the lower harvest levels reflect primarily the decline in average timber sale volumes and subsequent loss of manufacturing capacity in Southeast Alaska.

What is the likelihood that this situation will improve, and that Alaskan mills will be able to maintain a 3-year supply of timber under contract in the future? Judging by the alternatives described in the Revised Supplement, the outlook is extremely bleak. Table 2 attempts to estimate, in a rough fashion, the expected volume of timber remaining under contract at the end

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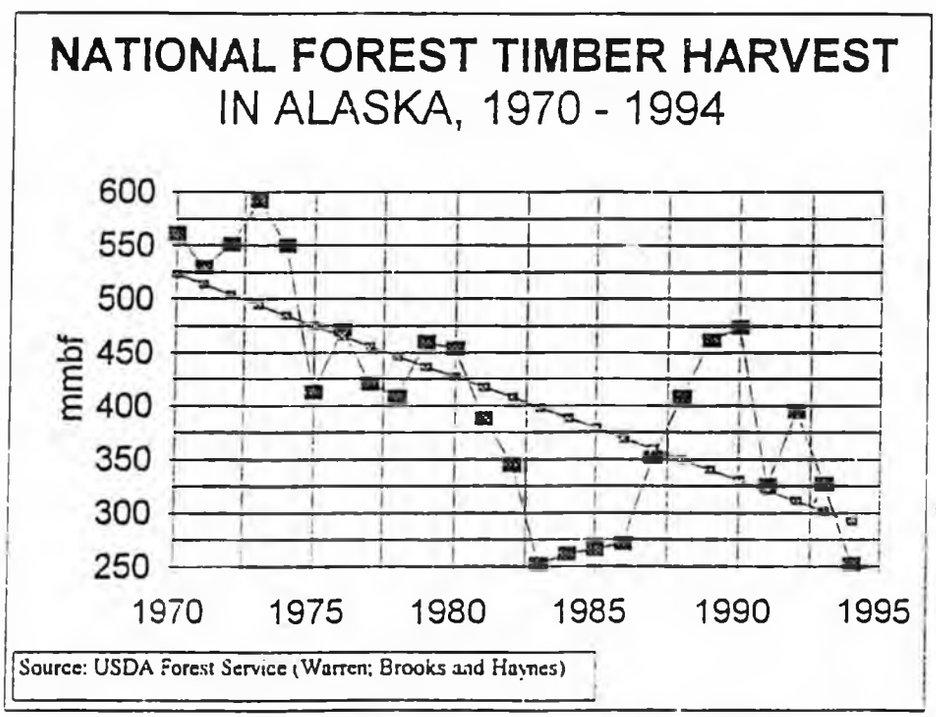
[46]Morse, 1995a, ref. cited.

[47] From Brooks, David J. and Richard W. Haynes. 1990. "Timber Products Output and Timber Harvests in Alaska: Projections for 1989-2010", PNW Res. Sta, Gen. Tech. Report PNW-GTR-261, Dec., 1990.

Table 2. Volume Under Contract Tongass National Forest						
	FY95	FY96	FY97	FY98	FY99	
KPC		Volumes in MMBF Scribner				
Volume released (1)	159	205	170	143	279	
Volume consumed (2)	172	172	222	222	222	
Volume remaining (3)	221	253	201	122	179	
Independent Sales						
Volume sold (1)	102	118	128	103	99	
Volume consumed (2)	78	78	114	114	114	
Volume remaining (3)	100	140	154	143	128	
Total						
Volume released /sold (1	261	323	298	246	378	
Volume consumed (2)	250	250	336	336	336	
Volume remaining (3)	321	394	356	266	308	
(1) FY95 from Timber Supply and Demand 1995 (ANILCA Report)						
FY96 from Morse 1995a (as planned)						
FY97-99: Alternatives 2, 7 and 9 Timber Sale Action Plan, Revised Supplement p. 3-174						
(2) Average volume of logs consumed 1985-94, including Wrangell. From Morse, 1995a						
Note: Independent Sales program actual for FY95, est. FY96, includes Wrangell for FY97-						
(3) Volume remaining under contract, including volume enjoined.						

Fig. 2



of FY1999, assuming the most optimistic scenario. This table assumes:

- Volumes sold or released in FY1996 and 1997 will be as described by Morse (1995a).
- Volumes sold or released in FY98 and FY99 will be as described in the Timber Sale Action Plan for Alternatives 2, 7, and 9 in the Revised Supplement
- Volumes consumed in FY96 will be the same as FY95 actual, and volume in FY97-99 will be the same as the decade average (1985-94) as described in Table 2 of Morse (1995a)

These assumptions are somewhat optimistic for several reasons:

- Dave Arrasmith[48], Planning Staff Officer for the Tongass, pointed out that the maximum volume which could be provided to KPC in FY96 was 174 MMBF, and in FY97 about 156 MMBF, which is a total of 45 MMBF less than assumed in Table 2 above.
- Recent estimates of the Independent Sales volume indicate FY96 will be substantially less than the 118 MMBF assumed here.
- The assumed timber sales volume for FY98-99 was based on the Timber Action Plan for Alternatives 2,7, and 9. These Alternatives have the highest Allowable Sales Quantity (ASQ) level of the alternatives considered, and the Forest Service has already stated a Preferred Alternative which has a substantially lower timber sales program.

Why has the Forest Service failed to provide the volume of timber which they have stated is necessary for the industry in Southeast Alaska to survive? One problem is "falldown", or the difference between what the Forest Service plans to harvest, and the much lower volume that actually makes it through the timber sale pipeline, survives appeals, and is eventually harvested. The second problem is the fact that the Allowable Sales Quantity, the maximum timber volume that the Tongass is permitted to sell, is declining.

Falldown

One problem which has plagued the forest products industry in Alaska over the last 5 - 10 years is "falldown". The Forest Service defines falldown as "the difference, usually a reduction, between the number of acres planned for timber harvest and those actually harvested."[49] So-called "hard" falldown occurs when previously unmapped areas which

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[48] Arrasmith, 1995. Ref. cited.

[49] USDA Forest Service. "Tongass Land Management Plan Revision: Revised Supplement to the Draft Environmental Impact Statement", Forest Service Alaska Region R10-MB-314a, March 1996, p 2-11.

are unsuitable for timber production are identified during the planning process. "Soft" falldown occurs when reductions are made due to project planning, design, or layout. The primary cause of "soft" falldown, according to the Forest Service, is "an incomplete review of site conditions prior to designing or implementing a project." Falldown typically ranges from about 5 to 20%, according to the Forest Service. The Irland Group estimated the falldown loss at closer to 25%.

Allowable Sales Quantity

Allowable Sales Quantity is "the maximum amount of timber that may be sold from the area of suitable land covered by the Forest Plan within a given decade", typically expressed in average annual terms. The Forest Service has stated repeatedly that the ASQ is a ceiling, not a required or targeted volume. This is exactly the problem with the ASQ. The industry in Southeast Alaska cannot depend on the Forest Service for a known volume of timber, because the industry never knows how far below the ASQ the actual sales volume will fall.

The ASQ of the Current Plan is 450 MMBF (sawlog). During the period 1980 - 1995, only about 68% of the ASQ was sold/released, on average. According to the Forest Service, many factors can result in actual sales offerings falling below the ASQ, including "lack of funding, new resource issues that need to be addressed, changes in timber markets, sales held up by appeals or lawsuits, or any of the falldown factors previously discussed."[50]

For example, according to the Forest Service, since 1991, "over 1.1 billion board feet has been appealed or litigated." Considering that the total volume sold or released since 1991 was 1.7 billion feet, this means that 65 % of the timber supply has been appealed or litigated. If the Forest Service is serious in wishing to maintain a 3-years supply of timber under contract, it has to take into account the extensive appeals of timber sales which have become a regular occurrence. This has not been done in the current Tongass Land Management Plan Revision.

In the ten alternatives being considered in the Revised Supplement to the DEIS, (9 alternatives plus a "preferred" alternative), ASQ ranges from zero to a high of 689 MMBF per year. [Note: maximum potential supply, given the available area for timber management, is 704 MMBF. Total potential biological yield on the Forest is approximately 1.56 billion board feet.][51] The Tongass National Forest has approximately 10 million acres of forest

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[50] USDA March, 1996, p. 2-11.

[51] USDA Forest Service, Alaska Region. March, 1996. Tongass Land Management Plan Revision, Revised Supplement to the Draft Environmental Impact Statement, Proposed Revised Forest Plan, p. 1-8.

lands, yet only 3 of the alternatives considered by the Forest Service have any lands in the High Timber Yield category. Approximately 24% of the forest lands on the Tongass are considered unproductive, that is, not capable of growing commercial timber. Alternative 7, which has the highest ASQ of any considered, considers 1.9 million acres, or about 19% of the forested land on the Tongass, to be available in the "High Timber Yield Category".

In the Preferred Alternative, the total ASQ is 357 MMBF. Note that this volume includes sawlog plus utility, not just sawlog volume. The Forest Service states that "sawlog plus utility volumes are roughly 15-17 percent higher than sawlog by itself."[52] Some industry representatives claim this percentage is too low, but for discussion purposes we will assume here that it is correct. This means that the previous ASQ of 450 MMBF (sawlog) would have been equal to 518-526 MMBF if expressed as sawlog plus utility. Thus the ASQ in the Preferred Alternative is roughly 31-32% lower than in the past.

The comparison between past ASQ levels and likely future levels as detailed in the Revised Supplement needs to be clarified further. In the Revised Supplement, ASQ is expressed in 2 parts, called "non-interchangeable components, or NIC's":

> "The NIC I portion of the ASQ represents the amount that is projected to be economical to log, given ground conditions, market conditions, and available logging technology. The NIC II portion is that amount projected to be economically or technologically marginal to log."

In the Preferred Alternative, about 60 MMBF of the total 357 MMBF ASQ is classified as NIC II, and therefore is unlikely to be offered except under unusual conditions. Thus the total volume becomes 297 MMBF, sawlog plus utility, or a reduction of about 42-44% from the previous ASQ.

In the Tongass Forest Plan Review, the Forest Service discusses its rationale for choosing the Preferred Alternative.[53] They state that "...changes are warranted to improve the current plan's protection of wildlife viability, fish habitat, and karst and cave resources.... (which) led them away from Alternatives 2, 7, and 9." These Alternatives (2, 7, and 9) had the highest ASQ levels. Presumably, the Forest Service planners decided that if timber harvesting proceeded at the level of the estimated ASQ in these alternatives, there would be insufficient protection for the other resources. Even if this is correct, there is an apparent failure to account for the fact that actual harvests over the last 15 years have been only about two-thirds of stated ASQ. It is unclear whether the concern over protection of other resources is based on impacts of actual harvest levels equal to the ASQs described, or to the likely much lower harvest levels (relative to ASQ) which historically

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[52] TLMP, Revised Supplement, p. 2-12

[53] USDA Forest Service. Tongass Forest Plan Review, Issue 12, April, 1996, p. 11.

have occurred. This again points out the problem with using an ASQ, or maximum sales quantity allowed, rather than a minimum volume expected.

Another issue which needs clarification in the Revised Supplement is the quantity of cedar included in the ASQ. According to the Forest Service, the NIC I Component of the Annual ASQ will contain only about 6% cedar (red or yellow) in the first decade (see Table 3-60 in the Revised Supplement). Some alternatives indicate a slightly lower percentage of cedar, but the overall component of cedar on the Tongass is about 12%, and timber harvests in recent years have been averaging even higher. It is unclear whether the volume of cedar indicated in the Revised Supplement (about 6% of the total harvest) is only that portion deemed "economic", or whether there is an error in Forest Service estimates. Because cedar is not sawn by the major mills, and is not usable in the pulp mills, these Forest Service logs may be exported. However, while this may allow operators to make a profit, it does not help the domestic mills remain productive. If the ASQ does not take this into account, it makes it even more difficult for timber processors in Alaska to wood their mills.

Continuing Slide in Timber Sales Program?

Forest products producers in the lower 48 are continually upgrading their mills, making the investments necessary to remain competitive. It is difficult for mill owners in Southeast Alaska to justify making investments, when there remains such great uncertainty over the future timber supply for those mills. If anything, Forest Service efforts to resolve problems with the Tongass Land Management Plan, and to ensure a steady supply of timber for Southeast Alaskan producers, have been counter-productive. It appears that the longer the planning process continues, the less timber will be made available.

There are roughly 10 million acres of forest land on the Tongass National Forest, and an additional 6.9 million acres of non-forest land. Prior to the passage of the Tongass Timber Reform Act in 1990, there were approximately 4.1 million acres classified as commercial forest land on the Tongass, available for producing timber on a sustainable basis. Initial withdrawals for Wilderness, stream buffers, etc., reduced this to 3.42 million acres. The 1991 SDEIS reduced this to 2.54 million acres classified as "tentatively suitable", and the Revised Supplement reduced this category further to 2.32 million acres. The Alternatives being considered have total suitable forest land areas which are even smaller, ranging from 73,000 acres to 2.08 million acres. Alternative 6, which has an ASQ very close to the Preferred Alternative, classifies only 1.44 million acres as suitable forest lands. That is 43% less than the "tentatively suitable" acres selected in the 1991 SDEIS, and is 65% less area than was available during the 1980s. It represents just 14.4% of the total forest land area on the National Forest.

The decrease in National Forest timber supply seems to be on a continuing slide, and Forest Service reports which estimate demand for timber in Southeast Alaska indicate that this may continue. In reports published in 1993-94, after the closure of the Alaska Pulp Mill, Forest Service analysts examined the demand for timber "with" and "without" the APC mill operating. Perhaps not surprisingly, most of the Alternatives now receiving serious attention treat the former APC volume as if it did not exist; that is, instead of utilizing volume previously reserved for APC to meet the demand for lumber and pulp production, the proposed ASQ in the preferred Alternative is 32% below the former ASQ. The most recent estimates of demand for Tongass timber (Morse, ref. cited), include estimates of log consumption needs both with and without the Wrangell sawmill operating. The Wrangell sawmill is currently not operating, and will not operate unless a buyer can be found. By publicly discussing timber supply needs as if the Wrangell sawmill did not exist, the Forest Service is contributing to the viewpoint that sufficient timber will likely not be made available for that mill in the future. As The Irland Group pointed out in their report to the Forest Service, "A TNF (Tongass National Forest) ASQ based on an assumed low level of demand will become a self-fulfilling prophecy."[54]

Failure to meet demand

Section 101 of the Tongass Timber Reform Act states:

> "...the Secretary shall... seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle."

The Revised Supplement mentions that Forest Service planners' "expectations about demand" rely on the 1994 forecast by Brooks and Haynes, which we believe to be relatively conservative in its outlook on demand for Alaskan timber. However, according to the Revised Supplement, only Alternatives 7 and 9 "would have the capability of providing sufficient raw material that would meet projected demand for lumber and pulp." Since the Forest Service is already moving towards a Preferred Alternative that contains an ASQ well below Alternatives 7 or 9, it is apparent that they have no intention of trying to meet market demand for Tongass timber.[55]

Thus, even if the Forest Service actually sold/released all of the volume indicated in the Preferred Alternative ASQ (for NIC I), they would still not be supplying sufficient timber to meet their own relatively conservative estimates of market demand. And a timber

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[54] The Irland Group. 1992. Ref. cited.

[55] The ASQ for NIC I in the Preferred Alternative is 297 MMBF. This is about 37% less than the ASQ for NIC I in Alternative 9 (474 MMBF), and is about 48% less than Alternative 7 (577 MMBF).

program which actually achieves the ASQ is far from certain. "Given the uncertainties inherent in developing ASQs," says the Forest Service, "shortfalls between the ASQ and timber sales should be expected." As a ceiling on timber sales volume, the ASQ does absolutely nothing to assure the forest products industry or potential investors that a stable supply of timber will be made available.

Conclusion

In summary, we believe that it is important for the Forest Service to recognize the following in their final revision of the Tongass Land Management Plan:

1. The forest products processing industry in Southeast Alaska is totally dependent on the Tongass National Forest for its raw material needs.

2. The forest industry is extremely important to the economy of Southeast Alaska, and the KPC pulp mill is critically important to the survival of the forest products industry. This has been recognized since the Tongass Timber Act of 1947, when the House Committee on Agriculture stated:

> "A large-scale development of the timber resources in southeastern Alaska, involving the establishment of important business enterprises and the employment of many persons for extensive operations on a year-round basis, is essential to the maintenance of a prosperous and stable economy in the Territory."[56]

3. Supplying sufficient timber to meet market demand means much more than just supplying the currently operating mills. As The Irland Group pointed out, because log consumption has been constrained by supply in Southeast Alaska, "We cannot simply equate market demand with past or present consumption...If current consumption were taken as a measure of demand, it would be an underestimate."[57] There is more than adequate demand in Pacific Rim markets to absorb Alaska's wood products, provided sufficient volume of economically accessible timber is made available. Meeting market demand, as The Irland Group pointed out, includes:

   - establishing a level of security about future supply that does not now exist on the Tongass.
   - providing a mix of timber that is responsive to the needs of processing facilities for timber size, grade, and quality.

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[56] H.R. Rep. No. 873, 80th Congress, 1st Session (July 10, 1947).

[57] The Irland Group, 1992. "Adequacy of Supply Study for the Tongass", Appendix at page 49.

- making timber available at delivered costs that allow for profitable processing over the market cycle.

4. After years of arguing over the Allowable Sales Quantity, it has become obvious that the ASQ has little meaning in establishing security about future timber supplies. Because the Forest Service has consistently failed to make available a volume of timber equal to the ASQ, the processing industry will have no security of supply unless the ASQ is set high enough in the Revised TLMP to insure that the actual sales volume will be at a level high enough to supply the mills' requirements.

5. The Forest Service needs to recognize that the timber sale program must account for the relatively high percentage of cedar and pulp logs that exist in some units, and to supply a sufficient total volume to insure an adequate supply of spruce and hemlock sawlogs.

6. Uncertainties due to legal actions and the actual performance of the Forest Service in meeting the FY1996 timber sales objectives make it difficult to perform precise calculations, but we estimate that the Tongass National Forest would have to sell or release approximately 480 MMBF per year (spruce and hemlock, sawlog plus utility) during FY1997-FY2000 in order to build a 3-year supply of volume under contract. This assumes operation of the Wrangell mill, and all other existing mills, at average operating rates for the last decade, but does not include plans for an MDF plant or any other new facilities or expansions of existing facilities. This also assumes that the TNF fully achieves the FY1996 timber sales targets, and that all volume currently under contract is released from litigation. Because of the cedar component (assumed to be only 12%, based on Forest Service estimates), the TNF would have to sell or release about 540 MMBF per year during FY1997-2000, to achieve a 3-year supply of timber under contract by the end of that period. Achieving the 3-year supply target sooner would require a more aggressive sales program.

7. The Forest Service has expressed concerns over protection of other resources if it adopts an ASQ above the 357 MMBF per year described in the Preferred Alternative. Note that even this level of ASQ contains about 60 MMBF of timber which is unlikely to be economic to harvest at current market conditions or those expected in at least the coming decade. Because full achievement of any level of ASQ is doubtful, based on past experience, the only way that the Forest Service can build a 3-year supply of timber under contract, and thus stabilize the industry in Southeast Alaska, is to adopt an accelerated ASQ for the first decade.

8. While an accelerated ASQ for the first decade would result in a slightly lower long-term sustained yield, it is essential for survival of the wood products processing industry in Southeast Alaska. Besides, if the industry does not maintain its competitiveness

in the near term, if the KPC pulp mill and sawmills and several independent mills cannot survive, then the "long-term sustained yield" is meaningless. Sustained yield must be based on both biologic and economic criteria. Without a stable supply of economically priced timber which is available to meet the pricing cycles (i.e., a reasonable supply of timber under contract), the industry in Southeast Alaska will collapse, and the "sustained yield" will drop to zero.

END OF REPORT

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LTN1100-R01 LEGISLATIVE TELECONFERENCE NETWORK PAGE 01
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**** ORDER SUMMARY ****
SPONSOR: HRES HOUSE RESOURCES CHAIRS: GREEN
PURPOSE: PUB PUBLIC HEARING LEGISLATIVE WILLIAMS
CONTACT: KRISTY TEL#: (907)258-8198
CHAIRING SITE: ANCHORAGE 716 W 4TH, #200 ZZZ

SPONSOR REMARKS(PUB): TESTIMONY:I INVITATION ONLY 99 MINUTE LIMIT
COMMENTS ARE BY INVITATION ONLY.
SEE COMMITTEE SCHEDULE IN BASIS
TCN REQUESTED ON 09/27/96 AND HAS 10 UPDATES

**** AGENDA ****
1 SPRUCE BARK BEETLE INFESTATION

**** PARTICIPATING LIOS ****

*	ANC	ANCHORAGE	716 W 4TH, #200		LOCATION STAFF
	COR	CORDOVA	705 2ND STREET		LOCATION STAFF
	FBX	FAIRBANKS	119 N CUSHMAN ST		LOCATION STAFF
	JNU	JUNEAU	GOLDSTEIN #319	GLD319	LOCATION STAFF
	KEN	KENAI LIO	145 MAIN ST LOOP		LOCATION STAFF
	KOD	KODIAK	112 MILL BAY RD.		LOCATION STAFF
	KOT	KOTZEBUE	333 FRONT STREET		LOCATION STAFF
	KTN	KETCHIKAN	352 FRONT STREET		LOCATION STAFF
	MAT	MATSU	600 E RAILROAD		LOCATION STAFF
	SEW	SEWARD	2001 SEWARD HWY		LOCATION STAFF
	SIT	SITKA	210 LAKE STREET		LOCATION STAFF

**** VOLUNTEER & OFFNET SITES ****

ZZZ	OF1	OFFNET 1	HOMER	REP. PHILLIPS (907)999-9999
ZZZ	OF2	OFFNET 2	HOMER	LARRY SMITH (907)235-3855
ZZZ	OF3	OFFNET 3	D.C.	MARK RAY (202)999-9999

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THE RISING STAR IN ALASKA'S FUTURE

Its Forest Land and Associated Resources

CONFIDENTIAL
UNTIL
9/27

Prepared for

Commonwealth North Policy Forum
Anchorage, Alaska

September 26, 1996

Prepared by

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Introduction

It is a genuine pleasure to have an opportunity to speak to Commonwealth North. This is my fourth working trip to Alaska in three years and I hope it will be followed by other visits in the near future.

Before proceeding with the main text, may I say that my attraction to Alaska goes back nearly 30 years when I came here on an assignment to study the feasibility of a land bridge railway to the Lower 48. Before that time I had already worked in Canada's Northwest Territories, and had developed a strong sensibility to the Northerness of these upper latitudes. This Nordicity, as we call it, has been a shaping force in Canada's poetry, landscape art, history and its cultural identity more broadly. It is easy to be seduced by the North, by its panoramic and monumentalized character of wealth and beauty, its sense of loneliness and replenishment. Indeed, one can reach a state of resonance with the landscape of the North, as nowhere else on earth.

At the same time there is a danger that we take it for granted. Having made our homes here, it seems to me that mankind has a reciprocal or companion role to play in the ultimate destiny of the North.

To the extent we accept this philosophical imperative, or that we deny it, then we are faced with two options, or two roads if you like.

Accordingly, my objective in the next few minutes is to paint two pictures which represent choices for those charged with stewardship of Alaska's renewable resources. And I use the term stewardship in the inclusive sense to embrace all the citizens, not just senior officials and leaders in the community. We are all accountable.

The first step in my presentation is to describe the existing forest emergency, namely the insect infestations in Alaska's south central forests. The second is to identify some means to mitigate these losses and to rehabilitate the damaged areas. The third step is to speak of the cost of doing nothing, of simply allowing the forest to die and ignoring the consequences. Finally, I will sketch out the kind of strategic thinking which can crystallize your goals and define an action plan for the future.

Two Basic Propositions

The departure point for this discussion is based on two propositions. First, a conviction that Alaska's land and its related values are unique on this globe. The vastness, diversity and majesty of your landscape is legendary. Together with its fish and wildlife, you have bounty without parallel on this globe.

Second, there is no such thing as a static equilibrium. Overlaying this bounty, which we think of primarily in spatial terms as attributes we can see and feel and experience today, is a temporal cycle of birth, growth, aging and decay.

A Forest Emergency

The spruce bark beetle is the current manifestation of decay and death in the forest. The losses to-date are staggering. Over 1 million acres were infested in 1995 and possibly another million have slipped off the edge. The pace of the insect appears to be accelerating. As many as 100 million trees have already been killed. The volume loss is believed to be 10 billion board feet or 50 million m^3.

This emergency condition is unprecedented in the State's forests, insofar as historical records are available.

Extensive losses to timber stands are followed automatically by wildfire, destruction of wildlife habitat and of associated values. These range from the Native food chain and life style to the destruction of scenic watersheds, impaired tourism and recreation activity, and broader negative impacts on the economic and social fabric of the State of Alaska. Even the fiscal viability of the public treasury is coming under increased strain.

Fortunately, there are clear choices which offer the possibility of lessening the damage and dislocation. But first, the downside risk.

The Global Downside Risk

The decisions to be taken in this State, even the decision to do nothing, must necessarily recognize realities and public perceptions elsewhere in the world. The first reality is that exemplary forest stewardship has recently become the pre-requisite for respect and goodwill in the international community. Conversely, any country which neglects its renewable resource legacy should expect condemnation from its customers, whether these are buying fish, forest products, or wilderness recreation.

I wonder if the people of Alaska realize the enormous pressure now being piled on resource managers beyond your boundaries. The cries for corrective action reached a peak at the environmental summit in Rio a few years back, and have scaled new heights of indignation in 1996.

So it is unthinkable today, whether in Sweden, Oregon, Indonesia, Brazil, British Columbia, or even in Siberia, to ignore the destruction of forests, wildlife habitat and related features. I say this gently but firmly. Alaska is now in a class by itself. A resource without parallel is suffering a grave emergency, with virtually no public concern and with minimal government action.

One is reminded of a book by Alston Chase, Playing God in Yellowstone. Let nature take its course if you will, but eventually disaster will strike. It is absolutely predictable.

The Global Promise

It is time to consider The Rising Star in Alaska's Future. Let us turn quickly to the positive side, to the opportunities for mitigation of forest losses and to rehabilitation of widespread damage of watersheds and landscapes. Here again there is a global context for decision making, but this time with generous implications for Alaska.

Timber shortages have emerged around the world in the last decade. Here is the essential picture in capsule form for the main producing regions, taken from a World Timber Resources Outlook, a 200-page analysis which I co-authored a few months ago.

British Columbia log production peaked in 1987 at 90.6 million m^3, has since fallen to 75 million m^3 and is projected to drop as low as 60 million m^3 by 2010. The rest of Canada is a mixed picture, with declines in softwood timber availability roughly offset by hardwood increases.

The harvest in the US Pacific Northwest peaked at nearly 150 million m^3 in the late 1980's, is now well below 100 million m^3, and is expected to fall below 60 million m^3 by 2010. The production of softwood logs in the Mountain States will drop by half, the North region will mark time, and the latest word is that the US South could experience a decline of 50 million m^3 or 30 per cent by 2010. Increases in hardwood log production are in doubt and will certainly not do much to offset the softwood losses.

Russian production of roundwood had been in the range of 360–400 million m^3 for several decades, more or less on a plateau. In the early 1990's this dropped by two-thirds and observers can see only modest recovery in the period to 2020. The Russian Far East has shared in these declines. Although log exports to Japan have begun to inch upward, total production in the RFE continues downward. This means that their wood processing industry is on its knees.

The old natural tropical forests in Southeast Asia were heavily overcut and are now in process of reducing output by 50 per cent. Other tropical virgin forests are also edging downward in volume produced. The traditional consumers of tropical forest products are scrambling for other suppliers.

The Nordic countries are fairing better and could actually add 10-20 million m^3 over the next 20 years, as could some other European producers. But these increases are very modest compared to declines elsewhere.

. This leaves Fast Growing Plantations to cushion the fall in timber harvest globally. However, I do not believe that they can even begin to close the supply gap which is projected. Meanwhile the use of domestic fuelwood in Third World countries is still climbing as population gains continue. These users are now encroaching more and more on industrial timber lands and even on plantations.

This pessimistic picture of timber deficits is shown in accompanying charts. The end result of course will be three major shifts in the marketplace. The world's populations will learn to economize further in the consumption of solid wood and wood fibre products. Substitution will occur on a major scale. Prices of timberlands, logs and forest products will increase sharply and reach historic record levels.

I believe that this wood price escalation is excellent news for Alaska. Long considered economically unattractive, the softwood and hardwood forests of south central Alaska will now be operable. In the first instance, markets will be available for dead and dying timber, much of which could be salvaged to permit prompt reforestation and watershed restoration. At the same time, plans can be made to develop an orderly harvest of the mature and over mature green timber, which incidentally is most susceptible to insect attack.

The obvious course of action for Alaskan entrepreneurs is to begin feasibility studies immediately for a variety of projects. At the top of the list will be engineered wood products, such as OSB (oriented strand board) and MDF (medium density fibre board). Consumption of these has been growing at 5-8 per cent annually.

The second product is wood pulp made by either of two processes, both of which are closed loop systems with no liquid effluent. BCTMP or bleached chemical thermo mechanical pulp is a refiner groundwood product used primarily in newsprint.

A newer wood pulping system employs alcohol rather than chlorine for cooking and bleaching. A large pilot plant using the ALCELL method has been built in New Brunswick by Repap and they have plans to build a world scale ALCELL mill in the same province.

The ORGANOSOLV process developed by Dr. Laszlo Paszner at the University of BC is more attractive in several ways. It has a higher percentage recovery than bleached kraft pulp, 58 per cent rather than 44 per cent. In addition, ORGANOSOLV can use low quality wood of any species and it produces a variety of by-products such as ethanol, xylitol sweeteners, lignin, extractives and fertilizers, thus contributing importantly to mill revenues by achieving high value added levels.

Ideally, the processing would be done in an integrated complex, making possible the economical use of all grades of wood as well as fibre which would otherwise create a waste disposal problem. Production and export of pulpwood chips for Japan could generate cash flow in the early stages of a venture such as this.

The benefit-cost analyses should consider the full range of factors, including the fiscal trap facing the State Treasurer, declines in the tourism and fishing sectors, fire catastrophes which will endanger human life and personal property, and the threats to Native people who are terribly exposed by inaction.

Cost of Doing Nothing

The cost of doing nothing will far outweigh the funds eventually expended on control of the insect, salvage efforts, and the restoration of economic and social damage. The do nothing option will have the following end results.

1. Catastrophic wildfires are the natural sequel to insect depredations.

2. Destruction of private property, parks and recreation areas.

3. Unprecedented damage to forested watersheds, accompanied by the erosion of land and major reductions in fish and wildlife populations.

4. Foregone options to diversity the income and employment base of the State.

5. Loss of potential State revenue from timber sales, hunting, fishing, tourism, etc., at the very time when the State is pondering a report titled Alaska's Growing Fiscal Gap.

6. Impairment of the Native lifestyle which depends significantly on healthy, stable, renewable resources.

7. Similar impairment of the non-Native use and enjoyment of the recreation and scenic values, and of nature's bounty generally.

8. Damage to the international reputation of Alaska as a wise trustee of forest lands and related endowments which are the envy of every country.

Yes, the stakes are enormous. Your appreciation of them will expand as non-sustainable oil revenues experience inevitable decline.

A Strategic Approach

In my report to the State of Alaska in August 1993, I closed with a plea for strategic thinking to cope with the crisis which was evident to the International Panel on Forest Health. Here are the items on my action plan today, with only minor changes from the original report.

1. Treat the beetle epidemic as the emergency it is
    - in terms of budgets, staffing, infrastructure

2. Prepare an integrated strategic plan
    - include timber and non-timber assets
    - balance preservation, protection, and conservation
    - recognize biological realities, capabilities and constraints
    - develop an ecosystem management approach

- strive for both rehabilitation of degraded values and enhancement of thrifty resources
- give due regard to succeeding generations
- reflect community values throughout

3. Establish explicit goals
   - forest health
   - forest use and enjoyment
   - habitat, recreation and tourism
   - production of fish, wildlife, timber
   - expanded and enhanced yield, to replace implicit status quo thinking

4. Strengthen mechanisms for cooperation, coordination
   - within Department of Natural Resources
   - among all State agencies
   - across ownership boundaries
   - across State and federal jurisdictions

5. Build constituency support
   - residents and visitors
   - non-government agencies
   - State and federal officials
   - private sector
   - media
   - educators, students

6. Examine the revenue potential
   - timber sales, licences, leases
   - permits, game tags
   - cost recovery for services, where feasible

7. Review legislation, regulation
   - for relevance in current circumstances
   - to reduce costs of compliance
   - for accountability purposes

8. Address information gaps
   - as they have already been identified
     - inventory
     - growth and yield
     - prompt regeneration
     - impacts on biodiversity, especially spruce genetics
   - de-mystify these concepts
     - sustained yield of timber
     - periodic allowable cuts
     - the benefits of departure from even flow of timber harvest
     - multiple use
   - the advantages of landscape mosaic for biodiversity
     - vegetation age classes
     - forest types

9. Activate a Citizen's Forest Land Advisory Council
   - to generate policy advice
   - to develop an agenda for action
   - to monitor progress under the Strategic Plan

10. Table an Annual Report on the Status of Alaska's Renewable Resources
    - addressed to the House and Senate
    - distributed simultaneously to the public

Concluding Comments

Perhaps it needs to be said again. The resources associated with Alaska's forest land are impressive by any measure. They are world class: majestic, vast, diverse and accessible.

It follows that these values deserve world class stewardship on behalf of the State's citizens. This will not happen in the absence of strategic thinking, a process in which all of you can and should participate. It opens up the debate about assumptions, goals and values.

Strategic planning is not simply a complicated forecast. Quite the contrary. A strategist looks at the direction in which events are headed and asks a simple question: Is that where we want to go?

The strategist's role is to influence events, to foster innovation, and to design a different future which corresponds to the needs and aspirations of the entire community.

In reality, you can choose your future here in Alaska. One choice is the path of indifference and drift. The other is the path of true destiny, to be taken by those gripped with a new vision and a sense of urgency.

So I close with the admonition. Follow The Rising Star in Alaska's Future. In the words of Carl Sandburg:

NOTHING HAPPENS, WITHOUT FIRST, A DREAM

SOCIETY OF AMERICAN FORESTERS 1900

Alaska Society of American Foresters

Cook Inlet Chapter
Juneau Chapter
Ketchikan Chapter
Sitka Chapter
Stikine Chapter
Yukon Chapter

To: Meeting Participants

For several years the Alaska Society of American Foresters (SAF) has been tracking the devastating spruce beetle epidemic that is impacting Alaska's forests. This forest health problem is continuing to accelerate. Costly impacts to all healthy forest resource values are inevitable across federal, state, local and private forest jurisdictions.

Alaska SAF has been involved in a number of briefings, workshops, and papers regarding this issue. However, because of the continued acceleration of this problem and less than matching response to protect forests from infestation and/or rehabilitation of impacted areas, Alaska SAF is compelled to facilitate renewed discussion of this subject and to act as a catalyst for consideration of options to restore health to these forests.

To accomplish this, SAF is arranging for meetings with several entities including; the Kenai Peninsula borough, Fort Richardson and Elmendorf, Anchorage Municipality, and the State Legislature, where local government leaders and the public can learn the extent and impacts of the spreading infestation. These forums will serve to provide updated infestation information, provide a forum for considering options to reduce impacts or rehabilitation actions, what programs are available to assist coordinated actions, and what various organizations are doing or can contribute to evaluate and deal with this situation.

Alaska SAF is providing F.L.C. Reed; former chief of Federal Canadian Forestry Service in Ottawa, international Forestry Consultant and Forestry Professor Emeritus of UBC; and Dr. Patrick Moore; a funding member of Greenpeace, President of Greenpeace Canada for 8 years, seven year Director of Greenpeace International, a current Director of the Forest Alliance of British Columbia, and internationally recognized environmental author to provide assistance with these discussions. We are fortunate to have these two high credential forestry experts to assist these discussions and provide perspective on the scope of this Alaskan forest health issue.

Enclosed is an initial packet of information for these discussions. It is likely that additional information will be made available at the meetings.

We are very pleased at the positive response regarding the need for these meetings, and look forward to enlightening and productive discussion that will pave the way to coordinated actions.

Jerry L. Boughton Chair, Alaska SAF	John Sandor Project Committee Chair	Maynard Nuss Executive Secretary
John Hall Consulting Forester	Dan Golden Resource Consultant	Wayne Nicolls Legislative Liason

"REALIZING THE POTENTIAL OF ALASKAN FOREST RESOURCES"
An Agenda for Action (Executive Summary)

The objective of this report is to make a positive contribution to the health of Alaska's forests at a time of unprecedented loss due to the spruce bark beetle.

This report's recommendations deal primarily with forest policy, planning and program implications of the insect epidemic. Highlights of the report are itemized below.

1. The spruce bark beetle epidemic has created a grave emergency in Alaska's forests. Mortality is so extensive that in some cases no new spruce will generate unaided for several decades. In other cases conversion to grass will be more or less permanent. Loss of forests damages other values society holds important, including recreation and wildlife.

2. The State is commended for mounting the Forest Health Initiative in a timely manner, but it is just the opening phase in a program of containment and restoration.

3. The cost of doing nothing will far outweigh the funds expended on control, mitigation, salvage and restoration.

4. It is essential that the public be made aware of the risks of inaction, and the educational work has already begun under the Forest Health Initiative. It has begun to galvanize action through the appointment of the International Forest Panel and other means.

5. The recommended action plan contains these items
   a. Prepare an integrated strategic plan
   b. Treat the beetle epidemic as the emergency it truly is
   c. Establish explicit goals for forest health
   d. Strengthen mechanisms for coordination

e. Build constituency support, public education is imperative
f. Examine the potential for various forms of revenue
g. Review legislation and regulation
h. Address information gaps
i. Strengthen and activate the Board of Forestry
j. Consider an additional Citizen's Forest Advisory Council which embraces more constituents

6. It is recommended that an initial budget for comprehensive implementation of the above is about $15 - 20 million annually.

7. Additional professional staff are required to carry out a full program.

8. Capital items necessary to provide logistical support might come from the Exxon Settlement Fund. The precedent has already been set for using large sums, $37 and $41 million, to preserve heavily damaged forests, even without having management plans in place. The logic of returning to this fund, for restoration of forest health on much larger areas, is very appealing.

9. A side benefit of the Forest Health Initiative will be the sale of dead and dying timber worth as much as $20 million annually.

10. It would be risky, if not dangerous, to delay implementation of the foregoing agenda for forest health.

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Alaska Society of American Foresters

Cook Inlet Chapter
Juneau Chapter
Ketchikan Chapter
Yukon Chapter
Sitka Chapter
Stikine River Chapter

A POSITION STATEMENT

ON

SOUTH-CENTRAL AND INTERIOR ALASKA'S

DETERIORATING FOREST HEALTH

I. Summary

The largest spruce bark beetle epidemic in North America is resulting in substantial and expanding impacts to wildlife, fisheries, recreation, and timber resources, as well as loss of critical old-growth habitat, in the white and Lutz spruce forests of Southcentral and Interior Alaska. Continued extensive tree mortality and associated resource impacts constitutes the greatest ecological crisis facing Alaska forests today.

An aggressive forest restoration and forest health maintenance program involving federal, State, local and private forest managers is necessary to fully recognize the severity and extent of impacts to forest resources and to develop coordinated forest management actions to restore damaged ecosystems and prevent unnecessary additional ecological impacts.

The Society of American Foresters fully supports coordinated multi-ownership forest health planning at the landscape scale, research to identify spruce beetle induced impacts to all forest resources, and development of a forest industry as the funding mechanism to subsidize implementing planned forest health actions.

II. Definition of Issue

Forest health in Southcentral and Interior Alaska is rapidly deteriorating. The spruce beetle epidemic is manifesting unprecedented rapid forest change within the white, Lutz and Sitka spruce forest types. Spruce beetle induced mortality is in many instances eliminating all live forest cover (main canopy) in major portions of large drainages. Impacts associated with forest tree canopy losses are occurring to all resources that require a forested landscape [ie. wildlife, fisheries, watersheds, scenic vistas, etc.]. Many of these infested forest stands do not meet current definitions of "ecologically functional" old-growth and lack of regeneration following infestation has potential to convert these stands to other than conifer forest cover for an extended period of time. Loss of old-growth habitat from spruce beetle infestation in the white, Lutz and Sitka spruce forests of Alaska (Southeast included) is occurring at a rate of 6-8 times the combined rate of all other forest change agents (fire, timber harvest, urban sprawl, etc.). This long-term beetle induced loss of old-growth

habitat will have a significant impact on maintaining current biological diversity in Southcentral and Interior Alaska.

Lack of fully recognizing ecological impacts coupled with lack of a viable forest industry to provide cost effect management options has resulted in little direct action to address this declining forest health problem to date. Meanwhile, hundreds of thousands of acres of Alaska forests are being subject to ever-increasing negative impacts, losing future resource potential, and rapidly losing economic value that could fund positive management actions.

Long-term loss of old-growth habitat, substantial forest conversion, and associated resource impacts in the naturally fragmented landscape patterns of Southcentral and Interior Alaska, coupled with little direct action to contain the epidemic or rehabilitate previously impacted areas, make this situation the most ecologically critical issue to sustained ecosystems facing Alaska's forests today.

III. Background

Southcentral and Interior Alaska have hundreds of thousands of acres of white and Lutz spruce forest types that are simultaneously entering a mature, decadent condition and consequently becoming highly productive spruce beetle habitat. This, coupled with recent favorable weather conditions has increased spruce beetle population growths to epidemic proportions.

Systematic monitoring of insect conditions by the U.S.D.A. Forest Service has documented that the area of active spruce beetle infestation is growing at an exponential rate and will likely exceed 1 million acres by the summer of 1994.

There is currently a lack of research documenting specific resource impacts from this forest health crisis. Impacts to wildlife and streamside stability are observable, but documentation of these through research studies or published monitoring is limited.

IV. Discussion

Spruce beetle populations have shifted from endemic to epidemic levels. Halting the infestation in the near term is unlikely. However, concerted efforts by all landowners and resource managers can significantly slow the buildup, restore already impacted areas, and minimize future resource impacts from this insect.

The only recognized effective treatment to reduce hazard and risk of spruce beetle induced resource damage at the landscape scale is to maintain a mosaic of species and age types. Maximum resource values can be maintained using coordinated restoration and prevention silvicultural treatments. While economics should not be the major driver for addressing Alaska forest health problems, clearly, economics should not be ignored. The fact that implementation of forest management to address forest health will not only assist to pay for the needed forest health treatments, but meet other state goals such as rural economic development is significant. Particularly with wood product values anticipated to rise, the potential for significant economic returns from implementing forest health treatments, and consequent loss of these values through inaction, should not be ignored.

The Society of American Foresters has recently published a National Task Force report "Sustaining Long-Term Forest Health and Productivity". This report describes the need to address the sustainability of healthy forests by considering social or human forces as well as considering scientific and economic forces. A coordinated effort applying positive management actions to deal with this Alaskan forest health crisis would be consistent with the recommendations of this report to sustain long-term forest health and productivity in

our ecosystems. Lack of action allowing continuation of increasing forest health decline would be inconsistent with sustained ecosystem productivity.

V. Recommendations

The Alaska Society of American Foresters recommends and fully supports:

(a) Coordinated multi-interest forest health planning at the landscape scale.
(b) Research to identify spruce beetle induced impacts to all forest resources.
(c) Development of a forest industry as the funding mechanism to subsidize planned forest health actions.

The Alaska Society of American Foresters should actively highlight the need for assertive management actions to address declining forest health in south-central and interior Alaska to local, state, and federal officials. This implies implementation of ecologically and silviculturally sound management approaches that will assure maintenance of the health of the forest as well as it's biodiversity.

The Alaska Society recommends using the 1994 National Convention to highlight the National significance of this extensive forest health problem and promote understanding and support for assertive ecological management applications within the American Forestry profession.

This position was approved by the Alaska Society of American Foresters Executive Committee on November 7, 1993 and will expire November 7, 1996.

Alaska Society of American Foresters

Cook Inlet Chapter
Juneau Chapter
Ketchikan Chapter
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Sitka Chapter
Stikine River Chapter

A STUDY REPORT

ON

SOUTH-CENTRAL AND INTERIOR ALASKA'S

DETERIORATING FOREST HEALTH

Alaska State Society of American Foresters
July, 1993

TABLE OF CONTENTS

1. BACKGROUND

The largest spruce bark beetle epidemic in North America is resulting in substantial and expanding impacts to wildlife, fisheries, recreation, and timber resources, as well as loss of critical mature forest ecosystems, in white, Sitka, and Lutz spruce forests of south-central and interior Alaska. Increased spruce beetle activity is also ocurring in the coastal Sitka spruce stands of Prince William Sound and Southeast Alaska, although of lesser magnitude than infestations further north. This epidemic constitutes one of the most significant forest health declines currently impacting Alaska forests.

Historical descriptions from miners, fur traders and settlers (Lutz 1960, Johnson 1975) indicate common and extensive fires in these Alaska forest types in the mid-to late 1800's. Fire was a major natural change agent that helped maintain species and age class diversity on the landscape. Stand development following these early fires, and effective fire suppression since the 1950's, has created hundreds of thousands of acres of white, Sitka, and Lutz spruce forest types that are simultaneously becoming mature, decadent and highly susceptible to spruce beetle damage today.

In a 1987 timber inventory, the Kenai Peninsula was estimated to have 364,000 acres of white/Lutz spruce type, of which 220,500 acres was considered commercial timberland, -- that is producing over 20 cubic feet of wood per acre per year (Van Hees and Larson, 1991). This inventory estimated that on the Chugach National Forest portion of the Kenai Peninsula, mortality exceeds annual growth and that 57% of this mortality is estimated to have been caused by the spruce bark beetle. Van Hees (1992) noted dramatic increases in spruce bark beetle populations on the Kenai Peninsula since the 1987 inventory.

Systematic monitoring of insect conditions by the U.S.D.A. Forest Service has been in effect since the 1950's. Entomologists monitoring the spruce beetle infestations have been predicting substantial population increases for a number of years (Holsten 1990). Rapid beetle population increases to epidemic levels have occurred in the last 4 years. Statewide, acreages of active spruce beetle infestation from the U.S.D.A. Forest Service annual forest insect and disease aerial surveys (USDA Insect Conditions Reports; 1989, 1990, 1991, 1992) are:

1989 -- 177,000 acres
1990 -- 232,000 acres
1991 -- 375,000 acres
1992 -- 600,000 acres

The current infestation of 600,000 acres is located in three principal geographic locations. These are the Kenai peninsula, the Copper River basin, and the Yukon River basin. This infestation is the largest area of active spruce beetle infestation ever mapped in Alaska and constitutes the largest existing spruce bark beetle infestation in North America.

This epidemic spans a variety of private as well as state and federal land ownerships. Addressing this situation will require coordinated land management actions. Significant ownerships of infested forest types include; the Bureau of Land Management, the U.S. Fish and Wildlife Service, the U.S. National Park Service, the State of Alaska, the U.S.D.A. Forest Service, several boroughs, and privately owned forest lands. Some of these ownerships have few or no forest management specialists to address this problem. (ie. The State Division of Forestry currently has less than 2 full time forestry people dedicated to planning and implementing forest health treatments on the Kenai Peninsula.)

Efforts to address this problem to date include:

..During 1991 and 1992, the U.S.D.A. Forest Service coordinated a comprehensive forest health protection and restoration effort for the Cooper Landing area of the Kenai Peninsula. The majority of that project has been implemented.

..As part of a State Forest Health Initiative, the State Division of Forestry completed a general Forest Health plan for the Western Kenai Peninsula and Kalgin Island in 1992. Seven project areas were identified in that plan to receive management actions. The first of the seven areas (Falls Creek) is planned for project implementation, but the project is receiving criticism from the preservationist community. Also as part of this initiative, the Division of Forestry has established a citizen working group to consider management actions in the Copper River basin.

..The U.S.D.A. Forest Service has begun a planning effort for the Seward Scenic By-Way and Hope portions of the Kenai Peninsula. These actions constitute the extent of coordinated planning and implementation efforts to date in spruce beetle impacted areas.

These actions have thus far resulted in approximately 3,000 of the current 600,000 acres (0.5%) receiving actual ground treatments.

2. DISCUSSION

Maintenance of healthy forest ecosystems has become a national issue in recent years. A national strategic plan has been developed by the U.S.D.A. Forest Service to address concerns of forest health (USDA, 1993). The current national forest health monitoring programs by the U.S.D.A. Forest Service and the Environmental Protection Agency give strong emphasis to maintaining forest health along with forest biodiversity, all within the context of sound ecosystem management. Many existing silvicultural practices have strong application within this context.

Public perception regarding the spruce bark beetle problem in Alaska has been documented (Daniels 1991, Kruse 1991). Study respondents overwhelmingly were in favor of prevention of spruce beetle outbreaks, mitigation of associated impacts as well as providing management actions that would restore the health of the impacted forests. Publics surveyed in this study expressed a willingness to subsidize reforestation actions if necessary.

The Society of American Foresters has recently published a National Task Force report "Sustaining Long-Term Forest Health and Productivity" (Society of American Foresters, 1993). This report describes the need to address the sustainability of healthy forests by considering social or human forces as well as considering the scientific and economic forces. This Task Force Report includes 26 recommendations on ecologically sound approaches to maintaining or improving forest health. These fall in four broad areas of action:

-Advocate ecosystem management.
-Integrate ecosystem management into educational programs.
-Promote ecosystem management research.
-Coordinate between land owners and the public.

A coordinated effort applying assertive management actions to deal with this Alaskan forest health crisis would be consistent with the recommendations of this report to sustain long-term forest health and productivity in our ecosystems. Lack of action allowing continuation of increasing forest health decline would be inconsistent with sustained ecosystem productivity and biodiversity.

Not all resource disciplines are actively furthering the ecological significance of these forest alterations. Changes in forested wildlife habitat and/or old-growth habitat has not been raised as an issue in Southcentral or Interior Alaska. The limited and naturally fragmented landscape patterns of Southcentral and Interior Alaska make this loss of forest habitat a much more critical issue to sustained ecosystems than loss of habitat in southeast Alaska where the forested landscape is broader and more continuous. Yet, habitat loss has been raised as a major issue in Southeast Alaska and virtually not acknowledged in Southcentral or Interior Alaska.

Lack of fully recognizing the ecological impacts coupled with lack of a viable forest industry to provide cost effective management options has resulted in little direct action to address this declining forest health problem. Meanwhile, hundreds of thousands of acres of Alaska forests are being subjected to ever-increasing negative impacts, losing future resource potential, and rapidly losing economic value that could fund positive management actions.

Forest economic development is often billed as the rationale for "logging". While economics should not be the major driver for addressing Alaska forest health problems, clearly, economics should not be ignored. Implementation of forest management to address forest health can not only assist to pay for the needed forest health treatments, but contribute to other state goals such as rural economic development and economic diversification. Particularly with wood product values anticipated to rise, the potential for significant economic returns from implementing forest health treatments, and consequent loss of these values through inaction, should not be ignored. The U.S. imports nearly thirty (30%) percent of its wood fiber, much of which comes from countries with less stringent environmental guidelines than our own (Salwasser, MacCleery, and Snellgrove). Advocating non-use of the large and growing inventory of beetle killed spruce, while supporting the harvest of green trees from foreign sources, may be considered environmentally irresponsible.

The previous lack of viable timber markets in Southcentral and Interior Alaska have prevented development of a forest industry to utilize industrial wood recovered in silvicultural management activities. Without an industry to provide a reasonably cost effective vehicle to support forest management actions, few silvicultural management actions have been taken to assist ecosystem manipulations. The recent national rise in industrial wood product values has set the stage for ecosystem and silvicultural management that could subsidize assertive forest health enhancements. Markets are rapidly developing for a variety of forest products from Alaskan forest types including house logs, veneer, dimension lumber, and chips. All indications are that market values will increase in the future.

3. STATEMENT OF FINDINGS

Forest health in Southcentral and Interior Alaska is rapidly deteriorating. However, the greatest forest impact is potential long-term change in forest cover from spruce bark beetle induced tree mortality over extensive portions of the white, Sitka, and Lutz spruce forest types.

Spruce beetle populations have shifted from endemic to epidemic levels in many areas of Alaska. Spruce beetles have and always will be a feature of these ecosystems, however, the notion that this infestation is or should be managed as a totally "natural" event is erroneous. While several environmental factors such as annual weather conditions, host susceptibility, changes in predator and parasite populations, etc., continue to influence beetle population changes, past and future human intervention (such as fire suppression, clearing activities, or simply increased habitation) has removed this situation from a "natural" setting. Even if this event was natural, impacts are occurring which could be either positive or negative depending on the affected resource and the desired future condition. Consideration of human needs and influences to establish an appropriate desired future condition for these impacted forest types is ecologically appropriate.

Spruce beetle induced mortality is currently occurring on over 600,000 acres in these forest types (USDA, Insect Conditions Report-1993). In many instances this mortality is eliminating all live forest cover (main

canopy) in major portions of large drainages. Impacts associated with forest tree canopy losses are occurring to all resources that require a forested landscape (ie. wildlife, fisheries, watersheds, scenic vistas, etc.).

Many of these spruce beetle impacted forest stands will not meet current definitions of "ecologically functional" old-growth (USDA, Ecological Old-Growth Definitions-1992) following beetle infestation. This long-term loss of old-growth habitat will have a significant impact on maintaining current biological diversity in Southcentral and Interior Alaska.

Natural regeneration of spruce in these impacted stands is spotty at best. Without assertive reforestation actions, long-term forest conversion from spruce to hardwood stands or grass dominated areas could occur on many sites. This conversion will drastically alter current landscape patterns, substantially reducing forested wildlife habitat for the long term. Cover and large organic material input to anadromous streams will be significantly altered over time. From a human ecology standpoint, fire risk and hazard are increasing and causing substantial concern in rural communities as well as in the larger urban forest interface areas such as the Anchorage bowl.

Research on impacts of the bark beetle on the timber resource and control methods exists (Werner and Holsten, 1983; Werner, Hard, Holsten, 1988; Holsten and Werner, 1990; Hard, 1989), but more emphasis is needed in this area. There is currently a lack of research documenting impacts to non-timber resources associated with the spruce bark beetle infestation. Impacts to wildlife and stream side stability are observable, but documentation of these through research studies or long-term monitoring are limited. The emergency nature of this beetle epidemic dictates use of an adaptive management approach based upon known research.

Lack of action and continued forest health decline will result in:

-Increasing loss of wildlife habitat for mature forest species.
-Continued riparian area degradation.
-Substantial long-term conversion from forest to grass or hardwoods (lack of spruce regeneration).
-Increased community fire hazard & associated increased fire suppression costs.
-Degradation od aesthetic quality of forested landscapes.
-Degradation of developed recreation areas and increased trail maintenance costs for removal of hazardous and down trees.

Continued focus of habitat loss in Southeast Alaska (primarily the Tongass National Forest) with little expressed concern for habitat loss in Southcentral or Interior Alaska is a serious wildlife management oversight. Applying fundamental habitat relations and fragmentation concepts, it is clear that hundreds of thousands of acres of tree mortality (with little natural regeneration) to forested habitat in a naturally fragmented environment (Southcentral and Interior situation) has tremendously more impact than one-thirtieth of that amount of acres being converted to young forest conditions a less fragmented environment (Southeast situation). Wildlife species respond only to habitat changes, regardless if those changes are human induced (timber harvesting) or from another change agent (spruce beetles). Ecologically sound resource management philosophy must be founded upon biological and ecological reasoning rather than development versus non-development opinion. Strong focus needs to be directed to maintaining the biological diversity through sound ecological management (including silvicultural) procedures.

4. CONCLUSIONS

Lack of forest management, non-recognition of the biological/ecological impacts, and lack of expressed professional concern have all contributed to this forest health problem.

Halting the infestation in the near-term is unlikely; however, concerted efforts by all landowners and resource managers can significantly slow the buildup, restore already impacted areas, and minimize future resource impacts from this insect.

Once forests are dead, ecosystem management options are limited. If, however, silvicultural treatments are considered not only for restoration of damaged areas, but also for damage prevention of currently uninfested areas, a variety of silvicultural options are available to meet various resource objectives. Maximum ecosystem values can be maintained by coordinated ecosystem restoration and enhancement planning, and assertive silvicultural treatment application.

Coordinated ecosystem enhancement and restoration planning has the capability to provide:

-Restoring damaged wildlife habitat (forage and cover).
-Restoring damaged riparian area integrity (cover and stream bank stability).
-Providing immediate reforestation.
-Reducing potential fire hazard to communities.
-Preventing additional uncontrolled impacts (reduced mortality).
-Providing rural community development (jobs).

The most generally accepted treatment to reduce hazard and risk of spruce beetle induced resource damage at the landscape scale is to maintain a mosaic of species and age types. Considering public habitation and use of the forests, eliminating fire suppression and allowing catastrophic and unrestricted wildfires is not a viable option. Active ecosystem management, through application of appropriate silvicultural techniques to create a future desired landscape mosaic is the most plausible solution.

An aggressive forest restoration and forest health maintenance program involving federal, state, local and private forest managers is necessary to fully address the severity and extent of impacts to forest resources and to develop coordinated forest management actions to restore damaged ecosystems and prevent unnecessary additional ecological impacts. This conclusion is consistent with the recommended option of the Kenai Peninsula Borough report (Hall 1992) addressing forest health management needs for the Kenai Peninsula.

5. RECOMMENDATIONS

The Alaska Society of American Foresters fully supports:

1) Coordinated multi-interest forest health planning at the landscape scale,

2) Research to identify spruce beetle induced impacts to all forest resources,

3) Development of a forest industry as the funding mechanism to subsidize implementing planned forest health actions.

Following the lead of the National SAF Task Force report on Sustaining Long-Term Forest Health and Productivity, it is recommended that the 26 specific recommendations from that Task Force Report be implemented in Alaska using ecologically sound approaches to maintaining or improving forest health. These recommendations will be applied through the following four broad areas of action:

-Advocate ecosystem management,
-Integrate ecosystem management into educational programs,
-Promote ecosystem management research,
-Coordinate between land owners and the public.

The Alaska Society of American Foresters should actively highlight the need for assertive management actions to address declining forest health in Southcentral and Interior Alaska to local, state, and federal officials. This implies implemention of ecologically and silviculturally sound management approaches that will assure maintenance of the health of the forest as well as it's biodiversity.

The Alaska Society recommends that agencies charged with managing sustainable forest resources establish adequate organizations with appropriate expertise to develop site specific silvicultural treatments to accomplish those goals.

The Alaska Society recommends that the U.S.D.A. Forest Service's Pacific Northwest Research Station prepare a white paper evaluating the significance of the loss of old-growth habitat in south-central Alaska resulting from continued forest health decline.

The Alaska Society recommends using the 1994 National Convention to highlight the National significance of this extensive forest health problem and promote understanding and support for assertive ecological management applications within the American Forestry profession.

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United States
Department of
Agriculture

Forest Service

Alaska Region

R10-TP-61

February, 1996

Forest Health Management Report

Forest Insect and Disease Conditions in Alaska--1995

STATUS OF INSECTS

ROLE OF DISTURBANCE IN ECOSYSTEM MANAGEMENT

A key premise of ecosystem management (based on natural variability) is that native species have adapted to, and in part, evolved with natural disturbance events. Species loss and ecosystem change have been observed in areas where "natural" disturbance regimes have been substantially altered. Disturbances, large and small, are responsible for the way current landscapes appear and function today. Disturbances of various kinds and intensities will determine the structure, composition, and function of future landscapes. Alaska ecosystems are shaped/produced by disturbances. Just note the effects of glaciation, earthquakes, tidal waves, fire, flooding, etc. Disturbance events such as fire, insect and disease outbreaks create and maintain a shifting mosaic of landscape patterns. Both fire and flooding are responsible for spruce and birch regeneration in south-central and interior Alaska; large scale windthrow is important in southeast Alaska. Fire burns across the landscape in an irregular and uneven manner. The burned surface may or may not be essentially the same as the pre-burned surface. Succession after fire in Alaskan forest ecosystems is comple[illegible]d related to site, fire, climate, type and [illegible]ge of the vegetation present before fire, and plant species available for sprouting or invasion after fire. Alaska insect communities, probably one of the largest components of forest ecosystems, are also "creatures" of disturbance as well as agents of disturbance. Arctic/boreal insects are characterized by having few species and large population numbers. These insects are opportunistic in their behaviors. They respond quickly to disturbances in climate, food, and breeding material. The spruce bark beetle for example, responds quickly to large scale blowdown, fire scorched trees, or spruce impacted by flooding. Large beetle populations can be produced by such breeding material, leading to potential outbreaks.

As agents of disturbance, spruce beetles are one of the most important mortality agents of mature spruce stands in Alaska. There are a variety of impacts associated with outbreaks to forest resources, both timber and non-timber. These impacts can be viewed positively or negatively depending on the forest resource in question. Some of the impacts associated with spruce beetle infestations include, but are not limited to:

(1) Loss of merchantable value of killed trees: The value of a spruce as sawtimber is reduced within three years of attack in south-central Alaska as weather checking and increased sap-rots occur. The value of a beetle killed tree as houselogs, chips, or firewood continues for some time; **(2) Long term stand conversion:** To best regenerate both spruce and birch, a site disturbance (i.e. fire, windthrow, flooding, etc.) is required which results in a seed bed comprised of bare mineral soil with some organic material. If there is adequate seed source, such site disturbances provide

excellent sites for regeneration. However, what is occurring on many sites in south-central Alaska after spruce beetles have "opened up" the canopy is a scarcity of regeneration establishing due to minimal ground disturbance. Under such conditions, grass and other competing vegetation quickly invade the site and delay future re-establishment of tree species; **(3) Impacts to wildlife habitat:** Those wildlife species that are dependent on large diameter spruce stands are negatively impacted. Those wildlife species that benefit from early successional stage vegetation, such as willow and aspen, will benefit from spruce beetle infestations as stand composition changes; **(4) Impact to scenic quality:** Recent studies have demonstrated that there is a significant decline in scenic quality of spruce beetle impacted stands and that scenic beauty is an important forest resource. Along scenic corridors such as National Scenic Byways, maintaining or enhancing scenic quality necessitates minimizing impacts from spruce beetle infestations; **(5) Fire hazard:** There is concern that fire hazard of spruce beetle impacted stands will increase over time as dead trees fall and dry grass accumulates, thus increasing fuel loading. Recent Alaska studies have shown that more than 35 tons per acre of large woody debris accumulates on the forest floor 5-10 years after a spruce beetle outbreak. In contrast, approximately 2 tons per acre of large woody debris accumulates in uninfested stands; and **(6) Impact to fisheries:** If salmon spawning streams are bordered by large diameter spruce and if these trees are subsequently killed by spruce beetles, there is a concern as to the long term availability of large woody debris in the streams. A continual supply of large woody debris in spawning streams is a necessary component for spawning habitat integrity.

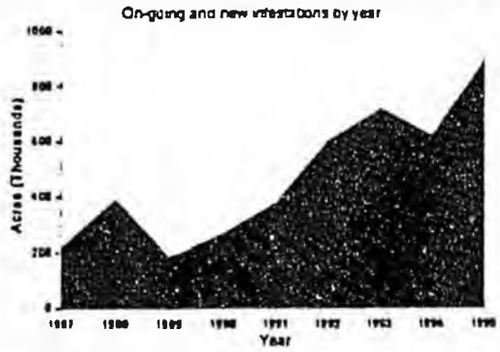
There are a variety of techniques that can be used to prevent, mitigate, or reduce impacts associated with spruce beetle infestations. However, before pest management options can be developed, the resource objective(s) for a particular stand, watershed, landscape, etc. must be determined. The forest manager must evaluate the resource values and economics of management actions for each stand in light of management objectives. The beetle population level must also be considered because population levels will determine the priority of management actions and the type of strategy to be invoked. Properly applied silvicultural practices as well as fire management in south-central and interior Alaska, can maintain the forest diversity needed to provide the range of products and amenities available in the natural forest.

SPRUCE BEETLE

Dendroctonus rufipennis Kirby

Spruce beetles continue to impact vast areas in Alaska. Spruce beetle activity increased by 40% over levels detected last year (Fig. 1). Approximately 892,831 acres of on-going and newly infested areas were detected this year; the highest level of activity on record. The most extensive areas of spruce beetle infestations continue to be in the Copper River Area--170,767 acres and south-central Alaska--683,281

Fig. 1. Alaska Spruce Beetle Activity



acres. Southeast Alaska's Sitka spruce forests are being impacted by 16,500 acres of beetle infestations. The white spruce forests of interior Alaska currently have 22,283 acres of on-going infestations.

Areas of specific interest include:

South-central and Interior Alaska

<u>Spruce beetle activity on the Chugach National Forest doubled this year</u>--more than 32,433 acres of on-going and newly infested acres were aerially detected vs. 12,715 acres in 1994 Spruce beetle activity in the Turnagain Arm area is increasing: scattered activity (100 ac) in the Girdwood area, 200 acres in the Twenty Mile area, and approximately 850 acres scattered from Sawmill Creek to Ingram Creek, including Seattle Creek. Spruce beetle activity has intensified in the Sixmile River drainage where more than 1,635 acres of beetle-caused spruce mortality are located from the Hope-Y to Sunrise. More than 1,500 acres of on-going infestations occur near Hope from Bear Creek to Palmer Creek. In the Moose Pass area, beetle infestations are occurring on more than 4,500 acres from the north side of Trail Lake to Crown Point. Nearby on Kenai Lake, more than 5,900 acres are infested. Spruce beetle activity is still apparent in the Granite Creek, Summit Lake, Cooper Lake, and Upper Russian lake, and along Resurrection River near Boulder Creek.

<u>On the rest of the Kenai Peninsula south to and including Kachemak Bay, bark beetle activity is intense</u>. From Pt. Possession south to Tustumena Lake, more than 50,000 acres of beetle infested spruce stands were detected; the heaviest beetle activity located between Skilak and Tustumena Lake. From Tustumena Lake south to Homer and including the Fox River drainage, spruce beetle activity is extremely intense and widespread. More than 400,000 acres of spruce are infested with many stands having more than 60% mortality. The southeast portion of Kachemak Bay from Sheep Creek to Seldovia is experiencing a dramatic increase in spruce beetle infestations: more than 36,000 acres of Sitka spruce are currently impacted vs. 11,440 acres

detected last year. The Kachemak Bay outbreak had its origins in a blowdown event in 1981. By 1984, approximately 200 acres of infested standing spruce were detected; this rose sharply in 1988 and has increased ever since (Fig. 2). Of interest is the rapid spread of beetle activity southeast along the Bay. More than 12,000 acres are infested (40% mortality) in the China Poot Lake area and 600 acres of scattered beetle kill are appearing near Seldovia with another 700 acres near Port Graham.

Fig. 2. Kachemak Bay Spruce Beetle

<u>A significant increase in spruce beetle activity was noted on the west side of Cook Inlet</u> from Tuxedni Bay up to the McArthur River and the West Forelands where more than 35,000 acres of Sitka and white spruce are infested. Scattered infestations are increasing slightly in the Judd Lake and Hiline Lake areas near the Skwetna River. Further west and inland, the Iliamna Lake spruce beetle outbreak intensified on more than 60,000 acres; a substantial increase over last years levels. Spruce beetle activity is heaviest south of Pile Bay on the west side of the lake. Beetle activity appears to be increasing in the Pedro Bay Area. Beetle activity in the Lake Clark area from the northeast end of the lake to the Pass has intensified. Almost all of the spruce has been killed on more than 19,000 acres.

<u>Spruce beetle activity more than doubled in the Anchorage Bowl area</u>: more than 8,000 acres of spruce beetle activity were noted. Areas heaviest hit include: Fire Island--3,700 acres; Bear Valley/Rabbit Creek--500 acres; Kincaid Park--800 acres (Fig. 3) North of Anchorage the majority of the spruce stands in the Eagle River (4,671 ac.) and Eklutna River (2,800 ac.) drainages are heavily infested. Further north along the Glenn Highway, spruce beetle activity is apparent and heavy on more than 7,000 acres from Chickaloon to Sheep Mtn. Lodge.

<u>The Copper River Basin area continues to support more than 170,767 acres of on-going spruce beetle infestations.</u> Heavy spruce beetle activity continues around: Klutina Lake (13,500 ac.); Tonsina Lake (7,000 ac.); along the Richardson Highway from Tonsina to Copper Center and down the Copper River to its confluence with the Chitina River. There is also light spruce beetle activity scattered over 3,300 acres from Glennallen north along the Glenn Highway

<u>White spruce forests of interior Alaska were slightly impacted this year</u>. Approximately 6,695 acres of light infestations continue to occur along the Yukon River south from Koyukuk to Kaltag. Another 4,085 acres of spruce beetle activity were noted east of Delta Junction. Further south along the Kuskokwim River, there are more than

3,000 acres of infested spruce from McGrath downstream to Devil's Elbow. An additional 1,500 acres of infestations were located along the Big River and 4,000 infested acres of spruce up the South Fork of the Kuskokwim River to Farewell Lake.

Southeast Alaska

During 1995 in southeast Alaska, spruce beetle infestations encompassed approximately 16,500 acres. Four areas were impacted substantially, although other scattered areas were affected to a smaller degree.

The spruce beetle outbreak in Glacier Bay National Park has shifted east and up in elevation (1500 ft.), from its historic location in lower Glacier Bay. The new infestation along the west side of the ridge between Gustavus and Excursion Inlet totaled approximately 2,200 acres. A small amount of scattered spruce mortality occurred farther west at Dundas Bay and Berg Bay. The new area affected is nearly five times greater than the 1994 level. The historic outbreak in lower Glacier Bay has impacted more than 30,000 acres, resulting in mortality as high as 75 percent from outbreaks over the past decade and a half. Wood rotting fungi, such as *Fomitopsis pinicola*, have rapidly infested beetle-killed trees, resulting in bole breakage and numerous forest canopy gaps. Secondary plant succession follows in these gaps, among the many jackstrawed tree boles and tops. Observations to date on Lester Island indicate a predominance of hemlock regeneration in these disturbed/altered stands.

The Haines area experienced the most substantial spruce beetle pressure in southeast Alaska as the outbreak continues for the sixth consecutive year. Over 8,400 acres along drainages of the Chilkat, Klehini and Kelsall Rivers have new or ongoing infestation, which is up from 3,600 acres in 1994. The majority of this area is located on state lands, but the infestation continues north into Canada. Salvage efforts have been increased in the Haines area by State personnel.

Spruce beetle activity on National Forest and Private land along the Taku River is in its second year and has shown an increase in active infestation, from approximately 75 acres in 1994 to over 3,900 acres in 1995. The beetle activity there follows a large windthrow event that occurred in the fall of 1990. The beetle effects this year were compounded by heavy black-headed budworm defoliation in the same area.

New spruce beetle activity was identified on National Forest land in the region of the Stikine River delta, including Dry Island, Farm Island, Rynda Island and scattered patches up the river. Wit!. 2,040 acres impacted, this is the largest new infestation in southeast Alaska. As on the Taku River, the beetle activity was found in association with black-headed budworm. Scattered, small scale spruce beetle activity occurred on Admiralty Island at Whitewater Bay, Gambier bay, Ward Creek and south of Greens Creek. Other minor beetle activity occurred on Baranof at Branch Bay and near Sitka west of Deep Inlet.

Alaska Department of NATURAL RESOURCES

BRIEFING:

State Spruce Bark Beetle Programs

September 11, 1996

DEPARTMENT OF NATURAL RESOURCES – DIVISION OF FORESTRY

OVERVIEW

Goals. The goals of the state's bark beetle programs are to accelerate reforestation, maintain diverse forest types and ages to support a wide variety of public uses, and capture economic value from infested trees before they decay.

All sales are designed to protect and enhance forest diversity and support multiple use. Sale design is based on vegetation, land uses, habitat values, beetle impacts, access, and economic feasibility. Site-specific prescriptions are done for each sale. In the Kenai and Copper River areas, DNR has helped fund Department of Fish and Game habitat biologists to help design the sales to protect or enhance fish and wildlife values.

Infested area. In cooperation with the US Forest Service, DNR annually maps insect infested areas statewide. Based on these surveys, about 2.5 to 3 million acres have been infested with spruce bark beetles statewide since 1989. In 1995, active outbreaks were mapped on roughly 900,000 acres statewide. Surveys for 1996 have been completed, but we have not yet analyzed the data. Spruce bark beetles are endemic wherever there is Sitka, white, or Lutz spruce. However, in southcentral Alaska and in the Haines area, severe bark beetle outbreaks have occurred for several years and are expected to continue for at least several more.

Economics of state timber sales. The amount of timber actually purchased and cut depends largely on timber markets. The beetle-killed wood is suitable primarily for pulp or chips, and markets for these products are currently low. Two recent sales, the Aurora sale on the Kenai Peninsula and the Thunder Creek sale in the Haines State Forest received no bids due to weak markets. DNR may delay some salvage sales if there is no market for the wood.

DNR requires that all timber sales bear the cost of harvesting, roads, and site preparation. In addition, the sales will bear varying proportions of the costs of contract administration and replanting. For some sales, such as those in the Moose Pass area where timber values and volumes are high, revenue will probably exceed total cost. On small sales, the state will pay most of the replanting and administration costs. The main benefits are that dead and dying wood will be salvaged to provide jobs and wood products, and replanting will accelerate forest regrowth in infested areas.

DNR staffing for timber sales is quite limited. In the Kenai area, we have two full-time forest management positions, and part of two additional positions. In the Haines area one full-time position and one part-time position have forest management responsibilities. No positions in the Copper River area have operating funds for forest management. The DNR timber salvage

program depends heavily on capital funding from the legislature, and when fire risk is low, we also use fire-fighting technicians to help prepare timber sales, and we borrow staff from throughout the state to help with salvage sale layout when other duties allow.

Can harvesting control the beetles? State timber sales cannot control the widespread beetle outbreak in southcentral Alaska or Haines. In small areas where infestation is just starting, harvests may slow the spread or reduce the percent of trees attacked. Diverse vegetation types and ages may be the best long-term remedy for beetle outbreaks.

Reforestation. The Alaska Forest Resources and Practices Act (AS 41.17) does not require reforestation on timber sales that are salvage operations like the harvests in beetle-impacted areas. However, DNR has publicly committed to reforesting all state timber sales. Some sites will regenerate naturally after site preparation; most areas will need planting. We will replant with native tree species grown from local seed sources. The timber purchaser pays site preparation costs. Where feasible, DNR requires the purchaser to pay planting costs.

Do bark beetles increase the risk of wildfire? Predicting the risk of fire is complex. Fire hazard varies with the time since the beetle attack and the type of ground cover. However, the best defense against wildland fire is a mosaic of different age classes of green vegetation. For residential areas, DOF holds informational meetings to help landowners reduce fire hazards. A summary paper by Fire Management Officer John See describes how beetle infestation affects fire risk and is available from DOF. A new USFS study shows that increased fuel loads and grass cover following a beetle epidemic could result in intense fires that would be difficult to control. Landowners may need to remove dead and dying trees and replant with fire resistant vegetation to minimize the hazard from wildland fires in the wake of a spruce bark beetle infestation.

Beetle-killed trees were not a factor in the Miller's Reach #2 fire in June, 1996. In contrast, the Crooked Creek fire on the western Kenai Peninsula did burn through beetle-killed spruce. The volume of dead vegetation in the fire area directly affected the spread and intensity of the fire, which included active crown fires.

Sustained yield. Under the Alaska constitution and state law, DNR must manage renewable resources for sustained yield. In general, we must achieve and maintain in perpetuity "a high level annual or regular periodic output of the various renewable resources of forest land and water without significant impairment of the productivity of the land and water" (AS 41.17.950(17)). The Supreme Court further determined that this permits timber cutting "at a level that cannot be sustained over a rotation only in unusual circumstances. ... Such circumstances might include such things as salvage cuts where trees have been killed or damaged... ." (SEACC v. Alaska, 1983) To date, DNR salvage harvests have not exceeded the allowable cut for each decade.

Public involvement. State law requires that DNR provide for meaningful public participation in the timber sale process. The public process is lengthy and expensive, but it is also essential on public land. Public concerns have affected the sale process and sale design, and reinforced DNR's

commitment to careful harvest and reforestation.

In all areas, the Division of Forestry prepares a Five-Year Schedule of Timber Sales (FYSTS) annually. The schedule provides an overview of state proposals for timber harvest, reforestation, and transportation. A Forest Land Use Plan (FLUP) is also prepared for each individual sale. Schedules and plans are subject to review by agencies and the public before DNR adopts them. In addition to these requirements, DNR has made special efforts to involve the public in forest management in each of the areas with severe beetle infestations as noted below.

KENAI AREA

State land ownership and allowable cut. The State of Alaska owns approximately 2.1 million acres of land in the Kenai Peninsula Borough, or 20% of the total area. Half the state land is in state parks, refuges, and critical habitat areas. Of the 1.1 million acres of the state public domain, 449,000 acres are forested land: 248,000 acres west of Cook Inlet, and 201,000 acres on the Kenai Peninsula and Kalgin Island. The state has selected an additional 410,000 acres of land in the Chugach National Forest that may be state-owned in the future. The estimated annual allowable cut for the Kenai Peninsula is 1,652 acres; for the west side of Cook Inlet and Kalgin Island, it is 1,816 acres. Allowable cuts are regulated over a ten year period. Therefore, 16,520 acres could be harvested each ten years on the Peninsula, and 18,160 acres on Kalgin Island and the west side.

State forest land affected by bark beetles. In 1993, about 90,000 acres of state land on the Kenai Peninsula was infested by bark beetles, and the beetle infestation is still expanding from previously infested stands. Beetles also infest state land on Kalgin Island and state land west of Cook Inlet. The most heavily impacted state land is on the western Kenai Peninsula south of Tustumena Lake to Homer and Kachemak Bay, and in the Moose Pass area.

Affected forests include stands of white spruce, Lutz spruce, and Sitka spruce in either pure stands or mixed stands with birch, cottonwood, or aspen. In infested areas, future stands are likely to be more open, have more grassy areas, and where hardwoods are present, have more hardwood-dominated stands.

Proposed forest management. Prior to 1994, DNR sold an average of 200 acres of timber sales per year. Starting in 1994, in response to the infestation, the amount of state timber offered has greatly increased. In 1994 and 1995, DNR sold 17 salvage sales totaling 6,857 acres on the Kenai Peninsula and Kalgin Island. Seven sales and a personal use area are scheduled for offering in FY 96. The FY 96 offerings total 1,885 acres. DNR is proposing timber sales on approximately 27,880 acres of land in the Kenai Borough affected by bark beetles over the next five years. This includes about 19,020 acres on the Kenai Peninsula. One salvage sale prepared by DNR in the Moose Pass area also included Mental Health Trust land.

Additional public outreach. DNR has made special efforts to involve the public in forest management decisions in the Kenai area.

- Establishing a citizen's advisory panel led by the Kenai Peninsula Borough mayor that reviewed all sales on the FY 94-98 Five-Year Schedule, including the FY 95 and FY96 sales. DNR adopted all the unanimous recommendations of the panel, and made many changes to respond to recommendations that weren't unanimous.
- Holding public meetings on timber sales in nearby communities and scheduling field trips to the larger proposed sales.
- Involving the public in development of a Forest Health Management Plan for the Kenai.
- Working with the US Forest Service and a citizens' advisory committee during joint federal-state forest management projects for the Cooper Landing and Moose Pass areas.
- Meeting with media representatives and including them in field trips to harvest areas.
- Preparing a handout on the infestation for tour companies that use the Kenai Peninsula.
- Steadily improving the Five-year Schedules and Forest Land Use Plans to ensure that the public gets clear, complete information on planned sales.

How will timber sales affect other land uses? Tourism and recreation: Most of the sales including those in the Falls Creek-Ninilchik area and on Kalgin Island will have little impact on recreation and tourism. These sales are in flat, low country off the main road system. They receive little current recreation use or tourism, and will not be visible to road travelers. Harvested areas will be visible to air traffic between Anchorage and Homer.

Sales in the Moose Pass area have the greatest potential to affect scenery, recreation, and tourism. Large beetle-killed areas also have the potential to affect these activities. The USFS analyzed recreation and scenic impacts on state and federal land. The state is using this information to design sales to minimize these impacts.

Fishing: Protecting fish habitat and water quality is the main goal of the state's Forest Resources and Practices act. The Act prohibits harvesting within 100 feet of anadromous and high value fish streams on all state land. On the Kenai, we use wider buffers for key areas, such as the Ninilchik River corridor. Buffers and required best management practices prevent significant impacts to fish habitat.

Wildlife habitat and use: Kenai forest lands also provide upland wildlife habitat and areas for hunting and wildlife viewing. Whether we harvest timber or not, the composition of Kenai forests and habitat will change as beetles kill extensive areas of spruce. By encouraging regrowth of mixed hardwood-spruce forests and accelerating regeneration, more diverse stands will be grown. Timber harvests should have a neutral to beneficial impact on habitat for most

wildlife species. DNR is funding the Department of Fish and Game to participate in the design of state timber sales.

Timber sale access. Timber access is one of the most controversial issues for the Kenai forests.

ADF&G has expressed concern on the impacts of new access on wildlife, especially bears. DNR proposes no new permanent roads for state timber sales. Temporary roads and winter roads will provide access. Most access will use existing trails, such as seismograph lines. Temporary roads will be put to bed after harvesting and reforestation is complete. The timber purchaser pays road construction and maintenance costs during the life of the sale. In the Moose Pass area, we are considering designing some sales for helicopter logging to minimize road access.

Timber harvest methods. DNR designs harvest methods for each sale based on the extent of beetle damage and opportunities for natural regeneration. In general, we propose salvaging the dead, dying, and immediately threatened spruce trees. We will leave most hardwoods, smaller spruce, seed trees, stream buffers and leave areas for wildlife, and trees that aren't threatened by beetles. In some areas, beetles have killed nearly all trees, and the harvest will approach a clearcut patch. In others, many trees will be left.

Appeals and litigation. On September 22, 1994, Trustees for Alaska and four other groups appealed the FY95-99 FYSTS in Anchorage Superior Court. There was no administrative appeal of the schedule. On October 25, the same groups asked the Anchorage Superior Court for an emergency stay of the auction of eight small timber sales. The Court denied the stay and the sales were auctioned. Trustees added the eight sales and the Falls Creek sale to their original lawsuit and expanded the list of appellants to nine groups and one individual. Since then, the individual, petitioned the court to withdraw from the suit and the court granted his petition.

On November 30, 1994 the same groups appealed the Kalgin Island FLUP to the DNR Commissioner. The Commissioner denied the appeal and Trustees requested reconsideration of the denial. The Department of Law counseled that reconsideration cannot be granted under current statutes. Trustees asked the Anchorage Superior Court for an emergency stay of the auction; the court denied the stay on January 11, 1995.

Trustees et. al and another individual filed appeals of the Falls Creek Sale with DNR in January, 1995. The DNR Commissioner denied both appeals. Trustees filed for an emergency stay; but their request was denied by the court February 7, 1995 and the sale was auctioned.

On June 5, 1995, the Court ruled in DNR's favor on a motion to recover expenses in the Trustees case. The Court ordered the appellants to pay the State $4,931 as the reasonable costs of preparation of the record filed to date.

Judge Souter denied two motions by Trustees on November 1, 1995. He denied a motion to add the FY 96-00 Five-Year Schedule to the case, stating that it is inappropriate to roll multiple appeals into one case, and that a court appeal of the FY 96-00 Schedule would require a separate case. He also denied a motion to submit an over-length brief and add 470 pages of new material to the record. He directed them to rewrite their brief and strike any references to their addendum. Oral arguments and a decision on the case are pending.

One person appealed DNR's coastal consistency finding on the Falls Creek sale to the Coastal Policy Council. The CPC reviewed the appeal and decided in DNR's favor on all counts.

On September 18, 1995, Trustees for Alaska appealed the final finding for the Crown timber sale to the Commissioner of Natural Resources. The Commissioner denied the appeal and DNR auctioned the sale.

In a separate case, two individuals appealed DNR's forest management program to the Superior Court. They alleged that DNR was not harvesting enough timber to meet Constitutional direction to maximize use. The court ruled on all but one count in fall, 1994, and decided in DNR's favor on each count. Alaska Husky Wood, Inc. filed a similar case against the state in April, 1996. The state asked the court to consolidate this with the earlier case and the court agreed. A decision on the case is pending.

COPPER RIVER AREA

State land ownership and allowable cut. The State of Alaska owns 3.3 million acres of land in the Copper River Basin, of which approximately 30,000 acres is commercial timber. The estimated annual allowable cut on state land is approximately 200 acres per year. Vegetation mapping for state land in the Copper Basin is limited.

State forest land affected by bark beetles. In 1996, about 230,000 acres of land on all ownerships in the Copper Basin was infested by bark beetles. The infestation is still expanding in most areas. Most beetle activity is on federal or Native corporation land, however, state land is significantly impacted in some areas. Acreage figures for the amount of infested area on each ownership in 1996 are not yet available. Many areas are intensively infested with most of the white spruce killed by beetles. Many of the stands are pure white spruce and may convert to alder where the spruce are killed.

Proposed forest management. In FY 96, DNR received capital funds from the legislature for timber salvage, and we have expanded our timber sale program in the infested areas. We propose to offer a number of salvage sales over the next several years, beginning with about 300 acres of salvage in FY97. DNR also prepared about 6 MMBF in salvage sales for BLM on roughly 4,200 acres of federal land in the Copper Basin.

Timber sale planning and public involvement. DNR is currently identifying areas with potential for timber salvage and reforestation. We have also met with other landowners and interest groups to identify forest management issues that will be addressed through the Five-year Schedule of Timber Sales and Forest Land Use Plans for salvage sales. DNR began working with the public on these issues in 1994, but suspended the work temporarily due to lack of funding.

The first of the salvage sales will be included in the FY 97-01 Five-year Schedule and will be

proposed for sale late in FY 97. The FLUPs will address describe the proposed harvest location and methods, address multiple use issues, identify access, and describe the reforestation strategy.

HAINES AREA

State land ownership and allowable cut. DNR manages the 270,410-acre Haines State Forest. Within the Forest, 49,231 acres are commercial forest land available for timber harvest. The annual allowable cut on this land is 6.96 million board feet per year (an average of roughly 370 acres per year).

State forest land affected by bark beetles. The 1996 survey mapped about 16,000 acres of infestation, about 10,000 acres of which is state land in the Haines State Forest. It appears the total infested area is continuing to expand. About 51% of the commercial timber base -- 25,039 acres -- has been significantly infested by the spruce beetle. The beetles have killed from 50% to 99% of the spruce in these stands. A total of about 35,000 acres of state land has been infested since 1989 in the Haines area. The main forest type is a mix of Sitka spruce and hemlock. Future stands are likely to be dominantly hemlock in much of the infested area. The hemlock in this area is highly decadent, with 60% of the hemlock timber volume being pulp quality.

Proposed forest management. On average, DNR has sold approximately 29 MMBF of timber from the Haines State Forest from 1993-1995. In FY 96, DNR received capital funds from the legislature for timber salvage. With these funds we offered the 14.4 MMBF Thunder Creek salvage sale from 565 acres of infested land. Lynn Canal Conservation Society appealed this sale to the Commissioner of DNR. The Commissioner denied the appeal and the sale was offered, but not purchased due to low markets for pulp. Several small salvage sales were also prepared and sold with this funding and we are continuing to offer small salvage sales. We expect to offer about 25 MMBF over the next five years.

Reforestation. All large sales require the purchaser to replant with Sitka spruce grown from a local seed source. On the small salvage sales, DNR provides the seedlings and contracts for planting.

Additional public involvement. DNR manages the state forest under the Haines State Forest Management Plan. The plan was adopted in 1996 after extensive public input.

OUTREACH TO PRIVATE LANDOWNERS

DNR also manages federal-funded programs in Forest Stewardship and Urban and Community Forestry. Four staff members in southcentral Alaska work in these programs. They assist communities and individuals with forest management plans, consult on forestry issues, and disseminate information on protecting private homes and trees from fire and insects.

The Forest Stewardship program provides landowner assistance through site visits, written plans, public workshops, and federal cost-share programs. Since starting, 156 stewardship plans have been prepared covering 13,600 acres of private land, and most of these address spruce beetle concerns. Spruce beetle abatement techniques used by individual landowners include sanitation harvesting, trap trees, pruning, and pesticide application. DNR Forest Stewardship staff have also conveyed grants to help five Alaska Native corporations in southcentral Alaska. The grants provide for multiple-use planning, and spruce beetle impacts have been a major consideration in preparing the plans.

KENAI PENINSULA SPRUCE BEETLE
WILDLAND FIRE CONSEQUENCES

Prepared By The Alaska Department of Natural Resources
Division of Forestry
February 1993

The spruce bark beetle infestation has modified the Kenai Peninsula's forest health in a number of ways. Considerable attention is focused on the potential impacts from wildland fire because of the hazard presented by beetle killed stands of spruce. The following facts were collected from foresters, researchers, and fire behavior specialists to offer a realistic perspective on the situation.

1. The advancing tree mortality caused by the spruce bark beetle is causing establishment of a different vegetative type. Once healthy stands of timber are giving way to grass, brush and dead snags. This altered fuel type can burn very rapidly, under the right conditions, particularly in the spring and early fall.[1]

The fire hazard moderates after green-up usually around June 10th, and does not re-appear until the first hard frost.

2. The grass/brush fuel types can be dangerous under the right conditions. Most fatalities and loss of structures in wildland fires occur in these fuel types.[2] Rapid rates of spread can outrun a person, especially when the fire is being pushed upslope by the wind. These new fuel types present more danger to life and property during the pre-greenup and post frost stages than did the previous healthy stands of timber.

3. After the overstory (snags) fall or are wind thrown, the fire behavior will change again. The rates of spread will slow down, however, the fire may be too intense to effectively control unless controlled quickly. The reason for the decreased spread rate is the heavy fuels break up the continuity of the surface fuel bed, acting as a heat sink to the passing flames. If the downed timber is dry and the heavy fuels support combustion, the resulting fire intensity may alter the soil characteristics, enough to effectively prohibit re-establishment of the climax plant community (spruce/hardwoods) over a portion of the fire area. The spruce type may be lost for decades if this occurs.[3]

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[1] John W. See, Cooper Landing Spruce Beetle Fire Behavior Analysis February 23, 1990

[2] Carl C. Wilson, Some Common Denominators of Fire Behavior on Tragedy and Near-Miss Forest Fires, U.S.D.A. Forest Service, December 1976

[3] Rodney A. Norum, personal correspondence, February 1993

4. A "worst case" scenario will occur when a combination of events happen. Long term drying trends that span several years (drought) reduce fuel moistures in the heavy dead fuels to critical levels. Combined with a wind event, such as a weather frontal passage or subsiding air mass, referred to as "red flag" warning weather conditions, would create the conditions necessary for "worst case fire behavior".

The probability of experiencing the effects of a long term drying trend (drought) are one year out of every four years. "Red flag" warning weather conditions that would coincide with a drought to create this type of "worst case" fire behavior occurs once every five years.[4] "Red flag" weather conditions refer to a combination of low humidities (less than 20%), high temperatures (80 degrees or more) and high winds (generally over 25 mph). History supports this assertion considering the frequency of large wildland fires on the Kenai Peninsula. There has been a large fire on the Peninsula every 10 to 20 years.

5. Alaska's spruce trees burn more readily than other tree species such as encountered in the lower 48 states because of low foliar (needle) moisture content. Therefore, when a spruce tree in Alaska turns yellow or red after a beetle attack, it is not significantly more flammable than a healthy tree. Resins and other chemicals in the needles are also partially responsible for this phenomena.

Adjustments have been made by the fire suppression agencies to counteract the increased hazard. The retardant aircraft fleet has been modified to provide a 2000 gallon air tanker stationed at Palmer, Alaska. This aircraft has improved capabilities in the urban wildland interface areas of the Kenai Peninsula. Training sessions on urban wildland firefighting tactics have been developed and presented and a specialized wildland engine firefighter class has been developed and given to the rural fire departments that cooperate with the wildland fire agencies.

The federal, state and local fire protection organizations responsible for fire suppression must be prepared to effectively initial attack fires while they are small. In the pre-greenup scenario, initial attack response times cannot be compromised, especially when the reported fire corresponds with red flag warnings conditions. During drought conditions, additional suppression forces must be in-place to maintain the success of the initial suppression action.

If you have any other questions regarding this subject, please feel free to contact the Division of Forestry Office in Soldotna.

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[4] Neil Marshbanks, National Weather Service, Fire Weather Forecaster, personal correspondence, February 2, 1991

House and Senate Resources Committee Meeting
Agenda
September 27, 1996
Spruce Bark Beetle Infestation
1:00 PM

1) Call to order & welcome by **Co-Chairman Green**

2) Introductions by **Jerry Boughton**, Alaska Chairman, Society of American Foresters

3) Overview by **Dr. Ed Holstein**, U.S. Forest entomologist and forest health specialist

4) International Perspective by **Dr. Patrick Moore**, Director of the Forest Alliance of British Columbia & **F.L.C. Les Reed**, President, F.L.C. Reed and Associates Ltd.

5) Organization Perspectives: Status/Responsibilities (approx 8 minutes each)

DNR Division of Forestry - **Tom Boutin** via teleconference
Ninilchik Native Corp. - **Greg Encelewski**, Forester
U.S. Forest Service - **Larry Hudson**, Forest Supervisor
Alaska Coop Extension - **Mike Faustibend**, Extension Agent
Alaska Forest Assn. - **Jack Phelps**, Exec. Dir.
DF&G Division of Habitat - **Lance Trasky**, Division Director

6) Committee discussion and questions

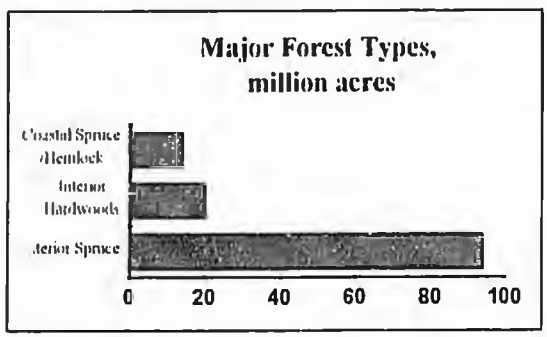
7) Adjourn

Alaska

Forest Health Highlights

The Resource

There are 129,000,000 acres of forest land in Alaska, which is approximately 27% of the total land area. Two distinct forest ecosystems make up these forests: the boreal forest ecosystem of south-central and Interior Alaska, and the temperate rainforest of southeast Alaska and Prince William Sound. The boreal forest is characterized by a mosaic of spruce and hardwoods (mostly birch and aspen). The coastal rainforest is mainly made up of spruce and hemlock.



Management Focus

Federal, State, and private entities all manage significant portions of this vast forest resource. An approximate breakdown of ownership and management focus is:

Federal (Approximate area):

46 million acres - National Park Service. National Parks primarily managed for recreation resources.

12 million acres - Bureau of Land Management, managed for multiple uses.

11 million acres - National Forests, managed for multiple uses.

7 million acres - Fish & Wildlife Service. National Wildlife Refuges primarily managed for wildlife reso ces.

State (Approximate area):

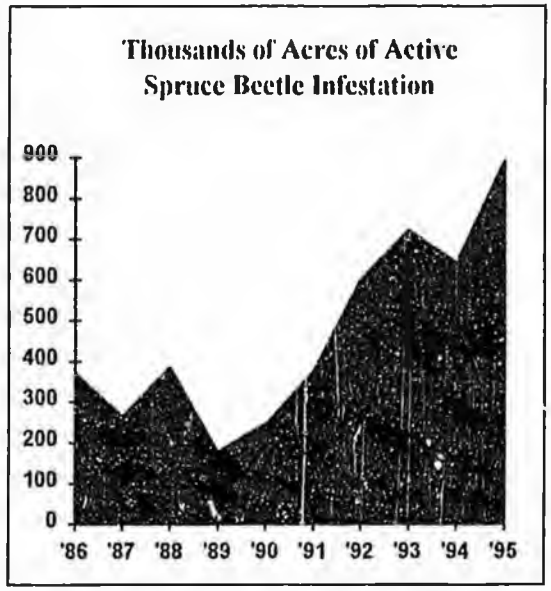
21 million acres - State forests and unclassified lands, managed for multiple use.

Private lands (Approximate area):

30 million acres - primarily native ownership.

Special Issues

Spruce Beetle: The spruce beetle outbreak is the largest recognized forest health issue in Alaska. This infestation has been on-going for over a decade, but has substantially increased in the last five years. It is estimated that 25,000,000 spruce trees died from this infestation in 1995 alone. In many areas entire drainages of spruce forests have been killed. Most current tree mortality is in the Cook Inlet/ Kenai and Copper River areas, but is also occurring in southeast Alaska. Impacts of this outbreak include: loss of old growth, long-term conversion to non-forest types, altered watershed characteristics, changes in wildlife habitat value, declines in scenic quality, merchantable value reduction of killed trees, and increased fire hazard.



Yellow-Cedar Decline: Decline and mortality of yellow-cedar is the most spectacular forest problem in southeast Alaska. About 595,000 acres of this decline have been mapped to date. Yellow-cedar is the principal victim of this decline as other tree species are largely unaffected. Yellow-cedar has extremely valuable wood; thus the problem has considerable economic impact. This tree species also has ecological importance and its wood and bark have long been used by Native people.

Decline occurs in forests that have not been visibly altered by timber harvesting or other human disturbance. While the cause of yellow-cedar decline is not understood, it appears to be naturally occurring and caused from some environmental stress. Excessive mortality of yellow-cedar may lead to reduced populations of this species due to its poor regeneration. Because yellow-cedar is resistant to decay, there is potential for salvaging dead trees.

Other Issues

Management of second-growth stands: In many areas of southeast Alaska, regeneration in harvested areas has gone untended, resulting in very dense young stands. These dense areas are not productive wildlife habitat for many decades. Altering of wildlife habitat to these conditions through timber harvesting is a growing concern and significant part of the issues pertaining to the amount and location of forest management on the Tongass National Forest. Appropriate silvicultural treatments to reduce this dense condition following timber harvesting can reduce this impact to wildlife habitat.

Defoliating Insects: Alaska has a number of periodic outbreaks of defoliating insects. These outbreaks often exceed 200,000 acres in size. While this magnitude of defoliation would cause considerable concern in other portions of the country, due to Alaska's relative inaccessibility, these conditions rarely induce management actions. These insects do not always cause tree mortality, but do stress host trees after several years of infestation. Large outbreaks have been recorded in coastal spruce/hemlock forests and interior aspen and spruce forests.

Dwarf Mistletoe and Heart Rot Diseases: These are very important diseases of trees in unmanaged, old-growth stands throughout southeast Alaska. Forest managers must recognize the potential for reduction in timber volume and value under various silvicultural scenarios, keeping in mind that these diseases contribute to stand diversity and structure.

Interior Hardwood Heart Rots: Considerable heart rot decay occurs in both birch and aspen in interior Alaska. Surveys are being conducted to determine the pathogen amount and severity. Defect in both species has an important bearing on potential utilization.

Regional Surveys

Insect and Disease Conditions

Insect and disease aerial surveys have been conducted in Alaska since the 1950's. These surveys are a cooperative effort of the Alaska State Division of Forestry and the U.S. Forest Service, Forest Health staff. Surveys are flown each year and the current level of insect and disease activity is mapped and described in an annual Insect and Disease Conditions report.

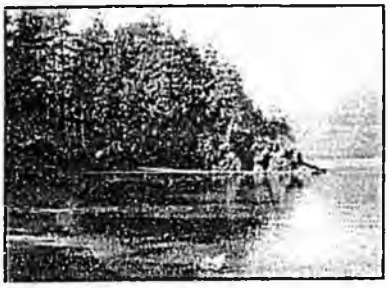
Forest Health Monitoring

There is a nation wide effort to systematically monitor forest conditions and assess change in all U.S. forest types. Due to Alaska's large size and overall inaccessibility, cost effective Forest Health Monitoring here will require different techniques than are being used in other portions of the country. The U.S. Forest Service and State Department of Natural Resources are working to design an appropriate monitoring effort for Alaska's forest types. Implementation of this effort is expected within the next few years and will require participation by all major Alaska forest ownerships.

For More Information Contact:

Forest Health Management
State and Private Forestry
USDA Forest Service
3301 "C" Street, Suite 522
Anchorage, Alaska 99503

907-271-2575
Fax 907-271-2897



Alaska Forest Management Education Alliance

Fire Danger from Bark Beetles

The Subject

Do beetle-killed trees increase fire danger or not? This issue has been a very misconstrued subject rampant with misinformation. Actual relationships of fire danger with changing fuels are well documented and easily understood. The key is to consider the changing forest condition using established fire danger factors.

Fire Danger

Fire professionals describe fire danger using the three factors of Hazard, Risk, and Management, related by the following formula:

Danger = (Hazard + Risk) - Management

Hazard = Fuel conditions (fuel loading)
Risk = Chance of ignition
Management = Capacity to reduce hazard or risk and to suppress fires

All three factors must be considered when thinking about how fire danger is changing in Alaska's forests.

Fire Hazard (Fuel Loading)

Forests and their fuel loading are constantly changing. Sometimes change is gradual. When insect infestation or other large disturbances happen, the change can be very rapid.

Birch Forests
Driving through the Mat-Su Valley you're aware of the birch forests. Yet walking through those forests and looking closely you will see:

- 20-40 white spruce per acre, many having been killed by beetles in the last ten years.
- Many of these spruce have fallen over adding large fuels to the ground.
- A number of the birch are over-mature and have dead or dying tops.
- This thinning forest canopy change allows more light to the ground and a substantial increase in grass, brush and other fine fuels.

These changes are much more subtle than massive beetle kill in solid spruce forests, yet can increase fire danger none-the-less.

White Spruce Forests
Most of Alaska's white spruce forests originated from fire and have trees of similar age and size. When beetle infested, often nearly all spruce trees are killed in three to five years. Fuel hazard changes drastically as the trees have their needles turn red and fall off, the trees fall over, and the ground vegetation increases from more sunlight getting to the forest floor.

The year after beetles attack a tree the needles will be red (a very flashy easily ignited fuel). The red needles will fall off the next winter and most small twigs will fall within two years.

Once the needles and twigs fall from the tree, a forest of dead sticks standing in the air remains. These large fuels do not present a large fire hazard when upright as there is so much air around them. However, fine fuels increase over time as the forest vegetation (grasses and brush) increase from more sunlight to the ground.

These dead trees break off and fall to the forest floor five to ten years after being killed. Large fuels on the ground can increase from 2 tons/acre in a healthy green forest to over 40 tons/acre in a forest killed by beetles (Schulz 1995).

As fine fuels increase and large fuels (dead trees) fall to the ground, fire hazard is increasing. The greatest amount of fine fuels mixed with the greatest amount of large fuels (i.e., highest fire hazard) happens seven to ten years after beetles kill the forest.

When these conditions ignite under the right climatic conditions, fires spread quickly, burn intensely, and can be very difficult to contain or control.

Fire Risk

Fire risk is the chance of ignition. The more fine fuels (easy to ignite) present, the more lightening strikes or people in these fuel conditions, the higher the risk. Alaska's increasing number of tourists is adding to our risk. This is particularly true on the Kenai Peninsula. Usual management actions to lessen this factor include things such as fire prevention signing to raise peoples awareness to be careful, limit people's access to the woods, burning ordinances, fireworks bans, etc.

Green Versus Dead Spruce Forest

Individuals who oppose forest management actions to deal with this problem have tried to convey that live (green crowned) white spruce forests pose more fire danger than dead spruce forests.

When the increased fuel loading is considered, together with the volatility created by the presence of mixed fuels, the greatest fire danger occurs after beetles have killed the trees and those trees are allowed to fall and lie on the forest floor. The presence of many people during hot dry summer days increases this danger.

Common sense examples:

Next time you have a burn pile, throw a green spruce bough on the pile. There is enough heat to volatilize the chemicals in the needles and the bough will flash and burn the needles. Hold a Bic lighter under another green bough and nothing will happen. Without intense heat from another source, green trees do not easily ignite.

Next time you're camping try starting your campfire with green boughs (without Coleman fuel). Then as you normally do, pile dead grass, twigs and large logs together. A flick of the Bic is all it takes to start an intense fire.

Forested acres with beetles killing trees (fuels building) has been rapidly rising since 1990.

1990 - 245,000 acres	1991 - 375,000 acres
1992 - 600,000 acres	1993 - 721,000 acres
1994 - 641,000 acres	1995 - 892,000 acres

Fire danger is increasing on hundreds of thousands of acres in Alaska. If we do not manage our forests to reduce this fuel buildup and prevent the certainty of wildfires, why spend millions to put the fires out once they start?

Over $16 million dollars was spent trying to control wildland fires this spring. The Crooked Creek fire alone burned 17,000 acres or the equivalent of 3% of the forest area that was killed by beetles in 1995.

Management Actions

Management actions are a factor that can reduce overall fire danger. These actions reduce the danger by reducing either the hazard on the site or by reducing the risk of ignition.

Taking management action that only addresses risk, is, pun intended, playing with fire. Fire managers readily acknowledge the complex fire danger in insect-killed forests. Fuel conditions following insect infestation coupled with weather conditions can together make fire danger extreme. Once a fire is started in extreme fuel and weather conditions, it will spread quickly and be very difficult to control. When this happens, containment efforts become more complex and expensive.

Preventing this situation from occurring by managing (reducing) the fuel problem is the only long term, cost effective, rational solution.

Summary

Spruce beetles are killing over 22 million trees each year in Alaska's forests. This dramatic forest change is increasing fire danger on hundreds of thousands of acres each year. This spring Alaskans saw the devastating impacts of wildfires. Taking no action to address this problem will result in spending millions of dollars trying to control wildfires, and even so seeing repeat disasters costing devastating property loss and possibly loss of life. Active forest management can reduce the fuel buildup that's happening and regenerate healthy new forests. The dead trees removed will often pay for the cost of these forest rehabilitation actions.

Copies of the fuel buildup study can be obtained from:

US Forest Service, State and Private Forestry
3301 "C" Street, Suite 522
Anchorage, Alaska 99503
907-271-2525

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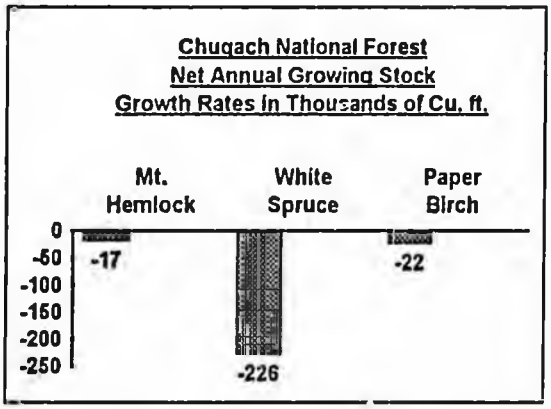
Phone: 907-566-0931

Alaska Forest Management Education Alliance

Forest Regeneration

Reforestation Summary

Disturbance is the key factor for regenerating our Northern forests. The tree species that makeup these forests are adapted to begin their life following disturbances. Fire, flood, insect epidemics, and erosion are examples of natural processes affecting forest death and rebirth. By using extensive fire suppression man is having an effect on natural regeneration processes. Research shows that Native peoples have used fire to open areas for hunting and wildlife forage for centuries.



The graph above shows that the trees growing on the Chugach National Forest are showing a net decline in fiber production. This is resulting from the trees getting old, rotting, having their tops die back, and from being attacked by insects. These forests are clearly saying.... "it's time for another disturbance." We can either stand by and accept whatever disturbance comes (many dead trees, followed by large fires) or we can provide managed disturbances needed to regenerate declining areas, and maintain a healthy forest that is not prone to disaster and provides all the forest values Alaskans want. Studies show that without these disturbances many areas may evolve to grassland and it could be centuries before spruce trees return. Allowing foresters to harvest and replant is one way we can assure our children that they will be able to enjoy a spruce forest.

In a forest the only constant is change itself. The major natural disturbances that influence forest birth, growth, and death include fire, floods, insects, disease, wind and erosion. Fire is the most common form of disturbance in Southcentral Alaska. Fire works well to perpetuate spruce and birch forests by opening the canopy, disturbing the ground moss and warming the soil. Fire prepares the seed bed by killing competing vegetation and allows seeds to fall on mineral soil where they can sprout and grow. Without some soil disturbance, vast areas may turn to grasslands.

By the active fire suppression we now have, we are by default managing our forests in a way that will not perpetuate a rebirth with these same tree species. Fires occur less frequently, burn more intensely in heavier fuels causing more damaging or disastrous fires. Foresters can simulate the natural effects of fire and perpetuate these forests in a controlled way by removing wood, providing planned disturbance, and replanting trees.

Regenerating Alaska's Forest

One of the tenets held by the forestry profession is: *"Do not cut a forest you cannot grow back."* Regeneration of the trees is, therefore, the first consideration in harvesting the forest. The task is sometimes done by mother nature and sometimes by man. Alaska has some unique regeneration opportunities that relate to the type of trees and cold soils we have. This varies from region to region in Alaska as well as with local conditions.

In the coastal forests of Southeast Alaska and Prince William Sound, regeneration following disturbance is almost always quick and profuse. Perhaps 95% of disturbed areas (including harvest units) seed-in naturally from surrounding stands. The species, primarily western hemlock and Sitka spruce grow quite rapidly.

In Interior and Southcentral Alaska, natural regeneration of the forest can often be achieved if the proper site conditions are prepared. In some areas, planting of trees may be necessary to ensure the forest is regenerated with the desired tree species. This is particularly true if all the large seed producing trees in the area have died before the regeneration action is taken. No seed means no natural regeneration. Natural regeneration is often preferred over planting. It is less costly and ensures regeneration with local seed well adapted to growing on that site. Most all of the tree species in this region regenerate best on newly exposed soil (such as that resulting from disturbances such as fires, slides, or planned tree harvesting).

Winter time harvesting results in little or no ground disturbance, and does not prepare the site enough for tree seeds to successfully grow. Having seed is only half the equation, the seed must fall on a properly prepared site to be expected to grow. Beetle killed areas that are allowed to stand will not have adequately prepared sites for seeds to grow, even if there are any trees left producing seed in the area. Often thick grass develops that keeps the soil too cold, and chokes out what few seedlings may get started. Grass seed penetrates moss present in spruce stands where spruce seeds cannot. Some hardwood species like cottonwood, birch, and aspen can reproduce vegetatively from sprouts.

If planting is necessary, it is best done in the spring as soon as the ground thaws to planting depth. Frozen soil is a frequent obstacle and cold soils insulated by grass retards growth. Competition from other plants often shade out or starve tree seedlings unless protective measures are taken. Planting seedlings raised from seed collected from local trees that had good growth and form characteristics can increase survival and growth resulting in obvious benefits.

The knowledge to successfully regenerate Alaska's Southcentral and Interior regions exists. Foresters and forest industries can work together to improve the health and composition of Alaska's future forests. The benefits to be achieved are related to many other living natural resources: fish, wildlife, other plants, and people. To achieve this healthy forest regeneration goal requires sustained and balanced harvests, mixed age classes of trees, harvesting overmature stands, and use of intensive forest regeneration techniques.

Alaska's goals of clean water, reduced fire hazard, increased wildlife, employment, and income all start with successfully maintaining the regeneration processes of our forests. Forest regeneration for Alaska's future will not happen without disturbance. For the sake of current Alaskans, these disturbances need to happen in a controlled way. Foresters have the knowledge to accomplish this task.

Next time you are in the woods we encourage you to look closely at the forest regeneration processes at work there. Particularly look closely at those areas that have been heavily impacted by bark beetles. If you have questions please contact your local Borough, State, Federal, or forest industry foresters. They can direct you to current literature and studies and are often available to answer specific questions.

Copies of the Forest Regeneration report can be obtained from:

USDA Forest Service, State and Private Forestry
3301 "C" Street, Suite 522
Anchorage, Alaska 99503
907-271-2575

The goal of the Alaska Forest Management Education Alliance is to provide the most current, objective, and scientific information about this and other forestry issues.
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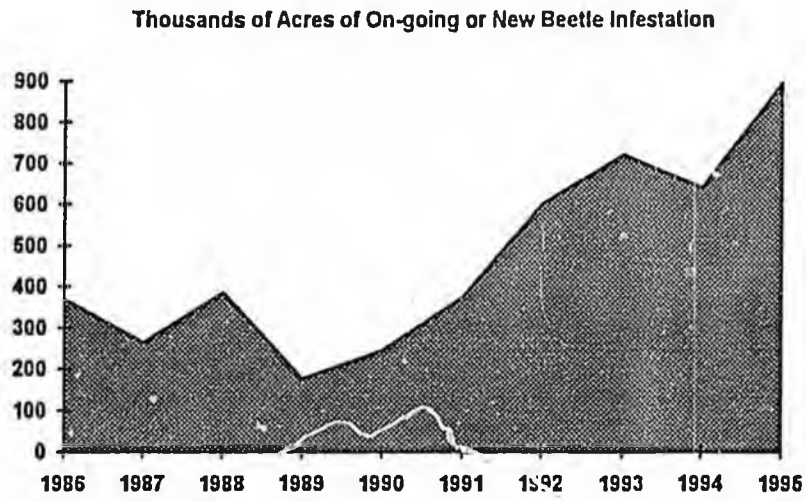
Phone: 907-566-0931

Alaska Forest Management Education Alliance

Alaska Spruce Beetle Situation

Alaska is experiencing the largest spruce beetle outbreak in North America. The spruce beetle population has risen at an alarming rate and remains at a very high level.

An estimated 22 million trees are being killed annually by spruce beetles.



Source: USDA Forest Service Alaska Region Annual Forest Insect and Disease Conditions Report.

Over 3,000,000 acres have been impacted statewide by this infestation in the last five years. This infestation is substantially reducing forest resource values throughout Alaska. Mortality is most often extensive with large portions of entire drainages having essentially all mature conifer cover killed. Impacts to wildlife, water quality, and aesthetics are being recognized.

- Extensive loss of old-growth habitat, and lack of natural regeneration constitutes the largest ecological crisis facing Alaska's forest today.
- Potential for catastrophic fires from tremendous fuel loading poses a growing threat to property and human life.
- Loss of economic forest values will hinder Alaska's ability to diversify its economy and will increase the state's economic dependency on oil.

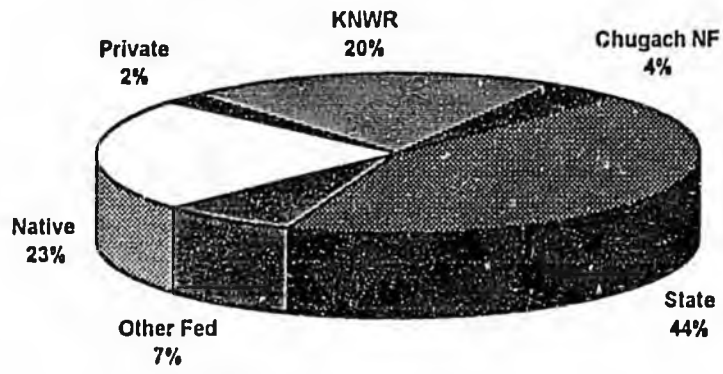
Amount of Timber Resource Affected by Major Ownership (trees that died summer of 1995)

	# of trees that died[1]	# of Million bd ft[2]	# of 3 bedroom home equivalents[3]
Chugach N.F.	747,000	33.6 MMBF	3,400
State of Alaska	8,665,000	389.9 MMBF	39,000
Native Corporation	4,597,000	206.8 MMBF	20,700
All Other Ownership	8,291,000	373.1 MMBF	37,000

[1] @ 25 trees per acre
[2] @ 45 bd. ft. per tree (ave. 12" dbh)
[3] @ 10,000 bd. ft. per house

Addressing this problem is complex due to multiple ownership, with some owners managing under a no treatment philosophy, and lack of an established forest industry to deal with the problem. Limited access to the infested areas presents additional challenges.

Active Spruce Beetle Infestation by Ownership



Major ownerships with infested acreage are the State of Alaska, the Federal government and Native corporations, in that order. Several Native corporations are actively marketing their timber and providing for reforestation. The state Department of Natural Resources has increased its timber sales in recent years, though all of them have been delayed by appeals. Much of the infested timber on Federal lands is in areas not managed for timber resources, but approximately 30,000 acres (4 percent of the total) is in the Chugach National Forest.

Markets can be developed to support forest management that would accomplish preventive and rehabilitation treatments. Selling values for recent sales have been sporadic, but can be a source of funding for reforestation and other forest health treatments, providing these harvests occur before the trees deteriorate.

- The ecosystems of Southcentral and Interior Alaska are ***demanding attention.*** Lack of action is contributing to increasing loss of forest values.
- Forest management with proper silviculture is a realistic method of addressing this problem.
- Timber sales can provide a vehicle to finance forest health restoration.
- Public awareness and desire for action are growing.
- Information about the changing forest situation is needed and desired by the public.

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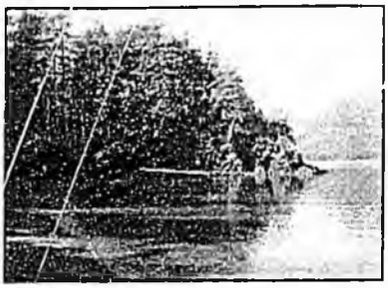


Alaska Forest Management Education Alliance

The Cost of No Action in Declining Forest Health

Summary

Alaska's dying spruce forests will have economic impacts to many resource values important to Alaskans. With all indicators considered, action to prevent the damage or to rehabilitate dead areas using the existing wood value to pay for treatments will be more cost effective than allowing continued deterioration of Alaska's forests.

The Setting

Nobody will say they desire an unhealthy forest. In two public opinion surveys (Daniels 1991 and ISER 1991) Alaskans recognized that spruce beetles are affecting scenic quality, wildlife viewing, and increasing fire danger. Further, they prefer management action to restore affected areas and support tree harvesting with regeneration, as opposed to allowing most trees to be killed by beetles.

It costs money to take action. Usually the value of the wood removed during forest health treatments can help pay for the cost of the treatment. However, too often economic comparison of action versus no action only looks at the value of the wood. Preventing and reducing losses while restoring the other forest values Alaskans want must be a part of the thought process.

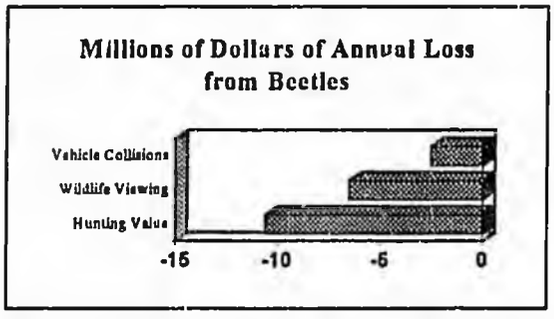
A report by the Alaska Department of Commerce & Economic Development (1996) looks at these values. Methods to determine how Alaska's forest values are being reduced by the beetle epidemic are discussed. "Costs" to Alaska by taking "no action" and continuing to allow our forests to deteriorate are summarized below.

Increased Fuel = Expensive Fires

Everyone is aware of the catastrophic impacts and high costs of wildfires. Our own recent Alaska examples bear this out. Besides the pain and suffering, insurance increases, as does personal loss to friends and neighbors. In the spring of 1996, more than $16 million dollars was spent trying to control fires in Alaska. The Crooked Creek fire burned 17,000 acres or the equivalent of 3% of the forest area that was killed by beetles in 1995. Typically, beetle-killed trees blow down within three years of dying. If this tremendous fuel loading is not removed, in the next ten years Alaskans could suffer many times the losses we glimpsed this spring.

Social Costs of Deteriorating Wildlife Habitat

Beetle killed forests being replaced with less diverse more grassy conditions (Holsten, Werner, Develice 1995) will impact habitat and numbers of several important wildlife species (such as moose and bear). Resident and non-resident hunting alone contributes over $188 million dollars annually to Alaska's economy. Wildlife viewing, a major reason tourists visit Alaska, contributes another $129 million. With beetles killing trees at the rate of 893,000 acres per year, a conservative estimate of a 5% impact on these wildlife value indicators amounts to an $18.4 million dollar annual loss to Alaska's economy.



Altered Water Pattern Costs

Beetles indirectly affect water patterns by removing all the live trees over large areas. Beetles do not leave streamside buffers. Watershed models show higher peak flows during flooding and lower stream flows during drought when live trees are removed from the streamside. Nearly all the spruce forest in the upper Kenai River drainage (Cooper Landing, Russian River, Trail River,

Moose Pass, etc.) has been heavily infested by beetles. If changing water patterns and fish behavior reduces sportfishing on the Kenai Peninsula by only 5.5%, it will cost the Alaska economy over $23 million dollars per year. Changing water patterns and stream flows that affect young fish survival and growth could have drastic effects on our commercial fisheries. The Copper, Yukon, Kuskokwim, and many smaller river drainages also have many trees being killed by beetles. Treatments to reduce or prevent further tree death and restore already dead areas can lessen this loss.

Real Estate Devaluation When Trees Die

Homeowners with dead or dying spruce trees must deal with the hazards and liabilities of falling trees, removing them, and the resulting reduction of property value. Professional tree removal can cost several hundred dollars per tree. Real estate appraisal techniques often attribute 7-15% of real property value to trees. A $200,000 Hillside home with 5 large beetle killed spruce trees could cost the homeowner as much as $30,000 in removal costs and property value losses. Professional or homeowner applied insecticide could protect those trees for as low as $200 dollars. Pruning may protect the trees, costing only a few hours of homeowner labor.

Recreation and Tourism

More than 800,000 visitors come to Alaska each year. The visitor industry provides the equivalent of 13,500 jobs in Alaska and $244 million in annual payroll. Over 52,000 Alaska jobs are directly affected by visitor spending. The total 1989-90 in-state spending by tourists exceeded $415 million dollars representing a significant portion of the state's economy.

Selected Sierra Club and Alaska River Journey's 1994 outings show individuals were willing to pay over $3,600 for an average 8.7 day outing in Alaska. Visitors willing to pay this amount undoubtedly have a high level of expectation for an amenity value from the outing and certainly considered other destinations than Alaska. Not meeting expectations, or even a perceived inability to meet those expectations, will result in visitors selecting other destinations or not returning to Alaska for another visit. This effect has been recently witnessed in the Mat-Su area where visitor days have been reduced due to perceived notions of what the Millers Reach fire did.

Many prime tourist areas are being heavily effected by beetles. Negative comments about the extensive areas of dead trees along the Richardson highway are common from both out of state and Alaskan travelers from Valdez. Large spruce tree death is very apparent along the Glenn highway. The Seward highway has tremendous tree death along its viewshed. Kachemak Bay spruce forests are now dead or dying on both the Homer and Seldovia sides. The west side of Cook Inlet is in rapid decline from heavy beetle infestations. For example, a 5% decline of visitor spending equates to a $20.8 million dollar annual revenue loss to Alaska's economy each year.

Parks, Trails and Roads

The Cooper Creek campground on the Kenai Peninsula did not receive preventive treatments, beetles killed all the large spruce, and the trees were removed before they became a safety hazard. Other campgrounds in the area did receive preventive treatments and still have live stands of spruce for campers to enjoy. Kincaid Park, an Anchorage summer and winter high public use area, has lost over 60% of its large spruce trees in the last two years.

Managers of public sites have a responsibility to provide for public safety. They can either pay a little now to protect the sites, or pay more later to provide for public safety. Preventive treatments are generally the most cost effective. Remedial treatments to remove hazards are very expensive ($25,000 per mile to remove hazard trees along the Seward highway in 1994). Liability lawsuits stemming from not providing public safety could potentially cost millions.

Copies of the 1996 Economic Indicator report can be obtained from:

USDA Forest Service, State and Private Forestry
3301 "C" Street, Suite 522
Anchorage, Alaska 99503
907-271-2575

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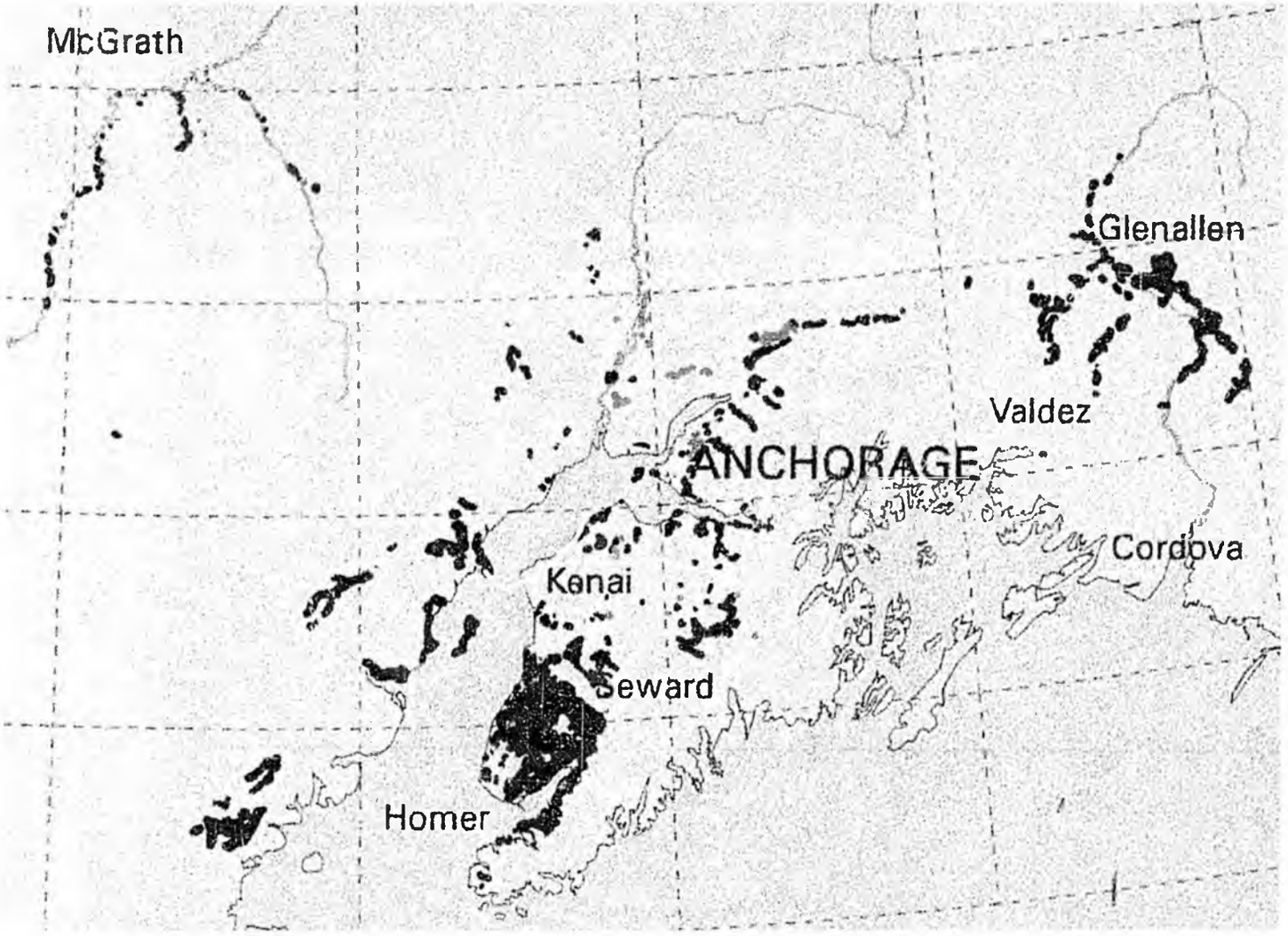
1995 SPRUCE BEETLE MAJOR INFESTATIONS - SOUTHCENTRAL ALASKA



Spruce Beetle

Large Aspen Tortrix

Forest Insect
& Disease
Leaflet 127

U.S. Department
of Agriculture
Forest Service

The Spruce Beetle

Edward H. Holsten,[1] R.W. Thier,[2] and J.M. Schmid[3]

Figure 1—*Yellowish orange and reddish colors in the tops of trees are evidence of spruce beetle infestation in Arizona.*

The spruce beetle, *Dendroctonus rufipennis* (Kirby), is the most significant natural mortality agent of mature spruce. Outbreaks of this beetle have caused extensive spruce mortality from Alaska to Arizona and have occurred in every forest with substantial spruce stands. Spruce beetle damage results in the loss of 333 to 500 million board feet of spruce sawtimber annually. In the past 25 years, outbreaks have resulted in estimated losses of more than 25 million board feet in Montana, 31 million in Idaho, over 100 million in Arizona, 2 billion in Alaska, and 3 billion in British Columbia (fig. 1).

Spruce beetle outbreaks cause extensive tree mortality and modify stand structure by reducing the aver-

[1]Entomologist, U.S. Department of Agriculture, Forest Service, Alaska Region, Anchorage, AK.
[2]Entomologist, U.S. Department of Agriculture, Forest Service, Intermountain Region, Boise, ID.
[3]Entomologist, U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

age tree diameter, height, and stand density, leaving small, slow-growing trees and intermediate-sized trees to become dominant.

As mature spruce are killed, forage may increase, benefiting some wildlife species. But species that depend on the mature spruce for habitat may be adversely affected.

Indirectly, extensive spruce mortality can also affect water yields and result in water gains in rivers, lakes, and streams because of reduced transpiration from dead and dying trees.

Hosts

The spruce beetle infests all species of spruce within its geographical range (fig. 2). The more important commercial tree species attacked include white, Lutz, Sitka, and Engelmann spruce.

Evidence of Infestation

On standing trees, the first sign of spruce beetle infestation is reddish-brown boring dust accumulating at the beetle's entrance holes, in bark crevices, and on the ground around the trunk of infested trees. Masses of pitch may accumulate around the en-

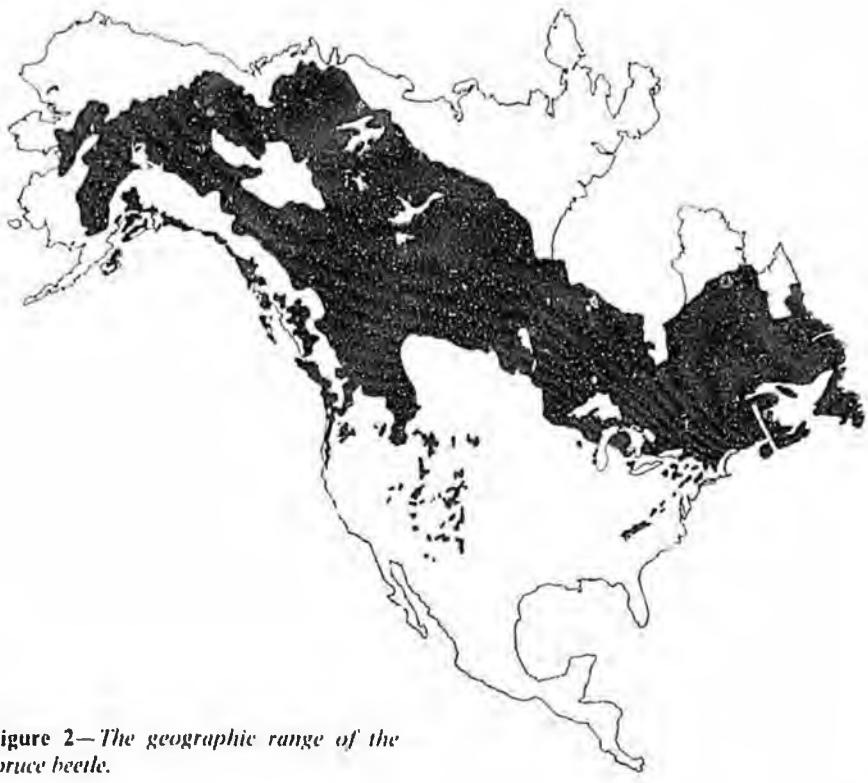


Figure 2—*The geographic range of the spruce beetle.*

trance sites. These signs are most visible the summer following infestation and become less noticeable months later.

On windthrown trees and logging residuals, spruce beetle attacks are readily detected on the lower surfaces of the material and should not be confused with *Ips* beetle attacks more commonly found on the upper surfaces.

Some standing trees may be attacked on only one side of the bole, creating a "strip attack." The infested area may die, but the tree usually remains alive, so the foliage does not discolor. Trees with "strip attacks" frequently are infested by subsequent spruce beetle generations and may host two or more generations simultaneously.

During the first fall and winter following spruce beetle infestation, one should look for trees "debarked" by woodpeckers (fig. 3). Partially debarked, green trees are easily noticed. However, on trees without significant debarking, one must be relatively close to see sawdust in bark crevices and around the tree base.

The needles of infested trees do not usually fade or discolor within the first year following attack. However, during the second summer following attack most needles turn yellowish. Some needles even remain green until the third summer, or up to 2 years after the initial infestation. The needles on separate branches of the same tree discolor at different times. Needles are removed periodically from the trees by wind or thunderstorms, leaving the upper crowns of exposed twigs with a yellowish-orange to reddish hue.

Figure 3—*Infested spruce debarked by woodpeckers.*

Identification of the Life Stages

Adult beetles are blackish brown to black with reddish-brown or black wing covers. The beetles are cylindrical, approximately 1/4 inch (6 mm) long and 1/8 inch (3 mm) wide (fig. 4).

Spruce beetles look similar to other *Dendroctonus* beetles and, if no host material is present, can be distinguished from them only by microscopic examination. At first glance, spruce beetles may also be confused with *Ips* beetles in spruce. It is important to remember that the posterior margins of the wing covers on spruce beetles are evenly rounded, while *Ips* beetles have wing covers with concave margins and teethlike projections.

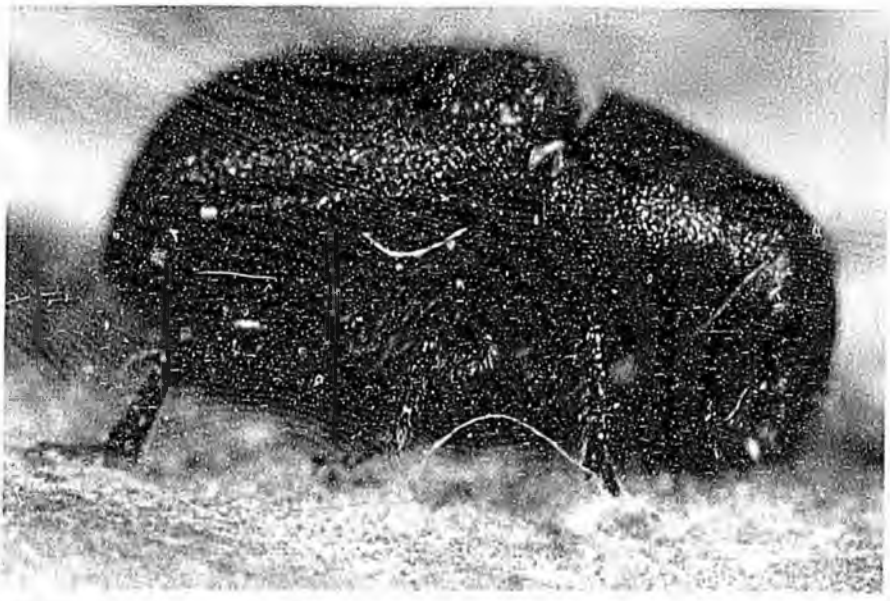


Figure 4—*An adult spruce beetle.*

The eggs of the spruce beetle are oblong, pearly white, and 1/16-inch (1.5 mm) long. The larvae are stout, cylindrical, legless grubs that pass through 4 larval stages (instars) and reach a length of 1/4 inch (6 mm) at maturity (fig. 5). The pupae are opaque white, inactive, and somewhat similar in size and shape to adults.

Life Cycle

Spruce beetles may complete their life cycle in 1 year on warm sites at lower elevations or take up to 3 years on cool, well-shaded locations on north slopes.

However, it generally requires 2 years for the spruce beetle to complete its life cycle. Adults may emerge any time from May to October, depending on temperature. The beetles attack host material soon after emerging. Adults that appear in August to October may represent a reemergence of parent adults or a movement of maturing brood adults to hibernation sites.

Figure 5—*Spruce beetle larvae.*

Figure 6—*Spruce beetle egg gallery and larval mines.*

To deposit eggs, female beetles bore through the outer bark of the host tree and create egg galleries in the underlying phloem tissue. Eggs are laid on either side of the egg gallery (fig. 6). Egg galleries are slightly wider than the beetle and, except for the terminal portion, are packed with frass and boring dust. Egg gallery length ranges from about 2.5 to 12 inches (6 to 30 cm). Eggs are usually deposited in short rows along alternate sides of the gallery in numbers ranging from 4 to 14 eggs per centimeter of gallery.

Most of the eggs hatch by August. The larvae bore outward from the egg gallery and feed as a group for the first and second instars. Third and fourth instars construct individual feeding galleries. The larval stage predominates during the first winter, although adults and eggs may also be present. During the 2-year life cycle, most larvae pupate approximately 1 year after attack. Pupation lasts 10 to 15 days and usually takes place in pupal chambers at the end of the larval galleries.

During the second winter of the 2-year cycle in standing trees, some beetles overwinter in their pupal sites. Other beetles—from 5 to 88 percent—emerge, move to the base of the tree, and bore into the bark near the litter line to hibernate. In windthrown trees, most adults overwinter in place. Approximately 2 years after attack, adults emerge from overwintering sites and attack new host material.

Stand Conditions Conducive to Infestations

Endemic spruce beetle populations usually live in windthrown trees (fig. 7). When beetle populations increase to high levels in downed trees, beetles may enter susceptible, large-diameter, standing timber. Most outbreaks in standing timber originate in windthrown trees.

In mature stands, large-diameter trees ($\geq 18''$) usually are attacked first, an obvious characteristic denoting susceptibility to spruce beetle attack. If an infestation persists in a stand, smaller diameter trees are attacked. Recent evidence from Alaska indicates that tree diameter is important in determining susceptibility only when coupled with less-than-average radial growth in the preceding 5 years. The proximity of uninfested standing spruce trees to infested hosts also denotes vulnerability to attack.

In the Rocky Mountain area, susceptibility of a stand to spruce beetle attack is based on the physiographic location, tree diameter, basal area, and percentage of spruce in the canopy. Spruce stands are highly susceptible if they grow on well-drained sites in creek bottoms, have an average diameter (d.b.h.) of 16 inches or more, have a basal area greater than 150 square feet per acre, and have more than 65 percent spruce in the canopy.

In Alaska, the susceptibility of a spruce stand is based on average tree

Figure 7—*Windthrown trees and logging residuals—prime habitat for beetle populations.*

diameter, age of the stand, condition of the stand, and proportion of white spruce in the canopy. A spruce stand of old-growth or damaged sawtimber is very susceptible to spruce beetle attack if the larger diameter spruce trees have a slower-than-average growth rate, have an average diameter (d.b.h.) greater than 12 inches, and if the stand has more than 70 percent white spruce.

Susceptibility of a spruce stand to spruce beetle attack in British Columbia and the Northeastern United States is based on criteria similar to that used in the Rocky Mountains and Alaska.

Hazard rating systems based on the stand and site conditions discussed above have been developed so that managers can identify stand susceptibility to spruce beetle attack.

Management Strategies

Forest managers can develop various strategies to avoid or reduce resource losses to spruce beetles. Before developing a strategy, the forest manager must evaluate the resource values and economics of management actions for each stand in light of management objectives. The beetle population level must also be considered because population levels will determine the priority of management actions and the type of strategy to be invoked.

The primary strategy should be silvicultural treatments of potentially susceptible stands in order to maintain their health with a moderate growth rate. The first step in this strategy is to hazard-rate spruce stands, which will indicate the most susceptible stands. The stands can then be treated with harvesting directed at the most susceptible stands. Infested logging residuals need never become a significant contributor to spruce beetle populations if stump height is kept below 18 inches (45 cm) and cull logs and tops are limbed, cut into short lengths, and left unshaded, unpiled, and exposed to sunlight. Silvicultural treatments have greater long-term effectiveness, because these treatments modify stand conditions.

The primary strategy assumes, in general, beetle populations are not immediately threatening resource values. If beetle populations are threatening, then strategies involving suppression methods are more appropriate. Suppression methods including silvicultural, physical, and chemical measures are available to forest managers for reducing spruce beetle populations. Some methods are suitable only for populations in windthrown host material; other methods are better suited for infestations in standing trees. Most suppression methods are short-term responses to existing beetle populations and, therefore, correct only the immediate situation.

Figure 8—*Green trees felled to capture emerging spruce beetles.*

Silvicultural Methods:

- *Sanitation overstory removal* involves the removal of all infested and susceptible spruce to encourage regeneration of a new vigorous stand.

- *Sanitation partial* cut involves the removal of infested and susceptible spruce to improve the growth of the residual stand. Sanitation partial cut removes most of the larger trees but may leave a residual stand that is below the recommended level of basal area. This residual stand may be more susceptible to windthrow.

- *Trap trees* are green trees with a diameter greater than 18 inches (d.b.h.) that are felled before beetle flight. Trap trees can absorb up to 10 times the number of spruce beetles that a standing tree will absorb. Once infested, trap trees should be removed from the forest.

Trap trees shaded from direct sunlight attract the most beetles. Spruce beetles attack cool, shaded portions of the trap tree boles (fig. 8). Felled trees should not be delimbed because limbs on the upper side of the bole provide shade while limbs on the underside permit the beetles to colonize the underside of the bole by keeping it off the ground.

Past ratios of trap trees to infested standing trees have ranged from 1:2 to 1:10. Current ratios vary with the size of the green trees to be felled as traps, with the number and size of infested trees in a stand, and with the existing beetle population.

- *Lethal trap trees* are green trees injected with a silvicide and felled before beetle flight. They are effective in areas where traps cannot be removed.

Physical Methods:

- *Solar heat* involves exposing infested logging residuals or windthrow to direct sunlight to kill inhabiting larvae. To maximize brood mortality, residuals should be cut into 5-foot lengths. All branches and debris shading the host material should be removed. The infested material should be rotated at 2-week intervals during the summer to expose all surfaces. While using solar heat is effective in the Rocky Mountains, it is not effective in Alaska, because summer temperatures are not warm enough.

- *Fire* involves piling and burning infested logging residuals and windthrow to destroy inhabiting broods. The infested material is usually green and difficult to burn, but only the bark has to be scorched to destroy the inhabiting brood.

Chemical Methods:

- ***Pheromones*** are chemical substances that influence insect behavior. Synthetic aggregating and anti-aggregating pheromones increase the attractiveness of trap trees, attract beetles into the trees to be cut, or discourage infestation of high-value trees. Aggregating pheromones are most efficient when used with trap trees. Methylcyclohexenone (MCH), an anti-aggregating pheromone, shows promise in discouraging spruce beetles from attacking trees; however, it has not yet been registered by the U.S. Environmental Protection Agency (EPA).
- ***Insecticides***, such as Lindane and carbaryl, can be applied to the boles of uninfested trees to kill attacking adults. In Alaska, carbaryl applied as a 2-percent spray has provided 100-percent protection from attacking beetles for at least 2 years. Cacodylic acid and MSMA (monosodium methanearsonate) are silvicides that can be injected into standing trees, which become lethal trap trees when they are felled.

Assistance

More information about the management of the spruce beetle may be obtained from the State Forester's office or the U.S. Department of Agriculture, Forest Service, Forest Pest Management.

The publications listed in the references provide more information on the biology, ecology, and management of the spruce beetle.

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Pesticides used improperly can be injurious to human beings, animals, and plants. Follow the directions and heed all precautions on labels. Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides where there is danger of drift when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment, if specified on the label.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Environmental Protection Agency, consult your local forest pathologist, county agriculture agent, or State extension specialist to be sure the intended use is still registered.

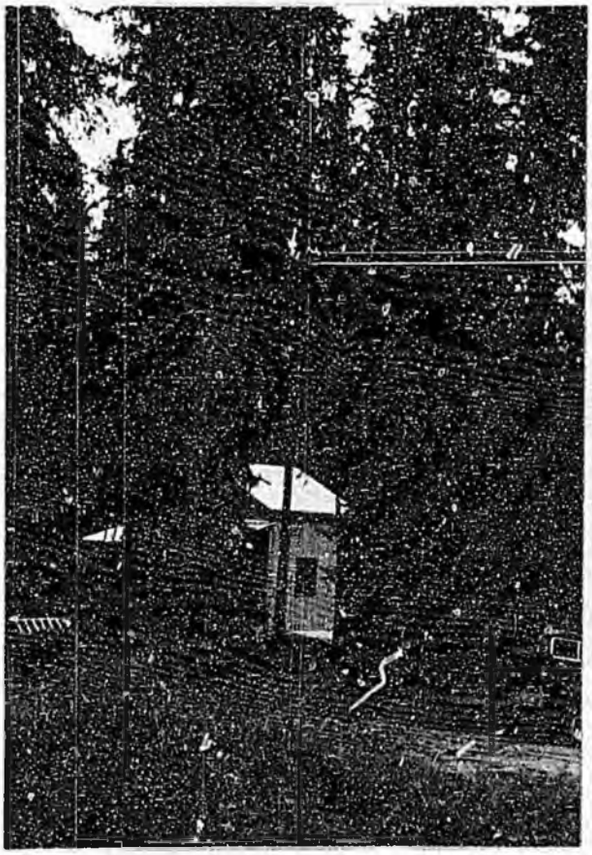
Dangerous Recreation Sites

How many Alaskans will be hurt as these trees fall over?
or
How much money will be spent trying to remove the hazards from our public facilities?

Lost Tourism Dollars $$

How many tourists will not return because of all the dead trees in Kachemak Bay? A five percent decline in visitor spending equates to a $21 million revenue loss to Alaska's economy.

Real Estate Devaluation

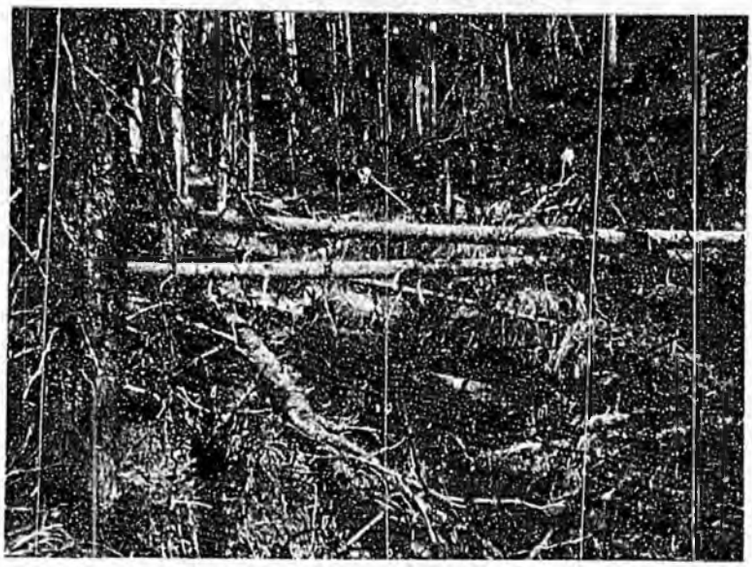


Seven to fifteen percent of home value is often attributed to trees. Note the lost tax revenues this year from the Big Lake area.

Fisheries Impacts

Beetles do not leave streamside buffers. A five percent decline in stream conditions equates to a $21.5 million annual economy loss from sport fishing in the Kenai area alone.

Lost Wildlife Habitat



A game species habitat decline of five percent could cost Alaskans $18.4 million annually.