ALASKA LEGISLATURE COMMITTEE FILES, 1989-1990 8672 369
5965 HOUSE RESOURCES

REGULATORY OVERSIGHT AND ENFORCEMENT OVERVIEW

Alaska State Legislature
HOUSE OF REPRESENTATIVES
COMMITTEE ON RESOURCES

POUCH V
JUNEAU, ALASKA 99811
(907) 465-3715

HOUSE RESOURCES COMMITTEE, OIL SPILL HEARING

Tuesday, January 23, 1990
3:00 to 5:00 p.m.
Capitol Room 124

REGULATORY OVERSIGHT AND ENFORCEMENT

Captain Bodron - Chief, Marine Safety Division
U.S. Coast Guard, Alaska
Role in tanker inspections, personnel, # of inspections a year and ability to esure compliance. Agreements between Coast Guard and State to allow the state to provide these functions.

Dan Lawn - Department of Environmental Conservation
Difficulties as a field officer to gain access to the Pipeline terminal and suggestions to make access and oversight more effective. Inspections of facilities and tankers in order to prevent oil spills or improve oil spill response.

Larry Dietrick - Director, Environmental Quality
Department of Environmental Conservation
Regulatory concerns relating to Prince William Sound and Cook Inlet.

Mike Williams - V.P. Environmental Planning and Control
Alyeska Pipeline Service Co.
Alyeska's view of appropriate oversight and enforcement of environmental laws and regulatory requirements.

Chuck O'Donnell - Superintendent, Valdez Marine Terminal

Anne Rothe - Chair, Alyeska Citizen's Advisory Committee
Explanation of the federal legislation as it relates to advisory committees and an explanation of the Alyeska citizen's advisory committee and its development. Role of Citizens in oversight of the industry.

Michelle Brown - Assistant Attorney General
Office of the Attorney General
Methods for improving statutes to ensure proper oversight and enforcement as well as incentives for compliance.

Mike Wenig - Staff Attorney, Trustees for Alaska
Proposals for improving oversight and enforcement

NOTES FOR USE AT ALASKA STATE LEGISLATURE HOUSE RESOURCES COMMITTEE - OIL SPILL HEARING

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STATEMENT
OF
MIKE WILLIAMS
Vice President for Environmental Planning & Control
Alyeska Pipeline Service Company
to the
Alaska House Resources Committee on
January 23, 1990

Thank you for the opportunity to testify to the House Resources Committee regarding regulatory oversight of Alyeska Pipeline Service Company, particularly at the Valdez Marine Terminal. I have been working at Alyeska on the Prince William Sound oil spill prevention and response plans since April 1989. On October 1, 1989, I became Alyeska's Vice President for Environmental Planning and Control. My brief testimony relies on Alyeska records, information from Alyeska employees, and personal experience.

Chuck O'Donnell, Alyeska's Valdez Marine Terminal Superintendent, is with me today to provide detailed information about the access rules he agreed to on September 21, 1989 with Bruce Erickson, DEC.

Alyeska wishes to make two suggestions today that we believe will improve not only regulatory oversight, but the relationship between industry and State government.

First, Alyeska believes it is most critical that agencies - especially the DEC - are adequately funded. Without adequate funding, the DEC is unable to develop and implement clear and concise regulations. Without adequate funding, the agency cannot employ enough qualified employees to interpret and enforce these

regulations across all walks of industry. Without good, clear, concise and scientifically accurate regulations, it is difficult - if not impossible - for industry to operate free of controversy with an agency. With funding, both sides benefit.

The second recommendation we wish to make is that a State law be introduced requiring all State and local government inspectors who have inspected a facility to give a verbal report of their findings to the facility's management before they leave the premises. This verbal report should be followed by a written report within seven days. In some cases, this or a similar procedure is already used. In those circumstances, the procedure has proven most beneficial for the agency and industry. It gives the management of the facility and the agency the opportunity to discuss concerns, but more importantly it gives the management a chance to rapidly fix any problems that may have been noted.

Before a state or local government inspector can carry out his duties, he must have access to the plant or facility.

Alyeska, like all other responsible corporations, has a real, ongoing concern for safety at our facilities. In any plant that handles crude oil or gas, there is the risk of fire and explosion. These risks are minimized by controlling the access of all people in these areas.

At Alyeska, for access to facilities such as the terminal, all visitors, including senior officials of the company, must state which part of the facility they wish to visit and must be accompanied to that area by trained personnel who know what is happening in that area at that time. We want to protect all

visitors and our own personnel from the potentially harmful consequences of inappropriate conduct by untrained people who lack detailed knowledge of daily changes in the operation.

Alyeska is frequently compared to the Sullom Voe terminal on the Shetland Islands. Alyeska's rules are, in fact, less stringent than those enforced at Sullom Voe where, for example, all visitors are escorted and no cameras or recording equipment are allowed.

Access to Alyeska's facilities such as the terminal cannot be free ranging for anyone. As you can see from the attached correspondence, Alyeska and the DEC agreed in 1986 to rules for routine access to the Valdez Marine Terminal. Chuck O'Donnell, Superintendent of the Terminal, will summarize these rules during his testimony.

Except for Alyeska's request to receive 24 hour prior notice of routine visits, which DEC has never adhered to, Alyeska continued to apply these rules until September 21, 1989 when Chuck O'Donnell, on behalf of Alyeska, and Bruce Erickson, on behalf of the DEC, clarified them to ensure that DEC personnel are allowed to enter the facility within 5 minutes of their arrival at the perimeter gate.

In summary, we wish to develop a good working relationship with the agencies concerned with good safe work practices.

I believe we have a good relationship with many agencies. We receive good cooperation and constructive feedback essential to problem solving from the federal Department of Transportation and

Bureau of Land Management and State Department of Natural Resources and Department of Environmental Conservation inspectors at our pump stations. However, we have had problems and misunderstandings with some DEC inspectors in Valdez. We have had very little feedback based on inspectors' trips to the terminal. We have unsuccessfully tried to use state public records act requests to obtain reports covering agency visits to the Valdez terminal. This lack of information exchange and cooperation is not good for us or for the DEC.

We hope that these confrontational patterns are a thing of the past. Alyeska wishes to work closely with all agencies and to rely on cooperation, not confrontation, in our future relationships.

Q. Does Alyeska agree with the Oil Spill Commission recommendations that Alyeska provide the DEC with an office at the Valdez Marine Terminal?

Alyeska presently provides work space and a telephone at the terminal security building to federal and state regulators.

Alyeska is willing to discuss different arrangements with the DEC. Alyeska would be receptive to the proposal so long as DEC personnel agree to an escort to other parts of the terminal and provide a verbal briefing after each inspection and send copies of inspection reports within seven days.

STATEMENT OF CHARLES F. O'DONNELL
Valdez Marine Terminal Superintendent
Alyeska Pipeline Service Company
to the
Alaska House Resources Committee on
January 23, 1990

Thank you for the opportunity to testify. I began working for Alyeska as a lead controller in the Operations Control Center in October 1976.

In 1978 I became Manager of the Operations Control Center in Valdez that operates the pipeline. In April 1987 I was transferred to become Marine Manager at the terminal. I became Terminal Superintendent in June 1988 and continue to have that job.

As Terminal Superintendent, I am responsible for the safe operation of the terminal consistent with environmental regulations. As explained by Mike Williams, the rules for access to the terminal are designed to protect the safety of all concerned and accommodate the DEC's need to inspect our facilities.

Since 1986 we have asked the DEC to abide by the following rules:

1. We would like to receive one day's prior notice for routine visits.

2. Routine visits should occur during normal business hours of 8:00 a.m. to 4:30 p.m.

3. Agency personnel must be accompanied onto the terminal by an authorized Alyeska supervisor, or if

one is not available, by a security guard. Alyeska's supervisor will ensure compliance with terminal safety rules, will answer questions, and provide access to Alyeska records and data.

Alyeska agrees that the prior notification and daytime visit requirements are not applicable to emergency or unusual circumstances. As a matter of practice, the DEC has not provided one day prior notice of routine visits. Otherwise, these access rules have worked since 1986.

In July 1988, after becoming Terminal Superintendent, I agreed with Dan Lawn that DEC personnel should not be required to wait longer than 15 minutes at the terminal gate for an escort. This procedure was acceptable to the DEC until September 21, 1989 when I agreed with Bruce Erickson, on behalf of the DEC, to reduce the maximum waiting time at the gate to 5 minutes. Initially, Alyeska placed an additional security guard on daytime shifts to ensure compliance with this standard. I have also assigned Jim Wilson, an Alyeska employee, to the primary responsibility of providing timely access for DEC and other agency personnel.

As you can see from the attached data taken from gate logs for a period from June 1988 through September 1989, DEC visits to the terminal occurred as frequently as 41 times in one month, indicating that Alyeska's access rules did not interfere with the agency's work.

Consistently since 1986, Alyeska has requested feedback from DEC inspectors about their observations at the terminal. For example, we have requested the DEC to work with us to develop and

use a standard vessel inspection form. Several years ago we developed an inspection form with the Coast Guard that allows us to quickly identify and correct vessel operational problems during loading and identify problem trends needing attention. Immediate identification of DEC concerns during vessel loading should be addressed initially by the vessel. If a vessel is not responsive, Alyeska's marine supervisors are authorized to stop the vessel loading operations to prevent a potential pollution discharge. Similarly, we would like feedback on all DEC visits to enable us to evaluate corrective measures when problems are noted.

Unfortunately, we do not receive the substantial feedback from DEC inspectors that is essential for a constructive relationship. I agree with Mike Williams that state law should require agency inspectors to tell facilities managers what they find during visits and inspections.

Thank you again for seeking our views on Alyeska's relationship with the DEC in Valdez.

TABLE A
VISITS OF A.D.E.C. EMPLOYEES TO ALYESKA TERMINAL, BY MONTH

MONTH	TOTAL VISITS
JUNE 1988	10
JULY	39
AUGUST	41 (see table B for detail)
SEPTEMBER	36
OCTOBER	30
NOVEMBER	10
DECEMBER	1
JANUARY 1989	11
FEBRUARY	0
MARCH	8 (pre-spill 4: 3-11, 3-12, 3-12, 3-16) (post spill 4: 3-24, 3-29, 3-31, 3-31)
APRIL	32 (see table C for detail)
MAY	8
JUNE	7
JULY	11
AUGUST	17
SEPTEMBER	12

TABLE B, PAGE 1

DATE	TIME	A.D.E.C. EMPLOYEE	ALYESKA CONTACT	PURPOSE OF VISIT
8-1	0900 0910	D. LAWN, T.McCARTY	R. BROWN	SLUDGE PIT, IMPOUND BASIN
8-1	1539 1554	D. LAWN, T. McCARTY	R. BROWN	SLUDGE PIT, IMPOUND BASIN
8-2	1019 1039	D. LAWN, T. McCARTY	R. BROWN	SLUDGE PIT, IMPOUND BASIN
8-2	1519 1535	D. LAWN, T. McCARTY	R. BROWN	SLUDGE PIT, IMPOUND BASIN
8-3	0831 0855	D. LAWN, T.McCARTY	R. BROWN, C. ROBINSON	SLUDGE PIT, IMPOUND BASIN
8-3	1453 1615	T. SCVANCARA	R. BROWN, K. GILSON,	SLUDGE PIT, IMPOUND BASIN.
			R. SARNACKI	INSPECT TANKER
8-3	1453 1508	D. LAWN	R. BROWN	SLUDGE PIT, IMPOUND BASIN
8-4	1413 1515	D. LAWN, G. MAGRR (sp?)	R. BROWN, C. ROBINSON	SLUDGE PIT, IMPOUND BASIN,
				AREA 19
8-5	1027 1107	D. LAWN, T. McCARTY	L. SHIER	IMPOUND BASIN, BUT, DAF CELLS
8-5	1426 1451	D. LAWN, T. SCVANCARA	L. SHIER	INSPECT TANKER
8-8	1138 1202	D. LAWN, T. SCVANCARA	C. ROBINSON	VAPOR RECOVERY
8-9	0956 1108	D. LAWN, T. McCARTY	guard CRAIG, R. BROWN	ADMIN BLDG
8-10	1500 1532	D. LAWN, T. McCARTY	R. BROWN	SLUDGE PIT
8-11	0925 1035	D. LAWN, T. McCARTY	L. SHIER	DESTINATION UNKNOWN
8-11	1459 1602	T. SCVANCARA	P. KOSZAREK	TANKER INSPECTION
8-12	0852 0932	D. LAWN, T. McCARTY	R. BROWN	DAF CELLS, SLUDGE PIT, BUT
				IMPOUND BASIN
8-15	1032 1214	T. SVCANCARA	J. BALDERIDGE	ALL BERTH TANKER INSPECTION

TABLE B, PAGE 2

DATE	TIME	A.D.E.C. EMPLOYEE	ALYESKA CONTACT	PURPOSE OF VISIT
8-15	1509 1527	D. LAWN, T. McCARTY	R. BROWN	DAF CELLS, E. IMPOUND BASIN,
				SLUDGE PIT
8-16	0845 1119	T. SCVANCARA	J. RUNNELLS	TANKER INSPECTION
8-16	1001 1045	D. LAWN, T.McCARTY	C. ROBINSON	AREA 19, W.FIREWATER PUMPHOUS
				VALVE 746
8-18	1505 1544	D. LAWN, T.McCARTY	J. RUNNELLS, R. OLIVER	VALVE 746, 747, IMPOUND BASIN
				SLUDGE PIT
8-19	0955 1039	D. LAWN T. McCARTY	C. ROBINSON	VALVE 746
8-19	1430 1555	T. SCVANCARA	J. RUNNELLS	TANKER INSPECTION
8-19	1458 1525	D. LAWN, T. McCARTY	C. ROBINSON	VALVES 746,747, SLUDGE PIT
				IMPOUND BASIN
8-22	1033 1100	D. LAWN	C. ROBINSON	VALVE 746
8-22	1420 1555	T. SCVANCARA	J. RUNNELLS	TANKER INSPECTION
8-22	1500 1520	D. LAWN, T. McCARTY	C. ROBINSON	VALVE 746
8-23	0957 1037	D. LAWN	C. ROBINSON	VALVE 746, ADMIN OIL SPILL
				BASIN
8-23	1459 1600	D. LAWN, T. McCARTY	C. ROBINSON, R. PUGH,	VALVE 746, POWER VAPOR,
			D. NIBLER	BAL. WATER
8-24	0951 1040	D. LAWN	D. NIBLER, R. PUGH	VALVE 746, SLUDGE PIT, ADMIN
8-24	1505 1557	D. LAWN, T. McCARTY	R. OLIVER, D. NIBLER	VALVE 746, DAF CELLS

TABLE B, PAGE 3

DATE	TIME	A.D.E.C. EMPLOYEE	ARCTIC SLOPE CONTACT	PURPOSE OF VISIT
8-25	0919 0958	D. LAWN, T. McCARTY	D. NIBLER, R. OLIVER	BWT, VALVE 746
8-25	1435 1605	T. SCVANCARA	P. KIHL	B 1-4
8-25	1520 1614	D. LAWN, T.McCARTY	R. OLIVER, D. GREENLEE	SLUDGE PIT, VALVE 746
8-26	0924 1010	D. LAWN, T. SCVANCARA	R. BROWN, C. ROBINSON	BWT
8-26	1515 1550	D. LAWN, T. SCVANCARA	R. BROWN	BWT
8-29	0925 1001	D. LAWN	C. ROBINSON, D. NIBLER	BWT, VALVE 746
8-29	0925 1113	T. SCVANCARA	C. ROBINSON, D. NIBLER	BWT, VALVE 746, BERTH AREA
8-30	1102 1434	D. LAWN	C. O'DONNELL	BWT, VALVE 746, PAGODA
8-31	0909 0926	D. LAWN	R. BROWN	BWT
8-31	1515 1547	D. LAWN	C. ROBINSON	VALVE 746, ASPHALT PLANT

TABLE C, PAGE 1

DATE	TIME	A.D.E.C. EMPLOYEE	ALYESKA CONTACT	PURPOSE OF VISIT
4-1	1342 1341	J. JANSSEN	J. BALDRIDGE, L. SHIER,	ADMIN
			R. BROWN	
4-1	1400 1436	I. JOOR (sp?), J. BUTLER	J. WILSON, R. KENT	BOAT DOCK AREA
4-4	1350 1550	J. JANSSEN, J. HATTSON	L. SHIER, J. RUNNELLS	EXXON BAYTOWN
4-5	1058 1219	J. JANSSEN	P. KIML, R. BROWN	ADMIN
4-6	1351 unk	J. JANSSEN	R. BROWN	UNKNOWN
4-8	0820 1229	H. FRIEDMAN	R. PREVOST, EXXON OFFICIALS	INCINERATOR
4-8	0905 1210	J. LeBEAU	R. PREVOST	W. TANK FARM INCINERATOR
				BURNING MONITORING
4-9	0926 1025	J. JANSSEN, R. CORMACK	GREENLEE	TOUR OF VAT
4-10	0723 0756	R. CORMACK, J. WILLINHAM	D. TAYLOR	B-4,
4-10	0950 1019	J. HALVORSON	C. ROBINSON	B-4, KEYSTONE CANYON
4-10	0823 1657	J. WILLINHAM	PUGH	B-4, KEYSTONE CANYON
4-10	1414 1933	R. CORMACK, J. LeBEAU	R. BROWN, D. BARNUM	B-4 KEYSTONE CANYON
4-11	0707 0816	J. LeBEAU	P. SARNACKI	B-4 KEYSTONE CANYON
4-11	1723 1854	L. TELLER, J. LeBEAU	P. SARNACKI	MARINE OPS
4-12	0816 0938	J. LeBEAU	P. SARNACKI	B-4 KEYSTONE CANYON
4-17	1411 1602	T.McCARTY, R. CRABBE	R. BROWN, P. KIML,	MTG
			C. ROBINSON	
4-20	1542 1953	T. McCARTY, R. CRABBE	C. ROBINSON, J. RUNNELLS	BWT

TABLE C, PAGE 2

DATE	TIME	A.D.E.C. EMPLOYEE	ALYESKA CONTACT	PURPOSE OF VISIT
4-21	0510 0728	D. LAWN	UNKNOWN	B-4, EXXON S.F.
4-21	0547 1044	T. McCARTY	J. BALDRIDGE	B-4
4-21	0642 1044	J. LeBEAU	J. BALDRIDGE	B-4
4-21	1000 1029	E. HAAS	R. PUGH	UNKNOWN
4-21	1530 1712	T. McCARTY	J. BALDRIDGE, R. EVERETT	B-4, B-5, SMALL BOAT HARBOR
4-22	1102 1222	T. McCARTY	J. BALDRIDGE, R. EVERETT	B-4
4-22	1853 1914	T. McCARTY	R. HOLMES	B-4, OBSERVE SALT WATER WASH
4-24	0905 1053	E. HAAS, A. RONIMUS	R. PUGH, GREENLEE	SEE PUGH
4-24	0903 1004	T. McCARTY	J. BALDRIDGE	B-4, SLUDGE PIT
4-24	1016 1053	J. WEBB, J. GILBERT	GREENLEE	MEET OTHER A.D.E.C.
4-24	1611 1643	T. McCARTY	J. BALDRIDGE	B-4
4-24	1930 2013	T. McCARTY	D. NIBLER	B-4
4-25	0859 1118	T. McCARTY	P. KOSZAREK	B-4, B-5
4-25	1821 1904	T. McCARTY	P. SARNACKI	B-4
4-26	1447 unk	A. RONIMUS	D. GREENLEE	P/V W GREENLEE

An Appeal for Significant Improvement in the Enforcement of Alaska's Environmental Laws

Recommended Legislative Remedies

submitted by: Sue Libenson, Executive Director
Alaska Center for the Environment

Mike Wenig, Staff Attorney
Trustees for Alaska

Introduction

In the wake of the Exxon Valdez oil spill, Alaska's greatest environmental tragedy, it is anticipated that the legislature will consider numerous approaches to improving public policy with the intent of preventing future spills. Many of these changes will focus on improvements within the Alaska Department of Environmental Conservation (DEC) which has the bulk of the State's responsibility with regards to oil spill prevention and response.

For any of the legislature's potential actions to succeed, however, they must be backed by one underlying factor - improved enforcement. While there are undoubtedly needs for change in spill prevention and response, the Commission must recognize that the current failure of existing regulatory safeguards is largely due to the inability of agencies, including DEC, to properly enforce the law and thereby create an atmosphere which encourages compliance by potential polluters.

The following outlines a package of legislative recommendations for improving the enforcement of Alaska's environmental laws and regulations. The implementation of these measures will ultimately be improved compliance, the ultimate tool in preventing future pollution catastrophes.

Recommendations

I. Authorize DEC to assess administrative penalties.

II. Strengthen criminal penalties for violations of pollution laws.

III. Authorize DEC to make reasonable inspections without first obtaining a warrant.

IV. Eliminate administrative and judicial "pre-enforcement review" of compliance orders.

V. Provide for citizen suits to enforce environmental statutes and regulations.

VI. Provide adequate funding for DEC to fulfill its regulatory

mandate.

Discussion of Recommendations

I. DEC SHOULD HAVE THE STATUTORY AUTHORITY TO ASSESS ADMINISTRATIVE PENALTIES

Among the tools that are necessary for DEC to have a credible, forceful, and efficient enforcement program is the authority to assess administrative penalties for violations of the State's environmental laws.

Penalties, generally, are an important enforcement tool because they greatly reduce the economic incentives to violate the State's environmental laws. However, DEC currently has the authority only to issue a compliance order requiring corrective action or to commence a judicial enforcement action for civil or criminal penalties.[1] Like most litigation, however, judicial enforcement actions require the State to commit substantial resources and time and, thus, are used only for the most extreme violators. By themselves, judicial enforcement actions cannot provide a sufficient enforcement threat.

A civil penalty program is thus a necessary tool for a credible enforcement arsenal. Administrative penalties could be assessed through a fair yet far less resource intensive administrative hearing procedure than court proceedings. Decisions by administrative hearing officers would be judicially reviewable on the record, rather than through a cumbersome trial

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[1] Two of these three tools, themselves, need to be strengthened, as explained below in sections IV and VI.

procedure.

Administrative penalties would greatly strengthen DEC's enforcement presence and capability by providing the agency with a relatively quick and efficient means of imposing penalties. The authority to assess administrative penalties is particularly important for the relatively numerous yet small violators, for whom DEC's commencement of lengthy judicial enforcement proceedings is simply not worthwhile. By greatly reducing the resources necessary to levy penalties, an administrative penalty program would provide an enforcement threat that is otherwise not present at all for these small violators.

Administrative penalties are an integral component of the federal environmental enforcement program.[2] Numerous state agencies also have the authority to assess penalties for violations of state environmental laws.[3] Administrative penalties should become an essential component of DEC's enforcement arsenal as well.

Of course, merely having the legal authority to assess penalties is not enough. DEC must also be given the corresponding budgetary resources to hire sufficient technical

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[2] See, e.g., section 309(g) of the Clean Water Act, 33 U.S.C. § 1319(g); section 3008(a) of the Resource Conservation and Recovery Act, 42 U.S.C. § 6928(a); section 14(a) of the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 1361(a); section 16(a) of the Toxic Substances Control Act, 15 U.S.C. § 2615(a); and section 109 of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9609.

[3] For example, see Washington, RCW 90.48.144.

staff and permanent hearing officers to make the administrative penalty process work.

II. CRIMINAL PENALTIES FOR VIOLATIONS OF STATE ENVIRONMENTAL LAWS SHOULD BE STRENGTHENED

Stiff criminal sanctions are another essential component of the kind of enforcement program that is necessary to achieve full compliance with the State's environmental laws. The current liability for criminal violations of Alaska's environmental laws is inadequate.

With a few exceptions, negligent and knowing violations of the State's environmental laws are currently only class B and A misdemeanors, respectively. AS 46.03.790(a), (b). Class B misdemeanors are punishable by a fine of not more than $1000 and by imprisonment for no longer than 90 days; Class A misdemeanors are punishable by a fine of not more than $5000 and by a maximum of imprisonment for one year. AS 12.55.035(b)(3), (4); 12.55.135(a), (b).

These liabilities stand in stark contrast with criminal liabilities for violations of federal environmental laws. For example, under section 309(c) of the federal Clean Water Act, negligent violations are punishable by either or both maximum fines of $25,000 per violation and/or one year imprisonment; knowing violations are punishable by either maximum fines of $50,000 per violation or by three years imprisonment. 33 U.S.C.

§ 1319(c).[4]

Alaska's criminal liabilities should be strengthened by making negligent violations Class A misdemeanors and knowing violations Class C felonies, which are punishable by a maxim fine of $50,000 per violation and five years' imprisonment. AS 12.55.035((b)(2); 12.55.125(e). In addition, the definition in AS 46.03.900(17) of "persons" who are subject to criminal sanctions should be amended to include "any responsible corporate officer." See Clean Water Act section 309(c)(6), 33 U.S.C. § 1319(c)(6).

The last legislature increased civil penalties for oil polluters (see SB 271) and considered tougher criminal sanctions in the oil pollution context. The legislature should now complete its mission and stiffen criminal sanctions for violations of all State environmental laws.

As to criminal liability for oil spills, in particular, two bills sponsored by the Governor and introduced in the last legislative session should become law. Among other things, HB 315 classifies as Class C felonies, oil spills of 10,000 barrels or more involving a failure to comply with an oil discharge contingency plan or a failure to adequately clean up a discharge of oil. HB 316 expands the penalties that can be levied against a defendant that is an organization by including fines equal to twice the damage or loss caused by the defendant.

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[4] See also, e.g., section 3008(d) of the Resource Conservation and Recovery Act, 42 U.S.C. § 6928(d); section 113(c) of the Clean Air Act, 42 U.S.C. § 7413(c).

III. DEC SHOULD HAVE THE AUTHORITY TO MAKE REASONABLE INSPECTIONS WITHOUT FIRST OBTAINING A WARRANT

The ability to make inspections to determine whether violations of the State's environmental laws are occurring is still another necessary element of a credible enforcement program. Currently, AS 46.03.860 appears to require DEC to obtain a search warrant before it can investigate possible violations. Federal environmental laws, in contrast, contain no such warrant requirement. For example, section 308(a)(B) of the Clean Water Act expressly provides the EPA with a "right of entry" and with authority "at reasonable times" to make inspections and copy relevant records. 33 U.S.C. § 1318(a)(B).[5]

Consistent with federal environmental law, AS 46.03.860 should be amended to remove the warrant requirement and thereby improve the DEC's ability to investigate potential violations of the State's environmental laws.

IV. THERE SHOULD BE NO "PRE-ENFORCEMENT REVIEW" OF DEC'S COMPLIANCE ORDERS IN EITHER AN ADMINISTRATIVE ADJUDICATORY HEARING OR JUDICIAL PROCEEDING

A sixth tool that is necessary for a sound, effective State environmental enforcement program is the ability of the enforcing agency to issue compliance orders without cumbersome procedural constraints. DEC does not presently have this ability.

Current State law (AS 46.03.850) provides DEC with the authority to issue compliance orders for known or suspected

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[5] See also, e.g., section 3007 of the Resource Conservation and Recovery Act, 42 U.S.C. § 6927; and section 114(a) of the Clean Air Act, 42 U.S.C. § 7414(a).

violations of the State's environmental laws, but the required procedures for issuing such orders are so cumbersome as to render the compliance order an infrequently used and thus ineffective enforcement tool.

State law appears to require that, before DEC can issue an order requiring a polluter to comply with an applicable State environmental law, the agency must first notify the polluter of its finding that the polluter is or may be in violation and give the polluter an opportunity to respond to the finding. AS 46.03.850(a), (b).[6]

In addition, although compliance orders become effective upon receipt (AS 46.03.850(c)), it appears that recipients can subsequently contest the order in an adjudicatory hearing that is required to include the extensive procedural steps set out in the Administrative Procedure Act. See AS 44.62. Recipients of a compliance order can also challenge an adverse ruling by a hearing officer in court. AS 44.62.560.

By requiring DEC to defend an order at administrative and, subsequently, judicial hearings, Alaska law imposes substantial resource constraints on the use of the compliance order as an enforcement tool by DEC (and its legal representatives in the Department of Law). These constraints effectively discourage DEC

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[6] AS 46.03.865 allows DEC to sidestep this pre-notification procedure, but only in the extremely narrow circumstances, where DEC has found that there is an "actual or imminent" discharge of either oil, a hazardous substance, or a low level radioactive material.

from invoking this tool, except in extremely rare circumstances.[7] As a result, the tool has not been used to fulfill its obvious role, as an efficient, relatively quick means for DEC to command compliance with the State's environmental laws and to compel the cleanup of unlawful discharges of harmful pollutants.

As with several of the other enforcement tools discussed above, State law regarding the procedures for issuing compliance orders does not compare with EPA's legal authority to issue orders to compel compliance with federal laws. Federal environmental law generally adheres to the sound policy of not allowing "pre-enforcement review" of EPA's compliance orders. This means that compliance orders which do not also require the recipient to pay an administrative penalty generally can not be challenged in any administrative or judicial proceeding, until and unless EPA commences a judicial proceeding to enforce the order and seeks penalties for violations of the order. At that time, the validity of the order can be questioned by the

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[7] In fact, the right of a recipient to challenge an order in an administrative adjudicatory hearing, by itself, appears sufficient to effectively discourage DEC from issuing compliance orders. DEC's budget does not include sufficient funds for a permanent in-house staff of hearing officers. Thus, when an adjudicatory hearing is requested, DEC must hire hearing officers on a contract basis. The substantial expense of such outside contracting, alone, strongly discourages DEC from issuing compliance orders.

recipient as a defense to EPA's enforcement suit.[8]

As the Second Circuit Court of Appeals recognized, in upholding the principle of no pre-enforcement review of compliance orders issued under the federal Clean Air Act:

> To introduce the delay of court review of administrative action taken to ameliorate a potential public health hazard would conflict with Congress' aim to 'accelerate . . . the prevention and control of pollution.' . . . In short, immediate pre-enforcement review of compliance orders . . . would 'serve neither efficiency nor enforcement' of the Clean Air Act.

Asbestec Const. Services, Inc. v. EPA, 849 F.2d 765, 769 (2d Cir. 1988).

Not until DEC's ability to issue compliance orders is as procedurally unencumbered as that of the EPA, will the compliance order become an effective tool in the State's environmental enforcement arsenal.

V. PRIVATE CITIZENS SHOULD HAVE THE AUTHORITY TO ENFORCE THE STATE'S ENVIRONMENTAL LAWS

The final, necessary, and, perhaps, most critical component of a viable, credible State enforcement program is the ability of citizens to act as "private attorneys general" by bringing suits to enforce the State's environmental laws. This ability is nonexistent under current law.

AS 46.03.760 and 46.03.765 provide State courts with authority to compel the payment of civil penalties and to grant

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[8] For example, section 113(h) of CERCLA, 42 U.S.C. § 9613(h) expressly prohibits federal courts from reviewing challenges to compliance orders, except under limited circumstances, including a suit brought by EPA to seek penalties for a violation of the order.

injunctive relief for violations of the State's environmental laws. But AS 46.03.870 provides that the bases for the enforcement actions listed above "inure solely to and are for the benefit of the state. . . ." Similarly, AS 46.03.890 provides that only State officials are authorized to enforce the State's environmental laws.

The ability of private citizens to enforce environmental laws is a critical supplement to government enforcement because resource constraints inevitably prevent governments from taking all the enforcement measures that would otherwise be warranted. Given the DEC's severely limited enforcement resources (even if a separate enforcement unit like the one recommended above were available), citizen suits are necessary to present to the regulated community a forceful and credible message that violations of the State's environmental laws will not be tolerated.

Congress has wisely recognized the value of citizen suits as supplements to governmental enforcement and thus provided citizens with ample authority to enforce the federal environmental laws.[9] The record of citizens suits to enforce these laws is a strong one. Citizens enforcement actions have proven not to be unreasonable avenues for harassment of industry

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[9] See, e.g., section 505 of the Clean Water Act, 33 U.S.C. § 1365; section 7002 of the Resource Conservation and Recovery Act, 42 U.S.C. § 6972, section 304 of the Clean Air Act, 42 U.S.C. § 7604; and section 310 of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9659.

or the EPA, but to be valuable means for stopping major violators whom the EPA had not been able to reach.

Full enforcement and, in turn, compliance with the State's environmental laws will simply not be achieved without the ability of citizens as well as the government to enforce those laws.

VI. THE LEGISLATURE SHOULD PROVIDE ADEQUATE FUNDING FOR DEC TO FULFILL ITS LEGAL MANDATE OF PROTECTING THE ENVIRONMENT

A State such as Alaska which relies on a healthy environment for many of its economic mainstays such as tourism and fisheries and yet persistently scrimps on environmental protection will continue to run the risk of environmental and associated economic degradation. Current funding levels for DEC not only preclude effective enforcement, they also result in delayed and inadequately researched permits as well as narrow interpretation of regulations intended to protect the environment. Future funding should provide for sufficient personnel, including attorneys, to provide DEC the ability to more effectively enforce Alaska's environmental laws. A commitment to increased funding would more realistically reflect the immense mandate of environmental protection assumed by DEC and the importance of DEC's success in assuring that there will be a viable environment for Alaska's long term needs. We will be working shortly towards providing the legislature with some recommendations for DEC budget needs.

REGIONAL CITIZENS ADVISORY COMMITTEE
750 West Second Avenue, Suite 200
Anchorage, Alaska 99501
(907) 694-9068

January 17, 1990

Senator Bettye Fahrenkamp, Chairman
Alaska State Senate Resources Committee
P.O. Box V
Juneau, Alaska 99811

Dear Senator Fahrenkamp:

I am writing to express the support of the Regional Citizens Advisory Committee for Senate Joint Resolution No. 58 now under consideration by your committee.

The formation of the Regional Citizens Advisory Committee (RCAC) was a cooperative effort between Alyeska Pipeline Service Company (Alyeska) and citizens of Prince William Sound and adjacent areas impacted by the Exxon Valdez oil spill. Efforts to organize this group were guided by recognition of the fact that participation of an informed citizenry is essential to insuring that potential environmental impacts from the operation of the Trans Alaska Pipeline Terminal, including operation of oil tankers served by the terminal, are minimized.

For your information, I have attached a copy of the list of the members of RCAC. The members came together in June of 1989 for two purposes:

1) To review Alyeska's revised oil spill prevention and response plan for Prince William Sound; and

2) To develop a plan of action for the formation of a permanent citizens' oversight group to monitor operation of the Trans Alaska Pipeline Terminal and oil tanker traffic served by terminal.

RCAC members provided Alyeska with our comments on the Prince William Sound Oil Spill Prevention and Response Plan released August 1. Our comments were incorporated into major revisions

to the plan released December 31. We are presently reviewing these revisions and will submit our comments to Alyeska in mid February.

Our chosen course of action for developing a permanent citizens oversight group was to incorporate as a nonprofit organization under Section 501(c)(3) of the Internal Revenue Code and enter into a contract with Alyeska that requires them to provide funding for the citizens group and establishes a formal and verifiable process for insuring that the advice provided by the citizens group is given serious consideration by the company.

We were chartered as a nonprofit corporation by the State of Alaska on December 26, 1989. The organizational meeting of the newly incorporated Regional Citizens Advisory Committee was held January 15. At that meeting, we elected our corporation officers and approved bylaws. Contract negotiations with Alyeska are nearing completion and we anticipate we will have a final contract ready to sign by the end of this week.

While we were organizing RCAC here in Alaska, we were aware that the concept of a citizens advisory committee had been included in oil spill legislation pending in Congress. We carefully reviewed Title V of Senate Bill 686 (authored by Senator Murkowski) and Title VIII of House Bill 1465 (authored by Senator George Miller of California), which deal with the establishment of citizens oversight groups. We felt Senator Murkowski's legislation most closely reflected what we felt was needed, except that it did not provide enough regional representation.

We rewrote Senator Murkowski's Title V to provide broader citizen oversight and took our language to Washington, D.C. in the hope that we could get it included in HB 1465 before it passed the House. Although we were asking for our language to be inserted very late in the House debate on the bill, Congressman Don Young agreed that he would see what he could do. After reviewing the direction of the debate on HB 1465, Congressman Young thought our language would have greater success if he could find another vehicle for its passage. He changed the federal oversight authority outlined in our language from the Environmental Protection Agency (EPA) to the U.S. Coast Guard and attached it to the Coast Guard appropriations bill which passed the House November 7, 1989.

When the House version of the Coast Guard appropriations bill reached the Senate, Young's Amendment (our language) was deleted. The Senate felt the Young Amendment should not have

been attached to Coast Guard appropriations, but should be considered along with S 686 and HB 1465 by the House-Senate conference committee for oil spill legislation to be convened in February. We intend to carry our language to conference committee staff next week.

I have included for your information our final recommendations on this language. Please note that we have given the federal oversight authority back to the EPA because we felt our concerns over the operation of the Trans Alaska Pipeline Terminal and tanker traffic through Prince William Sound fall primarily in their purview as the lead federal agency charged with responsibility for enforcement of the Clean Water Act. We have contacted the offices of Senators Stevens and Murkowski and Congressman Young, and have received assurances that they will help us in our efforts.

In the meantime, we are continuing the task of building our organization. We have established four working subcommittees: Oil Spill Prevention and Response, Port Operations and Vessel Traffic Systems, Terminal Operations and Environmental Monitoring, and Scientific Research and Review. We intend to hold public meetings over the next three months in locations throughout the region represented by our committee to take public comment regarding the scope and purpose of these subcommittees and seek nominations for subcommittee members. In addition, we will seek nominations for ex-officio members from the state and federal regulatory agencies responsible for overseeing terminal operations and tanker traffic in the Sound.

I hope this provides you with an understanding of the purpose and commitment of the Regional Citizens Advisory Committee. On behalf of our committee, I respectfully request that you give your strong support to SJR No. 58.

If you have further questions regarding the Regional Citizens Advisory Committee, please do not hesitate to contact me.

Sincerely,

Ann L. Rothe
President

Enclosures

cc: Members, Regional Citizens Advisory Committee

NATIONAL WILDLIFE FEDERATION

ANN ROTHE
ALASKA REGIONAL
REPRESENTATIVE

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December 12, 1989
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DAVE MOFFAT CITY OF WHITTIER	BEGICH TOWERS CONDO 504 WHITTIER, AK 99693 SS# 179-16-2663	472-2327(WK) 472-2443(HM)	472-2404
STACY PASCAL CHUGACH ALASKA CORP.	3000 A STREET SUITE 400 ANCHORAGE, AK 99503	563-8866(WK) 272-2272(HM)	563-8402
TIM ROBERTSON CITY OF SELDOVIA	DRAWER B SELDOVIA, AK 99663	234-7469(WK) 234-7491(HM)	234-7430
ANN ROTHE NAT'L WLD. FEDERATION	750 W. 2ND AVE SUITE 200 ANCHORAGE, AK SS# 479-70-4492	258-4800(WK)	258-4811
JEROME SELBY KODIAK ISLAND BOROUGH	710 MILL BAY RD KODIAK, AK 99615	486-5736(WK)	486-2886
MARGE TILLON CITY OF HOMER	P.O. BOX 935 HOMER, AK 99603	235-7085(HM)	235-7085
MEAD TREADWELL CITY OF CORDOVA	FIRST STREET BOX 1210 CORDOVA, AK 99574	424-6248(WK) 277-3042(HM)	424-6000

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

The mission of the Department of Environmental Conservation (DEC) is to protect public health and the environment. DEC provides statewide water and sewer construction, management, and technical assistance. It inspects restaurants and food processors. DEC also has broad responsibilities in the highly technical area of pollutant and hazardous waste control. This is the lead agency for oil spill management.

SUMMARY ANALYSIS

The Valdez oil spill placed DEC at the center of state (and national) attention. The FY1990 budget was substantially increased over FY1989, from $20 million to $29 million. For FY1991 the Governor proposed an additional $3.7 million, $2.9 of which is general fund.

MAJOR ISSUES

The Governor has requested $470,000 ($350,000 GF) to expand the Remote Maintenance Worker Program, provide utility management and business services, and enhance the operation of village safewater systems.

Environmental Health increments total $489,300 ($403,800 GF): $109,300 GF is requested for a reindeer inspection program, $249,800 GF to increase seafood inspection capabilities, and $130,200 ($44,700 GF) for the Palmer lab facility, mostly for a pesticide monitoring program.

The bulk of the requested increments fall into the Environmental Quality Projects component: $518,000 from the Oil and Hazardous Substance Release Response Fund will be used to clean up ten additional contaminated sites.

General fund requests total $2,156,300:

$915,500 to enhance oil spill prevention and response (17 full-time positions).
$481,200 for hazardous waste management under RCRA (7 full-time positions).
$437,000 for an investigation and enforcement unit (5 full-time positions).
$186,000 to expand the Prince William Sound Office (2 full-time positions).
$136,600 for toxic air contaminant control positions (2 full-time positions).

The Governor's requested budget for DEC represents a 13.5 percent increase (17.3 % GF) over the FY1990 authorized.

POSITION ANALYSIS

Five full-time and 1 part-time position are proposed to be added to Facilities Construction and Operations to provide maintenance and management assistance to remote villages.

Environmental Health has the proposed addition of a veterinarian for reindeer inspection, three seafood inspectors, and two positions at Palmer for pesticide control.

The Governor proposed 33 Environmental Quality Projects component new positions (as indicated in parentheses) for the increments listed above. In addition nineteen positions were created in the adjusted base (funded by transfer of contractual monies) for various programs including Leaking Underground Storage Tank (LUST), air and water quality, and oil and hazardous response.

Alyeska pipeline
SERVICE COMPANY

1835 SOUTH BRAGAW STREET ANCHORAGE, ALASKA 99512 TELEPHONE (907) 278-1011 TELEX 090-25-1311

March 19, 1986

Mr. William Ross, Commissioner
Department of Environmental Conservation
State of Alaska
Pouch O
Juneau, AK 99811

Dear Mr. Ross:

In an effort to promote a more effective exchange of information between your office and Alyeska, we intend to implement a more defined and hopefully more useful approach to accommodate representatives from your office while at the Valdez Terminal. As you are aware, the Department of Environmental Conservation is empowered to, at reasonable times, enter and inspect any property or premises to investigate or to ascertain compliance or noncompliance with any regulations.

Alyeska intends to put the following procedure into effect as soon as possible: Alyeska will require advance notice of intent to enter the Terminal facilities - preferably one day's notice. Visits should be confined to daytime periods of operation (8:00 am to 4:00 pm). These requirements can, of course, be waived under unusual or exceptional circumstances. In addition, Alyeska will require that before entering the Terminal an ADEC representative will be required to check in with a designated Alyeska representative who will accompany them at all times during their stay on the Terminal to answer any questions or address any concerns they may have at the time.

We believe this approach represents an opportunity to enhance effective communications between your department and Alyeska, without interfering with our respective responsibilities. If you have any questions regarding the implementation or operation of this approach, please feel free to contact me directly at 265-6306.

Sincerely,

C. M. Nelson
President

BILL SHEFFIELD, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION
OFFICE OF THE COMMISSIONER
P.O. BOX O, JUNEAU, ALASKA 99811-1800

Telephone: (907)
907-465-2600

March 27, 1986

Mr. G. M. Nelson, President
Alyeska Pipeline Service Company
1835 South Bragaw Street
Anchorage, Alaska 99512

Dear Mr. Nelson:

I have received your letter of March 19 in which you describe procedures that you believe would facilitate access to the premises of the Valdez Terminal by Department of Environmental Conservation (DEC) staff.

I concur that the procedures are, by and large, reasonable and DEC will conform with them, consistent with the need to discharge our official duties.

As we discussed on the phone, DEC reserves the right to conduct impromptu visits for the purposes of monitoring and/or enforcement activities. However, should the need arise to do either of these, it is reasonable that we check in with your designated representative.

Sincerely,

Bill Ross
Commissioner

cc: Keith Kelton, Director
Environmental Quality, DEC
Bob Martin, Deputy Director
Environmental Quality, DEC
Bill Lamoreaux, Supervisor
Southcentral Regional Office, DEC
Dan Lawn, Environmental Engineer
Valdez District Office, DEC

(B)

U.S. Department of Transportation
United States Coast Guard

Commander
Seventeenth
Coast Guard District

P.O. Box 3-5000
Juneau, AK 99802-1217
Phone: (907)586-7195
Staff Symbol: m

16000
December 19, 1989

Marilyn Heiman
Alaska Oil Spill Commission
707 A Street, Suite 202
Anchorage, Alaska 99501

Dear Ms. Hieman:

Listed below are the number of personnel assigned to the departments at the three (3) Marine Safety Offices (MSO) in Alaska. The departments are broken down as follows:

Marine Inspection: responsible for vessel inspection duties and investigation of marine casualties.

Port Operations: reviews contingency plans; conducts facility inspections; conducts vessel inspections for compliance with navigation and pollution prevention laws; responds to pollution incidents.

Regional Examination Center: responsible for licensing and documentation of seamen.

Vessel Traffic Services:

The numbers listed include personnel assigned to Marine Safety Detachments (MSD) associated with MSO Anchorage and MSO Juneau. The numbers do not reflect the total number of personnel assigned to each unit. For instance, I have not included administration personnel or civilian employees assigned to vessel documentation duties. Nor have I included the commanding and executive officers because they are responsible for all aspects of marine safety within their Captain of the Port/Marine Inspection zones.

You must also realize that many officers and enlisted personnel have multiple responsibilities that transcend the department breakdowns listed above. The information provided is a listing of the primary personnel assigned to each department, but these same personnel may be used in other areas as operational commitments dictate.

	Marine Inspection	Port Operations	Regional Exam Center	VTS
MSO ANCHORAGE	7 officers 1 enlisted	2 officers 14 enlisted	1 officer 1 enlisted	N/A N/A
MSO VALDEZ	2 officers 0 enlisted	0 officers 4 enlisted	N/A N/A	1 officer 10 enlisted 3 civilians
MSO JUNEAU	4 officers 0 enlisted	1 officer 4 enlisted	1 officer 1 enlisted	N/A N/A

16000
December 19, 1989

If you have any questions about the above information or the organization of the Marine Safety Offices please contact Commander Scot Tiernan of my staff at the 586-7689. He will provide you with any additional information you need.

D.E. BODRON
Captain, U. S. Coast Guard
Chief, Marine Safety Division
Seventeenth Coast Guard District
By direction of the District Commander

SOUTH DENALI RESORT DEVELOPMENT PROPOSAL

SUMMARY OF RECOMMENDATIONS

FINAL REPORT OF DOWL ENGINEERS FOR THE DENALI STATE PARK MASTER PLAN UPDATE

MARCH 1989

This paper summarizes the major recommendations of DOWL Engineers for the Denali State Park Master Plan. DOWL, under contract, has studied the park and surrounding region for the past year, identifying recreational and development issues, researching park resources, analyzing visitation trends, working with the park advisory board, and conducting public meetings. Recommendations fall into nine major categories, discussed below.

Copies of the full report are available from Alaska State Parks, Marie Castel, Box 107001, Anchorage, AK, 99510, phone 762-2617. A $5 fee helps defray printing costs.

1. South Denali Visitor Complex, Commercial Lodging. Visitor complex at the park's north end. Major element would be visitor center with 15-20,000 square feet, including parking, information counters, office space, interpretive displays, mountain viewing stations, media rooms, theater, coffee shop, rest rooms, medical aid room, tour staging area, interpretive trails, and employee housing. Medium-size lodge (100-250 rooms) at High Lake, with interpretive emphasis, including trails, displays, etc. A hostel (number of beds unspecified) and campground with 50 regular units and 10-15 walk-in units are also proposed for the complex.

Development of visitor facilities in the park's south end should be considered in the future, if a series of problems are resolved, including the need for land use controls to protect against spillover development.

2. Tokositna Lodge. Small-scale lodge, with 20-40 beds, located in the Long Creek area of the Tokositna Valley, focusing on views of McKinley/Alaska Range and natural history interpretation/appreciation. Designed for low-volume, high-quality experience, with low-rise construction of natural materials. Access by special four-wheel vehicles or air; in either case arrivals and departures would be limited to control noise and disruptions.

3. Zoning of Parklands. Wilderness designation of most of the Curry/Kesugi Ridge, plus the inaccessible area northwest of the Chulitna River (totalling approximately 33% of the park). Natural zone in most of the remainder of the park (about 60% of the total), with a "special management" overlay for the non-wilderness alpine areas of the ridge line and the swan staging/nesting areas of the Tokositna lowlands. Five development zones (about 7%): High Lake, Byer's Lake, Tokositna, South Curry Ridge, and Eldridge Knob. One small cultural zone, where the old Curry Hotel built a viewpoint on Curry Ridge. In sum, these recommendations represent a relaxation of the classification system of the 1975 master plan.

With respect to private lands, DOWL recommends that the Department of Natural Resources (DNR) work with the borough to strengthen the provisions of the Denali State Park Special Use District as a means of controlling undesirable spillover development. DNR should also consider using its zoning authority over private land inside park boundaries.

4. Park Boundary Adjustments. Four adjustments are proposed. A land trade with National Park Service encompassing approximately 5,500 acres would redraw boundaries along the Ruth/Coffee/Chulitna rivers to simplify field management. A 300 acre state-owned parcel north of

the Tokositna River would bring the river's entire length into park status. A 300 acre state-owned parcel north of Blair Lake would be added to ensure protection and provide access. A 500 acre state-owned parcel bounded by the railroad, Indian River, and Susitna River with very high scenic, habitat, and recreational values would be added to enable active management by the Division of Parks.

5. Public Use Cabins. Extensive network proposed along the road system, on lake shores, and in the back-country. Exact locations and numbers would be determined after more detailed study, but general areas and numbers are the Susitna River (several), Chulitna River (4-6), Tokositna River (several), Peters Hills (several), Byer's Lake (6), Lucy Lake, Spink Lake, and Eldridge Glacier Knob (1-2).

6. Wildlife Management. Park should be designated as a separate game management subunit, enabling more comprehensive consideration of park wildlife issues. Petition Board of Game to prohibit bear baiting, which has potential of encouraging negative bear-human encounters. Work with Board of Game and ADFG on possible wildlife viewing designations for certain areas (Eldridge Knob, High Lake, Tokositna, etc).

7. Vehicles. Snow machines would be allowed outside wilderness areas when snow depths are adequate. Off-road vehicles would be prohibited in summer. Airplane landings would be limited to gravel bars and beaches outside wilderness areas on the Tokositna, Susitna, and Chulitna rivers. Landings also would be allowed on Spink, Lucy, Ermine, and Home lakes, plus all un-named lakes intersected by the park's southern boundary. Landings on Curry/Kesugi Ridge prohibited. One designated fixed-wing landing site for Tokositna lodge. Commercial helicopter landings limited to two sites: Eldridge Knob (if interpretive facility is not built); and Tokositna lodge site (outside park if possible). Motorboats would be prohibited on lakes, and upstream of Bunco Lake on the Tokositna River.

8. Recreation Facilities. DOWL recommends a facility development program oriented towards the highway corridor, existing development nodes, and trails. A group campground and additional single camping units are proposed for the Byer's Lake area. A 20-40 unit RV campground and 15-30 unit conventional campground are proposed for the old gravel pit at the park's north end. A system of up to 11 remote campgrounds, each with 3-4 tent sites and pit latrine, is proposed for the trail network. An unspecified number of train stop shelters (probably at Curry and the Gold Creek bridge) would serve as shelters and staging areas for river rafters, train passengers, skiers, and other back country travelers. A Susitna River boat launch is proposed in the Gold Creek bridge area, and a system of raft put-in/take-outs are recommended for the Chulitna River (one suggested site is Honolulu Creek). Major trail proposals include relocating the existing Troublesome Creek trail head and the trail itself between the highway and Optima Pool waterfall. Three new trail heads are proposed on the Parks Highway. The Byer's Lake loop is slated for completion. A new trail would connect Byer's Lake and the Veteran's Memorial. New scenic pullouts are suggested along the Parks Highway, as well as improvement and expansion of existing overlooks.

9. Interpretive Program. In addition to the interpretive elements of the South Denali and Tokositna proposals, DOWL recommends developing an interpretive facility at Eldridge Knob, overlooking the Eldridge Glacier. The facility would be a small enclosed space, with displays and presentation areas, rest rooms, glacier overlook, telescopes, and snack bar. The eight-mile road would be an interpretive facility in itself, with a number of developed turnouts focussing on particular natural features. The road would be restricted to special rubber-tired trams, operated by a concessionaire.

A system of scenic and wildlife viewing overlooks is also proposed, entailing viewing platforms, boardwalks, roofed shelters, displays, and telescopes. Exact locations and numbers are unclear, although Horseshoe Creek and clear water sloughs adjacent to the Chulitna River are mentioned.

SOUTH DENALI PROJECT

DEPARTMENT OF NATURAL RESOURCES
MARCH 1989

Introduction. Denali State Park, located mid-way between Anchorage and Fairbanks on the Parks Highway, offers spectacular views of Mt. McKinley and excellent opportunities for recreation and interpretation of the region's natural history. There have been numerous proposals over the years for a major viewing/interpretive complex on the south side of the Alaska Range, including a visitor center, lodge, trails, and camp grounds. "South Denali" is envisioned as a public/private venture, with federal funding of the visitor center, state funding of infrastructure and recreation facilities, and private funding of lodging. The Division of Parks and Outdoor Recreation (with funding and cooperation from the Department of Commerce and Economic Development and National Park Service) is currently updating the Denali State Park master plan as a means of deciding whether the state should proceed with the South Denali project.

Background. "The Mountain" tops the list of visitor attractions in Alaska. Denali National Park has been operating at or near capacity for over a decade, while the number of tourists visiting Alaska has continued to increase annually. The national park has no plans for expanding its capacity, resulting in the supply of Denali region tourism facilities lagging far behind demand.

Proposals for a south side viewing facility date back to the mid-1960s. Since then, several proposals have been advanced, only to fall short of implementation.

The current master plan update is taking a comprehensive view of the Denali region, identifying and analyzing the full range of social, environmental, and economic issues related to Denali State Park. The master plan will recommend if, when, where, and under what conditions South Denali should proceed. It is scheduled for adoption in April, 1989.

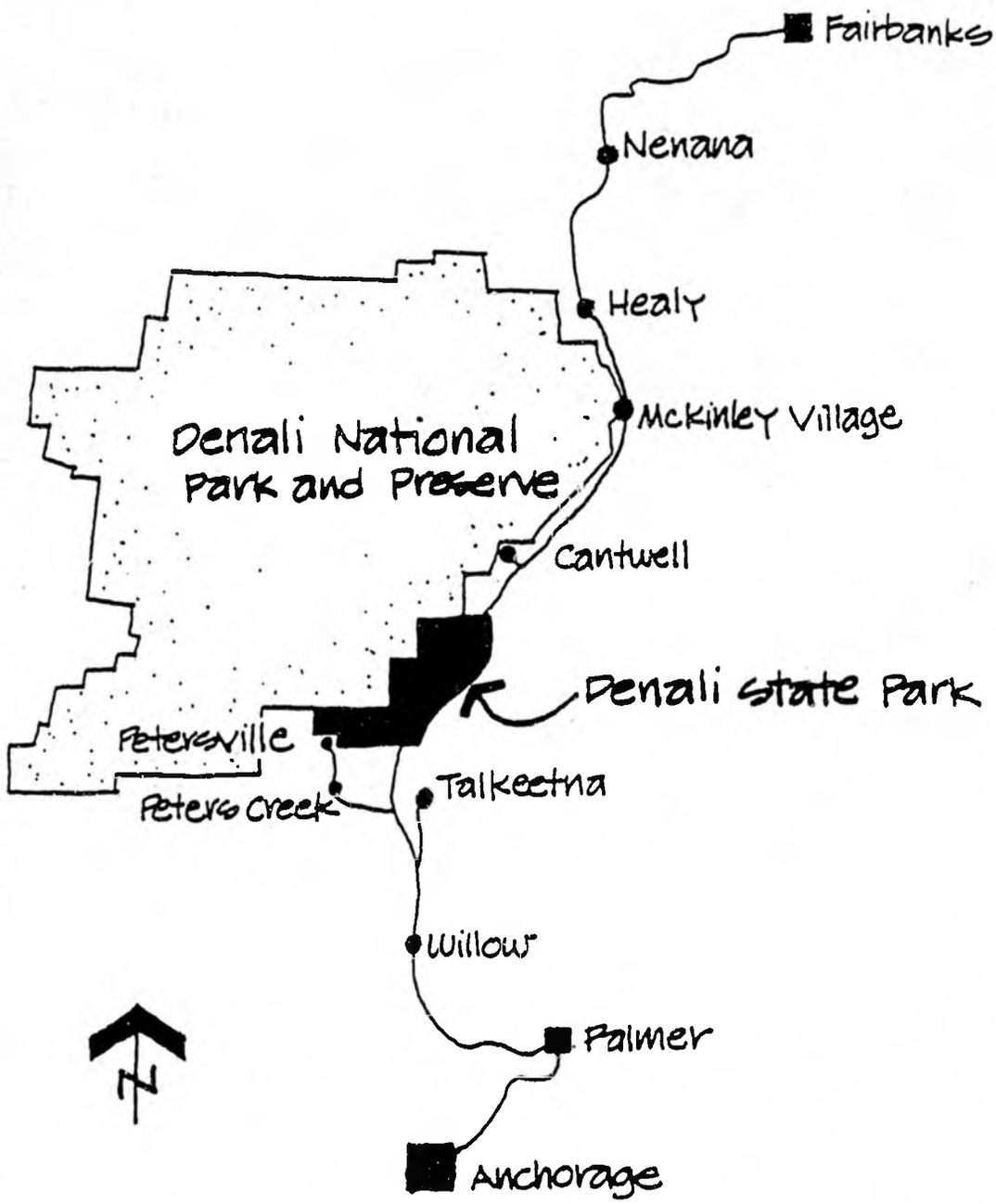
Issues. There is broad support for a visitor center in the Denali State Park (operated jointly by the State and the National Park Service). An important issue centers on whether overnight lodging should be built in the park, as part of the visitor complex. Some argue that commercial lodging should be located outside the park on private (or Alaska Railroad) lands. Others believe that quality control within the park would be much more rigorous, guaranteeing the quality such a project warrants. Another issue concerns the best location for the South Denali complex. A detailed site selection study was conducted as part of the plan update, analyzing sixteen sites inside and outside the park. The park's northern end is the preferred site at this time.

Status. DOWL Engineers, under contract to update the plan, recently delivered its final report. DNR will review DOWL's work, in cooperation with its advisory board, prior to final plan adoption. If the plan directs, DNR will begin implementing the South Denali proposal according to the state concession law. Public hearings would be held in May 1989. A Request For Proposals (RFP) would be issued in September 1989, and construction would begin in mid-1990.

Role of the Legislature. The nature and scale of the South Denali proposal assures a lot of public interest and some controversy. DNR will continue to inform the legislature of its activities and solicit guidance. The National Park Service has offered to fund construction of the visitor center itself, and DNR may request future capital funding for infrastructure and other recreation facilities, as well as operating funds.

For more information. Neil Johannsen
Director, Alaska State Parks
Box 107001
Anchorage, AK 99510
762-2601

David Stephens
Project Manager
Box 107001
Anchorage, AK 99510
762-2653


Fairbanks
Nenana
Healy
McKinley Village
Denali National
Park and Preserve
Cantwell
Denali State Park
Petersville
Talkeetna
Peters Creek
Willow
Palmer
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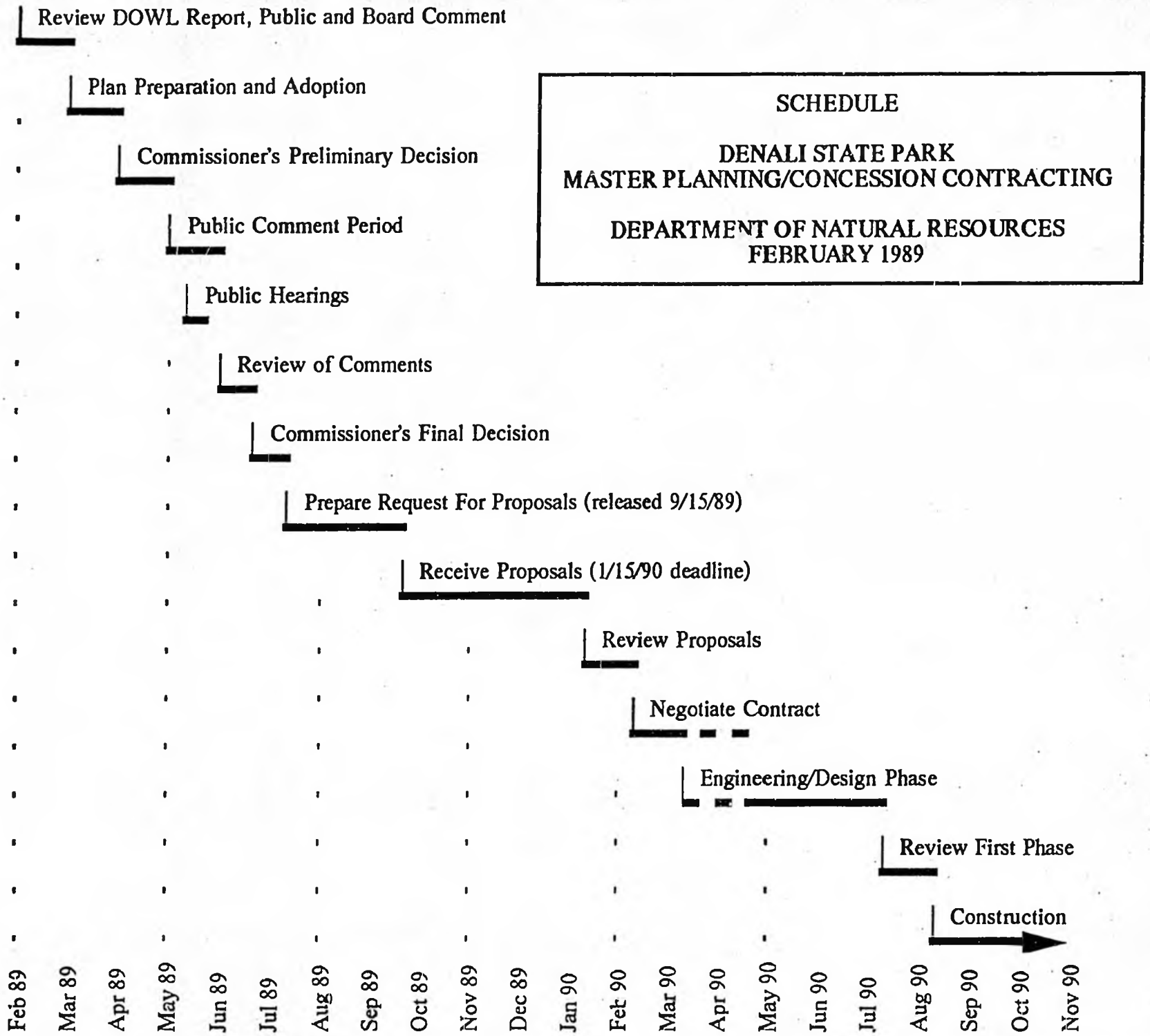


SCHEDULE

DENALI STATE PARK
MASTER PLANNING/CONCESSION CONTRACTING

DEPARTMENT OF NATURAL RESOURCES
FEBRUARY 1989

CHASE COMMUNITY COUNCIL RESOLUTION 89-04

A resolution making comments on the Denali State Park Master Plan.

WHEREAS planning is now in process for development of Denali State Park,

THEREFORE BE IT RESOLVED that as adjacent neighbors to the southeast of Denali State Park, the Chase Community Council makes the following comments on the Denali State Park Master Plan:

We feel that many of the recommendations by Dowl Engineers were good. We were also pleased that the public was involved in the process, although we feel that DNR, (Alaska Department of Natural Resources), has their own agenda contrary to public testimony concerning large scale development. We feel large scale development inside the Park conflicts with the outdoor recreational needs of Alaskans, and is detrimental to the resource base and serves as an attraction in and of itself.

We agree that major tourism lodging facilities should be located outside the Park, at the north end, on private, state, or railroad lands, where there is road and rail access, where there is the opportunity to regulate development on state and railroad lands and where less incidental development will occur.

We feel the same for moderate sized hotels also. High quality lodging, with restaurant, gift shop, associated facilities for patrons and employee housing, is better suited outside the Park so as to ensure a quality experience inside the Park.

We recommend a visitor center close to the highway and close to the lodging outside the Park. If a visitor center has to be inside the park boundary, it should be of modest proportion. If a visitor center has to have office space for Denali State Park and National Park Service, media rooms, coffee shop, gift shop, theater, and employee housing, we feel the Park is best served by having the visitor center outside it. DNR's goal should not be to create idyllic villages in Parks. Hotels, employee housing, tour staging areas, offices, ~~dream~~ IMAX theatre, shops and the like are best situated outside the Park.

We also oppose a high quality backcountry lodge in the Tokositna area because: 1) of local opposition, 2) because a road to a hotel precludes backcountry, 3) because controlled access by a concessionaire in practic e discriminates against Alaskans, 4) traffic due to running a concessions is contrary to a backcountry area. We would not be opposed to an unmanned 20-40 bed shelter accessed by foot, snowmachine, dogsled, skis--i.e. other than by a private road ruled by a concessionaire. This system would better serve the purpose of a low-volume, high-qulaity experience, and likewise give Alaskans an equal chance at reservations as opposed to something run by a concessionaire.

(1)

2

We oppose the Eldridge Glacier Center, primarily because of objections to access. We feel that helicopter access is unsuitable for a qulaity experience and has a negative impact on wildlife. We feel road access has too many drawbacks to be a solution. A limited access tram lane would be too expensive for the State to run; a concession run tram lane would not allow equitable treatment for Alaskans since a concessionsaire would allot seating to his hotel patrons first; unlimited road access would be too disruptive for the back country nature of the area; and further, a bridge would be an outrageous expense when money could better be spent on such mundane but important improvements as road pullouts, scenic overlooks, winter plowing for parking, acquiring private inholdings, etc. that enhance the potential for a high-quality park experience.

Except for the major development facilities mentioned, we are in agreement with most of Dowl's recommendations.

We are in favor of the general zoning recommendations, particularly the recognition of the neccessity for continuing the wilderness status of Curry Ridge.

We are in fovor of the acquisition of inholdings; of DPOR, (DNR's Department of Parks and Outdoor Recreation), working with the Borough to strengthen the provisions of the Denali State Park Use District as a means of controlling inappropriate spillover development; of formalizing cooperative management agreements with appropriate entities, and of working with ADF&G, (Alaska Department of Fish and Game), to establish management practicies for enhanced wildlife viewing.

We support the boundary adjustments.

We support public use cabins.

We support the Wildlife Management recommendations.

We support Dowl's recommndations for vehicles, particularly that airplane and helicopter landings on Curry/Kasigi Ridge be prohibited. We are opposed to commercial helicopters in association with Park activites. We also are opposed to motor boats upstream of the Bunco Lake outlet.

We are in support of the recreation facilities concerning campgrounds and trails.

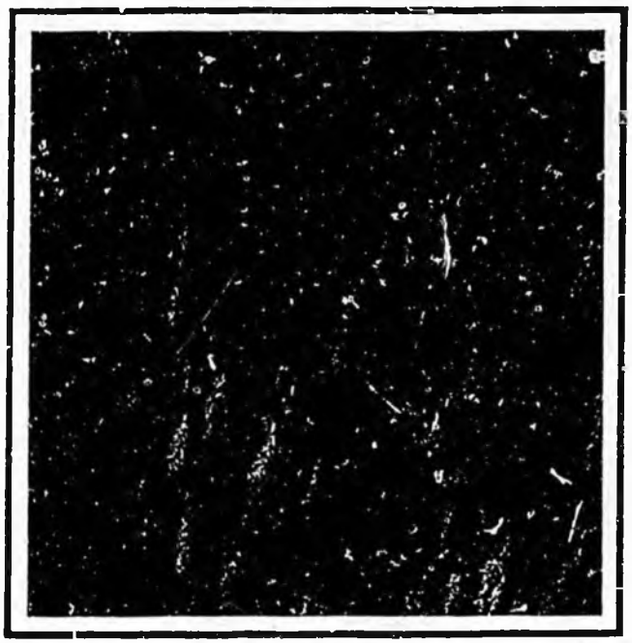
We feel that interpretive programs should be oriented to appreciating and experiencing Denali State Park, not in interpretive facilities that are attractions themselves as tour stops. Theatres showing movies of Mt. McKinley and wildlife are better suited outside the Park, close to the hotels, employee housing, gift shops, media rooms and offices.

Passed Unanimously 3/3/89

(2)

SPRUCE BARK BEETLES

The Spruce Beetle in Alaska Forests



Pacific Northwest Forest and Range Experiment Station
USDA Forest Service, Portland, Oregon
Revised 1982; reprinted 1984

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Cooperative Extension Service
University of Alaska and
U.S. Department of Agriculture Cooperating

A-0-060

The Spruce Beetle in Alaska Forests

by Richard A. Werner

The spruce beetle is a bark beetle that attacks white spruce trees in south central and interior Alaska. Bark beetles kill trees by boring through the bark and feeding and breeding in the phloem — the thin layer of soft living tissue directly beneath the bark. The phloem is vital to trees, as it transports food manufactured in the needles down to the roots. If the phloem is girdled, the tree will die.

Small populations of beetles are always present in white spruce forests. Most of the time, the number of beetles is kept low by parasites and predators of the insect. But when conditions are right, the spruce beetles may suddenly increase to epidemic numbers. The right conditions include an abundance of breeding material accompanied by an extremely dry summer. Beetles attack and breed in fresh windthrown trees, felled trees, injured trees, and logging slash. When the beetle population outgrows the supply of dead and injured trees, they move into nearby living trees, particularly mature stands of white spruce.

Of all the insects that affect white spruce in Alaska, the spruce beetle causes the most damage.

Signs that beetles are present

The primary indication that beetles are attacking a tree is reddish-brown dust which accumulates on the bark, in bark crevices, and on the ground beneath the attacked tree.

Globules of resin or pitch tubes at the entrance hole into the bark are another sign of beetle attack. Entrance holes are usually found in the roots (both exposed and underground) and lower part of the trunk. Early detection requires close examination of trees from early June to mid-July. To determine if spruce beetles are present, remove the bark around an entrance hole to locate the adult and larval tunnels.

Resin flow on newly infested trees

Bark removed by woodpeckers searching for beetles

Beetles that attack healthy, vigorous trees are usually trapped in a mass of resin and "pitched out" of the entrance hole. Trees that have been attacked in this way will have patches of resin flowing down the trunk.

Beetle infested trees are often sought out by woodpeckers and pieces of bark removed by pecking activity accumulate on the ground beneath the trees. This is especially noticeable in the winter when the bark accumulates on the snow.

A change in foliage color is another indication of spruce beetle attack. Needles begin to fade from dark green to pale yellowish-green as early as 1 month after an attack and may remain that color until the following summer. In some cases, needle discoloration may not be noticeable until 1 year after the attack and sometimes not until after the beetles have left the tree. By mid-summer, 1 year after initial attack, many needles have dropped and the tree turns reddish-brown. Three to 5 years following attack, the trees appear silvery-gray and remain that way for many years.

Life history

The spruce beetle in south central Alaska has a 1 or 2-year life cycle whereas those in interior Alaska have a 2-year cycle. Adult beetles emerge from infested trees from mid-May to mid-June, and their flight to fresh host materials lasts until mid-July. When the female beetle finds a suitable host, she bores into the bark and constructs an egg gallery in the phloem parallel to the wood grain and usually above the entrance hole. After mating occurs, the female lays whitish-yellow eggs in clusters on either side of the gallery. Eggs hatch into white grub-like larvae which feed in the phloem cross-wise to the egg gallery. Larvae do not enter the wood but may score the outer surface.

Under section of bark showing larval and adult galleries and pupal chambers (one-half normal size)

Adult beetle laying eggs in phloem (twice normal size)

The insects spend the first winter as larvae beneath the bark. In spring they resume development and eventually transform into white pupae for a short time and then to adult beetles. The parent adults may then emerge from the now dead or dying trees (by boring holes through the bark) and move to fresh trees. However, they may remain with the new adults, overwinter in the dead or dying tree, and emerge the following spring.

Guidelines for reducing beetle infestation

Various activities which disturb the environment of white spruce contribute to spruce beetle attack and epidemic outbreaks. These activities include timber harvest; land clearing related to road, seismic line, pipeline, powerline, or building construction; and severe winds which cause windthrown trees.

Spruce beetle attacks may be prevented or reduced by following these guidelines:

Proper Management of Spruce Forests

1. Maintain spruce stands in a healthy and vigorous condition by removing overmature, diseased, and dying trees.

2. Remove damaged or windthrown trees from spruce stands under management.

3. Establish a stand rotation age (harvest age) of less than 150 years.

4. Timber sale size and orientation of cutting areas are important in creating stands that can withstand high winds. Leave strips between clearcut or shelterwood cutting areas should be more than 100 feet wide. Timber sales should not be located along ridgetops where shallow-rooted spruce are highly susceptible to high wind.

Infested spruce trees

Timber Harvest

1. Overmature trees should be removed from forest stands as they are highly susceptible to spruce beetle attack.

2. Windthrown trees, particularly in recently logged areas, should be removed.

3. All logs cut after September should be removed and utilized prior to beetle flight the following May. Logs cut during the summer months should be removed shortly after cutting.

4. All slash and cull logs 4 inches in diameter and larger should be disposed of by burning, burying, chipping, or peeling.

5. Stumps should be cut as low as possible.

6. Whole tree logging will eliminate most of the breeding material usually left in the forest and concentrate it at the logging landing where it can be destroyed.

Rights-Of-Way Construction

1. Timber along rights-of-way for roads, seismic lines, pipelines, and power lines should be cut in the fall and the logs utilized before the next spring. Slash should be treated as described earlier. Trees next to the right-of-way should be examined for beetle attacks in late summer following cutting. If trees are infested, they should be removed.

2. Care should be taken to avoid scarring trunks with mechanical equipment, severing roots, altering drainage patterns, or severly compacting the soil.

Proper slash disposal along a powerline right-of-way

Improper slash disposal along a similar right-of-way

Home Construction

1. Trees removed for home construction should be properly disposed of or utilized. If stockpiled for firewood or used for construction, the bolts or logs should be peeled. Mechanical damage to standing trees should be avoided and damaged areas should be cleaned with a knife and treated with commercial pruning tar.

2. Excess soil should not be placed on top of or removed from the area over the root zone. Trees breathe to some degree through the roots and the addition or removal of soil can cause suffocation.

3. Avoid soil compaction around the base of trees and do not surface these areas with rock, concrete, or asphalt. Sewage drainage fields should be located away from trees because excess water can create stress conditions in adjacent trees.

4. Insecticides can be used to protect live trees from beetle attack. Water solutions of chemicals should be applied with a pressurized sprayer to the trunks of trees before beetle flight and attack from May to July. Your local agricultural extension office can provide additional information.

Additional information can be obtained from the following:

Institute of Northern Forestry
USDA-Forest Service
Fairbanks, Alaska 99701

Forest Insect and Disease Management
State and Private Forestry
USDA-Forest Service
Anchorage, Alaska 99504 and
Juneau, Alaska 99802

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SPRUCE BARK BEETLE ACTIVITY/RESEARCH IN ALASKA

- Areas of past insect activity or high landowner interest are mapped from the air annually. A relatively small portion of the entire State, but a significant portion of the Interior's Commercial Forest is thus covered.
- Mapped areas are always on the conservative side as observations can only reflect where canopy color has already changed.
- In heavily infested stands, over 80 percent of the white spruce trees hvae been killed.
- Due to thick organic mat, loss of seed source and cold soil conditions, natural spruce regeneration is slow or impossible.
- Insect mortality results in rapid loss of product value due to checking (cracking) and blue stain fungus.

Regional Volume Implications:

* Lower Yukon River - Estimated 2.5 billion board feet on 225,000 acres between Galena and Anvik (11MBF/acre). No end is in sight.
* Kuskokwim/Holitna Rivers - Estimated 1.5 billion board feet on 125,000 acres. Intense mortality on Kuskokwim. Infestation continues to spread on Holitna (12 MBF/acre).
* Copper River (Glenallen to Thompson Pass) - Estimated 300 million board feet on 50,000 acres along Richardson Highway, Not much left to kill. Surrounding area not mapped. (6MBF/acre).
* Coastal Alaska - Isolated outbreaks scattered from Prince William Sound to Yakutat show that Sitka spruce not immune to bark beetles.
* Tyonek to Mt. Susitna - Estimated 1.2 billion board feet on 450,000 acres. Beetles have killed most of spruce component in the stand. Insects spreading to north as they run out of food source. (2.7 MBF/acre)
* Upper Susitna/Willow - Estimated 250 million board feet on 100,000 acres. No projection of final potential of this infestation has been done.
(2.5 MBF/acre).
* Matanuska River below Chikaloon - Resident population of beetles is static. No dramatic increase in past five years.
* Kenai Peninsula - Estimated 3 billion board feet on 500,000 acres. Acreage and volumes are probably conservative. Most of upper peninsula has 90% + mortality. Old growth stands near Kachemak Bay have suffered 60% loss and infestation continues to kill trees. New outbreaks located near Clam Gulch and Tustumena Lake. No end of this infestation is in sight as they continue to cycle around the peninsula, hitting stands of spruce as they reach viable size and age - just as (or before) the trees become commercial in size on today's markets. (6MBF/acre).
* Beluga River/Mt. Susitna - Estimated 1.2 billion board feet on 100,000 acres. Intensity of mortality being surveyed this week in coordination with the Mat-Su Borough. Most of damage was done within the last 1 to 4 years. (2.5 MBF/acre).

Efforts to Date

- Field evaluations of mortality, volume loss, fiber degradation are just beginning.
- Demonstration area on silvicultural management options for bark beetle control is being set up by the U.S.F.S. on the Kenai Peninsula.
- U.S.F.S. grant funds provide for 75% of only one Division of Forestry employee with focus on Insect and Disease problems. Federal funding is very unstable.
- Developed a risk rating system for forested areas - which will the beetles most likely attack?
- Developed a vegetation management plan for Russian River Campground where spruce beetles have killed all the spruce over 2 inches in diameter.
- This spring we will be cooperating in lethal trap tree pilot studies - a promising new technology thats baits in and kills the insects without killing the tree on the Kenai Peninsula.
- Field distribution of artificial traps to limit spread of isolated flareups of insects detected at early stages will begin this spring.
- Research to determine the susceptibility of Sitka spruce to beetle attacks is being planned in Southeastern, Gulf of Alaska, Prince William Sound and Kachemak Bay. Studies include insect adaptability to wetter climates.
- "Trap tree" application on State land near Devil's Elbow on the Kuskokwim River will get bark removal and burning this spring.
- Annual survey results have been sent to most Regional and Village Corporations and all of the State D.O.F. Offices.

Limiting Factors

- Division of Forestry has extremely limited capability (one person) that is totally dependent on tenuous Federal funds.
- State land in Southcentral with the most active beetle populations have poor to nonexistent access and low volumes of spruce per acre making salvage impractical at this time.
- Kuskokwim River infestation is heavy on State land with limited existing markets and transportation contraints restricting salvage opportunities.
- Federal/State conservation units where logging to salvage trees or reducing spread potential through forest management is not allowed serve as an ongoing source of beetle attacks on surrounding areas.
- Tanana Chiefs are evaluating the Lower Yukon infestation for salvage options. The solution may involve roading to Norton Sound or special barging to the coast. Most of this infestation is on Native Corporation lands.
- Past State land disposals have put isolated private parcels scattered around most forested State land. These parcel holders (at least the vocal ones) are resistant to harvesting on any but extremely small scales and are against roads into "their wilderness". They do however expect the State to keep their property safe from forest fires such as the ones that burned through the insect killed timber at Yosemite this past summer.

Forest Health Through Silviculture And Integrated Pest Management

A Strategic Plan

United States
Department of
Agriculture

Forest Service

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Executive Summary

Objective

Enhance and maintain the health of the Nation's forests by developing an USDA Forest Service strategic plan to be implemented through Forest Service programs and authorities.

Discussion

The need for this plan was emphasized by the 1987 Congressional Appropriations hearings on the Forest Service budget, by expressions of concern by the public, and by the continuing evidence of pests in the forests.

Forest health is a complex subject with both real and perceived problems which can arouse strong emotions. Such problems justify nationwide concern and Forest Service attention.

For purposes of this report, a desired state of forest health is a condition where biotic and abiotic influences on the forest (i.e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives for a given forest unit now or in the future.

A healthy forest can be described by many standards, each related to a management objective for the forest. No single standard or definition covers all objectives. This diversity emphasizes the complexity of the problem. Each forest resource manager will have to decide, based on the management objectives for a particular piece of forest, what actions are needed to provide the forest condition and productivity desired.

Many factors impact the health of the forests. These include global warming trends, atmospheric deposition (air pollution and acid rain), meteorological events, soil erosion, volcanos, insects and diseases, and human activities. In preparing the following plan, a detailed analysis of each factor was impractical. Instead, the forest health issue focused upon insects, diseases, and atmospheric deposition effects. These factors have been most frequently mentioned by Congress, Forest Service administrators, and the general public. The effects of forest pests and atmospheric deposition are examined to understand the processes that affect forest health and the actions necessary to mitigate those effects. Forest pests are often symptoms of forest health problems.

It is possible to identify and treat such symptoms with available remedies.

This report focuses on Forest Service responsibilities and programs. The Forest Service has a role in identifying, researching, evaluating, and implementing responses to forest health concerns. This role is best fulfilled by demonstrating the effectiveness and efficiency of selected actions on lands managed by the Forest Service. By developing, testing, transferring and implementing proven technology, the Forest Service redeems its leadership role in maintaining forest productivity now and in the future.

Throughout the United States, forest land is divided among many owners. Each may have different management objectives for their land. Vegetation may be manipulated to achieve particular purposes using a variety of silvicultural treatments. Such treatments can be effectively used to develop stands and forests that are more vigorous and less susceptible to disease and insects. However, not all lands can be treated immediately and not all lands will receive treatment.

Although more than 60 percent of the over 700 million acres of U.S. forest land could receive silvicultural treatments to enhance forest condition, at the current rate of entry it would take almost 50 years to treat all of the treatable acreage (if all areas received only one entry for treatment). Reserved, inaccessible, nonstocked, unproductive, and a large percentage of non-industrial private forest land will not be affected by silvicultural activities to improve forest health. Therefore, Forest Service leadership, advocacy of silvicultural treatments, and resource management actions will not solve all forest health concerns.

Factors such as weather are beyond the influence of the Forest Service. The Forest Service recognizes its air quality responsibility and has implemented programs to determine atmospheric depositions and receptor relationships. Additionally, the Forest Service is developing actions to manage the effects of atmospheric deposition on ecosystems.

For those forest lands where economics and other societal values permit treatment, the emphasis must be on achieving long-term improvements. Properly applied integrated resource management and integrated pest management represent the best practical solutions available for improving forest condition in the long run. However, for the next decade, suppression and mitigation of forest pests are the most relevant responses to forest health concerns.

Eight forest health issues are identified that relate to Forest Service programs and authorities. These issues include planning, public involvement, resource management, pest suppression, environmental analysis, pesticides, pest control technology, and forest health monitoring. Recommendations are developed for dealing with each issue.

Recommendations

The following recommended options for resolving the issues are proposed as a Forest Service strategic plan to enhance and maintain a healthy forest condition. Some of the recommended options require further analysis and the consideration of alternative procedures before they will be ready for implementation.

ISSUE 1- PLANNING

Integrated forest pest management considerations are not adequately incorporated in forest resource management planning processes.

RECOMMENDED OPTIONS

***Develop procedures for including pest impact information in the next planning cycle.**

***Transfer integrated pest management technology to the National Forest system and states.**

*** Require pest specialist input to National Forest system inter-disciplinary teams conducting forest resource management planning.**

ISSUE 2- PUBLIC INVOLVEMENT

Traditional forest management practices frequently conflict with public expectations.

RECOMMENDED OPTIONS

*** Establish a nationwide information program on forestry and the dynamics of the forest ecosystem.**

*** Require a comprehensive public information effort in conjunction with forest pest management activities.**

*** Train federal, state, and county specialists in conducting public information meetings.**

*** Target high-use recreation areas for intensive integrated pest management.**

*** Clarify and apply integrated pest management policy in wilderness areas.**

ISSUE 3- RESOURCE MANAGEMENT

Certain forest management practices may aggravate forest pest problems.

RECOMMENDED OPTIONS

*** Risk-rate all high-value forest analysis areas for pest outbreak potential.**

***Include integrated pest management in forest resource management prescriptions.**

*** Identify imminent pest risks to high-value resources and reschedule management activities to minimize impacts.**

*** Analyze the feasibility of using fuelwood sales to achieve vegetative management objectives.**

*** Determine optimum levels of forest pest management support.**

ISSUE 4- PEST SUPPRESSION

Mechanisms are needed for prompt responses to pest outbreaks.

RECOMMENDED OPTIONS

*** Include suppression funding need projections in the budget process.**

*** Establish a funding authority to suppress emergency pest outbreaks.**

*** Provide training in integrated pest management for all foresters in the National Forest system.**

*** Update guidelines setting priorities for funding pest prevention and suppression.**

ISSUE 5- ENVIRONMENTAL ANALYSIS

Programmatic NEPA documents permitting timely intervention against pest outbreaks are not available.

RECOMMENDED OPTIONS

*** Prepare programmatic NEPA documentation for potentially controversial pest management activities.**

*** Prepare programmatic NEPA documentation for pest management in forest nurseries and seed orchards.**

ISSUE 6- PESTICIDES

Alternatives to environmentally unacceptable chemical pesticides are needed for integrated pest management systems.

RECOMMENDED OPTIONS

*** Set priorities and conduct research to meet insecticide/ fungicide needs for integrated forest pest management.**

*** Determine Forest Service response to pesticide development needs for integrated forest pest management.**

ISSUE 7- PEST CONTROL TECHNOLOGY

Effective and economical integrated pest management technology is needed to protect forest resources from pest damage.

RECOMMENDED OPTIONS

*** Strengthen integrated pest management technology for major forest pests.**

*** Improve the development of technology to solve operational problems.**

*** Improve the program to transfer integrated pest management technology.**

ISSUE 8- FOREST HEALTH MONITORING

Standardized indicators for monitoring forest health are needed.

*** Establish a task force to identify standards and procedures for monitoring forest health.**

Although specifically applicable to the Forest Service, the actions listed above represent a positive first step for any forest resource management agency seeking ways to respond to concerns about the health of our Nation's forests.

FOREST HEALTH THROUGH SILVICULTURE AND INTEGRATED PEST MANAGEMENT- A STRATEGIC PLAN

INTRODUCTION

PURPOSE

This report describes recommendations for a USDA Forest Service strategic plan to enhance and maintain the health of the Nation's forests.

This strategic plan represents the Forest Service response to the forest health problem and the concerns emphasized by the Members of Congress during the 1987 Congressional Appropriations hearings on the Forest Service budget.

The recommendations of this report focus on Forest Service programs and responsibilities. The Forest Service has a leadership role in identifying, researching, evaluating and implementing responses to the forest health problem. This role is best fulfilled by demonstrating the effectiveness and efficiency of selected actions on lands managed by the Forest Service.

BACKGROUND

Apparently, a large portion of the public perceives a decline in the health of the Nation's forests. During the appropriation hearings on the 1988 Forest Service budget, Members of Congress expressed specific concerns about forest health. Their concern was partially triggered by ongoing outbreaks of gypsy moth, southern pine beetle, western spruce budworm, and mountain pine beetle. An additional concern was the growing need for information that might not be forthcoming about atmospheric deposition (air pollution and acid rain) and root diseases. Members of Congress questioned whether the proper balance was being maintained between short-term, commodity-oriented pest suppression projects and long-term investments in prevention or research.

Forest pest outbreaks seem to have increased in both frequency and severity during the last twenty years. Prior to the 1980s, gypsy moth defoliation exceeding one million acres in any one year occurred only during major outbreaks. Since 1980, at least one million acres have been defoliated annually. Prior to 1970, southern pine beetle outbreaks occurred at 10-year intervals. Since then, there have been three major outbreaks, two of record-breaking proportions. During the last ten years, the most damaging eastern spruce budworm outbreak ever recorded ended while western spruce budworm defoliation climbed to record levels. The mountain pine beetle also continued to cause substantial tree mortality on 3 to 4 million acres per year. In addition, losses from diseases such as fusiform rust, root diseases, and dwarf mistletoes continue at high levels as does concern about the possible effects of atmospheric deposition on sensitive forest resources.

A variety of standards are used to describe a healthy forest. Each standard is based upon specific management objectives for a given forest. No single standard or definition covers all objectives. This diversity reflects the complexity of the problem and the difficulty in defining forest health. Each forest resource manager must determine which forest characteristics require improvement and protection based on the management objectives for the forest. The actions needed to improve forest condition and enhance productivity will vary accordingly.

Throughout the United States, forested lands have many owners. Their diversity is reflected in numerous management objectives that can range from intensive and extensive management to wilderness and non-management. Silvicultural treatments that manipulate vegetation for given purposes can also vary widely. Such treatments can be an effective method to develop stands and forests that are less susceptible to attack by insects and disease. However, not all lands can be treated at once nor will all lands receive treatments. The National Forests can be used as an example. Less than 30 percent of National Forest lands have been identified in Forest Land Management Plans as suitable for timber management. Thus, silvicultural treatments such as regeneration harvests, commercial thinnings, salvage, planting, release, precommercial thinnings and fertilization occur on less than 2 percent of the total area each year. Some additional vegetation management opportunities do exist for wildlife and range management purposes.

Many factors impact the health of forests, including global warming trends, air pollution, acid rain, meteorological events, soil erosion, volcanos, insects and diseases, and human activities. Preparing an analysis of all factors for use in a Forest Service forest health strategic plan was not practical. To make the task manageable, this report focuses specifically on forest insects and diseases and atmospheric deposition as they affect forest health or condition. These factors were most frequently mentioned by Congress, Forest Service administrators, and the general public.

Sociologists deal with the health of our society by using social indicators such as rate of divorce, suicide, school dropouts, and unemployment. Epidemiologists address public health issues using indicators such as the incidence of cancer and heart attack. Forest managers can also address forest health using indicators such as changes in tree growth rate, trends in tree mortality, frequency and severity

of pest outbreaks, production of goods and services, and vulnerability to pests.

The most useful indicators should reflect the many factors influencing forest health. A superficial look at forest health might suppose an overly simple relationship. A forest of vigorously growing trees resulting from proper silviculture, for example, does not assure the absence of forest pest outbreaks. Conversely, forest pest outbreaks do not preclude the availability of plentiful and diverse products, even though visual, recreation, or wildlife resources may be altered or displaced.

By examining forest pests and atmospheric deposition as case studies, the processes affecting forest health, as well as the actions necessary to mitigate those effects, can be better understood.

Until more specific indicators are developed, the desired state of forest health is a condition where biotic and abiotic influences on the forest (i.e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives for a given forest unit either now or in the future.

METHODOLOGY

The primary sources of information for this report were the background documents on major forest pests, pest complexes and atmospheric deposition prepared by subject matter specialists. These background evaluations are summarized in the following discussion section, and are reproduced as Appendices to this report.

SCOPE

All United States forest land is considered in this analysis. However, since its purpose is to develop a strategic plan for specific implementation by the Forest Service, the proposed actions focus on Forest Service programs and authorities. It is expected that successful

Cedar Creek plantation in 1912 when Douglas-fir seedlings were planted- Mt. Hood National Forest, Oregon.

strategies employed by the Forest Service will be applicable to other forest land ownerships.

DISCUSSION

In 1977, the forests of the United States covered over 31 percent of the almost 2.4 billion acres of land and water areas. By 2030, forest land is expected to decrease by about 24 million acres as other land uses take precedence. Most forest losses will occur in lower elevations where accessible land will be acquired for agricultural, industrial, and urban development. The remaining forests will have to supply a greater proportion of goods and services. To achieve higher levels of production, a greater percentage of forest land will require some form of production management. Lands already managed will receive more intensive management. To save shrinking forests from pests, managers will have to move from reactive to proactive strategies. Necessarily, that will mean greater emphasis on prevention and less dependency on suppression to reduce the impact of forest pests.

FOREST HEALTH ENHANCED THROUGH SILVICULTURE AND INTEGRATED PEST MANAGEMENT

Silvicultural changes are the single most important action that can be taken to mitigate forest pest and atmospheric impact on the condition of the forest. Forest resource managers employ vegetation management practices that will produce a desired mix of goods and services. Achieving the desired level of productivity generally requires that the forest vegetation is alive and healthy. Practices that promote short-term goals but are detrimental to plant health can have a negative impact on long-term productivity.

Cedar Creek plantation after 9 years (1921)- Mt. Hood National Forest, Oregon.

Vigorous growth in Cedar Creek in 1939- Mt. Hood National Forest, Oregon.

Silvicultural practices such as site preparation, planting, prescribed fire, release or precommercial thinning from competing vegetation, and various harvesting practices including regenerative cutting, commercial thinning, and salvage can have beneficial effects on forest vegetation if applied properly and in a timely fashion. In addition, other practices that include genetically-improved seedlings may provide opportunities to grow forests that are more resistent to insects and diseases.

The major factor in the overall health of the forest is the vigor of the trees and other forest vegetation. If the majority of the trees in a given area have reached or exceeded their pathological age, or have densities that result in stagnated stands, then these trees become vulnerable to attack by insects and diseases. Silvicultural treatments that manipulate vegetation in such a way as to maintain the vigor of the forest could play a major role in achieving healthy forests. Sound management practices can greatly reduce a forest's susceptibility to insect and disease.

For example, pest attacks are directly related to the vigor of the plants. Plant vigor is influenced by soil structure and fertility, proper plant selection for the locality, competing vegetation, adequate sunlight and moisture, and judicious cultivation. When plants are stressed, insect and disease attacks become prevalent and unrelenting. To obtain desired production levels requires application of pest controlling materials- most frequently chemical pesticides. If the conditions responsible for causing plant stress are not corrected, these pest outbreaks recur year after year. Where rotation periods are long and plant responses to stress-causing conditions are more subtle, stress factors tend to accumulate. If the stress-causing practices are not corrected, conditions in the forest will also trigger pest outbreaks and the forest resource manager is confronted with the potential loss of production.

Integrated pest management, or IPM, is a much used and poorly understood concept in forest protection. IPM is defined in Forest Service Handbook Chapter 3409.11 as "A decision-making and action process incorporating biological, economic and environmental evaluation of pest-host systems to manage pest populations." Unfortunately, IPM is often erroneously interpreted as being an alternative to chemical insecticides for dealing with forest pests.

Frequently, interest in IPM occurs only after pest populations have reached damaging levels. Resource managers often look for quick, efficient and cost-effective solutions. They may consider a series of options among which is an IPM approach that includes the use of a pesticide to control outbreak populations. The IPM option is selected, pesticide is applied and the pest outbreak subsides. But the remainder of the IPM option is often abandoned. No long-term benefits are achieved because the other IPM components are not implemented.

On Cedar Creek plantation in 1981, the forest resource has been renewed- Mt. Hood National Forest, Oregon.

IPM is a strategy for long-term management of forest pest-host interactions. Situations capable of causing potential pest problems are anticipated and avoided or changed before outbreaks occur. IPM includes intensive surveys to provide early pest detection and delineation information; introduction or augmentation of predators, parasites or pathogens that help keep pest populations at low levels; and intervention with appropriate techniques to prevent or disrupt damage-causing behavior or successful reproduction.

IPM also considers the condition of trees and forests, their tolerance for pest effects, and their resilience in being able to recover from pest outbreaks.

IPM must be included in forest management prescriptions to accomplish the long-term goal of minimizing pest impacts. Integrated resource management (IRM) should include the information provided by IPM because IRM encompasses the interaction of all relevant functions in the implementation of forest plans. Integrated resource management is the framework for interdisciplinary considerations on each project with the goal of achieving the management objectives established in the forest plan.

While IPM as a concept is fairly well established, IPM as a practice in forest management is still evolving. IPM practices have not been adopted for several reasons. In some cases, IPM is focused on the pest rather that the host. Cultural practices that mitigate host plant stress-causing factors are essential components of IPM. The initiative for implementing IPM must come from the specialists responsible for forest cultivation. An equally important reason for the low level of IPM usage is the absence of pest impact and pest management information in the forest planning and

resource management decision-making processes. Pest management specialists are not providing technical input in forms compatible with planning and decision-making needs. The technology and skills for solving both of these problems exist or can be developed. However, getting the technical input into the decision-making process will require changes in attitudes, management, organization, and values. The importance placed on improving forest health determines how successfully this change can take place.

Not all forest land will receive integrated resource management treatments to enhance forest health. Of the over 700 million acres of land classified as forest, approximately 38 percent is non-productive, reserved or inaccessible (Table 1). The current rate of management and harvest entry is approximately 8.8 million acres per year (Table 2). At this rate, it will take about 48 years for all treatable land to be treated. Improving unacceptable forest conditions is a long-term undertaking. It will require that the current generation of managers must gain the commitment of their successors to continue forest health initiatives.

TABLE 1. Estimate of opportunities to use Integrated Pest Management specified silvicultural treatments in solving forest pest and forest health problems.

FOREST CLASSIFICATION	FOREST AREA[1]	AREA NOT RECEIVING SILVICULTURAL TREATMENTS	AREA AVAILABLE FOR SILVICULTURAL TREATMENTS
	(thousands of acres)		
NON-PRODUCTIVE FOREST LAND	207,900	207,900[2]	
RESERVED TIMBERLAND	34,916	34,916[3]	
AVAILABLE TIMBERLAND			
FOREST INDUSTRY	70,326		70,326
NON-INDUSTRIAL PRIVATE	274,896		274,896
NON-FEDERAL PUBLIC	39,163		39,163
OTHER FEDERAL	11,429		11,429
NATIONAL FOREST SYSTEM	85,448	29,773	55,675[4]
TOTAL FOREST LAND	724,078	272,589	441,262
PERCENT	100	38	62

[1] Draft RPA 1987 National Data Base.

[2] Noncommercial forest where silviculture is not practiced.

[3] Excluded from many treatments by law.

[4] Identified in National Forest Land Management Plans as suitable for timber management.

TABLE 2. The rate at which forest pest and forest health problems can be improved using the opportunities afforded by current forest management activities.

FOREST CLASSIFICATION	AREA AVAILABLE FOR SILVICULTURAL MANAGEMENT	AREA BEING MANAGED ANNUALLY	AREA MANAGED AS PERCENT OF AVAILABLE [1]
	(thousands of acres)	(thousands of acres)	percent
AVAILABLE TIMBERLAND			
FOREST INDUSTRY	70,326	2,444 [2]	3.5
NON-INDUSTRIAL PRIVATE	274,896	3,456 [3]	1.3
PUBLIC NON-FEDERAL	39,163	1,057	2.7 [4]
OTHER FEDERAL	11,429	309	2.7 [4]
NATIONAL FOREST SYSTEM	55,675 [6]	1,530 [5,6]	2.7
TOTAL	451,489	8,796	1.9

[1] Rate at which the area available for IPM related silvicultural treatments is currently being managed.

[2] Reforestation and TSA in 1986. Source: 1986 U.S. Forest Tree Planting report (tables 4 & 6).

[3] Sum of 667,000 acres reforestation; 282,000 TSI; 506,000 wildlife habitat improvement; 2,001,000 harvested, not reforested (3 times the estimated reforested area). Source: 1986 Report of the Forest Service.

[4] Assumed as same rate as National Forest System.

[5] Sum of 365,000 reforestation; 360,000 TSI,; 155,000 wildlife habitat improvement; 650,000 fuel management. Source: 1986 Report of Forest Service.

[6] The areas where the Forest Service has direct control. The 1,530,000 acres of NFS land are 0.2% of the land with a potential forest health problem.

FOREST CONDITION

Of the more that 737 million acres of land in 1977 with at least 10 percent stocking by forest trees, 29 percent was located within the Pacific Coast states, 19 percent in the Rocky Mountain and Great Plains states, 28 percent in the South, and 24 percent in the North (Forest Resource Report No. 23). Twenty-one states had more than 50 percent forest cover. Of those, 20 states are located in the East and South. The USDA Forest Service administers over 187 million acres, or 25 percent of the forested acreage in the United States.

Approximately 346 million acres of commercial forest land produce 50 cubic feet or more of wood fiber per acre per year. This could mean that as much as half of the forested land in the country may require planned management and protection at some time to maintain its timber productivity. As uses for wildlife habitat, water production, and recreation gain in importance, the remaining 391 million acres may also require management intervention.

The most economically important commercial forest types in the United States are the oak-hickory and oak-pine forests of the East; the loblolly-shortleaf and longleaf-slash pine forests of the South; and the spruce-fir, Douglas-fir-hemlock, ponderosa pine and lodgepole pine forests of the

West. These forests cover a combined total of 422 million acres of which over 219 million acres produce 50+ cubic feet of wood fiber per acre per year.

Tree mortality (primarily unsalvaged mortality) on commercial forest land is one useful indicator of forest health. By examining the relationship between annual mortality of growing stock to inventories of growing stock, national and regional trends in forest condition can be identified and compared. Changes in mortality, calculated by dividing the annual mortality of growing stock by the net volume of the inventory of growing stock, are expressed as a percentage. These data are developed for softwoods and hardwoods for selected years by geographic area (Table 3).

North

In 1952, growing stock mortality as a percentage of growing stock inventory in northern softwood and hardwood forests was 0.78 and 0.62 percent, respectively. The percentage mortality during the intervening years from 1952 to 1976 fluctuated above those figures and returned to approximately the same level by 1987. A 0.04 percentage point increase in softwood growing stock mortality between 1976 and 1987 is attributed to spruce budworm outbreaks in Maine and the Great Lakes States. The downward trend in hardwood mortality observed during this period is not expected to continue due to the spread of the gypsy moth throughout the region and the increased incidence of hardwood dieback, declines, and outbreaks of other hardwood defoliators.

South

The greatest changes in growing stock mortality between 1952 and 1987 occurred in the South. During this period, softwood mortality decreased by the same amount from 0.79 to 0.62 percent. The trend during the intervening years for softwood was generally downward until 1976. From 1976 to 1987, softwood growing stock mortality as a percentage of growing stock inventory jumped 0.25 percentage points. Much of this increase is attributed to southern pine beetle outbreaks during that period. Conversely, while hardwood mortality increased 0.10 percentage points between 1952 and 1962, the trend has been downward ever since. This downward trend may be ending now that the gypsy moth is becoming established throughout the South and oak decline is becoming more prevalent.

Rocky Mountains

Growing stock mortality as a percentage of growing stock inventory in the Rocky Mountains was less in 1987 than it was in 1952 for both softwood and hardwood. The trend for softwood mortality was generally downward during this period while hardwood growing stock mortality increased from 0.88 to 0.94 percent by 1970 before falling to 0.69 percent in 1987. Subsequent inventories are expected to show an increase in softwood mortality due to the extensive damage caused by mountain pine beetle infestations throughout the region. Future trends in hardwood mortality will depend on how extensive and destructive the invading gypsy moth becomes.

TABLE 3. Trends in annual hardwood and softwood mortality form all causes expressed as a percentage of growing stock inventory, by geographic region, from 1952 to 1987. [1,2]

YEAR	UNITED STATES		NORTH		SOUTH		ROCKY MTS.		PACIFIC COAST	
	SOFT-WOOD %	HARD-WOOD %	SOFT-WOOD %	HARD-WOOD %	SOFT-WOOD %	HARD-WOOD %	SOFT-WOOD %	HARD-WOOD %	SOFT-WOOD %	HARD-WOOD %
1952	0.62	0.69	0.78	0.62	0.57	0.79	0.65	0.88	0.60	0.52
1962	0.62	0.75	0.86	0.67	0.56	0.89	0.65	0.87	0.59	0.53
1970	0.55	0.65	0.84	0.71	0.50	0.60	0.58	0.94	0.51	0.47
1976	0.53	0.64	0.74	0.69	0.65	0.58	0.48	0.79	0.46	0.49
1987	0.60	0.59	0.78	0.63	0.86	0.62	0.49	0.69	0.49	0.43

[1] Data source: FRR-23 for 1952 to 1976; draft RPA 1987 National Data Base for 1987. Uses data proposed by FIA of SE Station for South softwood in 1976, and for softwood and hardwood for 1987.

[2] Mortality is determined by dividing total disappearance between mortality and removals based on available observations and other information.

Pacific Coast

Relatively minor fluctuations accompanied the downward trends of softwood and hardwood growing stock mortality on the Pacific Coast from 1952 to 1987. These trends are partially explained on the basis that old growth forests are being replaced by younger, more productive forests. This trend may be ending, however, as Douglas-fir and true fir become the dominant species on sites better suited to pine and other drought-tolerant species. Major outbreaks of western spruce budworm, such as is now occurring in eastern Oregon and Washington, and the Douglas-fir tussock moth could dramatically increase the level of softwood growing stock mortality. The gypsy moth is also a potential threat to Pacific Coast hardwoods but will take several years before it becomes a factor.

National

Modest decreases of 0.02 and 0.10 percentage points in softwood and hardwood growing stock mortality as a percentage of growing stock inventory occurred between 1952 and 1987. Although mortality is increasing, it did not increase as fast as annual growth rate. Net annual growth on commercial forests increased from about 13.9 billion cubic feet in 1952 to 22.3 billion cubic feet in 1987.

From these figures, it is not clear whether or not a national forest health crisis is at hand. However, it is apparent that serious regional and local problems do exist. Where forest ecosystems are continuously subjected to stress-causing influences, their ability to resist or tolerate additional stress loads is diminished.

FACTORS CONTRIBUTING TO PEST OUTBREAKS

Native forest pests are natural components of forest ecosystems. Changes in pest population densities are directly related to vegetation changes within the forest, and how those changes affect the survival of the pest organism. Other factors affecting pest populations include biological, meteorological, cultural, and socio-political events and conditions. In many cases, events within each category interact to mask or accentuate the effect of a single factor. The following is a summary of the more common processes involved in triggering forest pest outbreaks.

Biological

Host condition, predators/parasites/pathogens of the pest, and pest population dynamics may all provide biological triggers for pest outbreaks.

Examples of host-related factors include large diameter trees with thick phloem that maximize conditions for production of large bark beetle broods; mature and overmature trees producing large flower crops that provide an enriched food source for budworms and subsequent larval survival and adult fecundity; and the genetic predisposition of certain clones that serve as reservoirs for pest populations during periods of low pest incidence. Table 4 presents the acreage of susceptible commercial forest by vegetation type and the annual acreage involved in outbreaks of major pests from 1979 to 1983.

The dynamics associated with relationships between a forest insect and the complex of predators, parasites and pathogens that prey on it are usually cyclic in nature. Outbreaks may occur when these biological control organisms are unable to keep pace with increases in pest populations. This is a fairly common condition since most native insects have co-evolved with their predators, parasites and pathogens. A certain amount of inefficiency exists in this relationship; otherwise, extremely efficient predators or parasites would eliminate their prey and cause their own extinction. Predators or parasites that have more than one host are opportunistic and prey on those species that are most plentiful. These situations do not provide a reliable natural mechanism for keeping pest populations from increasing.

Pest populations themselves may also influence outbreak episodes. Pest species that have multiple generations per year have the ability to exploit conditions favorable for population increases. Some individuals in low populations of defoliators may exhibit an aggressive behavior that carries them to a greater number of potential hosts. When an insect invades new areas, the absence of predators, parasites, and pathogens may result in a population explosion producing many times more individuals than the host trees can sustain. A typical example is the gypsy moth introduced into the United States from Europe. The introduced white pine blister rust, Dutch elm disease, and chestnut blight were particularly destructive because the host trees had no resistance to these disease-causing fungi. In general, however, biological factors are subordinate to other causes of pest population outbreaks.

Management

Management activities influencing forest pest outbreaks include activities that, by design or accident, produce forest conditions favorable to the survival or growth of forest pests. There are many examples of management activities on forested lands of the United States that are responsible for some of the more destructive pest outbreaks. Specific examples that frequently occurred in the past include off-site planting; harvest schedules beyond the entomological or pathological rotation for the species or area; planting susceptible varieties (or relying on natural vegetation) in areas of known disease occurrence; increasing stand densities; planting or encouraging the natural establishment of extensive monocultures; failure to remove infested overstory trees during a harvest; and, failure to provide a cultural substitute for the stand mosaic-creating effects of fire. Stand management plans that do not address potential pest problems set up the conditions for serious pest outbreaks.

TABLE 4. Acreage of commercial forests potentially susceptible to outbreaks of major forest pests in the United States and the average annual acreage in outbreak from 1979 to 1983.

FOREST PEST	PRINCIPLE SUSCEPTIBLE HOST TYPES	ACREAGE OF SUSCEPTIBLE HOST TYPES (million)	AVERAGE ANNUAL ACRES IN OUTBREAK (million)
GYPSY MOTH	Oak-hickory; oak-pine; oak-gum-cypress; maple-beech-birch; aspen-birch; western hardwoods.	240.7	5.8
EASTERN SPRUCE BUDWORM	Red spruce-balsam fir; white spruce-balsam fir.	13.8	5.7
SOUTHERN PINE BEETLE	Longleaf-slash pine; oak-pine; loblolly-shortleaf pine.	57.3	9.3
ROOT DISEASES	Southern pine plantations; shortleaf pine; sand pine; Douglas-fir; fir-spruce.	77.1	16.8
WESTERN SPRUCE BUDWORM	Douglas-fir; grand-white fir; western larch; Engelmann spruce.	41.6	6.8
MOUNTAIN PINE BEETLE	Lodgepole pine; ponderosa pine; sugar pine; western white pine.	56.6	4.3
DOUGLAS-FIR TUSSOCK MOTH	Douglas-fir; grand-white fir.	49.2	<0.1
DWARF MISTLETOES	All western pines; true firs; spruces; Douglas-fir; larch; hemlock.	112.3	22.6
FUSIFORM RUST		44.0	15.3

Meteorological

While biological and management factors may predispose forests to pest outbreaks, weather is frequently responsible for actually triggering an outbreak. Droughts or floods can create tree stress and enhance the attack success of bark beetles. Warm, dry weather during periods when defoliator egg hatch occurs increases the survival of the newly-hatched caterpillars. Wind-thrown trees provide breeding sights for borers, engraver beetles, and other bark beetles. High winds may transport large numbers of egg-carrying female spruce budworms into areas with low resident budworm populations. Lightning strikes in southern pine forests create stressed trees that are susceptible to attack and serve as reservoirs for southern pine beetles. Winds may move gypsy moth larvae twenty or more miles beyond generally infested areas into new areas. Conversely, weather conditions adverse to pest populations are the most frequent cause of the collapse of an outbreak.

Atmospheric deposition (air pollution and acid rain) is suspected of influencing forest pest outbreaks but does not fit conveniently into any of the previous categories. Although few specific correlations between forest pests and air pollution or acid rain have been confirmed, research in this country and Europe has established that plants are adversely affected by concentrations of pollutants commonly detected in ambient air samples.

It is difficult to identify a relationship between pollutants and plant stress that trigger pest outbreaks. The task is complicated by the tremendous variation in plant tolerance to different pollutants. Research technology for evaluating atmospheric deposition effects on plants is still evolving. However, scientists continue to suspect that atmospheric deposition contributes to tree stress. The concern is that, as pollution impacts increase, forests will become more susceptible to secondary problems such as insects and disease. If the effects occur over wide areas, the

stage is set for potentially catastrophic forest pest population explosions.

Socio-political

A wide variety of social and political factors influence forest management decisions that can have an impact on forest health. These include public opposition to some vegetation management activities such as clear-cutting, herbicide treatments, thinning, forest type conversion, or tree cutting for any purpose; public opposition to road construction in roadless areas; and, budgetary priorities that preclude mitigation of incipient pest outbreaks that, if left untreated, may intensify or accelerate the deterioration of forest condition.

Policies and practices that fail to recognize forests as dynamic systems may create the conditions they are intended to prevent. The apparent perception by a large segment of the public that mature, stately stands of trees will remain unchanged forever if human interference is prohibited can create potential obstacles to the enhancement and maintenance of healthy forests. As Americans increasingly choose to live in urban areas their attitudes about forestry and the natural environment change and tend to favor protection and preservation rather than consumptive uses. The public perception of what forests should be also influences legislators.

Economics frequently influence decisions that affect forest health. A major problem in management planning is the difficulty in quantifying the value of non-commodity forest resources. The majority of management decisions are therefore bases on the quantifiable benefits accruing from commodity-producing activities and resources. Recreation, water, wildlife, and scenic resource values are generally not factored into the process. Management action essential for preventing or suppressing pest outbreaks or improving forest conditions may be withheld because benefits cannot be calculated. Economics will also determine the extent to which forest conditions will be improved in the future.

Summary

Pest populations respond to conditions within the forest environment. Meteorological and other natural episodes such as wildfire may cause acute, localized, generally short-lived increases in pest levels. Conversely, cultural practices that suspend the progress of plant succession over extensive contiguous areas may increase the probability of pest damage. These practices may produce conditions favoring chronically high pest levels that subside only after a majority of susceptible host trees have been eliminated.

PEST STATUS BY GEOGRAPHIC AREA

Since 1973, outbreaks of six major forest insects have occurred in this country. These include the spruce budworm in the North, the southern pine beetle in the South, the gypsy moth in the North and South, the mountain pine beetle, the Douglas-fir tussock moth, and the western spruce budworm in the West. At their peaks, these outbreaks covered a combined total of 87 million acres. Three major forest disease- dwarf mistletoe, root disease, and fusiform rust- continue to cause serious losses on more than 35 million acres. There is also a high level of concern that atmospheric deposition may be adversely affecting sensitive forest resources. Table 5 summarizes average annual forest pest outbreaks that occurred from 1979 through 1983. The following section summarizes the current forest pest activity in the North, South and West.

North

There are three dominant forest health concerns in the North- spruce budworm, gypsy moth, and atmospheric deposition.

The spruce budworm is a normal component of the spruce-fir type in the Northeast and Lake States. Approximately 10 million acres of red spruce and balsam fir in the New England States and 4 million acres of white spruce and balsam fir in the Lake States are the major forest types susceptible to spruce budworm attack. At intervals of 60 to 70 years, outbreaks of spruce budworms defoliate and kill the mature and overmature trees. During the last New England outbreak (1974-1984), an estimated 1.9 million cubic feet of spruce and fir were killed. When the overstory is killed, the spruce and fir in the understory are released. This sets the stage for another spruce-fir forest and eventually, another spruce budworm outbreak.

The gypsy moth is an introduced forest pest that feeds principally on hardwoods such as oak. It also damages some conifers. Feeding by caterpillars defoliates the trees and causes growth loss. Repeated growth loss can result in tree death. The gypsy moth currently infests approximately 48 million acres of hardwood forests in the Northeast, Ohio, Virginia, and Michigan. At the peak of the last major outbreak (1981), the gypsy moth defoliated 13 million acres in 11 states. Initially viewed as a nuisance pest of the Northeast, the moth spread southward through Pennsylvania, Maryland, West Virginia, North Carolina and Virginia. It now threatens the hardwood forests of the South. Studies from Pennsylvania and other generally infested northern states suggest that heavy and repeated gypsy moth defoliation may cause the death of 50 percent or more of the oak component.

Concern about atmospheric deposition impacts on northern forests has triggered extensive surveys to detect and delineate forests that might be affected by environmental pollutants. Ozone and other oxidants appear to be associated with white pine foliar injury and growth reduction. Although the relationship is still considered circumstantial, pollution-related impacts may also be present in the upper elevation spruce-fir forests of New York, Vermont, and New Hampshire. In most other instances where atmos-

Gypsy Moth.

pheric deposition injury is suspected (particularly in sugar maple and low elevation red spruce stands), the damage has been associated with forest declines that historically have occurred in these forest types. Not answered is the question of what effect, if any, atmospheric deposition has on predisposing these forests to the declines.

In addition, there are a number of other forest pests in the North that impact forest health. Included are ash, maple, oak, and spruce declines; the beech bark, sapstreak, trunk rot, and blister rust diseases; and tent caterpillars, leaf tiers, spittlebugs, and borers. The impact of these pests occur on several thousand to several million acres of forest land every year. Few can be cost-effectively controlled. Most can be minimized on actively managed forest land. An increase in silvicultural efforts to prevent outbreaks of major forest pests in the North will also help decrease the relative impacts of most of these pests.

South

Southern pine beetle and fusiform rust have long been problems in southern forests. More recently, the potential threat of gypsy moth and atmospheric deposition is gaining attention.

The southern pine beetle is a native pest of southern yellow pines with loblolly-shortleaf pine type sustaining the greatest impacts. This type occupies 34 million acres of the more than 57 million acres of susceptible forest in 11 southern states. Over 51 million acres are in state and private ownership.

In 1986, at the height of the most recent outbreak, 46 percent of the susceptible forests were impacted by southern pine beetle attacks. This high level of attack is thought to be associated with increases in stocking density and the age of pine forests in the South. Older, densely stocked stands are more susceptible to attack. Also, large diameter trees produce more beetles per square foot of bark surface. The tremendous numbers of beetles produced are able to overcome the defenses of even the healthiest trees. Outbreaks continue until cold weather or some other factor causes a population collapse.

Fusiform rust is a chronic disease problem on about 15 million acres scattered throughout the 43 million acres of loblolly and slash pines. In young trees, damage causes mortality. Older trees suffer stem breakage and product degrade. Most direct mortality occurs before the trees reach ten years of age. For 1983, losses associated with replanting and tree mortality were estimated at $49 million, making fusiform rust the most costly forest disease in the South. The acreage of new infection is increasing at an average rate of over three percent per year.

Although the gypsy moth has been detected frequently in southern forests during the past ten years, it has only recently reached damage-causing numbers. Defoliating populations now exist in parts of Virginia and North Carolina. The potential threat of the gypsy moth to southern hardwood forests cannot be accurately forecast. The levels of oak mortality in Pennsylvania and the importance of the 119 million acres of hardwood forests to the economies of southern communities are reasons for con-

TABLE 5. Forest pest outbreaks and suppression activity from 1979 to 1983 for the major forest pests in the United States.

FOREST PEST	OUTBREAK LOCATION	ACREAGE AFFECTED	VOLUME LOSS	SUPPRESSION ACRES	SUPPRESSION COST
	(States)	(Million)	(MMCF)	(Million)	($MM)
GYPSY MOTH	DE,ME,MD,MA,NH,NJ, NY,PA,RI,VT,WV	29.1	176.6	1.8	24.2
EASTERN SPRUCE BUDWORM	ME,MI,MN,NH,VT,WI	28.4	841.1	6.9	39.8
SOUTHERN PINE BEETLE	AL,AR,GA,LA,MS,NC,SC TN,TX,VA	46.7	614.5	46.7	6.8
ROOT DISEASES	23 Southeastern and Western states	16.8	242.6	none*	none*
WESTERN SPRUCE BUDWORM	AZ,CO,ID,MT,NM,OR, UT,WA,WY	34.2	241.5	1.0	7.4
MOUNTAIN PINE BEETLE	AZ,CA,CO,ID,MT,NM,NV OR,SD,UT,WA,WY	21.6	398.3	0.9	13.9
DOUGLAS-FIR TUSSOCK MOTH	ID,NM,OR	<0.1	minimal	<0.1	<0.1
DWARF MISTLETOES	MI,MN,WI; all Western states except NV	22.6	1,967.5	0.1	4.5
FUSIFORM RUST	AL,AR,FL,GA,LA,MS,NC SC,TX,VA	15.3	[1]	N/A	N/A

[1] Volume is not calculated for fusiform rust since damage is to seedlings and saplings.

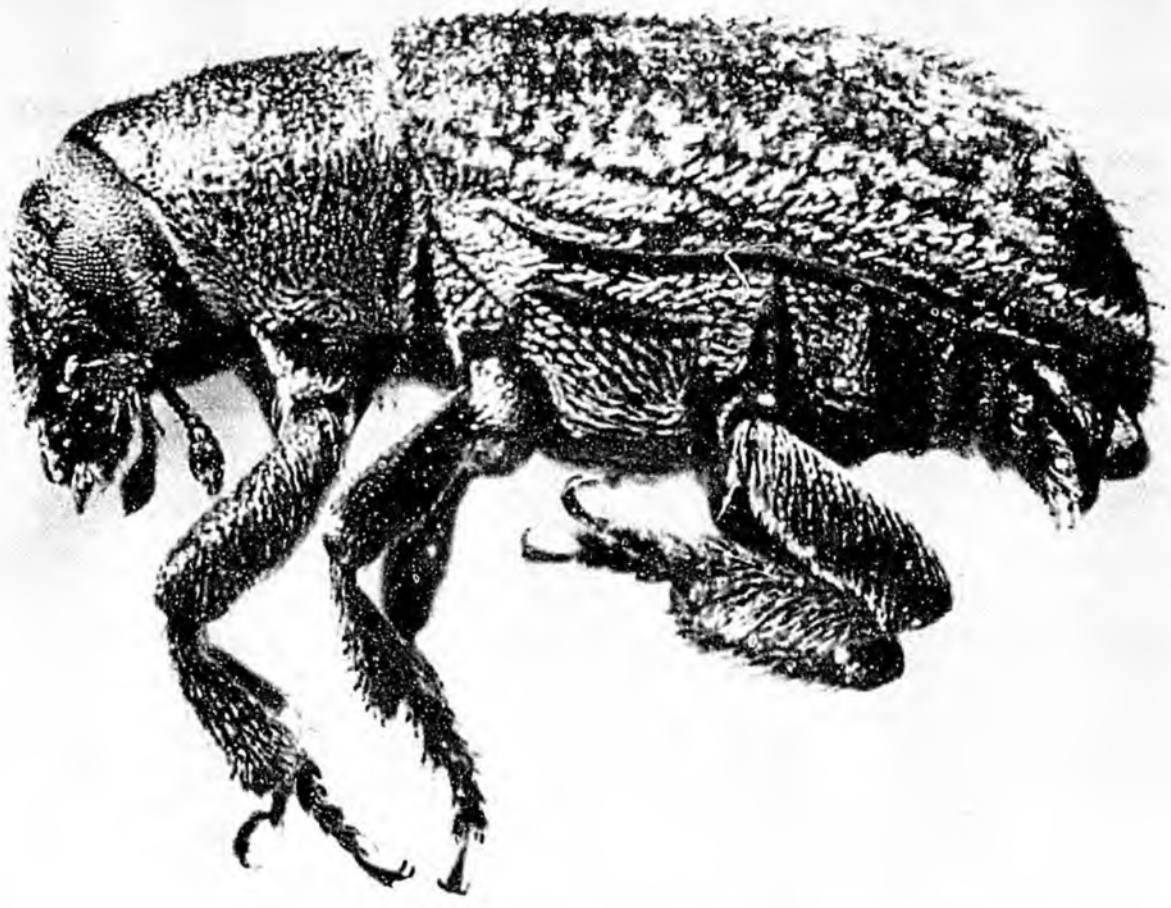
N/A - Not applicable

* No direct suppression.

cern. The southern oak forests are essential to the timber, wildlife, and recreation activities in the region.

Concern in the South for atmospheric deposition generally parallels that in the North. Upper elevation conifer forests in the southern Appalachian mountains show symptoms which may be related to the effects of environmental pollutants. Growth loss in southern pine forests has also been a concern. So far, however, agents other than environmental pollutants have been identified as the most likely and significant contributing factors. This suggests that the effects of atmospheric deposition are mostly indirect, contributing an as yet undetermined level of stress on forest ecosystems. No instance of a southern forest being killed by non-point source environmental pollutants has yet been confirmed. However, recent studies have determined that loblolly pine, cottonwood, and white oak are among those tree species sensitive to ozone. A potential does exist for adverse effects on southern forests from air pollutants.

A condition commonly but mistakenly attributed to the effects of atmospheric deposition is the problem known as "oak decline." Although little information is available about the severity of oak decline in the South, the problem is widely distributed throughout upland hardwood forests. In one sense, oak decline is related to environmental conditions.



Southern Pine Beetle.

Dieback, decline, and mortality generally follow stress-causing episodes of drought, frost, and defoliation.

Southern pest management specialists cite several reasons why oak decline is a potential concern. Oak and hickory mortality averaged 29 percent in decline-affected stands during 1985 and 1986. Oak and hickory stands valuable for timber, recreation, and wildlife habitat are converting to sugar maple, ash and yellow poplar. It is expected that gypsy moth-caused defoliation will place additional stress on the upland hardwood forests.

Root diseases of southern pines represent another problem for the South. Annosus root disease, littleleaf disease, and sand pine root disease potentially threaten over 36 million acres of susceptible loblolly, shortleaf, and sand pine stands. Plantations are particularly vulnerable to these root diseases. Unless cultural practices known to reduce the threat from these diseases are employed within susceptible areas, benefits from tree improvement genetics could be offset by root disease-caused seedling mortality, growth loss, and replanting expenses.

West

Of the major western pests, the mountain pine beetle is the most destructive insect. Unmanaged stands of mature and overmature lodgepole pine and second-growth mature and overmature ponderosa pine, mature and overmature western white and sugar pine, and overmature whitebark and limber pines are all susceptible to attack. Lodgepole pine is the principal host, representing 95 percent of the trees killed during a five-year period (1979-1983). Over 56 million acres of western forests are potentially susceptible to mountain pine beetle attack. Three states- Idaho, Oregon, and Montana- account for over 50 percent of this acreage. As the average age of the susceptible forest type increases, continued destruction from this pest is anticipated.

The western spruce budworm is the most persistent and destructive foliage-feeding insect in the West. A native pest of Douglas-fir, true firs, Engelmann spruce and western larch, the western spruce budworm causes growth and productivity loss and tree mortality. Approximately 41

Dwarf mistletoe in Jeffrey pine, Laguna Campground- Cleveland National Forest, California.

million acres are covered by forests susceptible to this insect. A major outbreak is occurring on over 6 million acres in eastern Oregon and Washington. Outbreaks follow no set pattern and may last up to 20 years. Damage is caused by larvae feeding on buds and needles. Forests most susceptible to western spruce budworm attack are mature, dense stands of shade-tolerant species on dry sites.

Concern about root diseases of western coniferous forests is escalating as the number of unsuccessful efforts to regenerate harvested stands increase and stands previously regenerated become understocked. Although all western forests are affected to some degree by root diseases, Douglas-fir and the spruce-fir types are the most seriously damaged. These two forest types occupy over 50 million acres or 40 percent of the commercial forest land in the West. Tree killing is the most serious consequence of root pathogens. Trees weakened by diseased roots may be predisposed to attacks by other pests such as bark beetles or become vulnerable to windthrow. Root diseases are a management concern on about 15 million acres of western commercial forest land. Five states- California, Idaho, Montana, Oregon, and Washington- account for over 86 percent of this acreage. The incidence of root disease problems is expected to increase due to management activities that favor Douglas-fir and true firs.

Most of the conifer species in the West are parasitized by dwarf mistletoes. Although losses from dwarf mistletoe are not as visible as those caused by insects, the cumulative losses of growth and mortality are considerable over the life of the forest. According to recent estimates, more than 22 million acres of commercial forest land are infested with dwarf mistletoes. Annual losses in growth and mortality exceed 380 million cubic feet. A history of selective harvesting, perpetuation of infected uneven-aged stands, failure to remove infected trees during harvest, restricted size of clearcuts, and lack of attention to dwarf mistletoes in vegetation management planning have served as obstacles to implementing remedies for this problem. As more

stands are managed appropriately, dwarf mistletoe losses should be reduced accordingly.

The Douglas-fir tussock moth, a potentially serious pest of Douglas-fir, is found throughout the range of this important tree species. Grand fir and white fir are also damaged by this foliage-feeding insect. These three tree species occur on 49 million acres of commercial forest land throughout the West. No single factor has been identified as responsible for the cyclic pattern of outbreaks that have occurred every 8 to 10 years since the turn of the century. While the outbreak expected during the mid-1980s failed to materialize at the magnitude predicted, the 800,000 acres defoliated in Oregon, Washington, and Idaho during the mid-1970s sustained a loss averaging over $100 per acre.

The best documented evidence of atmospheric deposition injury to forest ecosystems occurred in the San Gabriel, San Bernardino, and Sierra Nevada mountain ranges of California where ozone is the primary pollutant. Ponderosa and Jeffrey pines were seriously affected. Trees with ozone foliar injury symptoms not only have slower growth rates but are predisposed to attack by other organisms. The extent to which air pollution is a factor in the various tree and forest declines remains to be determined. Other damage studies are being focused on areas downwind of the Los Angeles basin, the San Francisco/San Joaquin air basin, and the larger cities in the Pacific Northwest and interior West.

Additional pests identified by pest management specialists in the West include the bark beetle complexes attacking conifers, the aspen defoliator complex, the black-headed budworm in Alaska, white pine blister rust, and cedar decline. During the most recent outbreaks of these pests, a cumulative 9.4 million acres of the 25.3 million acres of susceptible hosts were impacted. These pests may become locally important but rarely attain Region-wide or multi-Regional significance. The importance of such pests is related primarily to impacts on non-timber resources and their contribution to the general deterioration of forest health.

ISSUES AND OPTIONS

Eight issues are identified that relate to forest management activities affecting forest health. These issues include planning, public involvement, resource management, pest suppression, environmental analysis, pesticides, pest control technology, and forest health monitoring.

The issues reflect administrative and technical conditions that require substantive clarification before an appropriate course of action can be recommended. Clarification was obtained by developing rationale statements and presenting various plausible options as solutions to the problems. Options are recommended for resolving the issues. The following options are proposed as a Forest Service strategic plan to enhance and maintain a healthy forest condition. Each option will have further analysis, including the development of alternatives, before they will be ready for implementation.

Options recommended for further analysis and action are set in *bold-face.

ISSUE 1- PLANNING

Integrated forest pest management considerations are not adequately incorporated in forest resource management planning processes.

RATIONALE

- Plans mention but do not provide for practicing integrated pest management.

- Plan analyses projecting productivity rarely make necessary adjustments for potential losses to forest pests.

- Means for predicting some forest pest-caused impacts were not available for the current planning cycle.

- Failure to address forest pest impacts in the plans and stand management prescription could exacerbate existing and potential pest problems

- Priorities for forest management activities rarely consider management of forest pests.

- Economic or biological thresholds triggering pest prevention or suppression activities have not been extensively defined or included in forest plans.

OPTIONS

A. Amend selected National Forest plans to include integrated pest management for high value forest resources.

Regions would identify National Forests having the potential for significant adverse pest impacts on forest plan targets. Using existing technology, an analysis would derive expected impacts. A decision to amend the forest plan would, in part, depend upon the magnitude of predicted pest impacts.

B. * Develop procedures for including pest impact information in the next planning cycle.

Washington Office Forest Pest Management, Forest Insect and Disease Management, and Timber Management would develop or enhance capabilities to predict tree growth loss and mortality for major pests and pest complexes and integrate this information with other information on other forest management outputs to establish potential impacts for use in the forest planning process. For those

areas exhibiting sufficient impact, National Forests would involve the public in the process of incorporating integrated pest management strategies and displaying the consequences of unmanaged pest problems.

C. * Transfer integrated pest management technology to the National Forest system and states.

Washington Office Forest Pest Management, Forest Insect and Disease Research, with participation by field specialists, will develop procedures for making IPM technology and information on the consequences of pest activity available to forest resource management planners.

D. * Require pest specialist input to National Forest System inter-disciplinary teams conducting forest resource management planning.

Washington Office Forest Pest Management, Land Management Planning, and Timber Management jointly prepare Forest Service Manual direction to include pest specialist input to interdisciplinary teams involved in forest resource management planning.

ISSUE 2- PUBLIC INVOLVEMENT

Traditional forest management practices frequently conflict with public expectations.

RATIONALE

- Harvesting and silvicultural activities frequently elicit a negative public response.

- Forests most attractive to the public are more open, feature larger trees, have a diversity of age classes and species with little high brush or downed trees.

- A greater number of people from more diverse backgrounds are using the forest, predominantly for recreation.

- The general public does not understand forest ecosystem dynamics or the dynamics of pest outbreaks, and may be further confused by the differing opinions of experts.

- Forest management decisions and practices, appropriate from the perspective of the forester, are often viewed by the public as narrow in purpose and not responsive to broader social goals and values.

- When perceived as a natural phenomenon, extensive areas of dead trees may be accepted by the public for backcountry areas but not for recreation and scenic locations.

- Communications with the public about forest management are not always in terms that the public understands.

- Developed recreation areas are intensively used and a valuable forest resource that can be highly affected by a deterioration in forest condition.

- Forest health is more important to recreational use of the forest than to timber production in specific areas.

- The condition of National Forests surrounding public and private recreation developments is important to the quality of experiences afforded visitors, and to the support of regional economies dependent upon forest-based tourism.

- The impact of recreation use, soil compaction, and tree injury combine with insect and disease to increase frequency and severity of pest outbreaks in recreation areas.

- The public may be skeptical of vegetation management activities for pest control that appear to be conventional commercial timber harvesting operations.

OPTIONS

A. Regions conduct site-specific integrated resource management information programs for high-use areas.

Regions analyze opportunities to target large numbers of National Forest users for educational information about forestry, vegetation management, and pest prevention and implement a site-specific information program.

B. * Establish a nationwide information program on forestry and the dynamics of the forest ecosystem.

The Public Affairs Office, Forest Pest Management, Forest Insect and Disease Research, Timber Management, Timber Management Research, and other Washington Office staffs, as appropriate, develop a National Resource and Environmental Education program module to communicate information on forests as a dynamic system and on management required to produce goods and services to meet public needs; consider use of television and media other than brochures to reach a broader audience.

C. * Require a comprehensive public information effort in conjunction with forest pest management activities.

Forest Pest Management provide Forest Service Manual 3400 direction requiring the regions to establish information programs. Regions would be required to expend a minimum of one percent and no more than two percent of the cost of any prevention or suppression project on education and information materials. Materials could include billboards, posters, editorials, television and radio spots, articles, and brochures. Information materials and programs would explain what is being done, what the objectives are, how project performance will be evaluated, and the contribution of environmental analyses and NEPA to decision-making.

D. * Train federal, state, and county specialists in conducting public information meetings.

Washington Office Forest Pest Management and Public Affairs Office design a training package for use by Regional office staffs in demonstrating how to give technical presentations, organize informational materials, and conduct question and answer sessions at public meetings.

E. * Target high use recreation areas for intensive integrated pest management.

Washington Office Forest Pest Management, Land Management Planning, and Recreation prepare Forest Service Manual direction requiring incorporation of forest pest management considerations in management plans for developed recreation areas and areas surrounding high use sites.

F. * Clarify and apply integrated pest management policy in wilderness.

Washington Office Forest Pest Management and Recreation prepare an analysis of policy needs governing forest pest management activities within wilderness areas consistent with Wilderness Act requirements.

G. Require prevention tactics to reduce human impacts on recreation area vegetation.

Regional Forest Pest Management and Recreation staffs develop regional directives to enhance the protection of vegetation in developed recreation areas from adverse effects of human use and the protection of recreation users from hazardous vegetation.

ISSUE 3- RESOURCE MANAGEMENT

Certain forest management practices may aggravate forest pest problems.

RATIONALE

- Existing forest conditions reflect the management or lack of management of the past 50 to 200 years.

- Successful reduction of wildfire in the forest ecosystems eliminated a natural cause of forest mortality, diversity and change.

- Cultural practices that result in longer rotations for a host species increases the probability of a forest pest outbreak.

- Rotation ages beyond the pathological rotation for a host species increases the probability of a pest outbreak.

- Off-site planting, planting susceptible species in areas having high pest hazard, and type conversions that reduce diversity, increase the probability of a pest problem.

- Practices that cause nutrient depletion, soil degradation, and overcrowding increase tree stress and vulnerability to pests.

- Active forest management, especially well-managed harvesting of wood, reduces the occurrence of forest pest problems.

- Fuelwood is a major product of forest growing stock and the largest outlet for all forest material; removal of fuelwood from National Forests helps eliminate wood material susceptible to pest damage from the forest.

OPTIONS

A. * Risk-rate all high-value forest analysis areas for pest outbreak potential.

Washington Office Forest Pest Management and Timber Management prepare Forest service manual direction requiring risk-rating for all high value forest analysis areas to determine the potential for pest outbreaks. Forests to modify management prescriptions as necessary.

B. * Include integrated pest management in forest resource management prescriptions.

Washington Office Forest Pest Management and Timber Management prepare an analysis to determine the adequacy of pest impact, benefit, and treatment cost considerations in stand management prescriptions and prepare policy direction to correct deficiencies as needed.

C. * Identify imminent pest risks to high value resources and reschedule management activities to minimize impacts.

Regional Forest Pest Management and Timber Management identify potential pest outbreaks likely to occur within the next 5 years and adjust harvesting and stand improvement activity schedules to maximize predicted impacts.

D. Set national priorities for integrated pest management by forest types.

Forest Pest Management, Timber Management, Land Management Planning, and Resources Program and Assessment identify, by Region, the forest types essential to meeting national targets for forest products and develop priorities for focusing forest pest prevention and suppression resources.

E. * Analyze the feasibility of using fuelwood sales to achieve vegetative management objectives.

Washington Office Timber Management, Policy Analysis, and Wildlife and Fisheries conduct an analysis of the future demand for fuelwood and prepare a report, including policy recommendations, identifying ways to maximize the sale of firewood from National Forest and private lands as a means of achieving stand improvements and reducing stand vulnerability to pest outbreaks.

F. * Determine optimum levels of forest pest management support.

Washington Office Forest Pest Management conduct an analysis of the benefits and costs of national, regional, and state pest management activities to establish the appropriate level of program funding to federal land managers and state cooperators.

ISSUE 4- PEST SUPPRESSION

Mechanisms are needed for prompt responses to pest outbreaks.

RATIONALE

- No mechanism exists for projecting forest pest suppression funding beyond one year.

- Allocations of pest suppression funds are strongly influenced by political considerations.

- A system is needed to forecast occurrence and location of pest problems a minimum of one year, and preferably three years in advance, as well as the estimating costs of controlling these problems.

- A significant number of susceptible forests will continue to exist and to require substantial pest suppression efforts for the foreseeable future even as the threat of pest damage is reduced through preventative management.

- No mechanism exists to rate pest-threatened forests in terms of their value, susceptibility, imminence of pest attack, expected treatment success, and projected treatment costs. This information is needed to develop a long-term strategic plan which could be updated annually.

- Reliable risk rating systems need to be developed and used to indicate where the pest outbreaks might be expected to occur.

OPTIONS

A. * Include suppression funding need projections in the budget process.

Washington Office Forest Pest Management develop Forest Service Manual 3400 direction requiring that Regional Offices identify and summarize by pest the probable high and moderate levels of expected outbreaks and the respective funds needed for suppression during the next three years.

B. * Establish a funding authority to suppress emergency pest outbreaks.

Washington Office Forest Pest Management and Program Development and Budget gain Agriculture Department and Office of Management and Budget support for authority to respond to rapidly expanding or unexpected pest outbreaks for which annual appropriations are insufficien'

C. * Provide training in integrated pest management for all foresters in the National Forest system.

Washington Office Forest Pest Management and Timber Management prepare Forest Service Manual direction requiring training in integrated pest management for National Forest System resource managers, especially silviculturists and others responsible for preparing management prescriptions.

D. * Update guidelines setting priorities for funding pest prevention and suppression.

Washington Office Forest Pest Management and Timber Management, with field unit participation, review existing procedures, guidelines, and criteria for setting prevention and suppression funding priorities, revising Forest Service Manual direction as necessary to improve responsiveness to pest management needs.

ISSUE 5- ENVIRONMENTAL ANALYSIS

Programmatic NEPA documents permitting timely intervention against pest outbreaks are not available.

RATIONALE

- Situations involving pesticides, wilderness, threatened or endangered species make it difficult to respond to pest outbreaks promptly.

- Forest pest suppression activities require supporting environmental analyses.

- The lead time to prepare required NEPA documentation may preclude rapid response (suppression action) against low level, but increasing, populations of a threatening pest.

- Early communications with the public would be facilitated during preparation of these documents.

OPTIONS

A. * Prepare programmatic NEPA documentation for potentially controversial pest management activities.

Washington Office Forest Pest Management, Forest Insect and Disease Research, and Timber Management, with participation by field unit specialists, coordinate preparation of programmatic EIS's for major multi-Regional pests to which site-specific EA's (environmental assessments) can be tiered. Each EIS should include consideration of the potential need to treat wilderness areas and other sensitive special purpose areas, and to protect threatened and endangered species. These analyses can cover a wide range of issues, including risk analysis of pesticide use, efficiency of alternative treatments, long-term impacts, and cumulative effects. This activity should include state cooperators.

B. * Prepare programmatic NEPA documentation for pest management in forest nurseries and seed orchards.

Regions and Area prepare a South-wide, North-wide, and West-wide programmatic EIS, respectively, to which site specific EA's can be tiered for pesticide use in all Forest Service nurseries and seed orchards.

ISSUE 6- PESTICIDES

Alternatives to environmentally unacceptable chemical pesticides are needed for integrated pest management systems.

RATIONALE

- Use of pesticides will continue to be challenged.

- New technology is needed to improve the accuracy of pesticide applications and to enhance the dependability and effectiveness of existing biological pesticides.

- Environmentally acceptable pesticides and behavioral chemicals need to be developed.

- Commercial pesticide development does not address forest protection needs.

OPTIONS

A. Create a research program with the specific responsibility to develop alternatives to the use of chemical pesticides.

Forest Insect and Disease Research and selected Forest Service Research Experiment Stations establish new or re-direct existing projects to develop non-chemical pesticides and the application technology for use against the gypsy moth and spruce budworm.

B. * Set priorities and conduct research to meet insecticide/ fungicide needs for integrated forest pest management.

Washington Office Forest Insect and Disease Research and Forest Pest Management complete a review of Forest Service insecticide/fungicide research and development needs for biological and other environmentally compatible insecticides and propose any needed improvements toward a more responsive program.

C. * Determine Forest Service response to pesticide development needs for integrated forest pest management.

Research and State and Private Forestry review the Forest Service's pesticide research and development activities, including screening, selecting, enhancing, and formulating promising biological pesticides; preparing the required registration documentation, and developing the necessary application technology and propose any needed changes in current policy, organization or delegations to improve Forest Service responsiveness in these areas.

ISSUE 7- PEST CONTROL TECHNOLOGY

Effective and economical integrated pest management technology is needed to protect forest resources from pest damage.

RATIONALE

- New technology is often inadequately field tested before it must be tried operationally.

- Available technology is not used because the technology transfer process is not completed or is not effective.

- A significant time lag exists for movement of new technologies from research into applied areas.

- A long lag often exists in the process of finding solutions to operational problems in forest pest management.

- Better monitoring of the success of pest management activities is needed to document the effectiveness of technology now in use.

OPTIONS

A. * Strengthen integrated pest management technology for major forest pests.

Washington Office Forest Insect and Disease Research and Forest Pest Management review current programs and recommend any needed changes to increase Forest Service's responsiveness to improving integrated pest