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Forest Science Research and Scientific Communities in Alaska: A History of the Origins and Evolution of USDA Forest Service Research in Juneau, Fairbanks, and Anchorage

Cover Photos:

Background photo: *The Kuskokwim drainage as seen from the air in June 1969. The spectacular expanse of the forests of interior Alaska contrasts starkly with the mountainous terrain and coastal inlets of southeast Alaska. (Juneau 3348)*

Front cover inset (upper-left): *Forest Service boat, the Tongass Ranger, towing a riffle sifter out of Tenakee Inlet. An example of the "can-do" spirit and optimism of the early 1960s, the riffle sifter was an experimental prototype designed to restore salmon habitat in logged-over watersheds, but it suffered from repeated technological breakdowns. Later fisheries habitat experts discount the theoretical basis behind this technological solution to systemic problems. (Meehan collection)*

Front cover inset (upper-right): *Concern about mass soil movements on large clearcuts on the Maybeso Experimental Forest in the 1960s led to studies of underlying geological structures and a broadening of the range of expertise among scientists in Alaska. Doug Swanston, shown here in 1978 at Whitestone Harbor coring in-situ for engineering soil tests with Lee Schroeder, a cooperator from Oregon State University, was one of the scientists recruited to Alaska during this period. (Swanston collection)*

Front cover inset (bottom): *Watershed research in the 1970s focused on reproducible studies under controlled conditions in an artificial streambed (flume) constructed at Youngs Bay Experimental Forest in southeast Alaska. Here, Bill Walkotten manipulates a freeze sampler in the flume. (Schmiege collection)*

Back cover inset (left): *Wildlife research in the 1980s included laboratory research under controlled conditions with live specimens; Don Spalinger is measuring the intake rate and bite size for deer in a foraging study by Tom Hanley's unit at the Juneau FSL in the 1980s. (Hanley collection)*

Back cover inset (right): *This technician measuring rodents in the Hollis laboratory in 1958 illustrates the rigorous measurements and methodical records generated in the early years of the Alaska Forest Research Institute. Institute researchers adhered to scientific standards of their era, despite the remote, rustic setting of the lab. (Juneau 190)*

Author

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Max G. Geier

Pacific Northwest Research Station
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Abstract

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Research interest in the forests of Alaska can be traced from the 1990s back to 1741, when Georg Steller, the surgeon on Vitus Bering's Russian expedition, visited Kayak Island, collected plants, and recorded his observations. Given the scope and scale of potential research needs and relatively high expenses for travel and logistics in Alaska, support for forest research in Alaska, from this first European contact through the present era of scientists working with the U.S. Department of Agriculture, Forest Service, seldom was adequate. Forest Service scientists at Juneau, Fairbanks, and Anchorage in the late 20th century have nevertheless accomplished research goals despite difficult logistics, limited funding, and agency mandates for timber production. The Alaska Forest Research Center was established at Juneau in 1948, with some research activity also at Fairbanks by the 1960s, in cooperation with the University of Alaska. Research at Juneau included silviculture, mensuration, fisheries habitat, water quality, soils, entomology, pathology, and forest survey; and, at Fairbanks, silviculture, fire ecology, entomology, hydrology, and aquatic biology. Multifunctional research units at Fairbanks and Juneau studied the ecology of interior and coastal forests by the 1970s. The Forest Inventory Unit was transferred from Juneau to Anchorage in 1978. The Alaska National Interest Lands Conservation Act and public concern about the effects of logging on the Tongass National Forest redefined the context of research in Alaska by the 1980s. The research program at Juneau was reorganized in 1984 as a Multiproject Program to conduct research that would assess how timber harvests, as mandated by ANILCA, would affect the multiresource management goals mandated by the National Forest Management Act of 1976. The program also included six PNW Research Work Units outside of Alaska: Recreation, Utilization, Forest Engineering, Production Economics, Foreign Trade, and Resource Management Impacts. Agency scientists and cooperators broadened the range of questions and disciplines in forest-related research, but budgetary concerns, and the political environment continue to influence the kinds of issues studied in the search for usable knowledge about Alaska's forests.

Keywords: Forest research, Alaska, history, ecology, fisheries, entomology, wildlife, survey, inventory, timber, taiga, Tongass, Chugach, Pacific Northwest, fire, clearcut, salmon, watershed, landslide, experimental forest, Research Natural Area, aerial photography, remote sensing, transportation, boats, aircraft

Preface

This project began in late 1991, when Ken Wright first asked whether I would be interested in editing a compilation of anecdotes and recollections into a history of forest research in Alaska. That conversation initiated the process of framing the scope of this historical inquiry, and the boundaries of the project were fleshed out a few months later in a meeting with Dick Woodfin, Cindy Miner, and Wright. As with any research project, initial assumptions and priorites in force during the planning stage of historical research influenced decisions about the methodology, hypotheses, and resources used in gathering information, weighing evidence, analyzing data, and reporting the results of research.

The primary purpose of this project, beginning with that first conversation with Wright, was to tell the story of forest-related research from the perspective of the people who had made that work a significant part of their life's purpose. Wright and Miner were most helpful in providing copies of Ray Taylor's autobiographical account, personal notes, and correspondence about his time in Alaska from 1924 through 1959. They also provided copies of Robert Cowlin's massive manuscript covering the history of the PNW Station through the mid 1970s from the perspective of a former Station director, a preliminary chronology of significant events that Al Harris had compiled several years earlier from the perspective of a scientist with extensive field experience in Alaska, and open access to the historical files maintained at the Portland office. Their continued assistance and advice were invaluable in the early stages of planning and refining the intended purpose and scope of the research project.

As with many other research projects in Alaska, this study faced the familiar constraints of a limited budget coupled with a compressed field season, scheduling conflicts, and high overhead costs for travel, lodging, and logistical support. The process of selecting subjects, scheduling interviews, and reviewing written records, consequently, involved a curious admixture of meticulous planning and serendipitous opportunism to make the most of scarce resources and time. People or events excluded from discussion in these pages, therefore, were not necessarily excluded by intent or design, and although some may feel as though their contributions were neglected or slighted, I can only hope they will accept my apologies and advance assurances that any perceived slights were wholly unintentional and probably unavoidable, given the constraints noted above.

The background, preparation, and priorities of the lead researcher also invariably influence research design, execution, and analysis, and the author of record shoulders the burden of responsibility for the final product. As a historian of community development and natural resource issues in the American and Canadian Wests whose academic training is rooted in the traditions of the land-grant universities and state systems of higher education in Washington (1990 Ph.D. in history at Washington State University) and California (1985 M.A. and 1983 B.A. in history at California State University, Northridge), my professional priorities and historical outlook are indelibly colored by a lifetime of personal experiences and acquaintances among human networks

in Western states ranging from Minnesota to Oregon and from California to Alaska. In my lifetime, I have seen once-thriving farming communities in Minnesota and Wisconsin wither up and drift away, and I have lived among logging and timber communities in Oregon, Washington, and California that have similarly slid into decline over the past 20 years. Some of the people in those communities sank into despair and self-imposed isolation, blaming outside forces for the decline and often with good reason. Others struggled to expand their vision of community beyond their immediate surroundings and reached out to develop new human networks, often with unanticipated results. Similar processes are apparent in the communities of people who have participated in forest-related research in Alaska.

My association over the past 5 years with Research Information Services (now the Communications Group) at the Pacific Northwest Research Station in Portland, Oregon, and with Forest Service people at the Forestry Sciences Laboratory in Corvallis also has shaped the context within which this project evolved. In working on the project, I was drawn into closer relations with Forest Service people, and I have had to make a conscious effort to step back from that community to maintain critical perspective and judicious balance while still fulfilling the primary goal of compiling a personalized history from the perspective of agency scientists engaged in forest-related research in Alaska. Those scientists were part of a community of scholars with networks reaching back into past traditions of scholarship and ranging widely through the present to include colleagues in other agencies, academia, and other walks of life. They developed a wide array of personal networks and shared experiences that shaped their world view and the priorities they brought to their work.

This history of research in Alaska is intended to convey the ongoing process by which scientists continually build on the work of their predecessors in an effort to expand the range of human understanding about forests and related ecosystems. Each generation of scholars, however, also operates within the cultural context of its own era to frame research questions and to set priorities for the allocation of resources, which can never be sufficient to cover the full range of potential inquiry. Ideas and priorities fall in and out of favor from era to era, and words themselves often take on new meanings with the passage of time. The terms ''utilitarian" and "frontier" are two examples of this phenomenon, and because they appear frequently in the pages that follow, a brief mention of their intended meaning is necessary. The term "utilitarian," as used in this study, refers to the philosophy that pragmatic purposes are, or should be, the motive force driving human action. Americans tend to value pragmatism as a positive virtue, and virtually every human being who has ever walked the Earth, I would argue, acts on that philosophy at some level during the course of everyday life. Utilitarian motives, however, may also conflict with other priorities, or with another person's sense of utilitarian value. My use of this term in this study is not intended in a judgmental sense, rather to convey the potential conflict inherent in the process of weighing conflicting interests. The term "frontier" similarly tends to convey a sense of individualism and positive virtue in American culture, particularly in Alaska. One person's expansive frontier, how-

ever, is usually another person's defensive perimeter, and individualism carried to the extreme can undermine community stability. My use of this term in various ways throughout this study is, again, not intended to be judgmental, but to convey the self-perceptions of individuals in Alaska and the community culture of their era.

The scientists who engaged in forest-related research in Alaska brought to their work traditions of scholarship, personal experiences, and human networks that provided the context for understanding their roles in the research communities at juneau, Fairbanks, and Anchorage. All of the scientists interviewed for this project, without exception, stressed their indebtedness to the work of their predecessors in Alaska and the unusually strong sense of community they enjoyed with their colleagues there. The study emphasizes those aspects of their time in Alaska that they recalled as most significant to their work, but it is not intended to imply that those experiences or perceptions were necessarily unique to Alaska or that the problems they encountered were not also experienced by their colleagues in other regions or throughout the Forest Service. The focus is on Alaska experiences because that was the primary purpose of this study as originally conceived, but those experiences are also considered in the context of national and international trends relevant to the issues at hand. Finally, because the initial planning for this research project began in 1991, the study ends with the decade of the 1980s. Obviously, much has transpired in the first half of the current decade, perhaps most notably the closure of the Fairbanks Lab in fall 1 995, but the project goals defined at the outset called for bringing the narrative through the late 1980s, and the research methods were designed to meet that goal. The 1990s are certainly worthy of study, but that is another project for another time. It is my sincere hope that this current study will serve a utilitarian purpose by conveying a collective memory of past experiences into the present, where it may inform plans for the future.

Many people went above and beyond normal expectations in supporting and encouraging this project. I cannot hope to do justice to them all, and I apologize in advance to any whom I inadvertently slight in this brief note. In addition to the many current and former administrators, scientists, technicians, and staff at each lab who graciously agreed to be interviewed or energetically responded in writing to requests for information (their names appear in the footnotes throughout this work), many other people directly contributed in ways less immediately apparent. A grant from the Western Oregon University faculty-development committee funded research to locate and identify the numerous photographs that appear in this publication, and many of the faculty and staff at Western contributed ideas, encouragement, and collegial enthusiasm. Keith Hadley was particularly challenging and incisive in his comments and suggestions, and Mike McGlade's good humor and penchant for interdisciplinary exchange has sparked more than one idea. Martha Brookes edited my tortured prose and grammatical quirks with tactful aplomb, but more importantly, facilitated my early interview efforts and contributed insightful criticisms, professional guidance, and personal enthusiasm from the beginning of this project through the final copy. Bill Robbins provided early advice and encouragement and made room in his frenetic

schedule to review an early draft. Ken Wright and Bill Meehan read more drafts and editorial reviews than anyone should do in a lifetime, and they were unfailingly diplomatic and helpful in their suggestions. Cindy Miner's deft administrative skill and respectful grasp of history as it relates to contemporary issues are largely responsible for keeping this project on track. Del Thompson went far beyond the call of duty to communicate his ideas and work miracles with the layout of text, photos, and graphics, including his own line-art drawings, which appear on the cover and throughout the text. John Ivie artfully accomplished the daunting challenge of converting raw files, photos, and ideas into an integrated whole, and the grace and style apparent in the final layout largely reflects his talents. Stella, Josh, and Andrea Greenberg made Fairbanks feel like home over and over again, and Hans Geier contributed incisive critiques of the Alaska experience from his homestead near Delta and his day job at the university. In true Alaska spirit, Carla Dedera rescued me from the Juneau Airport one day before Christmas when Rudolph wasn't flying, and Bill Farr showed me the ropes and facilitated interviews and gatherings at the Juneau Lab. Gilda Geier gave up Hawaii for Alaska more than once while unflaggingly supporting and encouraging my work on this project, and Mitra Geier, in the first year of her life, found herself facing north on the frozen tundra of the Yukon drainage with the wind in her hair.

Max G. Geier
Western Oregon University
1997

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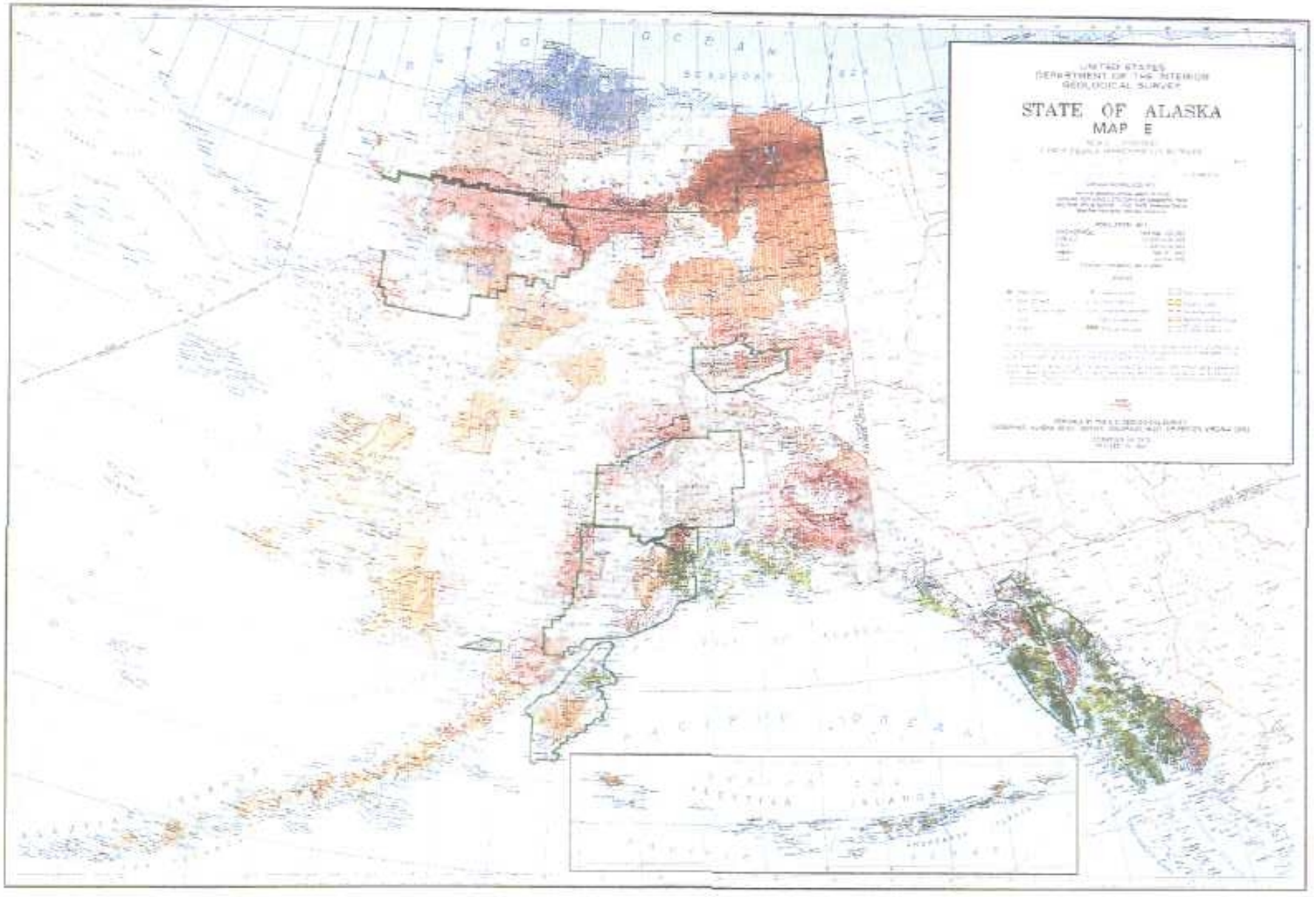
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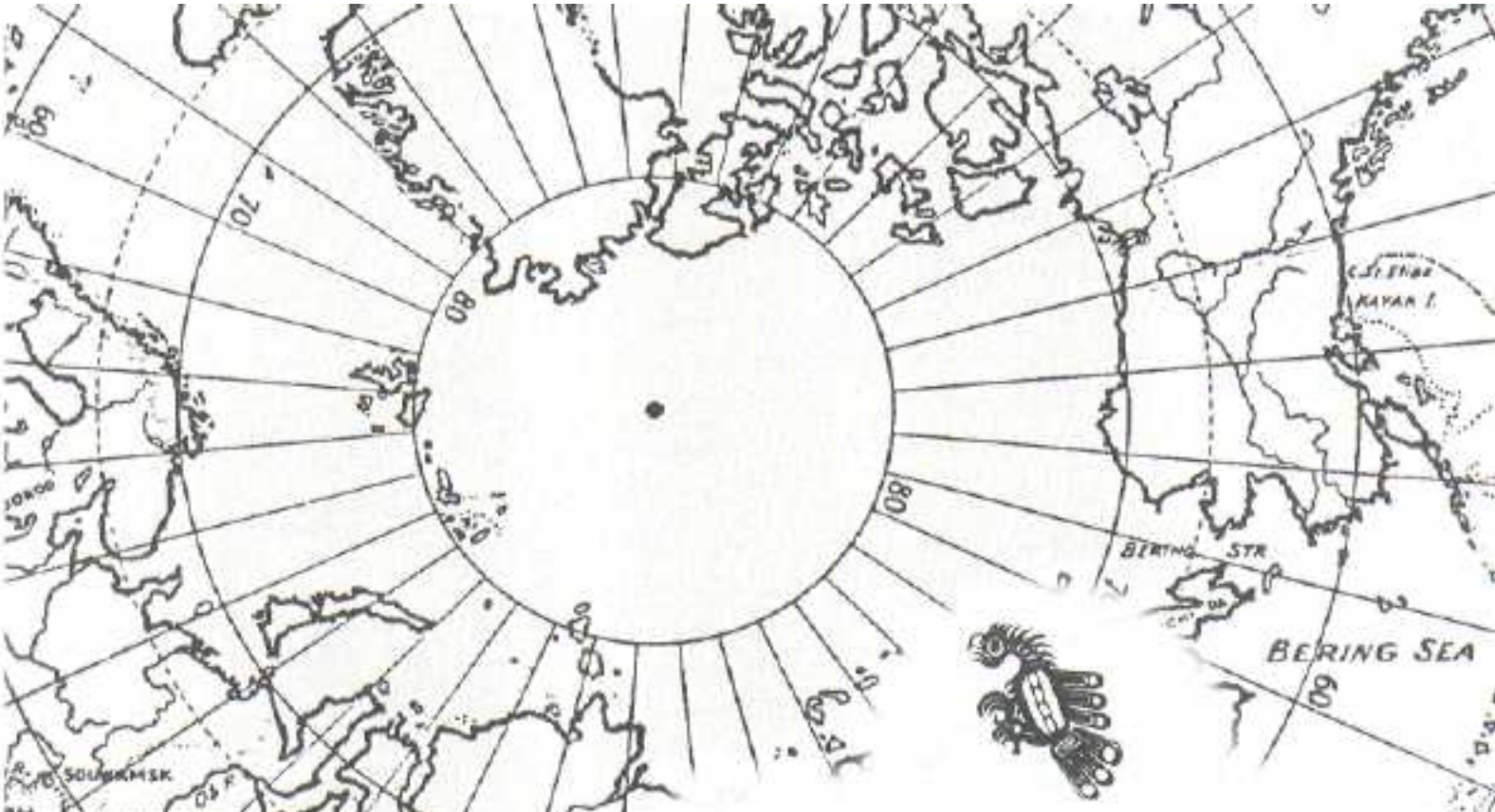
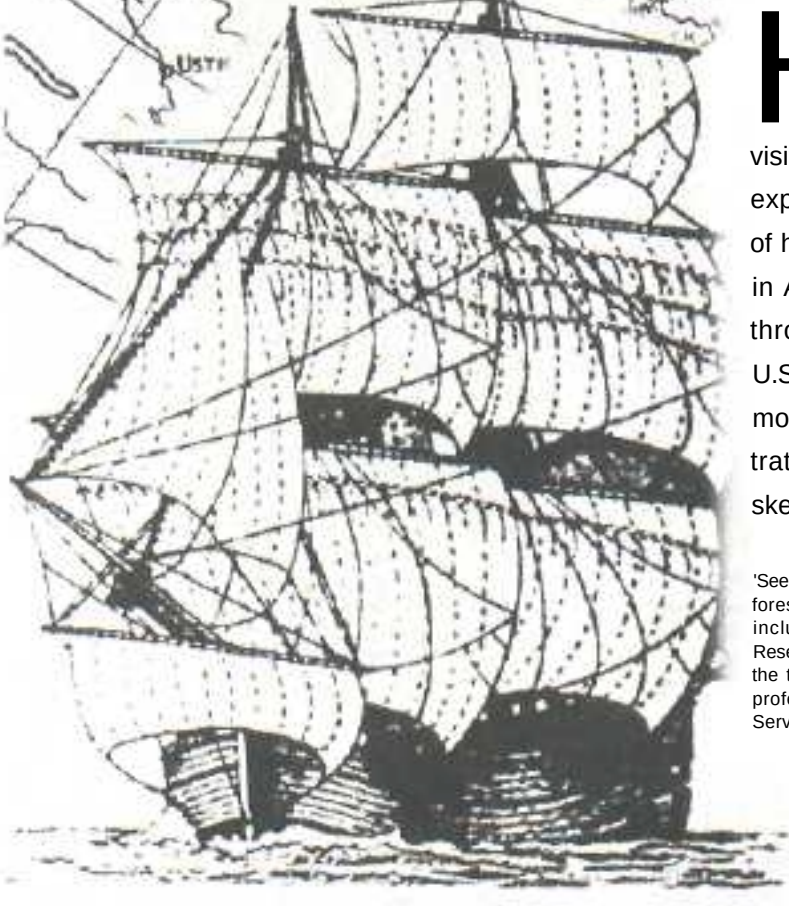


CHAPTER ONE:

Introduction to the History of Forest Research in Alaska

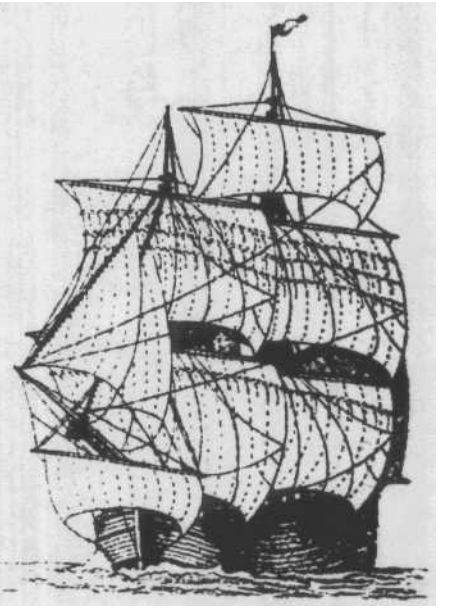
Human efforts to develop an understanding of Alaska forests began long before German-born naturalist Georg Wilhelm Steller visited the Alaska coastline with Vitus Bering's Russian expedition in 1741,[1] but Steller's work is a good example of how European traditions have shaped forest research in Alaska from the time of first contact with the region through the present era of scientists working with the U.S. Department of Agriculture, Forest Service. Many modern forest researchers can identify with Steller's frustration at the lukewarm administrative support and the skeletal logistics that Bering provided for the naturalist's

[1]See appendix A tor a timeline of significant milestones in the history of forest-related research in Alaska from 1741 through the present, including changes in the administrative structure and personnel with the Research Branch of the Forest Service in Alaska. Ken Wright compiled the timeline from information presented in this study and from his professional experience as a scientist and administrator with the Forest Service since World War Two.



work. The reality that scientific research often was not a top priority in the budgets and agendas of public and private governing agencies responsible for managing forests in North America is a historical pattern evident as early as Steller's era, and Forest Service scientists in the late 20th century still struggle to attain their research goals within the constraints imposed by similar problems of logistics and funding.[2]

Steller was a contemporary of the scientific revolution in Europe at a time when scientists argued that traditional ideas about nature were steeped in superstition and falsehood. In place of tradition, these thinkers promoted the virtues of empirical research, direct observation, and rigorous classification in the search for an objective, rational, and **usable** truth. Their divide-and-conquer approach to describing natural systems, together with ideas of racial and cultural superiority, often alienated European and American scientists from the traditions, knowledge, and methods of Native people, for whom the parts of nature (i.e., the trees) could not be understood in isolation from the whole (i.e., the forest ecosystem).[3]



German-born naturalist Georg Wilhelm Steller visited the Alaska coastline with Vitus Bering's Russian expedition aboard the St. Peter. (Derived from a drawing based on the logbook of the voyage as rendered in O.W. Frost (ed.), Georg Wilhelm Steller: Journal of a Voyage with Bering, 1741-1742, Stanford: Stanford University Press, 1988.)

The chasm separating European scientists from the traditional knowledge of North American people is readily apparent in forestry. Schemes of classification based on the principle of utility have promoted the view that forests, in essence, are groups of trees with potential for economic use as defined in European terms. This emphasis on trees and markets has colored most forest

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[2]In the course of his voyage with Bering, Steller was allowed ashore for a brief 10-hour tour of Kayak Island on the gulf coast of Alaska, but only after he threatened to report his superiors to the Russian monarch for interfering with royal interests in information on Alaska mineral reserves. Steller complained that after more than 10 years of preparation, he was allowed only 10 hours ashore, and he noted with dismay the realization that he had been included on the expedition primarily for his medical skills. Georg Wilhelm Steller, journal of a Voyage with Bering, 1741 -1742, edited by O.W. Frost, translated by Margritt A. Engel and O.W. Frost (Stanford, CA: Stanford University Press, 1988), 64-65, 75. Steller's journal entries and his catalog of plants at Kayak often are cited as the first scientific observation of Alaska forest conditions. See, for example, John F. Thilenius, "Steller's Journey on Kayak Island, Alaska, July 20, 1741: Where and How Did He Co?" Unpublished typescript (30 Sept 1981) Forestry Sciences Laboratory, Juneau, AK; and O.W. Frost, ed., Bering and Chirikov: The American Voyages and Their Impact (Anchorage: Alaska Historical Society, 1992). The catalog of plants (in botanical Latin) is reprinted in Leonhard Stejeneger, Georg Wilhelm Steller: The Pioneer of Alaskan Natural History (Cambridge: Harvard University Press, 1936), 554-561.

[3]Robert Pogue Harrison, Forests: The Shadow of Civilization (Chicago: University of Chicago Press, 1992), 1 14-122; Richard White, "Discovering Nature in North America," journal of American History 79 (December 1 992), 879-882. In fairness to Steller, he was extremely interested in Native customs and culture, and he quickly grasped the utility of antiscorbutic plants that the Native people of Siberia used to ward off scurvy at a time when the usual European treatment, bloodletting, did little to stop the ailment and probably hastened the end for many unfortunate sailors. Steller, journal of a Voyage With Bering, 92-94.

Native people and Europeans faced similar problems ot logistics and transportation. and boats often provided the onIs access to sites along interior rivers or in coastal waters. This drawing ot a "skin boat" depicts a scene similar to Steller's description ot his first view ot a Native Alaskan near Bird Island in 1741. (Drawing reproduced from Leonhard Stejneger, Ceorg Wilhelm Stella: The Proneer of Alaskan Natural History, Cambridge: Harvard University Press. 1936.

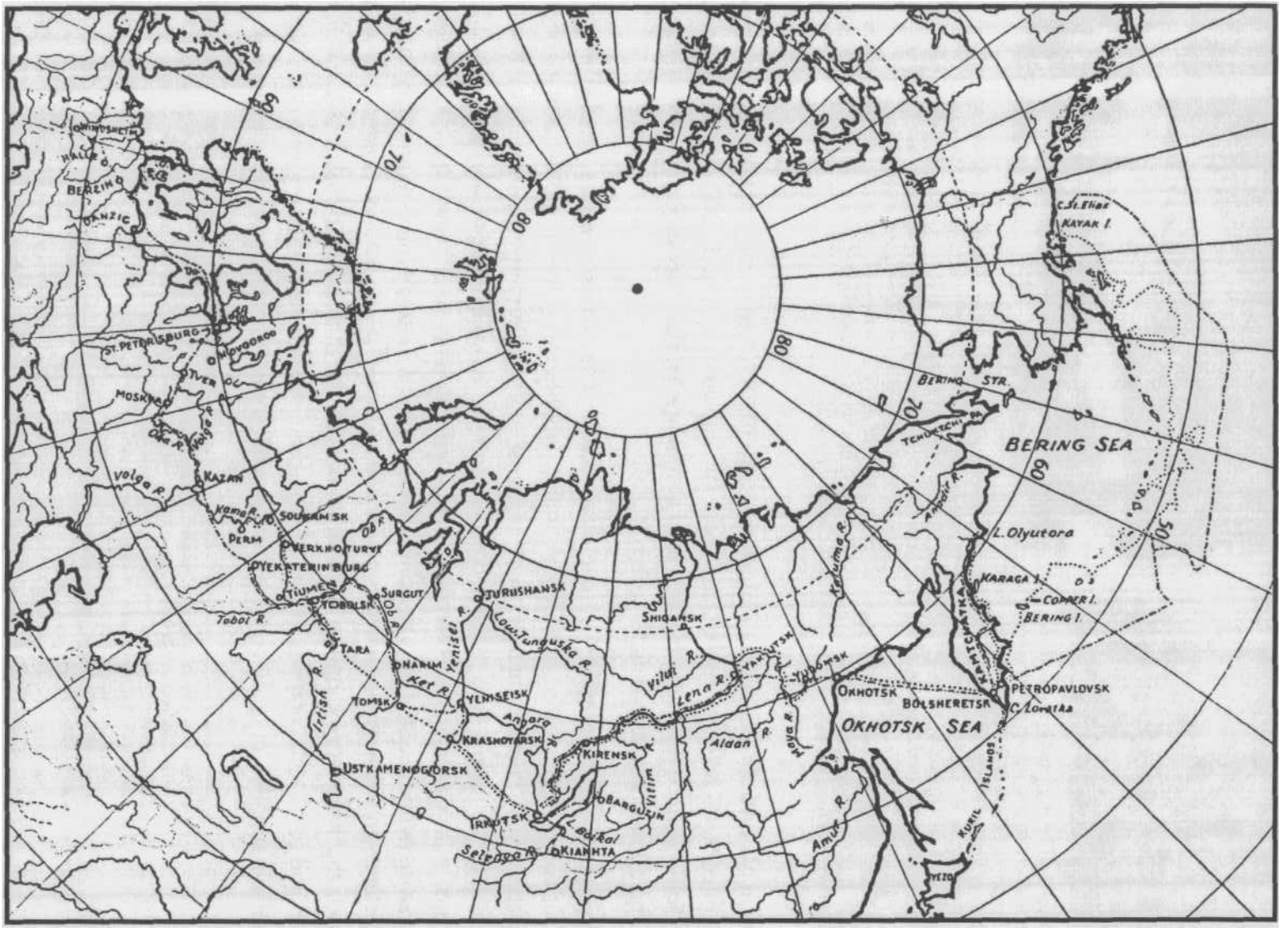
Native skills and technology tacilitaled Euro-American research efforts through the late 19th century. Inland travel often proved a grueling test ot endurance, and most early naturalists and scientists consequently based their analyses on second-hand repoits or relied heavily on Native guides and expertise. (Naturalist William H. Dall introduced his study. Alaska and Its Resources, Boston: Lee and Shepard, 1870, with this drawing of a dog-sled team.

research in Alaska from Steller's era through the early 1970s, when social and political pressures in the United States began to encourage a more encompassing view of forest ecosystems. Most current Forest Service research programs in Alaska, however, still carry forward scientific traditions of partitioned and segmented research.[4]

Native people and Europeans, despite differences in their views of nature, studied Alaska forests for comparable reasons of economic utility, and they faced similar problems of logistics and transportation. Problems of travel in the immense Alaska landscape are compounded by the remoteness of the region, with its limited access and vast range of climatic and physiographic conditions. Native people, nonetheless, accumulated a storehouse of knowledge about Northwest ecosystems that enabled them to manipulate and exploit forest resources to meet their needs for subsistence and commercial activities before and after contact with European traders.' Among other uses, that knowledge supported the early success of the Russian and British fur trade in the late 18th and early 19th centuries. European merchants found that Native trappers often were more reliable suppliers of turs than were European adventurers. Native communities were well

'How and v\hen the locus of research in Alaska began to shift away from trees to include consideration ot broader ec osystem issues was discussed in numerous interviews with USDA Forest Service researchers stationed in Juneau, Anchorage, and Fairbanks in December 1992 and |ulv 1993. Particularly helpful on this topic were the comments of loan M. Foote, Wilbur A. Farr, Vemon |. LaBan, William R. Meehan, Donald C. Schmiege, and A.S. Harris. Harris noted, in reference to the focus of ecosystem research in the 1980s, that in earlier years (meaning the 1940s. 50s, and 60s "...we just didn't think about those things.'

For an excellent case study ot Native manipulation of the forest resource and their adaptation over time, see Richard White, Land_Use, Environment, and Social Change: The Shaping of Island County, Washington (Seattle: University ot Washington Press, 1980). Stephen Pyne's Fire in_America: A Cultural History of Wildland and Rural Fire Princeton: Princeton University Press. 1982) includes a useful discussion of the historical use ot tire to manipulate natural resources, and he explores its transmission from Asia to North America.



Russian imperial interests shaped early patterns of scientific work in Alaska. Steller's journal describing his observation and route of travel from Russia to Alaska, as depicted on this map, sparked a flurry of Russian expeditions. (Map based on Stejneger, Ceorg Wilhelm Steller, plate XXIX.)

aware of the economic value of forest resources, both in traditional terms and in European terms, and they acted within the bounds of their culture to develop and exploit those resources. They organized tribal monopolies (forest reserves) to regulate access to the forest, conserve resources, and control trade with European outposts, and they manipulated forest vegetation to encourage the proliferation of different kinds of game, fur-bearing animals, and fish.[6] They developed their knowledge of the forest and adapted their methods of forest management to meet the new social needs and economic conditions evident after contact with European traders. In large part, this effort to expand and adapt an existing base of knowledge to meet new needs and conditions has been the the role of forest researchers in Alaska from the time of early Russian contact through the modern era of research by Forest Service personnel in Juneau, Fairbanks, and Anchorage. Forest researchers throughout that period have been heavily influenced by public and private interests seeking usable knowledge about the vast expanse of Alaska forests.

Scientific Research in Forests of Russian America, 1741-1867

Forest researchers in Alaska have long been preoccupied with compiling baseline data, or "just finding out what's out there," in the words of one Forest Service scientist.[7] In the 60 years after Bering's voyage of 1741, more than 90 expeditions from Siberian ports visited Alaska's shores in search of furs, and many returned with journals recording their impressions of the flora, fauna, and people encountered there. Notable among these expeditions was an official venture organized with support from Catherine II[8] in 1764 and commanded by Petr Dreitsyn. Dreitsyn and his crews surveyed Umnak, Unalaska, Unimak Island, and the Alaska Peninsula in August 1 768, and Peter Simon Pallas, a German historian, compiled accounts of many of these expeditions for the Saint Petersburg Academy of Sciences between 1768 and 1774.[9]

These reports and evidence of Russian success in the fur trade encouraged other European powers to sponsor expeditions that broadened European knowledge of Alaska's resources. The viceroy of Mexico dispatched expeditions to Alaska in 1774, 1777, 1 778, and 1790; the French sent an expedition in 1785; and the Americans entered the scramble in 1789.[10] Perhaps the most

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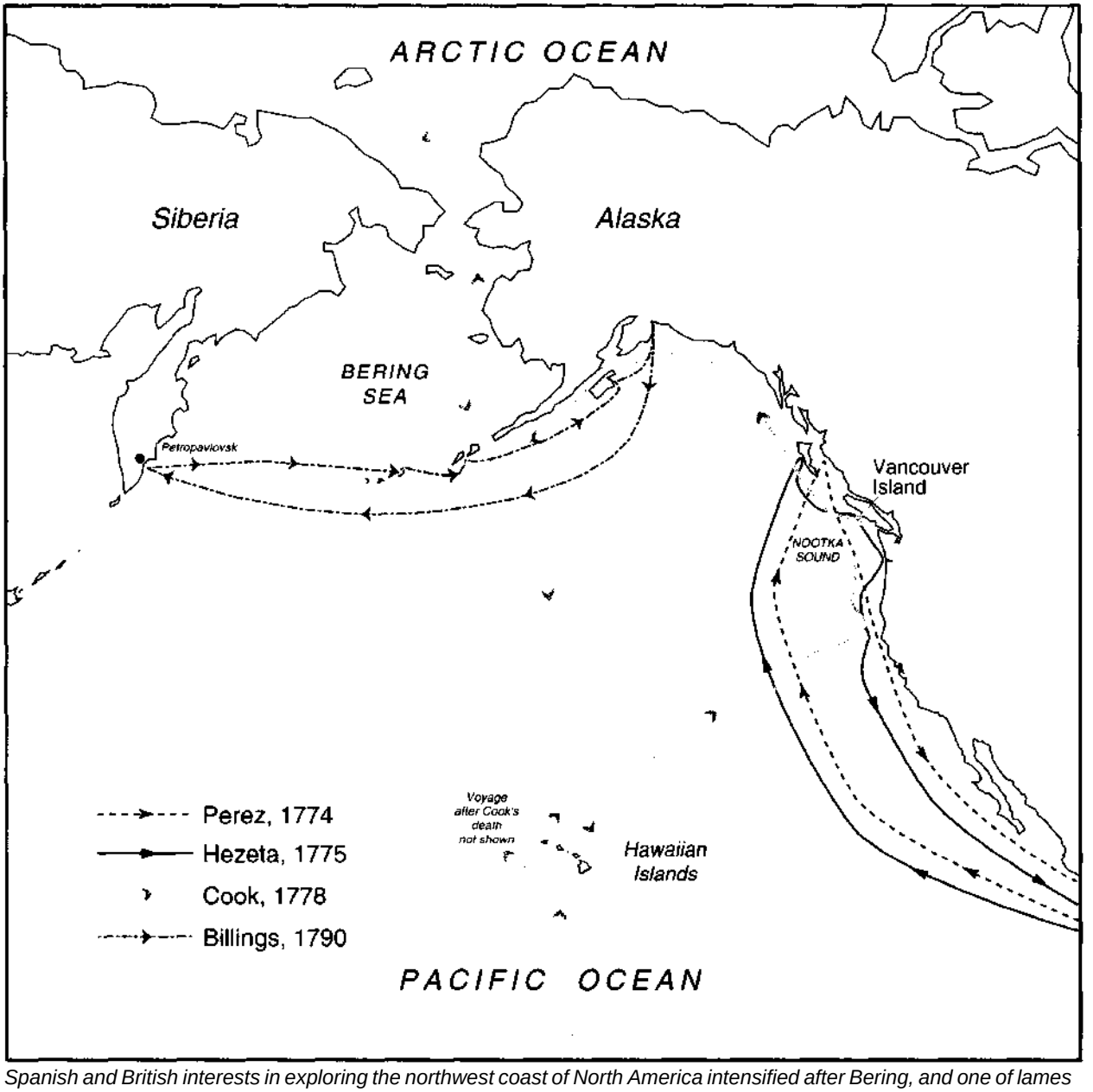
[6]Native ettorts to limit access and manage the forest resource are discussed in Robin Fisher, Contact and Contlict: Indian-European Relations in British Columbia, 1774-1890 (Vancouver: University of British Columbia Press, 1977) and White, Land Use. William Cronon, Changes in the Land: Indians, Colonists, and the Ecology of New England (New York: Hill and Wang, 1983) examines similar developments on the east coast of the United States. Among other things, Native people traded furs, skins, and meat for a variety ot European goods. Arthur F. McEvoy, The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980 (New York: Cambridge University Press, 1986) includes a useful discussion of various Native American strategies for managing salmon fisheries.

[7]Author's interview with Joan Foote in Fairbanks, AK, 2i December 1992.

[8]"In the context of her support for scientific exploration and survey of the region, Catherine II was a correspondent with leading figures of the enlightenment, including Voltaire, Diderot, and d'Alembert. Claus-M. Naske and Herman E. Slotnick, Alaska: A History of the 49th State, Second Edition (Norman: University of Oklahoma Press, 1987), 28.

[9]"Robert Fortunie, Chills and Fever: Health and Disease in the Early History of Alaska (Fairbanks: University ot Alaska Press, 1992). 92-93; Melody Webb, The Last Frontier: A History of the Yukon Basin of Canada and Alaska (Albuquerque: University of New Mexico Press, 1985), 21-22; Dorothy lean Ray, The Eskimos of Bering Strait, 1650-1898 (Seattle: University of Washington Press, 1992), 21-27.



Spanish and British interests in exploring the northwest coast of North America intensified after Bering, and one of lames Cook's subordinates in 1778, Joseph Billings, later headed a Russian expedition that brought German naturalist Carl H. Merck to Kodiak Island and Prince William Sound in 1790. Routes of the Spanish expeditions of 1774 (Perez) and 1775 (Hezeta), the British expedition ot 1778 (Cook), and the Russian expedition of 1790 (Billings) are shown here. The map was devised from information provided in Warren Cook, Flood Tide ot Empire: Spain and the Pacific Northwest, 1543-1819, (New Haven: Yale University Press, 1973), in Carlos Arnaldo Schwantes, The Pacific Northwest: An Interpretive History, Revised and Enlarged Edition, (Lincoln: University ot Nebraska Press, 1996), and in lean Barman, The West Beyond the West: A History of British Columbia, Revised Edition, (Toronto: University of Toronto Press, 1996.)

significant expedition for its effects on future scientific research in Alaska, however, was Captain James Cook's voyage along the Alaska coast in 1778. Profits from furs that Cook's crew obtained from Native people on the Northwest coast and sold in China prompted a flurry of British and American interest in the region, and two of Cook's subordinates on that trip, Joseph Billings and George Vancouver, later returned at the head of expeditions with distinguished naturalists on board. Catherine II authorized Billings to head an expedition to Alaska in 1785, in an effort to shore up Russian claims to the region, and Billings recruited German naturalist Carl H. Merck to make scientific observations. Billings and Merck ventured as far as Kodiak and Prince William Sound in 1 790 before returning to Kamchatka.[11] Expeditions like these expanded knowledge of Alaska's coastal areas, although information about the inland regions and forests remained sketchy.[12]

International interest in Alaska's resources increased rapidly between 1780 and 1790, but most information about inland areas originated with private fur traders. Much of that information was sketchy or unreliable in the first 50 years of contact because traders tried to protect their best trading sites from competitors. The situation began to change near the end of the 18th century. One wealthy fur trader, Grigorii Shelikhov, is notable for his role in founding a dominant trading company that eventually gained a monopoly charter from the Russian crown and displaced the previous system of small, independent traders. He is also notable (for the purposes of this study) for his proposal, in 1790, that a tree-growing site be designated at each settlement in Russian America.[13] Shelikhov, with his wife and 192 men, established a settlement at Three Saints Bay on Kodiak Island by 1 784 with trading posts on Kodiak Island, Afognak Island, and the Kenai Peninsula by 1 786. Shelikhov also sent field parties into the regions surrounding these sites and Prince William Sound.[14] These projects marked the beginnings of a more regulated effort to research and describe the inland resources of Alaska.

Shelikhov's company faced transportation and logistics problems similar to those that plagued later forest researchers seeking to locate and identify inland resources. As in later years, boats were crucial to successful operations in Alaska's forests. With this in mind, Shelikhov's hand-picked manager for the Alaska enterprise, Aleksandr Baranov, moved operations in 1791 from Three Saints Bay to the northern portion of Kodiak Island for easier access to forest resources needed for fuel wood and construction materials and to take advantage of a better harbor site at

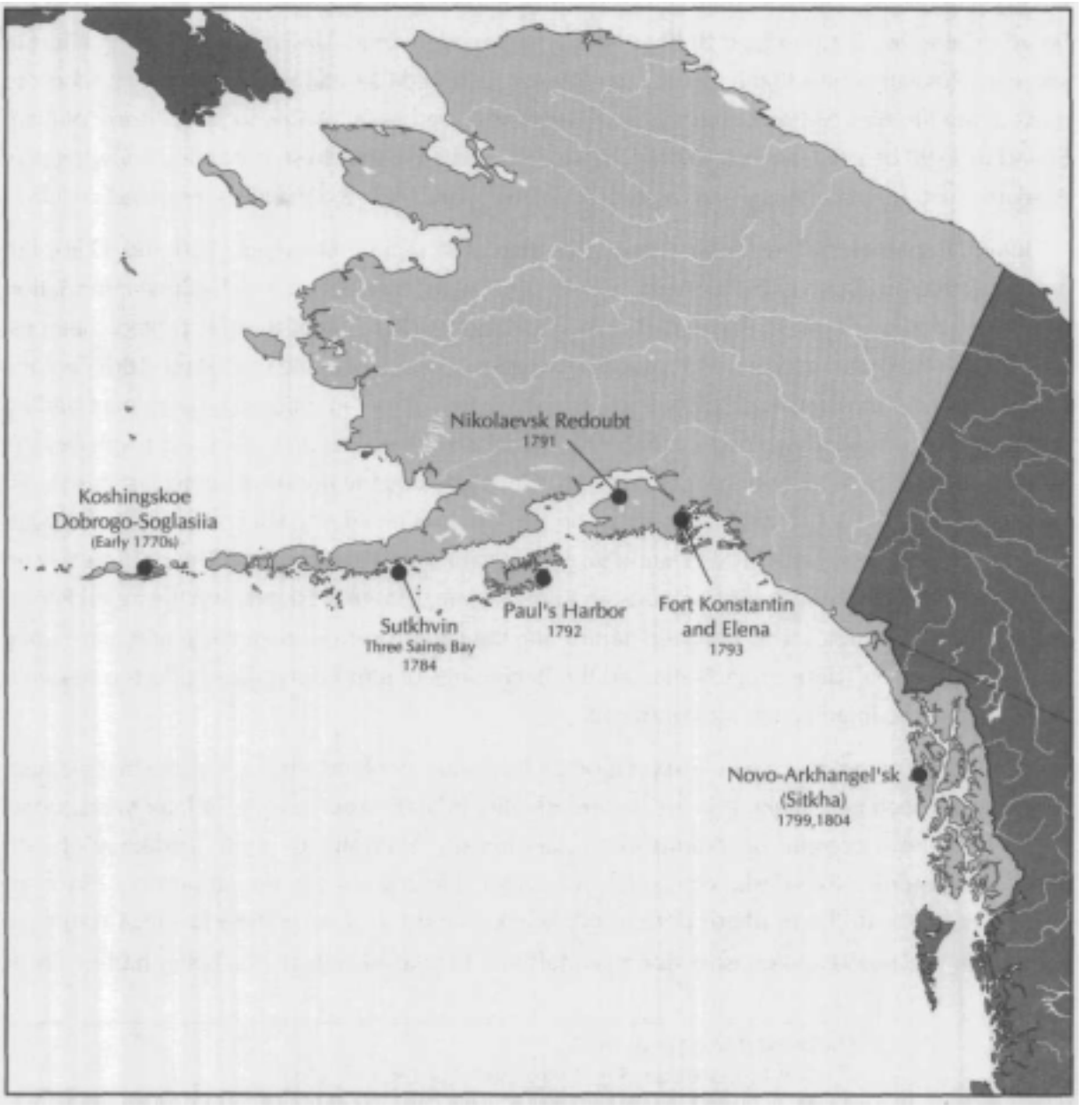
[13]Naske and Slotnik, Ałaṣka, 29-30.

[14]Fortuine, Chills_and Fever, 93-94; Ray, Eskimos of Bering Strait, 47-49.

[15]Contusion over whether the Kheuveren River was forested or unforested, for example, contributed to a long-enduring myth of a Russian fort called "Kyngovei" supposed to have been established by ship-wrecked Russians from Lena in 1648. For a discussion of the myth and confusion over forested river valleys, see Ray, Eskimos of Bering Strait, 28-38.

[16]David Bruce, "History of Tree Planting on the Aleutian Islands," in j. Alden *et al.*. ed., Forest Development in Cold Climates, (New York: Plenum Press, 1993), 396.

[17]Fortuine. Chills and Fever, 94-95; Naske and Slotnik, Alaska, 31-33.



Russian development and shipbuilding in Alaska left its mark on Alaska forest resources by the 1790s, when George Vancouver noted "visible effects of the axe and saw" in Prince William Sound. Major Russian settlements in Alaska by 1800 are shown on this map. (Based on information from Naske and Slotnick, Alaska.)

that location. Baranov then located forest reserves suitable for shipbuilding near Resurrection Bay on the Kenai Peninsula, and recruited an English shipbuilder to construct a sea-going vessel, the Phoenix, which broadened the company's range of activity along the Alaska coast.[15]

Control over Alaska forests and responsibility for identifying usable forest resources shifted with international events and politics. Shelikhov died in 1795, and his son-in-law, Nikolai Petrovich Rezanov, proceeded to reorganize the Alaska fur enterprise as the Russian-American Company. Tsar Paul I then granted Rezanov's new company a monopoly charter in 1799 that conveyed exclusive trading privileges in Alaska with a mandate to explore and occupy lands to the north and south not already possessed by another European nation. The charter also conveyed rights of access and control on forest reserves in Alaska.[16]

The ascendency of the Russian-American Company to monopoly status was partly due to Russian concerns about Vancouver's expedition in 1794 and publication of his journals in 1 798. Vancouver, who had served as a midshipman on Cook's voyage 20 years earlier, headed a British expedition that included Archibald Menzies as ship's surgeon and naturalist. Menzies collected seeds and cuttings from southeast Alaska that eventually were planted in England as specimen trees, thus bringing Alaska species into the limelight of forest research in Europe.[17] Vancouver's journals include vivid descriptions of forest conditions in the Prince William Sound region, including the effects of human activity: "Many trees had been cut down since these regions had been first visited by Europeans; this was evident by the visible effects of the axe and saw." He also noted soil conditions of vegetative "morasses" on forested hillsides that appeared dry and verdant on the surface, yet "sunk to nearly half leg deep in water" when walked upon, and he observed that these hillside bogs retained enough water to sustain very large "pine trees" on an otherwise rocky foundation of steep hillsides.[18]

Rezanov's concern about Vancouver's expedition and other examples of foreign interest in Alaska also yielded a bonus for later forest researchers. Rezanov visited Alaska in 1805 to review and revitalize Russian holdings as part of an effort to discourage foreign ventures in the region. Baronov met with Rezanov in a series of meetings at Sitka and emphasized the need to raise profits and improve morale among company employees in the bleak surroundings of the Aleutian

[15]Naske and Slotnik, Alaska, 32.

[16]Ray, Eskimos of Bering Strait, 56-57; Naske and Slotnik, Alaska, 33-37; Fortuine, Chills and Fever, 105-106.

[17]Alfred Hulse Brooks, "History of Explorations and Surveys," in Alaska and Its History, Morgan B. Sherwood, ed. (Seattle: University of Washington Press, 1967). See also, Wallace M. Olson and john F. Thilenius, The Travel Journal of Archibald Menzies, 1793-1794 (Fairbanks: University of Alaska Press, 1993).

[18]George Vancouver, "Voyage of Discovery to the North Pacific Ocean," as quoted in |ohn A. Murray, ed., A Republic of Rivers: Three Centuries of Nature Writing from Alaska and the Yukon (New York: Oxford University Press, 1990), 45-47.

Islands.[19] One apparent result of those meetings was the decision to establish tree plantations on Amaknak Island in Unalaska Bay to make the area more appealing to its human occupants and to provide wood for ship repairs, housing, and firewood. Sitka spruce were transported from Sitka to Unalaska between 1807 and 1813, and several plantations were established at various sites over the next half century. These early afforestation sites eventually yielded information useful for forest geneticists studying the dispersion and adaptability of Sitka spruce from southeast Alaska.[20]

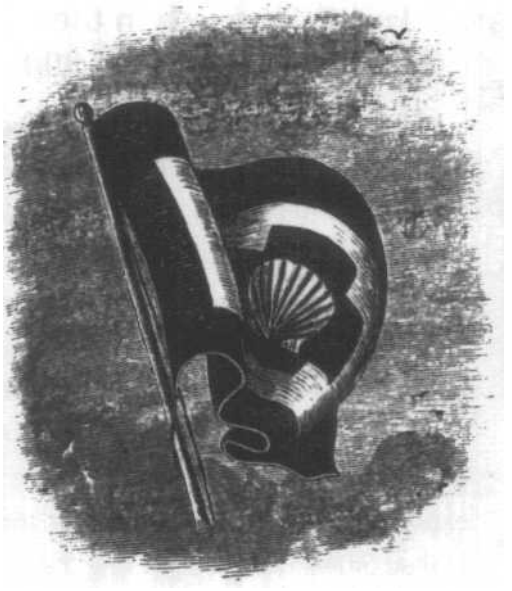
Support for scientific research in Russian America increased after 1821, when Emperor Alexander I renewed the monopoly charter for the Russian-American Company with the stipulation that the company's chief managers must be officers in the Royal Navy. This shift in administrative authority came about after Russian officials learned that members of the United States Congress were advocating military action against Russian interests in Alaska. Alexander I responded with a moratorium on trade with Americans and by transferring control of the fur monopoly to military officers who were expected to be more loyal to imperial interests than to company profits. Several of those officers were men of scientific training who encouraged geographic and meteorologic research. Frederic Litke commanded one such expedition in a survey of Unalaska, the Pribilof Islands, and the northern coast of the Alaska Peninsula aboard the Russian corvette Seniavin in 1826-29. Litke and the expedition naturalist, a Dr. Mertens, returned to Russia with specimens of more than 2,500 plants and more than 1,500 specimens of animals they had collected in Alaska. The collection of specimens was made available to European scientists at the Saint Petersburg Academy of Sciences, and Litke published his journal in 1835.[21]

Research in the interior of Alaska also increased during the era of Naval administration, and especially after Ferdinand Petrovich von Wrangell, a noted explorer and descendent of German nobility, became governor in 1830. Wrangell relied heavily on Creoles (offspring of Russian men and Native women) for expeditions to expand knowledge of the interior. Creoles Andrey Glazunov and Pyotr V. Malakhov, for example, explored the Yukon River drainage in skin boats built by Native craftsmen in 1833-34, and laid the groundwork for Lavrenty Alekseyevich Zagoskin, who led the first scientific expedition into the Yukon and Kuskokwim drainages in 1842-43. Zagoskin, a graduate of the Khronshtadt Naval Cadet Corps who had studied scientific methods for field observation and sampling, collected numerous specimens and made careful note of natural resources in the region. His published journals include detailed descriptions of boreal forest ecology in the Yukon drainage as far inland as the mouth of the Tanana River, and he also collected

[19] Naske and Slotnik, Alaska, 37-38. Examples of later scientists with the Forest Service who recognized the significance of these early plantations include Harold Lutz, History of Sitka Spruce Planted in 1 805 at Unalaska Island by the Russians (Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Northern Forest Experiment Station, May 1963) and lohn Alden, Growth of Historical Sitka Spruce Plantations at Unalaska Bay, Alaska (Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Research Station, Gen. Tech. Rep. PNW-236, 1989).

[20] Bruce. "History of Tree Planting," 7; author's interview with John Alden, 21 December 1992.

[21] Naske and Slotnik, Alaska, 45-46, 50-52; Brooks, "History of Explorations and Surveys," 36-38; Murray, ed.. A Republic of Rivers, 63-67.



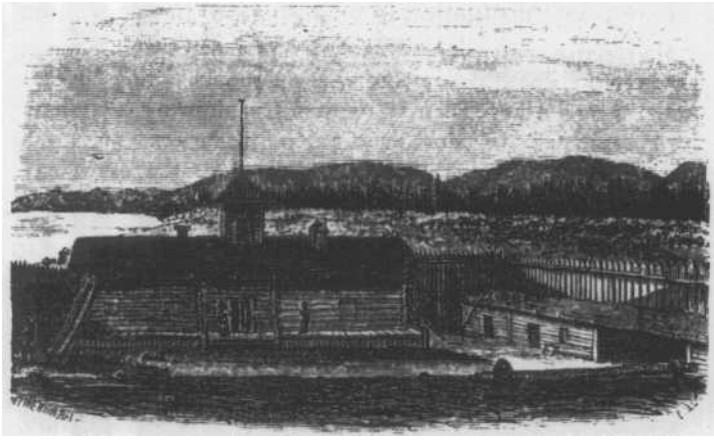
Flag of the Scientific Corps of the Western Union Telegraph Expedition, with names of expedition members. As depicted in Dall, Alaska and Its Resources.)

extensive information from and about the people native to the region and their use of its natural resources. In the tradition of European science, however, he prided himself on avoiding dependence on native people or their methods.[22]

Support for scientific study of natural resources in Russian America shifted when international conflicts and innovations in long-distance communications and newspaper technology altered the relative importance of Alaska on the world stage. The Crimean War (1852-54) and conflict with the British Navy weakened the Russian Navy and drained the imperial treasury. The same war attracted great interest from newspapers in the United States. American newspapers had expanded circulation and established newswire services during their coverage of the American war against Mexico 4 years earlier. Interest in transoceanic telegraph cables peaked in the mid-1850s, when news correspondents struggled to provide timely news about the Crimean War for American newspapers and their readers, but attention shifted northward to the Bering Strait after the American Civil War disrupted trans-Atlantic shipping during the early 1860s. The Western Union Telegraph Company commissioned a survey in 1863 for an overland telegraph line from the Western United States through British Columbia and Russian America to the Bering Strait, where it was to link up with the trans-Siberian line. Robert Kennicott, formerly curator for the Northwestern University Museum of Natural History, headed the Russian-American division of the survey for Western Union, and he assembled a "scientific corps" of specialists in botany, insects, birds and small mammals, paleontology, and invertebrates and fishes. The scientific corps drew minimal salaries from Western Union, but contributions from the Smithsonian Institution and the Chicago Academy of Sciences funded much of their work. Members of the scientific corps traversed much of Alaska from 1865-67, sent reports and specimens to the Smithsonian, and produced numerous publications relating to forest resources in coastal and interior Alaska. These reports appeared in the United States just as new technology in steam-powered presses and new methods for producing newsprint from wood pulp began to transform Americans' perceptions of forest resources and shortly after they discovered that their Secretary of State, William Seward, had purchased Alaska for $7.2 million in 1 867.[23]

[22]Melody Webb, The Last Frontier: A History of the Yukon Basin of Canada and Alaska (Albuquerque: University of New Mexico Press, 1985), 25-28, 31-36; Naske and Slotnik, Alaska, 52-54; L.A. Zagoskin, "Nulato, A Settlement on the Yukon," as quoted in Murray, ed., A Republic of Rivers, 79-83.

[23]Michael Embrey, The Press in American History; Brooks, "History of Explorations and Surveys," 42-43; Webb, The Last Frontier, 53-55; lames Alton lames, The First Scientific Exploration of Russian America and the Purchase of Alaska (Evanston, IL: Northwestern University, 1942). Morgan B. Sherwood, Exploration of Alaska, 1865-1900 (New Haven: Yale University Press, 1965), 15-35.



Russian and American military infrastructure in Alaska created local markets for forest resources, as this view ot the interior of Fort Durbin suggests. The amount of wood necessary for pallisades and structures was just a fraction of that needed for firewood. (Drawing from Dall, Alaska and Its Resources.)

Forest Research in the American Era, 1867-1900

The United States Army occupied Alaska and assumed administrative authority soon after the purchase was announced, but scientific research in Alaska was a relatively low priority in the American Army in 1867. International agreements and the purchase of Alaska had largely resolved issues of sovereignty and control that had driven exploration in earlier years, and the United States was just entering the tumultuous years of reconstruction and military occupation of the former Confederacy. The military culture of the United States Army in 1867 also differed from that of the Russian Navy. Army officers who rose in ranks during the American Civil War were rewarded for skills not necessarily scientific in nature, and they often found duty in Alaska boring and uninspiring. Some of their Russian predecessors, by contrast, actually had requested assignment to Alaska because of their scientific interests and training.[24] The initial result, in 1867, was relatively weak support for government-sponsored research programs in the region.

The Western Union project also floundered after the purchase, and other private research efforts mostly lacked the scope, direction, and depth of the scientific corps project. Kennicott died of heart failure in 1866, and his 20-year-old successor, fish specialist William Healy Dall, suffered a fate familiar to later forest researchers when funding for the project was abruptly terminated in 1867. Western Union cancelled the telegraph survey because, shortly after the Civil War ended, a trans-Atlantic telegraph cable successfully linked the United States and Europe, and the Alaska route no longer seemed economically feasible. The work of the scientific corps did help Seward win Congressional approval for the Alaska purchase, and he also organized a small group of Coast Survey scientists headed by George Davidson to examine and report on the new territory. Davidson's group touched base at Sitka, Kodiak, and Unalaska in a 4-month cruise aboard a Revenue Marine cutter before filing his report, while Dall was forced to scramble for private funding to complete his work in Alaska. He eventually collected more than 4,500 specimens in the Yukon drainage, and his book Alaska and Its Resources, published in 1870, encouraged further scientific expeditions in the interior of Alaska.[25]

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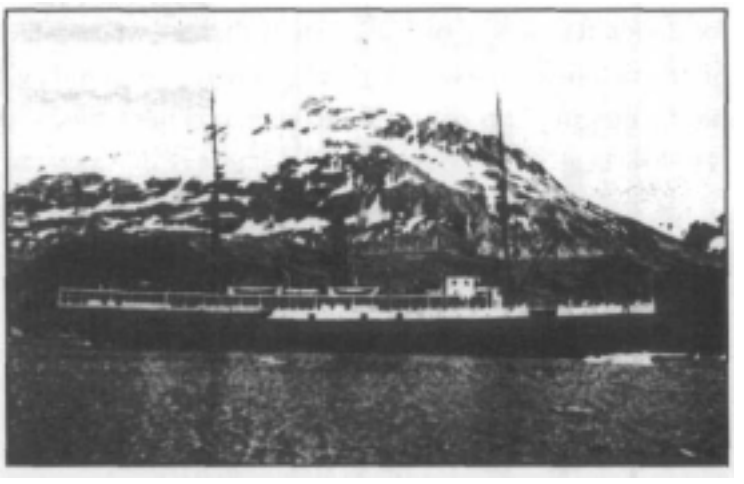
[24] Sherwood, Exploration of Alaska, 31-33; Naske and Slotnik, Alaska, 67-69.

[25] Sherwood, Exploration of Alaska, 31-33, 40-43; William Healy Dall, Alaska and Its Resources (Boston: Lee and Shepard, 1870).

With Dall and other Americans, the tradition of scientific research with emphasis on the isolation, identification, and classification of distinct and usable truths assumed new significance in Alaska. Charles Darwin's The Origin of Species by Natural Selection, published in 1 859, challenged the ideas of Louis Agassiz, a naturalist who argued that individual species were created separately and with no genetic connection. Before his time in Alaska, Dall had studied with Agassiz and spent much of his time in search of evidence that could be brought to bear on this dispute. He gained appointment with the United States Coast Survey in 1870 and continued his naturalist work amidst other official duties in later years, forwarding plant specimens and other materials to the Smithsonian and to Agassiz. The Alaska Commercial Company, organized in 1868 and the dominant force in the American fur industry in Alaska by 1870, also cooperated closely with researchers affiliated with the Smithsonian, collecting specimens and providing logistical support.[26]



William Dall. John Muir, and Bernard Fernow accompanied Edward H. Harriman and 18 other scientists on an extended research voyage aboard the George W, Elder (shown here), which made more than 50 stops on a 9,000-mile cruise off the Alaska coast in 1898. (Photo bv E.H. Harriman.)

Federal support for research in Alaska forests before formal establishment of the Division of Forestry in the Department of Agriculture, largely centered on the efforts of Ivan Petroff, a native of Russia and veteran of the Union Army who compiled a special report on Alaska for the Tenth Census of the United States in 1880. The Tenth Census was particularly concerned with natural resources, and Petroff, a journalist who previously had researched Russian sources for historian Hubert Howe Bancroft, produced a census report that divided Alaska into several districts classified according to distinct physical and climatic provinces. Petroff noted that forests covered a broad area of Alaska, but he argued that valuable or usable species were relatively sparse compared with the forests of Oregon or Washington. His report described commercial stands in the Alexander Archipelago, Prince William Sound, and Cook Inlet, and it is notable for Petroff's effort to designate particular species found in each area. It is also notable for its division of the forest into distinct groups of independent, exploitable resources: fish, fur, timber, and minerals. Petroff, who was not a scientist bv training or inclination, drew heavily on the work of Dall and earlier sources and scientists to compile his report. Bernard E. Fernow, the Prussian-trained forester who headed the Division of Forestry in the U.S. Department of Agriculture after 1 886, later noted that Petroff's data on Alaska timber was "vague" and "faulty." Petroff's census report and his work

[26]Note that Dall contributed evidence that bolstered the arguments of Asa Gray, an American champion of Darwinian theory. Sherwood, Exploration of Alaska, 42-46; Naske and Slotnik, Alaska, 67-69.

for Bancroft's History of Alaska, nevertheless, were influential in shaping American perceptions of Alaska forests. He was, perhaps, more remembered by acquaintances in Alaska for consuming prodigious amounts of alcohol with no apparent effect—a skill which earned him the nickname "Hollow Legs" and a place in the mythology of American Alaska.[27]

Petroff's utilitarian assessment of Alaska forests contrasted with the views of John Muir, who toured the Alexander Archipelago and Glacier Bay in 1 879. Muir's writings were in the European tradition of romantic naturalism, and his descriptions of the forests and glaciers of the region contributed to the myth of Alaska as a pristine wilderness that should remain unsullied by human industry. Like many of his contemporaries and subsequent writers, Muir failed to recognize the long history of human occupation and interaction with the environment before European contact with Native people, or even the extensive impact of European activities that Vancouver and others noted in the region nearly a century before Muir's expedition. Muir's writings also, ironically, popularized the region as an area full of potential for scientific research and tourism, which he viewed as destructive to the wilderness ideal. This conflict between productive use and aesthetic value was part of a broader debate in American society that coincided with a movement to professionalize administration of American forests.[28]

Some members of the American Forestry Association, which represented the interests of professionally trained foresters in the United States by the late 19th century, expressed concern about diminishing timber reserves in the early 1 870s. The Association urged the national government to adopt a program that would promote timber cultivation and forest preservation. Delegates to an Association convention in 1 875 called for a national program of forest research, and in 1 886, a member, Bernard Fernow, finally gained appointment to head the Division of Forestry. Fernow, who was the first professional forester to hold the position, had advocated conservation of forest lands in the United States for nearly a decade before his appointment. In his first year in office, Fernow outlined a systematic plan of forest research and lobbied hard for Congressional legislation to set aside federal forest lands. He was finally successful in 1891, when Congress passed a Forest Reserve Act authorizing the President to establish forest reserves. The next year, Benjamin Harrison established the Afognak Forest and Fish Culture Reserve, although this designation of the first federal reserve in Alaska primarily addressed concern for salmon fisheries in the region raised by a team ot researchers working for the federal Commissioner of Fish and Fisheries and headed by ichthyologistTarleton H. Bean.[29]

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[27]Harold K. Steen, The U.S. Forest Service: A History (Seattle: University of Washington Press, 1976), 17; Lawrence Rakestraw, A History of the United States Forest Service in Alaska (Anchorage: Alaska Historical Commission, Department of Education, State of Alaska, and the Alaska Region, Forest Service, United States Department of Agriculture, 1981), 7; Sherwood, Exploration of Alaska, 57-65. C. Hart Merriam, Harriman Alaska Expedition, Volume Two (New York: Doubleday, Page, and Company, and Washington, D.C.: Smithsonian Institution, 1902), 239.

[28]Sherwood, Exploration of Alaska, 75-76; John Muir, Travels in Alaska (Boston: Houghlin-Mifflin, 1 91 5).

[29]Steen, The U.S. Forest Service, 8-11, 26-27; Michael Frome, The Forest Service, second edition (Boulder CO: Westview Press, 1984), 18-19; Rakestraw, Forest Service in Alaska, 8-10; Robert Cowlin, [30]Federal Forest Research in the Pacific Northwest: The Pacific Northwest Forest and Range Experiment Station" (unpublished typescript, Portland Office History Files), 11.

Fernow became directly involved with forest research in Alaska after 1 898, when he resigned his position with the Division of Forestry and accepted appointment to organize and head the forestry program at Cornell University. The next year, Fernow joined an expedition organized by railroad magnate E.H. Harriman, who chartered a steamship and recruited more than 20 scientists for a grand tour along the Alaska coast. Among the scholars who joined the expedition were specialists in botany, paleontology, mining engineering, mineralogy, geology, zoology, entomology, mammalogy, ornithology, biology, anatomy, forestry, and geography. Two other passengers on the steamer who were particularly notable for their earlier contributions to forest research in Alaska were John Muir and William Dall.[30] Participants were divided into various committees organized according to discipline and function, much like a university faculty. The expedition made more than 50 stops in a 9,000-mile cruise, and participants produced a multitude of scholarly papers, subsequently published from 1902 to 1914 in a multivolume work entitled Harriman Alaska Expedition. This publication was one of the most comprehensive compilations of Alaska research available at the time. Fernow's contribution to the compendium was a report on the forests of Alaska and an assessment of their marketing potential drawn from his own observations along the coast and from second-hand accounts of the interior. Fernow argued that the coastal forests in Alaska could not compete with timber from the Puget Sound area for lumber markets, but he suggested they could be logged and marketed as pulpwood.[31] This suggestion initiated a long series of proposals aimed at developing a pulpwood industry in Alaska, and it played an important role in shaping the direction of forest research in the first half of the 20th century.

Forest Research and the U.S. Department of Agriculture, 1900-1924

Forest research in Alaska entered a new era of federal direction and professional administration about the time the Harriman expedition closed out the 19th century with a grand flourish of private initiative and funding. Federal interest in Alaska's affairs increased markedly after the gold rush of 1898, and by the early 1900s, professional foresters were gaining a firm foothold in the administrative hierarchy of the national government. Gifford Pinchot, who succeeded Fernow at the Division of Forestry in 1898, was professionally trained as a scientist and forester, a former manager of forest lands for theVanderbilt estate in North Carolina, and a graduate of Yale University. He was also a close associate of Theodore Roosevelt, and when Roosevelt became President after William McKinley was assassinated in 1901, professional foresters gained access to the corridors of power in Washington, D.C. By the end of that year, Filibert Roth headed the newly established Division of Forestry in the General Land Office of the Department of Interior, and Pinchot's unit in the Department of Agriculture was renamed the Bureau of Forestry. Four years

[30]Cowlin, 'Federal Forest Research," 17; Sherwood, Exploration of Alaska, 182-186.

[31]Rakestraw, Forest Service in Alaska, 15; C. Hart Merriam, Harriman Alaska Expedition, Volume Two (New York: Doubleday, Page, and Company, and Washington, DC: Smithsonian Institution, 1902), 2.35-256; Sherwood, Exploration of Alaska, 182-186.

later, Congress transferred administration of forest reserves from the Department of the Interior to the Department of Agriculture, and the Bureau of Forestry became the Forest Service in July 1905.[32]

Federal research in Alaska forests expanded during Pinchot's tenure, but research was not Pinchot's top priority and the people who conducted the research were not always professionally trained as scientists or foresters. Pinchot's primary concerns were to expand the area of forest reserves subject to **management** by professional foresters, and his political connections and social standing helped secure increased funding for the Bureau of Forestry and its expanding role in Alaska. With Pinchot's encouragement, the new President made the establishment of new forest reserves in Alaska a priority early in his administration. Roosevelt, formerly an assistant secretary of the Navy, commissioned a lieutenant in the Navy, George Thornton Emmons, to draft a report on the potential for establishing forest reserves in Alaska. Emmons previously had collaborated with the Field Museum of Natural History and other agencies in various scientific expeditions in Alaska. His 1902 report, "The Woodlands of Alaska," described in 16 handwritten pages the forests of interior and coastal Alaska in terms of their potential marketability and importance for local development. Emmons' proposed forest reserve primarily consisted of islands selected because they were relatively remote from potential development, relatively devoid of white inhabitants, and relatively unlikely to be economically viable for commercial logging in the future. Forest researchers seeking to establish Research Natural Areas in later years often found similar characteristics helpful in securing approval for proposed sites. On the basis of Emmon's report, Roosevelt established the Alexander Archipelago Forest Reserve by presidential proclamation on 20 August 1902.[33]

The transition to management and research by professional foresters was a gradual process in the Pinchot era. The man Pinchot appointed to manage the new forest reserves, William Langille, had broad interests and practical experience, but he was not a professional forester. Langille assumed his duties as forest supervisor of the Alexander Archipelago Forest Reserve after a 2-year examination of forest conditions in coastal and interior Alaska. He made a series of expeditions from Juneau to Prince William Sound, Controller Bay, Norton Bay, and the Kenai Peninsula in 1904, and he made a dogsled journey from Seward to Fairbanks between January and March 1905. Langille, much like his predecessors in the early years of the Russian-American Company, faced serious problems of difficult access, inadequate transportation, and a hostile population of Alaskans. He spent much of his time locating boats for transport and answering local critics of the Reserve. Frederick E. Olmstead, a professional forester, joined Langille in Alaska after Congress transferred administration of forest reserves from the Department of the Interior to the Department of Agriculture in 1905. Olmstead examined existing forest reserves and reviewed the

[32]Naske and Slotnik, Alaska, 85-87; Steen, The U.S Foprest Service, 47-48, 131-132; Cowlin. "Federal Forest Research," 21;

[33]Steen, The U.S Forest Service 52-74; Rakestraw, Forest Service in Alaska, 15-17; author's interviews with Wilbur A. Farr and A.S. Harris in luneau, AK, 23 December 1992;

potential for additional designations. He also recommended a survey of timber resources in Alaska, and he proposed an aggressive marketing campaign to promote developing those resources and enlarging the forest reserves.[34]

OImstead and other professional foresters in the Bureau of Forestry became more involved with Alaska forests just as forest research began to assume a more formal standing in the Bureau. Pinchot established the Section of Special Investigations as the research arm of the Division of Forestry during his first year in office. By 1902, it had evolved into the Division of Forest Investigation with a staff of 55 employees accounting for one-third of the agency's budget, and by 1905, Pinchot had organized investigative work into the sections of Forest Products, Dendrology, and Silvics. Three years later, Raphael Zon, a Russian `emigrè who headed the Section of Silvics in the Washington Office after studying with Fernow at Cornell, proposed a plan for decentralizing research by establishing a series of Forest Experiment Stations on the National Forests. Pinchot approved the plan on 6 May 1908 and by the end of that year, an experiment station was in operation in Arizona with investigations being conducted throughout the West.[35]

As research activities expanded in the Western United States, Alaska reserves began to attract more attention from scientists in the Forest Service. The head of the Silvics Section in the Portland office, Fred Ames, inspected forests in southeast Alaska with Langille in 1909. Royal S. Kellogg, an assistant forester with the Forest Service, examined interior and coastal forests that same year. Kellogg's research was published in 1910 in the first Forest Service bulletin devoted to the forests of Alaska. In his assessment of the market potential of Alaska forests, Kellogg echoed Fernow's suggestion that the coastal forests were best suited for producing pulpwood.[36]

Forest research gained a strong advocate when Henry S. Graves replaced Gifford Pinchot as Chief Forester in 1910, and Graves was also more directly involved with Alaska forests than was his predecessor. President William Taft fired Pinchot after the Chief Forester became embroiled in a dispute with the Secretary of the Interior over the disposition of coal lands in Alaska. The circumstances under which Pinchot was fired meant that the policies of his successor were strictly scrutinized, which in part accounts for the establishment of an independent research branch in the U.S. Forest Service. Graves was a professional forester who supported research into the use of fire as a tool for forest management. Amidst concerns that this research might conflict with established Forest Service programs that enlisted public support for suppressing fires, however, Graves faced critics in the Forest Service and in Congress who questioned whether fire research was an appropriate use of Forest Service funds. In this context, Graves ordered a halt to the practice of supporting experiment stations with general expense funds, and he sought independent funding from Congress for research activities in 1912 .[37]

[34] Rakestraw Forest Service in Alaska, 18-22, 30-31.

[35] Cowlin, "Federal Forest Research." 26-28; Steen, The U.S. Forest Service, 131-132;

[36] Rakestraw, Forest Seryice in Alaska, 30-31.

[37] Sleen The U.S. Forest Service, 135-137; Rakestraw, Forest Service in Alaska 55-62.

Graves established the Branch of Research as an independent unit in the Forest Service in 1915, and he visited Alaska himself that same year. His published articles appeared in 1916 with descriptions of the forests of Alaska and their value as a source of timber. Graves named a professional forester, Earle H. Clapp, to head the Branch of Research in Washington, D.C., and assume control over the various lines of investigative work in the Forest Service. Clapp, who reported only to the Chief Forester in the Washington Office, credited this reorganization with protecting researchers from the whims of District foresters. Other forest researchers, however, including Thornton Munger, the Assistant Chief of the Division of Silviculture in the Portland Office, argued that the realignment had centralized authority in the Washington office while it undermined the autonomy and responsiveness of researchers in the field.[38] This problem, in various incarnations, has confounded forest researchers in Alaska from 1 91 5 through the present.

Scientists found professional respectability in the Forest Service under the protective umbrella of the Branch of Research after 1915, and their presence established the reputation of the Forest Service as the national leader in forest research by the 1920s, but the question of scientific autonomy and initiative remained an important issue, especially in Alaska. Graves and his critics in the Forest Service echoed principles of scientists since Steller's time in suggesting that forest research should provide usable knowledge for practicing foresters. In keeping with that utilitarian outlook, which was a common priority among progressive scientists and policy makers in early 20th-century America,[39] researchers in Alaska worked on volume tables and inventories to serve the needs of forest managers and developers. Efforts to promote and develop a pulpwood industry on the Tongass National Forest also prompted studies of waterflow and soil conditions, mostly at the initiative of Forest Supervisors on the Chugach and Tongass National Forests. Some scientists questioned, as early as 1917, whether this pattern of research was appropriate for scientists in the Forest Service, but their protests had little success in shifting the focus of forest research in Alaska or elsewhere.[40]

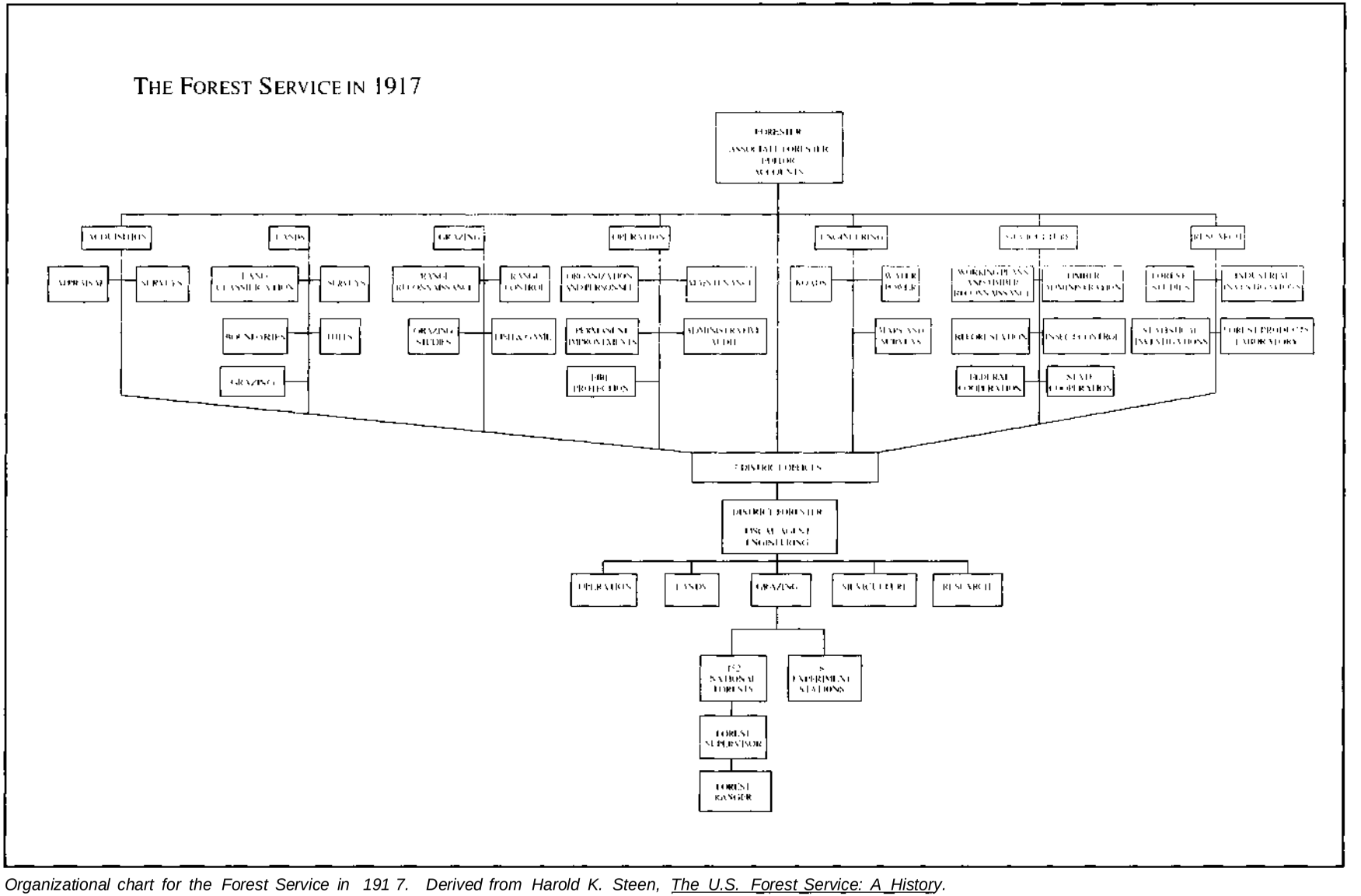
Administrative realignment of Forest Service activities in Alaska in the decade after 1919 widened the gap between forest research and forest management on paper, but not necessarily in practice. Administrative control of forest management moved closer to Juneau when Alaska was split away from District 6 in 1921 and was reconstituted as District 8 (later Region 8 and Region 10),[41] but when the Pacific Northwest Forest Experiment Station was established in 1924, initially

[38]Cowlin, 'Federal Forest Research," 40; Steen, The U.S. Forest Service, 137-140.

[39]Progressive reformers ot this era typically emphasized the need for increased efficiency, scientific methods, and immediate action to address problems with real-world implications. The Pure Food and Drug Acts of 1906, for example, addressed sanitation problems dramatized and popularized in Upton Sinclair's The jungle. This utilitarian bent fostered a wave of reforms that generated a strong demand for protessionally trained scientists in many areas ot public service and administration, including the Forest Service.

[40]Cowlin, Federal Forest Research," 42-47; Steen, The U.S. Forest Service, 137-140, Rakestraw, Forest Service in Alaska 76-78.

[41]Forest Service Districts were reorganized as Regions in 1930; in 1934, Region 8 became Region 10 in a re-numbering of the various regions ot the Forest Service. Rakestraw, Forest Service in Alaska, 90-91.



Organizational chart for the Forest Service in 191 7. Derived from Harold K. Steen, The U.S. Forest Service: A History.

CONTINUED

Mendenhall Glacier near Juneau. The spectacular scenery of mountains and glaciers in coastal regions of Alaska shaped early European and later American perceptions of available resources and potential avenues of scientific inquiry through the modern era of professional forestry in Alaska. (Farr collection)

with responsibility tor forest research in Alaska as well as Oregon and Washington,[42] the stage was set for Portland to become the administrative center of research in Alaska. This proposal did not become a practical reality for another four decades, but from 1924 through 1948, forest researchers who focused on Alaska did their field work in locations far removed from the administrative centers of the Research Branch and in close proximity to Regional Foresters on whom they often depended for logistical support. In the first two decades of forest research in Alaska after 1924, this administrative and geographic reality reinforced existing priorities in forest research aimed at addressing questions directly relating to the economic development of forest resources. It also contributed to the tendency common among many early scientists in Alaska to view themselves as rugged pioneers isolated on the distant periphery of the Research Branch of the Forest Service in other areas of the United States.[43]

The scientists who laid the foundation for subsequent research in Alaska developed a common outlook, or community culture, that in many ways survives into the modern era among personnel at Anchorage, Fairbanks, and Juneau. This community culture included positive features that sustained several generations of scientists in Alaska, but it also raised potential points of concern for Forest Service leaders in offices outside Alaska. Through the 1 980s, administrators at PNW Station recognized the need to maintain open lines of communication with personnel who seemed to "go Alaskan"[44] very soon after their arrival in northern latitudes, while scientists in

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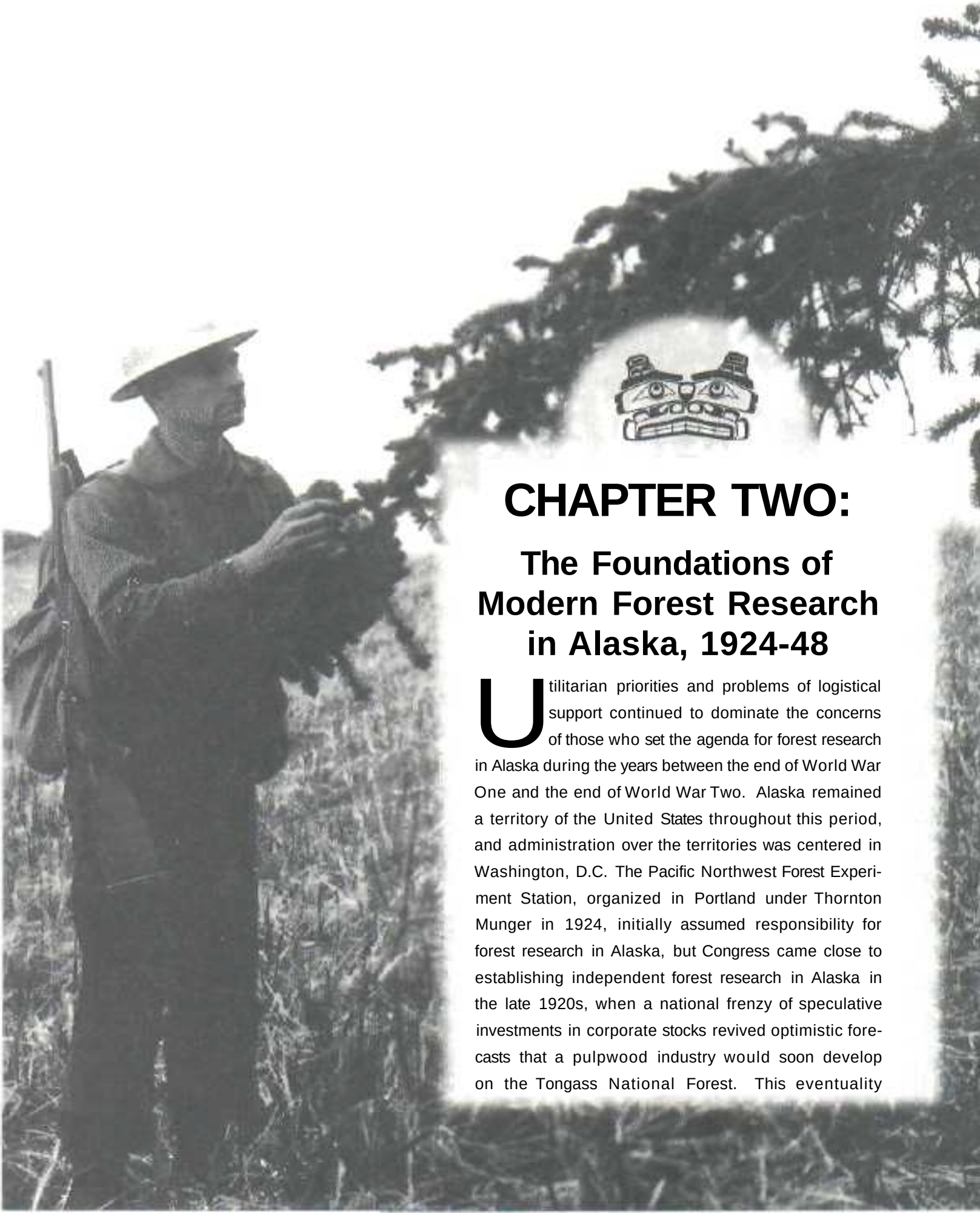
[42]Cowlin, "Federal Forest Research," 48-50.

[43]This outlook permeates the writings ol" Ray Taylor, whose early involvment in forest research in Alaska is detailed in the next chapter.

[44]This phase c ame up in many conversations between the author and PNW staff in Alaska and in Portland. Typically. Ihe phrase carried no judgmental implications but, rather, indicated an adjustment or acclimation to the regional lifestyle and cultural outlook of more long-term residents of Alaska. As such, it is a tacit recognition that personnel in Alaska faced unique challenges. Former PNW Station Director Robert Lthington recalls that the process of recruiting personnel for assignment in Alaska required exceptional tare and attention to family needs, personal dispositions, and leisure-time interests. Interview with Robert Ethingtor 12 July 1995; interview with Robert Buckman 13 July 1995; interview with Robert Tarrant 11 July 1995. Interviews with Bill Farr, Bill Meehan, Tom Hanley, Doug Swanston, Al Harris, Mary Lewis, Carl Hegg, and Tom Laurent, 22 December 1992; Interview with Ken Wright, 13 July 1993

Alaska frequently emphasized their physical detachment from PNW Station and their difficulties in conveying to administrators in Portland and elsewhere the unique problems of conducting research operations in Alaska.[45] Regional Foresters in Alaska, by contrast, were fellow Alaska residents who understood local conditions and could marshal the resources needed to work under those conditions. In this context, the relatively recent (1915) creation of the Branch of Research as an independent administrative entity in the Forest Service did not immediately translate into independent scientific research in Alaska. Administrative networks and personnel already in place in Alaska shaped the early course of forest research and influenced the scientific traditions that emerged among the community of forest researchers recruited to Alaska over the next four decades.

[45]One researcher stationed in Alaska indicated in correspondence with the author in 1993 that in 17 years of work in Alaska for the PNW Station, he had never been to the Portland Office. Personal communic alion from Vic Van Ballenbergh to author, 1993. Interview with Bill Farr, Bill Meehan, Tom Hanley, Doug Swanston, Al Harris, Mary Lewis, Carl Hegg, and Tom Laurent, 22 December 1992. Interview with Robert Buckman. 13 July 1995; interview with Robert Tarrant, 11 July 1995; interview with Robert Ethington, 12 July 1995.



CHAPTER TWO:

The Foundations of Modern Forest Research in Alaska, 1924-48

Utilitarian priorities and problems of logistical support continued to dominate the concerns of those who set the agenda for forest research in Alaska during the years between the end of World War One and the end of World War Two. Alaska remained a territory of the United States throughout this period, and administration over the territories was centered in Washington, D.C. The Pacific Northwest Forest Experiment Station, organized in Portland under Thornton Munger in 1924, initially assumed responsibility for forest research in Alaska, but Congress came close to establishing independent forest research in Alaska in the late 1920s, when a national frenzy of speculative investments in corporate stocks revived optimistic forecasts that a pulpwood industry would soon develop on the Tongass National Forest. This eventuality

prompted demands for growth and yield studies, and Congress responded with legislation authorizing a forest experiment station in Alaska. The legislation, however, failed to provide funding, and the idea was abandoned during the Great Depression. Forest research over the next two decades, consequently, depended heavily on logistical support from forest managers in Alaska with concerns about the quantity and marketability of timber in the region.[1]

Forest research priorities at PNW Station during the late 1920s were formulated in cooperation with a Forest Advisory Council appointed by Calvin Coolidge's Secretary of Agriculture, William Jardine, and headed by C.S. Chapman, chief forester for Weyerhauser Timber Co., who was elected chairman at the first meeting of the council. Thornton Munger served as secretary, and other members of the council included leaders from the timber industry, public and private professional foresters, faculty from the forestry schools at the state agricultural colleges of Oregon and Washington, and state and federal foresters.[2]

Munger emphasized the need for utilitarian research in his first year as director of the PNW Station. His 1924 address before delegates to the Annual Meeting of the Western Forestry and Conservation Association in Vancouver, British Columbia, amounted to a pledge to keep the interests of private landholders and the timber industry on an equal footing with the interests of National Forest administrators, arguing that "Governmental forest research is not conducted primarily for application on publicly owned land. It is undertaken quite as much for the benefit of the private land owner as for the National Forest administration."[3]

Munger also called for more cooperation with state foresters and forestry schools, and he warned that forest research must focus on matters of practical utility:

> We have no time now for research for research's sake; for delving into incidental trifles of mere academic interest; for working on questions, the answers to which have no application in current affairs. I believe we have no justification now in working with our less important tree species or in the non-commercial forest types. For the present our major activities must lie in the important timber belts, where the extensive lumbering operations lie and where there are great areas whose future may be either devastation or reforestation. The selection of projects for study will depend on their economic importance.[4]

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[1]Covvlin, 49a-53; Rakestraw, 93-94; Ray F. Taylor, "Forest Research and the State of Alaska's Forests" (Dummy copy and preliminary manuscript labeled Station Raper 11, Alaska Forest Research Center, U.S. Departmenl of Agriculture, Forest Service, Juneau, Alaska, Jan 1959, located in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service), 3-4; Taylor, "Early Forest Research in Alaska," 14-27. Thornton T. Munger. "Recollections of My Thirty-Eight years in the Forest Service, 1908-1946." Timberlines: Thirty-Year Club Region Six U.S. Forest Service. Supplement to Vol. XVI (December 1962), 17.

[2]Cowlin, 58-61.

[3]Thornton T. Munger, "Governmental Forest Research: A Paper Concerning the Work of the Pacific Northwest Forest Experiment Station for the Annual Meeting of the Western Forestry and Conservation Association, Vancouver, B.C., December 3, 1924," (Typescript located in the storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service), 2.

[4]Munger, "Governmental Forest Research", 4.

Jim Walley and Thornton Munger, Director of the Pacific Northwest Forest and Range Experiment Station, tour Alaska waters aboard the Forest Supervisor's boat in 1927. (Taylor m.s., p. 79)

Munger gave top priority to growth and yield studies, particularly for second-growth stands of Douglas-fir in Oregon and Washington, but also for spruce-hemlock in forests extending from Oregon through Washington, British Columbia, and into Alaska. In an address to the Pacific Logging Conference in Portland, Munger urged industry leaders to shift from exploitative practices to "timber farming." He warned that the country had outgrown the "wild crop" methods of its frontier youth, observing that "It may be presumptuous to say that man can improve on Nature, but he certainly can if he goes about it. Under proper management man can produce more wood per acre than Nature has in the wild stands."[5]

In his joint capacity as director of the PNW Station and secretary for the Advisory Council, Munger embarked in 1927 on a 6-week tour of the "principal logging regions" in Alaska (from Ketchikan to Juneau and Sitka, with special attention to Prince of Wales Island) to explore the silvical problems of southeastern Alaska and to suggest methods of cutting that should be used. Various Forest Service workers then in Alaska, including a young man named Ray Taylor, accompanied Munger on his tour. Munger's report reiterated his earlier call for studies of growth, yield, and reproduction in the spruce-hemlock forests of Alaska. He encouraged coordination with Canada, and he argued that these studies must be completed before any pulp operations could begin in Alaska.[6]

Munger's recommendation for expanded research was consistent with the political culture and economic outlook in the Nation as a whole and in Alaska during the administrations of Presidents Warren G. Harding and Calvin Coolidge. The business boom of the late 1920s was peaking, the national economy had apparently recovered from the post-war depression, and construction of the government-owned and government-operated Alaska Railroad by 1924 had stimulated an investment and economic development boom from Seward north through Anchorage, Fairbanks, and surrounding regions. In addition to providing jobs and transportation access, the railway encouraged the growth of communities that provided local markets for construction-grade timber.[7] All of these developments increased the pressure on Forest Service administrators

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[5]Munger, "Governmental Forest Research", 6 1/2; Thornton T. Munger, "The Objectives of the New Federal Forest Experiment Station: Address read at Pacific Logging Congress, Portland, Oregon, October 22, 1924."(Typescript located in the storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service), 1-9.

[6]Taylor, "Early Forest Research," ii; Munger. "Recollections of My Thirty-Eight Years," 1 7, Thornton T. Munger, "A Research Reconnaissance of Southeast Alaska," RS Cooperation District 8, 30 July 1 927.

[7]Naske, Alaska, 96-97.

to monitor and explore options for timber management on National Forests in Alaska, even as the business-oriented administrations of Harding and Coolidge forged a coalition of congressmen and private interests who supported an expanded role for Research in the Forest Service to encourage and promote economic development on forested lands.[8]

Ray Taylor absorbed the frontier spirit of Alaska during his summers as a seasonal worker with the District Forester's office in the mid 1920s. Here, he poses in front of his rustic quarters in Wrangell. (Taylor m.s., p. 25)

Forest research gained a powerful boost in the mid 1 920s when Congress expanded federal assistance to the states for fire protection and provided matching funds to establish nurseries. New York Congressman John D. Clarke introduced legislation in 1923 dealing primarily with the need for cooperative fire control efforts among local, state, and federal governments. Oregon Senator Charles McNary, who served as chairman of the Select Committee on Reforestation, sponsored similar legislation in the Senate and scheduled hearings that solicited input from a variety of industry leaders and professional foresters, prominently including representatives from the National Lumber Manufacturers Association. Most of those who were invited to testify before the committee downplayed the need for regulation and stressed the need for cooperation between public and private foresters. The Clarke-McNary Act that emerged from this process in 1924 not only called for cooperative fire protection and replanting assistance to private forest-land owners, it also authorized the Secretary of Agriculture to fund studies on the effects of tax laws on forest practices and methods of forest perpetuation, and to cooperate with state and other agencies to investigate and write tax laws that would encourage timber production.[9] This measure significantly expanded the role of Forest Service Research to include private as well as public lands.

Earl H. Clapp, who directed the Branch of Research during the 1920s, worked with the industry-based National Forestry Program Committee and the American Forestry Association to draft a proposal designed to secure independent funding for the Forest Products Laboratory, the various experiment stations, a national inventory of forest resources, and a study of grazing in relation to forest lands. Ohio Congressman John R. McSweeney introduced Clapp's proposal before Congress in 1927, gained the support of Senator McNary, and managed to secure passage for the bill in 1928. The McSweeney-McNary Act, in addition to securing a $3 million budget that essentially enacted the proposals generated by Clapp and the National Forestry Program Committee,

"Steen, The U.S. Forest Service, 140-42.

"William C. Robbins, American Forestry: A History of National, State, and Private Cooperation (Lincoln: University of Nebraska Press, 1985), 84-86, 92-93; Steen, 184-187.

secured the position of Research "on a par" with other forestry activities, and formalized the basic framework for the organization of regional forest experiment stations. Among other provisions, McSweeney-McNary named and described broad fields of study organized into discrete sections or areas of research: forest diseases; forest insects; forest animals, birds, and wildlife; forest fire and weather; forest range and watershed; forest products; forest survey; and forest reforestation and economic studies.[10] In this climate of government cooperation with private industry, researchers in the Forest Service began to focus more directly on timber resources in Alaska, and much of their energy was directed toward identifying the extent and quantity of those resources.

Early Forest Research on the Tongass and Chugach National Forests

Forest researchers in the Territory of Alaska labored through the interwar period and World War Two with limited human and fiscal resources, despite the rising status of research within the Forest Service. Relatively isolated scientists worked with the Forest Service in Alaska and struggled to compile baseline data in cooperation with administrators of District 8 (headquartered in Juneau after 1921) at the request of public and private groups interested in forest resources and in relative isolation from the research community at the PNW and other experiment stations. These early scientists cultivated a self image of practical innovation, cooperation, adaptation, and accommodation inspired by the remote, isolated, and wild conditions of frontier Alaska. This self-styled tradition of "frontiersmanship" had a powerful, formative influence on the community culture that developed in later years among the Research staff in Alaska.[11] It tended to emphasize male camaraderie and individual initiative in coping with the remote, isolated, and unique conditions of research in Alaska, and it often tended to neglect the contributions of office clerical

[10]Covvlin, 67-68; Steen, 141, 194.

[11]As an example of how this tradition of frontiersmanship, or "seat of the pants" research prevailed until relatively recent years, Austin Helmers recalls how Dan Bishop mapped the location of wood debris and changes in streambed topography for salmon habitat studies on Prince of Wales Island. Near the end of one project, Bishop used aerial photographs taken with a surplus K-20 camera from a Hi Her 12E helicopter equipped with floats. Bishop first calculated the number of seconds between film exposures required to obtain a 60-percent end-lap for stereo coverage with the photos at a given altitude and speed. Assistants then lashed Bishop to planks attached to the floats on the helicopter. As the aircraft flew the stream courses, an assistant with a stopwatch sat with his feet astraddle Bishop on the float and jabbed him in the back to indicate each photo interval. In another example, Helmers recalls that he and Bishop examined landslides on the Maybeso Experimental Forest and elsewhere in southeast Alaska by struggling up the slopes with nothing but a surveying chain for a rope: "...every night when we got down to the main camp down there, you know, he'd say, 'you know, that was pretty foolish, what we did today!' but it just kept happening day after day after day! llaughsl" Austin Helmers, interviewed by Max Ceier in Palmer, Alaska, 13 July 1993. Helmers recalls, however, that it was a "tooth and toenail struggle" to climb the slopes, and they soon acquired climbing ropes for ascents with prussik slings and descents by rappelling techniques. Correspondence from Austin Helmers to Cindy Miner, 10 March 1 995. For other examples of how early forest researchers cultivated a self-image of frontiersmanship and for descriptions of the conditions of forest work in the 1920s, see Ray Taylor, "Early Forest Research in Alaska," (Typescript and notes located in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service), 1 -1 2; and "History Compiled by R.F. Taylor," (Looseleaf collection of notes and documents located in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service), n.p.

Taylor spent his first summers in Alaska working as a log sealer tor the District foiesler's office. (Tavlor m.v, *p. 25)*

workers and, especially, women.[12] The people who helped shape this self-image of frontiersmanship in the remote wilderness of Alaska, ironically, were themselves closely tied to the academic traditions of professional forestry and the culture of private institutions of higher education at the center of power in the northeastern United States, and they worked with evangelical fervor to demonstrate that scientific forestry would yield practical, economic benefits.[13]

District Forester Charles Flory and his assistant district forester for timber management, B.F. (Frank) Heintzleman (who later became Governor of the Territory of Alaska), were graduates of the Yale School of Forestry, and Flory allowed Heintzleman to use timber management funds to initiate a research program tailored to suit the needs of his office during the early 1920s. Heintzleman brought in Forest Examiner James M. Walley and Forest Assistant Harold J. Lutz in 1924 to study forest reproduction on small, cutover areas on the Tongass National Forest, and to compile local volume tables from timber felled for milling and pilings. Ray Taylor, a senior in the College of Forestry at the University of Washington who had worked as a sealer on theTongass in the summer of 1924, replaced Lutz on the Tongass in 1925, and Lutz transferred to the Chugach National Forest. Shortly after they began working in Alaska under the direction of Heintzleman, both Lutz and Taylor were accepted into the graduate program at their boss' alma mater, the Yale School of Forestry in New Haven, Connecticut, and they left Alaska to begin their studies at Yale in 1926.[14] Taylor returned to Alaska for summer work under Walley in 1927, and he soon found himself the senior researcher on the scene when Walley, who had recently married and fathered a child, transferred from Ketchikan to the Lake States Station for family reasons.[15]

Taylor, who later directed the Alaska Forest Research Center in Juneau during the first two decades of its existence, played a significant role in shaping the course of research in Alaska in a period spanning more than three decades after 1928. Taylor's graduate study at Yale exposed him

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[14]In fairness, this neglect was partly a reaction against forest managers and field workers who reportedly viewed researchers as somewhat effete, and Ray Taylor, for one, apparently felt the pressure to prove himself in the field. See, for example, Taylor, "Early Forest Research," 14-16, 32-3.3, and 76-77. A group photograph of personnel at Juneau in 1935, found on page 111 in Taylor's manuscript, is instructive on attitudes toward women affiliated with the Forest Service. Of the 28 people pictured, Taylor provides names for 20. All 8 of the people who appear in the photo without names are women (II of the people in the piclure appear to be women, but Henrietta Sell, Sally Shafer, and Tina Glass are the only women lor whom names are supplied).

[15]For an example of how this evangelical fervor carried over into later years, see Taylor, "Forest Research and the State of Alaska's Forests", 3-9.

[16]Havlor made the overland trip from Seattle to New Haven by Model T Ford with his friend from the U.W. Al Thompson. Ray Tavlor, "Forest Research," in Rakestraw, Forest Service in Alaska, 93-94, Taylor, "Earl\ Forest Research," 14, 72.

[17]Tavlor, "Earlv Forest Research," 74.

to the ideas of an influential group of established scientists and future leaders in forest research. By his own account, Taylor spent much of his time at Yale working on a "deep study" of the pulp industry under the direction of a faculty headed by the former chief of the Forest Service, Henry Graves. Taylor's autobiographical account lists, among other distinguished faculty of note during his time at Yale, Herman H. Chapman, Ralph Hawley, and Sam Record. A future Dean of the Yale school, George Garratt, was a graduate student in the doctoral program when Taylor and Lutz arrived in 1926, and his fellow graduate students included Svend Heiberg, a Scandinavian immigrant who eventually joined the faculty at Syracuse as professor of forestry. Lutz joined the Connecticut Agricultural Station and eventually joined the faculty at Yale as a professor of silviculture who conducted a series of studies in the 1940s and 1 950s exploring, among other things, the effects of fires, soil conditions, and animal effects on forests of interior Alaska.[16]

Alaska was an adventure for young forestry students in 1926, and these early experiences shaped later perceptions of the assignment to Alaska. Here, Taylor and his friend Allen Thompson make camp with their Model-T Ford, enroute to graduate school at Yale from their summer work in Alaska. The trip took 17 days. (Taylor m.s., p. 81)

Family and *alma mater* were important considerations for forest researchers in Alaska during this period. Taylor suggests that Walley was pressured into leaving Alaska because Heintzleman (a life-long bachelor) was unwilling to accommodate Walley's efforts to spend time with his new family. Taylor notes that his own wife "went south" during the field season, "...thus not interfering with my work," and Taylor argues that he enjoyed a more amicable relationship with Heintzleman and Flory because "...we were both 'Yale men."[17] Heintzleman, as the chief forester in charge of timber sales, was also a strong advocate for starting a pulp mill in Alaska, and it was more than coincidental that he selected his fellow Yale man and student of the pulp industry, Junior Forester Ray Taylor, to head a research effort in Juneau in 1928 that focused on obtaining basic information for developing methods of timber management most appropriate for pulpwood production.[18]

Taylor headed a two-person research program in Juneau in 1928 as a Junior Forester on the Tongass National Forest at about the time the McSweeny-McNary Act mandated a Forest Service inventory of forest lands and resources. The U.S. Navy began a program of aerial photography in

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[17]Taylor, "Early Forest Research," 72; H.j. Lutz, Early Forest Conditions in the Alaska Interior: An Historical Account With Original Sources (Juneau: U.S. Department of Agriculture, Forest Service, Northern Forest Experiment Station, 1963), 1.

[18]Taylor, "Early Forest Research," 74-75.

[19]Taylor, "Early Forest Research," 75. Annual lumber production in the United States dropped from 36 billion board feet in 1928 to 26 billion in 1930 and 1 0 billion in 1932. Robbins, American Forestry, 122-23.

Taylor initiated reproduction studies in 1928 with support from frank Heintzleman in the District Forester's office. This site was logged in 1924, and Taylor is shown measuring growth in 1928. (Taylor m.s., p. 39)

southeast Alaska in 1927 that laid the groundwork for later innovations in remote sensing by researchers with the forest survey program in Alaska, but Forest Service plans for a systematic and comprehensive survey of forest resources in 1 928 were derailed by the Great Depression. Heintzleman's commitment to the research program in Juneau, meanwhile, faltered when the bottom fell out of the timber industry between 1928 and 1932, and the anticipated pulp mill industry failed to materialize on theTongass National Forest. Taylor left Alaska in 1929 and returned to Yale for advanced graduate study, but he returned regularly over the next four years for summer field work, while also researching his dissertation topic, "Available Nitrogen as a Factor Influencing the Occurrence of Sitka Spruce and Western Hemlock Seedlings in Forests of Southeastern Alaska." Taylor also compiled a pocket guide to Alaska trees that was published in 1929 as a U.S. Department of Agriculture Miscellaneous Publication, and he completed his dissertation in 1 934. That year, Heintzleman transferred to a new assignment in the Washington Office, and Taylor soon joined him in the capital as assistant chief of the Division of Silvics.[19]

Taylor's field work in Alaska spanned nearly a decade by the time he brought his practical experience and Yale degrees to the Division of Silvics in Washington, D.C. During his time in Alaska, Taylor had worked closely with several scientists and forest managers in developing growth and yield tables and volume tables for tree species deemed most valuable for utilitarian strategies of forest management. He had been supported in those efforts by district administrators like Heintzleman and Flory, and he had drawn on the expertise of established scientists of the Yale School of Forestry. He was a product of the political hierarchy of a profession that had emerged during the Republican progressive era of Theodore Roosevelt and had consolidated its influence during the business-oriented, Republican administrations of Presidents Harding, Coolidge, and Herbert Hoover. By the time Taylor arrived in Washington, however, the Democratic presidency of Franklin D. Roosevelt was in the process of an administrative reorganization that filtered down to the Forest Service, including a proposal to establish work camps on the National Forests for the dual purpose of creating jobs and promoting conservation efforts.[20] Taylor gained exposure to

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[19]Tavior observes that his goal in transferring to Washington was to "...keep an eye on research jobs at the various stations and perhaps grab one later..."Cowlin, 73; Taylor, "Early Forest Research," 75-76; 85-86; Rakestraw, Forest Service in Alaska, 94-95.

[20]Franklin Roosevelt had a particular interest in forestry as former chair of the New York legislature's committee on forestry and as manager of his estate at Hyde Park. His election campaign of 1 932 included a demand for the creation of more National Forests to provide forestry-related work for the unemployed. Robbins, American Forestry, 138-39

The Forest Service administered the Civilian Conservation Corps in Alaska during the Great Depression of the 7 9305, and the average age of CCC recruits in Alaska was higher than in the rest of the United States. Few were college educated, and Yale graduate Ray Taylor did not consider them suitable material for research assistants. This camp was located at Cooper's Landing in the Kenai Division. (Taylor m.s., p. 118)

the administrative center during this period of ferment and re-examination of the Forest Service, its mission, and its place in the federal bureaucracy. He expanded his personal network of professional colleagues, gained greater insight into the inner workings of the central administration, and parleyed that exposure into an assignment to assist in establishing a new Forest Research Station at Fort Collins, Colorado, in 1935.[21] Thirteen years later, he put that experience to use as the first administrator of the newly organized Alaska Forest Research Center in Juneau.

Taylor's networks with the higher administration and the world of academia increased the visibility of forest research in Alaska, but his efforts also depended on close working relations with field personnel and other scientists in Alaska. Jake Anderson, a botanist from Iowa State College who operated a greenhouse in Juneau during the 1920s and 1930s, helped Taylor make preliminary identifications of plants before official identifications made their way back from the Washington Office. Taylor credits Anderson, who later published his own book on the plants of Alaska through Iowa State College, with identifying three different varieties of birch (Western, Alaska, and Kenai) that Taylor used in his reports.[22]

Other researchers pursued their work independent of Taylor during the same period. Harold Lutz published his "Observations on the invasion of newly formed glacial moraines by trees," in 1930 (Ecology 11:562-567), and Robert F. Griggs published several articles on forest ecology and soils in 1933 and 1934.[23] Another researcher, L.J. Markwardt, studied the distribution and

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[21] Taylor spent less than 2 years in the Washington Office before transferring to the Rocky Mountain Forest and Range Experiment Station in Ft. Collins. Austin Helmers, who worked with Taylor in Juneau for a lew years between 1957 and 1960, also spent 2 years in the Washington Office from 1955 to 1957 before transferring out, and Helmers recalls that the experience of working in the nation's capital "...sure gives you a different view of the organization...when you get out, all those inspectors who come out, you knew 'cm all...no matter where you went, you knew somebody..." Both Helmers and Taylor described their transfers as an "escape" from Washington. Author's interview with Austin Helmers, Palmer, Alaska, 5 August 1993; Austin Helmers Professional Biography File, Central History Files, Portland Office, PNW Station; Rakestraw, Forest Service in Alaska, 95; Taylor, "Early Forest Research," 116.

[22] Taylor, 'Early Forest Research," 86-87.

[23] R.F. Griggs, "Edge of the forest in Alaska and the reasons for its position," Ecology 15 (1934), 80-96; R.F. Griggs, "The colonization of the Katmai ash, a new and inorganic "soil," American lournal of Botany 20 (1933), 92-113.

Taylor's work in the 1920s laid the groundwork for later efforts after the Forest Servie established the Alaska forest Research Center in 1948. This photo, taken in 1953 by Dick Codman, shows Lawrence Zach at Plot I, established by Taylor at Virgin Ray in 1926. 'luneau 334)

mechanical properties of Alaska woods, with estimates of total forested areas and volumes in Alaska and on theTongass and Chugach National Forests (16.5 million acres on the Tongass and 4.8 million acres on the Chugach) published in USDA Technical Bulletin 226 in 1931.

Research on wildlife and rangelands during this period included work by Lawrence J. Palmer, who investigated the progress of reindeer grazing in USDA Departmental Bulletin 1423, published in 1926, and he conducted a range reconnaissance of moose on the Kenai Peninsula in 1933.[24] Forest Examiner J.P. Williams worked on the Kenai Peninsula and the Tongass National Forest during the 1920s and 1930s, and he gained a reputation as the wildlife specialist in the regional office with his work on the bear management plan and bear census conducted by the Forest Service during the 1930s.[25] Frank Dufresne produced a report through the Regional Office in Juneau entitled "Alaska's animals and fishes," that was published by A.S. Barnes of New York in 1946. Heintzleman also produced a report in 1936 for the Forest Service that outlined the area, climate, and forest conditions of coastal Alaska and the interior and included a summary of existing and potential agricultural areas, domesticated livestock, and range herds of caribou and reindeer. Heintzleman noted the threat of overgrazing, and he emphasized the need for fire protection, grazing controls, management of predatory animals, game management areas, and wildlife refuges. He also called for the formal establishment of a forest and range experiment station.[26]

Natural and human-caused disasters often have provided the impetus for research in Alaska, and one such disaster apparently encouraged Heintzleman to initiate a wildlife study on Admiralty Island. Forest Ranger Jack Thayer was killed by a bear while cruising timber on the island in October 1929. Thayer's death caused a sensation in area newspapers and led to a review of Forest Service safety precautions in the region. Within a few months, Heintzleman had established a refuge for brown bear on the island, and he recruited Forest Examiner Jay P. Williams to conduct a study of brown bear and their behavior along Pack Creek. In the wake of Thayer's death, Forest Service employees in Alaska were required to travel in pairs and carry a rifle to ward off bear attacks.[27]

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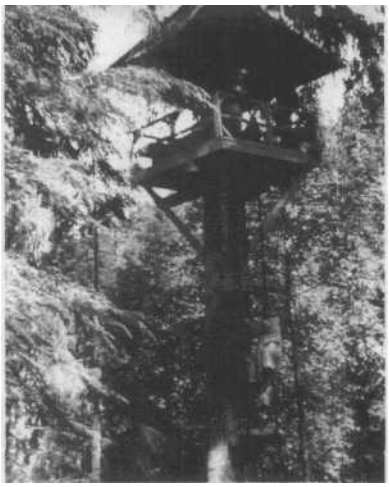
[24] M.inuy ript located in the luneau FSL Library.

[25] Rakestraw. Forest Service in Alaska, 112; Taylor, "History," (Loose-leaf collection of notes and addenda located in the storage room, luneau Forestry Sciences Laboratory, USDA Forest Service).

[26] B.F. I lemt/leman, "Alaska" in The Western Range—a Great But Neglected Natural Resource (U.S Department ol Agriculture, Forest Service, Senate Document 199—Separate 17, 1936).

[27] Taylor. Notes and addenda located in the storage room, Juneau Forestry Sciences Laboratory, USDA Forest Serviec; Tavlor, "Early Forest Research," 100-107.

Bear sightings were part ot the job tor field workers in Alaska. (Schmiege collection)



The bear attack on Jack Thayer prompted many early studies of bear. This "bear observatory" was at Pack Creek on Admiralty Island. (Farr collection)

Transportation and Conditions of Early Research Efforts

Thayer's death graphically illustrates the isolation and potential hazards of forest research in remote regions of Alaska where ranger boats were the primary means of transportation in the interwar period of the 1920s and 1930s. The bear attacked Thayer about 2 p.m. on 1 6 October 1 929 and inflicted more than 100 wounds. Thayer's assistant, Fred Herring, rushed back to their boat, the Weepoose, in search of help, reached the boat in about an hour, and returned to Thayer with the other member of their crew, Carl Collins, at about dusk. Collins and Herring packed Thayer's wounds with flour and blankets from the boat, but they found his condition so bad, they were unable to move him, tried to make him comfortable, and watched him die by 10:30 p.m. They then tried to carry his body out, but could manage only 1/2 mile, before they were forced to leave him behind. They returned to the Weepoose and sailed to a cannery on Pybus Harbor seeking additional help, returned with 5 men at 11:30 p.m. on October 18, carried Thayer to the Weepoose, and finally arrived back at juneau at 8:30 p.m. on October 1 9 after "running all night."[28]

Herring's struggle to bring Thayer out of the woods was a grueling ordeal spanning three days and six hours between the time Thayer was first attacked and the time his body finally reached a port with medical facilities. Prompt medical care may not have saved Thayer, given the nature of his reported injuries, but this incident clearly shows the risk associated with field work and the limitations of conducting research in remote areas in an era when Forest Service scientists depended on boats for transportation and spent extended hours in virtual isolation and beyond the reach of emergency assistance. Taylor, for example, worked from the Weepoose and another boat, the Ranger 10, in 1 929 along the west coast of Prince of Wales Island and the west side of Admiralty Island, with plots at Chaik Bay, Hood Bay, Kanalku, and Mitchell Bay, and he recounts several confrontations with brown bear on Admiralty Island just before the attack on Thayer.[29]

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[28]"From the log ot the Weepoose as quoted in Rakestraw, Forest Service in Alaska, 92; Taylor, "Early Forest Research," 108-109.

[29]"Tavlor, Early Forest Research," 97-102.

The logistics of travel by boat often defined the nature, locale, and focus of forest research in Alaska, and it further isolated field workers from each other and from their colleagues in other regions of the Forest Service. Boats were the primary means of transportation for researchers and forest managers in Alaska long after trucks and automobiles replaced the horses that were more common in other Western districts of the Forest Service.[50] Aircraft were not readily available until World War Two, and most areas were inaccessible by roads or railways. These conditions reinforced the self-image of researchers in Alaska as a "breed apart" and promoted an *esprit de corps* closely aligned with timber managers facing similar conditions in the region.

Al Harris, shown here examining a Sitka spruce at Saginaw Bay in May 1966, began his work in Alaska with field crews in the Taylor years and eventually rose to the rank ot Research Forester. Note the rifle, which scientists routinely carried in the field to meet Forest Service regulations adopted in response to the hear attack on Thayer. (luneau 4035)

Navigation at night in the waters of southeast Alaska brought home the isolation and danger of early research. This view of the M/V Forester in the Hollis ice pack was taken in February 1951. (Fair collection)

Railroad service to Fairbanks introduced a corridor of industrial development in the interior and lires often broke out near the railroad, as this example of fire damage in the interior at Nenana Bridge shows. (Photo taken in 1964, luneau 1592)

[30]Forest Service workers in many ofher districts outside Alaska were already heavily dependent on trucks and automobiles by this time, even in relatively remote areas. Austin Helmers, for example, grew up as a "Forest Service brat" in remote regions of Montana, where his father maintained Forest Service roads, working out of an army truck or World War One vintage to support a household with his wife and child in a steel-wheeled wagon hitched behind the truck. The family lived in this mobile household until Helmers' father gained appointment as a Ranger. Helmers recalls, "...mother was the cook, and we roamed around over some of those mountain roads there in Montana...! was an awfully small guy then, I wasn't even in school." Helmers interview, 5 Aug 1993; Correspondence from Austin Helmers to Ken Wright and Cindy Miner 27 November 1995.

Forest Fires as an Impetus for Research

The Alaska Railroad from Seward to Fairbanks improved access and indirectly promoted the need for forest research in the interior because sparks from the engines regularly ignited forest fires. The railroad opened the region for commercial developments that pressured the Forest Service to fulfill its forest protection and survey mandates on the Chugach National Forest between Seward and Anchorage. Other lands along the route from Anchorage to Fairbanks primarily fell under the jurisdiction of the Bureau of Land Management, another federal agency concerned with fire control and stewardship of public lands. Fires in these areas also opened large, cleared areas that facilitated regeneration studies, and railroad construction disrupted the permafrost and created conditions that promoted the growth of weeds along the railroad bed. These weeds dried out during the summer and posed an extreme fire hazard. In 1923 alone, 58 fires broke out along the railroad right-of-way. Taylor visited the Kenai Lake district between 1931 and 1934 and observed the problem of fires breaking out along the railroad. He bunked with standby fire crews while studying regeneration and growth on cut-over and burned-over stands on the Chugach National Forest. Fire crews followed the trains to put out any fires that sprang up along the tracks, and Taylor periodically found himself drafted into the fire crews when the situation got out of hand. One legacy of these fires, however, was a virtual laboratory for studies of regeneration, fire effects, and succession, all within relatively easy reach of a central transportation corridor in the interior of Alaska.[31]

As the depression continued, fire control gained prominence as a job well suited to the administrative structure and makeup of the Civilian Conservation Corps (CCC), initially known as Emergency Conservation Work (ECW). The CCC in Alaska differed from administration of the program in other jurisdictions of the United States. The Forest Service, rather than the army, directed CCC camps in Alaska and eliminated age limits for recruits, accepting middle-aged men, as opposed to the youth-oriented program in place elsewhere in the system. In addition to fighting forest fires, CCC crews built forest roads, trails, bridges, warehouses, recreation cabins, small-boat facilities, hatcheries, docks and small boat harbors, and landing fields across Alaska. This work expanded the existing infrastructure, promoted public awareness of forest resources in Alaska, and encouraged a renewed emphasis on conservation efforts.[32]

Several infrastructure improvements undertaken by the Forest Service during this period later became particularly important to forest-related research efforts in southeast Alaska. In Juneau, Warehouse No. 1 on the waterfront was razed in 1936 and replaced with a new building, and a crewhouse, garage, warehouse, filling station, and machine shed were constructed to support Forest Service CCC operations in the region. At Little Port Walter, Forest Service CCC crews constructed a 15-room biological laboratory and residence in 1938, along with a dock and a

[31]Taylor, "Early Forest Research," 109-111; Rakestraw, Forest Service in Alaska, 111-113

[32]Naske, Alaska, 110-111; Robbins, American Forestry, 139-143; Rakestraw, Forest Service in Alaska, 95-97, 112-113.

steel-reinforced salmon weir that supported fisheries research by other federal agencies at the site. These facilities and those at Juneau also served as staging areas for later Forest Service researchers in southeast Alaska, and the CCC crewhouse was renovated as the Alaska Forest Research Center in 1948.[33]

Research efforts rapidly lost support as the emphasis on forest protection, emergency conservation work, and infrastructure development captured the attention of Forest Service adminstrators and served the interests of the federal government. The CCC helped ease the unemployment crisis of the 1930s, and it also enabled the Forest Service to continue its cooperative fire protection program mandated under Clark-McNary in a period when other sources of funding were stagnant or eroding. Secretary of the Interior Harold Ickes reinforced this tendency when he expressed outrage at the extent of devastation by fire that he witnessed during a visit to Alaska in 1938. Ickes concluded his visit in a meeting with Heintzleman that eventually led to the establishment of a fire protection program for the interior of Alaska. Conservation efforts in Alaska became a relatively inexpensive but exotic showpiece for New Deal programs, and the chronically underfunded forest administration gained an infusion of capital and manpower (a CCC quota of 325 men for 1933 was raised to 600 men by 1938) that was intended to employ undereducated, unemployed workers at hand labor. This policy conflicted, however, with the interests of university-trained researchers who sought educated research assistants, often with college backgrounds and considerable technical expertise.[34]

The emphasis on emergency conservation work during the early years of the depression also coincided with a series of administrative realignments in the Forest Service that disrupted the coordinating framework and support systems necessary for conducting effective field research in Alaska. Forest Service Districts were reorganized as Regions in 1930, and a terse general inspection of Alaska that year was highlighted by severely strained relations between the inspector and local forest administrators. This inspection and the generally hostile report were quickly followed by the establishment of a new system of five field divisions to replace the old framework of an administration built around ranger districts for each National Forest. New divisional headquarters were established at Ketchikan, Petersburg, Juneau, Anchorage, and Cordova, thus diffusing the administrative power previously wielded by forest administrators and eroding the basis for centralized coordination of research efforts on each National Forest. In 1934, Region 8 became Region 10 in a re-numbering of the various regions of the Forest Service. Research-oriented administrators and scientists like Heintzleman, Taylor, and Wendell Moran, Taylor's assistant at Juneau, left Alaska by 1935 in the wake of these changes and as CCC work increasingly domi-

[33]Taylor, Notes and addenda located in storage room files, Juneau Forestry Sciences Laboratory, USDA Forest Service.

[34]Taylor, for example, was seldom satisfied with the quality of his assistants, and expected them to have a solid background in professional forestry techniques before they began working for him. His narrative is filled with comments about assistants who were not capable of work expected of sophomore forestry students. See, for example, Taylor, "Early Forest Research," 76-78; Taylor, Notes and addenda located in storage room files,)uneau Forestry Sciences Laboratory, USDA Forest Service; Robbins, American Forestry, 143-149; Rakestraw, Forest Service in Alaska, 90-91.

nated the Forest Service agenda. Heintzleman, however, returned to Alaska in 1937 to succeed Charles H. Flory as regional forester, and he held that position until he became Territorial Governor in 1953.[35]

World War Two and Military Spending

If CCC projects begun during the depression improved the physical infrastructure for forest research in Alaska, military procurement policies and practices in Alaska during World War Two set the stage for a surge of interest in forest resources and the need for research in the postwar era. It also expanded the range of options and extent of transportation facilities and introduced new technology that facilitated later forest inventory work out of Juneau. As early as 1935, Congress identified Alaska as one of six strategic areas for siting an Army air corps base. Alaska's Territorial delegate to Congress lobbied for an appropriation to build the base, and construction of a cold-weather testing station for airplanes finally began in 1940 near Fairbanks. In 1941, the U.S. Navy began constructing Naval air stations at Sitka and Kodiak, and the Army acquired funding to construct a military base near Anchorage. By September 1941, Kodiak and Dutch Harbor had been commissioned as Naval air stations. In December 1941, the Japanese attacked American military bases in the Pacific, and on 2 June 1942, a Japanese carrier force hit Dutch Harbor with an aircraft attack, and then landed troops on the Aleutian Islands of Kiska and Attu. Alaska suddenly became an active theater of the war.[36]

Less than six months after the Japanese attack in the Aleutians, U.S. Army engineers completed the Alaska-Canada Military Highway, and convoys of trucks headed north with supplies for the Alaskan command and the Soviet Union. Between September 1942 and fall 1945, nearly 8,000 aircraft were delivered in Fairbanks to Soviet pilots who flew them to Nome and Siberia, and more than 152,000 members of the U.S. armed forces were stationed in Alaska by 1943. Between 1941 and 1945, the federal government spent more than one billion dollars in Alaska with improvements to the Alaska Railroad; expansion of airfields; construction of roads, docks, and wharves; and support services for military personnel. The sudden crush of construction activity associated with the military buildup in Alaska caused a surge in timber sales, and logging operations escalated on the Chugach National Forest.[37]

Heavy demand for spruce wood needed for building plywood bombers in the early years of the war also stimulated timber production in Alaska under the Alaska Spruce Log Program (ASLP) established in June 1942 and administered by the Forest Service with financing from the Commodity

[36]Rakestraw, Forest Service in Alaska, 90-91; Taylor, (Notes and addenda located in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service). The historical files in the storeroom at Juneau contain a file of letters from several different Forest Service personnel submitted shortly after the visit, formally complaining that the inspector, E.W. Loveridge, was unnecessarily confrontational and abrasive in his dealings with Alaska staff members and questioning whether his conclusions could be trusted as a result. Most notably, they complained he did not allow for oral explanations of written documents. See, for example, the criticisms of Melvin Merritt and C.M. Archbold.

[37]Naske. Alaska, 121-123.

[38]Rakestraw, Forest Service in Alaska, 120; Naske, Alaska, 126-131.

The Alaska Spruce Log Program of World War Two created large areas of open laboratories for regeneration studies. This photo, taken by Al Harris in May I963, shows Austin Helmets (white hat) on a plank logging road at Coning Inlet, surrounded by trees that regenerated in the 20 years since the area was logged. Note the 20-year-old "plank" timbers still in place. Uuneau 96)

Credit Corporation. Heintzleman headed the program as regional forester, and managed it with a goal of producing 100 million board feet of aircraft-grade timber per year. Logging operations centered around field headquarters at Edna Bay on Kosciusko Island west of Prince of Wales Island, and the first raft of logs (900,000 board feet) reached Anacortes, Washington, in March 1943. The spruce log program officially ended in March 1944 as the War Production Board phased out production of wood planes, but 38.5 million board feet of spruce was shipped south under the program and another 45 million board feet of lower grade spruce and hemlock went to Alaska mills from Edna Bay during the short period of operations.[38]

The short-lived spruce log program and military interest in securing construction materials for operations in Alaska reawakened interest in timber resources from the two National Forests, brought several professional foresters into the region, and rejuvenated interest in forest research after the war. Little in the way of forest research was accomplished during the war, but the U.S. Army initiated tree-planting efforts in the Aleutians in 1942 in an effort to strengthen morale and improve conditions for troops stationed on the treeless islands. Officers of the 151st Engineers solicited support from the Forest Service office in Juneau, and Forest Service personnel worked with the 42nd Engineers in Juneau to furnish the Army with seedlings of European ash, red alder, and spruce. David Bruce, a graduate of Yale University with a B.S. in plant science, an M.F. in forest management, and experience with the Southern Experiment Station of the Forest Service before the war, served with the Army in Alaska from 1940 to 1945 and participated in the tree-planting program.[39]

General Simon Buckner with the Alaska Department of the U.S. Army initiated a more systematic program of tree planting in 1944, and Bruce was assigned full-time responsibilities with the project. Bruce corresponded with Lutz at the Yale School of Forestry seeking suggestions, and Lutz provided suggestions and advice. Bruce worked from mid May through mid September in 1944 digging soil samples, observing plantations established in earlier years, and selecting potential sites for planting the trees. Locations scheduled for tree-planting in 1944 included Cold

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[38]Rakestmw, Forest Service in Alaska, 121-122.

[39]Professional Biography Files, Central History Files, Portland Office, PNW Station; PNW News, 9 May 1977; David Bruce, "History of Tree Planting on the Aleutian Islands," in J. Alden, et al., Forest Development in Cold Climates (New York: Plenum Press, 1993), 412-413; correspondence from David Bruce to Ken Wright 1 1 March 1 995.

This plank road at Coning Inlet on Long Island was constructed in 1941 to facilitate logging operations, (Juneau 1241)

Logging operations and log truck on plank road at Coning Inlet in 1941. (Juneau 1240)

Bay, Umnak, Adak, Amchitka, Shemya, and Attu. Buckner left Alaska in June 1944, however, and support for the program dissipated by that fall. Relatively few trees (about 10,000) were actually planted under the program, and Bruce returned to his work for the Forest Service at the Southern Experiment Station after the war. He moved to the Pacific Northwest in 1960 to join the new division of forest fire research at the Portland office of the Pacific Northwest Forest and Range Experiment Station, and he served as project leader for mensuration research from 1966 until his retirement in 1977. This project did provide useful information, however, for spruce genetics studies and plantings by John Alden, Ken Wright, and the Juneau Forestry Sciences Laboratory, beginning in 1986 in cooperation with the U.S. Army.[40]

Tension between the United States and the Soviet Union after World War Two continued the military presence in Alaska and ensured a continued emphasis on developing forest resources during the late 1 940s, but earlier conflicts over the allocation of resources re-emerged during the postwar years. Postwar construction of the largest airfield in the world, Eielson Air Force Base, 26 miles south of Fairbanks, and other defense facilities near Anchorage, Fort Greely, Kodiak, Shemya, and Adak generated a boom in Alaska's construction trades and boosted demand for developing local timber resources. This emphasis on resource development in Alaska ran counter to national trends in forestry, where concerns about the effects of destructive logging during the war encouraged a re-evaluation of the mission of the Forest Service by the mid 1940s. Over the previous two decades, and especially during the war years, "sustained yield" had come to mean continuous production of lumber, and "conservation" had come to mean conserving the **industry** by providing continuous supplies of raw material. These ideas had gained formal expression in the 1944

[40]PNW News, 9 May I 977; Bruce, "History of Tree Planting," 413-414; correspondence from David Bruce to Ken Wright 11 March 1 995; Interview with John Alden in Fairbanks, Alaska 1 7 December 1992.

Ray Taylor's long association with Frank Heintzleman meant Research had friends in high places through the 1950s. Shown here in 1955, Heintzleman was Governor of the Territory ot Alaska. (Taylor m.s., p. 119)

Sustained-Yield Forest Management Act, sponsored by McNary, which reserved National Forest timber in a given geographic area for use by operators in that economy and permitted long-term guarantees of public timber to private mills without competitive bidding. Concerned about the postwar impact of this philosophy, an aging Pinchot met with Roosevelt to urge a re-evaluation of conservation as "the greatest good of the greatest number for the longest time," and called for a global inventory of natural resources. Immediately after the war, Forest Service Chief Lyle Watts sounded a similar note as he pressed for a reappraisal of the status of the Nation's forests and recommended for corrective measures.[41]

Allocation of forest resources in Alaska in the postwar era was complicated by Native claims on the Tongass National Forest and the role of the Forest Service as a manager of public lands in previous decades. Areas occupied by Natives before creation of the Tongass National Forest and then abandoned, could be reopened for entry at a later date. In areas where the Forest Service had allowed development for other purposes, this allowance often led to conflicts between Native and non-Native claimants. By the 1930s, the Alaska Native Brotherhood was pressing through political and other channels for civil and political rights for Indians. Alaska's Territorial Delegate to Congress, Anthony Dimond, took a strong interest in Indian affairs, statehood proposals, and land issues from 1933 to 1944, and he came on the scene in Washington, D.C., just as his Democratic Party colleagues in the House and Senate, and in Roosevelt's administration, orchestrated a series of sweeping reforms known as the Indian New Deal. This combination of factors brought national attention to Native claims on the Tongass. A supportive ruling from Secretary of the Interior Ickes in July 1945 entitled Indians to sue in the courts for any claims they might have against the United States. Heintzleman protested that the Native claims filed in the wake of that decision threatened the viability of management plans to develop the National Forests in Alaska, and Congress responded with the Tongass Timber Act in July 1 947, sponsored by Senator Warren Magnuson of Washington state.[42]

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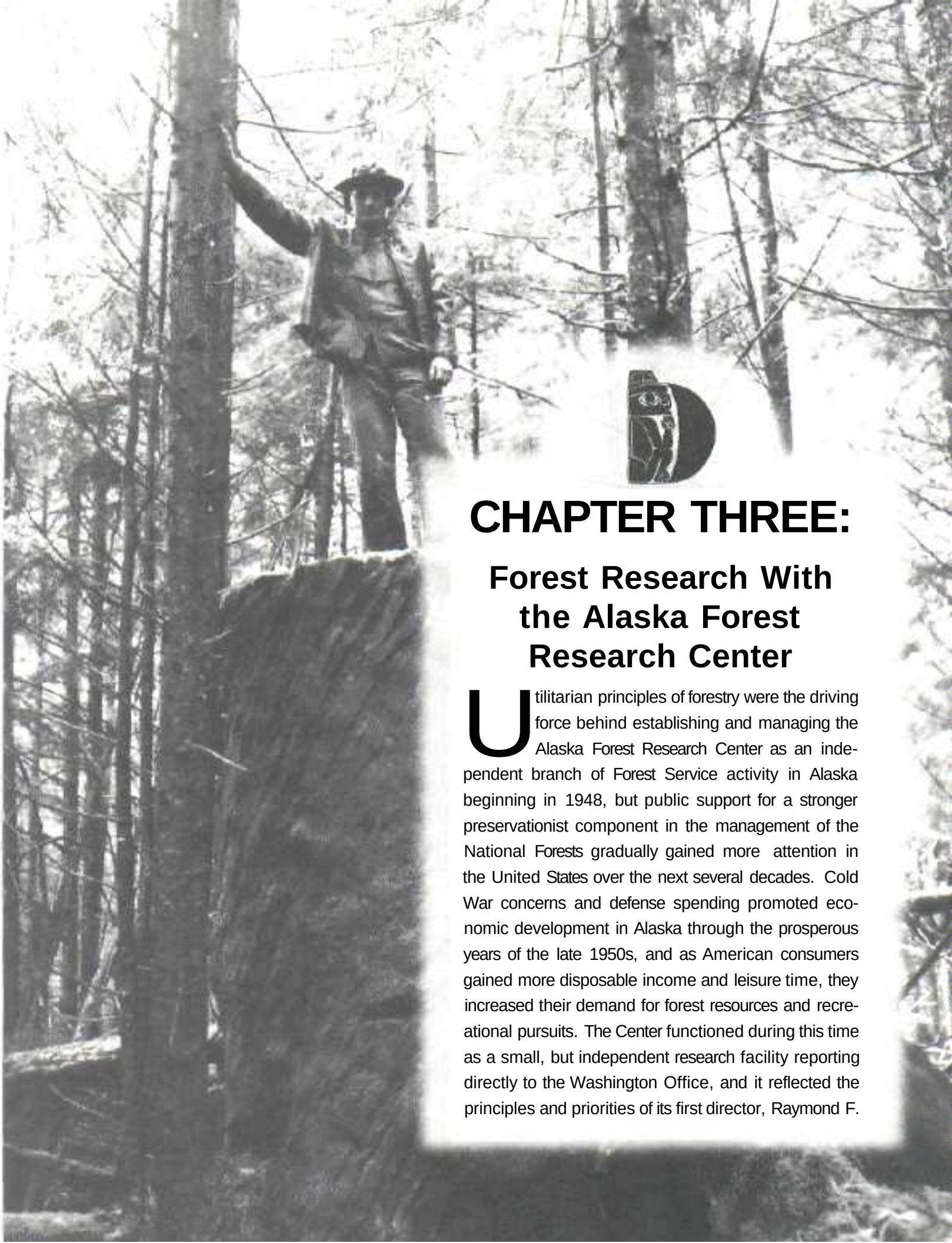
[41]Naske. Alaska, 151-132; Steen, The U.S. Forest Service, 250-251, 255-256.

[42]Naske. Alaska, 110-111,1 42-43; Rakestraw, Forest Service in Alaska, 1 25-127.

CONTINUED

Under the terms of the Magnuson bill, the Secretary of Agriculture could continue to approve timber sales, but receipts from the sales must remain in a special fund until the issue of Native claims was settled. This cleared a major obstacle to developing timber resources on the Tongass National Forest. The next year (1948), a firm from Magnuson's state, Puget Sound Pulp and Timber, signed a preliminary agreement with the Forest Service in 1948 to locate a pulp mill at Ward Cove near Ketchikan, thus realizing the goal of industrial development with Alaska forest products that Heintzleman had pursued since the 1920s. That same year, Heintzleman's protégé, Ray Taylor, arrived in Alaska to direct the Alaska Forest Research Center in Juneau.[43]

[43]Rakestraw, Forest Service in Alaska, 125-127.



CHAPTER THREE:

Forest Research With the Alaska Forest Research Center

Utilitarian principles of forestry were the driving force behind establishing and managing the Alaska Forest Research Center as an independent branch of Forest Service activity in Alaska beginning in 1948, but public support for a stronger preservationist component in the management of the National Forests gradually gained more attention in the United States over the next several decades. Cold War concerns and defense spending promoted economic development in Alaska through the prosperous years of the late 1950s, and as American consumers gained more disposable income and leisure time, they increased their demand for forest resources and recreational pursuits. The Center functioned during this time as a small, but independent research facility reporting directly to the Washington Office, and it reflected the principles and priorities of its first director, Raymond F.

Taylor, who guided the Center's growth from a two-person operation when he first began work in July 1 948 to a staff of 14 by 1959, when he retired and Alaska became a state. Taylor, at the time he took the reins of the Center, was firmly committed to the principles of utilitarian research as promulgated by Heintzleman during his earlier years in Alaska. Taylor accepted the assignment to head the Center with assurances he would report directly to Washington and not to Heintzleman, but Heintzleman remained a powerful force in Alaska for most of Taylor's tenure, first as regional forester from 1937 through 1 953, and then as Territorial Governor of Alaska, from 1953 through early 1957. Less than two years after Heintzleman resigned as governor (4 months before the end of his term), Taylor retired as director of the Alaska Forest Research Center.[1]

Ray Taylor fostered a frontiersmanship ethic in the early years of the Alaska Forest Research Center. In this 1954 photo, which he included as an illustration tor his autobiographical memoir, he notes "I'm about to get a drink. " (Taylor m.s., p. 57)

Origins and Establishment of the Alaska Forest Research Center

Timber cut on National Forests in Alaska increased from 43 million board feet in 1936 to 60 million in 1950 under the Heintzleman administration, and Heintzleman aggressively courted the pulp industry in a series of negotiations that placed high priority on locating marketable stands, demonstrating their long-term potential to attract investors, and allaying concerns about the possible effects of logging operations on salmon habitat and the dangers of water pollution from pulp processing. This need for information paved the way for a 1948 congressional appropriation of $50,000 for funding the Research Center that Congress had authorized nearly two decades earlier. Heintzleman worked with scientists from the Alaska Water Pollution Board, the Pacific Northwest Forest and Range Experiment Station, and the Forest Products Laboratory to address these concerns, and Taylor arrived in Juneau in July 1948 to organize the Alaska Forest Research Center. The next month, the Forest Service approved a preliminary award to the Ketchikan Pulp Company, controlled by American Viscose Corporation and Puget Sound Pulp and Timber, out of Bellingham, Washington.[2]

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[1]Memo 15 March 1959 from R.F. Taylor, Forester in Charge, Alaska Forest Research Center, luneau to Regional Forester, Region 10, "regarding Raymond F. Taylor, History of Service." Located in slorage room, Juneau Forestry Sciences Laboratory, USDA Forest Service. Naske, Alaska, 155.

[2]Rakestraw, 127-129; Taylor, "First Annual Report of the Alaska Forest Research Center,": 1948 Localed in the storage room, luneau Forestry Sciences Laboratory, USDA Forest Service, 1, 6-8; Taylor, (Notes and addenda located in the storage room, luneau Forestry Sciences Laboratory, USDA Forest Service); Cowlin, "lederal Forest Research,' 280-81;

Taylor's unit grew from two to tour employees within 6 months after his arrival in July 1948. Taylor's staff at the Center by the end of 1 948 included Forester Richard Godman, who transferred from the Massabesic Experimental Forest in Maine in early July, Clerk-Stenographer Elizabeth Corey, who transferred from Washington in October, and Forester Lawrence Zach, who transferred from the Admiralty Division of the Tongass National Forest in December. Taylor and Godman initially worked from a desk in one corner of a room in the Regional Office as they began type-site identification of forest stands "merchantable for pulp" during their first short field season with the Center. Shortly after Zach arrived in Juneau in December 1 948, Taylor's unit (Taylor, Godman, Corey, and Zach) moved out of the cramped quarters in the Regional Office and set up shop in the crewhouse previously constructed by CCC workers on the Juneau waterfront, where they shared space in the building that also housed the U.S. Geological Survey. The type-site identification work remained a staff priority at the Center as contract negotiations with the Ketchikan Pulp Company continued over the next 3 years. The contract, finally signed in July 1 951, awarded

'The trees were enormous." lohn Grove strikes a sacrititcial pose before a large spiuce at Virgin Bay in 1951, the third year ot operation lor the Alaska Forest Research Center, (juneau 413)

The skeletal crew and resources in the early years of the Research Center contributed to the sense of exploration and discovery, as in this photo ot Harold Lutz, 7. Mardahl, and Ray Taylor going ashore at Karta Bay in June 1950. (Farr collection)

Lawrence Zach spraving "aminiate" on salmonberrv brush near the Hollis laboratory site in 1953. (luneau 324)

"just finding out what's out there," or gathering base-line data, was an early priority ot Research in Alaska. Here, Dick Godman measures cl.b.h. on the largest second-growth tree found on this logged-over site in 1955. Data from this study indicated the tree was 20 years old. (luneau 338)

1.5 billion cubic feet of timber on a 50-year contract at 85¢ per cubic foot for pulpwood, and between $1.50 and $3 for saw timber, depending on the species.[3]

Securing adequate office space, transportation, and temporary workers with logistical support for field research were leading priorities for the Center in the first few years of its existence. Office space at the crewhouse amounted to 700 square feet, including four offices and a storage closet in the crewhouse, which was refurbished on a budget of less than $1,100. Taylor arranged for the transfer and refitting of a twin-engine, diesel-powered boat from the Navy surplus yard in Seattle with help from Region 6 and the Washington Office. By 1949, the Center commanded a small fleet consisting of a Steelcraft cruiser for short trips and fast travel, several work skiffs with outboard motors, and a small wanigan (essentially a scow measuring 18 x 50 feet supporting a refurbished army surplus hut measuring 1 6 x 24 feet that could be towed from site to site) with a kitchen, six bunks, a toilet, shower, and power plant. Taylor also arranged with Region 10 to lease the diesel-powered *Ranger 7.* This fleet was supported with a radio system borrowed from Region 10 that failed to operate when needed, and several research assistants who Taylor recruited in 1949 from his undergraduate *alma mater,* the University of Washington.[4]

Center scientists concentrated their studies of timber regeneration and the effects of logging near salmon streams in the Maybeso Valley on Prince of Wales Island, and they drew heavily on other agencies for technical and logistical support. Despite Taylor's insistence on autonomous status for the Center as a Research facility responsible only to the Washington Office, Taylor worked closely with Heintzleman and Region 10. Although Taylor repeatedly emphasized "...no pressure brought to bear on the selection of research problems," he also acknowledged "...considerable help from all branches of Region 10 with little or no thought of cost." The Center hosted the annual Christmas party for Region 10 employees and personnel with the U.S. Geological Survey, and the USGS water resources specialist in Juneau helped Taylor's crew install water stage recorders for the salmon stream study.[5]

Taylor solicited input from other federal and territorial agencies and promoted the mission of the new research center in a series of meetings and presentations with administrative officials during his first few years in Alaska. He reported establishing "cooperative relations" with the Fish and Wildlife Service offices in Juneau. Taylor also reported he had established a similar contact

[3]David M. Smith, currently Professor Emeritus of Silviculture at Yale University, who spoke with Heintzleman in the 1950s when the former Regional Forester was involved in fundraising efforts at Yale, observes lhat, in hindsight, the deal that Heintzleman made with the pulp companies was "...too much of a sweetheart deal and that he was just too eager to lure them in." Smith cautions, however, that "...it must be remembered that about 1940 [11 years before the deal was signed] ponderosa pine stumpage in the Northwest was selling for 50c to $1.50 per M." Correspondence from David M. Smith to John A. Sandor *2b* February 1995. [R.F. Taylor], "First Annual Report of the Alaska Forest Research Center," (1948) Located in the storage room, luneau Forestry Sciences Laboratory, USDA Forest Service, 1-8; R.F. Taylor, "Second Annual Report: Alaska Forest Research Center, 1949," located in the storage room, luneau Forestry Sciences Laboratory, USDA Forest Service, 5-6; [Taylor], "Third Annual Report [1950] Alaska Forest Research Center: Forest Research Needs of Alaska and Progress Made to Date, February 20, 1951;" located in the Library, Juneau Forestry Sciences Laboratory, USDA Forest Service, 1, 10-31.

[4]Taylor, "First Annual Report," 2-4; Taylor, "Second Annual Report," 33-34;

[5]Taylor, "First Annual Report," 4-5.

Boats and water routes provided ac cess and a home-away-from-home tor livid crews in Alaska. Research "wamgans," a name derived from the Ojibwa term "wannikan," meaning "man-made hole," were essentially barges with living quarters and laboratory facilities constructed on deck that were towed to field sites. This one anchored on Harris River in 1958. (Juneau 854)

This 1955 photograph ol a ravine in Halt-Mile Creek on the Maybeso Experimental Forest shows soil sliding and erosion on a site logged in 1954. The scientist who took the photograph noted on the tile copy of the print: "erosion seems to be accelerating. " (juneau, unnumbered)

with George Klez, who headed Fisheries Management, and with whom Taylor's Research unit cooperated in the study of the effect of logging on salmon streams. The Forestry Division of the Bureau of Land Management, which maintained a headquarters in Anchorage for Alaska operations, also asked Taylor to construct volume tables from their measurements and to draw up a plan for obtaining growth and yield data. Taylor also visited Fairbanks and toured the interior forests north of town from the air as part of a series of discussions with BLM officials concerning their fire protection program.[6]

Research efforts at the Center in this early phase of its existence were mostly reactive, as Regional Foresters with the BLM and the Forest Service raised various "problems" and "concerns" that Taylor and his staff sought to address. Taylor repeatedly emphasized his independence from Region 10 in the Center's annual reports, but given the virtual meeting of minds between himself and Heintzleman on the subject of pulp mills, any direct pressure from Heintzleman for targeted research would have been superfluous (and probably counter-productive, given Taylor's reputation for an aggressivly independent personal style). Taylor, for his part, noted in his reports that the small size of the Center forced him to target areas of inquiry where forest research was of "highest priority," and he observed that most of the Center's research on the Tongass National Forest was "...geared to needs related to an early development of the timber and pulp industry."[7]

As planning for the pulp mill moved into high gear, Taylor pressed for more studies of coastal and interior Alaska to facilitate economic development. He lobbied for a forest survey on the Tongass National Forest before the Ketchikan mill began operations, warning: "Too little is known

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'Taylor, "first Annual Report," 4-6.

Tavlor, "Second Annual Report," I-2.

Despite Ray Taylor's assertion in the early 1950s that research in Alaska offered an opportunity to study an area "untouched by logging," scientists found ample evidence of early timber harvests, such as this old stump of a tree logged in 1918 at Mission Cove, which afforded Torolf Torgerson a view of the surrounding (regenerating) forest. (Farr collection)

Lawrence Zach taking a discharge measurement with a Price Current Meter #2400, waders, and a tag line. (Juneau, unnumbered)

Zach took this photo from a 1950 study at McCarty Cove as an example of potential erosion. He noted that the "road & mud & silt that will wash in fall floods...can't hurt this non-tish stream... tor forestry, erosion probably beneficial it it promotes drainage. " (Juneau 789)

of this climax forest.....It is practically impossible to manage a forest area without an inventory of growing stock." Toward that end, he acquired two sets of aerial photographs of southeast Alaska at scales of 1:20,000 and 1:40,000) taken by the U.S. Navy in 1948. He also pointed out the vast expanse of burned-over forests in the interior that he had toured with the BLM, and argued that a study of this area was necessary to determine the extent of damage to timber resources. Taylor contracted his former classmate from Yale, H.J. Lutz, to begin an investigation of the ecological significance and effects of uncontrolled fires on marketable timber in the interior. The Center lacked sullicient resources to fund work in the interior, however, and Lutz worked with Taylor in i 949 to select a portion of the Kenai Peninsula of the Chugach National Forest as the first of a planned series of studies that Taylor claimed would be "representative" of the interior forests of Alaska." Differences between forest conditions in the southwest Alaska region of the Kenai and those of inland Alaska notwithstanding, this compromise solution that Taylor and Lutz devised stands as a good indication of the difficult conditions of funding and logistics that have long plagued research efforts in Alaska.

Tavlot. 'Second Annual Report." 1-2. I 8-1 9; Taylor, "Third Annual Report," preface.

Research conditions in Alaska required adaptive technology, such as this oil tube for winter operation of a stream gauge. Constructed of a 20-foot-long section of 20-gauge galvanized iron, this 75-pound tube had to be packed to the site, where in 1950, it was placed in a gauge-house well and then given a "charge" of 10 gallons of kerosene. A measurement float rested on the kerosene, which formed a nonfreezing barrier through the ice to unfrozen water below, (luneau 804)

Unidentified researcher with the Alaska Forest Research Center taking a stream discharge measurement in 1957. The photographer (RCM) noted on the file copy: "Note concentration required by operator to watch bucket wheel and stop-watch simultaneously." (Juneau 547)

Research Priorities and the Maybeso Experimental Forest

Taylor argued that forest research in Alaska was unique because it "did not follow forest devastation" and it primarily dealt with "...nature's climax forest as yet almost untouched by the axe." Much of the early research by Center personnel, however, was either on sites logged-over in the 1 920s, or on drainages about to be logged or already logged under the pulp mill allotment on the Tongass. The first, experimental forest in Alaska was established in the Maybeso Valley of Prince of Wales Island on National Forest land that included an abandoned townsite where adjacent areas were logged over for timber and firewood by former residents. The Center initiated studies of stream discharge, water temperature, solids, and woody debris in major stream channels of the Maybeso Valley in 1949, when it became obvious the area would be a source of pulp timber for the Ketchikan mill. Intensive logging in the area began in the early 1950s and continued through the next decade, and the Maybeso Experimental Forest was formally established in 1956.[9]

Center scientists studied major streams in the Maybeso Valley as early as 1949 in response to concerns that the proposed logging operations might disrupt the fisheries of coastal Alaska, and they helped clear the way for final approval of the pulp timber allotment. On 20 February 1951, less than two years after initiating those studies, Taylor and his limited staff reported in an executive summary that "No evidence was found that logging had destroyed any of the streams for spawning."[10] The body of the report, however, cautioned (over 29 pages later) that "...so much is still unknown about salmon that our best bet is to concentrate on the physical characteristics of our streams and whether or not logging alters those characteristics." The paragraphs immedi-

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[9]Taylor fourth Annual Report, Alaska Forest Research Center, 1951," located in Library, Juneau Office, PNVV Station, 2-3; Taylor, "Second Annual Report," 1-2, 1 8-1 9; Taylor, "Third Annual Report," preface;
[10]Mavbeso Experimental Forest Establishment File" Central History Files, Portland Office, PNW Station.
[11]Tavlor, 'Third Annual Report," preface.

Lawrence Zach in a cable car above the Harris River on the *Maybeso Experimental Forest in Mav 1951. Climbing into this shoestring convey ance required a considerable leap of faith, especially with spring run-oil swelling the streamtlow below. The cable cars eventually were replaced with bridges. (Swanston collection)*

ately following that statement further muddied the waters, suggesting that "fluctuations" in stream characteristics and spawning behavior after logging may be the result of "great fluctuations in nature" that are "beyond the control of man."[11]

The early watershed studies on the Maybeso Experimental Forest, reportedly took place in the context of an ongoing interagency rivalry between Fish and Wildlife Service officials and Forest Service personnel who, at the time, did not view their mandate to manage "habitat" as extending to studies of the physiology, habits, or requirements offish.[12] Given these limitations, and the existing standards of research or knowledge about fisheries and habitat requirements, the studies failed to fully explore the effects of logging on salmon habitat in small streams. Their emphasis was on streams draining logged watersheds, not salmon behavior in the streams or habitat requirements of salmon.[13]

With negotiations to initiate pulp sales underway, research concerns naturally focused on what the effects of that logging would be, and Taylor's research unit valiantly struggled with the limited resources and scant knowledge at hand to supply the answers to questions of enormous import. The results of these studies, however conscientious or independent the scientists involved, inevitably were the product of the assumptions and priorities of those who framed the initial research questions and the limitations of accepted standards of research or the existing base of knowledge. The newly created Center, moreover, had yet to establish itself as a viable program with value to potential clients. A definite answer to the management question that Heintzleman posed (Would clearcutting on watersheds of salmon streams ruin these streams for spawning?) could achieve that goal more certainly than evasive disclaimers or a series of "maybe so, maybe no" conclusions.[14]

Rather than emphasizing the limitations of the study, the preliminary nature of the findings, or the meager resources at the disposal of his fledgling operation, Taylor's report, understandably enough, emphasized the positive: what he and his scientists had been able to accomplish with the means available to them. This positivist, "can-do" approach in the face of overwhelming odds and meager resources continued traditions of scientific research in Alaska dating back to

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[11] Quotations are from Taylor, "Third Annual Report," 2-7, 21-22, and, 28-31.

[12] Correspondence from Al Harris to Ken Wright 14 March 1995.

[13] William Meehan discussed shortcomings of early salmon stream studies in interviews at Juneau on 22 December 1992 and 9 August 1993.

[14] In keeping with this concern, Taylor summarized his conclusions in a prefatory section of the report headed: "Pertinent Results in Brief." Taylor, "Third Annual Report," (n.p.); Rakestraw, Forest Service in Alaska, I29.

Research technician collecting gravel for use in silt traps on the Harris River in 1957. (Iuneau 558)

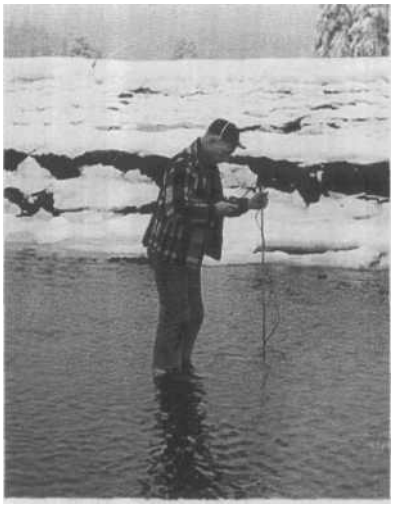
Research technician preparing silt haps by washing gravel in running water to remove *"lines" (ca. 1957) (luneau 557)*

Technology in use for watershed studies in 1957 included this 46-*ounce tin can filled with washed gravel. This silt trap was placed in the stream bed on the Harris River as part of the ettort to determine whether widespread logging would affect fisheries in southeast Alaska, (luneau 559)*

Scientists with the Alaska Forest Research Center spent much of their time establishing an infrastructure to support research efforts, as in this view of Lawrence Zach and an assistant constructing a hand-rail for a log bridge on Old Tom Creek in 1950. (Juneau 778)

William McNeil demonstrates a method tor obtaining dissolved oxygen samples from stand pipes in a creek in 1958. (luneau 851)

Visitors view a counting tower built on an old tish trap during a demonstration program in 1958. These outreach programs were an important component in Taylor's strategy to develop a client-base for the Alaska Forest Research Center in its first decade of operation, (luneau 849)



Lawrence Zach measuring discharge on Indian Creek near its confluence with the Harris River at low tide in 1950. (Juneau 769)

John drove and A.P. "Cappy" Caporaso loading a boat at a cabin on the Taku River in 1955. The scientist's life was not always glamorous, and logistical matters consumed energy, time, and resources. (Juneau 1335)

Steller's 10-hour jaunt on Kayak Island two centuries earlier. That tradition of making do with resources at hand and forging ahead into unknown territory has often yielded significant rewards and accolades, but it is not without its pitfalls, as the earlier experiences of Steller and Bering dramatically demonstrate.

Taylor's report (regardless of his intentions[15]) served the interests of Heintzleman, who in 1951 was in the final stages of negotiations with the Ketchikan Pulp Company and was starting negotiations with a Japanese firm interested in locating pulp mills in Alaska. One year later, the U.S. Department of Agriculture awarded Heintzleman its Superior Service Award in recognition of his management of forest resources in Alaska.[16] Heintzleman's star was clearly on the rise, and his long-standing commitment to support forest research in Alaska was a critical factor central to the successful emergence of Taylor and the Center.

At this stage in the development of a research program, the Center lacked access to many of the tools commonly available to forest researchers in other regions of the Forest Service, but Taylor and his staff compensated by piggybacking their research on forest management projects

[15]Although Taylor's commitment to scientific veracity and independent research is not in dispute, his personal inclinations on the subject of developing a pulp industry in southeast Alaska were straightforward and are certainly relevant to the manner in which he reported the initial results of research accomplished by his unit, which by his own admission, was understaffed and underfunded. Taylor, for example, went out of his way to express support for developing an industry based on the fiber content of coastal forests in an unusual expository preface to the Center's "Third Annual Report". In that preface, Taylor elaborated on the perceived need for political, social, and economic development in southeast Alaska in an editorial outlining the population growth of Alaska and the need, as he saw it, for a "year-round permanent industry." Taylor, "Third Annual Report," 1-3.

[16]On Hemlzlemans pulp mill negotiations, see Records of the Forest Service, Regional Forester, Juneau, Alaska. "Japanese Mission, Historical Records" located in the National Archives-Alaska Region; Rakestraw 128; and Taylor, "History," (Notes and addenda located in storage room, (uneau Forestry Sciences 1 aboratorv, USDA Forest Service).

An aerial view of the research camp and other facilities at Hollis in September 1959. (Juneau 692)

Cat Island camp at Hollis on Prince of Wales Island looking down floating walkway to Wanigan 12 and skiffs, with the MV Maybeso at anchor and a view of clearculs on the Maybeso Experimental Forest in the background. Photo taken at high tide in July 1957. (Helmets collection)

Watershed study on the Harris River, spur 241. The drainage was first cat-logged, then the creek was diverted, the gravel removed and tinallv, the creek re-diverted lo its original coutse minus the graveli. Photo taken in 1959 (Juneau 567)

Hollis camp at high tide in 1957, including, from left, a workboat, the 42-toot Research vessel MV Maybeso, Wanigan 12 (housing the dining area, cook's quarters, office, bunk rooms, and supplies storage), two skiffs, the floating walkway to shore, Wanigan 13, and a small shop. (Helmers collection)

As the local hub of Research efforts on the Maybeso Experimental Forest, the Hollis "camp" gradually expanded into an impressive collection of semipermanent structures by 1958, including floats, shop, "transa-home," and cabin, but lite at Hollis could also be an isolating experience tor research staff with family in luneau. (Juneau 264)

Years ot scientific work at the Hollis camp made it a rural outpost of urban culture with considerable appeal to Alaska wildlife such as this black bear at the Hollis dump. (Farr collection)

and harvest operations. Research efforts in southeast Alaska quickly concentrated around the major drainages near the Hollis townsite in the Maybeso Valley, although Taylor claimed in his second annual report that "...the wholeTongass Forest is an experimental area..."[17] Taylor repeatedly emphasized the need for "year-round permanent industry" in Alaska, and research efforts consciously aimed to support the development of a timber industry either directly, with growth and yield information and volume tables, or indirectly, with research programs designed to clear obstacles to timber production.[18]

A visiting professional forester from the Washington Office, W.H. Larrimer, toured the Center's facilities at Hollis in 1952, reportedly while enroute from the Third Alaskan Science Conference and while Taylor was away at a conference. Larrimer listened to staff members with the Center discuss problems with boats[19] and workspace in Juneau, and he suggested the need for an experimental forest to minimize the need for travel to and from field sites. This chance meeting and gripe session apparently sparked efforts over the next 4 years to formally establish an experimental forest on the Maybeso Creek drainage. Research efforts before 1952 focused on three test streams near the abandoned townsite at Hollis. Later foresters emphasize that extreme diversity of conditions from site to site is a defining characteristic of forest research in Alaska,[20] but at this

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17 Tavlor. Second Annual Report," 34.

18 See, lor example, Taylor, "Third Annual Report," 2-7, 21-22, and his comments on the salmon stream studies, 28-31.

19 At the lime of his visit, the Ranger 6 was on loan from Region 10 to the Center because it was 20 considered unsafe for further use by Region 10." Taylor suggested it was "not in the interests of the Forest Ser\ ice Safely program to continue to run these old, rot-filled boats." R. F. Taylor, "Fifth Annual Report. Alaska Forest Research Center, 1952," (typescript located in the luneau Library, PNW Station), 29

20 Interview with Hill Farr 9 August 1993.

Many scientists gained their first exposure *to Alaska Research in the comforting environs of the Mayheso Experimental Forest. In this case Robert Gregory who later gained reknown tor his studies ot white fir in the interior, examines a specimen of suhalpine fir in July 1952.* (*juneau 458)*

early stage of gathering basic information on theTongass National Forest,Taylor claimed that this area near Hollis included "...all forest types common to the southern part of the Forest and much of the work on cutting methods will be done here, as logging proceeds." Initial plans for the Maybeso Experimental Forest called for logging the Maybeso and Harris Creek drainages "right up to the stream's edge..." and reserving the third drainage (Indian Creek) as an unlogged watershed. The Center established a 16- x 28-foot cabin at Hollis in 1952 to support the small 12- x 16-foot office-laboratory constructed the previous summer, and Taylor proposed construction of a 42-foot boat, aptly named the *Maybeso* and dedicated upon completion to support research operations in the Maybeso Valley and elsewhere.[21]

Housing and family concerns caused problems with retaining field workers employed by the Center. During the Center's first decade in operation, staff members who found themselves working 5 months in the field at the Hollis site requested reassignment for family reasons. Zach resigned in 1952 to take up farming in Oregon to avoid being separated from his family (who remained in Juneau for 5 months each year while he worked at Hollis during the field season), and Godman requested a transfer to the states the same year for similar reasons. Workers living in official quarters on research projects in the field (the wanigan, research boat, or bunkhouse at Hollis) also demanded compensation for the weekends they were trapped on site and away from town, and Taylor suggested a 6-day work week might be the answer. The transfers of Zach and Godman also left openings for two new scientists and a generational change, of sorts, in research personnel. Taylor recruited Division Supervisor Harold E. Anderson from the Petersburg office to replace Zach, and he held Godman's spot open for 1 year anticipating the return of Cornell graduate Robert Gregory, a botany and soils specialist who had worked for the Center for two summers before 1 952 and had just left Alaska to begin the graduate program at Yale School of Forestry. A third recruit, John L. Hall, was hired in 1 952 primarily for computing work in the Juneau office. Hall was also a Yale graduate who had worked for the Center the previous two summers.[22]

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[21]Taylor, ' Fifth Annual Report," 21-22, 29-30; Interview with Al Harris 22 December 1992 in Juneau, AK: "Mavbeso Experimental Forest Establishment File" History Files, Portland Office, PNW Station.

[22]Taylor, 'Tilth Annual Report," 30-31.

Limestone Inlet was one of the first Research Natural Areas in Alaska. (Farr collection)

Research Natural Areas Established Before 1960

Timber sales and logging operations scheduled for the Maybeso Valley during the 1950s led Taylor to conclude that "control" areas should be set aside for future reference in studies exploring how these disruptive events might affect what he described as the "natural climax forests" of southeast Alaska. Toward that end, the Center sought approval for Research Natural Areas at Old Tom Creek near Ketchikan, and at Pack Creek and Limestone Inlet near Juneau. These three areas were set aside with approval from Heintzleman and the Washington Office in 1951, and they were maintained in their natural state, free of logging or other disruptive uses through the 1 980s. Research Natural Areas generally were proposed by field researchers and were subject to the approval of forest managers at Region 1 0 and the Washington Office. Proposals that successfully snaked their way through the approval process typically highlighted the unique features represented within the area while implying that no marketable stands were in the area.[23]

In an era when the policy ot the Forest Service was to promote timber production on the Tongass and Chugach National Forests, forest managers usually refused to approve any sites with harvest potential. Sites might be deemed unsuitable tor harvest if they were either too remote for economical timber production or if trees on those sites were unlikely to produce valuable timber

[23]Those familiar with this process in Alaska suggest that it was somewhat of an art and those who succeeded at winning approval tor proposed RNAs honed their sleight-of-hand skills along the way. Al Harrisrei. alls it was like "pulling teeth... if there was any commercial timber there, it could not get approver! " Bill Farr observes thai relatively little research work was done on the Research Natural Areas- because the emphasis in Alaska has always been research on logged-over areas, or development on logged areas, at least until Charley Wallmo and Tom Hartley began studying deer in the old-growth forests of southeast Alaska. Interview with Bill farr 21 Dec 1992 in Juneau, AK; Interview with Al Harris Bill farr, Don Schmiege, Doug Swanston, Bill Meehan. Tom Laurent, Carl Hegg, and Mary Lewis *22* Dec 1992 in luneau, AK; "RNA File,' located in storage room, luneau Forestry Sciences Laboratory, USDA Foresl Service

in the near future. Given the logistical problem of physical accessibility and the production-oriented research of the period, however, either of these two conditions would undermine the utility of a site as an RNA: "Benchmark" studies in undisturbed stands would be prohibitively expensive and difficult to accomplish in remote, inaccessible areas, and unless at least some areas with commercial timber could be included, the resulting matrix of RNA sites would not truly represent the entire range of ecosystems in Alaska forests. As a result, relatively few sites proposed for RNA status gained final approval, and those that were approved seldom played a significant role in forest research in Alaska for most of the next three decades.[24]

Administrative Changes and Expansion of the Research Program

Research at the Center branched out into new areas during the mid-1950s as forest policy, administrative, and personnel changes at the Center, the Region, and nationally expanded the areas of responsibility for scientists at Juneau, increased the diversity of their educational backgrounds and research interests, and continued the Alaska tradition of strong ties with leading figures in forest research and forest management. Heintzleman retired from the Forest Service in 1953 and accepted appointment as Governor of Alaska Territory just as pulp logging escalated with the beginning of wood-chip exports to Japan. His successor at Region 10, Arthur W. Greeley, was the son of former Chief W.B. Greeley (of the Harding-Coolidge era) and a forest manager with Forest Service experience in Montana, Idaho, and California. Greeley was left to contend with a serious outbreak of the blackheaded budworm, which seriously threatened Alaska timber just as he assumed control, and this outbreak created a demand for entomological research at Juneau. These changes took place during the administration of Forest Service Chief Richard McArdle, who took office 2 years earlier and presided over a system-wide administrative reorganization in 1953.[25]

McArdle was a long-term veteran of the Forest Service and also an academic who held a Ph.D. in forestry from the University of Michigan and had served as Dean of Forestry at the University of Idaho during the early 1 930s. As Assistant Chief in the 1940s, McArdle promoted the idea that the Forest Service should provide "on-the-ground technical assistance to individual landowners,"[26] and he worked with research and state and local foresters throughout his Forest

[24]Al Harris, whose experience with the Forest Service in Alaska dates back to 1954, was involved in several efforts to establish RNA sites, recalls that Region 10 managers "...tended to resist any withdrawal of timber from potential cutting, although they were always ready to cite existing RNA's as examples of their concern for science and multiple use." Correspondence from Al Harris to Ken Wright 14 March 1995. Interview with Bill Farr 21 Dec 1992 in Juneau, AK; interview with Al Harris, Bill Farr, Don Schmiege. Doug Swanston, Bill Meehan, Tom Laurent, Carl Hegg, and Mary Lewis 22 Dec 1992 in Juneau, AK; "RNA File," located in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service

[25]More than 11 .6 million acres on the Tongass National Forest were under attack from the budworm by 1954, when Congress amended the McSweeney-McNary Act to include funding and support for research and inventory work on forest lands in the territories as well as the states. R.F. Taylor, Annual Report I 954 (juneau: U.S. Department of Agriculture, Forest Service, Alaska Forest Research Center, Station Paper 2, 1955), 1; communication from Ken Wright to author June 1995; Rakestraw, Forest Service in Alaska, 140-141; Steen, The U.S. Forest Service, 278-280.

[26]Robbins, American Forestry, 1 72-1 73.

Alaska Lumber and Pulp mill at Sitka. (Juneau 3092)

Service career to promote cooperative relations with private industry and state foresters. McArdle remained Chief of the Forest Service through 1962, and his connections with academic foresters at the University of Michigan and the University of Idaho apparently helped bring a new breed of researchers to the fore in Alaska. McArdle's Deputy Chief for Research, V.L. Harper, and his Associate Chief, George Jemison were responsible for implementing a substantial increase in the size of Forest Service Research, improved training and work environments for Forest Service scientists, and a program of laboratory construction from the early 1950s through the early 1960s.[27]

During McArdle's administration, "Yale men" became less dominant at the Center, and scientists assigned to work there more often earned their graduate and undergraduate degrees at state colleges and universities in the Midwest (notably the University of Michigan and Michigan State University) and in the West (notably the University of Idaho, Oregon State University, the University of Oregon, and the Colorado, California, and Washington schools).[28] McArdle and subordinates such as Greeley were no less committed to the utilitarian principles of forestry and cooperation with the needs of industry than their predecessors, but they reshaped the professional networks of power within the agency and between the Forest Service, academia, and private industry. Over the long term, those networks drew a new generation of scientists into the Forest Service and distributed them through the agency into various offices, experiment stations, and research centers. Over the short term, the administrative reorganization of 1953[29] led to a shuffling of assignments and a willingness to consider new positions opening up at the Center. One result of this process was a new diversity of ideas and backgrounds among the forest researchers working with the Center in Juneau during the late 1950s and early 1960s.

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[27]Communication from Robert Buckman and Ken Wright to author, Spring 1996.

[28]Profossion.il Biography Files, Central History Files, Portland Office, PNW Station.

[29]This reorganization came in the first year of the Dwight D. Eisenhower presidency and was part of a government-wide shuffle that phased out many agencies in the wake of election-year promises from Eisenhower and Congressional Republicans) to reduce the size of government and privatize New Deal programs. Ken Wright recalls that agencies "phased-out" included the Bureau of Entomology and Plant Quarantine, and he notes he was transferred into the Forest Service as part of the shuffle that moved Foresl Entomology and Pathology into the Forest Service. Communication from Ken Wright to author June 1995.

Natural Events and the Transformation of Research in Alaska

The problems facing forest researchers in Alaska initially were defined by the needs of private industry, refined by the dictate's of Congressional legislation and Forest Service policy, and transformed by "natural" events and legal actions that often were unplanned consequences of earlier forest management practices. During the late 1950s, these forces converged in a series of events that redefined the mission of the Center and culminated in its reorganization as the Northern Forest Experiment Station by the early 1 960s. The blackheaded budworm crisis of the mid 1 950s, massive landslides on areas logged for pulp timber during the late 1950s, forest fires in the interior, and a federal mandate to begin a forest survey of coastal and interior Alaska vastly expanded the scope, purpose, and geographic extent of Center responsibilities and led to an increase in funding, personnel, and areas of research. Private industry, academia, and government agencies asked more and different questions of a larger and more varied research staff who brought a broader range of disciplines and methods to bear on those issues.

The blackheaded budworm crisis peaked during this period of administrative realignment and made entomological research at the Center a high priority just as research on forest entomology came under the nationwide purview of the Branch of Research. Industry officials and public foresters in the Pacific Northwest lobbied Congress for federal legislation to improve coordination of forest protection efforts after World War Two, and the Forest Pest Control Act of 1947 provided for federal funding and technical assistance to coordinate detection and control efforts nationwide. Responsibility for Alaska fell to the Forest Insect Investigations Laboratory of the U.S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, in Portland through 1953, and Portland Division Chief Robert Furniss visited Alaska several times during the

Close-up of "actively eroding suiface" at traitor's Cove in 1957. Photographer Zach noted that the "mat of soil holding stumps and roots has gnen way on steep unstable slope. Note debris-choked water course." Zach's conclusion: "No evidence that this material was washing down slope."(juneau 837)

Debris-choked draw in Halt-Mile Creek on the Maybeso Experimental Forest in 1955, showing erosion on slopes logged tor the watershed studies in the early years of the Alaska Forest Research Center. Taylor concluded within three years oi beginning those studies that "No evidence was found that logging had destroyed any ot the streams tor spawning. " (juneau 1699)

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blackheaded budworm crisis. At the peak of the crisis in 1953, Congress approved funds for forest insect surveys in Alaska, and entomologist William F. McCambridge from the Rocky Mountain Forest and Range Experiment Station joined the Center in Juneau to direct the project that year. Under continuous pressure from the timber industry, Congress formally transferred responsibility for forest insect and disease work from the Bureau of Entomology and Plant Quarantine to the Forest Service in 1 953, and responsibilty for Alaska shifted to the Division of Forest Entomology of the Pacific Northwest Forest and Range Experiment Station in Portland and then to the Center in Juneau the next year. In Juneau, McCambridge faced an uphill battle as the lone forest entomologist responsible for survey-oriented work to detect forest insects, make biological evaluations, and appraise their potential effects on forests in Alaska through 1956.[30]

Forest Survey Methods and Technology

Forest insect flareups also increased the pressure from industry and other state and federal agencies to complete a forest survey in Alaska, and the Center formally assumed responsibility for the forest survey in 1954 with cooperative support from Region 10 and other federal agencies. The Center staged a pilot program, of sorts, with a re-inventory of the Ketchikan Pulp Company allotment on Prince of Wales Island from 1952 through 1954, apparently in response to a disagreement between the company and Region 10 over the amount of timber actually on the allotment. Taylor's unit was in the thick of the dispute, if only because Center researchers had identified major discrepencies between extensive pulp-timber surveys made in 1944 and Research maps compiled in 1949 and 1950. The Center's subsequent resurvey of the Twelve Mile Arm Block in 1952 had suggested the amount of timber actually on the allotments had been seriously overestimated. Taylor's report warned that the allowable cut on those allotments had been set too high, and he argued that available timber resources could probably support less than half as many mills as previous studies had indicated. He concluded with a call for "...an accurate forest survey of the entire Tongass National Forest, and he suggested oblique photographs be used as the basis for such a survey. John Sandor, who later became Regional Forester for Region 10, reportedly headed the operation, and Taylor also added a young field assistant, A.S. "AI" Harris, to the Center's staff that year.[31]

Al Harris (at rear of skiff), shown here in 1956, began his long career in Alaska as a seasonal crew worker, and he eventually gained permanent appointment as Research Forester, (luneau 1072)

[30]Robbins, American Forestry, 216-220; Steen, The U.S. Forest Service, 282; Taylor, Annual Report 1954, I; Taylor, "Fifth Annual Report [1952|," 25-26; Taylor, "Forest Research and the State of Alaska Forests,' 15. Communication from Bill McCambridge to Ken Wright 3 December 1995; communication from Ken Wright to Max Geier December 1995.

[31]Taylor, "Fifth Annual Report |1952[," 1, 3-9. Communication from Al Harris to Ken Wright 14 March 1995; Communication from Jim LaBau to K.H. Wright March 1995.

To77 *Laurent and Paul Haack on test plot in 1959. (Juneau 1069)*

The experiences of some participants in the pilot survey program on the Ketchikan Pulp Company allotment in 1954 suggests that Taylor's revision of earlier, more optimistic estimates of pulp timber had contributed to slightly more tense relations between Center personnel and pulp industry representatives. Harris recalls that he was assigned in 1954 to a joint, six-member survey team designed to "avoid bias" in air checks of survey plots on the company's allotment. The survey team consisted of three representatives from the Forest Service and three from Ketchikan Pulp Company. In a working agreement designed to "avoid bias," guidelines required each air-check party (usually consisting of two men) to include at least one member from the Center and one from the company. One of these two-man check parties reportedly matched up Tom "Jonesy" Jones (representing the Center), who was formerly a pilot in the Air Corps, and Tom Kelley (representing the company), whose reputation for airsickness saddled him with the nickname "Cast Iron Kelley." Harris recalls that Jonesy usually was the first to identify the plot and call out the timber type, and if Kelley disagreed, Jonesy would ask the pilot to move closer in, with a tight turning-radius, until Kelley came around to his way of thinking.[32] Friendly rivalries notwithstanding, Center involvement in the company survey laid the groundwork for methods applied in the later, more detailed inventory of southeast Alaska.

As defined in Taylor's reports for the period, the 1954 forest survey initially was designed to find out "...how much timber there is, where it is, what condition the forests are in, and to keep this information current by periodic resurveys."[33] The survey provided information on the volume, species, quality, and location of standing timber; the ownership of forest land; rates of timber growth and mortality; and prospective requirements for timber products. This information was valuable to the timber industry, and Taylor lobbied strongly for comprehensive survey work throughout the 1950s. Early on, the vastness of the task in Alaska and the relatively small staff available for the inventory led to a heavy reliance on aerial photography. The aerial photos that Taylor had obtained from the U.S. Navy in 1 949 provided the basis for a two-phase survey system during the late 1 950s. In the first phase, photo interpretors examined plots systematically placed on each airphoto, classified each plot according to vegetation type and land use, and calculated the size, location, and density of timber stands on the plot. In the second phase, field crews, usually consisting of two men, traveled to randomly selected samples of photo plots for on-the-ground examination to monitor the accuracy of the photo interpretation and to gather informa-

[32]Communication from Al Harris to Ken Wright 14 March I995; Communication from |im LaBau March 1995.

[33]Taylor. Annual Report 1954, 1-2.

tion not discernible from the photos. Data gathered by the field crews during the summer were compiled and analyzed during the winter to check on the accuracy of type-mapping from the airphotos.[34]

The two-phase system economized on the amount of field work necessary for conducting the survey and allowed for extrapolation of data to encompass broad expanses of inaccessible terrain, but it required field crews to land at randomly selected locations seldom accessible by boat and almost never accessible by land only. Innovative use of air transport facilities quickly became the hallmark of forest inventory efforts in Alaska, although the survey initially made extensive use of water craft. The hardships of life on the boats doubtlessly encouraged Center innovations in study designs that could incorporate alternative transportation systems. The survey team primarily relied on three boats through 1957: the Chugach, the Langille, and the Stikine, respectively skippered by Spencer Israelson, Harold Gallant, and Bob Mervin. Center staff assigned to the boats worked 10 days on and 4 off, including time for reprovisioning the boats. Harris recalls this schedule was particularly hard on their families in Juneau because radios frequently malfunctioned, leaving crews out of touch for extended periods.[35]

The administrative changes of 1954 that transferred authority for the survey to Research brought new personnel who proposed innovative solutions to the problem of difficult access on the massive expanses of forest lands in Alaska. A.P. "Cappy" Caporaso joined the Center to take respon-

Old stumps suggest a stark contrast between the historical stands ol coastal Alaska and the second-growth forests that researchers like Tom Laurent (shown here) surveyed from these lofty vantage points. (juneau 1220)

Forest Research and inventory crews began using helicopters to access remote field sites as early as 1956, and early scientists in Alaska fondly recall pilot Jim Sweeny, at the controls here with passengers Karl Hegg and Tom Laurent at Humpback Bay in 1956. (Juneau 1162)

[34]Interview with Jim LaBau 5 August 1993; Taylor, Annual Report 1954, 3-4.

[35]Harris notes, however, that being out of touch "wasn't all bad." Al Harris to Ken Wright 14 March 1995.

sibility for the forest survey in 1954, and he was among the first to recognize the potential for delivering field crews to ground sites by helicopter. Caporaso's suggestion came in November 1955 in response to a visiting administrator from the Washington Office of the Forest Survey, who suggested that field work in Alaska might be **replaced** with observations from low flying planes circling above the ground plots.[36] By 1 956, small planes and a helicopter supported the Center's field work on the survey of the Tongass, and by 1957, field crews with the Center routinely used float planes and helicopters to access areas that otherwise would have required 3 or more days of overland travel by foot from the nearest point accessible by boat.[37]

The MV Maybeso underway in September 1956. (Juneau 351)

Disparities in the resources available for forest survey, as compared with other research activities by the Center, soon became apparent, but the Center gained visibility and influence as the agency responsible for the survey project in Alaska. Federal appropriations flowed in to support the forest survey as McArdle made the nationwide Timber Resources Review a top priority in his administration after 1 953. Aside from defraying the expense of airplane and helicopter support, this funding created employment opportunities for field workers and brought a greater number of seasonal employees into the circle of Center employees. This increase enhanced the visibility of the Center as a career opportunity in the Forest Service, and some of the field workers eventually joined the permanent staff as professional foresters. Harris, for example, began his career in Alaska as a field worker in 1954 and published a technical note with the Center by 1957. Others who arrived during this time include Karl Hegg, Thomas Laurent, and Paul Haack, all of whom were active in subsequent research to devise methodologies appropriate for application when the forest survey moved on from coastal regions into the interior. Haack's work is particularly notable for his tests of color, panchromatic, and black-and-white infrared photography.[38]

The Center managed three and sometimes four field crews each summer for the survey of southeast Alaska, but the expanded operation used only one boat to support operations in the

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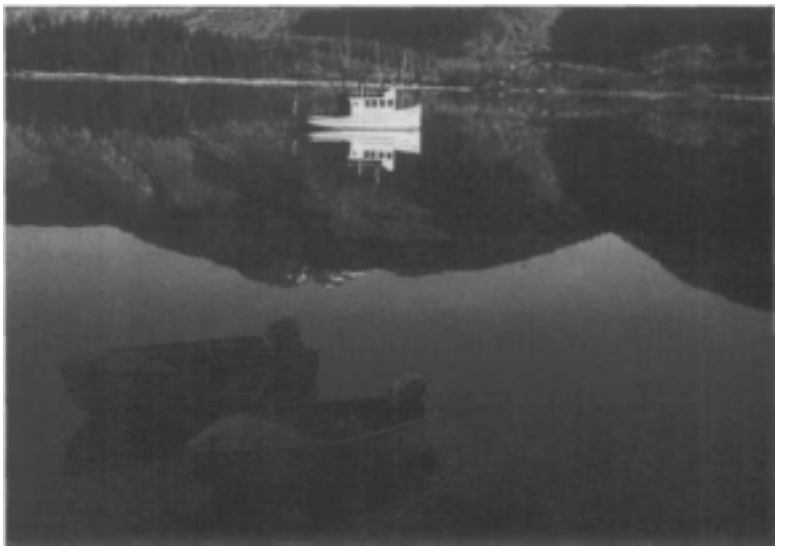
[36] Marginal note by A.P.C. in memo from R.D. Carver, Director Forest Survey to H.R. losephson, Chief Division of Forest Fconomics Research 15 November 1955; located in the Central Files, Anchorage Office, PNW Station.

[37] Harris recalls that the first helicopter that Caporaso chartered for the survey was a Bell helicopter from Alaska Coastal Airways, which eventually became Alaska Airlines in a later merger. The pilot who flew the c hartered craft, |im Sweeney, also reportedly flew Alaska Air's first jet aircraft. Al Harris to Ken Wright 14 March 1995. Taylor, Alaska Forest Research Biennial Report for 1956-1957, Station Paper 9 (Juneau: U.S. Department of Agriculture, Forest Service, Alaska Forest Research Center, 1958), 2.

[38] Haacks work eventually led to the decision to adopt the black-and-white infrared for the interior survey. Correspondence from Jim LaBau to Ken Wright March 1995; Interview with Al Harris 22 December 1992; A.S. Harris, The quick cruise circular slide rule, (luneau: U.S. Department ol Agriculture, Forest Service, Alaska Forest Research Center, Technical Note 37, March 1957).



View ol the MV Maybeso at Cat Island anchorage of the Maybeso Fxperimental Forest with skiffs in the foreground and clearcuts in the background in 1957. (Helmets collection)

Aircraft provided the primary link between scientists in the field and the outside world, and it required no little amount of faith in the pilot's navigational skills for scientists who relied on this combination of technology and human artistry to access remote field sites. Here, Bill Farr poses, in 1962, next to an airplane at a site 30 miles north of the Arctic Circle. (Juneau 1278)

field and relied almost exclusively on small planes and helicopters by the end of 1957. Aircraft and helicopter support and large field crews, however, generally were prohibitively expensive under the reduced funding available for most other areas of forest research at the Center, and research vessels such as the Maybeso (designed by Harold Anderson and launched in Seattle in 1954) remained a mainstay of operations well through the next three decades.[39]

The forest survey team's working plan for extending the inventory from coastal Alaska into the interior, drafted in September 1956, divided the interior into forest survey units in decreasing order of priority according to potential for timber production. At the top of the list, the first three units covered the region served by the Alaska Railroad: the Susitna-Matanuska unit covered the most developed area northeast of Anchorage, the Kenai-W. Cook Inlet unit covered the Kenai Peninsula west of the Chugach National Forest from Seward north to Anchorage, and the Tanana-Fairbanks unit covered the Tanana River drainage in the vicinity of Fairbanks in the mining districts at the northeast terminus of the railroad. Units 4 and 5 (the Upper Tanana and Copper River units) were also given high priority because they were deemed the only remaining units with "prospects for significant wood utilization in the near future."[40]

The forest survey in Alaska covered massive expanses of unpopulated terrain and the surveys were planned to economize on labor, maximize speed, and optimize the utility of the survey for forest managers concerned with industrial development. Field crews completed their work on the Juneau unit of the coastal survey by 1955 and the Sitka and Petersburg units by 1956, and

[39] Inteniews with Bill Fair 22 December 1 992 and 9 August 1 993; Taylor, Biennial Report for 1956-57, 2.

[40] Bnef of Tentative Working Plan—Forest Survey of Interior Alaska, September 1956," located in the Central Files Anchorage Office, PNW Station.

funding for the forest inventory of the interior began in 1956. By 1957, the Center had acquired aerial photographs of the Chugach and had completed fieldwork on the Yakutat and Ketchikan units. The next year, the Center contracted for aerial-photography of the interior in strips flown at low altitude every 25 miles at right angles across the major river drainages. This strategy provided black-and-white infrared airphotos of about 300,000 acres at a scale of 1:5000 that were the basis tor inventory work in the interior between 1959 and 1961.[41] The strip-photo method provided detailed information on forest stands along major river drainages where commercial development most likely would occur.

As the interior inventory got underway, administrative shuffles expanded professional networks and brought new personnel and skills to the Center's survey teams in Juneau. Caporaso transferred to the Intermountain Station in 1959, assumed control of the Forest Survey in that region, and recruited Vernon "Jim" LaBau and Wilbur "Bill" Farr. Under the tutelage of Karl Moessner at the Intermountain Station, LaBau and Farr learned photo-interpretation techniques useful in Alaska, and then transferred to Juneau in 1960 to work with Caporaso's former subordinates, Haack and Hegg.[42] In an effort to cope with the vast distances and remote conditions of interior Alaska, the inventory devised a three-phase system that added an "air check" as an in-

Bringing the tools and methodological rigor ot modern science to remote Held sites recjuired elbow grease and professional dedication. Karl Hegg, who photographed this scene in 1961, described it as "Jim LaBau Boring Tree— [Jim] Bones Recording." (Juneau 1407)

The dramatic setting of Alaska forests could make field research an addictive pursuit, as this view of Bill Farr's 1962 camp on the Yukon River below the Tanana River suggests. (Juneau 1962)

[41]Interview with Jim LaBau 4 August 1993 in Anchorage.

[42]The training at Intermountain Station included techniques using aerial stand-volume tables and parailax measurements with stereo photos to determine tree heights. They also studied similar methods for niensuiation studies with aerial photos. Correspondence from |im LaBau to Ken Wright March 1995.

Hick Hard and Al Harris with a floatplane at Whitewater Bay. Aircraft linked Alaska forest researchers with remote areas from the earls survevs of the 1950s through the programs of the 1990s. (Farr collection)

Breathtaking scenery notwithstanding, the floatplane was a lifeline to be firmly grasped at this spruce-yield plot 331 on the Porcupine River. (Farr collection)

terim phase between the analysis of airphotos and field work on ground plots. LaBau describes the air-check as a grueling process in which the biggest challenge was to avoid becoming airsick. The pilot and the observer flew in a small aircraft at about 1000 feet and circled points clustered on 1 0-mile-long transects selected to provide a 10-percent sample of the flight strips covered by the airphotos. The plane would fly about 30 miles to one of the segments, check 30 points at that segment, then fly on to the next segment. LaBau recalls, "...you were sitting in a fairly bumpy aircraft as you go around in fairly tight circles...these points were one-third of a mile apart and you'd just barely get out of one circle, get your next point picked out, then circle again, and you had to turn your photos the opposite way the aircraft was circling..." and this process continued for 5 to 8 hours a day.[41]

Another admininstrative shuffle in 1956 brought entomologist George L. Downing to Juneau from the California Forest and Range Experiment Station to replace McCambridge, and after his arrival, forest entomologists increasingly adopted aerial survey methods similar to those developed for inventory work: low-level insect damage surveys from small aircraft followed by ground checks. The forest insect aerial-survey program included annual flight strips over some of the more remote and less frequently visited timber lands. The flights were primarily intended as sample strips geared toward detecting extensive infestations and as a guide to yearly changes in insect conditions.[44]

Fixed-wing aircraft and helicopters improved access and reduced the time required to reach medical help in case of emergency, but the new technology could also put field workers farther afield where equipment failures or human error could be disastrous. Float planes flew ground crews to staging areas for helicopters that flew the crews farther in and dropped them at randomly selected ground plots, often where likely no one had ever been before, and without ra-

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Interview with |im LaBau 4 August 1993.

Tavlor, Biennial Report for 1956-57, 9-10; Communication from Ken Wright to author June 1995.

dios. The ground crews remained on the ground until the helicopter pilot returned to pick them up. The Center initially contracted these services from the lowest bidder, and former crew members recall their concern that a cut-rate pilot with a decrepit airship was their only lifeline to civilization.[45] The first helicopters used for this purpose were cumbersome, underpowered airships with limited lift that could not maneuver in heavily wooded areas and could not get out of very deep depressions or gullies. Aircraft radio nets of the 1 950s and 1 960s were often poor, and in remote areas, inaccessible except at high elevations. Aircraft that landed remained out of touch until they took off and regained a high altitude. If any problems developed during takeoff or landing, radio contact usually was not possible unless another plane flew overhead. LaBau recalls that three of the five pilots who flow with him during this period were killed in accidents, but surprisingly, no one working with the forest survey was ever injured in a crash, despite several forced landings and near misses.[46]

Airborne crews working on the inventory of Chugach National Forest, which included Afognak Island, encountered several particularly nerve-wracking experiences that illustrate the hazards of working with aircraft and in remote locations. LaBau recalls that Afognak was especially interesting as a worksite because trails broken in by the huge Kodiak bear were virtually the only paths available once the crews reached the ground. Once, a bear rampaging through the dense under-

Standing on shore *watching the floatplane take off could be a sobering experience for field crews whose only contacts with the outside world were through the pilots of these craft. In many locations of interior Alaska, radio coontact was only possible at higher altitudes. (Farr collection >*

Field work in the interior could mean extended stays at remote sites, such as this 1962 campsite that Karl Hegg and Bill Farr called home during their work at plots 108 and 109 near Lake Minakokosa. (Juneau 1276)

[45]Pilots, occasionally, would forget where they had dropped the crew. LaBau's crew was once stranded near a plot on the upper Kuskokwim when the helicopter pilot ran low on fuel while searching for the crew at the end of the day. LaBau's group was stranded overnight until the next day, when Karl Hegg, flying a fied-wing aircraft, led the helicopter to the site indicated on a camp map. Interview with |im LaBau 4 August 1993.

[46]LaBau and others credit good fortune, more than any other factor, for this injury-free record in the earls vears of air travel by researeh personnel. Interview with Bill Farr 9 August 1993 in Juneau; Interview with Jim LaBau 4 August I993; Correspondence from Jim LaBau to Ken Wright March I995.

brush startled LaBau and Hegg. LaBau clambered up a tree while Hegg struggled to draw a bead on the bear through the dense foliage. As the bear charged, Hegg found his front sight obscured by leaves. Luckily for Hegg, the bear rumbled on past him and disappeared into the forest, leaving Hegg searching for a target amidst the leaves at the end of the rifle barrel.[47]

Dangers caused by human error and mechanical failure often surpassed hazards from wildlife or conditions in the field. One pilot with the Chugach inventory in Kodiak reportedly tore up a Widgeon aircraft when he made a water landing with the wheels down; then, only a few weeks later, the same pilot landed another aircraft at Anchorage airport with the wheels up, tearing the belly out of the plane. In that case, the pilot was reassigned as a radio dispatcher, but LaBau recalls that inexperienced members of ground crews also endangered pilots and other aircraft passengers. In one incident, LaBau recalls, he, Tom Laurent, and two other people boarded an aircraft with chain saws and fuel cans that began venting fumes into the cabin area as the plane

Camp established by Austin Helmers and Robert Gregory on the Yukon River in 1961. (Helmers collection)

Helmers operating a skiff enroute to work in Mitchell Bay on Admiralty Island, with Al Harris (back to camera, on left) and Bob Emery (back to camera, on right) in 1962. (Helmers collection)

Robert Gregory negotiating the Tatonduck River, a tributory of the Yukon River, below Eagle in 1963. (Helmers collection)

[47]Correspondence from Jim LaBau to Ken Wright March 1995.

gained altitude. Apparently oblivious to the danger, one of the other passengers lit a cigarette while LaBau and Laurent braced for an explosion that, luckily, never materialized.[48]

Ground crews on the interior survey worked 10 days on and 4 days off in a pattern that left them completely isolated from outside contact for 5 days at a stretch. Aircraft would fly the crews in with camping gear and leave them there for 5 days with no radio contact, while the crews checked ground plots against airphotos. After 5 days in one camp, the pilot would return to collect the crew and move them to a second site, where they would spend another 5 days checking ground plots. After 10 days in the field, ground crews were allowed 4 days leave in Fairbanks, Anchorage, or wherever they happened to be, before they went back out to begin the next series of ground checks. The 4 days leave usually amounted to only 3 days off, in practice, because the fourth day was spent buying food and gear for the next 10-day work period.[49]

From Alaska Forest Research Center to Experiment Station

With the forest and insect surveys well underway, Taylor and his colleagues at Region 10 lobbied the Washington Office to broaden the designation of the Alaska Forest Research Center to a full-fledged Experiment Station.[30] Studies of forest regeneration and watersheds continued on the Maybeso Experimental Forest, but new personnel began to expand the range of expertise at the Center and extended their focus to include areas of the Chugach National Forest and the Kenai Peninsula. Austin Helmers arrived in 1957 to replace Harold Anderson on the salmon habitat and watershed studies. Robert A. Gregory began work for the Center that same year with silvicultural studies in southeast Alaska and studies of seed dispersal on a mile-square clearcut established on the Maybeso Experimental Forest for that purpose in 1957. Gregory also developed cooperative relations with scientists at the University of Alaska, Fairbanks, where he began preparation of growth and yield tables for white spruce, aspen, and birch with destructive sampling and stem analysis in 1957 and preliminary work on white spruce seed production in 1958 on sites that eventually became part of the Bonanza Creek Experimental Forest 5 years later.[51]

Gregory's work came at a crucial time in the transition from research center to experiment station because it began in the heat of the campaign for Alaska statehood and at the peak of concern about potential problems with forests in the interior. A flareup of forest damage from the spear-marked black moth near Fairbanks and from the Alaska spruce beetle on the Kenai Peninsula in 1957 and 1958 raised serious questions about the condition of forests in the interior that had an important bearing on congressional debate over the Alaska Statehood Act. The Statehood Act entitled Alaska to select about 105 million acres of land for transfer from federal to state

[49]Interview with Jim LaBau 4 August 1993; Correspondence from Jim LaBau to Ken Wright March 1995.

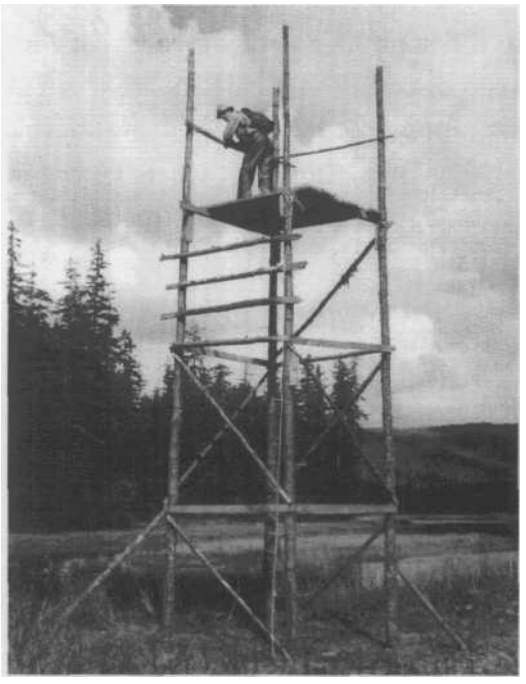
[50]Interview with Jim LaBau 4 August 1993.

[51]Memo 5 July 1956 from H.R. Josephson to Region 10, located in the Central Files, Anchorage Office, PNW Station.

[52]Research on the Bonanza Creek Experimental Forest. A review of past and present research," Memo 7 October 1969 from Les Viereck, Project Leader, to Richard M. Hurd.

control in the largest land transfer of its kind in U.S. history. Much of that land was forested, and the potential damage from insect flareups on those forests increased pressure for the Forest Service to supply the federal and territorial governments with accurate information. President Dwight Eisenhower signed the Alaska Statehood Act 7 July 1 958 and officially proclaimed Alaska in the Union on 3 January 1959. With national attention focused on the problem of incomplete forest research in Alaska, Taylor decided to intensify his efforts to have the Center reclassified as an experiment station. He drafted Station Paper 11 as an informal report on the state of Alaska torests and past and current forest research in Alaska, and he intended the report as a primer for potential allies in his campaign for experiment station status.[52]

These changes came as Congress began to recognize the growing importance of recreation in American society and appropriated $2.5 million to fund the Outdoor Recreation Resource Review Commission in 1958 to inventory and evaluate outdoor recreational resources. The Forest Service and McArdle moved quickly to participate in the Commission and have a say in how those resources were allocated. The Commission's discussions identified wilderness as a recreational resource, about the time that the Multiple Use Sustained Yield Act became law in 1960 with support from McArdle and industry leaders who were involved in timber, mining, and grazing activities on National Forests and viewed multiple use primarily as a guarantee of future access. Nevertheless, the Multiple Use-Sustained Yield Act directed the Forest Service to give



Salmon-counting tower at Twelve-Mile Creek in 1957. (Meehan collection)

Research gained a broadened mandate with the Multiple Use Sustained Yield Act of I960, which directed the Forest Service to give equal consideration to outdoor recreation, range, timber, water, and wildlife and fish. This act also included the caveat that "establishment and maintenance of areas of wilderness are consistent" with multiple use. (Schmiege collection)

[52] Memo 17 December 1958 to Pete Hanson from Ray Taylor, located in the storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service; Rakestraw, Forest Service in Alaska, 147-48; Naske, Alaska, 155-57; Steen, The U.S. Forest Service, 311-313;

Austin Helmers absorbed the frontier spirit of earlier scientists like Rav Taylor and helped pass that ethic forward into the next generation of researchers in Alaska. Here, he studies spruce coming in beneath alder on a cut-over site at the. south end of Wrangell Island in 1960. (Juneau 344)

equal consideration to outdoor recreation, range, timber, water, and wildlife and fish, and in a compromise designed to thwart potential opposition from conservationists, the Multiple Use Act also included the caveat that "establishment and maintenance of areas of wilderness are consistent" with multiple use. Wilderness legislation was also proposed in Congress about the time debate began on the Multiple Use Act and 4 years before it became law, but the Wilderness Act did not become law until 1964, when it gave new meaning to the industry buzzwords "multiple use" and "sustainable forestry."[53]

Forest Service Research in Alaska gained new impetus and direction as a result of the changes accompanying statehood and the Multiple Use Act in 1959 and 1960, and leadership at the Center transferred from one generation of scientists to the next during this formative period. Statehood eliminated the artificial distinctions governing Forest Service responsibilities in territories and states, and federal-state cooperation as mandated under the Clarke-McNary Act of 1924 opened new areas of funding and support for forest research in relation to forest protection and fires. Ray Taylor resigned from the Forest Service in 1959 and Austin Helmers became Acting Forester in Charge at the Center. Under Helmers' direction, Keith Hutchison became project leader for the forest survey for Alaska in 1 959 and joined the forest survey team at Juneau. Gregory moved to Fairbanks to establish an office from which he conducted studies on the growth of interior forests, and forest entomologist Richard "Skeeter" Werner joined the research staff in Juneau to study the behavior and ecology of forest insects in southeastern coastal Alaska. Helmers also initiated negotiations with the University of Alaska, Fairbanks, to locate a Forest Service research facility on campus, and he acted on Gregory's idea to establish an experimental forest in the Interior. Gregory and Helmers worked together in the field to decide on the boundaries, and Helmers followed through with the administrative process required to arrange a lease agreement with the state of Alaska and establish an experimental forest on the Bonanza Creek drainage near Fairbanks.[54] In his 2 years as interim director with the Center, Helmers had a powerful effect on the future scope and focus of Forest Service Research in the interior a decade before he moved to Fairbanks to establish a multifunctional work unit in 1971.

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[54]Rakestraw. Forest Service in Alaska, 147-48; Naske, Alaska, 155-57; Steen, The U.S. Forest Service, 311 -.313, Samuel Trask Dana and Sally K. Fairfax, Forest and Range Policy: Its Development in the United Slates, Second Edition (New York: McGraw-Hill Book Company, 1980), 196-199, 200-206, 217-221

[53]Memo 25 June 1959 from Austin Helmers to Manager, Land Office, Bureau of Land Management; Memo 15 July 1960 from Austin Helmers to C.C. Carleson, Regional Attorney, Office of the General Counsel, U.S. Department of Agriculture, Portland.

View of the Harris River tide flats in August 1961. Note the extensive clearcuts in the background and log rafts in the toreground (Juneau 892)

Generational Change and The Young Bay Experimental Forest

The interim administration of Austin Helmers as Forester in Charge of the Center marked a transition from the Yale-influenced, production-oriented traditions of forest research under Ray Taylor[55] to a new era in which ecological concerns relating to "natural" disturbances and legal action increasingly set the agenda for research. The establishment of the Young Bay Experimental Forest in 1959, however, demonstrates that this process was gradual with many false starts and pitfalls. While initial planning for the Bonanza Creek Experimental Forest was getting underway during Helmers' brief administration, the Center finalized the establishment of the second experimental forest in Alaska (Maybeso Experimental Forest was the first). The Center established the Young Bay Experimental Forest to accommodate watershed research on 6,425 acres of western hemlock-Sitka spruce forest in southeast Alaska. Helmers selected two streams on steep terrain on the northeastern shore of Admiralty Island as sites for studies of spawning habitat for pink and chum salmon in 1958, and the area was designated an experimental forest the next year. As with the Maybeso, the Young Bay Experimental Forest was established on a site where it was possible to clearcut one drainage and maintain an adjacent drainage as a "control."[56]

Logging that began on the Maybeso forest in 1952 had run its course by 1958 to the point where it was no longer possible to continue with the parallel watersheds program of research, and this sparked the search for another site with comparable watersheds. Helmers reportedly selected the Young Bay region because it contained two similar watersheds close to town. Fisheries biologist William Meehan and hydrologist Douglas Swanston, both of whom worked with Helmers at the Juneau Lab in the early 1960s, observe that this selection process unavoidably involved some assumptions that did not stand the test of time. Swanston observes that the notion

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[55] One influential professor of the Yale school was H.H. Chapman, whom Taylor cites with admiration in his autobiographic al account (apparently written in the late 1950s) of faculty he came in contact with as a graduate student at Yale in the 1 920s. Chapman, who had trained 1 5 academic generations of scholars at the torestrv school by the time Taylor retired from the Center, advocated during the late 1950s the extension of logging into National Parks, wilderness, and recreation areas, and he ridiculed as "utterly ignorant' National Park advocates who claimed that old forests and decaying trees were a healthy component of the natural environment. Paul W. Hirt, A Conspiracy of Optimism: Management of the National forests Since World War Two (Lincoln: University of Nebraska Press, 1994), 164.

[56] Young Bav Experimental Forest Establishment File" Central History Files, Portland Office, PNW Station

Gravel quarrying on Twelve-Mile Creek in I960. The watershed research program for Young Bay Experimental Forest in the early 1960s included plans to quarry gravel from other areas and then transport it in barges to an artificial stream channel constructed at the Young Bay site. This channel was designed to allow researchers to model different sreambed materials and conditions, (Juneau 507)

that two watersheds are discrete and not affected by events on an adjacent watershed is an unfounded assumption with serious ecological implications, and Meehan notes that the choice of comparable watersheds failed to take into consideration significant differences in the soil characteristics of each drainage—i.e., in some significant aspects, they were not comparable. Swanston also notes that the comparable watersheds were selected on the basis of tree types and the significant issue of soil types simply was not a consideration in the context of watersheds research in the late 1950s.[57]

Helmers, who acknowledges that the watersheds at Young Bay are different in many respects, emphasizes that he was primarily concerned with locating a site easily accessible from Juneau for studies of spawning habitat. He first considered streams on the mainland near Juneau, but acreage on public land in the Mendenhall Valley with an adequate water supply was not available. At the time, the Center planned studies on three major types of spawning gravels. The site at Young Bay did not include all three types, but Helmers planned to barge gravel in from other areas to construct an artificial channel useful for the spawning studies. Forest Service researchers constructed the artificial stream channel and used the site from 1 966 to 1976 for studies of spawning habitat with controlled discharge, velocity, gradient, gravel composition, and type of sedimentation in an effort to refine and extend research completed on the Maybeso Experimental Forest during the mid 1950s.[58] This research, and the Young Bay Experimental Forest itself, is a monument to the hidden assumption that has governed scientific research since the age of enlightenment: the idea that any system can be understood by isolating and dissecting discrete parts to arrive at an understanding of the whole. During the 1960s and early 1970s, that idea gradually came under attack in forest research.

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[57]Interview with William Meehan and Douglas Swanston 22 December 1992; interview with Austin Helmers 4 August I993.

[58]Young Bar Experimental Forest Establishment File" Central History Files, Portland Office, PNW Station.

George A. "Jim" lones who heacded the Port-Orford-Cedar I penmental forest near Coquille. on an early trip to explore the location tor the Young Bav l\perimenlal lorest on Admiralty Island in 1962 Helmers (collection)

Bill Wdlkolten (seated) and Austin Helmers wait for aircraft pickup on Young Bay Experimental Forest, Admiralty Island, in 1969. (Helmers collection)

Construction of a gabion dam at fast Creek on Young Bay Experimental Forest in 1969. (Swanston collection)

Doug Swanston wrestles a sheet of plastic into place during the construe lion of the collection basin for the flume at Young Bay Experimental Forest. The flume provided watershed research with a stream bed that could be manipulated to simulate a variety of conditions. (Median collection)

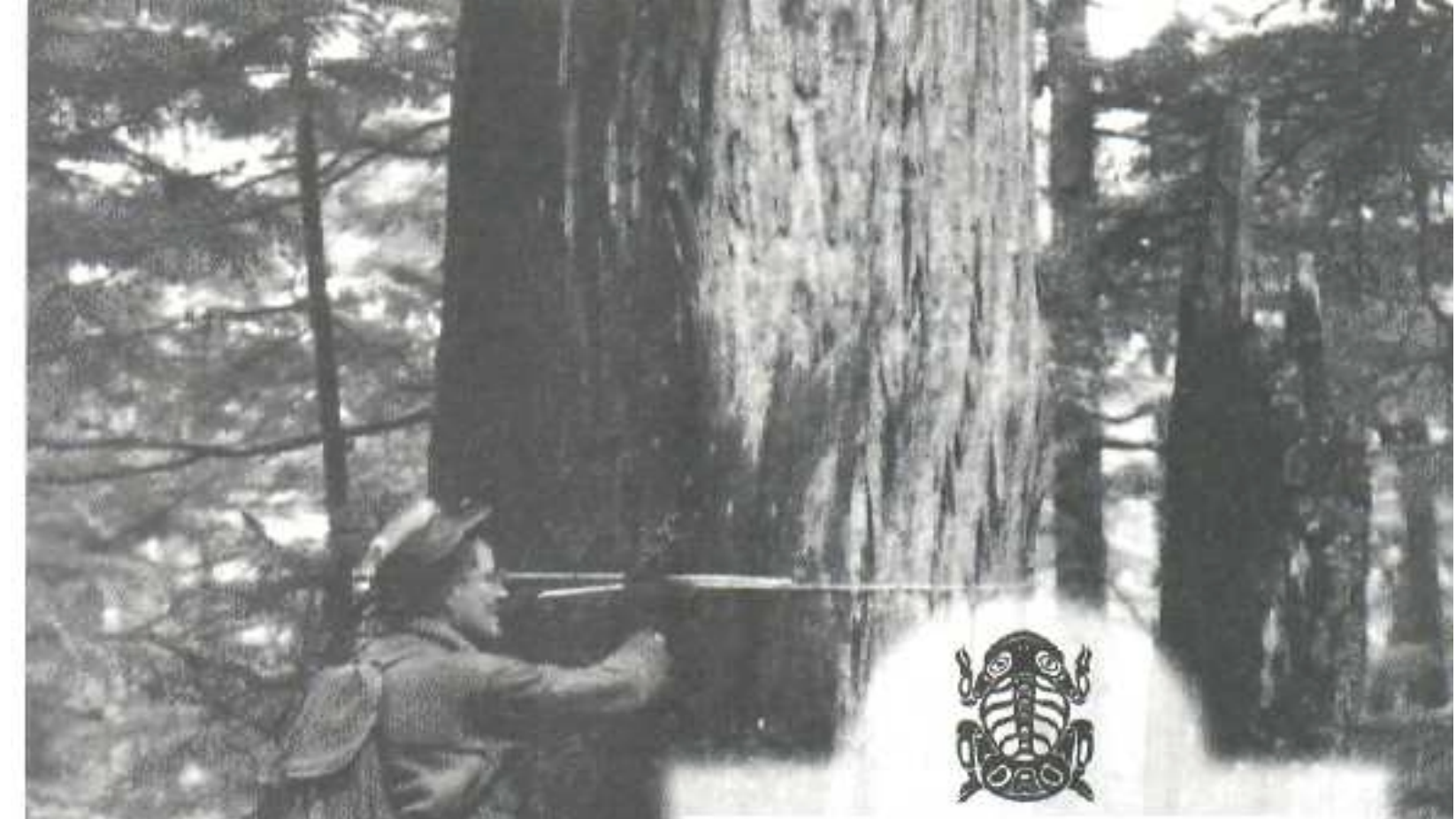
Bill Walkotten (on tractor) and Doug Swanston (on toot) hauling flume sections for the experimental stream channel under construction at the lab site on East Creek in 1969. (Helmers collection)

Bill Meehan (standing) and Bill Walkotten (seated] during construction of the lest flume at East Creek. (Swanslon collection)

Flume at Admiralty Island study site. (Schmiege collection)

Flume and collecting pond on Young Bay Experimental Forest. (Schmiege collection)

Bill Walkotten developing and testing a liquid CO, gravel sampler on the flume at Young Bay Experimental Forest in 1974. (Swanston Collection)



CHAPTER FOUR:

Forest Research With the Northern Forest Experiment Station

The Alaska Forest Research Center disappeared from the Forest Service organizational chart on 1 July 1961, when it was reorganized as the Northern Forest Experiment Station (the Northern Station) with headquarters at Juneau and Richard M. Hurd as Director. This move ended the administration of Acting Forester-in-Charge Austin Helmers and stood as a monument to the ambitions of former Center Director Ray Taylor and the political logrolling that followed Alaska statehood. This particular monument lasted less than 6 years, however, before the Northern Station was placed under the administrative control of the Pacific Northwest Forest and Range Experiment Station (PNW Station) and renamed the Institute of Northern Forestry (the Institute).[1] Aside from Taylor,

Austin Helmers examines a raised marine terrace with shells dating more than 9,000 b.p. on Indian Creek, Prince of Wales Island, in 1965. Swanslon collection)

only one other person directed Forest Service Research in Alaska longer than Hurd,[2] who continued as director of the program in Juneau for four years after the merger with the PNW Station. Hurd's administration continued the transition, begun under Austin Helmers, from a Forest Service research center that largely addressed questions arising from the production-oriented decisions of forest managers to a facility that increasingly focused on research questions arising from broader concerns that required the expertise of a multidisciplinary research staff. That transition was made with considerable legislative and litigative prodding from outside the Forest Service. Ken Wright replaced Hurd in 1967 as the assistant director responsible for most Alaska programs, and Hurd retired from the Forest Service in 1 970, just as a series of Sierra Club lawsuits and the National Environmental Policy Act of that period began to change the context within which research questions were framed. Together, Hurd and Helmers (who continued with the Institute of Northern Forestry in Fairbanks from 1971 to 1976) left a legacy of a research program that in many ways was a reflection of their personal and professional lives spent in the Western United States working with the Forest Service.[3]

Administrative Personalities and Expansion Into the Interior

Station Director Richard Hurd brought an impressive array of academic credentials and experience as a professional administrator to the Northern Forest Experiment Station in 1 961, but his predecessor in office, Austin Helmers, who embodied the frontiersmanship, or "can-do" spirit of researchers in the Taylor years, transmitted that occasionally problematic outlook into the Hurd

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[2]The Noiihein Forest Experiment Station was reorganized in 1966 as the Institute of Northern Forestry under the direction of the Pacitic Northwest Forest and Range Experiment Station in Portland, Oregon. There after, the Fairbanks office was known as the Forestry Sciences Laboratory and the Juneau office was known as the Institute of Northern Forestry. By 1972, however, the nomenclature was reversed, and PNW Slalion Reports of that year reler to the Institute of Northern Forestry at Fairbanks and the Forestry Scienes bmatorv (FSL) at luneau. The tacilities at Fairbanks, ironically, were constructed as *a* resean h laboratory, while scientists at juneau have never had the benefit of a building constructed for the purpose of laboratory research, despite the official designation of the Juneau office as an FSL after 1971 Scentis at luneau came close to securing funding for construction of a laboratory in the mid 1980s but the project failed to gain final approval. Instead, Juneau scientists have worked in a series of office buildings poorly suited to controlled, laboratory research. In succession, researchers in Juneau were housed in the former C C C rewhouse, the Federal Building, the Johnson Building, and the current structure near the airport (the Rhinoceros Building).

Assisiant Director Ken Wright, of the PNW Station, was responsible for Alaska Research from 1967 through his retiremenl in the late 1980s.

[3]Professional Biography Files, Central History Files, Portland Office, PNW Station; Forestry Research News, 11 Aug I970; Richard M. Hurd, Biennial Report, 1960-61 (Juneau: U.S. Department of Agriculture, Fores! Ser\ ice, Northern Forest Experiment Station, 1962).

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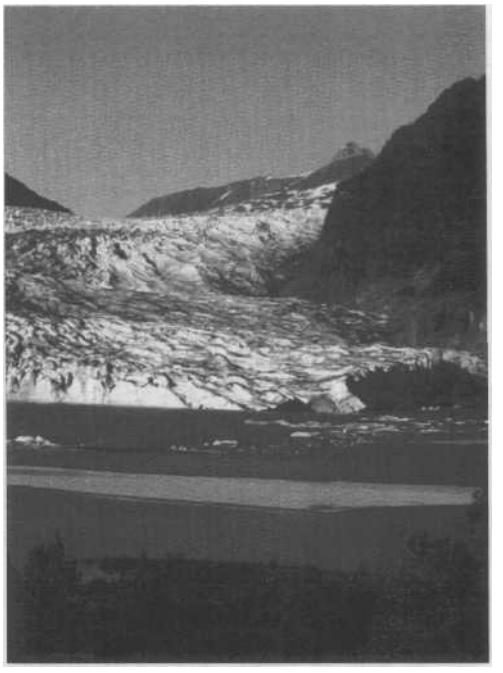
era. Together, they directed station scientists through a period that placed the Northern Station at the cutting edge of research in the interior forests of Alaska by the mid 1960s, and they expanded the range and focus of research in southeastern Alaska. Helmers favored a seat-of-the-pants style of administrative direction that sometimes conflicted with the bureaucratic traditions of the Forest Service and other cooperating agencies and institutions. He generated a lot of energetic enthusiasm, and was well liked by his research colleagues (which was often not true for Hurd), but his blunt style often conflicted with the traditions of cooperating agencies and occasionally alienated people in positions of power. Hurd, who was reportedly more aloof than Helmers and who was often abrasive in his dealings with fellow researchers, was nonetheless somewhat more cautious and diplomatic in his bureaucratic exchanges with the Forest Service hierarchy and outside agencies. These conflicting personal styles contributed to a degree of tension between the two men that Helmers characterizes as "controlled latent friction," but, ironically, their administrations jointly fostered an era of experimentation and innovation in the direction and planning of the research program.[4]



Mendenhall Glacier near Juneau. (Miner collection)

Helmers gained his outlook on forestry from a lifetime spent in association with the National Forests in the North American West. He was born in one of the flattest states in the country at Rock Rapids, Iowa, but Helmers grew up in the mountains of the Big Sky Country in northern Idaho and Montana, where his father worked as a forest ranger. His childhood memories read like a page out of the larger-than-life folk tales of Paul Bunyan. Helmers claims he got his training in forestry by walking along the chutes and riding logs down the flumes in northern Idaho. He spent his earliest years living with his mother in a small shack on a steel-wheeled wagon that his father towed from site to site in the forests of Montana, and he grew up at his father's "moderately isolated" ranger station in northern Idaho. As a youth, he developed an early curiosity about the biggest thing in the West (Alaska) by reading everything he could find about the subject. Two friends of his father at the ranger station in Idaho later brought the subject a little closer when they moved to Fairbanks for a couple of years and then returned to the station in Idaho full of stories from the frozen North. When he eventually got to Juneau years later, Helmers developed a

[4]Author's assessment derived from interview with Austin Helmers 4 August 1993 in Palmer, Alaska, and from various documents and interviews with Helmers' contemporaries and colleagues at the Station; Correspondence from Jim LaBau to Ken Wright March 1995; Forestry Research News, 11 Aug 1970; Correspondence from Don Schmiege to Ken Wright. The Helmers quote is taken from correspondence from Austin Helmers to Ken Wright 27 November 1995. Helmers emphasizes that despite this "latent" friction, he and Hurd "got along well on most matters and we were friends socially."

This Forest Service duplex in Fairbanks illustrates the kinds of facilities researchers endured before the University of Alaska at Fairbanks authorized constructing a research laboratory on the campus in the early 1960s, (Juneau Archives Polaroid)

fascination for the big glacier just beyond the city, and he spent so much of his time exploring its reaches that his supervisor finally had to order him to stay off the glacier and get to his assigned work.[5] This fascination for the country and innate curiosity about the vast scale in Alaska carried over into the professional atmosphere of inquisitive research that Helmers helped create at the Northern Forest Experiment Station during the 1960s. He embodied the "idle curiosity" or "instinct of workmanship" that progressive-era social critic Thorstein Veblen once argued was necessary for scientific progress[6] but he was also practical in his outlook and utilitarian in his views on forestry.

Helmers was also a product of the academic West and the system of state-supported colleges and universities. He earned B.S. and M.S. degrees in plant ecology at the University of Idaho by 1942, and then joined the Forest Service Branch of Research in 1943 as a temporary worker in timber management studies at the Northern Rocky Mountain Station in Missoula, Montana.[7] Helmers recalls that he was classified 4F (ineligible for service) in the military draft, and notes that he tried to enlist in the Marines, Navy, and Army, but was turned down each time. As he recalls, many permanent workers had gone off to war at that time, and he worked his temporary position into a permanent assignment by the end of World War Two, while enduring stage whispers of "4Fer" on the home front. After the war, he worked as a forester with the Northern Rocky Mountain Station on flood control surveys of the upper Missouri River. Helmers considers that experience good preparation for working in Alaska. Working on a tight deadline, he and his survey partner once spent an evening in a bar in the county seat eliciting information about flood damage from a county commissioner, and the next morning, he was on the phones milking local farmers and ranchers for additional information. As Helmers recalls of this and subsequent assignments with the Columbia River survey and as snow physicist with the Army Corps of Engineers in Greenland, "These projects were the opposite of long term in-depth, narrow scope studies. For all of them you worked against a time limit, and for some you learned in a hurry how to paint with a broad brush— at times something we still have to do."[8]

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[5] Interview 4 August 1993 with Austin Helmers; Interview 13 July 1993 with Ken Wright.

[6] Thorstein Veblen, The Place of Science in Modern Civilzation and Other Essays, (New York: B.W. Huebsch, 1919). 29.

[7] The Northern Rocky Mountain Station was short-lived, and the Intermountain Station (now headquartered at Ogden, Utah) soon absorbed its research program. Communication from Ken Wright to Max Geier December 1995.

[8] Interview 4 August 1993 with Austin Helmers; Professional Biography Files, Central History Files, Portland Office, PNW Station; correspondence from Austin Helmers to Ken Wright 27 November 1995.

Robert Gregory (facing camera) and Austin Helmers eat lunch enroute to George *Lake in 1961. Photo taken by Bob Funsch. (Helmers collection)*

Front entrance to the Northern Forest Experiment Station on the campus of the University of Alaska, Fairbanks. In keeping with the optimism of the 1960s, this building was designed to accommodate the addition of a second floor for later expansion, but the lab was never expanded and it was closed in 1995. (Juneau 349)

Helmers' colorful manner and his penchant for opportunistic and innovative methods of problem solving seemed to fit the optimistic mood prevalent in Alaska in the heady years after statehood when the economic boom fueled by national defense spending was at its peak. That mood was apparent in his account of how Congress allocated money for establishing a research center in Fairbanks and an experiment station at Juneau shortly after John F. Kennedy's New Frontiers campaign of 1960. Helmers recalls, "I remember reading in the Congressional Record, how when [Mississippi's Senator,)ohn| Stennis was making this speech getting all these billions of bucks, getting these research centers all over the [southern and central] states, [Alaska's Senator, Ernest] Gruening made a pitch for the research center up here [interior Alaska], and by golly, it flew." Shortly after Gruening and Stennis secured Congressional support for their proposal, the Washington Office instructed Helmers to "start looking for a lab site." This directive placed responsibility for initiating a new research facility squarely on the shoulders of an interim director with limited administrative experience. In a comment evoking both the "can-do spirit" of his generation of Alaska scientists and the sense of personal isolation sometimes caused by the pressures of administrative duty, Helmers reflects, "...that was during that period when I was all by my lonesome |as administrative director) at Juneau...so I've gotta get busy and get this thing started." Helmers, obviously, was surrounded by other scientists in Juneau at the time, but he bore the onus of responsibility for bringing the new facility on-line. Ken Wright, who later assumed responsibility for research at the Fairbanks Lab (as Assistant Director at PNW Station), notes: "I am personally thankful that we had Austin in AK at that time! I have long been convinced that without Austin we would not have a Lab at Fairbanks!!"[4]

[9]Correspondence from Ken Wright to author June 1995. Quotations from Austin Helmers originate from the author's 4 August 1993 interview with Austin Helmers in Palmer, Alaska. Bracketed insertions in the quote derive from correspondence from Austin Helmers to Ken Wright 1 7 March 1 995 and correspondence from Austin Helmers to Ken Wright 27 November 1995.

The people who walked down this temporary ramp atter witnessing the Fairbanks FSI dedication in 1963 probably expected the laboratory itself would remain a permanent fixture on the campus (Portland Office History Files)

Senator Ernest Cruening speaks at the dedication of the Forestry Science Laboratory at Fairbanks in 1963, with Dick Hurd (right) and William Wood (left). Wood was hired as President of the University of Alaska in 1961, the same year that Hurd replaced Austin Helmers as Director of the Northern Forest Experiment Station; together, they negotiated the agreement to build the new lab on the University campus. (Portland Office History Files)

The image of the lone administrator facing down the challenge of work in Alaska was in keeping with the New Frontier theme of the early 1 960s. Helmers evoked that theme in an article published in the journal of Forestry entitled "Alaska forestry—a research frontier,"[10] and he approached the issue of negotiating with the University of Alaska Board of Regents for space on the campus near Fairbanks like a lone gunfighter going up against the Dalton Gang (with the expected results). Helmers recalls that "the first thing I had to do was to cross swords with the Board of Regents...", and in his first meeting, "...they looked at the campus long-range plan and noted no sites designated for a forestry sciences lab. A short time later, they offered a site on the black spruce-permafrost side of the north ridge, near the muskox enclosure. This is when I decided, how about in Palmer in cooperation with the Agricultural Experiment Station?"10

Robert Gregory apparently convinced Helmers to stick with the original plan to locate the research center in Fairbanks, but not before Alan Mick, Director of the Agricultural Experiment Station in Palmer, Alaska, offered space on the University Farm area. Helmers recalls that he and Gregory "actually lookeci at this possibility" and he still argues that the lab would have been better off in Palmer, where it would have been closer to the Matanuska Valley settlements and could have shared facilities with the Experiment Station. It also would have been closer to the insect flareups on the Kenai Peninsula. Others at PNW Station, notably Ken Wright, remain convinced that Fairbanks was the best choice for the lab, and administrators in the Washington Office also seemed determined that the lab should be located on the University of Alaska campus.[12]

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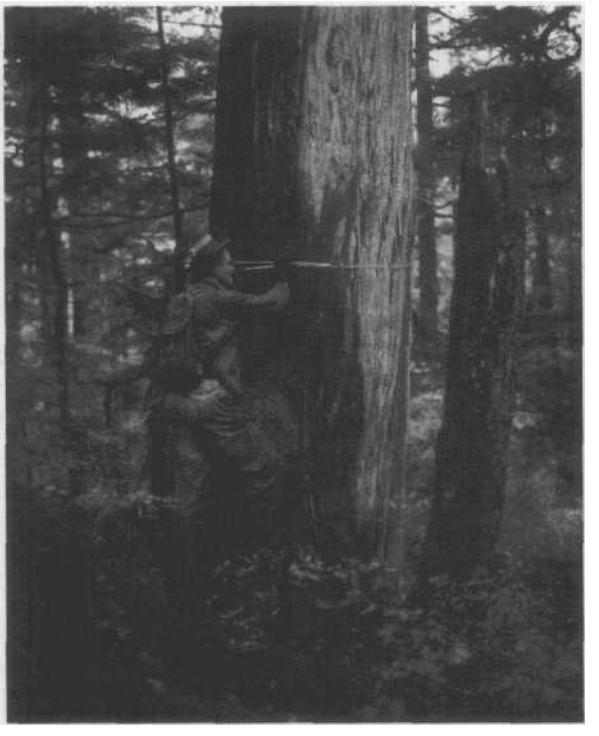
[9] A.E. Helmers, "Alaska Forestry—a research frontier," lournal of Forestry 58(6): 465-71.

[10] Interview 4 August 1993 with Austin Helmers; correspondence from Austin Helmers to Ken Wright 27 November 1995.

[12] Communication from Ken Wright to author June 1995; correspondence from Austin Helmers to Ken Wright 27 November 1995.



Austin Helmers measures an Alaska-cedar at Cape Fanshaw Research Natural Area in 1963. Helmers encountered this stand of cedar unexpectedly during routine field work, and he identified it as a candidate for RNA designation, (Juneau 1215)

Helmers made little progress in the negotiations for locating the lab on campus until the University of Alaska hired a new president just before Richard Hurd arrived on the scene in early 1 961. Helmers recalls that the new president, Dr. William A. Wood "...understood what we were trying to accomplish and enthusiastically welcomed the prospect of the new lab."[13] Support from the university president was not sufficient to move the proposal past other influential opponents of the plan, including the Board of Regents, the university architect, or the university engineer, and Helmers actually gave up on the original plan to establish a lab on the campus. He selected an off-campus site on BLM land across the river on Airport Road and hired an architect from the Regional Office in Juneau to draw up the plans. Helmers was brought up short in his efforts, however, when Chief of Research George Jemison called him in Juneau and said "meet me in Fairbanks." Jemison's first words when he met Helmers at his hotel room were: "The lab is going to be **on the campus!"**[14] As Helmers relates the story, "...that was a bad position to be in." Shortly thereafter, Hurd took over the negotiations as Director of the Northern Forest Experiment Station and "...wheeled and dealed...and by golly, he ended up with that little plot we got [on campus]."[15]

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[13] Helmers c redils Wood's enthusiasm to the new president's experience at the University of Nevada, Reno, where the Forest Service had established a new lab just before Wood's move to Alaska. Correspondence from Austin Helmers to Ken Wright 10 March 1995.

[14] Interview 4 August 1993 with Austin Helmers; correspondence from Austin Helmers to Ken Wright 27 November 1995.

[15] Interview 4 August 199 3 with Austin Helmers.

Richard Hurd and Research Priorities for the Experiment Station

Richard Hurd brought a certain degree of bureaucratic detachment that sharply contrasted with the romantic frontiersmanship and passionate disregard for the "bean counters" that was more common during the administrations of Helmers and Taylor. Helmers, who had come up through the ranks of hands-on research, favored a hands-off management style that emphasized free-wheeling experimentation and innovation in the field:

> I had more dang fun than a barrel of monkeys...always figured, you know, you keep too close of control on them, you're gonna tend to stifle their imagination and their ingenuity, and you know, that's what you **hired** these guys for, was to be ingenious and imaginative."[16]

Hurd, by contrast, was a military man with Washington Office experience, a strong background in ecology, range management, and wildlife, and an established record as a successful administrator at research stations in the West and in Washington, D.C.[17] He was also a product of the utilitarian tradition of research in the Forest Service at mid-century, and his academic and professional background leaned heavily toward resource management, although his Forest Service background was solidly in the Branch of Research. He earned a degree in forestry and range management from Iowa State University in 1939, and served with the Forest Service in Utah as an ecologist with the Intermountain Forest and Range Experiment Station in the range reseeding programs. During World War Two, he volunteered for the U.S. Navy and returned to the Intermountain Station after the war. Hurd transferred to the Washington Office in 1950, where he served as Assistant to the Chief of the Forest Service Range Research Division for 5 years. In 1955, he became the leader for the Research Center of the Rocky Mountain Forest and Range Experiment Station in Laramie, Wyoming, and he developed, directed, and coordinated programs in forest utilization, timber, range, wildlife habitat, and watershed management for the Rocky Mountain Station at Rapid City, South Dakota, until 1961.[18]

Hurd, who frowned on some of the more extreme antics of Austin Helmers and his loose style of management,[19] took a firm hand as director of the Station and expanded operations in the interior. Hurd encouraged Helmers to refocus his energies on field research, where he could apply his energy and scientific curiosity in a way that would not bring down the wrath of the

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[16] Interview 4 August 1993 with Austin Helmers.

[17] Professional Biography Files, Central History Files, Portland Office, PNW Station; Forestry Research News 11 Aug 1970.

[18] Professional Biography Files, Central History Files, Portland Office, PNW Station; Forestry Research News 11 Aug 1970.

[19] Helmers recalls one conversation he had with Assistant Chief Arthur W. Greeley, who he knew from his youth when Creeley worked for Helmers' father. Helmers argued that landslides on clearcut slopes simply hastened a natural process of erosion in u-shaped, glaciated valleys, and he suggested: "...one of the best things we could do here in this valley is log the hell out of it, get these damn slopes down to something reasonable, because they're too steep, you see, and so we log it and just hasten the process, and get the land down to a reasonable gradient, hell, we can do something with it, instead of fighting the damn thing up here where every time you do something it's unstable..." Helmers recalls that Greeley went back to Hurd and said, "Well, Helmers says logging the landslide is ok." and Hurd "...went up through all the rest of the floors when he heard that (hearty laughter)..." Interview 4 August 1 993 with Austin Helmers.

federal bureaucracy. Hurd also made the Fairbanks research facility a priority in his administration. Under his direction, the building was designed with one story but structurally engineered to support a second story so the lab could be easily expanded at a later date. Construction began in 1961 and was completed in July 1963, providing office and laboratory space for scientists and support staff with the research program for interior forests. Some of the faculty with the Forestry Department at the University of Alaska located their program and offices in the new facility soon after it opened, and the mid-1 960s were characterized by close cooperation between the University and the new Forestry Sciences Laboratory.[20]

Bill Farr photographed this view of Bonanza Creek Experimental Forest from a vantage point overlooking the Tanana River and black spruce study sites in the interior in 1976. (Juneau 5016)

Development of the Research Program at Fairbanks

Dedication of the new facilities on 1 July 1963 coincided with dedication of the Bonanza Creek Experimental Forest and brought together a group of research scientists committed to the study of forests in the interior of Alaska. Research Forester Robert Gregory had already established an office in Fairbanks and was working with Paul Haack from the inventory unit in Juneau to prepare growth and yield tables for the interior. Gregory directed operations and recruited several young scientists to the new facility. Botanist Les Viereck and fire research scientist Von Johnson moved into the building when it opened in 1963, and Wilbur Farr moved with his new bride to Fairbanks from Juneau for the 1964 field season. Joan Foote, a botanist, also joined the staff that year as a technician working with Gregory and was the first woman in the office other than clerical support staff.[21]

This new research team arrived on the scene in the wake of some of the worst fires in the history of interior Alaska, and much of their work revolved around fire effects. Wildfires burned over 1.2 million acres in the interior in 305 different flareupsfrom 1956 through 1960, attracting attention to the area and accounting in part for the sudden surge of support for forest research. Stands of black spruce suffered the most damage. Black spruce generally was not marketable timber, but the fires threatened the livelihoods of trappers and subsistence residents in the region,

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[20]Memo 11 October 1961 from C.E. Weller to R.M Hurd, located in Historical Files, Fairbanks Office, PNW Station. Interview 1 8 December 1992 with Keith VanCleve at the University of Alaska, Fairbanks; Interview with Les Viereck 30 July 1993 at the Institute of Northern Forestry, Fairbanks; Interviews with Joan Foote 15 December 1992 and 1 8 December 1 992 at the Institute of Northern Forestry, Fairbanks; Richard M. Hurd, "Forward," Biennial Report 1960-1961 (Juneau: U.S. Department of Agriculture, Forest Service, Northern Forest Experiment Station, 1962); Richard M. Hurd, "Forward," 1 962 Annual Report (Juneau: U.S. Department of Agriculture, Forest Service, Northern Forest Experiment Station, 1963); Richard M. Hurd, "Forward," Annual Report 1963 (Juneau: U.S. Department of Agriculture, Forest Service, Northern Forest Experiment Station, 1964).

-' Interview with Les Viereck 30 July 1993; Interviews with Joan Foote 15 December 1992 and 18 December 1992.

Les Viereck's training in plant ecology at the University of Colorado and his established networks in the academic community broadened the multidisciplinary reputation of the work unit at Fairbanks in the 1960s and 1970s. Here, he examines an experimental burn on the Kenai Peninsula in 1976 (Dyrness collection)

and these concerns influenced the range and nature of research at the Fairbanks Lab over the next several decades. Von Johnson, who led the newly established Alaska Fire Control Methods project at Fairbanks, beginning in 1963, moved into the lab from his previous position with the Bureau of Land Management in Fairbanks. Johnson brought to the lab an extensive background in fire control and resource management, and through his professional networks, the Fairbanks Lab strengthened its ties with the fire organizations administered through the local BLM office and the Alaska Division of Lands.[22]

Les Viereck brought to the Fairbanks Lab a personal and professional commitment to the study of ecological issues that went far beyond the utilitarian outlook of forest production more common among his predecessors in Forest Service Research in Alaska. A graduate of the University of Colorado with a Ph.D. in plant ecology, Viereck was an established member of the academic community in Alaska before he joined the Fairbanks Lab. He served on the faculty of the University of Alaska from 1959 until 1961, when he became a casualty of the Cold War. The University contracted with the Atomic Energy Commission (AEC) to study the possible effects of Project Chariot, a plan to create a harbor in northwest Alaska with nuclear explosions. Viereck served on the team of 80 scientists commissioned to work on the project, and with his colleague, William Pruitt, Viereck was among a small group of scientists on the university commission who opposed the project when their studies showed that it would damage the area's ecosystem and disrupt the food chain. He resigned from the commission to protest official press releases that contradicted his findings. He helped organize the Alaska Conservation Society (forerunner to the Northern Alaska Environmental Center), and he toured Alaska, staging protests against Project Chariot. The AEC eventually scrapped the project, to the dismay of business interests in the state, and Viereck and Pruitt both lost their jobs at the University within the year.[23] After a 2-year stint with the Alaska Department of Fish and Game, this environmental activist joined the Forest Service staff at the Fairbanks Lab as a research biologist.

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[22]Bonanza Creek Experimental Forest Management Plan, 25 February 1987," (located in the Bonanza Creek File, Central Files, Fairbanks Office, PNW Station), 8-; Interview with Les Viereck 30 July 1993; Interviews with Joan Foote 1 5 December 1992 and 18 December 1992. Communication from Richard |. Barney to Ken Wright 21 June 1995.

[23]The University of Alaska awarded Viereck an honorary degree in 1993 in recognition of his efforts to halt Project Chariot. Interview with Les Viereck 30 July 1993; Naske, Alaska, 193-196; PNW Research News June/My 1993.

Bill Farr, Boh Mattson, and Jim LaBau assemble a collapsible boat for the first time at a site on the Chena River in Fairbanks in I962. (Juneau 1273).

Scientists in Fairbanks enjoyed ready access to field sites where new equipment could be tested, such as this "first trial" of a collapsible boat assembled on the banks of the Chena River in Fairbanks and piloted on its maiden voyage by Bill Farr and Bill Funsch in 1962. (Juneau 1275)

Viereck considered the opening at the new Forest Service lab a "very good opportunity for me—good freedom, Dick Hurd was director and it worked out very well—we had good relations and adequate money—no worries..."[24] Viereck recalls that Gregory gave him "free rein" in developing studies of white spruce on flood plains of the Yukon, Charley, Tanana, Chena, and other major rivers of the interior. He did wide geographic surveys, but concentrated on the Tanana drainage, where he established permanent plots in 1964 and 1965. He also made a detailed study of the environment, climate, permafrost relations, and successional sequences on the Chena River drainage in his first decade at the Fairbanks Lab.

Despite his falling out with university administrators, Viereck also helped develop close ties between the university and Forest Service scientists at the Forest Science Laboratory. By the mid 1960s, the University's Forestry Department located offices in the Forest Science Lab, and operated a soils laboratory in the facility from 1965 through 1973. Keith VanCleve, who directed the soils lab for the university, was a specialist in nutrient cycling and productivity who worked closely with Viereck and others at the lab during this period. He continued this close cooperation after the soils lab outgrew the available space and moved out of the building in 1 973.[25]

Viereck and the other botanist at the Fairbanks Lab, Joan Foote, contributed to the emergence of a spirit of community among the small group of scientists that set the Fairbanks office somewhat apart from the established traditions of research at Juneau. Like Viereck, Foote was a graduate of the University of Colorado with an M.A. in alpine ecology. Like Helmers, she became interested in Alaska as a youth, listening to the stories of her aunt, who taught school in western

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[24] Interview with Los Viereck .50 July 1993.

[25] Interview with Keith VanCleve 18 December 1992 at the University of Alaska, Fairbanks.

Evidence of human occupation often surprised research crew members who sometimes felt as though they were "the first" human visitors to a remote locale. This trappers' cabin on the Porcupine River was a reminder of the ongoing human presence before and after scientists visited the region. (Farr collection)

Joan Foote, who held a graduate degree in alpine ecology from the University of Colorado, worked closely with Viereck and contributed to the spirit of community that emerged among scientists at Fairbanks in the 1960s and 1970s. Foote, who is shown here seated between "Skeeter" Werner (left) and Ted Dyrness (right) at the Youngs Bay research facility in May 1979, prized the cooperative spirit of "family" evident at Fairbanks when she first joined the research staff in 1964. (Dyrness collection)

Alaska. She visited Alaska while still an undergraduate at the University of Indiana in 1 958, and worked as a biologist at Camp Denali in Alaska in the summer of 1963. Her appointment in 1964 as a research technician with the Fairbanks Lab was her first job out of graduate school, and she later earned promotion to research botanist. At Fairbanks, scientists like Foote and Viereck faced temperature extremes and field conditions often more difficult than those in southeast Alaska, and they developed a strong sense of rugged outdoorsmanship. In contrast to the Juneau office, however, the close proximity of the Bonanza Creek Experimental Forest facilitated a family atmosphere at the lab, and isolation was less of a problem than might have resulted from extended research at other, more remote field locations. Les Viereck recalls, for example, that much of their work on the experimental forest could be accomplished in 1-day, in-and-out trips, and researchers often met each other daily in the Fairbanks Lab.[26]

Foote, who worked closely with Viereck on studies of floodplain succession, recalls that when she first arrived in 1964 only five people worked in a facility that had no telephones, inadequate heating for the winter, and little prior work to draw upon in developing field projects or studies. When temperatures in the lab failed to rise above 32 degrees Fahrenheit one winter, the typewriters froze, everything stopped working, and they were forced to close the lab and take administrative leave. Fairbanks researchers faced similar problems with field equipment, and they hired a jeweler to dismantle the clockwork mechanisms in data recorders, clean off the oil-based lubricant, and replace it with graphite lubricants so they would operate in sub-zero temperatures. Despite these annoyances, Foote recalls that everyone at the lab was like family and it seemed like a good place to settle in for a lifetime career.[27]

-" Interview with Les Viereck 30 July 1993; Interviews with Joan Foote 14 December 1992 and 18 December 1992.

[27]Interview with Joan Foote 14 December 1992.

Rivers served as virtual highways tor research boats in the interior, but tor shipwrecked scientists stranded on the wrong side of a river such as the Tanana (shown here in July 1974), the scenic view became an impassable barrier, (Juneau 1354)

Transport to field sites often involved cooperative arrangements with other agencies, such as this crew shown unloading a BLM aircraft at Swift River Lake in 1967. (Juneau 3144)

Researchers in the interior, despite the advantages of the easily accessible Bonanza Creek Experimental Forest, also faced problems of difficult access and isolation similar to those in south-east Alaska. They often lacked the resources to contract for aircraft support and relied heavily on boats during the field season. Foote had three riverboats sink underneath her in the course of three decades of research. In one case, on the Porcupine River, she had been in the field for about 6 weeks when shifting water levels trapped the boat on a sandbar and forced her crew to evacuate. They managed to save everything but the rifle, but Foote and her crew were trapped on the wrong side of the river without radio contact for 4 days before their colleagues back at the lab got worried. Austin Helmers, who had been away on a trip, recalls that upon his return, he learned that Foote and her crew were out on the Porcupine and had been out of contact for some time. Project Leader Charles Cushwa was not at the lab at the time, so Helmers took it upon himself to alert the BLM. The BLM supplied a Cessna 1 80 search plane that flew Helmers' search party to Fort Yukon and then up the Porcupine Valley. As Foote relates the story, the plane happened to find Foote's party while one member of the crew was hunched over "going to the John" and, consequently, was not visible from the air. Helmers and the worried aircrew made a quick headcount, concluded that one person was missing, hastily scrawled a note on a case of C-rations asking if everything was okay, and then climbed for several thousand feet in altitude so they could radio the location to the BLM airbase. Helmers recalls that the BLM dispatched a Grumman Goose to pick up the stranded field crew, but the river boat remained stranded until later that summer, when the Old Crow mailboat picked it up and returned it to Circle.[28]

Wilbur Farr, who worked briefly at the Fairbanks Lab in 1964 and made periodic forays to the interior in later years, recounts a similar incident with a jet boat on the Tanana River. He hit a

[28] Interview with Joan Foote 18 December 1992; communication from Austin Helmers to Ken Wright 10 March 1995

snag with the boat, hiked out of the woods back to Fairbanks, went out the next day with Gregory to buy a new boat, took the boat out later in the day and sank it too; but this time, he and his field assistant were forced to jump out and hit shore on the wrong side of the Tanana. With no bridges across the river, Farr used waterproof matches to start a fire, and when he saw a C-47 heading his way out of Fairbanks, he threw wet alder on the fire and sent up a huge column of smoke. The plane spotted them and hung around for about an hour until the Army sent out a "banana" helicopter that picked them up and dropped them at a nearby camp. At the time, Farr recalls, nobody knew where they were, and they weren't expected back for another 1 0 days, so if the C-47 hadn't spotted them, they might have been in "serious trouble".[29]

The Fairbanks unit rapidly developed a strong ecological focus that went beyond the more traditional, utilitarian goals of Forest Research, but Gregory also directed scientists at the lab to pursue pragmatic work, compiling volume tables and yield tables of marketable tree species and exploring fire management issues. The Fire Research project came under new leadership when Richard Barney replaced Von Johnson in February 1 965. Barney drew on his undergraduate and graduate training in forest management and fire research at the University of Montana to compile historical statistics and other information relating to forest fires in Alaska, and he reported that study in the form of a problem analysis for the fire research project. This work laid the foundation for initial efforts to adapt the standards of the new National Fire Danger Rating System to the weather, fuel, and fire environments in Alaska.[30]

Bill Farr "boring a tree' in 1966. (Juneau 4077)

The Kuskokwim drainage as seen from the air in June 7 969. *The spectacular expanse of the forests of interior Alaska starkly contrasted with the mountainous terrain and coastal inlets of southeast Alaska, (Juneau 3348)*

[29] Interview with Bill Farr 22 December 1992.

[30] Interview with Ruth Murphy 14 December 1992; communication from Richard). Barney to Ken Wright 21 June 1995.

Barney continued the close ties with fire organizations in the BLM and the Alaska Division of Lands that Johnson had facilitated over the past 2 years, offering his expertise in fire behavior. In return, these agencies, which retained responsibility for fire suppression in the region, supported research programs at the Fairbanks Lab with staff, transportation, and equipment. With this and other support, Barney's unit developed, among other things, a root-feeder method to suppress fires in the organic layers that harbored smoldering fires beneath the frozen surface of the taiga forest. Barney also expanded the range of cooperation between his project and other agencies, including support for fire-weather forecasting by the National Weather Service. In return, Bill Trigg, of the Weather Service, worked with Barney's unit during the winter to boost the capabilities of the fire project. Research forester Nonan Noste, who joined Barney's unit at Fairbanks in 1966, came to the lab from the Northern Forest Fire Laboratory via the Lake States Experiment Station, and his previous experience with the Fire Detection Project in Missoula, Montana. This expanded unit pursued a research agenda over the next two decades that included fire history, fire-danger-rating applications, fire suppression, instrumentation, biomass and fuel studies, climatic studies, smoke occurrence and distribution, and fire management applications. Scientists with the fire project consequently broadened the scope of pragmatic skills at the lab and strengthened the range of professional networks in an area of expertise vital to the mission of the Fairbanks Lab.[31]

Scientists at Fairbanks continued the tradition of close cooperation with outside agencies, and they worked with scientists and administrators at PNW Station in Portland to broaden the base of knowledge about Alaska forests throughout the 1960s. Don Flora, who led the forest fire rating project in Seattle for the PNW Station through 1966 and whose later responsibilities in Alaska as Assistant Director at PNW Station included the forest survey, identifies Barney as his "primary contact" in Alaska during the early 1960s. He recalls working closely with Barney to gain first-hand experience with fire conditions in the interior and the mystique of working in the far North. In the midst of one particularly severe fire season, for example, Barney and Flora flew up the Yukon Valley in a light plane seeking a fire reportedly near the small community of Chandalar at the north bank on the confluence of the Chandalar and Yukon rivers. The fire burned itself out before their arrival, but Flora recalls that this expedition qualified him for membership in Barney's "exclusive" Arctic Fire Research Society, purportedly open only to those who had served on a fire mission north of the Yukon River.[32] This initiation, of sorts, illustrates the distinctive sense of community carefully cultivated among scientists in Alaska who often viewed themselves, their situation, and their work as, perhaps, something a little bit out of the ordinary.

Gregory directed the small staff at Fairbanks to focus on the ecology of white spruce, which the Forest Service targeted as the most marketable timber resource in the region. Richard [Skeeter]

[34]Interview with Ruth Murphy 14 December 1992; Richard). Barney, "Root Feeder Suppresses Fires," Fire Control Notes 30 (1969) 3: 11-12; Interview with loan Foote 1 5 December 1 992. Communication from Richard). Barney to Ken Wright 21 June 1995.

[32] Communication from Don Flora to Ken Wright 6 June 1995; Cowlin, "Federal Forest Research," 483.

Werner, an entomologist at Juneau, had made several studies of insects associated with white spruce as a visiting scientist at Fairbanks earlier in his career. Research entomologist Roy Beckwith[33] extended Werner's early studies of insect relations in white spruce when he joined the Fairbanks staff in 1966 as project leader for forest insect research in interior Alaska. Viereck's early work with Foote explored the relation of white spruce to lenses of perennially frozen ground, or permafrost. Farr returned to Juneau after his brief stint at Fairbanks, but research forester John Zasada, a University of Michigan graduate with earlier experience on the Tongass National Forest, made several forays into the interior before he transferred to Fairbanks in 1968. Zasada, who was a second-generation scientist in forest research with the Forest Service, was a specialist in tree physiology and tree-soil-water relations at the time he joined Gregory at Fairbanks in studies on the regeneration of white spruce.[34] With the addition of Zasada, the small research facility at Fairbanks began to approach critical mass, in terms of the research skills, talent, and personnel needed to tackle major research problems from a multidisciplinary perspective, but their research centered on a region remote from any National Forest in Alaska.

Keith Hutchison stands next to an instrument shelter established by Austin Helmers on the Bonanza Creek Experimental Forest in June 1976. (Farr collection)

Cooperative Research on the Bonanza Creek Experimental Forest

With no National Forest in the interior of Alaska, Forest Service researchers at the Fairbanks office interacted less with Region 10 than did their counterparts in Juneau, and they developed closer cooperative agreements with agencies outside the Forest Service. The Bonanza Creek Experimental Forest, for example, was established in 1963 on state Forest land in a 55-year-lease agreement with the state of Alaska, Division of Lands. University of Alaska scientists cooperated with the Forest Service in conducting research on the experimental forest throughout the 1960s and expanded the range of studies to include wildlife and soils. Paul Heilman, professor of forest soils at the University of Alaska, studied nutrient relations of birch and black spruce

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[33] Beckwith is a good example of how the Northern Forest Experiment Station was beginning to attract top researchers with little experience in Alaska who were drawn by the professional opportunity the lab offered as opposed to a personal fascination with Alaska. Beckwith was a Navy veteran of World War Two with *an* M.S. in forest entomology from Syracuse University and 14 years of combined experience as an entomologist with the Bureau of Entomology and the Forest Service. Professional Biography Files, Central History Files, Portland Office, PNW Station.

[34] Zasada's father also had a long career in Forest Research at the Lake States (later North Central) Forest Experiment Station. Cowlin, "Federal Forest Research," 499; R.A. Werner, "White spruce seed loss caused by insects in interior Alaska," Canadian Entomologist 96 (1964): 1462-1464; interview with Les Viereck 50 July 1 993; Roy C. Beckwith, "Scolytid flight in white spruce stands in Alaska," Canadian Entomologist 104 (1992): 1977-1983; John C. Zasada and Robert A. Gregory, Regeneration of white spruce with reference to interior Alaska: a literature review, (Portland: U.S.Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Research Paper PNW-79, 1969); Professional Biography Files, Central History Files, Portland Office, PNW Station.

on the experimental forest between 1964 and 1967, and a cooperative agreement between the Fairbanks Lab and the Wildlife Department at the University supported a 6-year study of red squirrels from 1962 through 1968. Graduate students and faculty members participating in the squirrel study included C.H. Brink, Frederick C. Dean, Michael Smith, Donald Streubel, and Paul Krasnowski. Richard S. Fleming, a graduate student in botany, studied vegetational composition of birch stands on the Tanana uplands of the experimental forest from 1966 to 1968, with support from the lab, and Keith Van Cleve and his UAF graduate students in the Forest Soils Laboratory studied the ecology of river bottom sites with Les Viereck along the Tanana River on the Bonanza Creek Forest.[35]

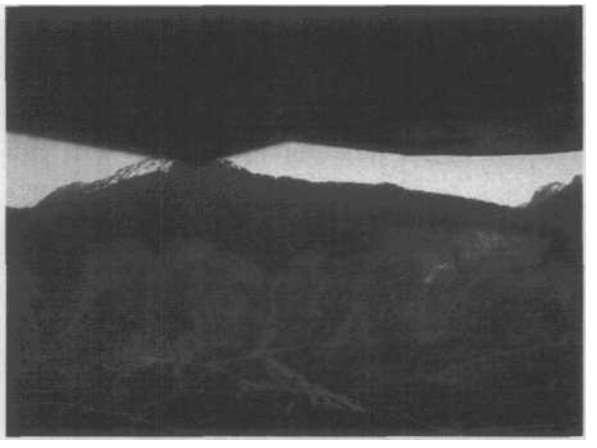
A Sno-Cat crosses the Chatanika river during a study of permafrost hydrology on the Caribou-Poker Creeks Watershed near Fairbanks in 1975. Scientists at Fairbanks enjoyed ready access to nearby study sites, but winter conditions posed logistical problems for field research. (Helmers collection)

Watershed Research and the Caribou-Poker Creeks Site

Another cooperative agreement with federal and state agencies after a disastrous flood in the mid 1960s involved the Fairbanks Lab in a unique watershed project near the Bonanza Creek Experimental Forest. Larry Dingman, a research hydrologist working with the Department of the Army, U.S. Cold Regions Research and Engineering Laboratory (CRREL) out of Fort Wainwright, Alaska, initiated a small watershed study in 1964 on Glenn Creek Basin near Fairbanks. Dingman's study terminated in 1967, ironically, the same year that a major flood swamped Fairbanks without warning, and a new surge of interest in flood-control research for interior Alaska surfaced as the waters receded. Families fleeing the floodwaters in Fairbanks found refuge at the Fairbanks Lab,[36] and the efforts of Dick Barney and other lab personnel were acknowledged by the editors of the Fairbanks News Miner. This positive publicity merged with more pragmatic concerns about the need for advance warning of flooding conditions on the Tanana watershed and led to strong support for watersheds research in the interior. Background information was sketchy because rivers and streams in watersheds with permafrost (such as the Tanana) freeze for more than half a year and behave differently than do watercourses of similar size in watersheds without permafrost. In an effort to bridge the gap, the Inter-Agency Technical Committee for Alaska organized a Research Coordination Subcommittee in spring 1969 to coordinate

[36]Memo 7 October 1969 from Les Viereck to Richard M. Hurd (located in the Bonanza Creek File, Central Files, Fairbanks Office, PNW Station).

[37]Barney recalls that he and Nonan Noste literally lived in their offices because they were cut off from their homes by the flood for more than a month. Barney did manage to take his river boat from the street below his office and tie up in front of his house, but the river had flooded so high, he was unable to pass the bridges and had to go around them over the floodplain. Communication from Richard). Barney to Ken Wright 21 June 1995.



Austin Helmers photographed this view of a mile-square clearcut on the Mayheso Experimental Forest as an example of "soil mass movement. " (Juneau 1519)

flood-control research and explore the need for establishing a research watershed. Agencies represented on the subcommittee included the College of Biological Sciences and Renewable Resources at the University of Alaska, the Geophysical Institute at the University of Alaska, the Institute of Water Resources at the University of Alaska, the U.S. Army Corps of Engineers and the CRREL, the U.S. Bureau of Land Management, the Alaska Water Lab of the U.S. Federal Water Quality Administration, the U.S. Geological Survey, the U.S. Soil Conservation Service, the U.S. National Weather Service, the Division of Lands for the state of Alaska, and the Institute of Northern Forestry.[37]

The Interagency Subcommittee selected the Caribou-Poker Creeks drainage near the Bonanza Creek Experimental Forest as the site for a research watershed on the basis of criteria similar to those Helmers had used in selecting a site for the Young Bay Experimental Forest years before. Committee members sought a site large enough to have several discrete subdrainages that were reasonably accessible from the city (Fairbanks), relatively undisturbed by human activities, reasonably "representative " of the surrounding region, preferably encompassing a wide range of environments within the drainage basin (orientation, elevation, vegetation cover), and located on public land owned by the state or federal government.[58] The selection of both Caribou-Poker Creeks and Young Bay Experimental Forest emphasized the scientific ideal of studies conducted in isolation from human or natural factors considered unrelated to the phenomena under scrutiny.

Charles [Chuck] Slaughter, a forest hydrologist with CRREL who happened to witness the 1 967 flood while in Fairbanks on a research trip, moved to Fairbanks in 1 968. He was the only resident hydrologist with the Department of Defense when the agency moved to establish the watershed project between 1968 and 1970. By 1970, the Caribou-Poker Creeks watershed project was operational over 40 square miles, and research on the project focused on developing a real-time flood-warning network. Slaughter described the watershed as "...the only complete catchment in the permafrost-dominated subarctic of the U.S. which is dedicated to hydrology and environmental research." This pioneering project was a completely voluntary effort on the part of the participating agencies, and the coordinating committee had no budgetary authority. Projects on the watershed were "bootlegged" with funding from the participating agencies. By 1971, the

[37] Charles W. Slaughter, Caribou-Poker Creeks Research Watershed, Interior Alaska Background and Current Status, (Hanover, New Hampshire: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Special Report 157, May 1971), 2-3, 11; interview with Charles [Chuck] Slaughter 16 December 1992 in Fairbanks Office, PNW Station; Communication from Ken Wright to author |une 1995.

[38] Slaughter, Caribou-Poker Creeks Research Watershed, 3.

PNW Station reassigned its resident expert on watersheds, Austin Helmers, from the Juneau office to Fairbanks, and Helmers worked closely with Slaughter and other researchers on the watershed for the next 5 years.[39]

Expansion of the Research Agenda in Southeast Alaska

Extensive landslides and mass [soil] wasting on steep, cutover slopes in the Maybeso Valley in the early 1960s led to a reassessment of research priorities in southeast Alaska, much as floods and fires led to the development of cooperative studies in the interior, and Hurd recruited a new generation of scientists who remained in Alaska through most of the 1960s. This third wave of forest researchers broadened the array of skills and experience available for research projects in southeast Alaska, but unlike those in Fairbanks, they joined established research programs staffed with scientists who worked closely with Region 10 on the Tongass National Forest. The forest survey moved ahead during the 1 960s with Karl Hegg, Tom Laurent, David Born, Robert Mattson, and Jim LaBau under the direction of Keith Hutchison, who was a graduate of Oregon State University with a master's degree in agricultural economics from Ohio State University and 13 years of experience in the Forest Service before his arrival in 1 959. Austin Helmers continued his work with watersheds and salmon habitat, and also glacial geology; Al Harris and Bill Farr continued their work on forest regeneration, growth, and yield.[40]

Reconnaissance of a landslide in 1962 showing effects of logging along a stream. (Juneau 1032)

Forest Service Research crew repairing a cabin in exchange for free use of the facility in 1967. These kinds of adaptive arrangements were crucial to the success of doing research on a limited budget in an area that required high expenditures for logistical support. (Juneau 3151)

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[39] Interview with Chuck Slaughter 1 6 December 1 992; interview with Austin Helmers 4 August 1 993; Letter *16* April 1975 from Charles W. Slaughter to Brian Bedford, EER Project Manager at The Institute of Ecology, W.K. Kellogg Biological Station (Located in Central History Files, Portland Office, PNW Station).

[40] Interview with Bill Farr, Karl Hegg, Tom Laurent, and Al Harris 22 December 1992 in Juneau Office; Hurd, Biennial Report 1960-1961.

Nearly 70 landslides and debris flows on steep, logged slopes of the Maybeso Experimental Forest during heavy October rains in 1961 led to a concerted effort to study the relation between logging practices and mass movements of soil and a renewed interest in various methods of re-seeding to encourage regeneration after logging. Similar slides developed on heavily logged slopes on other parts of the Tongass National Forest, and many of the slides affected uncut timber. Aerial photos taken in June 1 948, July 1952, May 1959, May 1961, and August 1962 provided a visual record of previous landslides in the Maybeso Valley before and after the major clearcutting of the mid 1950s. These methods revealed a 350-percent increase in the area subjected to land-slides between 1959 and 1961, and the area subjected to landslides between May 1961 and August 1962 was nearly 450 percent greater than the area subjected to landslides between May 1959 and May 1961. Initial research by Dan Bishop, and the realization that the heavy rainfall in October 1961 was likely at least once every decade, lent a sense of urgency or even panic to the apparent association between logging and massive slide activity, and Hurd recruited Research

This view of a landslide at Neets Bay in 1962 illustrates the hazardous conditions confronting scientists who worked on the landslide reconnaissance that year. Note the smooth bedrock surface exposed in this slide, (Juneau 1473)

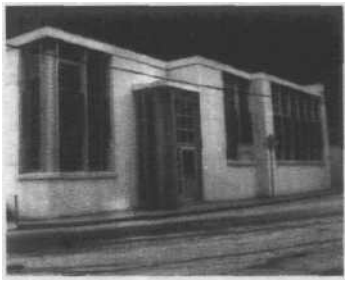
Maybeso Valley in May 1962, seven years after logging. (Schmiege collection)

Doug Swanston, shown here testing rool sheer strength, was recruited in 7 962 *to address concerns about soil mass movements on areas of the Maybeso Experimental Forest clearcut in the 1950s. (Schmiege collection)*

Geologist Douglas Swanston to study the phenomenon. Swanston held an undergraduate degree from the University of Michigan and a Master's degree in glacial geology-geomorphology from Bowling Green State University (Ohio) at the time he began working in Juneau with Al Harris in summer 1962.[41]

Swanston recalls that researchers in Juneau when he first arrived in 1962 perceived themselves as somewhat isolated from the mainstream of power and influence in forest research. In contrast to Viereck, who joined the staff at Fairbanks the next year and reported no concerns about funding or recognition, Swanston notes that although he, personally, was well received, the mood among researchers in juneau was somewhat resentful, and scientists who had worked there over the previous decade seemed concerned that their work was going unrecognized outside Alaska. Helmers, the former acting director who had been replaced when Hurd arrived only a year earlier, warned Swanston in 1962: "If you're gonna stay here, you're gonna be forgotten. Just go ahead and do the work you need to do up here, but nobody's gonna pay any attention."[42] Swanston reports that "...it seemed true at the time...people were either crazy or sadistic types who preferred the cold, cruel woods." He also notes that they had problems getting field people who would stay on because of the isolated working conditions.

Swanston had arrived at a moment of deep concern that things had somehow gone very wrong, and much of the earlier research that seemed to suggest that it was safe, or even beneficial, to clearcut drainages right up to the streambed now faced closer scrutiny. In contrast to



The researchers at juneau never enjoyed the luxury of a permanent laboratory facility designed expressly for controlled research. This view of the Johnson Building on Admiralty Way in I960 greeted scientists who in earlier years worked out of the old CCC crewhouse, then in the Federal Building downtown, and more recently in a leased building near the airport north of Juneau. (Juneau 1381)

Research Entomologist John Hard joined Don Schmiege in Juneau as a replacement for Richard "Skeeter" Werner in 1964. Here, Hard examines twigs infested with hemlock sawflies and seeks clues to their life cycle. (Portland Office History Files)

Here, Hard lowers a sawfly-intested branch from a tree near MacKenzie Inlet, west of Ketchikan. (Portland Office History Files)

[41] Hurd, Annual Report 1963, 15-16; Interview with Douglas Swanston 22 December 1992 in) uneau Office; Professional Biography Files, Central History Files, Portland Office, PNW Station.

[42] Interview with Douglas Swanston 22 December 1992.

Fairbanks, where the mood through the 1 960s was one of optimistic innovation and cooperative expansion, the focus in Juneau was damage control, retrenchment, and questioning of previous assumptions and conclusions. This reassessment provided opportunities for up-and-coming young scholars like Swanston who asked different kinds of questions and looked at different kinds of issues, but those young scholars often challenged the methods, assumptions, and conclusions undergirding earlier research conducted by scientists like Helmers. Helmers argued that the mass movements in the Maybeso were simply a continuation of natural processes in the U-shaped, glaciated valleys of southeast Alaska. He pointed out that landslides commonly occurred long before any logging developed, and he compared airphotos of the Maybeso Valley with photos from other valleys, arguing that slope instability is just nature's way of leveling the land.[43]

Swanston's work during the 1960s focused on the underlying structures supporting the forested slopes in southeast Alaska, unlike his predecessors at Juneau, who tended to focus more on the trees and surface events. Helmers notes that researchers in Juneau before Swanston lacked the expertise needed to understand the geology and soil mechanics influencing debris avalanches in southeast Alaska, and Swanston was hired to fill this gap. This expanded area of inquiry was also a reflection of broader shifts in forest research and environmental issues in the National Forest System as forest management practices came under closer scrutiny and uses other than timber began to assume greater prominence in the mission of the agency. Unlike the earlier generation of researchers, this "third wave" of scientists often came from backgrounds unrelated to timber production and often not directly related to forestry. Swanston's background, for example, was in glacial geomorphology, whereas Helmers was, literally, born and raised in a forest management family. By the mid 1960s, this tendency toward greater diversification in academic background and experience became more pronounced at the Juneau Office.[44]

New Researchers and Retraining in the Juneau Office

Under Hurd's direction in the mid 1 960s, the Juneau research facility expanded its staff with specialists in entomology, fisheries biology, and geology, and other scientists at the Station updated their knowledge with post-graduate studies. Don Schmiege, a native of Wisconsin, joined the staff in 1961 with funding from the Washington Office while finishing his doctoral work at the University of Minnesota. His background included a stint in the U.S. Army in the postwar period and an undergraduate degree in forestry, an M.S. in economic zoology, and a Ph.D. in entomology, fisheries, and wildlife, all from the University of Minnesota. Research Entomologist John Hard, a Navy veteran during the 1950s with an undergraduate degree in forestry and a graduate degree in forest entomology from Syracuse University, joined Schmiege as a replacement for Werner[45] in 1964. Hard previously had worked for 2 years as research entomologist with the

[43] Interview with Austin Helmers 4 August 1 993.

[44] Professional Biography Files, Central History Files, Portland Office, PNW Station.

[45] Werner transferred to the Southeastern Forest Experiment Station, where he worked while he pursued graduate studies at the University of Maryland and North Carolina State University between 1965 and 1971. Interview with Richard ISkeeter] Werner 30 July 1 993; Professional Biography Files, Central History Files, Portland Office, PNW Station.

CONTINUED

Lake States Forest Experiment Station in St. Paul, Minnesota. Wilbur [Bill] Farr, a graduate of New York State College, went back to school at Oregon State University for about a year in 1962, continued his studies at the University of California, Berkeley, in the 1964-65 school year, and returned to work at the Juneau Lab between 1 965 and 1 968, when he again resumed his studies, this time at the University of Washington. Jim LaBau returned to graduate school in 1965 at Oregon State University, where he wrote a master's thesis on the application of Bitterlich's point sampling techniques to the inventory of coastal forests in Alaska. Swanston, meanwhile, continued his graduate work with Michigan State University, where his doctoral dissertation explored the geology and slope failures in the Maybeso Creek Valley, and he earned a Ph.D. in geomorphology-engineering geology in 1967.[46]

Bill Meehan inspects an egg-rearing basket in 1971 downstream from a footbridge previously constructed at Young Bay Experimental Forest. (Meehan collection)

Of all the staff and personnel changes introduced at Juneau after 1961, the addition of Fisheries Biologist William Meehan to the watersheds project in 1966 had, perhaps, the most far-reaching implications. Meehan was the first fisheries biologist employed with the Research Branch of the Forest Service, and he was an established scientist with nearly a decade of experience in Alaska when he joined Helmers and Swanston on the watersheds project in Juneau. Meehan, a native of Buffalo, New York, had earned an undergraduate degree in biology from the University of Buffalo, an M.A. in biology from Oregon State University, and a Ph.D. in fisheries and wildlife from Michigan State University by 1958. He also served in the U.S. Army Medical Corps during the Korean War. Meehan worked for the Alaska Department of Fish and Game from the time he finished graduate work at Michigan State University until he joined the Juneau office. With the Alaska Department of Fish and Game, he served as senior biologist and director of the Kitoi Bay Research Station, then as supervisor of the Sockeye Salmon Research Project, and finally, as research supervisor of the Westward Region and director of the Kodiak Research Center.[47]

The addition of Meehan to the watershed project marked the beginning of a gradual shift over more than two decades from the study of logging and its effect on streambeds and waterflow to the study of fish in the streams and their biological requirements. Meehan began some fisheries work between 1966 and 1971, but his work in the biological aspects of streams began in earnest

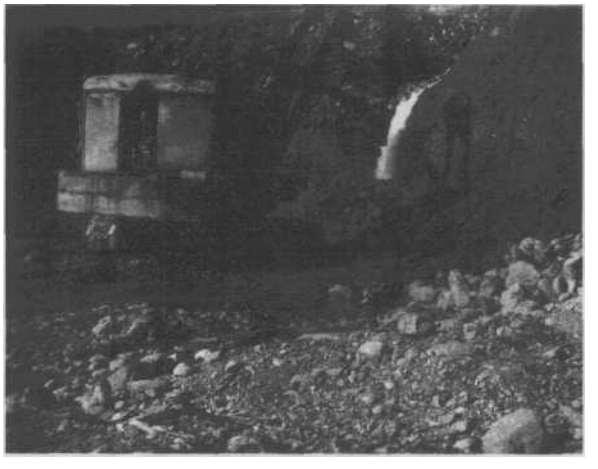
[46] Protession.il Biography Files, Central History Files, Portland Office, PNW Station; Communication from Jim LaBau to Ken Wright March 1 995.

[47] Interviews with William Meehan 22 December 1992 and 9 August 1993; Professional Biography Files, Central History Files, Portland Office, PNW Station.

One of the many temporary homes of the Juneau FSL, the Federal Building in downtown Juneau was ill-P(uipped for laboratory research because of the risk ot exposing other federal office workers to chemicals and other hazards. (Fair collection)

after Helmers transferred to Fairbanks in 1971 and Meehan took charge of the watershed project. Meehan recalls that his work with the watershed project from 1966 to 1971 fell into three rough categories: the effects of logging and other land uses on fish habitat, habitat requirements of salmonids, and methods for enhancing fish habitat. As Meehan recalls, when he arrived in 1966, fisheries aspects were "implied" from after-logging studies and there was "no solid fisheries investigation." What passed for fish habitat studies mostly involved studies of sedimentation and erosion with limited understanding of the biological requirements of the fish. Before 1966, studies of habitat requirements focused mainly on pink and chum salmon, with little work on coho salmon and cutthroat trout—species that remained in the streams for one or more years. Meehan notes that habitat enhancement was the lowest priority for research and remained so over the next two decades.[4]"

When Meehan joined the Forest Service in 1966, the facility in Juneau was located in the Federal Building, and the lab had no facilities geared toward fisheries work, such as hatcheries, experimental laboratories, or artificial stream channels. Meehan spent much of his time lobbying for new laboratory facilities in Juneau, but was mostly unsuccessful. Instead, he was forced to pursue his work in the field where conditions were very difficult to control, and where the ex-

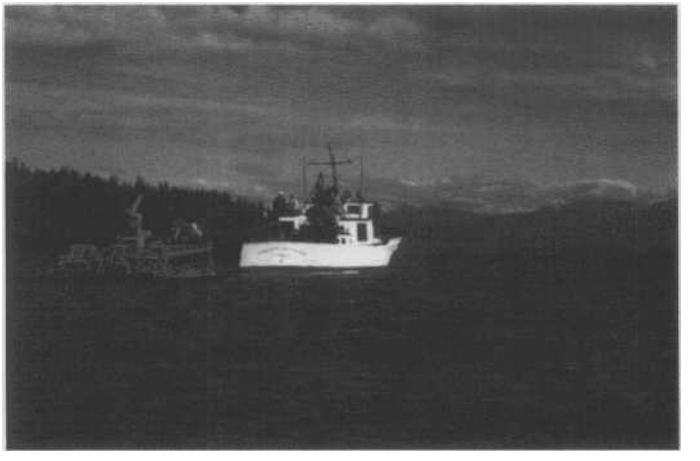


Washing gravel in Half-Mile Creek in 1956. (Juneau 719)

Cravel-washing operations at Half-Mile Creek on the Maybeso Experimental Forest in 1956. The cumbersome expense of this process for restoring gravel spawning beds encouraged scientists to seek more cosl-effective alternatives during the 1960s and 1970s. (Juneau 718)

[48]Ink'rui'vv with William Meehan 9 August 1993.

pense of research was as much as three times higher than elsewhere in the United States. Among the projects he worked on during this period was the attention-grabbing "riffle sifter," which he describes as a "monster" that was supposed to stir up the gravel, suck up the fine sediments, and kick them out on the bank. In practice, the riffle sifter blew some sediment out on the bank, but some was flushed downstream, and the sediment blown out on the bank easily washed back into the stream. The idea for the riffle sifter, which Al Harris describes as more of an engineering design project than a research project, apparently was based on research by Bill McNeil, of the University of Washington Fisheries Research Institute (FRI), who argued that sediment in streambed gravel interfered with oxygen flow to buried salmon eggs.[49]



Forest Service boat, the Tongass Ranger, towing a riffle sifter out of Tenakee Inlet. An example of the "can-do" spirit and optimism of the early 1960s, the riffle sifter was an experimental prototype designed to restore salmon habitat in logged-over watersheds, but it suffered from repeated technological breakdowns. Later fisheries habitat experts discounted the theoretical basis behind this technological solution to systemic problems. (Meehan collection)

Helmers describes the riffle sifter somewhat differently than Meehan, arguing that it was a "pretty good idea" that may have been influenced by his off-hand speculation in a casual conversation with a representative of Ketchikan Pulp Company:

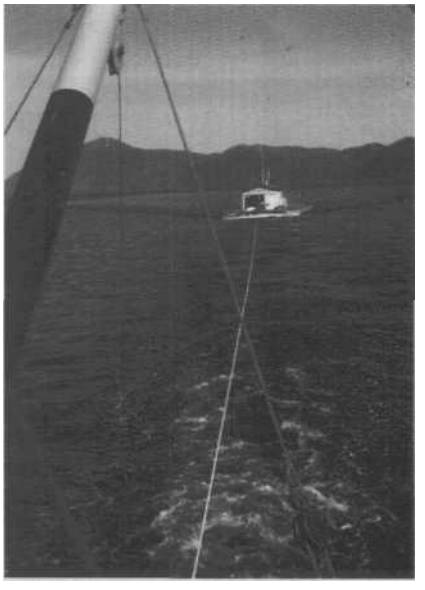
> One of the things that led to it, I suppose, I remember one time I was up in Fairbanks for some meeting, and Art Brookes was there. At the time he was in charge of log production for KPC [Ketchikan Pulp Company]. So we were sitting around having a meeting one night, and I had this idea, you know how inviolate streams are to logging, you don't dare touch it, and I said to Art, "you know," I said, "if we could get you guys to do some yard logging across these streams at the right time of year, you know, we could clean up these rapids quite a bit."(laughs) Well he said "nothin doing—I got enough trouble as it is." (loud laughter) I said "we could do this as research, purely experimental, you know, and we're the ones that are asking you to do it," and he said "nothin doing" (laughs) "By the time the public got ahold of that," he said, he didn't want any part of it (laughs), so then we went out and came up with a device to do the same thing.[50]

Helmers' tongue-in-cheek proposal also seemed rooted in the long-standing quandary that scientists in Alaska had faced since the time of Steller: how to balance the boundless potential for

[49] Interview with William Meehan 9 August 1993; Correspondence from Al Harris 14 March 1995.
[50] Interview with Austin Helmers 4 August 1993.

scientific inquiry with the reality of limited resources and funding. Helmers contends that yarding the logs across the stream might have created an opportunity for determining "...the amount of streambed sediment reduction, gravel redistribution and stability." Without support from the FRI, he continues, the Fairbanks Lab would not have had "...adequate capabilities for determining effects on streambed biota."[51] In short, Helmers had proposed a scheme by which Ketchikan Pulp Company logging activities would subsidize research that otherwise would not have been feasible with resources at the Fairbanks Lab. It was an innovative and resourceful idea with undoubted potential as a public relations nightmare, but it was also an effort to accomplish, on a shoestring budget, research in keeping with the new theories of habitat-salmon interaction emanating from FRI laboratories. The riffle-sifter was simply a more technology-laden variation on the same theme.

Wanigans provided a mobile research platform and housing for staff and supplies at remote sites. This view of Wanigan 13 was taken in 1959 at Young Bav on Admiralty Island (Juneau 1959)



Wanigan 13 under tow to a work site in 1961. Photo taken from the deck of the MV Maybeso. (Helmers collection)

Forest Insect Research wanigan at MacKenzie Inlet in July 1971. (Wright collection)

Torolf Torgerson on his way to a plot near MacKenzie Inlet in southeast Alaska in 1971. (Wright collection)

[51]Correspondence from Austin Helmers 10 March 1995.

Postmortems on the outcome of the riffle-sifter experiment reveal the shifting perspectives that redefined the direction of fisheries and watershed research over the next two decades. As Helmers recalls, the riffle-sifter prototype, which he witnessed in operation for only about half an hour at Montana Creek, had "quite a few little mechanical breakdowns, so every day, why, the thing was down for some problem or the other, but I don't think there's anything wrong with the concept at all..." Meehan argues, however, that the problem with the riffle sifter was as much conceptual as mechanical because it failed to address the question of where much of the sediment would settle further downstream. In other words, restoration of habitat upstream may well destroy habitat further downstream.[52]

As Meehan struggled with inadequate laboratory facilities in fisheries, the insect research project in southeast Alaska moved ahead with new laboratory facilities acquired in 1962 and a growing faculty of entomologists with advanced graduate degrees. The laboratory and crew quarters were located on a wanigan designed and built by Werner in 1961. It consisted of a steel barge 52 feet long and 15 feet wide with a wooden frame structure designed for laboratory and living quarters. Helmers recalls that he arranged with the GSA (Government Services Administration) in Seattle to visit various shipyards, initially looking at old landing craft. Finally, at the Duwamish Shipyards, they located and purchased a "fairly new steel barge" that was modified as the support structure for the new research wanigan. The wanigan was self-contained, with a generator, two-way radio, propane gas utilities, and freshwater storage. Torolf Torgerson also

Don Schmiege and Skeeter Werner at Limestone Inlet, 20 miles south ot Juneau, in 1962. This site was used for research on the black-headed budworm and hemlock sawfly. (Portland Office History Files)

Don Schmiege inspecting a Pacific silver fir in 1969 on the Red River Research Natural Area, which includes the northernmost stand of this species. Ken Wright was instrumental in securing RNA designation tor this site, and the Chief Forester attended its dedication. (Juneau 4164)

Interview WIth William Meehan 9 August 1 993; Interview with Austin Helmers 4 August 1993.

Karl Hegg sets a compass bearing in 1967. (Juneau 3145)

Al Harris at a regenerating clearcut on the Maybeso Experimental Forest in 1965. (Juneau 1810)

joined Schmiege and Hard on the project in 1965, shortly after Werner left for the Southern Station. Torgerson was a graduate of Syracuse University with a degree in forestry, and he pursued an M.S. and Ph.D. in entomology from the University of Wisconsin, where Schmiege served as Visiting Professor of Entomology in 1 966. Most entomology research in the mid-to-late 1 960s focused on the black-headed budworm and hemlock sawfly, which were most common in the spruce-hemlock forests of southeast Alaska. The outbreaks of the late 1950s had left enormous areas of dead and top-killed timber, and fears of another flareup spurred research and monitoring efforts in the mid 1960s. Investigations at Limestone Inlet, a Research Natural Area located about 20 miles from Juneau, focused on the life cycle of the budworm in an effort to identify factors that contribute to mortality.[53]

As Schmiege recalls, his research often was driven by requests for information from Region 10 and consequently focused mostly on providing basic information, or counting what was out there. Schmiege argues that entomology "research," as such, really was not feasible, given the scale of management activities, and he noted the best that could be expected was to make predictions about insect response to those activities. Nonetheless, he notes that Limestone Inlet, where the wanigan was located, was "just great" as a research site. Methods developed for studying the budworm included examining egg-bearing needles during winter and spring by erecting 40-foot steel towers adjacent to the tree, then climbing the tower to study the budworm eggs in their natural setting in the tops and middle crowns of the trees. Studies of the hemlock sawfly were accomplished by placing muslin sleeve cages around hemlock branches to isolate the prepupae and facilitate studies of predators and parasites that might affect the life cycle of the insect[54]

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[53] Hurd, 1 962 Annual Report, 6-9; Professional Biography Files, Central History Files, Portland Office, PNW Station;

[54] Hurd, Annual Report 1963, 1-3.

The research camp at Hollis, seen here in 1962, remained an important base tot regeneration growth and yield studies on the Maybeso Ixperimental Forest through the 1970s. (Helmers collectioni

Al Harris examines a second-growth stand of 40-year-old hemlock-spruce at Howkan in 1966. (Juneau 4007)

Other scientists at the Juneau Lab produced a series of reports and research notes on forest regeneration and inventory methods and findings. Karl Hegg produced a photo-identification guide for forest and land types in the interior, Harris studied natural reforestation on the large clearcuts on the Maybeso Experimental Forest, and Farr examined growth and yield on well-stocked stands of white spruce in the Interior. Farr also cooperated with Meehan, Daniel Bishop, and J.H. Patric to produce a report on the effects of clearcutting on salmon habitat in 1969, and Swanston issued several reports on mass wasting and debris avalanching in shallow till soils of southeast Alaska.[55] The scientists who undertook these studies did so in a climate of increasing uncertainty and day-to-day speculation about the future of forest research in Alaska.

Administrative Agendas and Research in Southeast Alaska

Administrative control over Forest Service Research in Alaska gradually slipped away from the Juneau office while the Fairbanks Lab pursued its cooperative agreements and research programs. The mid 1960s was a period of enormous turmoil for the Forest Service nationally and in Alaska. Between 1 964 and 1971, the agency faced challenges from wilderness advocacy groups, Alaska Natives, and other state and federal agencies concerned about Forest Service administration of public lands. The intense scrutiny focused on the Forest Service during this period also coincided with planning for the 60-year anniversary of the establishment of the agency within the Depart-

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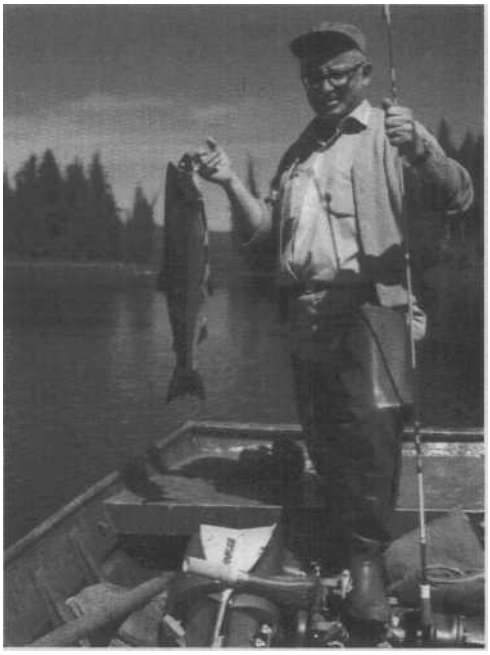
Kdri Hegg A pholo identitication guide lor the kind and forest types of interior Alaska, (Juneau: U.S. Deparlmen! of Agriculture, Forest Service, Northern Fores! Experiment Station, NOR-3, 1966); A.S. Harris, Natural reforestation on a mile-square clearcut in southeast Alaska, (Portland: U.S. Department of Agriculture Forest Service, Pacific Northwest Forest and Range Experiment Station, PNW-52); Wilbur A. Farr Growth and yield of well-stockeel white spruce_s_tands in. Alaskta, (Portland: U.S. Department of Agriculture Forest Service, Pacific Northwest Forest and Range Experiment Station, PNW-53); William R. Meehan. W.A. Farr. D.M. Bishop, and J.H. Patric. Some effects of clearcutting on salmon habitat of two southeast Alaska safmon streams, (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest ,and Range Experiment Station, PNW-82); Douglas N. Swanston, Mass wasting in coastal Alaska, (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Expeiiment Station, PNW-831; Douglas N. Swanston, Mechanics of debris avalanching in shallow till soils of southeast Alaska. (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, PNW-103).

Bill Farr measures d.b.h. from the downhill side of a tree on the Kenai Peninsula, (Juneau 1406)



Ken Wright, Assistant Director at PNW Station, displays the "first salmon of his life" at McKenzie Inlet in July 1971. Wright held responsibility for administering research programs in Alaska longer than any other assistant director in Portland, and he earned the moniker "Mr. Alaska " for his unflagging commitment to secure support for those efforts. (Wright collection)

merit of Agriculture. In this context, the Washington Office initiated a review of operations in 1 963 (just as the landslide studies on the Maybeso got underway) to assure that its house was in order, and an inspection of the Pacific Northwest and Alaska at mid-decade yielded a recommendation that Alaska research should be administered by the Pacific Northwest Forest and Range Experiment Station (PNW Station) with headquarters in Portland, Oregon.[56]

Responsibility for research in Alaska reverted back to the PNW Station as part of a $4 million Congressional allocation in 1966 that also covered construction funds for expanding research facilities in Corvallis and La Grande, Oregon. Hurd briefly continued as administrator in Juneau with responsibility for the various facilities, experimental forests, and research progress in southeast Alaska and the interior, but his budget came through the Portland Office rather than the Washington Office.[1]" At the time of the transfer of authority, Hurd directed a total of seven projects staffed by 1 7 professional researchers. Four of the projects were located at Juneau: Al Harris was project leader for Culture of Coastal Forests—Alaska, Austin Helmers was project leader for Erosion and Sediment Reduction—Alaska Coastal Forests, Don Schmiege was project leader for Forest Insects—Coastal Alaska, and Keith Hutchison was project leader for the Forest Survey—Alaska. Three projects were located at Fairbanks: Bob Gregory was project leader for Ecology of Subarctic Trees and Forests, Dick Barney was project leader for Fire Control Methods—Alaska, and Roy Beckwith was project leader for Forest Insects-Interior Alaska.[58]

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[56]Covvlm, "Federal Forest Research," 471-48.5; Interview with Kenneth Wright 13 July 1993 in the Portland (mice, PNW Station.

[57]Cowlin, "Federal Forest Research," 484; Interview with Kenneth Wright 13 July 1993.

[58]Pacific Northwest Forest and Range Experiment Station, Annual Report 1 967 (Portland: U.S. Department ot Agri(ulture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1968), 5.

"Mr. Alaska" Ken Wright on Adak Island in June 1986. (Loopstra collection)

As the PNW Station and the rest of the Forest Service scrambled to keep pace with new legislative initiatives and administrative changes during the late 1960s, PNW Director Philip Briegleb re-shuffled assignments and program responsiblities throughout the Station. Between 1967 and 1970, he reorganized the Institute of Northern Forestry as the Forestry Sciences Laboratory, Juneau, and he restructured the Forestry Sciences Laboratory, Fairbanks, so that it was administered directly from the Portland Office rather than through Juneau. Projects and personnel at these two facilities were distributed among the five major divisions of the PNW Station, each headed by an assistant director (AD) in the Portland office: Timber Management Research (AD David Tackle), Forest Environment Research (AD Robert W. Harris), Research Support Services (AD Charles [Chuckl J. Petersen), Forest Protection Research (AD Kenneth H. Wright), and Resource Economics, Products, and Engineering Research (AD Donald F. Flora). In addition, Floyd A. Johnson headed the Biometrics division at Portland as principal biometrician.[59]

In a sweeping realignment, researchers in Alaska suddenly found themselves reporting to several administrators in Portland rather than one person in Juneau; meanwhile, they lost from their own ranks two experienced leaders with nearly two decades of combined experience in Alaska. Richard M. Hurd, who had served as Director of the Institute of Northern Forestry for nearly a decade, was suddenly stripped of his adminstrative responsibilities in 1967. He served 3 more years and then retired from the Forest Service in 1970. Donald Schmiege, who had directed the forest insects project in Juneau for over a decade, also left Alaska for a new position at the Pacific Southwest Experiment Station at Berkeley, California, in 1 970. At Juneau, the Culture of Coastal Forests in Alaska project, with Al Harris (Project Leader) and Bill Farr, fell under the purview of AD Tackle; the Erosion and Sediment Reduction—Alaska Coastal Forests project, with Austin Helmers (Project Leader), Bill Meehan, and Doug Swanston was AD Harris' responsibility; the Forest Survey, with Keith Hutchison (Project Leader), Karl Hegg, Jim LaBau, Tom Laurent, and Ronald Dippold, came under AD Flora's administration; and the Forest Insects—Coastal Alaska project, with John Hard and Torolf Torgersen, was administered from Portland by AD Ken Wright. Wright, who was tagged with the moniker "Mr. Alaska" by Flora and others, also directed two projects at Fairbanks: Forest Insects—Interior, with Roy Beckwith (Project Leader), and Fire Control Methods—Alaska, with Richard J. Barney (Project Leader) and John Dell. The other project at Fairbanks, Ecology of Subarctic Trees and Forests, with LesViereck (Project Leader)

[59]Cowlin, "Federal Forest Research in the Pacific Northwest," 512-528. Pacific Northwest Forest and Range Experiment Station, Annual Report 1970 (Portland: U.S. Department of Agriculture, Forest Service, Pacific. Northwest Forest and Range Experiment Station, 1971), 1-2, 9-12.

Ken Wright's background as an entomologist contributed to a broader, more interdisciplinary emphasis in forest-related reseaich in the years he served at PNW Station as lead administratoi for Alaska programs. Here, Torolf Jorgerson examines insects under a hemlock tree on Prince ot Wales Island. (Portland Office History Files)

and John Zasada, also was included under AD Tackle's division.[60] With these changes, by 1 970, three different assistant directors in Portland administered the five scientists at Fairbanks, and four assistant directors in Portland were responsible for the 13 scientists at Juneau.

Assistant Director Ken Wright, who directed programs at both Fairbanks and Juneau, soon established himself as a hands-on administrator with a keen interest in Alaska, as his nickname (Mr. Alaska) suggests. Wright embodied in one person several established traditions of leadership in the administration of programs at Juneau and Fairbanks. Like Taylor, Wright was a product of the academic hierarchy of eastern institutions of higher education (Duke University, 1950). Like Helmers, he was a transplanted native of the Midwest (North Dakota) with academic training in the Pacific Northwest (University of Washington B.S. in 1948 and graduate work at Oregon State University). Like Hurd, he was a Navy man and a veteran of World War Two with an eye for detail and a penchant for orderly planning, and he had accumulated considerable administrative and professional experience with the Navy and two federal agencies in Portland, Oregon (the Bureau of Entomology and PNW Station, which he joined in 1 953), before his involvement with Alaska. Wright's graduate studies in forest entomology, finally, helped narrow the gap between earlier generations of administrators with training in forest management and the "third-wave" scientists who joined the Forest Service research faculty in Alaska in the late 1 960s and early 1 970s with interests and graduate preparation in areas other than forest science or forest management. These characteristics and others complemented a personal style that rapidly established Wright's reputation as a Portland administrator who was "good for Alaska." The administrative priorities, scientific training, and personal networks that Wright brought to bear on his responsibilities significantly reshaped the community culture of scientists who worked with the Research branch of the Forest Service in Alaska after 1968. His broader view of scientific priorities coincided with an expanding federal mandate to explore the environmental implications of economic development and administrative realignments on public lands in Alaska over the next two decades.[61]

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[60]Cowliu. "federal Forest Research in the Pacific Northwest," 512-528; Pacific Northwest Forest and Range lixperiment Station, Annual Report 1 970 (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1971), 1-2, 9-12. Communication from Don Flora to Ken Wright 6 June 1995.

[61]Don Schmiege credits Wright for improving administrative support for scientists in Juneau after his appointment, observing: "Ken was good for Alaska." Interview with Don Schmiege 22 December 1992. Cowlin. 'Federal Forest Research," 484; Interview with Kenneth Wright 13 July 1993.

The administrative shuffle at PNW Station produced a mixed bag of functional and geographic assignments for assistant directors like Wright, whose responsibilities included, but were not limited to Alaska programs. This diffusion of responsibility might have been a disruptive influence, if the new administrators had not struggled to rapidly reestablish lines of communication and develop a firsthand understanding of the situation in Alaska. That process was not always easy, and it occasionally included some gentle prodding from those more familiar with the traditions of Forest Service involvement in Alaska. Don Flora, for example, also was assigned responsibility for numerous programs in Seattle and Portland. Flora recalls an early lesson in the "political realities of Alaska" and the "budgetary facts of life" in relation to Alaska during a visit with Staff Director H.R. (joe) Josephson, of the Washington Office, shortly after assuming his new position as AD with PNW Station. Josephson, who had managed the economics/survey portfolio (including Alaska) for many years, reportedly demanded of the neophyte AD an explanation of why he intended to spend limited Forest Survey funds in the "economically barren timber region" of interior Alaska instead of devoting those resources to the "prime timber country" of Washington and Oregon. Flora recalls that at the time, he "hadn't a clue," and decided to take the matter up with PNW Station Director Phil Briegleb. Briegleb, as Flora recounts the story, soon straightened him out, pointing out that for political reasons, "...there was no way we were going to move Forest Survey funds away from Alaska, and Joe, of course, knew it."[62]

Keith Hutchison, seen here on the Porcupine River, exemplified the commitment to professional expertise and managerial efficiency characteristic of the forest inventory unit In the 1960s. (Farr collection)

Flora's account of his first visit to Alaska as an assistant director similarly illustrates the impact of the administrative changes on the clients of Forest Service Research in Alaska, as they struggled to adjust to the new chain of command through Portland. Flora had lived in Ketchikan for a time as a child and was very familiar with the Alaska environment, but he met with a chilly reception in Juneau that was not simply the result of the weather. Flora recalls that he was the first person from Portland to meet with Hurd after the Director of the Northern Experiment Station at Juneau and Fairbanks was demoted and his responsibilities parceled out to people like Wright and Flora. Alaskans clearly favored their own research organization, and Flora recalls that Hurd, himself, was somewhat frosty in their early meetings. Hurd reportedly refused to accompany Flora on introductory visits with cooperators and research clients, and Flora, who notes he was "...hugely sympathetic to [Hurd's] situation..." recalls "...getting cold reactions everywhere."[63]

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[62] Communication from Don Flora to Ken Wright 6 June 1995

[63] Correspondence from Don Flora to Ken Wright 6 June 1995

Karl Hegg interprets aeial photos for the Upper Tanana Study in 1974. (Juneau 3375)

The frontiersmanship ethic of the Taylor era fostered a community culture of male camaraderie among scientists that could be difficult for women to join. Most male scientists recall women who served in various clerical support positions, but women also increasingly gained employment as Research technicians and scientists. Here, Chris Andrew prepares insect larvae for dissection at the Institute of Northern Forestry in juneau. (juneau files)

The research staff at Fairbanks and Juneau, however, seemed more congenial, and Flora reports they "...generally liked the change." Hurd, who was relatively successful in his dealings with outside agencies and other administrators in the Forest Service, apparently lacked the easy rapport with other scientists that was more characteristic in the brief administrative tenure *of* Helmers, who was well liked by fellow researchers but occasionally abrasive in his dealings with bureaucrats in and out of the Forest Service. Hurd had a reputation for being somewhat more aloof and abrupt in his dealings with researchers, and Flora recalls that he had a way of telling people "...what they needed to know, rather than what they wanted to know...." This characteristic, which may have had its uses in formal administrative matters, often left close associates "...feeling out of touch."[64]

Personnel matters aside, the transfer of authority from Juneau to Portland may have had some side benefits. PNW Station's larger support staff partly alleviated the continuing need for support services from Region 1 0. The Regional Forester's office, while not unsympathetic to the needs of Research, clearly had other priorities that often took precedence over the concerns of scientists at Juneau or Fairbanks. The first priority of PNW Station, on the other hand, was research, and Station personnel offered greater flexibility and faster turn-around, in some areas, than the Region could accommodate within its federal mandate. The trade-off, of course, was that decisions on funding allocations and other administrative concerns were further removed from the day-to-day activities of the people most affected by those decisions."[65]

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64 Correspondence from Jim LaBau to Ken Wright March 1995; Correspondence from Don Flora to Ken Wright 6 June 1995.

65 Cowlin, "Federal Forest Research," 483-484; correspondence from Don Flora to Ken Wright 6 |une 1995.

The Forest Survey and the Environmental Challenge

The merger of the Northern Station within PNW Station also came at a critical point in the ongoing effort to define the variety and potential uses of forest resources in Alaska. Coincident with the transfer of authority from juneau to Portland, Keith Hutchison's Forest Inventory—Economics unit published Alaska's Forest Resource (1967) as a resource bulletin of the PNW Station. This major publication provided the completed results of the inventory of Alaska's forest resource, begun in 1954, and as such, it represented more than a decade of work aimed at defining and describing forest resources in Alaska and their potential for development. By 1967, however, an ongoing national dialogue to establish appropriate management and development goals for the Nation's forest resource had shifted gears to more directly address issues of environmental concern that were creeping into the national consciousness. As the culmination of survey efforts begun under Taylor's administration, continued under the administrations of Helmers and Hurd, and completed in the era of consolidation with PNW Station, Alaska's Forest Resource is an excellent example of how basic research (just finding out what's out there) establishes the context within which subsequent research questions are framed. Those subsequent questions, however, often do not head off in directions anticipated by the scientists involved in the initial research. Publication of Alaska's Forest Resource, for example, helped fuel a national debate over the priorities of multiple use and sustained yield, and it helped bring Alaska forests to the center of controversy in ways that began to shed light on forest resources not included in Hutchison's report.[66]

Hutchison, who came to Alaska from the Central States Forest Experiment Station (CSFES) at Columbus, Ohio, to head the survey in September 1959, took the position as the better of two alternatives offered him when the CSFES was dismantled: a job in the Washington Office or Project Leader of the Forest Survey unit in Juneau. Once in Juneau, he reported primarily to the Division of Economics in the Washington Office, while seeking minimal support and assistance from the Northern and PNW Stations. Hutchison's 13 years of experience in the Forest Service before his arrival in Juneau provided him with important contacts throughout his tenure with the Inventory unit, and he reportedly enjoyed strong support from H.R. Josephson in the Washington Office, who seemed to take a personal interest in the project.[67] This network of support and relative independence made Hutchison an important figure in the effort to define the terrain over

[66]This statement is not meant to impugn the work of Hutchison or his unit; rather, it refers to the tendency for solid research to raise many new questions even as it answers questions relevant to the concerns that prompted the initial inquiry. O. Keith Hutchison, Alaska's Forest Resource (Juneau: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Institute of Northern Forestry, U.S. Forest Service Resource Bulletin PNW 19, 1967), 1-2; Cowlin, Federal Forest Research," 493.

[67]Dave King, a personal friend and former colleague of Hutchison's at CSFES who was working for H.R. Josephson in the Washington Office in 1959, made the offer as an either-or proposition: he promised Hutchison a "good job in the WO," warning that if Hutchison rejected that position, he would be "...sent to Juneau..." Hutchison recalls that he told him on the initial call that he would go to Juneau, but King argued for the WO job and insisted Hutchison discuss the move with his wife. Hutchison recalls that he did just that, and then called King the next day to confirm the move to Juneau. Communication from Keith Hutchison to Jim LaBau 23 May 1995.

which future research would travel, and he contributed to the changing characteristics of the community of scientists at the Juneau lab.

Despite the independence of Hutchison's unit at Juneau, which included Hegg, Laurent, and LaBau, the survey group worked in close proximity with other scientists at the lab and kept them informed of their future plans, work program, and progress. As with other units in Alaska during the administrations of Helmers and Hurd, moreover, Hutchison brought in scientists from a broader array of disciplines and many with graduate and undergraduate training from colleges and universities in the West. The particular challenges of survey work in Alaska inspired innovative solutions to problems of scale, access, and sampling. Among others who made significant contributions in these areas, James Kimmey's "cull tables," developed during his stint with the inventory unit in the late 1950s, served as the standard through most of the 1960s and 1970s before they were supplanted with work by Laurent, Farr, and LaBau. Similarly, the wood utilization tables, volume tables for Sitka spruce and hemlock, and mill studies to evaluate defect and grade, which were developed for the inventory unit by Jim Bones between 1961 and 1963, were instrumental in harvest and management decisions over the next two decades. Hutchison also hired Arlie Hamar as clerical support specifically for the Forest Survey unit. Hutchison credits Hamar as an indispensable member of the survey team who was critical to its success. Her contributions in the office ran the gamut from receptionist to clerk/typist, time keeper, and telephone operator, and she served a vital role as editor for reports generated by the unit.[68]

Alaska's Forest Resources, then, was the culmination of a program largely built and directed under the administration of Hutchison in accordance with the research standards shaped by his college training in the mid 1940s, his experience with the Forest Service from 1946 through 1 967, his interaction with colleagues in Juneau and Portland, and the priorities and support of the Washington Office. Hutchison observed, in the 1967 report, that Alaska contained 1 6 percent of forest land in the United States, or 119 million acres. This figure equaled the combined acreage of forest land in Montana, Washington, Oregon, and California. Of that 119 million acres, however, Hutchison reported only 28.2 million acres of "commercial" forest capable of producing a minimum of 20 cubic feet of industrial wood per acre annually. This report specified an allowable cut of 864 million board feet in southeast Alaska and 358 million board feet for the interior. The criteria Hutchison used to establish an allowable cut included availability of existing markets, accessibility for logging as determined from aerial photographs and sample field observations ("...a minimum of 16,000 board feet per acre must be available in the area that can be yarded to a protected beach or truck road."), and net volume minimums per tree. At the time of the report, the timber cut from Alaska's National Forests amounted to about 400 million board feet per year, or less than 50 percent of the allowable cut in Hutchison's report.[69]

[68]Communication from Keith Hutchison to Jim LaBau 23 May 1995; Communication from Jim La Ban to Ken Wright March 1995.

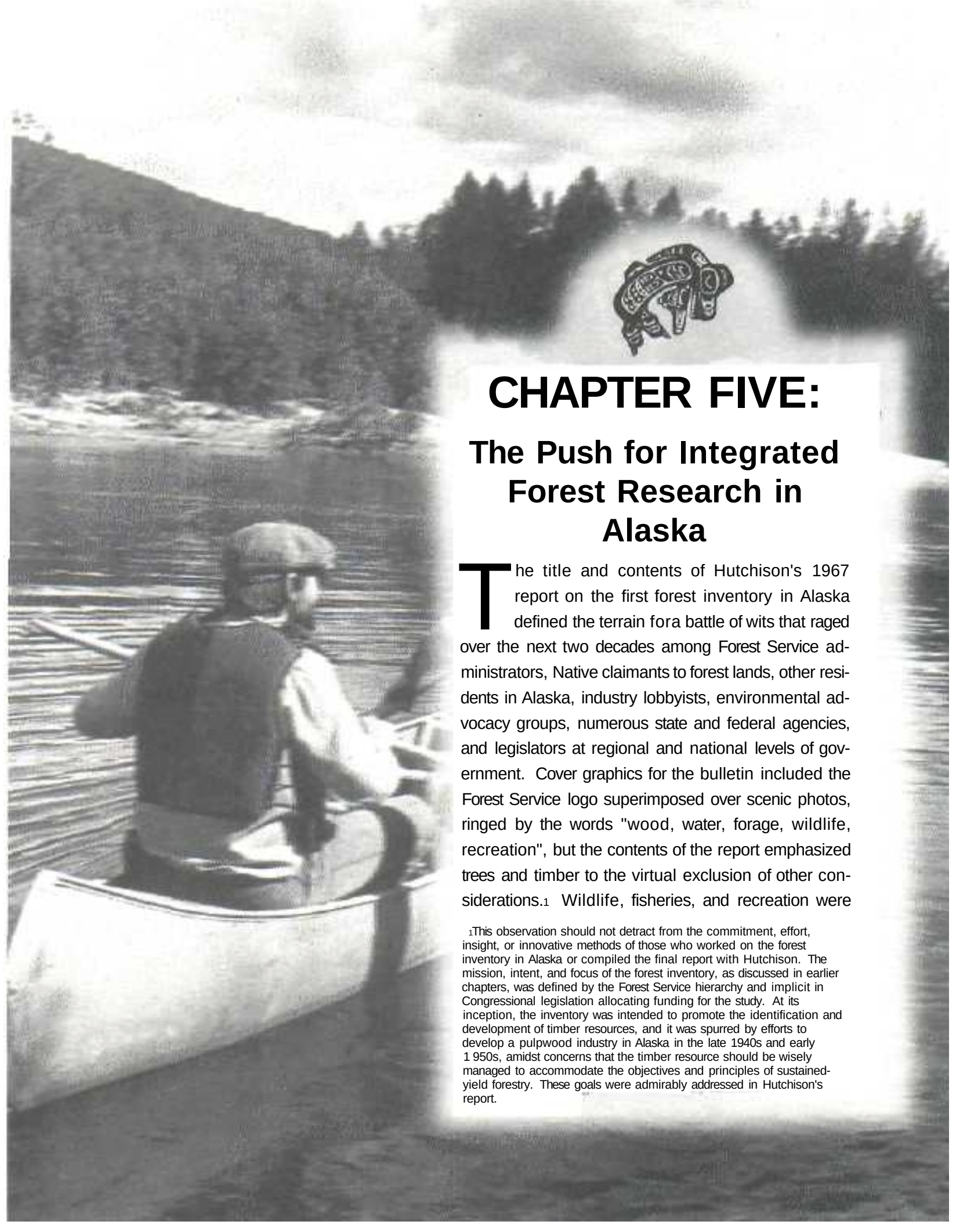
[69] O. Keith Hutchison, Alaska's Forest Resource (Juneau: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Institute of Northern Forestry, U.S. Forest Service Resource Bulletin PNW 19, 1967), 1-2, 18-19, 38-40.

Hutchison observes, in retrospect, that he made the mistake of "over-simplifying the definition and discussion of allowable cut" in Alaska's Forest Resource. The allowable cut he cited in the report, he notes, was intended only as a "benchmark for discussion," and was not intended to be binding in individual forest management, where Hutchison suggests, more precise determinations of the allowable cut could be made. Hutchison argues that his failure to clarify this point in the 1967 report contributed to "misunderstandings" and "opened the door for critics."[70]

By the time the Hutchison report hit its second printing in 1 968, several groups in Alaska and outside the region argued that the allowable cut was already too high and were mounting challenges to existing management practices of the Forest Service. By the end of the decade, research scientists with the Pacific Northwest Forest and Range Experiment Station operated in a political environment in which "ecology" and "environmentalism" had become household words. These issues figured prominently in Forest Service research plans developed over the next two decades in Alaska, and the Hutchison report contributed to that process by forthrightly explaining the priorities and assumptions underlying the assessment of forest resources by the Forest Service, thus encouraging a vigorous debate as various groups questioned those priorities and assumptions and demanded answers to questions not previously addressed.[71] What the report did not include, moreover, was as important in the looming national debate as what was enclosed within its covers.

[70]Communication from Keith Hutchison to jim LaBau 23 May 1995.

[71]Pacific Northwest Forest and Range Experiment Station, 1969 Annual Report: Toward Better Environment, (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1970), 1.



CHAPTER FIVE:

The Push for Integrated Forest Research in Alaska

The title and contents of Hutchison's 1967 report on the first forest inventory in Alaska defined the terrain fora battle of wits that raged over the next two decades among Forest Service administrators, Native claimants to forest lands, other residents in Alaska, industry lobbyists, environmental advocacy groups, numerous state and federal agencies, and legislators at regional and national levels of government. Cover graphics for the bulletin included the Forest Service logo superimposed over scenic photos, ringed by the words "wood, water, forage, wildlife, recreation", but the contents of the report emphasized trees and timber to the virtual exclusion of other considerations.[1] Wildlife, fisheries, and recreation were

[1]This observation should not detract from the commitment, effort, insight, or innovative methods of those who worked on the forest inventory in Alaska or compiled the final report with Hutchison. The mission, intent, and focus of the forest inventory, as discussed in earlier chapters, was defined by the Forest Service hierarchy and implicit in Congressional legislation allocating funding for the study. At its inception, the inventory was intended to promote the identification and development of timber resources, and it was spurred by efforts to develop a pulpwood industry in Alaska in the late 1940s and early 1 950s, amidst concerns that the timber resource should be wisely managed to accommodate the objectives and principles of sustained-yield forestry. These goals were admirably addressed in Hutchison's report.

George A. "Jim" Jones lot the Port Orford Experimental Forest) examining a Sitka spruce near Sitka, Alaska, in 1962. The Forest Service managed 92 percent of forest lands on the Tongass and Chugach National Forests in the southeast and south-central regions of Alaska. (Helmers collec lion)

conspicuously absent from the table of contents, which included as major headings "Sawtimber volume", "Log quality and tree diameters", "Timber losses and risks", "Allowable cut", "Timber processing and marketing", and "Forest area by stand-size classes".[2]

The Hutchison report was a classic illustration of a not-uncommon perception in the Forest Service of that era that "the forest resource" meant timber, first and foremost. It spelled out, in succinct and readable prose, who controlled the timber and where it was located: The federal government controlled the vast majority of forest lands in the state, and 92 percent of the forest lands in the southeast and south-central regions were managed by the Forest Service on the Tongass and Chugach National Forests. As various groups emerged to challenge this situation, forest researchers in Alaska found themselves at the center of controversy and on the periphery ot control over the administrative framework that directed funding and review of their work. This twin reality initially promoted a greater emphasis on interdisciplinary work in juneau and especially at the Fairbanks Lab, but it ultimately fractured the community of Forest Service researchers in Alaska along administrative lines and scientific disciplines, even as the need for integrated studv of forest ecosystems increased during the 1970s and 1980s.[3]

Completion of the forest inventory within little more than a decade was a remarkable achievement accomplished with limited resources and personnel under difficult conditions, but the results of that effort were released at a wrenching moment in American history when long-held beliefs were under attack. Public confidence in government administrators, scientific research, and the basic premise of incremental progress rapidly dissipated in the political chaos of the late 1960s and the cultural conflicts ot the Vietnam War. The discovery of the vast Prudhoe Bay oil field in I968, and the ensuing debate over the economic and ecological implications of developing an infrastructure to extract that resource, also focused national attention on Alaska at this volatile moment in history. Alaska's newly elected Republican Governor, Walter Hickel, came

[1]Hutchison concededes that in hindsight, "...we should have at least acknowledged these needs [the relations and dependencies of water, forage, wildlife, and recreation on the forest]. Perhaps I expected too much, I had hoped that those trained in management of wildlife, fisheries, and recreation would draw upon the survev statistic s to speak to the needs for forest cover." Communication from Keith Hutchison to Jim LaBau 25 May 1995. O. Keith Hutchison, Alaska's Forest Resource, (Juneau: U.S. Department of Agricuture. forest Service, Institute of Northern Forestry, Resource Bulletin PNW 19, 1967), iii-v,

[2]Hutchison Alaska's Forest Resource, iii-v, 1-7, 60-61.

under intense pressure from all sides to settle Native land claims that threatened to impede economic development in much of Alaska,[4] and Hutchison's report facilitated settlement of this issue with information on the economic potential and timber resources on forest lands.

Gene Fiend standing before a cross-seation cut of a spruce log at Mirror lake, [he Alaska Native Claims Settlement Act of Dacember 1971 ushered in a land-rush scramble in the early 1971s, as villages organised into Native Corporations selected land, and liquidated resorces to accumulate operating capital. Schmiege collection '

Alaska Native Claims Settlement Act (ANCSA) and Forest Research

Efforts to settle the issue of Native claims placed a premium on information about the value and potential of forest lands and the effects of various methods of timber management, and forest researchers came under heavy pressure to supply answers to questions posed by government agencies, Native groups, Congress, and other concerned citizens. Hickel had campaigned on the theme of economic development, and the business community in Alaska as well as the Alaska Federation of Natives urged him to move toward a final settlement of Native claims early in his administration. Hickel proposed a draft outline of a settlement that would grant Natives full title to some lands around their villages and surface rights to a larger area, and he appointed a 37-member lands-claim task force (later redesignated as a commission) to prepare a lands-claim measure for consideration in the United States Congress. Alaska Senator Ernest Gruening introduced legislation derived from the commission's report in the Senate in 1968 and initiated the process that eventually led lo the Alaska Native Claims Settlement Act (ANCSA) signed into law by President Richard Nixon on 18 December 1971. This legislation extinguished Native claims based on aboriginal title in Alaska in return for legal title to 40 million acres and federal compensation in the form of cash and revenue sharing from mineral royalties amounting to a total monetary settlement of $962 million. It abolished existing Native reserves, except for Annette Island, and all United States citizens with ancestry of 25 percent or more from Alaska Indian, Eskimo, or Aleut peoples qualified as Natives eligible for shares in village and regional Native Corporations established to own and manage Native lands. This act initiated a land-rush scramble during the early 1970s, as Native villages organized Village Corporations and Native Corporations, selected land, and liquidated resources to accumulate operating capital.[5]

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[4]One of the most spectacular examples of this conflict revolved around a proposal to construct a 530-loot-high and 4700-loot-long dam at Rampart Canyon on the Yukon River to generate cheap hydroelectricity thah it was hoped, would attract investment and industry to east-central Alaska. The dam would create a reseivoir that would take more than 20 years to fill, and the artificial lake would cover an area larger that I ake Erie. It was strongly supported by Alaska's Senator Ernest Gruening, and adamantly opposed by Nutive groups, the U.S. Fish and Wildlife Service, and conservationists in the United States and Canada, Naske Alaska. 197-1 98, 241.

[5]Naske, Alaska, 198-20; Rakestraw, Forest Service in Alaska, 148.

The Alaska Native Claims Settlement Act wound its way through the legislative process in the company of other landmark measures and ecological events that forced the Forest Service to broaden the focus and scope of its research program in Alaska and elsewhere. The Public Land Law Review Commission (PLLRC)[6] released, in 1970, a report on the results of its 5-year investigation of public land laws. The report emphasized the need for Congress to reassert its constitutional authority to manage public lands, and it accused administrative agencies of withdrawing and reserving public lands without adequate consultation with Congress. The report specifically argued that Congress should review all National Forest lands to determine which should be reserved to the federal government and which should be transferred to state or private control. The report proposed a "best use" policy that was heavily slanted in favor of timber production, favored an accelerated program for building access roads, observed that "conservative cutting practices" had resulted in over-mature forests, and concluded that the National Forests were not particularly valuable for uses other than timber production. The report also called for a joint federal-state resources board in Alaska.[7] It was a virtual declaration of a three-front war on the Forest Service, the principle of multiple-use management, and resurgent preservationists who feared the implications of "best-use" management on National Forests.

Environmental Activism and the Transformation of Research

The PLLRC report landed with a thud in the midst of Earth Day preparations, passage of the National Environmental Policy Act (NEPA), and Nixon's pronouncement in January 1970 that this would be the "environmental decade". As public enthusiasm surged in support of environmental legislation such as the Wild and Scenic Rivers Act (1968), NEPA (1970), and the creation of the Environmental Protection Agency (1970), the Forest Service was preoccupied with PLLRC proposals to move the agency into the U.S. Department of the Interior and create a new Department of Environment and Natural Resources, and it was blind-sided with a series of lawsuits that the Sierra Club filed in a counter-offensive on the PLLRC proposals for "best-use" management on National Forest lands. The Sierra Club strategy was to use legal challenges in a vigorous defense of the widest possible reading of multiple-use legislation to secure and expand wilderness designations on the National Forests and to place wilderness on a footing equal or superior to other economic or productive uses.[8]

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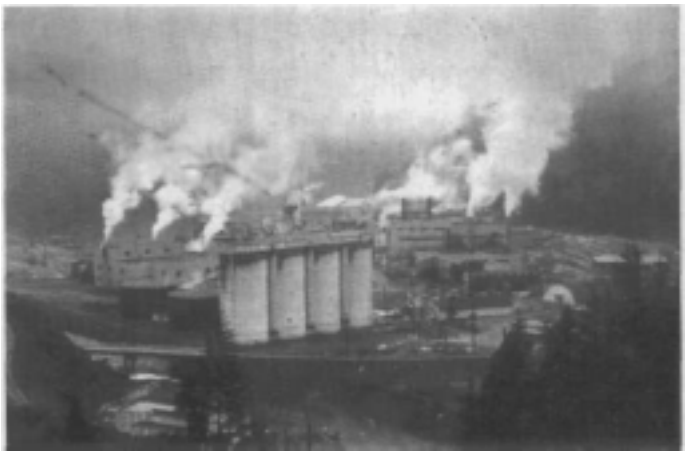
[6]Congress established the PLLRC in 1964 at the insistence of Congressman Wayne Aspinall and as part of a compromise that facilitated passage of the Wilderness Act of that year. The commission was composed primarily of members of Congress, chaired by Aspinall (who also chaired the House Interior and Insular Affairs Committee), and it studied laws and policies pertaining to all public lands except Indian reservations. Dana and Fairfax, Forest and Range Policy, 231-233.

[7] Public I and Law Review Commission, One Third of the Nations Land (Washington, D.C.: GPO, 1970); Roy M. Robbins, Our Landed Heritage: The Public Domain, 1776-1970 (Lincoln: University of Nebraska Press, 1976), 466-469: Dana and Fairfax, Forest and Range Policy, 232-234; Philip Berry and Michael McCloskey, "The Public Land Law Review Commission Report: An Analysis," Sierra Club Bulletin 55 (October 1970), 18-30.

[8] Dana and Fairfax, Forest and Range Policy, 221-222, 241-242, 311-315; Steen, U.S. Forest_Service, 328-329; Naske, Alaska, 225-226.



Sitka pulp mill in 1974. The Sierra Club initiated a series of legal challenges to federal management of the forests of southeast Alaska in the late 1960s and early 1970s, in an effort to place wilderness on a tooting equal or superior to other economic or productive uses of those forests. (Sehmiege collection)

Requirements of the National Environmental Policy Act ot 1970 significantly broadened the range of research needs in Alaska. Here, Francis Palmer works with a small-mammal trap in an old-growth stand on the Maybeso Experimental Forest in 1975. (Juneau

Three Sierra Club lawsuits specifically focused on the region of southeastern Alaska and challenged Forest Service findings in cases spanning the years from 1968 through 1979. These cases, ironically, provided the Forest Service with a public forum to reaffirm the agency's commitment to multiple use and defend its record at a time when the agency was under attack from advocates for "best use" management on public lands. Some members of the research unit at Juneau gained an opportunity to showcase their work in court deliberations, but the trials imposed a heavy burden on their time, and research findings were repeatedly scrutinized. Hutchison's unit, in particular, was forced to expend significant energy and resources preparing court briefs and responding to interrogatories. The first case (1968), for example, involved a challenge to a long-term timber sale to support a proposed mill at Berner's Bay north of juneau, and Hutchison's unit faced Sierra Club charges that the Forest Survey had over-estimated the amount of available wood by 797 percent. The charge reportedly originated with figures from a private study commissioned by the ALP at Sitka as part of an attempt to gain cutting access to a contingency supply of timber. LaBau notes that the Survey unit had refuted those "highly biased" figures on the basis of studies he conducted with Bob Mattson. The District Court in Anchorage ruled in favor of the Forest Service in the 1969 case, but that decision was later overturned by the Circuit Court in California. LaBau recalls that the Sierra Club's repeated accusations that the Forest Survey had over-estimated available timber by 797 percent were based on figures taken "out of context", and this accusation was "one ot the most frustrating situations" for Hutchison's unit.[9]

Two more Sierra Club challenges in the 1970s kept the pressure on Hutchison's unit and spotlighted research by other scientists at)uneau. The Sierra Club's move to halt timber sales on Admiralty Island in 1973, for example, resulted in a Forest Service victory at the District Court in

[9]Communu ation from Jim LaBau to Ken Wright March 1995; Dana and Fairfax, Forest and Range Policy, 22 I-222, 241-242, 3 1 1-315

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Francis Palmer at work in the Maybeso Valley in 1975. (Schmiege collection)

Anchorage. Again, that decision was followed by a reversal at the Circuit Court in California. In this case, Doug Swanston's soils research on mass wasting reportedly played an important role in court deliberations, and the findings of the inventory unit again came under close scrutiny. A third case, in 1979, originated with concerns over harvest practices on the Haines State Forest. The suit involved the Forest Service because inventory work at Haines in 1964 was the basis for a report that included a determination of the allowable cut. That earlier work by LaBau and Dave Born brought Hutchison's unit into the 1979 case, which followed the familiar route of defeat for the Sierra Club in the Anchorage court, followed by a reversal of that decision in the California court.[10] As these cases wound their way through the legal system, Forest Service scientists at Juneau and Fairbanks also struggled to stay abreast of a bewildering array of political initiatives and legislation that influenced the kinds of research questions requiring most immediate attention.

The NEPA requirement for advance studies of the potential environmental impact of federal legislation and agency programs[11] significantly broadened the scope and focus of research needs throughout the United States, including Alaska. Taken together with the Native Claims Settlement Act, NEPA created a sudden demand in Alaska for information relating to methods of forest management from a variety of interest groups outside the Forest Service and expanded the range of issues that the Forest Service, by statute, was required to investigate. The result was an expansion of existing research programs and the development of new programs to address concerns related to the environmental legislation. As the definition and perception of forest resources changed during the late 1960s and 1970s, scientists scrambled to address questions and problems with new methods and disciplines not previously considered within the scope of the Forest Service mandate. The PNW, for example, initiated a new, multiproject research program known as Forest Residues Reduction Systems. The Station revved up its programs in recreation research and its study of biological methods for controlling forest insects. The PNW Station also initiated a study of "conservation-preservation" groups and their members in an effort to reconcile their conflicts with the "conservation-utilization" priorities of the agency.[12]

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[10] Communication from Jim LaBau to Ken Wright March 1995.

[11] Officially known as an Environmental Impact Statement (EIS).

[12] Quotations are from Covvlin, "Federal Forest Research in the Pacific Northwest," 512-528; Dana and Fairfax, Fores and Range Policy, 221-222, 241-242, 311-315; Steen, U.S. Forest Service, 328-329; Naske, Alaska, 225-226.

Administrative Changes at PNW Station

Personnel changes at the Station Director's level and in the Regional Forester's office also contributed to an era of administrative adjustments for Alaska Research during the late 1960s and early 1970s. On the eve of PNW Director Phil Briegleb's retirement in 1970, the Washington Office conducted an administrative review of the Station with a study team that included Associate Deputy Chief for Research Merle Dickerman, along with Robert Harris, and the future Director of PNW Station, Robert Buckman, whose previous experience with the Forest Service included 10 years at the lab in Grand Rapids, Minnesota, and 5 years in the Washington Office.[13] The review team identified a need for a stronger administrative presence in Alaska, and upon his appointment in 1971 as PNW Station Director, Buckman addressed that concern with a plan to establish multifunctional research units at Fairbanks and Juneau. Buckman, who held graduate and undergraduate degrees in forestry, silviculture, and public administration from the University of Minnesota, University of Michigan, and Harvard, had served on the Alaska component of the review team, and he recalls that Alaska was a very high priority in his first years as Station Director. Oil discoveries, Native claims, and other interests were fueling an ongoing, national debate over the disposition of federally controlled lands in Alaska. These issues threatened to strain the limits of Research funding, and Buckman notes that he hoped to compensate by "building bridges" with the new Regional Forester, Charles Yates, whose tenure with Region 10 began about the same time as Buckman's at PNW Station in early 1971. As a result of these twin appointments, Buckman believed that potential for developing stronger working relations and cooperation with the Region was good. With these goals in mind, he shifted personnel and restructured administrative responsibilities for Research in Alaska.[14]

Buckman highlighted Alaska Research in the PNW Station's Annual Report for 1971, and he worked with Wright to garner support in Congress for developing research programs in Alaska.[15] Both Wright and Buckman identify Republican Senator Theodore [Ted] Stevens, the ranking minority member on the Senate appropriations subcommittee for Interior and related agencies, as their most important ally in Washington during this period. Buckman notes, however, that Stevens' main concern was funding for Region 10, and only peripherally for Research. He recalls, moreover, that Stevens seemed increasingly suspicious that environmentalist concerns were gaining undue influence over research scientists in Alaska during the 1 970s. This concern, together with unexpectedly tense relations between Yates and various scientists at Juneau through the mid

[13] Buckman, who was named Director when Briegleb announced his retirement a few months after the review, recalls that he was unaware, at the time of this review, of his impending appointment to replace Briegleb at PNW Station, and he notes that his inclusion on the review team was consistent with the Forest Service practice of "bringing along" people identified as having leadership potential. Interview with Robert Buckman by Max Geier 13 July 1995 at Peavy Hall, Oregon State University, Corvallis, Oregon.

[14] Interview with Robert Buckman 13 July 1995.

[15] Buckman recalls he initially considered locating Wright in Juneau as A.D. responsible for Alaska, but given the limited number of contact points in Alaska, he decided that Wright could effectively administer programs there with regular trips from Station headquarters in Portland.

1970s, complicated efforts to establish multifunctional units at Juneau and Fairbanks,[16] but unusual circumstances at Fairbanks carried the concept past temporary setbacks related to personnel or politics.

Charles Cushwa examines erosion on a tire line constructed oxer permafrost on the Wickersham Dome fire area northeast of Fairbanks in July 1971, less than one month alter the burn. (Wright collection)

Wickersham Dome and the Multifunctional Work Unit in Fairbanks

The station-wide restructuring that Briegleb had initiated in the last 4 years before his retirement had, ironically, disrupted earlier structures of administrative responsibility for research in Alaska at a moment of great opportunity for developing an innovative strategy for conducting research in the interior. A natural event (fire) provided the focal point for a multifunctional work unit at Fairbanks built around the increasingly popular concept of studying natural systems from an interdisciplinary perspective. Ever since Lutz published the results of his study of fire in the interior,[17] Bureau of Land Management efforts to suppress fires in that region proceeded from his conclusion that "uncontrolled wildfires have no place in either forest or wildlife management." In 1971, however, the Wickersham Dome fire near Fairbanks provided an easily accessible field laboratory for forest researchers studying the effects of fire on the taiga forest, and their studies called into question the assumptions under which BLM formulated fire policies for the interior. Among the concerns they raised was the realization that fire-control lines carved into the permafrost to contain wildfires might wreak more havoc with the forest ecology than fire itself.[18]

The Wickersham Dome fire was a relatively small blaze that flared up in the second year after one of the worst fire seasons on record. Two years earlier, in 1 969, over 4 million acres of forest and rangeland burned in interior Alaska. Some of the blazes exceeded 500,000 acres, and smoke from the fires reached as tar south as Washington and Montana, showing up on the records of weather satellites. Nearly half the blazes in 1969 were caused by lightning, and these fires accounted for the vast majority of acreage burned.[19]

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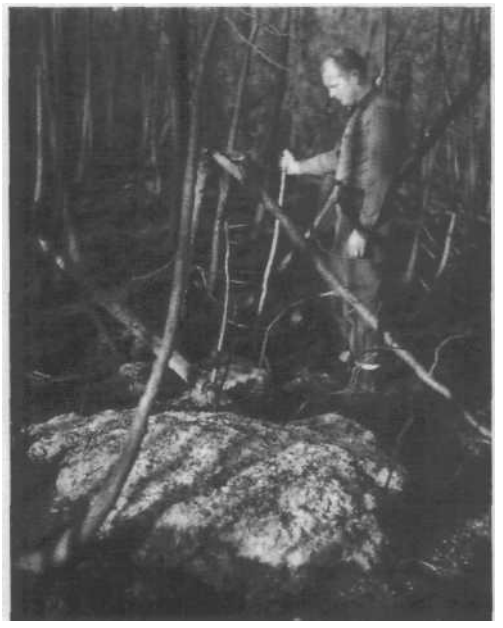
[16] Wright ie(alls that the key staffer with Stevens' office who facilitated good relations with the Senator also visited with sc ientists at field research sites and was instrumental in securing Stevens' support for Research funding. Wright notes that since the staffer has since been reassigned, Research scientists in Alaska have fewer opportunities for direct communication with the Senator's office. Interview with Robert Buckman 13 July 1995. Interview with Ken Wright 13 July 1993.

[17] H.J Lutz, Ecological effects of forest fires in the Interior of Alaska, (Washington, D.C.: U.S. Department of Agriculture, Technical Bulletin 1133, March 1956).

[18] Stephen |. Pyne, Fire in America: A Cultural History of Wildland and Rural Fire (Princeton: Princeton University Press, 1982), 505-509.

[19] PNW Station, 1969 Annual Report, 15; Memo 1 July 1969 from Richard J. Barney, Project Leader to Tongass National Forest Central Files (located in National Archives—Alaska Region, Records of the Forest Service. South Tongass National Forest, Record Group 95, Box 6).



Pathologist Keith Shea, entomologist Bill Waters (of the Washington Office), and Charles Cushwa examine the Wickersham Dome fire area in July 1971. (Wright collection)

The Wickersham Dome fire of 1971 provided scientists in Fairbanks an easily accessible field laboratory for studying the effects of fire on the taiga and provided a locus for the multifunctional unit. Here, Charles Cushwa examines an unburned "hummock" in a black spruce stand on the burn northeast of Fairbanks. (Wright collection)

The record-setting fire season of 1969 fostered support for research in the interior just before the Wickersham Dome fire. By 1970, Briegleb had placed Richard Barney's Fire Control Methods—Alaska project at Fairbanks under the direction of Assistant Director Ken Wright, who headed the Forest Protection Research division from Portland. Wright had several years of experience with Alaska under his belt by I 970, and he recognized the political and public support for fire-related research in the wake of the previous year's conflagration. Barney's research team maintained three permanent weather stations on the Bonanza Creek Experimental Forest and had established fuel moisture-analog plots and fuel volume plots associated with each weather station by 1970. At the time, Wright had just approved Botanist Les Viereck's application to study in Norway under the Government Employee Training Act program, the Caribou-Poker Creek Watershed was just getting underway, Viereck and Silviculturist John Zasada-[20] were researching the ecology of subarctic trees and forests, and Beckwith was responsible for the Forest Insects project for the interior. Under Wright's direction, these projects were assembled in 1 971 as a multifunctional work unit entitled Ecology and Management of the Taiga (Subarctic Forests—Interior Alaska).[21]

The multifunctional work unit was headed by a program leader with an unconventional background by the standards of previous Forest Service administrators in Alaska. Charles T. Cushwa would commit himself to only a two-year appointment in Fairbanks, beginning in 1971, as Program Leader and principal wildlife biologist for research on forest and related ecosystems of interior Alaska. Cushwa's previous research focused on the effects of prescribed burning on

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[20] Zasada hold an undergraduate degree in biology from Macalaster College and graduate degrees in forestry from Yale University and the University of Michigan. Professional Biography Files, Central History Files, Portland Office, PNVV Station.

[21] PNW Station, Annual Report 1970, 1 1; Interview with Les Viereck 30 July 1993; Interview with Ken Wright (13 July 1993) Pacific Northwest Forest and Range Experiment Station, PNW Annual Report 1972 (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1973). 8, 16.

Before assuming control of the multifunctional work unit at Fairbanks in 1974, Ted Dyrness had already gained valuable multidisciplinary experience in his work with lerry Franklin on the H.I. Andrews Experimental Forest near Blue River, Oregon, during the I960s. Shown here in 1979 measuring permalrost depth on forest floor manipulation plots, Dyrness notes that many of the plots he started at the Andrews in the early 1960s remained in use through the mid 1990s. (Dylness *collection)*

wildlife habitat in the piedmont pine forests of the southeastern United States, but his background included valuable experience as the assistant leader of the Pennsylvania Cooperative Wildlife Research Unit with the U.S. Department of Interior, Bureau of Sport Fisheries and Wildlife, at Pennsylvania State University from 1969 to 1971. This background was good preparation for Fairbanks, where Cushwa coordinated research efforts at the Forestry Sciences Laboratory with the priorities of the federal and state agencies that dominated land management in the interior, and with University of Alaska faculty and graduate students, who provided the manpower desperately needed for effective research in the interior. Under Wright's direction, Cushwa's unit at Fairbanks focused on the impact of wildfires, insects, and diseases on wildlife habitat; timber and forage production; landscapes and recreation quality; and soil and water relations on the taiga.[22] Cushwa, however, came to Alaska with no prior experience in the state, and he was unwilling to make a long-term commitment to the position. Buckman, who brought Cushwa into the position, viewed Cushwa as a "strong leader" who carried himself well and spoke forcefully, but he concedes the appointment was a "... failure, Cushwa just didn't work out." Buckman arranged a transfer to the Washington Office for Cushwa, who left Fairbanks "the day his commitment ended," and after a brief interim period with Austin Helmers as acting program leader, C. Theodore (Ted) Dyrness assumed control in 1 974 as project leader of the multifunctional work unit.[23]

Dyrness, a native of Wheaton, Illinois, was more rooted than Cushwa had been in the midwestem and western traditions and academic networks that typically brought forest researchers to Alaska after World War Two. He was also more deeply committed to interdisciplinary research, even before he accepted the appointment to head the multifunctional unit at Fairbanks. Like Helmers, Dyrness had developed a voracious appetite for things Alaskan while growing up, reading the Alaskan Sportsman magazine and anything he could find about the 1898 gold rush. In later years, as a college undergraduate, he became interested in botany, and his major professor eventually steered him toward the graduate program in forest soils at Oregon State University, where he studied soil-plant relations and forest ecology. He began working with PNW Station

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[22] Forestry Research News 24 June 1971.

[23] Viereck observed that Cushwa accepted the appointment primarily as a stepping stone to the Washington Office, where he transfered in I 973. Interview with Les Viereck 30 July 1993; Interview with Ted Dyrness by Max Geier at the Dyrness home in Albany, Oregon, on 1 7 July 1 995. Interview with Rob Buckman 13 July 1995.

scientists at the Corvallis Forest Science Laboratory while still an OSU graduate student in 1 959, and he continued his career at the lab after he finished his Ph.D. in 1960. By 1962, Dyrness had begun to lay in plots on the H.J. Andrews Experimental Forest near Blue River, Oregon, where he soon linked up with Jerry Franklin, a plant ecologist at the Corvallis Lab who also worked at the Andrews. Dyrness and Franklin collaborated on a descriptive summary of the natural vegetation of Oregon and Washington in preparation for an international botanical conference in Seattle in 1969, and they also worked together to establish the Andrews as one of the pre-eminent sites for the western coniferous biome project in the (multidisciplinary) International Biological Program (IBP).[24]

Administrative leaders agree that family matters were a leading concern they faced with any new recruit to Alaska, and Dyrness recalls that he and his wife Clara were well-established on a farm near Corvallis, Oregon. For them, the move to Alaska meant uprooting their three daughters from their schools, friends, and established routines. Seen here in summer 1974, the Dyrness family includes Clara and Ted (back row) and their three daughters (from left) Christina (age 5), Cynthia (age 10), and Cheryl (age 8). (Dyrness collection)

Dyrness, who gained valuable experience in locating outside funding in his work with Franklin and the IBP, also developed a penchant for long-term studies that, he notes, occasionally seemed to frustrate some administrators seeking a more immediate payoff on the funds invested in such research. His collaboration with Franklin also led to an early involvement in the Research Natural Area program, and he served with Franklin on the Research Natural Area Committee at PNW Station, beginning in 1970. In 1973, he collaborated with other scientists on the committee to compile a guide to Research Natural Areas with the aim of educating scientists and educators about the sites and their potential for conducting research, partly to counter claims that no one ever used the sites for research. As Dyrness recalls, "What we were facing, you see, was land managers [who] would say, 'gosh, you guys run around, set up these things, withdraw them from mineral entry and logging, and nobody ever goes to them, that we can see."[25]

Given his commitment to interdisciplinary team research and his abiding personal interest in Alaska, Dyrness was pleased to learn in 1 973 that PNW Station Director Robert Buckman wanted him to lead one of the first multifunctional units in the Forest Service. Dyrness recalls, however, that Buckman was concerned that Ted's family would also support the move. At the time, Dyrness and his wife were well established on a small farm near Corvallis, and the move to Alaska meant uprooting their three daughters from their schools, friends, and established routines. Their preliminary introduction to Fairbanks, moreover, took place in January 1974, during "the first really

[24] Interview with Ted Dyrness 17 July 1995; Communication from Ted Dyrness to Ken Wright 19 June 1995-

[25] Interview with Ted Dyrness 17 July 1995.

*Ted Dyrness said that though he and Clara cherished their lite in Alaska, they returned to Corvallis, Oregon, when he retired from the Forest Service. Their daughters, however, grew up in Alaska and now consider it their home. H*ere, *the family gears up at the start of the Chilkoot Trail in July 1*979. *'Dyrness collection)*

cold snap of the year, 40 below zero," and Dyrness recalls they hadn't brought clothes sufficient for that weather and had to borrow parkas and other cold-weather gear. Despite those concerns, Dyrness came away from his initial meeting with the staff at Fairbanks with a sense that "...it was a really good crew up there... John Zasada had us over, and all the people at the lab were there, and there was such a feeling of camaraderie and community that you really don't get down here, ...because adversity welds people together." Dyrness, moreover, recalls his excitement at the prospect of leading an interdisciplinary team of researchers: "...wow, I was already sold on interdisciplinary/multidisciplinary approaches to research, and I thought, man, this would be great, to try to lead a project of everybody from entomologists to hydrologists, etc., in a common goal." Dyrness consulted briefly by telephone with Franklin, and then committed himself to a minimum of 3 years as Project Leader, little expecting that he would remain in Fairbanks for the next 1 6 years.[26]

Dyrness recalls that publication of the results of previous work on Wickersham Dome became his first priority as program leader at Fairbanks. He called all of the scientists at the lab together and proposed they report the results of their studies in a single publication. That report of work begun in 1971 finally was published in 1979,[27] which serves as one illustration of the problem Dyrness and the PNW Station often faced in sustaining the idea of a multifunctional unit: Ongoing, interdisciplinary work may not yield immediate dividends, but Congressional allocations often depended on the ability to address short-term, politically timely questions as posed by staffers who were often interested in achieving politically beneficial results within a time frame dictated by electoral politics, rather than the conditions of research in interior Alaska.[28]

Dyrness worked closely with Keith Van Cleve, the soil nutrient specialist at the University of Alaska, and together, they put together a proposal for the NSF to fund a "mini IBP-program" for interior Alaska. Van Cleve had been trying to cooperate with the IBP, and the two scientists had met from time to time at earlier IBP meetings. Dyrness recalls that when he moved to Fairbanks, Van Cleve "...just welcomed me with open arms," and they began a period of collaboration that combined the resources of the University of Alaska and the newly designated Institute of Northern Forestry at Fairbanks. Dyrness observes that their timing was good because Franklin was

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[26] Interview with Ted Dyrness I 7 July 1995.

[27] L.A. Viereck and CM. Dyrness, eds., Ecological effects of the Wickersham Dome fire near Fairbanks, Ajaska, (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report PNW-90, 1979).

[28] Interview with Ted Dyrness 17 July 1995; Interview with Robert Tarrant 11 July 1995 at Tarrant's home in Corvallis, Oregon; Interview with Robert Buckman 13 July 1995.

The National Science Foundation approved a 3-year cooperative study involving Dyrness' multifunctional unit at the Fairbanks lab and Keith Van Cleve's soil-nutrient program at the University of Alaska, beginning in 1975. Here, scientists get ready tor the first day of the cooperative research effort at Washington Creek in March 1975. Dyrness collection)

working with the National Science Foundation in Washington, D.C., and was "begging for proposals." The NSF approved their project for a 3-year period, beginning in 1975, and they embarked on a study of "The structure and function of a black spruce forest in relation to other fire-affected taiga ecosystems." The project strengthened relations between the lab and the university, and it provided a focus for the multidisciplinary unit, culminating in joint publication of the study's results in a special issue of the Canadian lournal of Forest Research in 1983 (Vol. 1 3, No. 5) and a book published in 1986.[29]

The mini-IBP program initiated a new era at the INF during which Dyrness and the multifunctional unit pursued more cooperative agreements and devoted more attention to studies of black spruce and other ecosystems previously neglected by the Forest Service because they were of marginal value for timber production. Wildfire and related research had demonstrated that effective management strategies for more marketable species would require a sounder understanding of black spruce and the fire ecology of the taiga of interior Alaska.[30] Dyrness concedes that before he went to Alaska, he had the attitude that "...well, gee, the resource values are not there, so we, the Forest Service, shouldn't put a lot of money into research in interior Alaska." Once at Fairbanks, however, he realized that "if ever the Forest Service has a chance to say what, really, multiple use is all about, that it wasn't just timber, it's in interior Alaska."[31]

Dyrness credits Station Directors Robert Buckman and, particularly, Robert Tarrant for the flowering of the multifunctional unit at Fairbanks during the mid 1970s, but he also notes that the failure to establish a National Forest in the interior during those years probably eroded support for the INF after 1979. The annual budget for the multifunctional unit steadily increased during the first 6 years of his tenure at the INF, to the point where 12 scientists were

This region of the Porcupine River, shown here in 1976 at a point between white spruce plots 326 and 328, was a leading candidate for designation as a National Forest. Ken Wright recalls it was valued tor its timber and for its scenic qualities. The National Forest designation, however, failed to materialize, as environmental groups and other interests favored plans to transfer control over the region to state and federal agencies other than the Forest Service, (Juneau 5014)

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[29] Correspondence from Ted Dyrness to Ken Wright 19 June 1995; Interview with Ted Dyrness 17 July 1995; K. Van Cleve, F.S. Chapin III, P.W. Flanagan, L.A. Viereck, and C.J. Dyrness, Forest Ecosystems in the Alaskan Taiga: A Synthesis of Structure and Function (Springer-Verlag, 1 986).

[30] Professional Biography Files, Central History Files, Portland Office, PNW Station; Interview with Les Viereck 50 |uly 1993; Interview with Keith Van Cleve 18 December 1992.

[31] Interview with Ted Dyrness 17 July 1995.

on staff by the end of the decade. Dyrness and others at the INF were hopeful that several National Forests would be established in the interior, and those hopes escalated when a staffer with Senator Stevens' office who seemed sympathetic to their concerns visited the lab several times during the late 1970s. Dyrness recalls, however, that Buckman advised the scientists at the lab to maintain official neutrality on the issue of National Forests in the interior, and he voices a sentiment common to many scientists in the Forest Service of that era, when he asserts: "...I can't say I ever got involved because that's not my thing, ...I'm not a politician..."[32]

Dyrness echoes a sentiment common to many scientists of his era in Alaska with this observation about various proposals to establish National Forests in the interior: "I can't say I ever got involved, because that's not my thing, ...I'm not a politician..." Here, he takes a break on the Chilkoot Trail in July 1979. (Dyrness collection)

Caribou-Poker Creeks Watershed Project

Dyrness also worked closely with Austin Helmers, who joined the multifunctional unit at Fairbanks in 1971 to coordinate development of the watershed project with other agencies working on the Caribou-Poker Creeks project. Helmers, who served as acting program leader from the time Cushwa left in September 1973 until Dyrness arrived in July 1974, recalls that for all the talk about a multifunctional unit focused on fire effects, direction of the program was pretty vague when he first arrived in 1971, and in his efforts to draft a problem analysis for the watershed project,

> ...it occurred to me, I'm looking at water, water and its various effects, permafrost and so forth, and it occurred to me that there's no way that you're going to be able to do any meaningful work on the hydrology of some little plot of soil without taking into account all of these other factors surrounding it...you've gotta look at everything, so I guess that's the first time that the whole realization of this concept of multidisciplinary research really hit me, and so I re-wrote my report and took the tack of multidisciplinary research—I just figured you can't do watershed research as an isolated package, you're going to have to relate it to everything else....[33]

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[32] Buckman, reportedly, told Dyrness that in view of the fact that the INF served multiple clients, including the BLM, the U.S. Fish and Wildlife Service, and State Forestry, scientists at the lab could not afford to go out on a limb to openly advocate the creation of National Forests in interior Alaska, because if they did so, and National Forests were not forthcoming, they might be in "tough waters." Dyrness recalls that at least one member of the Forest Service planning team for the proposed forests told him: "Ted, if you don't get any Interior National Forests...your program is doomed." Interview with Ted Dyrness 17 |uly 1995.

[33] Interview with Austin Helmers 4 August 1993.

Military Sikorsky 5-64 *sky-crane delivers fiberglass road matting used to stabilize vehicle trails on permafrost terrain in 1979. Note that the second mat on the ground is caught in the downdraft from the helicopter rotor. (Helmers collection)*

Richard "Skeeter" Werner, who assumed the adminstrative reins at Fairbanks after Ted Dyrness stepped down, recalls that the opportunity for field work was the primary attraction of assignment in Alaska. Shown here in October 1988, Werner enjoys the fringe benefits of his job. (Dyrness collection)

Helmers worked with personnel from the National Weather Service and the Cold Regions Research and Engineering Laboratory (CRREL) on the Caribou-Poker Creeks watershed, where he developed an appreciation for the complexities of permafrost in his efforts to improve access routes onto the site. He recalls how he "pioneered" a new route into the watershed from the lower end that was a "nice smooth ride over this moss and stuff," but he discovered that after about a year, the mud was so deep it was in the tire well and almost up to the passenger compartment. Helmers worked with the Army to engineer a solution to the quagmire that resulted from increased traffic into the watershed. The Army contributed portable buildings that Helmers and his crew dismantled into 4- by 8-foot panels that they hauled out to the site on an Army truck and laid down over the damaged areas of permafrost. As Helmers recalls, it was a good temporary fix until the plywood panels began to separate and warp in the mud. Forest Service researchers mostly used tracked vehicles, including a Sno-Cat with aggressive traction, but Helmers argues that much of the damage was caused by scientists like himself who walked across the watershed in vibram-soled boots that concentrated the impact and motive force of the human body on a relatively small surface area.[34]

Integration with the Pacific Northwest Forest and Range Experiment Station encouraged more frequent mobility among people assigned to work in Alaska. Personnel working with the multi-functional unit in the mid 1970s were a diverse group that included long-term members of the research community, recently reassigned veterans of the Northern Forest Experiment Station, and new recruits from other regions of the Forest Service. Joan Foote was promoted from technician to general biologist in 1 973 and continued her work with Viereck and Zasada. Helmers worked with the Fairbanks unit until he retired in 1 976, and he brought an element of the old spirit of

[34] Interview with Austin Helmers 4 August 1993.

frontiersmanship to the community of scientists with the multifunctional unit, but the focus at the lab remained solidly on interdisciplinary research and cooperative arrangements with other agencies and the University of Alaska through the late 1970s. Beckwith moved, in 1974, to the PNW Station's Forestry Sciences Laboratory in Corvallis, Oregon, where he served as principal insect ecologist in the Integrated Pest Management Research Work Unit for the next two decades. Flareups of the spear-marked black moth in the birch forests of the interior coincided with the first year of a 20-year-long series of spruce beetle outbreaks in south-central Alaska that same year, and Beckwith was replaced in Fairbanks by entomologist Richard [Skeeter] Werner, who returned to Alaska after nearly a decade with the Southeastern Station, during which time he completed his doctoral program at North Carolina State University.[35]

Werner recalls that the opportunity for field work was the primary attraction of work in Alaska. He spent most of his time in the southeastern United States working with chemicals in laboratories, and he found himself missing the outdoor studies of his years in Alaska during the early 1960s. Most of his work in Alaska, Werner notes, involved cooperative work with other agencies who requested information about insect outbreaks on land they managed. It was interesting work that changed constantly as the land went through various successional stages, and different insects lived in association with the vegetative cover at each stage, with incredible diversity from site to site. Under these conditions, Werner observes, getting bored with his work was impossible. In contrast with his earlier work out of Juneau, Werner seldom found his field studies in the interior thwarted by the weather, and he found a unique challenge in unraveling the strategies of insects that go into dormancy during the long winters of interior Alaska. The continuing series of spruce beetle outbreaks in south-central Alaska also caused Werner to expand his field work into the Kenai Peninsula at the request of forest managers with Region 10 on the Chugach National Forest during the latter half of the 1 970s.[36]

Skeeter Werner checks a study site for research on the overwintering strategy of the spear-marked black moth in 1975. (Dyrness collection)

Spruce beetle outbreaks in south-central Alaska led Werner to expand his fieldwork into the Kenai peninsula. Here, Werner removes bark beetles from a pheromone trap in 1979. (Dyrness collection)

[35] Professional Biography Files, Central History Files, Portland Office, PNW Station; PNW News 10)une 1974; Interview with Richard Werner 30 July 1993.

[36] Interview with Richard Werner 30 July 1993.

More scientists were attracted to the lab from various agencies and other research stations during this period, and the sudden press of work also led to innovations in data processing. Bob Woollard, a graduate of Oregon State University, joined the Fairbanks office in 1 974 as a research technician responsible for handling computer-related data processing. Austin Helmers' retirement in 1 976 left an opening for the addition of another scientist who, like Werner, had a previous history of work with the Fairbanks Lab. In his position at the CRREL, Charles Slaughter had worked with Helmers in establishing the Caribou-Poker Creeks watershed, and as late as 1975, Slaughter served as chairman tor the Research Coordination Subcommittee of the Inter-Agency Technical Committee for Alaska and listed Helmers as the alternate contact for correspondents interested in the watershed. In 1976, Slaughter went to work for the Forest Service as Helmers' replacement at Fairbanks.[37]

Wildfire research on Wickersham Dome provided an early focus for the multifunctional unit at Fairbanks, but these studies lacked data on what the burned sites were like before the fire. Scientists at the lab decided that the best solution would be to set in plots on unburned areas, and then burn them to their own prescriptions. To that end, Dyrness recruited Rod Norum from the Fire Lab in Missoula, Montana, in 1976; Norum's specialized skills added a powerful new dimension to the multifunctional unit at Fairbanks. Dyrness, for example, identifies Norum's prescribed fire study in black spruce at Washington Creek in 1 978 as the first controlled experiment

Les Viereck examines an experimental burn on Washington ('reek in 1978 (Dyrness collection)

Dyrness recruited Rod Norum from the Fire Lab in Missoula, Montana, in 1976, after scientists with the multifunctional unit decided they needed to establish plots on unburned areas and then burn them to their own prescriptions to garner base-line information useful for their studies of wildfire in the region. Here, Norum examines an experimental burn on Washington Creek in 1978, which Dyrness identifies as the first controlled experiment on fire effects ever conducted in interior Alaska. (Dyrness collection)

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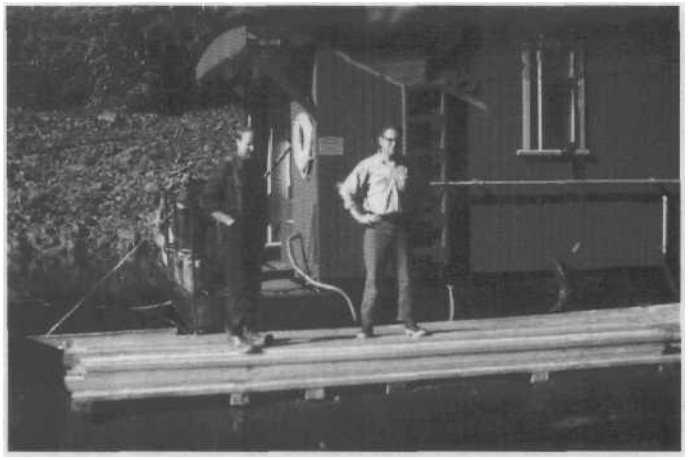
[37]By this time, the Forestry Sciences Laboratory at Fairbanks was officially known as the Institute of Northern Forestry, and the facilitv in Juneau was officially known as the Forestry Sciences Laboratory. This distinction was ironic , considering that the staff in Juneau lacked access to adequate laboratory facilities. and the unit in Fairbanks not only operated in a relatively new laboratory facility, but also had access to research facilities on the University of Alaska campus. Letter 16 April 1975 from Charles W. Slaughter, Research Hyclrologist, Department of the Army, U.S. Cold Regions Research and Engineering Laboratory Fort Wainwright, Alaska, to Brian Bediord, EER Project Manager at The Institute of Ecology, W.K. Kellogg Biological Station (located in Central History Files, Portland Office, PNW Station); Interview with Austin Helmers 4 August 1993; Interview with loan Foote 15 December 1992; Interview with Les Vieieck 30 July 1993.



Forest Insect Reseach scientists Torolf Torgerson and John Hard on Held research wanigan at McKenzie Inlet near Ketchikan in 1971 (Wright collection)

on fire effects ever conducted in interior Alaska. Norum also continued the Fairbanks tradition of cooperating closely with other fire experts in the interior. Norum worked with fire management crews as a fire-behavior expert during the burn season each year, and he worked with other agencies to develop fire management zones for the state of Alaska, identifying unpopulated areas for which a "let it burn" policy was the preferred management alternative. Norum's work on developing these management zones incorporated the findings of Barney and other scientists with the multifunctional unit who had demonstrated that tire was an essential, even beneficial component of the interior Alaska environment.[38]

The successful extension of the research program to include controlled experiments with fire sustained the heady atmosphere of scientific inquiry at the Fairbanks Lab through the late 1970s, but external politics and budgetary concerns began to impinge on that mood by the end of the decade. Viereck recalls that the multifunctional unit of the early 1970s was "fairly exciting...! kind of liked that work we did together...that kind of interaction together, but it just didn't hold. The Washington Office just couldn't envision all of their line-items being put into one pot...we never really got a lot of support."[39]

Forest Ecosystem Research and Personnel Changes in Juneau

The Multifunctional Work Unit concept at Fairbanks also was instituted at Juneau in 1972, but the program for southeast Alaska lacked the singular focus that wildfires provided in the interior. The unit at Juneau continued to focus on the effects of logging on forest regeneration and salmon habitat in the Southeast, but it continued with essentially the same staff of scientists who had worked there during the late 1950s, minus a few important departures. One exception to this trend was Don Schmiege, who returned to Alaska from Berkeley, California, to become Program Leader for the multifunctional unit formally entitled "Ecology of Southeastern Alaska Forests". This unit was included in the Forest Environment Research—People and Forest Resources division headed by then Assistant Director Robert Tarrant in Portland, rather than Wright's division. The juneau multifunctional unit included silviculturist Arland [Al] Harris, fisheries biologist

[38]C.J. *Dy*mess and Rodney A. Norum, "The eltects of experimental tires on black spruce forest floors in interior Alaska. Canadian Journal of Forest Research 13 (1983): 879-893; Interview with Ted Dyrness 17 July I99S; Commaniation from Ted Dyrness 19 June 1995.

[39]Interview whenles Viereck .30 July 1993.

Don Schmiege [sans beads] with rifle kneeling over his recent "kill." Regional Forester Charles Yates reportedly perceived Schmiege as a long-haired radical with environmentalist leanings, and that perception poisoned the atmosphere between Research and Region 10. (Schmiege collection)

Bill Meehan prepares a gravel basket used for fry-survival studies at Young Bay Experimental Forest in 1971. (Swanston collection)

William Meehan, geologist Douglas Swanston, mensurationist Wilbur Farr, and entomologists John Hard and Torolf Torgerson. As one example of the new focus on forest ecology, Meehan assumed responsibility for watershed research when Helmers left for Fairbanks in 1971, and he gently nudged watershed research in Juneau toward a stronger emphasis on fisheries biology, although he is reluctant to suggest that would not have happened if Helmers had remained in Juneau.[40]

Buckman's decision to recruit Schmiege from the PSW Station at Berkeley and make him Program Leader for the multifunctional unit at Juneau was part of his general strategy to "bring along" people with strong leadership potential, and Buckman recalls that he was satisfied with Schmiege's performance in that regard. Wright recalls, however, that Schmiege had absorbed much of the counterculture prevalent in Berkeley during the late 1960s and early 1970s, and his long hair and beads reportedly caused quite a stir among the more conservative foresters with Region 10 when he arrived in Juneau. Buckman notes that "[Regional Forester Charles] Yates' first reaction was 'tell that s.o.b. to cut his hair.' Those were his first words."[41] The cultural conflict evident in Yates' comments about Schmiege poisoned the atmosphere between Research and Region 10 and stymied Buckman's hopes for a closer working relationship throughout Yates' tenure. The tension between Schmiege and Yates flared up in a dispute involving Al Harris' regeneration studies on Afognak Island. When Harris learned about a Region 10 proposal to log the area, he warned Yates that regeneration would present serious problems. When Yates dismissed his concerns, Harris brought the matter to the attention of Forest Service Chief John McGuire, who met with Buckman in Washington to discuss the issue. Shortly thereafter, McCuire selected John Sandor to replace Yates, who retired as Regional Forester for Region 10. In contrast to Yates,

[40]Interview with William Meehan 9 August 1993; Interview with Don Schmiege, Wilbur Farr, and Al Harris 22 December 1992; PNW Annual Report 1972, 4-9.

[41]Interview with Robert Buckman 1 3 July 1995; Communication from Ken Wright to Max Geier 28 August 1 995).

forest regeneration studies in southeast Alaska included this Douglas-fir successtully planted near Virgin Bay and shown here next to a beaming Bill Farr. (Farr collection)

both Buckman and Tarrant identify Sandor as very supportive of Research. Wright recalls, however, that the Regional Forester's office continued to view Schmiege and his cohorts at Juneau as somewhat "left of center" and overly sympathetic to environmentalist concerns, and Schmiege remains convinced that "the disingenuous work of several R-10 people—especially Sandor" undermined the credibility of some of the most significant research accomplished in southeast Alaska.[42]

In addition to coping with external conflicts with the Region, Schmiege struggled to surmount internal problems involving shortfalls in personnel and funding that threatened to undermine morale and impede progress with research. Schmiege and Dyrness tried several times to develop a sense of community between scientists at Juneau and Fairbanks, and they communicated fairly regularly with each other to commiserate about their problems and concerns. Dyrness recalls a sense that "We were fighting for Alaska together...." Early on, they organized field gatherings every year, in which scientists from Fairbanks conducted tours of their field sites for their counterparts from Juneau, who returned the favor the following year. Those field exchanges, however, died out after a couple of years because the expense of travel placed too much of a strain on the budgets allocated each unit. Keeping a lid on expenditures was a constant headache for Schmiege and Dyrness, both of whom were expected to be productive scientists in addition to their administrative duties. Dyrness recalls that Ruth Murphy, administrative assistant for the Fairbanks Lab, made his job considerably easier with her talent for maintaining "cuff accounts" (on expenditures) that were more current than the monthly reports generated from Portland. "The trick was," Dyrness notes, "to always end up in the red, not too far so you really gain the ire of the bosses, but you would want to spend your budget, that's for sure, and maybe just a little bit more...." That strategy, Dyrness recalls, backfired at least once on Schmiege, who called him on the phone one day and announced, "Geez Louise, I just found out, we overspent our budget by $500,000...you got any extra money you could give us?" Dyrness, who was "out in the red" with his own accounts at the time, wasn't able to accommodate Schmiege, and he recalls, "...oh man, Don was so sick, he was just so sick..."[41]

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[41] Interview with Robert Buckman 13 July 1995; Interview with Robert Tarrant 11 July 1995; Interview with Ken Wright 13 July 1993; Communication from Ken Wright 28 August 1995; Communication from Don Schmiege to Ken Wright 1 2 August 1995.

[42] Interview with Ted Dyrness 17 July 1995.

Torolf Torgerson's insect trap at a site on McKenzie Inlet in 1971. (Wright collection)

K Koski examines fry at the Harris River. (Fan collection)

Art Bloom and Steve Elliot measure fish. (Schmiege collection)

Despite the best efforts of Schmiege and Dyrness to develop a sense of community and common cause between the two labs, the multifunctional work unit at Juneau apparently failed to ignite the same sense of excitement that Viereck described for the early phase of multifunctional research in Fairbanks. Rather than working together more closely as a cooperative unit, scientists at Juneau seemed to spiral off in different directions.[44] Project Leader Keith Hutchison and the Forest Survey for Alaska were divorced from the multifunctional unit and placed under the administration of Assistant Director Donald Flora, who headed the division of Resource Economics, Products, and Fngineering Research in Portland.[45] Geologist Douglas Swanston left Juneau for Corvallis that same year (1972) to study slope stability in the Coast Ranges of Oregon. Helmers had already left to begin the watershed program in Fairbanks the previous year, Meehan left Juneau for the Corvallis Lab in 1973 to coordinate the development of a fisheries program for California, Oregon, Washington, Idaho, and Alaska, and in 1 974, Torolf Torgerson transferred to the Integrated Pest Management Research Work Unit at the Forestry Sciences Laboratory in Corvallis. This hemorrhage of talent out of Juneau in the formative years of the multifunctional unit, together with the lack of a compelling central focus, resulted in a research group that was certainly multifaceted but never really functioned as a distinct unit. Individually, however, forest researchers in Juneau made significant advances in the scope and nature of their studies during the 1970s.[46]

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[44] Meehan spent one month in 1971 at the Washington Office, where he worked to prepare prospecti for fisheries projects throughout the United States. His reassignment to Corvallis was an outgrowth of that effort. Professional Biography Files, Central History Files, Portland Office, PNW Station. Interview with William Meehan 9 August 1993; Interview with Bill Farr 9 August 1993.

[45] It should be noted here that this was due to administrative and personal career moves, and is not a reflection on the abilities of Don Schmiege or the motivation of individual scientists. Meehan notes, for example, that researt hers in fisheries and watersheds were "really a very closely knit group...it was one big study area," and the two groups "...worked closely from 1971 to 1991." Interview with William Meehan 9 August 1993.

[46] Interview with William Meehan 9 August 1993; Interview with Don Schmiege, Wilbur Farr, and Al Harris 22 December 1992; PNW Annual Report 1972, 4-9.

Integrated research efforts at Juneau yielded a series of reports between 1974 and 1978 entitled Forest Ecosystems of Southeast Alaska. Here, two contributors to those reports, Bloom and Schmiege, view a stream on the Kadashan watershed. (Schmiege collection)

Several new recruits joined the staff at Juneau in the mid 1970s to fill the gaping holes left by the departure of scientists like Helmers, Meehan, and Swanston. Meehan hired Fisheries Biologist K Victor Koski in 1973 to study the effects of logging on fish habitat. Koski came to Juneau from the Fishery Research Institute at the University of Washington, and had studied the effects of logging at Hollis before joining the Forest Service. He held undergraduate and graduate degrees in fisheries from Oregon State University and had also worked with the Oregon Game Commission. Meehan also brought in Fisheries Biologist Arthur Bloom, who began studies offish habitat in small tributary streams during the mid 1970s. Bloom brought specialized training in genetics (he had earned an M.S. in genetics from McGill University in Montreal) to the work unit, and his work in Alaska ranged beyond fisheries to include studies of winter range for Sitka black-tailed deer.[47]

Perhaps the most significant result of the integrated research effort at Juneau was the publication between 1974 and 1978 of a series of 10 reports under the combined title Forest Ecosystems of Southeast Alaska. These reports were authored and edited by former and current staff members at Juneau, and they were published as PNW Station General Technical Reports at the direction of Station Director Robert Tarrant. The reports summarized the results of nearly three decades of forest research in southeast Alaska. The format of a series of 10 sequentially numbered reports also emphasized the management concept of multiple use, although the late publication date of the tenth and last report, "Outdoor Recreation and Scenic Resources," also lent credence (however inadvertent) to criticism from the Sierra Club and other environmental action groups that these uses of the forest resource remained relatively low on the scale of Forest Service priorities.[48]

Forest Ecosystems of Southeast Alaska was billed as a summary of published and unpublished reports and data presented with additional observations from resource scientists and managers with years of experience in the region. The intent of the series was to provide a first-source reference for managers of forest resources in southeast Alaska to help them estimate the consequences of various management alternatives.[49] The first report in the series (I) was a synthesis of

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[47] Arthur M. Bloom, "Sitka black-tailed deer winter range in the Kadashan Bay area, southeast Alaska," Journal of Wildlife Management 42 (1978), 55-56; Professional Biography Files, Central History Files, Portland Office, PNW Station.

[48] Roger N Clark and Robert C. Lucas, The Forest Ecosystem of Southeast Alaska. X. Outdoor Recreation and Scenic Resources (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, PNW-66, 1978.

[49] Robert E. Buckman, "Preface," in William R. Meehan, The Forest Ecosystem of Southeast Alaska. III. Fish Habitats (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, PNW-15, 1974).

the physical "setting" of southeast Alaska, and was compiled by a team of seven authors and editors. Hard wrote the report on forest insects (II), Meehan wrote the report on fish habitat (III) and the report on wildlife habitat (IV), and Swanston wrote the report on soil mass movement (V). Laurent wrote the report on forest diseases (VI); Harris and Farr wrote the report on forest ecology and timber management (VII); and Schmiege, Helmers, and Bishop wrote the report on water (VIII). One year later (1975), Hutchison and LaBau teamed up for the report on timber inventory, harvesting, marketing, and trends. Then, in 1978, Roger Clark and Robert Lucas produced the final report in the series, which covered outdoor recreation and scenic resources.[30]

View of blowdown damage from the 1968 Thanksgiving Day storm. Farr found himself re-evaluating his earlier work when evidence emerged in the 1970s suggesting that blowdowns and other past events influence growth rates in trees on similar soils. (Schmiege collection)

Meehan continued to be a major figure in fisheries research in southeast Alaska despite his move to Corvallis. He worked with Logan Norris in Corvallis and Howard Sears at the Auke Bay Fisheries Lab of the National Marine Fisheries Service to publish a paper in 1974 detailing the results of their study of how the forest herbicide 2,4-D affected salmonids in southeast Alaska. This paper, together with 1972 amendments to the Federal Water Pollution Control Act, and rising public concerns about forest chemicals in general, led to revisions in Forest Service policies on aerial spraying of the chemical and encouraged efforts to identify alternatives to spraying, including biological controls.[31]

Regeneration and other torest management studies at Juneau also branched out to include uses other than timber production during the mid 1970s, although the effort to collect basic data for timber production still preoccupied forest researchers. Regeneration studies on the Maybeso Experimental Forest focused on early detection of possible insect and disease outbreaks that threaten young stands, and a cooperative study begun in 1974 studied the effects of thinning practices in the Maybeso Valley. Farr and Harris established plots in areas clearcut in 1954 and thinned the regenerating stands from 4,000 stems per acre to stand densities of 680, 300, and 170 stems per acre. In 1976, private landowners and government land managers began to request

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[30] "Forestry Sciences Laboratory Publications List, 1963-1982," located in the Library, Juneau Office, PNW Station.

[31] William R.Meehan, logan A. Norris, and Howard S. Sears, "Toxicity of various formulations of 2,4-D to salmonids in southeast Alaska," Journal of the fish Resouces Board of Canada 31 (1974), 480-485; interview with Al Harris, 22 December 1992; Research Progress 1974, 3-5, 12-14; Steen, U.S. Forest Service, 329: Dana, Forest and Range Policy, 255, 257.

Getting there was half the fun, as this view of Ken Winterberger (rear) and companion on pressing business in 1976 might suggest For all the recent emphasis on planes, helicopters and satellite photos, the "explorer" with boat and paddle still got the job done, (Juneau 3384)

information about alternatives to natural regeneration, and Harris joined Zasada in a 1976 meeting at Juneau to advise state and federal foresters studying the feasibility of producing containerized seedlings in greenhouses for replanting in cutover areas.[32]

Farr also found himself re-evaluating his earlier work when evidence that emerged during the 1970s suggested that past events, such as blowdowns, logging, and landslides influence growth rates in trees on similar soils. This realization that sites differed not only by vegetation and soil types, but also by historical events far in the past led to a search for more reliable models that could be used for estimating growth and yield. Farr focused particularly on locating plots on logged-over areas to limit uncertainty over past events that might be influencing growth on managed plots. He spent the late 1 970s locating plots on sites known to have been logged or burned on a specific date.[33]

Forest Inventory Priorities, Methods, and Personnel

Scientists with the Forest Inventory unit at Juneau operated independently of Schmiege's multifunctional unit, but they operated in the same work environment and contributed to the evolution of the community of researchers in that office. They also scrambled to assimilate state-of-the-art knowledge of Alaska's forest resources as they developed new techniques for meeting the shifting priorities and administrative edicts filtering down from the political arena of Congressional debate and through the various levels of the administration. Forest survey work during the 1960s and 1970s initially focused on the first survey of the interior, beginning with the river drainage transects of the early 1960s geared toward timber production, then moving toward a broader re-survey that included other forest resources as well as timber during the late 1 960s and early 1970s. The first survey of the interior was completed by the early 1960s, and the results appeared in Hutchison's 1967 report. Over the next 3 years, agitation for the Alaska Native Claims Settlement Act heightened interest in resources other than timber, and a proposal to locate National Forests in the interior produced demands for more-detailed inventories in that region. During the mid to late 1970s, these demands led to a joint effort among personnel with the Forest

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[32] Mavbeso Experimental Forest Establishment File," Central History Files, Portland Office, PNW Station.

[33] Interview with Bill Farr 9 August 1993. Farr died from cancer in late 1995, just as the results of the research he had conducted with Harris over the previous two decades began to yield results with practical significance for forest managers. His death, coupled with Harris' retirement, creates serious doubt whether this promising avenue of research can be continued, in view of declining station budgets and stalling. Communication from Ken Wright to Max Geier December 1995.

Service and the Soil Conservation Service who aimed at developing a multiresource inventory, first introduced with the Susitna River Basin inventory in 1978. The resulting system, implemented in 1981 as the Alaska Integrated Resource Inventory System (AIRIS), included several phases of data collection and examined timber, shrub, and herbaceous vegetation; soils; water; wildlife habitat: and related, integrated information.[34]

The Forest Inventory crews went back to the coastal survey in the mid 1960s and began resurveying areas that had been inventoried the previous decade. Initial plans had called for a resurvey every 10 years, but the vast scale in Alaska made that impractical for areas that were not a high priority. Despite the official rhetoric about multiple use during the late 1960s, timber remained the primary concern of the Forest Service inventory, and the National Forests of southeast Alaska consequently received more attention than did the interior forests. The re-surveys served as a check on the methods and skills of the original crews, and suggested the need for revisions in how the later surveys should be conducted.[35]

The forest inventory project also began to explore alternative sampling methods during this period in an effort to contain costs and conserve staff time. In the mid 1960s, survey crews laid in exhaustive, 3.5-acre, stem-mapped plots in southeast Alaska near Petersburg, Juneau, Haines, and Sitka, where they measured every tree three inches or larger for use in a study of sampling designs for inventorying old-growth forests in coastal Alaska. The inventory unit was able to implement these methods during the mid 1 960s because newly available computing capabilities in Alaska permitted more powerful analysis of the data.[36]

Paul Haack, a product of the Yale graduate school, who had worked with Caporaso and Hutchison since the late 1950s, wrote the field and photo-interpretation manuals for the inventory unit, tested various forms of photography for the interior inventory, and developed aerial stand-volume tables. He also wrote a program for stem-mapped data that was designed to run on the computer owned by the Alaska Highways Department. Haack transferred out of Alaska in about 1964, but LaBau debugged his program and ran it on the Highways Department's 1620 IBM card-driven machine. Earlier inventory work with IBM punch cards had been tabulated with

[34] Les Viereck notes that researchers at Fairbanks came under fire from Region 10 for failing to aggressively lobby in favor of the proposal for National Forests in the Interior. He and other scientists at Fairbanks resisted pressure from the Region to lobby for the designation: "We said our role is research, not promotion--that was the Region's job. They felt we weren't promoting interior forests..." Instead, the areas wound up as wildlife refuges and parks. Viereck and his colleagues at Fairbanks and Juneau concede the Fairbanks lab would have been better off with a National Forest in the interior, but Viereck argues that overall, the region is better off with the land in refuges and parks. Interview with Les Viereck 30 July 1993 Interview with Richard Werner 30 July 1993; Interview with Bill Farr 9 August 1993; Interview with William Meehan 9 August 1993; Frederic R. Larson and Delbert R. Mead, "Designing a Comprehensive Multi-Resource Field Inventory for Alaska," in John F. Bell and Toby Atterbury, eds.. Renewable Resource, Inventories for Monitoring Changes and Trends: Proceedings of an International Conference August 15-19, 1983, Corvallis, Oregon (Corvallis: Oregon State University, December 1993), 313-317.

[35] Interview with Fred Larson 5 August 1993; Interview with Jim LaBau 4 August 1993.

[36] Interview with Fred Larson 5 August 1 993; Interview with Jim LaBau 4 August 1 993; Communication from Jim LaBau March 1995.

an antiquated machine in Berkeley, California, but access to the Alaska Highways Department computer by the late 1960s enabled Hutchison's inventory team to implement more sophisticated analytical methods for the reinventory of Alaska forests over the next decade.[37]

The reinventory during the late 1960s and early 1 970s was based on new aerial photography that essentially reverted to a two-phase sampling system and dispensed with the air-check component of the three-phase system developed for the first survey of the interior in the early 1960s. This process began on the Porcupine Unit, an area proposed for National Forest status and an area with numerous Native holdings. By the late 1960s, these factors stimulated a lot of interest in the whole range of potential resources in that region, and the inventory unit responded with an updated two-phase survey involving a photo inventory based on a grid system with systematic ground plots to verify photo analysis.[38]

By the late 1 970s, a proposal to move the Alaska state capitol to Willow prompted interest in development proposals for the Susitna River basin, and the forest inventory unit surveyed the area in four big blocks: Willow, Talkeetna, Beluga, and lastly, the upper Susitna. From there, the focus shifted back to the Tanana Valley, another area with rapid development that was central to the issue of Native land claims and proposals for National Forest lands in the late 1970s and early 1980s. By the time of the survey on the upper Susitna block, innovations in aerial and satellite photography allowed for experimentation with a four-phase system incorporating satellite photography, high-altitude photos at 1:60,000 scale, low-altitude photos at 1:3,000 scale, and finally, ground plots. This system, known as the AIRIS design, was an expansion of the two-phase system used for the first coastal survey in the 1 950s, but it dispensed with the air-check phase of the three-phase system developed for the first survey of the interior in the early 1960s. Innovations in satellite imagery and high-altitude photography also provided color infrared photos that facilitated identification of ground cover and associated vegetation, but logistical problems with weather initially limited the utility of that technology for much of Alaska.[39]

Administrative Moves in Portland and Implications for Alaska

Organizational restructuring of PNW Station at mid decade and individual retirements reshuffled administrative assignments in Portland and responsibility for Alaska Research just as the national political spotlight began to focus more intently on issues related to southeastern Alaska forests. Near the end of the decade, the multifunctional unit at Fairbanks gradually became somewhat less of a priority in the context of other pressing demands for new research needs

[37] When the Forest Service finally provided a computer tor the inventory in 1974. it was in Portland, and LaBac would fly down with IBM cards in his suitcases, run the data through the computer, and then fly back to luneau with the printouts. Interview with Jim LaBau 4 August 1993; Communication from Jim LaBau March 1995

[38] Interview with Fied Larson 5 August 1993.

[39] Overeat skies limited visibility for high-level photography and restricted light needed for low-level, folo infrared. Interview with Fred Larson 5 August 1993; Interview with Jim LaBau 4 August 1993.

posed by challenges to Forest Service management of the Tongass and Chugach National Forests. The PNW Station remained well connected with the administrative hierarchy in the Washington Office, but some of the new faces in Portland were less familiar with Alaska than their predecessors. Director Robert Buckman, who reorganized the PNW Station as part of the Forest Service restructuring of 1 974, placed the Station's 24 projects under the control of two assistant directors and three program managers. Less than a year after approving these changes, Buckman transferred from the PNW Station to Washington, D.C., in June 1 975, where he served as Deputy Chief for Research over the next 11 years. Robert F. Tarrant, who followed Buckman as Director of PNW Station, was a graduate of Oregon State University and a Navy veteran from World War Two and the Korean War. Tarrant, a soil scientist with 29 years of experience with the Research Branch of the Forest Service at the time of his appointment to head the PNW Station, was well acquainted with Alaska and placed a high priority on Research programs there throughout his tenure as Station Director. He had served as Assistant Director and Deputy Director with Buckman at PNW Station since 1971 and had worked closely with Senator Stevens' office before his appointment as Station Director in 1975. When Tarrant retired from the Forest Service four years after his appointment, he moved to Corvallis, accepted a "standing offer" to join the faculty at Oregon State University, and resumed his earlier career as a soil scientist. Tarrant's replacement, in September 1979, was another Buckman recruit, Robert Ethington, who recalls, "Before that, I had no involvement in Alaska programs at all, even from afar."[40]

Direct responsibility for Alaska Research temporarily shifted away from Ken Wright during these critical years of transition, and Assistant Director for Research John Grantham assumed control of the multifunctional unit in Fairbanks and other operations in Juneau under the station-wide reorganization in 1974, Wright remained nominally involved in Alaska Forest Protection Research, but he was assigned as Program Manager for the Department of Agriculture's Douglas-firTussock Moth Expanded Research and Development Program, reporting directly to the Department of Agriculture in Washington, D.C. for the duration of that program. Wright later resumed responsibility for programs in Alaska during the late 1 970s,[41] but his temporary assignment with the tussock moth program deprived Alaska Research of its most experienced administrative advocate in the Portland office at a crucial, transitional stage for the concept of multifunctional work units at Fairbanks and Juneau.

[40] Ethington, it should be noted, does not view his lack of prior involvement with Alaska as hindering his efforts as Station Director. He was appointed Station Director in September 1979, but he did not arrive in Portland until January 1980. Forestry Research News (Internal memo) 15 Aug 1975; Pacific Northwest Forest and Range Experiment Station, Research Progress 1974 (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1975), 1-3; 17; Interview wilh Robert Buckman 13 July 1995; Interview with Robert Tarrant 11 July 1995; Interview with Robert Fthmgton by Max Cieier on 13 July 1995 at Ethington's home in Corvallis, Oregon.

41Communiation from Ken Wrighi to Max Geier January 1995; Forestry Research News (Internal memo 15 Aug 1975; Pacific Northwest Forest and Range Experiment Station, Research Progress 1974 (Portland. U. S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1975), 1-3:17; Forestry Research News 10 Dec 1979.

Transfer of the Inventory Unit From Juneau to Anchorage

The massive scale and difficulty of access to forest sites in Alaska encouraged innovations that placed the Juneau inventory unit on the cutting edge of remote sensing, but these methods were prohibitively expensive and required a nightmarish tangle of logistical support and critical-path coordination with other government agencies and private contractors. The inventory unit worked closely with cooperating agencies, including Region 10, the Soil Conservation Service, the U.S. Geological Survey, the National Aeronautics and Space Administration (NASA), and military air bases. NASA supplied U-2 photography during the late 1970s and early 1980s that required funding from virtually every agency in Alaska, state as well as federal. This dependence on other agencies became an important consideration during the late 1970s as the Native land claims process moved into high gear with proposals to reclassify federal lands in the interior for parks, wildlife refuges, and other state and private uses. These proposals increased pressure on the Forest Service to expand the inventory and supply more complete information on nontimber resources. The need for close cooperation with other agencies to accomplish that objective led to relocation of the inventory unit from Juneau to Anchorage.[42]

The move from Juneau to Anchorage took place during Tarrant's tenure as Station Director, when Buckman was Deputy Chief for Research in Washington, D.C. Buckman recalls that he had long supported, in principle, the idea that the PNW Station should have a presence in Anchorage, but he notes that he wanted to use the lure of an Anchorage office to secure Stevens' support for additional Congressional allocations to Research, thus playing on the Senator's suspicion that scientists at the Juneau Lab had developed environmentalist leanings. Tarrant had other reasons for establishing a PNW Station presence in Anchorage. He notes that Juneau, like many other laboratory sites for Forest Service Research established after World War Two, had always been a weak location because it lacked a university community that could provide the libraries, contacts, and intellectual interaction vital to scientific inquiry. He cites the decision to relocate Meehan's fisheries unit from Corvallis to Juneau as a statement of intent to Stevens that the PNW Station was committed to Alaska, but he argues Anchorage was a more appropriate site for a lab, given the presence of liberal arts colleges and its closer proximity to the coastal forests. Fairbanks, despite the presence of the University of Alaska, he notes was too remote from coastal stands, where more intensive development had created a high demand for research.[65]

Philosophical considerations aside, the most compelling issues that led to the relocation of the inventory unit to Anchorage were the enormous cost of travel in Alaska and the political considerations that influenced the prioritization of forest survey work. The Alaska Native Claims Settlement Act included a controversial provision originally inserted to gain the support of con-

[64] Larson ,ind Mead, "Designing a Comprehensive Multi-Resource Field Inventory for Alaska," 31 3-31 (S; Interview with Ken Wright 1 3 July 1 993; Interview with Fred Larson 5 August 1993; Interview with Jim LaBau 4 August 1993; Interview with Bill Farr 9 August 1993; Interview with LesViereck 30 July 1993.

[65] Interview with Robert Buckman 13 July 1995; Interview with Robert Tarrant 1 1 July 1995.

servation forces in the United States, and that provision ultimately provided the flashpoint for a wholesale redistribution of federal lands in Alaska with the 1 980 Congressional legislation known as the Alaska National Interest Lands Conservation Act (ANILCA). Section 1 7(d)(2) of the Native Claims Act authorized the Secretary of the Interior to withdraw up to 80 million acres of federal lands for possible addition to the national systems of parks, forests, wildlife refuges, and wild and scenic rivers. Congress, however, reserved to itself authority for final disposition of those lands. This reservation was the origin of the *"6-2"* controversy that raged across the political landscape throughout the 1970s and culminated with ANILCA in 1980. Conservation groups across the country and in Alaska lobbied for the creation of national parks, wilderness areas, and refuges, while development interests in Alaska and elsewhere pressed for National Forests open to multiple use (including timber production, mining, and grazing). The first proposal from the Department of Interior in 1 973 called for three new parks, nine new wildlife refuges, expansion of the Chugach National Forest, and the addition of three new National Forests in the interior. These proposals raised a firestorm of protests when it became evident that they were based on precious little information on the nature, range, and quality of aesthetic, cultural, or economic resources on those lands.[64]

Escalating public and political demands for detailed information about both timber and nontimber resources filtered down through the Forest Service to Hutchison's inventory unit in Juneau by the mid 1970s and contributed to the decision to relocate in Anchorage. The national debate over Alaska lands made inventory work on federal lands in the interior a high priority, and Hutchison's unit consequently gained access to U-2 aerial photography. These photos provided the basis for inventory work in Alaska over the next 1 5 years, although they seldom were used for the original purpose of providing information for the debate over the disposition of federal lands. The lands issue, however, did concentrate the emphasis of inventory work on the Interior at the request of numerous federal agencies based mostly in Anchorage and with support from state and federal agencies with offices in Anchorage. National Forest Service policies, meanwhile, shifted responsibility for inventories on National Forests from Research to the Regions after 1973, thus eliminating a primary reason for locating the inventory unit in Juneau. By 1977, the inventory group in Juneau seemed unnecessarily remote from the primary focus of operations, and the Station Director (Tarrant) ordered the unit moved to Anchorage the next year.[65]

[64] Naske. Alaska, 224-235; Dana and Fairfax, Forest and Range Policy, 304-306.

[65] Ken Wmterberger, who worked on remote sensing for the inventory unit during this period, recalls that the dispute over allocation of lands led to enormous expenditures on satellite and U-2 photos, most of whích were never really used for the intended purpose of supplying information that would serve as the basis for determining the final disposition of the land in question. This expenditure did, however, provide the inventory unit with aerial photographs that otherwise would not have been available, and those photos provided the basis for multiresource inventories over the subsequent 1 5 years. Interview with Ken Winterberger 6 August 1993 in the Anchorage Office, PNW Station; Interview with Fred Larson *5* August 1 993; Interview with Ken Wright 1 3 July 1 993; Interview with jim LaBau 4 August 1993.

Keith Hutchison and the inventory project had always operated independently from other units at Juneau, and the move to Anchorage had minimal impact on other programs. The move did, however, cause problems for the people in Juneau who were asked to move their families, and several people in the unit transferred or resigned before the move. Hutchison, who had directed the forest inventory since 1959, routinely communicated directly with the Washington Office to secure approval and support for his program of operations, but he notes that he was not included in discussions leading up to the decision to relocate his unit in Anchorage. Hutchison recalls, however, that H.R. Josephson, the Director of Forest Economics Research in Washington, knew that Hutchison opposed the move and gave him the option of directing the unit from Juneau. Hutchison initially commuted to Anchorage from Juneau for 10-day stints, but he did so only until he had assembled a crew with people he considered qualified to lead the project. He made a surprise announcement of his retirement on 7 December 1979, just 1 week before his last day on the job.[66]

The team of scientists Hutchison assembled at Anchorage included Theodore Setzer, with a B.S. and M.S. in forestry from Iowa State University; Delbert Mead, with a B.S. in biology from Albright College and an M.F. in forestry from Duke University; Gary Carroll, with a B.S. in forestry from Iowa State University; Kenneth Winterberger, with a B.S. in forestry from the University of Montana; Frederic R. Larson, with a B.S. and M.S. in forestry from Northern Arizona State University and a Ph.D. in systems ecology and operations research from Colorado State University, and Jim LaBau, with a B.S. in forestry from Colorado State University and an M.S. in forestry from Oregon State University. Winterberger was the only holdover from Juneau. LaBau had been with the inventory team during the 1960s and early 1970s, but had transferred to the Rocky Mountain Station at Fort Collins from 1975 through 1979, when Hutchison asked him to join the unit at Anchorage. Larson transterred to Anchorage from the southwestern United States, where he worked on the Beaver Creek Project with the Rocky Mountain Forest and Range Experiment Station out of Flagstaff, Arizona. Setzer, like Carroll and Mead, transferred to Anchorage from the Intermountain Station. Setzer served as Acting Project Leader from 1979 until 1980, when LaBau took the helm. Conspicuously missing from the roster in Anchorage were Karl Hegg and Thomas Laurent, who had worked with Hutchison through most of the previous two decades. Hegg left Juneau for a short tour of duty in Rosslyn, Virginia, and Laurent completed his career in Juneau, where both he and Hegg eventually retired.[67]

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[66] Bill Fan, who worked with Hutchison in his early years at Juneau, recalls "Keith was a good guy to work tor." He was known for his sense of humor, and no one seemed surprised that he sprang the news of his retirement with no prior indication to his staff in Anchorage. PNW News 1 7 Dec 1979; Interview with Jim LaBau 4 August 1 99.5; PNW News 1 8 Feb 1 980; PNW News 28 May 1 982; Memo 1 2 Dec 1979 trom K.H. Wright, Assistant Director/North, to Deputy Director Glenn Cooper (located in Central History Files. Portland Office, PNW Station); Communication from Keith Hutchison to Jim LaBau 23 May 1995.

[67] PNW New-, 17 Dec 1979; Interview with Jim LaBau 4 August 1993; PNW_News 18 Feb 1980; PNW News 28 May 1982; Memo 12 Dec 1979 from K.H. Wright, Assistant Director/North, to Deputy Director Glenn Cooper (located in Central History Files, Portland Office, PNW Station). Communication from Fred I arson to Ken Wright 28 April 1995.

Jim LaBau, shown here in 1960 counting the rings on a 100-year-old spruce slump on BLM land, was known for his methodical, meticulous records and filing system as he guided the inventory unit into the 1980s, (juneau 1120)

LaBau, who served as project leader for the Forest Inventory and Analysis Program for the decade of the 1980s, was known for his habit of maintaining detailed files on virtually everything in the office, most of them organized with the numbering system used in Forest Service manuals. This fondness for order, bordering on compulsion, was an asset in pulling together a systematic program of forest inventory that would address the need for a detailed profile of all forest resources, including but not limited to timber. LaBau's unit in Anchorage brought together a diverse crew of innovative specialists at the cutting edge of inventory methods and technology. All of them came to Anchorage with extensive experience in the Western United States, where they were accustomed to dealing with vast expanses of territory. Setzer brought a strong background in data analysis, Winterberger specialized in remote sensing applications, and Larson brought logistical savvy honed in the forbidding terrain of the American Southwest. Carroll also brought valuable expertise in computer systems, programming, analysis, and data management, and Mead added his experience in field leadership and analysis. This combination of skills and the strong focus on forest inventory forged a particularly cohesive work unit with a completely different character than the groups at Fairbanks or juneau.[68]

During the 1 980s, LaBau's unit developed an inventory method that merged high technology with ecological theory and current research in forest science, wildlife, fisheries, vegetative analysis, systems modeling, and sampling methods. Mead worked with John Yarie, of the University of Alaska, to develop a unique vegetation profile system for coastal and interior Alaska with coefficents to measure biomass for everything from mosses and lichens to trees, grasses, forbs, and shrubs. The result was a multiresource inventory that provided a detailed profile of vegetation along vertical and horizontal axes with data on tree, shrub, and herbaceous vegetation; downed wood and ground cover; wildlife habitat species composition; soil, water, and geographical characteristics; dead trees or snags; fuel buildup and fire danger; browse availability; biomass estimates; species diversity, distribution, and composition; as well as timber resources and quality.'[69]

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[68] Interview with |im LaBau 4 August 1993; interview with Ken Wright 13 July 1993; interview with f red Larson August 1993; interview with Ken Winterberger 6 August 1993; interview with Ted Setzer 6 August 1993; interview with Bill Farr 9 August 1993.

[69] Larson and Mead. 'Designing a Comprehensive Multi-Resource Field Inventory," 313-315.

Transportation costs tor ground crews in Alaska consumed more money than all other costs. Here, j *charter plane leaves McKenzie Inlet near Ketchikan in 1971. (Wright collection)*

The multiresource inventory built on the four-phase system beginning with Landsat (satellite) imagery, small-scale (1:60,000) aerial photography, large-scale (1:3,000) photos, and finally, a systematic ground inventory of sample plots to cross-reference with the photographic sources and facilitate airphoto interpretation. Ground crews established circular plots covering eight hectares, interspersed with detailed sample points for different levels of the inventory (trees, shrubs, herbaceous vegetation, ground cover, etc.). The field workers ran transect lines across each ground plot to estimate dead and down woody debris, and they measured visibility through the stand at various levels. They also measured height and diameter, quality, defects, growth, crown characteristics, and tree damage for timber within the plot. Crews collected data on signs of animal activities, including browsing, grazing, nests, trails, fecal material, food caches, and bedding sites. Aerial photos provided information on distance from water, hiding cover, edge, or human activity. The Soil Conservation Service assigned a soil specialist to each ground crew, and with their help, soil pits dug at each plot yielded soil descriptions in association with vegetation and drainage characteristics. These sample plots provided data for computer modeling programs that applied the information across the area covered in the airphoto phases, yielding a composite horizontal and vertical profile of the area.[70]

Computer-generated reports based on the multiresource inventory provided standard tables for forest surveys, including commercial and noncommercial forest lands, timber volume per acre by species, and timber growth and mortality, but they also provided information on plant associations, wildlife, and noncommercial resources valued for their aesthetic, recreational, or ecological appeal. The detailed forest profile provided public land managers with information useful in predicting the presence of specific wildlife species, based on other studies of their habitat requirements and behavior patterns. The inventory system that LaBau's unit developed provided, for the first time, the kind of inventory that fulfilled the evolving interpretation of multiple use as including noncommercial and ecological uses, but the process was still driven by the demands of the various end-users of the inventory, including the timber industry, state and federal

[70]Larson and Mead, "Designing a Comprehensive Multi-Resource Field Inventory," 31 3-315.

agencies, conservation groups, private landholders, and Native villages and corporations. It remained a time-consuming, expensive process, requiring a lot of logistical planning for field work and the difficult conditions of work in roadless areas remote from human contact.[71]

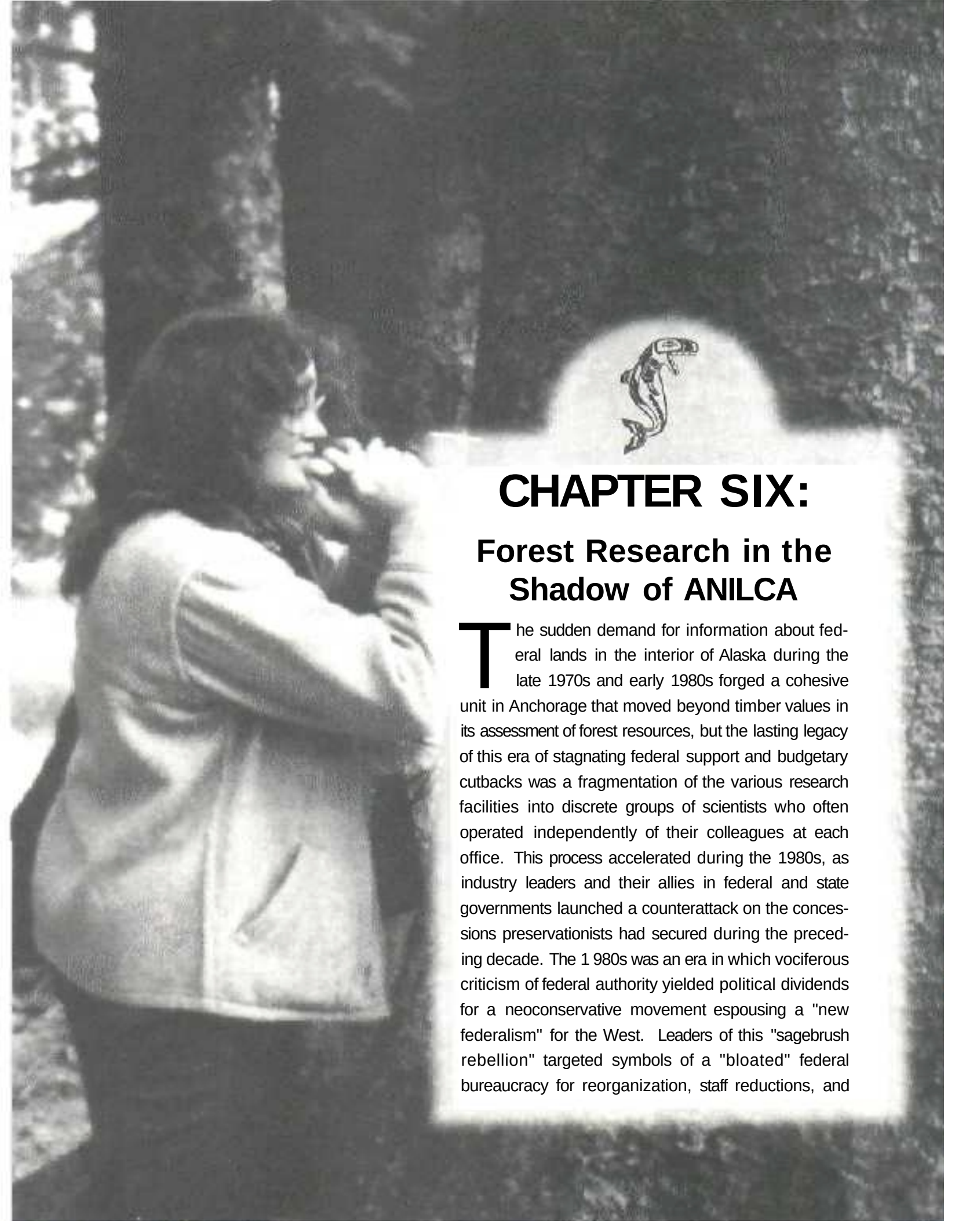
Persistent cloud cover over much of Alaska interfered with efforts to acquire large-scale photography for use in the inventory, so Larson and Winterberger teamed up with systems analyst Willem [Bill] van Hees during the mid 1 980s to develop a new sampling design that could better reflect the entire satellite image, instead of zeroing in on the labor-intensive, eight-hectare plots implemented with the AIRIS design. The new design separated satellite scenes into five subpopulations, including forest, woodland, shrubland, herbaceous lands, and barren lands that also included ice fields, snow, and water. The design then provided for a standard two-phase aerial photo and ground-truth system with smaller ground plots that could be tied back to the satellite scenes and provide, for the tirst time, a mapped base-inventory, which included all the understory vegetation and wildlife habitat measurements from the AIRIS design to continue the enumeration of multiple resources.[72]

The research unit at Anchorage developed close cooperative relations with a broad array of state and local agencies that helped defray the costs and supplied personnel for the ground crews. Transportation costs tor ground crews consumed more money than all other costs, including salaries, equipment, data processing, and logistical support. Only a high degree of support from other agencies permitted implementation of the multiuse inventory program during the 1980s. The inventory system also drew heavily on the work of Les Viereck and Ted Dyrness at Fairbanks, who were instrumental in developing a vegetation classification system for Alaska that went through numerous revisions between 1978 and 1992.[73] The multiuse forest inventory system was a continuation of the Congressional mandate to inventory the Nation's renewable resources and an outgrowth of the fierce debate over how federal lands in Alaska should be distributed. It was driven by competing demands from various groups, including industry, state and federal legislators, private and public land managers, conservation and preservation activists, recreation advocates, Native corporations, representatives of Native interests, and local citizen groups. In this sense, it was a major departure from earlier traditions of forest research in Alaska that primarily were driven by initiatives for timber production or concerns about the devastating effects ot natural events, but it was also a continuation of the premise that forest research should serve utilitarian purposes as defined by interests other than the detached curiosity of scientists.

Aside from the dangers inherent in backcountry flying, wildlife posed an additional hazard to ground crews. In one humorous example, a black bear rummaged through a tent and started chewing on one crew member's sleeping bag one night in 1980 at a field site near Circle Hot Springs. The crew member managed to escape unscathed but considerably shaken up. PNW News 25 August 1980. Interview with Fred Larson 5 August 1993; Interview with Ken Winterberger 6 August 1993.

Communication from Jim LaBau March 1995; Communication from Fred Larson 28 April 1995.

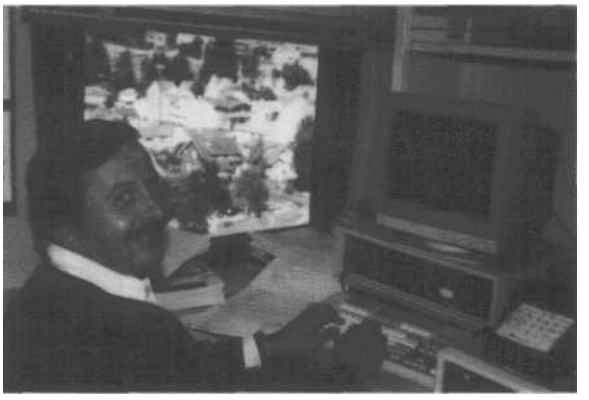
L.A. Viereck, C.T. Dyrness, A.R. Batten, and K.J. Wenzlick, The Alaska Vegetation Classification (Portland: U.S. Department of Agriculture, Pacific Northwest Research Station, General Technical Report PNW-GTR-286 July 1992).



CHAPTER SIX:

Forest Research in the Shadow of ANILCA

The sudden demand for information about federal lands in the interior of Alaska during the late 1970s and early 1980s forged a cohesive unit in Anchorage that moved beyond timber values in its assessment of forest resources, but the lasting legacy of this era of stagnating federal support and budgetary cutbacks was a fragmentation of the various research facilities into discrete groups of scientists who often operated independently of their colleagues at each office. This process accelerated during the 1980s, as industry leaders and their allies in federal and state governments launched a counterattack on the concessions preservationists had secured during the preceding decade. The 1 980s was an era in which vociferous criticism of federal authority yielded political dividends for a neoconservative movement espousing a "new federalism" for the West. Leaders of this "sagebrush rebellion" targeted symbols of a "bloated" federal bureaucracy for reorganization, staff reductions, and



Mensurationist Don Demars at work in the Juneau FSL Persona/ *computer technology enabled scientists in Alaska to expand their range of regular contact with experts in their fields beyond Alaska during the 1980s. (Loopstra collection)*

privatization. As a large federal bureaucracy with a high-profile presence in many areas of the country, and particularly in the Pacific Northwest, the Forest Service was vulnerable to attacks from preservationists and neoconservative utilitarians, and both factions greeted agency initiatives with skepticism.[1]

In this climate of suspicious animosity, federal support also eroded for integrated study units, and Forest Service Research in Alaska drifted more in the direction of stand-alone, grant-driven programs. Individual scientists employed with the Forest Service shared office facilities at Juneau, Fairbanks, and Anchorage, but they increasingly were forced to compete with other scientists in Alaska and elsewhere to secure sufficient funding for their operational expenses and staff support from the limited funds budgeted for Forest Service Research in the Congressional allocation process in Washington, D.C., and at various levels of the administrative hierarchy of the agency. The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 and the availability of Tongass Timber Supply Funds counteracted this trend in Juneau, but it also redirected priorities away from the interior, shifted the research focus back to southeastern Alaska, and proscribed the range of studies eligible for funding in ways that often excluded the programs of research developed by scientists at Fairbanks and sometimes Anchorage.[2]

Communications Technology and a New Corporate Culture[3]

New technology accelerated the centrifugal forces that political developments imposed on the corporate culture of Forest Service Research in Alaska and elsewhere in the United States during the early 1980s. Innovations in long-distance communications and computing systems

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'The sagebrush rebellion and the neoconservative movement of the 1980s have been the subject of considerable scholarship and debate. See, for a few pertinent examples, Daniel Faber and James O'Connor, "The Struggle for Nature: Environmental Crises and the Crisis of Environmentalism in the United States," Capitalism, Nature, Socialism 2 (Summer 1989), 12-37; and C. Brandt Short, Ronald Reagan and the Public Lands: America's Conservation Debate, 1979-1984 (1990).

[2]This discussion is based on numerous interviews and conversations with scientists at each office in Alaska and in Portland and recent scholarship on the history of the environmental movement in the 1980s, as cited above. For the effects of ANILCA on forest research in Alaska as viewed by PNW Station administrators at the beginning of the decade, see Pacific Northwest Forest and Range Experiment Station, "Planned Forest and Related Research to Meet Requirements of the 1980 Alaska National Interest Lands Conservation Act," (internal policy statement 14 July 1981, in the storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service).

[3]This section is based on a series of interviews and informal discussions between the author and Forest Service personnel in Juneau, Fairbanks, Anchorage, Portland, and Corvallis between 1992 and 1994. Those who have contributed particularly valuable insights on the topic of computers and networks in relation to research and interaction among scientists in the Forest Service, and particularly in Alaska, include Nancy Bonstedt, Ruth Murphy, Mary Lewis, Ken Winterberger, Bill Farr, Bill Meehan, John Alden, Joan Foote, Martha Brookes, Bernard Bormann, and Ken Wright.

CONTINUED

Fairbanks Forestry Science Laboratory in 1980. (Wright collection)

Forest Inventory field crew member using the relascope — a multipurpose instrument—in 1982. (Larson collection)

paralleled the revolution in political priorities and funding at the national scale, with the result that scientists at the various research laboratories in Alaska developed stronger, long-distance, professional networks. This expansion of the boundaries of the scientific community in Alaska carried great potential for developing research programs with broader relevance beyond Alaska. It also rendered more localized working relations relatively less significant, however, because it encouraged networking with other scientists in the same discipline, leaving less need (or time) for interdisciplinary stimulation and interaction with scientists working in the next office. Many scientists in Alaska still found themselves at the center of controversy and on the periphery of control over the administrative and funding decisions that defined the scope and even the direction of their work, but the new technology increased their ability to disseminate their research findings and commiserate with colleagues from other stations and other agencies. As criticism of the agency mounted in the early 1 980s, and as scientists became more dependent on grants and other outside funding, these external networks became more important, but colleagues in the same lab also increasingly competed against each other for scarce resources and administrative support. In this institutional climate of competitive positioning, the frontiersmanship that earlier generations of scientists in Alaska had cultivated as their corporate culture was submerged in the more prosaic, bureaucratic tradition of scrambling for recognition and funding from public and private sources that was more common at other Research labs outside Alaska. This bureaucratic tradition had always been a factor in shaping the research agenda in Alaska, but it usually had operated beneath the veneer of frontiersmanship that often disguised potentially divisive personal and political differences. These trends were mitigated at the Juneau Lab, where the Tongass Timber Fund provided a countervailing force against the budgetary pinch felt at all levels of Forest Service Research during the first Reagan Administration of the early 1980s.

)ust as computer-aided analysis transformed forest inventory methods to include an integrated resources sampling design from the late 1970s through the 1980s, computers also transformed work habits, patterns of interaction, and reporting among scientists in the Forest Service during the 1980s. The development of instantaneous communication by way of electronic mail in the

Chris Mack testing soil samples for the Forest Inventory unit in 1985. (Larson collection,

first half of the decade rapidly eroded support for more laborious compilations of reports and memos previously prepared for deposit in the central files and libraries maintained at Juneau, Fairbanks, Anchorage, and Portland. The practice of maintaining a central file at each facility gave way to a system of individual scientists maintaining personal libraries and communicating with each other through a massive electronic network contracted for the entire Forest Service from a corporate interest, Data General, by mid decade. This "DG" system was primarily designed for managerial and administrative purposes, and many scientists in Research who were already using personal computers and other computing facilities by the mid 1980s complained the monolithic DC! system was obsolete before it came on-line and poorly suited to their needs. Despite these criticisms, the DG rapidly changed the community culture of the Forest Service, including Research. Administrative matters became the subject of running conversations communicated in brief notes, and both scientists and administrators faced a flurry of inquiries and memos in which relevant information often was overwhelmed with messages unrelated to their work or even their work unit, and all of this was transmitted as discrete, disconnected messages spread out over days, weeks, months, and even years over an electronic medium that disappeared into the netherworld of cyberspace after a brief period of storage on local backup systems.

The new technology also effectively bypassed administrative assistants who had provided a community focus at each lab in earlier years and filtered out meaningful paperwork from the deluge of marginally important material typical of most bureaucracies. Scientists less frequently routed their professional communications through the administrative staff, and the institutional memory that these start members previously supplied was gradually eroded. Adaptation to electronic systems, moreover, often was a disorienting process that disrupted traditional patterns of interaction among scientists at each lab, and it coincided with an era of disruptive challenges to accepted practices and scientific assumptions within the Forest Service. By the mid 1980s, agency scientists in Alaska were searching for a new focus and mission for their work, but they increasingly did so in relative isolation from their colleagues at each site. This trend ironically developed just as the integrative research focus of the previous two decades bore fruit with the development of a new vegetation classification system for Alaska and the multiresource forest survey system developed at the Anchorage Lab.

Classification Systems and Forest Research

The movement to redistribute federal lands in Alaska during the late 1970s provided the impetus for interagency cooperation to develop the preliminary vegetation classification system that served as the basis for the multi-use inventory developed at the Anchorage office over the next decade. The Fairbanks Lab led in developing this system, which was a significant exception to the general drift away from integrated research among the different Forest Service Research labs in Alaska. The effort originated as a state initiative for an Alaska vegetation classification system in response to a federal program aimed at developing such a system for the lower 48 states, excluding Alaska, and it was a reaction to the issues raised in the wake of the Alaska Native Claims Settlement Act. Plant ecologist Les Viereck and soil scientist Ted Dyrness, both of the Fairbanks Laboratory, took the lead in generating a preliminary classification system with a committee consisting of William Gabriel of the Bureau of Land Management, Samuel Rieger of the Soil Conservation Service in Anchorage, and David Murray of the University of Alaska, Fairbanks. Dyrness, who had recently worked with Jerry Franklin to develop a classification of vegetation on the Andrews Experimental Forest in Oregon, recalls of the Alaska classification project, "...we didn't know what we were getting into at that point, but we just had a tiger by the tail." The first published result of their efforts appeared in 1980, and then went through a series of extensive revisions that spanned the next 12 years.[4]

Viereck, Dyrness, and other members of the committee proceeded from the premise long established among Forest Service researchers in Alaska that they were dealing with a relatively unknown frontier in which scientists had just begun to compile the basic elements of knowledge that were a prerequisite for more advanced research. In keeping with this tradition of "just finding out what's out there," Viereck's group focused on developing a system that "built up from below toward a higher level" as an interim step in developing management guides that would have to be developed at a later date and on a more regional basis. With this goal in mind, the system was designed to classify **existing** vegetation, not **potential** vegetation, and it was developed as an aggregate system, building upward from the basic unit of discrete, known, plant communities (Level V) toward broader classes of plant associations (Levels IV, III, II, and I). Classification workshops at Fairbanks and Anchorage between 1976 and 1986 encouraged input from the U.S. Fish and Wildlife Service, the Bureau of Land Management, the Alaska Department of Natural Resources, the Forest Service, the University of Alaska at Fairbanks, the University of

[4]Viereck recalls lhat the classification system was a long-term project that landed at his feet and essentially diverted him from his other research. Dyrness notes, however, that nobody knows more about Alaska vegetation than Viereck, and "...we NEEDED him, ...but he wasn't exactly hauled in kicking and screaming." Interview with Les Viereck, 30 |uly 1993; interview with Ted Dyrness, 1 7 July 1 995. Leslie A. Viereck and C.T. Dyrness, "A preliminary classification system for vegetation of Alaska," (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report, PNW-106, 1980); interview with Les Viereck, 30 July 1993; L.A. Viereck, C.T. Dyrness, A.K. Batten, and K.|. Wenzlick, The Alaska Vegetation Classification (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report, PNW-GTR-286), 1-4.

Alaska at Palmer, and the National Park Service.[1] They also worked closely with the Anchorage inventory unit, particularly near the end of the project. Dyrness observes, for example, that for many units of the classification system, the inventory unit was their only source of information because "...they had discovered these kinds of stands that nobody else has described."[6]

Viereck was astonished to discover, during the early 1 980s, that scientists at Juneau had established virtually no classification systems for vegetation in southeast Alaska. Ecologists Paul Alaback and Jon Martin produced provisional reports during the 1980s that drew on their personal experience working in southeast Alaska, but the results of their work was mostly unpublished, and their efforts essentially paralleled Viereck's. In the interior, Viereck was able to draw on his nearly two decades of research at the Fairbanks Lab, where the strong ecological focus of the multifunctional work unit yielded a nucleus of material describing vegetative communities and successional stages in relation to wildfire and permafrost.[7] This circumstance contributed to a classification system that closely followed the priorities of a research program centered on an area historically less valued as a source of marketable timber and increasingly valued as a potential site for national parks, wildlife refuges, and wilderness areas. In the political climate of the late 1970s, when this project began, those priorities placed a premium on descriptive systems that would assist in identifying lands appropriate for restricted uses, and timber production was a relatively low priority among the various state and federal agencies that funded the project and contributed staff and ideas.[8]

Alaska National Interest Lands Conservation Act

Viereck's vegetation classification system developed in the same political climate that produced the Alaska National Interest Lands Conservation Act, and subsequent interpretations of that act provided Forest Service Research in Juneau with an annual infusion of funds specifically for research on the Tongass National Forest, the Tongass Timber Supply Fund (TTSF). The ANILCA was an outgrowth of the final report of the Joint Federal-State Land Use Planning Commission for Alaska in 1 979 that was incorporated into legislation approved in the U.S Congress in 1 980. As finally drafted, ANILCA radically revised public land holdings in many parts of Alaska, placed 104 million acres in new conservation units distributed across Alaska, and included a statement

[6]L.A. Viereck, C.T. Dyrness, A.R. Batten, and K.J. Wenzlick, The Alaska Vegetation Classification (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report, PNW-C.TR-286), 1-4; interview with Les Viereck, 30 July 1993.

[7]Interview with Ted Dyrness 17 July 1995.

[8]Viereck et al.. The Alaska Vegetation Classification, 4-10.

[9]This situation has ruffled the feathers of some timber-oriented foresters more accustomed to the traditional Forest Service interpretation of multiple-use management as a production-oriented strategy of sustained yield, but it has gained the admiration of the forest research community, in and out of the Forest Service, that has responded to public demands for a broader interpretation of multiple use in more recent years. Interview with Ed Packee at the University of Alaska, Fairbanks, 16 December 1992; interview with Keith Van Cleve, 1 8 December 1 992; interview with Ken Wright, 1 3 July 1993; interview with Fred Larson, 5 August 1993; interview with Jim LaBau, 4 August 1993.

that Congress considered this legislation as the "last word" on land withdrawals. The ANILCA established boundaries for Native, private, federal, and state lands, and it provided a framework for resolving future disputes over land use. Among other provisions designed to garner support from timber interests and other industries, the act also mandated an intensive forest-management program aimed at maintaining a production of 4.5 billion board feet per decade from the Tongass National Forest. Congress funded this program with an annual allocation of $40 million, and the Forest Service annually assigned about 5 percent of those funds to support Research in southeast Alaska.[9]

Robert Ethington was the first PNW Station Director in the post-ANILCA era, which began with the election year of 1 980, when the Republican Party gained control of both the Presidency (Ronald Reagan) and the Senate on a platform promising cutbacks in government programs and expenditures. Ethington, consequently, faced a political situation significantly different from the era when Buckman and Tarrant expanded programs in Alaska, and his executive skills and training were rooted in experiences relatively remote from the ecological concerns shaping Alaska Research during the 1 970s. He also found himself representing an administration that placed a relatively lower priority on Research than in earlier years. Ethington notes that the "long payoff-curve" for Research made it a "natural target for Reagan budget cutters," and the first budget proposed by the Reagan administration for the PNW Station called for a 20-percent cut in funding.[10]

The new Station Director's leadership style was a product of a long career in public service, first in the military and later in the Forest Service. He placed a high priority on administrative leadership and the need for Research laboratories in Alaska to be responsive to Congressional mandates and to the needs of their client base, which included Native Corporations, the State of Alaska, and other federal agencies in addition to the Forest Service. Ethington had served in the U.S. Army in the Korean war, and he was a graduate of Iowa State University, with an undergraduate degree in wood technology, a master's degree in theoretical and applied mechanics, and a Ph.D. in wood technology and theoretical and applied mechanics. His background with the Forest Service included 10 years with the Forest Products Laboratory in Madison, Wisconsin, before he moved into an administrative position as Assistant Director at Madison for another 2 years. His administrative talents at the Forest Products Lab caught the eye of higher level managers, including Buckman, and they brought him into the Washington Office and placed him in charge of all harvesting and utilization research in the Forest Service, most of which was done at Madison. He remained in that position until September 1979, when his assignment as Director of the PNW Station suddenly placed him in charge of the innovative Research programs at Juneau and Fairbanks.[11]

[9]Naske, Alaska, 234-236; "Planned Forest and Related Research," 1; interview with Ken Wright, 1 3 July 1993.

[10]Interview with Robert Ethington, 12 July 1995.

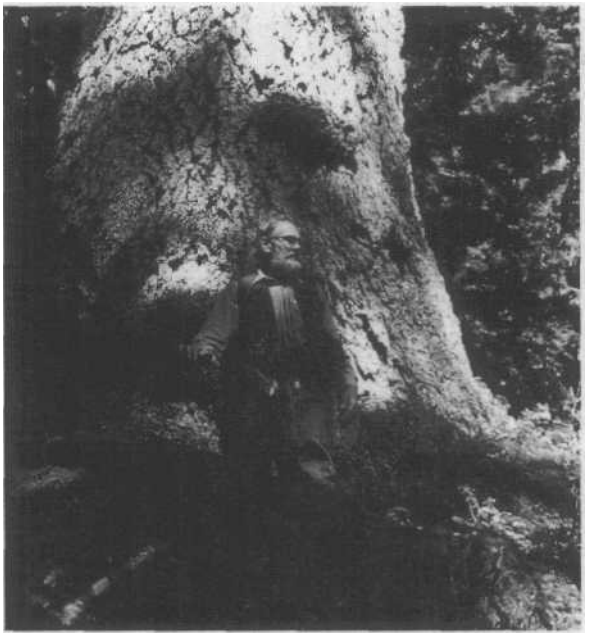
[11]Interview with Robert Ethington, 12 |uly 1995; interview with Robert Buckman, 13 July 1995.

Aside from his military background, Ethington's extensive background as a scientist and administrator was somewhat out of step with the history of programs in Alaska, where forest products research, other than feasibility studies for pulpwood production, were relatively uncommon before 1979 by comparison with other studies relating to the effects of logging or fire. Several forest products studies began about the time of Ethington's appointment, including a study begun in 1979 that was designed to estimate the volume and value of light framing lumber and chips from small-diameter hemlock logs from Alaska. Another study begun that year involved an evaluation of the quality of pulp produced from mill residues generated from blowdown logs of spruce and hemlock. Three years later, a 1982 study included estimates of the volume and recovery value of the lumber produced from beach logs of western hemlock and Sitka spruce. One other study, begun in 1985 during the latter years of Ethington's administration, was designed to provide data on lumber, chip, and sawdust volume recovery and lumber value for trees and logs from a sample of live trees and from samples of fire-killed stands of white spruce.[12]

ANILCA Funding for Research

Forest products research in Alaska became somewhat more common during Ethington's administration, but the Congressional allocation process loomed larger than professional experience as a dominant force shaping the scope and direction of scientific programs in Juneau during his tenure as Station Director. Research gained access to ANILCA funding in an example of close cooperation with Region 10 reminiscent of the era of Taylor and Heintzleman. In a show of support for Research, Regional Forester John Sandor contacted Assistant Director Ken Wright in Portland with the suggestion that Research should be included in the enabling legislation by which Congress would approve disposition of funds from the annual allocation authorized under ANILCA. Wright recalls that Sandor called him while the Station Director was out of town, and he advised Wright to contact the Washington Office immediately with a request to include funding for Research. Sandor was concerned that the mandate to sustain a high rate of timber production while protecting other forest resources and wilderness areas would create management problems, and Region 10 would require considerable support from Research. Sandor told Wright to "think big," and Wright came up with the figure of $2 million, which he drew from an economic study previously conducted by the PNW Station to determine Research needs for southeast Alaska. Wright called Sandor's contact in Washington and asked for an annual appropriation of $2 million for Research. The resulting legislation earmarked an annual allocation of about that amount to support Research on the Tongass National Forest in accordance with the goals and priorities of ANILCA.[13]

[12]Communication trom Marlin Plank, Forest Products Technologist (ret.), to Ken Wright, 25 August 1995.
[13]Interview with Ken Wright, 13 July 1993.



Olaf C. "Charley" Wallmo, a specialist in wildlife habitat, became the local point of tense relations between Research and Region 10 between 1978 and 1982, when his studies on the Tongass National Forest challenged forest management assumptions that clearcut logging improved habitat for deer and other browse animals. Wallmo's reseath was subjected to intense scrutiny and criticism from within the Forest Service, but the Wildlife Society awarded him its highest award in 1982 in recognition of his contribution to advancing scientific knowledge about old-growth forests. Wallmo died shortly after receiving the award. (Photo provided by Matt Kirchoff of the Alaska Department of Fish and Game'

The ANILCA raised the stakes in the contest between preservationists and Forest Service production-oriented conservationists because it provided funding that, ironically, challenged the implicit assumption of the act that high-yield timber production could be compatible with recreational uses and wilderness protection. Wildlife biology was one area in which this conflict became immediately apparent. O. Charles Wallmo, a specialist in wildlife habitat, had transferred to Juneau from the Rocky Mountain Station at Fort Collins, Colorado, in 1978 to begin studies of habitat for deer, goats, bear, moose, and nongame animals on the Tongass National Forest. Wallmo, who was the first wildlife biologist on staff at the Juneau Lab, operated on a budget of about $30,000 per year by 1980, by which time he had brought in a technician, Gordon [Gordy] Fisch. Wallmo and Fisch worked closely with the Department of Fish and Game in a cooperative agreement designed to contain costs. Their findings, by early 1980, challenged the long-held belief that clearcut logging improved habitat for deer and other browse animals. That belief, Wallmo argued, was rooted in an understanding of forest ecology and regeneration for the lower 48 states, but his studies demonstrated that those characteristics were different in the complex ecosystems of southeast Alaska. Wallmo's conclusions directly challenged fundamental assumptions supporting management policies in Region 10, and they sparked a storm of controversy.[14]

Relations between Region 10 and the Juneau Lab, already tense in the aftermath of the earlier dispute with Yates over Harris' regeneration studies on Afognak Island, were further

[14]Wallmo t arried impeccable scientific credentials into the dispute, and he was selected in 1980 for a 2-year term as associate editor for the journal of Wildlife Management, the publication of the Wildlife Society. The Wildlife Society also awarded Wallmo its highest honor for his research in this area. PNW News, 23 Jan 1978 and 4 August 1980. Interview with Bill Farr, 9 August 1993; interview with Thomas Hanlev by Max Geier in luneau, Alaska, 18 December 1995; interview with Bill Meehan, Doug Swanskin, Al Harris, Tom Laurent, Don Schmiege, Bill Farr, Karl Hegg, and Mary Lewis, 22 December 1992. Olot C Wallmo and |ohn W. Schoen, "Response of deer to secondary forest succession in southeast Alaska," Forest Science 26 (1980) 3, 448-462.

strained during the early 1980s when forest managers at Region 10 challenged the applicability of Wallmo's work beyond the specific study sites he had examined. Budgetary constraints had limited the scope of Wallmo's work to relatively narrow, site-specific studies before 1980, but his studies clearly indicated that deer on those study sites did not benefit from clearcutting. Wallmo also upped the ante when he presented his findings in an article for Forest Science aimed at practicing foresters, rather than limiting himself to communicating with other wildlife biologists. This willingness to directly confront the management implications of his research and communicate his insights to forest managers continued the utilitarian traditions of the Research community in Alaska, but it sparked a firestorm of controversy that drove a wedge between Research and Region 10.[15]

The controversy over the management implications of Wallmo's study of deer habitat in Alaska forests ironically paved the way for Thomas Hanky's long-term studies of deer habitat requirements in the 1980s. Here, Thomas Hanley relaxes with a deer and a portable computer. (Hanley collection)

Wallmo's results, when extrapolated across a broad spectrum of sites in Alaska, challenged central assumptions guiding Forest Service management of National Forest lands in southeast Alaska, and his research became the focus of intense scrutiny and numerous reviews, both within and outside of the Forest Service. John Schoen, a wildlife biologist with the Alaska Department of Fish and Game, who worked as a cooperator with Wallmo on the study, recalls that the state agency staunchly supported their research findings. Persistent reports that the Regional Forester's office had tried to block publication of Wallmo's study, however, further soured relations between Sandor and Schmiege, and aggravated existing tensions between Research and Region 10 in Alaska. Any such efforts to block publication of Wallmo's study apparently failed, but Wallmo eventually resigned, his health deteriorated, and he died not long after the controversy peaked. Station Director Ethington, who emphasizes that Sandor was "entirely professional in the way he conducted himself" during this episode, argues that Wallmo's personal style contributed to the acrimony nearly as much as did reactions to his science and its implications for forest management in southeast Alaska. Matt Kirchoff, however, who began his professional career working with Wallmo and currently holds appointment with the Alaska Department of Fish and Game as Deer Research Biologist, observes that Wallmo "had tremendous respect from his peers, not only as a first rate ecologist, but as a person of great integrity." Sandor dismisses as "absurd" the idea that Region 10 attempted to block research publications, but Schmiege and other scientists remain deeply suspicious about the motives and methods of the people in the Regional Forester's

[15] Thomas Hanley, who at the time was a Ph.D. candidate at the University of Washington, notes that he was one of the reviewers of the article for Fpxest Science. Interview with Tom Hanley, 1 8 December 1995.

juneau FSL technicians measure the energy cost ot locomotion in snow *for deer in southeast Alaska. The mask over the deer's muzzle collects exhaled CO2 in the weather balloon at right. (Haniey collection)*

Boh Erhardt (left) and an assistant assess stream profile on the Kadashan River, Chichagof Island. (Swanston collection)

office at the time of the dispute. Those scientists also view the incident as a challenge to the traditional autonomy of their branch of the Forest Service, although Research in Alaska had long been subject to influence from the Region, dating back to the era of Taylor and Heintzleman.[16]

Expanded support within the Forest Service for more-extensive studies of the habitat requirements of deer were an ironic by-product of the Wallmo controversy after 1 980, largely because of the convergence of TTSF funding for research and the insights of research forester Wilbur Farr. Farr's suggestion that deer habitat preferences might be correlated with timber-type maps led to the discovery of a correlation between high-volume stands and habitat preferences of deer, and ANILCA mandates called for maintaining a high volume of annual timber production on the Tongass. Wallmo's work had already pioneered the idea that at least **some** problems existed with clearcutting in relation to deer habitat in southeast Alaska, and Farr's work seemed to suggest the most valuable timber stands were also the stands most preferred by deer. Wallmo's replacement, Thomas Han ley, a wildlife biologist with a Ph.D. from the University of Washington, arrived at this moment:TTSF funding boosted the 1981 allotment for wildlife biology research from $30,000 to $1 30,000 as of February 1981, and forest managers were desperately seeking an answer to the question of **what** features of high-volume forests suit the needs of deer in southeast Alaska. Where Wallmo had struggled to break through preconceived notions that clearcutting was beneficial to

[16]Schoen observes that the Fores Science' article that he co-authored with Wallmo was subjected to more intense scrutiny and review than any other research project with which he has been associated. Hanley notes, tor example, that Region 10 brought in two deer biologists from the University of California Bill Longhurst and Les Robinette) for an independent investigation, and Wright brought in Hanley from the University of Washington for an independent review of their findings in a summer "close-out" session presenting the results of the "Longhurst-Robinette Report". Wallmo left the Station that September (1980), and Hanley arrived as his replacement in October 1980. Interview with Tom Hanley, 18 December 1 995: interview with Robert Ethington, 12 July 1995; communication from Robert Fthington to Max Ceier, 13 |uly 1995: communication from Don Schmiege, 12 August 1995; interview with Bill Farr, 9 August 1993; interview with Bill Meehan, Doug Swanston, Al Harris, Tom Laurent, Don Schmiege, Bill Farr, Karl Hegg, and Mary Lewis, 22 December 1992; interview with]ohn Schoen. 4 March 1996; interview with Matt Kirch off, 4 March 1996; communication from Matt Kirchoff, 22 lanuarv I 996.

Roy "Doc Feely" Sidle plotting soil horizons in a bore hole in 1979. (Swanston collection)

deer, Hanley enjoyed the luxury of a research climate in which leading forest managers recognized some problems existed and wanted an answer to the question: "now what do we do about it?" Hanley notes that this context enabled him to secure approval for a 10-year research program to study the general biology of deer (including, among other issues, overstory-understory relations and energy costs of locomotion through snow). This long-term study, which Hanley considers unusual in the broader context of Forest Service support for wildlife research in Alaska, included many individual elements with few obvious political implications in their discrete parts, and by the time the cumulative results were published in 1 989, Hanley notes that an emerging consensus of support for his findings effectively precluded any confrontation with forest managers such as that experienced by Wallmo 9 years earlier.[17]

The strong support for Hanley's research was a silver lining to the problem of ongoing tension between Research and the Regional Forester's office over the Wallmo controversy, which contributed to a sudden change in leadership at the Forestry Sciences Laboratory at a crucial point in the evolution of administrative guidelines for allocating funds from the Tongass Timber Supply Fund for Research in southeast Alaska. The Juneau Lab suddenly faced the new mandate with new leadership and new personnel when Schmiege, who had led the multifunctional program, Ecology of Coastal Alaska Forests, since its inception in 1972, announced his early retirement in 1982. Schmiege cites the "frustration of dealing with R-10 over the deer habitat issue" as a central motivation behind his decision. In an interview published in the Station newsletter in 1982, Wright credited Schmiege with sustaining the program at Juneau over the previous decade with his reputation and credibility with the Alaska legislature. Schmiege had developed strong ties with the Governor's office in Alaska that nearly led to funding for a new laboratory facility at juneau, but Schmiege left the program in the aftermath of the Wallmo incident and just as the Tongass Timber Supply Fund shifted the emphasis of Research in Alaska.[18]

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[18] Another wildlife biologist who successfully pursued an ongoing program of long-term research during this period was Vic Van Ballenberghe, whose studies of moose on the Kenai Peninsula are addressed in another se(tion of this chapter. Hanley notes that Region 10 had hired more biologists by 1 989, which he suggests may have contributed to the relatively supportive response to his summary report by forest managers with the Region. Thomas A. Hanley, Charles T. Robbins, and Donald E. Spalinger, Forest Habitats and the Nutritional Ecology of Sitka Black-Tailed Deer: A Research Synthesis With Implications for Forest N1anagerrient (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report, PNW-GTR-230, March 1989); interview with Tom Hanley, 18 December 1995.

[19] Communication from Don Schmiege, 12 August 1995; PNW News, 23 January 1978; PNW News, *27* July 1981: PNW News, 27 September 1982.

Station Director Ethington viewed Schmiege's retirement as an opportunity to change the administrative structure at the Forest Science Laboratory to "ease the burden" on scientists like Schmiege and Meehan while maintaining strong leadership in juneau. In keeping with that goal, Assistant Director Wright and others on the management team in Portland devised a multiproject program that placed Schmiege's former program and Meehan's fisheries program under the leadership of a person who would assume the administrative burden and leave the scientists free to pursue their work. Ethington recalls that he was concerned that the TTSF funding had created a difficult administrative situation in Juneau that might be "too tough" on people like Schmiege and Meehan, who were expected to be productive scientists even as they also ran their Research units. Among other concerns, administration of research supported with TTSF funds required different reporting and accounting procedures than did other PNW Station projects. Ethington recalls that after consulting with Deputy Chief Buckman, Assistant Director Wright, and others, he initiated a recruitment process to locate someone with strong leadership qualities who was "professionally big enough to look past all this internal scrapping... and, in fact, could lead the troops out of that.... Plus, they had to be someone with enough scientific credentials that they were scientists, that the troops wouldn't question whether they knew anything about science."[19] The man finally selected to head the multiproject program was new to Alaska, and his academic training and professional experience was a clear departure from Schmiege's or Meehan's.

*The Mendenhall Chapter of Federally Employed Women in 1981 inducted Schmiege into the organization as "our first male member, since you have been one of our most loyal supporters. " H*ere, *one of Schmiege's recruits, Technician Elaine Loopstra, ponders* Armillaria *sex in the luneau Forest Science Laboratory. (Loopstra collection)*

Calvin Bey and Staff Changes at Juneau

Calvin Bey, the person selected to fill the new administrative post at Juneau, was formerly Project Leader for the Genetics of Southern Pine research unit at the Southern Station, in Gulfport, Mississippi, and he arrived at the PNW Station in a period of substantial turmoil and frustration. Some scientists remained hopeful that the proposal for a new research lab at Juneau might yet be approved, but the Station was still adjusting to a new Director (Ethington), the aftermath of the Wallmo incident, the TTSF mandate, and the looming possibility of budgetary cutbacks in Congress. Bey held a graduate degree in forestry from Michigan State University, and a Ph.D. in silviculture and crop breeding from Iowa State University. His appointment marked a significant shift in local leadership at Juneau, from a specialist in entomology, pathology, fisheries, and

[19] Interview with Robert Ethington, 12 July 1995; communication from Robert Ethington, 13 **July** 1995; interview wilh Robert Buckman, 13 **July** 1995.

Forest pathologist Terry Shaw at work on the mistletoe plot at the Harris River, (Farr collection)

Some scientists hunted big game or brought back fishing trophies, but Bernard Bormann seemed pleased with this trophy-quality specimen of skunk cabbage that he bagged on an alder thinning area. (Farr collection)

Elaine Loopstra uses the shigometer at the juneau cemetary in tall 1981. Despite all the concerns about logistical support in the vastness of Alaska forests, study sites were also available almost within reach ot the scientists' back doors. (Farr collection)

wildlife (Schmiege), to a specialist in trees and silviculture (Bey). Many of the scientists with whom Bey worked at Juneau after 1982 had joined the lab in the years just before Schmiege's retirement, and they were influenced both by the professional legacy of Schmiege's leadership and by the administrative priorities that Bey brought to the program.[20]

New scientists at Juneau in the early 1980s were a small group of researchers who, like Hanley, continued the third wave of talent from western and midwestern graduate programs in fields other than forestry. Roy Sidle, who held undergraduate and graduate degrees in hydrology and soil science from the University of Arizona and a Ph.D. in soils and civil engineering from Pennsylvania State University, joined Swanston at Juneau in 1981. That same year, forest pathologist Charles G. "Terry" Shaw joined the staff at Juneau as a technician who worked closely with Tom Laurent and also with forest pathologist Paul Hennon and the State and Private Forestry unit in Juneau. Shaw, whose father (Charles G. Shaw, Sr.) was a forest pathology professor at Washington State University, later completed his Ph.D. at Oregon State University and eventually joined the State and Private Forestry unit. Another new recruit who worked with Shaw, biological technician Elaine Loopstra, signed on with Schmiege's group in the same month of 1 981 that the Mendenhall Chapter of Federally Employed Women (FEW) reportedly inducted Schmiege into their organization with the wry observation: "We feel it is fitting that you be our first male member, since you have been one of our most loyal supporters."[21]

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[20] Communication from Don Schmiege, 12 August 1995; PNW News, 23 January 1978; PNW News, *27* July 1981; PNWNews;, 27 September 1982.

[21] Dorothy Bergstrom; Addendum, 27 July 1981 ; PNW_News, 1 3 July 1981; 27 July 1981; 23 January 1978; 27 July 1981; 27 September 1982; 27 September 1 982; interview with Elaine Loopstra by Max Geier in the Juneau FSL, Alaska, 19 December 1995.

These new additions to the staff realized the vision of Wright and Schmiege, who had struggled to broaden the scope and focus of Research at Juneau throughout the 1 970s, but their arrival in Juneau also came when Congressional legislation and other political concerns increasingly shaped new priorities for Alaska Research in the 1980s. The ANILCA mandate for timber production in southeast Alaska, and the linkage of Research funding with the TTSF, built more on the traditions of Taylor and Heintzleman than on the integrated research and multifunctional programs fueled by third-wave scientists recruited to Alaska in the 1960s and 1970s. The Congressional mandate for high timber production was clear, and that reality framed the context for questions from Research clients, including Forest Service managers. This trend also extended into the interior. Assistant Director Wright, in early 1981, circulated to scientists in Alaska copies of a paper by forest economist Richard Smith entitled "Potential Economic Development of Forest Resources in Interior Alaska." Wright observed that the value of interior Alaska forests for wood products had long been the subject of speculation, and noted that ANILCA made the report on the potential for expanded timber production "particularly timely".[22]

In keeping with the emphasis on timber production and the provision for Research as mandated in the TTSF legislation, a second group of scientists joined the staff at Juneau between September 1982 and January 1983 to assume the increased workload associated with ANILCA. These new hires included plant physiologist Bernard Bormann, fisheries technician Pam Porter (who was quickly promoted to fisheries biologist), hydrological technician Barry Long, plant ecologist Ed Dealy, mensurationist Don DeMars, and biological technician Richard Orchard. These additions increased the number of scientists on the staff at Juneau by nearly 50 percent, to a total of 16 researchers, and Bey observed that areas of emphasis for Research in 1983 would include the effects of logging on timber, wildlife, slope stability, pathology, and site productivity. He also noted, "My job is to be sure that we aren't going in different directions; that we are focused. I'm here as an administrator to make the scientist's job easier."[23]

Most of this new class of scientists arrived with strong connections in the undergraduate and graduate programs of forestry schools in the Pacific Northwest, and with prior work experience at the PNW Station in Portland. Orchard, for example, transferred to Juneau from the Corvallis Forestry Sciences Laboratory. The sudden infusion of new blood in the research community at Juneau between 1980 and 1 983 (9 of the 1 6 scientists at the Forest Science Laboratory in 1983 were hired over the preceding two years) fostered a mood of creative energy that approximated conditions at Fairbanks 20 years earlier. The multifunctional unit at Fairbanks, however, had coalesced around studies of the ecological effects of natural events, such as fires, and watershed studies related to flooding. At Juneau, the new research team zeroed in on disturbances related to timber and logging activities mandated under the Lands Act. Dealy, for example, was a 1975 Ph.D. from Oregon State University who focused on wildlife habitat and land management policies on second-growth forests

[22]PNW News, 1 6 Feb 1981.

[23]Sou£dogh Nptes, January 1983.

in the vicinity of Ketchikan and Prince of Wales Island. DeMars was a 1968 Ph.D. from the University of Washington who studied forest stands to improve estimates of marketable timber per acre. Bormann, with a B.S. (plant ecology-soils) at Evergreen State College in 1976 and an M.S. in botany (ecology/ soils) from the University of Washington in 1978, earned his Ph.D. in 1981 in forest science (forest tree physiology) from Oregon State University. At OSU, he worked with former Station Director Tarrant and John Gordon, Department Head of Forest Science, who left OSU for a position at Yale shortly thereafter.[24]

Bormann is a good example of the new wave of scientists who came to Juneau during the 1980s, but he also illustrates how earlier trends and traditions of the Research community in Alaska continued into more recent times. He was raised near the center of forestry research at Yale, where his father was a forest ecologist known as "somewhat of a heretic" for his studies of nutrient loss from clearcutting.[25] The younger Bormann, however, yearned to get away from the East Coast, and after high school, he pursued his academic interests in the Pacific Northwest, where his scientific curiosity eventually drew him north to Alaska. His early work at the University of Washington was an ecological study concerned with soil development in relation to stand physiology and nitrogen-fixing bacteria in alder stands that had come in after disturbances of various kinds. His doctoral research involved a more controlled study requiring standardized plots and more experimental skills, but he worked to blend his interest in broader ecological studies with more technical studies that devoted more attention to specific cause-and-effect mechanisms that influence broader ecosystems. He credits this evolving focus in his work to his father, to Gordon, and to Tarrant, who took an interest in his studies at the UW and funded his Master's thesis through the PNW Station. Tarrant also convinced Bormann to accept a position as Research Plant Physiologist at the Olympia Lab in 1981, where he worked for 8 months before moving to Juneau in May 1982.[26]

Tarrant's recruitment of Bormann and his advice to the young scientist on the eve of his assignment to Alaska are a good illustration of how Research priorities had changed in the 8 years since 1974, when Buckman approached Dyrness about the job in Fairbanks. Buckman's first concern with Dyrness had been whether he and his family were willing to make Alaska their home, but Tarrant's first concern was that Bormann remember that his purpose in Alaska was science. He recalls telling Bormann, "You'll be like the first white man, just run your canoe up on any gravel bar and take a big sack and pick up a nugget, there's information lying there for the taking and you know how to do it. Promise me you won't go Alaskan on me."[27] Tarrant's insistence that Bormann should "go in, do the

[22]PNW_News, 26 October 1981; Sourdough Notes, January 1983; interview with Bernard Bormann by Max Geier at the Forestry Sciences Laboratory in Corvallis, Oregon, 31 August 1995; interview with Robert Tarrant, 11 July 1995.

[23]Interview with Robert Tarrant, 11 July 1995; interview with Bernard Bormann, 31 August 1995.

[24]Interview with Bernard Bormann, 31 August 1995; position description for Bernard Bormann, provided by Bormann to Max Geier, 31 August 1995; interview with Robert Tarrant, 11 July 1995.

[25]Tarrant recalls, however, that despite this advice, Bormann had barely settled in at Juneau before he started talking about buying a boat, cabin, and other accouterments of the Alaska lifestyle. Interview with Robert Tarrant 11 July 1995.

work, and get out" was a reflection of twin concerns at PNW Station: many excellent researchers were interested in Alaska, but they were often reluctant to move there on a permanent basis, and those who did want to move there often were so enamored of the place that they would follow their scientific curiosity into remote study sites where the vastness of scale overburdened them with logistical and budgetary problems that hampered completion of their work. Tarrant urged Bormann to seek study sites close to Juneau and to concentrate on completing the work and publishing the findings. Bormann, for his part, located plots accessible from the highway system in juneau and at sites accessible with short flights by floatplane from Juneau. He located much of his work at Hawk Inlet, where the Juneau Lab maintained two float houses obtained "on surplus" from the Vegetation Classification crew. Bormann recalls he and his crews anchored the boats at Hawk Inlet, where they provided a comfortable work environment for about 1 2 to 1 5 people at a location that was just a 1 S-minute flight from Juneau. After about 5 years, this and other work provided the basis for publications that rapidly established Bormann's reputation as a promising scientist, and he subsequently moved back to the Corvallis Forest Science Laboratory, where he became involved in efforts to develop scientific methods for ecosystem management.[28]

University of Washington Professor F.C. Ugolini, shown here rolling up his sleeves for work at Whitewater Bay, is an example of the invaluable support that cooperators provided tor research in Alaska. Ugolini worked closely with Bernard Bormann in the early 1980s. (Farr collection)

Even with his emphasis on locating study sites close-in to Juneau, Bormann grappled with the same kind of logistical problems, difficult field conditions, and uncertain travel arrangements that had frustrated scientists in Alaska since 1741. He notes that most people at the Juneau Lab who needed air transport preferred to work with Ward Air, a private contractor in Juneau with pilots certified by the Forest Service, rather than relying on planes dispatched through Region 1 0. Lingering tension between Region 10 and Research apparently spilled over into concerns about the service that dispatchers with the Region provided for crews from the Forestry Sciences Laboratory. Ward Air also had a reputation as the outfit with the best pilots in Juneau, but Bormann recalls that at least one hair-raising experience involving his crew "freaked out" even the "best pilot in juneau." Bormann and his crew were working near Hawk Inlet near the end of the field season when a snowstorm began to move in, and they hurriedly called Ward Air by radio to arrange for an early pick-up. The pilot flew in over the pass into Hawk Inlet just ahead of the storm, pulled up on the beach, and yelled "Get in! FAST!" Bormann recalls, "So we just throw our stuff in, and he

[28] Interview with Robert Tarrant, 11 July 1995; interview with Robert Ethington, 12 July 1995; interview with Robert Buckman, 13 July 1995; interview with Bernard Bormann, 31 August 1995; Bernard!. Bormann, Martha H. Brookes, E. David Ford, A. Ross Kiester, Chadwick D. Oliver, and lames F. Weigancl, Eastside Forest Ecosystem Health Assessment, Volume V: A Framework for Sustainable-Ecosystem Management (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-331, February 1994).

guns it, and he heads up over the pass, and it turns into complete, total white-out conditions, and its, you only can do that with visual contact, and so he did this really outrageous maneuver and came back and just landed back in Hawk Inlet, and like, put his head between his hands and wouldn't talk to us for a few minutes, and when the BEST pilot in Juneau is freaked out over something, you know that something pretty nasty could've happened." They sat there for about an hour, Bormann notes, and the weather just kept getting worse, until the pilot finally took off and flew about 6 feet above the churning whitewater that was Chatham Strait, all the way around the north end of the island. The flying time back to Juneau from Hawk Inlet, normally 1 5 minutes away, took more than 45 minutes, and Bormann recalls he spent the whole time "just kind of looking out the window, and it's froth down there, that was probably the worst one I had."[29]

Difficult field conditions, the need for base-line data specific to Alaska, and limited access to analytical facilities had often preoccupied and frustrated earlier scientists in Alaska, and these issues nearly discouraged Bormann from accepting the position in Juneau. Bormann recalls that his research at Olympia was heading more in the direction of controlled experimental work, and he was not optimistic about the opportunities for continuing such work in Alaska. As with the other scientists who preceded him at Juneau, however, he recognized the enormous potential for good research in southeast Alaska, and he soon adjusted his research methods to meet the conditions of work in that region. Bormann observes that "the Tongass and the Chugach National Forests, in general, ought to be thought of as a national treasure for understanding natural ecosystems, in that information gained from there has tremendous applications in many other places...." Once at Juneau, he reverted back to his earlier interest (at the University of Washington) in studies with a broad, ecological perspective, and he began to look more at "natural processes and mechanisms...."[30]

Despite his own initial trepidation about the move to Alaska, Bormann notes that he never had any trouble recruiting other scientists for his program: "That's one of the best things about working up there...most people are interested in the place...it's uncharted waters, for the most part, research-science-wise, all sorts of wonderful questions to look at, so it's a good combination." Bormann, who notes that his work would not have been possible without the solid foundation laid down by previous scientists in Alaska, initially worked closely with Bill Farr at Juneau, but he also maintained close connections with his colleagues at the University of Washington and Oregon State University. As one of his first moves, Bormann recruited F.C. Ugolini, a soil scientist from the University of Washington, to help him develop his research program at Juneau[31].

Ugolini, who had done considerable work in Alaska at Glacier Bay, had already established his reputation as an expert on the soil-development process of podzolization. Podzolization is a process that occurs mostly under conifers. It eventually produces a thick organic layer over a thinner "Bh" horizon in which iron, aluminum, and other elements combine with fine particulate

[29] Interview with Bernard Bormann, 31 August 1995.
[30] Interview with Bernard Bormann, 31 August 1995.
[31] Interview with Bernard Bormann, 31 August 1995.

Each generation of forest researchers in Alaska worked with their successors to pass along their experiences and insights, thus perpetuating the community culture of scientists in the field. Here (from left), Tom Hanlev, Dave Bruce, Bernard Bormann. Al Harris, and Don Domain cooler at Hollis. (Farr collection

organic matter to form a layer that roots can seldom penetrate. Bormann suspected that this podzolization process, which predominates in southeast Alaska, was a driving mechanism affecting the "basic productivity of the forests" in that region. Working with Ugolini and other scientists over the next 10 years, Bormann also found that windthrow was a significant mechanism working to prevent the whole landscape from becoming podzolized because, if a tree blows down while its roots are still in the zone where the Bh is forming, the disturbance stirs the soil and promotes more productive assemblages of species in terms of net primary production and wood production.[32]

Bormann notes that his research has far-reaching implications for management practices in southeast Alaska, although he initially faced criticism that his work was too esoteric. He observes that podzolization occurs throughout the North Temperate Zone, and windthrow is common all over the world and particularly in areas of Alaska that have not been logged. Logging removes trees that might otherwise be subject to windthrow, and thus eliminates a major mechanism for the nutrient cycling necessary for maintaining the long-term productivity of sites in southeast Alaska. Bormann argues that the pattern of clearcut logging, as historically practiced in Alaska, contributes to declining productivity in that region, and he has been active in devising new management strategies to promote harvesting methods that more closely mimic windthrow patterns and processes. He also suggests that management guidelines must take into account the reality that forest ecosystems in Alaska are dynamic, chaotic, rapidly changing, and often unpredictable. Bormann's work on podzolization eventually led him into studies of long-term ecosystem productivity, and he moved back to the Corvallis Lab in 1988 to lead the Long-Term Ecosystem Productivity (LTEP) program.[33]

Bormann's path-breaking work with Ugolini was the product of a long period of relatively esoteric research that yielded short-term dividends of marginal interest to other scientists and

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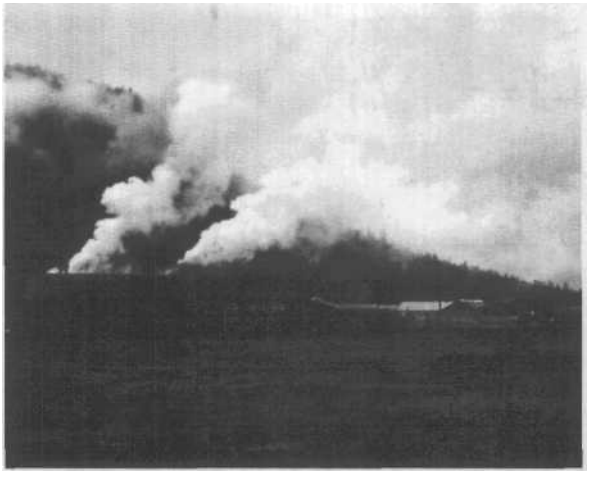
[32] F.C. Ugolini, B.T. Bormann, and F.H. Bowers, Soil development and the evolution of forest ecosystems in southeast Alaska [Abstr.] (Gustavus, AK: Glacier Bay Science Symposium, U.S. Department of the Interior, National Park Service, Glacier Bay National Park and Preserve, 1984); B.T. Bormann, "Podzolization and windthrow: natural fluctuations in productivity and management implications [Abstr.]," in Perry et al. (eds.). Maintaining the long-term productivity of Pacific Northwest forest ecosystems (Portland, OR; Timber Press, 1989); B.T. Bormann, H. Spaltenstein, M.H. McClellan, F.C. Ugolini, K. Cromak, Ir, ,ind S.M. Nay, "Rapid Soil Development After Windthrow Disturbance in Pristine Forests," Journal of Ecology 88 (1995): 747-757; interview with Bernard Bormann, 31 August 1995.

[33] Position description for Bernard Bormann, 31 August 1995; interview with Bernard Bormann, 31 August 1995.



Production-oriented research gained broader political and fiscal support during the 1980s and in the aftermath of the Alaska National Interest Lands Conservation Act, the focus of attention shifted away from the interior and hack to the Tnngass National Forest. Here, the Wrangell Mill illustrates the continuing concern lor timber pioduction in an era of broadening research methods and interests. (Wright collection)

forest managers in Juneau at the time. Bormann recalls he spent his first three years in Juneau doing "a lot of grunt work" to develop biomass regression equations "...that just didn't exist..." for Sitka spruce and western hemlock. These basic equations were necessary to his plans for developing stand-scale nutrient budgets and other interim tools needed to explore research questions relating to nutrient cycling, soil development, and changes in productivity, but they required a long-term commitment of human and fiscal resources that were already in high demand for research on immediate management problems for Region 10.[34]

Bormann also gained an appreciation for the relative status of Research in relation to other Forest Service priorities in Alaska during his years at the Juneau Lab. He recalls that one of his plots near Hawk Inlet was on a major deposit of sand slated for development as a gravel pit to support efforts to sand the icy roads servicing mining activities in the area. Bormann's unit had completed most of their work on the site by the time Region 1 0 announced the plan to develop the gravel pit, but some long-term measurements were still underway, and Bormann hoped to keep his options open for going back and doing some different work on the same sites. He recalls the Regional Forester's office eventually addressed his concerns, but "we had to do a lot of yelling and screaming. We were just on the list... fit] came down to, well, 'the National Forests are here to supply resources, and research winds up way down at the bottom of the list ... those things fall out, we'll accommodate you' was the message. It was the first time I fully realized where we were on the totem pole, which was really down at the bottom."[35]

Bormann notes, however, that he benefited from established traditions of scholarship in Alaska and from a shift in the kind of research that the broader scientific community was willing to support. Like other researchers in his class of recruits, Bormann arrived at a time of heightened expectations that timber resources in the region soon would be targeted for industrial development. At juneau, the new recruits joined an established staff of scientists already deeply engaged in studies evaluating the effects of logging on forests of southeast Alaska, although the entomological and pathological programs lost John Hard, who transferred to a position with the Pacific

[34]Quotations are from I he interview with Bernard Bormann, 31 August 1995; interview with Robert rarrant. 11 July 1995; interview with Robert Buekman, 12 July 1995.

[35]Interview with Bernard Bormann, *i*\ August 1995.

John Alden, Ken Wright, and Elaim- Loopstra sit before the Adak Forest in 1986, (lanked by Walter Brlggs and an unidentified assistant (standing). (Loopstra collection)

Southwest Station in Davis, California, about this time. Much of the ongoing work at Juneau and Fairbanks, however, involved descriptive studies that were still desperately needed in Alaska but were often less interesting to editors of scientific journals than the more analytical studies current in other regions of the United States. Other scientists and research programs in Alaska also struggled with stagnant budgets and staffing problems that often limited their productive output. Bormann, however, found funding opportunities and publishing outlets that enabled him to staff projects and deliver research results to an appreciative audience. He was able to acquire funding, for example, through the U.S. Department of Agriculture competetive grants program to support his research through the difficult era of limited budgets and political readjustments that scientists with the Branch of Research increasingly faced during the mid 1980s.[16]

ANILCA and Implications for Fairbanks and Anchorage

The ANILCA revitalized the program in Juneau and provided a central focus for work on the Tongass National Forest, but it also marked the beginning of a long period of stagnant budgets and eroding support for continuing the multifunctional unit in Fairbanks. ANILCA, moreover, virtually settled many of the issues relating to the disposition of federal lands, which had fueled support for the forest inventory work in Anchorage. The provision for an annual allocation of funds for Research from the Tongass Timber Supply Fund, along with controversial decisions to allow mining, hunting, and other activities on ostensibly protected reserves and wilderness areas on theTongass National Forest, diverted public attention from the interior. ANILCA largely settled many of the issues related to who would control which lands in Alaska, and the need for comprehensive surveys of broad regions became less of a priority than research targeted at management issues specific to a particular resource or local site. This political reality in Alaska coincided with the political backlash against the environmental initiatives of the 1970s, and production-oriented research gained broader political and fiscal support during the 1980s.[17]

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[16] Communication from Bill Meehan, June 1995; interview with Bernard Bormann, 31 August 1995; communication from Ken Wright, December I995.

Memo 19 June 1981. from Bill Meehan to Ken Wright (in TTSF File, Juneau Office, PNW Station); "Planned Forest ,md Related Research," 1-2; Pacific Northwest Forest and Range Experiment Station, "Research Work Unit Description. Management Alternatives for Timber and Related Resources" (unpublished report in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service, 1984).

Personnel and Research Trends at Fairbanks and Anchorage

The expectation that ANILCA mandates would open the forests of interior Alaska for economic exploitation generated an initial burst of interest in expanding the Research program at Fairbanks during the early 1980s, although that initiative rapidly dissipated as the focus of controversy and investment swung heavily southward by mid decade. Several new scientists brought a broader array of skills to bear on the study of interior forests, especially in genetics, silviculture, and wildlife biology, and the family atmosphere of the lab seemed conducive to the continued advancement of the concept of integrated research.

The experience of John Alden on the research staff at Fairbanks illustrates Wright's support for expanded studies in the interior before ANILCA and also the gradual erosion of that program over the next decade. Alden, who came to Alaska in 1 979, was much like many of the other scientists who joined the staff between 1980 and 1983, in that he had close ties with the Pacific Northwest before his arrival in Alaska. He came to Fairbanks from a position at the Portland office of the Bureau of Land Management, and Wright hired him to study forest genetics issues related to liquidation sales of timber on Native lands acquired after the Alaska Native Claims Settlement Act (ANCSA). Alden, who was frustrated with the administrative responsibilities that dominated his time with the BLM, hoped to develop his interests in studying genetic variation in the forests of Alaska, but he soon found that his colleagues in Alaska and directors in Portland expected population studies, and his initial research focused on seed supply and handling of seeds for the regeneration of white spruce and Sitka spruce.[38]

Alden soon found himself working closely with John Zasada under relatively primitive conditions at Fairbanks. Zasada contributed to the mood of renewal and brought a circumpolar perspective to the program in 1980, when he returned to the INF at Fairbanks after completing a year of post doctoral training with J.L. Harper, head of the School of Plant Biology at the University College of North Wales and a leading authority on the demography and population biology of plants. Harper approached population biology with a Darwinian emphasis on the life cycles of individual organisms in relation to the physical environment, available resources, and selective processes that lead to ecological and evolutionary change. One of the goals Zasada cited as a priority in his year of study with Harper was to determine methods other than herbicides useful in promoting the establishment and growth of desired species and to iden-

Early research efforts in Fairbanks proceeded without local nursery facilities, but more recently, scientists at the Institute of Northern Forestry in Fairbanks developed nursery beds such as this planting of spruce and alder near Fairbanks. (Wurtz collection)

[18]Inlerview with John Alden in Fairbanks, Alaska, 1 7 December 1992; interview with Ruth Murphy, 1 December 1992.

Ken Wright, John Alden, Elaine Loopstra, and Walter Briggs (Navy Forester) planting trees on Adak Island in June 1986. Alden secured cooperative grant funding from the U.S. Navy in 1985, which supported his research efforts in coastal regions through 1990, but these efforts also illustrate the gradual erosion of support for research in the interior after ANIICA. (Loopstra collection)

Indoor greenhouse at Petersburg. Forest geneticist John Alden faced a constant challenge of securing ongoing funding for research facilities and support staff, and he had to resort to "bootstrap" methods of improvising outdoor nursery beds because local nurseries could not accommodate his research. (Schmiege collection)

tify methods for re-establishing native trees and shrubs needed to restore severely disturbed sites in interior Alaska. Zasada also visited Sweden and Finland during his year abroad and observed forest regeneration practices and harvesting in the subarctic forests of Scandinavia. He later noted that this year of study abroad "...gave me a different perspective on forest community description and response to disturbance, which I hope will be useful in Alaska.../'[39]

The year Zasada returned from his sabbatical was also the year in which ANILCA went into effect, and a triumvirate of officials from the Portland office toured the facilities in Juneau, Fairbanks, and Anchorage that summer to identify areas of concern and review problems of forest economics and utilization of resources. They were accompanied by leading players in the game of defining federal policy and managing public resources in Alaska. PNW Station Director Tarrant had retired in 1979, and his successor, Station Director Robert Ethington, Deputy Director Glenn Cooper, and Assistant Director Ken Wright toured Alaska in June 1980 with a group of officials representing other federal interests in the research agenda.[40]

Problems with funding and supplies were glaringly obvious at the time this group toured through Fairbanks. Alden, who resembles Helmers in temperament and administrative style, recalls he was struggling to establish seed zones and develop baseline information on native species, but he was working with inadequate operating budgets, greenhouse facilities, or nurseries.

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[40] PNW News, 7 July 1 980; Request for a 1 -year sabbatical submitted to Bob Tarrant, Director of PNW, November 1978, in Professional Biography Files, Central History Files, Portland Office.

[44]The touring group included, among others, Assistant Secretary of Agriculture Rupert Cutler, Regional Forester John Sandor, and Forest Products Laboratory Energy Program Manager John Zerbe. PNW News, 16 June 1980; Professional Biography Files, Central History Files, Portland Office; Forestry Research News, 10 December 1979.

Field work at Fairbanks required an ability to adapt to winter conditions that could freeze equipment and people, but the snow cover also enabled scientists like Tricia Wurtz (partially visible here) to reach field sites by snow machine. (Loopstra collection)

Alden claims it was the technical challenge of conducting research in the "frontier conditions" of Alaska that appealed to him when he applied for the position in 1979, but he was not prepared for the lack of funding or technical support that plagued his efforts with the Forest Service. Alden recalls that, in 1 980, the nearest nursery was more than 300 miles away, in Palmer, Alaska, and he struggled to improvise with materials on hand. Alden and Zasada brought in sand from the river floodplain near Fairbanks and worked up an outdoor nursery bed with peatmoss, using a tractor and disc. Lacking sufficient funds for irrigation hoses or a pump, they used an Army surplus tank and trailer to haul water to the site, and they successfully irrigated lodgepole pine, white spruce, and black spruce seedlings with a gravity-fed system consisting of garden hoses attached to the trailer tank.[41]

This bootstrap solution was in keeping with the tradition of frontiersmanship for research in Alaska, but it also illustrated the shifting priorities of the program. If Alden and other scientists at Fairbanks expected stronger support in the wake of Ethington's tour in the summer of 1980, they soon discovered that southeast Alaska enjoyed an advantage in funding and priority. Alden notes, for example, that funding to support his seed zone project for the period 1979 to 1984 initially was allocated but then revoked amidst the budgetary reductions affecting the entire PNW Station during the first years of the Reagan administration. In the wake of those cuts, Alden resorted to using student interns from the Seward Skills Center in Fairbanks to manually compile records covering the preceding 20 years from 62 weather stations across Alaska. As fiscal support from Portland withered during the mid 1980s, Alden and other scientists at Fairbanks scrambled for alternative sources of funding. A cooperative grant from the Navy in 1985, for example, enabled Alden to develop seed collections, provenance studies, transplant beds, and wind-shelter experiments over the next 4 years. This reliance on funding from the Navy, however, forced Alden to shift the focus of his studies away from

When Forest Supervisor Clay Beale began inviting scientists at the Fairbanks lab for annual visits to the Chugach National Forest in the mid 1980s, Dyrness suggests, the experience seemed to encourage those scientists to refocus their energies "...to do more work down that way." Here, a field technician observes the behavior of a moose radiocollared for one of Vic Van Ballenberghe's wildlife studies. (Loopstra collection)

[41] Interview with John Alden, 17 December 1992.

the interior and into coastal regions near Seward, Valdez, Kodiak, and Adak. It also eroded the integrity of the multifunctional research unit and the premise of integrated research.[42]

Research Wildlife Biologist Victor Van Ballenberghe, who joined the staff in 1980, similarly drifted away from the integrated research unit at Fairbanks by mid decade, but unlike Alden, who remained at Fairbanks, Van Ballenberghe physically relocated his base of operations from Fairbanks to the Anchorage office. Van Ballenberghe was an established authority on moose populations with publications in his first year at Fairbanks, but as funding stagnated, he worked with Tom Hanley at Juneau to acquire funding and support for studies of deer in old-growth forests of southeastern Alaska, and he shifted his focus southward in the search for cooperative funding from other agencies and units.[43] Van Ballenberghe's studies of moose in relation to wolf predation in south-central Alaska soon yielded a series of publications in professional journals and a high profile article in National Geographic magazine. By mid decade, Van Ballenberghe's research in southeastern and south-central Alaska rendered his location in Fairbanks increasingly inconvenient, and he transferred to the Anchorage office in 1984, the same year that Assistant Director Wright established the Multiproject Program (MPP) in Juneau, headed by Calvin Bey.[44]

Three years' before the administrative burden at Fairbanks shifted onto his shoulders, Skeeter Werner (center) enjoys a break with technician Danny Lyon and seasonal employee Charles Kingery at a spruce beetle study site on the Chugach National Forest in 1981. (Juneau, unnumbered)

Spruce beetle outbreaks on the Kenai moose range (Seen here in an aerial view) and other concerns led to John Hard's move to Anchorage in 1985; Vic VanBallenberghe also moved to Anchorage in this period. (Wright collection)

[42] Interview with John Alden, 1 7 December 1992; interview with Robert Ethingion, 12 July 1995.

[43] Interview with Ruth Murphy, 17 December 1992; "Research Attainment Description, PNW-1652, Ecology and Management of Forests and Asociated Ecosystems in Coastal Alaska (Juneau, Alaska, Problem 2: Habitat requirements of wildlife, PNW Station, 1984," In storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service; V. Van Ballenberghe, "Utility of multiple equilibrium concepts applied to moose populations," North American Moose Conference and Workshop 16 (1980): 126-1 38; V. Van Ballenberghe and Thomas A. Hanley, "Predation on deer in relation to old-growth forest management in southeastern Alaska," in William R. Meehan, Theodore R. Merrell, Jr., and Thomas A. Hanley (eds.), Fish and wildlife relationships in old-growth forest proceeding of a symposium, 1982 April 12-15), (Juneau, AK: American Institute of Fishery Research Biologists, 1984), 291-2%.

[44] Research Work Unit Description, Management Alternatives lor Timber and Related Resources, Tongass National Forest in Southeast Alaska, Juneau, Alaska, Pacific Northwest Forest and Range Experiment Station, 6 July 1984, in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service; V. Van Ballenberghe, "Extraterritorial movements and dispersal of wolves in southcentral Alaska," Journal of Mammalogy 64 (1983): 168-171 ; Victor Van Ballenbcrghe, "Giants of the wilderness: Alaskan moose," National Geographic (August 1987): 260-280.

An outreach program from the Chugach National Forest Supervisor's office in the mid 1 980s further encouraged scientists at Fairbanks to shift their focus southward. Forest Supervisor Clay Beale began inviting Dyrness and his colleagues for visits every year to present their current research in 2- to 3-day programs geared toward managers and staff for the Chugach National Forest. In the process, the Fairbanks scientists gained an opportunity to learn about problems in the Chugach. Dyrness recalls people in his unit from Fairbanks enjoyed the opportunity to ''...get together with our Forest Service colleagues...and I think they did engender more of a desire on the part of guys like Vic Van Ballenberghe and Skeeter Werner to do more work down that way." At a time of continuing tension between Region 10 and Research at Juneau, scientists at the Fairbanks Lab (who worked closely with the BLM and State Forests people) hungered for more contact with "Forest Service people," and those with the Chugach National Forest were most accommodating.[45]

Bill Farr, seen here in August 1989, was hasped in Juneau for most of his career in Alaska, but he was also active in studies of the interior and is fondly remembered by those he worked with at Fairbanks, Anchorage, juneau, and Portland. (Loopstra collection)

These intra-agency exchanges with the Chugach National Forest were points of light in an unrelenting succession of bleak budgetary outlooks and constant worry over the status of the program throughout the 1980s. Dyrness recalls that the budgetary problems were "...kind of sad and ...[by the] last part of '84, I was getting burned out. I was really getting burned out. ...and this was the slim-down years, and you'd lose sleep—how are we gonna make, meet our budget, we can't do it, you know, how can we do our research on this lousy budget, and where's the money gonna come from..." Dyrness talked the situation over with Wright, and he noted that Werner was willing to assume the responsibilities as project leader, so Dyrness stepped down. He recalls "...after I'd stepped out and Skeeter [Wernerl took over, I'd go home and start worrying about these things, and I had to tell myself, 'It's not your problem anymore, Ted!' [laughs] I was just a research scientist like all the rest of them and then Skeeter had all these personnel headaches and stuff."[46]

By mid decade, budgetary concerns were taking their toll on scientists and staff at the Fairbanks Lab, and a pseudo-colonialist mood of resentful suspicion of administrative motives and priorities gradually seemed to displace the earlier climate of optimistic experimentation and fraternal cooperation.. Amidst rumors that the Forest Service was planning to close the Fairbanks Lab,

[45]Werner, lor example, studied spruce beetle flareups on the Kenai Peninsula. Interview with Ted Dyrness, 17 July 1995.

[46]Interview with Ted Dyrness, 17)uly 1995.

some scientists grew wary of administrative reassurances, scrambled to locate outside funding, and cultivated their contacts with outside agencies to shore up their programs. The result was an ironic sense of increasing alienation from decision-makers in the Forest Service even as their fate rode on the efforts of administrators within that agency, such as Ethington and Buckman, who worked with Congressional representatives who countered budgetary cutbacks proposed by the Reagan administration.[47] Alden, during this period, forged ties with the Nordic Forest Research Council (a consortium of scientists from Finland, Sweden, Norway, Denmark, and Iceland), which recruited him to assist in collecting specimens of Alaskan and Canadian species for introduction into Scandinavia and Alaska at a time when the Forest Service failed to fund his research proposals.[48] This project, and the transmission of Alaska species to scientists in Europe, was reminiscent of the early phase of forest research in Alaska during the late 1700s and early 1800s, when Archibald Menzies, Frederic Litke, and others collected seeds, seedlings, and cuttings from southeast Alaska and brought them to the attention of the international scientific community.[49] More than 200 years after European contact, and despite concerted efforts by administrators in Portland to channel money their way, Research scientists in Alaska still found themselves in a position of dependence on fiscal support from other sources, and they struggled to frame their research agendas in ways that would attract outside funding. In taking this approach, scientists did not sacrifice their commitment to quality science or independence of thought, but the realities of their quest for competitive funding effectively narrowed the field of viable research to those projects for which outside funding could be obtained to supplement allocations from PNW Station.[50]

Scientists in Fairbanks, particularly, depended on cooperative arrangements with the various national, state, and local agencies and interests that gained control of forest lands after ANILCA. Without a National Forest in interior Alaska, and with Forest Service priorities shifting heavily toward timber production in southeast Alaska, as mandated by Congress with the Tongass Timber Act, the future of the Fairbanks office increasingly depended on their ability to serve as interagency consultants. These realities further encouraged the outward spiral of the research community already apparent in the efforts of Alden and Van Ballenberghe, and other scientists at Fairbanks continued to cultivate such ties. Werner, for example, worked closely with Region 10 entomologists and John Hard in Forest Pest Management in the areas of greatest spruce beetle outbreaks in south-central Alaska from 1982 to 1990. Hard, who had already moved from Juneau to Davis, California, and then to Region 1 in Missoula, Montana, finally moved back to

[47]Interview with Robert Ethington, 12 July 1995; interview with Robert Buckman, 13 July 1995; interview with Ted Dyrness, 17 July 1995; communication from Ken Wright, 29 August 1995; interview with John Alden, 17 December 1992.

[48]Interview with John Alden, 17 December 1992.

[49]See chapter one of this publication for a discussion of these earlier expeditions.

[50]This situation fostered a problem of miscommunication between administrators in Portland and PNW Station scientists in Alaska. From the perspective of administrators in Portland, Alaska received a disproportionate share of funding, leaving research projects Oregon and Washington relatively underfunded. From the perspective of many scientists in Alaska, however, the scale of funding from the PNW Station was grossly inadequate for the enormous scale of the research problems confronting them in the far North. This dual reality fostered the emergence of a pseudo-colonialist mood among scientists in Alaska, as noted at the outset of this paragraph.

Alaska to join the Region 1 0 office in Anchorage in 1 985 to study the spruce beetle outbreaks on the Kenai Peninsula. Proximity to the Kenai was a central consideration for Hard in making the move to Anchorage rather than Fairbanks. The commute time from Fairbanks to study sites on the Kenai, along Cook Inlet, and on the lower Copper River was about 7-9 hours, but the same sites were only about 2-3 hours out from Anchorage.[51]

Werner's work on the Chugach National Forest during the 1980s included outreach programs to farmers, horticulturists, veterinarians, pesticide coordinators, plant pathologists, forest managers, representatives of state agricultural agencies, and representatives of the Alaska Railroad. Much of this work focused on damage from spruce beetle outbreaks on Lutz spruce with commercial potential, and Werner also directed his research toward evaluations of forest management alternatives in relation to the life cycle of the spruce beetle and other insects threatening stands of Lutz spruce in south-central Alaska.[52]

Hard arrived in Anchorage about the time the Inventory unit began to focus on the spruce beetle problem on the Kenai Peninsula in 1 985. This inventory work established baseline data at a fortunate time, shortly before more severe problems developed with beetle-killed trees in the latter part of the decade. Scientists at the Anchorage Lab also entered unfamiliar waters in the late 1980s, however, when Region 10 assumed responsibility for inventory work on National Forest lands. Wright and LaBau observe that the amount of training for inventory crews in the National Forest system did not meet the more rigorous standards maintained by the Inventory unit at the Anchorage Lab. Wright notes that this aggregation of national inventories also led to problems because the nature of information from inventories performed by the National Forests did not match those performed by Research. In other words, Wright concludes, "it becomes a matter of 'combining apples with oranges!'"[53]

In the bleak context of stagnating budgets, eroding jurisdictions, weak logistical support, and dissipating focus, however, the Rosie Creek Fire of 1983 was the catalyst for a temporary revival of the multifunctional unit for integrated research. Scientists at Fairbanks had become less isolated from their colleagues elsewhere in the Forest Service in March 1982, when direct-dial access to the lab finally became possible over the FTS telephone network,[54] and research centered on the 1983 fire on and near the Bonanza Creek Experimental Forest provided the focus for an Arctic Science Conference held at Fairbanks 2 years later. Contributors to the conference

[51]Interview with)oan Foote, 15 December 1992; interview with Richard Werner, 30 July 1993; PNW News, 21 Oct 1985.

[52]R.A. Werner, E.H. Holsten, "Mortality of white spruce during a spruce beetle outbreak on the Kenai Peninsula in Alaska," Canadian lournal of Forest Research 13 (1983): 96-101; PNW News, 1 Feb 1982; Richard A. Werner. Felton L. Hastings, Edward H. Holsten, and Alice S. Jones, "Carbaryl and lindane protect white spruce from attack by spruce beetles (Coleoptera: Scolytidae) for three growing seasons," lournal of Economic Entomology 79 (1986) 4: 1 1 21 -1 1 24.

[53]Interview with Jim LaBau, 5 August 1993; communication from Ken Wright, June 1995.

[54]Direct-dial access was previously available via commercial phone lines, but access via the FTS system made communication outside Alaska considerably less complex and less of a budgetary burden than in prior years.

included Werner, Viereck, Foote, Alden, and Dyrness, as well as John Zasada, who had recently transferred to Corvallis but returned for the session in Fairbanks.[55]

The ANILCA imposed a statutory mandate for management practices with the "least adverse impact" on rural residents, dependent on subsistence lifestyles, thus broadening the scope of multiple use and related research. (Schmiege collection)

One of the presenters at the Arctic Science Conference, Research Forester George Sampson, had joined the scientific community at Fairbanks in 1980, when he began studies of the potential for developing a forest products industry for interior Alaska. Sampson's research and his presentation at the 1985 conference (a discussion of product recovery potential for fire-killed white spruce in interior Alaska)[56] were examples of the production emphasis of scientists hired in the wake of ANILCA, even at the multifunctional unit at Fairbanks. Like Alden, however, Sampson's efforts at Fairbanks were hampered by the relatively low funding and support for Research in an area remote from Forest Service lands and far removed from the cash cow of ANILCA mandates. The flurry of interest in integrated research centering on the Rosie Creek fire dissipated rapidly after 1 985, and the lab headed into the latter half of the decade with an uncertain future.

Project Leader Ted Dyrness' 1985 summary of work unit objectives for the next 5 years of research at the Fairbanks Lab emphasized the need for studies that would support the goals of resource managers in the interior, but Dyrness and his colleagues could not escape the hard reality that those managers were not with the Forest Service. Three years earlier, however, the State Forest Bill had created the 1.8-million-acre Tanana Valley State Forest near Fairbanks and established a reforestation fund supported with receipts from state timber sales, and Dyrness cited the State's expressed interest in research on these lands as rationale for continued funding for his unit.[57] Dyrness and his colleagues were in the tenuous position of seeking federal funding to support research that would serve state programs and priorities, and in the political climate of the Reagan era, they were vulnerable to proposals to pare down, or even eliminate the federal facility in the interior.

Scientists at the Fairbanks Lab were not alone in their concerns about budgetary issues in Alaska, but they faced the most extreme possibility of termination at mid decade. System-wide budget cuts in the Forest Service during the early 1980s seriously undermined morale, and a

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[55] PNW Research News, 14 Oct 1985; interview with loan Foote, 14 December 1992; PNW News, 8 February 1982 and 15 March 1982.

[56] P.NW.Eesed.rch_News, 14 Oct 1985.

[57] "Research Work Unit Description, Ecology and Management of Taiga and Associated Environmental Systems in Interior Alaska, Fairbanks, Alaska, Pacific Northwest Forest and Range Fxperiment Station, 14 January 1985," in storage room, luneau Forestry Sciences Laboratory, USDA Foiesl Service.

Much early research focused on how timber harvests affected the environment, such as this stand of spruce at Shoe Inlet, first logged in 1918. By (he mid 1980s, however, critics of the Forest Service argued that a more appropriate question was whether timber should be cut, where how, and at what late. (Schmiege collection)

1 984 survey indicated that inadequate resources was one of the most important concerns facing Forest Service personnel in Alaska. By early 1985, the Forest Service was offering employees counseling to help them cope with job displacement and relocation. In February 1986, Ethington and Wright traveled to Fairbanks to break the news to the 1 6 staff members that the proposed budget for 1987 would close the Fairbanks Lab, transfer the research programs in wildlife habitat, entomology, and soil and water to the Anchorage office, eliminate all other programs at Fairbanks, reduce funding for wildlife research, and trim $ 148,000 from inventory work at Anchorage. Official announcement of the proposal to close the lab indicated that it was based on the premise that research should shift to applied studies of forest management and the reality that Forest Service management interests were in the south-central and southeastern regions of Alaska and not in the interior.[58]

Station Director Ethington and Deputy Chief Buckman recall that the proposed closure of the Fairbanks Lab was included in a system-wide effort to meet massive cutbacks for the Research Branch required in the annual budgets the Reagan Administration presented before Congress, but Buckman and Ethington both rec all they were convinced, at the time, that with Senator Stevens' support, Congress eventually would restore the funds needed to keep the Fairbanks Lab open. Ethington, who was technically a manager in the Reagan administration, found himself in the uncomfortable position of officially defending the proposed closure and initiating the administrative process of preparing the personnel at Fairbanks for the end, if and when it came. He recalls his visit to Fairbanks with Wright in February 1986 included a meeting with a citizen group, but very few people turned out because of the bitterly cold weather, and he concludes, "that was probably for the best." He also recalls that his meeting with PNW Station employees affected by the proposed closure was the first time he completely sympathized with angry people who were verbally attacking him in a public setting.[59] Congress finally did restore funding, and both the Fairbanks Lab and the other PNW facility slated for closure (the Bend, Oregon, Forestry Sciences Laboratory) survived the budgetary crisis, largely as a result of intervention by Senators Stevens and Murkowski and the Congressional delegation from Oregon.[60]

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[58] PNW Research News, 9 July 1984, 14 Jan 1985; Professional Biography Files, Central History Files, Portland Office, PNW Station; PNW News, 17 Feb 1986.

[59] Interview with Robert Ethington, 12 July 1995.

[60] Interview with Robert Buckman, 13 July 1995; interview with Robert Ethington, 12 July 1995; communication from Ken Wright, |une 1995.

An established relation with state of Alaska and local interests in the interior and the University of Alaska at Fairbanks, and an intensive lobbying campaign in Washington, D.C., by well-connected representatives of those interests, ultimately saved the Fairbanks Lab from closure in 1987, but it did not resolve chronic problems with funding and administrative and logistical support. Scientists at Fairbanks struggled through a period of uncertain readjustment, layoffs, and staff reductions over the latter part of the decade. The official explanation of the rationale behind the initial proposal to close the lab, moreover, was a clear repudiation of the principles that led to the founding of the multifunctional unit at the Fairbanks facility in the early 1 960s. Integrated studies of forest ecology and cooperative efforts with the University of Alaska, best exemplified by the successful development of a Long Term Ecological Reserve program headed by Viereck and Van Cleve, continued to be a central focus and a major source of funding at the Fairbanks Lab after the initial proposal to close that facility was withdrawn. Allocations of new funding for research on the Tongass National Forest through the Tongass Timber Supply Fund were linked to the Congressional mandates of ANILCA, however, and applied studies of forest management in that region rapidly emerged during the 1980s as a leading priority of the administrative hierarchy of the Forest Service. Scientists in southeast Alaska significantly advanced their understanding of forest ecology during this period, while similar efforts at Fairbanks lacked access to this new infusion of funding, and some scientists there struggled to continue or initiate studies. Forest Service Research in Alaska had come full circle from the era of Heintzleman and Taylor, when Management needs shaped the Research agenda, and scientists conducted their studies with an eye to immediate economic utility and usable knowledge about Alaska forests.

Scientists and technical stall recall the mid 1980s at the Juneau FSL as a period of congenial interaction, and the "coffee break" crowds at the FSL (shown here in August 1989) were often the setting tor exchanging stimulating ideas and developing working relations with others at the lab. (Loopstra collection)

The Tongass Timber Supply Fund and Related Research

Utilitarian priorities guided the Research program at Juneau after 1981, much as they had at the outset of the modern era of Forest Research in Alaska during the 1920s. Scientists in southeast Alaska gained a windfall of funding from ANILCA and the Tongass Timber Supply Fund at a time when the other labs in Alaska were facing severe budgetary limitations, but they also faced severe pressure to apply those funds in research programs addressing the practical concerns of forest managers who struggled to reconcile ANILCA mandates with prior forest management laws. The

ANILCA mandate to "...maintain the timber supply from the Tongass National Forest to dependent industry at a rate *of* 4 billion 5 hundred million board foot measure per decade" seemed to conflict with the mandate to manage forest resources in accordance with multiple use, as that concept had evolved during the 1960s and 1970s.[61] Tongass Timber Supply Funds, consequently, came with strings attached, but more important, they came with increased pressure for Research to address issues of immediate, practical concern, often with insufficient information or time to conduct rigorous investigations.[62] Region 10 administrators were under a Congressional mandate to increase timber sales within a specific timeframe, and funding derived from those sales (the TTSF) was earmarked for studies exploring their effects on specific forest resources identified as valuable under federal guidelines of multiple use.

Research gained a share of the Tongass Timber Supply Fund, but the ANILCA mandate to maintain timber supplies to industry from the Tongass imposed severe pressure on researchers to address immediate problems confronting forest managers working to meet harvest targets. (Schmiege collection)

The ANILCA also broadened the scope of the multiple-use concept and the need for research with a statutory mandate for management practices that would cause the "...least adverse impact possible on rural residents who depend upon subsistence...." Forest Service administrators identified this mandate, covered in Title VIII of ANILCA, as "...a standard by which all other Forest Service activities in Alaska will be measured, i.e., is the activity being conducted in a manner which will cause the least impact possible on subsistence?" and they noted the need for research to develop an information base that would serve this mandate.[63] This concern encouraged wildlife studies that focused more on habitat requirements of big game species, notably Sitka black-tailed deer, mountain goal, bear, and moose, as well as a shift toward fisheries studies that would describe "good" habitat as opposed to "pristine" conditions.[64]

Public criticism of the management practices of the Forest Service on the Tongass National Forest escalated in the early 1 980s as the ecological implications of ANILCA became more apparent, and the ensuing debate by mid decade increased the pressure on Research to provide fast

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[61] Research Work Unit Description, Management Alternatives lor Timber and Related Resources, Juneau, Alaska, Pacific Northvvesl Forest and Range Experiment Station, 6 July 1984," in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service.

[62] This problem had always existed in |uneau and often led to friction between Region 10 administrators and the Research office. Scientists at Juneau observe that forest managers with the Region often tended to frame research questions in terms of administrative issues that were not researchable, such as "how much limber should be cut?" Interviews with Don Schmiege, Doug Swanston, Bill Farr, Bill Meehan, and Al Harris, December 1992.

[63] ANILCA, Title VIII," memo from Walt Sheridan, ANILCA Coordinator, to Forest Supervisors and Staff Directors. 12 April 1984, in storage room, Juneau Forestry Sciences Laboratorv. USDA Forest Service.

[64] Pacific Northwest Forest and Range Experiment Station. "Planned Forest and Related Research to Mee Requirements of the 1980 Alaska National Interest Lands Conservation Act" (tvpescripl memo, 14 July 1981) p. 1-9; interviews with Bill Meehan, 9 August 1993 and 22 December 1992.

CONTINUED

Doug Swanston (right) and Keith Kahklen (left) installing surface-erosion equipment on Hippoback Ridge on Chichagot Island in 1993. (Swanston collection)

Research Mensurationist Bill Farr's long-term research in Alaska spanned the years from 1960 until his death in 1995 and laid the foundation tor research alternatives for clearcutting. Here, he measures tree size and height with an optical dendrometer. (Juneau, unnumbered)

answers to questions that otten were difficult to address within the framework of scientific inquiry. A policy memorandum from the PNW Station in 1981 identified classification of old-growth forest community types and studies of the potential to improve wildlife habitat with silvicultural treatments as "the most critical research concerns in Southeast Alaska,"[65] but the Southeast Alaska Conservation Council (SEACC), in 1 984, argued that Forest Service policy to comply with ANILCA mandates for timber sales could not be reconciled with multiple-use objectives of protecting wildlife, fish, and people in Alaska. Research proceeded from the legalistic premise that the timber would be cut and studied how logging would affect the environment and how those effects might be minimized or managed to protect multiple-use objectives, but critics of the Forest Service and the agency's implementation of ANILCA mandates argued that the timber sales were excessive, economically irrational, ecologically unsustainable, and hostile to multiple-use objectives. The Southeast Alaska Conservation Council further accused federal agencies, particularly the Forest Service, of subsidizing corporate efforts to strip the land of its timber wealth, and they claimed that the proper question was not how the timber sales would affect the environment, but whether the timber should be cut, where, how, and at what rates.[66] As this debate raged on, the PNW Station reorganized administration of Research in southeast Alaska.

Calvin Bey assumed control of the Multiproject Program at Juneau about the time the Southeast Alaska Conservation Council's challenge to Forest Service management policies on theTongass hit the press in 1984, and he assumed responsibilty for coordinating external relations with Region 10, the University of Alaska, the Alaska State Legislature, Native Corporations, Alaska state agencies, and all federal agencies. PNW Station Director Ethington also established a Program

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[65] Pacition Northwest Forest and Range Experiment Station, "Planned Forest and Related Research to Meet Requirement of the 1980 Alaska National interest I ands Conservation Act" (typescript memo, no author, 14 July 1981), p. 7.

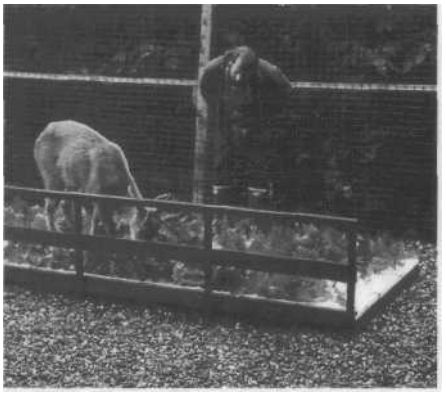
[66] Soulheasl Alaska Conservation Countil, The Tongass Timber Problem: What You Can Do About It (|uneau Fongass Accountability Project. 1984),3-9.

Management Committee consisting of PNW Assistant Directors-North (Wright) and Central (Flora), the Program Leader (Bey), and the Deputy Regional Forester for Region 10 (Michael Barton). This committee was responsible tor prioritizing and authorizing proposals eligible for funding under ANILCA guidelines and for".. .cooperating with Region 10 to incorporate research into managment practices.[67]

Within this framework ot coordinating committees, Forest Management gained a direct voice (in the person of the Deputy Regional Forester) in the decisions that guided Research in the second half of the decade. Project leaders involved in the Multiproject Program at Juneau were required to meet annually with the committee to explain their research plans, report on their progress, and disc uss funcling issues. Scientists seeking support under the program were required to submit research proposals, and the Program Management Committee reviewed each proposal and assigned it a priority ranking for the purpose of assigning funds.[68] This process of competitive grantsmanship pitted scientists against each other and directly exposed Research to the political pressures confronting Forest Management in southeast Alaska. Researchers from outside the agency also competed with Forest Service scientists for ANILCA funds. The ANILCA and theTTSF protected Juneau from the funding crisis that afflicted Fairbanks during the 1980s, but they also represented an erosion of the principle that the Research Branch should be funded independently of Forest Management in the Forest Service.

Scientists at juneau operated within the framework and constraints established by Congress, the Washington Office, and PNW Station to further a research agenda consistent with the tradi-

Doug Swansion sampling roots lor laboratory testing of tensile strength by size and species at Stoney Creek on Prime of Wale's Island in 1976.(Swanston collection)



Don Spalinger measuring the intake rate and bite size for deer in a foraging study by Tom Hanley's unit at the juneau FSL. (Hanley collection)

[67]Research Work Unit Description, Management Alternatives for Timber and Related Resources, Juneau, Alaska, Pacific Northwest Forest and Range Experiment Station, 6 July 1984," (in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service), n.p.

[68] Research Work Unit Description, Management Alternatives for Timber and Related Resources, Juneau, Alaska, Pacific Northwest Forest and Range Experiment Station, 6 July 1984," in storage room, Juneau Forestry Sciences Laboratory. USDA Forest Service, n.p.

tions of the Forest Research community in Alaska, the professional priorities of the staff, and the availability of funding. At the time Bey assumed control as Program Leader at Juneau, ANILCA funding to the PNW Station amounted to an annual appropriation of $1.67 million in support of the Multiproject Program.[69] This allocation more than doubled the regular appropriation for the two Research Work Units based in Juneau at the time. The initial framework for the Multiproject Program defined three "Research Problems" and their interrelations, including scientists responsible for solving each component of the problem and cooperating agencies. These problems included the need to identify: the effects of old-growth silvicultural systems on resource productivity; the effects of second-growth management systems on resource productivity; and the optimum rate ot resource consumption and matching demands. Station Research Work Units responsible for addressing these questions included Meehan's Anadromous Fish Habitat unit and Bey's Timber-Wildlife-Watershed-Diseases unit at Juneau, as well as units in Recreation and Forest Engineering, based in Seattle, Washington; units in Utilization, Production Economics, and Foreign Trade, based in Portland, Oregon; and a unit in Resource Management Impacts, based in Corvallis, Oregon.[70]

Bill Meehan in the mainstream, ca. 1993'. (Meehan collection)

Project Leader John Henley. (Hanley collection >

The sudden infusion of funding, the urgent focus and demand for Research, administrative shakeups, and budgetary cutbacks in other areas of the Forest Service promoted an intense flurry of proposals, studies, and publications at mid decade from scientists at the Juneau Lab and elsewhere in the Forest Service or with cooperating agencies. This burst of scientific inquiry[71] coincided with the revolution in computing technology at mid decade, and it came hard on the heels of the third wave of Forest Research in the late 1960s and 1970s that had expanded the range of

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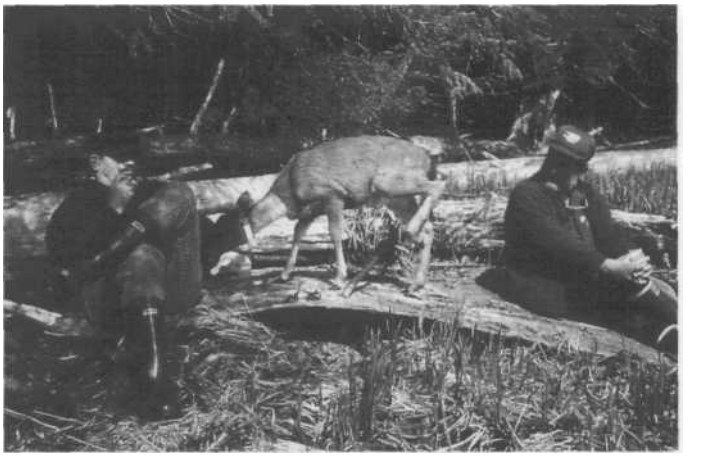
[69] Former Deputy Chief tor Research Robert Buckman recalls that only about 50% of this amount was available to grant applicants from outside the Forest Service. Interview with Robert Buckman, 12 July 1995.

[70] Research Work Unit Description, Management Alternatives for Timber and Related Resources, Juneau, Alaska, Pacific Northwest Forest and Range Experiment Station, 6 July 1984," in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service, n.p.

[71] 'Research Attainment Descriptions, PNW/RWU-1652/|uneau, AK, FY 1983, 1984, 1985" (in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service); "Research Attainment Descriptions, PNW/RWU-1705/Juneau, AK, FY 1983. 1984. 1985, in storage room," Juneau Forestry Sciences Laboratory, USDA Forest Service.

John Henley in the Juneau FSL overlooking downtown Juneau. Note the cruise ship docked at right. The FSL later moved from the Federal Building to a building north of the airport and nearer the Mendenhall Glacier, in a move that also placed more physical distance between the scientists and Region to forest managers headquartered in the Federal Building. (Loopstra collection)



Art Shipper (left), John Henley (right), and deer (center). Tongass Timber Supply Fund guidelines identified deer as the "priority species for which habitat research is being conducted. (Hanlev collection)

issues by promoting a broader understanding of ecological relations. As one scientist observed, "there was more environmental awareness by everybody, better funding for research in fields previously neglected, and better knowledge of where the problems are..."[72] Scientists in Juneau were less isolated from their colleagues outside Alaska, more aware of the broader implications of their research, and constantly reminded of the political interests looking over their shoulders. The result was an array ol studies that developed comparisons among forests in Alaska and those further south, but in many ways, scientists still struggled with the need to establish baseline data as the foundation for further research.

The search tor improved and alternative management practices that would ensure a continuous supply of timber while protecting other forest resources involved Farr, Sidle, Bormann, and Harris in studies that identified shelterwood and selection-cutting alternatives for forest managers concerned with protecting nontimber resources while still fulfilling ANILCA mandates. These studies summarized information on the characteristics, properties, and potential uses of Alaska-cedar, Sitka spruce, and red alder within their native ranges.[73] Swanston and Sidle also explored problems of slope stability and soil cohesion in heavily logged areas and implications of this problem for road engineers and forest management."[74]

Efforts to determine habitat requirements for wildlife and recommend management practices appropriate to those needs involved Hanley, Thilenius, Van Ballenberghe, and Meehan in interdisciplinary, cooperative studies that explored habitat issues in relation to wildlife behavior, ro~

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[72]Interview with Bill Farr, 9 August 1993.

[73]Reseaich Attainment Description, PNW-1652, Problem 1, PNW Station, Fiscal Year 1984," in storage room, Juneau Forestry Sciences Laboratory, LJSDA Forest Service).

[74]Research Attainment Description, PNW-1652, Problem 3, PNW Station, Fiscal Year 1985," in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service); "Research Attainment Description, PNW-MPP-I, Problem I, PNW Station, Fiscal Year 1985," in storage room, Juneau Forestry Sciences Laboratory USDA Forest Service.

dent populations, native forage, and nutrient requirements. In related, cooperative studies also funded by the work unit at Juneau, Wildlife Biologist Paul Alaback also compared the forest structure of secondary succession communities with old-growth forest structure in southeast Alaska and its implications for wildlife management, and Meehan and Hanley explored fish and wildlife relations in old-growth forests. Hanley also addressed disturbance events as ecological factors in old-growth forests and the theoretical implications of this process for forest managers concerned with timber harvests on those forests.[75]

Studies of the habitat requirements of anadromous salmonids also gained a powerful boost after ANILCA. Fishery Biologist Mason Bryant, Meehan, Aquatic Ecologist James Sedell (from the Corvallis Forestry Sciences Laboratory), and other cooperators drew Tongass Fund support for studies of coho salmon in southeast Alaska, and discovered that lack of suitable winter habitat might limit its smolt production. They also documented a relation between fish habitat and large organic debris, and linked removal of that debris over the preceding 100 years with significant reductions of adequate winter habitat in streams of southeast Alaska.[76]

In keeping with broader trends in the research community at Juneau after ANILCA, leadership of the Multiproject Program abruptly shifted in July 1986 from a man whose background was primarily in Forest Science, to a man whose background was primarily in Forest Management, Forest Products, and Research Administration. John Henley, who replaced Forest Geneticist Calvin Bey as Program Leader, left his position as Assistant Director for Plans and Applications at the Southern Research Station to accept his new assignment in Juneau, and he continued the trend toward hiring production-oriented staff with roots in the academic traditions of forestry programs in the western mountain states and the Pacific Northwest.[77]

Henley held B.S. and M.S. degrees in forest management from Colorado State University, and an M.S. in forest products from the University of Washington. His prior experience with the Forest Service included assignments with theTimber Quality Research Unit at the PNW Station in Portland from 1961 to 1973 and the Forest Residues and Energy Unit in Seattle from 1973 to 1980. Since 1980, he had served as Assistant Station Director for Plans and Applications at the Southern Station. His most prominent accomplishment before his appointment at Juneau was a group award in 1986 for his administrative involvement in the development of an electronic

[75] Paul B. Alaback, Secondary Succession Following Logging, in the Sitka Spruce-Western Hemlock Forests of Southeast Alaska: Implications for Wildlife Management (Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Gen. Tech. Rep. PNW-173, 1984); "Research Attainment Description, PNW-1652, Problem No. 2, PNW Station, Fiscal Year 1985" (looted in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service); "Research Attainment Description, PNW-1652, Problem 2, PNW Station, Fiscal Year 1984," in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service; "Research Attainment Description, PNW-MPP-1, Problem 2, PNW Station, Fiscal Year 1985," in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service.

[76] Research Attainment Description, PNW-1705, Problem 1, PNW Station, Fiscal Year 1985," in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service.

[77] Professional Biography Files, Central History Files, PNW-Portland Office; PNW News, 9 June 1986.

system for reporting research attainment for the entire Forest Service, and he had served as the line officer who coordinated activities with Washington Office staff and Station personnel.[78] His career path to administrative responsibility for Research in Juneau was not unlike that of Taylor or Helmers, both of whom parlayed experience in the Washington Office into appointments in Alaska. Like Taylor, he also brought a strong emphasis on the priorities of Forest Management to his position with Research.

When Henley arrived at Juneau in summer 1986, the projected budget for Tongass funds totaled $2.14 million for FY 1987 and $2.1 million for FY 1988, and PNW Station priorities for expending those funds emphasized (in order) research on timber management, improvements in harvesting technology, improvements in fish production, management practices to minimize impacts on soil and water, management practices for Sitka black-tailed deer, economics of marketing and management, improved utilization of harvested timber, and management practices to enhance recreation opportunities and uses. The guidelines identified deer as the "priority species for which habitat research is being conducted" and noted that research programs related to recreation uses would "focus on determining the consequences of timber management alternatives on resident and tourist recreation uses..."[79]

These priorities were a reflection of the ANILCA mandate and Forest Service guidelines for appropriating Research funds from the Tongass Timber Supply Fund, and they illustrated the dramatic shift in budgetary priorities from integrated studies of forest ecology to production-oriented research with specific, utilitarian purposes dictated by political and administrative forces governing forest resources in Alaska. Scientists at Juneau increasingly emphasized the need for integrated studies that recognized the complex interactions of the ecosystem, but the administrative framework imposed by ANILCA and Forest Service priorities for line-item programs supported with the Tongass Timber Supply Fund often seemed to frustrate those concerns by narrowing the focus of research to production-oriented questions and issues.

Henley arrived at the end of an era for Research in Alaska, as Assistant Director-North Ken Wright announced his retirement effective January 1987. Wright had played a central role at the PNW Station in shaping the direction of Research in Alaska for nearly two decades, and he continued in a volunteer role after his retirement in an effort to rally support and funding for projects he had administered before his retirement. With his retirement, however, scientists in

[78]Professional Biography Files, Central History Files, PNW-Portland Office; PNW News, 9 June 1986; DC Message From Barbara Rosenthal to PNW Staff, 30 May 86 (photocopy of printout in Professional Biography Files).

[79]Memo with attached enclosure from Station Director Robert L. Ethington to Forest Service Chief (cc to C.Bey) on the subject "FY'87 Research Program Plans for the Tongass Timber Supply Fund (TTSF-ANILCA), 50 March 1985 (photocopy in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service)". Memo with attached enclosure from Station Director Robert L. Ethington to Forest Service Chief (cc to C.Bey) on the subject "FY'88 Program Plans for Tongass Timber Supply Fund Research TTSF-ANILCA)", 4 February 1986 (photocopy in storage room, Juneau Forestry Sciences Laboratory, USDA Forest Service).

Alaska lost one of their strongest advocates in the administrative process of allocating funding and reviewing projects supported with Tongass Fund dollars. As a forest entomologist with considerable experience in forest management, Wright had been instrumental in hiring the third wave of scientists who had broadened the range of scientific inquiry at Juneau, Fairbanks, and Anchorage. That broadened perspective contributed to the deeper understanding of ecological processes that guided researchers who grappled with the far-reaching implications of the ANILCA mandate for timber sales on the Tongass.

Wright had also nurtured research programs that went beyond the specific missions of the units at luneau, Fairbanks, or Anchorage. He coordinated, for example, a cooperative agreement from 1978 to 1988 with Glenn Juday, of the University of Alaska, Fairbanks, to resuscitate the concept of Research Natural Areas in Alaska.[80] Wright's support for the reserve concept bore fruit, ironically, the same year he retired, when Van Cleve and Viereck won administrative approval and a 5-year federal grant to establish a Long-Term Ecological Reserve program at Fairbanks in a cooperative agreement including scientists at the Fairbanks Lab and the University of Alaska. Perhaps most indicative of Wright's philosophy of Research in Alaska, and the focus of much of his volunteer effort after retirement, however, was the establishment of the Copper River Delta Institute (CRDI) as a fourth research facility in Alaska under the direction of the PNW Station and Region 10 of the Forest Service.[81]

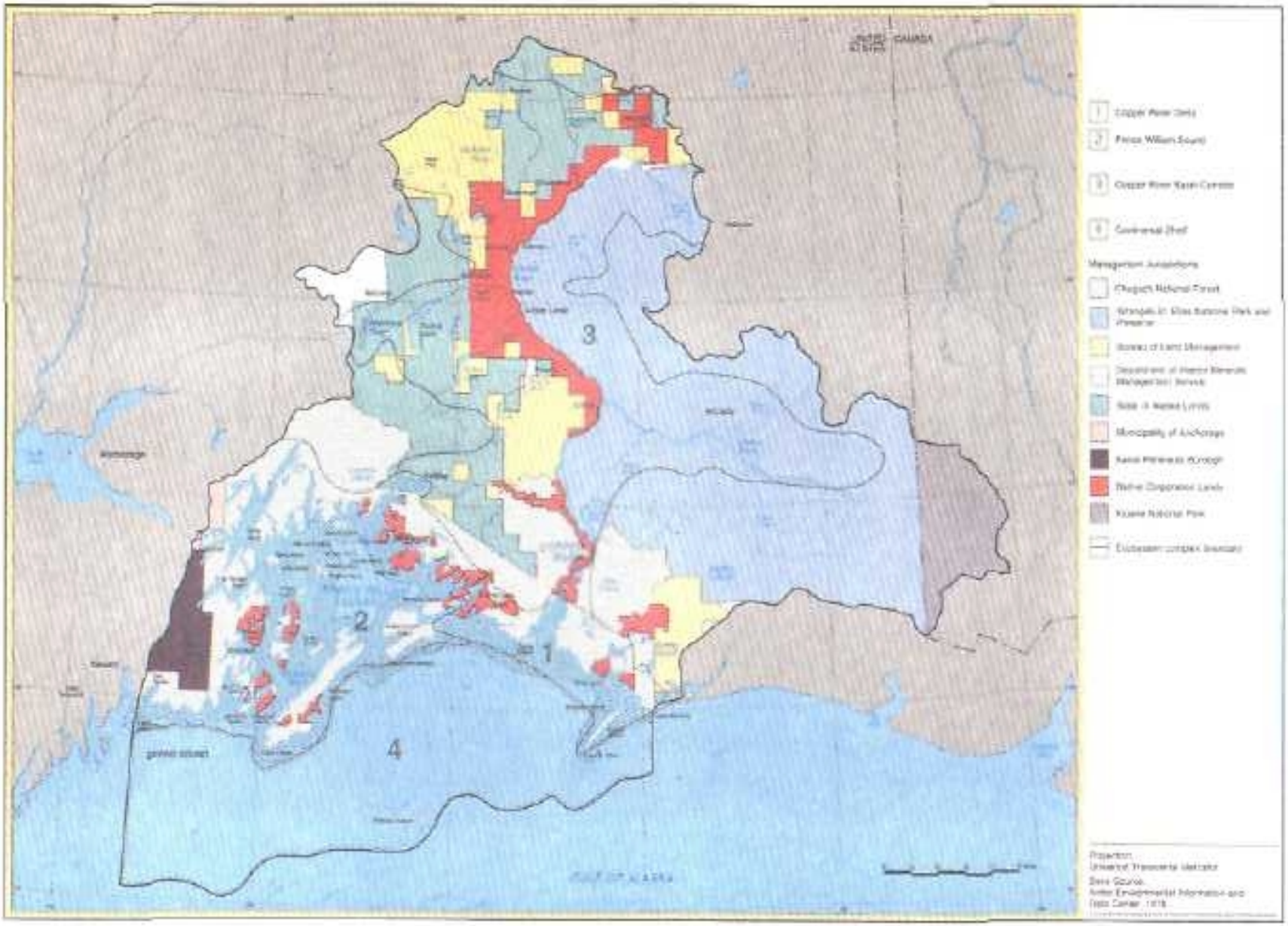
Research on the Copper River Delta in the late 1980s involved scientists from various agencies and universities. Here, Vicki Okimuta, Jim Sedell. and Brad Lovatt set a syke net in the Martin River Slough on the Copper Rivet Delta in luly 1987 Portland Office History Files)

Integrated Research and the Copper River Delta

The Copper River Delta Institute was one of two institutes established in the first year of Charles Philpot's term as PNW Station Director in 1 988, and it was an outgrowth of an ongoing series of cooperative conferences that began in the early 1970s under the leadership of Assistant Director Ken Wright and the supervisor of the Chugach National Forest, Woody Wood row, with additional support from the University of Alaska and the Alaska Department of Fish and Game. Wright recalls he and Woodrow cooperated in the effort to bring together people who

[80] Judav notes that support lor his efforts in the Forest Service evaporated after Wright retired, and he was evicled from his office at the INF in Fairbanks when Project Leader Richard Werner initiated a house-(leaning, of sorts, to refocus the mission of the lab in 1988 in view of declining budgets. Interview with Glen Jnday 18 December 1992.

[81] Interview with Ken Wright, 13 July 1993; interview with Keith Van Cleve, 18 December 1992; communication from Ken Wright to Max Geier, 23 September 1994.



The diversity of jurisdictions in the Copper River Drainage. These fragmented jurisdictions created administrative hurdles that led Ken Wright and others to work foward developing an interagency, coordinating office at Cordova in the 1980s. Map derived from K. Margnlis and T. Wolt eds. Prince William Sound Copper River North Cull of Alaska Ecosystem, /Washington, DC. and Cordova AK: Conservation International. Copper River Deita Institute, and Prince William Sound Science Center, 1991). p. 13.

The Eyak River ponds and sloughs arc typical of the wetlands on the Copper River Delia. Scott Glacier looms in the background. (Portland Office History riles)

were doing research on the Copper River Delta in annual and biannual conferences aimed at facilitating cooperatively funded studies in the region.[82] The Delta is the largest wetland on the west coast, including Mexico. It spreads out over 65 miles of coastline, covering 700,000 acres of estuaries, mudflats, marshes, and barrier islands from Orca Inlet to Cape Suckling. It is an important habitat for the greatest concentration of migratory shorebirds in the world during the spring thaw. Migrating geese, ducks, swans, and many other waterfowl in numbers approaching 10 million birds populate the Delta at peak migration and depend on the Delta as habitat. The Copper River also is a vital habitat for salmon spawning, and the Copper River drainage is an important range for deer, bear, moose, and caribou. Cordova is the tenth-largest fishing port in the United States as measured by catch value, and the Copper River drains an area rich in timber and mineral resources. Administrative jurisdiction over this vital ecological unit is divided among the Chugach National Forest, Native Corporations, the Wrangell-St. Elias National Park and Preserve, the Bureau of Land Management, and the State of Alaska, many of which serve conflicting mandates and various constituencies.[83]

The diversity of the ecological systems and administrative responsibility on the Copper River drainage led to a proliferation of studies in the region by scientists affiliated with numerous private and public agencies, and Wright worked with the supervisor of the Chugach National Forest, the Alaska Department of Fish and Game, and several other research cooperators, notably including Wildlife Ecologist)ohn Thilenius, to bring those people together in a series of conferences beginning in the early 1 970s and continuing through the 1980s. These conferences began as an annual event, and those involved gradually came to the realization that a more permanent framework might help draw together the various disciplines and research agendas to arrive at a more integrative perspective on the ecosystems, resources, and development proposals centered on the Copper River drainage and delta.

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[82]Fred Stormer recalls that Philpot made the establishment of CRDI one of his top priorities in 1988, in an effort to promote more interdisciplinary research at PNW Station. The establishment of the Blue Mounains Natural Resources Institute in La Grande was a parallel priority for the station in Oregon. Interview with Ken Wright and Fred Stormer, 3 July 1997; communication from Ken Wright to Cindy Miner, 25 June 1997; communication from Fred Stormer, June 1997.

[83]K. Margolis and T. Wolf, Prince William Sound Copper River North Gulf of Alaska Ecosystem (Portland Oregon: Conservation International, 1991), 1-15; interview with Ken Wright, 13 July 1993; interview with Chris Christensen, 13 July 1993.

The Ranger District Headquarters in Cordova was the site of a coordinating effort involving Region 10 and Research, with the establishment of the Copper River Delta Institute. The Institute was intended to promote an integrated ecosystem approach to research efforts, but it functioned with a skeletal staff and depended on cooperating scientists with outside funding. (Miner collection)

The Copper River Delta Institute, jointly funded by Region 10 and PNW Station in the late 1980s, functioned as a coordinating agency with a skeletal staff supporting scientist cooperators from public and private agencies. Here, Norbert Wissmar examines an intertidal slough on the Eyak River wetlands at low tide. (Portland Office History Files)

The Ranger District Headquarters in Cordova provided a logical site for a permanent institute, and it became the site for coordinating a joint effort of Research and Region. Harriet B. [Chris] Christensen, whose background included a Ph.D. in recreation from the University of Washington, was hired as the first director of the Copper River Delta Institute, which was jointly funded by Region 10 and PNW Station. This facility functioned as a coordinating agency to promote an ecosystem approach to assessing the natural resources of the region and human activities sustainable within that ecosystem.[84] In this regard, the Institute was a throwback to the beginnings of the multifunctional unit at Fairbanks in the early 1960s. In the spirit of the 1980s, however, it functioned with a skeletal staff, and cooperating scientists from public and private agencies with outside funding accounted for the bulk of the research accomplished under its auspices. The express goal of the institute was to build a program that would attract outside support and serve multiple functions of promoting research, education, and technology transfer. Stormer recalls this effort as an attempt to address the need to make science relevant and to promote applied science, and he observes that the intent was to ensure that management goals remained reasonably possible within the broader guidelines of the Forest Service mandate.[85]

The Copper River Delta Institute was an institutional manifestation of two distinct, and often contradictory, historical realities in the evolution of Forest Service Research at Juneau, Fairbanks, and Anchorage; that the Institute became the focus of a joint review process that revisited many of the issues that Research scientists had faced in Alaska since the years when Taylor first worked to establish the independent status of the Alaska Forest Research Center is thus not surprising. On the one hand, Research in Alaska had long struggled to balance the ideal of independent research

[84] Interview with Ken Wright, 13 July 1993; interview with Chris Christensen, 13 July 1993.

[85] These efforts were part of a broader reorganization that Philpot initiated shortly after his arrival as PNW Station Director in 1988. Interview with Ken Wright and Fred Stormer, 2 July 1997.

with the reality of dependence on the Region for logistical support.[86] On the other hand, scientists had long recognized the need to cultivate cooperative and interdisciplinary networks with other state and federal agencies and university research programs. The administrative dichotomy between Forest Research and Forest Management often blurred in the field, where forest managers sought answers to problems and forest researchers found outlets for their creative energy and scientific curiosity. They worked together in a community of Forest Service professionals far removed from the center of administrative authority in Washington, DC, but they were also closely connected with leaders in the scientific community, both in and out of the Forest Service. Those joint goals found formal expression in the appointment of the Copper River Science Commission, which assembled in 1991 to evaluate the joint administration of the Institute by the PNW Research Station and Region 10 and to propose a series of action steps and goals for future development of that effort.[87]

The report of the Copper River Science Commission also reconfirmed the principle that scientific inquiry in the region should include systematic studies of human societies, past and present, in relation to the Copper River ecosystem. The report is notable for its cogent statement of the historical pattern of human interaction with the ecosystem, including insights derived from the experience of Alaska Natives, before European contact, who were often neglected in the formative years of forest-related research in Alaska, beginning with Steller and continuing into the 20th century. The report's overview and recommended action steps also explicitly recognized the need for a "human ecology" component of research to study "the interrelationships between people, the places they value and use, and the processes of which they are a part" (p. 12). It noted that the Copper River ecosystem afforded an important opportunity to study the relation between specific environments and human interactions and historical developments, and it argued, "an understanding of the history of the natural and human components of the ecosystem, and knowledge about the impact of human activities on the ecosystem today, are important to [the reevaluation of policies and institutions in the region]"(p. 1 5).

The Copper River Science Commission also proposed a re-evaluation of the historical distinction between Research and Management in the Forest Service. It emphasized the need to integrate scientific research with studies of human interaction with the ecosystem in the past and present. This concept was buttressed with further arguments that management policies should include the search for knowledge as a primary goal. It called for a formal recognition of the need for long-term research and monitoring, with support for on-going studies, integration of the results into management policies, and coordination of research with input from local communities,

[86]Bernard Bormann observes, for example, that scientists in Alaska enjoyed virtually free rein from Region 10 in locating plots and study sites on National Forest lands, while other Regions often require compliance with a much more elaborate clearance process before initiating studies, laying in plots, or digging soil pits.

[87]Copper River Science Commision, "Report of the Copper River Science Commission submitted to: Dr. Charles Philpot, Director, PNW Research Station [and] Mr. Michael Barton, Regional Forester, R10," (typescript manuscript provided by Bernard Bormann, dated 1991)

The Report of the Copper River Science Commission (1991) explicitly recognized the need lor a "human ecology" component at research to study "interrelationships between people, the places they value and use, and the processes of which they are a part. " (Schmiege collection)

The Copper River Science Commission report (1991) called for formal recognition of the need for long-term research and monitoring, with support for on-going studies. Here, Brad Lovatt, Jim Hawkins, and Brenda Wright weigh and measure salmonids captured on the Eyak River. (Portland Office History Files)

and formal evaluation of the impact that research has on management policies. Action steps proposed in the report included the creation of a technical committee to provide advice on management decisions affecting research, with members representing local, national, and international interests and a "wide mix of disciplines." (pp. 24-26)

The ideas expressed in the Copper River Science Commission report hinted at a new paradigm for Forest Service Research in its relations with Regional Foresters in Alaska that, nonetheless, built on themes deeply rooted in the era of Heintzleman and Taylor. Heintzleman had strongly supported and subsidized Research in Alaska, and that kind of support remained central to the success of the Alaska Forest Research Center and later incarnations of the Research Branch in Alaska into the 1 990s. Taylor had struggled to assert the independent status of his unit; however, he, like later administrators of Research in Alaska, struggled with problems of scale and difficult access that strained the limits of available resources. The upshot of that struggle, which continued through 1990, was a community culture of scientists who asserted their independence from Region 10 even as the Regional Forester facilitated the annual allocation of Tongass Timber Supply Funds to Research and served on oversight committees governing the disposition of those funds. The continuing reality of their interdependence aggravated other tensions between Research and Region, and, together with difficulties in securing sufficient internal, external, and Congressional support,[88] effectively limited the viability of the jointly administered Copper River Delta. The Copper River Science Commission's proposed action steps represented a self-conscious effort to formalize the integration of Forest Research priorities and agendas with Forest Management goals and mandates in a document developed with input from representatives of

[88]Fred Stormer cites three major factors behind the failure of the CRDI to flourish after its initial establishment: "diversion of management energy and dollars; a failure to engender sufficient internal, external, and congressional support; and competition and overlapping roles with the Prince William Sound Science Center." Interview with Ken Wright and Fred Stormer, 2 July 1997.

Region 10, the PNW Station, the broader scientific community, and local, state, national, and international interest groups. In this sense, it was an effort to continue the interdependence between Region and Research, but in a more structured and balanced way than previously. In another sense, it documents the continuing evolution of Forest Service priorities and the re-integration of human knowledge about forest ecosystems in an effort to better understand the disparate parts making up the whole.

Conclusion: Legacies and Evolving Priorities in Alaska Forest Research, 1741-1990

The reliance on grantsmanship and cooperative arrangements with scientists outside the Forest Service had transformed traditions of Research among the community of scientists with the Forest Service in Alaska by the end of the 1980s. The quest for usable knowledge about forest resources had clearly entered a new era by the end of the decade, but in many ways the situation in 1 990 bore a remarkable resemblance to the time when naturalist Georg Steller was forced to sign on as ship's surgeon to gain passage with Vitus Bering to North America nearly 250 years earlier. As noted at the outset of this history, Steller was forced to set aside his primary research interests and assume what he considered the more mundane responsibilities of a ship's surgeon, to cover the high overhead costs (for travel and logistics) of doing research in Alaska. By his own account, Steller endured months of ridicule at the hands of Bering and his crew, and despite his enthusiasm about being on the expedition, he became increasingly agitated as numerous opportunities for research passed him by while he pursued his duties on board the ship, before he finally was allowed to unleash his professional curiosity for a scant 1 0 hours of scientific discovery on Kayak Island in Prince William Sound. In a later period, and under different circumstances, scientists experienced similar spasms of conflicting emotions: enthusiasm and excitement at the potential for scientific discovery, and frustration with necessary limits constraining the release of their professional curiosity.

Scientists with the Forest Service in Alaska, until 1 990, often found themselves at the center of vocal public debates about the consequences of the agency's long-term management of Alaska forests, and they frequently found themselves engaged in relatively mundane efforts to gather information requested by the various parties to those debates. They sometimes chafed at the situation in which they found themselves: many had enthusiastically sought and secured PNW Station appointments in Alaska, often in pursuit of long-term research interests, but they also frequently chafed under the realization that limitless opportunities for potential research in the vast forests of Alaska were just beyond their reach, given the differential between available funding, and the exorbitant costs of travel and logistical support for research in Alaska forests. The more innovative of these scientists competed for funding by adapting their research to attract support from alternative funding sources and cooperating agencies. In southeast Alaska, scientists had access to research allocations from the Tongass Timber Supply Fund, provided their research proposals addressed the Congressional mandates governing distribution of those funds. In the post-ANILCA world of the 1980s, consequently, research efforts in southeast Alaska entered an expansive new era. Scientists in the interior, by contrast, generally lacked access to these funds, unless they were able to redirect their research into avenues more directly relevant to the forests of southeast Alaska. In this sense, they remained relatively vulnerable to the shifting moods of public priorities and governing mandates for Alaska.

As scientists in Alaska struggled to pursue their professional interests and goals, they also worked within the corporate culture of the Forest Service, which was deeply rooted in the hierarchical traditions of the progressive era, and tended to reward individual effort and focused specialization. The system of budget-line allocations sometimes imposed a structural hurdle for scientists and PNW administrators seeking to build long-term, interdisciplinary programs of research, particularly when coupled with the chronic differential between the high overhead cost of doing research in Alaska and the available funding from PNW Station, and the competing need to fund research elsewhere in the station. These hurdles were not impassable, and scientists and PNW Station administrators engineered often remarkable advances in the area of multidisciplinary research at Fairbanks and)uneau, especially during and after the 1970s. The obstacles sometimes were enough to frustrate talented scientists and channel their energies into paths other than those their curiosity might have chosen in the quest for knowledge about how forest ecosystems operate and why. Nevertheless, scientists and administrators with PNW Station pioneered programs of research in Alaska that opened new opportunities for a productive interface between science and policy and between Research and Management in the region's forests, which have been the focus of scientific inquiry and discovery for more than 200 years.

Epilogue

When we were asked to write an epilogue to this history, we began by looking up the definition in the American Heritage Dictionary. An epilogue, the dictionary says, is

> A short addition or concluding section at the end of (a) literary work, often dealing with the future of its characters.

The "characters" for which we here provide a future are the PNW researchers in Alaska from about 1990, when Max Geier ended his history, to the present. The situation in Alaska has changed in ways far beyond the scope of an epilogue. Here, we present a brief description of the most important events since 1990.

First, we would like to reflect on the book's contents. The book is an analysis of Alaska forest research history by Max Geier, a professional historian contracted from a nearby university. One benefit of having someone from outside the Forest Service write the history is that the writer can stand back and observe the organization somewhat more objectively than an insider might. We asked the author to base this history on interviews with the PNW scientists who lived it. Sometimes what Geier describes is reassuring. Sometimes it is not; we may even disagree with some of his observations. Regardless, this history allows readers to reflect on the present and future of the PNW Station from a perspective well grounded in the past.

The 1 990s have accelerated the trends described here for the 1980s: high-profile issues about natural resources in Alaska accompanied by increased budget constraints. The Station went through a major reorganization and developed a long-term strategic plan under the leadership of Charles Philpot, Station Director from 1988 to 1995. Philpot foresaw federal budget trends and helped the Station anticipate them. One of his strongest efforts was designed to improve integration of research by reorganizing the structure of the Station. The reorganization created programs that shifted the focus of the organizational framework from geography to subject areas. Thomas Mills became Station Director in 1995, just when the effects of major reductions were being felt throughout the federal government. Forest Service Research took a 10 percent cut in 1996. In March of that year, the Station closed the Fairbanks lab. Although the Fairbanks laboratory is no longer open and the research budget has been cut substantially, the Institute of Northern Forestry continues as a cooperative effort between the Station and the University of Alaska in Fairbanks.

The most pressing work in Alaska for the Station in the 1 990s has been to contribute scientific information as a basis for revising the Tongass Land Management Plan. A team of scientists led by Fred Everest worked with resource managers from the National Forest system in 1994 to assess the Tongass National Forest, in keeping with the trend to conduct such assessments over large areas to provide input into major planning efforts. The science team examined information from the literature; conducted specific assessments, workshops, and resource analyses; and consulted with various expert panels to help in evaluating the consequences of alternative decisions. Current Station Director Thomas Mills has played a significant role in defining how science fits into

the Tongass Land Management Plan. He expects Station scientists to freely provide information from their research, describing the degree of certainty it provides, but without advocating courses of action.

After an assessment and agreement between the Station and the Forest Service Washington Office, the PNW Station deemphasized research in several areas, including boreal forest ecosystems—a main thrust of the research at Fairbanks. At the time of the decision to close Fairbanks, the following areas were the primary focus of research:

> Forest insects, including dispersal behavior of bark beetles, pheromone studies on population dynamics of the spruce beetle and other Alaska bark beetles, and host-insect interactions and related resistance of trees to those insects.
>
> Boreal forest regeneration, from both basic and applied perspectives, especially regenerating harvest sites. Studies included population ecology of mixed species plantations, competition studies, and trials of alternatives to herbicides for managing vegetation.
>
> Ecosystem processes in the boreal forest of Alaska to help in managing them or for predicting and mitigating changes caused by such factors as altered global climate. Long-term studies included ecosystem processes that control primary succession; forest development on river flood plains; and long-term monitoring of forest ecosystem health and condition in the Bonanza Creek Experimental Forest and the Caribou-Poker Creeks Research Watershed.

At its closing, the Fairbanks laboratory had seven permanent full-time scientists; some of them retired, others found new positions in the Federal government or elsewhere, or they resigned. Two new positions were created to continue the Institute of Northern Forestry with focus on the Long-Term Ecological Reserve project. One of these positions is a half-time appointment filled by Tricia Wurtz in summer 1996. The laboratory building, which is Station property (the land is under long-term lease from the University), is being offered to other Federal agencies. If none choose to occupy it, it will become the property of the University.

Closure of the Fairbanks laboratory brings to an end most of the Station's outstanding basic and applied research on boreal forests over the past 40 years. Cooperative research with the University of Alaska will continue, but the scope of the Station's program at Fairbanks is much reduced.

The Copper River Delta Institute has suffered a fate similar to that of the Fairbanks laboratory. Station scientists continue programs of research in the Copper River Delta, but the Institute has been closed.

The Anchorage Forestry Sciences Laboratory continues to serve as the single source for scientifically designed, ground-based, statewide inventory information on Alaska forest lands, under team leader Fred Larson. Kathy Geyer became acting Program Manager after Jim LaBau retired in 1991. Although forest health and protection research was discontinued in Fairbanks, two shared positions with Region 10 remain in Anchorage (Paul Hennon and Ed Holsten), where current

studies include spruce beetle population interactions with fire. Vic Van Ballenberghe continues to study moose population dynamics with one of the longest studies of record on the subject.

The Juneau Forestry Sciences Laboratory has teams from two Stationwide programs: Aquatic and Land Interactions and Resource Management and Productivity. In the first, the Juneau team is responding to three fish-riparian themes: ocean to main stream and uplands, flood plain and stream interactions, and hydrologic and geomorphic processes affecting aquatic and riparian systems. The team has recently been reorganized into several groups led by Tom Hanley, Fred Everest, Richard Woodsmith, and Mason Bryant.

The Resource Management and Productivity Research Program in Juneau is currently conducting three studies. One is on how a wind-dominated disturbance regime and widespread wetlands in southeast Alaska affect the productivity, structure, and functions of forest; the study is focused on management implications and designing silvicultural systems. The second study is on the biological, physical, and socioeconomic effects of silvicultural alternatives to clearcutting in southeast Alaska. The third is on growth and yield of young, even-aged stands on public and private lands in Alaska.

As this history shows, forestry research ebbs and flows, and has many dimensions in Alaska. What is in the future? Budget constraints will continue, although the 1997 budget is not expected to have cuts at the same scale as in 1996. Station priorities for the next 3 to 5 years will focus mostly on southeast Alaska, with some activities in the interior. The Station will continue to work with the Alaska Region in studies related to the Tongass Land Management Plan.

We have the pleasure of knowing first-hand the dedication and tenacity of PNW Station employees in producing scientific information important to decisions about natural resources in Alaska. We look forward to the continuation of this tradition by current and future generations of Station scientists in Alaska.

Ken Wright
Cindy Miner
January 1997

Appendix A

Timeline of Administrative and Science Leadership in Alaska Forest and Related Research, 1741 to 1990

Kenneth H. Wright

1741 Georg W. Steller, a member of Vitus Bering's Russian expedition, visited the Alaska coastline and was allowed a 10-hour tour ashore on Kayak Island to collect plants and make observations. Steller's journal entries are regarded as the first scientific observation of birds in Alaska.

1741-1800 Journals were written from about 90 expeditions from Soviet ports to assess fur availability, but information on flora, fauna, and Native peoples was also recorded. The voyage of Englishman James Cook in 1 778 along the Alaska coast also resulted in important scientific information. Gregori Shelikov established trading posts on Kodiak Island, Afognak Island, and Kenai Peninsula by 1 786. He proposed in 1 790 that a tree-growing site be designated at each settlement in Russian America, like the one established atThree Saints Bay on Kodiak Island in 1784. Shelikov's successor, Aleksandr Baranov, moved operations in 1 791 to the northern portion of Kodiak Island for easier access to forest resources for fuel wood and ship building.

Nikkolai Rizanov took over in 1 795 and proceeded to reorganize the Alaska fur enterprise as the Russian-American Company; in addition to dealing in furs, the company conveyed rights of access and control over forest reserves in Alaska.

George Vancouver, who had served on Cook's 1778 voyage, conducted his own expedition in 1794 and published his journals from it in 1798. The expedition included Archibald Menzies as ship's surgeon and naturalist. Menzies collected seeds and cuttings that eventually were planted in England as specimen trees, thus bringing Alaska species into the limelight of forest research in Europe.

1800-67 Rizanov's concern about Vancouver's expedition and other foreign interests in Alaska yielded a bonus for later forest researchers. Rizanov met with Baronov in 1805; they decided to establish plantations on Amakrack Island in Unalaska Bay to make the area more appealing to human occupants. Sitka spruce were transplanted from Sitka to Unalaska between 1807 and 1813, and several plantations were established over the next half century.

Frederic Litke commanded an expedition with naturalist Dr. Merkens from 1826-29 and returned to Russia with 2,500 plants and more than 1,500 animal specimens. The collection of specimens was made available to European scientists; Litke published his journal in 1835.

Loventry Zagoskin led the first scientific expedition into the Yukon and Kuskokwim drainages in 1842-43. His published journals include detailed descriptions of boreal forest ecology in the Yukon drainage as far inland as the mouth of the Tanana River.

Western Union Telegraph Company commissioned a survey in 1863 for an overland telegraph line from the Western United States through British Columbia and Russian America to the Bering Straits, to link up with the trans-Siberian line. Robert Kennicott headed the survey for Western Union and assembled specialists in plants, insects, birds, small mammals, invertebrates, and fishes. The Smithsonian Institution and Chicago Academy of Sciences funded much of the work from 1865-67 and produced many publications.

1867-1900 The military culture of the United States Army, which occupied Alaska after its purchase in 1867, differed in many ways from that of the Russian Navy. Army officials were rewarded for skills not necessarily scientific in nature. Some of their Russian predecessors had requested Alaska assignments because of their scientific interests and training. The initial result, in 1867, was weak support for government-sponsored research programs.

The Western Union project of 1863-67 floundered, and its Director, Robert Kennicott died in 1866. His successor, fish specialist William Dall, suffered when his funding was abruptly terminated in 1867, although he did collect more than 4,500 specimens in the Yukon drainage. His book, Alaska and Its Resources, was published in 1870; it encouraged further scientific expeditions in the interior of Alaska.

American government support for research in Alaska forests before the Division of Forestry was established in the Department of Agriculture largely centered on the efforts of Ivan Petroff, a native of Russia and a veteran of the Union Army, who compiled a special report on Alaska for theTenth Census of the United States in 1880. Petroff's census reports were influential in shaping American perceptions of Alaska's forests.

John Muir toured southeastern Alaska in 1879 and emphasized its potential for scientific research and tourism. The American Forestry Association, in the 1870s urged the national government to promote timber cultivation and

preservation. Bernard Fernow, a member of the American Forestry Association, became head of the Division of Forestry of the U.S. Department of Agriculture in 1886. In his first year in office, he outlined a plan of forest research. He lobbied hard for Congressional legislation to set aside federal forest lands. He was successful in 1891, when Congress passed a Forest Reserve Act. In the next year, President Harrison established the Afognak Forest and Fish Culture Reserve. The E.H. Harriman expedition to Alaska in 1989 recruited more than 20 scientists, including Fernow, to tour the Alaska coast. The expedition included specialists in botany, paleontology, mining, mineralogy, geology, zoology, entomology, mammalogy, ornithology, biology, anatomy, forestry, and geography, and many scholarly papers were published from 1 902 to 1 91 4.

1900-24 The Bureau of Forestry became the U.S. Forest Service in 1905, under Cifford Pinchot, but research in Alaska was not a priority.

Henry Graves replaced Pinchot in 1915, visited Alaska, and named Earl Clapp as head of the Branch of Research, in Washington, DC. Forest Service research in Alaska focused on needs of Forest Supervisors on the Chugach and Tongass National Forests, and related to forest management. Graves and Thornton Munger visited Alaska. The small amount of research done was under the supervision of the Regional Forester.

1924-48 The Pacific Northwest Forest and Range Experiment Station was established in 1924 under Thornton Munger. Alaska Research was transferred to the PNW Station; however, logistic and financial support continued to depend heavily on Alaska forest managers until the late 1920s.

PNW Station Director Munger toured Alaska in 1924, accompanied by Ray Taylor, who had conducted growth and yield research in southeastern Alaska since 1 924. Munger recommended expanded research in Alaska, particularly on growth, yield, and regeneration in spruce-hemlock forests. The McSweeney-McNary Act, passed in 1925, put Research on a par with other Forest Service activities, and formalized the basic framework for the regional forest experiment stations in the United States.

Ray Taylor, Harold Lutz, and James Walley conducted research from the mid to late 1 920s, funded mainly by Regional Forester Frank Heintzleman, on growth, yield, and forest inventory. Taylor continued seasonal research in Alaska until 1939 while doing graduate work at Yale. He then transferred to the Washington, DC, Office of the Forest Service, and then to the Rocky Mountain Station in 1935. Lutz published research on glacial moraines in 1930.

Robert Criggs published several articles on forest soils and ecology in 1933 and 1934. L.J. Markwardt published in 1931 on the mechanical properties of Alaska woods and made estimates of Alaska timber volumes. Research by L.J. Palmer on wildlife and rangelands in Alaska resulted in publications in 1926 and 1933. Frank DuFresne reported on Alaska animals and fishes in 1946. David Bruce conducted tree-planting research in the Aleutians in the early 1940s and has continued his interest and involvement to the present.

1948-59 Ray Taylor returned to)uneau in 1948 and established the Alaska Forest Research Center at Juneau—with some research programs at Fairbanks. The Center operated independently, reporting directly to the Forest Service's Washington Office. It grew from a two-person operation in 1948 to a staff of 14 by 1959, when Taylor retired. Key researchers in addition to Taylor were Richard Godman, Lawrence Zach, Harold Anderson, John Hall, William McCambridge, George Downing, A. P. Caparoso, Al Harris, Bill Farr, Robert Gregory, Austin Helmers, Keith Hutchison, Karl Hegg, Tom Laurent, Paul Haack, and Richard Werner. Important areas of research during the period included silviculture, mensuration, fisheries habitat, water quality, soil movement, entomology, and forest survey.

Taylor prepared excellent Progress Reports on the research at both Juneau and Fairbanks. Several publications were also produced.

1959-61 Leadership of the Alaska Forest Research Center was transferred to Austin Helmers, who also administered from Juneau a small staff at Fairbanks in rented facilities near the University of Alaska. Scientists on site at Fairbanks were Bob Gregory (silviculture) and Von Johnson (fire ecology). Working out of Juneau, Forest Inventory work included surveys in interior Alaska beginning in 1956 under Caparoso.

Taylor and colleagues at Region 10 lobbied the Washington Office to broaden the designation of the Center from a research facility to a full-fledged Experiment Station. Their effort was successful, and the Northern Station became a reality July 1, 1961, with headquarters at Juneau under Director Richard Hurd.

Staffing at Juneau and Fairbanks remained much the same at both locations as in 1 959, but with Bob Gregory serving as project leader at Fairbanks.

1961-66 Richard Hurd served as Station Director and reported to the Deputy for Research in Washington. Research at Juneau was concentrated on forest management (Al Harris and Bill Farr), wildlife and fish habitat (Bill Meehan), forest

soil and water (Doug Swanston and Austin Helmers), insect and disease research (Don Schmiege, John Hard, and Tom Laurent), forest survey (Keith Hutchison, Jim LaBau, Paul Haack, Karl Hegg, David Born, Bob Mattson, and Jim Bones). Research at Fairbanks was expanded with studies on white spruce, silviculture (Bob Gregory, Les Viereck, Joan Foote), fire ecology (Von Johnson, Dick Barney), entomology (Roy Beckwith), and water ecology (Austin Helmers).

At Fairbanks, a new forestry sciences laboratory was built on the University of Alaska campus (1961-63), and the Bonanza Creek Experimental Forest (in cooperation with the State) was dedicated in 1963. Much of the research at Fairbanks was cooperative studies with University of Alaska scientists.

1966-71 As a result of a Washington Office inspection, the administration of Forest Service research in Alaska was transferred back in 1966 to the Pacific Northwest Forest and Range Experiment Station, then directed by Philip A. Briegleb. Briegleb organized the Alaska research by subject matter under four Assistant Directors (ADs) who also had responsibilities in Oregon and Washington:

Timber Management		**Forest Environment**		**Forest Protection**		**Economics, Inventory Engineering Products**	
AD David Tackle		AD Robert Harris (1966-70) AD Robert Tarrant (1 970-74)		AD Kenneth Wright		AD Donald Flora	
Juneau	**Fairbanks**	**Juneau**	**Fairbanks**	**Juneau**	**Fairbanks**	**Juneau**	**Fairbanks**
Al Harris	Les Viereck	A. Helmers	A. Helmers (1971)	Don Schmiege	D. Barney	K. Hutchinson	—
Bill Farr	Joan Foote	Bill Meehan	—	John Hard	N. Noste	J. La Bau	—
—	John Zasada	D. Swanston	—	T. Torgerson	R. Beckwith	Karl Hegg	—
—	Bob Gregory	—	—	—	—	R. Dippold	—

Richard Hurd retired from the Forest Service in 1970, as did Director Phil Briegleb of PNW Station.

1971-75 Robert Buckman became director of the PNW Station in 1971, and Ken Wright assumed responsibility for Alaska research, except for Forest Inventory which remained under Don Flora and soil, water, and fisheries research which continued under Bob Tarrant.

In 1971, all research at Fairbanks was combined under a multifunctional research unit titled "Ecology and Management of the Taiga" (subarctic forests)—Interior Alaska; Charles T. Cushwa was recruited as leader and served from 1971-74. Ted Dyrness assumed control of the Fairbanks unit in 1974, and stayed for 1 6 years.

Recreation research was begun in southeast Alaska, but it was conducted as extensions from the PNW recreation research unit in Seattle, as were forest

products recovery and timber quality studies from a PNW unit in Portland. The Caribou-Poker Creeks Experimental Watershed was established in the Fairbanks research program, with Austin Helmers as leader. The U.S. Army contributed facilities and equipment. Helmers retired in 1976, and was replaced by Chuck Slaughter.

Beckwith transferred from Fairbanks to Corvallis in 1 974, and was replaced in forest insect research by Skeeter Werner.

The multifunctional research unit concept was also instituted at Juneau, in a program titled "Ecology of southeastern Alaska forests," headed by Don Schmiege.

K Victor Koske and Arthur Bloom, fisheries biologists, were added to the multifunctional unit at Juneau in 1973.

Assistant Director Ken Wright was detailed to the U.S. Secretary of Agriculture, Washington, (but remained in Portland) to lead the westwide research and development program on the Douglas-fir tussock moth from 1 974 to 1 977. During his absence, Jack Grantham, a project leader in forest products research, was detailed to replace him.

1975-80 PNW Director Buckman transferred in 1975 to Washington, DC, to become Deputy Chief of Forest Service Research.

The Forest Inventory unit was transferred in 1 978 from Juneau to Anchorage; unit leader Keith Hutchison retired in December 1979, after recruiting scientists Ted Setzer, Bert Mead, Gary Carroll, Fred Larson, and Ken Winterberger. Already on board was Jim LaBau, who was assigned the project leader position.

The Alaska National Interest Lands Conservation Act (ANILCA), passed in 1980, was an outgrowth of the final report of the Joint Federal-State Land Use Planning Commission for Alaska in 1 979. As finally drafted, the Act radically revised public land holdings in many parts of Alaska, placing 104 million acres in new conservation units; it established boundaries for Native, private, federal, and state lands.

1981 -1990 Because of strong support from Region 10 Regional Forester John Sandor, PNW Station research in Alaska gained access to substantial annual funding from provisions of the Act for S.E. Alaska projects. This support came to be known as Tongass Timber Supply Funds (TTSF). Primarily from the Tongass Timber Supply funding, research staffing at Juneau underwent significant reorganization, leadership, and staffing. Directors of the Multiproject Research

Program were Calvin Bey, 1983-86, and John Henley, 1986-90. Serving on the advisory committee were Deputy Regional Forester John Sandor, Assistant Director Ken Wright, and Assistant Director Don Flora.

MULTIPROJECT RESEARCH PROGRAM

Advisory Committee:
R-10 Deputy Regional Forester
Assistant Director Ken Wright
Assistant Director Don Flora

Director Calvin Bey 1983-86
Director John Henley 1986-90

Timber Management	Fish habitat	Soil and water	Wildlife habitat	Economics	Improved utilization
Al Harris	Bill Meehan	Doug Swanston	Tom Hanley	Don Flora*	Dick Woodfin*
Bill Farr	Mason Bryant	Roy Sidle	John Thilenius	Roger Fight*	Marlin Plank*
Bernard Bormann	Pam Porter		Vic Van Ballenberghe	Richard Haynes*	Frank Ward*
	Dick Orchard		Paul Alaback		Tom Fahey*
	Jim Sedell*				Jim Howard*

*Working at PNW locations other than Juneau.

Research biologist Vic Van Ballenberghe joined the staff at Fairbanks and began highly productive research in wildlife biology (mainly on moose and wolf). He moved to the Anchorage Laboratory in 1984. In 1984, Skeeter Werner replaced Ted Dyrness as project leader at Fairbanks. John Hard, entomologist, returned to Fairbanks in 1985 after assignments in California and Missoula; he then transferred to the Region 10 office in Anchorage. During the 1980s, Region 10 assumed responsibility for forest inventories of National Forest lands.

George Sampson joined the Fairbanks Lab in the early 1980s to study the potential for developing a forest products industry for interior Alaska.

The Fairbanks Laboratory was faced with closure in fiscal year 1987, for lack of appropriated funds. Congress restored funding; but the lab was closed in 1995.

In 1987, Les Viereck, in cooperation with University of Alaska, won administrative approval and a 5-year federal grant to establish a Long-Term Ecological Reserve Research Program at Fairbanks.

The Copper River Delta Institute was formally established at Cordova in the late 1980s, after annual meetings of many cooperating federal and state agencies, beginning in 1971. Chris Christensen was appointed as the first director. The undertaking was funded jointly by Region 10 and the PNW Station. The Delta is the largest wetland on the west coast of North America, covering 700,000 acres of estuaries, mudflats, marshes, and barrier islands.

Appendix B

Suggested Readings

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Index[1]

[1]Personal names, although prevalent throughout the text, are not indexed because this history is built around the scientific communities involved in forest research in Alaska, and for the purposes of this study, individuals are important for their contributions within those communities and for the traditions and networks they brought to those communities. Locales and programs of study provide the context for those interactions, and by tracking those elements through this index, the reader may follow threads of interconnection among different people and their community links.

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Geier, Max G. 1998. Forest Science research and scientific communities in Alaska: a history of the origins and evolution of USDA Forest Service research in Juneau, Fairbanks, and Anchorage. Gen. Tech. Rep. PNW-GTR-426. Portland OR: U.S. Department of Agriculture Forest Service, Pacific Northwest Research Station. 220 p.

Research interest in the forests of Alaska can be traced from the early 1990s back to 1741, when Georg Steller visited Kayak Island. Given the great research needs and logistical costs in Alaska, support for forest research from this early European contact through the present was seldom adequate. Scientists at Juneau, Fairbanks, and Anchorage in the late 20th century have nevertheless met research goals despite limited funding and agency mandates for timber production. They, with cooperators, have broadened the range of research questions, but budgetary concerns and the political environment still influence issues studied in the search for usable knowledge about Alaska's forests.

Keywords: Forest research, Alaska, history, ecology, fisheries, entomology, wildlife, survey, inventory, timber, taiga, Tongass, Chugach, Pacific Northwest, fire, clearcut, salmon, watershed, landslide, experimental forest, research natural area, aerial photography, remote sensing, transportation, boats, aircraft

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