Assessment of Indian forests and forest management in the United States

Volume II

2013

The third Indian Forest Management Assessment Team for the Intertribal Timber Council

Acknowledgements

This following narrative represents a synthesis of information and analysis provided from numerous sources. It is about the many and diverse forest ecosystems of the American Indian peoples and the dedicated professionals that serve them. The Indian Forest Management Assessment Team is indebted to the tribal officials who generously allowed us to visit their lands. We would especially like to acknowledge the many tribal leaders, elders, educators, and other tribal people who interpreted their forest and shared their concerns. We would like to express our special appreciation to the tribal and Bureau of Indian Affairs natural resource personnel who made time in their workday to discuss the opportunities and challenges of Indian forestry and explain their experiences at the many reservations that we visited.

Colville	Makah	Spokane
Coquille	Menominee	Tulalip
Eastern Cherokee	Mescalero Apache	Tule River
Flathead	Nez Perce	Warm Springs
Fort Apache	Penobscot	White Earth
Lac du Flambeau	Quinault	Yakama
Leech Lake	San Carlos Apache	

Our thanks are also extended to the BIA employees at the four BIA Forestry Regional Offices that we visited in person (Northwest, Pacific, West, Midwest), the BIA Forestry Regional Office visited by conference call (Southwest), the BIA Branch of Forest Resource Planning (BOFRP) visited by conference call, the BIA Branch of Wildland Fire Management (BOWFM) at the National Interagency Fire Center (NIFC) visited in person, and the BIA Central Forestry Office in Washington D.C. Special thanks go to Dave Wilson at BOFRP, Mark Jackson and Robyn Broyles at BOWFM, and to Bill Downes, the recently retired Chief Forester for the BIA.

We also thank the ITC Oversight Committee and the tribes that they represent;
Steve Andringa (Yakama), John DeGroot (Nez Perce). Bill Downes (BIA), Jim Erickson (ITC), Darin Jarnaghan, Sr. (Hoopa), Tim Miller (Grand Portage), and Gary Morishima (Quinault).

We acknowledge our most capable reviewers and thank them for their contributions:
Joyce Berry, Dean of the Warner College of Natural Resources, Colorado State University
Eric Eberhard, Distinguished Indian Law Practitioner, Seattle University School of Law
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An assessment of Indian forests and forest management in the United States

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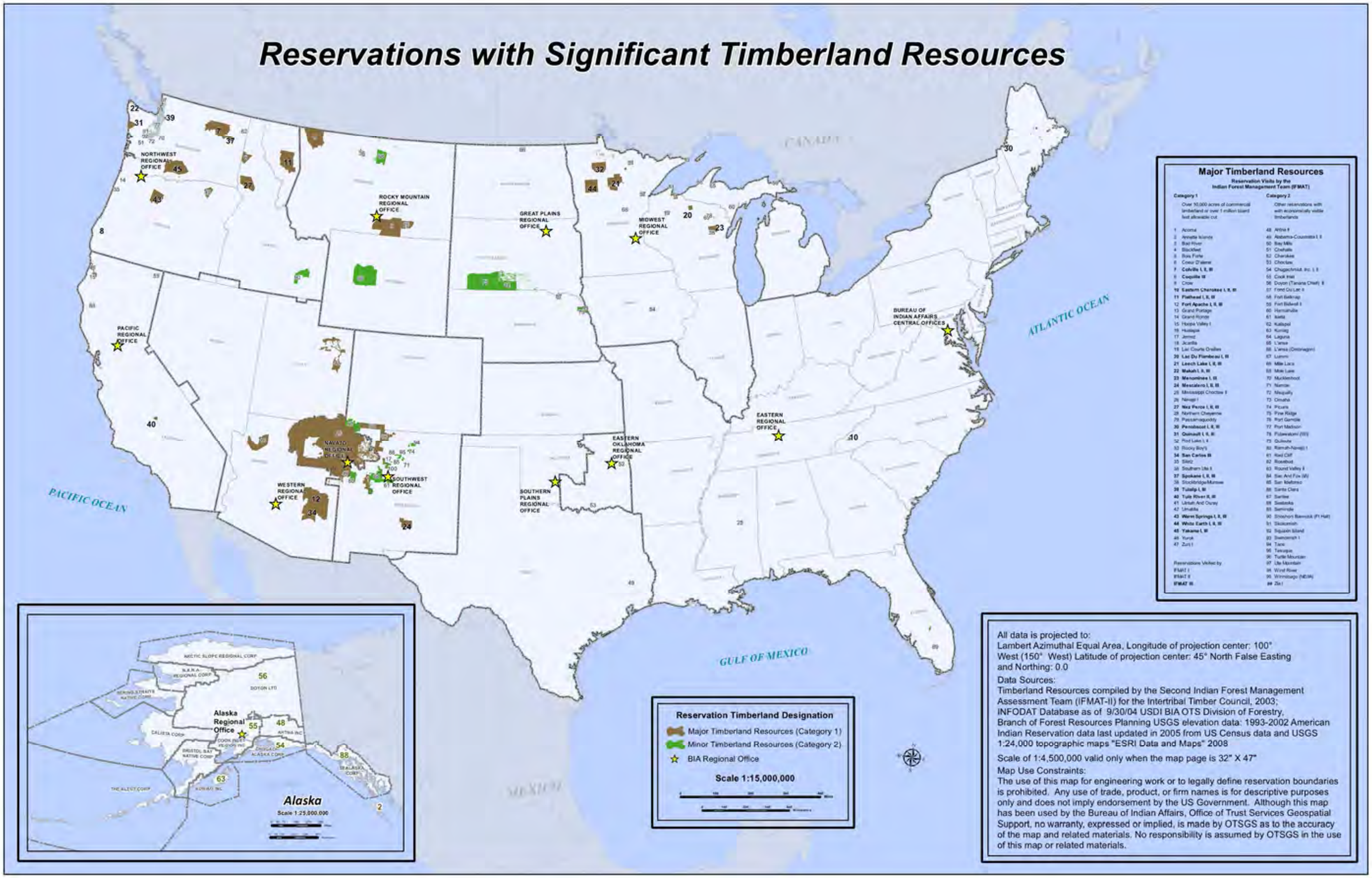
2013

By the Indian Forest Management Assessment Team

For the Intertribal Timber Council

The IFMAT III report is produced in three parts: (1) **Executive Summary**; (2) **Volume I: s**ummarized commentaries, findings and recommendations; (3) **Volume II:** detailed task reports, findings, and recommendations along with references and appendices.

All IFMAT III reports are available for download at:
http://www.itcnet.org/issues_projects/issues_2/forest_management/assessment.html


Reservations with Significant Timberland Resources
CANADA
ATLANTIC OCEAN
PACIFIC OCEAN
GULF OF MEXICO
MEXICO
NORTHWEST REGIONAL OFFICE
ROCKY MOUNTAIN REGIONAL OFFICE
GREAT PLAINS REGIONAL OFFICE
MIDWEST REGIONAL OFFICE
PACIFIC REGIONAL OFFICE
NAVAJO REGIONAL OFFICE
SOUTHWEST REGIONAL OFFICE
WESTERN REGIONAL OFFICE
SOUTHERN PLAINS REGIONAL OFFICE
EASTERN OKLAHOMA REGIONAL OFFICE
EASTERN REGIONAL OFFICE
BUREAU OF INDIAN AFFAIRS CENTRAL OFFICES
Alaska Regional Office
Alaska
Scale 1:25,000,000
Major Timberland Resources
Reservation Visits by the Indian Forest Management Team (IFMAT)
Category 1
Over 10,000 acres of commercial timberland or over 1 million board feet allowable cut
Category 2
Other reservations with with economically viable timberlands
1 Acoma
2 Annette Islands
3 Bad River
4 Blackfeet
5 Bois Forte
6 Coeur D'alene
7 Colville I, II, III
8 Coquille III
9 Crow
10 Eastern Cherokee I, II, III
11 Flathead I, II, III
12 Fort Apache I, II, III
13 Grand Portage
14 Grand Ronde
15 Hoopa Valley I
16 Hualapai
17 Jemez
18 Jicarilla
19 Lac Courte Oreilles
20 Lac Du Flambeau I, III
21 Leech Lake I, II, III
22 Makah I, II, III
23 Menominee I, III
24 Mescalero I, II, III
25 Mississippi Choctaw II
26 Navajo I
27 Nez Perce I, II, III
28 Northern Cheyenne
29 Passamaquoddy
30 Penobscot I, II, III
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34 San Carlos III
35 Siletz
36 Southern Ute II
37 Spokane I, II, III
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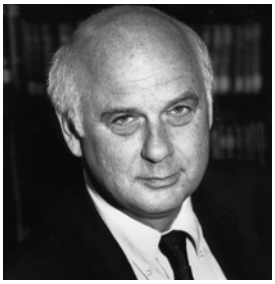
39 Tulalip I, III
40 Tule River II, III
41 Uintah And Ouray
42 Umatilla
43 Warm Springs I, II, III
44 White Earth I, II, III
45 Yakama I, III
46 Yurok
47 Zuni I
Reservations Visited by
IFMAT I
IFMAT II
IFMAT III
48 Ahtna II
49 Alabama-Coushatta I, II
50 Bay Mills
51 Chehalis
52 Cherokee
53 Choctaw
54 Chugachmiut, Inc. I, II
55 Cook Inlet
56 Doyon (Tanana Chief) II
57 Fond Du Lac II
58 Fort Belknap
59 Fort Bidwell II
60 Hannahville
61 Isleta
62 Kalispel
63 Koniag
64 Laguna
65 L'anse
66 L'anse (Ontonagon)
67 Lummi
68 Mille Lacs
69 Mole Lake
70 Muckleshoot
71 Nambe
72 Nisqually
73 Omaha
74 Picuris
75 Pine Ridge
76 Port Gamble
77 Port Madison
78 Potawatomi (WI)
79 Quileute
80 Ramah-Navajo I
81 Red Cliff
82 Rosebud
83 Round Valley II
84 Sac And Fox (IA)
85 San Ildefonso
86 Santa Clara
87 Santee
88 Sealaska
89 Seminole
90 Shoshoni Bannock (Ft Hall)
91 Skokomish
92 Squaxin Island
93 Swinomish I
94 Taos
95 Tesuque
96 Turtle Mountain
97 Ute Mountain
98 Wind River
99 Winnebago (NE/IA)
Ak-Chin I
All data is projected to:
Lambert Azimuthal Equal Area, Longitude of projection center: 100° West (150° West) Latitude of projection center: 45° North False Easting and Northing: 0.0
Data Sources:
Timberland Resources compiled by the Second Indian Forest Management Assessment Team (IFMAT-II) for the Intertribal Timber Council, 2003; INFODAT Database as of 9/30/04 USDI BIA OTS Division of Forestry, Branch of Forest Resources Planning USGS elevation data: 1993-2002 American Indian Reservation data last updated in 2005 from US Census data and USGS 1:24,000 topographic maps "ESRI Data and Maps" 2008
Scale of 1:4,500,000 valid only when the map page is 32" X 47"
Map Use Constraints:
The use of this map for engineering work or to legally define reservation boundaries is prohibited. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the US Government. Although this map has been used by the Bureau of Indian Affairs, Office of Trust Services Geospatial Support, no warranty, expressed or implied, is made by OTSGS as to the accuracy of the map and related materials. No responsibility is assumed by OTSGS in the use of this map or related materials.
Reservation Timberland Designation
Major Timberland Resources (Category 1)
Minor Timberland Resources (Category 2)
BIA Regional Office
Scale 1:15,000,000

The Indian Forest Management Assessment Team

Authors



John C. Gordon

Co-chairman, IFMAT III.
Chairman, IFMAT 1 and IFMAT II

Yale School of Forestry, Pinchot Professor Emeritus of Forestry and Environmental Studies in the Yale School of Forestry and Environmental Studies; Dean 1983-92; 1997-98. Head and Professor, Department of Forest Science, Oregon State University, Professor of Forestry at Iowa State University, and Principal Plant Physiologist in the Pioneering Project in Wood Formation, USDA Forest Service, Rhinelander, Wisconsin. B.S. (forest management) and a Ph.D. (plant physiology and silviculture) from Iowa State University. Fulbright Scholar in Finland (University of Helsinki) and India (GKVK State Agricultural University, Bangalore). Awarded the University Medal by the University of Helsinki in 2002, an honorary doctorate by Unity College in 2004, the Gifford Pinchot Medal by the Society of American Foresters in 2008 and the Henry A. Wallace Award by Iowa State University in 2012. Author of numerous scientific papers and books. Chaired or co-chaired all three Indian Forest Management Assessment Teams.

John Sessions

Co-chairman, IFMAT III.
Vice-chairman, IFMAT I and IFMAT II

University Distinguished Professor of Forestry and Strachan Chair of Forest Operations Management at Oregon State University. Served in various positions in the USDA Forest Service at the district, forest, regional office, central office, and research station in engineering and timber management. Consulted in 16 countries for NGOs, companies, and agencies on five continents. Systems analyst and harvesting manager of JARI Florestal in northern Brazil for 3 years. Teaches Forest Planning, Forest Operations, Transportation Planning, Logging Mechanics, Combinatorial Optimization, and International Forestry. Research focuses on efficient solutions to forest planning problems and all aspects of the forestry supply chain. Currently leads the Logistics Team for the multi-university 5-year effort to develop a supply chain for the conversion of forest harvest residues to aviation fuel. B.S. in civil engineering, M.S. in civil engineering, M.S. in forest engineering, Ph.D. in forest management and is a licensed professional engineer. In 2013 he was recognized by the Society of American Foresters with the Award in Forest Science.

John Bailey

Associate Professor, Forest Engineering, Resources and Management, Oregon State University. Research focuses on using traditional and experimental silviculture practices to achieve a spectrum of objectives in a landscape, including commodity production, habitat creation, and ecosystem restoration. PhD, 1996, Forest Science, Oregon State University. MF, 1985, Forest Biology, Virginia Tech, Blacksburg
BS, 1983, Forestry and Wildlife, Virginia Tech, Blacksburg.

Climate Change Advisor of the USDA Forest Service. Serves the Forest Service Chief, executive leadership, and the field by coordinating activities related to climate change adaptation, mitigation, and communication. Primary USFS spokesperson on the role of forests in climate change and leads the implementation of the Forest Service's nationwide strategy for weaving climate change response into policies, processes, and partnerships.

David Cleaves

President of Northwest Management, Inc. (NMI) a natural resource consulting firm with offices in Idaho, Washington and Montana. SAF Certified Forester, a member of the Association of Consulting Foresters, and a certified Environmental Management System lead auditor and past president of the Western Forestry Conservation Association. Consulting services include strategic business planning, project development, contract negotiations, log marketing and due diligence for land acquisitions and exchanges. Expertise includes providing leadership for enterprise and business opportunities. Received from University of Idaho, Natural Resource Award for programs exemplifying integrated natural resource management, ITC Northwest Regional Award and the Nez Perce Tribal Executive Committee special appreciation award for work with the Nez Perce Tribe.

Vincent Corrao

Chair, Natural Resources Department, Salish Kootenai College. Ph.D., Forestry. 2005. University of Massachusetts. M.F., Forestry. 1996. Yale University School of Forestry and Environmental Studies. B. A., Anthropology. 1992. State University of New York, Albany, NY. Research interests include silviculture, tree growth, fire history, and tribal forest management.

Adrian Leighton

Research consultant for Alternative Dimensions Inc., working in applied problem-solving for integrated approaches to sustainable forests, societies, and ecosystems. Former research scientist and project coordinator for the Rural Technology Initiative at the University of Washington with focus on Forest Systems Analysis, Life Cycle Analysis, Bioenergy Development, and Forest Products Manufacture and Marketing. Forty years of experience in forest industry, forest policy, and forestry research. Former owner and operator of a sawmill and logging company in Washington. B.S. in Forest Management and M.S. in Silviculture and Forest Economics from the University of Washington.

Larry Mason*

Mark Rasmussen

Principal, Mason, Bruce & Girard. Long term forest planning, forest policy analysis, economic analysis of forest management practices, and forest valuation. Former Policy Analyst for the National Forest Products Association in Washington, D.C. Former Forest Economist at Timber Data Company, providing the forest industry with insight into stumpage markets across the West. Started career with the United States Forest Service developing forest plans. M.S. in Forest Economics and a B.S. in Environmental Studies both from Utah State University.

Hal Salwasser

Professor of Forest Ecosystems and Society at Oregon State University and Director of the High Lonesome Institute. From July 2000 to July 2012 was Dean, College of Forestry and Director of the Oregon Forest Research Laboratory. Held numerous positions with the US Forest Service culminating as Regional Forester in the Northern Rockies and Research Station Director in California. Appointed First Boone and Crockett Professor of Wildlife Conservation at The University of Montana (1992-1995). Served in many professional capacities including President of The Wildlife Society in 1993-94, the National Commission on Science for Sustainable Forestry (chair 2003-2005) and the Board on Agriculture and Natural Resources of The National Academies from 2006-2012. In 2012, honored as Top Dog, Distinguished Alumnus of the College of Science and Mathematics at CSU, Fresno. PhD in Wildland Resource Science from the University of California, majoring in wildlife and rangeland ecology, and a BA in biology , emphasizing fresh water and marine biology, from California State University, Fresno. He is a Fellow of the Society of American Foresters.

Mike Sterner*

Attorney in private practice in Oregon. Forest policy researcher and report editor on IFMAT-II. Three years as a Peace Corps volunteer. J.D. from the University of Washington and a Master of Forestry from Yale University.

***Writing team members**

Student observers

Breanna Gervais

Penobscot

Portland State University OR. Undergraduate Environmental Science Management, USFS-Research Technician PNW. Interest, forestry, ecology, and Indigenous science.

Serra Hoagland

Laguna Pueblo

PhD student in the School of Forestry at Northern Arizona University, currently studying the effects of forest treatments on Mexican spotted owl occupancy and reproduction and plans to create a short documentary that translates traditional ecological knowledge for broader use in natural resource management. B.S. Ecology, Cal Poly, San Luis Obispo. M.S. Bren School of Environmental Science & Management at University of California Santa Barbara. While completing her master's thesis on California oak woodland ecology and management, Serra pioneered a Wildlife Linkages project where she assessed the habitat connectivity of open spaces in Santa Barbara. Joined the Eastern Forest Environmental Threat Assessment Center of the US Forest Service in 2011.

Laurel James

Yakama

Interdisciplinary PhD program, at the University of Washington where her dissertation focuses on a forest history project combining forest management (forest inventory/remote sensing), policy, traditional knowledge systems and Communications. Currently works part-time at the University of Washington, Department of Chemical Engineering, managing the Tribal Projects Partnership section of the WSU led Northwest Advanced Renewables Alliance aviation biofuels project. AAS from Yakima Valley Community College, a professional certificate in Environmental Law & Regulation, BS Forest Resources –Wildlife Science and a MS Forest Resources – Fire Ecology, all from the University of Washington. 20 years with the Division of Natural Resources of the Yakama Nation; crew leader on Northern Spotted Owl project; Forest –Wildlife representative to the Yakama/BIA, interdisciplinary Team. Fought fires on the Engine & Helitack crews for the Yakama Agency -Fire Management program; then, transitioned to the USFS Entiat Ranger District, Interagency Hotshot Crew.

Intertribal Timber Council liaison

Technical Specialist, Intertribal Timber Council. Provided support for coordinating IFMAT site visits, arranging for interviews, and identifying contacts to secure information. Former Forest Manager for the Spokane Reservation and BIA Billings Area Forester. Treasurer and Board Member, Wisdom of the Elders, Inc. American Indian Science and Engineering Society, Washington Agriculture & Forestry Education Foundation, Big Brothers Big Sisters. B.S. Forest Engineering, University of Washington.

Don Motanic

Umatilla

Abbreviations

AAC	Annual Allowable Cut
ADS	Aerial Detection Survey
BAER	Bared area emergency response
BBF	Billion board feet
BIA	Bureau of Indian Affairs
BIARS	Bureau of Indian Affairs Road System
BLM	Bureau of Land Management
BOFRP	Branch of Forest Resources Planning
BOWFM	Branch of Wildland Fire Management
CFI	Continuous forest inventory
CFLRP	Collaborative Forest Landscape Restoration Program
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
DOI	Department of the Interior
EMDS	Ecosystem Management Decision Support
EQIP	Environmental Quality Incentive Program
FAEIS	Food and Agriculture Education Information Statistics
FEPP	Federal Excess Property Program
FHWA	Federal Highway Administration
FIA	Forest Inventory Analysis
FLAME	Federal Land Assistance, Management and Enhancement
FMD	Forest management deduction
FMP	Forest management plan
FPA	Funding and Position Analysis
FTE	Full-time equivalent
FY	Fiscal year
GIS	Geographic Information System
HFPAS	Hazardous Fuels Prioritization and Allocation System
IFMAT	Indian Forest Management Assessment Team
ILCA	Indian Land Consolidation Act
IRMP	Integrated resource management plan
IRR	Indian Reservation Roads System
ITC	Intertribal Timber Council
LCC	Landscape Conservation Cooperative
LTRO	Land Title & Records Office
MBF	Thousand board feet
MEL	Minimum Expected Level
MMBF	Million board feet
NASP	National Advanced Silviculture Program
NCA	National Climate Assessment
NCCE	National Center for Cooperative Education
NEPA	National Environmental Policy Act
NIFC	National Interagency Fire Center
NIFRMA	National Indian Forest Resource Management Act
NRCS	Natural Resource Conservation Service
NTFP	Non-timber forest product
OST	Office of the Special Trustee
OTR	Office of Tribal Relations USFS
QFR	Quadrennial Fire Report
REIT	Real Estate Investment Trust
RPA	Resource Planning Act
S&PF	State and Private Forestry USFS
TAAMS	Trust Asset and Accounting Management System
TCU	Tribal Colleges and Universities
TEK	Traditional Ecological Knowledge
TFPA	Tribal Forest Protection Act
TIMO	Timber Investment Management Organization
USGCRP	US Global Change Research Program
USDA	US Department of Agriculture
USFS	USDA Forest Service
VCC	Vegetation Condition Class

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Introduction

The National Indian Forest Resources Management Act (NIFRMA), enacted as Title III of Public Law 101-630 on November 28, 1990, provided guidance on a range of challenges and objectives for Federal trust administration to support sustainable management of Indian forests.

Among key findings were congressional acknowledgements that:

- Forest lands of Indians are among their most valuable resources.
- The United States has a trust responsibility toward Indian forest lands.
- Existing federal laws do not sufficiently assure the adequate and necessary trust management of Indian forest lands.
- The federal investment in, and the management of, Indian forest land is significantly below the level of investment in, and management of, Forest Service land, Bureau of Land Management (BLM) forest land, or private forest land.
- Tribal governments make substantial contributions to the overall management of Indian forest land.
- There is a serious threat to Indian forest lands arising from trespass and unauthorized harvesting of Indian forest land resources.

NIFRMA (section 3111) directed the Secretary of the Department of the Interior (DOI), in consultation with the affected Indian tribes, to obtain periodic independent assessments of the status of Indian forest resources and their management. The first two assessments were completed in 1993 and 2003. As the third assessment, this report provides an opportunity to look back across the past two decades of change and advancements, as well as to consider challenges that remain for Indian forestry programs.

NIFRMA states that assessments of Indian forests and forest management shall be national in scope and centered on eight topics of inquiry:

A. An in-depth analysis of management practices on, and the level of funding for, specific Indian forest land compared with federal and private forest lands.

B. A survey of the condition of Indian forest lands, including health and productivity levels.

C. An evaluation of the staffing patterns of forestry organizations of the Bureau of Indian Affairs and of Indian tribes.

D. An evaluation of procedures employed in timber sales administration, including preparation, field supervision, and accountability for proceeds.

E. An analysis of the potential for reducing or eliminating relevant administration procedures, rules, and policies of the Bureau of Indian Affairs consistent with federal trust responsibility.

F. A comprehensive review of the adequacy of Indian forest land management plans, including their compatibility with applicable tribal integrated resource management plans and their ability to meet tribal needs and priorities.

G. An evaluation of the feasibility and desirability of establishing minimum standards against which the adequacy of forestry programs of the Bureau of Indian Affairs in fulfilling its trust responsibility to Indian tribes can be measured.

H. Recommendations of any reforms and increased funding levels necessary to bring Indian forest land management programs to a state-of-the-art condition.

As with preceding reports, the Secretary of the Interior contracted with the Intertribal Timber Council (ITC), a national organization of forest-managing Indian tribes, to oversee the development of this report. At the request of ITC, the assessment was expanded to include the following three questions regarding contemporary issues of special interest to forest-managing Indian tribes:

(1) Issues relating to workforce education, recruitment and retention with special attention to recruiting more Indian professionals in natural resource management.

(2) Quantification of economic, social, and ecological benefits provided by Indian forests to tribal and regional communities.

(3) Consideration of changes in forest management, harvesting, and transportation infrastructure in the vicinity of reservations and the potential for Indian forests to become “anchors” of forest infrastructure.

Other topics that currently affect Indian forests include trust responsibility; federal budget reductions; policies related to fractionated ownership; and the Tribal Forest Protection Act (TFPA). Immediate threats to the sustainability of forests across all ownerships, such as forest fire hazard, climate change, endangered species, and market declines, also warrant

consideration.

To address these questions, ITC selected a group of ten independent forestry experts from various disciplines to make up the third Indian Forest Management Assessment Team (IFMAT III)**.** Some members participated in one or both of the previous IFMAT assessments, allowing them to make direct comparisons over time in their fields of expertise.

Thinned pine forest- Mescalero Apache. Photo by Vincent Corrao.

Methodology

ITC selected ten nationally-recognized forestry experts to form IFMAT III, and appointed an oversight committee to work directly with the team. Twenty forested reservations (listed below), some large and some small, distributed throughout the United States, generously agreed to host site visits by IFMAT III during 2012. At each site, tribal and Bureau of Indian Affairs (BIA) staff provided briefings on resource programs. In addition to visits with resource professionals, IFMAT III participated in discussions with tribal leaders, tribal elders, members, government officials, students, and educators. At each reservation, in addition to meetings, at least one day was spent touring the tribal forest lands to observe management in practice. On reservations where the tribe operated a wood-processing facility, IFMAT III visited the facility and interviewed staff. Most reservation visits were completed in two days, while a few on the larger reservations with schools or sawmills required three days. A trip log is included in the Appendix V

New with IFMAT III has been the initiation of a Native student observer program. Three ambitious scholars from three tribes joined the team as principal interns for site visits, organizational meetings, and research investigations. Another five students joined IFMAT for single reservation visits. Internships provide beneficial opportunities for students to gain experiences, tribal contacts, and leadership skills that will serve them into the future while

bringing added depth to Indian forest management assessments. IFMAT recommends that future investigations provide similar opportunities for student participation.

Student participation

Principal student observers:

Laurel James (Yakama), PhD candidate, University of Washington (UW)
Serra Hoagland (Laguna Pueblo), PhD candidate, Northern Arizona University
Breanna Gervais (Penobscot), undergraduate, Portland State University

Single visit participants:

Spus Wilder (Colville), Master of Science student, UW
Jeromie Grits (Eastern Band of Cherokee), Masters student, UW
Everett Isaac (Yakama), PhD, UW
Chris Beatty (Fort Apache), Master of Science student, UW
Louis Moses (Spokane), undergraduate, Salish Kootenai College

In addition to reservation visits, IFMAT III met with educators from schools with Native enrollments in resource sciences and with federal agency personnel at regional and national BIA and other federal offices with responsibility for providing services to Indian tribes.

Field visits to reservations

IFMAT III visited 20 Indian reservations (Colville, Coquille, Eastern Band of Cherokee, Flathead, Fort Apache, Lac du Flambeau, Leech Lake, Makah, Menominee, Mescalero Apache, Nez Perce, Penobscot, Quinault, San Carlos Apache, Spokane, Tulalip, Tule River, Warm Springs, White Earth, and Yakama).

Field visits to schools

Four Indian colleges (Salish Kootenai College, Northwest Indian College, Leech Lake Tribal College, and College of Menominee Nation), three community colleges with forestry programs close to reservations (Grays Harbor College, Heritage College, Spokane Community College), one tribal high school with forest education program (Taholah).

Field visits to BIA and federal offices

IFMAT visited and interviewed staff at four BIA Forestry Regional Offices (NW, Portland; Pacific, Sacramento; West, Phoenix; Midwest, Minneapolis), the National Interagency Fire Center (NIFC, Boise), and the BIA Central Forestry Office in Washington D.C. One Regional Office (SW, Albuquerque) and the Branch of Forest Resource Planning (BOFRP, Lakewood) were visited via conference calls. Meetings with federal agencies in Washington D.C., that deliver services to Indian forestry programs, included BLM, USDA Natural Resources

Conservation Service (NRCS), USDA National Institute of Food and Agriculture, the USDA Office of Tribal Relationships, and USDA Forest Service Research.

Indian symposia

IFMAT III attended the 2012 BIA National Forest and Fire Conference and the 2012 ITC National Indian Timber Symposium.

Focus groups

Tribal members, elders, and councils – 12 reservations (Eastern Band of Cherokee, Colville, Coquille, Flathead, Lac du Flambeau, Menominee, Mescalero Apache, Nez Perce, Quinault, Tule River, Fort Apache, Yakama)

Educators, resource professionals, and students

10 reservations (Colville, Eastern Band of Cherokee, Fort Apache, Leech Lake, Menominee, Mescalero Apache, Quinault, Flathead, San Carlos Apache, Yakama)

Questionnaires

Focus group survey – 218 responses
Workforce survey – 135 responses

Data

Hard data and analysis that help answer the NIFRMA-mandated questions have remained consistent through three IFMAT reports. The assessment process is largely informed by data collected and provided by BOFRP, supplemented by contributions from other federal and state agencies. Other data sources include BIA central offices, BIA Branch of Wildland Fire, tribal forest plans, the USDA Forest Service (USFS) Forest Inventory Analysis (FIA) program, Aerial Detection Surveys, LANDFIRE, and others. Our discussion of tribal leadership and vision has been guided by what we have learned from the conversations and survey responses contributed by tribal members, young and old. Augmenting the multiple centuries of career experience shared by members of the IFMAT with review of historic, technical, and legal literature, we add our thoughts and recommendations in regard to the elusive concepts of "state-of-the-art" forestry and federal trust responsibility.

Scope

Funding analysis (Task A) extends to all BIA funding obligations for forestry and fire programs including those from Alaska. Other Task findings and recommendations are generally limited to Indian forests held in trust within the contiguous United States. Unfortunately, due to time and budgetary limitations, we were unable to examine the vast and resource-rich lands of Alaska where Native individuals, villages, tribes, and corporations hold almost 50 million acres, about half of which is forested. Most of these lands are in fee status, but 460,000 acres are trust lands many of which are widely scattered with no over-arching management plans. An IFMAT-type

study of the Native peoples of Alaska and their forests is sorely needed and long overdue but beyond the scope of this investigation. Nevertheless, we hope that some of the discussions presented in IFMAT III, especially concerning topics such as trust responsibility, forest health, traditional knowledge, and climate change, will be of interest to tribal and BIA forestry professionals to the north.

Snag retention – Coquille. Photo by Larry Mason

FIT

To look beyond disciplinary siloes and provide a more integrated understanding of our findings, we introduce the concept of ***FIT (fire, investment, and transformation)***. The themes of fire, investment, and transformation embody the progress that Indian forestry has made over the period of the IFMAT assessments, as well as the opportunities and challenges that lie ahead.

Wildland ***Fire*** and other related forest health threats jeopardize the economic and ecological sustainability of Indian forests. Strategic ***Investment*** is needed to achieve tribal forest visions and plans, and to fulfill the U.S. government trust responsibility for Indian forests. ***Transformation*** of tribes to self-governance, and toward the emergence of Indian forestry as a model for landscape stewardship, presents a pathway leading to a sustainable future.

Underburn to reduce hazardous fuels – Flathead. Photo provided by CSKT Fire Division

Fire

Few tribal land managers, particularly in the West, deny the growing problem with widespread fuel accumulation owing to decades of fire exclusion. Despite rising costs of fire suppression across the nation, and the National Fire Plan (2000) that led to major increases in federal agency funding for preparedness and fuel treatments, there has been an increase in the acreage of forests and woodlands consumed by wildfire each year.

Tribes have more management flexibility to deal with these issues than their federal neighbors. In general, our findings highlight many examples of healthy and productive Indian forests. We saw outstanding examples of sound forest management practices such as innovative uneven-aged forest management including prescribed fire, thinning regimes, and increasing use of integrated multiple resource management.

These examples of effective treatments offer hope, but are not enough to match the magnitude of the growing problem. The health of tribal forests is threatened by density-related issues such

as wildland fire, insects, and disease, which will increasingly compromise long-term forest sustainability. This is especially the case in the dry interior West where much of Indian forest acreage is located.

Suppression funding is legislatively based on a 10-year running average and continues to climb, which pulls money from preparedness and fuel management. The boost from National Fire Plan funding is dissipating more each year. BIA-NIFC struggles to maintain a qualified workforce and funding for routine operations, leaving little buffer in the system.

Thinning backlogs on tribal forest lands have been estimated by the BIA (2012d) to be 440,000 acres however, this acreage does not include the tens of thousands of acres on which hazardous fuels reduction treatments are needed. If land managers are truly going to use fire as a tool to restore ecosystems and reduce landscape-level fuel accumulations, they need to be treating five to ten times the amount of acres they have been treating annually over the last decade (Sandsberry 2012, Gorte and Bracmort 2012, Gorte 2011).

Adding urgency to these risks are climate changes; personnel shortages; the widespread loss of harvesting, transportation, and processing infrastructure; and adjacent forest ownerships that are densely stocked in many locations, posing increased wildfire threats to tribal resources.

Tribes, with their long and acknowledged relationship with fire and sustainable land management, can lead the way over the coming decades as public land management agencies work toward the goal of restoring the natural role of wildland fire.

Harvester/processor - Menominee.
Photo by Larry Mason

Investment

Indian forests require a minimum annual appropriation of $254 million to bring per acre funding on a par with appropriate comparators (USFS for stewardship and wildfire for commercial timberlands; BLM for stewardship and wildfire on non- commercial forest lands; state and industrial forests for timber production). Current annual funding of $154 million is $100 million below comparable public and private programs.

This base funding does not include support for substantive tribal involvement in the DOI's Landscape Conservation Cooperatives (LCC) or other collaborative initiatives. Tribes need equitable access to funds and services related to climate change planning, adaptation, and response. Moreover, staffing is inadequate to provide the quality and quantity of services needed to care for Indian forests. Expertise and leadership are being lost through retirements and employment transfers for higher wages. The involvement of Native American professionals has increased, but enrollment and recruitment efforts for natural resource professionals are inadequate to replace losses. Compensation received by tribal staff is significantly lower than that available for BIA and other agencies, which challenges recruitment and retention for tribal programs. Due to lack of stable, adequate funding, forest management functions are relying more and more on non-recurring grants, increasing administrative burdens and posing challenges for maintaining program continuity.

What is needed to bring Indian forestry up to par with other forest ownerships?

Approximately **800 staff positions**
Approximately **$100 million annually** in additional funding for forestry and wildfire management
Another **$12.7 million annually** for forestry education and training programs

Retirements, insufficient recruitment and retention, and limited professional training opportunities are resulting in the erosion of workforce skills, leadership, and institutional knowledge within BIA and tribal forestry programs. Investments are needed in education and workforce development to replace an aging workforce with a new generation of skilled managers and technicians.

The 2011 Funding and Position Analysis (FPA) indicates that a minimum of an additional 792 professional and technical staff are needed to support the Indian forestry program, an increase of 65 percent above current levels. In addition, IFMAT recommends that a BIA national coordinator be recruited to pursue and oversee forestry education and training programs as envisioned by NIFRMA. A total cost of $12.7 million per year or about $0.69/acre will be required in addition to the $100 million needed for forest management.

Our recommendations attempt to identify "leverage points," where targeted changes might yield substantial benefits. Tribes have enduring connections to the lands where they live, and live with the consequences of their management decisions. Healthy tribal forests provide

spillover benefits to society at large in the form of clean air and water, wildlife habitat, reduced fire risk, and biodiversity. When investments in tribal forests are made and recoverable products can be sold, caring for the forest can bring net return instead of sunk cost. The future environmental benefits of healthy forests can be regarded as interest earnings. Investments in tree planting and other long-term forest improvement activities assure the added benefits of sustainable communities and the skilled human resources needed to take care of the forest. Without management, forest health deteriorates, resiliencies needed for climate change adaptation are lost, and unwanted wildfires increase in frequency.

These factors, together with their greater flexibility in management options, make Indian forestry programs an investment responsibility with high potential returns.

Tule River. Photo by Larry Mason.

Transformation

Successes in Indian Country have not gone unnoticed. A profound transformation is underway in Indian forest management as BIA-dominated policies and programs are being replaced by tribal visions and development of expertise under self-determination contracting and self-governance compacts. Tribal involvement in forest management is leading to greater satisfaction in the quality of forest management in tribal communities. Indian forests are being increasingly managed by tribal programs in accordance with tribal visions and management priorities are shifting towards protection, with commodity production receiving less emphasis.

For example, despite continuing barriers, tribes are increasingly moving toward self-governance. In the twenty years since IFMAT I, the number of tribes that are taking control of their own forest management programs through compacts or contracts with BIA has risen more than 84 percent from 59 in 1991 to 112 in 2011. As a result, tribal forest management strategies are narrowing the gap identified in IFMAT I between timber commodity production and tribal visions for multi-resource stewardship built upon an integration of western science with traditional knowledge and values.

IFMAT III found that forest management plans now exist for most tribal forest lands. We suggest that planning could serve tribes in new ways: as a vehicle for funding and staffing negotiations, to develop conservation strategies to bring relief from regulatory burdens such as the National Environmental Policy Act (NEPA).

In policy and action, there appears a growing acceptance of an Indian worldview that "all things are connected," accompanied by growing recognition that environmental challenges cannot be contained within political boundaries. The TFPA is an example. TFPA was intended to protect tribal assets by allowing tribes to contract with the federal agencies to carry out hazardous fuel and forest health silvicultural treatments on "adjacent" federal lands. TFPA represents an underutilized opportunity to work with state and federal agencies to increase jobs and economic stability in tribal communities, protect tribal resources and treaty rights on and off the reservation, and implement needed fuel hazard reductions that otherwise might not be accomplished. TFPA partnerships should be aggressively expanded, as 80 million acres of national forest land are in need of treatment and tribes share nearly 3000 miles of common boundary with national forests and rangelands.

Another opportunity for tribal forestry to play a pivotal role in efforts to achieve cross-boundary, landscape-level resource management is through anchor forests. An initiative of the ITC, the anchor forest concept centers on the idea of tribal forest managers collaborating with neighboring ownerships to collectively ensure long-term flow of harvested timber sufficient to sustain wood processing facilities within feasible transportation distances. These "anchor forests" will achieve economic, environmental and cultural objectives. A key aspect of this collaboration is the recognition that forest management must be both ecologically sustainable and economically viable.

Trust Responsibility

We find that the federal government continues to inadequately fulfill its trust obligations to Indian forestry as identified by Congress in the preamble to NIFRMA [Title III SEC 302]. This is evidenced in part by the fact that real funding and staffing levels are lower now than at the time of IFMAT I and continue to be well below those of comparable public and private programs. In

addition, there continues to be an inadequate response to the mandate of NIFRMA for the federal government to work with the tribes to provide for multiple use management consistent with tribal values and needs such as subsistence and ceremonial uses, fisheries, wildlife, recreation, aesthetic and other traditional values.

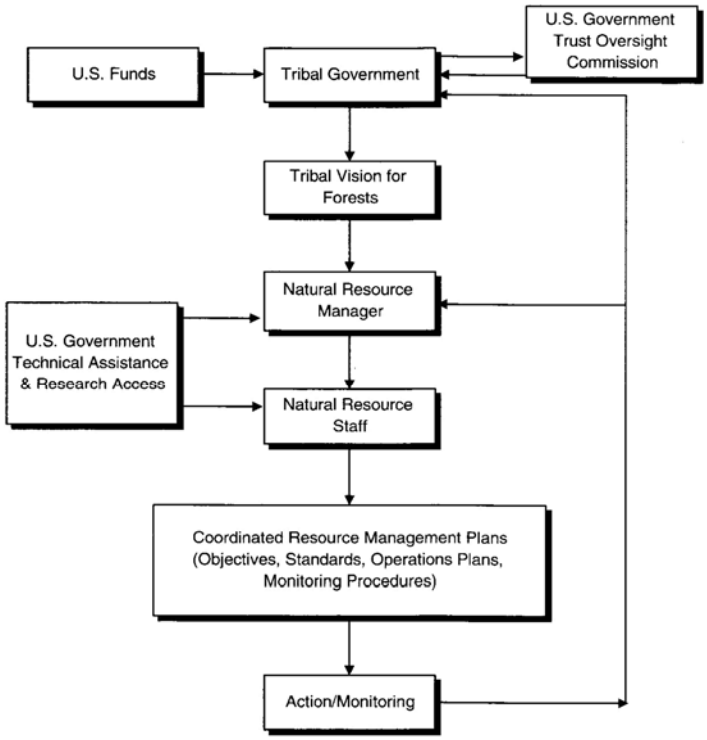
We recognize that no explicit, uniform performance standards for Indian forest management have been established to provide a firm basis for evaluating the degree to which the federal government is fulfilling its trust responsibility. However, we remain concerned that 1) funding and staffing levels continue to be insufficient to support state-of-the-art forest management, 2) that sufficient separation of oversight from operational responsibilities has not been put into effect, and 3) that administrative processes for Indian forestry are becoming extremely costly to complete.

After 20 years, still both pitcher and umpire

As noted in IFMAT I and II, a conflict of interest is created by the dual obligations of the BIA to both deliver Indian services *and* to assess whether those services are adequate and well-executed. Prior IFMAT reports characterized this situation as the BIA attempting to perform as both pitcher and umpire.

The diagram below was first proposed by IFMAT I, two decades ago, as a framework to restructure trust oversight. An independent commission would periodically review performance of services against tribal plans, accepted by the Secretary of the Interior, and would have the power to require corrections. The commission would be national-level, but with local reach. An example of such a model is the Nuclear Regulatory Commission. The trust oversight commission could contract with regional entities to be primary providers of oversight duties, subject to commission review. Any trust oversight body must have the technical capacity and skill to assess forest management issues.

Fulfillment of the federal trust duty depends upon standards against which performance can be evaluated. Standards must have adequate oversight for their execution, and must be enforced. An effective mechanism for enforcing standards does not currently exist, and the third party oversight as recommended by past IFMAT reports has not been implemented. A state-of-the-art Indian forestry program must: 1) be assured of predictable, consistent, and adequate funding for forestry programs on all reservations, whether direct service, contracting, or self-governance compacting; 2) have access to adequate technical and research support; 3) be guided by each tribe's vision for its forests; and 4) strive to sustain tribal resources and objectives. The condition of the forest itself, over time, is the best measure of whether state-of-the-art management is being achieved. A central part of the trust responsibility is to see that each tribe has the means to develop its vision and management plans with adequate technical resources and personnel.



A framework for trust oversight

There are lingering concerns regarding separation of operational from oversight responsibilities – the "pitcher-umpire" issue – identified in IFMAT I and II. The Indian trust beneficiaries and the credibility of the government will be better served by addressing this conflict of interest. It remains to be seen if current efforts, such as the Secretarial Commission on Trust Administration and Reform, and BIA streamlining will effectively address conflicts of interests and improve administration of the trust.

Trust responsibility and NIFRMA

Eric D. Eberhard *is a Distinguished Indian Law Practitioner in Residence at the Seattle University School of Law. Mr. Eberhard served as the General Counsel and Staff Director for the US Senate Committee on Indian Affairs from 1989 – 1995. In that capacity, he was directly involved in the Congressional mark up and passage of NIFRMA. IFMAT asked Mr. Eberhard to briefly share his thoughts on trust responsibility and Indian forestry.*

Treaties, Acts of Congress - including the NIFRMA - and decisions of the federal courts acknowledge the United States' trust responsibility to the tribes. The trust responsibility applies to the entire federal government. While it is the case that the Congress has delegated primary responsibility for the discharge of the trust responsibility to the President and Secretary of the Interior in 25 U.S.C. §§ 2 and 9, it is also clear that every department and agency in the

Executive Branch is charged with acting in a manner that is consistent with the trust responsibility.[1] The trust responsibility imposes fiduciary duties on the federal government and in the absence of any Act of Congress to the contrary, the federal courts will hold the government to a strict standard of compliance with those duties.[2]

When viewed in its entirety, the legislative history and the plain language of NIFRMA clearly evinces a Congressional intent to embrace the trust responsibility and to apply it strictly. In doing so, Congress also intended to require the Executive Branch to provide support for both sustained yield and multiple use management of Indian forest lands, consistent with the goals and vision of each tribe and the laws governing self-determination and self-governance.[3] During the consideration of NIFRMA Congress noted with approval that the tribes were using the Indian Self-Determination Act to enter into contracts, grants, cooperative agreements and self-governance compacts in the area of forest management because "it has yielded improved forest management activities."[4]

The Supreme Court long ago concluded that the trust responsibility for Indian forest management is clear. In *United States v. Mitchell*, the Court determined that:

> *Our construction of these statutes and regulations is reinforced by the undisputed existence of a general trust relationship between the United States and the Indian people. This Court has previously emphasized "the distinctive obligation of trust incumbent upon the Government in its dealings with these dependent and sometimes exploited people."*
>
> *Because the statutes and regulations in this case clearly establish fiduciary obligations of the Government in the management and operation of Indian lands and resources, they can fairly be interpreted as mandating compensation by the Federal Government for damages sustained. Given the existence of a trust relationship, it naturally follows that the Government should be liable in damages for the breach of its fiduciary duties. It is well established that a trustee is accountable in damages for breaches of trust.*[5]

Both the House and the Senate were cognizant of the Court's holding in *Mitchell II* during the consideration of S. 1289, the bill which became NIFRMA, and both embraced this same language from the Court's opinion in *Mitchell II*.[6] There can be no doubt that the Congress intended to accept the Court's holding in *Mitchell II* and to incorporate the Supreme Court's understanding of the trust responsibility into NIFRMA.[7]

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[1] *Poafybitty v. Skelly Oil Co.*, 390 U.S. 365 (1968) and *United States v. Winnebago Tribe*, 542 F.2d 1006 (8th Cir. 1976).
[2] *United States v. Creek Nation*, 295 U.S. 103 (1935).
[3] 25 U.S.C. §§ 450 et seq.
[4] S. Rpt. 101-402 at 9.
[5] *Mitchell II*, 463 U.S. at 225-226 (citations omitted)
[6] S. Rpt. 101-402 at 5 (101st Cong., 2d Sess. 1990) and H. Rpt. 101-835 at 13 (101st Cong., 2d Sess. 1990).
[7] Because of concerns over liability for breach of trust and unique jurisdictional and political complexities of Indian Country resulting from over two hundred years of history replete with vagaries of policy, legislation, and court

The legislative history for NIFRMA demonstrates that Congress intended to address many of the same issues that have been identified as problems in IFMAT I, II and III. The historic and consistent lack of adequate funding for the management of tribal forests throughout the 20th century was well documented, as was the continuous breach of what was characterized as a "sacred trust."[8] The lack of adequate funding has persisted despite the enactment of NIFRMA. NIFRMA was also intended to address issues[9] such as:

- ✓ The need for additional personnel.
- ✓ Improved forest management planning and integrated resource management planning.
- ✓ Technical assistance in marketing forest products.
- ✓ Forest road systems, fire protection and pest control.
- ✓ The direct expenditure of tribal funds to carry out the federal trust responsibility for the management of tribal forests.
- ✓ The burdens of compliance with archaeology and historic preservation laws which were originally intended to apply to public lands, not tribal trust lands.[10]
- ✓ The management problems and expenses created by the checker boarding of Indian forest lands as a result of the General Allotment Act.
- ✓ The problems created by the absence of statutory authority for multiple use management of Indian forest lands and the single minded focus on sustained yield management, without regard to tribal objectives that are consistent with tribal values and needs such as subsistence and ceremonial uses, fisheries, wildlife, recreation, aesthetic or other traditional values.[11]

Finding

Twenty-three years after the first IFMAT assessment, notwithstanding the record of tribes improving management of their forests, Indian forests remain underfunded, tribes are constrained by conflicting rules and regulations that hinder rather than help them achieve self-governance, and tribal forests are increasingly threatened by inaction on the borders of their lands.

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decisions, an extensive set of rules, regulations, and procedures is contained in manuals and handbooks for trust administration of Indian forests.

[8] S. Rpt. 101-402 at 2-3; H. Rpt. 101-835 at 11-12.

[9] S. Rpt. 101-402 at 5-10; H. Rpt. 101-835 at 14-17.

[10] A federal nexus created by funding provided to fulfill treaty and trust obligations and the involvement of the United States as trustee, coupled with the lack of consideration for the special status of lands held in trust for Indians has resulted in the application of such laws to Indian forestry. II refers to these requirements as "unfunded mandates."

[11] The fiduciary trust model, as conceived and implemented by Interior, is still dominated by the notion that the primary economic value produced by forests is limited to timber harvest. In order to gain greater understanding of the multi-dimensional benefits that forests provide, the ITC requested that IFMAT-III include a special study area to quantify economic, social, and ecological benefits provided by Indian forests to tribal and regional economies.

Pah-to (Mt. Adams) – Yakama. Photo by Mark Rasmussen.

Indian Peoples' Visions

Achievement of the dynamic future that tribes desire for their forests is the most compelling criterion for the adequacy of forest management. Thus, a tribal vision for the way their forests should look and be in the future is a critical component of effective management planning and implementation. Ideally, this vision is reflected in a written document that can be referenced or incorporated into a forest management or natural resources management plan. But it is more important that tribal forest futures are discussed in earnest by tribal members and leadership, and that the discussion is listened to carefully by foresters and other resource managers. This communication is particularly important given the fact, often previously observed, that tribal people tend to live intimately with the consequences of management decisions. Often their forest is neither remote nor conceptual but rather their everyday environment and a constant source of both material and spiritual sustenance.

In an effort to understand tribal citizens and resource professional's views of Indian forests and forestry, IFMAT I conducted surveys and focus group discussions during site visits to Category I and II timber tribes. Results revealed that tribal members and resource professionals had differing perceptions of what tribal members valued the most. Tribal members on the whole favored "protection" of the forest resource, whereas resource professionals thought that tribal members favored economic return. Through further interpretation of survey results and focus groups held at most reservations visited, it emerged that tribal members defined protection as the sustainable provision of all benefits derived from the forest, including, but not limited to, harvesting and revenue generating activity, and beginning with the assurance that forests are kept as forest land in perpetuity.

IFMAT II and III adopted similar survey and focus group techniques in order to evaluate if 1) the overall vision first articulated in IFMAT I has changed, and 2) if progress has been made in transforming forest management to better reflect that vision.

Methods

To assure that each time period was truly comparable, the same survey instrument was used as in the other assessments. As before, the survey was given to focus group members and made available to the tribes for dissemination. The only difference from previous IFMATs was that the survey was made available in an online format as well as through paper copies. Survey documents used by IFMAT can be found in Appendix VI.

We collected a total of 218 surveys, and conducted focus group discussions during 12 of the site visits (Table V.I). Each focus group included 5-15 individuals invited to attend by the tribal forester. We asked the same questions as in previous IFMATs: 1) "What do you most value/want from your forest and why?" 2) "What do you think about current management practices on your tribal forest?" and 3) "Have you seen changes in management since the last IFMAT, and if so, what has changed?" Focus groups were held at the Coquille, Nez Perce, Menominee, Quinault, Flathead, Colville, Eastern Band of Cherokee, Tule River, Fond du Lac, Yakama, Mescalero Apache and Fort Apache Reservations.

Table. V.1 2012 survey respondents

Demographic	Number of Respondents
Tribal Public	127
Tribal Natural Resources	28
Tribal Forestry	31
Non-tribal Forestry Staff	32
Total	**218**

Findings

V1. Tribal vision themes remain consistent over the last 20 years. The diversity of Indian tribes, values, and forests make generalization difficult. However, for the most part, tribal members tend to express a holistic view of the forest, seeing it as more than an aggregate of resources. Tribes have consistently articulated the primary importance of caring for the forest and managing it in an integrated fashion.

Another central element of the tribal vision is the importance of self-determination and self-governance. With recent trends toward greater management by tribes, these values have been at the heart of many changes to tribal forestry operations and have led to increased tribal member satisfaction in the quality of forest management. As part of this vision of self-determination, the role of youth education and effective communication with the tribal

public in forest and natural resource management again arises as a central part of the tribal vision that was expressed repeatedly in focus groups, surveys and discussions with tribal forestry and natural resource staff.

V2. Convergence of goals and values continues. The first IFMAT report revealed a significant divergence between tribal public values and the perception among BIA personnel of those values. Tribal members articulated a clear desire to place protection of forest resources foremost, with strong concern also for cultural uses and aesthetics. BIA personnel, especially non-tribal foresters, placed greater emphasis on income generation as a primary management value. Tribal natural resource staff also rated protection less highly than did the tribal public.

IFMAT II reported a convergence of views and values between the tribal public and resource managers. A majority of survey respondents, including both tribal members and forestry professionals, agreed that forest protection should be the management priority. This shift in perception was especially evident among non-tribal BIA foresters, who placed markedly less emphasis on income generation compared to IFMAT I. IFMAT II explained this trend toward greater convergence as 1) the beginning of a shift toward greater tribal self-governance, 2) an increase in the number of forest managers who are Native American, and 3) greater presence and influence of tribal natural resources departments.

IFMAT III found that the trend toward greater agreement on management priorities continues. All groups valued protection as the most important objective, with cultural and scenic values remaining fairly consistent. Income production remains the only category showing inconsistency between the groups, but the gap is narrowing. Although 31 percent of tribal natural resource employees rated income as important, none of this respondent group felt income to be the most important value, whereas more than 20 percent of non-Native tribal employees cited income as the paramount benefit. That difference, however, is minor compared to IFMAT I. IFMAT III finds agreement among respondents that protection of forests should be the management priority.

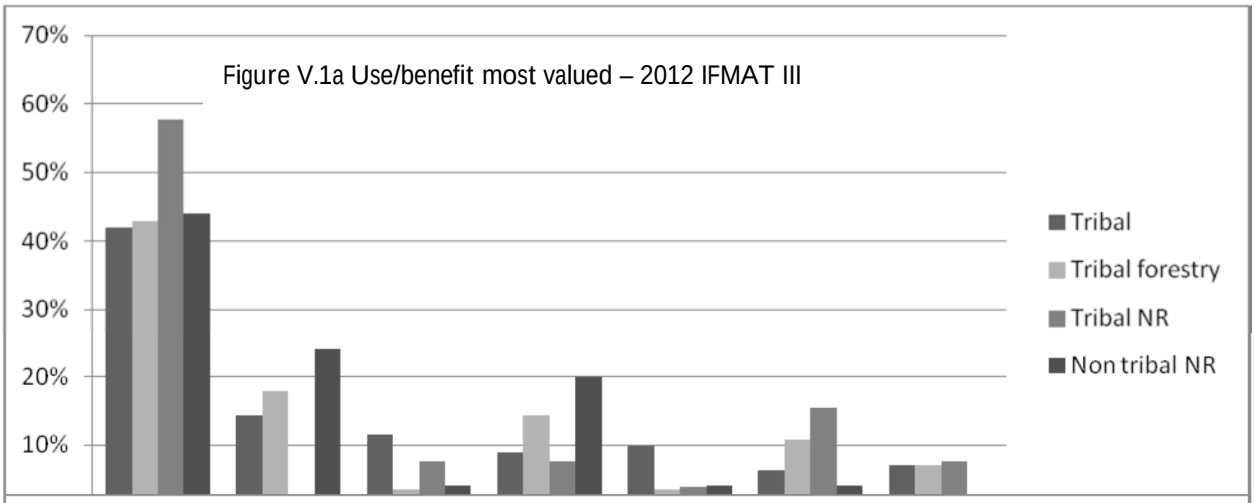


Figure V.1a Use/benefit most valued – 2012 IFMAT III

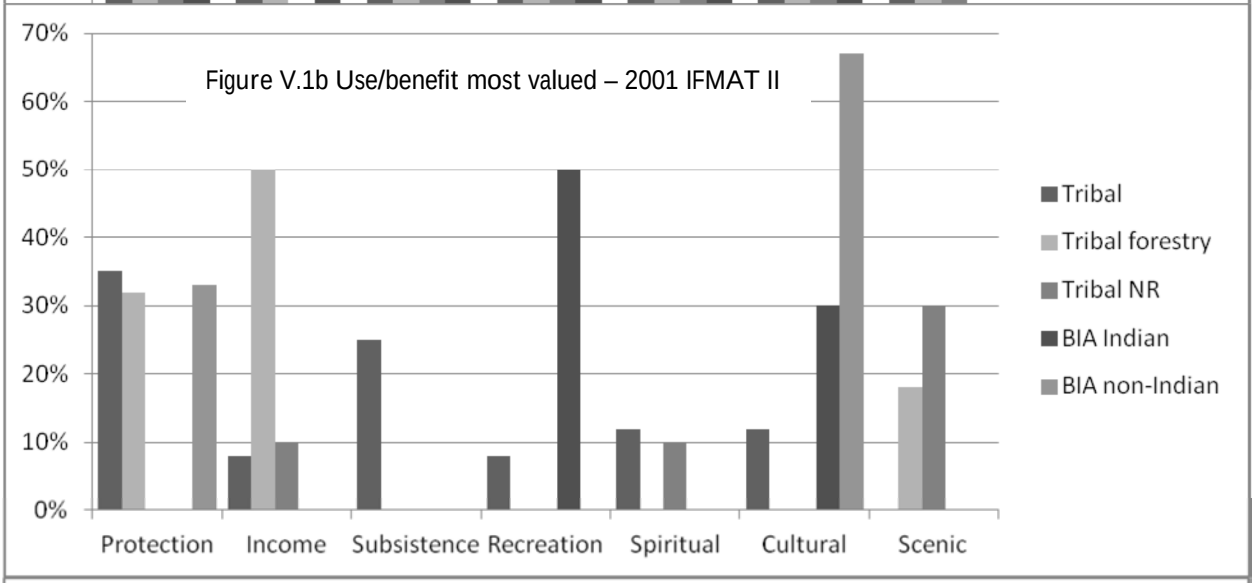


Figure V.1b Use/benefit most valued – 2001 IFMAT II

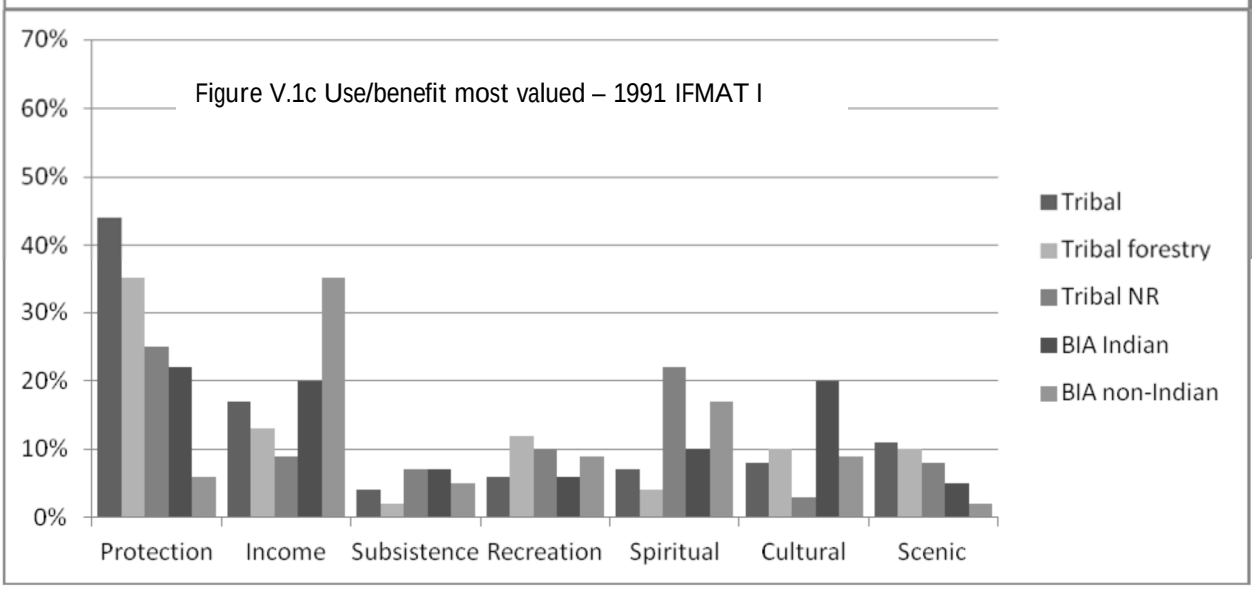


Figure V.1c Use/benefit most valued – 1991 IFMAT I

When IFMAT III survey participants were asked *"What do you want from your forest?"* the convergence of views between tribal members and non-Indian forestry professionals is striking as can be clearly seen in Figure V.2. In most cases tribal and non-tribal responses were within a few percentage points of one another. Income, while acknowledged by half of the respondents as an important forest value, is subordinated by cultural and environmental priorities.

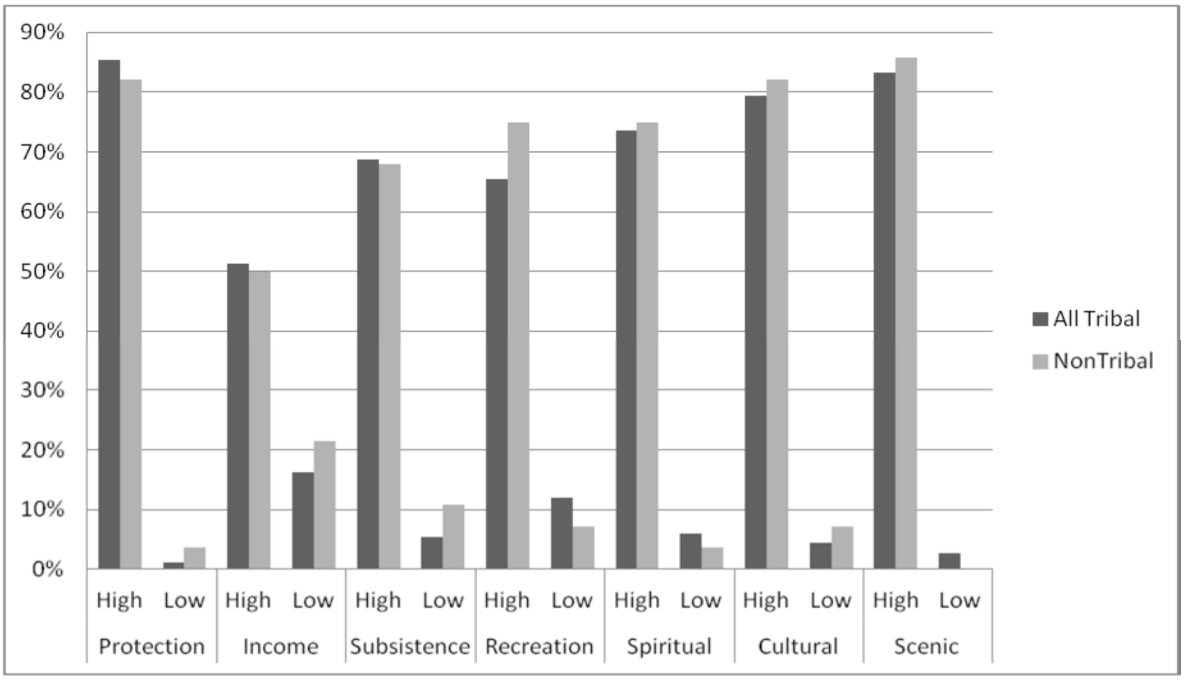


Figure V.2 What do you want from your forest?

V3. Perception of the quality of management over time has noticeably improved. In the last two decades, there has been a marked move toward self-determination and self-governance, with most tribes visited during IFMAT III contracting or compacting the management of their forests. This has led to greater tribal input in management direction and vision with a corresponding increase in positive perception of the quality of management by tribal members.

IFMAT I found that overall, the tribal pubic was not satisfied with the quality of management being performed on tribal lands. Specifically, less than 25 percent of survey respondents gave a "good" or "excellent" rating to the following activities: grazing, recreation, water quality and quantity, non-timber forest products, employment of tribal members, creation of new enterprise, food gathering, spiritual values, visual quality, protection from pollution and waste, poaching, trespass, and overall management.

IFMAT II found some improvement in overall perception of the quality of management, but still less than 25 percent of survey respondents gave a "good" or "excellent" rating to the

following activities: grazing, recreation, non-timber forest products, employment of tribal members, creation of new enterprise, spiritual values, visual quality, poaching and trespass. Categories that showed improvement included water quality and quantity, food gathering, protection from pollution and waste, and overall management.

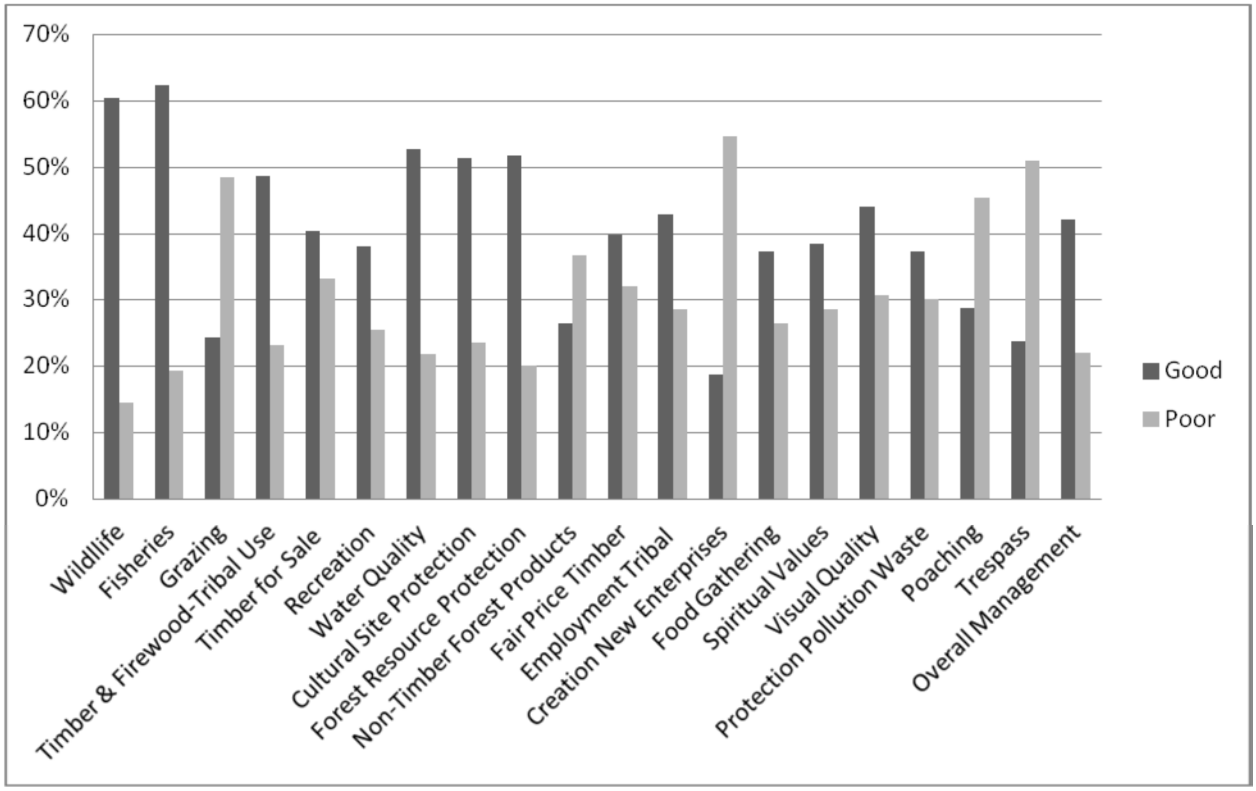


Figure V.3 How well do you think your forests are being managed?

In the last 10 years, tribal member satisfaction with aspects of management has improved, with only three activities now receiving less than 25 percent "good" or "excellent" ratings: grazing, creation of new enterprise, and trespass. Although approval is by no means universal, the general trend is positive, and five programs received greater than a 50 percent "good" or "excellent" rating: wildlife management, fisheries management, water quality, cultural site protection, and forest resource protection. Five activities, however, received a higher proportion of negative ratings than positive. These were grazing, creation of new enterprises, trespass, management for non-timber forest products and poaching. Overall management received 42 percent positive ratings, compared to only 22 percent of tribal members surveyed that ranked it as poor.

Recommendation

V1. Innovative and continued efforts need to be made to foster, strengthen and continue communication between the tribal membership, tribal forestry, other natural resource programs and tribal leadership. We find that a tribal vision of their future forest's appearance, productivity and dynamics is the foundation of management planning. An integrated vision of the suite of components, values and products a tribe wishes to pursue will require effective information and education provision by resource managers, and vigorous involvement and discussion by leaders and members. Without this vision process, we feel that integrated management planning will produce modest and sometimes harmful results. As an acknowledged element of state-of-the-art forestry, BIA should work to assure that adequate resources are made available to conduct meaningful outreach to tribal members through scoping and visioning sessions as well as field tours such that tribal visions are well-understood and can be incorporated into forest planning. Outreach should include young people (K-12 students) as well as tribal elders, leaders, and general membership.

Comments from tribal members shared during focus group discussions

Natural, beautiful places for traditional uses

- "We have an awesome forest land, we need forest management to maintain and protect our lands and forest."
- "Our cultural value is directly a part of Mother Earth, not separate in any way, spiritually connected".
- "The forest is our world, both spiritual and cultural."
- "The forest is us. The forest is the most important part of our future. We are planning to be here forever."
- "The value of a forest is our life. The forests and the people have been here together for thousands of years."
- "If we are not maintaining our forests, then that is a reflection of how we are living our lives."
- "More people are using the woods now, visiting for ceremonial and spiritual purposes."

Integrated management

- "The forest needs to be managed for multi-use. The BIA Forestry has only allowable cut and income in their eyes. It's a part of their performance evaluations. Don't harvest if timber prices are too low. Cutting timber to create jobs is detrimental to the forest. The timber will always be there for another time. Manage for species manipulation, spacing, insect, disease, fire, and subsistence."
- "Very disappointed in 10-year management plan. Seems to be just another document no one pays attention to. I have never seen an evaluation of what worked in the

previous plan and a critical evaluation of what needs improvement. Our huckleberry fields are less than desirable. Too many wild horses in forested area pushing out the deer and elk."

- "Is there a way (for the BIA) to measure success that doesn't punish tribes for non-timber forest management?"
- "As an Elder once said 'Fish grow on trees. Everything is part of a circle."
- "We have been here for eons. We have been sustained and have sustained. Everything is important. We must guard against missing links and pieces."
- "We must strive for economic sustainability in the whole community (tribal and non-tribal). The tribe has to be a leader in how things are managed. The tribe won't be successful without a successful larger community."

Self-governance and trust responsibility

- We could avoid future litigation about the land such as the one that is happening right now if the government kept their word and the natives buy their ancestral land and start respecting themselves."
- "Training and educating. Then we don't need BIA! We don't anyway (they encumber our efforts!)"
- "Our foresters are working on their days off in order to get things done- they should get paid better for what they do."
- "They (BIA) have a trust responsibility. The only thing missing is the trust."
- "Things are getting better but they are getting more complicated all the time."

Communication, tribal public involvement, education

- "I would suggest they make more effort to keep the tribal members informed on who runs forestry, what they are managing and for what reasons. I would like to know more about our Forestry program."
- "It seems like there are a lot of trees being hauled off. It would be nice to know where these trees are being taken, or what authorization was given. I am sure it is posted somewhere, but I do not feel I am informed, nor do I feel I know where to look."
- "Keep the Community educated and updated on all activities."
- "Teach our young people in schools to be aware of our beautiful land, to preserve it!"
- "Forestry could always do a better job of educating the community and explaining the reasons behind forest practices, but it takes time and staff to do this. It is hard for them to do this without resources or time."
- "Unfortunately, the natives are not teaching their future leaders (the children) about the importance of sustaining the land that we once used to respect."

Tribal youth – Mescalero Apache. Photo by Vincent Corrao.

The Indian Forest Resource and the Benefits It Provides

In order to gain greater understanding of the multi-dimensional benefits that Indian forests provide, the ITC requested that IFMAT III quantify economic, social, and ecological benefits provided by Indian forests to tribal and regional societies. This section addresses ITC question 2: Quantification of economic, social, and ecological benefits provided by Indian forests to tribal and regional communities.

"Our Land is What Makes Us Who We Are[12]*"*

Not counting Alaska, Indian lands once covering 2.4 billion acres are now reduced to 57 million acres, mostly in the West. A very small fraction of lands in Indian Country are in fee ownership (in which the owner holds title to and control of the property), but the vast majority are held in trust for tribes and individual Indians by the federal government. The Secretary of the Interior as the primary designated federal trustee of Indian Country, thus oversees the largest land trust in the world.

[12] Focus group comment from IFMAT I

There are 12 BIA Regional Offices that, for comparability to prior IFMAT reports, we have grouped into 5 reporting regions as follows:

Northwest – Northwest (Portland), Rocky Mountain (Billings), Pacific (Sacramento)

Southwest – Southwest (Albuquerque), West (Phoenix), Navajo (Gallup)

Lake States – Midwest (Minneapolis), Great Plains (Aberdeen), South Plains (Anadarko), East Oklahoma (Muskogee)

East – Eastern (Nashville)

Alaska – Alaska (Juneau)

On a total of 334 Indian reservations in 36 states, there are 18.6 million acres of Indian forests and woodlands. Of the total number of reservations, 305 have trust status and 29 are in fee ownership. Excluding Alaska, we find 18 million acres on 294 Indian reservations located within the contiguous United States and held in trust by the federal government. It is these lands and the forestry programs charged with their care to which IFMAT's inquiry directs its primary attention. Complicating Indian forestry further, however, are the thousands of fragmented, fractionated, and forested allotted lands that are owned by individual Indian families and are held in trust by the federal government, most often within reservation boundaries, and managed in conjunction with tribal forest trust lands.

Coastal conifer forest – Makah. Photo by Mark Rasmussen.

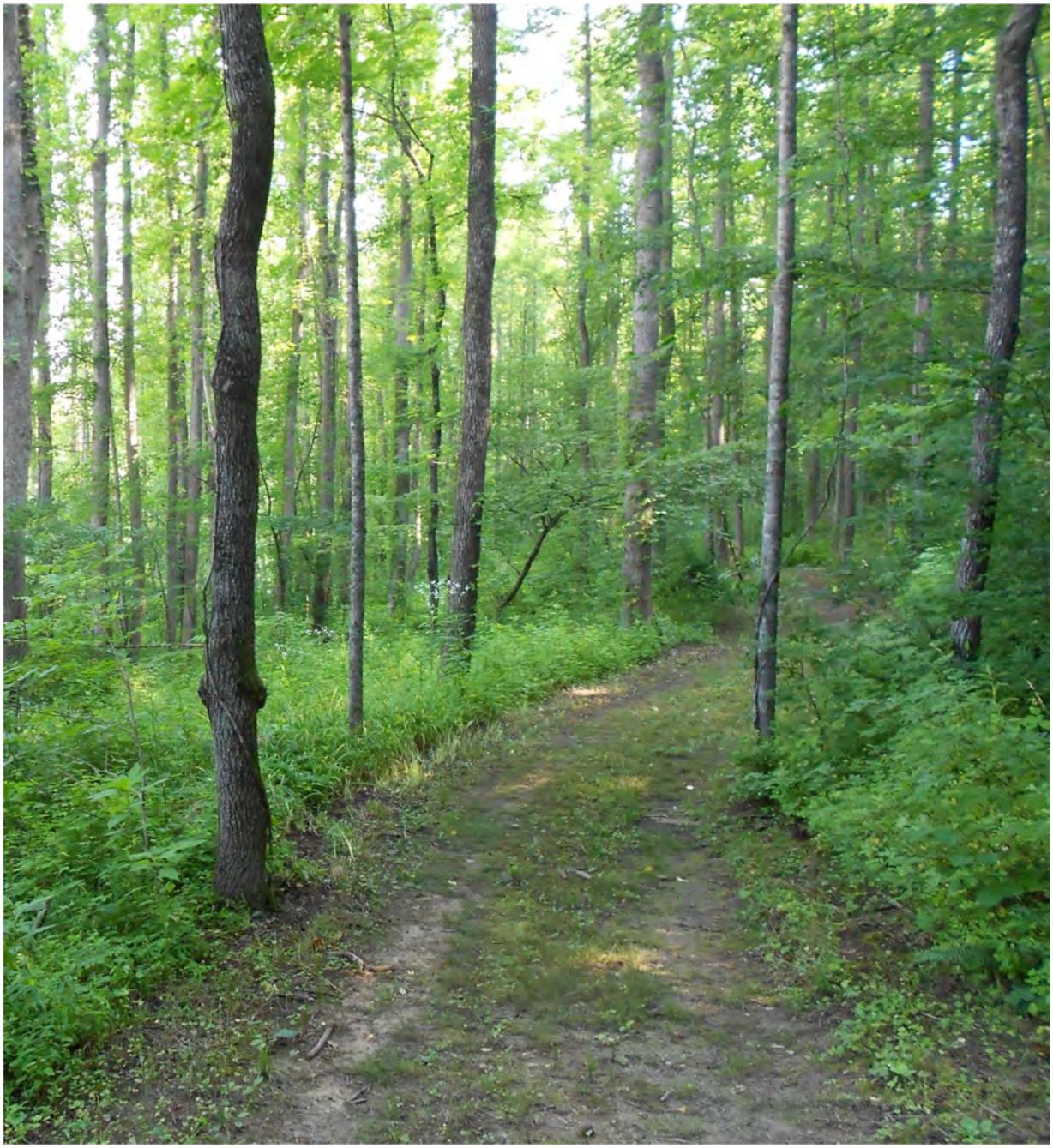
Diverse forest types: diverse benefits

Forest land and the resources it provides are very important to tribal people. Since the first IFMAT report in 1991, through dedicated programs of reacquisition, tribes have been able to gradually increase their cumulative forest holdings by more than 2.8 million acres. Tribal forests cover about one-third of all Indian trust lands and serve as the economic and cultural backbone for many Indian reservations. There is perhaps no other single natural resource as varied or as

important to tribal governments and their members. Forests store and filter the water and purify the air. They sustain habitats for the fish and wildlife that provide sustenance for the people. They produce foods, medicines, fuel, and materials for shelter, transportation, and artistic expression. Forests provide revenues for many tribal governments, sometimes the principal source of revenue, and sorely-needed employment for Indian people and rural communities. Forests provide a sense of place that sustains tribal lifeways, cultures, religions, and spiritual practices. These "ecosystem services" are perhaps nowhere more closely linked to community and cultural vitality than in Indian Country.

Tribal forests and woodlands are ecologically and geographically diverse, hosting representative samples of most of the tree species and forest ecosystems found in North America. They include, for example, Douglas-fir, western red cedar, and hemlock in the moist Northwest; giant sequoias and redwoods in California; ponderosa pine, lodgepole and larch in the Inland West; pine, pinyon, and juniper in the dry woodlands of the Southwest; aspen, maple, oak and white pine in the Lake States; eastern red spruce in the Smokey Mountains; and northern hardwoods and mixed conifers in the Northeast.

Of the 18 million forested acres on Indian reservations, six million acres are considered commercial timberlands, nearly four million acres are commercial woodlands, and more than eight million acres are a mixture of non-commercial forests and woodlands. More than one million acres of these forests have been set aside from harvest by tribal governments as cultural and ecosystem reserves.



Young hardwood forest – Eastern Band of Cherokee. Photo by Vincent Corrao

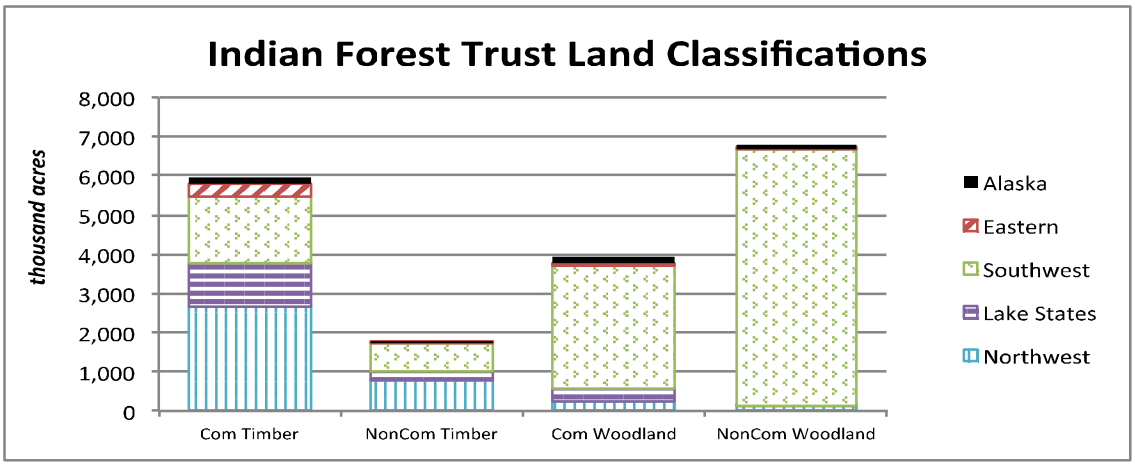


Figure IF.1. Forest classifications by region.

Table IF.1. Forest Classifications by acreage and region.

Indian Forest Trust Land Classifications by Region - *thousand acres*					
	Com Timber	**NonCom Timber**	**Com Woodland**	**NonCom Woodland**	**Total Acres**
Northwest	2,667	796	235	122	3,820
Lake States	1,091	193	359	5	1,649
Southwest	1,718	725	3,133	6,567	12,143
Eastern	311	30	11	12	364
Alaska	175	51	174	61	461
Total Trust Lands	5,963	1,795	3,912	6,766	18,437
Total Trust & Fee Lands	6,051	1,812	3,912	6,803	18,593

Table IF.2. Forest Classifications of trust and fee lands.

Indian Forest Land Classifications – *reservations trust and fee*			
Component	**Trust & Fee**	**Trust Only**	**Trust w/o AK**
Forested Reservations	334	305	294
Timber Only	124	99	97
Woodland Only	121	109	109
With Woodland	210	202	193
Indian Forest Lands – *thousand acres*	18,593	18,437	17,975

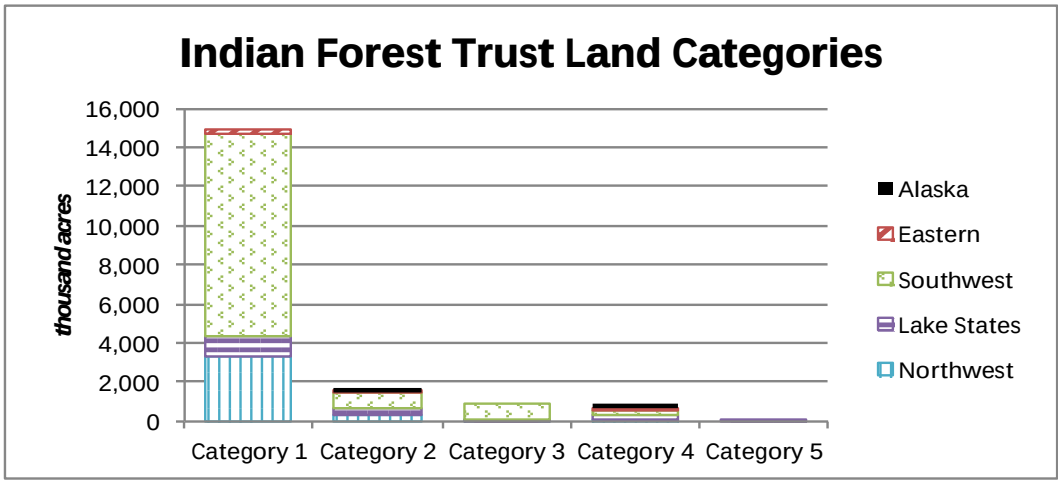


Figure IF.2. Indian forest categories and acres by region.

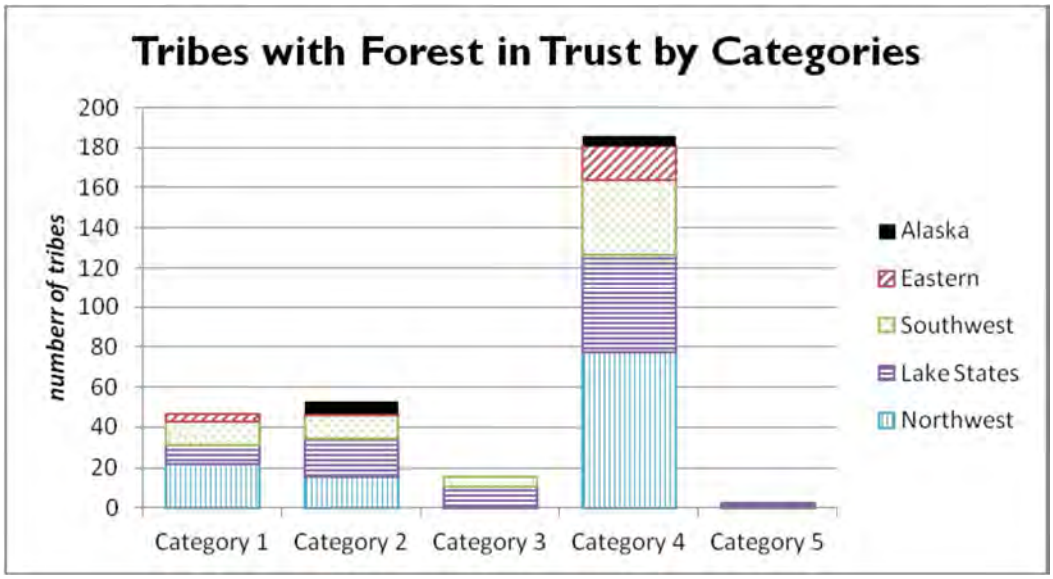


Figure IF.3. Indian forest categories and number of tribes by region.

The Number of Indian Forest Reservations in Trust by Category

Table IF.3. Reservations in trust by number and category.

	Category 1	2	3	4	5	Total
Northwest	22	16	1	78	1	118
Lake States	10	19	10	49	2	90
Southwest	11	11	5	37	0	64
Eastern	4	1	0	17	0	22
Alaska	0	6	0	5	0	11
Total	47	53	16	186	3	305

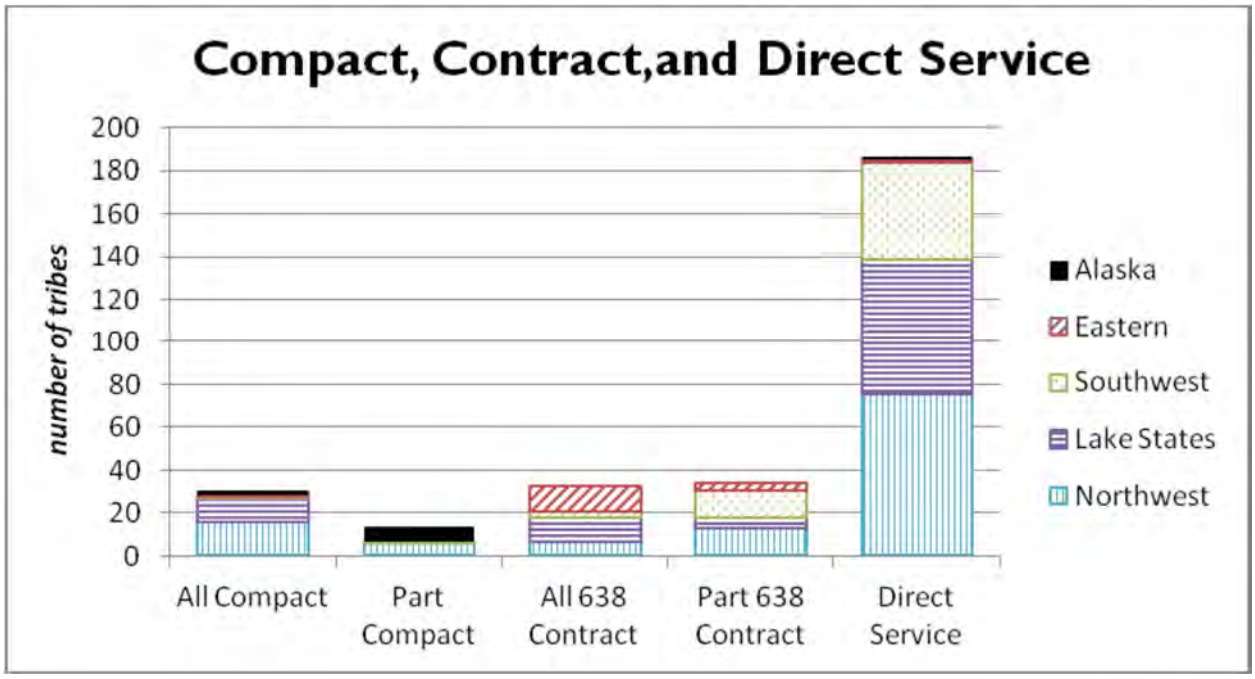


Figure IF. 4. The number of compact, contract, and direct service Indian tribes.

Table IF. 4. The number of compact, contract, and direct service Indian forestry programs.

The Number of Indian Forest Reservations in Trust Compact, Contract, Direct Service							
	All Compact	Part Compact	All 638 Contract	Part 638 Contract	Direct Service	Other	Total
Northwest	16	6	7	13	76	0	118
Lake States	11	0	11	5	63	0	90
Southwest	1	1	3	13	45	1	64
Eastern	1	0	12	3	1	5	22
Alaska	2	7			2		11
Total	31	14	33	34	187	6	305

Table IF.5. Changes in Indian forest lands from 1991 to 2011 by region and forest type.

1991 Region Acres	Commercial Timberland	Noncommercial Timberland	Commercial Woodland	Noncommercial Woodland	Total Acres
Alaska	259,417	2,917	305,189	106,805	674,328
Northwest	2,307,373	993,514	236,962	84,678	3,622,527
Lake States	1,019,116	277,514	274,455	0	1,571,085
Southwest	1,794,789	391,183	3,544,645	3,904,439	9,635,056
Eastern	300,027	25,233	20,000	0	345,260
Total w AK	**5,680,722**	**1,690,361**	**4,381,251**	**4,095,922**	**15,848,256**
Total w/o AK	**5,421,305**	**1,687,444**	**4,076,062**	**3,989,117**	**15,173,928**

2001 Region Acres	Commercial Timberland	Noncommercial Timberland	Commercial Woodland	Noncommercial Woodland	Total Acres
Alaska	181,566	52,602	191,035	89,477	514,680
Northwest	2,265,891	1,116,330	195,660	144,518	3,722,399
Lake States	1,045,152	233,751	214,658	4,092	1,497,653
Southwest	1,838,440	568,884	2,895,615	6,389,447	11,692,386
Eastern	248,196	59,069	22,228	6,400	335,893
Total w AK	**5,579,245**	**2,030,636**	**3,519,196**	**6,633,934**	**17,763,011**
Total w/o AK	**5,397,679**	**1,978,034**	**3,328,161**	**6,544,457**	**17,248,331**

2011 Region Acres	Commercial Timberland	Noncommercial Timberland	Commercial Woodland	Noncommercial Woodland	Total Acres
Alaska	175,329	51,169	173,992	60,860	461,350
Northwest	2,667,277	795,529	234,664	122,323	3,819,793
Lake States	1,091,373	193,197	359,089	4,882	1,648,541
Southwest	1,717,951	725,198	3,133,034	6,566,654	12,142,837
Eastern	311,039	30,258	11,033	11,654	363,984
Total w AK	**5,962,969**	**1,795,351**	**3,911,812**	**6,766,373**	**18,436,506**
Total w/o AK	**5,787,640**	**1,744,182**	**3,737,820**	**6,705,513**	**17,975,156**

Change 1991-2001	Commercial Timberland	Noncommercial Timberland	Commercial Woodland	Noncommercial Woodland	Total Change
Alaska	-84,088	48,252	-131,197	-45,945	-212,978
Northwest	359,904	-197,985	-2,298	37,645	197,266
Lake States	72,257	-84,317	84,634	4,882	77,456
Southwest	-76,838	334,015	-411,611	2,662,215	2,507,781
Eastern	11,012	5,025	-8,967	11,654	18,724
Total w AK	**282,247**	**104,990**	**-469,439**	**2,670,451**	**2,588,250**
Total w/o AK	**366,335**	**56,738**	**-338,242**	**2,716,396**	**2,801,228**

Timberlands

The estimated total standing inventory of commercial timber in Indian Country is 43 billion board feet (BBF). It is from the commercial timberlands that most of the income from harvest of forest products is generated. The Northwest has a scant 20 percent of all Indian forestlands but more than half of the forest inventory is located there. In 2011, two-thirds of total Indian harvested timber volume and 80 percent of the stumpage value came from harvest activities in Northwest forests. Although the Southwest has nearly 30 percent of Indian timberland and 80 percent of the commercial woodland, in 2011, harvest volumes were only two percent of the total Indian timber harvest and less than one percent of the stumpage value. The Lake States region, with 20 percent of the commercial timberland, produces most of the hardwood harvest: 25 percent of the total timber volume, and 18 percent of the stumpage revenue. Eastern forests contribute seven percent of the timber volume and three percent of revenue (BIA 2012a). While timber harvests occur in Alaska, primarily on fee lands owned by Native corporations, analysis of Native forestlands in Alaska is beyond the scope of this report.

A struggling world economy and consequent fall in log and lumber prices have had a significant impact on Indian forest programs and harvests. During the 1990s, harvest volumes averaged 800 million board feet (MMBF)/year. By 2001, harvest had dropped to 600 MMBF/year, due to the federal shift in funding from forestry to fire management as much as market changes. However, by 2011, Indian timber harvest fell to 360 MMBF/year, the lowest volume of timber harvested from Indian forests since the great depression (BIA 2012a, Newell et al. 1986). Stumpage returns in 2001 equaled $87 million but in 2011 dropped by more than half to $43 million. All Indian forest communities have suffered as timber has lost value, but the Southwest has been particularly hard hit with revenues from timber sales dropping to less than three percent of 2001 levels (BIA 2012a).

Double cut band saws - San Carlos Apache. Photo by Mark Rasmussen.

Losses in infrastructure

In connection to the decline in timber harvests, mill closures and job losses have swept through the forest industry and across the nation. FIA statistics show that since 2005, 1,009 sawmills, 15 pulp mills, and 148 other mills closed: together, 19 percent of all mills in the United States forest sector. U.S. lumber production has dropped b40 percent (Smith and Guldin 2012). For tribes that sell logs to scarce

and distant markets such loss of customers can be devastating. For tribes that operate milling facilities it can be just as bad (Morishima et al. 2011). Since 2001, ten Indian sawmills have closed, leaving just four that struggle to remain operating.

As timber revenues drop, economic consequences ripple throughout reservation economies. For instance, forest management deductions (FMDs) are assessed as a percentage deduction from gross timber sales revenue. Since these monies are used for stewardship activities such as tree planting, falling timber prices limit tribal abilities to practice forestry. When FMD shortfalls are made up from other tribal funds, programs such as student scholarships may suffer. When federal funding for tribes declines as well, cycles of reservation poverty and forest health decline are perpetuated.

Winter pulpwood harvest – White Earth. Photo by Larry Mason.

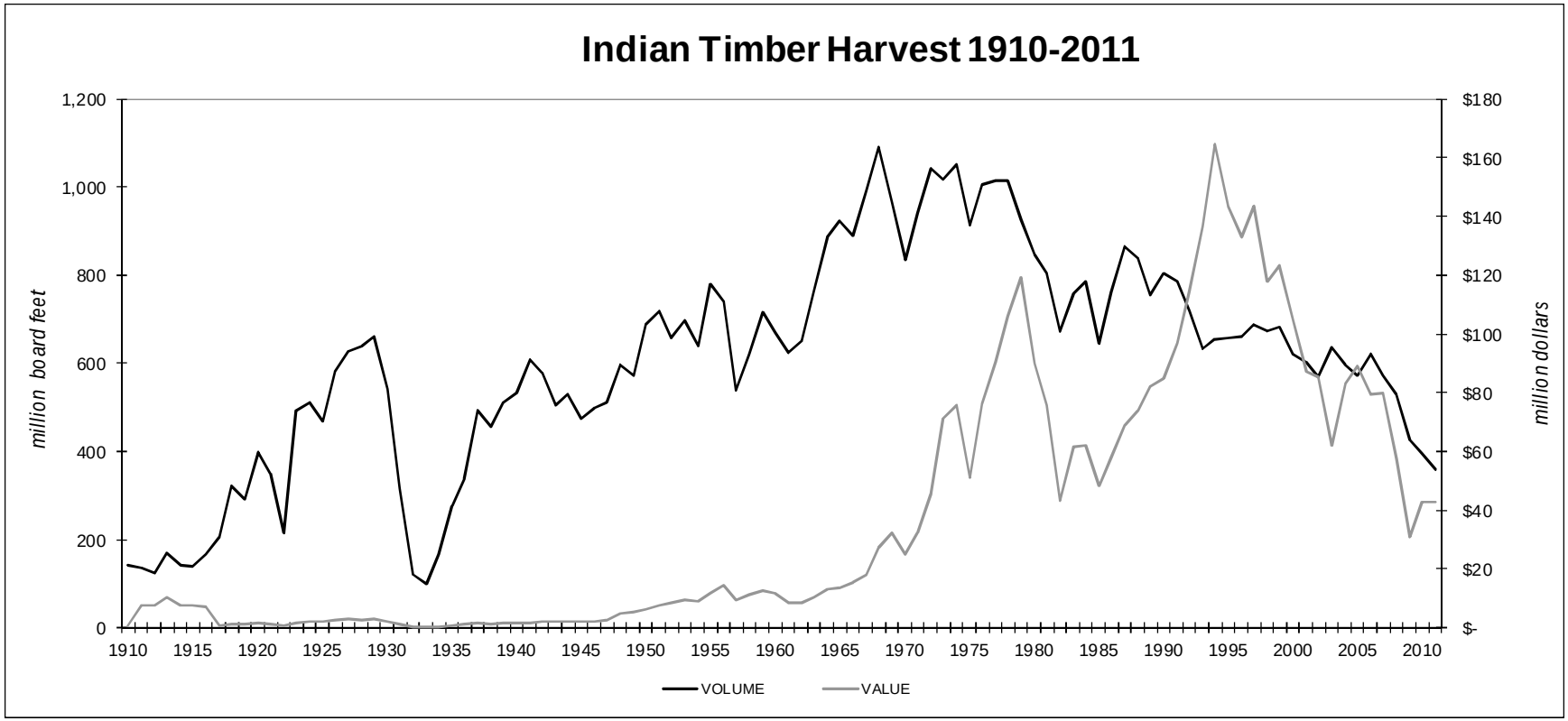


Figure IF.5. Indian timber harvest: volume in million board feet and value in million dollars of the day from 1910-2011.

The green chain - Mescalero Apache. Photo by Larry Mason.

Jobs

However, although tribal timber activities have slowed considerably, Indian forests remain a source of significant employment. Timber harvests extend high job and revenue leverage in part because of the labor-intensive nature of some Indian forestry practices, such as uneven-aged management and extended rotations. The BIA reported that jobs resulting from timber harvest in 1991 and 2001 were equivalent to 53 full- and part-time jobs for every MMBF of timber harvested (IFMAT 2003, 1993). These economic multipliers indicate that for 2011, Indian timber harvests generated 19,000 full- and part-time jobs suggesting a loss of more than 10,000 jobs in the last decade representing a reduction in community benefits of 38 percent from 2001 levels.

However, updated assessments of the regional impacts of Indian forestry, once provided by the BIA, have not been available for twenty years. Updated assessments of regional impacts would provide important information for evaluating investments in Indian Country.

In addition to forestry programs, the BIA Branch of Wildland Fire Management (BOWFM) oversees more than 60 percent of the DOI casual firefighter workforce, approximately 7,000 employees, many of whom are Native Americans, that are on call as needed for deployment to interagency wildland fire emergencies (BIA 2012b). The BIA and tribes jointly manage response resources including helicopters, air tankers, engines, and bulldozers. In aggregate, BIA received more than $160 million for wildland fire management in 2011 (BIA 2012c), which included fire preparedness, hazardous fuels reductions, suppression, and burned area emergency response (BAER) funds.

These BIA funds serve to protect people, wildlife, property, and forest ecosystems by providing resources for fire management programs, reducing the risk of fires, and protecting resources once fires start. On average, BIA obligates around $75 million per year for fire suppression alone. Because the incidence, magnitude, and duration of fires cannot be foreseen, however, suppression funds vary widely from year to year. For example, BIA use of fire suppression funds ranged from $52 to $89 million over FY 2007 through FY 2009 (OIG 2009).

Navajo fire crews. Photo by Dale Gilmore

Investments in thinning and hazardous fuels reductions keep forests healthy and resilient, helping to avoid stand-replacing crown fires with accompanying environmental and economic consequences, including pollution to the atmosphere. In 2011, Indian tribes and the BIA performed fuel hazard reduction treatments on 232,368 acres throughout the nation at a total cost of $40.3 million, an average of about $174 per acre (BIA 2012c). Hjerpe and Kim (2008) conducted analysis of the economic impacts of 2005 National Forest fuels reduction programs in the Southwest. Their results, which are consistent with studies from Oregon (Nielsen-Pincus and Moseley 2010), indicate that 16.7 jobs plus $705,000 in economic activity were generated from $1 million allocated to fuels reduction treatments. These numbers suggest that 2011 BIA

hazard reduction treatments resulted in close to 700 reservation jobs and $28.4 million in economic outputs.

Work projects that create employment for seasonal labor are welcome in jobs-starved reservation communities. For example, tree plantations on 15,600 acres of reservation lands in 2011 established new forests and generated around 10,000 person-days of employment (BIA 2012a, Larson 2006). However, there is much more to be done. The Indian Forestry Status Report (BIA 2012d), submitted annually to Congress as required by NIFRMA, indicates a backlog on Indian reservations of more than 750,000 acres in need of planting, thinning, or other stand improvement.

Tribal forestry programs are also seeing a need for their services on neighboring federal forests. Upwards of 80 million acres of overstocked forests are in need of treatment on national forest lands (Wilent 2012). Indian tribes and the USFS share nearly 3,000 miles of contiguous borders and sixty tribes have treaty rights that extend onto federal forests where culturally important resources need protection. The agency and tribes are more than just neighbors; they are partners with common goals for social, cultural, ecological, and economic sustainability (Forest Service 2012).

Wildfire

Federal forests at risk from uncharacteristically severe wildfires can pose significant hazards to tribal communities. For example, wildland fires that started on private and federal lands in Southern California in 2003 devastated several Indian reservations (NYT 2003), as did 2008 fires originating on federal lands in the ponderosa pine forests of the Inland West (NWCN 2008), and in the Southwest, where fires burned centuries-old cliff dwellings and destroyed about 6,000 acres and 63 homes on the Santa Clara Pueblo (Indian Country Today 2011). Because losses from wildland fire can threaten social and economic stability, tribes are seeking a more proactive role in partnership with federal neighbors to confront declines in forest health and reduce hazardous fuel loads under the authority provided by the TFPA. (U.S. Congress 2004).

Effects of fire on cultural resources - Coconino National Forest, Arizona from Kelly and McCarthy (2012).

A dramatic example of the effectiveness of Indian forest thinning occurred in 2011. On May 29, the Wallow Fire started on the Apache-Sitgreaves National Forest in central eastern Arizona. By June 6, it had burned 240,000 acres. Indian hotshot and hand crews began burnout operations along 45 miles of reservation roads and previously treated prescribed fire units on the White Mountain and San Carlos Apache Indian Reservations. When the fire hit the Indian fire line and thousands of acres that been previously treated to reduce fuel loads, it dropped to the ground (Jackson et al. 2011). By the time the Wallow Fire had reached its final size on July 8, it had burned 835 square miles in Arizona and 23 square miles in western New Mexico. Wallow was the largest wildland fire in Arizona history, but would have been bigger without Apache thinning and burning (Quester 2011). As importantly, a disproportionate number of acres outside of the reservation burned at unusually high severity for those forest types.

Heroes of such fire fights across the nation's public and private landscapes are the Indian fire fighters under the authority of the BOWFM. Since 1948, with the formation of the Mescalero "Red Hats" and the Southwest Indian Fire Fighters, thousands of American Indians have distinguished themselves as "fire warriors." Approximately one out of five forest and wildland firefighters today is an American Indian or Alaska Native. Firefighting remains a much-needed source of income for reservation families. Firefighting wages represent approximately one-third of the income Indian firefighters earn each year (DeJong 2004).

Red Hat firefighters on the lines in California, 1951. Photo by Oscar Shields; US National Archive (DeJong 2004).

High-severity crown fires cause significant environmental damage to forests, wildlife, and water quality. They also release large pulses of greenhouse gases, such as carbon dioxide (CO_2), into the atmosphere. Wiedinmeyer and Neff (2007) found that U.S. wildfires release volumes of

CO_2 equivalent to four to six percent of total annual U.S. emissions. On the other hand, healthy forests that are managed to avoid severe fires play an important role in global carbon cycling by absorbing carbon dioxide during photosynthesis, storing carbon above and below ground, and producing oxygen as a by-product of photosynthesis. In the presence of increased greenhouse gases in the atmosphere, healthy forests help to mitigate the effects of climate change by removing CO_2 from the atmosphere. Indian forests currently sequester approximately 400 million metric tons of CO_2 equivalent. Indian forest lands that are successfully managed to restore historic fire regimes avoid the high mortality and CO_2 releases associated with pathogens, insects, wildfires, and decay. If nascent markets for carbon offsets and other "ecosystem services" mature, the environmental contributions of Indian forests could become financial opportunities for tribes.

Woodlands

Little commercial timber harvesting occurs on the woodlands and non-commercial forests that account for two-thirds of all Indian forested areas. Eighty percent of these lands are found in the Southwest region. In total, 202 tribes have woodlands. For 109 of these tribes, woodlands are their only forests, but they are being neglected. The last report on the state of Indian woodlands was published in 1988, before concerns about climate change took on a sense of urgency (BIA 1988). Woodlands are semiarid ecotones at the margin between forests and rangelands; responses of vegetation to variations in climate changes are expected to be most rapid and extreme at these types of boundaries between ecosystems (Allen and Breshears 1998). Grazing practices (including the effects of feral horses) are having a negative impact on many Indian woodlands, juniper encroachment is altering surface water availability in some areas, and tribal elders are attributing changes in woodland vegetation and wildlife abundance to climate change.

Woodland landscape – Colville. Photo by Serra Hoagland.

The economic implications of woodland utilization, albeit generally overlooked, can be significant. Analysis of BIA free-use permits indicates that tribal members gathered 78,000 cords of firewood in 2011 (BIA 2012e). Tribal use of firewood instead of heating oil to warm their homes avoided a cumulative cost burden of more than $30 million (EIA 2012, Reeb 2009). Had they used heating oil, more than two and a half times the green gas emissions would have been released during combustion (Reeb 2009, Houck et al. 1998).

Non-timber forest products

A recent study, commissioned by the ITC, reported on opportunities to increase value returns and employment from Indian forests. The study team found that sensitive harvest of non-timber forest products (NTFP) had promise and aligned well with sustainable forestry (Morishima et al. 2011). For thousands of years, Native Americans have actively used many of the species that we now call NTFPs. Moerman (1998) reported that Indians used more than 4,000 species to create over 40,000 medicines, foods, shelter materials, baskets, and other subsistence and trade items. Contemporary recognition of the value of indigenous approaches to health and wellness has led to incorporation of many traditional plants and herbs into medicines. High regard for Native remedies helps create opportunities for Indian peoples to develop markets for health, herbal, and cosmetic products. Traditional tribal stewardship represents the earliest form of organic and sustainable management of forest ecosystems, adding further NTFP opportunity to take advantage of high-value "buy local" programs, organic food marketing, and direct-to-consumer "green" sales programs. Harvest, preparation, and sale of NTFPs provide low-cost entry to potentially rewarding business opportunities. BIA reporting, although dated, suggests that collection, use, and sale of basketry materials, range forage, berries, floral greens, and a host of other NTFPs generate tribal benefits equivalent to $8-10 million annually. Marketing both traditional and new forest products can provide individuals and businesses based in Indian Country with sustainable incomes from the forest, which could be critical during the cyclical fluctuations of timber markets. In addition, marketing of NTFPs could fit well with other tribal enterprises such as gaming and ecotourism (Morishima et al. 2011).

The list of NFTPs is extensive, including medicinals, forest botanicals, fresh floral, preserved floral, charcoal, aromatics, nuts, berries, roots, flowers, decorative woods, cones, seeds, Christmas greenery, chips, shavings, excelsior, sawdust, bark mulch, pine straw, firewood, syrups, wild game meats, honey, craft materials, mushrooms, native landscape plants, music woods, cultural and spiritual products, and more. Progress, however, has been constrained by limited access to start-up capital and a lack of available expertise in products marketing (Morishima et al. 2011).

Floral greens, big game, mushrooms, and biomass are but a few of the NTFPs available from Indian forests (Morishima et al. 2011). Images from the public domain.

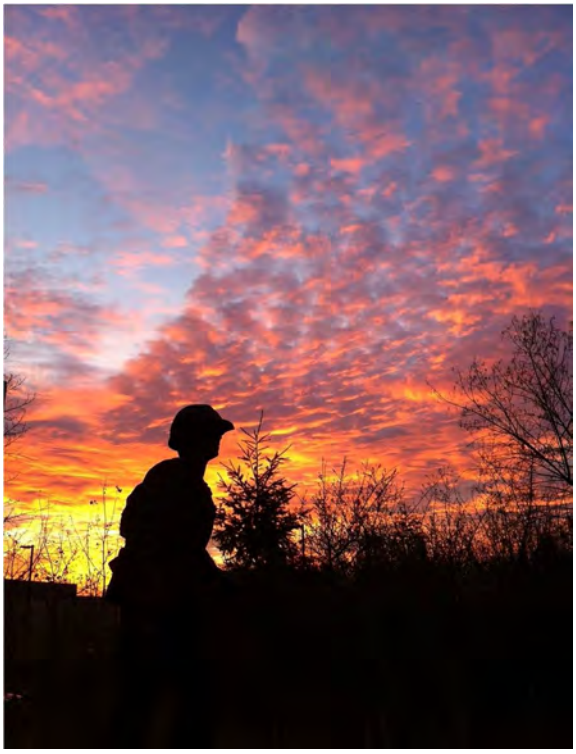
Finding

Nearly two thousand individuals, Indian and non-Indian, some of who are directly employed by tribes and others that work for the BIA, earn a living keeping Indian forests healthy and productive. Thousands more find related income as contractors, workers, fire fighters, and service providers. Sale of reservation timber helps to support tribal governments and communities. The contributions to cultural identity, employment, and revenues, as well as subsistence and informal economies that are provided by forests, are uniquely important to Indian families as compared to the more transient and opportunity-rich broader society. Because of these ties, threats to forests, such as changes associated with climate change, are expected to be more severe for American Indians. In other words, although American Indians have contributed relatively little to the causes of climate change, they face disproportionate risks (Lynn et al. 2011). Traditional practices such as the gathering of traditional foods, medicines, and firewood, as well as grazing, hunting, and fishing that have been practiced for millennia are jeopardized. Economic ventures are also threatened, as well as future growth.

Recommendation

IF1. Establish a regular BIA state-of-the-resource report including assessments of marketing, economics, woodlands, and climate change that would incorporate a protocol for continuing data acquisition (with specific reference to NIFRMA questions). Existing federal agency examples of such assessments include the FIA, the Resource Planning Act (RPA) assessment, and the National Climate Center assessment.

Climate Change and Indian Forestry



Changes in temperature and precipitation cycles are occurring in Indian Country. Photo by Robyn Broyles.

Changes in the earth's climate are affecting the growth, mortality, and composition of forestland resources and the ecosystem qualities and services upon which people depend. The range and scale of impacts are large. Changing weather patterns are imposing new threats to important species of plants (including trees), wildlife, and cultural resources. Adjusting forest plans and practices to accommodate climate changes will impose additional costs, logistical constraints, and other management challenges for forestry programs. While such impacts logically extend across political boundaries and property ownerships, IFMAT is most interested in the effects of climate change on Indian forestry. Federal responses to climate change are reshaping agency priorities and institutional arrangements affecting how federal trust obligations to tribes are being implemented. For instance, the availability of federal financial and technical assistance becomes a critical element in determining tribal potential for adaptive response to climate change. This is especially true where drought, insects, disease and wildfire are affecting Indian timberlands and woodlands. The rate of global warming and the range of observed impacts have increased since IFMAT I (Climate Central 2012, QFR 2009). Systems and resources supporting or depending on forests, such as water supplies, wildlife, energy, housing and infrastructure, food and agriculture, and human health are being affected.

Climate change exacts disproportionate social, economic, and cultural impacts on tribes limited by scarce resources, mobility, and access to information. These inequities are amplified as rates of change accelerate (Bull Bennett and Maynard 2013). Forestry programs that are underfunded, understaffed, or poorly connected to information sources will not be able to adapt. For these reasons, IFMAT III explored climate change as an emerging driver for Indian forests and forestry.

Climate changes and impacts on forests

Globally, the last decade was the warmest for at least 1,500 years (Marcott et al. 2013). Temperatures in the lower 48 states of the US have increased 1.3 degrees F over the last 100 years, with the top ten warmest years occurring since 1990 (NOAA 2012). Growing seasons

have increased by 2 weeks since 1900, the largest change occurring over the last 30 years; more rapidly in the West that the East (Kunkel 2012). Because of higher winter temperatures, plant hardiness zones have shifted northward and many changes are being observed in wildlife wintering ranges, pollination, hibernation times, and other phenomena.

Precipitation has increased 6% overall in the last 100 years and has shifted to proportionately more rain (than snow) increasingly is distributed in heavy downpours. Snow pack has decreased by as much as 75% in some areas, the area covered by snow overall has been reduced by 7% since 1970 (NOAA 2012).

Extreme events such as heat waves, downpours, droughts, and windstorms are more frequent. In the US, eight of the top 10 precipitation days have occurred since 1990, mainly in the eastern US. Yet in the West, the current drought is one of the worst on record and has been accompanied by record temperatures. More than 64 percent of the United States experienced moderate to severe drought in 2012 and, for some parts of the country, 2012 was the driest year on record. Six of the 10 most active hurricane seasons have occurred since 1990, and April 2011 was the most active tornado month on record since 1950 (NOAA 2012). Across the West, wildfires are starting earlier and ending later, extending the average wildfire season by about 75 days since 1970 (Climate Central 2012).

Climate change forecasts include more frequent and extreme weather events such as windstorms.
Storm damage – Leech Lake. Photo by Vincent Corrao. Blowdown – Makah. Photo by Larry Mason.

A recent synthesis (Vose et al. 2012) provided the principal input for the new US Global Change Research Program (USGCRP) National Climate Assessment (NCA) on the effects of climate variability and change in North American forested ecosystems. This synthesis lists the following observed and expected future impacts:

- Increases in temperature will reduce the growth of some species (in dry forests) and perhaps increase the growth of others (high-elevation forests).
- Decreased snow cover depth, duration, and extent will lead to drier conditions

especially in the West, decreasing tree vigor and increasing susceptibility to insects and pathogens.

- Mortality will increase in older forests, especially those already experiencing soil moisture stress.
- Species habitats will shift, in general moving up in elevation and northward in latitude.
- Interacting disturbances will impact forest ecosystems.
    - Wildfire will increase throughout the US, doubling the area burned by the mid-21st century.
    - Insect infestations will expand affecting greater areas than wildfire.
    - Invasive species will become more widespread, especially in dry forests after disturbance.
    - Increased flooding, erosion and sediment movement can be expected from fire disturbance and downpour combinations especially in steep areas.
- Tree growth and regeneration will decrease for some species, especially near limits of the range.
- Increased drought will exacerbate the interactions of stressor complexes leading to higher tree mortality, slower regeneration, and shifting combinations of plant species that may result in changed and possibly novel forest ecosystems.
- Eastern forests will continue to serve as carbon sinks while Western forest ecosystems may transition to carbon sources because of combustion and decay associated with wildfire and insects disturbances.

The Vose et al. synthesis described Regional perspectives and key issues for the forest sector in the NCA regions. Table CC.1 crosswalks those regions to the regional breakdown used in the IFMAT III report. Table CC.2 characterizes some of the more important implications of the Vose et al. (2102) and other climate effects literature for tribes in those regions.

Table CC.1. Crosswalk between IFMAT, BIA, National Climate Assessment Geographical breakdowns.

IFMAT Region	**BIA Regions**	**States**	**National Climate Assessment Regions (approx.)**
Northwest	Northwest	WA; OR; MT	Northwest
	Rocky Mountain	MT; WY; ID	
	Pacific	CA	
Southwest	Southwest	NM; CO; TX	Southwest
	West	AZ; NV; UT; CA; OR; ID	
	Navajo	NM	
Lake States	Midwest	IA; MN; MI; WS	Midwest
	Great Plains	ND; SD; NE	Great Plains
	South Plains	OK; KS	
	Eastern Oklahoma	OK	
East	Eastern	ME; NH; CT; RI; PA; WV; MD; VA; KY; TN; NC; SC; AR; MS; AL; GA; LA; FL; TX	Northeast
			Southeast

Table CC.2. Regional impacts from Vose et al. (2012) for IFMAT III regions.

IFMAT Region	Major Climatic Changes	Climate-driven stressors	Major non-climate stressors	Effects on forest systems	Forest management implications
NW	More precipitation as rain. Smaller snowpack/ earlier melt. Temp increases, esp. winter. Drought duration & intensity.	Wildfire. Bark beetle & other insect/disease. Downpours.	Fire suppression. Fragmentation.	Growth reductions in Southern range. Species distribution change – Doug-fir decrease. Grass, shrub lands, woodlands interface. Disturbance area increase.	Wildfire management. Forest density and spp. Composition management. Reforestation strategies. Woodlands mgt.
SW	Multiyear droughts. Heat waves. Episodic flooding.	Wildfire intensity. Insect outbreaks. Sedimentation. Lower carbon storage.	Water competition. Exurban profusion. Grazing.	Large scale diebacks. Growth decreases. Species shifts: conifer to mixed. Species distribution changes. Disturbance area increase. Increased mortality in "fringe pine" and woodlands	Aggressive fuels management. Density mgt. Woodlands management.
Lake States	Heat waves. Precip. Increases. Downpours. Multiyear droughts. Lower winter temps.	Floods and erosion. Insect, disease and invasives increases.	Fragmentation. Air pollution.	New species assemblages. Moisture stress. Nitrate leaching losses. Soil carbon losses.	Changes to reforestation species and strategies.
East	Heat waves. Intermittent droughts. Snow accumulations. Precipitation increases. Downpours. Windstorms.	Heat and moisture stress. Insect and disease increase, expansion. Flooding, sedimentation and erosion. Wind damage Wildfire season lengthening (Southeast).	Urban expansion. Fragmentation. Air pollution. Invasives.	Growth increases in some species. Species reductions and shifts (conifers and some hardwoods). New species assemblages. Moisture stress. Cold-water fish habitat degradation. Nitrate leaching losses. Soil carbon losses. Shifts in commercial forest and carbon sequestration productivity (Southeast).	Reforestation strategies. Forest health management. Open space conservation strategies.

Climate change vulnerability – a framework for understanding and managing climate impacts

Vulnerability is used here to describe the degree to which a system(s) is susceptible to adverse effects of climate change, including variability and extremes (Adger and Brown 2009, IPCC 2007). Communities in the weakest economic or resource position are often the most vulnerable to change, especially when multiple stresses converge and interact (Lynn et al. 2011).

Climate adaptation is the proactive management of the range of vulnerabilities presented by changing climate and its interaction with existing and other emerging stressors (Rose 2010). Vulnerability management is organized around three key concepts: *exposure, sensitivity* and *adaptive capacity*. Improvements in any or some combinations of these elements of vulnerability contribute to overall resilience of the system. Resilience is the ability of a social or ecological system to absorb change while retaining structures and ways of functioning, the capacity for self-reorganization, and the ability to adapt to stress (IPCC 2007). Losses in resilience mean losses of adaptive capacity.

The following is a basic framework for evaluating and comparing multiple impacts of the changing climate on tribes and for designing interventions to reduce negative impacts and/or take advantage of possible opportunities. The terms and structure used here are generally accepted management principles of climate change adaptation (IPCC 2012). The framework breaks vulnerability into key components (*exposure, sensitivity, and adaptive capacity*) to make it easier to evaluate the contributions of different policy, management, and other options. This approach can be used to analyze a specific value or range of vulnerabilities yet is general enough to address broad ecological, social, economic, and cultural impacts (Adger 2006, Smit and Wandel 2006).

Exposure is determined by regional and local differences in stressors such as fire, insect, disease and other disturbance, the proximity of tribal lands to hazards posed by other ownership conditions, and the circumstances conducive to transmission such as fuels, forest density, or other attributes of the forest. *Sensitivity* refers to susceptibility to harm (or benefit) that may be influenced by the level of dependence (e.g. economic dependence of communities on forest resources or cultural reliance on individual species) and the forest properties (species mix, diversity, density or other properties) that resist harm to system functions. Many tribes are exposed and sensitive to climate change impacts due to their resource-based livelihoods, the nearly 3000 miles of shared boundaries with federal lands, and the locations of their homelands in remote and marginal environments.

Adaptive capacity is the ability of a system to withstand disturbance and retain, recover, or transform important functions. Adaptive capacity to changing environmental conditions is strongly rooted in the ability of people to modify both their behavior and the resiliency of forested environments (Ford et al. 2006). Diversification provides a buffer against change and is an important attribute of adaptive capacity.

Adaptive capacity is influenced by:

- Resources – nature and level of investments and financial capital
- Capacity of management and technical staff
- Nature and strength of relationships (intratribal, landscape neighbors, and service providers)
- Access to technology and information
- Institutional and governance effectiveness (e.g. intratribal social and political systems; effectiveness of federal trust system)
- Access to markets and competitive position in those markers (e.g. individual vs. collective marketing approaches)
- Management strategies (embodied in forest management plans and IRMP's)
- Knowledge systems (diversity and integration of traditional, experiential, and scientific knowledge; education, public information, and professional development systems)
- Policy fabric within which the tribe operates (e.g. self-government and federally sponsored programs (Prno et al., 2011).
- Others

Managing vulnerability and adaptation – roles of traditional knowledge

Adaptive capacity for tribes is rooted in traditional ecological knowledge (TEK), diversified resources and livelihoods, social institutions and networks, and cultural values and attributes that encourage innovation in the face of uncertainty. The paradigm of active management in pursuit of multiple goals is a hallmark of Indian forestry and a source of inherent adaptive capacity (Berkes et al. 2000). Guided by TEK and closeness to the land, active management allows for the experimentation, learning and adjustment that will be needed to keep pace with the trends and surprises of a changing climate. Adaptive management, present in Indian forestry, should be viewed as a valuable asset in collaborative attempts to deal with climate and other stressors at landscape scales.

During IFMAT visits, we observed tribal uses of scarce financial and technical resources that were effective, leveraged, and creative. Tribal adaptations to harsh physical and social environments can provide lessons for others who heretofore have been insulated from climate change by plentiful resources, infrastructure, and protective institutions (Nakashima 2012). Tribes are disproportionately affected by climate change due to the marginal nature of their lands and their direct dependence upon natural resources to sustain tribal lifeways (Lynn et al. 2011, Salick and Ross 2009). The federal government's responsibility to protect Tribes' rights to water and hunting, fishing, cultural practices, and other resources extends to support for climate impact adaptation. Williams and Hardison (2006) raised questions about culturally important species and sites and the cultural sustainability of tribes. Hanna (2007) maintained that climate change threatens the rights of tribes to inhabit lands and continue social and cultural practices on those lands. There may also be an issue of social inequity given the

relatively small contributions by tribes to the causes of climate change – greenhouse gas emissions – as compared with resultant impacts for Native cultures, practices, and rights (Curry et al. 2011). Emerging policies for adapting to climate change or reducing greenhouse gas emissions may have unintended, perhaps negative consequences for tribes and could either change some aspects of the relationship between tribes and the federal government or intensify existing problems in that relationship (NTAA 2009). Policies and practices that underlay tribal forestry and federal trust relationships need be evaluated to determine potential for improvement/detriment to the adaptive capacity of tribes facing climate change (Curry et al. 2011).

Multiple forms of knowledge and innovative thinking will be needed to cope with and adapt to changing climate patterns. TEK with its emphasis on holistic thinking, long-term perspectives, experiential learning and communication appears to offer a great complement to scientific knowledge (Parrotta and Trosper 2012, Kimmerer 2000, Pierotti and Wildcat 2000). Effective and appropriate deployment of TEK could help tribes and other landowners and communities diversify and enrich their ability to address climate-driven changes (Nakashima et al. 2012).

Berkes (2012) defines TEK as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living things (including humans) with one another and their environment." Houde (2007) describes TEK as consisting of six interactive "faces" including factual observations; systems ("complex webs of practices') for place-based management and adaptation; past and current uses of the land embodied in life stories; ethics and values expressed as cultural norms and expectations; vectors for maintaining cultural identity in the face of landscape, societal, and other change; and overall assumptions and beliefs about how the ecological or other systems work ("cosmology").

Houser et al. (2001) affirmed that the oral histories and TEK of native peoples across North America offer insight and are useful for understanding climate changes and impacts on human communities. Oral histories record not only the consequences of climate fluctuations, but also the responses that helped communities adjust and survive. For example, traditional ways of caring for the forest, such as density management and underburning, are gaining acceptance as helpful alternatives to failed policies of fire suppression (Mason et al. 2012). TEK also carries the principles that underlie subsistence economies - personal relationships, generosity, and diversifying resource reliance among others – that could help to inform the adaptive responses by the broader society (WCED 1987).

TEK embraces features that will be essential in dealing with turbulence and uncertainty of a changing climate: knowledge creation, knowledge transfer and sharing, preservation and protection of knowledge from exploitation, learning through stories about actions and

consequences, and the acceptance of interconnected systems and constant change (Whyte 2013).

Several authors suggest powerful potential for integration between traditional and scientific knowledge to deal with environmental change, including inclusion of local expertise, history, and baseline information; fruitful hypotheses for research; insights about the impacts of adaptation measures and strategies; and shared basis for long-term monitoring by communities (Motanic 2012, Nakashima et al. 2012, Berkes 2012, Trosper 2007, Michel and Gaton 2002). Vinyeta (2012) described how the differences between TEK and Western scientific knowledge complement each other in dealing with the complex problems of adaptation. TEK accumulates localized, field-tested wisdom that have been communicated orally through generations, while scientific knowledge tests hypotheses in controlled settings and reports results through publications. Both forms of knowledge are based in observation and are subject to modification as new observations, experiences, or assumptions emerge Vinyeta (2012).

Informal interviews with tribal forest managers

To help us to better understand how tribal foresters regard climate changes, we conducted a series of informal interviews with the forest managers of the tribes visited by IFMAT. Each interviewee was asked to summarize representative perspectives for his or her forestry program. The questions were provided in advance to allow managers and staff to reflect on the nature of climate influences and to offer specific examples. Questions were open-ended and consisted of the following:

What changes in climate and weather patterns have been most evident in the last 10 years?

1. Are any of these changes affecting the tribe's forests? How?
2. Has your tribe adjusted its forest management practices or planning in response to these climate and other weather pattern changes? How?
3. What is the most important barrier(s) your tribe faces in responding to changing climate and weather patterns?
4. Has your tribe received any federal or other outside funding to assist it in responding to the changing climate?
   If yes, what programs and/or agencies provided this funding?
5. Please describe your experience in considering and/or applying for funding, whether or not you were successful.
6. Please provide any additional thoughts about your tribe's response to changing climate or general comments about climate change in Indian Country.

Forest managers are observing changes in species distributions that impact water availability. For example, juniper encroachment (as shown left) degrades watersheds (Bedell et al. 1993). Photo right shows results of a juniper removal project with retention of scattered mature trees - San Carlos Apache. Photos by Larry Mason.

Findings – Tribes, forests, and climate change

CC1. Tribes and the BIA have not been successful in accessing new and redirected federal funding for climate change response during the period 2009-2012. Tribes are not experiencing equitable access to funds or technical services related to climate change planning, adaptation and response. In 2012, DOI received $175 million in climate change related funds that make up their LCC efforts. In contrast, the BIA received $0.2 million despite the fact that they have a unique federal trust obligation for tribal lands that also encompass 10 percent of DOI's land base and host the largest human population living on the land overseen by DOI agencies.

CC2. Managers of tribal forests are observing impacts of a changing climate. Some of these impacts include increased severity of wildfires and insect and disease activity, increased frequency and intensity of precipitation events, more severe droughts, changes in the timing of plant and animal activity, and the spread of invasive species. These observed impacts vary by region and tribe and are informed in many cases by comparison with observations and stories provided through TEK and memories of tribal elders.

CC3. Tribal forestry managers and tribal leadership recognize the inevitability and some of the implications of a rapidly changing climate for their prosperity and culture.

CC4. Some tribes are already building adaptation to climate into their forestry programs and practices, but few tribes have incorporated climate change into their forest management plans

CC5. Intertribal organizations perform an important function and some have direct benefits, including tools and resources for tribal forest managers. There are numerous coalitions, networks, and other organizations that have emerged through intertribal collaborations, university, tribal college, and agency sponsorships devoted to assisting tribes and their natural resource managers in responding to climate change.

CC6. Tribes need better access to relevant science-based information about the impacts of the changing climate on local forests and management options. The effects of the changing climate on woodlands are particularly of interest given the paucity of scientific information about these ecosystems and the potential for dramatic climate-induced ecological transitions.

CC7. There is little specific information about the carbon sequestration value of tribal forests and woodlands and the potential for tribes to benefit from participation in programs and policies designed to reward long-term carbon sequestration.

CC8. Tribes can be key players in landscape scale partnerships to manage climate vulnerabilities. Climate-influenced impacts occur at scales large enough to demand better mechanisms for convening, governing, and resourcing landscape-scale partnerships. Tribes have much to offer landscape-scale conservation in the form of TEK, long-term observations, holistic (systems-level) approaches, and the proclivity for active, adaptive approaches to broad-scale stressors.

CC9. Institutional arrangements to promote landscape-level collaboration and science delivery have not yet been successful in engaging and meeting the needs of tribes. Tribes have had little to no representation or access to the regional LCC's that have been launched to facilitate integrated multi-agency and ownership strategies for responding to the changing climate. In the last year, tribal involvement in the NW LCC steering committee has created a much-needed precedent of involvement in these DOI funded consortia. However, opportunities for consultation and collaboration that come without sufficient resources to support participation can bring greater burden than benefit.

"Tribal leaders stated their desire to partner with state and federal government to address issues, but indicated the need for greater resources to allow tribal capacity building, particularly in addressing climate change" [13]

[13] Achieving A Brighter Future For Tribal Nations: Synopsis of the 2012 White House Tribal Nations Conference, March 2013.

Findings – Adaptive capacity

Exposure and sensitivity lead to vulnerability. Higher adaptive capacity allows tribes to reduce or better cope with vulnerability. In Table CC.3, we assess the above findings as *upward, neutral, downward or not applicable* (within the definitions) and *weak, strong, or uncertain* for each of the elements of vulnerability defined above. For example, the worst assessment combination of vulnerability would be *up* and *strong* for exposure and sensitivity whereas *down* and *strong* is the worst assessment for adaptive capacity. These are subjective judgments offered by IFMAT III to help inform overview of the relationship between IFMAT findings and the expected prospects for incorporating climate change into future discussions.

Table CC.3. IFMAT III general findings and their judged contribution to overall vulnerability to a range of climate change impacts.

Finding	Exposure	Sensitivity	Adaptive Capacity
Innovative silviculture	Down/strong	Down/strong	Not applicable, but supported by strong adaptive capacity
Density-related threats	Up/strong	Up/strong	Not applicable, but management supported by adaptive capacity
Emphasis on fire and fuels	Down/strong	Down/strong	
Declining funding levels and grant money dependence	Up/indirect	Up/indirect	Down/strong – erosion of adaptive capacity
Inadequate staffing and pay	Up/indirect	Up/indirect	Down/strong – erosion of adaptive capacity
Declining availability of technical support	Up/indirect	Up/indirect	Down/strong – erosion of adaptive capacity
Plans – adequate but variable forest plans; IRMP progress slow	Uncertain/indirect	Uncertain/indirect	Down/uncertain – inadequate attention to changing and future conditions and integration
Resource management varied and distinct; lacking comparators	Down/uncertain	Down/uncertain	Down/uncertain – need for standards and benchmarks for progress
State-of-the-art forestry variable and incompletely defined	Uncertain	Uncertain	Down/uncertain – need for better definition, engagement by Tribal Councils, and consideration of future drivers (e.g. climate)

Resourceful leadership despite constraints	Down/indirect through active management	Down/indirect through active management	Up/strong. Strength that needs to be built on with adequate resources.
Proactive stewardship of Indian lands	Down/strong	Down/strong	Up/strong. Strength that needs to be built on with adequate resources.
Allotment: fractionalization fragmentation	Up/strong	Up/strong	Down/strong. Negative influence on the costs and effectiveness of managing vulnerabilities.
Lack of payment for ecosystem services	Uncertain	Uncertain	Down/uncertain. Diversion of scarce resources from action to process with little funding.
BIA streamlining	Uncertain	Uncertain	Uncertain
Trespass for illegal plant cultivation, theft, and poaching	Up/strong. Vectors for invasives, fire, other stressors.	Up/strong	Down/uncertain. Diversion of resources to law enforcement and security.
Inadequate attention to woodlands resource	Up/strong	Up/strong	Down/strong. A major resource with thin science base and management guidance
Wood processing infrastructure declines	Up/strong. Inability to economically manage forest density on tribal and adjoining lands.	Up/strong. Little economic buffer or ability to use damaged resource.	Down/strong. Key element of adaptive capacity.

Findings – NIFRMA tasks and climate change

Table CC.4. below displays key findings taken from the NIFRMA Task reports and applied across the exposure/sensitivity/adaptive capacity framework. Each finding is rated (+) or (-) for the direction of its contribution to climate vulnerability and adaptive capacity. A positive (+) in exposure for sensitivity denotes an upward influence on vulnerability. A positive (+) designation under adaptive capacity denotes an influence on the ability to counteract or reduce vulnerability as discussed above. No attempt was made to rate findings for the strength of their contribution to vulnerability.

Table CC.4. IFMAT III task-specific findings and their judged relationship to overall vulnerability to a range of climate change impacts.

IFMAT Task	Exposure (+) is bad/(-) = good	Sensitivity (+) is bad/(-) = good	Adaptive Capacity (+) is good/(-) = bad
Overall Findings	Locations at edges of changing ecological systems (-)	Dependency on natural resources high (-)	Depressed economies (-) Loss of markets (-) Low access to services (-) Low mobility (-)
A. Practices and funding	A6. & A7. –Fire prep and HFR funding low (+) A8. - Law enforcement funding vs. trespass (+) A10. - BIA roads funding low (+)	A5. - Land base size (+) A10. - BIA roads funding low (+)	A1.- BIA alloc. and inflation (-) A2. – Reliance on outside grants (-) A4. – funding/acre low (-) A7.- land base size (-) A6. & A7. – fire prep and HFR funds (-)
B. Condition of forest lands	B1. – Few unusual forest health issues (-) B5. – Volume and densities lower than federal lands (-) B7. & B10. – Insect and fire less impactful than on federal lands. (-)		B2. - Diversity in seral conditions and proactive density mgt. (+) B3. – ownerships remain intact (+) B4. – Timber volumes have increased (+) B5. & B6. – Productivity and growth as good or better that other owners (+)
C. Staffing patterns	C2. - Reductions in fire staff (+) C10 – Lack access to technical skills in inventory, planning, and wildlife (+)		C1. - Overall staffing decline (-); Low salaries hamper recruitment and retention (-) Aging workforce not being replaced (-) C5. – Professional staff increased but improvements needed (+) C6. - Increases in Native American professionals (+) C7. – Diversion of staff time for funds development (-); CE1. –graduation levels of Native foresters insufficient for future demand (-) CE2. – Tribal colleges have increased and play important roles (+) CE3. – Only 1 of 7 NIFRMA educational programs being implemented (-) CE5. – Access to continuing education a problem (-) CE6. - Lack of coordination with research institutions (-)
D. Timber sale procedures and enterprise	D1. & D2.– Federal regulations & unfunded mandates (+) D9. – TFPA not well-used (+)		D2. – Sales processes need to be efficient and flexible (-) D.3. & D.4. – Lack shelf-ready sales to reduce costs and meet

operations		changing markets (-) D5. – Tribal enterprises provide jobs and enable forest management (+) D7. – Coordination between tribes, enterprises, and nat. resource programs can be improved (-) D8. – Lack of expertise and information about market opportunities (-) D10. – Allotment management not responsive to owners' needs (-) D11. – Trust asset and accounting system not fully effective (-)
E. Federal trust responsibility – rules and policies	E3. – Roads of lower quality (+) E4. – Trespass (+)	E1. – NEPA increases planning costs (-) E2. – Unfunded mandates hinder self-determination (-) E6.– Few IRMPs developed and implemented (-) E7. – Inadequate supply for tribal processing facilities from surrounding lands (-)
F. Plans and planning processes	F4. - Most FMPs predominately timber plans (+) F5. - Plan technology lacking (+) F8. – FMPs do not address climate or forest restoration. (+) F13. – Little recognition of enterprises in FMPs. (+) F14. – Allotments underplanned (+) F15. – Limited planning and direction for woodlands (+)	F1. - The Indian Forest Management Handbook is an excellent document (+) F8. – FMPs do not address climate or forest restoration. (-) F9. – Most forests covered by FMP (+); Few IRMPS (-) F14. – Allotments underplanned (-) F15. – Limited planning and direction for woodlands (-)
G. Adequacy of trust implementation	G1 – Few standards to measure impacts of federal land management on tribal forests (+) G3. - Tribal forestry programs, guided by self-determination policies, are increasingly focused on provision of environmental and cultural values (-) G5. – Consultation with federal agencies remains challenged (+)	G3. - Tribal forestry programs, guided by self-determination policies, are increasingly focused on provision of environmental and cultural values (+) G8. – Indian forests are places of experimentation (+)

Recommendations – Tribes, forests, and climate change

CC1. Require allocation of federal agency funds for climate change response and develop process and criteria to assure a more equitable distribution of funding to tribes.

CC2. Require all regional and national assessments of the forest resource to include an assessment of the condition and trends of Indian forest lands under a range of future scenarios.

CC3. Encourage the exchange of traditional ecological knowledge and Western scientific knowledge in planning and adjusting to climate change impacts, recognizing the unique strengths that each form of knowledge brings to the challenges of adaptation. Develop more effective policies for the appropriate sharing and protection of TEK through the adoption of guidelines similar to the Natural Resources Conservation Service guide (NRCS 2010).

CC4. Require federal agencies to develop mechanisms for coordinated interagency delivery of science findings, technical and financial services to tribes.

CC5. Provide technical support for tribal assessments of climate-driven vulnerabilities towards incorporation of this information into forest planning and management processes.

CC6. Incorporate adaptation planning into the IRMP and forest management planning processes of tribes using a template similar to the one developed by ITEP that integrates traditional and scientific knowledge.

Many of the IFMAT main findings and recommendations would enhance the resiliency of tribes through reductions in exposure to stressors, moderating the sensitivity of tribal forests and other resource to these influences, or enhancing the adaptive capacity of forest management programs, tribal organization, or the institutional relationship between the tribes and the federal government.

By addressing the barriers to state-of-the-art adaptive capacity for Indian forestry programs such as funding inequities, diversion of technical expertise to funding development, and risk transfers from lack of management on neighboring ownerships, and others, the IFMAT recommendations envision an enterprise that can better handle existing vulnerabilities and grow stronger as these stressors increasingly interact and become more intense. Although tribes have dealt with variability in the climate for many centuries, the speed and volatility of change are intensifying the need for the improvements recommended by this report.

Climate changes threaten endemic ecotypes such as California woodlands – Tule River. Photo by Larry Mason

Anchor Forests

This section addresses ITC question 3: Consideration of changes in forest management, harvesting, and transportation infrastructure in the vicinity of reservations and the potential for Indian forests to become "anchors" of forest infrastructure.

"The Nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value.[14]"

For more than one hundred years, North American foresters and resource policy makers have sought to achieve sustainability (Floyd 2002). Initially envisioned as a sustained yield of timber flow, we now take a broader view. Although there have been many definitions (Fedkiw 2007, Helms 1998), for the last several decades sustainability has been characterized by interlocking circles reflecting a balanced intersection of three realms of consideration: the ecological, the social, and the economic (Bare 2002). The simplicity of the image, however, belies the challenge of its implementation.

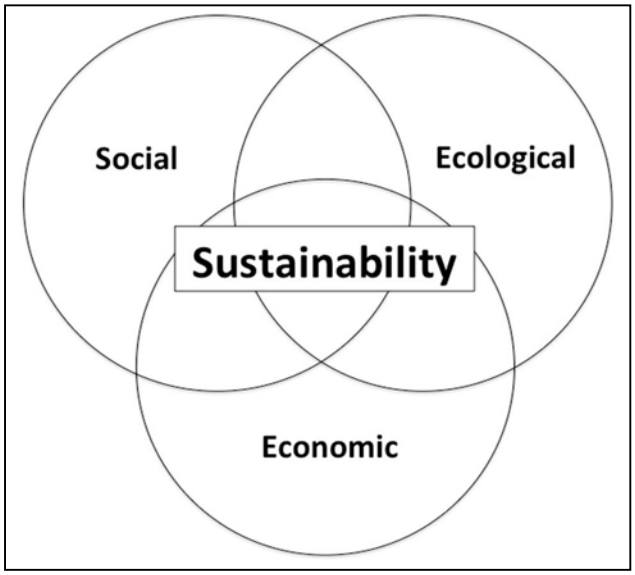


Figure AF.1. The overlapping circles of sustainability highlight the intersection of economic, environmental, and social factors.

Public and private forest managers have long struggled with attempts to integrate stewardship of ecological processes with maximizing returns on investment. A recently completed National Report on Sustainable Forests identified a host of threats to America's forests, ranging from fragmentation and development to forest fires, insect-induced mortality, and invasive species (USDA 2011). Declining markets and losses of processing infrastructure undermine sustainable forest management further (Woodall et al. 2012). Increasing trends in private forestland conversions to non-forest uses are compromising ecosystem functions (Stein et a. 2005, Smail and Lewis 2009). Climate change, with forecasted potential to alter distribution of forest cover, species, and disturbance patterns across entire landscapes, may present the greatest challenge of all (Vose et al. 2012).

Budget trends bode ill as well. For instance, with forest health in decline, wildfires grow larger each year in size, intensity, and cost. As suppression costs escalate, funds are redirected away from conservation strategies such as hazardous fuels treatments (USDOI 2012). As investments in hazard reductions dwindle, the threats and costs of wildfires increase (Ingalsbee 2010). Agency personnel now refer to this trend as "the suppression monster." The Government

[14] Roosevelt, T.R. 1910.

Accountability Office showed that appropriations for federal agencies to prepare for and respond to wildfires rose from an average of $1.1 billion per year in fiscal years 1996 through 2000 to an average of more than $2.9 billion per year from fiscal years 2001 through 2005 (GAO 2007). By FY2008, wildfire funding, including emergency supplements, had reached $4.5 billion, more than in any previous year (Gorte 2011). Upwardly spiraling suppression costs of uncharacteristically destructive wildfires -- so-called "mega-fires" -- combine with losses of resources, habitats, and water quality to push sustainability further and further from reach (Williams 2011). Whether measured by the escalating costs of wildfire suppression (Western Forestry Leadership Coalition 2009) or the precipitous loss of forest products manufacturing facilities (Smith and Guldin 2012), the evidence that we are on an unsustainable path is abundant and compelling.

"The threats our forests face and the inadequacy of our current response to these threats have caused concern as to whether the nation's forests are sustainable.[15]*"*

Moreover, contemporary forest issues are now broadly acknowledged as too large to be successfully addressed at a local level or single ownership (NASF 2009). Federally supported collaborations, such as LCC's, the Wildland Fire Leadership Conference, and the Collaborative Forest Landscape Restoration Program (CFLRP), are seeking multi-ownership conservation strategies at landscape scales. More and more policy makers and land managers are recognizing the growing interdependence between forest industry sectors, public agencies, and forest-managing Indian tribes.

"The threats facing our forests don't recognize property boundaries…we must operate at a landscape-scale by taking an 'all-lands approach.[16]*"*

During the course of this IFMAT investigation, we have heard clearly and often from tribal leaders across the nation that, given current economic and environmental declines, the future of tribal forests may be in question. Depressed markets for forest products have led to revenue shortfalls, job losses, and diminished ability to care for tribal forests. Forest health declines, often most acute on neighboring federal lands, threaten resources vital to tribal lifeways, such as water, fish, wildlife, cultural foods, materials, and medicines. A sense of emergency is growing within many forest-dependent Indian communities, especially in the West.

Tribes are increasingly acknowledged as the senior caretakers of American landscapes. Indian people share a common responsibility to manage the environment on behalf of present and future generations. Years back, the fundamental tribal objective was protection of Indian people and resources from the intrusive pressures of the outside world. However, faced with the growing threats of declining forest systems and limited economic and employment opportunities, concerned tribal leaders are now turning their attention and stewardship abilities to environmental challenges beyond reservation borders. The future of the forests on and off the reservation may depend upon the success of their effort. There is a growing agreement

[15] Western Governors Association.
[16] Agriculture Secretary Vilsak. 2009

between tribal and BIA resource managers that no other public or private entity is up to the task (IRDS 2012, ONR 2010).

> *"Tribal and indigenous peoples'…lifestyles can offer modern societies many lessons in the management of resources in complex forest, mountain, and dryland ecosystems.*[17]*"*

The ITC is a 36-year-old association of 70 forest-owning Indian tribes and Alaska Native organizations. ITC is dedicated to improving the management of natural resources of importance to Native American communities. Leaders of ITC have brought forth the concept of Anchor Forests as a means to help focus collaborative efforts to sustain forests.

Anchor Forests have a simple and sensible premise: sustainability. In order to sustain desirable cultural, ecological, and economic forest objectives, sufficient levels of timber harvest must be assured such that stewardship programs, industrial infrastructure, and forest dependent communities remain viable. Harvests must reliably come from multiple owners: large and small, public and private. In areas with significant Indian forests, tribes can become "anchors" to multi-owner stewardship programs.

The Anchor Forest concept is not new. National concern for the economic stability of forest-dependent communities following decades of "cut and run" harvesting was formalized when Congress passed the Sustained Yield Forest Management Act in 1944. The act empowered the Secretary of Agriculture to establish cooperative "sustained yield units" comprised of private and federal forestlands. Six sustained yield units were established to support the raw material needs of local manufacturing (Clary 1987). During the 1950s, the Forest Service also established two long-term supply agreements in Alaska with pulp manufacturers (Morse 1997). Although several of these arrangements lasted for decades, only one federal unit is still active today in Lakeview, Oregon. These early prototypes for cooperative forestry eventually failed because of unstable federal resource policies and a lack of adequate engagement with diverse stakeholders (Clary 1987).

Anchor Forests are intended to provide a foundation to foster the development of common visions through collaboration and cooperation across ownership boundaries and among disparate interests. For regional planning and development, Anchor Forests support the capacity to mount and focus financial resources for infrastructure investments by identifying regional needs and opportunities, and informing forest land owners of prospects for future timber markets.

Anchor Forests are envisioned as large, contiguous areas of land guided by collaborative agreements across ownerships based upon four major objectives:

1. A reasonable expectation for sustainable wood commodity production;
2. Timber harvest volumes sufficient to support economically viable manufacturing, processing, and workforce infrastructure within accessible/affordable delivery distances;

[17] World Commission on Environment and Development. *1987.*

3. Long-term management plans, supported by inventory and monitoring systems, professional staff, up-to-date technical capabilities; and integrated research, i.e., capable of workable adaptive management strategies;
4. The institutional and operational commitment and capacity needed for implementation.

The first two objectives center on the relationship between commercial activities and the ability to care for forests. Anchor Forests must be capable of sustaining production levels of forest products at a scale necessary to maintain at least a minimal level of competition (~100 MMBF/yr) within viable transportation distances (~60 mile radius) from the woods to processing facilities. Income from the utilization of forests is essential to help underwrite the costs of stand improvements to sustain vital ecological functions and economic systems. Minimum levels of harvesting, manufacturing, processing, transportation and work force infrastructure must be identified, maintained and improved to address forest health problems and support rural forest-dependent communities. Currently, harvesting and processing infrastructure is in a critical state of decline. Once these human and physical resources disappear, they will be very difficult to replace. Without access to markets for forest products, without the ability to prepare and implement management prescriptions, without loggers and mills and the means to transport wood to markets, without the income generated from harvest to defray costs of forest health treatments at the scale required, forests are facing the prospect of increasing losses from insects, disease, wildfire, conversion and climate change. They, in essence, move from being community assets to community liabilities.

> *"In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit.*[18]*"*

The third and fourth Anchor Forest objectives emphasize the importance of having the institutional capability, the staff, equipment, facilities, and organizational components, necessary to support coordinated management across the landscape. Information and staff are needed to undertake cross-boundary analysis and management planning for investment and to restore, maintain, and enhance road systems, habitats, forest health, ecosystem functions and services. Landscape-scale analyses are required to plan for and reduce risks of loss due to wildfire, insects, and disease, maintain ecosystem functions, and increase resiliency to uncertain stresses from climate change to acceptable levels (Hemstrom et al. 2012).

A trusted foundation for decision-making and facilitated active involvement of agencies, scientists, and practical advice from the field is needed to bring the collective knowledge, expertise, and information to bear on the issues under deliberation. Multi-disciplinary, multi-party science support will be needed to support informed stakeholder deliberation. To the extent possible, scientific uncertainties need to be diminished, or at least identified and agreed to their extent, so discussions can effectively focus on matters of policy. Participants need to

[18] Intergovernmental Panel on Climate Change. 2007

have confidence in the collation, analysis, and synthesis of information, the identification and evaluation of options and trade-offs, and the currency and relevancy of developments in information, technology and research. Integration of traditional knowledge and understandings with contemporary science and technical capacity should be encouraged such that managers and scientists might learn from tribal elders and holistic problem-solving might proceed.

Tribes are uniquely positioned to convene stakeholders in support of multi-ownership forestry collaborations. Tribes are political sovereigns with reserved rights on ceded lands that have potential for unparalleled influence in the co-management of federal lands. Tribal resource programs are backed by unique legal and political relationships with the United States established through treaties, statutes, executive orders, and judicial decisions. All federal actions that impact Native Americans and Alaska Natives must proceed based upon consultation with tribal leaders. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect and enhance tribal sovereignty, treaty rights, lands, assets, and resources.

Federal trust obligations to Indian tribes parallel broader US environmental responsibilities embodied in common law by the public trust doctrine. At the core of the doctrine is the principle that every sovereign government holds vital natural resources in "trust" for the public (Sax 1970). As trustee to both Indians and all citizens, the government has a dual responsibility to protect natural resources and the environment for present and future generations of all Americans. Fulfillment of trust responsibility to Indian tribes is an unavoidable moral and legal obligation that can positively be considered as an investment in Anchor Forests.

Indian tribes are not politically aligned with stakeholder extremes from either industry or environmental groups. They answer to the forest and the people not the federal bureaucracy. In some regions, especially in the West, tribes have the last remaining processing infrastructure and natural resource management staff. Tribes are reacquiring forestlands, which once acquired, will not be sold.

> *"Indian tribes are here to stay. We will not sell our land or shear down our forests during wavering economic times and relocate our operations elsewhere. Our ancestors - our culture - is committed to the land upon which we live.*[19]*"*

Indian tribes are keepers of TEK. Handed down through interpersonal teachings, stories, and practices, TEK reflects cumulative understandings of how the people coexist in natural environments. TEK can be important in development of collaborative arrangements because it brings together different forms of knowledge and practices while creating opportunities for mutual learning and relationship building (Donoghue et al. 2010).

Resource management approaches adopted by modern society have long been dominated by western science. Yet, a cascade of environmental misunderstandings and unintended consequences now demonstrate that science alone may not be adequately equipped to address

[19] Former ITC President J. Pinkham. 1995. Testimony at the NIFRMA Oversight Hearing

complex environmental challenges such as climate change and forest health declines. While TEK and science represent historically different ways of thinking, these two realms of knowledge share a common understanding that the natural world is amenable to explanation. Both develop sophisticated knowledge used to inform cause and affect relationships from which strategies might emerge (Mason et al. 2012). Anchor Forests represent unprecedented opportunities for bringing TK and science together to broaden understanding of a complex and changing world.

The BIA, located within the DOI, is the primary federal agency charged with carrying out the United States' trust responsibility to American Indian and Alaska Native people, maintaining the government-to-government relationship with the federally recognized Indian tribes, and promoting and supporting tribal self-determination (BIA 2013). Indian reservations represent ten percent of the land base within DOI jurisdiction and the largest permanent human residential population on DOI lands. DOI has federal trust obligation to protect, preserve, and enhance Indian land for its beneficiary inhabitants.

Indian tribes and the USFS share nearly 3,000 miles of contiguous borders. Sixty tribes have treaty rights that extend onto federal forests where culturally important resources and sacred sites require protection and stewardship. The agency and tribes are more than just neighbors; they are partners with common goals for social, cultural, ecological, and economic sustainability (USDA 2012). In the face of deteriorating conditions in federal forests that threaten Indian resources, tribes have contracted with the Forest Service to conduct hazardous fuels reduction treatments on federal lands through stewardship contracting and the TFPA. However, the scope of these activities has been tentative and inadequate. As mentioned earlier in this report, TFPA partnerships for co-management of federal lands should be aggressively expanded, as 80 million acres of national forest lands are in need of treatment and pose a threat to tribal resources. "Goods for Services" contracts with tribal enterprises can help offset the costs of federal forest health treatments while providing raw material to tribal enterprises. In many areas of the nation, without an increase in fuels treatments and timber harvests on federal lands, sustainability will not be achievable. Given the potential for accomplishment, we are left to ask what might be slowing progress?

Anchor Forests will require a social and political climate that enables on-the-ground treatments at the scale required to address forest health and support investment, i.e., large landscapes. Ideological differences in values and perspectives have led to an atmosphere of confrontation and controversy that has stymied forest management, particularly on federal lands. Resolution has been elusive. The need for collaboration has been acknowledged but has manifested as a diverse and confusing array of programs intended to help but unable to move beyond the project pilot scale. Effective utilization of funds and authorities could be improved through coordinated focus within an Anchor Forest "all lands" context. Federal programs for collaborative management should seek out tribal participation as leaders and facilitators. This will be especially important to the evolution of climate change strategies for adaptation and mitigation.

In the beginning of this report we looked across the specific charges of our NIFRMA assignment to form central questions that have helped to guide our inquiry. We find that tensions surrounding chronic underfunding, challenged staff retention and uncertain federal commitment to trust responsibility, as noted in prior IFMAT reports, remain unresolved. However, the intractability of these issues does not mean that progress has not been observed. We offer *Fire, Investment, and Transformation (FIT)* as an emergent theme reflective of the hopeful developments that we see occurring in Indian Country. As noted two decades ago by IFMAT I, Indian forests are places of experimentation where many examples of effective, innovative, and adaptive management can be found. We find that the Anchor Forest proposal is a particularly encouraging development for the rescue of forest landscapes and communities. Anchor Forests are a welcome manifestation of "transformation."

Although an objective of sustainability has long been established in rhetoric and regulation, a fresh look at the human dimension of sustainability is instructive. We draw upon the familiar three-circle schematic to suggest that sustainability be considered as a social construct dependent upon three attributes, capability, commitment, and vision—the convergence of which fosters stewardship. The success of collaborative landscape management and Anchor Forests will be determined by our collective ability to summon stewardship forward.

Capability means sufficient, dedicated, and competent interdisciplinary staff with access to technical experts as well as the education and research communities. Harvest and processing infrastructure to support sales of forest products and creation of employment must be available. Adequate financial resources for investments in support of short- and long-term economic, ecological, and cultural objectives will also be required from both public and private sources.

Commitment means enduring ties by local people to the land and the community. Collaboration, as envisioned for Anchor Forests, is a process of social learning and durable relationship building reliant upon establishment and maintenance of trust. Stewardship will be poorly practiced if approached as a transient activity or with a priority objective of short-term financial gain. Commitment extends beyond the people to the status of the land and the resources. Significant forestlands must be dedicated, harvested, and cared for; not sold, converted, or abandoned.

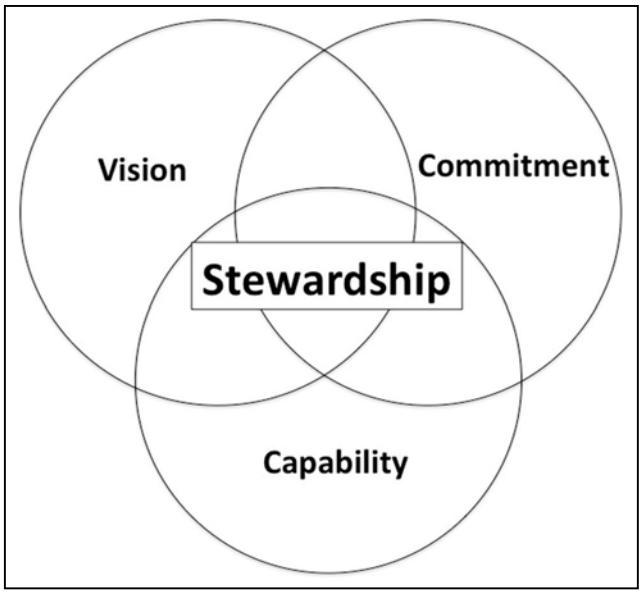


Figure AF-2. The overlapping circles of vision, commitment, and capability characterize stewardship, which is sustainability in practice.

Vision is the ability to "see" the past in the context of potential and adaptive futures. Vision evolves when critical thinking and observations coalesce into guiding principles and understandings of an interconnected world. Tribal keepers of TEK are uniquely qualified to contribute vision. Tribes live on the front lines of climate change, are uniquely dependent upon jeopardized resources, and have the vision to recognize change well in advance of climate scientists, yet tribes have only nominally been invited to participate in federal programs that address climate impacts to forested ecosystems. When thinking of stewardship, note that while capability and commitment might be schooled, hired, contracted, or purchased; vision is only available to those with a long history on the land. Vision has been a critical missing element in past landscape management experiments.

Vision, commitment, and capability must all be present such that informed planning can proceed to implementation, the unanticipated can be accommodated, and unintended consequences, such as the contemporary challenges detailed above, might be avoided. We have observed dedicated forestry professionals and technicians, Indian and non-Indian, working together in tribal and BIA operations, employed under the watchful eye of elders, to care for Indian resources and fulfill the wishes of the tribe. Tribal forestry programs strive to do the best they can with the resources available. Tribal people live with the consequences of their decisions. Stalled action is not any more of an alternative than rapid exploitation. Some reservations can be viewed as regional models for sustainable forestry (IFMAT I 1993, IFMAT II 2003).

Donoghue and others (2010) report an increase in collaborative resource management projects involving Indian tribes and agencies. On federal and tribal lands, awareness of the importance of cultural values and traditional management is on the rise supported by increased acknowledgement of treaty rights, affirmed commitment to consultation, and evolving understanding of tribal self-determination. For example, projects such as the restoration of meadows in the northern California Maidu Stewardship Project, the Nez Perce Gray Wolf reintroduction in Idaho, wild rice restoration in Minnesota by the Red Lake Band of Chippewa, the Navajo Nation Hogan Project in Arizona, and others have brought together tribes with federal, state, and private partners for shared objectives of tempering the contemporary by counterbalancing the traditional (Donoghue et al. 2010).

> *"We must work towards a shared vision -- a vision that conserves our forests and the vital resources important to our survival while wisely respecting the need for a forest economy that creates jobs and vibrant rural communities.*[20]*"*

Anchor Forests represent a new and welcome expansion of collaboration between forest tribes and others. In central Washington State, the first Anchor Forest pilot project, the Tapash Sustainable Forest Collaborative, has been convened. The partners include the USDA Forest Service, The Nature Conservancy, the Washington Department of Natural Resources, the Washington Department of Fish and Wildlife, and the Yakama Indian Nation. The primary focus is to create interactive, consensus-based solutions for restoring forest health and avoiding

[20] Agriculture Secretary Vilsak. 2009.

forestlands conversion within the east Cascades. The Tapash represents a hopeful beginning; however, more projects need be undertaken as stakes are high and time is short in the forest areas where Indian reservations abut untended national forests.

"Start with the rising sun, and work toward the setting sun, take only the mature trees, the sick trees, and the trees that have fallen. When you reach the end of the reservation, turn and cut from the setting sun to the rising sun and the trees will last forever.[21]"

Findings

AF1. Multi-ownership "all lands, all hands" management of landscapes has been rightly championed by USDA Secretary Vilsack as necessary to address forest health, conversion, fragmentation, climate change, and other threats to US forests.

AF2. Federal trust obligations to Indian tribes parallel the broader US environmental responsibilities embodied in common law by the public trust doctrine. As trustee to both Indians and all citizens, the government must protect natural resources and the environment for present and future generations of all Americans.

AF3. Conversion and fragmentation of forestlands threaten the sustainability of American forests. Landscape strategies that fail to address conversion and fragmentation cannot succeed.

AF4. In the face of environmental and economic crises, tribes as sovereign nations with obligated federal protections and a long tradition of stewardship, now feel compelled to pursue stewardship beyond reservation borders.

AF5. Anchor forests bring together stewardship partners, convened by tribes and including federal, state, and private forestland owners, with a shared objective to provide sustainable harvest of timber sufficient to supply local process infrastructure, provide jobs, generate revenues, and support stewardship.

AF6. Anchor forests are based upon understandings that people are part of nature and that people have a responsibility to care for the land.

AF7. Tribes live on the front lines of climate change, are uniquely dependent upon jeopardized resources, and have the vision to recognize change well in advance of climate scientists, yet tribes have only nominally been invited to participate in federal programs that address climate impacts to forested ecosystems.

[21] Menominee Chief Oshkosh, 1854.

AF8. Fulfillment of trust responsibility to Indian tribes is a moral and legal obligation that can also be considered as an investment in Anchor Forests. When thinking of stewardship, note that while capability and commitment might be schooled, hired, contracted, or purchased; vision is only available to those with a long history on the land.

Recommendations

AF1. Anchor Forests, such as currently being piloted in Washington, should be supported. In general, new entrepreneurial approaches to collaborative resource management should be bolstered and more widely applied. Innovative tribal forest resource management techniques and people should be considered as co-managers or managers of appropriate portions of the federal forest estate. Federal lands, taken inappropriately from tribes during the allotment period and within reservation boundaries, should be returned to tribal trust status as a part of Anchor Forest stewardship and consolidation.

AF2. Anchor Forests can evolve when applicable federal agencies bring Indian tribes into collaborative programs, such as Landscape Conservation Cooperatives and the CFLP, as funded partners, facilitators and acknowledged stewardship leaders. Shared funding and involvement should extend to climate change. Equivalent levels of funding to that of sister agencies within DOI should be provided to BIA.

AF3. Non-governmental organizations and federal resource agencies should underwrite costs of tribal purchases of private forestlands through loans, grants and tax incentives such that lands are placed in trust status and perpetually remain in forestry. Shared costs of restoring traditional lands to tribes are cost-effective investments in conservation and bestow deserved rewards for tribal provision of ecosystem services such as clean air and water, wildlife habitats, and viewsheds.

AF4. Stewardship Contracting and TFPA are valuable but underutilized opportunities for tribes to assist fuels removals on federal lands. These contracting authorities should be linked to Anchor Forests, expanded, and extended to support ten-year agreements.

Selectively harvested forest – Warm Springs. Photo by Vincent Corrao.
Tribal lumber production – Warm Springs. Photo courtesy of Warm Springs Forest Products Industries.

The NIFRMA Tasks – We elaborate within the rest of the report our analysis, findings, and recommendations for the eight tasks, stipulated by NIFRMA. Within each section, findings and recommendations are shown in bold type. References, that helped to inform this work, follow the Task presentations.

Western larch managed forest – Colville. Photo by Mark Rasmussen

NIFRMA Task A - An in-depth analysis of management practices on, and the level of funding for, specific Indian forest land compared with federal and private forest lands.

Overview

A comparison of management practices on Indian forest land to similar federal, state, and private forest lands identifies that, for *commercial forest land* stewardship and wildfire management, the USFS is the appropriate cost comparator. For *noncommercial forest land* stewardship and wildfire management, the BLM is the appropriate cost comparator. For the goal of *timber production*, the state forests and private industrial forests with similar management systems are the appropriate comparators for Indian forests. We find the level of forest investment on Indian lands to be much lower than the comparator organizations. To determine the funding level for Indian forestry, we propose a model that recognizes the cost of stewardship and incremental cost of timber production. As background to developing the stewardship /production cost model we compare levels of investment for forestry and wildfire management, by BIA region, to federal, state, and private organizations.

We also compare the results of the stewardship/production model with the 2011 BIA FPA needs assessment. Both the stewardship/production model and FPA needs assessment indicate a funding gap compared to other organizations.

Our primary conclusion is that the current (2011) federal funding for forestry and wildfire management of $154 million is about $100 million (39%) below the $254 million that we estimate necessary for a level of forest stewardship and timber production consistent with Indian goals and comparator organizations.

We conclude with Summary of Findings and Recommendations.

Introduction

Indian forestry is funded in three components: BIA Forestry, BIA Fire, and Tribal Contributions. Support to forestry is provided by the BIA Division of Transportation (formerly Branch of Roads) which maintains roads on the BIA road system (BIARS) and is funded by the Federal Highway Administration (FHWA). Other federal agencies contributing forest health and protection services and grant funds are the USDA Forest Service for insect and disease monitoring and control and NRCS through the Environmental Quality Incentives Program (EQIP) and other conservation programs. GIS support often is provided through tribal natural resource staffs.

BIA contributions to Forestry have fluctuated over the last 20 years (Table A.1). In terms of 5-year measurement points, BIA Forestry and Fire funding peaked in 2001 in both nominal and inflation adjusted bases ($2011). Forestry funding, in real terms, has declined 23% over the last 20 years and even more steeply in the last 10 years. During this 20-year period Indian forest trust lands have increased from 15.8 million acres to 18.4 million acres. Some tribes have had no budget increases in 20 years; others have had budgets or services reduced. On at least one major timber producing forest, tribal contributions are paying for BIA personnel. Tribal contributions across Indian Country have declined due to reductions in FMD associated from market conditions over the last several years, as well as declining harvests from land use changes. For many tribes, FMD Accounts are exhausted). Planting and thinning backlogs are evidence that forest investments have been inadequate (see discussion under Question B.)

Tribes are increasingly reliant upon NRCS funding for conservation projects– White Earth. Photo by Mike Smith

Decreased BIA funding has increased reliance on outside non-recurring grants (soft money), such as from NRCS. Grant writing, administration, and reporting is costly in terms of staff time

with some staff managers claiming more than half of their time is spent in grant writing, administration and reporting. The 2011 BIA Funding and Position Analysis report (BIA 2012a) suggests $3.3 million were received as grants, endowments, and other outside contribution sources. Data on outside forestry grants and contracts are probably incomplete.
Fire preparedness and hazard fuel reduction budgets that rose significantly in response to the National Fire Plan (2000) have decreased 16% in real terms over the last 10 years and are projected to decline further in response to reductions in federal appropriations in the coming years.

Tribal contributions to the forestry program remained fairly constant from 1991 to 2001 in real terms, but have declined almost 40% in real terms since 2001. A significant part of this is due to declining timber receipts that fund FMDs.

Table A.1. Sources of Forest Revenue, Allowable Annual Cut (AAC), Harvest Volumes, and Trust Land from 1991 to 2011. Previous period budgets are adjusted using CPI (Wilson, 2012), except 2001 and 2011 fire budgets are from NIFC (Mason 2013a). Fire includes preparedness and hazard fuel reduction, but not suppression.

		1991	**2001**	**2011**
Actual		**Million $**	**Million $**	**Million $**
Forestry	BIA	40.8	58.7	52.0
Fire	BIA	21.9	95.6	102.0
Tribal	Contributions	18.5	23.5	18.6
All Sources	**Total**	**81.1**	**177.8**	**172.6**
Inflation Adjusted		**Million 2011$**	**Million 2011$**	**Million 2011$**
Forestry	BIA	67.4	74.6	52.0
Fire	BIA	36.1	121.4	102.0
Tribal	Contributions	30.5	29.8	18.6
All Sources	**Total**	**134.0**	**225.8**	**172.6**
Forest & Harvest		**1991**	**2001**	**2011**
AAC	All Regions	930 MMBF	779 MMBF	564 MMBF
Harvest	All Regions	730 MMBF	606 MMBF	360 MMBF
Forest Trust Land	All Regions	15.6 million ac	17.6 million ac	18.4 million ac

Indian forest trust lands include about 18.4 million acres of forest land with 6.0 million acres classified as commercial timber land and 3.9 million acres of commercial woodland. BIA Funding differs by region (Table A.2). One of the main differences between regions is forest type. Regions with low proportions of commercial forest (Great Plains, Southern Plains, Southwest) have higher per acre forest costs although administrative unit size is also important in all regions. We return to this later in the Discussion section.

Table A.2. BIA forestry funding and land base by Region for 2011. Note: ** indicates small amount of commercial forest land (Mason 2013b).

	Forest acres	Comm. acres	Comm. acres	$/acre	$/acre	$/acre
BIA Regions		**Timber**	**Woodland**	**All Forest land**	**Comm. Tim**	**Comm. Tim + Woodland**
Alaska	461,350	175,329	173,992	$2.56	$6.73	$3.38
Eastern	363,984	311,039	11,033	$6.42	$7.51	$7.26
Eastern OK	123,787	57,281	42,488	$1.19	$2.57	$1.48
Great Plains	377,910	139,950	221,986	$4.44	$11.99	$4.64
Midwest	1,047,614	890,104	0	$7.33	$8.63	$8.63
Navajo	5,415,532	388,626	1,139,109	$0.32	$4.45	$1.13
Northwest	2,815,251	2,010,179	73,056	$6.26	$8.77	$8.46
Pacific	199,921	116,164	46,564	$14.23	$24.49	$17.49
Rocky Mtn	804,622	540,932	115,044	$3.98	$5.92	$4.88
Southern Plains	99,230	4,038	94,615	$1.40	**	$1.41
Southwest	2,675,995	602,200	792,627	$2.65	$11.79	$5.09
Western	4,051,310	727,125	1,201,288	$1.57	$8.75	$3.30
Total	**18,436,506**	**5,962,969**	**3,911,812**	**$2.82**	**$8.72**	**$5.27**

Aspen and conifer vista – Fort Apache. Photo by Vincent Corrao

Comparison to adjacent forest lands

We compiled adjacent forest land management costs to compare the level of forest investment and cost per output. As in previous IFMAT reports we used the USFS as our comparator as well as the forest industry and states in the Northwest. In this assessment, we include the BLM O&C Grant lands (Oregon and California Railroad Revested Lands) and broaden the number of

states queried as well as industry and provide additional regional focus (Table A.3, Table A.4, Table A.5).

Table A.3. Comparators used for Indian forestry management costs.

BIA Region	Forest Service	BLM	State	Industry
Alaska	Region 10		-	-
Eastern	Region 9		Maine	Northeast, Appalachia
Eastern OK	-		-	-
Great Plains	-			-
Midwest	Region 9		MN,WI	North Central
Navajo	Region 3		-	-
Northwest	Region 6	O&C lands	OR, WA, ID, MT	OR, WA
Pacific	Region 5		-	-
Rocky Mtn	Region 1,2		-	-
Southern Plains	-		-	-
Southwest	Region3		-	-
Western	Region 3		-	-

Boundary marker for tribal forest – Nez Perce. Photo by Larry Mason.

State and private forests

The total 2011 BIA allocation for forest management of Indian forest lands is $2.82 per acre if the budget is divided by total forest land (18.4 million acres). This compares to a range of $3.83/acre to $7.63 per acre for selected state forests in the Lake States and East and $11.28 per acre to $32.67 per acre in the West. A similar pattern in management costs is shown for

private forest owners. Forest management costs in the East average about $4.50 per acre except Appalachia (Table A.5) which is lower than other areas of the East. The private owners represent a broad group as indicated by the range in management costs (Table A.5).

Table A.4. Comparison of federal forest management allocation to tribes to selected states ($/acre). Costs do not include fire management. Land base for tribes is all forest land including woodlands. Derived from Decker (2012), Morrison (2012 a,b), WIDNR (2012), Larson (2012), Helmer (2012), Idaho (2012), Dent (2012), and Brodie (2012).

BIA Allocation to Tribes	**$2.82/acre**
States East	**$/acre**
Wisconsin State Lands	$3.83
Minnesota State Lands	$5.50
Maine State Forests	$7.63
States West	**$/acre**
Montana Trust Lands	$11.28
Idaho Department of Lands	$17.91
Washington Trust Lands	$19.98
Oregon Trust Lands	$32.67

Table A.5. Forest management costs in selected areas of the eastern and western United States provided by two major forestry consulting companies. Costs do not include fire management.

	Average	**Minimum**	**Maximum**
Private East	**$/acre**	**$/acre**	**$/acre**
Southeast - Natural Pine/Hardwood/Planted Pine	$4.85	$1.33	$16.77
Northeast - Spruce/Fir and Natural Hardwoods	$4.55	$3.73	$6.58
North Central - Natural Hardwoods	$4.43	$3.41	$6.51
Appalachia - Natural Hardwoods	$2.70	$1.58	$4.82
Private West	**$/acre**	**$/acre**	**$/acre**
W. Washington/W. Oregon DF/Hemlock	$19.00	$8.00	$62.00
E. Washington/ E. Oregon - Pine/Fir	$7.25	$2.00	$12.00

National Forest System

The USFS manages for multiple uses including dispersed and developed recreation, mineral development, and Wilderness. The 2011 National Forest total budget for multiple use management without recreation, mineral development, facilities management other than roads, and Wilderness was $8.57 (Table A.6). Law enforcement was about $0.58 per acre. Fire management (preparedness and hazard reduction was an additional $5.16 per acre. Fire management will be discussed separately. Not included in Table A.6 is a significant additional investment in the National Forests that takes place through stewardship contracts where stumpage is traded for project work such as forest restoration.

Table A.6. National Forest System costs for 2011 excluding recreation and mineral budgets. Budgets include all road investments including federal highway funding, but does not include $200 million from the FHWA Forest Highway Development Fund for road access to and through the National Forests. Law enforcement and wildfire costs are separated. Derived from Danelle (2012) and Anderson (2012).

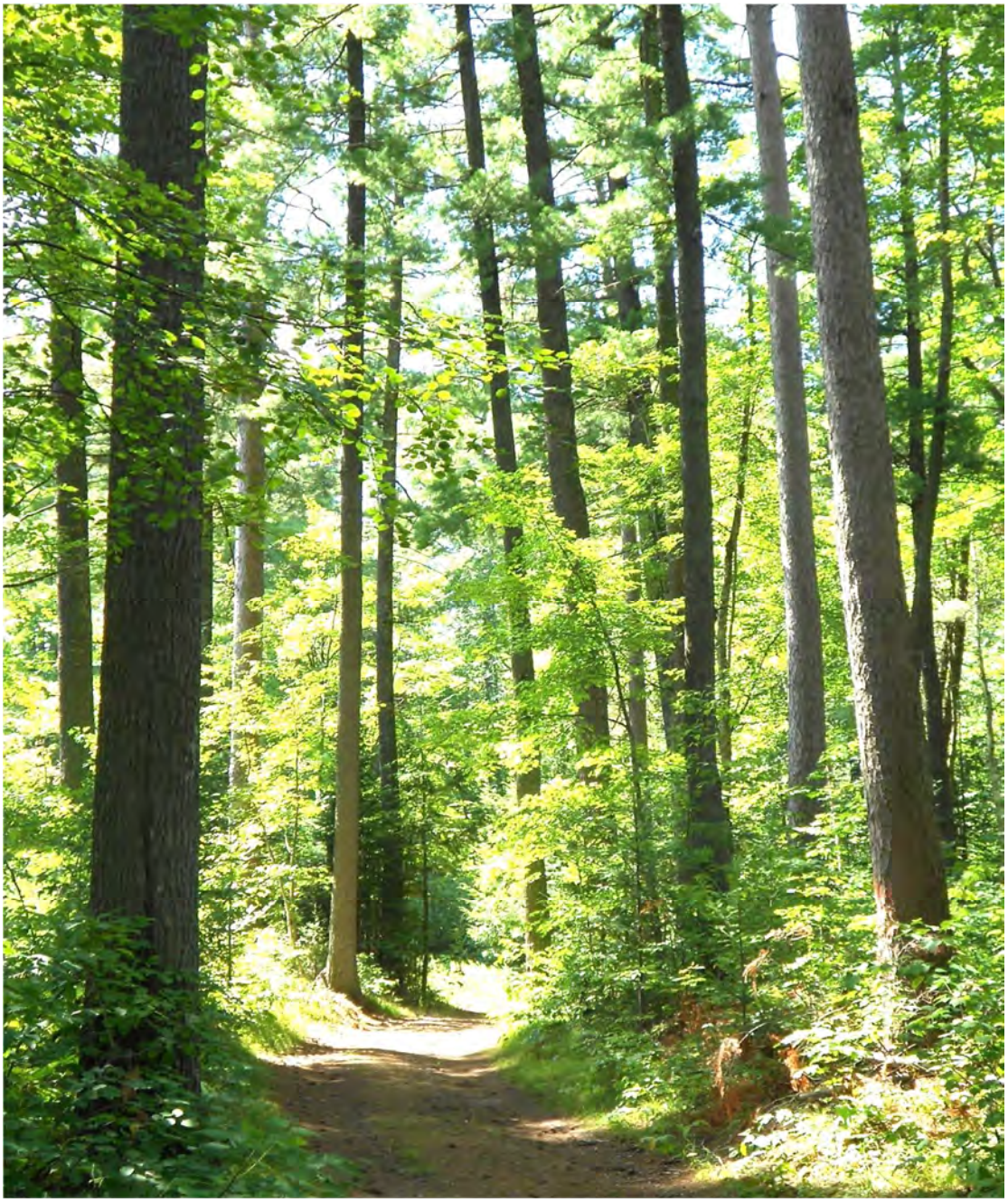
Bureau of Land Management, Oregon O&C Grant Lands 2008	**Total ($1000)**	**$/acre**
All Land and Resource Management	$154,075	$59.72
Wildfire Management	$18,504	$7.17
Total	**$172,579**	**$66.89**

BLM western Oregon

The BLM manages about 248 million acres of land, including 2.58 million acres of primarily forest land in western Oregon. The total 2011 Oregon BLM budget is $266 million, including $51 million for wildfire management. The majority of the Oregon BLM budget is for management of the O&C lands, but the breakout was not available. As a proxy, we used data from 2008 that was compiled for during the EIS preparation for the Western Oregon Plan (Table A.7). The proportion that is directly related to timber production is not available.

Table A.7. Bureau of Land Management costs for 2008 for the western Oregon O&C Grant lands including the State BLM Office share. Derived from Thauland (2012).

National Forest System Surface Land Management 2011	**Total ($1000)**	**$/acre**
Collaborative Forest Landscape Restoration	$14,970	$0.09
Land Management Planning	$45,033	$0.29
Inventory and Monitoring	$167,219	$1.06
Wildlife & Fisheries Habitat Management	$140,260	$0.89
Grazing Management	$49,738	$0.32
Forest Products	$336,049	$2.13
Vegetation & Watershed Management	$184,341	$1.17
Landownership Management	$91,765	$0.58
Roads (All roads – direct appropriations)	$240,105	$1.52
Roads (FHWA road maintenance funding)	$82,500	$0.52
Total excluding law enforcement and fire	$1,351,980	**$8.57**
Law Enforcement	$91,765	**$0.58**
Fire Preparedness	$585,654	**$3.71**
Hazard Reduction	$228,344	**$1.45**



Mature forest – Lac du Flambeau. Photo by Vincent Corrao.

BIA funding per unit of timber harvest

Indian forests harvested about 360 MMBF equivalent in 2011 including pulpwood and excluding firewood. Harvest has declined from about 730 MMBF/year in 1991 (IFMAT 1) for a variety of reasons (See discussion under Question F) including changes in management objectives, changes in forest condition, reduction in markets, and lack of funding. Expressed in terms of timber

harvested, the BIA allocation, adjusted for inflation, was $92 /MBF in 1991, $123/MBF in 2001, and $145/MBF in 2011 (Table A.9). BIA 2011 allocations per unit of timber production are lowest in the Northwest ($77-79/MBF). Market conditions have accentuated imbalances between timber offered and timber harvested in many BIA regions which make interpretation difficult as the forestry program funds both timber sale preparation and timber sale administration. Several of the regions have primarily forest stewardship programs, which exaggerate costs of timber harvest. We discuss the cost of forest stewardship later.

On average, BIA timber allocations per unit of timber production are higher than state lands (Table A.9) and, on average, approximately the same level of the direct costs of timber production on National Forests (Table A.10). In the Northwest, BIA 2011 allocations per unit of output are on the upper end of what states budget and are much lower than the National Forests. State lands in the West with the exception of Montana are in the range of $65-75/MBF. Minnesota has the lowest timber production costs at $53/MBF equivalent and Maine has a timber production cost of $86/MBF equivalent.

Table A.8. Costs of Indian timber production (2011) in terms of timber offered and timber harvested. Budgets are 2011 BIA allocations by region with central office operations prorated to the regions in proportion to the regional allocations. *** Indicates too small a volume to provide meaningful comparison. Derived from Wilson (BIA 2012a).

BIA Regions	Budget ($1000)	Offered (MMBF)	$/MBF	Harvested (MMBF)	$/MBF
Alaska	$1,179	-	-	-	-
Eastern	$2,337	9.3	$250	$25.0	$94
Eastern OK	$147	-	-	-	-
Great Plains	$1,678	0.2	***	$0.2	***
Midwest	$7,677	35.1	$219	$87.9	$87
Navajo	$1,728	0.4	***	$0.5	***
Northwest	$17,634	228.2	$77	$223.7	$79
Pacific	$2,845	10.9	$260	$11.4	$250
RockyMtn	$3,202	10.4	***	$2.9	***
Southern Plains	$139	0.2	***	$0.2	***
Southwest	$7,098	-	-	$5.4	***
Western	$6,361	65.5	$97	$2.5	***
Overall	**$52,026**	**360.3**	**$144**	**$359.7**	**$145**

Table A.9. BIA, National Forest, and selected state forest expenditures (2011).Timber production volumes for Oregon and Washington have been adjusted reflect BIA scaling rules. Idaho and Montana volumes have not been adjusted and may underestimate BIA scale by up to 5%. Cost per MBF here is calculated by dividing total budgets by total volume with the exception of the National Forest System where only costs directly supporting timber production have been included. Forest expenditures include stewardship costs so the $/MBF are not direct timber production costs, except for the National Forests. Stewardship costs are discussed later. Derived from Decker (2012), Morrison (2012 a,b), WIDNR (2012), Larson (2012), Helmer (2012), Idaho (2012), Dent (2012), Brodie (2012), and Danelle (2012).

	2011 Expenditures ($1000)	Harvest Vol. (MMBF)	$/MBF
BIA	$52,026	360	$145
National Forest System	$380,711	2,533	$150
Oregon Trust Lands	$22,000	312	$71
Washington Trust Lands	$44,000	669	$66
Idaho Department of Lands	$17,500	248	$71
Montana Department of Lands	$5,939	47	$126
Minnesota DNR	$21,000	400	$53
Maine State Forests	$4,577	53	$86

The USFS has estimated National Forest timber sale management related costs including other resource support of timber sales (Table A.10). Costs in 2011 per forest acre (net of Wilderness) are lowest in the Southwest (Region 3, Region 4), and highest in Region 6 (Oregon, Washington) and Region 9 (Eastern US). The average unit cost per net forest acre is $2.41/acre/year. In 2011, the Forest Service harvested about 2.5 BBF at an average cost of $150/MBF. In the contiguous states, costs ranged from $90/MBF in Region 8 (Southeast US) to $220/MBF in Region 1 (Montana, northern Idaho).

Table A.10. Direct timber management costs for the National Forests in 2011 (Danelle 2012).

Forest Service	$/ Net Forest acre	MMBF	$/MBF
Region: 01	$2.57	210.6	$220
Region: 02	$2.00	204.7	$164
Region: 03	$0.79	131.9	$111
Region: 04	$0.61	118.7	$155
Region: 05	$3.62	311.4	$174
Region: 06	$4.27	547.6	$156
Region: 08	$3.97	542.4	$90
Region: 09	$5.48	421.4	$136
Region: 10	$1.34	44.2	$496
Overall	**$2.41**	**2,532.9**	**$150**

Roads

Roads are an important part of Indian forestry providing access for forest protection, commercial and noncommercial forest uses. IFMAT I and II identified underinvestment as the primary factor in the generally poor state of Indian forest roads as compared to the National Forests. Roads in Indian Country are divided into two categories: (1) roads on the Indian Reservation Road System (IRR[22]), and (2) roads that are not on the IRR.

The IRR includes approximately 29,000 miles of public roads on Indian reservations, owned by the BIA and designated on the BIARS plus State and local public roads that provide access to and within reservations plus designated tribal owned-roads. Roads that are not on the IRR system must be financed through resource extraction or tribal contributions.

In 1928, Congress gave authority to fund what was later to become the IRR system when it enacted what is now 25 U.S.C. 318a. That statute reads: "Appropriations are hereby authorized out of any money in the Treasury… for…improvement, construction, and maintenance of Indian reservation roads not eligible to (sic) Government aid under the Federal Highway Act…" (Leonard, 2012). In 1982, as part of the Surface Transportation Act, Congress put the IRR system under the Federal Lands Highways program making explicit that only reservation public roads would be eligible as these funds came from the Highway Trust Fund. Indian roads restricted from public travel are not eligible for FHWA funds. This has caused friction between tribes and the federal government for tribes who choose to restrict travel for cultural, trespass, or other reasons.

Overall, road infrastructure in-forest and out-of-forest is poor in Indian Country, with reportedly only 16% of the IRR functioning at acceptable or better levels (Gishi 2012a). IFMAT I estimated that more than $200 million would be needed to bring forest roads up to a standard that would provide a stable transportation system and protect watershed condition. From estimates provided by Gishi, $200 million is less than 1% of the total cost needed to bring the IRR up to standard. This pales against overall Indian transportation needs. Funds for the

[22] Roads on the IRR are public and located within or provide access to an Indian reservation or Indian trust land, or restricted Indian land. The BIA Road System is a subset of the IRR system, consisting of roads that are owned and maintained by the BIA and tribal governments, including those existing and proposed IRR for the BIA has or plans to obtain legal right-of-way. The BIA has the primary responsibility to improve and maintain the roads on the BIA Road System. The IRR also includes Federal, State and local public roads that provide access to American Indian reservations and Alaska Native villages or, in some instances, are located within reservations or American Indian lands. Over 55 percent of the IRR system is unimproved, earth, and/or gravel.

IRR are provided by the FHWA under a relative needs and priority system. The 2011 BIA FPA identified additional road funding needs (road design, construction, and maintenance) as only $1.0 million (Table A.25). In addition to federal funding, a number of states share state fuel taxes with tribes through agreements and compacts (Zelio 2005).

Construction

Federal funding for the IRR between 2005 and 2009 averaged about $400 million per year (BIA 2012f). Additional funding of about $14 million is for provided for bridge maintenance and replacement. Funding for 2011 (Gishi 2012b) was $364.3 million (Table A.11). Funding is allocated by a priority system in consultation with tribes (FHLP 2012). Under current regulations, up to 25% of this funding can be used for road maintenance for any roads on the IRR once regular road maintenance funds are expended. Most new forest development roads are not eligible for this funding unless they are proposed as public roads and put on the BIARS.

Table A.11. Construction Funding for the Indian Reservation Road Program (2011). Potentially up to 25% can be allocated to road maintenance (Gishi 2012a,b).

BIA Regions	Million $
Alaska	$50.8
Eastern	$11.7
Eastern OK	$44.8
Great Plains	$26.1
Midwest	$40.0
Navajo	$54.3
Northwest	$27.0
Pacific	$30.7
Rocky Mtn.	$18.7
So. Plains	$21.6
Southwest	$13.3
Western	$25.5
TOTAL	**$364.3**

Bridge replacement funded with NRCS cost-share – Quinault. Photo by Larry Mason.

Maintenance

The DOI funds the maintenance of the BIARS, which has an annual authorization of about $25.5 million, about $900/mile/year. Funding is restricted to BIARS. BIARS includes many of the major forest development roads, but usually not collectors and spur roads. A large proportion of natural resource roads are not on the BIARS. Maintenance of natural resource

roads that are not on the BIARS must be provided from charges to natural resources or tribal contributions.

A major difference between tribal funding of resource roads and other land owners is that road users are expected to pay their road use share on Forest Service, BLM, state, and many private lands. On most reservations, commercial users on tribal roads do not pay user fees outside of the immediate sale area. Inside the sale area, the timber purchaser pays for road construction and road maintenance. The rationale is that road maintenance funding through reductions in stumpage payments simply moves money from one hand of the tribe to another. However, this contributes to lack of stable road funding with potential impacts on other resources.

Expressed on a per acre basis, the $25.5 million DOI funding to the BIA equates to about 23% of the road maintenance funding that the USFS receives and about 20% more than the BLM on average, although BLM road maintenance budgets in Oregon area are similar to USFS maintenance budgets. The $25.5 million does not include discretionary road maintenance reallocation choices by the tribes from the FHWA road construction fund of which up to 25% can be diverted to road maintenance projects. Of course, neither the BLM nor USFS has responsibilities to provide community road services.

Finding a good comparator for road maintenance funding is challenging. The road infrastructure on federal lands in the western United States is widely recognized as deteriorating, primarily from the reduction in commodity extraction that funded road maintenance programs through road user fees. The agencies simply have too many roads for the user costs to support at current harvest levels. The National Forest and BLM reaction has been to decommission roads and/or reduce service levels.

Recycled gravel from road reclamation project – Coquille. Photo by Larry Mason.

Road maintenance needs for forest stewardship vary by topography and climate, but are probably in the range of $0.50-$2.00 per acre per year (Table A.12).

Table A.12. Comparison of road maintenance funding (2011) between organizations expressed on a per acre basis. BIA road maintenance funding does not include road maintenance contributions from the construction fund. National forest land base does not include Wilderness. National Forests and BLM funding allocations do not include road user maintenance charges or FHWA Forest Highway Development funding. Omitted from the table is a small amount of FHWA funding to BLM.

Organization	$/acre
BIA	$0.46
National Forests (overall)	$2.04
BLM (overall)	$0.30
BLM (w/o Alaska)	$0.38
BLM (Oregon)	$1.54

Wildfire management program

The wildfire management program for the BIA includes both forest protection and non-forest protection from wildfire on reservations as well as some non-reservation lands. The wildfire program within the federal agencies is divided into preparedness, suppression, and hazardous fuel reduction. The three components are budgeted, but suppression funding depends upon actual conditions. Prior to 2009 supplemental appropriations were made when budgeted suppression funds have been exhausted. Currently, however, the FLAME Act of 2009 (**F**ederal **L**and **A**ssistance, **M**anagement and **E**nhancement) Wildfire Suppression Reserve Fund is being used to avoid supplemental appropriations, but ultimately, suppression deficit funding depends upon Congress. In this section we compare Indian funding for preparedness and hazardous fuel reduction and do not discuss suppression costs.

As part of the National Fire Plan, combined BIA fire preparedness and hazard reduction budgets more than tripled in real (inflation adjusted) terms during the 1990's to peak around 2001; then have since declined to 2.8 times the 1990's levels (inflation adjusted) in 2011 (Table A.1). The recent decline has caused, and continues to cause, stress in BIA and tribal fire organizations as they expanded in response to increased budgets and then have contracted under reduced budgets. Because of concerns about internal data and programming issues, the Fire Program Analysis interagency priority budgeting tool, used in 2010 and 2011 was not used to develop the 2012 budget (DOI Budget Justification, FY 2012, Wildland Fire Management). In 2007, the federal agencies adopted the Hazardous Fuels Prioritization and Allocation System (HFPAS) that uses the modeling tool Ecosystem Management Decision Support (EMDS). The DOI is making significant changes to HFPAS to address concerns about outputs (DOI Budget Justification, FY 2012, Wildland Fire Management).

Although we draw comparisons between agencies for preparedness and hazardous fuel reduction, the percentages of forest land, commercial forest, and non-forest differ between BIA

areas as well as between forest owners (Table A.13). The USFS has, by far, the greatest proportion of forest land, commercial and non-commercial, and the BLM has the lowest. In terms of proportions, the USFS has approximately three times the percentage of commercial land and non-commercial forest land as the BIA. This has implications for preparedness, hazardous fuel reduction, and suppression costs.

Table A.13. Approximate vegetation characteristics by owner.

Owner	% Com. Forest land	% Non-Com. Forest/Woodland	% Range/Other
BIA	< 16	< 16	> 68
BLM	< 2	< 10	> 88
Forest Service	< 50	< 50	> 15

To permit comparisons to other organizations, the Central Office fire preparedness and hazard reduction budgets have been prorated to regions in proportion to regional budgets (Table A.14). Per acre budgets are expressed as a function of protection acres and reservation acres (Table A.15). Indian forest protection includes areas outside of reservation boundaries where tribes have wildfire management responsibilities. For the purpose of this analysis, forest protection acres are used as the land base for comparison of preparedness. For the purpose of hazardous fuel reduction, reservation acres are used.

Fire Preparedness

It is challenging to compare fire preparedness budgets for private and state forest lands to Indian forest lands because in many states fire preparedness budgets come from general funds and are not easily isolated. The State of Oregon is one state where it is possible to identify the costs. Oregon provides fire protection services to 16 million acres of forest land. Private landowners are assessed a per acre rate based on forest type and location at about one-half the expected cost of forest protection and the remainder comes from the general fund. Non-private entities such as the BLM, several tribes, and the Oregon Department of Forestry can, and do, contract for fire protection services at the full rate.

Table A.14. BIA Preparedness and Hazardous Fuels Reduction budget (2011). Adjusted preparedness and hazard reduction budgets have Central Office/NIFC budgets prorated to regions in proportion to BIA regional budgets. Derived from Mason (2013a).

BIA Regions	Preparedness ($1,000)	Hazardous Fuel Reduction ($1,000)	Adjusted Preparedness ($1,000)	Adjusted Hazardous Fuel Reduction ($1,000)
Alaska	$286.4	$1,296.2	$454.9	$1,345.3
Eastern	$771.9	$471.5	$1,226.4	$489.4
Eastern OK	$669.6	$481.6	$1,063.8	$499.9
Great Plains	$3,758.4	$2,489.5	$5,971.1	$2,583.9
Midwest	$2,029	$2,779.3	$3,223.5	$2,884.7
Navajo	$1,726.2	$1,186.7	$2,742.5	$1,231.7
Northwest	$9,144.9	$10,725.2	$14,528.7	$11,131.9
Pacific	$2,401.6	$3,273.2	$3,815.4	$3,397.4
Rocky Mtn	$4,576.2	$1,511.1	$7,270.3	$1,568.4
So. Plains	$691.3	$426.2	$1,098.3	$442.3
Southwest	$4,617.0	$8,796.1	$7,335.1	$9,129.6
Western	$8,128.8	$5,422.8	$12,914.3	$5,628.4
CO/NIFC	$22,843.0	$1,473.5	-	-
Total	**$61,644.3**	**$40,332.9**	**$61,644.3**	**$40,332.9**

The full rate forest protection rates vary from about $1.40 to $4.00/acre/year depending upon forest type and geographic location. This covers cost of preparedness *and* suppression. Protection for range lands in Oregon is voluntary and is done through 17 Range Protection Associations in a "Neighbors Helping Neighbors" program that covers 3.3 million acres of private lands and about 0.5 million acres of state land (Foster 2012). Direct state payments to fire protection on range lands in Oregon are lower than $.05 per acre per year. These protection associations compete for outside grants and are eligible for the Federal Excess Property Program (FEPP) through which they, and state fire protection programs, such as the State of Washington, obtain much of their fire-fighting equipment, such as trucks and engines, at little or no charge.

Table A.15. BIA Preparedness budget by protection acre and Hazardous Fuel Reduction budget by reservation acre (2011). Preparedness and hazard reduction budgets have BIA CO/NIFC allocation prorated to regions in proportion to BIA area budgets. Derived from Mason (2013a).

BIA Regions	Protection Acres	Reservation Acres	Preparedness $/ac	Hazardous Fuel $/ac
Alaska	1,190,191	1,184,040	$0.38	$1.14
Eastern	562,170	647,070	$2.18	$0.76
Eastern OK	635,456	641,145	$1.67	$0.78
Great Plains	11,241,503	5,883,850	$0.53	$0.44
Midwest	1,345,414	1,503,991	$2.40	$1.92
Navajo	17,170,109	17,170,109	$0.16	$0.07
Northwest	5,360,088	4,990,868	$2.71	$2.23
Pacific	462,340	386,695	$8.25	$8.79
Rocky Mtn	9,334,226	6,360,787	$0.79	$0.25
Southern Plains	452,482	454,206	$2.43	$0.97
Southwest	4,961,629	4,675,421	$1.48	$1.95
Western	12,597,009	12,573,036	$1.03	$0.45
Overall	**65,312,617**	**56,471,218**	**$0.94**	**$0.71**

Forest protection services provided by Idaho and Montana to private owners are reportedly about $0.60/acre/year and the fire preparedness budget for Minnesota is about $0.50/acre/year.

USFS fire preparedness for 2011 averages $3.78 per acre (Table A.16). Budgets are highest in the Pacific NW (Region 6) and California (Region 5) and, outside of Alaska, lowest in the Southwest (Regions 3 and 4). Fire preparedness allocations between the USDA and DOI are difficult to compare due to differences in accounting practices between the two agencies. Preparedness personnel for the USDA can be reimbursed for their normal weekly work time on suppression, while DOI personnel cannot. However, BLM budgets (Table A.17) are similarly highest in northern Rockies, Oregon and California. The average cost of preparedness is $0.85/acre excluding Alaska.

Using comparator regions between the BIA, USFS, and BLM (Table A.18) the USFS per acre budgets are higher than BIA budgets, consistent with the USFS having a much greater percentage of forest acres (Table A.13). In the East, though, where percentage of forest acres is most similar, the USFS budgets still typically exceed BIA budgets. All of the federal agencies significantly exceed Minnesota's fire budget ($0.50/acre). The Navajo Region receives considerably less than USFS and BLM comparators. The Southwest and Western BIA regions receive much less than USFS, as does the BLM. The USFS Region 5 (primarily California) receives the largest preparedness funding of any USFS region (42% of the total USFS preparedness budget) and the Pacific Region (California) receives the highest per acre funding in the BIA.

Table A.16. National Forest System Preparedness and Hazardous Fuel Reduction Budgets (2011) with Washington Office costs prorated to regions in proportion to regional budgets. The land base is National Forest land per region net of Wilderness. Derived from Danelle (2012).

Forest Service	Prorated Preparedness	Prorated Hazardous Fuels
Region	**$/acre**	**$/acre**
Region: 01	$3.17	$1.13
Region: 02	$1.81	$1.44
Region: 03	$2.99	$1.96
Region: 04	$1.89	$0.75
Region: 05	$16.65	$3.29
Region: 06	$3.86	$1.41
Region: 08	$2.86	$2.95
Region: 09	$2.05	$0.94
Region: 10	$0.16	$0.07
Average	**$3.71**	**$1.45**
Average w/o Alaska	**$3.78**	**$1.49**

Table A.17. BLM Preparedness and Hazardous Fuel Reduction Budgets (2011) with Washington Office, Fire Aviation, National Training Center, and National Operations Center support prorated to states in proportion to state budgets. Derived from Thauland (2012).

State	Prorated Preparedness $/acre	Prorated Hazardous Fuels $/acre
Alaska	$0.47	$0.02
Arizona	$0.63	$0.35
California	$1.31	$0.44
Colorado	$1.24	$0.72
Idaho	$1.81	$1.27
Montana	$1.77	$0.69
Nevada	$0.50	$0.14
New Mexico	$0.45	$0.44
Oregon	$1.31	$1.30
Utah	$0.71	$0.47
Wyoming	$0.34	$0.20
Average BLM	**$0.73**	**$0.35**
Average BLM w/o Alaska	**$0.85**	**$0.49**

Hazardous fuel reduction

Hazardous fuel reduction is an important safety and resource conservation activity in dry forest ecosystems. Allocating hazardous fuel reduction treatments nationally within, and between, agencies has been part of a larger activity within the DOI and USDA for the past 10 years to rationalize preparedness and hazardous fuel reduction plans for development of budgets. For

the last several years the BIA has received about 22% of the DOI hazardous fuel reduction budget (Mark Jackson, ITC Board Meeting, December 11, 2012). Tribal land is equal to about 18% of the lands under DOI responsibility, outside of Alaska. The combination of national budget priorities and known deficiencies in the databases supporting the Fire Program Analysis has created considerable concern within the BIA and tribal fire organizations. The DOI is making changes to HFPAS system (DOI, 2012 Budget Justification, page 39) to reflect these concerns.

In 2011, on a cost per administrative acre basis, excluding Alaska, the BIA hazardous fuel reduction allocation to tribes averaged about $0.69/acre of reservation land (Table A.19) as compared to $1.49/acre of National Forest land outside of Wilderness, and $0.49/acre for the BLM. BIA allocations to the Western and Navajo Regions were much lower than comparator regions of the USFS and BLM. BIA allocations were comparable in the East and higher than comparator regions in the Northwest, Pacific, and Midwest regions. (Table A.19).

Table A.18. BIA, National Forest System, and BLM Comparators by BIA region for fire preparedness. The land base for BIA is total protected acres. The land base for USFS is net of Wilderness. The land base for the BLM is state administrative acres.

BIA Regions	Preparedness $/ac	Forest Service	Preparedness $/ac	BLM State Office	Preparedness $/ac
Alaska	$0.38	Region 10	$0.16	Alaska	$0.47
Eastern	$2.18	Region 9	$2.05	--	--
Eastern OK	$1.67	-	-	Colorado	$1.24
Great Plains	$0.53	-	-	Colorado	$1.24
Midwest	$2.40	Region 9	$2.05	Colorado	$1.24
Navajo	$0.16	Region 4	$1.89	Arizona, NM	$0.63/0.45
Northwest	$2.71	Region 6, 1	$3.86/1.13	Oregon, ID, MT	$1.13/1.81/1.77
Pacific	$8.25	Region 5	$16.65	California	$1.31
Rocky Mtn.	$0.79	-	-	Wyoming	$0.34
So. Plains	$2.43	-	-	Colorado	$1.24
Southwest	$1.48	Region 3	$2.99	Arizona, NM	$0.63/0.45
Western	$1.03	Region 3	$2.99	Nevada, Utah	$0.50/0.71
All w/o AK	$0.95	All w/o AK	$3.78	All w/o AK	$0.85
All	$0.94	All	$3.71	All	$0.73

BIA hazardous fuels removal treatment. Photo provided by Robyn Broyles.

Table A.19. BIA and National Forest System and BLM Comparators by BIA region for hazardous fuel reduction budgets for BIA regions. The land base for USFS is net of Wilderness. The land base for the BLM is state administrative acres.

BIA Regions	Hazardous Fuel Reduction $/Ac	Forest Service	Hazardous Fuel Reduction $/Ac	BLM State Office	Hazardous Fuel Reduction $/Ac
Alaska	$1.14	Region 10	$0.07	Alaska	$0.02
Eastern	$0.76	Region 9	$0.94	--	--
Eastern OK	$0.78	-	-	Colorado	$0.72
Great Plains	$0.44	-	-	Colorado	$0.72
Midwest	$1.92	Region 9	$0.94	Colorado	$0.72
Navajo	$0.07	Region 4	$0.75	Arizona, NM	$0.35/0.44
Northwest	$2.23	Region 6, 1	$1.41/1.13	Oregon, ID, MT	$1.30/1.27/0.69
Pacific	$8.79	Region 5	$3.29	California	$0.44
Rocky Mtn.	$0.25	-	-	Wyoming	$0.20
So. Plains	$0.97	-	-	Colorado	$0.72
Southwest	$1.95	Region 3	$1.96	Arizona, NM	$0.35/0.44
Western	$0.45	Region 3	$1.96	Nevada, Utah	$0.14/0.47
All w/o AK	$0.69	All w/o AK	$1.49	All w/o AK	$0.49
All	$0.71	All	$1.45	All	$0.35

Discussion

Prior IFMAT reports have shown that federal funding for forestry on Indian forest land significantly lags federal, private, and state lands, particularly in the West. The gap between federal funding for Indian forest land and other federal land appeared to be narrowing between IFMAT I and IFMAT II, primarily due to reduced funding for the National Forests and the creation of the National Fire Plan (2000).

IFMAT III finds that federal forestry funding for Indian forest lands still lags forest land investments on the federal forests (National Forests and BLM), state forests and private lands, particularly in the West. Forest investments can be divided between forest stewardship and forest production. The USFS (commercial forestland) and BLM (noncommercial forestland) are the best comparators for forest stewardship, including wildfire management (hazardous fuel reduction and fire preparedness). The states and industry are the best comparators for production costs that use management systems similar to those practiced on Indian lands.

Forest stewardship investment

Investments for providing minimum forest management services (stewardship) on the National Forests, states, and larger private land owners are in the range of $5-$6/acre/year, including roads. National Forests funding is $8.57/acre (Table A.6) without recreation, wilderness, mineral, and law enforcement. Subtracting the direct costs of timber management ($2.41/acre) and grazing ($0.32/acre), the cost of stewardship management is in the range of $5.60-6.00 per acre per year. Similar costs can be demonstrated on state lands and larger private lands owners. National forest investments in hazardous fuel reduction and fire preparedness are approximately $1.50 and $3.75/acre respectively (Table A.20).

Minimum management services on noncommercial timberland and noncommercial woodland appear to be about $1.40/acre/year using the 2011 BLM budget considering soil, water, air, riparian, cultural resources, wild horse management, facilities and transportation. A previous study by the BIA Midwest Region has suggested that the management of woodlands be considered about one-quarter of that of commercial timberland. This is consistent with ratio between BLM and National Forest stewardship costs (1.40/5.60 = 25%). BLM investments in hazardous fuel reduction and fire preparedness are approximately $0.50 and $0.85/acre outside of Alaska respectively (Table A.17). We use these estimates in Table A.20 as being representative of most Indian lands.

Table A.20. Estimated stewardship costs for commercial forest land and other Indian Lands, $/ac/year using estimates based on National Forests for commercial forest and commercial woodland and BLM for noncommercial forest and noncommercial woodland.

	Stewardship (w/o wildfire mgt.)	**Hazardous Fuel Reduction**	**Preparedness**
Commercial Forest Land	$5.60 (National Forest)	$1.50 (National Forest)	$3.75 (National Forest)
Non-Commercial/Range	$1.40 (BLM)	$0.50 (BLM)	$0.85 (BLM)

A management study of private forest land management in the Pacific Northwest (Figure A.1) showed that management costs for smaller properties were more costly to manage than larger properties.

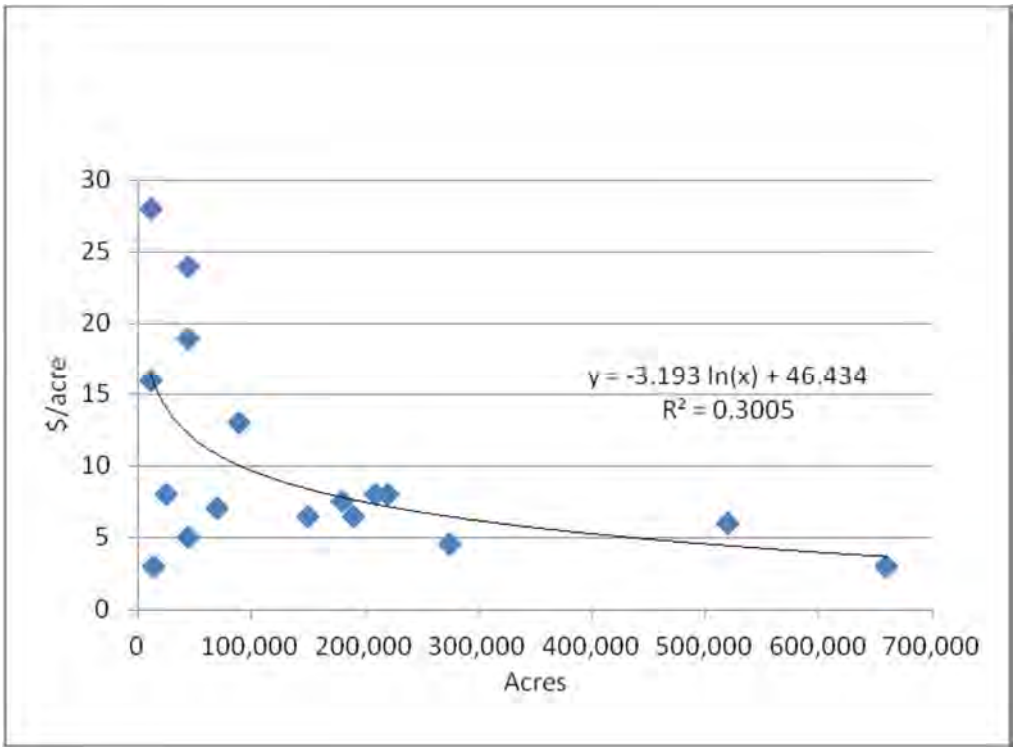


Figure A.1. Forest management costs ($/acre) as a function of size of ownership from a 1989 study of 17 private forest lands in the Pacific Northwest.

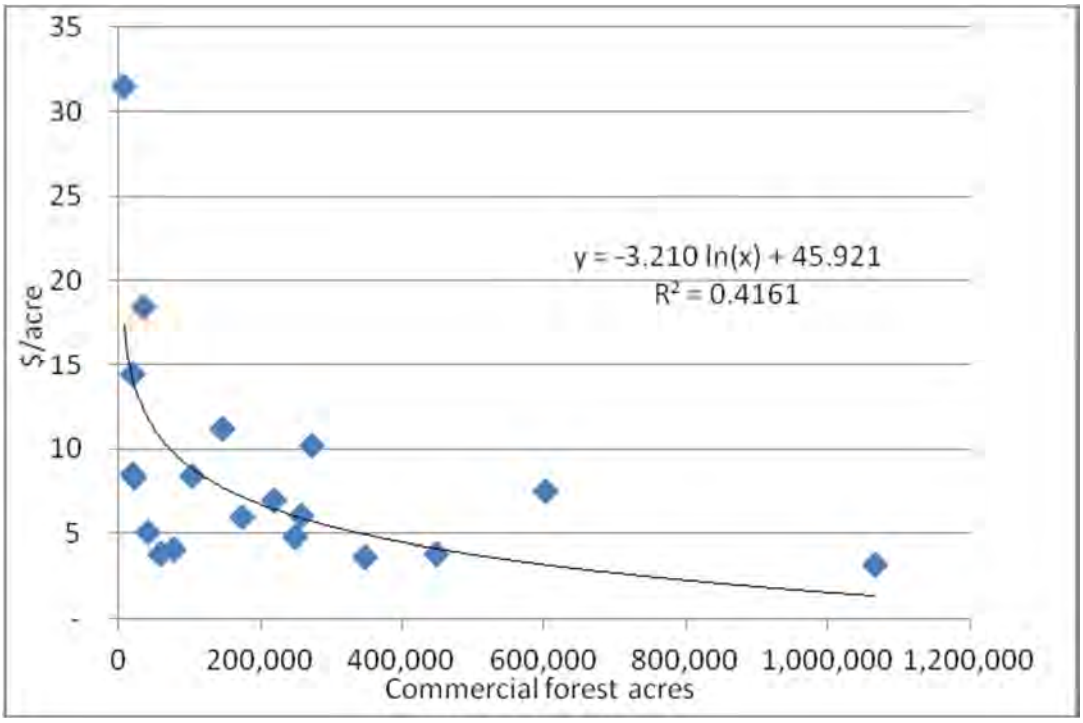


Figure A.2. BIA funding ($/acre) versus commercial forest acres from tribes that IFMAT visited during the IFMAT III assessment.

IFMAT III observed a similar trend with higher per acre BIA funding for reservations with fewer commercial forest acres. (Figure A.2). Category 1 and Category 2 tribes account for about 90 percent of the commercial forest land including nearly all of the commercial timberland. Using 500,000 acres or larger of commercial forest land as the base, the management cost multipliers for smaller management units range from 1.2 to 3.5 with a weighted average of 1.54 considering the distribution of commercial forest land over 100 reservations (Table A.21).

Table A.21. Commercial forest acres by size class and BIA category and management cost multipliers developed using the regression equation from Figure A.1.

Size Class (1000 ac)	No. of Cat 1 Tribes	Cat 1 Com Forest Acres (1000)	No. of Cat 2 Tribes	Cat 2 Com Forest Acres (1000)	Cat1 + 2 Com Acres (1000)	Percent	Cost Multiplier
1000 +	2	2594	0	0	2594	29	1
500-1000	1	603	0	0	603	7	1
250-500	6	2018	0	0	2018	23	1.2
100-250	11	1726	1	166	1892	21	1.7
50-100	5	388	5	499	887	10	2.3
25-50	7	250	7	253	503	6	2.8
<25	15	218	40	201	419	5	3.5
Total/Ave	**47**	**7797**	**53**	**1119**	**8916**	**100**	**1.54**

To recognize the cost of managing the smaller units in tribal forestry as compared with larger federal and state agencies we recommend increasing the cost of managing the tribal commercial forest land by a factor of 0.54 to reflect the smaller management units in tribal forestry as compared to the larger federal and state agencies. This increases the $5.60 /acre for commercial forest land to $8.62/acre (Table A.22). We do not have data to provide a similar adjustment factor for noncommercial forest land or wildfire management.

Table A.22. Estimated stewardship costs for commercial forest land and other Indian Lands, $/ac/year using estimates based on National Forests for commercial forest and commercial woodland and BLM for noncommercial forest and noncommercial woodland with an adjustment for reservation size.

	Stewardship (w/o wildfire mgt.)	**Hazard Reduction**	**Preparedness**
Commercial Forest Land	$5.60 x 1.54=$8.62 (National Forest)	$1.50 (National Forest)	$3.75 (National Forest)
Non-Commercial/Range	$1.40 (BLM)	$0.50 (BLM)	$0.85 (BLM)

Applying the investment factors from Table A.21 to Indian forest land yields an equivalent cost of stewardship of $219.7 million (Table A.23).

Table A.23. Estimated forest stewardship costs for Indian trust lands, million dollars/year. Commercial timberland and commercial woodland ~ 9.9 million acres, non-commercial timberland and noncommercial woodland ~8.5 million acres, hazardous fuel reduction land base ~ 56.5 million acres, wildfire preparedness land base ~ 65.3 million acres. Row 1 is calculated using commercial forest land. Row 2 is calculated using the forest, reservation, or protected acres minus commercial forest acres.

	Forest Stewardship (w/o wildfire mgt.) Million $	**Hazardous Fuel Reduction Million $**	**Preparedness Million $**	**Total Forest Stewardship Million $**
Com Forest Land (timber/woodland)	$85.4	$14.9	$37.1	$137.4
Non-Commercial Forest Land /Other	$11.9	$23.3	$47.1	$82.3
Total	$97.3	$38.2	$84.2	$219.7

Incremental Timber Production Cost

Additional costs for timber production above forest stewardship costs, based on states and industry as the comparators, are $40-80/MBF. Timber production costs on the federal lands are much higher for a variety of reasons including NEPA procedures, eligible timber prescriptions and wage differences. Timber production budgets would depend on the sustainable harvest levels adopted by tribes (Table A.24).

Table A.24. Total recommended investment level to fund forest stewardship and timber production for Indian Forests using $60/MBF for timber production.

Annual Harvest Level	Forest Stewardship Million $	Timber Production Million $	Total Million $
400 MMBF	$219.7	$24.0	$243.7
500 MMBF	$219.7	$30.0	$249.7
600 MMBF	$219.7	$36.0	$255.7
700 MMBF	$219.7	$42.0	$261.7

A budget to support the current allowable annual cut of 564 MMBF would be about $254 million on a national basis. Individual regional budgeting would depend upon regional conditions. In comparison BIA funding to the tribes totaled $154 million in 2011 (Table A.1).

Comparison to BIA needs estimates

Each 5 years the BIA, in collaboration with the tribes, documents current and needed funding and staffing in the FPA Report. The 2011 FPA report identified $70.9 million in additional funding (Table A.25). The largest category was Wildfire Management including Fire Preparedness, Hazard Reduction and Rehabilitation. Other major needs included additional funding for Forest Planning, Program Administration, Multiple Use Management, and Timber Sales. The BIA total Forestry budget including the identified 2011 FPA needs is $100.0 million (52.0+48.0). This compares to IFMAT's recommendation of $133.3 million ($97.3 million for stewardship plus $36.0 million for a production goal of 600 million board feet). The BIA wildfire management budget including identified 2011 FPA needs is $124.9 million (102.0+22.9). This compares to IFMAT's estimated wildfire management budget of $122.4 million (219.7-97.3) to bring wildfire management investment to the level of similar federal land. Part of this difference is due to BIA funding requests for site rehabilitation after wildfire ($3.9 million).

Table A.25. Forestry funding needs identified in the 2011 Funding and Position Analysis Report. (BIA 2012a).

Budget Category	Identified Additional Need (Million $)
Program Administration	$9.6
Administrative Support	$0.9
Forest Planning	$10.2
Forest Product Sales	$6.7
Forest Development	$5.0
Multiple Use Management	$8.4
Forest Research	$0.1
Forestry Education	$1.7
Technical Assistance	$0.2
Road Design, Construction, Maintenance	$1.0
Pest Management and Other Forestry	$2.7
Wildfire Management	$22.9
Law Enforcement	$1.5
Total	$70.9

Findings

A1. BIA allocations to the forest program have not kept up with inflation and are now only 77% of the 1991 budgets. Funding allocations have declined, in inflation adjusted dollars, from $67.4 million in 1991 to $52.0 million in 2011. Over this same period of time Indian forest trust lands have increased from 15.6 million acres to 18.4 million acres.

A2. Reliance on outside grants has increased as BIA forestry allocations have fallen in real terms.

A3. For forest stewardship costs on commercial forestland, including wildfire management, the Forest Service is the best comparator. For other Indian lands, the BLM is the best comparator. For active timber production, States and private industry are better comparators.

A4. Indian forests are receiving less forest management funding on a per acre basis than adjacent forest land owners in the West, particularly the level of funding that states are investing in their trust lands, and private forest owners are investing in their own lands. The difference in funding is probably understated due to generally lower salaries paid to tribal professionals and technicians under self-governance.

Forest Management Funding Comparisons ($/acre) (Including Alaska)		
Forestry Organization	**$/acre**	**Range $/acre**
BIA	**$2.82**	
States East		
Wisconsin State Lands	$3.83	
Minnesota State Lands	$5.50	
Maine State Lands	$7.63	
Private East		
Southeast	$4.85	[$1.33-$16.77]
Northeast	$4.55	[$3.73-$6.58]
North Central	$4.43	[$3.41-$6.51]
Appalachia	$2.70	[$1.58-$4.82]
States West		
Montana Trust Lands	$11.28	
Idaho Department of Lands	$17.91	
Washington Trust Lands	$19.98	
Oregon Trust Lands	$32.67	
Private West		
Westside OR/WA	$19.00	[$8.00-$62.00]
Eastside OR/WA	$7.25	[$2.00-$12.00]
National Forests	$8.57	
Fire Funding Allocations ($/acre)		
Organization	**Preparedness**	**Hazardous Fuels**
BIA	**$0.94**	**$0.71**
National Forests	$3.71	$1.45
BLM	$0.73	$0.35
Roads Maintenance Funding ($/acre)		
BIA	**0.46**	
National Forests	$2.04	
BLM (all)	$0.30	
BLM (all except AK)	$0.38	
BLM (OR)	$1.54	

A5. Many tribes have relatively smaller land bases than their neighbors, particularly their federal neighbors. Management costs are a function of scale, with smaller land bases generally costing more to manage per acre than larger bases (See Figures A.1 and A.2).

A6. On a regional scale, Indian forests are receiving less fire preparedness funding on a per acre basis than comparators in the West, particularly the Forest Service. In the Midwest, fire preparedness funding compares favorably with their neighbors, but funding comparability may be overstated due to scale of ownership. In the East, Indian forests are receiving about the same for fire preparedness as the Forest Service. Overall, the National Forests are receiving $3.71/acre, the BLM is $0.73/acre and the BIA is receiving $0.94/acre.

National Forests	$3.71/ac
BLM	$0.73/ac
BIA	$0.94/ac

A7. On a regional scale, Indian forests budget allocations for hazardous fuel allocations compare favorably with Forest Service and BLM allocations for most regions, but are significantly lower in the Western and Navajo Regions. Overall, the National Forests are receiving $1.45/acre, the BLM is $0.35/acre and the BIA is receiving $0.69/acre.

National Forests	$1.49/ac
BLM	$0.49/ac
BIA	$0.69/ac

A8. Trespass is a growing problem in Indian Country. Illegal drug production, illegal hunting, theft of non-timber products, and dumping of wastes occur on Indian forests. Although NIRFMA provided for establishing civil penalties for trespass, law enforcement funding remains a recurring problem. This study finds the cost of law enforcement on National Forest lands is $0.58/acre and on BLM lands is $0.11/acre. Law enforcement is not funded through forestry.

National Forests	$0.58/ac
BLM	0.11
BIA	--

A9. Accounting practices for the USDS differ from the DOI for fire suppression. DOI rules require the first 40 hours on suppression must be charged to preparedness for preparedness personnel. USDA allows full fire project time to be charged to suppression significantly leveraging preparedness dollars.

A10. Road maintenance allocations to the BIA road system continue to lag far behind the National Forests contributing to environmental impacts and higher road user costs. In addition, many tribes do not collect user fees on their roads, contributing to a lack of stable funding for road maintenance programs.

Recommendations

A1. Revise the federal funding model to provide for basic land stewardship costs including wildfire management, plus additional support for active timber management, consistent with tribal goals.

A2. Increase base level funding by $100 million to support forest stewardship for Indian forests to reach parity with National Forest and BLM funding on their respective land classifications. Program additional funding to support timber production consistent with tribal goals. At least an additional $100 million is needed to be comparable with other public and private forest managers and correspond to an annual allowable cut of 564 MMBF. Current (2011) funding is $154 million.

Recommended investment levels linked to annual allowable cut to fund forest stewardship and timber production for Indian Forests.

Annual Harvest Level	Forest Stewardship Million $	Timber Production Million $	Total Million $
400 MMBF	$219.7	$24.0	$243.7
500 MMBF	$219.7	$30.0	$249.7
600 MMBF	$219.7	$36.0	$255.7
700 MMBF	$219.7	$42.0	$261.7

A3. Provide adequate additional funding for law enforcement (trespass) on Indian forest lands ($2-3 million per year).

A4. Standardize accounting systems for fire preparedness personnel on fire suppression between the DOI and the USDA to eliminate bias and to facilitate benchmarking.

NIFRMA Task B - A survey of the condition of Indian forest lands, including health and productivity levels.

The ability of the land to sustain the people is at the core of long-term tribal success, and that ability is based on: 1) the extent and productivity of the tribal land base over time, and 2) its sustainable management within the context of its social and ecological landscape. *Forests* are defined as land areas having >10 percent cover of tree species (consistent with earlier IFMAT reports) and *woodlands* as 5-10 percent vegetative cover in trees. *Condition* of that forest or woodland is defined as the existing composition and structure of the resource. Forest and woodland *health* is defined as the ability of that resource to naturally resist disturbances and/or consistently demonstrate resilience to those disturbances, both natural and anthropogenic. Forest *productivity* is defined as the ability of the forested land base to meet the needs of the tribe in terms of identified and desired ecosystem services. Forest cover and the standing crop of trees are surrogates for these broader concepts of condition, health and productivity given the limited availability of monitoring data for other attributes (e.g., fuel loading and/or habitat features). *Commercial* forests and woodlands are a subset of the total land base referring only to those acres able to be accessed and productively managed.

Pine overstory retention to rehabilitate formerly degraded commercial forest lands - Penobscot. Photo by Larry Mason.

Data for this assessment of forest/woodland condition and health were available from the tribes and their respective management plans, the BIA's FPA, the USFS FIA and forest health Aerial Detection Survey (ADS) programs, the DOI's LANDFIRE program, and the Quadrennial Fire Report (QFR). All of these data draw on a range of sources from surveys of land managers to satellite imagery, but have been consistently aggregated to fairly large scales with coarse resolution. These data have furthermore been summed or averaged by BIA Region for this

report. Hence, none of the findings and recommendations can be applied to specific tribes or their specific acreage and/or their specific project-level planning and activities.

We assessed condition, health and productivity by examining trends in total acreage managed by region, tree density and standing volumes of wood on those acres, age and size distributions, net growth and forest mortality rates, aerial detection surveys of disease/insect injury to US forests, and fire statistics. Comparisons are made to the condition, health and productivity of lands managed within the National Forest System of the USFS, as well as lands managed by all other federal forest lands combined, state and local governmental agencies, forest industry (including Timber Investment Management Organizations), and small private landowners. These data are augmented by reviews of planning documents from the BIA and tribes, lengthy discussions with practitioners, and personal observations from the 20 site visits.

Background

Past findings, concerns and recommendations

1) There has been a loss in forest resources across regions and forest types, with specific concerns about:
    a. Loss of diversity and complexity in forests and woodlands as classified into five broad categories: ponderosa pine, mixed (western) conifer, pinyon-juniper woodlands, Northwest coastal conifer, and eastern hardwood-conifer forests;
    b. Watershed-scale impacts of human population expansion (and resulting fragmentation), road construction and delayed maintenance, and invasive/exotic animal and plant species across all five categories; and
    c. The inability of the BIA/tribes to monitor and effectively manage the resource comprehensively given the lack of data, staff and finances particularly for woodland management.
2) There were emerging severe and large-scale issues with forest health and wildland fire, the ability to continue to implement sufficient preventative fuels treatments and/or adequate suppression capabilities, and the impact of declining forest condition on/among neighboring lands. Drier forest types and woodlands were identified as important in many of the western landscapes but frequently under-managed.
3) An added concern is climate change (discussed separately in this report).

Earlier recommendations therefore focused on the development of integrated resource management strategies (and associated planning documents), concurrent staff development and funding, hazardous fuels reduction treatments integrated with a range of management approaches (e.g., wildlife habitat enhancement and “ecosystem management”), extensive monitoring, watershed restoration including road system enhancements and riparian restoration programs, expanded woodland management, and some targeted independent

studies. Progress was noted in a few of these areas in, but most issues and recommendations remained after those ten years.

Current findings regarding forest condition

Tribal forest lands held in trust and excluding Alaska have increased by 16 percent (2.8 million acres) across the four BIA regions over the twenty years since IFMAT I, with the largest increase occurring from additions of noncommercial woodlands in the Southwest (Tables B.1-B.4). As tribes assume greater self-determination and self-governance, they are voluntarily increasing no-harvest reserves for perceived environmental and cultural protection. In 1991, the percentage of forest land in reserve was 4.5 percent (719,812 acres). By 2011, that percentage had grown to 5.9 percent (1,096,955 acres). Although total forest lands have increased, commercial forests and woodlands as a percentage of the total lands have decreased. Commercial forests and woodlands represented 53.5 percent of Indian forests in 2011, down from 63.5 percent in 1991. Looking only at commercial timberland, the percentage cover declined from 35.8 percent to 32.5 percent over the same 20 years although the actual acreage increased 366,335 acres.

The standing volume on tribal commercial forest lands (as measured in board feet) has increased in the Eastern and Northwest Regions by 5 and 11 percent, respectively, in the 20 years since IFMAT I but decreased in the Lake States by 24 percent through loss of forestland acres and the actions of disturbance agents. The Southwest Region was stable through 2001, but significant fire events (e.g., the Rodeo-Chediski and Wallow Fires) since then have reduced standing volumes considerably; there is not sufficient clarity in the database to make a numerical estimate of volume lost.

Forest density as measured by basal area, which combines both number of stems and their respective size, is consistently lower on tribal lands than on national forests, but the magnitude varies by region (Figure B.1). The greatest differences are in the Northwest, where tribal forest density is less than other federal lands and state/local governmental lands. Tribal lands typically have basal area/acre that is most similar to (but generally greater than) industrial and/or small private ownerships lands. These broad differences, however, must consider differences in site quality, age distributions and disturbance patterns – all of which influence landscape-level density/stocking. Considering that these lands are less productive inherently (see finding B4) and that harvest levels have been reduced in the last decade, much of this pattern can be explained by stand age (see finding B6).

Annual productivity by acre (growth), on average, is lower on tribal lands than all other lands in the Eastern and Lake States Regions – though state/local governmental lands are similar (Figure B.2). In the Northwest, tribal forestlands are less productive than all lands except for national

forest lands, likely due to elevation and legacy challenges created by former mismanagement. In the Southwest, however, tribal lands are the most productive in the region. This pattern may reflect the history of how lands were allocated, purchased and/or held during the 19th and 20th Century (the "value" of the land in terms of soils and climate and associated species) rather than any loss or gain of productivity through management.

We saw no evidence of recent loss of productivity on tribal lands; indeed, the high productivity and comparative resilience of tribal forests in the Southwest Region appears attributable to sound, active management using uneven-aged approaches. In the Lake States and Eastern regions, most tribes are continuing to rehabilitate the standing stock and productive capabilities of their land.

Forest mortality rates can influence productivity rates, and mortality rates have been periodically high in some regions and ownerships over the last decade (Figure B.2) particularly on Forest Service lands and in the West. Only in the Lake States Region are tree mortality rates on tribal lands comparable to the national forests, and these data are confirmed by aerial detection survey data trends over the last 14 years (Figure B.3). The spike in insect and disease damage in 2001 and 2002 in the Lake States is attributed to the gypsy moth.

The age distribution of forests on tribal lands are currently most similar to federal, state and local governmental lands (Figure B.4) in terms of the relative percentages of young, early-seral conditions to mature stands to older stands; industrial and small private ownerships have higher proportions of young stands likely reflecting more frequent harvests rather than any natural disturbances. Tribes have a considerable percentage of their lands in older stands, at or above that of the USFS *except* for the Northwest region (given 20 years of the Northwest Forest Plan).

The pattern of more older forests in the Southwest, with two-thirds of the landscape in stands >100 years, is likely tied to a higher percentage of the land well managed using uneven-aged silvicultural principles, which would produce the "old" age class designation in these FIA data but actually reflects a balanced age distribution maintained by active management (with high per acre productivity and low insect/disease mortality as noted above).

Sequoia forest – Tule River. Photo by Larry Mason.

Figure B.1 Basal area by ownership and region; timberlands.

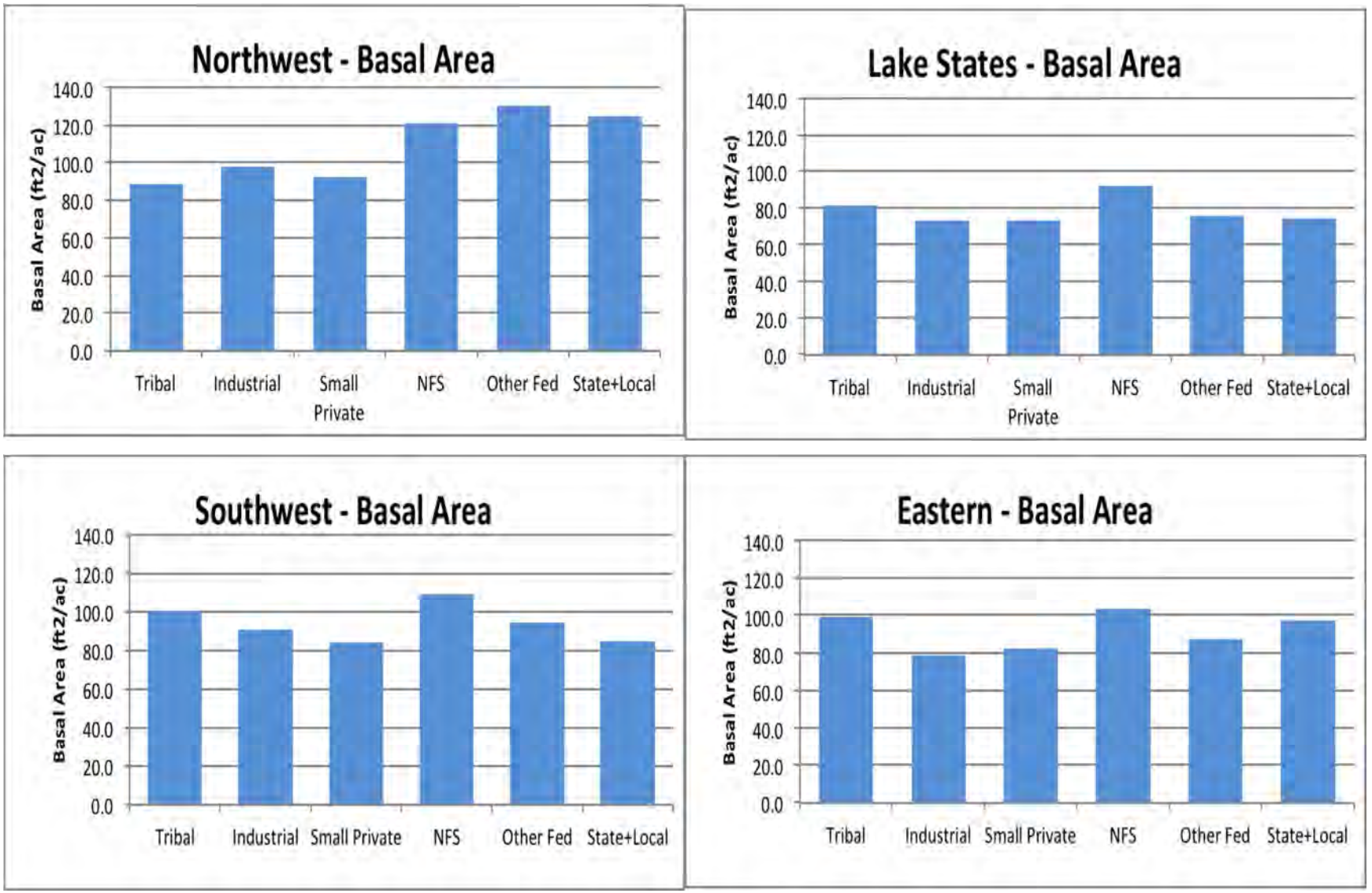


Figure B.2. Net growth and mortality as measured in board feet/acre/year for timberlands across ownerships by region.

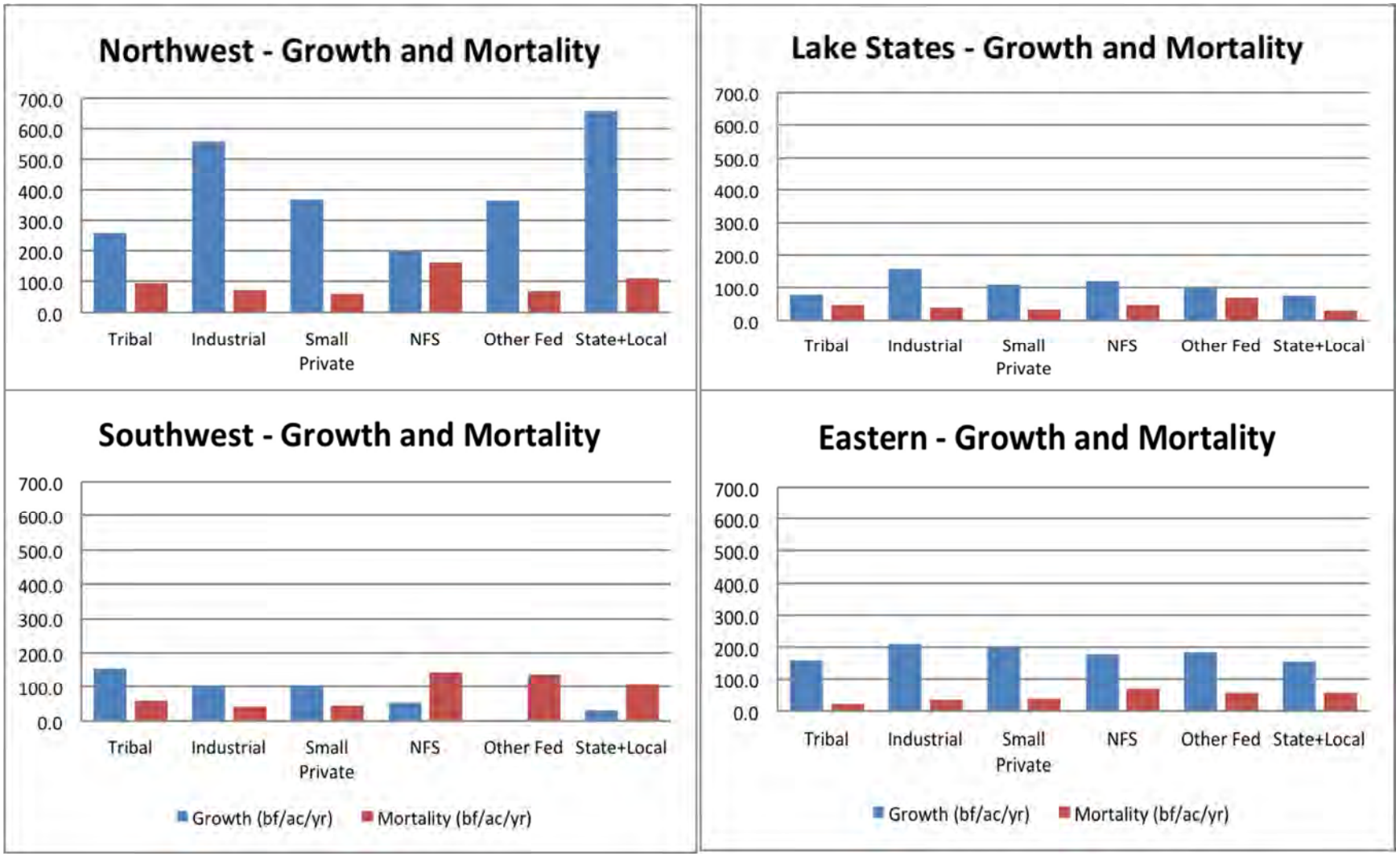


Figure B.3. Aerial detection survey: % of land area affected by ownership and region.

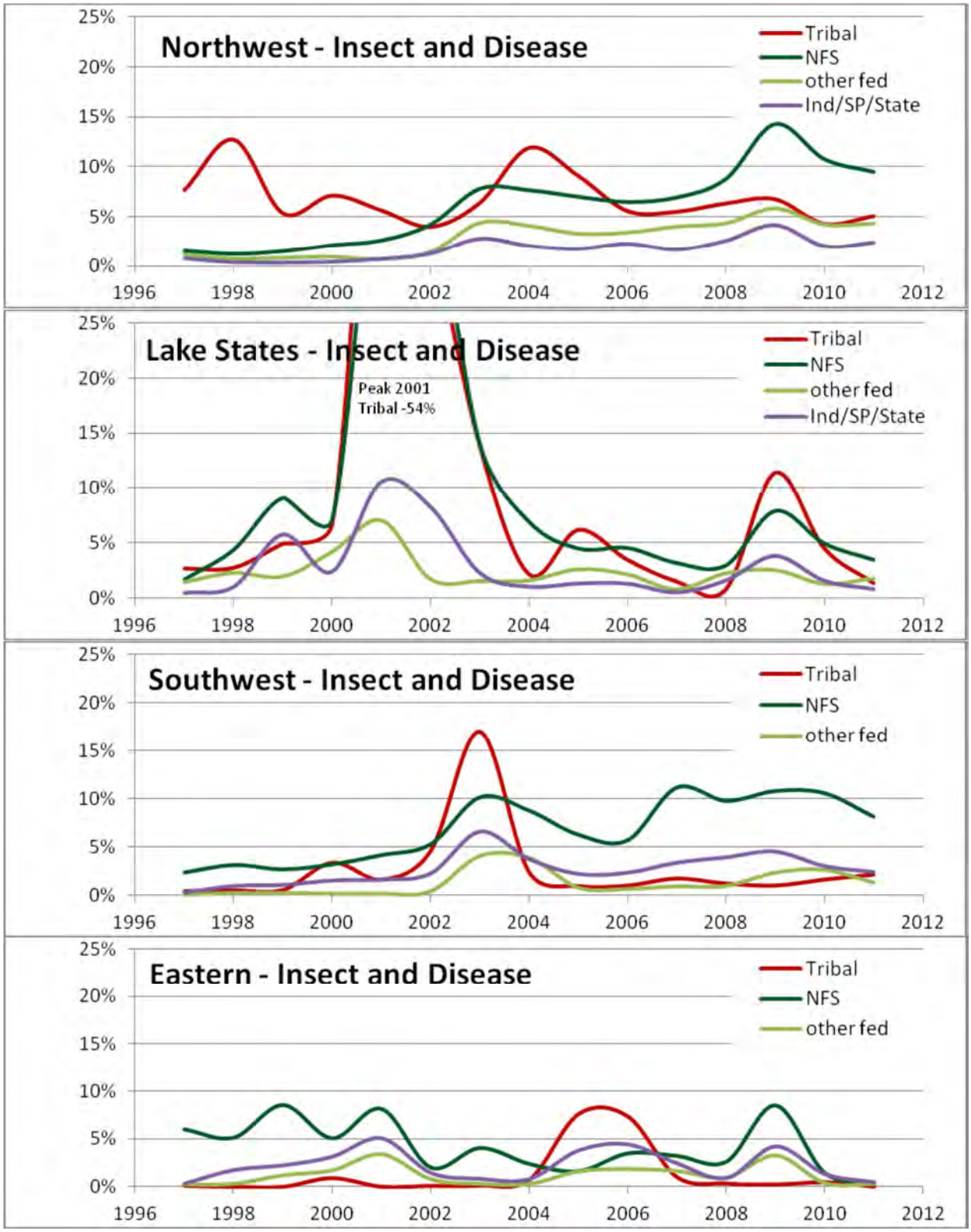
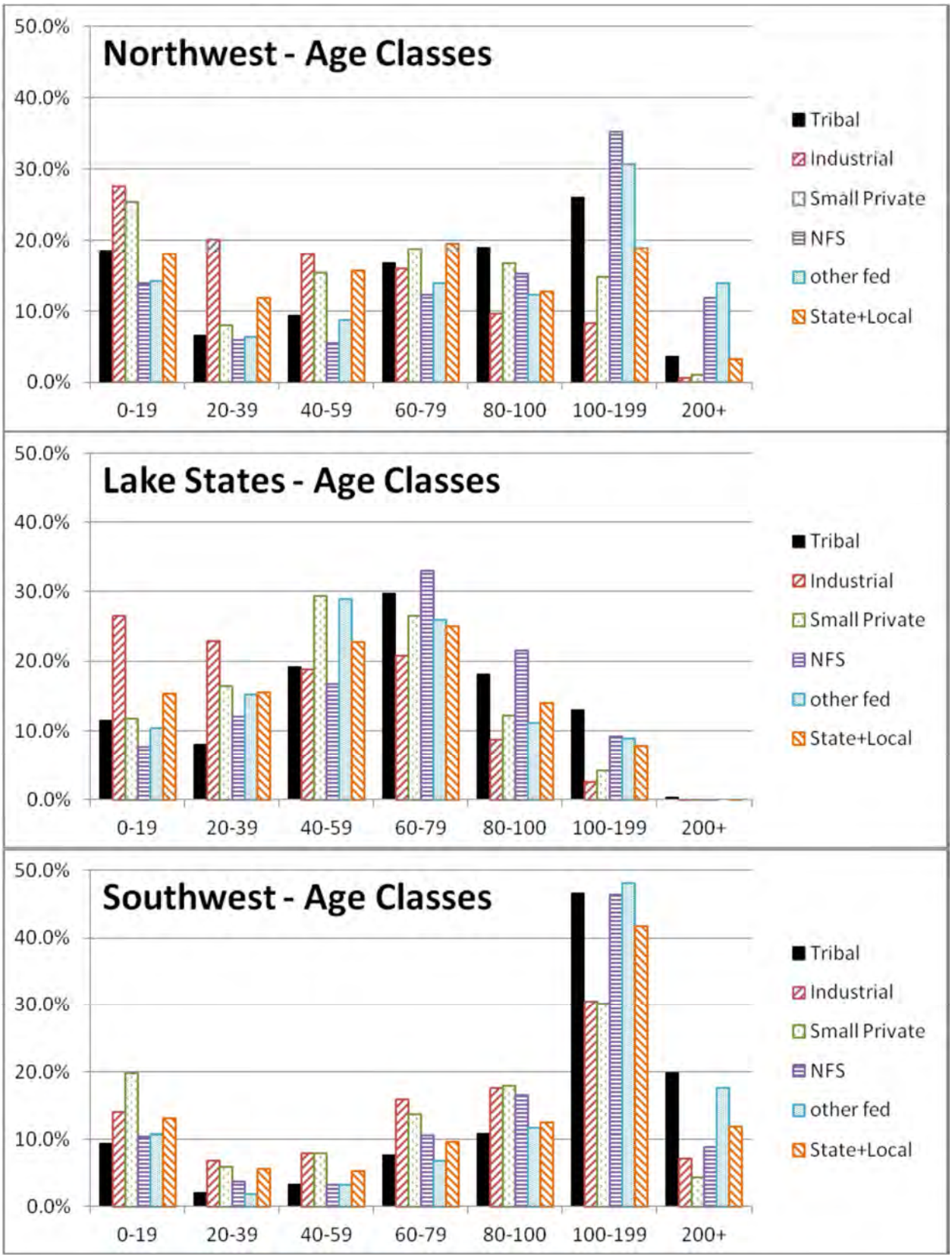
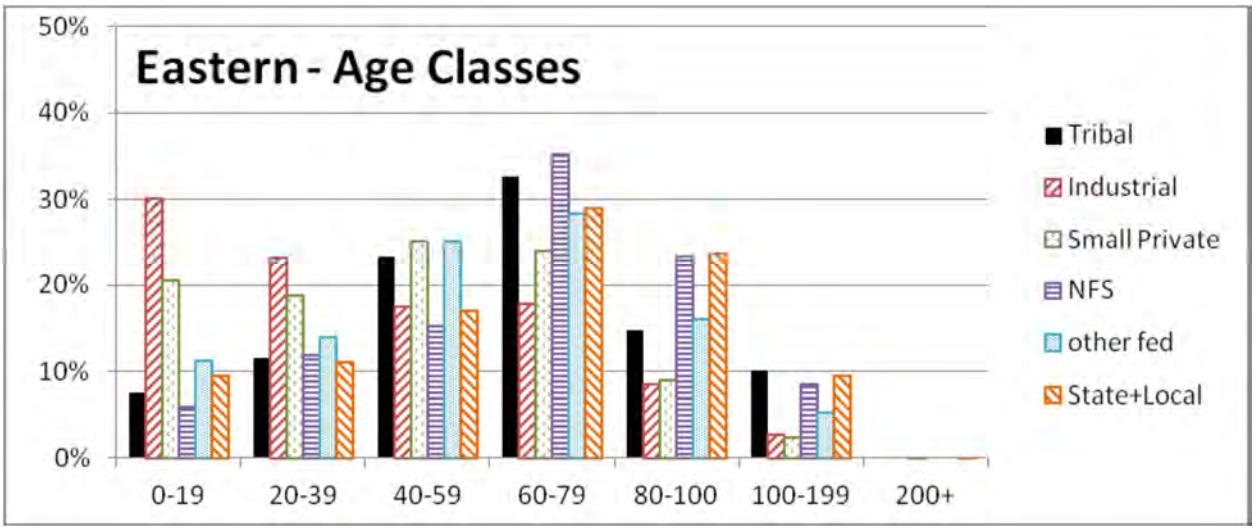


Figure B.4. Age distribution by ownership and region (x axis reflects age classes).

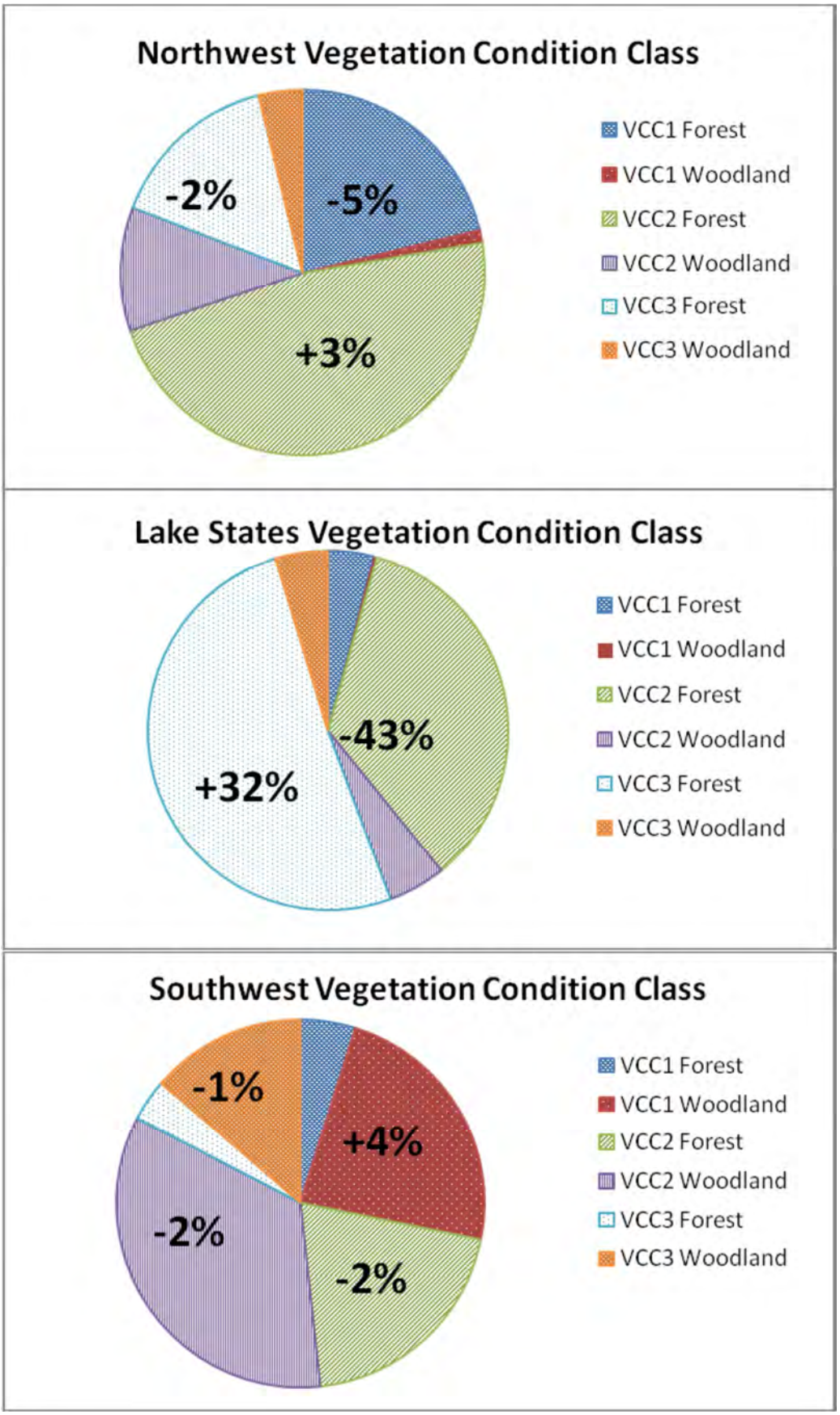


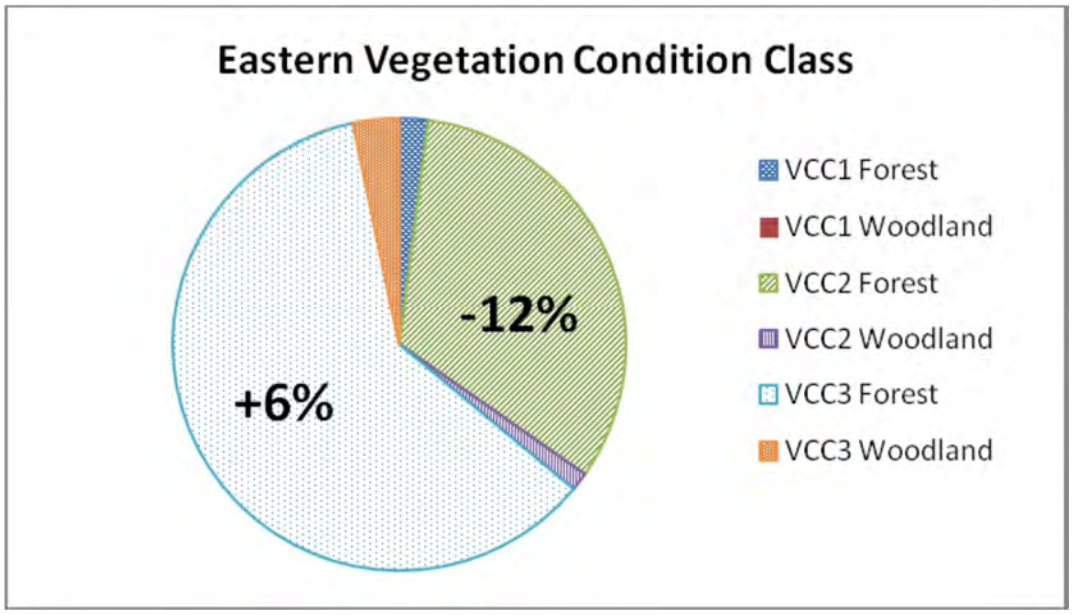


The tribes have been very successful at demonstrating the ability of pro-active forest management to create/maintain a full range of seral conditions within a landscape, including older stands and large trees, while minimizing forest health issues through density management and creating resistant and resilience structural conditions.

The condition of tribal forestlands has declined in the East and remained relatively stable over the last decade in the West based on DOI LANDFIRE analyses (Figure B.5). In the LANDFIRE System, Vegetation Condition Class 1 (VCC1) refers to pixels/acres classified as being in a natural structural condition for that forest type based on remote sensing data and supported by ground plots (e.g., FIA); Vegetation Condition Class 3 (VCC3) refers to a significant deviation from structural characteristics associated with resistant and resilient forests (particularly in terms of fire hazard), with VCC2 being an intermediate classification. In the relatively small Eastern region, VCC3 forest (high risk) now represents 61 percent of tribal acres, an increase of six percent from 2001 to 2008, with most of the acres shifting from VCC2 condition. There are considerably more acres of tribal land in the Lake States region and those lands also showed an increase in high risk classification, with 51 percent of forestlands now in VCC3 (37 percent increase). In the Northwest region, both VCC1 (low risk) and VCC3 (high risk) forestlands have declined, and the dominant classification is now the intermediate VCC2 (47 percent of tribal ownership); this makes an assessment of condition difficult from these data. The Southwest region is similarly dominated by VCC2 lands.

Figure B.5. LANDFIRE analyses of tribal land showing the distribution within each region for VCC 1-3 with percent change from 2001 to 2008 indicated for key forest types.





Findings

B1. On the whole, the health and productivity of Indian forests are being maintained, but forest density-related threats from fire, insects, disease, and climate change have and increasingly will compromise the long-term sustainability of Indian forests unless treatment measures are accelerated and appropriate annual harvest targets can be met. Overly dense stands—legacies of past management practices—exist on large acreages of Indian forests. The hazard posed by these dense stands and the continuity among fuels in the landscape represents an emerging fire management paradox, defined by strained financial and human resources attempting to suppress wildland fire, along with declining abilities to proactively treat fuels.

The good practices now instituted on many Indian forests need to be maintained and accelerated. Accelerated treatments could ideally be extended to adjacent federal forests that, in many locations, are untended, overstocked, and pose a threat to tribal resources.

B2. Progress continues in innovative silviculture, integration of forest management for a range of values, and in the presence of quality staff. We observed evidence of effective forestry in each region, including strip harvests to regenerate birch in the Lake States, cable thinning and pre-commercial thinning for density management in the Pacific Northwest, effective fuels management and juniper density reduction in the Southwest, and hardwood pulp removals to re-establish pine dominance in the Northeast. Extended rotations and uneven-age management dominate tribal forest practices. Several locations demonstrated the effective use of integrated resource management plans. Scarce resources, however, continue to impede development of multi-resource management plans envisioned by NIFRMA. Backlogs of forest development activities, such as planting and thinning, have decreased since IFMAT I, but still remain at 750,000 acres (Figure B.8 as reported by the

annual Indian Forestry Status Report to Congress), and compromise the resource potential of Indian forests.

B3. Tribal forest and woodlands have remained largely intact across the regions, and have increased nationwide in the 20 years since IFMAT I.

B4. Standing timber volumes have increased in most regions due to uneven-aged management, extended rotations, and reductions in annual allowable cut. Tribes actively manage their lands and regulate forest health, but typically harvest less volume than is growing (i.e. do not meet their designated AAC) given broader management objectives and declining access to markets. This finding suggests that review of the appropriateness of AAC as a priority management objective may be warranted.

B5. Total wood volumes and stand densities are comparable to small private and industrial landowners, and typically lower than that on federal lands. In many regions lower standing volumes on tribal as compared to federal forests may be related to effective stocking reductions to reduce fire hazard.

B6. Annual forest growth on tribal forest lands varies by region consistent with the quality of the land on reservations. Productivity of tribal forests in the Southwest appears to exceed that of other regional landowners.

B7. We saw no evidence of unique or unusual forest health issues on tribal lands. In some areas dense stands and continuous fuels pose significant risks to long-term sustainability, but these are concerns common to most forest ownerships. In many cases, tribal forests benefited from pro-active management and were often found to be in better condition than neighboring federal lands.

B8. Tribes clearly demonstrate the ability of pro-active forest management to create or maintain a full range of seral conditions within a landscape, including high proportions of older stands and larger trees, while minimizing forest health problems through density management. The economic and environmental benefits of investments in fuels reductions and density controls are well-documented in the forestry literature.

B9. Long-term sustainability of these lands is fundamental to the tribes and their culture, different from many neighboring lands, offering motivation and insight for innovative approaches to forest management.

B10. Insect epidemics and stand-replacing fires, dominant forces for creating young forests in the western regions over the last decade, have not impacted tribes as heavily as federal lands. Pro-active land management likely plays a role in this pattern at multiple scales.

B11. Tribes will be caught in the emerging fire management paradox, with strained financial and human resources attempting to suppress wildland fire, declining abilities to proactively treat fuels, and increasing fire risk in light of climate change and human expansion into the forest. Specifically, the hazard posed by dense stands and the continuity among fuels in the landscape, often aggravated by conditions on adjacent federal forests, represents a significant risk to the long-term sustainability of these forests.

Recommendations

B1. Continue to improve tribal inventory and monitoring capabilities (e.g., staff and funding) to ensure local and comprehensive understanding of resource productivity, health and potential to meet the needs of tribes.

B2. Continue to focus on implementing sound, state-of-the-art silviculture in response to the challenges of multiple-use management and current/emerging issues in Indian Country; for example, creatively meeting multiple economic and ecological objectives, efficiently handling small diameters and secondary species, and placing the treatments in a culturally palatable arrangement for tribal members.

B3. Exercise the entire silvicultural toolbox to address these challenges and meet the objectives of the tribe, including the expanded use of prescribed fire and chemicals where appropriate. This will require trained staff, adequate funding, and sufficient technical support.

B4. Add staff, funding, and technology to address emerging issues associated with human expansion into the forest: exotic/invasive plant and animal species, land trespass/safety, climate variability, watershed protections, threats to cultural resources, and wildlife management.

B5. Create heterogeneity in the landscape in terms of forest types, age/size of trees, and structural conditions that fit appropriately to the topography, reflect a tribal vision for diverse ecosystem services, and increase landscape resiliency to climate change.

B6. Avoid the tendency to not manage (or to manage only by constraints) over large expanses due to issues associated with wildlife habitat, watershed protection and other non-timber values; less management might be a viable alternative in the near-term but carries a long-term risk, particularly from wildland fire, exotic and invasive pests, and climate change.

B7. Continue the relocation, improvement and maintenance of necessary road systems to protect watersheds and, where possible, regulate access to preserve road

integrity, reduce fire ignitions and trespasses, and minimize the spread of exotic/invasive plants and animals.

B8. Continue to coordinate with other natural resources disciplines to achieve related goals most efficiently. We saw outstanding examples of such collaboration, and it is the future of land management in general and particularly for woodland management.

B9. As both previous IFMAT reports recommended, expand staff and funding for woodlands management, which represents the most acreage in Indian Country and contains many of the most pressing management issues (e.g., fire risk, watershed protection, exotic species, and climate change).

B10. Promote the inherent connection of tribal human communities, including the land management professionals, to the resources being managed within the tribes and in the media. This connection is often unique among landowners and fundamental to the need for sustainability.

The changing fire management paradigm

Wildfire has become a dominant management concern across much of western U.S. in the 20 years since IFMAT I, and a great deal of money and staffing has been allocated during the last ten years through the National Fire Plan for both preparedness and suppression. Though wildfire impacts a relatively small percentage of tribal acres, less than one-half percent per year (QFR 2009), when wildfires do occur the impacts can be devastating for tribes. Fire is a growing physical, economic and ecological problem for tribes, especially where adjacent national forests create high risk of intense wildfires. The passage of the TFPA in 2004 was an attempt by Congress to address this hazard exposure to tribal resources. Under TFPA agreements tribal forestry program would contract with federal agencies to reduce fuel loads on federal lands that threaten tribal resources. To date TFPA projects have been tentative and inadequate (ITC 2013). Nationally, the number of acres burned per fire, the total acres of uncharacteristically severe fires, and the dollars spent on suppression are all on the rise (Figures B.6 and B.7). Fire ecologists and national planners are now referring to the large fires of the last decade as "Mega-Fires." Climate change is expected to increase the frequency, intensity, and magnitude of wildfires two to six times depending upon the region and forest type (Climate Central 2012).

In recent years, steadily increasing suppression costs have begun to undermine the availability of funds to invest in hazardous fuels reductions treatments as total fire dollars are generally declining across agencies including the BIA. The lack of markets for small-diameter wood products and biomass further hamper the ability of tribal forest managers to treat fuels over significant areas, though, to date, they have generally been more effective than their neighboring federal lands. We saw several stark examples of neighboring high-risk lands during IFMAT visits

to forested reservations. Tribes undoubtedly will be caught in the emerging fire management paradox, though, with strained national financial and human resources attempting to suppress wildland fire, declining abilities to proactively treat fuels in a meaningful way across landscapes, and increasing fire risk in light of climate change and human expansion into forests and woodlands.

Tribes continue to be challenged with limited budgets and a residual backlog of work to properly manage their lands: planting, thinning and fuels treatment. Nearly 750,000 acres, four percent of their ownership, is in backlog for planting and thinning (BIA 2012d). These acres have decreased since IFMAT I given regular management efforts and/or the natural development of forests and woodlands. Additional challenges to implementing state-of-the-art forestry emerge from: 1) a lack of regional support in terms of nurseries and planting stock for reforestation; 2) a lack of markets for small-diameter wood, chips and/or biomass that can offset the costs of much of the thinning and fuels management backlog; and 3) a reluctance to use prescribed fire and herbicides to most efficiently achieve management objectives in many areas.

Tribal forest managers, particularly in the West, are well aware of the growing problem of fuel accumulations (especially on federal lands) in terms of amounts and contiguity, increasing duration and depth of fire seasons, and increasing risk of fire given human expansion into and around forests and woodlands. There has been an increasing trend both in the acreages burned by forest and woodland wildfires each year (NIFC 2012) and in the associated costs (OPA 2012) of the national response (Figures B.6 & B.7).

The reality of these numbers and the sense of foreboding emerging among fire managers, however, have failed to produce a realistic solution to a series fire appropriations issues:

Fire-related findings

BF1. Funding formula/systems such as Minimum Expected Level (MEL) are outdated and inconsistent among and within agencies. The BIA BOWFM estimates that they are operating at 50% MEL currently – the HFPAS, designed to improve fire funding allocations, does not address fundamental issues and is vulnerable to "gaming the system".

BF2. Under the FLAME Act, suppression funding is legislatively based on a 10-year running average that continues to climb each year given the increasing amount of wildland fire. Suppression is the priority funding allocation amongst fire programs. Increasing suppression allocations therefore displace funding needed for other programs such as fire preparedness, hazardous fuels management, and burned area emergency rehabilitation (BAER). Logically, as dollars for hazardous fuels reduction activities decrease, then fire

hazard increases resulting in greater wildfire activity and suppression costs. A vicious cycle of crisis management therefore ensues with suppression expenditures consuming ever more of the funds that otherwise might be used to regulate future wildland fires.

BF3. BIA Branch of Wildland Fire Management struggles to maintain a workforce and funding for routine operations, while workforce retirements, loss of institutional knowledge, and declining infrastructure erode ability to respond to crisis incidents.

BF4. Fire professionals require a long-tenured accumulation of trainings, qualifications, and certifications. BIA lacks the ability to plan for and hire GS-5-7-9 positions, and disproportionately must fill positions with emergency hires of temporary workers.

BF5. There is a growing backlog of equipment, facilities maintenance and construction upgrades identified by BIA with no indication of opportunity for address in the foreseeable future.

BF6. If land managers are truly going to use fire as a tool and/or restore ecosystems and/or reduce landscape-level fuel accumulations, then they typically need to be treating five to ten times the amount of acres they have been treating annually over the last decade yet hazardous fuels funding continues in decline.

BF7. Given that humans ignite about 80% of fires on Indian lands, investment in education programs and law enforcement are warranted.

Fire-related recommendations

BF1. Revise federal fire funding allocations, that currently appear insufficient and unreliable to fulfill federal obligations to protect Indian forests, foster inequitable distribution amongst competing agencies, and foreclose opportunities to reduce future wildland fire risk by shifting resources to suppression rather than hazard reduction.

BF2. Increase federal support for BIA Branch of Wildland Fire Management to address growing backlogs in facilities maintenance and equipment needs as well as shortfalls in education, law enforcement, and recruitment of qualified staff.

Crown fire. Photo provided by Robyn Broyles.

Figure B.6. The number and acres burned of wildfires in the United States 1960-2011.

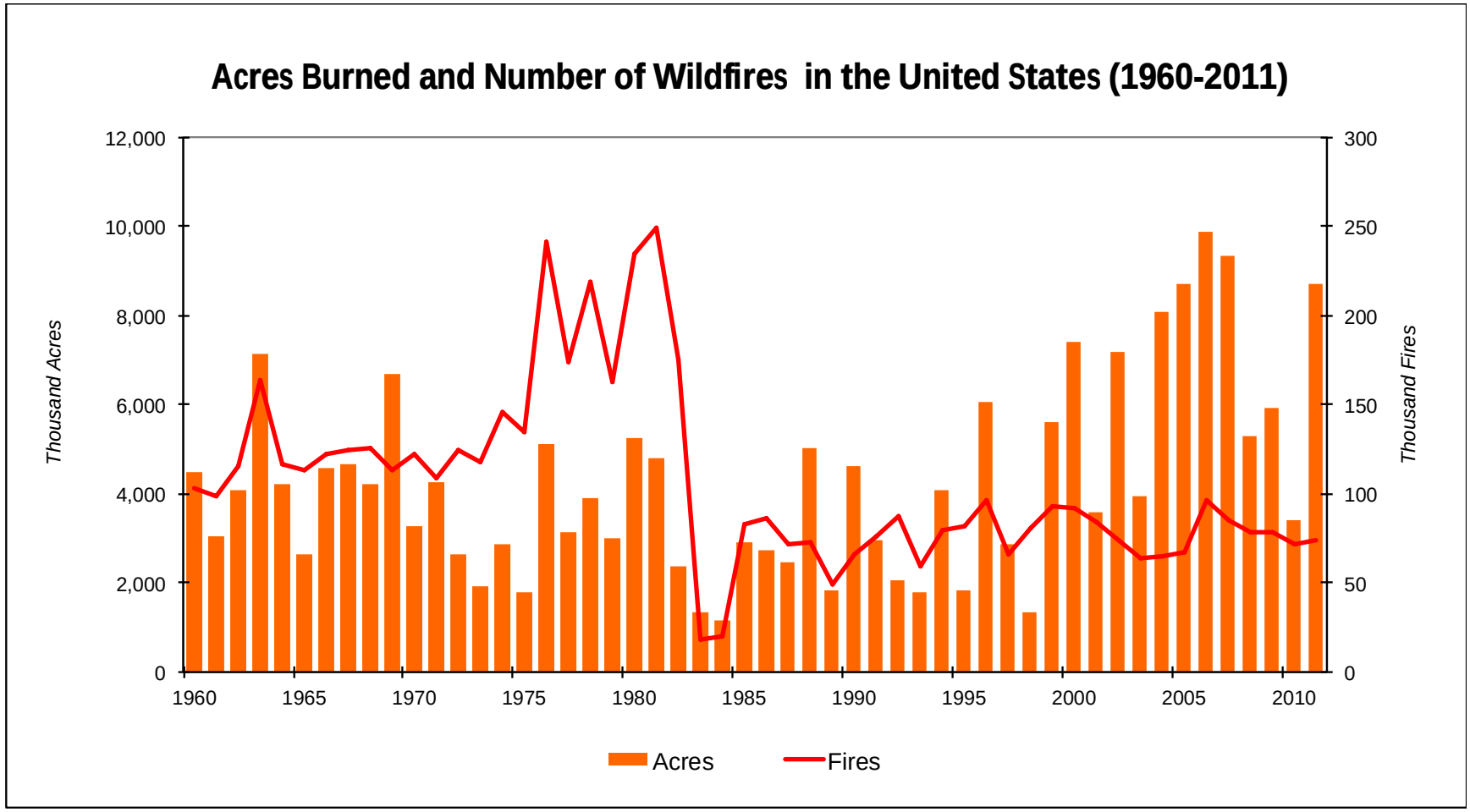


Figure B.7. Wildfire suppression costs in the United States from 1985-2012.

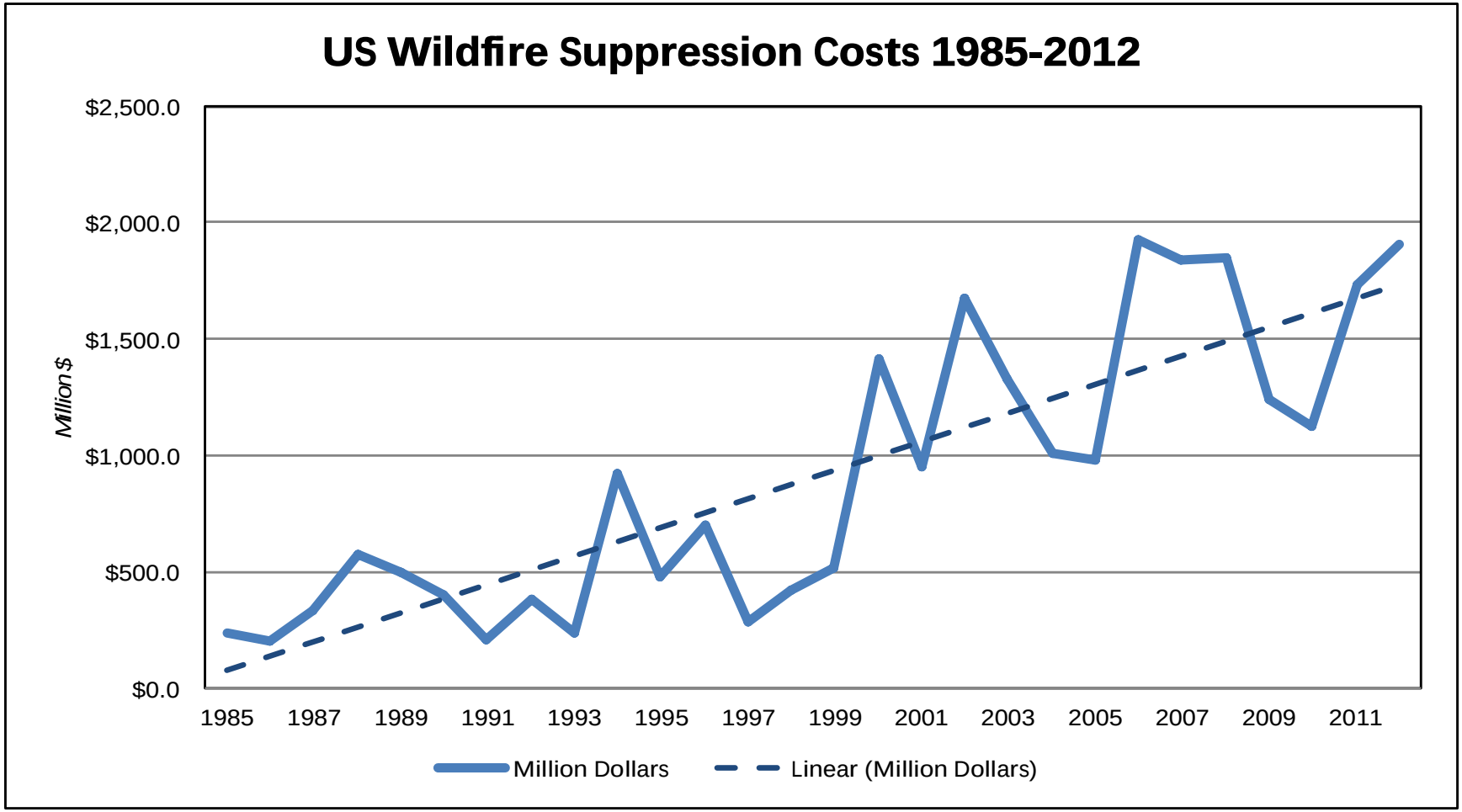


Figure B.8. Planting and Thinning backlogs on Indian reservations.

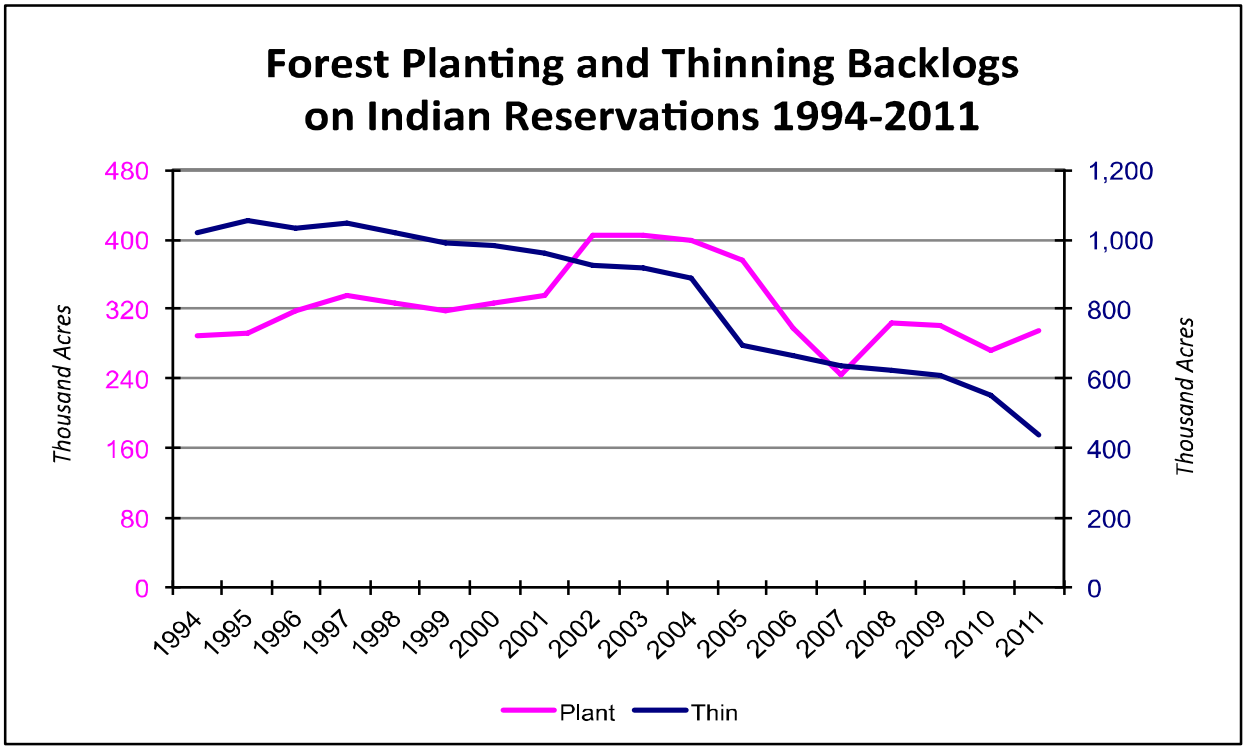
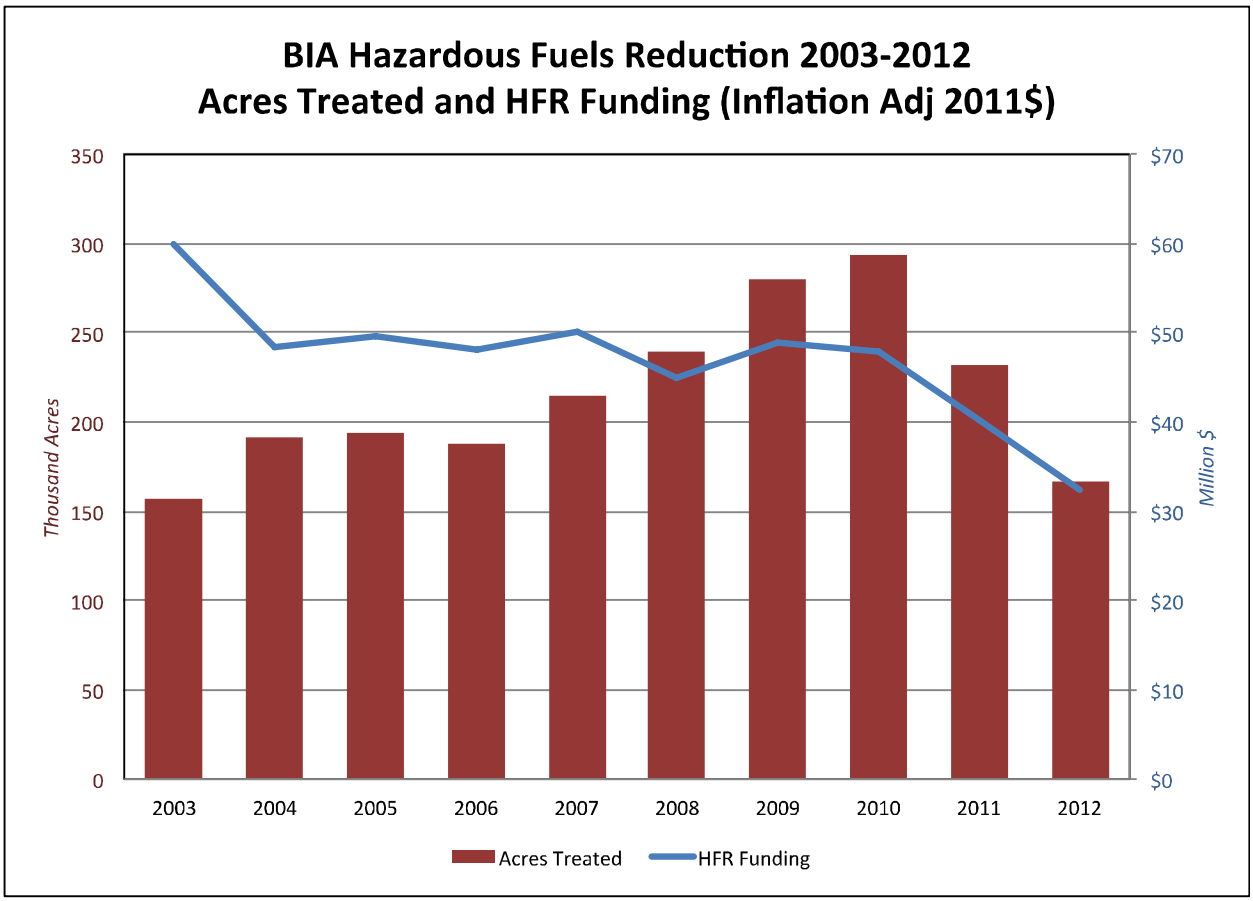


Figure B.9 Acres Treated and HFR Funding (inflation adjusted 2011$).



NIFRMA Task C - An evaluation of staffing patterns of forestry organizations of the Bureau of Indian Affairs and of Indian tribes. *The section also addresses the special study area of workforce education, recruitment, and retention*

Staff

An assessment of the adequacy of BIA and tribal staffing to manage reservation and allotted forest lands is of central concern to NIFRMA, and hence a core topic of study in all IFMAT reports. IFMAT I (1993) and IFMAT II (2003) analyses found that in 1991 and 2001 that Indian forestry was understaffed relative to its tasks and in comparison to staffing levels for federal and state agencies and private industry. IFMAT II, in contrast to an IFMAT I recommendation for staffing increases, found a 26% decrease in forest management staff over ten years. This reduction in staff was somewhat masked, however, by a large increase in fire staff that resulted from emergency national fire program expansions following the devastating fire season of 2000. Other findings of note from previous IFMAT reports included the lack of staffing to support progress in integrated and coordinated resource planning; a continuing decline in BIA capacity to provide technical services such as GIS, inventory, and marketing support; and a chronic shortage of professional foresters as compared to state and federal agencies and private industry.

In the last decade, there have been national trends related to staffing that bear mention before launching into our trend analyses of tribal and BIA forestry staff.

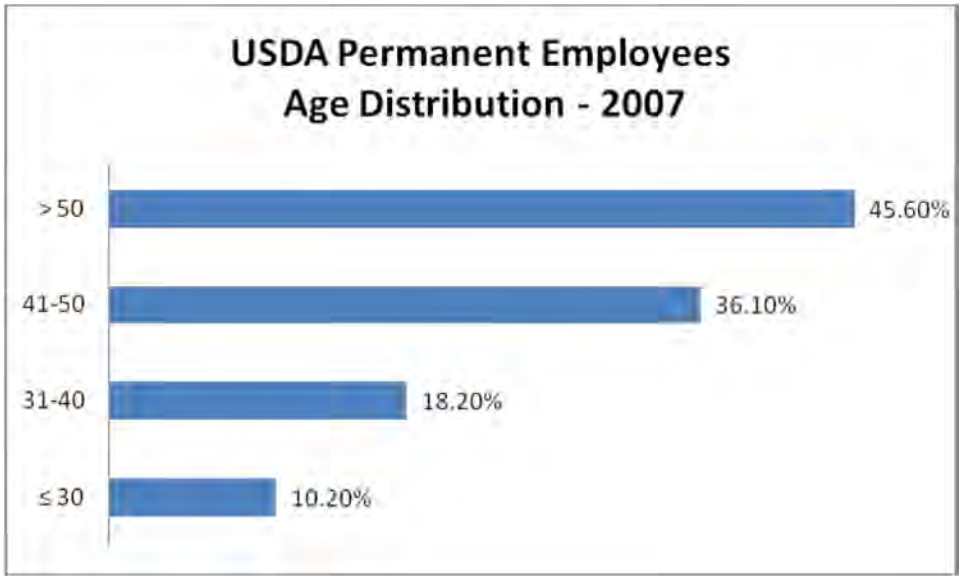


Figure C.1. USDA Employee age distribution 2007 (USDA 2008).

An aging workforce in forestry is affecting forestry organizations across the Nation as a large proportion of the experienced workforce is, or soon will be, eligible for retirement. A 2011

study showed that the average age of foresters was 51, higher than most related natural resource professions (Sharik and Lilieholm, 2012). The USDA strategic workforce plan (2008) found that 27% of all foresters, 36% of supervisors/managers and 62% of the senior executive service were eligible for retirement. A nationwide "scarcity" of trained and experienced foresters will add to the already considerable recruitment and retention issues faced by BIA and the tribes. For instance over 60% of BIA forestry staff in the Pacific Northwest Region are eligible for retirement in the next 5 years (Shaw, 2012). Within a small agency such as the BIA, a disproportionate wave of retirements can translate to major shifts in personnel, losses of institutional knowledge, and leadership deficits.

In the past, IFMAT has developed comparisons of BIA and tribal staffing levels to those of other public and private forestry organizations in order to help inform discussion about the number of staff per acre of forest land needed to sustain state-of-the-art forest management. This method has been adopted again in IFMAT III. However, there have been some notable shifts in non-Indian forestry organizations that should be considered in assessing their merit as comparators.

- As private timber land ownership has shifted from long-tenured and vertically-integrated companies and toward short-tenured Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs) the number of full time professional staff has been reduced while consultants and other contractors have increasingly provided management services.

- The USFS has also undergone a significant staffing re-structuring as management objectives have changed for national forests. Between the years 2005-2007 the average rate of loss of foresters in the USDA was 12% (retirement and attrition) while the hiring rate was 3.4%. The 5-year projection for the years 2008-2013 includes a cumulative 15% reduction in the "mission critical" area of forestry within the USDA during this time period. At the same time that the USDA lost 371 foresters, they hired 1,000 people within the general biological science series (USDA 2008). The transition away specialized forest management to a more general biological focus changes the value of the national forests as a baseline comparator for tribal forestlands, which continue to be actively managed for an integrated mix of cultural, economic, and environmental objectives.

During IFMAT site visits we found that tribal and BIA forestry programs have dedicated staff made up of a mix of tribal members and non-Indian professionals. However, an aging workforce, an increasingly challenging management environment, and issues regarding recruitment and retention represent growing challenges for the future.

Since education is essential to generate quality forestry staff, both previous IFMAT reports commented on trends and concerns in forestry education programs and access. ITC requested that the IFMAT III team more fully explore trends in Native American natural resource education and how such trends might affect tribal and BIA forestry programs, especially given current demographic shifts. Education is discussed below as an additional section of the Task C report.

Findings

C1. Overall staffing has continued to decline, down 21% from 2001 and 13% below the 1991 baseline. We find fewer staff per acre in Indian forestry programs than is the case for federal, state or private forest operations. As indicated in Table C.1., in the decade since IFMAT II (2011-2001), total staffing has fallen 21%, reflecting a particularly dramatic drop in fire staff of 36% and a more modest decline of 4% in forest management staff. In the prior decade (2001-1991), however, total forestry staff fell by 29% while fire staff increased by 29% and consequently, although the decline in forestry staff was significant, total staffing, during the decade of 2001-1991, actually increased by 10%. These data illustrate dual staffing concerns: the number of staff available verses needed to properly care for the forest and the destabilizing nature of volatile shifts in forest and fire staffing numbers.

Table C.1. Total number of staff full time equivalents (FTEs) forestry including professionals and technicians as well as seasonal and support works.

	2011	2001	1991	% change (2011-2001)	% change (2011-1991)
Forest Management Staff					
BIA	404	409	1,002	-1%	-60%
Tribal	766	815	642	-6%	19%
Total	**1,169**	**1,224**	**1,645**	**-4%**	**-29%**
Fire Staff					
BIA	331	796	490	-58%	-32%
Tribal	473	462	133	2%	256%
Total	**804**	**1,258**	**622**	**-36%**	**29%**
Total Forest and Fire Staff					
BIA	734	1,206	1,492	-39%	-51%
Tribal	1,239	1,277	775	-3%	60%
Total	**1,973**	**2,483**	**2,267**	**-21%**	**-13%**

C2. Reductions in fire funding over the last 10 years have led to a 36% reduction in fire staff (Table C.1). The influx of fire funds that occurred in the earlier part of this decade, reported by IFMAT II, peaked in 2001 and continues to decline. The Fiscal Year 2012 Budget Justification for the DOI Wildland Fire Management calls for a DOI wide

reduction in full time staff of 332 jobs (8% reduction) (DOI, 2012a). This relatively sudden influx and then erosion of the funding base has created challenges for tribes in hiring, retention and job duty allocations. It has also had profound effects on the inter-relationship and relative roles of forestry and fire program personnel. The divisions between forestry and fire programs that existed previously, especially when fire funding was plentiful, are once again blurring, as tribal forestry departments attempt to use a mixed bag of funding from forestry, fire and grant sources to retain staff and accomplish management objectives such as hazardous fuel reduction and other fuel treatments.

C3. Funding and Position Analysis and Workforce Survey data indicate a need for a 65% increase in staff for Indian forestry programs. IFMAT staffing needs analyses based on tribal and BIA responses to the 2011 FPA survey conducted by BOFRP shows that perceived staffing shortages are getting worse as compared to prior IFMATs. 2011 FPA results indicate a need for an addition of 361 professional foresters – a 62 % staffing increase. Needs analysis also calls for 431 additional technicians, a 69 % increase beyond current levels. Needed additional personnel for Indian forestry programs total 792 (Table C.2.). FPA respondents report that forest protection (36% of all requested personnel) is the most needed area of expertise, followed by increases in forest management and inventory planning staff (21%), sales (17%) and forest development (10%).

Table C.2. Current and requested full time staff (professionals and technicians only) by region.

Region	Current Staff	Requested Staff	% Increase
Northwest	565	268	47%
Southwest	330	276	87%
Lake States	226	182	81%
Eastern	49	50	102%
Central Office	40	16	40%
Total	**1,210**	**792**	**65%**

Regionally, staffing needs vary, with the Eastern, Southwest and Lake States requesting the greatest percentage increase in staffing while the largest numbers of additional staff are requested by the Northwest, Southwest, and Lake States (Table C.2.).

At numerous site visits, IFMAT was told that additional staff were needed and that the bare-bones forestry staff are just barely able to "keep the shop open" at current staffing levels. Under such circumstances, only the most urgent management issues get addressed while long-term activities such as integrated planning, climate adaptation, and woodland management are necessarily differed. Most reservations report vacant positions for which recruitment has been difficult or funding has disappeared. The IFMAT III workforce survey reports that 71 of 199 respondents (36%) claim that there is at least one current forestry

job opening at their tribe/agency. Lack of funding was most frequently identified as the major cause of persistent job vacancies. However, difficulties in job postings, lack of funds for relocations to remote reservations, and inadequate pay levels and benefits packages all hinder staff recruitment.

Table C.3. Comparisons of BIA staffing levels to those of other public and private forest management organizations (BIA 2012a, USDA 2008).

Forestry Organization	% Professional	Forest acres per professional
BIA/Tribes, all	**30%**	**30,000**
National Forests	19%	24,500
Oregon Trust Lands	80%	3,500
NW Forest Industry-West Side	40-80%	9,000
NW Forest Industry-East Side	40-80%	16,000

C4. Indian forestry operations are understaffed compared to other public and private forest management organizations. Retirements and limited training opportunities contribute to loss of institutional knowledge and leadership. Recruitment and retention of Indian forestry staff trend toward opposite extremes: often, talented staff members serve for a long time, but many others enter, train, and quickly move on. Relatively low salaries, remote locations, and small organizations lead to poor career ladders, resulting in employee turnover and recruitment difficulties. Exacerbating the problem is the large number of long- term employees eligible for retirement.

Lengthy processing time by Human Resources appears to be a widespread problem at all levels of BIA forestry and fire organizations. Delays of up to one year in filling funded positions are common, impacting delivery of all program aspects from forest management planning to project implementation.

C5. The percentage of professionals in the workforce has increased for the second straight decade, but is still lower than that of state and private forestry operations. There has been a significant increase (35%) in the number of professional foresters over the last 20 years despite a consistent downward trend in overall staffing. There is also a marked transition from BIA to tribal employment as a result of the shift towards greater self-determination and self-governance. FPA data indicate a 206% increase in tribal foresters since 1991. Although that trend has continued over the last decade, BIA professional staffing levels have declined by 15% since 1991. The majority of the remaining BIA jobs are in regional and support functions rather than local direct service.

Table C.4. Changes in BIA and tribal professional foresters since 1991.

	2011	2001	1991	% change 10 years	% change 20 years
BIA professional	289	291	342	-1%	-15%
Tribal professional	306	249	100	23%	206%
Total	**595**	**500**	**442**	**19%**	**35%**

Forest and foresters – Spokane. Photo by Mark Rasmussen.

C6. The number of Native American forestry professionals has increased from 22% of the Indian forestry professionals in 1991 to over 48% in 2012. IFMAT I reported that, in 1991, 22% of all Indian forestry professionals were Native American. The current IFMAT III workforce survey of tribal and BIA professional foresters indicates that 48% are Native. Although this is a positive step, some tribal forestry departments are still staffed predominantly by non-native foresters. Many tribes reported on-going commitments to recruit and train tribal members into forestry positions and to support tribal members pursuing higher education in forestry (see following section on education). According to the survey, of the Native American professional foresters working in Indian Country, 64% work on their home reservations, 15% work on other reservations and 21% work off reservation (generally a BIA agency or regional office).

Increasing the number of Indian foresters, especially in positions of leadership, that care for the resources so important to reservations is a powerful objective of self-determination and

self-governance. Additionally, however, it is important to acknowledge the many non-Native professionals that have dedicated their careers to working in Indian forestry programs often at wage levels below those available at public agencies and private companies. Native and non-Native foresters are in agreement that working in Indian country brings uniquely rewarding opportunities to practice forestry that are unavailable from other forest management organizations.

C7. Tribal foresters report an increasing amount of staff time is spent on pursuit of outside grant opportunities and the attendant duties of administration and reporting. Due to declining funding levels from BIA (see Task A Report), tribal staff report that in an effort to augment strained budgets as well as support interdisciplinary staff needed for integrated resource management (biology, fisheries, hydrology, etc.) an increasing amount of staff time must be spent on pursuing, administering, and reporting outside grant opportunities. At multiple IFMAT reservation visits, discussions with forest managers and other natural resource department supervisory professionals indicate that the time spent by a staff member to secure and execute project grants can be as much as 50 percent FTE. At several reservation visits, IFMAT found key staff totally reliant upon non-recurring project funds to support their positions. Programs, hires and other activities based on grant funding tend to be for short periods of time (1-5 years) with no guarantee of sustainability or renewal. Although partnerships between tribes, agencies and other funders can result in beneficial conservation projects, such projects may not align with tribal priorities and may even distract key personnel from more pressing but under-funded responsibilities. Further, we saw funding-strapped tribes creatively piecing together support for key personnel from part project funds, part program funds, and part fire funds. Such fragile funding support arrangements cannot be sustained and, although project funding might only provide a portion of a staff person's wages, without the supplement provided by such funds the position might be lost all together. Baseline funding for staff should be adequate, stable, and predictable in order to support the long-term staff engagement that stewardship of forests and woodlands requires.

Tribal forester – Warm Springs. Photo by Vincent Corrao.

C8. Below average salary and benefit packages offered by many tribes hamper recruitment and retention efforts. Retention of foresters working for the tribes, especially non-tribal employees, is often hampered by below average salary and benefits packages. Reports from tribal forestry personnel at many of the site visits indicate that wages for tribal forestry employees are 15-30% lower than those for comparable federal positions. Benefits packages are also reported to be less generous than those available to federal employees. Many tribal forestry staff have complained that, in addition to low wages, isolated reservations serve as a "training platforms" for young foresters that then move on to better paying state and federal positions. On the other hand, as indicated by the long tenure of many survey respondents and professional staff interviewed at site visits, we do find foresters (Indian and non-Indian) that report preference for forestry jobs in Indian country.

C9. An aging workforce will result in staff losses that are overcoming current recruitment and retention measures. IFMAT III workforce survey of 135 professional foresters indicates an average age of 49. While this is slightly lower than the 51 years documented in a national study (Sharik and Lilieholm, 2012), the workforce survey reveals that 51% of the surveyed foresters were 50 years or older (Figure C.2.). The average number of years of experience in Indian forestry was 18 with 40% reporting 21 or more years of service. The last systematic analysis of BIA workforce recruitment and retention challenges was done in 1992. In spite of skewed age distributions that foretell coming waves of retirements, we find no cohesive national strategic plan to address increasing shortages of trained personnel within Indian forestry programs. We find no systematic program for employee recruitments such as is the practice for the Forest Service. The BIA has no protocol for consolidating or advertising available positions. Recent postings of BIA openings on the Division of Forestry and Wildland Fire Management Facebook page are

part of a new effort to utilize social media for recruitment. BIA foresters report frustration with the DOI Human Resources system. Multiple reports were heard of four months to a year to create a position description and longer to advertise, interview, and follow through to the selection of an individual. In the IFMAT III workforce survey, 55% of respondents reported that the average length of time needed to fill an open position exceeded 7 months (with almost 32% claiming that it took over a year).

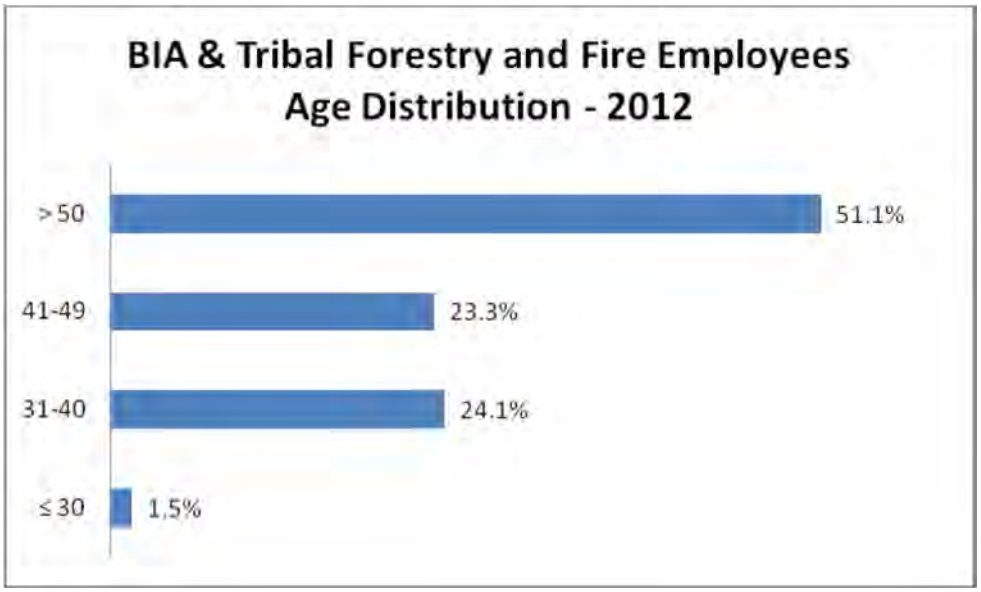


Figure C.2. BIA and Tribal forestry and fire employees age distribution 2012.

C10. Tribal forestry programs lack access to needed technical support, especially in the fields of forest management inventory and planning, wildlife management, engineering, marketing, and in coordination of integrated resource planning. BIA technical support capability varies by region and tribe, but inadequate technical support has been chronic since the first IFMAT report. Insufficient technical support by BIA contradicts the recommendations of this and earlier IFMATs. Tribes that rely on direct service support from the BIA are particularly affected. Tribes that rely upon direct service support from the BIA are particularly affected. Forest inventory and analysis capability is often seen as slow and less than adequate. Forest management plans are sometimes prepared with old, outdated inventory information and inadequate help in analyzing the inventory data available. Use of geographic information systems (GIS) was often identified by tribes as a technical area in which they needed more support. Electronic sharing of files has been cited as another technical challenge.

BOFRP has the central responsibility for technical support to tribes, and is chronically understaffed. As example, in 2011 BOFRP operated at 50 percent of need due to unfilled staff vacancies. Soon, BOFRP is set to inherit a significant suite of new responsibilities as it

has been called upon to provide the forestry expertise to support the Office of the Special Trustee (OST) in administration of allotment acquisitions as part of the Cobell settlement. This will further compromise BOFRP's ability to provide needed technical support.

Recommendations:

C1. A total of $254 million annually and 2002 professional and technical staff members are needed to adequately support tribal forestry programs. Section A of this report recommends a minimum increase in funding of $100 million/year. We find these funds will, in part, provide support for the 792 professional and technical staff additions needed for Indian forestry programs. Downward trends in funding and staffing (despite increases in trust acreage, fire hazard, climate change impacts, and other responsibilities) along with increasing reliance on project grants preclude achievement of state-of-the-art forestry and compromise fulfillment of federal trust obligations. Nearly 800 new staff members need be recruited for Indian forestry programs across the Nation to create a total BIA and tribal forest and fire workforce of 2002 professional and technical staff.

C2. BIA delivery of technical services needs to be analyzed at the programmatic level and re-structured to increase its effectiveness. Analysis of critical expertise areas for tribes in each region will not only provide insight into which fields are most badly needed by individual tribes, but will provide an opportunity to investigate cooperative mechanisms for hiring experts to address pressing management challenges such as invasive species, inventory planning and analyses, roads, GIS, and other disciplines. Development of IRMPs requires technical support in multiple disciplines many of which are outside of forestry and not currently provided by BIA. For small tribes shared technical staff or consultant support can help if needed funds are made available. The BIA should work with tribes to determine the technical support most needed and the means to provide the human and funding resources that will be needed. Opportunities may exist to collaborate with other federal agencies such as the USFS, BLM, NRCS, and EPA to develop integrated agency strategies that address the underserved technical needs of Indian forestry programs.

C3. The BIA should work with tribes to develop a strategic plan to recruit, train, and retain tribal forestry professionals and technicians. BIA should involve tribes and intertribal organizations such as the ITC, Native American Fish and Wildlife Society and the National Congress of American Indians in an effort to address current and anticipated personnel shortfalls for Indian forestry.

Education

In both IFMAT I and II, considerable attention was paid to issues related to access of Native American students to natural resource education, especially at the post-secondary level.

NIFRMA specifically addressed the importance of funding and supporting Native Americans who wished to study natural resources. In 25 U.S.C. § 3113 & 3114, NIFRMA authorized the BIA to create and administer 1) an internship program, 2) a cooperative education program, 3) a scholarship program, 4) forestry education outreach, 5) post-graduation recruitment, 6) post graduate intergovernmental internships and 7) continuing education and training.
IFMAT I acknowledged the important role of tribal colleges and community colleges in proximity to reservations in providing opportunities to Native students of forest sciences. IFMAT I also expressed concern, however, about the low number of Native Americans graduating from 4-year degree programs in natural resources. Additionally, there was some discussion of innovative high school and youth camp programs that provided summer employment and natural resource education to Native youth during the summers. IFMAT I also expressed concern that of the seven educational programs created by NIFRMA, only the internship program had been funded. IFMAT I recommended the creation of "an education committee of selected universities, agencies, and companies to develop, implement, and coordinate a comprehensive national plan for recruiting and retaining Indian natural-resource professionals." IFMAT II echoed this concern and called for a study to analyze whether current education funding programs were sufficient to meet the needs of tribal foresters and other natural resource managers.

During the IFMAT III investigation, we encountered three important realms of education that are essential to recruitment of skilled tribal staff as well as to the broader well-being of forested reservation communities:

a) Education begins with the children that if not brought early into the forest may be drawn later to video games, substance abuse, and other destructive elements of the non-Indian society. We saw forestry camps, resource education programs, and summer internships that taught K-12 aged children and young adults about their culture and about the forest while preparing them for potential career opportunities in natural resource science and management. These programs were most often taught by volunteer tribal members and struggled for funds just to rent a bus or provide the children lunches. The future of Indian forests and reservation cultures are dependent upon reaching out to youth. Where opportunities exist they must be funded. The costs of failure are unacceptable.
b) Workforce survey respondents indicate that leadership and technical training is essential to maintain a state-of-the-art workforce, provide opportunities for staff qualification certifications, and to bring future leaders up through the ranks. Continuing education, trainings, and workshops appear as one of the first funding allocations to go when budget are cut yet the long-term implications for loss of institutional knowledge and capacity will be considerably more costly.
c) There have been improvements in recruitment of students into higher education natural resource programs with most gains coming from tribal colleges. One tribal college has

launched a 4-year forestry program since IFMAT II and another offers a 4-year degree in resource sustainability. Tribal colleges are playing an increasingly important role in creating forestry educational opportunities customized for tribal students. Tribal forestry programs can be supported several ways: direct funding, education partnerships with universities, education/internship partnerships with federal and state agencies and scholarships to deserving students. Another way to support tribal students and colleges is through increased involvement in natural resource science research. Under such circumstances tribal research issues are better addressed, costs of education can be underwritten through research assistantships, and students and tribal college instructors benefit from partnerships with university and agency scientists. Areas of research can include linking traditional knowledge to western science, tribal adaptation to climate change, the economics of natural resource management on Indian reservations, stewardship and restoration of woodlands, and more topics of special interest to Indian forestry programs.

Tribal colleges with natural resource science programs visited by IFMAT.

Education findings

CE1. Educational access of Native Americans to natural resource programs is improving, but many challenges still exist. The current number of Native forestry graduates will not be sufficient to keep up with retirements and loss of staff to other agencies or employers. With over half of the professional foresters working for tribes or the BIA over the age of 51, there is a need for a significant number of young foresters and other natural resource professionals to move into the ranks now, so that they can receive the experience and on-the-job training needed to prepare them for management level positions. According to the IFMAT III workforce survey, only 1.5% of professional foresters are under the age of 30, and only about 25% are under 40.

The declining trend in natural resource undergraduate enrollments (all ethnicities), and forestry in particular, that was seen through the 1990s and into the early 2000s has reversed, although enrollments are still well below 1980s levels. Forestry enrollments in particular have remained fairly flat from 2004 through 2011.

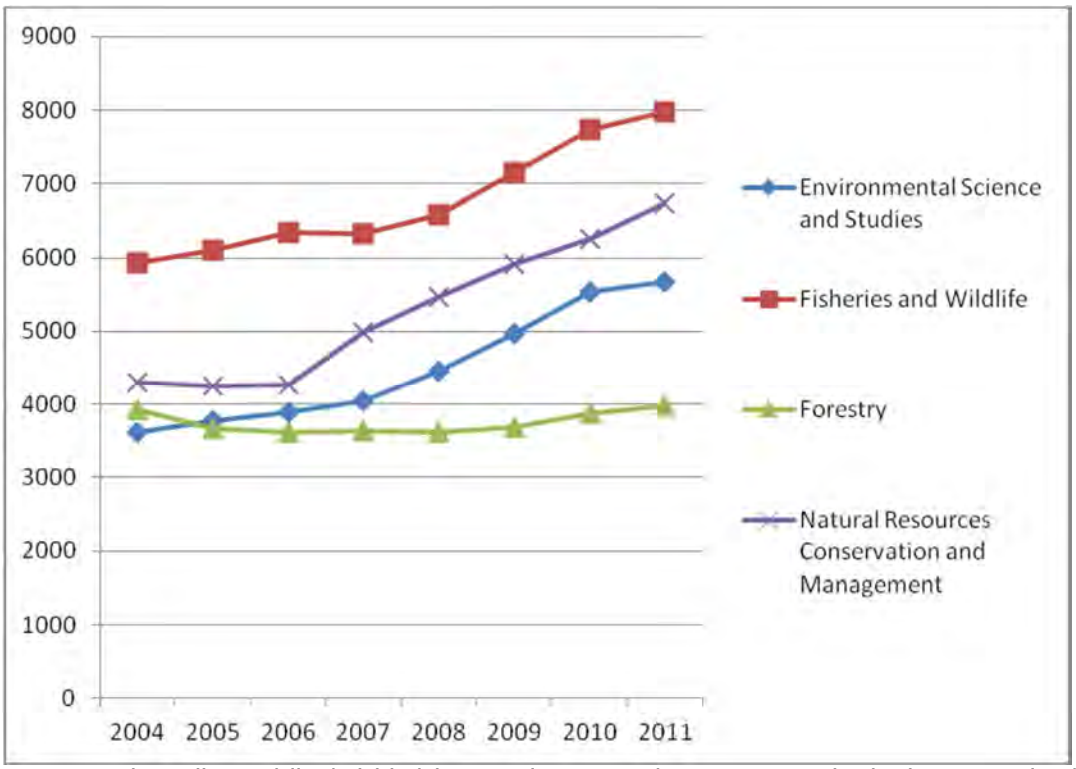


Figure C.3. Total enrollment (all ethnicities) in natural resource degree areas. 85 institutions reporting (FAEIS 2013).

Native American enrollments at large colleges and universities are showing an upward trend, with a 19% increase across all natural resource fields between 2004 and 2011 (Table C.5). IFMAT I documented small numbers of Native Americans graduating in forestry, citing a Society of American Foresters report (1993) that 13 Native Americans received baccalaureate degrees in forestry in 1990 followed by just 5 in 1991. According to USDA's Food and Agriculture Education Information Statistics (FAEIS) data (2013), there have been an average of 15 Native Americans/year graduating with bachelors degrees in forestry from traditional universities over the last decade. There are also on average 4-5 Native students/year graduating from one tribal college that started offering a 4-year degree in forestry in 2007. FAEIS reported an average total of 175 Native students/year completing baccalaureate degrees in all natural resources fields over the last decade. However, FAEIS figures do not include tribal colleges.

Table C.5. Native American enrollment in natural resources fields of study. Data from 85 institutions and supplied to IFMAT III by Bill Richardson, FAEIS.

	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Environmental Science and Studies	28	36	29	34	40	43	44	36
Fish and Wildlife	47	39	44	48	56	56	76	67
Forestry	52	49	38	54	48	50	55	53
Natural Resource Conservation and Management	33	33	41	32	34	55	50	46
Natural Resources Recreation	15	16	19	18	15	13	8	9
Range Science and Management	11	14	13	9	9	15	18	17
Watershed Science and Management	0	0	0	2	2	0	0	1
Wood Science/Products	2	2	7	5	4	2	2	1
Totals, all majors	**188**	**189**	**191**	**202**	**208**	**234**	**253**	**230**

In terms of support for Native students pursuing degrees in natural resources, there have been mixed trends in the last decade. For example, a Native American forestry program at one major university was de-commissioned, with funding moved into recruitment and scholarships for students from all under-represented minority groups. At the same time, another university began a Native American natural resources program, established partly with funds from a large private foundation.

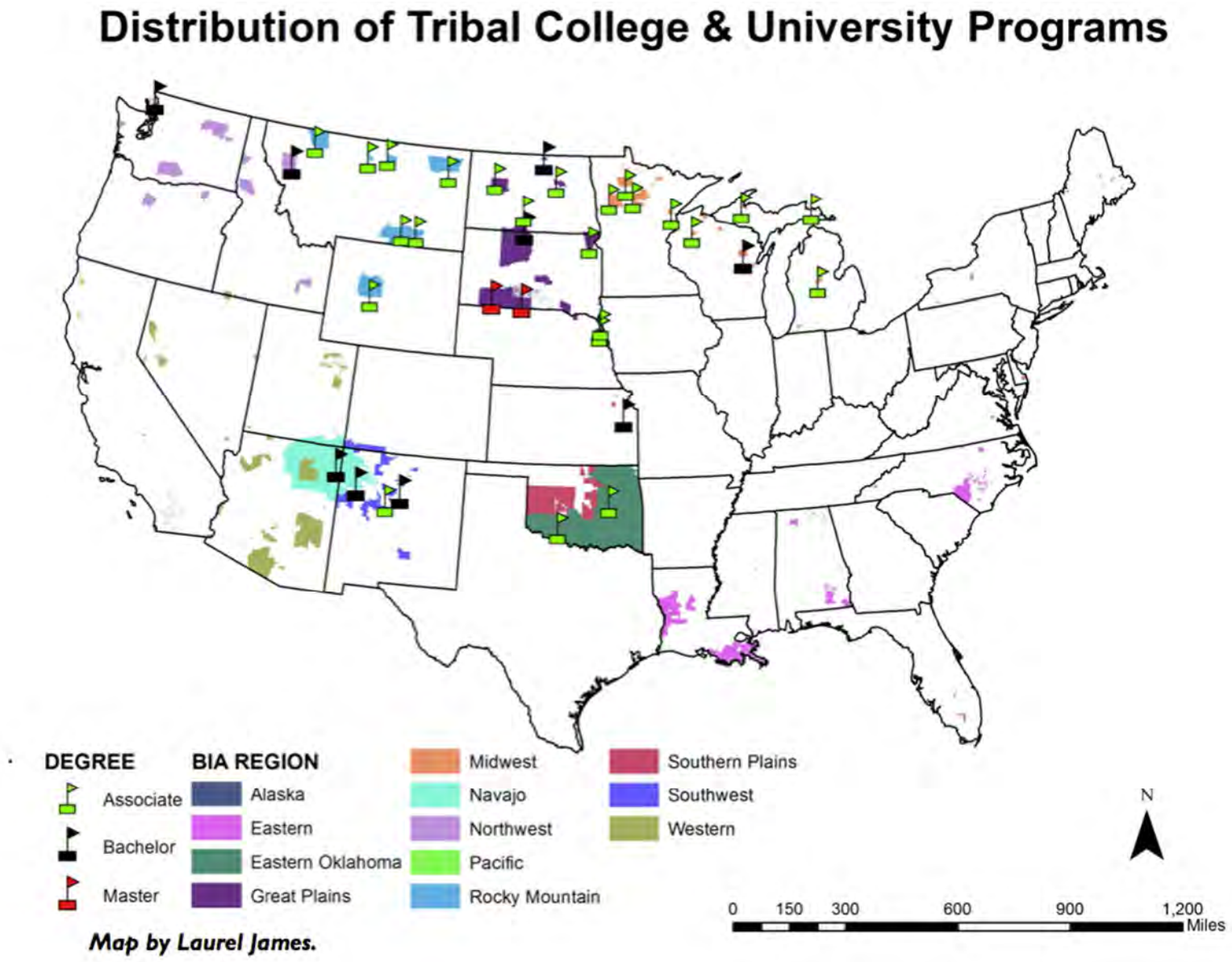


Figure C.4. Tribal reservations, colleges, and university degree programs throughout the contiguous United States.

For more than 30 years the ITC has supported Native American natural resource students through the Truman Picard Jr. Memorial Scholarship Program. Scholarships are granted to enrolled members of federally-recognized tribes that are pursuing higher education in natural resources. Picard Scholarships are available to graduating high school seniors ($1500), current undergraduates and graduate students ($2000). To date, 287 scholarships have been awarded cumulatively over $500,000. Past recipients of the scholarship include many BIA regional foresters and tribal forest managers.

However, for many reservation communities, access to college-level forestry classes may not be available or may be dependent upon the extraordinary efforts of forestry staff. In at least three cases we met tribal foresters who were teaching forestry classes at local community or tribal colleges so that tribal members would have opportunity for forestry education.

Discussions with forestry technicians and students in education focus groups convened during reservation visits revealed numerous hurdles to Native student recruitment. In addition to cultural challenges experienced at large urban universities, many Native students have family obligations and work responsibilities that must be accommodated while attending school. Scholarships and tuition waivers are limited, competitive, and require time and effort for application. Most large universities have limited outreach programs for recruiting, retaining and mentoring Native students. Tribal college programs have been expanding education deliveries to fill an important niche: provision of education customized to tribal needs and cultural considerations. On the other hand the value of on-the-job training should not be overlooked. Some tribal forestry technicians don't feel a need for institutional education as they are comfortable working their way up through the ranks to become accomplished resource managers without leaving their reservations**.**

CE2. Tribal college natural resource programs have increased in number and enrollments over the last decade and represent an important link between tribal natural resource programs, tribal members and future natural resource professionals. There are currently an average of 400 students each year enrolled in natural resource degrees at 23 Tribal Colleges and Universities (TCU) (AIHEC). Most of these degrees are 2-year or technical degrees, and there are currently only two active TCU programs in forestry (1 associates and 1 baccalaureate). In the last five years, two TCUs started 2-year programs in forestry. Both of these programs are on hold due to a lack of resources and enrollment. A third TCU is currently studying the feasibility of launching a two-year forestry program. The IFMAT III workforce survey identified 12 colleges and universities that were attended by 5 or more of respondents, two of these were TCUs (Table C.6).

Table C.6. Twelve universities and colleges most commonly attended by Native natural resource students as identified by IFMAT III workforce survey respondents.

University/College	# Attendees
Northern Arizona University	21
University of Washington	17
Washington State University	15
Humboldt State University	12
University of Montana	12
Oregon State University	10
Colorado State University	9
University of WI Stevens Point	8
Salish Kootenai College	7
Haskell Indian Nations University	7
Oklahoma State University	6
New Mexico State University	5

C3. Of the seven educational programs empowered by NIFRMA, only the cooperative education program is being implemented. The National Center for Cooperative Education (NCCE), formerly the Student Career Employment Program (SCEP), is now being run in accordance with the new Pathways program created by the Office of Personnel Management, funded by BIA Division of Forestry and Wildlife Management. This program is designed to provide tuition assistance and internships to 20 Native American students a year in forestry and another 5 in range management. There are currently 20 students enrolled in this program (18 forestry, 2 range management) at a variety of universities and tribal colleges. The overall cost of this program is approximately $450,000 year, $5,000 per student paid in tuition assistance, and $5,000 for summer internships. The NCCE office is currently located at Haskell Indian Nations University. Of the 123 students accepted into the NCCE program, 63% have graduated and found employment. Graduates of this program include three regional foresters and several tribal foresters. The NCCE is an amalgam of the internship and cooperative education programs, authorized by NIFRMA, that provides education outreach, scholarship and post-graduate placement.

Tribal colleges offer many advantages to natural resource education including close proximity to tribal forests, inclusion of Native American cultural perspectives in the curriculum, access to elders and sources of traditional ecological knowledge, and the ability to educate the tribal public on natural resource management through reservation outreach programs. Not only are tribal colleges increasingly becoming the training ground of future Native American natural resource professionals, they also offer an opportunity to increase tribal member awareness of what resource managers are doing on the reservation and why, helping to overcome the poor communication between membership and managers that has been a common theme in focus groups during all three IFMAT investigations.

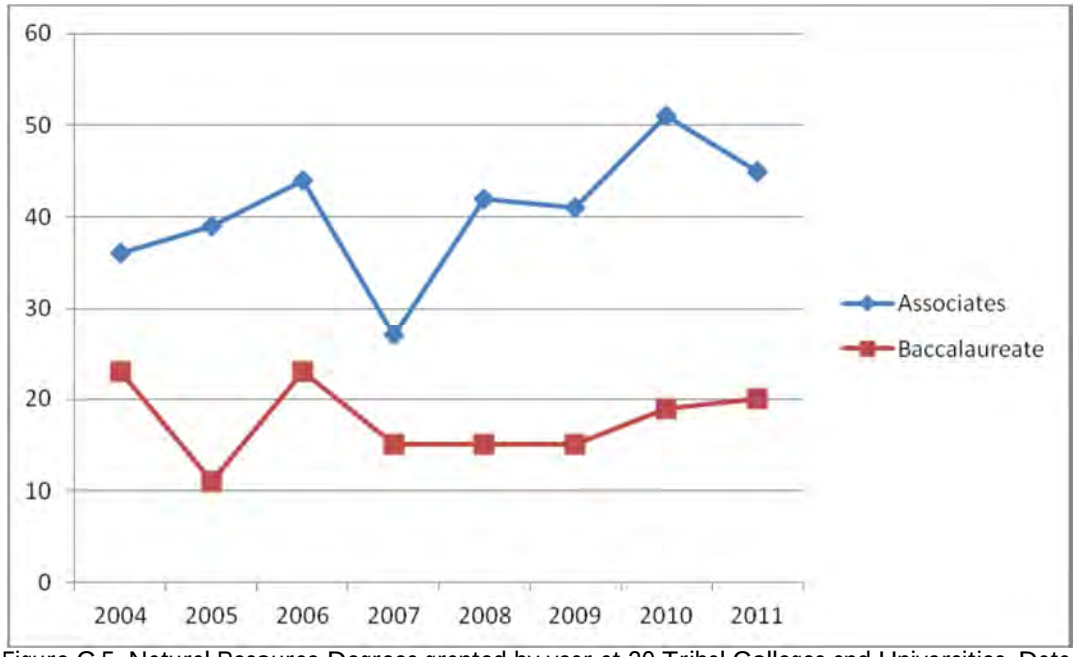


Figure C.5. Natural Resource Degrees granted by year at 20 Tribal Colleges and Universities. Data provided by Bill Richardson, FAEIS

CE.4 Education focus group discussions at tribal site visits have repeatedly revealed that tribal natural resource staff and tribal members in general are concerned that their young people are becoming disconnected from the land. Concerns are common amongst elders that tribal youth are losing contact with their forests and their culture. High school students that attended IFMAT focus groups expressed frustration about the lack of interest in natural resources amongst their peers. Some tribal forestry programs are hiring high school interns for summer work in the forest. We met several forest managers that speak to students in the classroom about forestry. Some foresters volunteer to participate in summer natural resource youth camps. However, limited funds and staff availability are chronic challenges for such outreach activities.

CE5. Access to training and continuing education continues to be an issue for BIA and tribal forestry and natural resource staff. Workforce survey respondents identified multiple continuing education needs that, if addressed, could enhance productivity. Continuing education is essential to meet and sustain the NIFRMA objective of state-of-the-art forestry. Of the 181 responses to the question regarding desired training needs, 34 skill areas were identified with 7 accounting for 67% of total responses.

Table C.7. Top seven training needs (67% of total responses) identified by workforce survey respondents.

Training needs	# Responses
Leadership/upper level management skills	33
GIS and GPS	23
Wildland fire/fire science and ecology	15
Laws and authorities especially PL 638 and trust administration	13
Budgeting and accounting	13
Computer skills- data base management, Excel and MS Word, social media	13
Silviculture	11

Respondents to the workforce survey, especially tribal employees, identify lack of travel funds and inability to leave primary work duties (due to understaffing) as two major impediments to continuing education. Leadership training and greater access to GIS training and technical assistance were the most frequently mentioned continuing education needs.

CE.6 A BIA lack of coordinated research or research advocacy has led to the tribes being under-serviced by federal and academic research institutions. Provision of federal research to tribes has largely fallen to the USFS Research Stations, which historically have not taken a very active role in engaging tribes. In the last several years, a number of the research stations, working with the ITC research sub-committee, have been seeking opportunities for collaborative research projects with tribes. Currently USFS researchers are developing a national tribal research strategy designed to engage tribes as research partners, provide support to tribal students through research programs and create regional tribal research liaisons.

Many colleges and universities have had intermittent and inconsistent relationships with tribes. As federal grant funds have become more competitive, there has been a surge of interest in having tribes as research partners.

TCU's offer an opportunity for culturally sensitive, locally-based research. However, TCUs do not have graduate programs, limiting the scope and complexity of research, and TCU faculty have little time for research projects. Without additional funding and staff, such as could be provided through McIntyre-Stennis funds, tribal college participation in research collaborations will be limited.

Education Recommendations

CE1. A BIA national educational coordinator is needed to pursue programs as envisioned by NIFRMA and to coordinate education programs with the Bureau of Indian Education and all other applicable federal agency programs such as the National Science Foundation and the USDA National Institute of Food and Agriculture. This individual would

be tasked with maximizing the effectiveness of the NCCE program as well as implementing other education and recruitment incentives called for by NIFRMA. The BIA coordinator would work with tribes to secure steady funding for outdoor youth programs. Through this position, the BIA and tribes would be better represented and able to interact more effectively with other federal natural resource education and research organizations such as NSF, NIFA and the USFS research stations. The coordinator could act on the IFMAT I recommendation of convening a national panel of universities, companies and agencies to develop a comprehensive plan for supporting Native student education and a state-of-the-art forestry workforce. An overall budget that would allow adequate resources for this individual to be able to effectively interact with tribes, universities and federal agencies would amount to approximately $400,000 a year.

CE2. Implement education programs envisioned by NIFRMA. NIFRMA specifically addressed the importance of funding and supporting Native Americans who wished to study natural resources. In 25 U.S.C. § 3113 & 3114, NIFRMA authorized the BIA to create and administer 1) an internship program, 2) a cooperative education program, 3) a scholarship program, 4) forestry education outreach, 5) post-graduation recruitment, 6) post graduate intergovernmental internships and 7) continuing education and training.

CE3. Increased programmatic support and cooperation with tribal colleges is needed by both the BIA and tribes. A large percentage of Native Americans enrolled in natural resource programs are at TCU's. Increased involvement of the BIA and tribes in TCU programs, curriculum design and internship/career development programs will be essential to sustain well-trained Native American natural resource professionals and an educated, informed and engaged tribal public. The BIA education coordinator could serve as liaison with tribal colleges.

CE4. One million dollars per year should be made available to tribes for the support of youth internships and nature/culture camps. Tribal youth education programs, which are an excellent opportunity to connect tribal youth to the outdoors and to their cultural heritage, are constantly challenged by lack of funds. A federal funding allocation of at least $1 million/year ($50,000 per tribe for 20 tribes) should be appropriated to support youth education and career programs in natural resources.

CE5. BIA should provide approximately $11.3 million per year for continuing education for forestry staff. IFMAT I found that the BIA devoted approximately 3% of personnel budget to continuing education, while the US Forest Service earmarked 9-12%. Although IFMAT III was unable to find exact figures, this comparison is consistent with our observations and discussions, as well as finding from the workforce survey. If the average salary plus benefits of a tribal or BIA forestry staff person was approximated at $55,000 this

would mean the dedication of an additional $4,950 annually per staff (assuming a 9% gap between BIA and the USFS as comparator) for continuing education. There are currently 1210 forestry professionals and technicians within Indian forestry and another 792 needed. At $4,950 per current staff ($5,989,500) and $6,600 for each new staff (assuming the 12% baseline funding this would be $5,280,000) adequate funding for continuing education would necessitate an additional $11,269,500 per year. Primary needs for this funding include leadership training (see below) and an increased provision of instruction and technical services in GIS. While BIA does support an active training program in wildland fire through its involvement in NIFC, and fund participation in the National Advanced Silviculture Program (NASP), the expressed need in the workforce survey in both fire and silviculture training exceeds current program deliveries.

Table C. 8 BIA investment needed to adequately support education and professional training.

Staff Development Needs	Funding Million $	$/acre
Education Coordinator	$0.40	$0.02
Youth Internship Programs	$1.00	$0.06
Professional Training and Continuing Ed.	$11.30	$0.61
Total	**$12.70**	**$0.69**

CE6. A strategy similar to the national agriculture leadership network should be developed that allows tribes, the BIA and the ITC to work together to address the leadership and upper level management skill needs identified in the workforce survey. Funds should be made available to contract with ITC or another entity to organize and host regional leadership training programs.

CE7. National level advocacy and support for building research partnerships between tribes and research institutions is needed. Although the USFS research programs have recently made efforts to improve their partnerships with and deliveries to tribes, there is still the need for a central, national advocate and source of technical support in research design and partnering for tribes. For example, Our Natural Resources (O.N.R., pronounced honor, http://www.ournaturalresources.org/) is an inter-tribal consortium of thirteen Native American natural resource organizations that may be able to play a leadership role in bringing forward tribal natural resource research priorities.

NIFRMA Task D - An evaluation of procedures employed in timber sales administration, including preparation, field supervision, and accountability for proceeds.

IFMAT I and II drew many of their findings from six elements that had been identified for tribes to obtain the full benefits from timber harvested from their forest. These six elements pertain to timber sale preparation, marking, bidding, size of sale, utilization, and scaling. Business management was also found to be important. IFMAT III found many of the six elements had improved and that key findings in IFMAT III Task D are more on business management and the relationship between the BIA and tribal forestry programs as well as the relationships between the natural resource departments/tribal forestry programs with Tribal Councils and enterprises. Improvements have been made in the relationships between the BIA and tribal forestry programs, but there has been little improvement in the relationship between the natural resource departments/tribal forestry programs and the forest products enterprises.

Mobile yarder/loader – Spokane. Photo by Mark Rasmussen.

Timber sales occur on tribal trust lands, allotted lands, and tribal fee. On some reservations, the BIA arranges tribal timber sales and provides the sale layout for timbered allotments through direct services. On other reservations, tribal forestry programs, through contract or compact, provide the tribal timber sale preparation and administration and may also employ an allotment forester to take care of allotted lands. Allotments and tribal trust lands are those lands that are held in trust by the federal government. Tribal fee lands are lands that tribes have acquired often for purposes of consolidation or economic development. Tribal fee lands, just as

non-Native private forests and woodlands, are subject to the forest practices regulations and taxes imposed by state governments. When possible tribal forestry programs may consolidate sale preparation and administration of tribal trust and tribal fee lands as well as allotment timber sales to reduce cost and improve efficiencies.

As tribes pursue self-governance and gain greater control over their forests, tribal timber sales and forest management practices more closely reflect tribal objectives than at any time since federal authority was initiated, however, government statutes and procedures remain as obstacles to effective marketing and sale of timber (Hill and Arnett 1995).

Mechanized log processor on the landing – Quinault. Photo by Mark Rasmussen.

The tribal timber sale layout process presently includes an inter-disciplinary team (IDT) approach that develops formal environmental assessments (EA) including NEPA and ESA. A review of the EA is conducted by the BIA and a Finding of No Significant Impact (FONZI) is prepared before a proposed timber sale can move forward through the process. The sale, including an appraisal of value, is then prepared and approved by the Tribal Council and the BIA. Following approval the sale can then be advertised. Sales are commonly stumpage sales and can be harvested over a three-year period. Generally one sale is prepared at a time and made available for purchase before preparation of another can begin.

Skidder logging over frozen ground – Penobscot. Photo by Larry Mason.

By comparison, the timber sale processes widely employed by industrial forestland owners may be delivered log sales or stumpage sales. Where multiple species are sold, as in the Pacific Northwest, the delivered log sale process is favored. Where one or two species are being sold and are of similar size and quality, as in the southeastern U. S., the stumpage sales process is more common. The process is direct and streamlined and often the sale areas are chosen to attempt to meet the demands of the market place and the purchasing strategies of the log buyers as well as to accommodate least costs for harvest and transport.

Most private timber sales programs do not conduct a formal environmental assessment but instead complete an environmental checklist that reviews the issues associated with the timber sale area. This does not necessarily mean that environmental protections are compromised as evidenced by the fact that many industrial timberland owners are compliant with the requirements of third party certification. Silvicultural prescriptions are developed by foresters and the sale is prepared and approved by the resource manager. The sale is sold by species, product type and sometimes by grade to the highest bidder for each sort. Delivered log sale contracts generally last three to nine months and are negotiated between seller and purchaser based upon the short-term market demand of the region and the negotiated price leverage of buyer and seller. In the case of stumpage sales, which are generally sold on a lump sum or pay as cut basis , the timber is sold to the highest bidder at auction and can be available for harvest at any time for 1 to 3 years depending on the payments schedule and contractual requirements of each landowner. Industrial timberland owners strive to reduce administrative costs while increasing stumpage returns. The major differences between industry and tribal timber sales processes are shown in Table D.1.

Table D.1. Comparison of industrial and tribal timber layout process

	Tribal Timber Sale	Industry Timber Sale
Environmental Assessment	Prepare EA with ID Team, complete public input, prepare FONZI, Tribal and BIA approval required	Complete an environmental checklist for sale area
Type of Sale Advertisements	Primarily stumpage sales	Primarily delivered log or lump sum stumpage payment for sale
Harvest Timelines	Stumpage sales: 3 year contracts	Delivered logs: 3 to 9 month sale Stumpage sales: 1 to 3 years
Ability to Respond to Markets	Sales are slow, cumbersome, and cannot respond to market conditions.	Short layout period and quick harvest response creates loyal customers and market flexibility.

Findings - timber sale preparation

D1. The requirements included in the National Environmental Protection Act (NEPA) and the Endangered Species Act (ESA) increase the cost of timber sale preparation, lengthen preparation time, and reduce opportunities to meet market and tribal goals. The tribal timber sale preparation process includes many federal requirements such as NEPA and ESA that are time-consuming and expensive. NEPA and ESA requirements burden tribal funding and staff resources that could otherwise be directed toward other forestry activities. ESA in particular frustrates forestry staff who often consider the management of a single species as not compatible with holistic tribal worldviews and harvest constraints as a compromise to beneficial use of the Indian trust lands. Many feel that impacts to tribes are a result of poor practices on other land ownerships. Both NEPA and ESA procedures require interdisciplinary analysis and expertise that are not adequately supported by BIA. This is particularly true for disciplines outside of forestry such as wildlife biology, hydrology, or fisheries.

D2. The timber sale process and appraisals on many reservations could be more efficient to meet market fluctuations and improve revenues. The Code of Federal Regulations (CFR) works for some reservations, but many tribal foresters feel it needs to be updated and revised. The trust responsibilities in dealing with the timber sale process, the CFR, and stumpage appraisal system appear to be applied differently for each reservation. Clarification of the trust responsibilities for each of the unique situations on the tribes needs to be evaluated.

The CFR is considered obsolete by some and examples include the requirement by the BIA to conduct an appraisal from stump to lumber to determine stumpage values. This exercise

calculates for many sales a deficit and after completing the process the BIA then negotiates with the tribe to establish a minimum stumpage value. Tribal foresters also point to the large amount of documentation and paperwork necessary to complete a BIA timber sale as compared to a tribal timber sale. Some tribes have been able to prepare timber sales particularly salvage sales after wildfires within three to six months. Timber sales not involving an emergency harvest can take up to two years.

Tribal timber sale preparation on left as compared to BIA timber sale preparation for an allotment on right for similar timber types and acreages – Tulalip. Photo by Larry Mason.

D3. A suite of "shelf ready" timber sales is desirable to take advantage of spot market opportunities and require sufficient prepared timber volume to be ready for rapid sale. Alternative procedures to current appraisal methods are needed to allow tribal foresters sufficient flexibilities to exploit transient market opportunities. The timber sales flexibilities created by pipeline sales inventories can be particularly important during periods of market instability and economic downturn. At several reservation visits, we heard of delays in timber sale offerings created by the need to have distant BIA offices review and sign-off on documentation. Funding and staffing shortages (see funding and staffing discussions in Tasks A & C) mean that tribal foresters have multiple responsibilities and consequently, in some

cases, appear to subordinate timber sale preparation when more urgent priorities arise. Effective marketing of timber involves a combination of the timing of sale advertisement, harvest delivery schedules, log manufacturing quality and providing consistency in delivering annual sales volumes. As sawmills manufacture product for sales, the species, log quality and volume availability are important for them to meet their customer's expectations. An efficient log seller that can reliably satisfy such expectations can become a preferred supplier with ability to leverage market premiums for timber sales programs. When developing a timber sale program, sale preparation should be a facet of the whole log marketing process such that a variety of customers and products are considered to ensure sufficient utilization and market return for the total harvest yield. An adequately funded and staffed approach to forest management that considers market forecasting, marketing strategies, and coordination with existing mills can improve cultural, employment, and stumpage value returns (see planning discussion in Task F). Creation of pipeline inventories of prepared timber sale units will require a short-term investment in timber sales preparation to create an inventory that can be carried forward and replenished as needed.

D4. Producing "shelf-ready" timber sales provides lead-time for road installation, road maintenance, and developing and implementing transportation plans that can reduce the cost of harvesting. Reducing harvest cost increases revenues to the tribes. Forest management by adjacent state and private landowners generally includes timber sale preparation for harvest areas at least one full year in advance of sale with planning for sales beginning two years out. This lead time provides for road installation, road maintenance and to evaluate marketing strategies and harvesting configurations as well as logistics options such as access (right-of-ways) as needed that can reduce harvesting and transportation costs. IFMAT I and II identified a lack of competition for sales and logging contracts as a cause of compromise to tribal sale revenues. The lack of planning to control cost and forecast markets also compromises tribal revenues. An evaluation of timber sale harvesting cost per unit can identify the differences and opportunities prior to implementing harvest operations and ensure that other tribal goals are being addressed.

Findings – marketing, timber sales, and stumpage values

D5. Tribes use many different methods to determine the value of their logs and stumpage, and questions remain as to whether they are receiving appropriate value. Each tribe has different goals and objectives specific to the needs of their communities and forests: some operate sawmills, while others sell delivered logs or stumpage. Many are in remote locations. As identified in previous IFMATs, there is a need for an auditing procedure to document the competitiveness of forest enterprises and monitor the stumpage comparisons between tribes and neighboring lands.

Table D.2. Regional stumpage return comparisons between tribes and state forestry programs.

Stumpage Prices 2011	
Region	**Ave $/MBF**
Northeast Region	
Maine	$145
Minnesota	$146
Lake States	$328
Average Tribal Stumpage Value	**$87**
Northwest Region	
Washington Westside	$361
Oregon West Side	$398
Average Tribal Stumpage Value	**$278**
Inland West Region	
Eastern Washington	$205
Idaho	$201
Montana	$127
Average Tribal Stumpage Value	**$120**
SW Region	
Arizona	N/A
New Mexico	N/A
Average Tribal Stumpage Value	**$18**
West Region	
California	$397
Average Tribal Stumpage Value	**$326**
Southeast Region	
North Carolina	$144
Virginia	$177
Average Tribal Stumpage Value	**$47**

Tribes use many different methods to determine the value of their logs and stumpage. Some tribes use a stump to mill calculation developed by the BIA. Others that operate sawmills have used models to determine the appropriate stumpage arrangement for dedicated sale from the tribal forestry program to the tribal enterprise. Log value estimates are based on the value of lumber less the costs of harvest and processing or can be estimated based upon the value of log sales on adjacent timber lands. The results must be carefully considered because the tribes have different market (dollars) and non-market (jobs, environmental and cultural benefits) objectives associated with outcomes of timber harvest.

Some tribes in remote locations have sawmills and it has been challenging in the soft lumber market of the past five years to operate and consequently many of these facilities are closed

at this time. Other tribes in regions where there is sufficient processing capacity to support competitive log markets sell logs on the open market albeit in reduced volumes in recent years. Questions remain on many reservations as to whether the tribes are receiving appropriate value for their timber. Table D.2. shows that tribes generally receive less for their logs than neighboring state forestry programs. There are many reasons why log sales might be compromised such as poor timber quality, poor market leverage, and distance to markets. IFMAT I and II identified the need to develop an auditing procedure to document the competitiveness of forest enterprises and to monitor the stumpage comparisons between the tribes and neighboring lands. There remains a need to monitor timber values and stumpage comparisons.

Tribal enterprises can create numerous community benefits through a multiplier effect that is not well documented. In isolated communities and reservations with high unemployment, the creation of jobs can avert significant health and social service costs. Tribal enterprises that manufacture lumber products provide a considerable number of jobs on reservations with their sawmill enterprises and often are the only opportunity to provide better forestry. They are essential to local communities. A critical lack of economic information about the market and nonmarket value relationships unique to reservations clouds understanding of trust obligations, handicaps forest planning, and confounds best value estimation for comparative timber sale arrangements.

D6. Some tribal enterprise businesses are accustomed to marketing logs and managing harvest operations, while a few are manufacturing logs for standard and specialty lumber products. On many reservations the tribes maintain marketing enterprises that are separate from forest management programs. Some enterprises oversee tribal sawmill operations, but most enterprises oversee production and marketing of logs. Log marketing enterprises generally receive tribal timber at a price determined by a BIA approved appraisal system. Sometimes these sales are exclusive and other times enterprises must compete with non-Native timber buyers. Generally in the latter case, the enterprise is given the option of matching the high bid and being awarded the sale. This is almost always the case for allotted timber sales to tribal enterprises so that allotment owners are assured that they receive the highest return that the market provides. Forestry enterprises generally contract with tribal loggers and log haulers to grade and sort logs for sale to international and domestic markets. On some reservations, the profits generated by enterprise activities are used to purchase forest lands for the tribe.

From the woods to the mill – Menominee Tribal Enterprise. Photos by Larry Mason.

A few tribes have sawmills that process tribal products (at the time of this writing only four are operating but two more have plans to reopen within a year). Most tribes contract with companies owned by tribal members to perform logging and hauling operations, conduct thinnings, and complete forest development work on reservations. Tribal contractors support reservation employment with most payroll dollars spent locally creating high leverage within the social accounting matrix (SAM). Benefits also accrue off reservation when parts, fuels and equipment purchases are needed. A few larger tribes with forest products enterprises manage sawmills that may employ as many as 200 people at each location. The multiplier effects of reservation resource management and manufacture have never been adequately investigated and consequently are poorly understood. For isolated economies such as reservations that are burdened with high unemployment, the avoided health and social service costs associated with job creation can be significant. Reservation economies are unique in many other respects as well since trust resources are communally owned and support tribal benefits such as schools and elder care. A critical lack of economic information about the market and nonmarket value relationships unique to reservations clouds understanding of trust obligations, handicaps forest planning, and confounds best value estimation for comparative timber sale arrangements. BIA has not undertaken economic research in more than twenty years. BIA should provide economics support to tribes by initiating studies to help understand comparative value recoveries from Indian forest resources.

Loaded log truck – Fort Apache. Photo by Larry Mason.

D7. Better coordination between the Tribal Councils, Enterprise Board of Directors, and the Natural Resource Programs would help in integrating social, economic, and political concerns with environmental concerns. This integration is critical to improving forestry operations on reservations. Lack of effective communications and alignment in planning between tribal forestry/natural resource departments, tribal councils, enterprise managers and boards, causes inefficiencies in implementing management processes and incurs higher cost and lower revenues for tribal products.

We saw little improvement in relationships between the natural resource departments, tribal forestry programs, and forest products enterprises. Better coordination between tribal councils, enterprise board of directors, and the natural resource programs would help in integrating social, economic, and political concerns with environmental concerns. This integration is critical to improving forestry operations on reservations.

D8. NIFRMA identified the need for BIA to provide technical support for marketing strategies for both domestic and international sales opportunities. BIA technical support and marketing specifically are identified under NIFRMA as elements of trust responsibility. However, BIA technical support for marketing has been missing for many years. Without

availability of reliable marketing expertise, potential opportunities for tribal enterprises to expand and improve domestic and international sales will be foregone. The lack of marketing assistance was identified in IFMAT I and II and continues to restrict tribes marketing opportunities. A recently completed study of the potential for expanding access for Indian forest products to broader domestic and international markets found that shortages of skilled marketing and sales personnel within Indian Country was a primary obstacle to progress (Morishima et al. 2011).

D9. Opportunities may exist for tribes to expand hazardous fuels reductions on federal forests through the Tribal Forest Protection Act (TFPA) and Stewardship Contracting while helping provide raw material needed to support log markets and processing infrastructure.

Stewardship contracting discussion at the Sitgreaves National Forest - Fort Apache visit. Photo by Vincent Corrao.

Throughout much of the inland west, milling infrastructure has largely disappeared and consequently there is little value to be recovered from the harvest of forest products. However, declines in forest health and changing climate trends are contributing to an expensive and environmentally-destructive wildfire emergency the worst of which is on federal forests adjacent to tribal reservations. Tribes share 3,000 miles of common boundary with federal forests. In 2004, Congress acknowledged the threat to Indian Country created by fires that start on federal lands when it passed the TFPA. Prior to that in 1998, the USFS, at Congress's direction, began a program of Stewardship Contracting whereby community contractors could assist the Forest Service with hazardous fuels removals in exchange for a combination of financial compensation and timber salvage. The effectiveness of fuels treatments in reducing the hazard and costs of wildfires is well-documented (Peterson et al. 2005, Graham et al. 2004,

Stewardship contracts between tribes and adjacent national forests benefit both ownerships. Before and after treatment examples are shown as paired photos for Mescalero/Lincoln National Forest (top) and Flathead/Lolo National Forest (below). Photos by Larry Mason.

Keyes and O'Hara 2002, Omi and Martinson 2002,). Indian tribes with ready workforce and next door to federal forests have sought TFPA and Stewardship Contracting opportunities, however, progress has been slow and only a handful of projects have gone forward while millions of forest acres remain at risk.

The BIA, the USFS, and the Department of Energy have encouraged the tribal use of biomass for energy production and market development for small diameter logs but the opportunities vary considerably by regional. Tribes in the Northeast and Midwest have markets and can sell biomass and benefit from an economic return. Tribes in the dry forests of the Northwest and Southwest do not yet have markets and consequently non-merchantable material must be removed and burned at considerable cost to reduce wildfire hazard. To restore process infrastructure needed to create value for logs, underwrite costs of forest restoration projects, and spur renewable energy development a sustainable flow of raw material must be available in sufficient supply and certainty to support investment.

Expanded use of TFPA and Stewardship Contracting authorities offer such opportunities. For tribes the benefits are manifold: expanded markets for timber sales from increased supply and activity, more employment for tribal members, opportunities for energy development, and safer home reservations. TFPA and stewardship contracting opportunities should be aggressively pursued towards creation of long-term (10 plus years) contracts such that skilled human resource can be recruited and retained and investments in equipment can be justified.

Finding - allotment management

D10. The cost of preparing timber sale activities and administering allotments continues to be high due to small land parcels, checker-board ownership, and fractionation. The high cost to prepare and administer allotments which are generally smaller parcels and not contiguous on the reservations continues to be a barrier. Landscape management requires extended planning horizons and stable ownership. In the case of allotments, the consent of numerous heirs, often living in widely separated counties or states, must be obtained before a sale is sold. Timing for allotment timber sales is more generally a function of how the parcel has progressed through the sales queue rather than market timing. Allotment timber sales require time-consuming boundary surveys. Allotment management is further plagued by lack of BIA law enforcement to protect from timber trespass. Many allotments may be land locked without right-of-ways. Reservations with higher percentage of acreage in allotment ownerships require high management costs to meet federal regulatory requirements. The Indian Land Consolidation Act (ILCA) was passed to help tribes reacquire allotments and consolidate ownerships but funding and acreage acquisitions have been limited. There is a need to continue consolidation of allotment lands on reservations to reduce cost and provide effective long-term landscape management to meet tribal vision and goals. The recent Cobell settlement will

certainly help consolidate allotments (DOI 2012b). However, there is uncertainty about what percentage of the $1.55 billion available for allotment purchases might be spent to acquire interests in allotted forest lands.

Finding - accountability for proceeds

D11. Evaluation of accounting procedures includes an assessment of the Trust Asset and Accounting Management System (TAAMS). TAAMS stores information and provides an accounting system to help distribute proceeds from the sale of forest products and to support the management of trust title ownership, encumbrance, and land records through a centralized Bureau wide system. Initially the TAAMS Land Title and Records Office (LTROs) could not record title documents, deeds, leases, and probates received from agencies and field offices with the speed required to certify and issue Title Status Reports and successfully complete trust asset transactions. Prior to TAAMS the agency offices manually created and mailed title documents to LTROs, who manually recorded, microfilmed and entered data into the title system to maintain title documents. TAAMS significantly reduced the amount of time needed to process documents and closes the gap between manual and automated delivery and processing of title documents and certified land title products and reports.

Some of the tribes indicated that they have significant problems with the Bureau documents and the TAAMS. TAAMS provides many challenges in establishing tribal priorities due to its inability to provide timely and accurate ownership information.

When BIA personnel retire, it can be difficult for new staff to learn to use the TAAMS program. Some BIA foresters report that the TAAMS process is not as easy for reconciling payments as the older system possibly because TAAMS was designed primarily for oil and gas accounting. However, we have heard that TAAMS has made a significant difference in the ability to ensure that the payments are accurate and timely. Continued training is required if tribes are to benefit from the TAAMS.

Recommendations

The earlier IFMAT assessments made recommendations that are still valid today. Good progress has been made on many of the original six elements identified in the earlier assessments. Funding, communication, and education in business operations and marketing opportunities are needed to improve efficiencies and implementation of long-term forest management.

D1. Forest Management Plans and Integrated Resource Management Plans should include strategies for long-term harvest planning and marketing of tribal forest products. An approved FMP or IRMP can be used as a guide for harvest scheduling and for gaining efficiencies in timber sale preparation.

D2. An auditing procedure should be developed to document the competitiveness of forest enterprises. IFMAT I and II identified the need to develop an auditing procedure to document the competitiveness of forest enterprises. This will require periodic monitoring of stumpage comparisons between the tribes and neighboring lands to determine whether tribes are receiving appropriate value for their logs. The audit process should produce benchmark cost analysis for personnel, harvesting, and management cost. This would provide tribes with metrics to evaluate efficiency of their timber programs as compared to others.

D3. Improve coordination among Tribal Councils, Enterprise Boards of Directors, and Natural Resource Programs. Studies of the social, economic, political and environmental performance of these communities is needed to better understand the suite of benefits and multiplier effects of Indian timber harvest both on and off the reservation. It was found in IFMAT II that there is a need to have natural resource personnel on enterprise boards and that enterprise personnel should be part of the interdisciplinary resource team in planning management activities.

D4. Develop a timber market reporting system that monitors and periodically publishes log and stumpage price values to compare domestic and international sale values. The BIA has not undertaken economic and market research for over 20 years. A market reporting system that monitors and publish delivered logs prices, stumpage values, produce benchmark cost analysis for personnel, harvesting and management cost periodically would provide the tribes metrics to evaluate the efficiency of their programs and to determine if they are receiving appropriate economic value for their forest products.

D5. Consolidation of allotments represents high economic and conservation value recovery. Create a system of matching funds to underwrite land reacquisition costs for tribes that choose to provide a percentage of the purchase costs. Unfortunately, ILCA and Cobell alone will not solve this problem; an additional step worthy of consideration would be creation of matching funds to underwrite land reacquisition costs for Indian tribes that choose to provide a percentage of the purchase costs. The high cost to prepare and administer allotments on the reservations continues to be a barrier to combining landscape management with meeting tribal and allottee goals.

D6. Provide consistent programmatic funding to adequately address unfunded mandates and improve timber sale preparation timelines. Research the opportunity to develop blanket environmental assessments to help reduce sale preparation and improve

opportunities to capture market trends. Evaluate the CFR required by the BIA to understand the value of the documentation and requirements necessary to complete the timber sale process under these guidelines.

NIFRMA Task E - An analysis of the potential for reducing or eliminating relevant administration procedures, rules, and policies of the BIA consistent with federal trust responsibility.

Overview

Federal statutes and treaties establish the trust responsibility of the federal government to Native American tribes. This responsibility extends beyond the DOI BIA to all agencies of the federal government. Treaties further establish tribes as sovereign nations and grant tribes rights to hunt, fish, and gather natural resources on lands ceded to the federal government. Ceded lands include both public and private ownerships. Meeting the trust responsibility and satisfying treaty rights requires environmental conditions both on and off reservations such that lands and waters are biologically diverse, productive, resilient to both natural and human-caused disturbance, and capable of sustainably yielding desired resources and settings.

The policy of "Self-Determination" was passed in 1975 (Public Law 93-638). The Act called for increased involvement of tribal leadership in all decision-making, including forestry. Congress passed NIFRMA in 1990 to increase the tribal role in management of their forests consistent with objectives of self-determination. In 1994, Self-Determination was further modified by adding the "Self-Governance" amendments to the Act. The Self-Governance amendments provide for the transfer of Federal authority toward Indian authority over programs and services including forestry.

Achievement of self-governance is dependent on the right and responsibility of a tribe to make its own rules and policies and to negotiate such with others on matters affecting more than a single political entity, such as water, migratory animals, and other resources relevant to tribal wellbeing. However, self-determination and self-governance have not changed the way federal environmental law is applied on Indian forest lands. The BIA and tribes must still fully comply with the NEPA, the ESA, the National Historic Preservation Act, and other federal laws.

Certain federal laws have been interpreted to apply to tribes and reservations beyond trust and treaty responsibilities, for example NEPA, ESA, and the Clean Water Act. These laws carry implementation costs and constraints on action, both on and off reservations. The trust responsibility means the federal government has a fiduciary responsibility to the health, safety, economic, educational, environmental, and cultural wellbeing of tribes and their members. Costs imposed but not funded constitute "unfunded mandates." Those costs plus constraints unmitigated by federal action constitute an erosion of trust obligations. IFMATS I, II, and III have each observed tensions and conflicts between trust and treaty obligations and the costs and constraints imposed by other federal laws, rules, and policies. During the same time, tribes have made substantial progress in self-determination and self-governance empowering the capacity to more fully function as sovereign nations. Conflicts regularly arise in forest management, however, when federal

regulations and unfunded mandates constrain self-determination and stewardship of natural resources.

Findings

E1. Because some Indian forests have been managed more effectively in pursuit of tribal goals than surrounding private forests, they sometimes provide habitats and services no longer found on private lands. This leads to a view that Indian forests have an obligation to continue to provide those services, even at the expense of generating revenue for the tribal beneficiaries. Payments to tribes for ecosystem services as advocated by the USFS could bring needed support for integrated management. NEPA imposes costly processes in planning projects that use federal funds. We found variable degrees of full natural and cultural resources integration in plans or management staffs across the tribes visited. On a positive note, in some case tribes are able to use Environmental Assessments (less costly, more timely) for the same kind of project work that requires the USFS to use Environmental Impact Statements (more costly, more time and resource consuming).

E2. Goals for and laws granting sovereignty and enabling self-determination are often made difficult to achieve by requiring tribes to adhere to federal forest and environmental laws and policies, especially when not adequately funded. Because of concerns over liability for breach of trust and unique jurisdictional and political complexities of Indian Country resulting from over two hundred years of history replete with vagaries of policy, legislation, and court decisions, an extensive set of rules, regulations, and procedures is contained in manuals and handbooks for trust administration of Indian forests. A federal nexus created by funding provided to fulfill treaty and trust obligations and the involvement of the United States as trustee, coupled with the lack of consideration for the special status of lands held in trust for Indians has resulted in the application of such laws to Indian forestry. IFMAT III regards these requirements as "unfunded mandates. In the extreme case, they inhibit full sovereignty and self-determination and make reaching tribal goals insurmountable. Dealing with species listed as threatened or endangered under the ESA, including costly Section 7 consultation, is the most troubling example.

Untreated spotted owl habitat – Yakama.
Photo by Mark Rasmussen.

Coyote tracks on the skid trail – Penobscot.
Photo by Larry Mason

E3. Forest roads in Indian Country are of much lower quality than on other federal lands, creating adverse environmental impacts and reducing potential for tribes to derive full benefits from their resources. Tribal roads often lack adequate drainage capabilities (surface/ditch/cross-drainage). Road funding for Indian Country comes from the FHWA

through the BIA. Unlike FHWA funding for USFS, there is no special recognition of the importance of Indian forest roads for the protection, administration, use and development of tribal forest resources. BIA funds only a portion of the forest transportation system. Timber sales fund a substantial portion of construction, and road use fees cover maintenance of roads that are not on the BIARS or IRR. Because FHWA road funding requires those roads to be open for public use, this source of funding raises tribal concerns for control of access, infringement on sovereignty, and potential for harmful trespass (fire and theft). Most tribes do not desire general public use of forest roads on their reservations, yet to receive BIA support it is required that roads be open to the public.

E4. Trespass, particularly for illegal plant cultivation, has been identified as a significant management problem on several western reservations. Law enforcement officials frequently find sophisticated marijuana operations on Indian forests in addition to trespass problems such as theft of natural resources and poaching.

E5. The NIFRMA and Code of Federal Regulations apply to all tribes. Procedures contained in BIA manuals and handbooks, developed to ensure that policies are met, apply to those contracted tribes where the contract does not specifically waive use of the manuals and handbooks. Self-governance tribes are not restricted by procedures contained within the manuals and handbooks. Some tribes have made progress in developing procedures and associated tribal codes to address items such as trespass. This allows tribes to increase the level of self-governance and exert greater sovereignty over their resources.

E6. All three IFMATs have found a lack of natural and cultural resources integration in planning. Siloed disciplines within the BIA undermine remedy. NIFRMA calls for development of integrated resource management plans (IRMPs), yet the BIA places forest and wildland fire management in one administrative division, and fish, wildlife, recreation, agriculture, and rangeland in another natural resources division; water in yet another. BOFRP is the keeper of process and planning records for the Division of Forestry and Wildland Fire Management, but data for other forest and natural resources are gathered and stored elsewhere. Although there are few IRMPs developed and implemented, there are notable exceptions. Those notable exceptions are models of progressive management to sustain the full array of forest ecosystem values, uses and products.

E7. Mill-owning tribes lack sufficient commercial forest land to sustain a local mill, while adjoining public lands have sufficient supply, yet are constrained by various policies and judicial orders from providing it. This could be interpreted as failure to meet federal agency trust responsibility for the welfare of the tribe(s) under the TFPA.

Recommendations

E1. Encourage interdisciplinary planning. Examine opportunities for improved integration of all forest and rangeland natural resource responsibilities at all BIA administrative levels, i.e., forest, wildland fire, fish, wildlife, recreation, water, rangelands, and cultural resources and promote the development of IRMPs by the tribes.

E2. Reward tribes that demonstrate capacity for and commitment to forest and natural resource management and stewardship that meets balanced cultural, social, environmental, and economic goals, as vetted by tribal leadership, such as through an approved IRMP, by enabling such tribes to establish and implement their own rules and procedures as sovereign, self-determining nations.

Forested vista – Eastern Band of Cherokee. Photo by Larry Mason.

E3. Enable the use of Categorical Exclusions and Environmental Assessments. For tribes that have well-integrated forest, cultural, and natural resource plans or management staff and strong support for those plans and staffs from council and tribal publics, enable Categorical Exclusions for integrated projects or streamline NEPA to facilitate the development of less costly single-alternative Environmental Assessments. Self-governance tribes should be able to develop tribal NEPA procedures and associated code to replace BIA NEPA manuals and handbooks. This approach furthers self-determination and self-governance and would reward tribes for progress in integrated planning.

E4. Remove costly unfunded mandates of implementing federal laws and processes, including consultation under the ESA, or provide full federal funding for carrying out those laws and processes.

E5. Use TFPA to work with federal agencies, and collaborate with state forest agencies to dedicate sufficient federal forest or state land within economically feasible haul distance for sustainable timber supply to augment tribal forest supply and form the combined anchor forest for local employment and manufacturing of forest products.

E6. Build upon the anchor forest concept to explore the creation of "anchor plant, fish, and wildlife management areas" on federal lands to secure treaty rights on ceded lands that have suffered due to historic or current management practices on those areas.

E7. Amend current funding formulas to recognize the importance of forest transportation systems on Indian lands. Investigate and amend current FHWA funding formulas or processes that impede the availability of funds for forest roads.

Allotments: fragmented forests and management

Complicating the management of Indian forests are the thousands of fragmented and fractionated allotted parcels of forest land, generally 40–160 acres in size, that are owned by individual Indian families and are held in trust by the federal government, most often within reservation boundaries, and managed in conjunction with tribal forest trust lands.

The allotment system, created by the Dawes Act of 1887, gave individual Indians ownership interest in specific parcels of land (Indian Land Tenure Foundation 2012a). The intention was to introduce private property ownership and encourage tribal people to become farmers. However, the amount of land suitable for agricultural use was very limited on reservation lands. In carrying out the terms of the Dawes Act along with its amendments and special acts, the Indian Service found it necessary to allot millions of acres of forest land wholly unfit for agriculture. The allotment of forest lands created an extremely difficult problem for the management and administration of Indian forests.

The Secretary of the Interior through the BIA is mandated to hold Indian forest land in trust for the benefit of individual Indian and Tribes, managing them in the best interest of the Indian beneficiaries (25 CFR Subchapter M, Part 163). This responsibility is outlined in the Indian Affairs Manual (IAM Part 53. Forestry; BIA 2006) and includes timber harvesting and management, wildfire control, and various silvicultural activities. An essential part of this policy is to provide for management of Indian forest lands under the sustained yield concept.

Discussion of the unique challenges to management created by fragmented and allotted forest lands at the agriculture interface – Nez Perce. Photo by Mark Rasmussen.

Over time, ownerships divided among heirs through probate and many parcels became fractionated - shared among multiple owners. Each allottee holds an undivided fractional interest in the revenue from the allotment property. The proceeds from a timber sale, for example, would be paid to each allottee based on his or her percentage ownership of the allotment (Indian Land Tenure Foundation 2012b).

Our site visits indicate that the challenges that the allotment system presents to the forest manager are amplified as allotments become increasingly fractionated. For example, the number of fractional interests grew by about 12.5% from 2007 to 2011 (DOI 2012b). Obtaining permission from a majority share of allottees is difficult. Different allottees might have different needs for revenues from harvest. And because servicing allotments is more time consuming, a backlog of forest management work develops. Allottees sometimes wait for long periods for attention from forestry staff. In general, management of allotments is not responsive to individual owners' needs.

Allotments have long-lasting negative impacts on the nature, use, and structure of Indian forestry programs. This ownership structure increases management costs, limits forest products marketability, frustrates landscape level management, results in an uneven distribution of

management constraints between allotment owners, and reduces the economic development potential of Indian forest assets.

The proportion of allotments varies considerably by reservation. Many reservations have no allotted lands, but on 150 reservations, 2.9 million fractional interests are owned by more than 219,000 individuals summing to more than 10 million acres or about 20 percent of all Indian trust lands. It is unknown how many million acres of forest land are in allotment status but there has been little progress in consolidation of forested allotments since IFMAT I[23]. However, we do know that about half of all allotted lands are located on 19 reservations that have been classified as Category 1 or 2 timber tribes (DOI 2012b). Seven of these reservations were visited by IFMAT.

IFMAT has recommended three times, over more than two deacdes, that allotment lands be consolidated into tribal ownership through a willing buyer-willing seller program, and further recommends easing NEPA and ESA regulatory burdens on allotted forest lands.

The Cobell Settlement

In 1996, Eloise Cobell, a member of the Blackfeet Tribe, filed a lawsuit in federal court on behalf of herself and hundreds of thousands of other American Indians. One issue was whether the United States had breached its fiduciary duty to account for revenue derived from lands held in trust by the federal government for individual Indian allotment owners (allottees). The BIA has responsibility for management of trust lands, and a responsibility to account for revenue from land leases, oil and gas, and mineral extraction, grazing, and timber harvesting.

The Cobell court cases continued from 1996 to 2009. During the course of the litigation, the court found that the BIA had failed to account properly for revenue from trust lands for over 100 years. However, the evidence was inadequate to permit an accurate accounting of the exact amount of funds that should have been distributed to Indian beneficiaries.

In 2009, the Indian plaintiffs and the federal government reached a settlement agreement in the amount of $3.4 billion out of which $1.55 billion has been dedicated as the Trust Land Consolidation Fund for acquisition of fractional allotted interests and consolidation into tribal ownership (DOI 2012b). It is too early to tell whether or to what extent Cobell settlement funds might consolidate forested allotments in tribal ownership or otherwise benefit Indian forestry.

[23] In spite of numerous requests to BIA and other sources, IFMAT was unable to obtain data on the total number of acres in forested allotments.

NIFRMA Task F - A comprehensive review of the adequacy of Indian forest land management plans, including their compatibility with applicable tribal integrated resource management plans and their ability to meet tribal needs and priorities.

Pine plantation – Leech Lake. Photo by Larry Mason.

This review of a set of forest management plans for properties as diverse as the tribal forests is necessarily a subjective undertaking. Forest planning is an exercise of discovery and plans must reflect the resources, issues and opportunities unique to each individual forest. This assessment relies heavily on our experience developing and reviewing forest management plans on hundreds of private, federal, state and tribal forests. This being the third such review, we believe it important to build on the findings of past IFMATs and to identify what can now be seen as trends. We realize that a functional forest plan is more than just the final planning document, and during our site visits we listened to tribal forest managers describe the planning process, the forest plan and their efforts to manage consistently with the forest plan objectives. In general, we found that these discussions indicate that the forest plans were prepared thoughtfully and enjoy the support of the forest managers. In short, it appears NIFRMA's emphasis on planning and subsequent efforts by BIA and tribal foresters has been well placed.

All the forest management plans we reviewed during this assessment were from Category 1 or 2 reservations that have a significant commercial timberland component. There is great diversity among reservations and our recommendations are necessarily broad. There is no such thing as a one-size-fits-all forest plan, and we urge readers to consider these recommendations within this broader context and think about how and whether the recommendations might or might not apply to any particular forest.

In this section we first describe the purpose and benefit of a forest plan. We then summarize findings from IFMAT I and II. Then we summarize our review of the planning documents. We conclude with our findings and recommendations.

Aerial and ground views of strip thinning to aid birch release – Lac du Flambeau.
Photos provided by Scott MacDougall and Larry Mason.

Purpose and benefit of a forest management plan

Forest management plans (FMPs) are required for all Indian forest lands in federal trust status. NIFRMA mandates that all management activities on Indian trust forest lands be consistent with an approved FMP. NIFRMA also defines an IRMP as a document, approved by an Indian tribe and the Secretary, which provides coordination for the comprehensive management of such tribe's natural resources.

Ideally, a FMP is a living document that provides the forest manager with a number of benefits over a long period of time. Here we list a few.

- **Authorize management.** A FMP specifies the objectives of forest management, identifies the tactics used to achieve those objectives, and establishes practices, schedules, standards and guidelines and contingencies for implementing decisions made in the plan.
- **Establish trust standards.** A FMP for tribal forests reflects tribal objectives and vision for the forest. For trust lands, the management objectives and the proposed management set forth the Trustee's obligation to trust beneficiaries.
- **Resolve issues.** A successful forest planning process identifies a variety of forest management issues and provides the decision makers with the information needed to find an acceptable resolution.
- **Set budget, staffing and revenue expectations**. A FMP should clearly identify the resources necessary to meet planning objectives. The plan and/or the planning analysis can also be used to evaluate both additional investment opportunities as well as the short and

long-term consequences of funding or staffing shortfalls.

- **Consider impacts of proposed changes in management.** Forest managers are often faced with suggestions for changes to current forest practices and strategies. A well-designed forest planning analysis considers and evaluates such changes, offering insight about short and long term consequences of such proposals. Well-designed forest planning tools, furthermore, can be used to evaluate proposals that arise after the initial planning effort has concluded.

Planning progress on forested reservations

Over the past 20 years, FMP development has demonstrated a positive trend. Currently, about 90 percent of Category 1 and 2 reservations have FMPs as compared to 53 percent in 1991. From 1991 to 2011, FMP development on the remaining reservations also increased from 13 percent to 43 percent (Table F.1).

In 2011, an estimated 14.9 million acres of Category 1 and 2 and 645,000 acres of Category 3, 4, and 5 forested reservations were covered by a FMP for a total of 15.5 million acres. The number of acres covered by an FMP has grown substantially since IFMAT I and II. In 1991, about 5.8 million acres were covered by a FMP, which then increased to about 7.3 million acres in 2001 (BIA Green Book, 2013).

IRMPs are not required and have not progressed at a similar pace. BIA data reports that 24 forested reservations (8.2 percent) had an IRMP in 2011. The majority of those (88 percent) were developed for Category 1 and 2 reservations.

Table F.1. Progress of FMP development on forested reservations.

Performance Indicator	**1991**	**2001**	**2011**
Percent of Category 1 & 2 Forested Reservations covered by a FMP	53%	68%	90%
Number of Category 1 & 2 Forested Reservations covered by FMP	44	64	85
Total Category 1 & 2 Forested Reservations	**83**	**94**	**94**
Percent of Category 3, 4, & 5 Forested Reservations covered by a FMP	13%	21%	43%
Number of Category 3, 4, & 5 Forested Reservations covered by FMP	6	19	86
Total Category 3,4, & 5 Forested Reservations	**47**	**92**	**200**

Source: BIA Funding and Planning Analysis, 1991 – 2011

Note: Data includes only reservations held in trust not including Alaskan reservations.

Summary of previous IFMATs

IFMAT I found that FMPs had the potential for focusing and directing forest management, but that the analysis was often inadequate, planning faced funding and personnel limitations and that implementation was difficult. Sustained yield was narrowly defined, forest inventories were useful, but could be improved. IRMP had not yet been implemented. IFMAT I also recognized that there were issues requiring special planning and management, including allotments, Alaska, mixed ownerships and off-reservation lands.

IFMAT I recommendations (*emphasis* added) included:

- Ensure that coordinated resource management plans guide Indian forest management *via clearly defined objectives, standards, operations plans, and monitoring procedures*.
- Direct more staffing and funding towards bringing *cultural resource planning*, initiatives and baseline data to where it can be effective in coordinated resource management.
- *Improve forest planning analysis*.
    - Broaden definition of sustained yield management – focus on ecological processes and forest productivity.
    - Make plan results accessible to the lay reader – graphs, figures, charts, etc.
    - Develop and analyze diverse set of alternatives.
    - Provide detailed timber supply discussion under the plan recommendations.
    - Modernize harvest scheduling techniques and up-to-date sustainability check.
    - Increase operational planning to implement forest plans and coordinated resource plans.
- *Improve the Bureau of Indian Affairs (BIA) CFI system*.
- Address *special planning and management issues*: allotments, Alaska, mixed ownerships, and off-reservation lands.

IFMAT II found that planning was decentralized, resulting in a wide variation between forest plans in terms of approach, content and quality. Progress on IRMPs was progressing slowly. While most FMPs defined a "tribal vision" there was much room for improvement. Progress had been made in describing ecological processes, describing the future forest, and linkages to operational plans, but there was still room for improvement. IFMAT II found that most plans defined sustainability solely in terms of harvest outputs. IFMAT II found that Continuous Forest Inventory (CFI) compared favorably to inventory and planning systems used by other agencies, but there were organizational inefficiencies in the CFI effort and in GIS support. At that time, continuing support of the CFI system was uncertain. It found that because of inadequate planning budgets, most BIA support was aimed at inventory analysis, rather than forest planning. Larger tribes were found to have the resources to support their own forest planning efforts.

IFMAT II recommendations focused on strengthening the planning effort and the systems that support it. Specific recommendations (*emphasis* added) include:

- Broaden and deepen the assessment of the ability of FMPs to sustain tribal forests and their benefits – *make 'achieving the tribal vision on a continuing basis' the definition of sustainability.*
- Maintain IRMP process, *increase funding so that 10 IRMPs could be completed annually.*
- Amend the BIA Manual to *allow for plans to be considered current until amended* in an effort to avoid conflict and costly tribal impacts associated with tribes not have a current FMP

- Convene a task force to *further define sustainability* in operational terms that be translated to management realities.
- Consolidate the *CFI analysis* and integrate it with the GIS support.

Findings

We reviewed in detail FMPs for the 20 forests we visited and discussed the plans on our site visits. For consistency and to allow for comparisons between previous IFMAT assessments, we used planning elements developed by IFMAT I and IFMAT II to review FMPs for the 20 current forests we visited. These planning elements are:

- A set of goals that reflect tribal aspirations for forest management (linked to the tribal vision for the forests).
- A discussion of the natural history of the forest, including historical disturbance processes.
- A discussion of human use of the forest (the history of human use) and its roles in the culture and economy of the tribe.
- Trends of vegetation and current conditions.
- A description of future forest reflecting tribal goals that becomes the long-term objective for the plan (and whether the plans give a visual or other portrayal of this future forest such that laymen can understand it).
- A description of the kinds of actions that the tribe will take to achieve its desired future forest conditions, uses, and values.
- Projections of future stand conditions, growth, and yield.
- A definition of sustainability related to achieving the tribal vision on a continuing basis, including protection of underlying ecological processes and forest productivity, and a demonstration that the plan will contribute to sustainability.
- A portrayal of the benefits that will result from the management plan in the short-term and their economic and social effects, including the economic outputs produced in the near term in a form usable by tribal enterprises.
- An assessment of whether these benefits can be maintained in the long-run (up to 100 years into the future).
- Compatibility of the forest plan with tribal IRMPs.
- Integration of the forest plan with plans for the management of other resources such as fire plans.
- Linkage to operations plans that will guide implementation, including a description of the type and location of activities.
- Standards and guidelines forest-wide and for different zones within the forest to guide implementation.
- A set of measures to gauge achievement of plan goals and a mechanism for monitoring their achievement and revising the plan as necessary (adaptive management plan).

- How does the plan determine and calculate harvest? How sophisticated are the modeling procedures? What type of inventory is used?
- Standards setting forth the funding and staffing requirements to carry out FMP.
- Level of quantitative criteria to evaluate the performance of FMP implementation.

During the course of our review, we identified additional criteria that were useful:

- Is the acreage distinguished between land classifications (trust, non-trust, allotments, etc.)?
- Is the plan approved by the tribal council?
- How long was the planning process and did the process include public participation?
- Were planning alternatives considered and analyzed thoroughly?

Thinned, burned, and regenerated - Colville. Photo by Larry Mason

Our review of FMPs from visited reservations suggests that there is a wide variety between plans in terms of quality of the plans – some plans were much more comprehensive and detailed than others. It also suggests some general areas of strength and weakness across the set of plans we reviewed. Few plans, for example, addressed staffing and funding needs with much specificity. Most plans, on the other hand, had a clear statement about the vision and purpose of forest management.

In our experience, a comprehensive and well-written forest planning document does not necessarily mean that the plan is effective. To be effective, a plan must enjoy the support of tribal leaders, forest managers, and the tribal public. It must have addressed and resolved, to the extent possible, key management issues. It should provide the vision and direction needed for continuity as new managers come to the forest. A well-written plan that sits on the shelf is not a good plan.

Table F.2. Ratings of the degree to which desirable elements of 16 tribal forest management plans were addressed of tribes visited by IFMAT (Four tribes did not provide a separate FMP from which the elements could be rated). Planning elements were chosen to be consistent with NIFRMA and previous IFMAT reports. Rating values reflect professional judgment of IFMAT members, using a scale of 1-5 (5 = completely addressed).

Plan Elements	Tribe															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Forest Management Goals	2	4	4	5	2	4	4	4	4	3	4	4	1	2	3	5
Natural History Discussion	2	5	2	5	0	1	2	3	4	1	3	4	1	4	0	4
Human Use Discussion	1	5	4	4	0	2	2	3	3	1	4	4	1	3	0	4
Trends of vegetation & current conditions	2	5	4	5	0	5	3	5	3	5	4	5	0	3	0	5
Long-term objectives of future forest	1	5	4	5	2	3	2	4	3	3	3	5	1	3	1	5
Specific actions to achieve future forest	2	4	4	5	3	3	3	3	4	4	4	4	2	3	2	4
Projection of future forest stand conditions, growth & yield	2	3	5	3	0	4	2	2	4	4	3	4	0	0	0	2
Definition of sustainability relating to tribal vision	0	3	1	3	2	3	1	1	5	0	2	3	0	0	1	4
Short-term management plan benefits	2	4	2	3	2	2	2	3	4	4	4	4	2	3	1	2
Assessment of long-term feasibility of benefits	3	3	0	2	2	3	0	1	2	0	2	3	1	2	0	1
Forest plan compatibility with IRMP	0	5	0	4	0	0	0	0	0	1	0	2	0	0	0	2
Integration of forest plan with other tribal resource plans	1	4	1	4	2	0	0	2	2	3	3	3	0	0	1	1
Linkage to operations plans - implementation	2	4	3	4	3	1	2	2	2	3	4	4	0	1	3	3
Standards & Guidelines to guide implementation	3	3	4	5	3	3	4	2	5	5	4	5	3	3	3	5
Measures and monitoring plans	0	4	4	5	1	2	1	2	0	5	4	5	1	0	3	3
Inventory, Harvest Modeling Procedures	1	3	5	5	1	4	3	2	3	5	3	5	3	3	1	2
Current Staffing and Funding	5	1	0	0	4	3	0	1	0	2	2	2	0	5	0	3
Staffing needs and funding to implement FMP	5	0	0	0	4	3	0	4	0	4	1	1	0	5	0	4
Quanitative criteria to evaluate performance	1	5	0	5	2	2	1	3	0	0	2	2	3	0	0	4

The commitment to and ongoing use of the FMP was a key element of inquiry in our site visits. Based on our review of the plans and our discussions with forest managers and BOFRP, we offer the following findings:

F1. The Indian Forest Management Handbook[24] is an excellent document that provides clear instruction on the necessary elements of a FMP satisfying the requirements set forth in Chapter 2, Part 53 of the Indian Affairs Manual (Forest Planning).

F2. Most forested acres are now covered by a plan.

F3. There exists great variation between plans in terms of approach, depth, content, and rigor.

F4. Forest plans are still primarily timber management plans, with some standards, guidelines or limitations imposed by other resources. We observed some efforts to integrate other resource management objectives into the timber management program, but much of this was expressed as limitations on timber management, rather than a more deliberate effort to use timber management to create forest conditions favorable to other resources.

F5. Planning technology within the BIA has not kept pace with forest planning developments on other ownerships. The BIA's CFI system, furthermore, does not support a more comprehensive approach to planning. It is not state of the art in terms of providing the comprehensive resource inventory necessary for more detailed and specific forest management plans.

F6. While it is sometimes difficult to discern a strong statement about tribal vision in a forest plan document, our site visits indicate that forest managers had a clear understanding and a deep commitment to a tribal vision.

F7. There is a wide range of approaches and of success in obtaining and incorporating input from the tribal public into the forest planning process.

F8. FMPs generally do not address climate change, forest health, or forest restoration.

F9. Progress on IRMPs is slow. Only 24 forests have IRMPs. A few of the forests we visited have IRMPs and forest managers on those forests cite benefits. Efforts on other forests are stalled and there are questions about the need or viability of IRMPs. Funding and technical support for IRMPs is limited.

F10. Most plans identify five or ten years' worth of upcoming projects. But most do not identify resources (funding, positions, investments) needed to support the effort. In fact, only 25 percent of the FMPs we reviewed fully addressed standards setting forth the funding and staffing requirements to carry out FMP. Some of the FMPs cover the organizational structure of the forest management department and current funding, but lack discussion on future funding needs.

[24] Indian Forest Management Handbook http://www.bia.gov/cs/groups/xraca/documents/text/idc008867.pdf

Pine savannah – Flathead. Photo by Vincent Corrao.

F11. Most of the FMPs provide some level of quantitative criteria to evaluate performance of FMP implementation but only a few provide evaluation criteria that are detailed and comprehensive.

F12. Many tribal foresters find value in the IDT approach prescribed by NEPA regulations, and indicate that they would follow a similar interdisciplinary review process even if not required. On some forests, NEPA appears to be more of a burden and cost than on others.

F13. There is little or no recognition of tribal enterprises in the forest plans. The plans do not address the nature of the wood needed by local processing facilities.

F14. Allotments are under-planned. Allottees have little or no view of when harvest will occur. Allotment harvest appears to be more opportunistic than planned.

F15. Some reservations that IFMAT visited contain commercial woodland with FMPs that addressed woodland management. Most provide limited direction for how the tribe should manage woodlands.

Recommendations

IFMAT continues to believe that strong forest planning will go a long way toward resolving issues and ensuring efficient and effective forest management. A good FMP authorizes management,

resolves resource issues, sets cost and revenue expectations, and describes the long-term impacts of proposed management. A well-crafted FMP transfers knowledge and expectations from one generation of forest managers to the next, helping to promote vision and consistency over time.

In an effort to manage a time consuming and costly planning process, IFMAT II recommended the BIA amend the planning manual to eliminate the fixed ten-year FMP review period and allow FMPs to remain current until amended. The BIA subsequently acted on this recommendation and the BIA Manual now allows a FMP to "remain 'current' unless it is determined that the plan no longer represents tribal goals or forest management policy, or the state or condition of the forest/timber resources."

We continue to support this change as it will reduce the cost of planning. However, we caution that FMP revision and modification should not be avoided simply because the regulations allow for more flexibility. New tools and data are consistently being developed which can ensure that forest planning processes address resource management issues as they evolve through time.

Tribes should consider a regular FMP review process to assess whether or not the document sufficiently addresses of all the resource management issues of the time. Changed conditions, new data, new management techniques, significant differences in funding and new management issues are reasons for considering modification to existing forest management plans. We offer the following recommendations for improving forest management plans as they are revised.

F1. Tribes should consider a desired-future-conditions based approach to forest planning. The current regulations describe the objective of forest planning as establishing sustainable harvest levels, given the nature of the resource and some restrictions designed to protect other resources. This approach is similar to federal and state forest planning approaches designed in the 1970s and 1980s. More recent forest planning efforts focus on agreeing on some kind of desired future condition (DFC) and deciding how best to move the forest toward the DFC. We note that a DFC is not a static state, but takes into account and makes provision for the dynamics of natural agents of change (fire, insects, disease, storms, and climate change). A DFC-based planning approach requires more specific data and more complicated forest planning tools than are currently available to tribes, as discussed below.

F2. Better inventory data are needed to build better planning models. The BIA's current CFI system is a low cost approach to providing the minimal amount of information needed to support basic timber management planning tasks. While a long-running CFI may provide scientists with an exceptional basis for evaluating the long term effects of climate change, management actions, etc., it does not provide land managers with data needed to decide what to do next and where to do it. Most state and private timberland managers have moved toward in-place inventories that provide the stand-level information needed to support management. Tribal foresters have devised a variety of workarounds to get some of the

information that an in-place inventory provides that can be inexpensively linked to management decisions and plan assessment. We did not make a comprehensive evaluation of other resource inventory information but we understand that such information is also limited.

Pine shelterwood – Menominee. Photo by Vincent Corrao.

The current sustained yield calculation, known as the Austrian Formula, the basis for the AAC calculation specified in BIA planning regulations, is an anachronism abandoned by most other timberland managers in the middle of the last century. While it can be used to calculate an AAC, it does not provide a cost efficient approach to meet multiple objectives, nor does it suggest to the planner where to go or how to manage the forest to achieve the AAC. At best it is an approximation heavily influenced by the opinion of the planner about future growth, harvest and mortality, and some kind of average inventory target.

Forest planners for federal, state and private lands have designed a variety of forest planning approaches that make provision for multiple management objectives, and provide forest managers with much more specific management direction.

The BIA should evaluate and adopt a more robust and more modern approach toward forest inventory and forest planning.

F3. BIA should provide more technical support for forest planning. Forest planning is a difficult chore. It requires a working knowledge of all fields of forestry (inventory, biometrics, management, economics, policy, regulation, etc.), wildlife and fishery biology, hydrology, range management, ecological processes, cultural values and is typically performed only periodically. As a result, tribal forestry organizations often do not have a forest planning specialist on staff. Our visits suggest that tribal forest planners would benefit from additional support.

BIA regional offices have a reduced capability to provide the technical support needed by tribal forestry organizations. Additional support is especially important as forest planning moves toward even more complicated planning systems. We recommend that BIA investigate approaches for providing more technical support. A team of planning specialists at the regional or even national level could go a long way toward providing support and assistance.

F4. Forest plans should recognize and account for natural processes. While most of the FMPs we reviewed describe potential insect and disease agents and treatments for infested and infected stands, most do not lay out management strategies designed specifically to treat such stands or avoid similar problems in future stands. For the most part, we did not see major insect and disease problems on our site visits. But some tribal forests have had significant health problems in the past, and some still have substantial problems. A forest plan offers the tribal forester an opportunity to take a proactive approach by identifying management designed to avoid developing insect and disease problems, and quickly treating problems as they arise.

F5. Forest plans should consider and address climate change. None of the forest plans we reviewed addressed climate change. Given that many of the tribal forests are in areas that could experience substantial changes, and that Tribal forests are typically managed on long rotations, climate change could have substantial impacts. Forest plans should address this issue.

A potential starting place for tribal forest managers could be the USFS's 10-point Climate Change Performance Scorecard that addresses organizational capacity, engagement, adaptation, and mitigation.[25]

In addition, the USFS created the guidebook, *Responding to Climate Change in National Forests,* that contains science-based principles, processes, and tools necessary to assist with developing adaptation options for national forest lands (Peterson et al. 2011). Another resource for addressing climate change is the Forest Service web portal called the 'Climate Change Resource Center[26] that contains resources for those seeking information on land management tools related to climate change.

[25] Climate Change Performance Scorecard http://www.fs.fed.us/climatechange/advisor/scorecard.html

[26] Climate Change Resource Center http://www.fs.fed.us/ccrc/

Douglas fir pre-commercial thin – Coquille.
Photo by Vincent Corrao

F6. Forest plans should consider current and future manufacturing infrastructure. Many tribes have some kind of tribal enterprise, and some of those are manufacturing facilities. None of the FMPs we reviewed, however, had any discussion about the correlation between the proposed management and needs of the tribal enterprise or other local manufacturing facilities. In fact, our field visits suggest there are sometimes substantial differences between the wood needed by the tribal enterprise and the harvest proposed for the forest.

We have seen, for example, harvest focused on removing small trees to promote the growth of larger trees, but the tribal mill and/or marketing of tribal timber are focused on higher quality large trees. This mismatch creates problems on both ends. We also saw where a reduction in AAC for other purposes leaves mills with insufficient timber resulting in higher manufacturing costs.

The FMP offers tribal foresters, enterprise managers and Tribal Council an opportunity to coordinate efforts and expectations. Indeed, coordination between land managers and manufacturing facilities is the basis of the Anchor Forest initiative. Coordination among tribes and adjacent landowners seems like a necessary first step.

F7. Forest plans should more completely describe staffing and funding needs to carry out implementation of FMP goals and objectives. Most FMPs we reviewed provided a description of the tribe's current forest management staff and budget details. They did not, however, provide significant detail regarding staffing and funding necessary to successfully implement goals and objectives set forth in the FMP.

The capacity of each tribe's forest management staff as well as the funding mechanisms needed to implement an FMP are important to meeting FMP goals and objectives. Tribal forest management would benefit from a more detailed and critical look at these needs within FMPs providing an opportunity for periodic evaluation of departmental personnel and funding levels.

F8. Forest plans should include quantitative criteria in more detail and clarity to evaluate FMP goals and objectives. Many FMPs we reviewed included criteria to help evaluate and monitor the progress of FMP implementation. In most cases, the criteria presented were mostly qualitative. To have an effective adaptive management process quantitative criteria should also be developed and integrated into the FMPs. Both qualitative and quantitative criteria will help tribes evaluate FMP goals and objectives as implementation occurs and will inform future planning decisions.

Douglas fir commercial thin – Tulalip. Photo by Vincent Corrao.

F9. Planning for allotments needs more attention. While data is not available to quantify the acreage of Indian forest land that is in allotments, evidence suggests that the extent of forested allotment is significant (see discussion in Task D). The proportion in allotments and the impacts on tribal forest planning vary considerably by reservation. In addition to management challenges, the accounting difficulties and expense associated with allotments have been well documented as evidenced by the Cobell settlement, and the OST.

Our site visits indicate that the allotment system presents a special set of challenges to the forest manager as well, and that these challenges are amplified where allotments are highly fractionated.

In our view, the allotments get little attention in tribal forest plans. Forest conditions on and historic and projected harvest levels for allotments are typically not reported separately. In fact, the very nature of the CFI inventory does not lend itself to describing or planning for allotments separately from Tribal trust lands – another reason for an in-place (stand level) inventory.

Forest plans should effectively communicate to allottees the kind of management and magnitude of revenue they could expect during the planning period. We recommend that BIA planning regulations be modified to direct forest planners to prepare a brief description of the forest conditions on each allotment, a statement about the objectives of allotees where such objectives can be determined, and a recommended forest management schedule for each allotment. Much of this detail can be carried in an appendix to the FMP and should be updated annually to reflect progress.

IRMP recommendations

Past IFMATs have offered strong support of efforts to create IRMPs. An IRMP offers tribal resource managers a way to enhance compatibilities and understand tradeoffs in production of multiple resources. Differences among reservations, however, make it difficult to specify the nature of the IRMP, or to even recommend that every reservation needs an IRMP.

The development of an IRMP has the potential to offer tribes additional benefits that are a result of the comprehensive planning process that accompanies IRMP development. An IRMP potentially can:

- Resolve conflict between tribal members, land managers, and tribal councils;
- Facilitate communication among resource managers (forestry, fisheries, etc.);
- Describe a more comprehensive vision for the tribe's natural resources;
- Create opportunities for collaboration with government and state agencies that may open up alternative funding sources for implementation;
- Result in NEPA relief through categorical exclusions or other mechanisms.

Our discussions with some tribal planners suggest that the development of an IRMP requires considerably more time, expense, and expertise than does a FMP. Many Tribes do not appear to have the required resources. With respect to IRMPs, we offer the following recommendations:

F10. The development of IRMPs may not be appropriate for every tribe. BIA funding and technical support for IRMP development may be best targeted to reservations that can benefit most from an IRMP. Criteria could include size of the reservation, the nature of natural resources, current resource conflicts, status of self-determination, etc. This focused approach to IRMP development could give a lift to the IRMP development success rate.

F11. For tribes that are moving in the direction of self-determination, an IRMP-type document could also serve as the trust agreement between the tribe and Secretary. We propose that a new kind of agreement between the Secretary and a tribe could better

define the trust obligation and responsibilities of both parties with respect to tribes moving toward self-determination. A document like an IRMP could be the basis for such an agreement. As currently described and written, the IRMPs are more strategic level plans. To make an IRMP a more suitable basis for an agreement, the document would need to tier to a tactical plan for achievement of long-term goals while also portraying the impacts on resources. Such a document should incorporate the following kind of information:

1. Description of who does what (this might be similar to the contract/compact documents).
2. Specification of funding needed to implement the vision, with some kind of contingency built in.
3. Description of the outcomes expected of the manager.
4. Adaptive management language.
5. A monitoring program.
6. A resolution process if inputs or outcomes stray from expectations.
7. Some relief from burdensome processes because of the existence of the agreement.

We offer this as a starting point. If the tribes and BIA decide to pursue this option, then more thought will need to be given to the nature of the document used as a basis for that agreement. Our hope is that such an agreement would provide more certainty and an articulation of clear boundaries between the government and the tribe regarding the responsibilities and obligations of both parties.

Woodlands

Woodlands comprise a sizeable portion of the forested tribal trust lands. Because they do not generate as much revenue or employment, woodlands typically receive much less attention from planners. Since the last IFMAT assessment, the BIA has been working diligently to prepare forest plans for smaller reservations which are typically weighted toward woodlands.

Only four of the reservations we visited had any significant amount of woodlands, and in those cases, the commercial forest land outweighed the woodlands in terms of size, significance and attention. We did not visit any reservations that were primarily woodlands, and recommend that future IFMAT assessments include one or more of those reservations.

F12. Reservations with a significant woodland component should integrate woodland management considerations into tribal FMPs. IFMAT II recommended that tribes bring woodlands "into the mainstream of forest management planning." We agree with this

recommendation and stress that a gap remains in woodland management planning, which acknowledges that significance and extent of the woodland resource. The ecological and cultural significance the woodland resource calls for a better understanding of the related resource management issues such as wildlife habitat, grazing, fuelwood, and non-timber forest products.

NIFRMA Task G - An evaluation of the feasibility and desirability of establishing minimum standards against which the adequacy of forestry programs of the Bureau of Indian Affairs in fulfilling its trust responsibility to Indian tribes can be measured.

> *"The BIA's mission is to enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian tribes and Alaska Natives…through the delivery of quality services, maintaining government-to-government relationships within the spirit of self-determination.[27]"*

Background

Given a long history of prolonged and expensive litigation, it is highly desirable to establish standards with which to ensure that the forestry programs of the BIA fulfill federal trust responsibilities. Some standards are already in existence but may need review in a more systematic and proactive fashion. Prior IFMAT reports have noted that the BIA has an apparent conflict of interest in its mandate to deliver technical services to Indian tribes and oversee trust obligations. IFMAT I and II characterized this situation as that of one individual attempting to serve as both pitcher and umpire simultaneously.

IFMAT proposes standards by which to measure several key elements of BIA programs upon which fulfillment of the federal trust duty depends. For standards to be effective, it is necessary to: (1) apply the standards; (2) oversee their execution; and (3) to have the power to enforce adequate performance. An effective mechanism for enforcing standards does not currently exist and the third party oversight as recommended by past IFMAT reports has never been implemented.

The adequacy of forestry programs can be measured by looking at the following:

1. Accounting for trust asset income from forest resources;
2. Technical Services;
3. BIA Funding;
4. Ability to obtain technical and financial support from other agencies;
5. Meaningful consultation and collaboration with other federal land management agencies;
6. Governance;
7. Tribal vision as "state of the art" forestry.

Findings

G1. It is feasible and desirable to establish standards to measure the adequacy of forestry programs on Indian lands.

[27] Office of Indian Services. http://www.bia.gov/WhoWeAre/RegionalOffices/Pacific/TribalOperations/index.htm

G2. IFMAT has observed that management of timber as a trust asset has increasingly been transferred from the BIA to tribes through compact and contract arrangements.

G3. Tribal forestry programs, guided by self-determination policies, are increasingly focused on provision of environmental and cultural values that are important to tribes. Tribal values subordinate, but not displace market returns from timber as priorities for forest management. Comparisons of tribal programs with those of other landowners with different management objectives may serve to understate the unique combination of benefits provided by investments in tribal stewardship.

G4. IFMAT notes that the diminished capacity of BIA programs to deliver technical services has caused tribes to depend more on other agencies, especially USFS and NRCS, and non-profit foundations for short-term financial and technical support.

G5. IFMAT has observed mixed results from its review of consultation by federal agencies. Protocols for tribal consultation vary by agency and are not consistently carried out by regional staff.

G6. There appears to be inconsistent understanding of tribal status and trust responsibility within the host of federal agencies that work with or manage lands adjacent to tribes. Agencies such as the USFS and the NRCS (both in the USDA) are engaging increasingly with tribes. For example, we observed woodland management activities supported mainly by NRCS. Project partnerships like these can be beneficial, but such engagement is not always coordinated with tribal objectives. The trust obligations of non-BIA agencies to tribes remain ambiguous. The trust duty could be clarified through adoption of interagency agreements with the BIA.

G7. An increasing number of tribes have used self-governance to create economic opportunity and to customize their forestry programs for best alignment with tribal values and visions.

G8. Despite funding and staffing difficulties, many Indian forests are places of experimentation, adaptive management, and innovation. Indian forest programs have been acknowledged as models of stewardship and sustainability from which other landowners can learn.

G9. Any standard to be used to measure fulfillment of the trust duty will need to be driven and defined by each tribe's vision for their forests.

G10. Tribes have extensive off-reservation treaty rights and reserved non-treaty rights on federal lands managed by the Departments of Interior and Agriculture.

Discussion of trust standards

1. Accounting for trust asset income from forest resources

Accounting for the income from and management of American Indian trust assets has been an issue in hundreds of court cases, most notably Cobell v Salazar. The BIA's accounting must be held to generally accepted government accounting standards, subject to regular audits by an independent organization such as GAO and Inspectors General. In 2007, the federal government carried out the "Historic Accounting Project" – an attempt to reconstruct trust beneficiary accounts going back to 1887.[28] The effort revealed that BIA trust asset accounting during more than 100 years often failed to conform to generally accepted accounting standards.

The BIA has a fiduciary duty to manage timber resources on a sustained yield basis and to properly account for monies associated with forest management activity. Federal laws "give the Federal Government full responsibility to manage Indian resources and land for the benefit of the Indians. They thereby establish a fiduciary relationship and define the contours of the United States' fiduciary responsibilities."[29]

Thirty years after the Mitchell II ruling, the federal government has settled numerous breach of trust claims with Indian tribes. Creation of the OST, a new accounting system (TAAMS), and new security measures are attempts at improvements toward the goal of fulfilling the government's fiduciary duty to protect revenues derived from trust assets. Both OST and TAAMS have required significant government investment which otherwise might be used to provide better support to tribal programs. The DOI invested approximately $3.9 billion (more than the Cobell settlement) from 1996 to 2008 on "management, reform and improvement of Indian trust programs."[30]

IFMAT III received comments from forest managers and technical staff about TAAMS. Not all Tribes have easy access to the system. Tribes that are far from regional offices may need to send staff on two-day long travel just to access or enter information into a secure computer terminal. Some interviewees stated that the program is time consuming, but an improvement over past systems. A few interviewees noted that TAAMS was inadequate because it lacks the capacity to link with GIS or other spatially explicit databases. Linkages to geographic information are important for assessing revenue streams from specific allotments. BIA representatives indicate that this issue is being addressed as of the time of writing.

OST appears to be well-equipped to carry out the duty of the federal government to account for the transfer of funds derived from trust assets, such as timber, to individual Indian beneficiaries. OST conducts annual trust evaluations that focus on flows of revenue from trust assets to

[28] http://www.justice.gov/civil/cases/cobell/

[29] United States v. Mitchell, 463 U.S. 206, 224 (1983) (Mitchell II). But see, United States v. Jicarilla Apache Nation, 131 S.Ct. 2213 (2011); United States v. Navajo Nation, 556U.S. 287 (2009); United States v. White Mountain Apache Tribe, 537 U.S. 465 (2003); United States v. Navajo Nation, 537 U.S. 488 (2003)

[30] S. Hrg. 110-48, 110th Cong., 1st Sess. at 3-4, 72. Oversight Hearing on the President's Fiscal Year 2008 Budget Request for Tribal Programs, February 15, 2007.

beneficiaries. Such evaluations do not, however, include an evaluation of the forest resource itself, and apparently are not carried out by staff with natural resources training. Interviews with BIA and tribal staff indicate that OST serves only an accounting function, without technical expertise in forestry or natural resources.

Even if OST had technical expertise in natural resources management, IFMAT still believes there is a need for an independent, third-party to oversee trust duties.

2. Technical Services

The BIA is responsible for delivering technical services to tribes to manage forests. The capacity of the BIA to provide adequate support services to Indian forestry programs has declined over the past 20 years, due to cuts in funding, reductions in staff, and expansion of the Indian forest land base. IFMAT has observed that management of timber as a trust asset has increasingly been transferred from the BIA to tribes through self-governance compacts and self-determination contract arrangements. Some tribal and BIA employees interviewed observed that funding of BIA direct service operations prior to self-determination did not increase under new contract and compact arrangements. Distribution and administration of funds to contract and compact tribes, however, require higher administration costs than direct service. For instance, as a result of *Salazar v. Ramah Navajo*[31] BIA is to pay $40 million to compensate compact and contract tribes for underpaid indirect costs. Given the shrinking BIA budget, court ordered payments will reduce funds available for technical services. For example, technical services delivery from BOFRP, especially to direct service tribes, are chronically inadequate and continue to decline. This causes delay in forest planning and implementation.

IFMAT finds that few tribes have adequate access to technical services despite the fact that the ability to achieve "state of the art" forestry depends on access to adequate technical services. IFMAT proposes a standard to measure whether individual tribes have access to qualified staff, technical expertise, and technical resources to manage their lands in a manner that achieves the tribal vision for their forests. These criteria need to be measured regularly by an independent third-party entity with technical forest management expertise to evaluate whether technical services are adequate to manage Indian forest lands. Where gaps are identified, the evaluator should be empowered to make authoritative recommendations for improvement.

3. BIA Funding

"State of the art" forestry depends on adequate and predictable funding. IFMAT proposes a standard to measure funding adequacy and stability.

NIFRMA mandated that IFMAT compare the funding of Indian forests to that of other federal and private forest land owners. IFMAT's comparison (Task A) to other ownerships has now shown three times that Indian forests are chronically underfunded compared to federal, state and private

[31] http://www.supremecourt.gov/opinions/11pdf/11-551.pdf

industry forests on a per acre basis. In real terms tribal forestry programs have less funding today than twenty years ago. Comparisons of tribal programs with those of other landowners may serve to understate the unique combination of benefits provided by investments in tribal stewardship. This is because tribal forestry programs that are increasingly guided by self- determination are now focused on the provision of environmental and cultural values that are important to tribes, in addition to more commonly considered market returns from forest products. IFMAT argues that Indian forestry programs are unique in providing greater benefits and more diverse services to Indian people than any other type of forest land management. These benefits include, among other things, direct and indirect economic benefits from timber revenue, jobs, firewood, grazing, hunting, gathering, water, as well as cultural and spiritual values that cannot be quantified.

Unfortunately, programmatic funding for Indian forests has been in decline and variations from year to year make it difficult to recruit and retain staff, as noted in other sections of this report. tribal forestry programs are increasingly dependent on temporary grant funding. IFMAT found on site visits that tribes consistently devote a greater amount of staff time to seeking "soft money" than ten years ago. A standard to measure the adequacy of funding must take into account the source, duration, and transaction costs of such funds.

Thus, IFMAT recommends a standard for measuring the federal government's fulfillment of its trust responsibility by measuring all the benefits that Indian forests provide to American Indian people, which extend beyond what other comparable forests might provide to society as a whole. We repeat prior IFMAT recommendations that third party oversight of the BIA by GAO and/or the Inspector General is needed to determine whether funding and technical support are adequate to fulfill trust responsibility for forest resource management.

4. Ability to obtain technical and financial support from other federal agencies

IFMAT notes that the diminished capacity of BIA programs to deliver technical services has caused tribes to depend more on other agencies and foundations for short-term financial and technical support. This is an unstable situation not conducive to the long-term planning required for sustainable forest management. The fact that tribes seek funding and services outside BIA indicates that BIA funding alone is not adequate to fulfill trust responsibility. IFMAT site visits found technical support/technical services deliveries varied from reservation to reservation, and from agency to agency. Prominent federal agencies that work with tribes on matters related to forestry include the DOI Fish and Wildlife Service, BLM, USFS, USDA National Institute of Food and Agriculture (NIFA), EPA American Indian Environmental Programs, DOE Tribal Energy Program, and NRCS. It appeared to IFMAT that federal funding was not well-coordinated, it resulted in high transaction costs, and in some instances funded work that did not match tribal goals.

During reservation visits, IFMAT observed numerous examples of forest development and infrastructure projects that were funded through NRCS conservation programs. An increase in NRCS involvement with tribes has political support at the national level and is mandated by the

2008 Farm Bill. Woodlands, in particular, have benefited from funds and technical support from NRCS since BIA funding for woodland management is scarce. Tribes visited by IFMAT report that relationships with NRCS are appreciated and that NRCS has provided beneficial and needed funding that otherwise might not have been available. For some tribes visited, departments that are essential to integrated forest management such as wildlife, fisheries, and water quality have become totally dependent for funding support upon grant writing success with NRCS and others. We find these circumstances to be inefficient and potentially unsustainable. Secure long-term program funding rather short-term project funding is needed to recruit and retain qualified staff to plan and implement multi-generational programs for integrated resource management as recommended by NIFRMA.

The USFS has expanded its Office of Tribal Relations (OTR) since IFMAT II. The senior executives of the agency have stated their strong support for assisting tribes with technical service needs. While much has been done, we see a need for an expanded role for OTR to coordinate and assist service deliveries to tribes from within USDA. Specifically, coordination is needed from USFS State and Private Forestry (S&PF), Forest Service Research and Development (R&D), NRCS, and NIFA. NIFA, among other programs important to tribes, provides support to tribal colleges. R&D currently helps tribes with issues such as insects and pathogens, and climate change, that threaten forests. In the case of S&PF, for instance, the ITC has repeatedly requested that agency funds should be distributed directly to tribes, not through state foresters as is currently the case. This is because tribes are to be served and tribes are not to be subordinated to states. ITC has also requested that funding inequities need correction. In addition, the S&PF name should be changed to Tribal, State, and Private Forestry in order to appropriately acknowledge the importance of tribal forestry within Secretary Vilsack's "All Lands" approach to forest management.[32]

IFMAT proposes a standard to measure whether funding and technical support from non-BIA agencies meets tribal goals, rather than government agency goals.

5. Meaningful consultation and collaboration with all relevant federal agencies

[32] http://www.fs.fed.us/video/tidwell/vilsack.pdf

Sitka spruce growth – Makah. Photo by Larry Mason

Executive orders from Presidents Clinton, Bush, and Obama reiterate the requirement for federal agencies to consult with tribes prior to taking certain actions. IFMAT has observed mixed results from review of consultation by agencies. Protocols for tribal consultation vary by agency and are not always carried out by regional staff. Consultation requests from federal agencies to tribes when not accompanied by sufficient resources to underwrite tribal costs of participation can function as unfunded mandates that burden already short-handed tribal staff. Adding further confusion, there appears to be inconsistent understanding of tribal status and trust responsibility within the host of federal agencies that deal with tribes. IFMAT III proposes that the effectiveness of consultation can best be assessed by tribal review of the consultation process, planning, and implementation of programs, policies, and actions undertaken by federal agencies with consequences for tribes. Effectiveness monitoring is particularly important for review of federal actions on lands adjacent to reservations and on ceded lands where tribes retain treaty rights.

The trust duty has generally been enforceable only when an agency has elaborate control over assets or has a clearly expressed duty to act.[33] The BIA needs to consistently work with, and have the ability to guide the actions of other agencies causing them to act in a manner that enhances Indian trust assets. Interagency agreements would provide a mechanism for such work.

IFMAT III has observed increased engagement between tribes and the Forest Service since 2003. The TFPA is a notable example of the potential for Forest Service to work with tribes on collaboration. TFPA was intended to protect tribal assets by allowing tribes to contract with the USFS to carry out hazardous fuel and forest health silvicultural treatments on federal lands.

[33] United States v. Mitchell, 463 U.S. 206, 225 (1983)

Stewardship contracting represents similar opportunities and can be undertaken on a multi-year basis extending to ten years. The effectiveness of tribal fuels reductions has been proven by wildfire behavior on the Wallow fire and others (Jackson et al. 2011). Tribal stewardship is both effective and trusted, as IFMAT heard on one National Forest, hazardous fuels reduction projects if not undertaken by the tribe would have been stalled by lawsuits from environmental groups. IFMAT III concludes that TFPA and stewardship contracting offer great potential to create economic opportunities for tribal members, protect tribal resources and treaty rights on and off the reservation, and accomplish needed fuel hazard reductions that otherwise might not be accomplished on federal lands. Several small projects have been undertaken but as yet longer-term contracts have not been initiated.

Federal failure to act results in forest declines that under changing climate conditions become increasingly vulnerable to destructive disturbance events such as wildfire. IFMAT observed numerous hazardous fuels conditions on National Forests of the inland west that are adjacent to reservations. It is worthy of note that 60 tribes retain treaty rights that extend to ceded areas of National Forests that without proper care are placed in jeopardy. USFS Chief Tidwell reports that 80 million acres of National Forest are in need of treatment. Not counting loss of facilities and natural resources, US forest fire suppression costs surpassed $2 billion in 2011 yet the USFS's inability to launch aggressive fuels reductions frustrates neighboring Indian land managers. Tribal foresters report obstacles to progress include burdensome processes and inability to form lasting relationships with frequently changing Forest Service personnel. The TFPA was intended to give tribes access to adjacent federal lands to treat fire and forest health risks. TFPA could be improved by Congressional mandate simply by changing "may" to "shall" in the statute.

IFMAT proposes a standard to measure the outcomes of federal actions that impact Indian lands. This would require extensive monitoring and reporting by individual tribes that is not now financially feasible. However, one measure available would be the number of acres treated under TFPA.

Oak regeneration – Lac du Flambeau.
Photo by Larry Mason

6. Governance (are self-determination and self-governance policies and contracts fully supported; do Councils have access to information and expertise to make informed decisions)

Following recommendations from President Nixon in 1970, Congress affirmed the right of tribes to have a greater say over the development and implementation of federal programs and policies that directly impact tribal members. It did so by enacting major pieces of legislation that together embody the important concepts of tribal self-determination and self-governance: The Indian Self-determination and Education Assistance Act of 1975 (P.L. 93-638), as amended in 1988, 1991, and the Tribal Self-Governance Act of 1994 (P.L. 103-413).

Through these laws, Congress accorded tribal governments the authority to contract for the administration of programs and services that previously were administered by the BIA. Congress established the Office of Self-Governance within DOI to develop and implement regulations, policies, and guidance in support of self-governance initiatives. It also upheld the principle of tribal consultation, whereby the federal government consults with tribes on federal actions, policies, rules or regulations that will directly affect them. Some tribes have chosen to contract with the federal government to deliver specific services, such as timber sales preparation. Under such circumstances tribes may take on greater program responsibilities when they are ready while, for the present, BIA and tribal professionals work together to accomplish tribal program objectives. These tribes are commonly referred to as "638" tribes. Under self-governance, tribes may contract for the entire suite of services included in BIA programs such as forestry. Under self-governance, the tribe has flexibility to decide how it allocates its funds to specific services whereas under 638 contracts specific amounts of funding are allocated for specific activities on a line item basis. Under both arrangements, tribal actions require BIA agreements that trust responsibility is not being compromised.

Loaded log truck – Yakama. Photo by Larry Mason

It is not clear to IFMAT III how the funding allocations for contracts and compacts are determined and whether allowance for upward adjustment is available to accommodate inflation, expansion of tribal resource objectives, additions to tribal land holdings through re-acquisition and consolidation, and ecosystem adaptions in response to climate change. Many of the contract and compact tribes that we visited reported little to no funding increases over the last two decades.

The funding situation appears worse for the tribes that remain as direct service recipients of BIA support. Generally these tribes are smaller and lack the resources and capabilities needed to take on contract responsibilities. Many of these tribes require only occasional technical support so that if they were to enter into self-determination contracts the funding available for the contract would be insufficient hire full time staff. Historically, BOFRP or BIA regional professionals have provided such technical services to multiple tribes. As was observed in IFMAT II, with the growth of tribal contracts and compacts, the funding and staffing levels at BIA to support technical services have suffered. Greater technical expertise needs to be available to all tribes, particularly to small reservations with limited forestry and natural resources staff. In addition to support for integrated resource planning, tribes require assistance with GIS, economic analysis, marketing, fish and wildlife biology, forest and woodland ecology, cultural anthropology, and climate change. We suggest three options for possible remedy.

1. Rebuild BIA technical capabilities at BOFRP and at regional offices. The more sophisticated and occasional services such as inventory analysis and integrated resource planning should be handled by BOFRP. However, technical services that apply to daily activities such as marketing and GIS support will be better supported at the regional or tribal level.
2. BIA could coordinate with other federal agencies such as NRCS and USFS to assure shared delivery of technical support.
3. Sufficient funding to contract occasional technical services from private consulting companies could be provided to tribes.

IFMAT finds that American Indian people and their governments now have greater control over their natural resources than 20 years ago. Today, contract and compact tribes represent nearly 40 percent of all federally recognized tribes. Self-governance creates tribal employment and empowers tribes to customize their forestry programs for best alignment with tribal values and vision. IFMAT observed, however, examples of contracting and compacting of program administration that complicated the trust oversight function of BIA because the trustee is further removed from day to day trust asset management. Administrative redundancies, such as occur when BIA and tribes are required to maintain parallel accounting, are inefficient and costly. Development of projects and timber sales have been slowed by NEPA compliance and the need to get a sometimes distant BIA to sign off on project acceptability. Self-governance should not diminish the federal trust responsibility, but inadvertently may weaken federal accountability. For example, the trustee may not be liable for breach of fiduciary duties if losses arise from failure of

the tribe to comply with the agreed-upon management plan; or for actions by tribal governments or tribal organization employees for which the trustee was not informed, or for which the trustee refused consent.

7. Tribal Vision as the standard of "state-of-the-art" forestry. Courts apply a fiduciary standard to determine whether the federal government fulfills its responsibility to manage Indian trust resources and revenue. IFMAT I stated that the standard is not clear with respect to forest management. That is, what is the measure of adequate forestry and forest management? NIFRMA refers to "state-of-the-art" forestry. This term must be defined and applied as a standard for measuring the adequacy of forest management.

Western red cedar is a culturally and commercially important tree – Quinault. Photo by Larry Mason.

IFMAT has long advocated for Indian people to make key decisions about their forest assets. A first step is to encourage each tribe to articulate a vision for forest and woodland management. Further steps include technical support for planning, endorsements from tribal and federal governments and adequate resources for implementation. We are in agreement with findings of IFMAT I and II; Indians live closer to the natural world and, therefore, directly experience the consequences of their forest management decisions more than other members of American society. Eighty percent of Americans live in urban and suburban environments. Indian communities on reservations depend heavily on their forests to sustain tribal values, employment, and income. Indians must make the best of the available resources. Despite funding and staffing difficulties, many Indian forests are places of experimentation, adaptive management, and innovation. Indian forest programs can serve as models of stewardship and sustainability from which other landowners can learn.

The condition of forests and tribal goals vary from one reservation to the next, and any standard for evaluating the adequacy of Indian forest management must take this diversity into account. Criteria for consideration by an independent auditor should include:

1. whether the tribe has articulated a vision for its forests;
2. whether the vision is integrated into the management plan; and
3. whether actions on the ground are adequate to carry out the plan.

IFMAT II considered the applicability of third-party certification systems to verify the environmental responsibility of Indian forestry programs but found a poor match. Although a few larger tribal forest product enterprises have enrolled in certification programs for market reasons, discussion with tribal foresters indicate distaste for the intrusion and expense imposed by certification companies. Fulfillment of trust duties instead requires acknowledgement by the Secretary that Indian forests are managed under the laws of the United States. Such acknowledgement should leave little doubt that Indian forest resources are managed sustainably and in concert with the integrated objectives of the tribe.

Recommendations

GI. Adopt IFMAT I's recommendation to define the trust standard as compliance with a forest management plan or IRMP that is based on the tribal vision for its forest, subject to approval and signature of the Secretary. The trustee will be evaluated on whether it has provided resources and technical support to carry out and follow the approved plan. A state-of-the-art Indian forestry program must: 1) be assured of predictable, consistent, and adequate funding for forestry programs on all reservations, whether direct service, contracting, or self-governance compacting; 2) have access to adequate technical and research support; 3) be guided by each tribe's vision for its forests; and 4) strive to sustain tribal resources and objectives. The condition of the forest itself, over time, is the best measure of whether state-of-the-art management is being achieved. A central part of the trust responsibility is to see that each tribe has the means to develop its vision and management plans with adequate technical resources and personnel.

Adopting IFMAT I's recommendation to define the standard as compliance with a FMP or IRMP based on the tribal vision for its forest will require that tribal councils be fully engaged in the process. We found tribal council engagement in forestry to vary, ranging from intense to much less so.

G2. Establish standards for funding Indian forestry that recognize the special ecological, social and economic importance of Indian forests. Fulfillment of the trust duty depends on provision of predictable, consistent, and adequate funding for forestry programs on all reservations, whether direct service, contract, or compact. Coordinate federal funding and technical services delivery with tribal priorities to improve access to predictable funding and technical resources.

G3. Ensure that the annual evaluations of compacted and contracted tribes, now done by the Office of the Special Trustee, include personnel with expertise in forestry. Trust evaluations should include a field component to determine if forest management is in compliance with the forest management plan and tribal vision.

G4. Provide on-going education and technical resources for tribal government leaders on natural resources management so that contracting and compacting, and direct services tribes can make informed decisions about their resources.

G5. Adopt interagency agreements between BIA and other federal agencies to coordinate deliveries of funding and technical support to tribes.

G6. Adopt interagency agreements to increase TFPA activities on federal lands where tribes have off-reservation treaty rights and on sites where tribes identify that action is needed.

G7. Consistent with IFMAT I and II, create an independent trust oversight body, for example, a permanent commission independent of both the BIA and Secretary of the Interior, to evaluate the overall federal government's fulfillment of its trust duties to Indian tribes.

NIFRMA Task H - A recommendation of any reforms and increased funding levels necessary to bring Indian forest land management programs to a state-of-the-art condition.

Recommendations

H1. The trust oversight recommendations of both previous IFMATs should be further developed and implemented before the next IFMAT review. When third party oversight is augmented by signed agreements between tribes and the DOI, based upon agreed obligations for both created through the planning process, the role of BIA can evolve out of the umpire/pitcher impasse toward that of technical service provider and facilitator of communication between Indian tribes and the federal government.

H2. Increase Indian forestry funding by a minimum of $112.7 million per year. Increase annual base level funding by $100 million (40 percent) to $254 million—the amount we estimate necessary for a level of forest stewardship and timber production that would be consistent with Indian goals. Appropriate $12.7 million to support education and professional training. A system of base and incremental funding should be implemented.

H3. Increase staffing by 792 professional and technical forestry positions. An education coordinator will also be needed to oversee education and professional training as envisioned by NIFRMA. Staffing replacement procedures need to be reviewed so that funded positions can be filled promptly according to a recruiting and retention strategic plan. Adequate compensation and relocation programs must be available.

H4. The anchor forest concept should be supported and expanded. Innovative tribal forest resource management techniques should be considered for appropriate portions of the federal forest estate. Benefit cost analysis of the unique leverages generated by Indian forestry is needed. We hypothesize that collaborative agreements such as anchor forests, TFPA, and stewardship contracting will result in valuable market and ecosystem benefits that more than compensate for investment.

H5. The full implications of organizational and personnel changes within the BIA and the federal establishment should be examined for their potential and immediate effects on trust responsibility and the sustainability of Indian forests.

H6. Self-governance tribes should be able to develop tribal NEPA procedures and associated code to replace BIA NEPA manuals and handbooks. This approach furthers self-determination and self-governance and would reward tribes for progress in integrated planning.

H7. A specific list of unfunded mandates should be drawn up and recommendations for their alleviation made and implemented.

H8. Control of trespass within tribal boundaries should be reviewed and strengthened.

H.9 Tribes should consider a desired-future-conditions based approach to forest planning. We note that a DFC is not a static state, but takes into account and makes provision for the dynamics of natural agents of change (fire, insects, disease, storms, and climate change).

H10. A regularly recurring state-of-the-resource report, including a protocol for continuing data acquisition with specific reference to the NIFRMA-mandated questions should be implemented jointly between BIA and tribal organizations such as the ITC. An IFMAT-type study of the Native peoples of Alaska and their forests is long overdue. Technical support for economic analysis, climate change adaptation, timber and non-timber forest products marketing, habitat and ecosystem enhancement, and forest planning and inventory are severely lacking undermining self-determination and integrated forest management.

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Appendix I. NIFRMA

NIFRMA highlights[34]

Sustainability

"…the development, maintenance, and enhancement of Indian forest land in a perpetually productive state…"

"…the regulation of Indian forest lands that will ensure… a sustained yield basis, continuous productivity and a perpetual forest business…"

Economic Development

"…the development of Indian forest lands and associated value-added industries by Indians and Indian tribes to promote self-sustaining communities, so that Indians may receive from their Indian forest land not only stumpage value, but also the benefit of all the labor and profit that such Indian forest land is capable of yielding …"

Tribal Vision

"…the development and implementation, with the full and active consultation and participation of the appropriate Indian tribe, of forest management plans which are supported by written tribal objectives and forest marketing programs …"

Ecosystem Services

"…the retention of Indian forest land in its natural state when an Indian tribe determines that the recreational, cultural, aesthetic, or traditional values of the Indian forest land represents the highest and best use of the land…"

"…the management and protection of forest resources to retain the beneficial effects to Indian forest lands of regulating water run-off and minimizing soil erosion…"

"…the maintenance and improvement of timber productivity, grazing, wildlife, fisheries, recreation, aesthetic, cultural and other traditional values…"

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TITLE III--INDIAN FOREST AND WOODLANDS

SEC. 301. SHORT TITLE.

This title may be cited as the `National Indian Forest Resources Management Act'.

SEC. 302. FINDINGS.

The Congress finds and declares that-- (1) the forest lands of Indians are among their most valuable resources and Indian forest lands--

(A) encompass more than 15,990,000 acres, including more than 5,700,000 acres of commercial forest land and 8,700,000 acres of woodland, (B) are a perpetually renewable and manageable resource,

(C) provide economic benefits, including income, employment, and subsistence, and (D) provide natural benefits, including ecological, cultural, and esthetic values;

(2) the United States has a trust responsibility toward Indian forest lands;

(3) existing Federal laws do not sufficiently assure the adequate and necessary trust management of Indian forest lands;

(4) the Federal investment in, and the management of, Indian forest land is significantly below the level of investment in, and management of, National Forest Service forest land, Bureau of Land Management forest land, or private forest land;

(5) tribal governments make substantial contributions to the overall management of Indian forest land; and (6) there is a serious threat to Indian forest lands arising from trespass and unauthorized harvesting of Indian forest land resources.

SEC. 303. PURPOSES.

The purposes of this title are to--

(1) allow the Secretary of the Interior to take part in the management of Indian forest lands, with the participation of the lands' beneficial owners, in a manner consistent with the Secretary's trust responsibility and with the objectives of the beneficial owners;

(2) clarify the authority of the Secretary to make deductions from the proceeds of sale of Indian forest products, assure the use of such deductions on the reservation from which they are derived solely for use in forest land management activities, and assure that no other deductions shall be collected;

(3) increase the number of professional Indian foresters and related staff in forestry programs on Indian forest land; and

(4) provide for the authorization of necessary appropriations to carry out this title for the protection, conservation, utilization, management, and enhancement of Indian forest lands.

SEC. 304. DEFINITIONS.

For the purposes of this title, the term--

(1) `Alaska Native' means Native as defined in section 3(b) of the Alaska Native Claims Settlement Act of December 18, 1971 (43 U.S.C. 1604);

(2) `forest' means an ecosystem of at least one acre in size, including timberland and woodland, which--

(A) is characterized by a more or less dense and extensive tree cover,

(B) contains, or once contained, at least ten percent tree crown cover, and

(C) is not developed or planned for exclusive nonforest use;

(3) `Indian forest land' means Indian lands, including commercial and non- commercial timberland and woodland, that are considered chiefly valuable for the production of forest products or to maintain watershed or other land values enhanced by a forest cover, regardless whether a formal inspection and land classification action has been taken;

(4) `forest land management activities' means all activities performed in the management of Indian forest lands, including--

(A) all aspects of program administration and executive direction such as--

(i) development and maintenance of policy and operational procedures, program oversight, and evaluation,

(ii) securing of legal assistance and handling of legal matters,

(iii) budget, finance, and personnel management, and

(iv) development and maintenance of necessary data bases and program reports;

(B) all aspects of the development, preparation and revision of forest inventory and management plans, including aerial photography, mapping, field management inventories and re- inventories, inventory analysis, growth studies, allowable annual cut calculations, environmental assessment, and forest history, consistent with and reflective of tribal integrated resource management plans;

(C) forest land development, including forestation, thinning, tree improvement activities, and the use of silvicultural treatments to restore or increase growth and yield to the full productive capacity of the forest environment;

(D) protection against losses from wildfire, including acquisition and maintenance of fire fighting equipment and fire detection systems, construction of firebreaks, hazard reduction, prescribed burning, and the development of cooperative wildfire management agreements;

(E) protection against insects and disease, including--

(i) all aspects of detection and evaluation,

(ii) preparation of project proposals containing project description, environmental assessments and statements, and cost-benefit analyses necessary to secure funding,

(iii) field suppression operations, and

(iv) reporting;

(F) assessment of damage caused by forest trespass, infestation or fire, including field examination and survey, damage appraisal, investigation assistance, and report, demand letter, and testimony preparation;

(G) all aspects of the preparation, administration, and supervision of timber sale contracts, paid and free use permits, and other Indian forest product harvest sale documents including--

(i) cruising, product marking, silvicultural prescription, appraisal and harvest supervision,

(ii) forest product marketing assistance, including evaluation of marketing and development opportunities related to Indian forest products and consultation and advice to tribes, tribal and Indian enterprises on maximization of return on forest products,

(iii) archeological, historical, environmental and other land management reviews, clearances, and analyses,

(iv) advertising, executing, and supervising contracts,

(v) marking and scaling of timber, and

(vi) collecting, recording and distributing receipts from sales;

(H) provision of financial assistance for the education of Indians enrolled in accredited programs of postsecondary and postgraduate forestry and forestry-related fields of study, including the provision of scholarships, internships, relocation assistance, and other forms of assistance to cover educational expenses;

(I) participation in the development and implementation of tribal integrated resource management plans, including activities to coordinate current and future multiple uses of Indian forest lands;

(J) improvement and maintenance of extended season primary and secondary Indian forest land road systems; and

(K) research activities to improve the basis for determining appropriate management measures to apply to Indian forest lands;

(5) `forest management plan' means the principal document, approved by the Secretary, reflecting and consistent with a tribal integrated resource management plan, which provides for the regulation of the detailed, multiple-use operation of Indian forest land by methods assuring that such lands remain in a continuously productive state while meeting the objectives of the tribe and which shall include--

(A) standards setting forth the funding and staffing requirements necessary to carry out each management plan, with a report of current forestry funding and staffing levels; and

(B) standards providing quantitative criteria to evaluate performance against the objectives set forth in the plan;

(6) `forest product' means—

(A) timber,

(B) a timber product, including lumber, lath, crating, ties, bolts, logs, pulpwood, fuelwood, posts, poles and split products,

(C) bark,

(D) Christmas trees, stays, branches, firewood, berries, mosses, pinyon nuts, roots, acorns, syrups, wild rice, and herbs,

(E) other marketable material, and

(F) gravel which is extracted from, and utilized on, Indian forest lands;

(7) `forest resources' means all the benefits derived from Indian forest lands, including forest products, soil productivity, water, fisheries, wildlife, recreation, and aesthetic or other traditional values of Indian forest lands;

(8) `forest trespass' means the act of illegally removing forest products from, or illegally damaging forest products on, forest lands;

(9) `Indian' means a member of an Indian tribe;

(10) `Indian land' means land title to which is held by--

(A) the United States in trust for an Indian, an individual of Indian or Alaska Native ancestry who is not a member of a federally- recognized Indian tribe, or an Indian tribe, or

(B) an Indian, an individual of Indian or Alaska Native ancestry who is not a member of a federally recognized

tribe, or an Indian tribe subject to a restriction by the United States against alienation;

(11) `Indian tribe' or `tribe' means any Indian tribe, band, nation, Pueblo or other organized group or community which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians and shall mean, where appropriate, the recognized tribal government of such tribe's reservation;

(12) `reservation' includes Indian reservations established pursuant to treaties, Acts of Congress or Executive orders, public domain Indian allotments, and former Indian reservations in Oklahoma;

(13) `Secretary' means the Secretary of the Interior;

(14) `sustained yield' means the yield of forest products that a forest can produce continuously at a given intensity of management; and

(15) `tribal integrated resource management plan' means a document, approved by an Indian tribe and the Secretary, which provides coordination for the comprehensive management of such tribe's natural resources.

SEC. 305. MANAGEMENT OF INDIAN FOREST LAND.

(a) MANAGEMENT ACTIVITIES- The Secretary shall undertake forest land management activities on Indian forest land, either directly or through contracts, cooperative agreements, or grants under the Indian Self-Determination Act (25 U.S.C. 450 et seq.).

(b) MANAGEMENT OBJECTIVES- Indian forest land management activities undertaken by the Secretary shall be designed to achieve the following objectives- -

(1) the development, maintenance, and enhancement of Indian forest land in a perpetually productive state in accordance with the principles of sustained yield and with the standards and objectives set forth in forest management plans by providing effective management and protection through the application of sound silvicultural and economic principles to--

(A) the harvesting of forest products,

(B) forestation,

(C) timber stand improvement, and

(D) other forestry practices;

(2) the regulation of Indian forest lands through the development and implementation, with the full and active consultation and participation of the appropriate Indian tribe, of forest management plans which are supported by written tribal objectives and forest marketing programs;

(3) the regulation of Indian forest lands in a manner that will ensure the use of good method and order in harvesting so as to make possible, on a sustained yield basis, continuous productivity and a perpetual forest business;

(4) the development of Indian forest lands and associated value-added industries by Indians and Indian tribes to promote self-sustaining communities, so that Indians may receive from their Indian forest land not only stumpage value, but also the benefit of all the labor and profit that such Indian forest land is capable of yielding;

(5) the retention of Indian forest land in its natural state when an Indian tribe determines that the recreational, cultural, aesthetic, or traditional values of the Indian forest land represents the highest and best use of the land;

(6) the management and protection of forest resources to retain the beneficial effects to Indian forest lands of regulating water run-off and minimizing soil erosion; and

(7) the maintenance and improvement of timber productivity, grazing, wildlife, fisheries, recreation, aesthetic, cultural and other traditional values.

SEC. 306. FOREST MANAGEMENT DEDUCTION.

(a) WITHHOLDING OF DEDUCTION- Pursuant to the authority of section 1 of the Act of February 14, 1920 (41 Stat. 415; 25 U.S.C. 413), the Secretary shall withhold a reasonable deduction from the gross proceeds of sales of forest products harvested from Indian forest land under a timber sale contract, permit, or other harvest sale document, which has been approved by the Secretary, to cover in whole or part the cost of managing and protecting such Indian forest land.

(b) AMOUNT OF DEDUCTION- Deductions made pursuant to subsection (a) shall not exceed the lesser amount of-

(1) 10 percent of gross proceeds, or

(2) the percentage of gross proceeds collected on the date of enactment of this title as forest management deductions by the Secretary on such sales of Indian forest products, unless the appropriate Indian tribe consents to an increase in the deductions.

(c) USE OF DEDUCTION- The full amount of any deduction collected by the Secretary shall be expended according to an approved expenditure plan, approved by the Secretary and the appropriate Indian tribe, for the performance of forest land management activities on the reservation from which such deductions are collected and shall be made available to the tribe, upon its request, by contract or agreement for the performance of such activities.

(d) LIMITATIONS-

(1) Forest management deductions withheld pursuant to this section shall not be available to--

(A) cover the costs that are paid from funds appropriated specifically for fire suppression or pest control, or

(B) otherwise offset Federal appropriations for meeting the Federal trust responsibility for management of Indian forest lands.

(2) No other forest management deductions derived from Indian forest lands shall be collected to be covered into the general funds of the United States Treasury.

SEC. 307. FOREST TRESPASS.

(a) CIVIL PENALTIES; REGULATIONS- Not later than 18 months from the date of enactment of this title, the Secretary shall issue regulations that--

(1) establish civil penalties for the commission of forest trespass which provide for--

(A) collection of the value of the products illegally removed plus a penalty of double their value,

(B) collection of the costs associated with damage to the Indian forest land caused by the act of trespass, and

(C) collection of the costs associated with enforcement of the regulations, including field examination and survey, damage appraisal, investigation assistance and reports, witness expenses, demand letters, court costs, and attorney fees;

(2) designate responsibility with the Department of the Interior for the detection and investigation of forest trespass; and

(3) set forth responsibilities and procedures for the assessment and collection of civil penalties.

(b) TREATMENT OF PROCEEDS- The proceeds of civil penalties collected under this section shall be treated as proceeds from the sale of forest products from the Indian forest lands upon which such trespass occurred.

(c) CONCURRENT JURISDICTION- Indian tribes which adopt the regulations promulgated by the Secretary pursuant to subsection (a) shall have concurrent civil jurisdiction to enforce the provisions of this section and the regulation promulgated thereunder. The Bureau of Indian Affairs and other agencies of the Federal Government shall, at the request of the tribe, defer to tribal prosecutions of forest trespass cases. Tribal court judgments regarding forest trespass shall be entitled to full faith and credit in Federal and State courts to the same extent as a Federal court judgment obtained under this section.

SEC. 308. DIRECT PAYMENT OF FOREST PRODUCTS RECEIPTS.

(a) REGULATIONS- Notwithstanding any other law, the Secretary shall, within 1 year from the date of enactment of this title, promulgate regulations providing for the payment of the receipts from the sale of Indian forest products as provided in this section.

(b) PAYMENT INTO A BANK DEPOSITORY- Upon the request of an Indian tribe, the Secretary shall provide that the purchaser of the forest products of such tribe, which are harvested under a timber sale contract, permit or other harvest sale document which has been approved by the Secretary, shall make prompt direct payments of the gross proceeds of sales of such forest products, less any amounts segregated as forest management deductions pursuant to section 306, into a bank depository account designated by such Indian tribe.

SEC. 309. SECRETARIAL RECOGNITION OF TRIBAL LAWS.

Subject to the Secretary's responsibilities as reflected in sections 302(2) and 303(1) and unless otherwise prohibited by Federal statutory law, the Secretary shall comply with tribal laws pertaining to Indian forest lands, including laws regulating the environment or historic or cultural preservation, and shall cooperate with the enforcement of such laws on Indian forest lands. Such cooperation shall include--

(1) assistance in the enforcement of such laws;

(2) provision of notice of such laws to persons or entities undertaking activities on Indian forest lands; and

(3) upon the request of an Indian tribe, the appearance in tribal forums.

SEC. 310. INDIAN FOREST LAND ASSISTANCE ACCOUNT.

(a) ESTABLISHMENT- At the request of an Indian tribe, the Secretary may establish a special Indian forest land assistance account within the tribe's trust fund account to fund the Indian forest land management activities of such tribe.

(b) DEPOSITS AND EXPENDITURES-

(1) The Secretary may deposit into the Indian forest land assistance account established pursuant to subsection (a) any funds received by the Secretary or in the Secretary's possession from--

(A) non-Federal sources, if such funds are related to activities on or for the Indian forest lands of such tribe's reservation,

(B) donations and contributions,

(C) unobligated forestry appropriations for the benefit of such Indian tribe, and

(D) user fees or other funds transferred under Federal interagency agreements if otherwise authorized by Federal law and, if such funds are related to activities on or for the Indian forest lands of such tribe's reservation.

Funds deposited in such account shall be for the purpose of conducting forest land management activities on the Indian forest lands of such tribe.

(2) Funds in the Indian forest land assistance account and any interest or other income earned thereon shall remain available until expended and shall not be available to otherwise offset Federal appropriations for meeting the Federal responsibility for management of Indian forest lands.

(c) AUDITS- At the request of an Indian tribe or upon the Secretary's own volition, the Secretary may conduct audits of the Indian forest land assistance account and shall publish the results of such audit.

SEC. 311. TRIBAL FORESTRY PROGRAMS.

(a) ESTABLISHMENT- The Secretary shall establish within the Bureau of Indian Affairs a program to provide financial support to forestry programs established by an Indian tribe.

(b) SUPPORT ALLOCATION FORMULA; CRITERIA-

(1) The Secretary, with the participation of Indian tribes with Indian forest lands, shall establish, and promulgate by regulations, a formula--

(A) for the determination of Indian tribes eligible for such support,

(B) for the provision of levels of assistance for the forestry programs of such tribes, and

(C) the allocation of base support funds to such tribes under the program established pursuant to subsection (a).

(2) The formula established pursuant to this subsection shall provide funding necessary to support--

(A) one professional forester, including fringe benefits and support costs, for each eligible tribe, and

(B) one additional professional forester or forest technician, including fringe benefits and support costs, for each level of assistance for which an eligible Indian tribe qualifies.

(3) In any fiscal year that appropriations are not sufficient to fully fund tribal forestry programs at each level of assistance under the formula required to be established in this section, available funds for each level of assistance shall be evenly divided among the tribes qualifying for that level of assistance.

SEC. 312. ASSESSMENT OF INDIAN FOREST LAND AND MANAGEMENT PROGRAMS.

(a) INITIAL ASSESSMENT-

(1) Within 1 year after the date of enactment of this title, the Secretary, in consultation with affected Indian tribes, shall enter into a contract with a non-Federal entity knowledgeable in forest management practices on Federal and private lands to conduct an independent assessment of Indian forest lands and Indian forest land management practices.

(2) Such assessment shall be national in scope and shall include--

(A) an in-depth analysis of management practices on, and the level of funding for, specific Indian forest land compared with similar Federal and private forest lands,

(B) a survey of the condition of Indian forest lands, including health and productivity levels,

(C) an evaluation of the staffing patterns of forestry organizations of the Bureau of Indian Affairs and of Indian tribes,

(D) an evaluation of procedures employed in timber sales administration, including preparation, field supervision, and accountability for proceeds,

(E) an analysis of the potential for reducing or eliminating relevant administrative procedures, rules and

policies of the Bureau of Indian Affairs consistent with the Federal trust responsibility,

(F) a comprehensive review of the adequacy of Indian forest land management plans, including their compatibility with applicable tribal integrated resource management plans and their ability to meet tribal needs and priorities,

(G) an evaluation of the feasibility and desirability of establishing minimum standards against which the adequacy of the forestry programs of the Bureau of Indian Affairs in fulfilling its trust responsibility to Indian tribes can be measured, and

(H) a recommendation of any reforms and increased funding levels necessary to bring Indian forest land management programs to a state-of- the-art condition.

(3) Such assessment shall include specific examples and comparisons from each of the regions of the United States where Indian forest lands are located.

(4) The initial assessment required by this subsection shall be completed no later than 36 months following the date of enactment of this title. Upon completion, the assessment shall be submitted to the Committee on Interior and Insular Affairs of the United States House of Representatives and the Select Committee on Indian Affairs of the United States Senate and shall be made available to Indian tribes.

(b) PERIODIC ASSESSMENTS- On each 10-year anniversary of the date of enactment of this title, the Secretary shall provide for an independent assessment of Indian forest lands and Indian forest land management practices under the criteria established in subsection (a) which shall include analyses measured against findings in previous assessments.

(c) STATUS REPORT TO CONGRESS- The Secretary shall submit, within 1 year of the first full fiscal year after the date of enactment of this title and within 6 months of the end of each succeeding fiscal year, a report to Committee on Interior and Insular Affairs of the United States House of Representatives, the Select Committee on Indian Affairs of the United States Senate, and to the affected Indian tribes a report on the status of Indian forest lands with respect to standards, goals and objectives set forth in approved forest management plans for each Indian tribe with Indian forest lands. The report shall identify the amount of Indian forest land in need of forestation or other silviculture treatment and the quantity of timber available for sale, offered for sale, and sold for each Indian tribe.

(d) ASSISTANCE FROM SECRETARY OF AGRICULTURE- The Secretary of Agriculture, through the Forest Service, is authorized to provide, upon the request of the Secretary of the Interior, on a nonreimbursable basis, technical assistance in the conduct of such research and evaluation activities as may be necessary for the completion of any reports or assessments required by this title.

SEC. 313. ALASKA NATIVE TECHNICAL ASSISTANCE PROGRAM.

(a) ESTABLISHMENT- The Secretary, in consultation with the village and regional corporations established pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601 et seq.), shall establish a program of technical assistance for such corporations to promote the sustained yield management of their forest resources. Such technical assistance shall also be available to promote local processing and other value-added activities with such forest resources.

(b) INDIAN SELF-DETERMINATION ACT- The technical assistance to be provided by the Secretary pursuant to subsection (a) shall be made available through contracts, grants or agreements entered into in accordance with, and made available to entities eligible for, such contracts, grants, or agreements under the Indian Self-Determination Act (25 U.S.C. 450 et seq.).

SEC. 314. ESTABLISHMENT OF INDIAN AND ALASKA NATIVE FORESTRY EDUCATION ASSISTANCE.

(a) FORESTER INTERN PROGRAM-

(1) Notwithstanding the provisions of title 5 of the United States Code governing appointments in the competitive service, the Secretary shall establish and maintain in the Bureau of Indian Affairs at least 20 forester intern positions for Indian and Alaska Native students.

(2) For purposes of this subsection, the term `forester intern' means an Indian or Alaska Native who--

(A) is acquiring necessary academic qualifications to become a forester or a professional trained in forestry-related fields, and

(B) is appointed to one of the positions established under paragraph (1).

(3) The Secretary shall pay all costs for tuition, books, fees and living expenses incurred by a forester intern while attending an approved post-secondary or graduate school in a full-time forestry-related curriculum.

(4) A forester intern shall be required to enter into an obligated service agreement to serve as a professional forester or other forestry-related professional with the Bureau of Indian Affairs, an Indian tribe, or a tribal forest-related enterprise for 2 years for each year of education for which the Secretary pays the intern's educational costs under paragraph (3) of this subsection.

(5) A forester intern shall be required to report for service with the Bureau of Indian Affairs during any break in attendance at school of more than 3 weeks duration. Time spent in such service shall be counted toward satisfaction of the intern's obligated service agreement.

(b) COOPERATIVE EDUCATION PROGRAM-

(1) The Secretary shall maintain, through the Bureau of Indian Affairs, a cooperative education program for the purpose of recruiting promising Indian and Alaska Native students who are enrolled in secondary schools, tribally-controlled community colleges, and other post-secondary or graduate schools for employment as a professional forester or other forestry-related professional with the Bureau of Indian Affairs, an Indian tribe, or a tribal forest-related enterprise.

(2) The cooperative educational program that is to be maintained under paragraph (1) shall be modeled on and shall have essentially the same features of the program operated on the date of enactment of this title pursuant to chapter 308 of the Federal Personnel Manual of the Office of Personnel Management.

(3) Under the cooperative agreement program that is to be maintained under paragraph (1), the Secretary shall pay all costs for tuition, books, and fees of an Indian or Alaska Native student who--

(A) is enrolled in a course of study at an education institution with which the Secretary has entered into a cooperative agreement, and

(B) is interested in a career with the Bureau of Indian Affairs, an Indian tribe or a tribal enterprise in the management of Indian forest land.

(4) Financial need shall not be a requirement to receive assistance under the cooperative agreement program that is to be maintained under this subsection.

(5) A recipient of assistance under the cooperative education program that is to be maintained under this subsection shall be required to enter into an obligated service agreement to serve as a professional forester or other forestry-related professional with the Bureau of Indian Affairs, an Indian tribe, or a tribal forest- related enterprise for one year for each year for which the Secretary pays the recipient's educational costs pursuant to paragraph (3).

(c) SCHOLARSHIP PROGRAM-

(1) The Secretary is authorized to grant forestry scholarships to Indians and Alaska Natives enrolled in accredited programs for post-secondary and graduate forestry and forestry-related programs of study as full-time students.

(2) A recipient of a scholarship under paragraph (1) shall be required to enter into an obligated service agreement with the Secretary in which the recipient agrees to accept employment for one year for each year the recipient received a scholarship, following completion of the recipient's forestry or forestry-related course of study, with

(A) the Bureau of Indian Affairs;

(B) a forestry program conducted under a contract, grant, or cooperative agreement entered into under the Indian Self-Determination Act (25 U.S.C. 450 et seq.);

(C) an Indian enterprise engaged in a forestry or forestry-related business; or

(D) an Indian tribe's forestry-related program.

(3) The Secretary shall not deny scholarship assistance under this subsection solely on the basis of an applicant's scholastic achievement if the applicant has been admitted to and remains in good standing in an accredited postsecondary or graduate institution.

(d) FORESTRY EDUCATION OUTREACH- The Secretary shall conduct, through the Bureau of Indian Affairs, and in consultation with other appropriate local, State and Federal agencies, and in consultation and coordination with Indian tribes, a forestry education outreach program for Indian and Alaska Native youth to explain and stimulate interest in all aspects of Indian forest land management and careers in forestry.

(e) ADEQUACY OF PROGRAMS- The Secretary shall administer the programs described in this section until a sufficient number of Indians and Alaska Natives are trained to ensure that there is an adequate number of qualified, professional Indian foresters to manage the Bureau of Indian Affairs forestry programs and forestry programs maintained by or for Indian tribes.

SEC. 315. POSTGRADUATION RECRUITMENT, EDUCATION AND TRAINING PROGRAMS.

(a) POSTGRADUATION RECRUITMENT- The Secretary shall establish and maintain a program to attract Indian and Alaska Native professional foresters and forester technicians who have already graduated from their course of postsecondary or graduate education for employment in either the Bureau of Indian Affairs forestry programs or, subject to the approval of the tribe, in tribal forestry programs. According to such regulations as the Secretary may prescribe, such program shall provide for the employment of Indian and Alaska Native professional foresters or forestry technicians in exchange for the Secretary's assumption of the employee's outstanding student loans. The period of employment shall be determined by the amount of the loan that is assumed.

(b) POSTGRADUATE INTERGOVERNMENTAL INTERNSHIPS- For the purposes of training, skill development and orientation of Indian, Alaska native, and Federal forestry personnel, and the enhancement of tribal and Bureau of Indian Affairs forestry programs, the Secretary shall establish and actively conduct a program for the cooperative internship of Federal, Indian, and Alaska Native forestry personnel. Such program shall--

(1) for agencies within the Department of the Interior--

(A) provide for the internship of Bureau of Indian Affairs, Alaska Native, and Indian forestry employees in the forestry-related programs of other agencies of the Department of the Interior, and

(B) provide for the internship of forestry personnel from other Department of the Interior agencies within the Bureau of Indian Affairs and, with the consent of the tribe, within tribal forestry programs;

(2) for agencies not within the Department of the Interior, provide, pursuant to an interagency agreement, internships within the Bureau of Indian Affairs and, with the consent of the tribe, within a tribal forestry program

of other forestry personnel of such agencies who are above their sixth year of Federal service;

(3) provide for the continuation of salary and benefits for participating Federal employees by their originating agency;

(4) provide for salaries and benefits of participating Indian and Alaska Native forestry employees by the host agency; and

(5) provide for a bonus pay incentive at the conclusion of the internship for any participant.

(c) CONTINUING EDUCATION AND TRAINING- The Secretary shall maintain a program within the Division of Forestry of the Bureau of Indian Affairs for the ongoing education and training of Bureau of Indian Affairs, Alaska Native, and Indian forestry personnel. Such program shall provide for--

(1) orientation training for Bureau of Indian Affairs forestry personnel in tribal-Federal relations and responsibilities;

(2) continuing technical forestry education for Bureau of Indian Affairs, Alaska Native, and tribal forestry personnel; and

(3) developmental training of Indian and Alaska Native personnel in forest land based enterprises and marketing.

SEC. 316. COOPERATIVE AGREEMENT BETWEEN THE DEPARTMENT OF THE INTERIOR AND INDIAN TRIBES.

(a) COOPERATIVE AGREEMENTS-

(1) To facilitate the administration of the programs and activities of the Department of the Interior, the Secretary is authorized to negotiate and enter into cooperative agreements with Indian tribes to--

(A) engage in cooperative manpower and job training and development programs,

(B) to develop and publish cooperative environmental education and natural resource planning materials, and

(C) to perform land and facility improvements, including forestry and other natural resources protection, fire protection, reforestation, timber stand improvement, debris removal, and other activities related to land and natural resource management.

The Secretary may enter into such agreements when the Secretary determines the public interest will be benefited.

(2) In such cooperative agreements, the Secretary is authorized to advance or reimburse funds to contractors from any appropriated funds available for similar kinds of work or by furnishing or sharing materials, supplies, facilities or equipment without regard to the provisions of section 3324, title 31, United States Code, relating to the advance of public moneys.

(b) SUPERVISION- In any agreement authorized by this section, Indian tribes and their employees may perform cooperative work under the supervision of the Department of the Interior in emergencies or otherwise as mutually agreed to, but shall not be deemed to be Federal employees other than for purposes of section 2671 through 2680 of title 28, United States Code, and section 8101 through 8193 of title 5, United States Code. (c) SAVINGS CLAUSE- Nothing in this title shall be construed to limit the authority of the Secretary to enter into cooperative agreements otherwise authorized by law.

SEC. 317. OBLIGATED SERVICE; BREACH OF CONTRACT.

(a) OBLIGATED SERVICE- Where an individual enters into an agreement for obligated service in return for financial

assistance under any provision of this title, the Secretary shall adopt such regulations as are necessary to provide for the offer of employment to the recipient of such assistance as required by such provision. Where an offer of employment is not reasonably made, the regulations shall provide that such service shall no longer be required.

(b) BREACH OF CONTRACT; REPAYMENT- Where an individual fails to accept a reasonable offer of employment in fulfillment of such obligated service or unreasonably terminates or fails to perform the duties of such employment, the Secretary shall require a repayment of the financial assistance provided, prorated for the amount of time of obligated service performed, together with interest on such amount which would be payable if at the time the amounts were paid they were loans bearing interest at the maximum legal prevailing rate, as determined by the Treasurer of the United States.

SEC. 318. AUTHORIZATIONS.

There are authorized to be appropriated such sums as may be necessary to carry out the purposes of this title.

SEC. 319. REGULATIONS.

Except as otherwise provided by this title, the Secretary is directed to promulgate final regulations for the implementation of the title within eighteen months from the date of its enactment. All regulations promulgated pursuant to this title shall be developed by the Secretary with the participation of the affected Indian tribes.

SEC. 320. SEVERABILITY.

If any provision of this title, or the application of any provision of this title to any person or circumstance, is held invalid, the application of such provision or circumstance and the remainder of this title shall not be affected thereby.

SEC. 321. TRUST RESPONSIBILITY.

Nothing in this title shall be construed to diminish or expand the trust responsibility of the United States toward Indian forest lands, or any legal obligation or remedy resulting therefrom.

Appendix II. Indian forest classifications

Indian forest lands

Below are definitions for the land classification, categories, and types for Indian forest lands. Definitions cited from the (25CFR) are referenced as such. Other definitions come from various handbooks.

Forest land (25CFR)

Forest or forest land means an ecosystem at least one acre in size, including timber land and woodland, which: Is characterized by a more or less dense and extensive tree cover; contains, or once contained, at least ten percent crown cover, and is not developed or planned for exclusive non-forest resource use.

Non-forest land

Lands that do not fall under the definition of Forest Land. This is land that (1) has never supported forests (e.g., barren, alpine tundra), (2) was formerly forested, but has been converted to a non-forest area class (e.g., rangeland, cropland), or (3) presently meets the stocking requirements for forest land, but human activity on the site will preclude the natural succession of the stand (residential development). Other examples of non-forest land are improved roads of any width, graded or otherwise regularly maintained for long-term continuing use, and rights- of-way of all power lines, pipelines, other transmission lines, and operating railroads. If intermingled in forest areas, unimproved roads and non-forest strips must be at least 120-feet wide and 1 acre in size to qualify as non-forest land.

Unreserved

Forest land that is administratively available for harvest.

Reserved

Forest land that is unavailable for harvest because of administrative restrictions.

Accessible

Forest land that is physically, administratively and economically accessible to harvest or is anticipated to become so during the management plan period.

Inaccessible

Forest lands that are inaccessible by conventional logging methods (i.e. steep terrain or cut-off ridges or canyons) or restricted by special treatments (i.e. disease and insect areas) are excluded from lands that are suitable for timber management.

Woodland (25CFR)

Woodland means forest land not included within the timberland classification, stocked, or capable of being stocked, with tree species of such form and size to produce forest products that are generally marketable within the region for products other than lumber, pulpwood or veneer.

Timberland (25CFR)

Timberland means forest lands stocked, or capable of being stocked, with tree species that are regionally utilized for lumber, pulpwood, poles or veneer products.

Commercial Forest Land (25CFR)

Commercial forest land means forest land that is producing or capable of producing crops of marketable forest products and is administratively available for intensive management and sustained production.

Noncommercial Forest Land (25CFR)

Noncommercial forest land means forest land that is available for extensive management, but is incapable of producing sustainable forest products within the general rotation period. Such land may be economically harvested, but the site quality does not warrant significant investment to enhance future crops.

Productive Forest Land (25CFR)

Productive forest land means forest land producing or capable of producing marketable forest products that is unavailable for harvest because of administrative restrictions or because access is not practical.

Unproductive Forest Land (25CFR)

Unproductive forest land means forest land that is not producing or capable of producing marketable forest products and is also unavailable for harvest because of administrative restrictions or because access is not practical.

Program Categories

Current category definitions were established in 1986 for the ranking of forest lands to establish emphasis and priority for program implementation. Designation of reservations/properties is the responsibility of the Regional Director and is re-evaluated as part of each year's update of this report.

Category-1 - *Major Forested Reservation* - Comprised of more than 10,000 acres of commercial timberland in trust, or determined to have more than 1.0 MMBM (million board measure) harvest of timber products annually.

Category-2 - *Minor Forested Reservation* - Comprised of less than 10,000 acres of commercial timberland in trust, and less than 1.0 MMBM harvest of timber products annually, or whose

forest resource is determined by the Regional Office to be of significant commercial timber value.

Category-3 - *Significant Woodland Reservation* - Comprised of an identifiable forest area of any size which is lacking a timberland component, and whose forest resource is determined by the Regional Office to be of significant commercial woodland value.

Category-4 - *Minimally Forested Reservation* - Comprised of an identifiable forest area of any size determined by the Regional Office to be of minor commercial value at this time.

Category-5 - Reservation or Indian property with forest land that the Bureau is charged with some degree of legal responsibility, but the land is not in [Federal] trust status."

Program Type

Describes how the forestry program is funded and managed

A - All BIA. Program remains under the responsibility of the Bureau of Indian Affairs.

B - P.L. 93-638. Program has been contracted to the Tribe under the P.L. 93-638 contracting regulations.

C - Part P.L. 93-638. Only a portion of the program has been contracted by the Tribe under the P.L. 93-638 contracting regulations. The remaining portion is still managed by the BIA.

D - All Compact. The entire forestry program has been compacted by the Tribe.

E - Partial Compact. Only a portion of the forestry program has been compacted by the Tribe. The remaining portion of the program is still managed by the BIA.

F - Other. The program is managed under some other agreement.

Trust Reservation

Reservation or Indian property that is in [Federal] trust status.

Non-Trust Reservation

Reservation or Indian property that the Bureau is charged with some degree of legal responsibility, but the land is not in [Federal] trust status.

Appendix III. Indian lands and forests by principal state (for reservations that cross state boundaries (e.g., Navajo), the state containing the most acreage)

Indian lands and forests by state

State	*Trust Reservation*	*Reservation Acres*	*Forest Acres*
AK	Yes	1,290,846	512,484
AL	Yes	387	92
AL	No	6,273	4,873
AZ	Yes	27,535,629	8,991,472
CA	Yes	495,513	202,129
CO	Yes	942,491	567,390
CT	Yes	2,025	1,239
CT	No	5,215	2,411
FL	Yes	168,694	41,996
FL	No	8,091	4,781
IA	Yes	6,157	3,000
ID	Yes	985,402	137,152
ID	No	32,674	24,649
KS	Yes	31,478	5,055
LA	Yes	1,875	443
LA	No	734	100
MA	Yes	467	181
MA	No	17	17
ME	Yes	210,100	195,036
ME	No	37,233	33,142
MI	Yes	34,093	21,476
MN	Yes	1,050,632	640,711
MS	Yes	31,746	24,018
MS	No	3,912	2,190
MT	Yes	5,340,204	1,023,227
NC	Yes	56,747	47,896
NC	No	514	300
ND	Yes	1,404,489	155,027
NE	Yes	68,191	17,905
NM	Yes	3,886,415	2,108,676
NM	No	189,034	74,295
NV	Yes	931,997	76,294
NY	Yes	88,497	51,247
OK	Yes	1,053,701	211,077
OK	No	117	105
OR	Yes	760,094	476,813
OR	No	8,550	1,479
RI	Yes	1,944	1,202
RI	No	750	250
SC	Yes	1,007	634
SC	No	325	325

SD	Yes	4,453,249	205,259
TX	Yes	14,835	6,533
UT	Yes	1,251,388	391,371
WA	Yes	2,610,641	1,696,240
WA	No	7,437	7,237
WI	Yes	439,355	382,427
WY	Yes	1,810,038	240,803
Total		**57,261,202**	**18,592,660**

Appendix IV. BIA Handbooks for forest and fire management

Indian Affairs Handbooks for Forest and Fire

53 IAM 2-H: Indian Forest Management Handbook – Forest Management Planning http://www.bia.gov/cs/groups/xnifc/documents/text/idc-022531.pdf	Replaces 53BIAM Supplement 2; Provides information and procedures applicable to forest management planning.
53 IAM 3-H: Indian Forest Management Handbook - Contract Sales of Forest Products *Due to the size of this document, please contact Office of Regulatory Affairs and Collaborative Action (RACA) for a copy.* http://www.bia.gov/WhoWeAre/AS-IA/ORM/index.htm	Replaces 53 BIAM Supplement 3 & Timber Sale Records Handbook; Provides information, procedures, and processes to prepare and administer a contract sale of Indian trust forest products.
53 IAM 4-H Indian Forest Management Handbook -- Permit Sales of Forest Products http://www.bia.gov/cs/groups/xraca/documents/text/idc008868.pdf	Replaces 53BIAM Supplement 4 & Timber Sale Records Handbook; Information, procedures & processes for harvesting Indian trust forest products with or without permits.
53 IAM 5-H Indian Forest Management Handbook -- Forest Development http://www.bia.gov/cs/groups/xraca/documents/text/idc008870.pdf	Replaces 53BIAM Supplement 5; Provides guidance on procedures and processes necessary to prepare, administer and report on forest development projects on Indian forest lands.
53 IAM 7-H Indian Forest Management Handbook - Forest Trespass http://www.bia.gov/cs/groups/xraca/documents/text/idc008866.pdf	Replaces 53BIAM Supplement 7; Describes procedures for resolving forest trespass situations on Indian trust land.
53 IAM 11-H Indian Forest Management Handbook -- Forest Management Deductions http://www.bia.gov/cs/groups/xraca/documents/text/idc008873.pdf	Replaces 53BIAM & Timber Sale Records Handbook; Provides the information, procedures, and processes to collect, monitor, and distribute forest management deductions.
59 IAM 3-H: National Environmental Policy Act Guidebook http://www.bia.gov/cs/groups/xraca/documents/text/idc009157.pdf	Provides guidance for preparing documents required by the National Environmental Policy Act (NEPA) of 1969, and the Council on Environmental Quality (CEQ) regulations implementing NEPA for BIA actions. This is an update to the 2005 version of the Handbook.
90 IAM 1.4 C (2)a-H: Fuels Management Program Planning	Provides standard operating procedures and guidelines

and Implementation Guide http://www.bia.gov/cs/groups/xraca/documents/text/idc009240.pdf	for the administration and management of the BIA Hazardous Fuels Reduction Program, and is intended as a supplement to the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide. This Handbook also supports operational guidance established in 90 IAM 1.4C (2)-H, Fuels Management.
90 IAM 1.4 C (6)-H: National Wildfire Prevention Handbook http://www.bia.gov/cs/groups/xraca/documents/text/idc008622.pdf	Standard operating procedures, guidelines, and policy for managing and administering the BIA Wildfire Prevention Program, including prevention planning, implementation, evaluation, and reporting.
90 IAM 1.4 C (7)-H: Fuels Program Business Management Handbook http://www.bia.gov/cs/groups/xraca/documents/text/idc008631.pdf	Functions as a companion text to the BIA Fuels Management Handbook. Provides general program business management direction for the Wildland Urban Interface (WUI) and Non-WUI Hazardous Fuels Reduction (HFR) programs.
90 IAM 1.4C (10)-H: National Wildfire Investigations Handbook http://www.bia.gov/cs/groups/xraca/documents/text/idc-022501.pdf	Establishes the roles and responsibilities in wildfire investigations on Indian forest and agricultural lands, and establishes national BIA investigation procedures and documentation requirements from the initial response through the litigation process.

Appendix V. IFMAT trip log

IFMAT trip log

September 2011	IFMAT-III members selected by ITC.
	First conference call of IFMAT-III.
October 2011	Site visit planning logistics begin.
	Second monthly conference call of team.
November 2011	Site visit planning logistics continue.
December 2011	Leighton, Mason and James convened student / education meeting in Seattle, Washington with ITC leadership and University of Washington students and faculty.
January 2012	Gordon, Sessions, Bailey, Berry, Cleaves, Corrao, James, Leighton, Mason, Rasmussen, Salwasser, and Sterner met in Portland, Oregon to finalize work plan and meet with ITC Oversight Committee.
	Gordon, Sessions, Bailey, Berry, Cleaves, Corrao, James, Leighton, Mason, Rasmussen, Salwasser, and Sterner met in Portland, Oregon with staff from BIA Regional Office.
	Gordon, Sessions, Bailey, Corrao, Leighton, Mason, Rasmussen, Salwasser, and Sterner visited Coquille Reservation, Oregon.
February 2012	Gordon, Sessions, Bailey, Corrao, Leighton, Mason, Rasmussen, Salwasser, James, and Sterner visited Nez Perce Reservation, Idaho.
	Bailey, Cleaves, Corrao, Leighton, Mason, Hoaglund, and Sterner visited Menominee Reservation, Wisconsin. Meeting with College of Menominee Nation.
March 2012	Leighton and Mason attend the BIA Forest and Fire Conference in California.
	Gordon, Sessions, Bailey, Berry, Corrao, Leighton, Mason, Salwasser, Hoaglund, James, and Sterner visited Mescalero Apache Reservation, New Mexico. Meeting with Youth Conservation Corps.
April 2012	Gordon, Sessions, Corrao, Leighton, Mason, Rasmussen, and Sterner visited Quinault Reservation, Washington. Meeting with Taholah High School and Greys Harbor Community College students and faculty.
	Corrao, Leighton, Mason, Rasmussen, and Sterner visited Tulalip Reservation, Washington.
	Leighton and Mason visited Northwest Indian College, Bellingham,Washington.
	Gordon, Sessions, and Sterner visited BIA Regional Office, Portland, Oregon.
May 2012	Gordon, Sessions, Bailey, Corrao, Gervais, Hoagland, James, Leighton, Mason, Rasmussen, Salwasser, Sterner and White attended ITC National Symposium at Warm Springs Reservation, Oregon.
	IFMAT conference call with Albuquerque BIA Regional Office.
June 2012	Sessions, Bailey, Cleaves, Corrao, Leighton, Hoaglund, Mason visited Eastern Band of Cherokee Reservation, North Carolina.
	Gordon, Sessions, Bailey, Corrao, Hoagland, Leighton, Mason, and Rasmussen visited Colville Reservation, Washington. Meeting with Spokane Community College.
	Gordon, Sessions, Bailey, Corrao, Gervais, James, Leighton, Mason, and Rasmussen visited Flathead Reservation, Montana. Meeting with Salish-Kootenai College forestry students and faculty.

July 2012	Gordon, Sessions, Bailey, Corrao, Hoagland, James, Leighton, Rasmussen, and Sterner visited Warm Springs Reservation, Oregon.
	Gordon, Sessions, Bailey, Hoagland, Leighton, Mason, and Sterner visited Tule River Reservation, California.
	Gordon, Sessions, Bailey, Hoagland, Leighton, and Mason visited Sacramento Regional Office.
August 2012	IFMAT meeting, Yakima, Washington.
	Gordon, Sessions, Bailey, Cleaves, Corrao, Hoagland, James, Leighton, Mason, Rasmussen, Salwasser, Sterner, and White visit Yakama Reservation, Washington. James, Leighton, Mason met with Yakama educators, students, and Heritage University faculty.
	Gordon, Sessions, Corrao, Leighton, Mason, and Sterner visited BIA Regional Office, Minneapolis, Minnesota.
	Gordon, Sessions, Corrao, Leighton, Mason, and Sterner visited Lac du Flambeau Reservation, Wisconsin.
	Gordon, Sessions, Corrao, Hoagland, Leighton, and Mason visited Leech Lake Reservation, Minnesota. Meeting with Leech Lake Tribal College.
September 2012	Gordon, Sessions, Corrao, Leighton, Mason, Rasmussen, and Sterner visited Makah Reservation.
October 2012	Gordon, Sessions, Bailey, Corrao, Hoagland, James, Leighton, Mason, Rasmussen and Sterner visited Phoenix BIA Regional Office.
	Gordon, Sessions, Bailey, Corrao, Hoagland, James, Leighton, Mason, Rasmussen and Sterner visited San Carlos Apache Reservation, Arizona.
	Gordon, Sessions, Bailey, Corrao, Hoagland, James, Leighton, Mason, Rasmussen and Sterner visited Fort Apache Reservation, Arizona.
	Gordon, Sessions, Corrao, Gervais, Hoagland, James, Leighton, Mason, and Rasmussen visited Spokane Reservation.
	IFMAT meeting, Troutdale, Oregon.
November 2012	Gordon, Sessions, Corrao, Leighton, Mason, Rasmussen, Hoaglund, and Sterner met with executive-level leaders and staff of the BIA, USFS, and NRCS in Washington, D.C.
December 2012	Bailey, Cleaves, Corrao, Gervais, Leighton, and Mason visited Penobscot Reservation, Maine.
	Bailey, Corrao, Gervais, Leighton, and Mason visit to White Earth Reservation, Minnesota.
January 2013	Bailey, Mason, and Corrao visit to BIA NIFC in Boise, Idaho.
	IFMAT meeting, Corvallis, Oregon.
	Writing team meetings, Portland, Oregon.
February 2013	Writing team meetings, Portland, Oregon.
	Draft report submitted to ITC Oversight Committee and outside reviewers.
March 2013	IFMAT meeting, Portland, Oregon.
April 2013	IFMAT conference call with BOFRP
	Writing team meetings Portland, Oregon.
	Editing, design, and layout of report.

May 2013	Sessions, Gordon, Mason, Sterner, and White met with ITC Oversight Committee to review report comments.
June 2013	Executive Summary completed.
	Gordon, Sessions, Bailey, Corrao, Hoagland, James, Leighton, Mason, Rasmussen and Sterner attended ITC Symposium, Menominee, Wisconsin to present findings and recommendations.
	Volumes I & II of report completed.

Appendix VI. IFMAT focus group survey

IFMAT III Tribal Public Questionnaire

In 1990 Congress passed the National Indian Forest Resource Management Act (NIFRMA) in order to assure that Indian forest lands were managed in a sustainable manner that benefited tribes and that the Bureau of Indian Affairs was living up to its Trust responsibility in relation to forest management on tribal lands

As part of NIFRMA, the Indian Forest Management Assessment Team (IFMAT) process was created. This calls for a once every ten year review of the state of Indian forestry by an objective 3rd party group of forestry experts. The IFMAT III team is currently conducting the 3rd of these assessments, with a report due in fall of 2013

This survey is a part of that process, and is designed so that the IFMAT team can hear the opinions of the tribal public and to ensure that programs meet the objectives and goals of individual tribes.

The Intertribal Timber Council (ITC) believes that the information obtained through these questions will be of vital importance to the future of Indian Forest lands and strongly urges you to take the time to personally complete the survey. Your participation, perspectives and opinions will be invaluable. We appreciate your candid opinions. All responses will be reported in terms of trends, ensuring the confidentiality of individual responses. The survey should take approximately 10 minutes.

Background information

Please take a moment to tell us a bit about yourself. This will help us look for trends and patterns in the survey data. All individual information will be kept strictly confidential

1. Please describe your occupation/job

2. Which reservation do you live on?

3. Are you a tribal member of the above-named reservation?

- ◯ Yes
- ◯ No

4. What is your gender?

- ◯ Female
- ◯ Male

5. What is your age?

- ◯ 18-25
- ◯ 26-35
- ◯ 36-45
- ◯ 46-55
- ◯ 56-65
- ◯ Over 65

6. Please describe your level of schooling

- ◯ K-6
- ◯ 7-9
- ◯ 10-12
- ◯ College

Number of years of college (if applicable)

Tribal Public Questionnaire

Please answer the following questions using a scale from 5 (very concerned) to 1 (not concerned) or 5 (most) to 1 (least)

7. In general, how concerned are you about what happens on your tribal forests?

○ 5 ○ 4 ○ 3 ○ 2 ○ 1

8. What do you want from your tribal/association forests

	5	4	3	2	1
Recreation	○	○	○	○	○
Income	○	○	○	○	○
Subsistence	○	○	○	○	○
Protection of forest resources	○	○	○	○	○
Spiritual values	○	○	○	○	○
Cultural values	○	○	○	○	○
Beauty/Scenery	○	○	○	○	○
Other	○	○	○	○	○

Other (please specify)

9. Which three of the above do you most value?

1

2

3

10. How well do you think your forests are being managed now for each of the following? Please rate on a scale from 5 (excellent) to 1 (poor)

	5	4	3	2	1
Wildlife	○	○	○	○	○
Fisheries	○	○	○	○	○
Grazing for livestock	○	○	○	○	○
Timber of firewood for tribal use	○	○	○	○	○
Timber for sale or enterprise	○	○	○	○	○
Recreation	○	○	○	○	○
Water quality and quantity	○	○	○	○	○
Cultural site protection	○	○	○	○	○
Forest resource protection	○	○	○	○	○
Non timber forest products (e.g. mushrooms)	○	○	○	○	○
Obtaining a fair price for timber	○	○	○	○	○
Employment of tribal members	○	○	○	○	○
Creation of new enterprises	○	○	○	○	○
Food gathering	○	○	○	○	○
Spiritual values	○	○	○	○	○
Visual quality	○	○	○	○	○
Protection from pollution/ waste	○	○	○	○	○
Poaching	○	○	○	○	○
Trespassing	○	○	○	○	○
Overall management	○	○	○	○	○

11. Of the forest resources or activities listed above, which are the three most important to you?

1 _____

2 _____

3 _____

12. What organization has primary management responsibility for your forests?

- ◯ BIA
- ◯ Tribe
- ◯ Equally shared Tribe and BIA
- ◯ Don't know

Other (please specify)

13. What organization in your opinion should have primary management responsibility for your forests?

- ◯ BIA
- ◯ Tribe
- ◯ Equally shared Tribe and BIA
- ◯ Don't know

Other (please specify)

14. What resources/ activities do you think are being managed best on your forests (list up to three)?

1
2
3

15. What resources/ activities do you think need improvement on your forests, and suggest what should be done about them (list up to three).

1
2
3

16. Do you have any additional comments or suggestions about your forests?

Thank you for your comments. Your input is a valuable part of the IFMAT process

If you would be interested in being contacted to help with interpretation and follow-up, please provide the following information (optional)

17. Optional contact information for follow up questions

Name	
Phone number	
Address	
Email	

Appendix VII. IFMAT workforce survey

IFMAT WORKFORCE SURVEY

The Indian Forest Management Assessment Team (IFMAT) requests your assistance in gathering important information on the workforce involved with Indian forestry. **Please** take a few minutes to complete this short survey and then place the form in the collection box at the registration table. Survey results will be aggregated to ensure that confidentiality of individual surveys responses is maintained. **Thank you for your assistance.**

Please circle or fill in response (use NA if not applicable)

1) a. Ethnicity?

Native	*Non-Native*

b. Gender?

Female	*Male*

c. Employer? Please provide specific Tribe, office or agency

*BIA Office*_____	*Tribe*_____	*Other*_____

d. If you are a tribal member, where do you work?

Your home reservation	*Other reservation*	*Off reservation*

e. If you work on a reservation, how are forest management services provided?

638 Contract	*Self-governance Compact*	*Direct Service*

2) a. What is your primary area of responsibility?

Program Admin	**For Prod Sales**	**Multi-Use Mgt**	**Forest Research**
Policy	Pre-Sale	IRMP	**Forestry Ed**
Budget	Sale Admins	Wildlife	Continuing
Oversight	**Forest Develop**	Fisheries	Coop/Intern
Admin. Support	Forestation	Recreation	**Tech Assistance**
Forest Planning	CTSI	Cultural/Arch	**Other** _____
GIS	**Forest Protection**	ESA	
Inventory	FPM	**Roads**	
Planning	Trespass	Design	
NEPA/Environ	Fire Prepard	Construction	
Monitoring	Fuels Mgt	Maintenance	
	E.S.&Rehab		

b. Position Type

Prof
Tech
Support
Temp/Furl
Other_____

3) Age: _____

4) Years working in Indian forestry: _____

5) Years in present position: _____

6) Age at which you plan to retire: _____

Please turn over

7) a. Highest level of formal education:

High School	*College -2yr*	*College-4yr*	*Grad-MS*	*Grad-PhD*	*Other*

b. Field(s) of study:

_____

c. College(s) or university(s) attended: _____

_____

_____

8) a. Total FTE forestry-related positions in your agency or program: _____

b. Number of Vacancies: _____

c. Primary reason for vacancies: _____

d. Average length of time needed to fill vacancies:

1 month	*2 -3 months*	*4-6 months*	*7 months – 1yr*	*More than 1yr*

9) Why did you decide to work in Indian forestry? _____

_____

_____

10) What do you enjoy most about your job? _____

_____

_____

11) What do you find most challenging about your job? _____

_____

_____

12) What could be done to help you do a better job? _____

_____

_____

13) What training would benefit you most? _____

_____

_____

Thank you for taking the time to share your thoughts & information

Appendix VIII. BIA Assistant Secretaries and Chief Foresters

Assistant Secretary of the Interior – Indian Affairs

Forrest Gerard (Blackfeet)	1977-1980
Thomas Fredericks (Mandan-Hidatsa)	1980-1981
Keneth Smith (Wasco)	1981-1984
Ross Swimmer (Cherokee)	1985-1989
Eddie Briwn (Tohono-O'odham-Yaqui)	1989-1993
Ada Deer (Menominee)	1993-1997
Kevin Gover (Pawnee)	1997-2001
Neal McCaleb (Chickasaw)	2001-2002
David Anderson (Lac Courte Oreilles Chipewa-Choctaw)	2003-2005
Carl Artman (Oneida Tribe of Wisconsin)	2007-2008
Larry Echo Hawk (Pawnee Nation of Oklahoma)	2009-2012
Kevin Wasburn (Chickasaw)	2012-

Chief Forester – Bureau of Indian Affairs

Joseph Farr	1910-1911
Alfred Chittenden	1911-1913
Franklin Reed	1913-1914
J. P. Kenney	1914-1933
Robert Marshall	1933-1937
Lee Muck	1937-1938
Leroy Arnold	1941-1953
Percy Melis	1954-1957
George Kephart	1957-1964
Perry Skarra	1965-1969
Earl Wilcox	1970-1973
Greg Stevens	1974-1978
George Smith	1978-1983
Marshal Cutsforth	1984-1992
Terrance Virden	1992-1993
James Howe	1993-1995
Arch Wells	1995-2000
Bill Downes	2000-2013

Appendix IX. Historical context

Historical Context: Indians, Forests, and the United States

The Way Forward Begins in the Trail Behind

Of special interest to this investigation, have been the implications of historic events for Indian forestry programs today. For instance, the development of forest regulations for Indian reservations has historically reflected the evolving social attitudes and pressures for land and resources that have driven timber policy in the United States, particularly for public forestlands. As example, throughout the nineteenth century, widespread illegal harvest of timber occurred on Indian and public domain lands with little concern for ownership or fear of accountability. The harvested lands were left to burn or re-establish as they might. Hence the term "cut and run."

It was not until the beginning of the twentieth century that public concerns about sustainability began to manifest in public policy. It was not until 75 years later that tribes could begin to assert management control over their own timberlands. More recently, in the Northeast and Midwest, IFMAT observed tribes working to restore pine, ash, and birch to forests simplified to aspen 150 years ago. In the Inland West, the contrast between forests, thinned and underburned, on Indian lands and forests left untended and overstocked on the federal estate is stark.

The "*Transformation*" element of the *"FIT"* paradigm is premised upon acknowledgement that sustainability is a direction, not a destination. The above-observed examples of adaptive management found on Indian forests reflect *transformation* empowered by policies of self-determination and self-governance that make possible the unique integration of traditional knowledge with forest science that guides contemporary Indian stewardship. Given the cascade of challenges in a resource-constrained world and the policy complexities unique to Indian country, a review of some historical milestones could be helpful.

A thorough history of Indian peoples and forested ecosystems in the United States is considerably beyond the scope and resources of this inquiry. However, from review of available literature, we have endeavored to provide abbreviated chronicle in the hope that contemporary issues might be given historical context and informed dialogue might better proceed. We identify twelve historical "eras" as delineated by periodic twists and turns in Indian policy and standing. These eras, often just several decades in duration, mark a rapid progression of change, rarely sought, that has challenged the sustainability of Indian cultures *and* American forest ecosystems. We find that Indians and American forests are and always have been inseparable and that the United States has moral and legal obligations to both.

CHRONOLOGY

1 Pre-Contact *Before 1500*

11,000 BCE	Paleo Indians: Southwest and Northwest.
5,000 BCE	Maize cultivation in Mexico.
3,000 BCE	Aleut and Inuit peoples in Alaska.
3,000 BCE	Coastal communities establish throughout California and the Pacific Northwest.
1,500 BCE	Maize cultivation in southwestern and eastern North America.
1,000 BCE	"Three sisters" (maize, squash, and beans) cultivation supports centralized societies with coordinated trade and religion. Corn grown throughout most of North America wherever climate will allow.
500 BCE	Hohokam irrigation system in Arizona.
500BCE – 1200 CE	Anasazi, Hohokam, and Mogollan cultures flourish in the Southwest; Cahokia and Adena societies in Midwest and Southeast; Hopewell culture in areas of eastern North America and the Plains. Trade networks are established.
1200-1300	Severe drought disrupts Native societies in the Midwest, Plains and Southwest.
1450	Iroquois League and Great Law of Peace (Gayanashagowa).
1500	4-18 million Indian peoples, speaking more than 400 languages, live in what will become the United States.

2 Discovery *1500-1600*

1492	Columbus arrives in the Caribbean.
1493	Pope Alexander VI grants the right to conquer newly found lands to Spain, thus establishing the *Discovery Doctrine* for the new world.
1497	Cabot makes landing in Newfoundland.
1519	Cortez Conquers the Aztec.
1500	Apaches and Navajos arrive in Southwest.
1532	Franciscus de Victoria advises King of Spain that aboriginal peoples have rights.
1537	Pope Paul III forbids slavery of indigenous peoples.
1500-1600	Europeans explore, conquer, and settle in North America: Spanish – Southeast, Southwest, California, and Mexico, British - Mideast and Northeast, French - Northeast and Canada.
1500-1600	Spain establishes principles of Indian title and consent requirement that influence international law through the 18th century. Indians are recognized as sovereign powers capable of making treaties.
1500-1600	Spanish bring horses to the Southwest.
1500-1600	Epidemic depopulation throughout North America some tribes become extinct.

1550-1600	Surviving remnants of tribes form confederacies such as the Creek, Chickasaw, Cherokee, and Catawba.
1580 - 1600	Fur trade is established in the Northeast and Great Lakes with French and Dutch.

3 Colonial Treaties 1600-1776

1607	Jamestown (Virginia) is established.
1616-19	Epidemic depopulation of coastal Natives in New England.
1620	Pilgrims arrive Plymouth Bay (Massachusetts) establish settlement on site of abandoned Indian village.
1626	Plymouth Colony passes ordinance to regulate timber cutting.
1633-34	Small pox epidemic throughout the Northeast.
1636	Pequot are defeated in Southern New England.
1646	Powatan and allies are defeated in Virginia.
1648-57	Iroquois Five Nations wage Beaver Wars against Hurons and allies in eastern Great Lakes region.
1647	Apalachees revolt in Florida.
1655	Harvard Indian College provides colonial higher education to Massachusetts Natives until closed 40 years later in 1695.
1656	Timucuas rebel against Spanish in Florida.
1675-76	King Philip's War in southern New England. Bacon's rebellion in Virginia.
1677	First Covenant Chain treaties between Five Nations Iroquois and English colonies.
1680	Pushed west by Europeans, Ojibwe (Chippewa) arrive in Great Lakes area.
1680s	New England sawmills produce lumber exports for Europe
1680-92	Pueblo revolt against Spanish in New Mexico.
1689-1713	Eastern Native Americans are drawn into European War of Augsburg and War of Spanish Succession.
1690s	English and French establish trade with Native Peoples of the northern Plains.
1696-1700	Smallpox epidemic from the Atlantic Coast to the Mississippi Valley.
1700	French establish trade with Caddos on Red River.
1701	Iroquois Grand Settlement with England and France.
1711-13	Tuscarora War in North Carolina.
1712-50	Mesquaki Wars with New France and Native allies.
1715-16	Yamasee War in South Carolina.
1722	Tuscaroras become sixth nation in Iroquois Confederacy.
1722-27	Anglo-Abenaki wars in northern New England.

1729-30 Natchez uprising in French Louisiana.

1730 Eastern Shoshones introduce horses in the northern Plains

1738 French and Indian trade is established on upper Missouri River.

1746-50 Choctaw civil war.

1750-60s Russian traders enslave Aleuts in Aleutian Islands.

1754-61 Eastern tribes drawn into Anglo-French War.

1763 French withdraw from North America. Royal British Proclamation reserving to the Crown the right to extinguish Indian title and establish a boundary line between Indians and colonists.

1769 Franciscans establish mission system in California.

4 Treaties of Alliance 1776-1800

1775-1781 Revolutionary War.

1775-83 Eastern Tribes drawn into American Revolution.

1777 North Carolina prohibits unlawful firing of the woods.

1780-82 Small pox epidemic spreads throughout western North America.

1778 Treaty of Fort Pitt with Lenape (Delaware) Indians. The first treaty between the United States and an Indian Tribe. Friendship and respect for separate territories.

1779 Treaty with the Wyandots is the first treaty to reserve tribal hunting rights within the area ceded to the U.S.

1781 Articles of Confederation give Congress exclusive right to regulate Indian Affairs.

1781 Quechans evict Spanish from Colorado River.

1783 Treaty of Paris grants independence to United States without providing for affected Indian allies of Britain.

1785-95 Northwest Indian Wars.

1785 Treaty with Wyandot, Delaware, Ottawa and Chippewa. Tribes retain hunting rights on ceded lands.

1785-86 Hopewell Treaties with Cherokee, Chickasaw, Choctaw create peace agreement and establish tribal/US boundaries.

1786 Peace treaty between New Mexico and western Comanche.

1787 Northwest Ordinance creates the Northwest Territories, first organized territory of the United States, northwest of the Ohio River. First formal acknowledgement by the United States of Indian sovereignty. “The utmost good faith” shall be shown to the Indians; their property “shall never be taken from them without their consent”; and “they shall never be invaded or disturbed, unless in just and lawful wars authorized by the Congress.”

1787 “Those who labor in the earth are the chosen people of God.” Thomas Jefferson

1789 U.S. Constitution, several clauses, especially Commerce and Treaty Clauses, relate the importance and place of American Indians separate but equal to the states of the new republic. Only the federal government has authority to purchase lands or negotiate treaties with Indians.

1789 Congress establishes a Department of War with responsibility over Indian affairs, sets aside money to negotiate Indian treaties, and appoints federal commissioners to negotiate treaties with tribes.

1790 Trade and Intercourse Act establishes exclusive federal jurisdiction over Indian title and commerce with Indians. Trade and Intercourse Acts (1790, 1793, 1796, 1799, 1802, and 1834) are passed by Congress establishing the primacy of trade as the means with which to deal with Indian affairs.

1790 First US census estimates population at 4 million people. The US census will not begin to include Indians until 1860.

1790s New England exports 36 MMBF of pine lumber and 300 ship masts annually.

1794 Jay Treaty. Indians along the United States-Canada border can freely cross.

1795 Treaty of Greenville demarcates lands to be retained by Lake States tribes.

1799 Federal Timber Purchasers Act appropriates $200,000 to buy timber and timberland for naval reserves.

1799 Russian-American Company monopolizes fur trade in Alaska.

1800 Code of Handsome Lake (Gaihwi:io) and Longhouse religion emerge among Senecas.

5 Treaties of Cession 1800-1830

1800's Wood products are the major export from New England to Europe.

1803 Louisiana Purchase. U.S. purchases 828,000 sq miles of land for $15 million from France, doubling the size of the United States and bringing Native inhabitants under U.S. rule and protection. "Manifest Destiny" is philosophy of U.S. expansion.

1804-06 Lewis and Clark Expedition to US Northwest.

1806 Congress creates Superintendent of Indian Trade in the War Dept.

1807 American Fur Company establishes trade in the northern Rockies.

1805-1813 Tecumseh Wars. Tecumseh killed at the Battle of the Thames. The opportunity for an Independent Indian State in the Midwest is lost.

1812 General Land Office is created in the Treasury Dept. to dispose of western lands.

1812-15 The War of 1812 between Britain and United States. With withdrawal of the British, treaty negotiations between tribes and US became increasingly one-sided.

1814 Creek War in Alabama.

1818 Seminole Wars in Florida.

1818 Dine Ana'aii settle near Zunis and Acomas in New Mexico.

1819 U.S. acquires Florida (40 million acres) in Adams-Onis Treaty with Spain.

1819 Civilization Fund Act. Congress authorized the President to institute education programs for Indians, including instruction in agriculture as well as reading, writing, and arithmetic.

1820 Mexico becomes independent; Anglos begin colonization of East Texas.

1821 Sequoya formulates Cherokee syllabary system of writing the Cherokee language.

1823 *Johnson v. McIntosh*, Chief Justice John Marshall recognizes Indian title, but the United States, like its predecessor Britain in the 1763 Royal Proclamation, holds the fee in tribal lands through the "*Doctrine of Discovery*." Native Americans merely have a "right of occupancy" that the federal government can extinguish.

1823 Monroe Doctrine forbids establishment by European countries of new colonies in the American hemisphere.

1824 Office of Indian Affairs established by the Secretary of War to administer funds for the "civilization" of Indians, and to decide upon claims arising between Native Americans and whites.

1824 Hudson Bay Company begins trade with Tlingits.

1824 Chumash revolt in southern California.

1825 Treaty of Prairie du Chien, identifies borders between the resident tribes in what is to become Wisconsin.

1827 Ho-Chunk uprising in Wisconsin.

1827 Cherokees adopt a written constitution and publish their own newspaper.

1828 Andrew Jackson elected President.

1828-29 Yokut uprising in California.

6 Removal and Relocation 1830-1850

1830-33 Epidemics of European diseases in California and Oregon Territory.

1830 Indian Removal Act passed by Congress legalizes the removal of all Indians east of Mississippi River to lands west of the river, thus opening up former Indian lands along the East Coast for white colonization. 19 tribes are removed.

1830-1850 Across much of New England, 60 to 80 percent of the land has been cleared for pasture, tillage, orchards and buildings. Small remaining areas of woodland are subjected to frequent cuttings for lumber and fuel.

1831 Treaty of Dancing Rabbit Creek. Choctaw ceded 11 million acres in Mississippi in exchange for 15 million acres in Indian Territory (Oklahoma).

1831 Timber Trespass Act establishes triple stumpage as the fine for timber trespass but rarely enforced on tribal lands or the public domain.

1831 *Cherokee Nation v. Georgia*, Chief Justice John Marshall ruled that the Indian tribes are "domestic dependent nations" and as "wards to a guardian" that the US has "trust responsibility."

1832 Congress establishes Commissioner of Indian Affairs in War Dept.

1832	*Worcester v. Georgia*, Chief Justice John Marshall ruled that the states do not have jurisdiction over Indian nations. United States comprises three jurisdictional entities, the federal, the states and Indian tribes.. Indian tribes are "distinct, independent political communities" with powers of self government that exist by reason of their original tribal sovereignty. "... the language used in treaties with the Indians should never be construed to their prejudice."
1831-39	President Jackson ignores Supreme Court decision. Five Civilized Tribes of the Southeast, Choctaw (1831); Seminole (1832); Creek (1834); Chickasaw (1837); and Cherokee (1838-1839 – "Trail of Tears"), relocated to the Indian Territory.
1832	Black Hawk War in Illinois and Wisconsin between combined Sauk and Fox tribes and the United States.
1833	Potawatomi removal in Illinois and Wisconsin.
1833	Trade begins with Southern Cheyenne and Arapahos on the Arkansas River.
1834	The Trade and Intercourse Act redefines the Indian Territory and Permanent Indian Frontier. Requires whites obtain a license to travel into Indian lands west of the Mississippi
1835	Texas declares itself a republic independent from Mexico. The Texas Rangers are organized to fight the Comanche.
1836	Congress organizes Wisconsin Territory. Menominee sign "Lumberman's Treaty" to allow logging on Wisconsin River.
1837	Pine Tree Treaty between U.S. and Chippewa for US to acquire lumbering and sawmill sites in the Lake Superior Chippewa country. Multiple other "timber" treaties followed in the Midwest for the Chippewa, Oneida, Stockbridge-Munsee, Potawatomi, and Winnebago.
1835-38	Second Seminole War; Osceola is captured 1837, dies 1838.
1837-38	Smallpox epidemic among Mandan, Hidatsa, and Arikara tribes of the upper Missouri claims 20,000 Natives.
1839	New York succeeds Maine as the largest lumber producer in the United States. Total national lumber production reaches 1.6 billion board feet.
1840	Sixth census of the US reports 31,650 water-powered sawmills in the US.
1841	Cherokee and Choctaw Nations establish public schools in Indian Territory.
1846	Miami tribe removal in Indiana.
1846	Following Treaty with Britain, Oregon Territory becomes part of the United States bringing the area and Native inhabitants under U.S. protection.
1846	Creation of Lands Division in Indian Service, which oversees timber activities. Indian sawmills constructed to provide building materials for Indian reservations.
1846-48	United States and Mexican War.
1846-1853	Epidemics of smallpox and measles devastate Native populations in the PNW.

1847 Taos Revolt: Pueblos attack Americans.

1847 1847 Cayuse Indian War. Plateau region of eastern Washington.

1848 Treaty of Guadalupe Hidalgo. 335 million acres of Spanish Southwest and its many Indian tribes become part of the United States (TX, NM, CA).

1848 Gold is discovered in California.

1849 Bureau of Indian Affairs transfers from the War Department to the newly-formed Department of the Interior.

1850 Lumber shipments from Green Bay, WI exceed 100 MMBF/yr. Timber trespass and fraud are rampant on MW tribal lands. Indian agents lack legal foundation, authority, and expertise to regulate the cutting and selling of reservation timber.

1850-60 Cholera epidemic among the Indians of the Great Basin and southern plains.

7 Reservations 1850-1887

1851 The 1851 Indian Appropriations Act formalized the reservation system, allocating funds to relocate tribes to established reservations.

1851 Treaty of Travers de Sioux. Minnesota creates first Sioux reservations.

1851 First Treaty of Fort Laramie. U.S. enters into agreements with Cheyenne, Sioux, Arapaho, Crow, Assiniboine, Mandan, Hidatsa, and Arikara.

1853 Gadsden Purchase adds 29 million acres to the "public domain" in AZ and NM.

1853-54 Northern Indian Territory is taken by Kansas-Nebraska Act to become Kansas and Nebraska Territories and make way for the railroad.

1853-55 Rogue River War in Oregon.

1854 Treaty of La Pointe authorized 80-acre allotments on Chippewa Reservations.

1854-55 Indian Superintendent and WA Governor, Isaac Stevens, "purchases" Indian lands in Washington Territory negotiating seven treaties in two years.

1855 Treaties with Wyandot, Chippewa, Winnebago, Choctaw, and Chickasaw.

1853-56 United States acquires 174 million acres of Indian lands through 52 treaties.

1856 Water-powered sawmill is constructed at Red Lake Reservation in Minnesota.

1858 George Weyerhaeuser buys first sawmill in Rock Island, Illinois.

1860 Pennsylvania becomes the largest US lumber producing state.

1860 Paiute War (also called the Pyramid Lake War) in Nevada.

1861 Enabling Act for the Kansas Territory contains first clear congressional recognition of reservations as jurisdictional enclaves within states.

1861-65 The Civil War. As punishment for support of the Confederacy, the Five Civilized Tribes relinquish the western half of the Indian Territory to 20 tribes from Kansas and Nebraska.

1862 The Department of Agriculture is established.

1862	Homestead Act opens up Indian land in Kansas and Nebraska to white homesteaders, who are deeded 160-acre plots. By 1934, 1.6 million settler homesteads are granted on 270 million acres (10% of all US lands).
1862-63	Santee Dakota uprising in Minnesota and North Dakota.
1863	Mescalero Apaches forced onto Bosque Redondo reservation.
1864-65	Cheyenne-Arapaho War in Colorado and Kansas.
1864	Navaho removal in Arizona.
1865	Reservation schools establish through US govt grants to Christian organizations.
1866	The Railroad Enabling Act appropriates Indian lands for railroads.
1866-68	War for the Bozeman Trail in Wyoming and Montana, Sioux, Cheyenne, and Arapahos under Chief Red Cloud. A second Fort Laramie Treaty resolves the conflict in 1868 and further reduces the size of Indian reservations.
1867	President Grant's "Great Peace Commission" recommends that the treaty process be abandoned. The Commission and Nez Perce Indians negotiate the last of 389 treaties between the federal government and tribes.
1867	United States purchases Alaska from Russia for $7.2 million adding 365 million acres to the "public domain."
1867-70	Osage, Shawnee, Pawnee, Delaware, Oto-Missouri resettled in Indian Country.
1868	President Grant's "Peace Policy" lasts until 1874 amidst widespread violation of treaty rights.
1868	Fort Laramie Treaty creates the Sioux Reservation including the Black Hills.
1868	Indians denied right to vote by passage of the 14th Amendment. Congress decides that Indians will not be counted as citizens until they pay taxes.
1868-69	Southern Plains War (Sheridan Campaign), involving the Cheyenne, Sioux, Arapahos, Kiowa, and Comanche.
1869-70	Smallpox epidemic among Canadian Plains Indians including Blackfeet, Piegans, and Bloods.
1869	Transcontinental railroad is completed.
1869	Brigadier General Ely Parker (Donehogawa), a Seneca, becomes the first Native Commissioner of Indian Affairs.
1870	Michigan becomes the largest US lumber producing state.
1871	Peshtigo Fire in WI causes the worst fire mortality in US history, killing 1,500 people and burning over 1.2 million acres of forest.
1871	Gold is discovered in the Black Hills of South Dakota.
1871	Indian Appropriations Act of 1871. Congress decides that United States will make no more treaties with Indian tribes.
1872	Western Apaches are assigned to reservations in Arizona.

1873	Timber Culture Act. Homesteaders receive additional lands if trees are planted.
1872-73	Modoc War in California.
1873	*US v Cook* Supreme Court rules that U.S. owns logs from Indian trust lands. Tribes and individual Indians have no rights to cut timber on reservation or allotment lands unless they are clearing the land for agricultural purposes.
1874-75	Red River War - Comanche, Kiowa, and Cheyenne.
1876-77	Great Sioux War - Sioux, Cheyenne, and Arapahos. Battle of Little Big Horn.
1876	Franklin B. Hough is appointed first federal forestry officer.
1877	Flight of the Nez Perce in the Northwest.
1878	Off-reservation boarding schools permit education away from tribal influences.
1878	Free Timber Act gives right to settlers in western states to cut timber for domestic and mining uses.
1878	Timber and Stone Act. U.S. sells western timberland for $2.50/acre.
1878	Paiute, Bannock, Sheepherder War in Oregon and Idaho.
1878-79	Flight of the Northern Cheyenne on the Plains.
1879	Ute War in Colorado.
1879-85	"Friends of the Indian" organizations founded (Indian Protection Committee, Indian Rights Association, Women's National Indian Association, and National Indian Defense Association).
1879	Bureau of American Ethnology, a branch of the Smithsonian, is founded for anthropological studies.
1879	Richard Pratt founds the Carlisle Indian School in Pennsylvania, with the philosophy of assimilating Indians into white culture.
1881	Helen Hunt Jackson publishes "Century of Dishonor" citing inequities perpetrated against the Indians. Congressional investigation leads to the Dawes Act.
1881	Division of Forestry is established in Dept of Agriculture. Hough appointed Chief.
1881	Sitting Bull surrenders at Fort Buford, North Dakota.
1884	Congress acknowledges Eskimo rights to Alaskan territorial lands.
1884	United States Indian Industrial Training School opens in Lawrence, Kansas. In 1887, the name is changed to Haskell Institute. In 1993, a baccalaureate program is added and the name is changed to Haskell Indian Nations University.
1885-86	Geronimo leads Apache resistance.
1885	Congress passes the Major Crimes Act extending federal and state jurisdiction over major crimes to Indians on reservations.
1886	Bernard E. Fernow is the first professional forester as Chief of Div. of Forestry.
1886	*United States v. Kagama*. Supreme Court upholds constitutionality of the Major

Crimes Act of 1885 and confirms Congress' plenary power over Indian affairs.

8 Allotments and Assimilation 1887-1934

1887 General Allotment (Dawes Severalty) Act, launches era of "assimilation" through break-up of Indian reservations into individual allotments of 40, 80, 160, and 320 acres, to be held in "trust" by the federal government. "Surplus" lands remaining after tribal members receive allotments (no provision for later generations) are sold to settlers or otherwise transferred to the government. By 1920, 217,572 allotments, covering 35,897,069 acres, had been made on 118 reservations. Between 1887 and 1934 Indian lands were reduced from 138 to 48 million acres.

1888 Congress passes law to prevent timber trespass on Indian reservations but law does not apply to allotments.

1889 Congress passes the "Dead and Down" Act, the first general policy for management of Indian forest resources. On a case by case basis, Congress legislatively authorizes harvesting of timber on reservations. From 1889-1896, 59 MMBF of timber is harvested from Chippewa Reservations in Minnesota.

1889 Two million acres of Indian Territory (Oklahoma) are "bought" from Indians and given to white settlers for the "Land Run."

1889 Nine million acres in western Dakotas are "bought" from the Sioux creating several smaller reservations.

1889 Nelson Act establishes agricultural allotments on the White Earth Reservation in northwestern Minnesota for Ojibwe bands. Timber lands were to remain communally owned.

1890 Menominee receive permission from the federal government to harvest green timber at an annual rate of 20MMBF/year. First annual allowable cut for an Indian reservation or federal forestland.

1890 Sitting Bull murdered at Standing Rock. Wounded Knee massacre at Pine Ridge.

1890 Michigan sawmill production peaks at 5.5 billion board feet.

1891 General Revision Act authorizes withdrawal of land from the public domain to establish "forest reserves."

1892 Intercourse Act prohibits the intrusion of non-Indians on Indian lands.

1894 Hinkley, MN. Forest fire burns 160,000 acres, destroys 6 towns, and kills 600 people.

1896 *Talton v. Mayes* , Supreme Court upholds tribal sovereignty in local affairs, but "all such rights are subject to the supreme legislative authority of the United States."

1897 Forest Service Organic Administration Act provides that national forests shall be established only to improve and protect the forest therein, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for use and necessities of the citizens of the United States In addition, the Secretary of Agriculture may make rules and establish such service as will assure the objectives of the Forest Reserves, namely, to regulate their occupancy and use and preserve the forest thereon from destruction.

1898 Curtis Act dissolves tribal courts and governments and forces allotments. It required Indians of abolished nations to submit to allotment, and it extended the policy of allotment to the Five Civilized Tribes – the Cherokee, Chickasaw, Choctaw, Creek, and Seminole.

1898 The Nation's first 4-year professional forestry curriculum is established at Cornell University. The Biltmore Forest School opens the same year. Yale follows in 1900 and adds a graduate curriculum. Within ten years a dozen forestry schools open at state universities around the nation.

1900 The population of Native Americans drops to its low point at 235,000.

1900 The Society of American Forests is founded as a professional organization of technically trained foresters.

1901 Congress authorizes the sale of timber from allotted lands on the Grand Portage Indian Reservation. Similar acts are passed in rapid succession for other Indian lands. The next year an act of Congress specifies that 5 percent of the timber on the Chippewa Indian Reservation be left standing for forest renewal purposes, and that cutting be restricted to pine.

1902 Yacolt Fire in WA and OR destroys 1 million acres and leaves 38 dead.

1902 *Cherokee Nation v. Hitchcock,* the Supreme Court held the United States has the power to overrule Cherokee laws.

1902 Morris Act stipulates price and sale arrangements for pine logs from ceded Chippewa lands. Timber and lands are sold separately.

1902 Congress declares Chippewa "surplus" lands as Minnesota Forest Reserve, later renames Chippewa National Forest.

1903 *Lone Wolf v. Hitchcock,* the Supreme Court establishes Congress' power to unilaterally break treaties. Tribal lands, a taken as "surplus" under the Dawes Act, can be sold without regard to treaty guarantees.

1904 Steenerson Act authorizes allotment of timberlands on the White Earth reservation.

1904 Clapp Act authorizes sale of timber from Chippewa Indian Allotments.

1905 *United States v Winans*, The treaty is not a grant of rights to the Indians, but a grant of rights from them with reservation of rights not granted such as fishing.

1905 The Forest Service is created in the Dept of Agriculture. Gifford Pinchot, appointed the first Chief, serves until 1910.

1905 Washington becomes the largest lumber producing state in the US.

1906 Indian Appropriation Act. Secretary of Interior may determine "competency" of Chippewa allotments owners such that title transfer may be expedited, taxes levied, and land and timber sold.

1906 Alaska Native Allotment Act. Congress creates procedures whereby individual Alaska Natives could acquire land. The act specifically provides that land acquired would be held in trust by the United States for the benefit of the individual Native owner. The

Alaska Native Claims Settlement Act of 1971 (ANCSA) repealed this act.

1906 Antiquities Act. Presidential protections for Indian ruins and other special places. Authorizes the President to designate national monuments to protect historic and prehistoric structures and other objects of historic or scientific interest.

1906 Burke Act grants the Commissioner of Indian Affairs the power to abruptly end the trust status of allotted Indian lands (as created by Dawes Act) making the lands subject to state taxes and potential forfeiture for non-payment. Many allotments are taken out of trust without the knowledge of the allottee.

1908 *Winters v. United States*, Supreme Court finds that water rights were reserved for tribes as an implication of the treaties that created the reservations. The "Winters Doctrine" establishes the canons of construction in which any ambiguity in treaties is to be resolved in the tribes favor.

1908 Menominee Sawmill is constructed at Neopit, Wisconsin.

1908 Depts of Interior and Agriculture enter into short-lived agreement for the Forest Service to Management Indian forests.

1908 The Forest Fires Emergency Act authorizes the Forest Service to spend whatever necessary (subject to supplemental appropriations) to combat forest fires.

1909 Teddy Roosevelt issues executive orders transferring 2.5 million acres of timbered Indian reservation lands to national forests.

1909 Indian Appropriations Act provides first appropriation for Indian forestry of $100,000.

1910 The use of executive order to create Indian reservations is terminated by statute.

1910 General Indian Timber Act establishes the Bureau of Indian Affairs Branch of Forestry and authorizes the sale of timber. J.P. Kenny becomes the first Chief in 1914 and serves until 1933.

1910 Allotment Act of 1910 provides for allotting lands to Indians found to be occupying, living on, or having improvements on lands that had become National Forest lands. Allows sale of timber on allotments.

1910 Great Fire of 1910 (WA, ID, and MT) burns 3 million acres and kills 87 people and sets the stage for federal policies advocating total fire suppression.

1910 US lumber production peaks at 44.5 BBF

1911 Office of Indian Affairs, Regulations and Instructions for Officers in Charge of Forests on Indian Reservations begins America's war on fire. "It shall be the duty of the Indian police to prevent and suppress forest and grass fires as far as possible, and failure on their part to perform such duties, or to report promptly any fire which they cannot control, will constitute sufficient cause for dismissal."

1911 The Weeks Act Authorizes and directs the Secretary of Agriculture to acquire forested, cutover, and denuded lands within watersheds of navigable streams necessary to the regulation of the flow of navigable streams or for timber production. Under the act, such lands are to be permanently reserved, held, and administered as national forests. The Weeks Act enlists states into a cooperative federal-state effort

to extinguish all federal forest fires. In 1922, Congress extends these protections to all public lands and Indian reservations.

1914-18 World War I. 12,000 Native Americans join the armed forces.

1920 The Pacific Northwest produces 30% of US lumber.

1921 The Snyder Act makes the Interior Department responsible for Indian education, medical, and social services.

1924 Clark-McNary Act amends the Weeks Act to authorize purchase of lands for timber production as well as stream flow protection. Directs the Sec of Agriculture to work with fed agencies, states, and private companies on fire control and reforestation.

1924 Indian Citizenship Act formally conveys citizenship and voting rights to Indians, regardless of their land tenure or place of residence. Up until this time, the U.S. Constitution did not apply to individual Indians. States are slow to acknowledge: Utah, last to enfranchise Indians, did not grant voting rights until 1956.

1924 Pueblo Lands Board Act allows non-Indians to validate title to previously acquired Pueblo lands.

1926 "10-Acre Policy" mandates suppressing all fires before they reach 10 acres in size.

1928 The Problem of Indian Administration (The Meriam Report). The first comprehensive study of Indians reports chronic poverty as a result of the failed federal Indian policies of allotments and assimilation. The allotment act is found especially ill suited for forestry. Encourages tribal self-determination.

1930's The Great Depression brings hardship to many American families, resulting in the election of President Roosevelt in 1932 and the beginning of the New Deal.

1932 John Collier is appointed Commissioner of Indian Affairs.

1933 The Copeland Report, an extensive examination of U.S. forests prepared by the Forest Service, recommends significant expansion of public ownership and more intensive management on all forestlands.

9 Reorganization 1934-1950

1933-42 Civilian Conservation Corps Indian Division (CCC-ID) creates conservation jobs for 77,000 Indian men on 78 reservations in 23 states. Also known as the Indian New Deal. Projects include reservation improvements such as construction of water systems, bridges, and roads and also include the first improvement significant investments by the U.S. government in improvements for Indian forests through tree planting, thinning, and forest health treatments. CCC-ID enrollees fight fires beginning a continuing history of Indian fire response teams.

1934 Indian Reorganization Act (Wheeler-Howard Act or IRA). Gives Indian Tribes option to organize as political and economic units, repealed the Allotment Act, establishes federal commitment to acquire lands for return to Indian Tribes, requires sustained yield management of Indian forestlands, institutes Indian preference hiring, establishes a revolving fund for econ dev., and extends the trust period for allotments indefinitely.

1934 Johnson-O'Malley Act. Congress provides funds to integrate Indian education into state school systems.

1935 The "10 a.m. Policy" is implemented, requiring all wild fires to be extinguished before 10 a.m. the morning following their first report.

1936 Interior Department General Forest Regulations calls for development of forest plans to support sustained yield management, raises number of seed trees to 25% of the stand, ends clear-cutting of aspen but funding is inadequate for planning.

1937 *Shoshone Tribe v U.S.* U.S. cannot take Indian land without just compensation.

1938 Oregon becomes the largest lumber producing state in the US.

1939-45 World War II – 44,000 Native Americans join the armed forces.

1942 *Seminole Nation v U.S.* U.S. has charged itself with moral obligations to tribes of highest responsibility and trust.

1944 The Sustained Yield Forest Management Act (SYFMA) Provides authority to the Secretary of Agriculture and the Secretary of the Interior to establish cooperative sustained yield units with private and other Federal agencies in order to provide for a continuous and ample supply of forest products and to secure the benefits of the forest in maintenance of water supply, regulation of stream flow, prevention of soil erosion, amelioration of climate, and preservation of wildlife. Under Section 7, trust or restricted Indian land, whether tribal or allotted, could be included in such a unit with the consent of the Indians concerned.

1944 National Congress of American Indians (NCAI) is founded.

1944 Smokey the Bear becomes U.S. public relations symbol in the war against wildfire.

1946 Indian Claims Commission Act is established to hear legal claims of Indian tribes against the U.S. The three-person board could only give money for land; it could not take back lands that were illegally settled by white settlers and now owned by their descendants. By the time of the Commission's final report in 1974, it had awarded $818,172,606.64 in judgments and had completed 546 dockets.

1946 The Bureau of Land Management is created in the Department of Interior.

1948 Mescalero Apache Red Hats organize as one of the first Indian fire fighting crews. Hopi, Navajo, Pueblo, Zuni also establish fire fighting crews.

1949 Hoover Commission recommends that assimilation be reinstated as the dominant objective of Indian policy.

10 Termination 1950-1970

1950 *Menominee Tribe of Indians v U.S.* Supreme Court awards Menominee damages for mismanagement of tribal timberlands by BIA.

1951 2,000 fire warriors organize as the Southwest Indian Forest Firefighters (SWIFF),

1953-1970 Direct Employment Program - "relocation centers" in Los Angeles, San Francisco, Denver, Minneapolis, and Chicago drew more than 90,000 American Indians away from their reservations.

1953-68 Termination. House Concurrent Resolution no. 108, United States ends federal recognition of 109 tribes and rancherias reducing tribal land holdings by 2.5 million acres. Menominee and Klamath, which won lawsuits against the U.S., are targeted for termination. Public Law 280, United States, gives California, Oregon, Minnesota, Wisconsin, Nebraska civil and criminal jurisdiction over most Indian lands within their borders. Begins decades long efforts to achieve restoration.

1954 Apache Red Hats receive Interior Department's top honor for meritorious service.

1955 *Tee-Hit-Ton Indians v. United States* Tribal right of occupancy can be terminated.

1955 1,200 Indian firefighters from seven reservations in Montana and Idaho organize as the Montana Indian Firefighters (MIF).

1959 *Williams v. Lee*, the Supreme Court rules that a tribal court has jurisdiction over a contract entered into by a non-Indian with reservation Indians.

1960 Multiple-Use Sustained-Yield Act. Forest Service to sustainably manage for multiple resources: timber, range, water, recreation, and wildlife. It authorizes and directs the Secretary of Agriculture to develop and administer the renewable resources for multiple use and sustained yield of the several services and products obtained therefrom. It authorizes the Secretary of Agriculture to cooperate with interested State and local governmental agencies and others in the development and management of the national forests.

1961 Winema Nat'l Forest is created from terminated Klamath tribal lands in Oregon.

1962 President Kennedy signs the last termination order for the Ponca Tribe.

1963 Following publication of the "Leopold Report," which recognized fire's beneficial role, the NPS allows forest fires to burn if they promote wildlife and vegetation.

1964 Indian Timber Sales Act. Timber on reservations and other land held in trust may be sold in accordance with principles of sustained yield management.

1964 Wilderness Act creates wilderness system of lands "untrammelled by man." Today there are 107.5 million acres of land designated as federal wilderness. Curbs fire suppression in wilderness areas.

1965 Boise Interagency Fire Center is established later to become National Interagency Fire Center (NIFC)

1966 National Historic Preservation Act (NHPA) states, "the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people."

1968 American Indian Movement (AIM) is founded in Minneapolis.

1968 Indian Civil Rights Act extends most of the protections of the Bill of Rights to individual tribal members.

1968 Navajo Community College (later renamed Diné College) is established as the first tribal college to be created on an American Indian reservation. Today there are 37 Indian Colleges and Universities throughout the United States.

1968 President Johnson speaks of the "Forgotten American" in special message to Congress and calls for "…new emphasis on Indian self-help and with respect for Indian culture."

1969 *US v Oregon* acknowledges the rights of several tribes to fish in the Columbia River with minimal regulation by state or federal government.

1969 National Environmental Policy Act (NEPA) establishes procedural requirements for environmental assessments by government agencies and requires agencies to invite Indian tribes to participate in the scoping process on projects and activities that affect them. Tribes with treaty rights on National Forest System lands may also meet with line officers in advance of the formal planning processes about their reserved rights. NEPA assessments are also required of BIA and tribes. Creates Council on Environmental Quality.

11 Self-Determination 1970-1990

1970 Nixon delivers special message to Congress, "The time has come to break decisively with the past and to create the conditions for a new era in which the Indian future is determined by Indian acts and Indian decisions."

1970 *Choctaw Nation v Oklahoma*. "Treaties with the Indians must be interpreted as they would have understood them... and any doubtful expressions in them should be resolved in the Indians' favor.""

1971 Alaska Native Claims Settlement Act (ANCSA) extinguishes Native claim to title to lands in Alaska, as well as hunting and fishing rights. Transfers 44 million acres to Alaska Native Corporations and bridges the last hurdle to the construction of the Alaska Pipeline.

1973 Menominee Restoration Act (P.L. 93-197), United States; repealed the 1954 act terminating the tribal status of the Menominee. In effect, this nullified the 1953 federal policy promoting termination of Indian status.

1973 Endangered Species Act (ESA) requires protection of threatened or endangered plant and animal species and their habitats and extends to Indian reservations.

1973 American Indian Higher Education Consortium (AIHEC) forms to provide support for tribal colleges and Indian education.

1974 Forest and Rangeland Renewable Resources Planning Act (RPA) requires periodic forest plans and resource assessments by the Forest Service. It also specifies procedures to insure that such plans are in accordance with NEPA requirements.

1974 *US v WA* (Boldt Decision) Supreme Court upholds WA tribes right to " take fish, at all usual and accustomed grounds and stations."

1974 The Indian Financing Act of 1974 establishes an Indian Business Development program in the Department of the Interior.

1975 Indian Self-Determination and Education Assistance Act (PL93-638) authorizes Secretaries of Interior, Health, Education, and Welfare to enter service delivery contracts with federally recognized Indian tribes. The act formally recognizes the U.S. obligation to provide education and services to Indian communities.

1976 Federal Land Policy and Management Act (FLPMA). Bureau of Land Management (BLM) organic act. Remaining public lands to be retained in federal ownership. Directs the Secretary of Agriculture to coordinate National Forest System land use plans with the land use planning and management programs of and for Indian tribes by considering the policies of approved tribal land resource management programs.

1976 National Forest Management Act (NFMA) is the primary statute governing Forest Service. Directs consultation and coordination of National Forest System planning with Indian tribes.

1976 Intertribal Timber Council (ITC) is formed as a nonprofit nation-wide consortium of Indian Tribes, Alaska Native Corporations, and individuals dedicated to improving the management of natural resources of importance to Native American communities.

1977 American Indian Policy Review Commission (AIPRC) Report to Congress is the first comprehensive analysis of Indian policy since 1928. AIPRC recommends strengthening tribal governments, affirming the trust relationship between tribes and the federal government, acknowledging the importance of tribal lands and forests, and reorganizing the BIA. "The overwhelming conviction of Indian people is that tribal land base is essential. The need to develop a comprehensive forestry management program for Indian country is obvious. "

1977 American Indian Science and Engineering Society (AISES) is established to increase American Indian and Alaska Native representation in science, technology, engineering, and mathematics.

1977 Assist Secretary for Indian Affairs position is established in Dept. of Interior.

1977 USFS drops the "10 am" and "10 acre" fire policies.

1978 *Oliphant v. Suquamish Indian Tribe*, Supreme Court rules tribes do not have jurisdiction over non-Indians residing on Indian reservations. Indian treaties "cannot be interpreted in isolation but must be read in light of the common notions of the day and the assumptions of those who drafted them."

1978 Indian Child Welfare Act, United States, protects Indian tribes' interest in retaining custody of their children.

1978 Tribally Controlled Community College Assistance Act provides construction, technical assistance, and endowment building funds.

1978 American Indian Freedom of Religion Act (P.L. 95-341)

1978 Cooperative Forestry Assistance Act authorizes Sec. of Agriculture to provide tech assistance to Indian forestry.

1979 *Washington v Washington State Commercial Passenger Fishing Vessel Association* Indians are entitled to 50% of the harvestable fish passing through their recognized tribal fishing grounds. Treaty words must be construed "in the sense in which they would naturally be understood by Indians."

1980 Alaska National Interest Lands Conservation Act grants subsistence rights to Alaska Natives.

1980 *U.S. v Sioux Nation of Indians* Supreme Court rules that taking of property that was set aside for the use of the tribe required just compensation, including interest. The Sioux have declined to accept the money because acceptance would legally terminate Sioux demands for return of the Black Hills.

1980 Maine Indian Claims Settlement Act establishes an $81 million land acquisition fund on behalf of Penobscot Nation, Passamaquoddy Tribe, Houlton Band of Maliseet Indians, and Aroostook Band of Micmacs. Between 1978-2006, 14 Indian land claims are settled providing involved tribes nearly $500 million.

1983 *New Mexico v Mescalero Apache Tribe*, the U.S. Supreme Court upholds the tribe's exclusive right to regulate non-Indian hunting and fishing on a reservation.

1983 *Lac Courte Oreilles Band of Chippewa Indians v. WI*, Chippewa rights are upheld to subsistence activities in territories ceded by treaties stipulating these rights.

1983 *Mitchell v U.S.* (Mitchell II) Supreme Court hold that statutes and regulations pertaining to timber management by the BIA create a judicially enforceable trust responsibility extending to allotment owners.

1984 Presidential Commission on Indian Reservation Economies recommends abolition of BIA and replacement with Indian Trust Services Administration.

1987 S. Con. Res. 76. acknowledges the contribution of the Iroquois Confederacy of Nations to the development of the U. S. Constitution and reaffirms the continuing government-to-government relationship between Indian tribes and the United States as established in the Constitution.

1988 Yellowstone Park Fires burn 800,000 acres and call into question US fire policy.

12 Transformation 1990 -

1990 National Indian Forest Resources Management Act. "Organic Act" of Indian Forestry (Organic act of Indian forestry) addresses forest management, funding, staffing, timber trespass, forestry education, and other aspects of forestry trust responsibility. Provides periodic Indian Forest Management Assessments.

1990 Native American Grave Protection and Repatriation Act (Public Law 101-601)

1990 Northern Spotted Owl listed as threatened under the Endangered Species Act.

1993 Mexican Spotted Owl listed as threatened under the Endangered Species Act.

1994 Indian Trust Fund Management Reform Act establishes Office of the Special Trustee for American Indians (OST) in Department of Interior. Requires accounting for funds held in trust by the U.S. for Indians and Indian Tribes.

1994 President Clinton Northwest Forest Plan limits timber harvest in Pacific Northwest federal forests in favor of "old growth" protections. Losses to timber processing infrastructure result in market value reductions for tribal timber.

1994 Indian Self-Determination Contract Reform Act and the Self-Governance Permanent Authorization Act are passed to improve and perpetuate the government-to-government relationship between Indian tribes and the U.S. and to strengthen tribal control over federal funds and program management.

1995 Federal Wildland Fire Management Report recognizes wildland fire as a critical natural process, while acknowledging the need to reduce hazardous fuels, and promoting agency and intergovernmental cooperation.

1997 SO 3206: Tribal Rights, Trust Responsibilities and the Endangered Species Act. DOI guidance about the federal-tribal relationship and the ESA. As harvest activities reduce habitats on private forests, tribes inherit legal costs of ESA.

1999 *Minnesota et. al. v. Mille Lacs Band of Chippewa Indians et. al.* United States Supreme Court narrowly upholds off-reservation treaty rights for Minnesota Chippewa Indians.

2000 US Native American population reaches 2.5 million.

2000 Executive Order on Tribal Consultation. President Clinton directs executive departments and agencies to engage in regular and meaningful consultation and collaboration with tribal officials.

2000 Assistant Secretary of Interior – Indian Affairs, Glover, apologizes to Native Americans for BIA history of abuse. 175 anniversary of the oldest federal agency.

2000 Cerro Grande Fire. Park Service-initiated controlled burn at Bandelier National Monument in New Mexico gets away and burns 40,000 acres destroys 240 Los Alamos homes and nearly incinerates the Los Alamos National Laboratory.

2001 At the request of the President, the Secretaries of Interior and Agriculture to develop a National Fire Plan.

2002 Rodeo-Chediski (Apache Sitgreaves National Forest, AZ) forest fire burns 460,000 acres (including 200,000 acres of White Mountain Apache forestlands) and 400 homes. Hayman Fire (Pike National Forest, CO) burns 140,000 acres and 600 structures. Biscuit Fire (Siskiyou National Forest, OR) burns 500,000 acres. The 2002 fire season is the worst in modern US history with costs exceeding $2 billion in federal suppression funds.

2002 Hayman forest fire burns 138,000 acres and destroyed 133 homes. It is the biggest fire in Colorado history.

2002 Wildland Fire Leadership Council forms to address increasing intensity, incidence and costs of forest fires in the United States.

2003 Healthy Forests Restoration Act launches national program to thin overstocked forests and clear away vegetation and trees to reduce wildfire hazard.

2004 President Bush Memorandum directs federal agencies to engage in government-to-government relationships with tribes.

2004 Tribal Forest Protection Act (TFPA) authorizes Depts of Interior and Agriculture to award stewardship contracts to Indian tribes for forest health treatments and fuels reductions on federal forests adjacent to Indian reservations.

2007 Salish Kootenai College graduates the first class from the only baccalaureate degree program in forestry at an Indian College.

2009 Federal Land Assistance, Management, and Enhancement Act (FLAME) creates a fund for national fire fighting costs that exceed annual agency appropriations and requires

creation of a cohesive wildland fire management strategy.

2009 *Cobell v Salazar* Class-Action Law suit over Individual Indian Money Accounts (IIM), begun in 1996 by Elouise Cobell, is the largest lawsuit ever filed against the federal government. $3.4 billion settlement includes $1.55 billion for tribal purchase of fractionated allotted lands.

2009 Executive Order on Tribal Consultation. President Obama directs executive departments and agencies to engage in regular and meaningful consultation and collaboration with tribal officials.

2009 The Secretary of the Interior establishes the Commission on Indian Trust Administration and Reform to review the Department's provision of services to trust beneficiaries.

2010 Indian Forestry Centennial

2010 US Census estimates total population of 309 million people of which 5.2 million people (1.7% of US citizens) report American Indian or Alaska Native ancestry. 78% of Native Americans live outside a reservation.

2011 National Cohesive Wildland Fire Management Strategy, required by FLAME Act, establishes collaborative approach for assessing fire risk and tradeoff analysis.

2011 Wallow Fire replaces Rodeo-Chediski as the largest fire in Arizona history. Wallow burns 540,000 acres and costs $109 million.

2012 Whitewater-Baldy Fire burns 300,000 acres, mostly in Gila Wilderness. It is the biggest forest fire in New Mexico history. 2012 US fires burn 9 million acres.

2013 Third Indian Forest Management Assessment Team Report (IFMAT III)

Trail Trees

For thousands of years extensive trade networks linked diverse tribes all over North America. When trails passed through forests the people would bend young trees to create permanent trail markers, designating safe paths through rough country and pointing travelers toward water, food or other important landmarks. One by one over time these old trees are disappearing but as evidence of the extent of pre-contact trail networks, Mountain Stewards, a nonprofit organization based in Georgia, have counted 1,970 remaining marker trees in 40 states.

Trail Tree. Chattahoochee, GA. (Mountain Stewards)