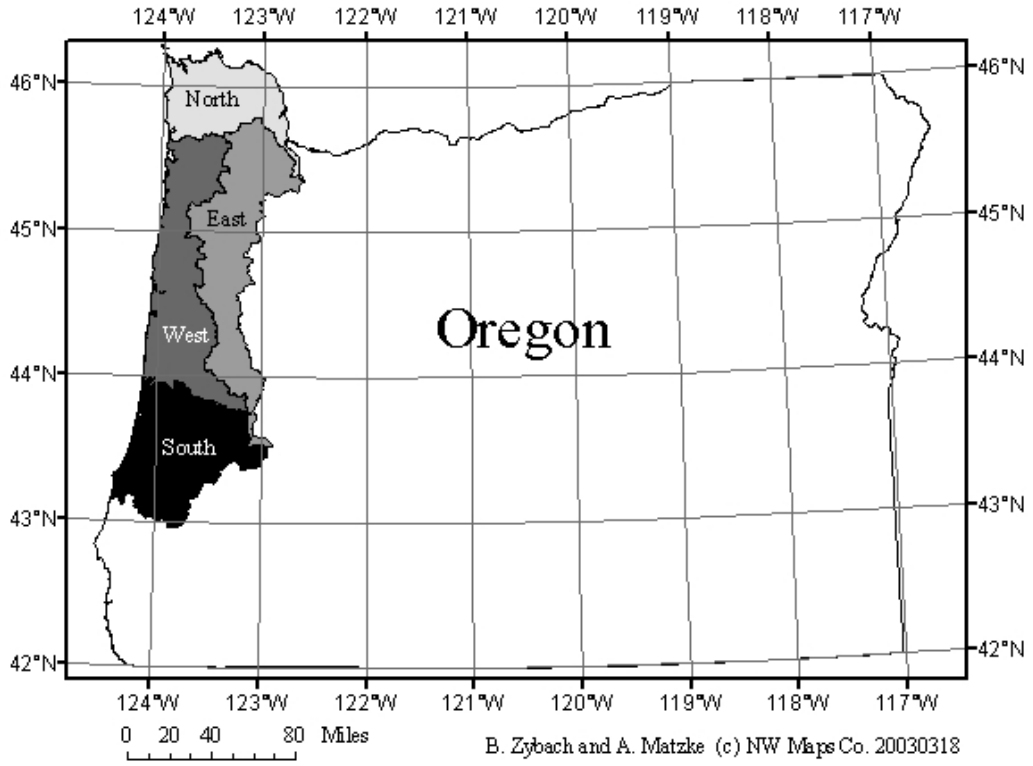
The Great Fires:

Indian Burning and Catastrophic Forest Fire Patterns of the Oregon Coast Range, 1491 - 1951

Presented by Dr. Bob Zybach

Association for Fire Ecology 5th International Fire Ecology and Management Congress
Oregon Convention Center, Portland, Oregon USA
December 5, 2012



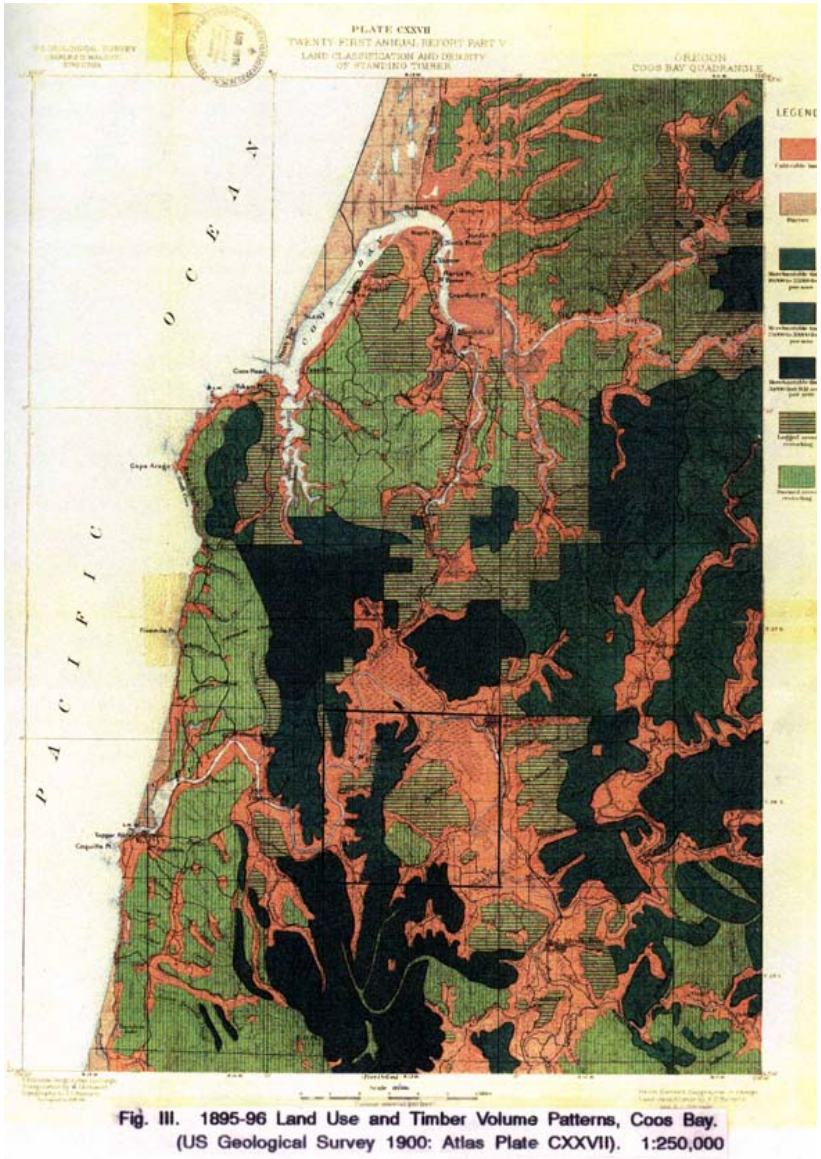
Hypothesis

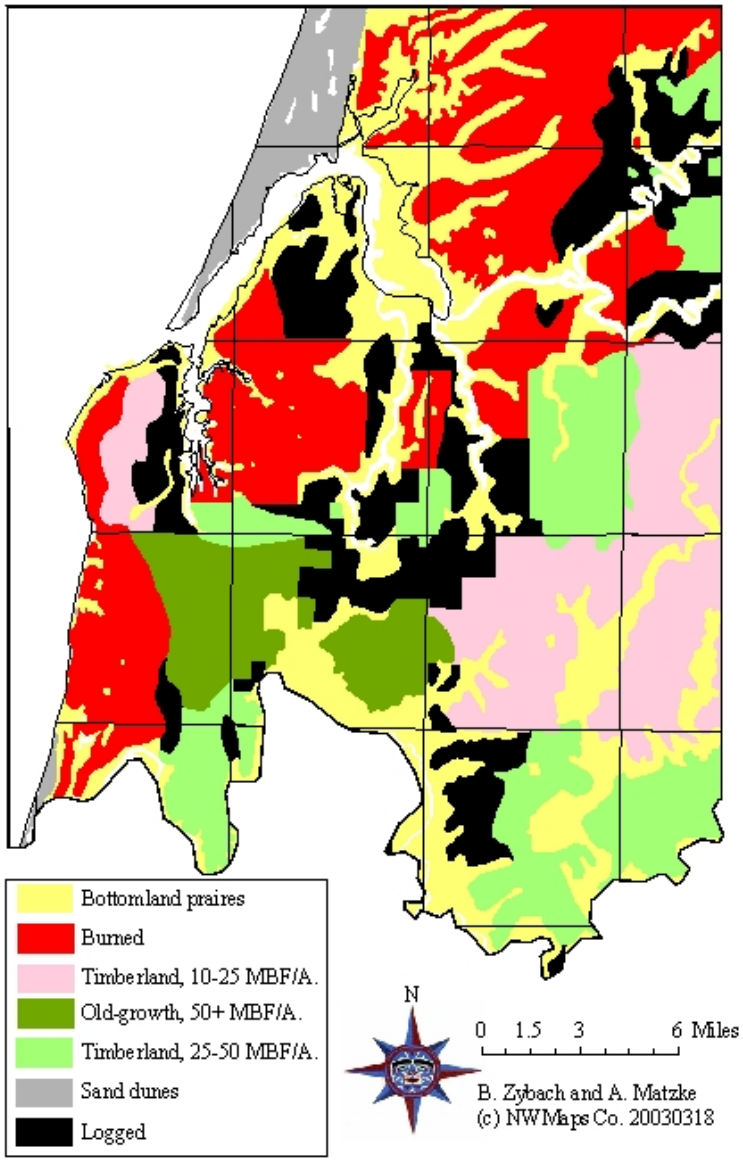
Current evidence suggests patterns of late-15th to mid-19th century Indian burning practices had a direct effect on subsequent patterns of Oregon Coast Range catastrophic forest fires that occurred from 1849 to 1951.

In particular, Indian fires may have influenced the cause, timing, severity, location, and boundaries of subsequent wildfires.

GIS

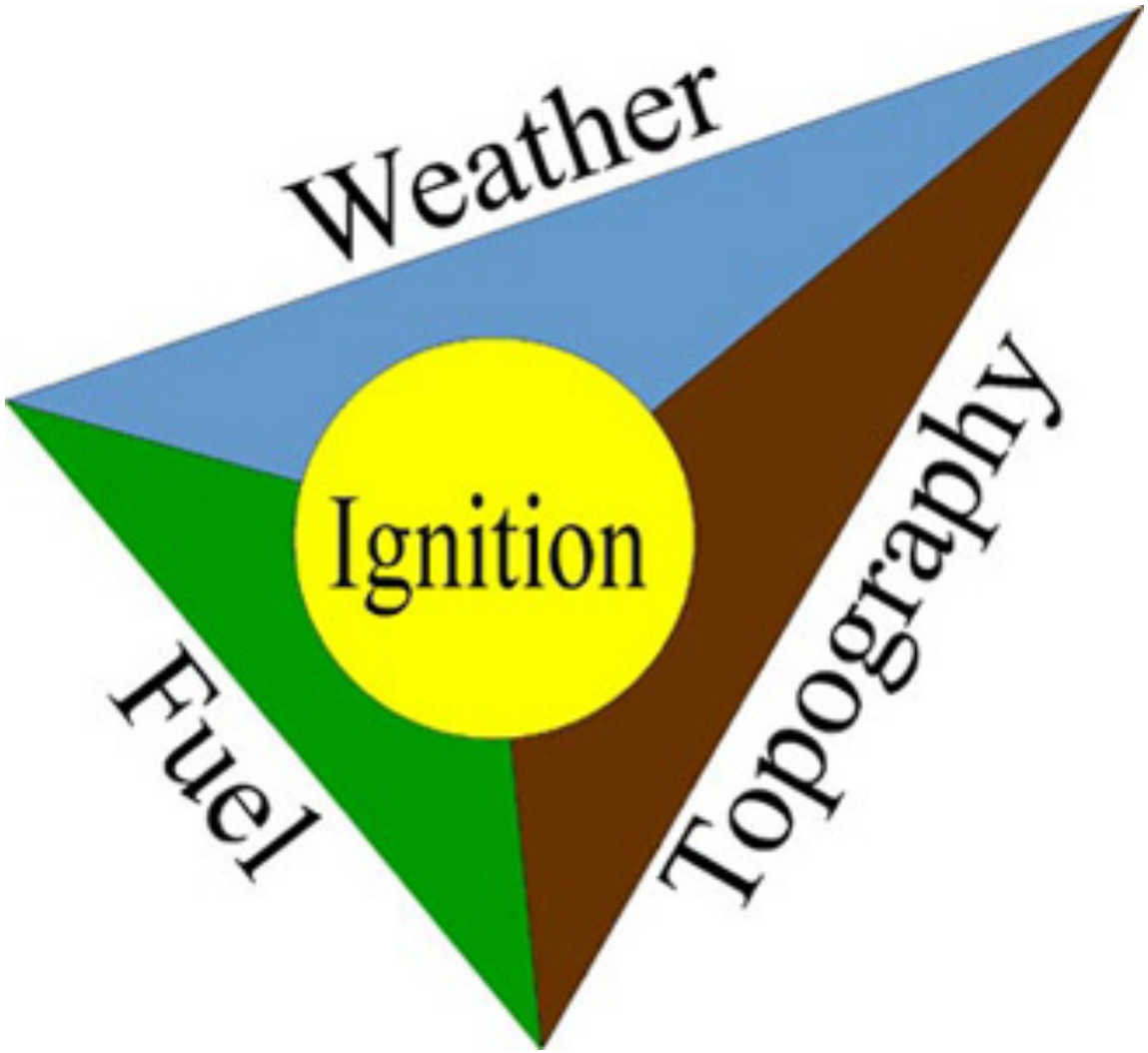
C O N V E R S I O N





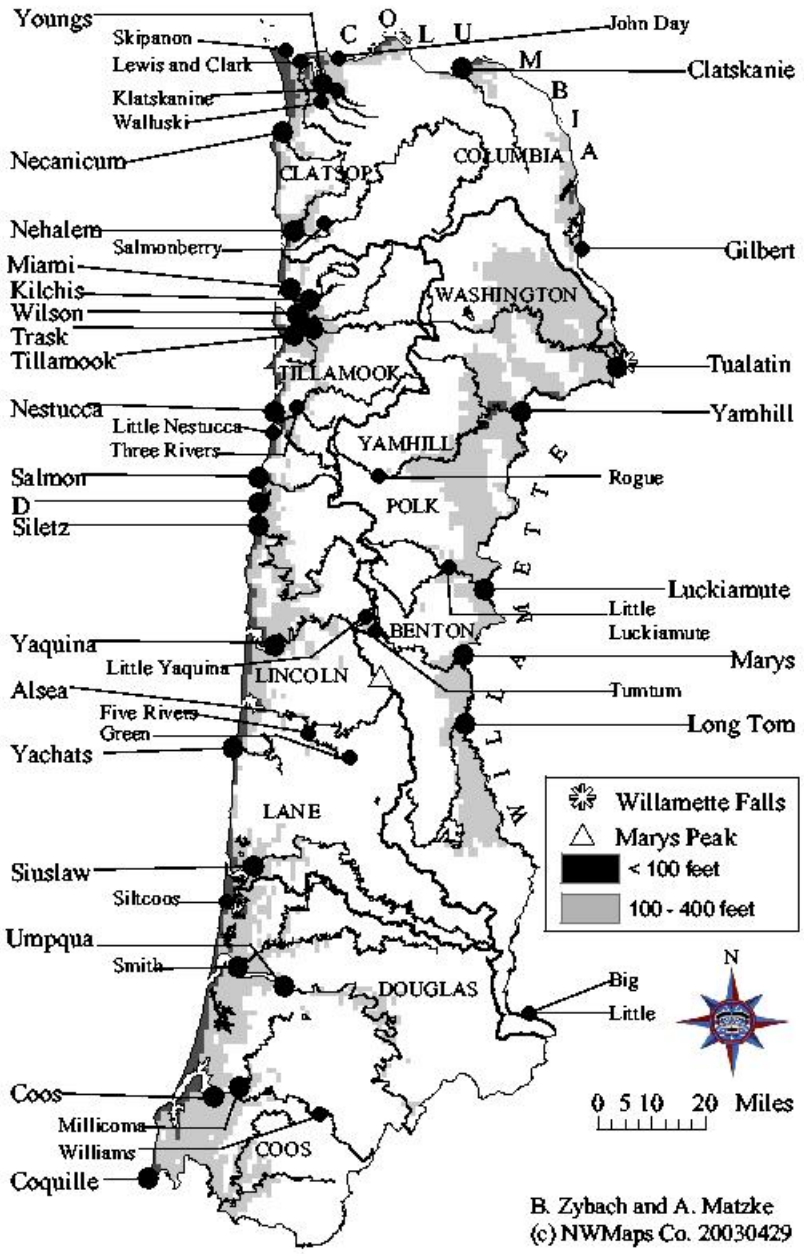
1895-96 USGS Coos Bay 30 min Quadrangle Map

- Bottomland Prairies
- 1868 Coos Fire
- 1770 Millicoma Fire
- Wagon Roads and Trails

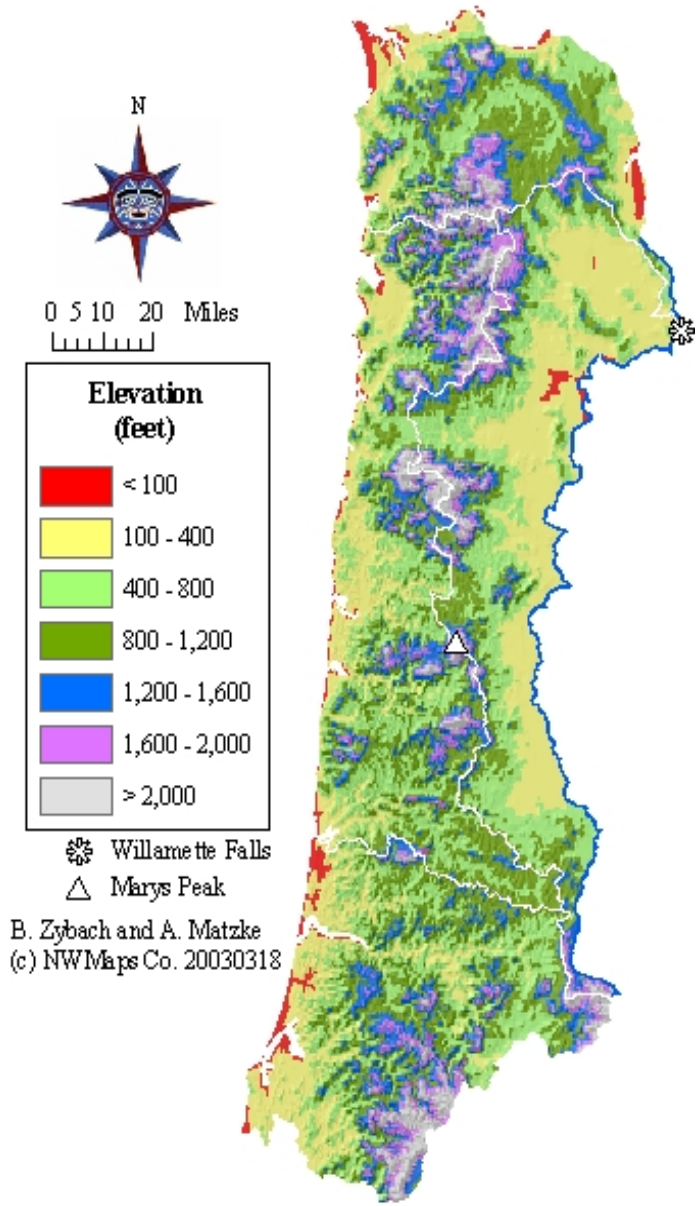

Weather
Ignition
Fuel
Topography

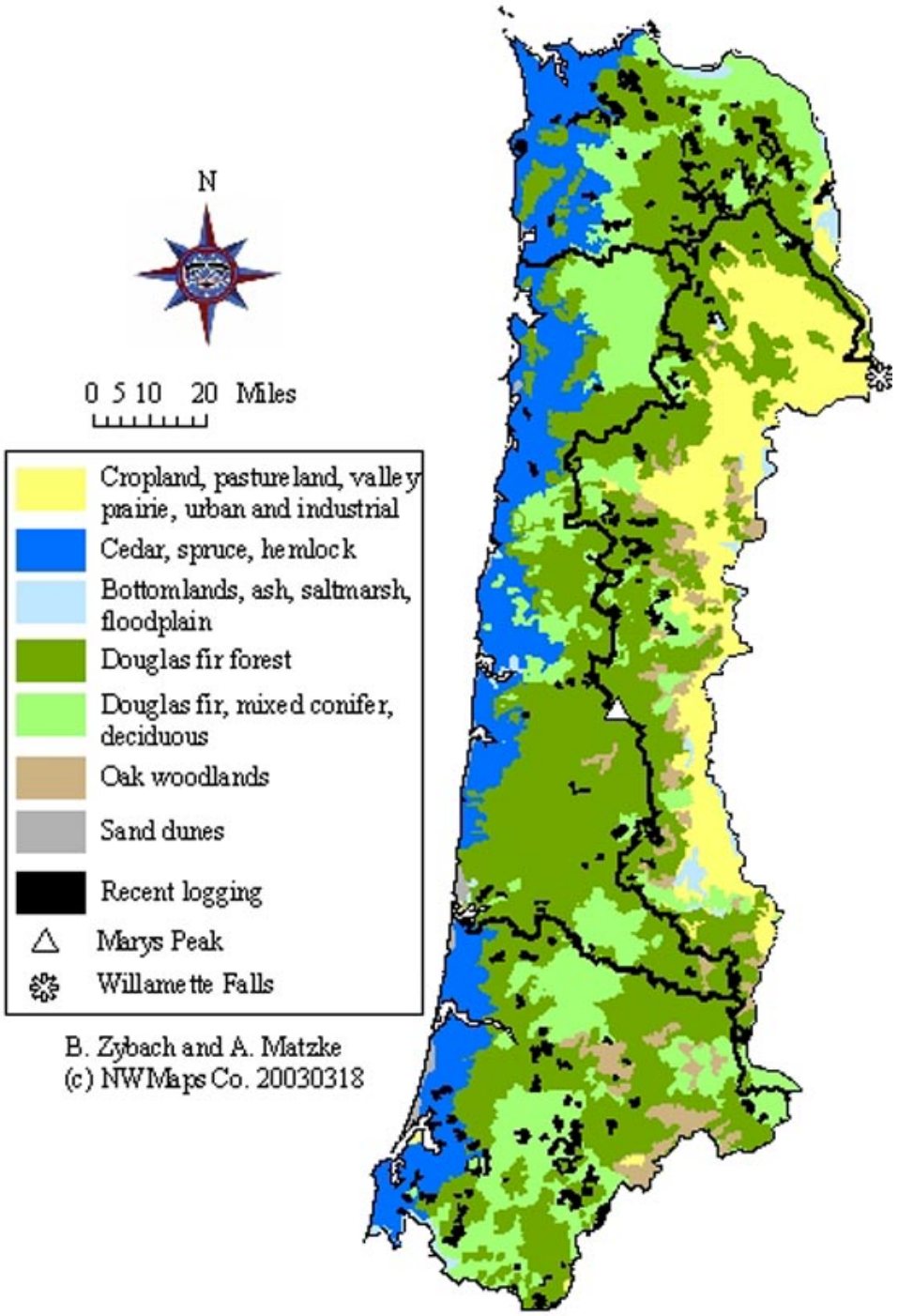
Oregon Coast Range

Named Rivers



Elevations





Oregon Coast Range Fuels

*Spruce/hemlock

*Douglas-fir

*Oak grasslands

Figure 19.--Natural regeneration of western hemlock-Sitka spruce is often too dense; 10 years after clearcutting, this stand contained approximately 15,000 trees per acre (37,000/ha).

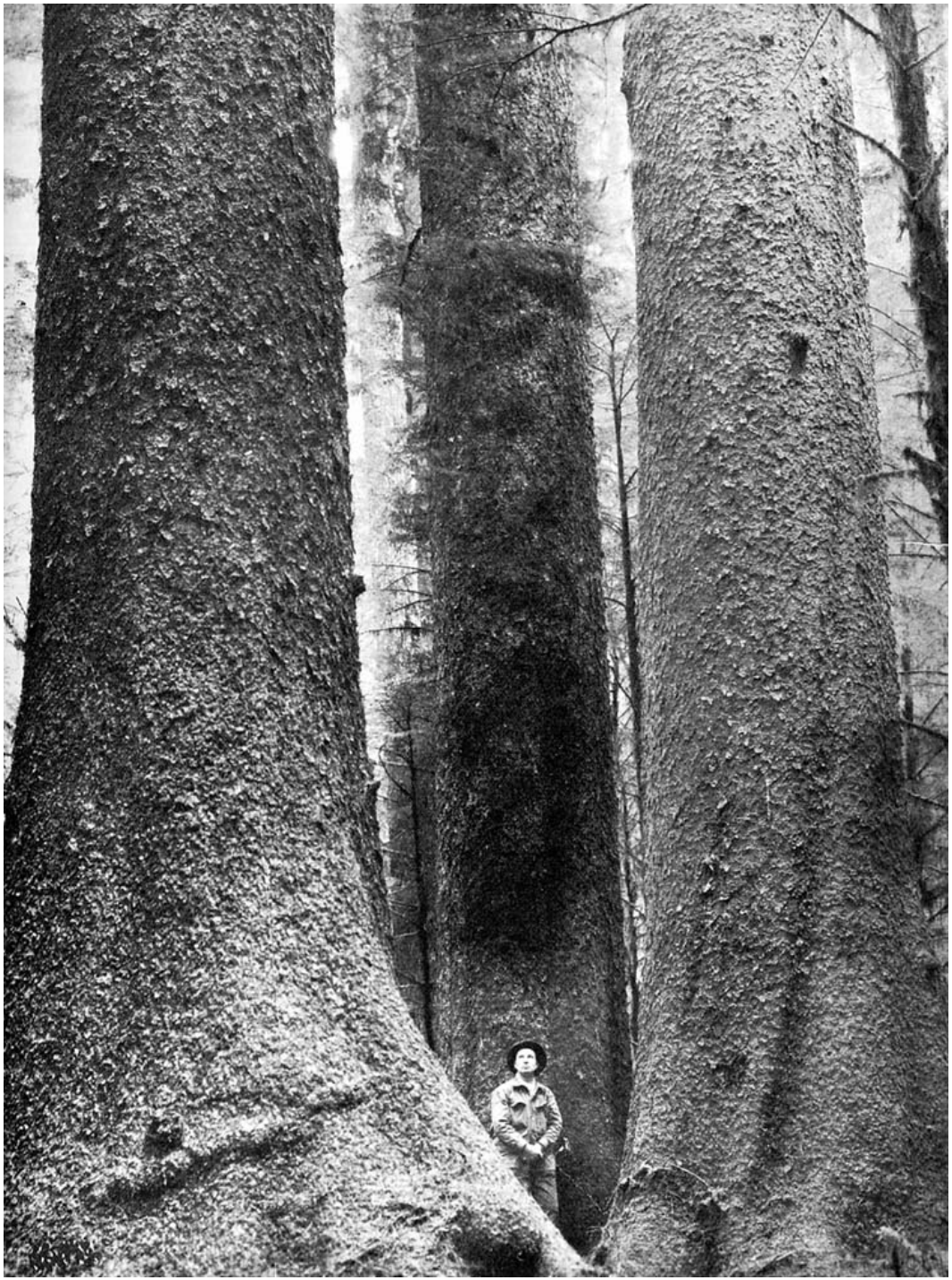
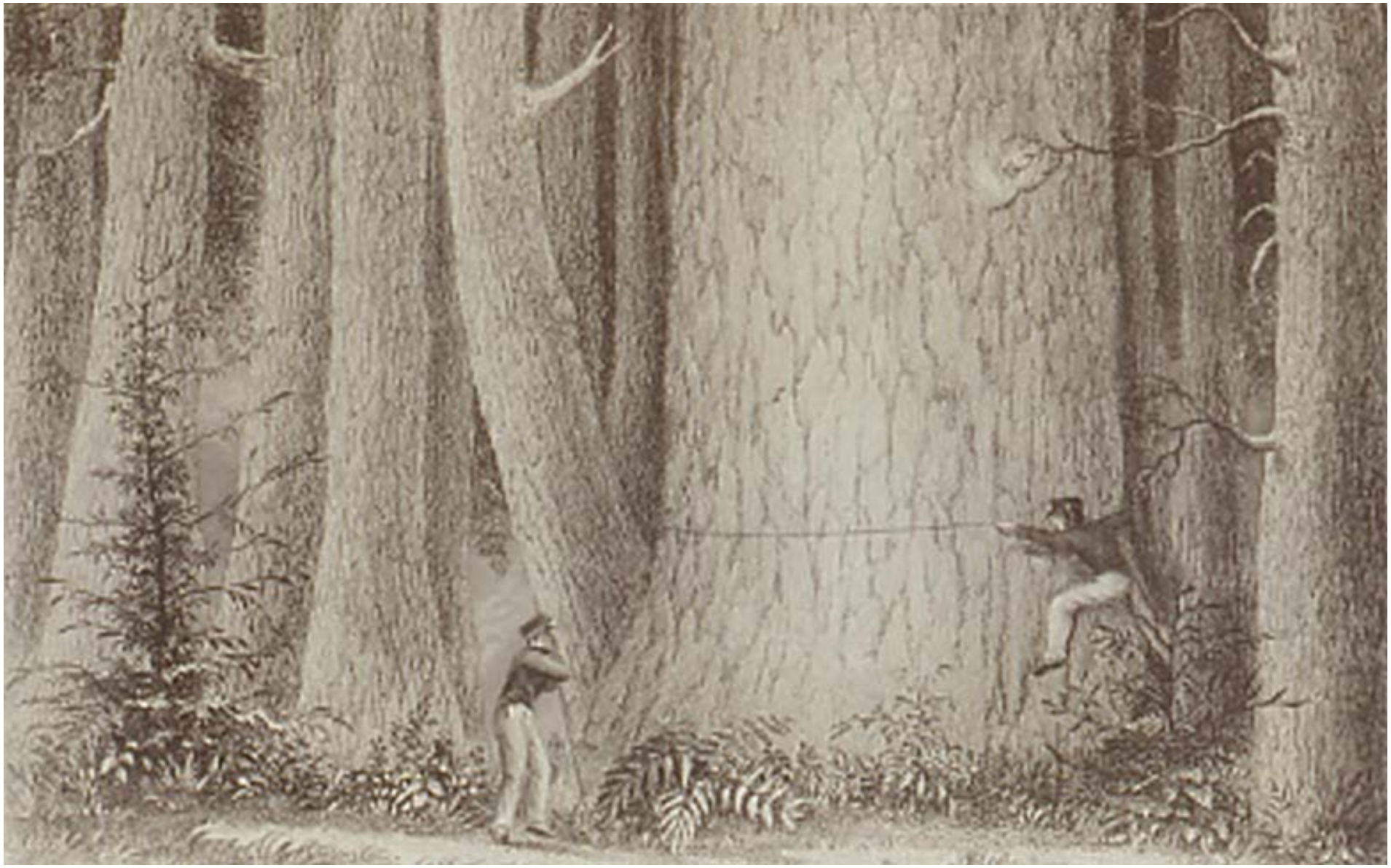
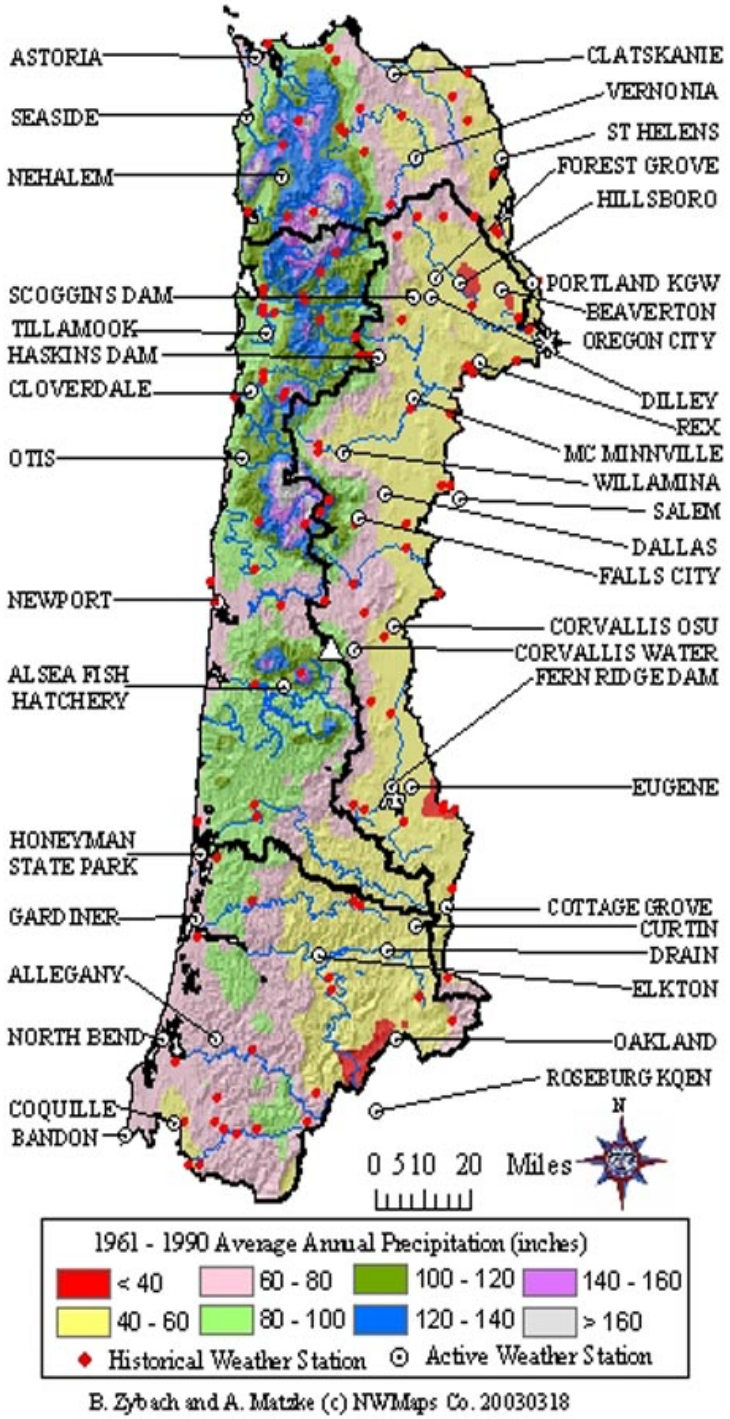


Figure 58. — Young conifer stands in the *Tsuga heterophylla* Zone are often dense enough to completely eliminate most of the understory; dense 66-year-old *Pseudotsuga menziesii* stand near Cottage Grove, Oregon.





Coast Range Seasonal Fuel Desiccation, 1961-1991

- **Killing Frosts**
- North (Nov. 3-Mar. 3)
- East (Nov. 2-Apr. 14)
- West (Nov. 8-Apr. 6)
- South (Nov. 10-Apr.5)

- **Summer Droughts**
- North (May-Sep.)
- East (Apr.-Oct.)
- West (May-Sep.)
- South (Apr.-Oct.)

SOURCES OF IGNITION = People & Lightning

Passed over some beautiful farming lands low grumbling thunder heard at a distance and I think this is the third time I have heard thunder in the Territory as thunder and Lightening is varry rare From what cause I cannot tell it may be possibly on account of the lowness of the clouds which rest on the mountains and in fact on the earth even in the vallies

---James Clyman, June 4, 1845

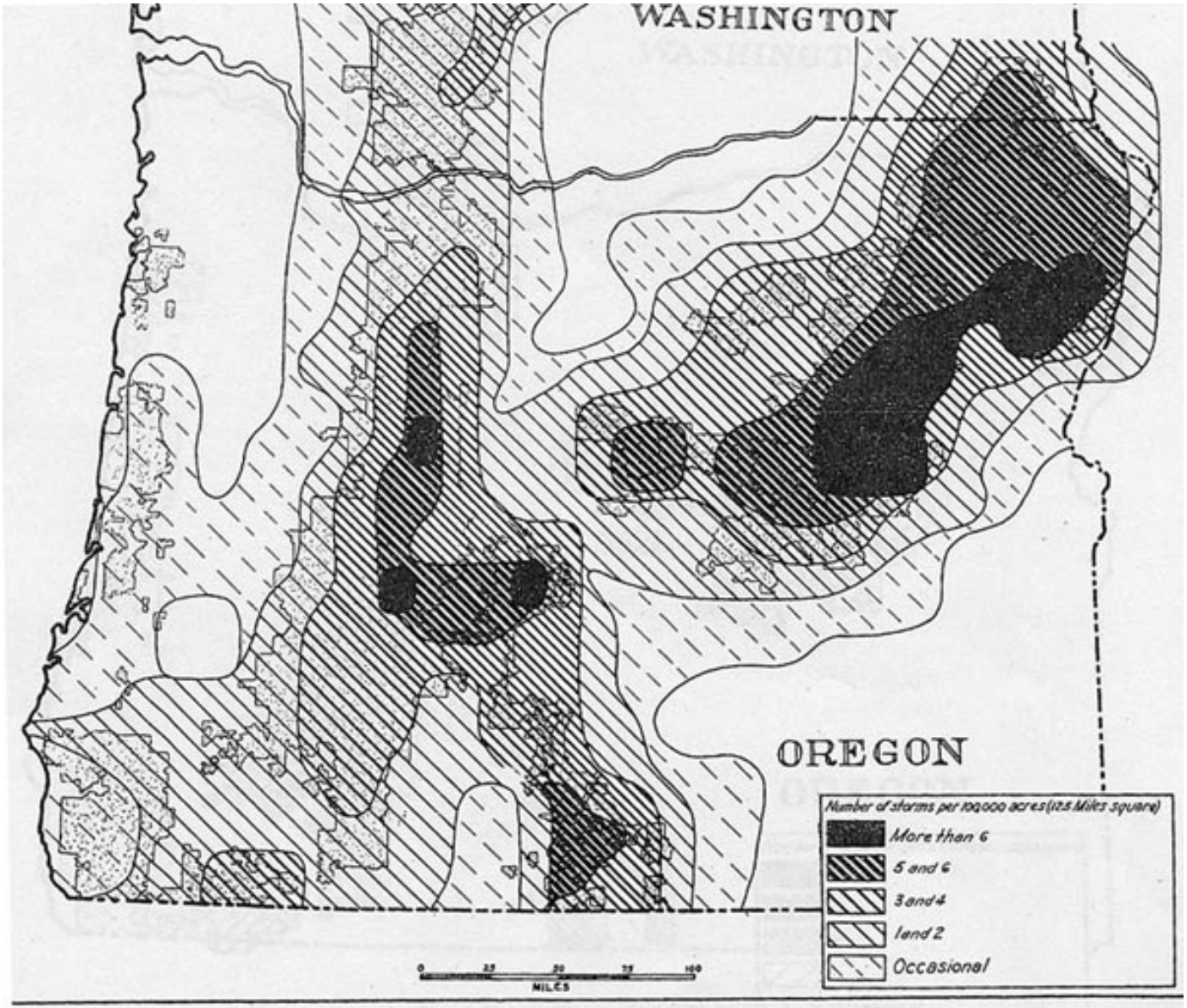
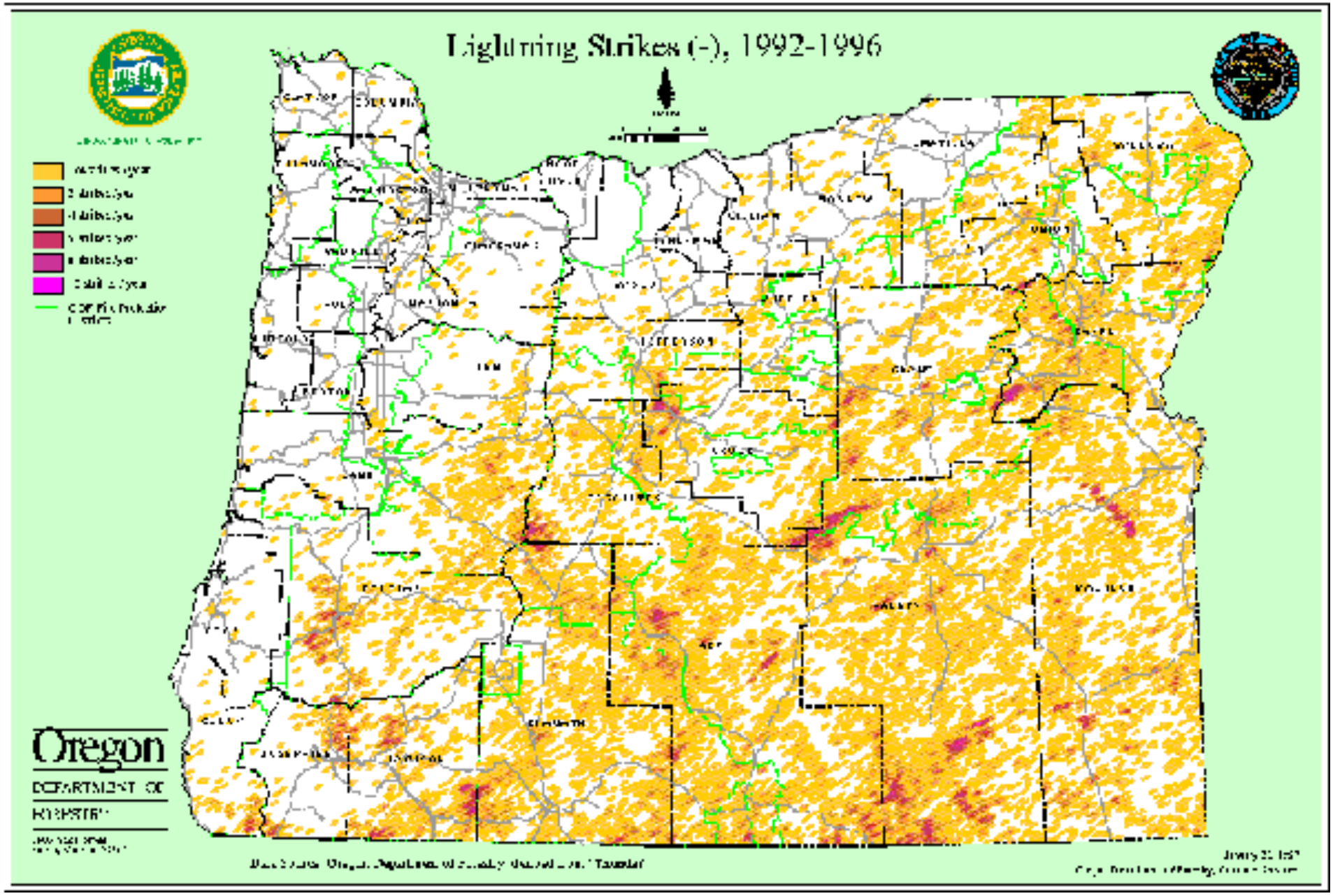
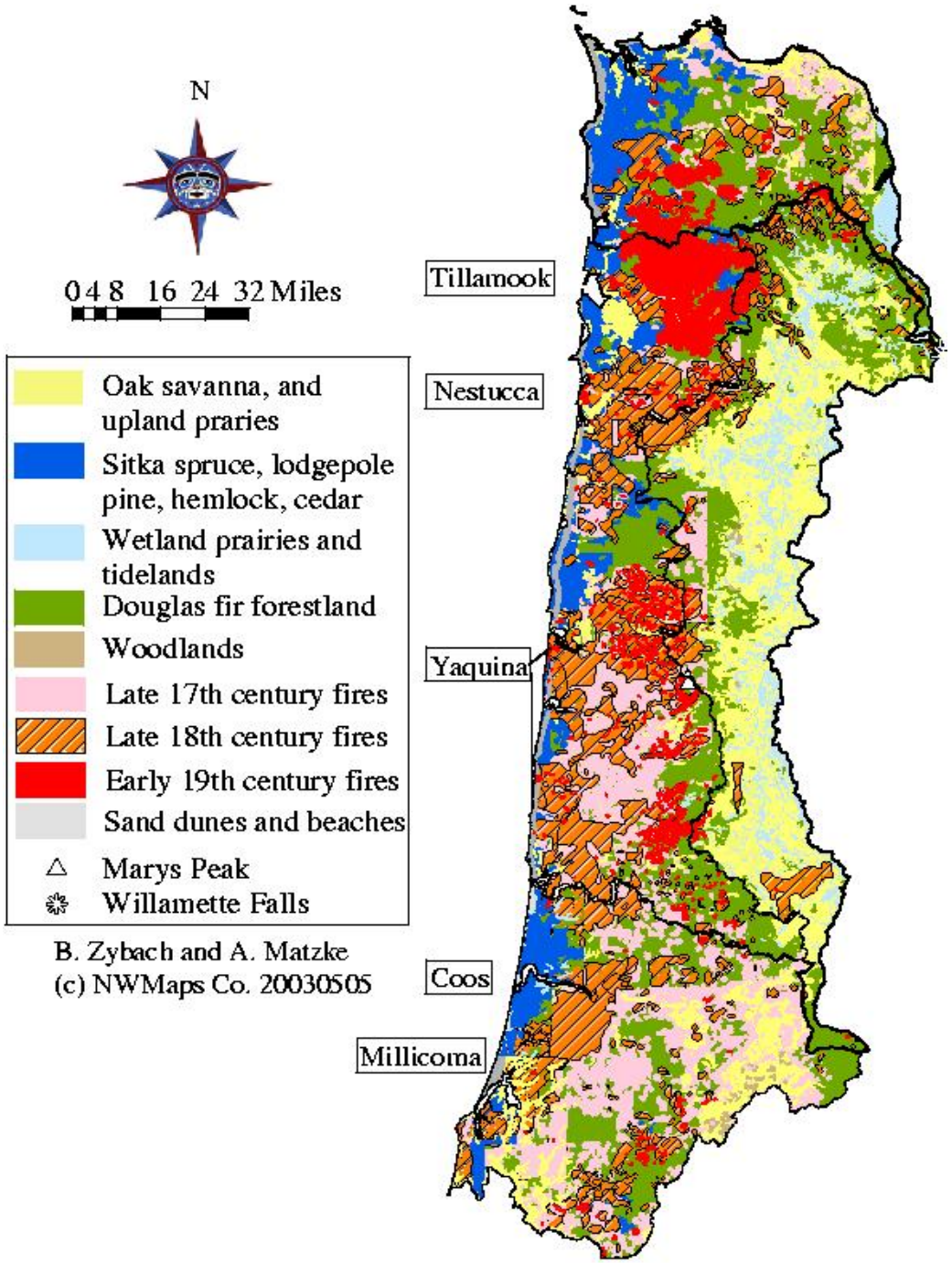


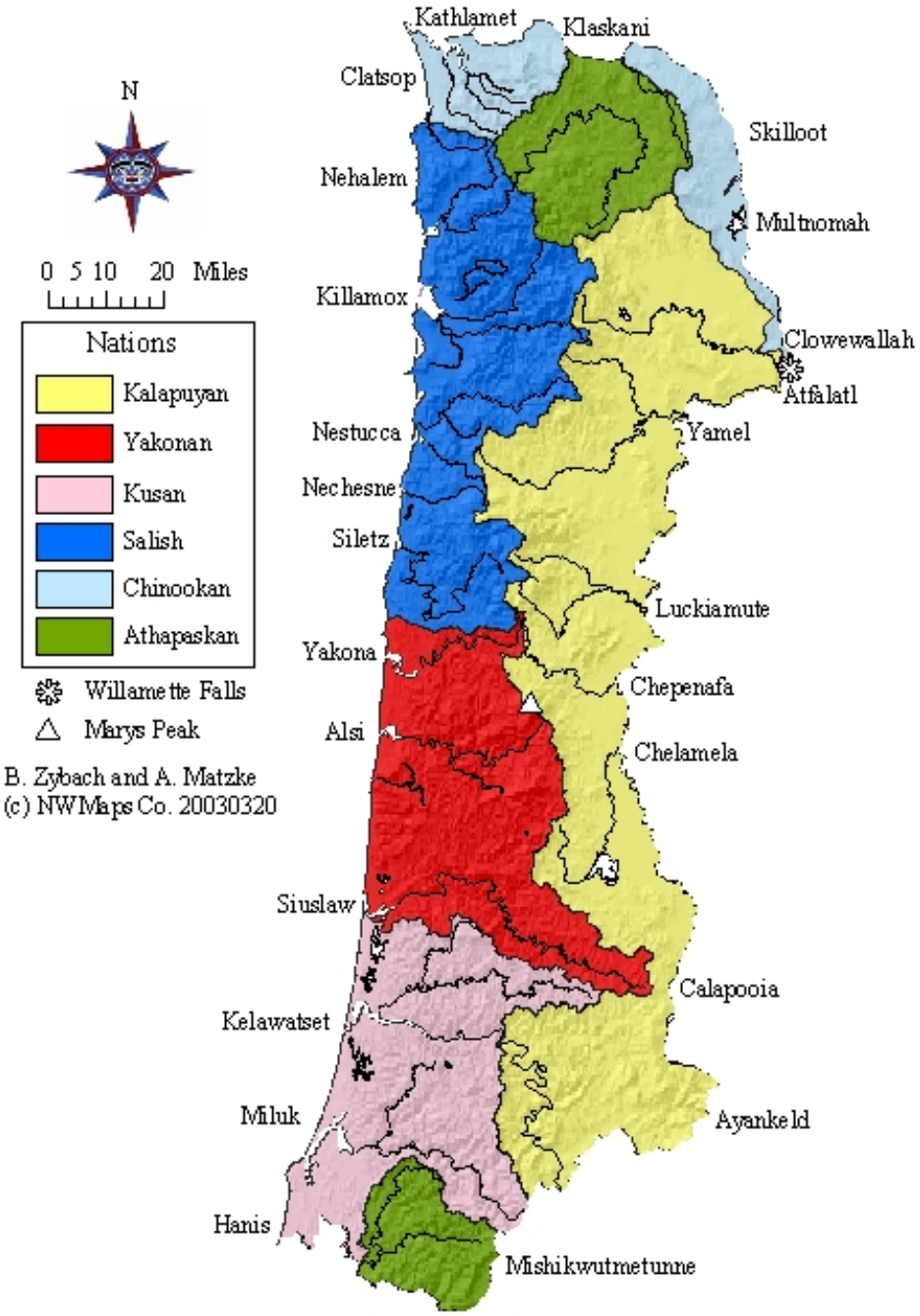
FIGURE 13.--Zones of average yearly lightning storm distribution in the vicinity o the national forests of Oregon and Washington as determined from more than 2600 storms reported by national forest fire lookouts during the 7-year period from 1925 to 1931.


Lightning Strikes (-), 1992-1996
Oregon
DEPARTMENT OF



The Great Fires

- **Millicoma, ca. 1775**
- **Yaquina, ca. 1849**
- **Nestucca, ca. 1853**
- **Coos, 1868**
- **Tillamook, 1933**

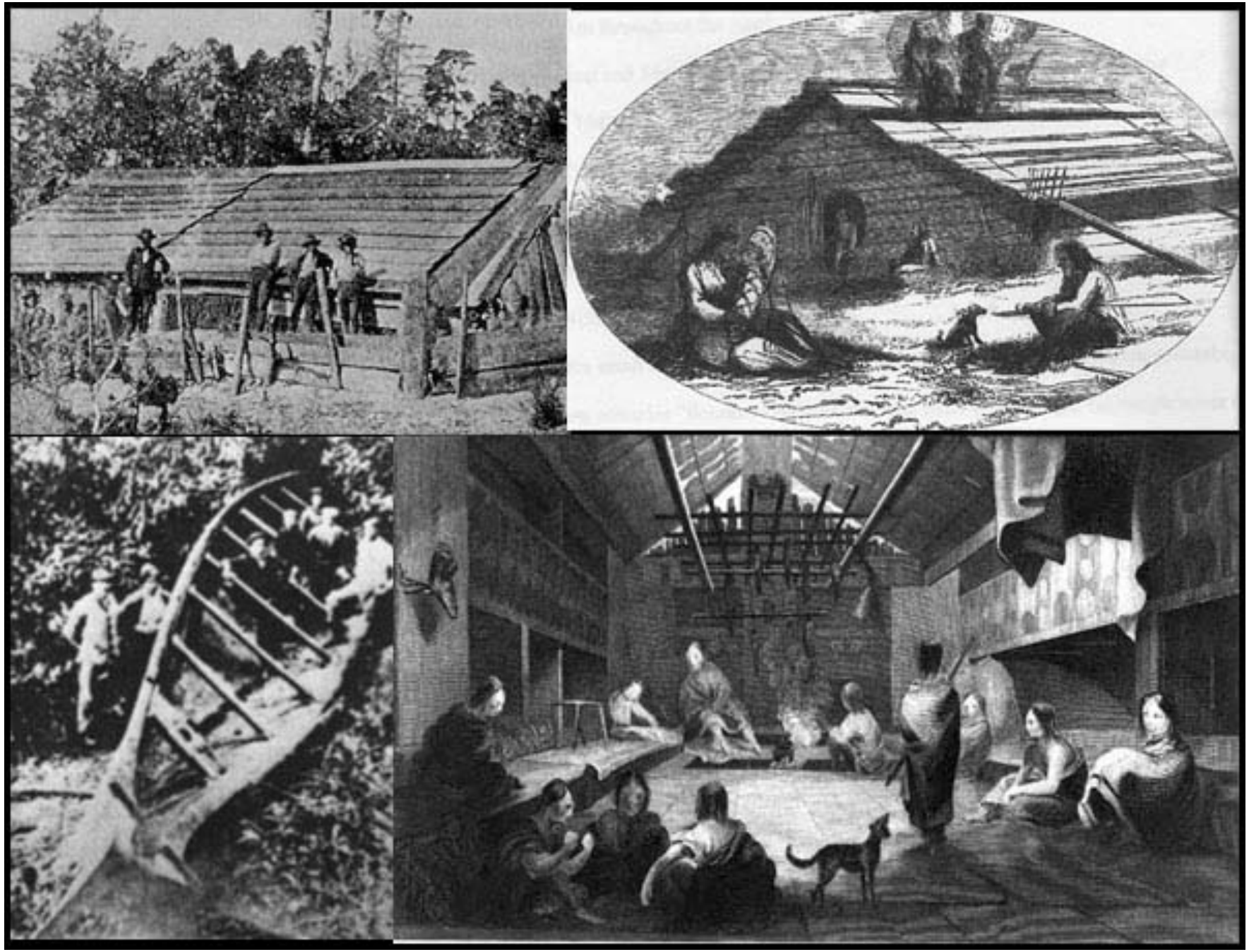


Tribe	Language	River
Northern		
Clowewallah	Chinookan	Willamette
Multnomah	Chinookan	Willamette
Kathlamet	Chinookan	Columbia
Clatsop	Chinookan	Youngs
Klaskani	Athapaskan	Clatskanie
Nehalem	Salish	Nehalem
Eastern		
Atfalatl	Kalapuyan	Tualatin
Yamel	Kalapuyan	Yamhill
Luckiamute	Kalapuyan	Luckiamute
Chepenafa	Kalapuyan	Marys
Chelamela	Kalapuyan	Long Tom
Calapooia	Kalapuyan	Willamette
Western		
Killamox	Salish	Tillamook
Nestucca	Salish	Nestucca
Nechesne	Salish	Salmon
Siletz	Salish	Siletz
Yakona	Yakonan	Yaquina
Alsi	Yakonan	Alsea
Siuslaw	Yakonan	Siuslaw
Southern		
Ayankeld	Kalapuyan	Umpqua
Kelawatset	Kusan	Umpqua
Hanis	Kusan	Coos
Miluk	Kusan	Coquille
Mishikwut-metunne	Athapaskan	Coquille

YAQUINA BAY—INDIANS' FULL DRESS.

Types of Indian Burning Practices

Type of burning	Products and purposes	Timing
Firewood gathering and burning	Heat, light, cooking, boiling, fuel stores, celebration, ceremony, security	Daily, concentrated near homes, trails, settlements and campgrounds
Patch burning	Hunting, berry patches, root fields, pest control, weaving materials, trail maintenance	Seasonal and situational
Broadcast burning	Stable wildlife habitat, curing seeds, hunting, transportation, weaving materials, acorn harvest.	Seasonal: late summer, early fall for grasslands; late winter, early spring for brackenfern



Native Food Animals

Food Type	Food Name	Fire
Crustaceans	Crabs, Dungeness	0
	Crawdads	X
	Shrimp	0
Fish	Eels, Lamprey	X
	Eulachon	0
	Flounder	X
	Salmon, Chinook	X
	Salmon, Coho	X
	Sturgeon	X
	Trout, Cutthroat	X
Fowl	Doves	XX
	Ducks	XX
	Grouse, ruffed	XX
	Geese	XX
Insects	Grass hoppers	XX
	Yellow jackets (larvae)	XX
Red Meat	Bear, Black	XX
	Boomer	XX
	Deer, Whitetail	XX
	Elk	XX
	Seals	0
	Squirrels, Gray	XX
	Whale, Grey (occasional)	0
Shellfish	Clams, Butter	X
	Clams, Razor	0
	Mussels, (saltwater)	0
	Oysters	X

Native Food Plants

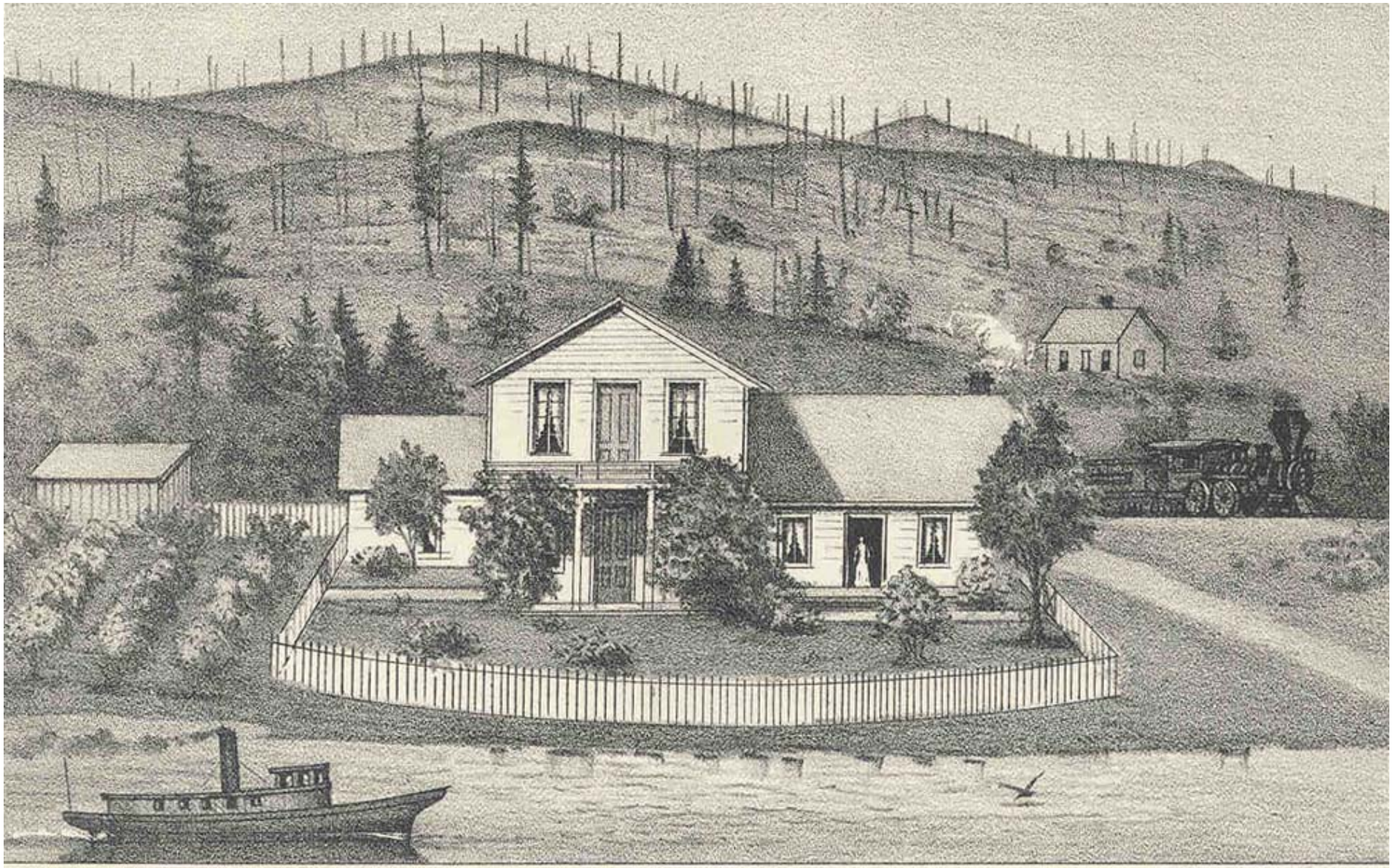
Food Type	Food Name	Fire
Berries	Blackberry	XX
	Gooseberry	XX
	Huckleberry	XX
	Salmonberry	XX
	Strawberry	XX
	Thimbleberry	XX
Bulbs	Camas	XX
	Lily, Chocolate	XX
	Lily, Tiger	XX
	Onion	XX
	Wapato	X
Fruits	Crabapple	X
	Chokecherry	XX
	Indian plum	XX
	Rosehips	XX
Grains	Indian peas	XX
	Sunflower	XX
	Tarweed	XX
Greens	Dock	XX
	Nettles	XX
	Seaweed	X
Mushrooms	Morrels	XX
	Puffballs	XX
	Shaggy Manes	
Nuts	Acorns	XX
	Filberts	XX
	Myrtle nuts	XX
Roots	Brackenfern	XX
	Mountain carrot	XX
	Yampah	XX
Stalks	Fiddleheads	XX
	Skunk cabbage	X
	Thistle (Edible)	XX

Oregon Coast Range Seasonal Burning Patterns, ca. 1600 - 1848

(Zybach & Lake 2001)

Mo.	Season	Weather	Temperature	Plant Fuels	Burning
Jan.	Winter	Wet	Freezing	Dormant	Firewood
Feb.	Winter	Wet	Freezing	Dormant	Patches
Mar.	Spring	Wet	Freezing	Budburst	Patches
Apr.	Spring	Mixed	Cool	New Growth	Patches
May	*Transition*	*Mixed*	*Warming*	*Growing*	*Projects*
Jun.	Summer	Dry	Warm	Growing	Firewood
Jul.	Summer	Dry	Warmest	Growing	Firewood
Aug.	Late Summer	Dry	Warmest	Dormant	Broadcast
Sep.	Late Summer	Dry	Warm	Dormant	Broadcast
Oct.	*Transition*	*Mixed*	*Cooling*	*Fall Growth*	*Patches*
Nov.	Fall	Wet	Freezing	Dormant	Firewood
Dec.	Fall	Wet	Freezing	Dormant	Firewood

The 180-year old Millicoma forest as it looked in the late 1940's. The forest was a result of a major fire event about 1765.

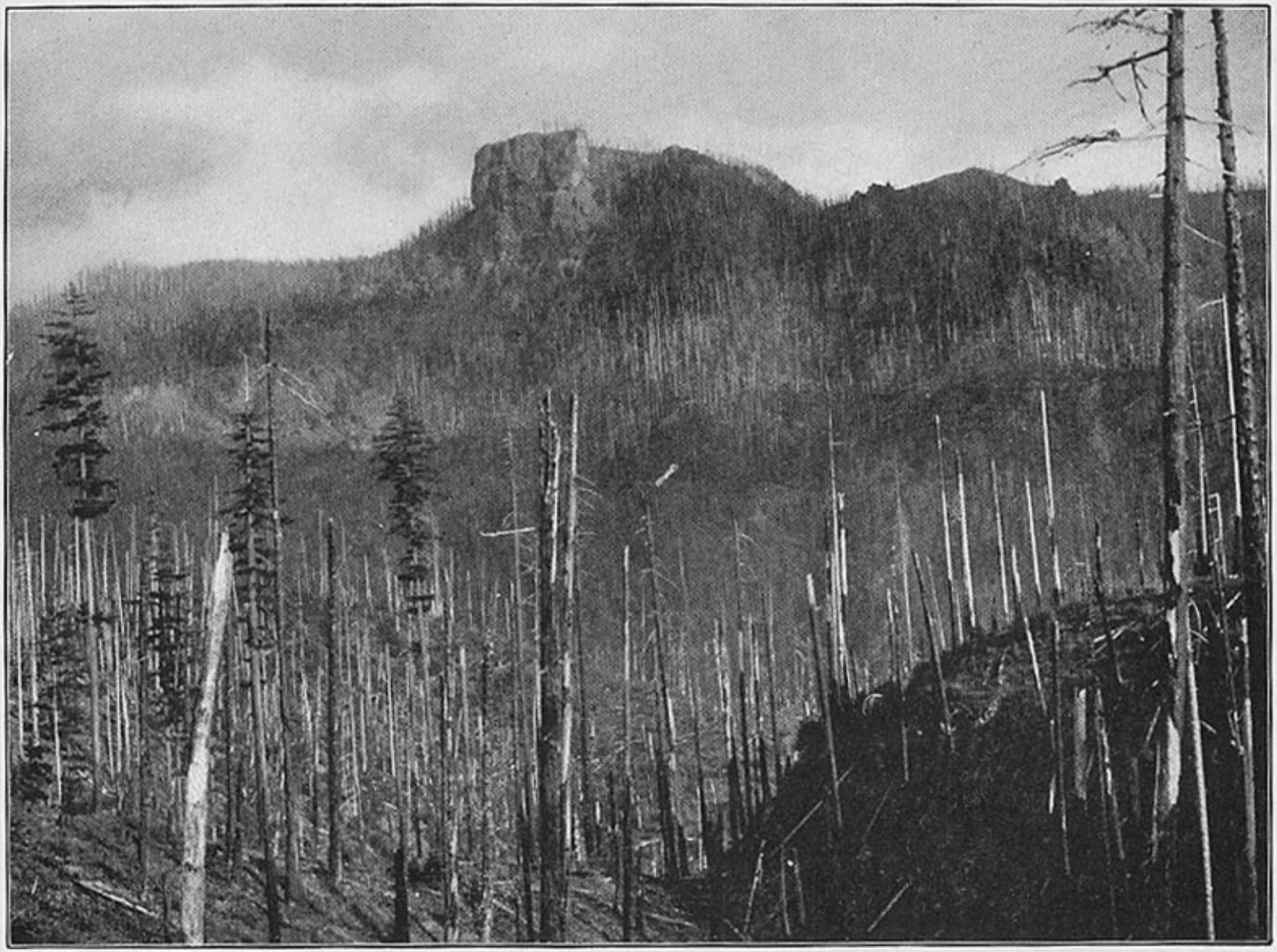


A. G. Walling, Lith. Portland, Or.

JOHN GRAHAM'S HOMESTEAD,

Toledo, Benton County, Oregon.

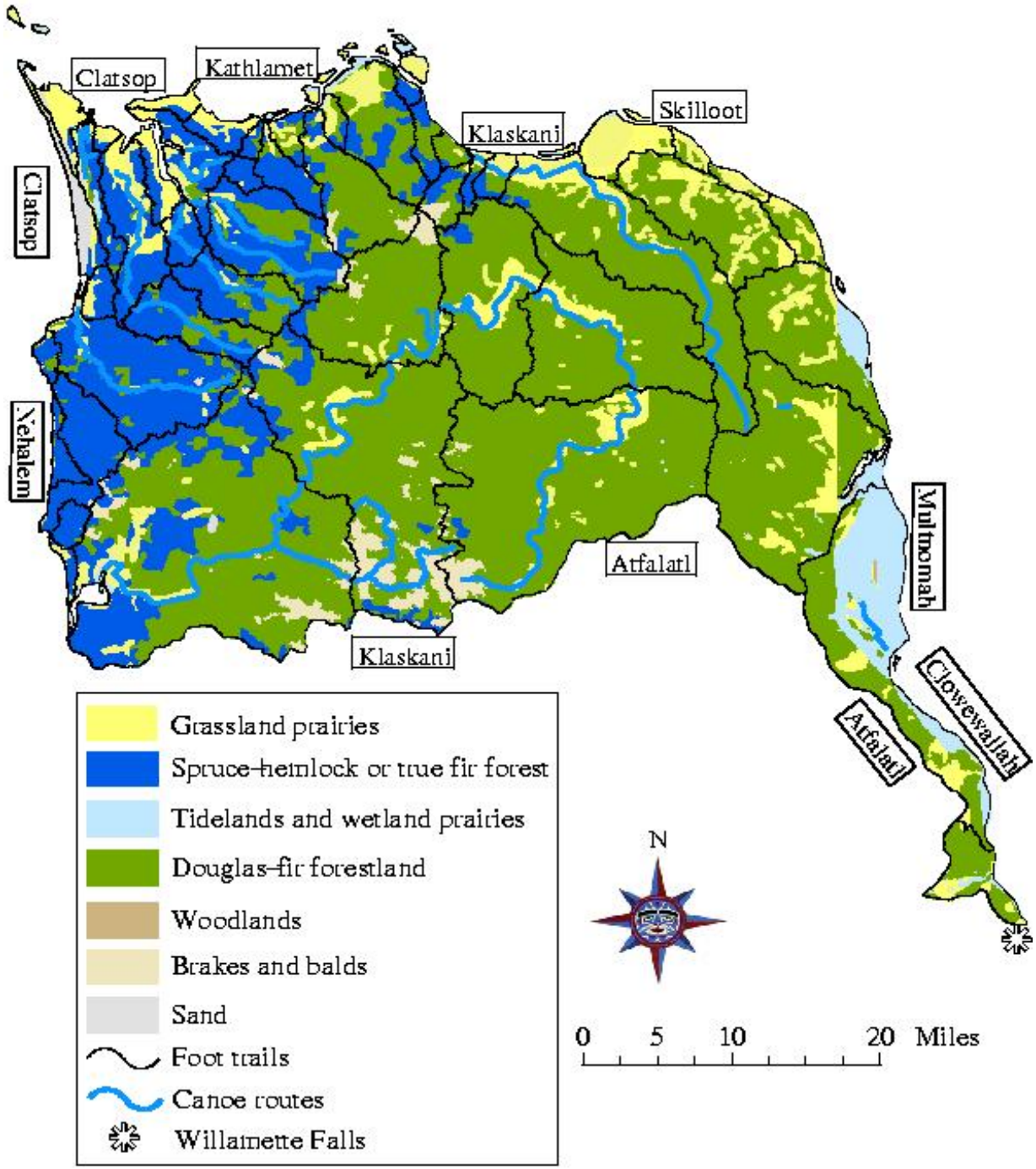
B. THE GREAT YAQUINA BURN.

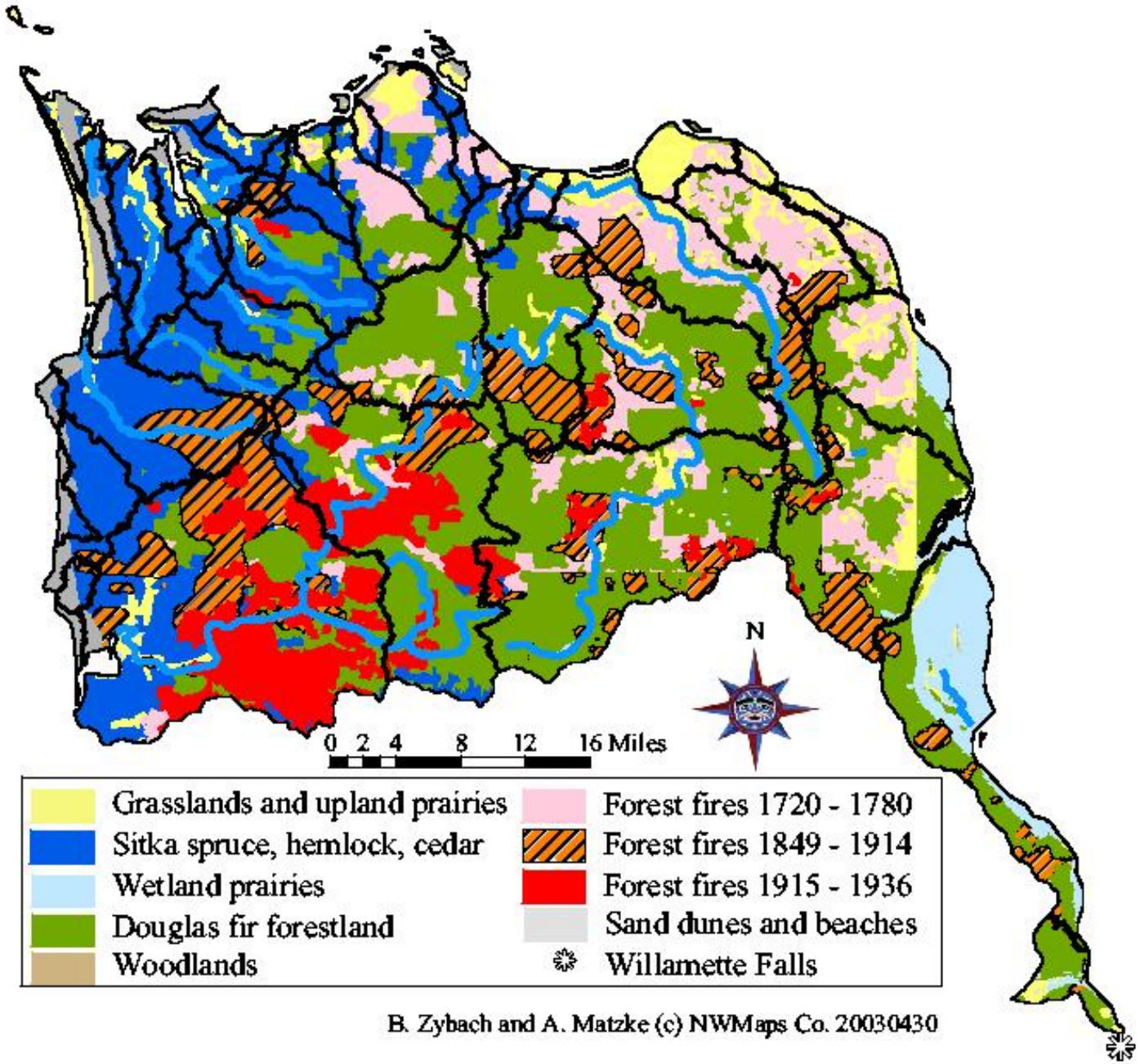


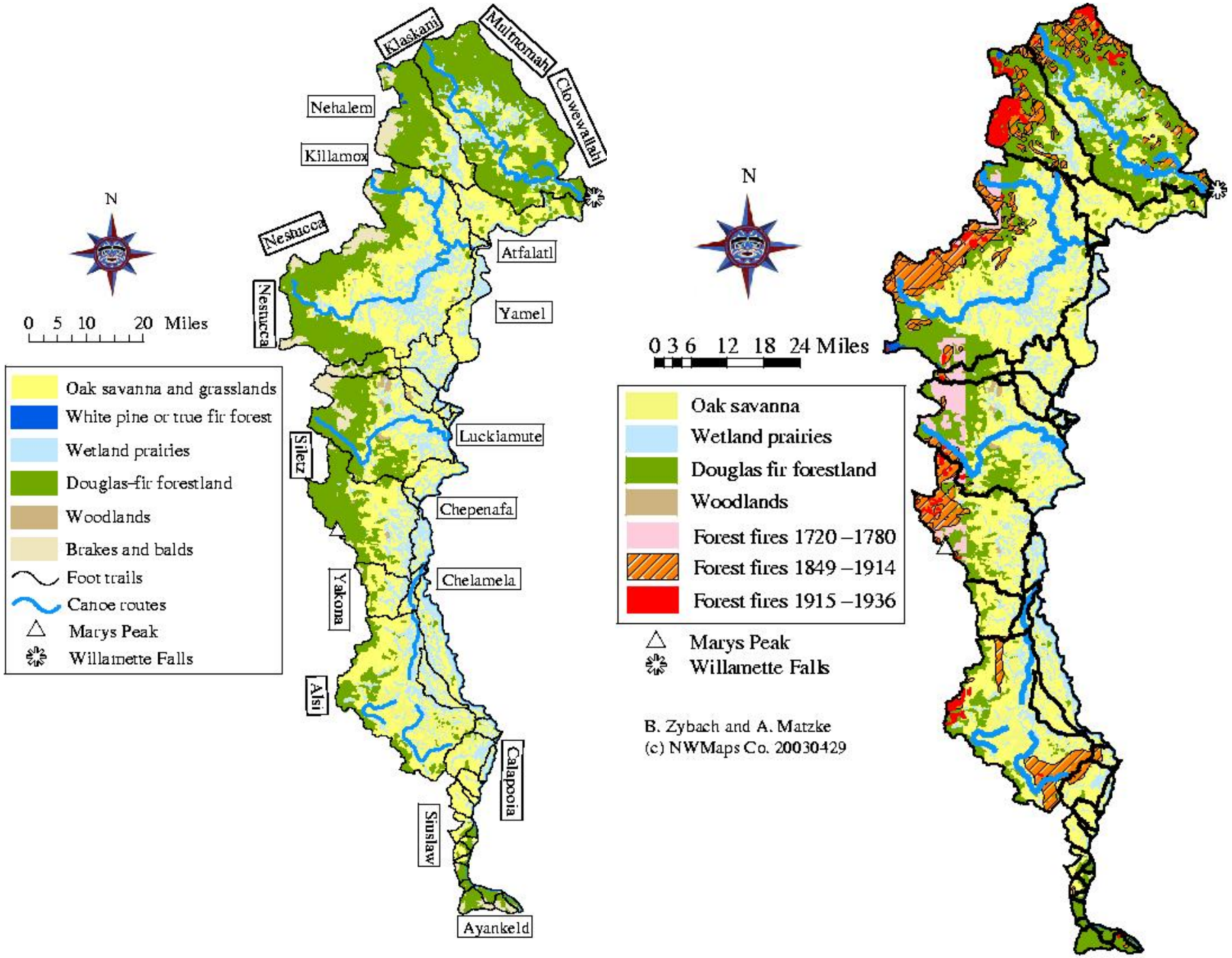
A. THE GREAT NESTUCCA BURN.

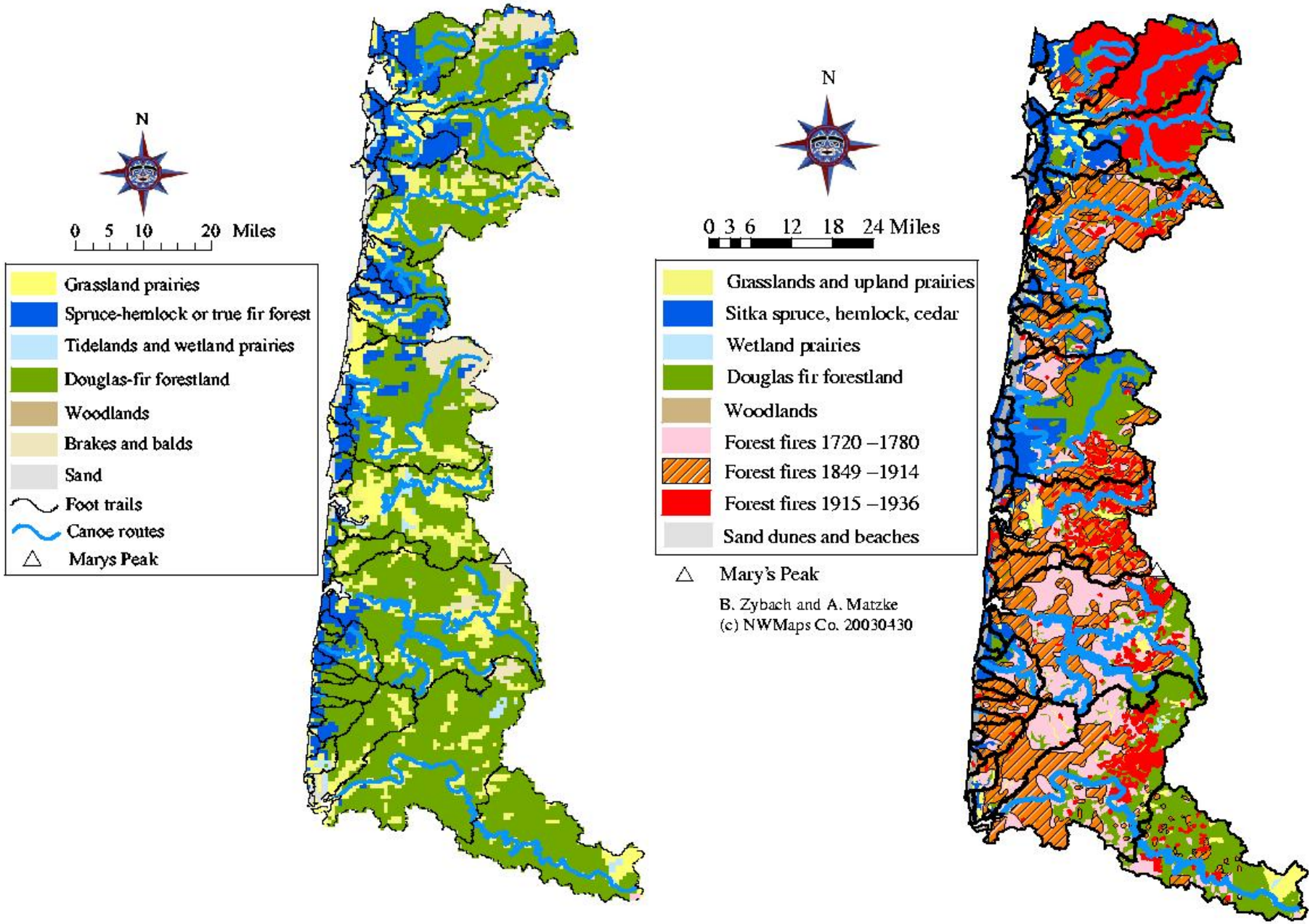
Elk Creek landslide forming Gould's Lake in 1894

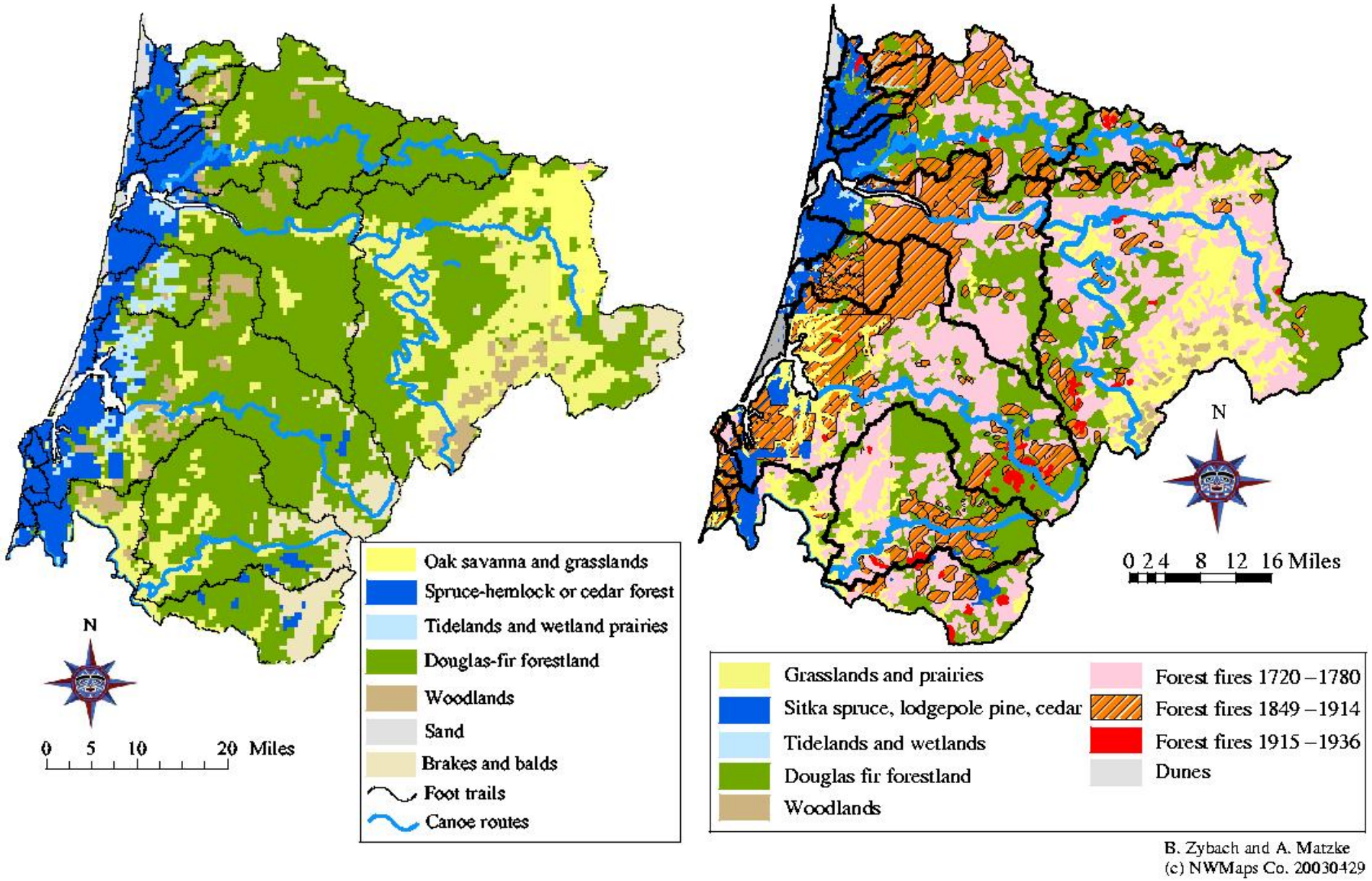
Notice the Willamette Valley in the Foreground of the 8 mile high mushroom cloud rising from the August, 1933 fire.


Clatsop
Kathlamet
Klaskani
Skilloot
Clatsop
Nehalem
Multnomah
Atfalatl
Klaskani
Clowewallah
Atfalatl
Grassland prairies
Spruce-hemlock or true fir forest
Tidelands and wetland prairies
Douglas-fir forestland
Woodlands
Brakes and balds
Sand
Foot trails
Canoe routes
Willamette Falls
N
0 5 10 20 Miles


N
0 2 4 8 12 16 Miles
Grasslands and upland prairies
Sitka spruce, hemlock, cedar
Wetland prairies
Douglas fir forestland
Woodlands
Forest fires 1720 - 1780
Forest fires 1849 - 1914
Forest fires 1915 - 1936
Sand dunes and beaches
Willamette Falls
B. Zybach and A. Matzke (c) NWMaps Co. 20030430


N
0 5 10 20 Miles
Oak savanna and grasslands
White pine or true fir forest
Wetland prairies
Douglas-fir forestland
Woodlands
Brakes and balds
Foot trails
Canoe routes
Marys Peak
Willamette Falls
Klaskani
Multnomah
Clowewallah
Nehalem
Killamox
Nestucca
Atfalatl
Nestucca
Yamel
Luckiamute
Siletz
Chepenafa
Chelamela
Yakona
Alsi
Calapooia
Siuslaw
Ayankeld
N
0 3 6 12 18 24 Miles
Oak savanna
Wetland prairies
Douglas fir forestland
Woodlands
Forest fires 1720 –1780
Forest fires 1849 –1914
Forest fires 1915 –1936
Marys Peak
Willamette Falls
B. Zybach and A. Matzke
(c) NWMaps Co. 20030429


N
0 5 10 20 Miles
Grassland prairies
Spruce-hemlock or true fir forest
Tidelands and wetland prairies
Douglas-fir forestland
Woodlands
Brakes and balds
Sand
Foot trails
Canoe routes
Marys Peak
N
0 3 6 12 18 24 Miles
Grasslands and upland prairies
Sitka spruce, hemlock, cedar
Wetland prairies
Douglas fir forestland
Woodlands
Forest fires 1720 –1780
Forest fires 1849 –1914
Forest fires 1915 –1936
Sand dunes and beaches
Mary's Peak
B. Zybach and A. Matzke
(c) NWMaps Co. 20030430



B. Zybach and A. Matzke

MAJOR FINDINGS

1) An abundance of historical evidence exists for reconstructing precontact vegetation patterns and human burning practices.

2) Precontact Oregon Coast Range Indians used fire to produce landscape-scale patterns of vegetation.

3) Native plants were systematically managed by local Indian families throughout all river basins of the Coast Range.

4) Common assumptions regarding the abundance and extent of precontact old-growth forests in western Oregon may need to be reconsidered, based on current evidence.

CONCLUSIONS

1. This study indicates a high rate of coincidence between precontact Indian land management practices and subsequent patterns of catastrophic wildfires in the Oregon Coast Range.

2. Areas managed as wetlands, grasslands and shrublands in precontact time continue to resist growing forests to the present time.

3. Consistencies between precontact Indian burning patterns and subsequent wildfires include: a) source of ignition, b) types of fuels consumed, c) seasonal timings, and d) common borderlines.

Oregon Websites and Watersheds Project, Inc.

www.ORWW.org