98-S-07

COARSE-SCALE SPATIAL DATA FOR WILDLAND FIRE AND FUEL MANAGEMENT

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A coarse scale assessment and mapping effort was initiated as two associated projects. The first project, called ***Fire Regimes for Fuels Management and Fire Use***, began in 1997 through an agreement with USDA Forest Service, Fire and Aviation Management, State and Private Forestry. This project involved mapping and characterization of historic natural fire regimes and current vegetation conditions, and development of an index of departure for use in national-level fire management planning. Development of the initial map of Historical Natural Fire Regimes for the conterminous United States was done under this agreement. Under the fire regime project, the concept of risk was defined as the *'risk of losing key components that define a system'* or specifically, losses attributed to the occurrence or introduction of fire, either wildland or prescribed fire. Within that framework, we classify current conditions as a function of departure from historical natural conditions. The second project, now called ***Ecosystems at Risk***, was undertaken to add a fire-related component to the USDA Forest Service's ***Forests at Risk*** project. The Joint Fire Sciences Program (JFSP) subsequently funded completion of these two efforts for interagency use in 1998, with specifications for development of several additional spatial data layers.

These data integrate biophysical information and pre-existing remotely sensed products. We have incorporated disturbance and successional processes, including development of stylized successional pathways for unique combinations of historical fire regime and potential natural vegetation. We organized and facilitated seven regional panels of expert ecologists, silviculturists, and fire managers to review and refine the spatial data layers, develop the pathway diagrams, and assign fire management condition classes. These data are intended for national, programmatic and strategic planning, and will be used by federal land managers, states, and other non-governmental organizations in fire and fuel management planning, assessments of ecosystem health, and risk assessments.

We have produced seven spatial data layers for this project, each a continuous coverage for the conterminous United States.

Note: *These coarse-scale data were developed for national-level planning. Summaries of the data were restricted to state or Forest Service regional scales. The data were not intended to be used at finer spatial scales.*

Click theme name below to download data products and documentation (metadata).

1. Potential Natural Vegetation Groups v2.0

This map is based on a terrain-matched refinement of Kuchler's Potential Natural Vegetation (PNV) map. Kuchler's PNV map was digitized for the conterminous United States, then adjusted to match terrain using a 500 meter Digital Elevation Model, 4th Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). These biophysical data layers were integrated with current vegetation layers, Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database, to develop generalized successional pathway diagrams. Expert regional panels refined the PNV map based on these successional pathways. PNV is the "climax" vegetation that will occupy a site without disturbance or climatic change. PNV is an expression of environmental factors such as topography, soils and climate across an area. Where cover type is a classification of existing vegetation, PNV is a site classification based on climax vegetation. Because the existing cover type at any particular location and time may reflect a vegetation community anywhere along its successional pathway - from seral to climax - the cover type may be the same as the PNV.

2. Current Cover Types v1.0

The data presented in this map depict the vegetative cover types currently present across the conterminous United States. These data were first developed by integrating two pre-existing remotely sensed vegetation classifications. The 1991 Land Cover Characteristics database (LCC) developed by USGS EROS Data Center was used for all non-forest cover types, and the 1992 Resources Planning Act map of Forest Types of the United States developed by the Southern Research Station, USDA Forest Service, was used for all forest cover types. The two remotely sensed classifications were based on biweekly composites of the Normalized Difference Vegetation Index (NDVI) derived from daily Advanced Very High Resolution Radiometer (AVHRR) satellite images collected during one vegetative growing season. These biweekly NDVI composites were clustered into areas of similar seasonal profiles, then classified into vegetation classes. Seven regional expert panels then integrated the biophysical classification of Potential Natural Vegetation and the Historical Natural Fire Regimes with the Current Cover Types data to create generalized successional pathway diagrams. These successional pathways diagrams and local knowledge were used to refine the integrated Current Cover Type map.

3. Historical Natural Fire Regimes v3.0

The Historical Natural Fire Regimes data were first developed through the integration of four biophysical data layers: Digital Elevation Model, Kuchler's Potential Natural Vegetation (PNV), 4th-Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). Three current vegetation layers were also used: Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database. Expert regional panels developed generalized successional pathway diagrams for all combinations of Historical Natural Fire Regimes and a modified PNV layer. Mapping and final refinements were made by assimilating generalized successional pathways with biophysical and existing data layers. The Fire Regimes are described in terms of frequency and severity and represent pre-settlement, historical fire processes. Fire regimes I and II represent frequent fire return intervals. The 0-35+ years/low severity fire regime (I) occurs mostly on forested land. The 0-35+years/stand-replacement regime (II) occurs mostly on grasslands and shrublands. Fire regimes III, IV, and V have longer fire return intervals and occur on forest lands, shrublands, and grasslands.

4. Current Conditions v1.0 (See link html below*)

Current Condition Classes are defined in terms of the relative risk of losing one or more key components that define an ecological system based on five ecosystem attributes: disturbance regimes (patterns and frequency of insect, disease, fire, etc.), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow, etc), and vegetative attributes (composition, structure, and resilience to disturbance agents). The Current Condition Classes categorize departure from the Historical Natural Fire Regimes based on these five ecosystem attributes. The risk of losing key components increases for each Current Condition Class, with little or no risk at the Class 1 level to significant risk at the Class 3 level. The Current Condition Class data were assigned to the generalized successional pathway diagrams created with the Historical Natural Fire Regimes data. These data were developed through the integration of four biophysical data layers: Digital Elevation Model, Kuchler's Potential Natural Vegetation (PNV), 4th-Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). Three current vegetation layers were also used: Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database. Expert regional panels developed generalized successional pathway diagrams for all combinations of the Historical Natural Fire Regimes and modified PNV layers. Mapping and final refinements were made by assimilating generalized successional pathways with biophysical and current data layers.

5. National Fire Occurrence, Federal and State Lands, 1986 - 1996, v1.0

National Fire Occurrence data was compiled for 1986 - 1996 for the conterminous United States. Federal data includes data from the following federal agencies: United States Department of Agriculture Forest Service, United States Department of the Interior (USDI), Bureau of Land Management, USDI Bureau of Indian Affairs, USDI Fish and Wildlife Service, and USDI National Park Service. Non-federal data were provided by State Forestry Divisions for all conterminous states but Nevada.

6. Fire Characteristics Probabilities v1.0

When flame lengths exceed eight feet, fires present serious control problems such as torching out, crowning, and spotting. Control efforts at the head of the fire are mostly ineffective and major runs can occur in more extreme cases. The maximum annual number of days where potential flame lengths exceeded 8 feet was calculated for 4th-code Hydrologic Units (HUCs) using indices acquired from the existing National Fire Danger Rating System (NFDRS) weather observation network and primary fuel model assignments. Potential flame lengths were derived from 180 days of NFDRS burning index (BI) data, April - September, for each of eight years, 1989 - 1996.

7. Population Density Map Data v1.0 (not yet available as of December 17, 1999)

Website Reference:

Course-scale Spatial Data for Wildland Fire and Fuel Management [Online] (1999, November). Prescribed Fire and Fire Effects Research Work Unit, Rocky Mountain Research Station (producer). Available: www.fs.fed.us/fire/nist/ [1999, December]

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Publish_Date: *12/16/99*
Expires: *None*

This is the page linked from 4. Current Condition Classes

Current Condition Classes, v1.0

Current Condition Classes are defined in terms of the relative risk of losing one or more key components that define an ecological system based on five ecosystem attributes: disturbance regimes (patterns and frequency of insect, disease, fire, etc.), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow, etc), and vegetative attributes (composition, structure, and resilience to disturbance agents). The Current Condition Classes categorize departure from the Historical Natural Fire Regimes based on these five ecosystem attributes. The risk of losing key components increases for each Current Condition Class, with little or no risk at the Class 1 level to significant risk at the Class 3 level.

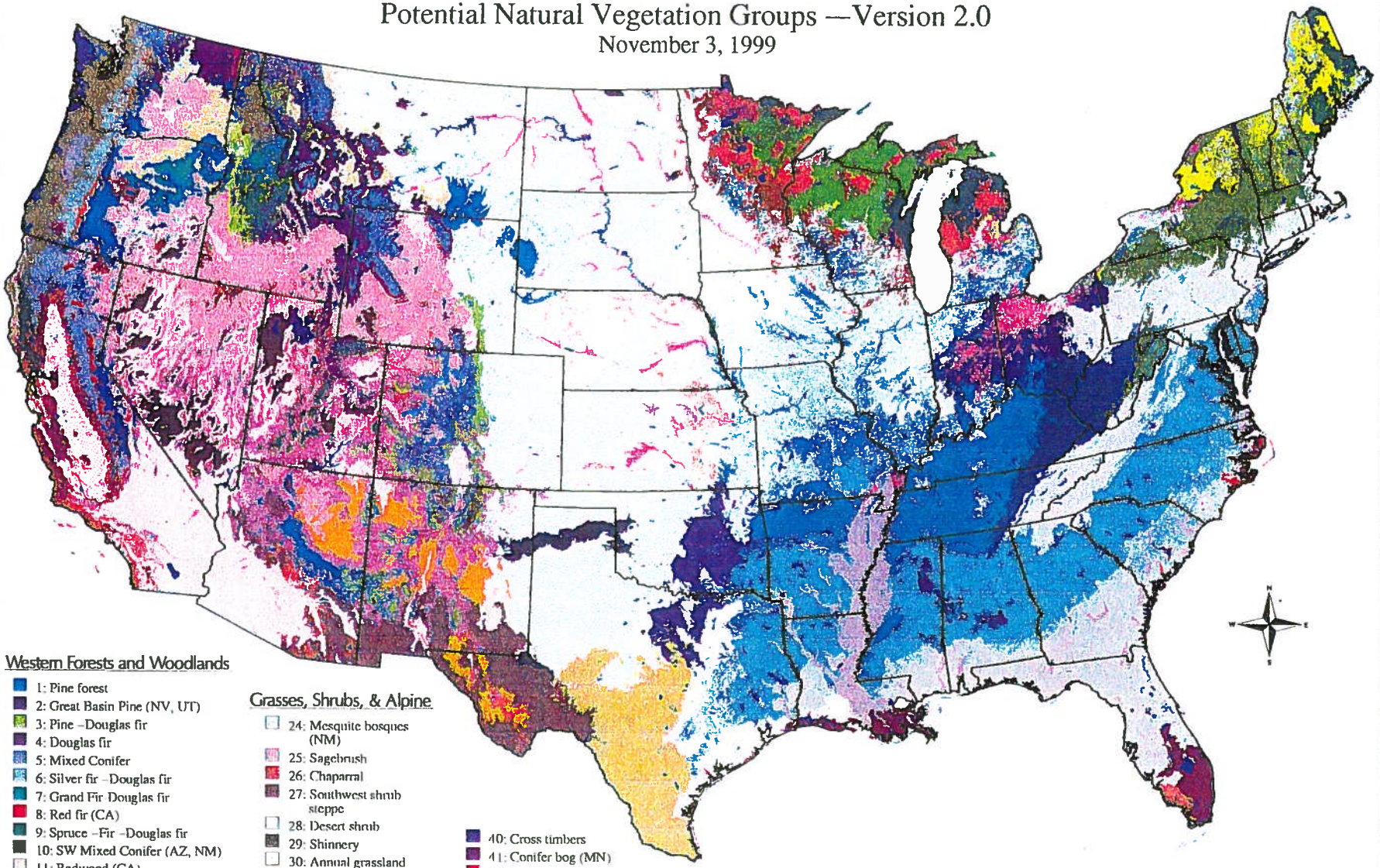
The Current Condition Class data were assigned to the generalized successional pathway diagrams created with the Historical Natural Fire Regimes data. These data were developed through the integration of four biophysical data layers: Digital Elevation Model, Kuchler's Potential Natural Vegetation (PNV), 4th-Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). Three current vegetation layers were also used: Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database. Expert regional panels developed generalized successional pathway diagrams for all combinations of the Historical Natural Fire Regimes and modified PNV layers. Mapping and final refinements were made by assimilating generalized successional pathways with biophysical and current data layers.

- Documentation
- GIS Data Layers
- Map Graphics
- Metadata

Return to Fuel Management Home

Potential Natural Vegetation Groups —Version 2.0

November 3, 1999



Western Forests and Woodlands

- 1: Pine forest
- 2: Great Basin Pine (NV, UT)
- 3: Pine –Douglas fir
- 4: Douglas fir
- 5: Mixed Conifer
- 6: Silver fir –Douglas fir
- 7: Grand Fir Douglas fir
- 8: Red fir (CA)
- 9: Spruce –Fir –Douglas fir
- 10: SW Mixed Conifer (AZ, NM)
- 11: Redwood (CA)
- 12: Cedar –Hemlock –Pine (WA)
- 13: Cedar –Hemlock –Douglas fir
- 14: Spruce –Cedar –Hemlock (WA, OR)
- 15: Fir –Hemlock (WA, OR)
- 16: Spruce –fir
- 17: Lodgepole –Subalpine (CA)
- 18: CA Mix Evergreen (CA)
- 19: Oakwoods (CA)
- 20: Mosaic Cedar –Hemlock – Douglas fir & Oak (OR)
- 21: Alder –ash (OR, WA)
- 22: Juniper –Pinyon

Grasses, Shrubs, & Alpine

- 24: Mesquite bosques (NM)
- 25: Sagebrush
- 26: Chaparral
- 27: Southwest shrub steppe
- 28: Desert shrub
- 29: Shinnery
- 30: Annual grassland
- 31: Mountain grassland
- 32: Plains grassland
- 33: Prairie
- 34: Desert grassland
- 35: Texas savanna
- 36: Wet grassland
- 37: Alpine Meadows – Barren

Eastern Forests

- 38: Oak Savanna (ND)
- 39: Mosaic Bluestem/Oak – hickory
- 40: Cross timbers
- 41: Conifer bog (MN)
- 42: Great Lakes pine forest
- 43: Spruce –fir
- 44: Maple –basswood/Oak savanna
- 45: Oak –hickory
- 46: Elm –ash forest
- 47: Maple –beech –birch
- 48: Mixed mesophytic forest
- 49: Appalachian oak
- 50: Transition Appalachian Oak – Northern Hardwood
- 51: Northern hardwoods
- 52: Northern hardwoods –fir
- 53: Northern hardwoods –spruce
- 54: Northeastern oak –pine
- 55: Oak –hickory –pine
- 56: Southern mixed forest
- 57: Loblolly –shortleaf
- 58: Blackbelt
- 59: Oak –gum –cypress

Others

- 60: Northern Floodplain
- 61: Southern Floodplain
- 62: Barren
- 63: Water

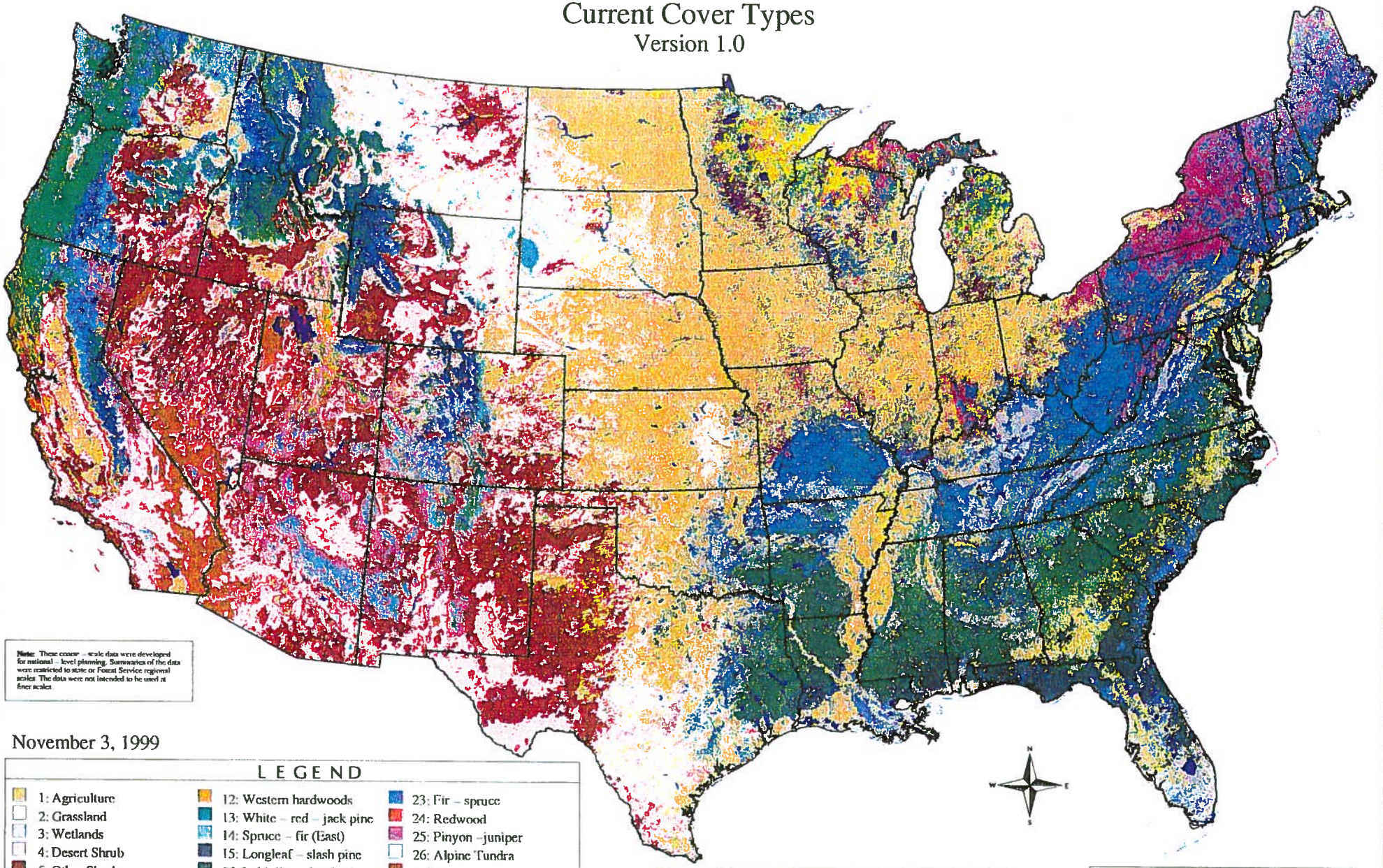
This map is based on a terrain – matched refinement of Kuchler's Potential Natural Vegetation (PNV) map. Kuchler's PNV map was digitized for the conterminous United States, then adjusted to match terrain using a 500 meter Digital Elevation Model, 4th Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). These biophysical data layers were integrated with current vegetation layers; Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database, to develop generalized successional pathway diagrams. Expert regional panels refined the PNV map based on these successional pathways.

PNV is the "climax" vegetation that will occupy a site without disturbance or climatic change. PNV is therefore an expression of environmental factors such as topography, soils, and climate across an area. Where cover type is a classification of existing vegetation, PNV is a site classification based on climax vegetation. Because the existing cover type at any particular location and time may reflect a vegetation community anywhere along its successional pathway – from near to climax – the cover type may be the same as the PNV.

Note: These course – scale data were developed for national – level planning. Summaries of the data were restricted to units of Forest Service regional scales. The data were not intended to be used at finer scales.

This product was developed by the Fire Modeling Institute at the Fire Sciences Laboratory, Missoula, Montana through funding from the **USDA FS/USDI Joint Fire Sciences Program** in collaboration with **USDA Forest Service, Fire and Aviation Management**

Current Cover Types
Version 1.0



Note: These coarse – scale data were developed for national – level planning. Summaries of the data were restricted to state or Forest Service regional scales. The data were not intended to be used at finer scales.

November 3, 1999

LEGEND

- 1: Agriculture
- 2: Grassland
- 3: Wetlands
- 4: Desert Shrub
- 5: Other Shrub
- 6: Oak – pine
- 7: Oak – hickory
- 8: Oak – gum – cypress
- 9: Elm – ash – cottonwood
- 10: Maple – beech – birch
- 11: Aspen – birch
- 12: Western hardwoods
- 13: White – red – jack pine
- 14: Spruce – fir (East)
- 15: Longleaf – slash pine
- 16: Loblolly – shortleaf
- 17: Ponderosa pine
- 18: Douglas – fir
- 19: Larch
- 20: Western white pine
- 21: Lodgepole pine
- 22: Hemlock – Sitka spruce
- 23: Fir – spruce
- 24: Redwood
- 25: Pinyon –juniper
- 26: Alpine Tundra
- 27: Barren
- 28: Water
- 30: Urban/Development/Ag

The cover types shown on this map depict the vegetative cover types currently present across the conterminous United States. These data were first developed by integrating two pre-existing remotely sensed vegetation classifications. The 1991 Land Cover Characteristics database (LCC) developed by USGS EROS Data Center was used for all non-forest cover types, and the 1992 Resources Planning Act map of Forest Types of the United States developed by the Southern Research Station, USDA Forest Service, was used for all forest cover types. The two remotely sensed classifications were based on biweekly composites of the Normalized Difference Vegetation Index (NDVI) derived from daily Advanced Very High Resolution Radiometer (AVHRR) satellite images collected from March to October, 1990. These biweekly NDVI composites were clustered into groups of similar seasonal profiles, then classified into vegetation types.

Seven regional expert panels then integrated the biophysical classification of Potential Natural Vegetation and the Historical Natural Fire Regimes with the Current Cover Types data to create generalized successional pathway diagrams. These successional pathway diagrams and local knowledge were used to refine this integrated Current Cover Type map.

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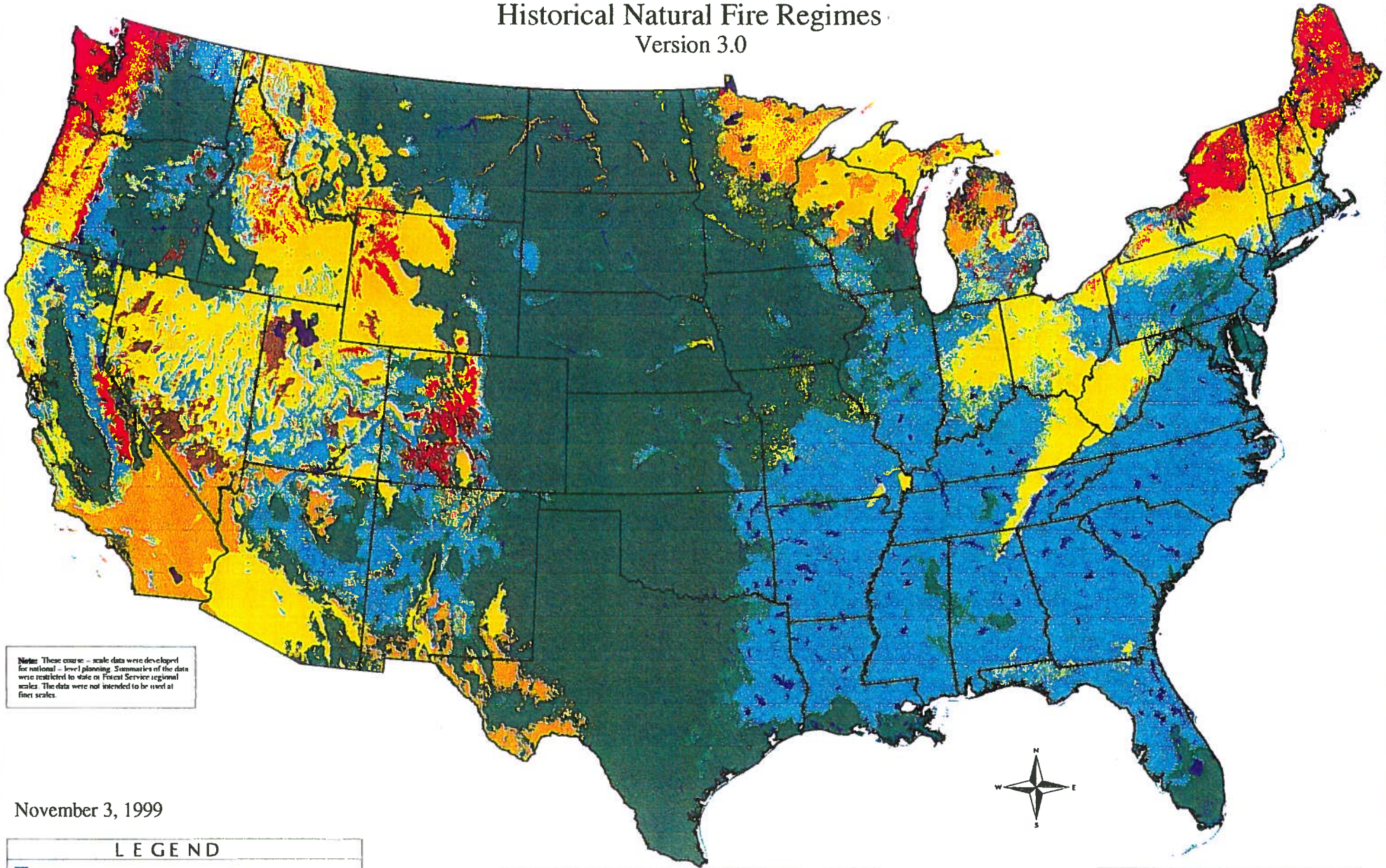
Historical Natural Fire Regimes
Version 3.0



Note: These coarse – scale data were developed for national – level planning. Summaries of the data were restricted to state or Forest Service regional scales. The data were not intended to be used at finer scales.

November 3, 1999

LEGEND

- I: 0 –35 yr. frequency, Low Severity
- II: 0 –35 yr. frequency, Stand Replacement Severity
- III: 35 – 100+ yr. frequency, Mixed Severity
- IV: 35 –100+ yr. frequency, Stand Replacement Severity
- V: 200+ yr. frequency, Stand Replacement Severity
- VI: Barren
- VII: Water

The first five fire regimes are described in terms of frequency and severity, and represent pre–settlement, historical fire processes. Fire regimes I and II represent frequent fire return intervals. The 0-35+ years/ low severity fire regime(I) occurs mostly on forested land. The 0-35+ years/stand–replacement fire regime(II) occurs mostly on grasslands and shrublands. Fire regimes III, IV, and V have longer fire return intervals and occur on forest lands, shrublands, and grasslands.

The Historical Natural Fire Regimes data were first developed through the integration of four biophysical data layers: Digital Elevation Model, Kuchler's Potential Natural Vegetation (PNV), 4th-Cole Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). Three current vegetation layers were also used: Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database. Expert regional panels developed generalized successional pathway diagrams for all combinations of Historical Natural Fire Regimes and a modified PNV layer. Mapping and final refinements were made by assimilating generalized successional pathways with biophysical and current data layers.

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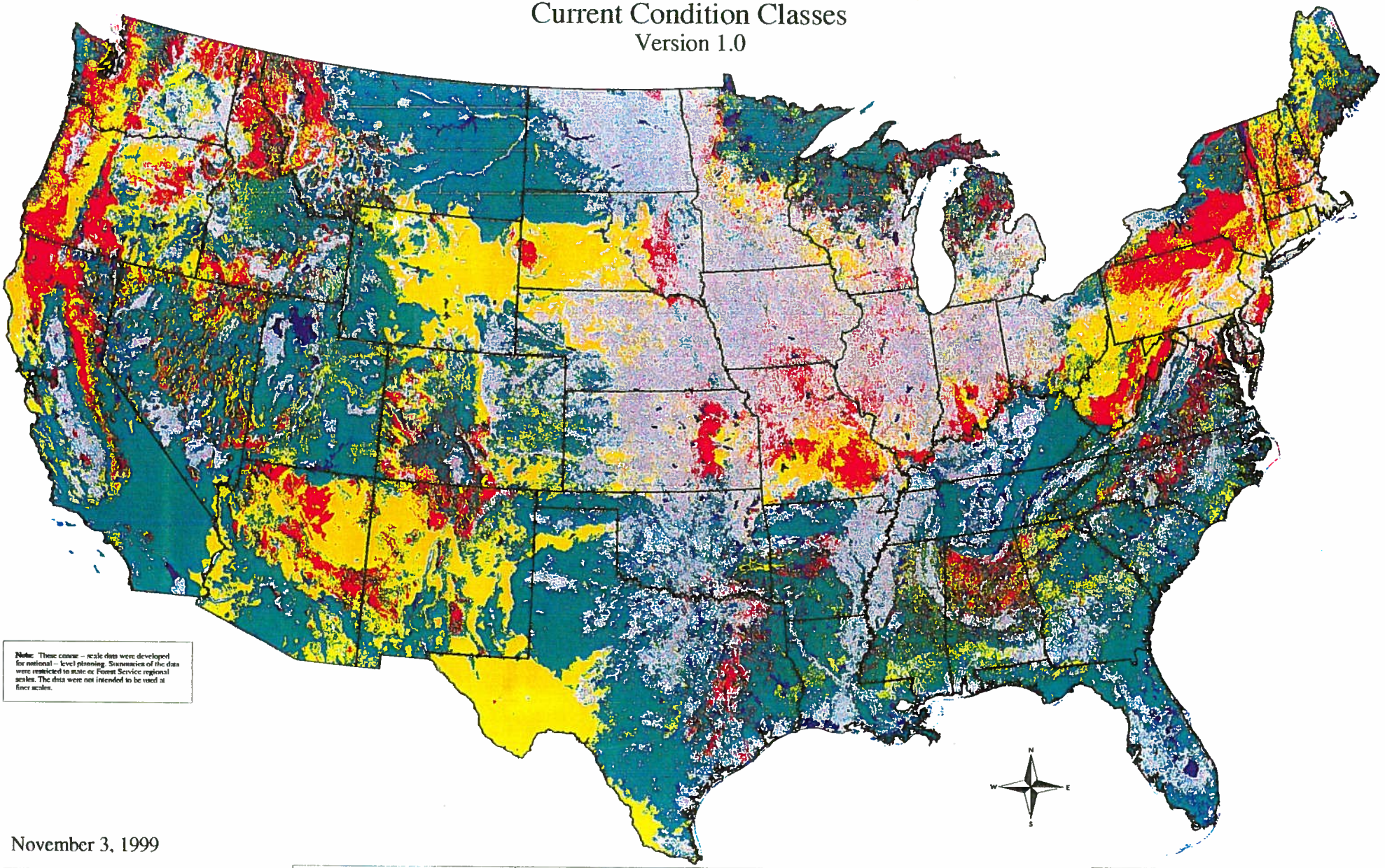
Current Condition Classes
Version 1.0



Note: These course – scale data were developed for national – level planning. Summaries of the data were restricted to state or Forest Service regional scales. The data were not intended to be used at finer scales.

November 3, 1999

LEGEND

- Condition Class 1
- Condition Class 2
- Condition Class 3
- Water
- Agriculture & Non–Vegetative Areas

Map # 46 87

The first three categories are **Current Condition Classes** relative to the departure from the Historical Natural Fire Regimes. The categories are based on five ecosystem attributes: disturbance regimes (patterns and frequency of insect, disease, fire, etc.), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow, etc), and vegetative attributes (composition, structure, and resilience to disturbance agents) Current Condition Classes can be defined as the relative risk of losing one or more key components that define an ecological system based on these five ecosystem attributes. The risk of losing key components increases for each Current Condition Class, with little or no risk at the Class 1 level to significant risk at the Class 3 level.

Interpretations for Each Current Condition Class

Condition Class #1 – The historical ecosystem attributes are largely intact and functioning as defined by the Historical Natural Fire Regime. Forested areas with an historically short fire return interval usually have frequent fires of low severity. Areas with an historically long fire return interval have few, infrequent fires of very high intensity and severity.

Condition Class #2 – The historical ecosystem attributes have been moderately altered as defined by the Historical Natural Fire Regime. One or more fire return intervals have been missed, possibly resulting in increased fire sizes, intensities, severities, and decreased landscape mosaics and diversity.

Condition Class #3 – The ecosystem attributes have been significantly altered as defined by the Historical Natural Fire Regime. Multiple fire return intervals have been missed resulting in dramatic departures from historical conditions.

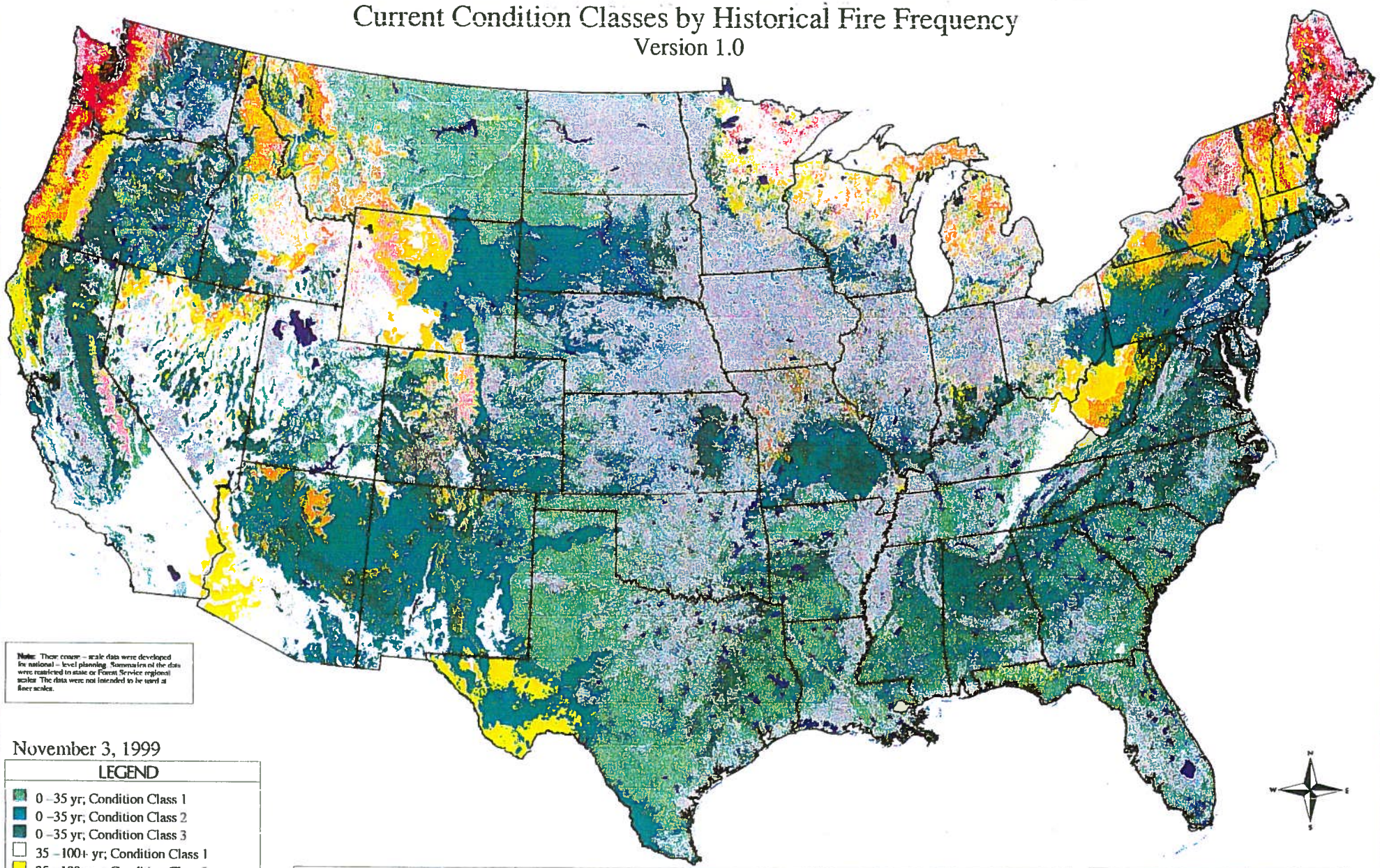
The Current Condition Class data were assigned to the generalized successional pathway diagrams created with the Historical Natural Fire Regimes data. These data were developed through the integration of four biophysical data layers: Digital Elevation Model, Kuchler's Potential Natural Vegetation (PNV), 4th Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). Three current vegetation layers were also used: Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database.

Expert regional panels developed generalized successional pathway diagrams for all combinations of the Historical Natural Fire Regimes and modified PNV layers. Mapping and final refinements were made by assimilating generalized successional pathways with biophysical and current data layers.

This product was developed by the Fire Modeling Institute at the Fire Sciences Laboratory, Missoula, Montana through funding from the **USDA FIRESEM Joint Fire Sciences Program** in collaboration with **USDA Forest Service, Fire and Aviation Management**

Current Condition Classes by Historical Fire Frequency

Version 1.0



Note: These coarse – scale data were developed for national – level planning. Summaries of the data were restricted to state or Forest Service regional scales. The data were not intended to be used at finer scales.

November 3, 1999

LEGEND

- 0 –35 yr; Condition Class 1
- 0 –35 yr; Condition Class 2
- 0 –35 yr; Condition Class 3
- 35 –100+ yr; Condition Class 1
- 35 –100+ yr; Condition Class 2
- 35 –100+ yr; Condition Class 3
- 200+ yr; Condition Class 1
- 200+ yr; Condition Class 2
- 200+ yr; Condition Class 3
- Water
- Agriculture & Non-Vegetative Areas

The first nine categories are **Current Condition Classes** relative to the departure from the Historical Natural Fire Regimes. The categories are based on five ecosystem attributes: disturbance regimes (patterns and frequency of insect, disease, fire, etc.), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow, etc), and vegetative attributes (composition, structure, and resilience to disturbance agents). Current Condition Classes can be defined as the relative risk of losing one or more key components that define an ecological system based on these five ecosystem attributes. The risk of losing key components increases for each Current Condition Class, with little or no risk at the Class 1 level to significant risk at the Class 3 level.

Interpretations for Each Current Condition Class

Condition Class #1 – The historical ecosystem attributes are largely intact and functioning as defined by the Historical Natural Fire Regime. Forested areas with an historically short fire return interval usually have frequent fires of low severity. Areas with an historically long fire return interval have few, infrequent fires of very high intensity and severity.

Condition Class #2 - The historical ecosystem attributes have been moderately altered as defined by the Historical Natural Fire Regime. One or more fire return intervals have been missed, possibly resulting in increased fire sizes, intensities, severities, and decreased landscape mosaics and diversity.

Condition Class #3 – The ecosystem attributes have been significantly altered as defined by the Historical Natural Fire Regime. Multiple fire return intervals have been missed resulting in dramatic departures from historical conditions.

The Current Condition Class data were assigned to the generalized successional pathway diagrams created with the Historical Natural Fire Regimes data. These data were developed through the integration of four biophysical data layers: Digital Elevation Model, Kuchler's Potential Natural Vegetation (PNV), 4th Code Hydrologic Unit delineations, and Ecological Subregions (Bailey's Sections). These current vegetation layers were also used: Resource Planning Act's Forest Types and Forest Densities of the United States, and USGS EROS Data Center's Land Cover Characterization database.

Expert regional panels developed generalized successional pathway diagrams for all combinations of the Historical Natural Fire Regimes and modified PNV layers. Mapping and final refinements were made by assimilating generalized successional pathways with biophysical and current data layers.

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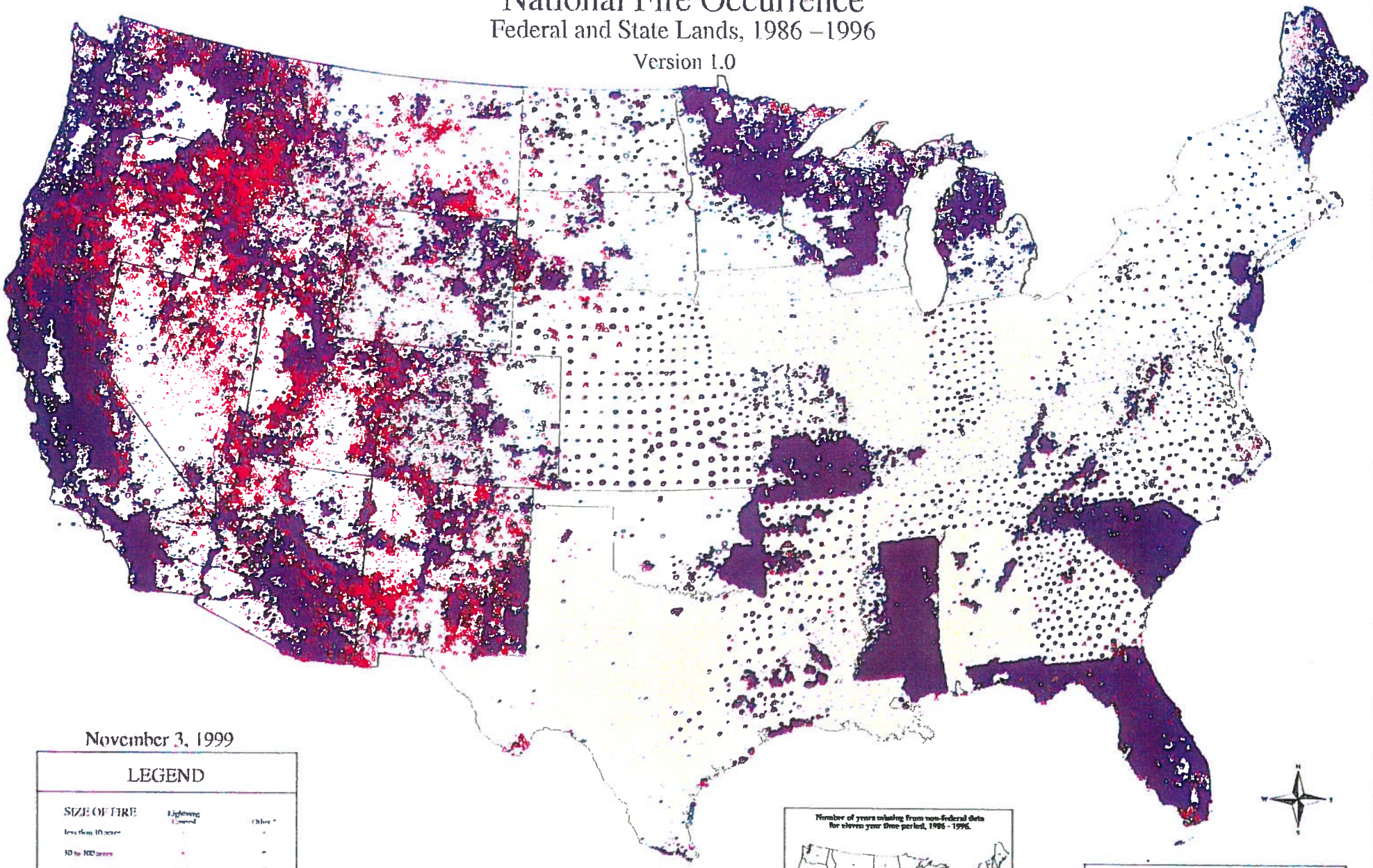
National Fire Occurrence
Federal and State Lands, 1986 –1996
Version 1.0



November 3, 1999

LEGEND

SIZE OF FIRE | Lightning Caused | Other *

Less than 10 acres

10 to 100 acres

100 to 1,000 acres

1,000 to 10,000 acres

10,000 acres or more

State Boundary

States with non-federal fire locations summarized to county

* Other types of fires included: Arson, Campfire, Powerline, Children, Debris Burning, Equipment Use, Railroad, and Miscellaneous

National Fire Occurrence data were compiled for 1986 - 1996. Federal data includes data from the following federal agencies: USDA Forest Service, USDI Bureau of Land Management, USDI Bureau of Indian Affairs, USDI Fish and Wildlife Service, and USDI National Park Service. Non - federal data were provided by State Forestry Divisions for all conterminous states but Nevada.

Number of years missing from non-federal data for eleven year time period, 1986 - 1996.

This product was developed by the Fire Modeling Institute at the Fire Sciences Laboratory, Missoula, Montana through funding from the USDA FS/USDI Joint Fire Sciences Program in collaboration with USDA Forest Service, Fire and Aviation Management

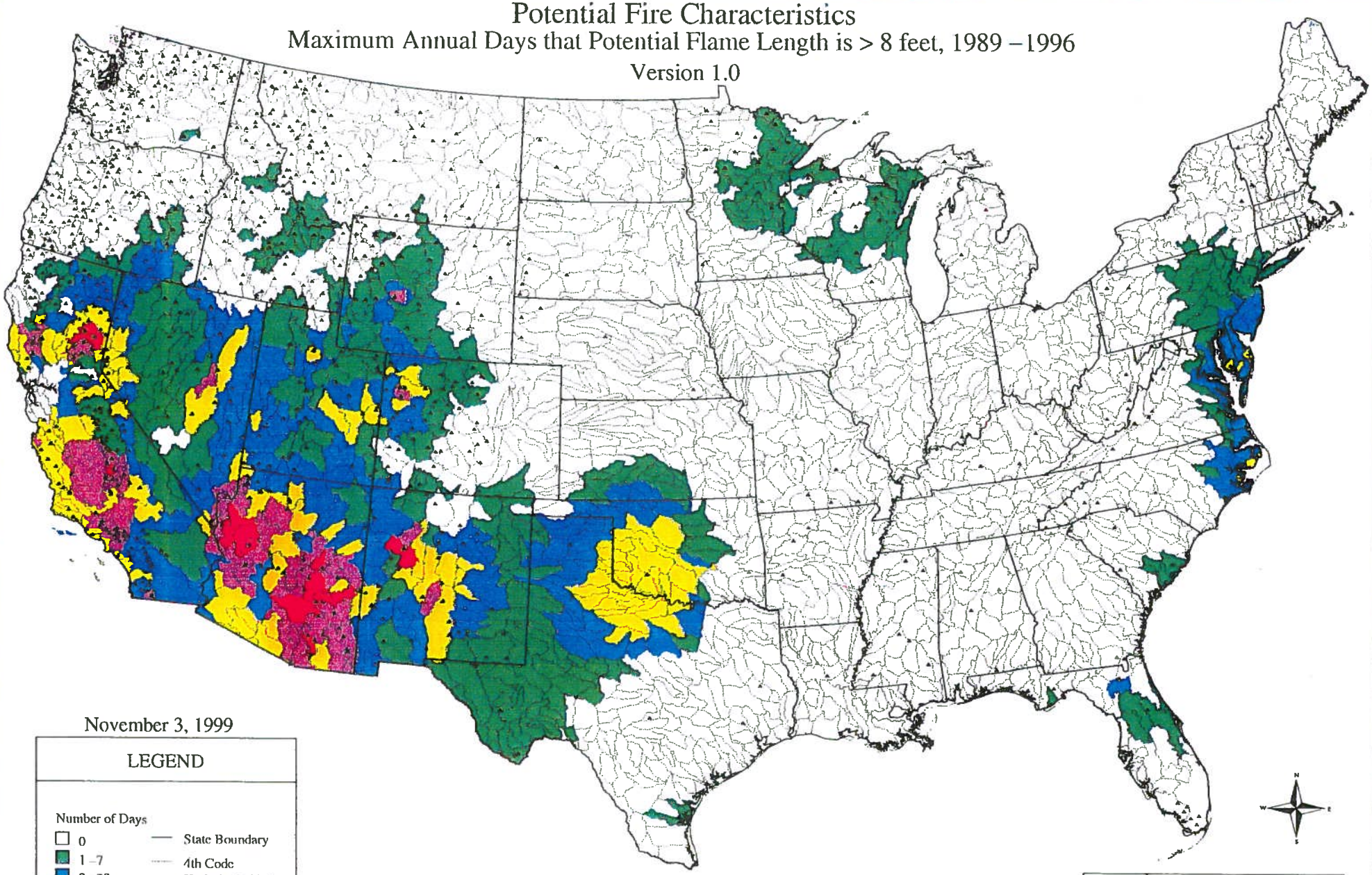
RMRS

USAS

Potential Fire Characteristics

Maximum Annual Days that Potential Flame Length is > 8 feet, 1989 – 1996

Version 1.0



November 3, 1999

LEGEND

Number of Days

- 0
- 1 – 7
- 8 – 23
- 24 – 46
- 47 – 78
- 70 – 139

- State Boundary
- 4th Code Hydrologic Unit
- NFDRS Weather Station

When flame lengths exceed eight feet, fires present serious control problems such as torching out, crowning, and spotting. Control efforts at the head of the fire are mostly ineffective and major runs can occur in more extreme cases.

The maximum annual number of days where potential flame lengths exceeded 8 feet were calculated for 4th code hydrologic units (HUCs) using indices acquired from the existing National Fire Danger Rating System (NFDRS) weather observation network and primary fuel model assignments. Potential flame lengths were derived from 180 days of NFDRS burning index (BI) data, April – September, for each of eight years, 1989 – 1996.

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in collaboration with
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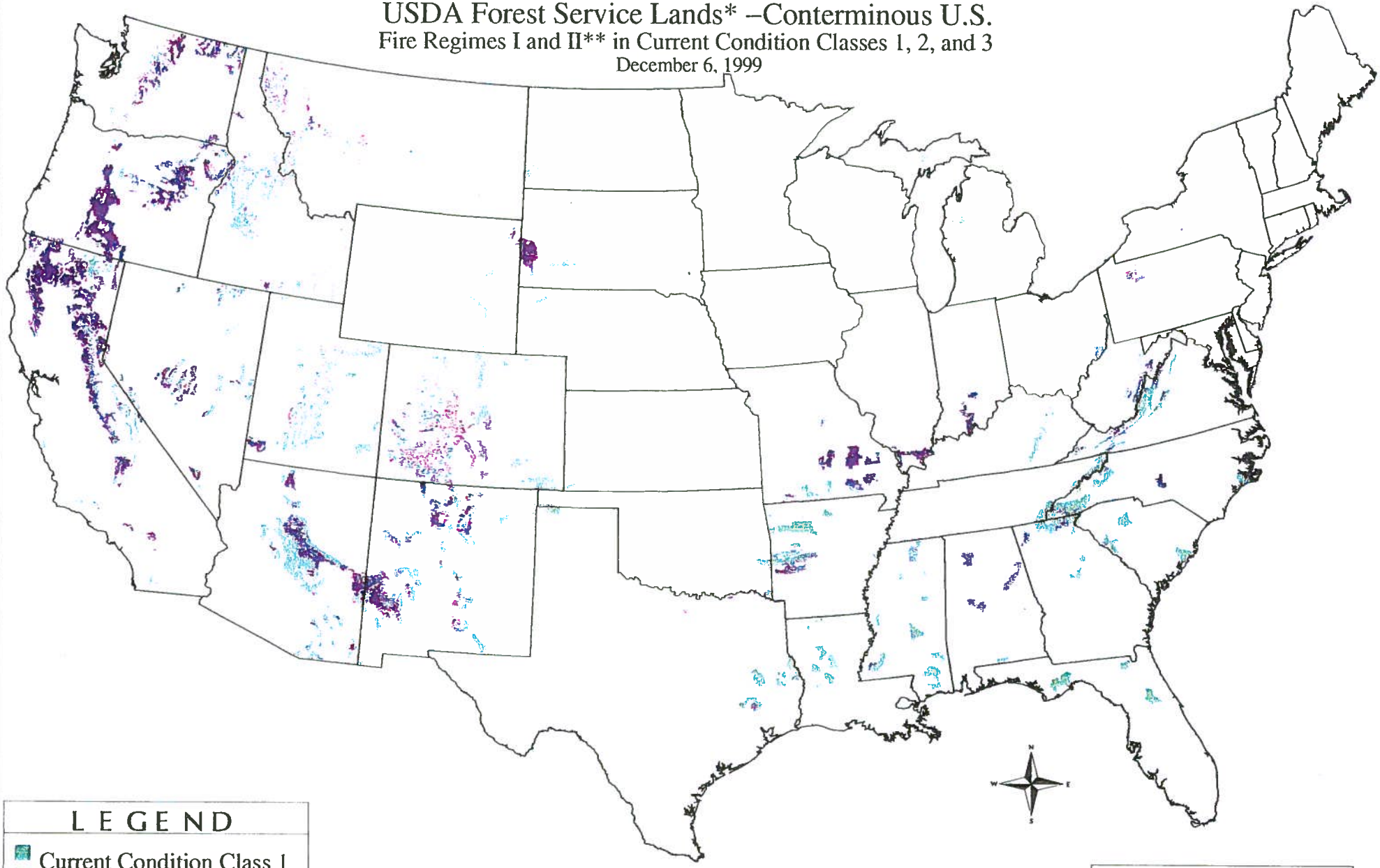
USDA Forest Service Lands* –Conterminous U.S.

Fire Regimes I and II** in Current Condition Classes 1, 2, and 3

December 6, 1999



LEGEND

- Current Condition Class 1
- Current Condition Class 2
- Current Condition Class 3

*All Cover Types are included except Agriculture, Grasslands, Barren, Water, and Urban/Development
**Fire Regime I: 0 – 35 years; Low Severity, Fire Regime II: 0 – 35 years; Stand Replacement

This product was developed by the Fire Modeling Institute at the Fire Sciences Laboratory, Missoula, Montana through funding from the USDA FSUSDI Joint Fire Sciences Program in collaboration with USDA Forest Service, Fire and Aviation Management