

Broad-Scale Assessment of the Multiple Values of Federal Wilderness

Web Site

www.srs.fs.fed.us/trends

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What is the Biggest **Threat** to the NWPS

- Climbing Anchors?
- Invasive exotics?
- Nearby population and development growth?
- Air and water pollutants?
- Recreation use?
- Political vulnerability?
- Shrinking budgets?
- Something else?

**Genesis of this
Project**

Convened a national group in Washington

ANSWER

- The biggest threat is potential loss of the NWPS altogether, combined with “chipping away”

PROBLEM

- Low awareness of issues, no public voice, lack of Congress’ support, and little collective energy

ACTION

- Provide Wilderness information in places and in forms where people will encounter and digest it

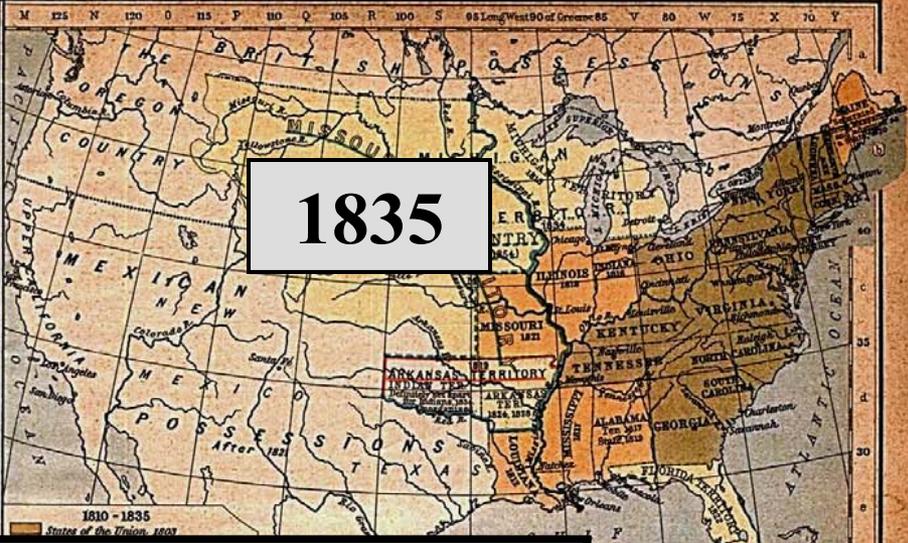
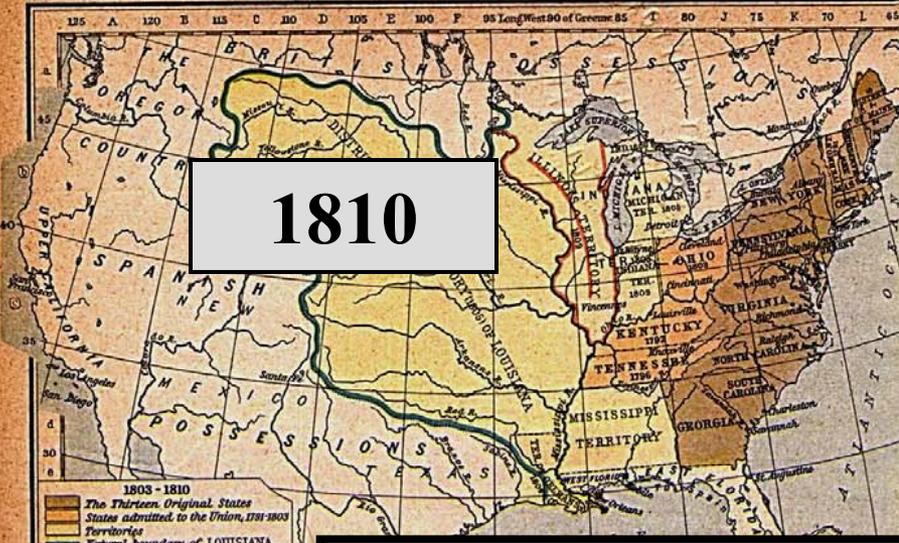
HOW?

- Start with accumulating the best information available that describes what people value about the NWPS
- Put this information in the hands of those who are and will be deciding the fate of the NWPS

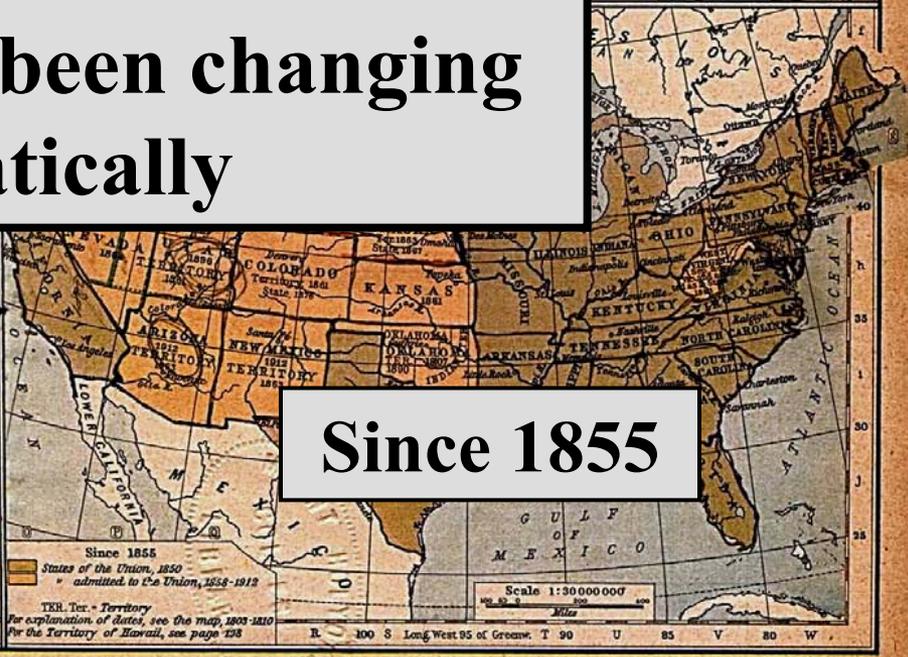
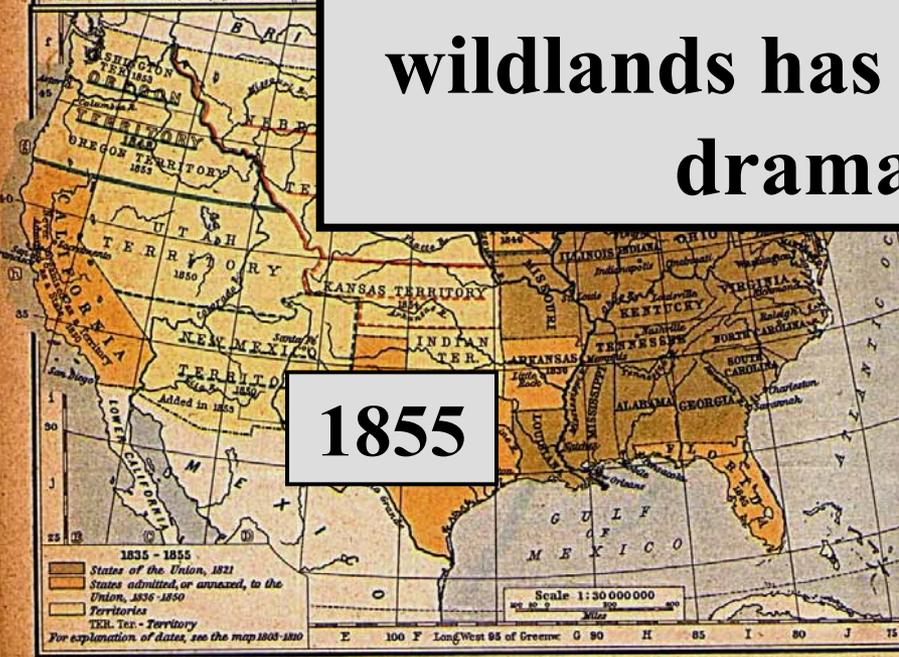
Primary approach, publish a book that provides a broad-scale assessment of the multiple social and ecological values of Federal Wilderness

- Assessing Wilderness values needed to acknowledge **multiple scales** -- area, regional and national levels (Landres, 2004)
- Our approach was to address the **broadest** perspective, national and regional
- With numerous partners, our FS unit and the U. of Georgia in Athens, GA has been working to better understand the **NWPS** as a national system of protected lands and the values the public attaches to those lands
- This work is part of the **Renewable Resources Planning Act (RPA) Assessment** of Forest and Rangelands, the Montreal Process, and supports federal policy and legislative analyses
- At the national workshop, we developed a framework for accounting for Wilderness Values as the principal **organizing structure** for this project
- The results of this work is soon to be published as a book by Venture Press entitled “*The Multiple Values of Wilderness*”

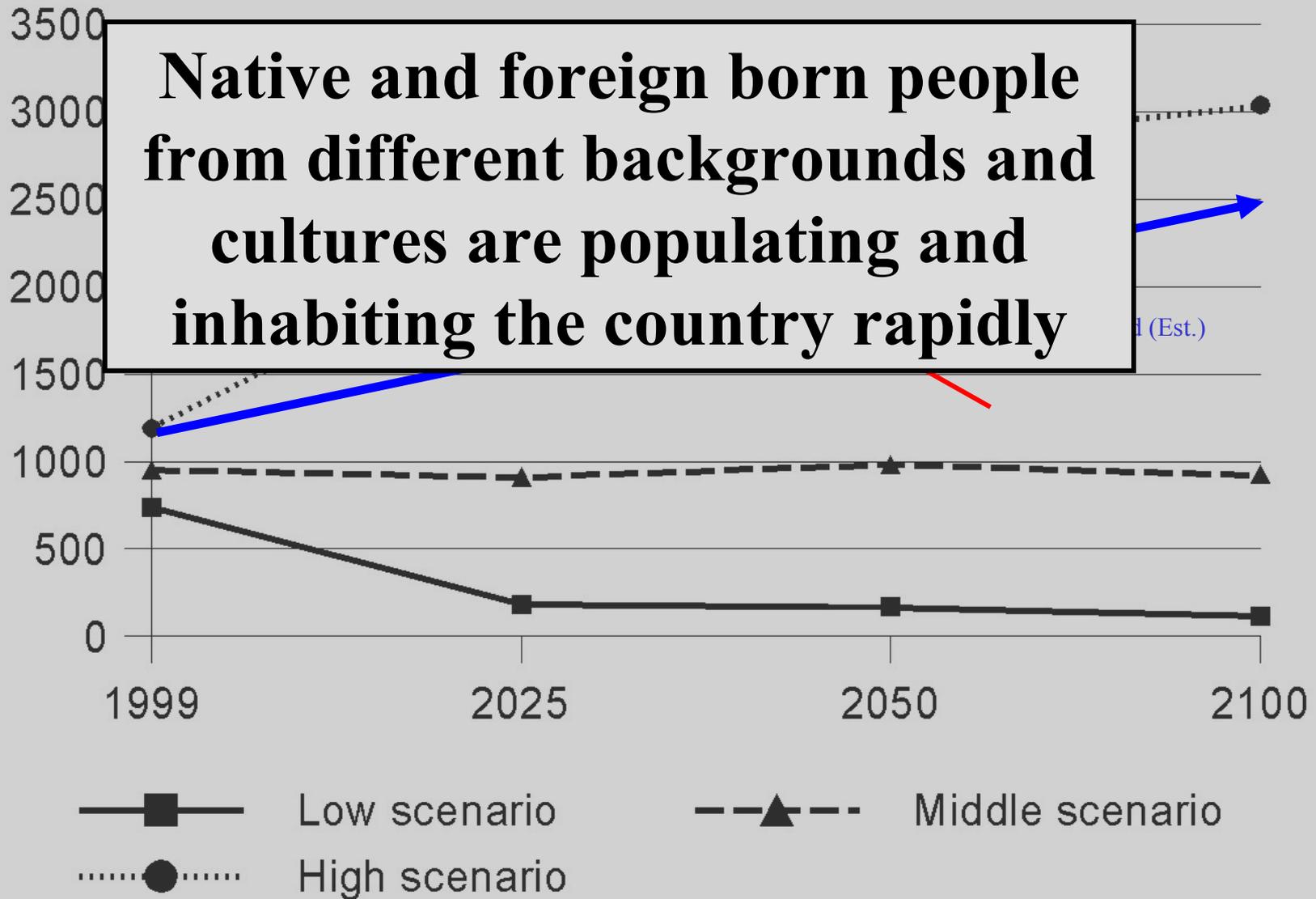




The human context of U. S. wildlands has been changing dramatically

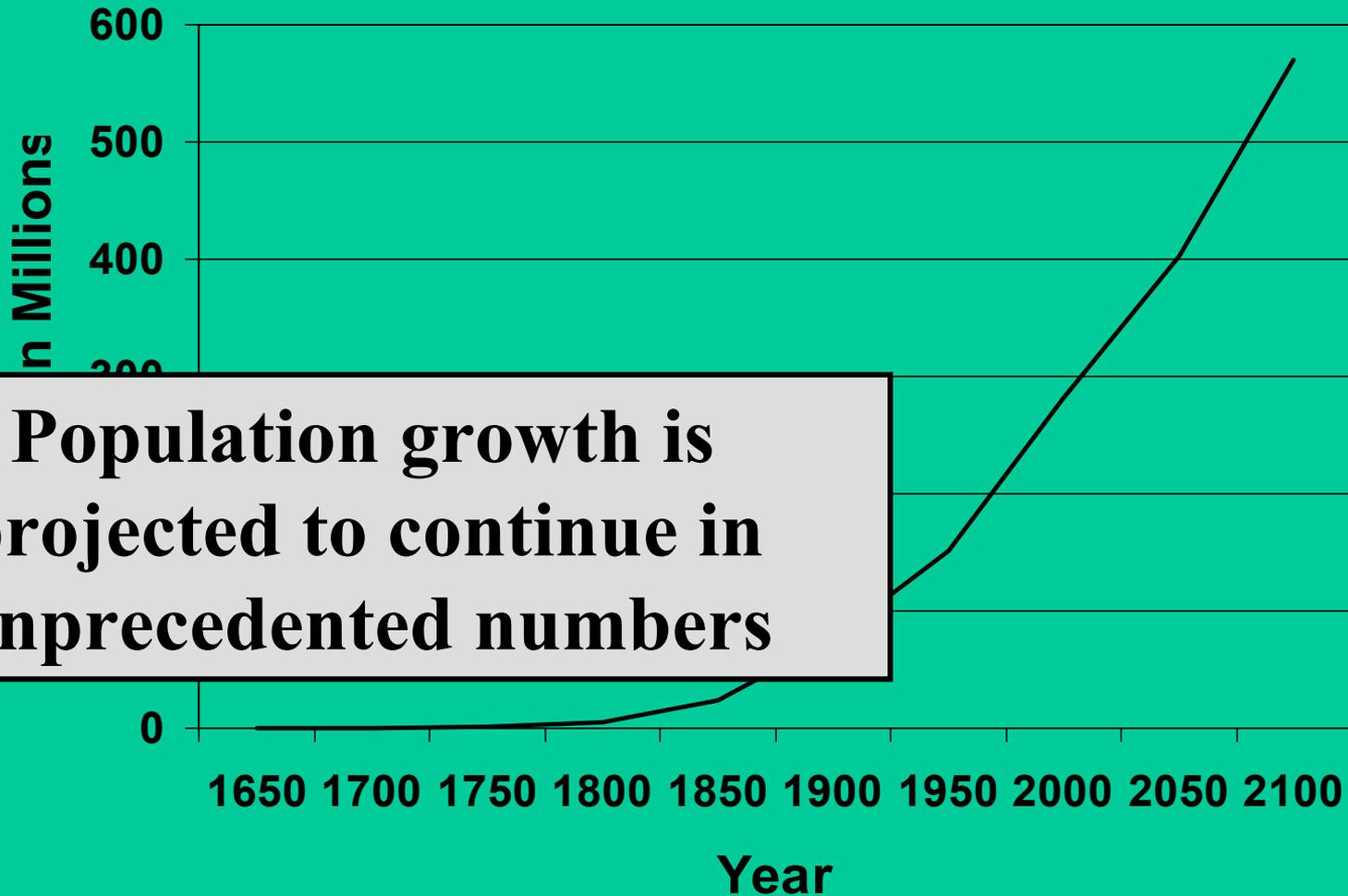


Native and foreign born people from different backgrounds and cultures are populating and inhabiting the country rapidly



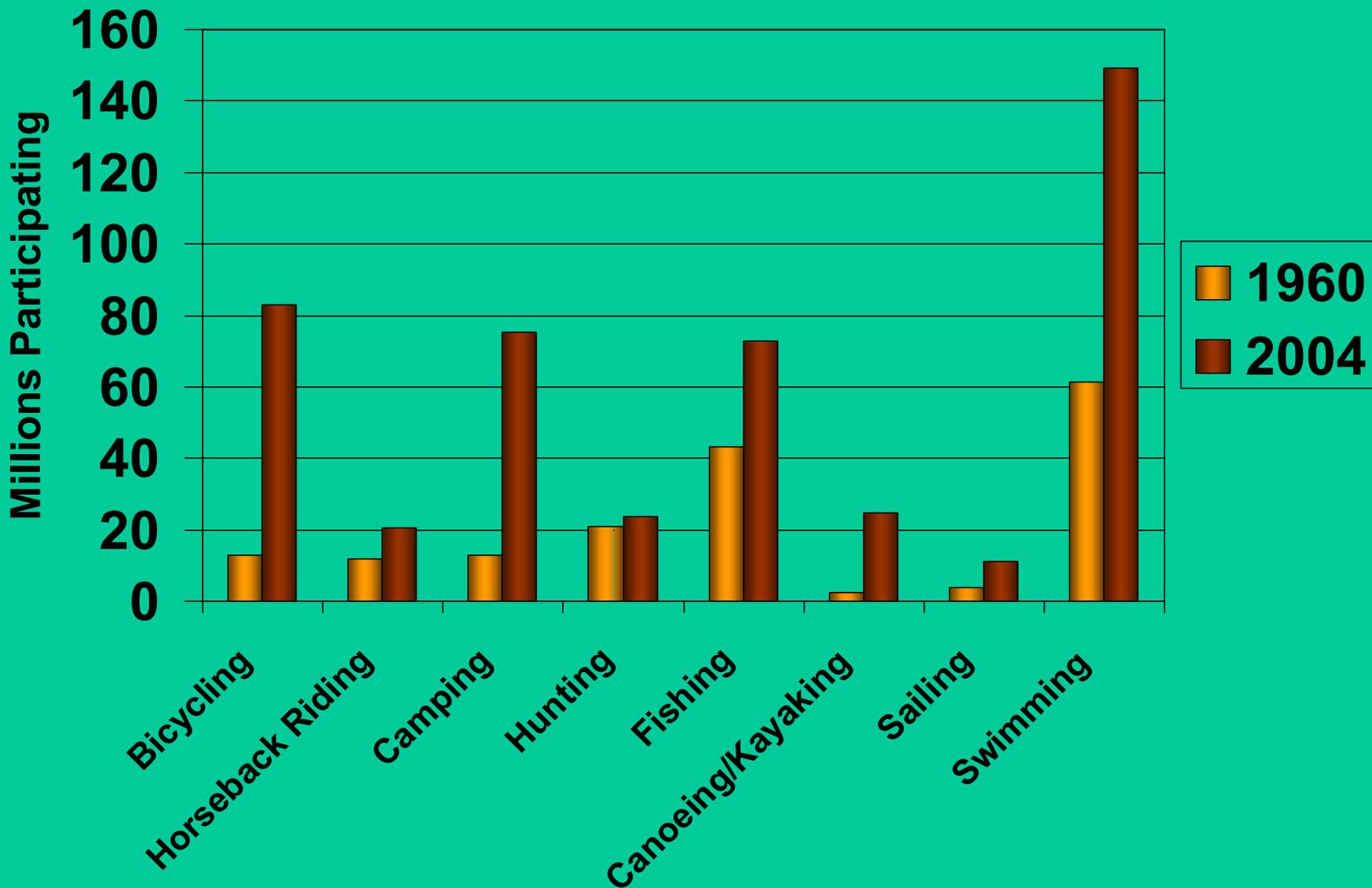
Projected net migration to the US, 1999-2100, under alternative low, middle, and high scenarios.

Historical and Projected Population in the U.S.



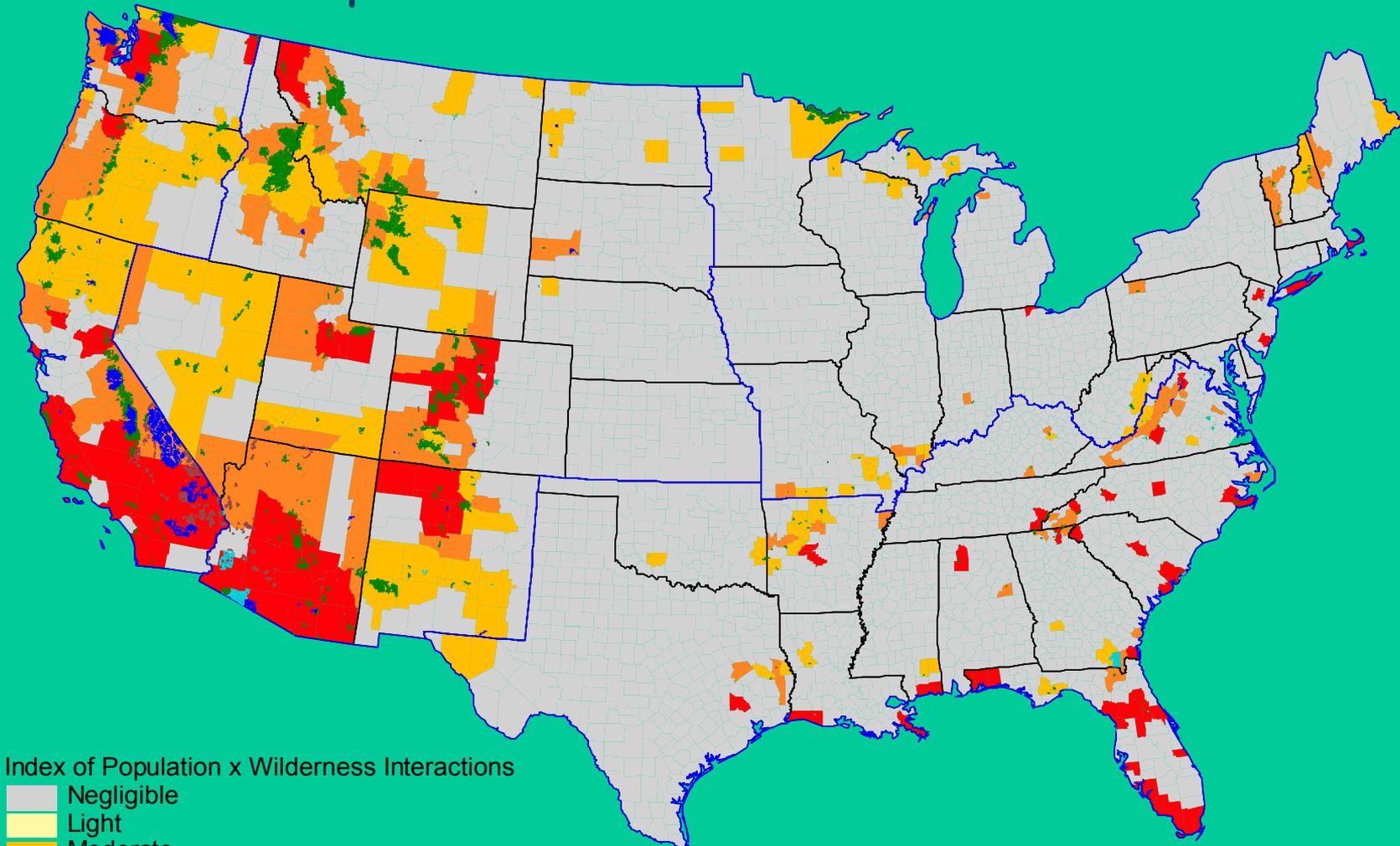
Population growth is projected to continue in unprecedented numbers

LONG TERM TRENDS SINCE 1960



Future Wilderness Hotspots (2020)

Ambient Population Pressures on Counties with Wilderness



- Index of Population x Wilderness Interactions
- Negligible
 - Light
 - Moderate
 - Moderately heavy
 - Heavy
 - National Forest Wilderness
 - Bureau of Land Management Wilderness
 - Fish & Wildlife Service Wilderness
 - National Park Service Wilderness

The pace and level of change across the U. S. and world make it imperative that we assess and monitor the trends, status and likely future of Wilderness in this country.

Book Outline

- **History Before, During and After the Act (Sutter and Scott, Chapters 3 and 4)**
- **Wilderness values and a framework for organizing what we know (Bergstrom, Bowker, and Cordell)**
- **The Context and Natural Character of Wilderness Lands (Cordell, Murphy, Riitters and Harvard)**
- **The Wilderness Attribute (Aplet, Wilbert and Morton)**
- **Social Values (Schuster, Tarrant and Cordell)**
- **Differences by Social Group (Johnson, Bowker, Cordell)**
- **Economic Values (Bowker, Harvard, Bergstrom and Cordell)**
- **Economic Development Benefits (Rosenberger and English)**
- **Ecological Values (Cordell, Murphy, Riitters and Harvard)**
- **Intrinsic Values (Gudmunson and Loomis)**

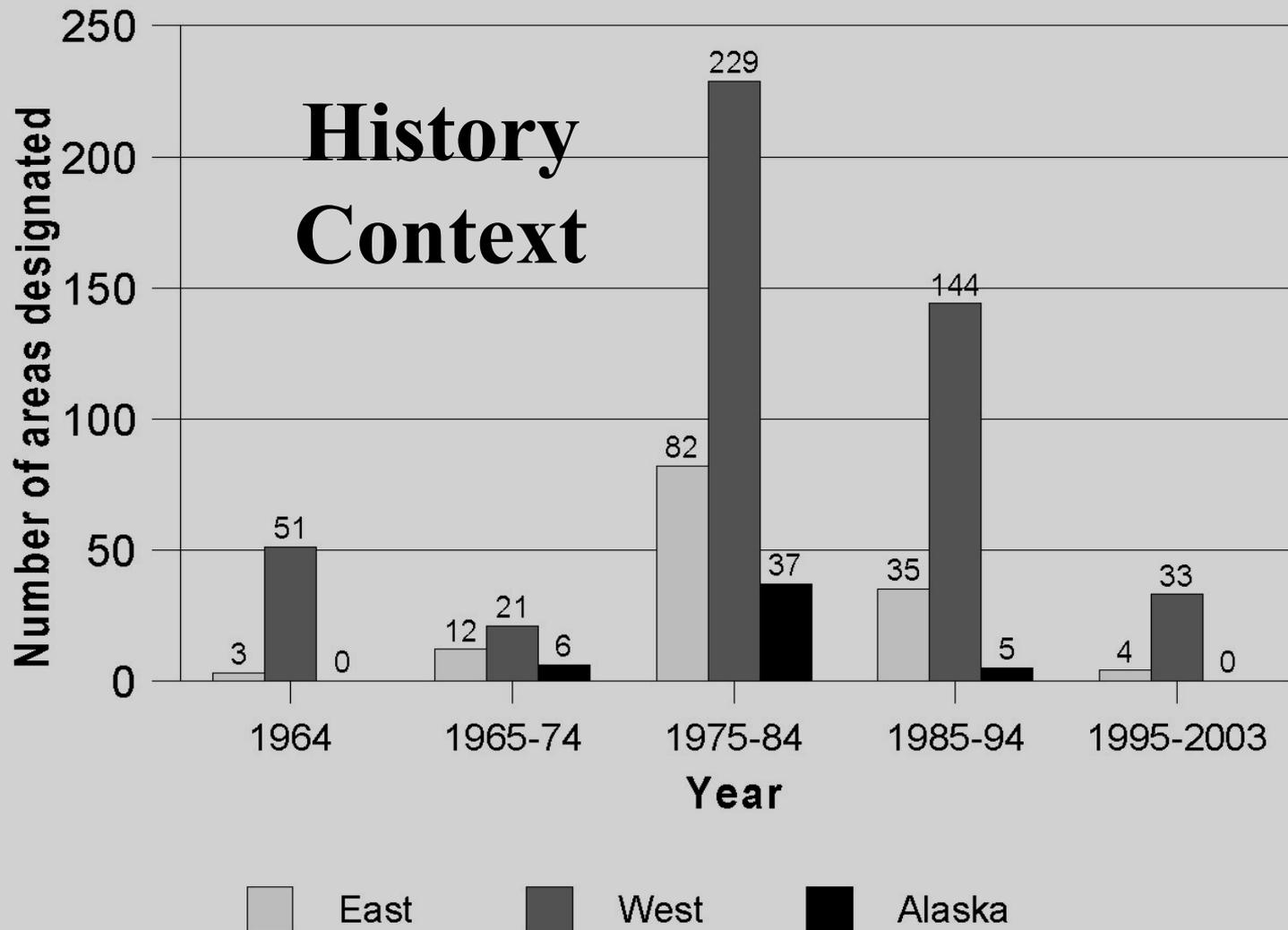
Chapter 2 - Origins of the National Wilderness Preservation System (Paul Sutter)

- **The Early Years**
- **Prelude to Wilderness:
The 1910s**
- **Leopold Enters the
Fray**
- **Marshall and Other
Interwar Advocates**
- **The Post World War
II Era**

Chapter 3 - The Wilderness Act and Its Recent History (Doug Scott)

- **A National Wilderness Preservation System
Is Created**
- **How the Wilderness System Was to be
Built**
- **Growth of the Wilderness System**
- **Designating Wilderness on a Grand Scale
in Alaska**
- **Wilderness and “Release Language”**
- **Current Status and Management of the
Wilderness System**
- **Management to Preserve Wilderness
Character**
- **The “Minimum Requirement” Process**
- **A Single, Integrated Wilderness System**
- **A Recent Assessment of the Status of
Management of the National Wilderness
Preservation System**
- **Wilderness Management in a Larger,
Evolving Context**

Historical Trend in Number of Wilderness areas designated in the East, West, and Alaska between 1964 and 2003



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Wilderness Value Account

- 1. Social (includes non-economic benefits to individuals and communities)**
- 2. Economic (includes economic values and impacts on individuals and communities)**
- 3. Ecologic (includes ecosystem structure and health)**
- 4. Ethical (includes issues related to justice, fairness, etc.)**

An Organizing Framework for Wilderness Values

Basic Functional Connections	Measurement Accounts or Categories	Specific Types of Measures or Indicators
Wilderness Values 	Social	Psychological Sociological Anthropological
	Economic	Active Use Value Passive Use Value Economic Impacts
	Ecologic	Human Life Support Value Animal and Plant Life Support Value
	Ethical	Intrinsic Value
Wilderness Services 	Animal and Plant Habitat; Carbon Sequestration; Subsistence Living; Cultural Preservation; Historic Preservation; Scientific Discovery; Educational Development; Personal Physical Health and Growth; Personal Emotional Health and Growth; Personal Spiritual Health and Growth; Community Health and Quality of Life	<div style="border: 2px solid black; padding: 10px; text-align: center;"> <h2 style="color: #003366; margin: 0;">Multi-Disciplinary Perspective</h2> </div>
Functions of Wilderness Preservation 	Preservation of Natural and Wild Places; Recreational and Experiential Setting; Ecosystem and Biodiversity Preserve	
Wilderness Attributes 	Geographic; Geologic; Hydrologic; Atmospheric; Biologic; Naturalness; Wildness; Constructed	

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- The Wilderness Attribute (Aplet, Wilbert and Morton)
- Social Values (Schuster, Tarrant and Cordell)
- Differences by Society (Cordell)
- Economic Values (Harvard, Bergstrom and Cordell)
- Development Benefits (Rosenberger and English)
- Ecological Values (Cordell, Murphy and Harvard)
- Intrinsic Values (Gudmunson and Loomis)

Social and Landscape Context

The Human Context and Natural Character of Wilderness Lands

(CHAPTER 5)

**Trends in Designations and Current Size of the NWPS
System Designation Trends
Size, Regions, and Management Agencies**

The Human Context of Wilderness

Ambient Population

Uses of Nearby Non-Wilderness Land

Proximity to Major Roads and Rivers

Pervasiveness of Roads Near Wilderness

The Natural Character of Wilderness

Wilderness at Different Elevations

Precipitation Over Wilderness

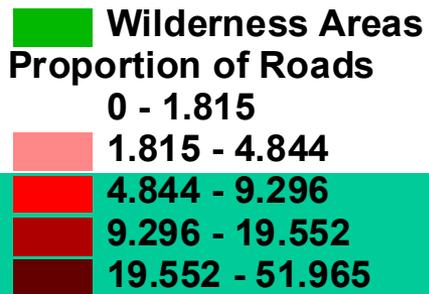
Ecosystems Represented

Number of people living within 25, 50, 100, 200, and 400 miles of Wilderness

Distance	Sum of Population	Percent of Population
25 miles	47,495,997	16.8
50 miles	114,497,257	40.6
100 miles	195,745,452	69.4
200 miles	262,151,985	93.0
400 miles	281,918,792	100.0

**Social
Context**

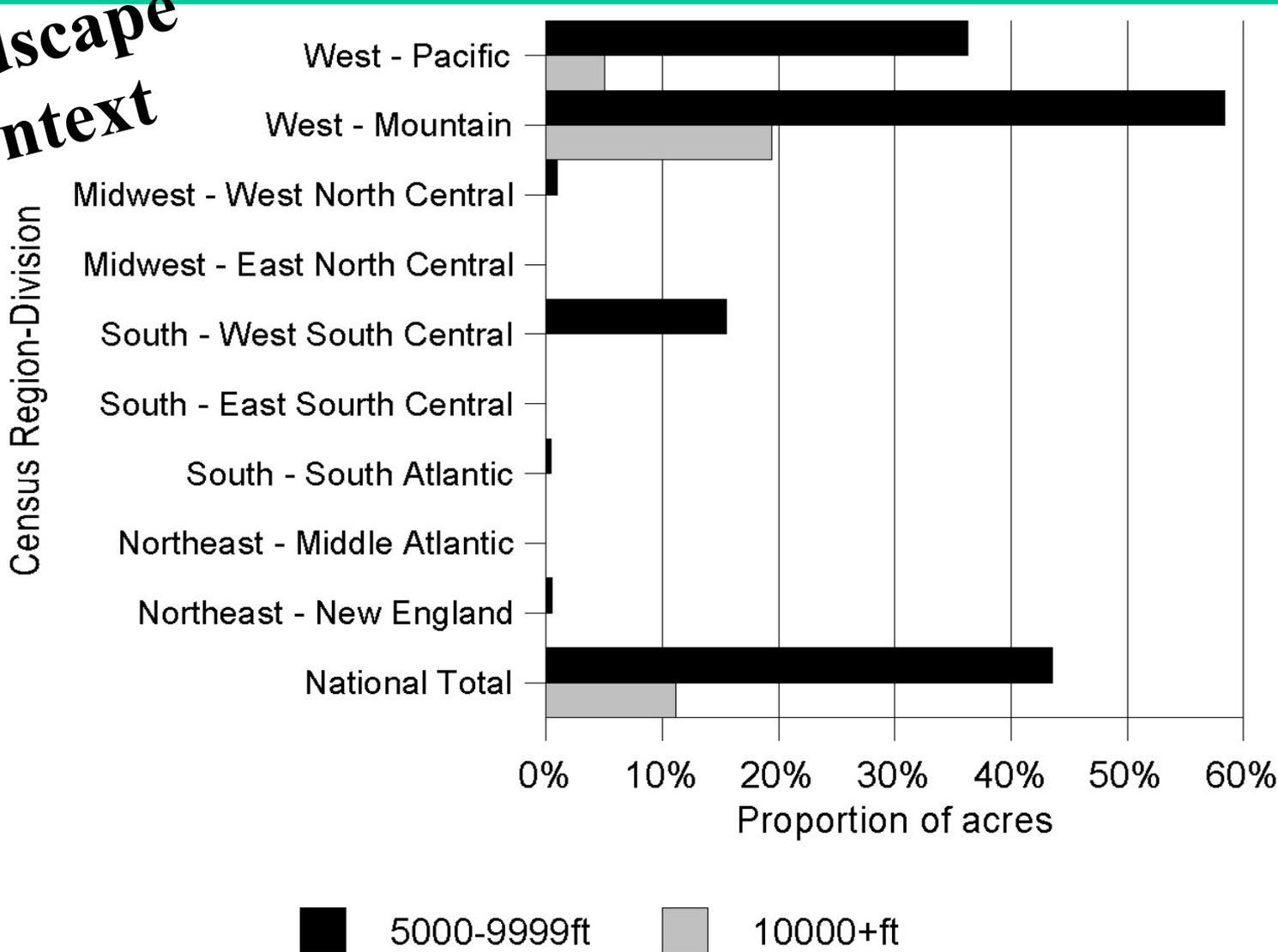
Landscape Context



Density of roads relative to Wilderness

Percentage of total Wilderness area at elevations above 5,000 feet by census division and nationally

**Landscape
Context**



**Natural
Character**

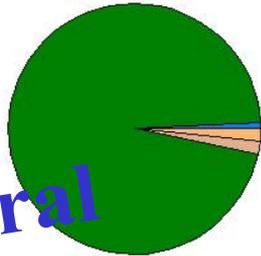
National

Precipitation	Areas	Acres	Percent of Total
0-15 in.	146	12,920,179	27.55
16-30 in.	138	9,517,039	20.29
31-40 in.	101	8,777,388	18.72
41-60 in.	185	9,817,244	20.93
61-90 in.	63	3,533,052	7.53
100+ in.	20	2,331,883	4.97

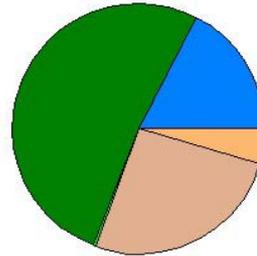
The proportion of Wilderness areas in each of 7 land cover classes by census division

Natural
Character

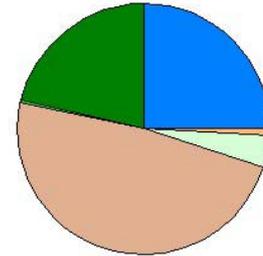
New England-Northeast



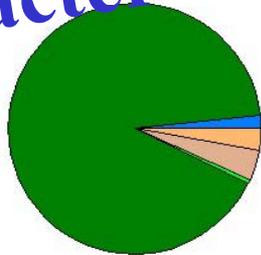
Middle Atlantic-Northeast



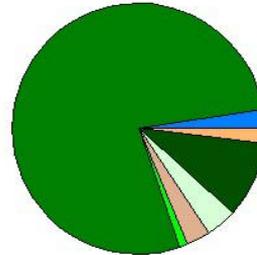
South Atlantic-South



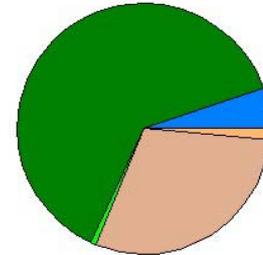
East South Central-South



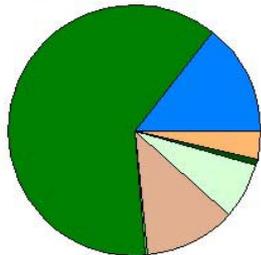
West South Central-South



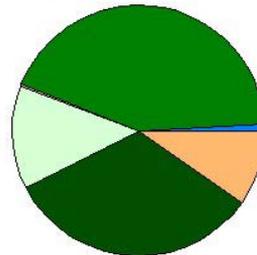
East North Central-Midwest



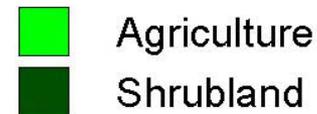
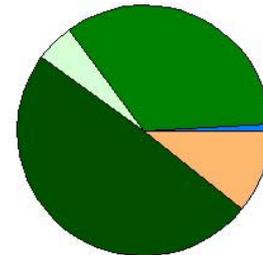
West North Central-Midwest



Mountain-West



Pacific-West



Natural Character

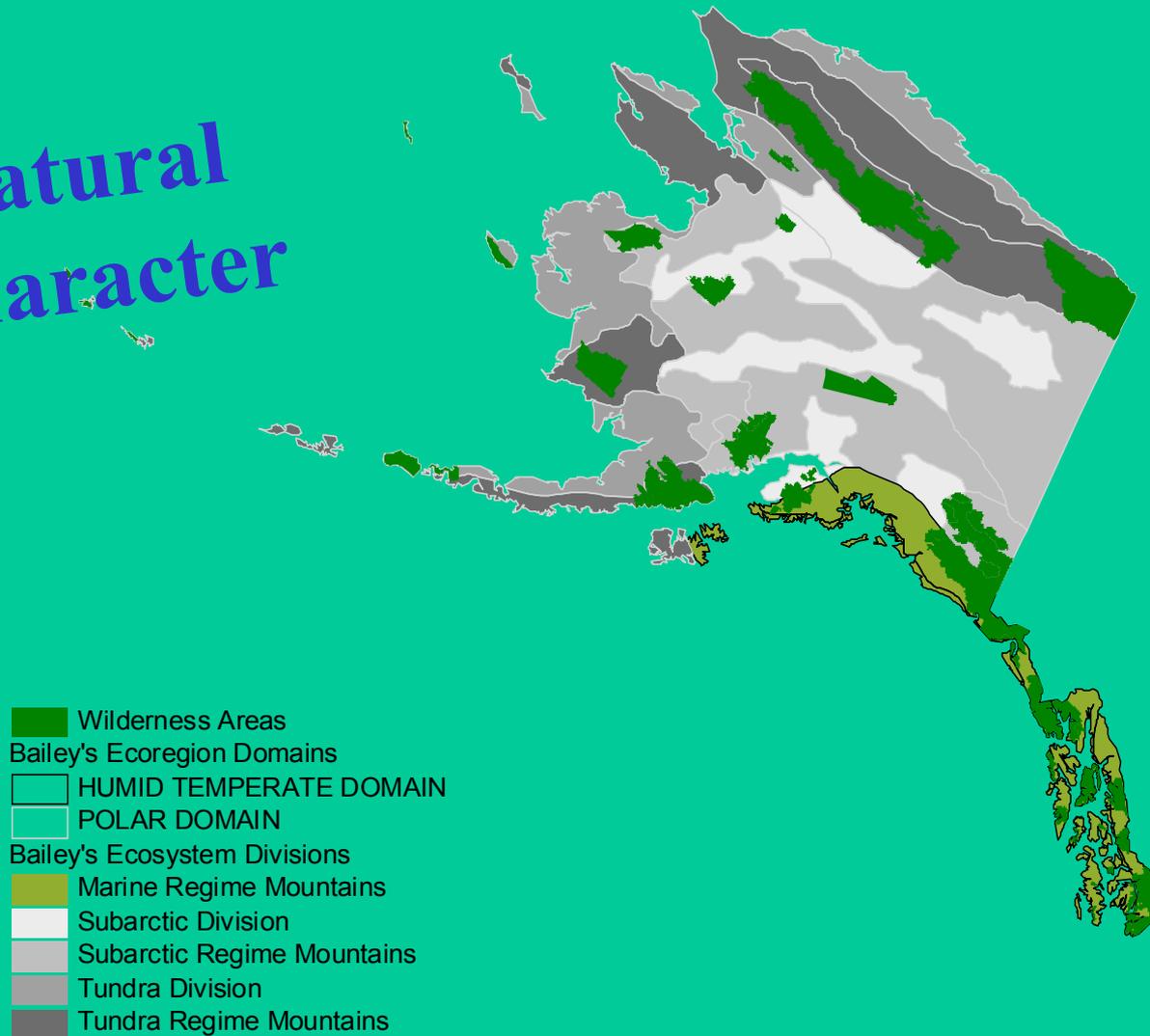
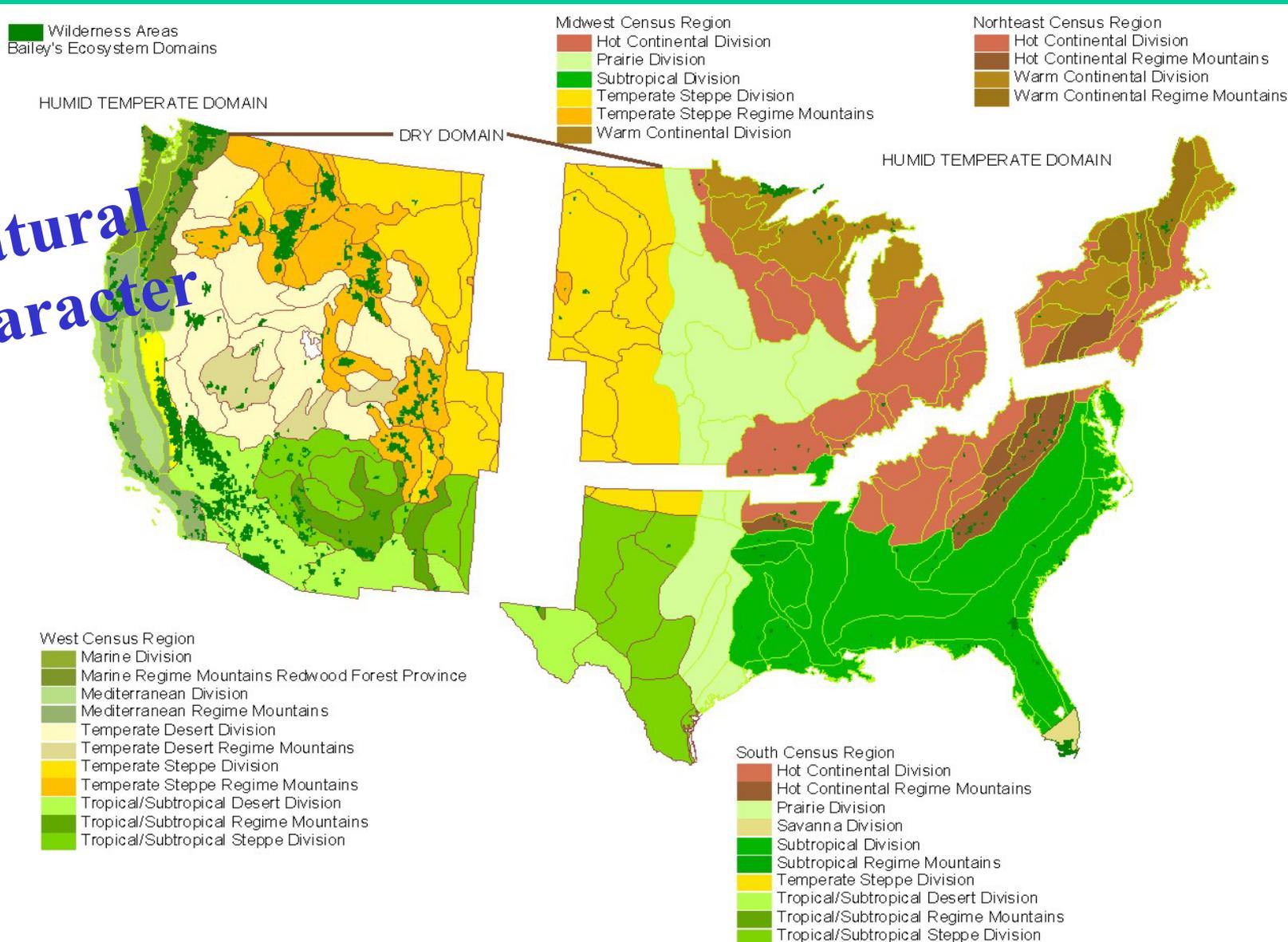


Figure 1. Wilderness Areas in Alaska in Relation to Bailey's Ecoregions at Domain and Division
http://www.fs.fed.us/institute/ftp/maps/na_regnshp.zip

Location of designated Wilderness areas relative to type of ecosystem at Bailey's Domain and Division level for each Census Region

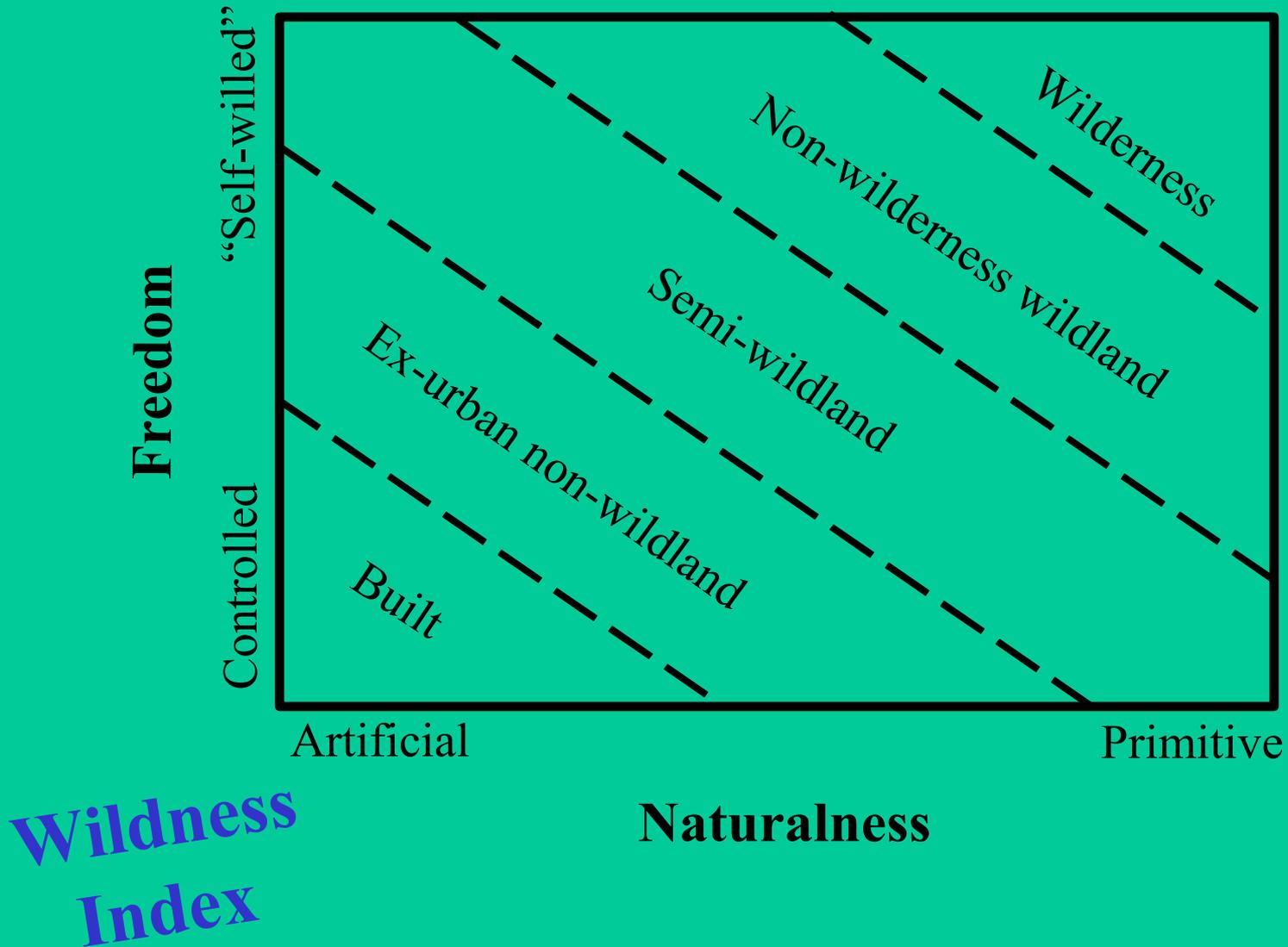
Natural Character



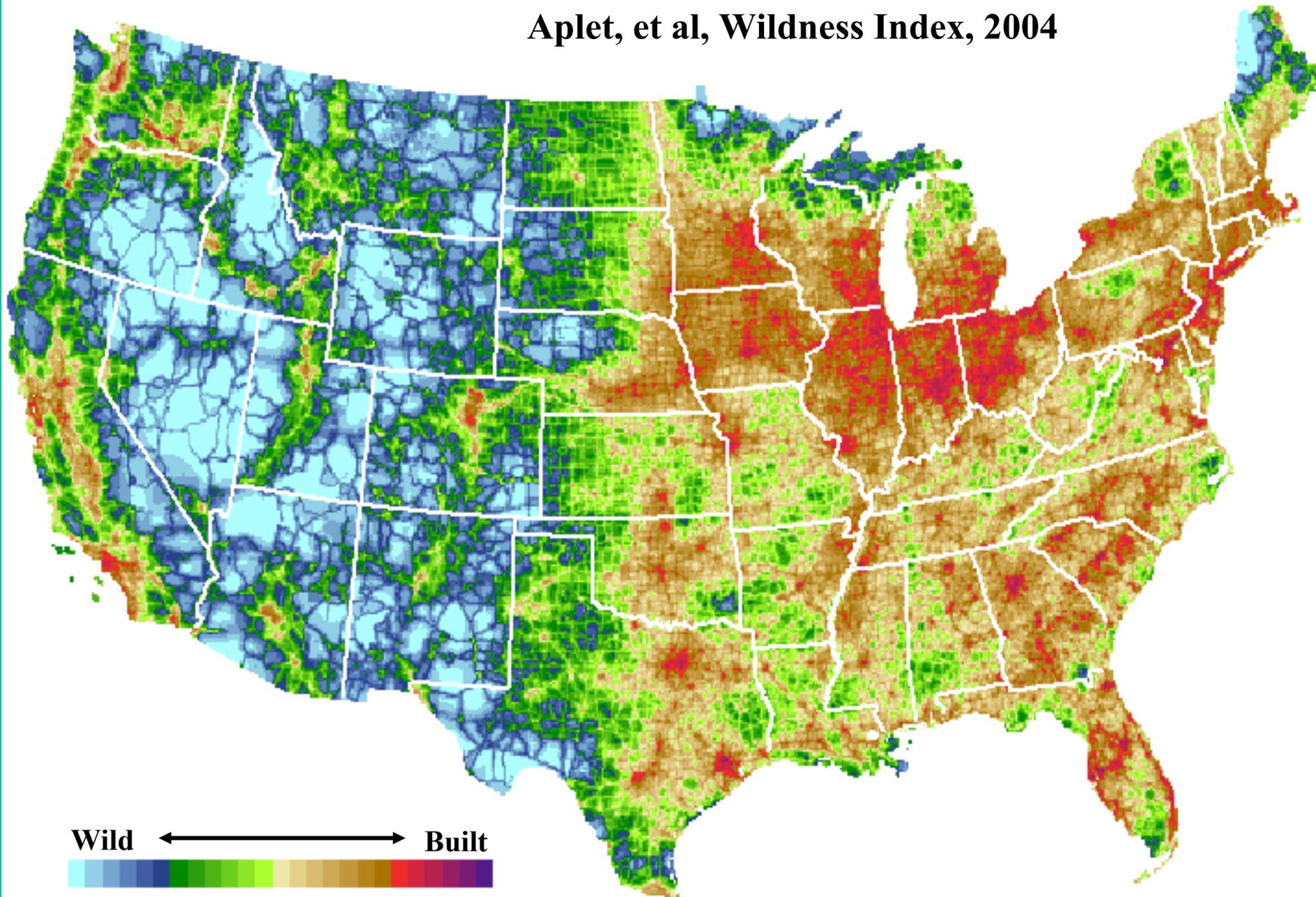
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- **Chapter 6 Wildness— A Social and Landscape Context**
- **Benefits (Rosenberger and English)**
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The Wildland Continuum



Aplet, et al, Wildness Index, 2004



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Chapter 7 - The Social Value of Wilderness (Schuster, Tarrant, Cordell)

- **Trends in Perceptions of Wilderness Benefits**
- **Public Opinion Surveys**
 - **Not Enough Land Designated as Wilderness**
 - **Designating Additional Wilderness**
 - **Tradeoffs to get More Wilderness**
- **Wilderness Benefits 1977 to 1985**
- **Wilderness Benefits 1985 to Present**

Americans' attitudes toward the amount of Wilderness land in the USDA National Forest system

	Percent of Respondents
Too little/Not enough	61
About right	24
Too much	8
Not sure/Don't know	7

What Americans in 2002 Value about Wilderness

<u>Wilderness Value</u>	<u>Percentage Saying It Is</u>	
	<u>Extremely Important</u>	<u>Slightly or Not Important</u>
Protecting air quality	58.4	1.5
Protecting water quality	55.9	1.5
Protecting wildlife habitat	52.7	3.1
Protecting endangered species	49.8	5.0
Legacy for future generations	49.1	3.1
Preserving unique ecosystems and genetics	44.3	5.1
Future option to visit	37.5	7.1
Just knowing it is preserved	36.9	6.4
Providing scenic beauty	35.4	5.5
Providing recreation opportunities	27.8	7.2
Providing spiritual inspiration	25.9	16.7
Undisturbed area for scientific study	23.9	11.6
Providing income for tourism industry	9.7	33.5

Recreation is a significant social benefit

Total visitation by agency, visitation by single-day and multi-day use and by region

Total NWPS Site Visits	12,825,610
FS site visits	10,517,000
NPS site visits	1,923,841
FWS site visits	333,466
BLM site visits	51,302
Total single-day site visits	8,458,490
Total multi-day site visits	4,367,120
Total FS, FWS, & BLM site visits	10,901,768
FS, FWS, & BLM single-day site visits (73%)	7,958,291
FS, FWS & BLM multi-day site visits (27%)	2,943,477
Total NPS site visits	1,923,841
NPS single-day use (26%)	500,199
NPS multi-day use (74%)	1,423,643

Grand mean scores of responses to 16 wilderness recreation experience preference domains from eight designated wilderness areas, CO and NC

Benefit	Grand Mean
Enjoy nature	1.5
Physical fitness	2.0
Reduce tensions	2.2
Escape	2.2
Outdoor learning	2.3
Sharing values	2.8
Independence	3.0
Family kinship	3.0
Spiritual	3.1
Considerate people	3.3
Achievement/stimulation	3.4
Physical rest	3.5
Teach/lead others	3.8
Risk taking	4.6
Risk reduction	4.7
Meet new people	5.1

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Chapter 8 - Wilderness Value Differences by Immigration, Race/Ethnicity, Gender, and Socio-economic Status (Johnson, Bowker, Cordell and Bergstrom)

- **Approach, Definitions, and Sources**
- **Immigrant and Native-born**
- **U.S.-born race/ethnic groups**
- **Gender**
- **Socioeconomic Status**

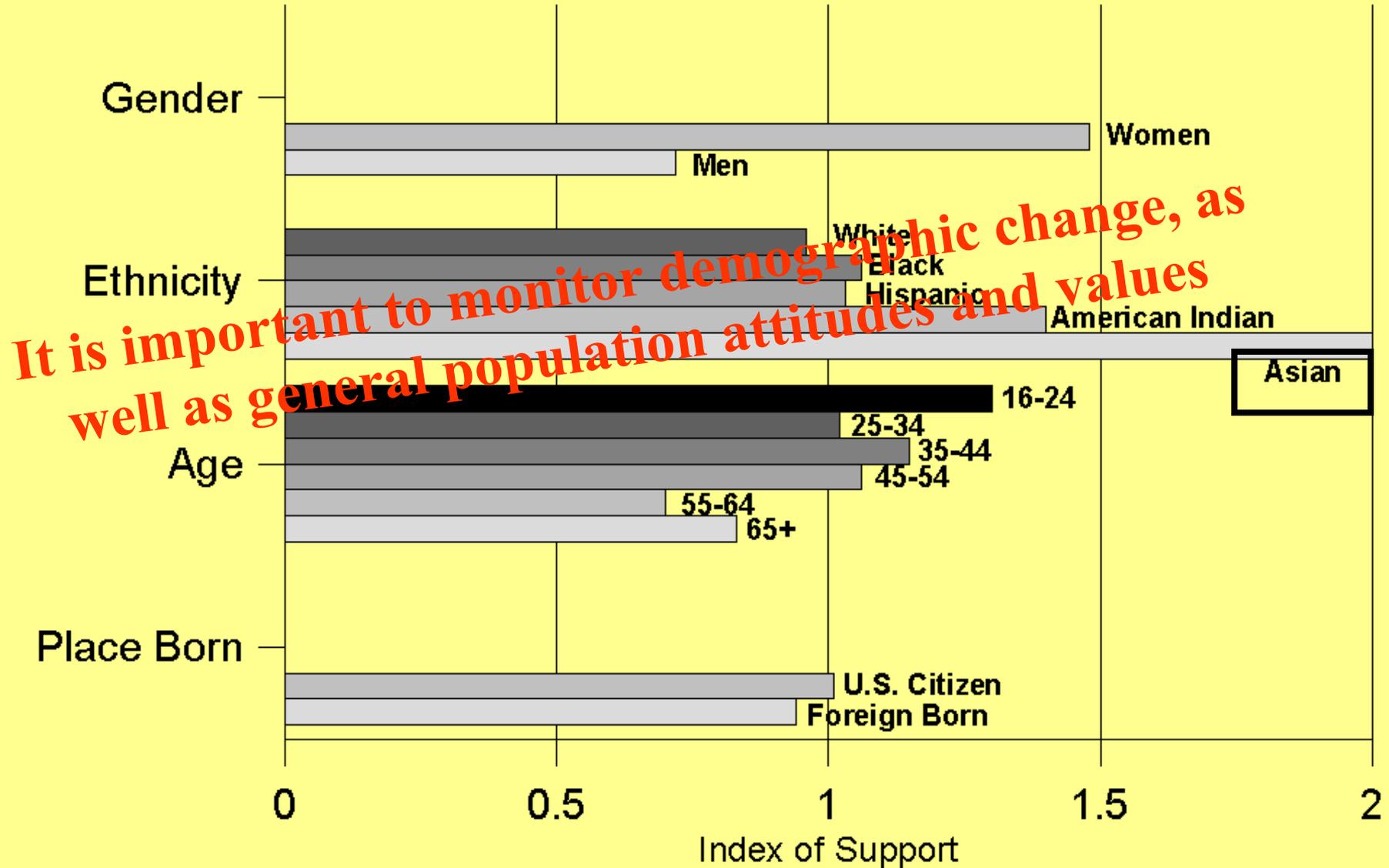
Indicators comparing relative likelihoods of social groups saying “yes” to active use value components

Wilderness value item	On-site current use	On-site future use	Off-site current use	Off-site environmental quality	Scientific/ medicinal
% respondents answering “yes” to value item	41	76	92	96	95
Immigrant (vs. native born) (% immigrant = 9)	Less likely	Less likely	More likely	Less likely	Nsd
Black (vs. White) (% Black = 12)	Less likely	Less likely	Less likely	Nsd	More likely
Latino (vs. White) (% Latino = 15)	Less likely	Nsd	Less likely	Nsd	Nsd
Asian (vs. White) (% Asian = 3)	Less likely	Less likely	Nsd	Nsd	Nsd
Gender (vs. Male) (% female = 53)	Less likely	Less likely	More likely	More likely	More likely
Age (avg. = 43.13)	Nsd	Less likely	More likely	Less likely	Less likely
Education (vs. no college) (% college = 27)	More likely	More likely	More likely	Nsd	Less likely
Urban (vs. non-urban) (% urban dweller = 0.80)	Nsd	Nsd	Nsd	Nsd	More likely
Acculturation (avg. years = 16.42)	More likely	More likely	Nsd	More likely	Nsd
Sample size	4,571	4,590	9,601	9,558	9,572

Nsd = no significant difference

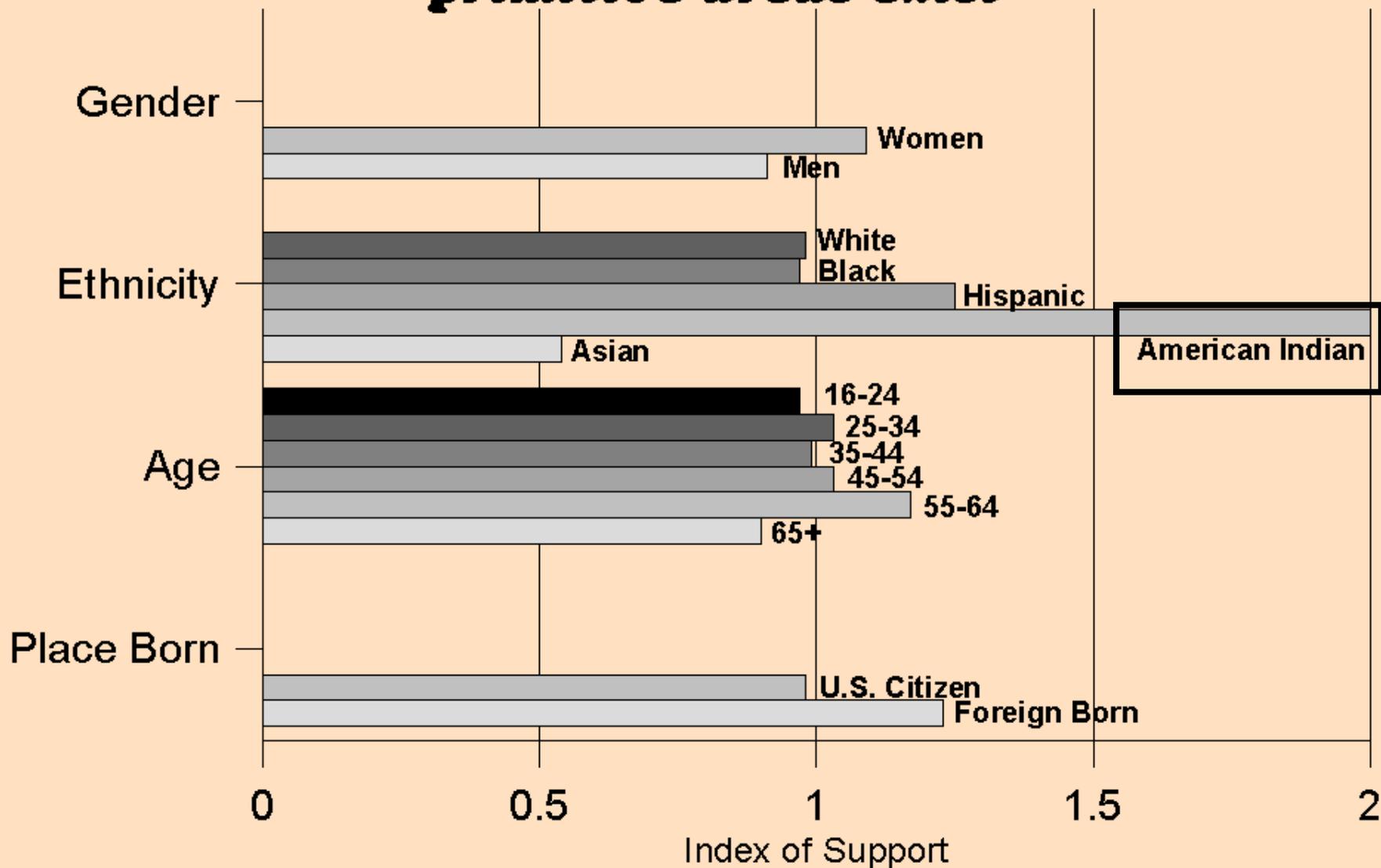
The Most Important Benefits of Wilderness

Protecting air quality



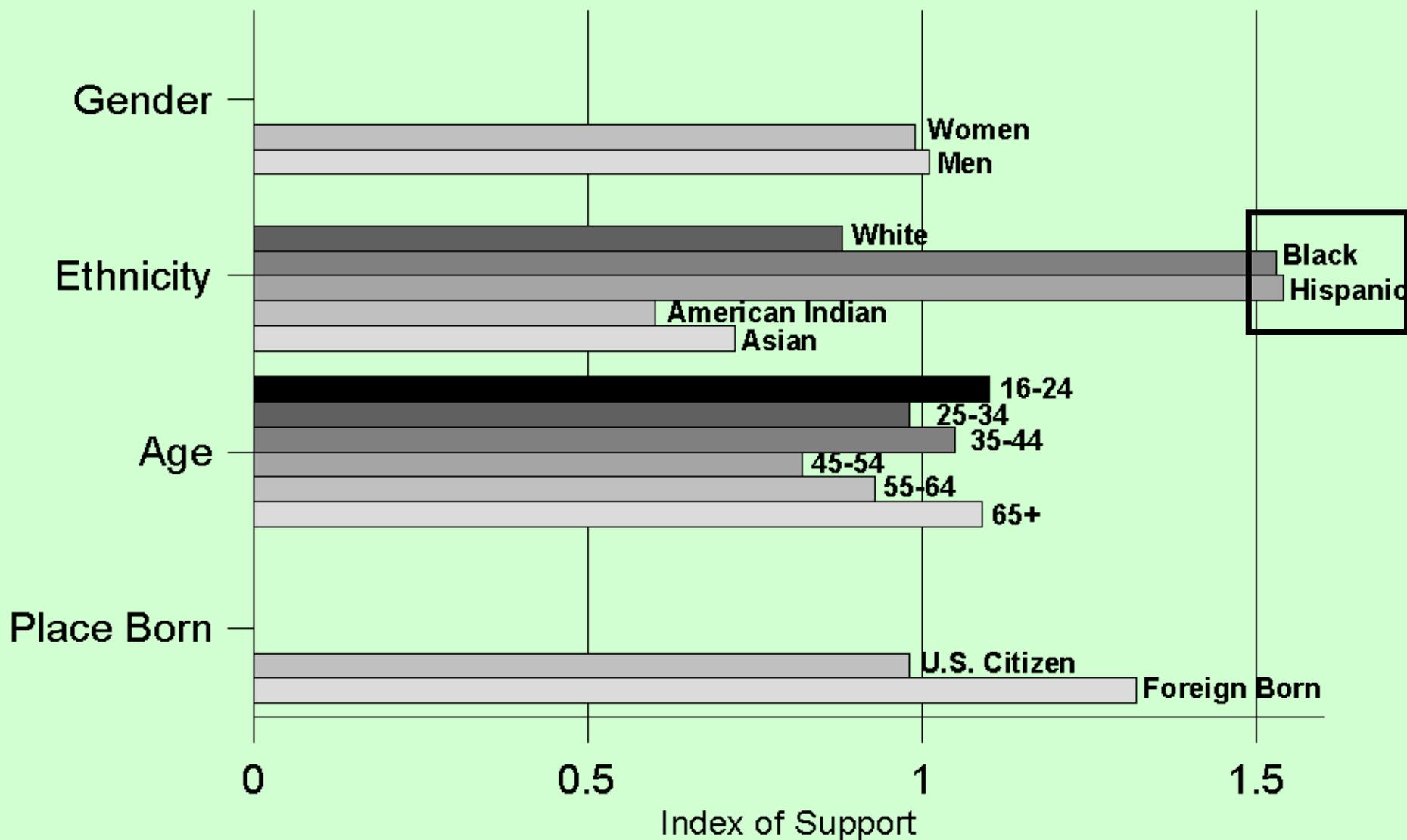
The Most Important Benefits of Wilderness

Just knowing that wilderness and primitive areas exist



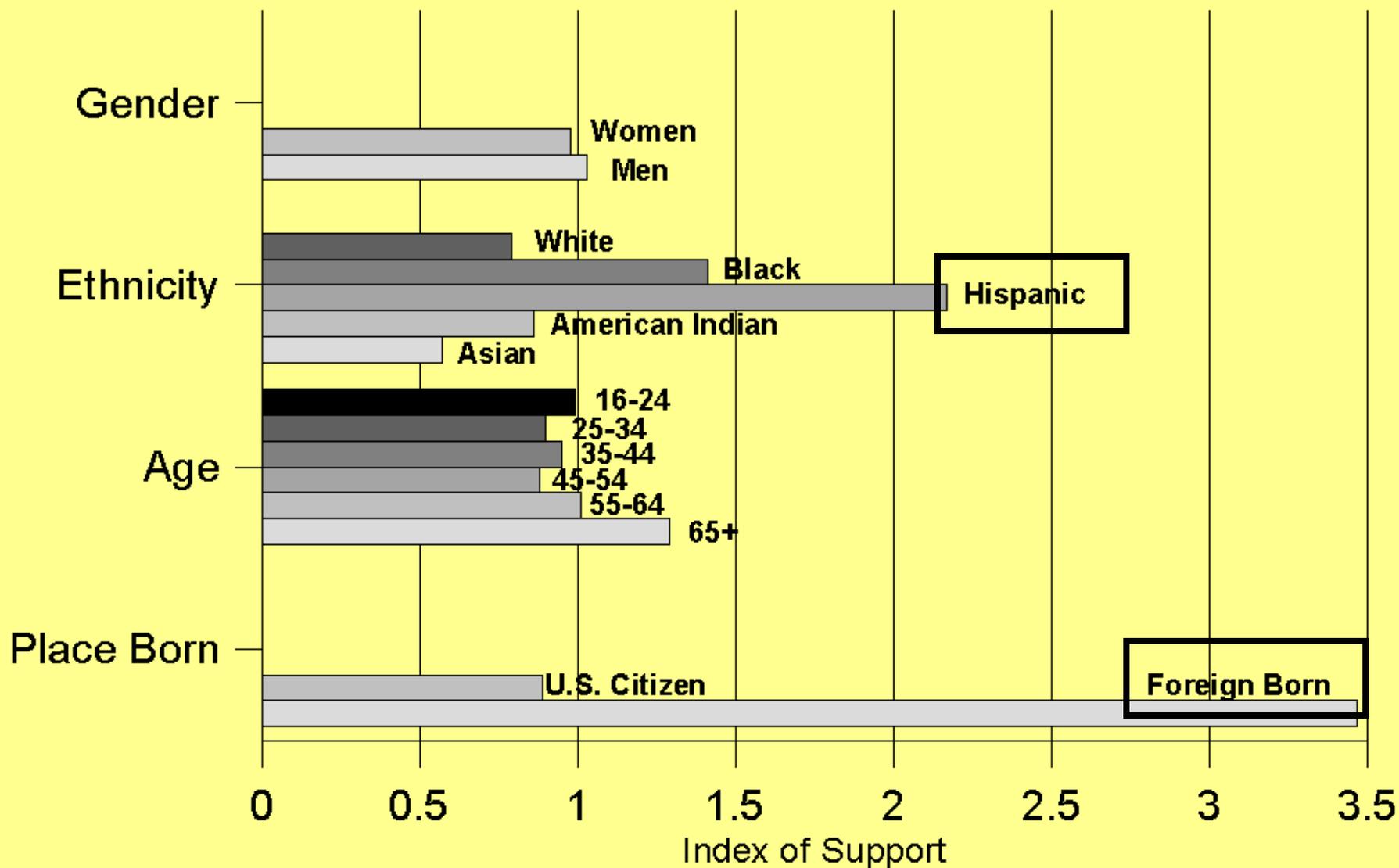
The Most Important Benefits of Wilderness

Providing recreation opportunities



The Most Important Benefits of Wilderness

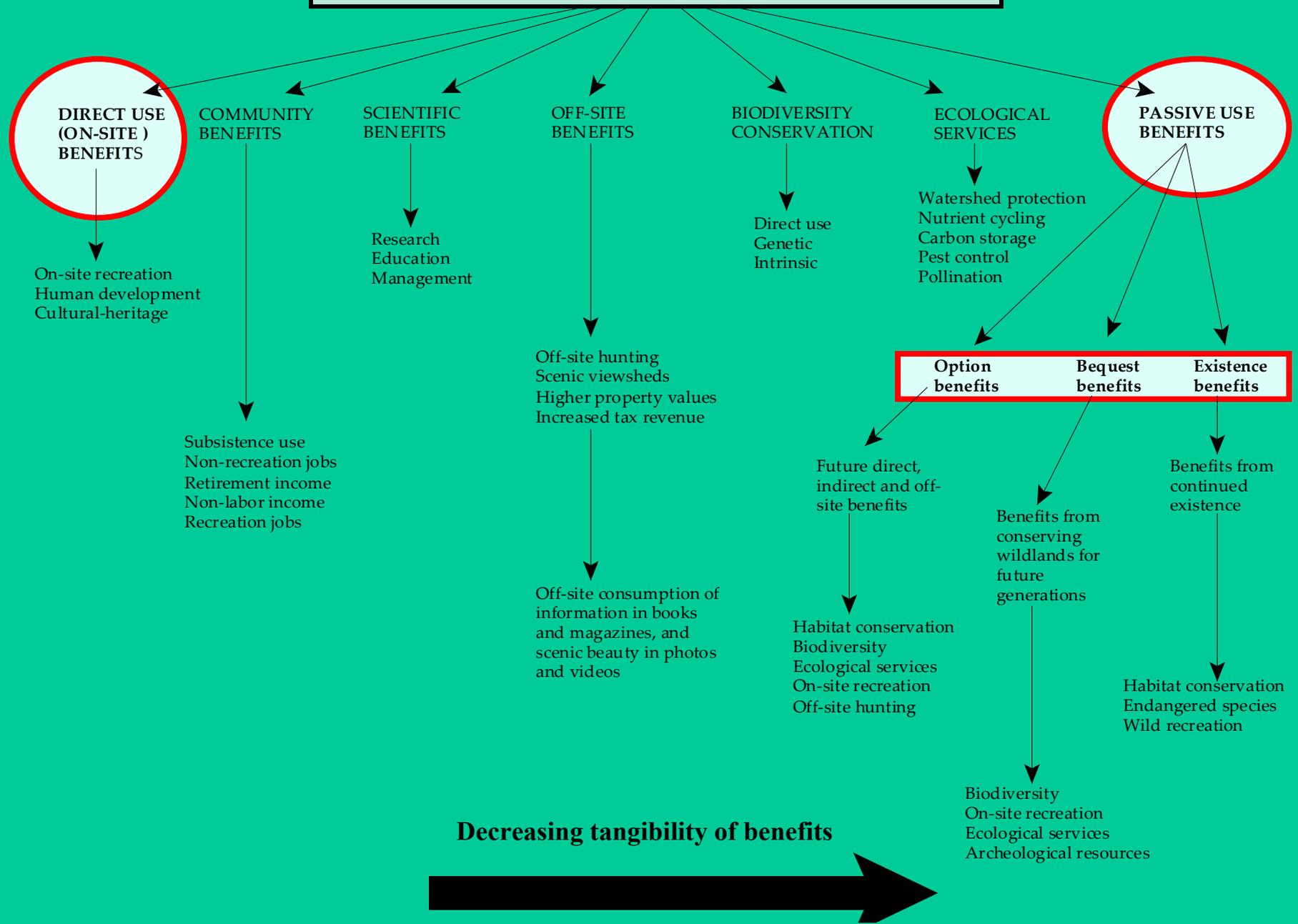
Providing income for the tourist industry



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- **Economic Values (Bowker, Harvard, Bergstrom and Cordell) (Chapter 9)**
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Total Economic Benefits



Decreasing tangibility of benefits



On-Site Recreation and Passive Use Annual Net Economic Value

Value Type	Totals for 2002	Average Net Economic Value	Total Annual Net Economic Value
Single-day on-site recreation	8.4 million single-day trips per year	\$19.50 per trip	\$163.8 million
Multiple-day on-site recreation	4.4 million multi-day trips per year	\$68.47 per trip	\$301.3 million
Passive use	54.5 million households	\$67.00 per household	\$3.7 billion
		Total Annual NEV	\$4.2 billion
		Per acre/year	\$39 (Could add \$2.4 billion for ecological services)

Net Economic Value Summation

- **On-site recreation use value is estimated to be around \$464 million per year**
- **Passive use net economic value per annum is estimated to be \$3.45 billion.**
- **Passive use value is estimated to be over 7 times (7.4 actually) greater than on-site recreation use value.**
- **Total net economic value per year for on-site and passive use is \$4.2 billion**
- **Net economic value for ecological services could add another \$2.4 billion per year**

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Economic Impacts

Does Wilderness Designation Harm Rural Economies?

- There are no discernible general patterns of negative impacts from Wilderness existing in rural counties
- Wilderness contributes to the quality of life of local residents and it is actively sought in migration decisions
- The total volume of visitation to Wilderness, and the associated spending by non-local visitors is not sufficient to sustain any significant tourism industry by itself
- “Wilderness protection does not impoverish communities by locking up resources. Rather, it protects the economic future of those communities by preserving high quality natural environments that are increasing in demand across the nation.” (Tom Power 1996)

Correlation of percentage of Wilderness in a sample of western rural counties and their economic development indicators

Category of counties with Wilderness	Employment growth, 1969-1996	Per Capita Income growth, 1969-1996	Total Income growth, 1969-1996	Population growth, 1969-1996
All rural counties (n=113)	0.382	0.253	0.341	0.337
Rural counties not adjacent to metropolitan areas (n=83)	0.443	0.289	0.406	0.453

Percent agreeing or disagreeing with Wilderness statement, National Survey

Statement	Agree	Disagree	No Opinion
Nearby wilderness areas are important to my county	81	10	9
Wilderness is an important reason to move or stay	53	26	22
There should be more access to wilderness	43	36	21
Additional wilderness should be designated nearby	39	35	26
Wilderness areas should be opened for mineral and energy development	22	65	13

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- **Ecological Values (Cordell, Murphy, Riitters and Harvard) (Chapter 11)**
- **Intrinsic Values (Gudmunson and Loomis)**

Chapter 11 - The Ecological Value of Wilderness

(Cordell, Murphy, Riitters and Harvard)

Ecosystem Health and Capacity to Support Life

Defining Ecosystem Health

Managed and Natural Ecosystems

Important Concepts in Defining Ecosystem Health

Homeostasis

Ecological Integrity

Natural Range of Variation

Sustainability

Biodiversity

Naturalness as the Essential Ingredient of Ecological Value

Measurement of Ecosystem Health and Naturalness

Selecting Indicators of Ecosystem Health and Naturalness

Data and Analysis of the Indicators

Forest fragmentation

Natural land cover

Distance from roads

Ecosystem representation

Results

Fragmentation

Land Cover

Distance to Roads

Ecosystem Diversity

Naturalness is the key concept in the ecological value of Wilderness

Percent of Wilderness acreage in each subregion by elevation

Region	Sub-Region	0-99 ft.	100-499 ft.	500-2499 ft.	2500-4999 ft.	5000-9999 ft.	10,000 + ft.
Northeast	New England	1.35	1.51	50.46	46.12	0.56	0.00
	Middle Atlantic	39.50	17.97	42.53	0.00	0.00	0.00
South	South Atlantic	67.69	13.72	6.74	11.42	0.43	0.00
	East South Central	6.91	1.33	65.74	26.02	0.00	0.00
	West South Central	3.21	20.64	59.20	1.46	15.49	0.00
Midwest	East North Central	0.00	1.09	97.91	0.00	0.00	0.00
	West North Central	0.00	0.79	90.39	7.88	0.94	0.00
West	Mountain	0.00	0.14	14.96	12.31	53.18	19.41
	Pacific	0.54	1.54	22.23	37.57	33.78	4.34

Wilderness Areas

Dry Domain [Midwest]
Black Hills Coniferous Forest Province
Great Plains Steppe Province
Great Plains-Palouse Dry Steppe Province

Humid Temperate Domain [Midwest]
Eastern Broadleaf Forest (Continental) Province
Eastern Broadleaf Forest (Oceanic) Province
Laurentian Mixed Forest Province
Lower Mississippi Riverine Forest Province
Prairie Parkland (Temperate) Province

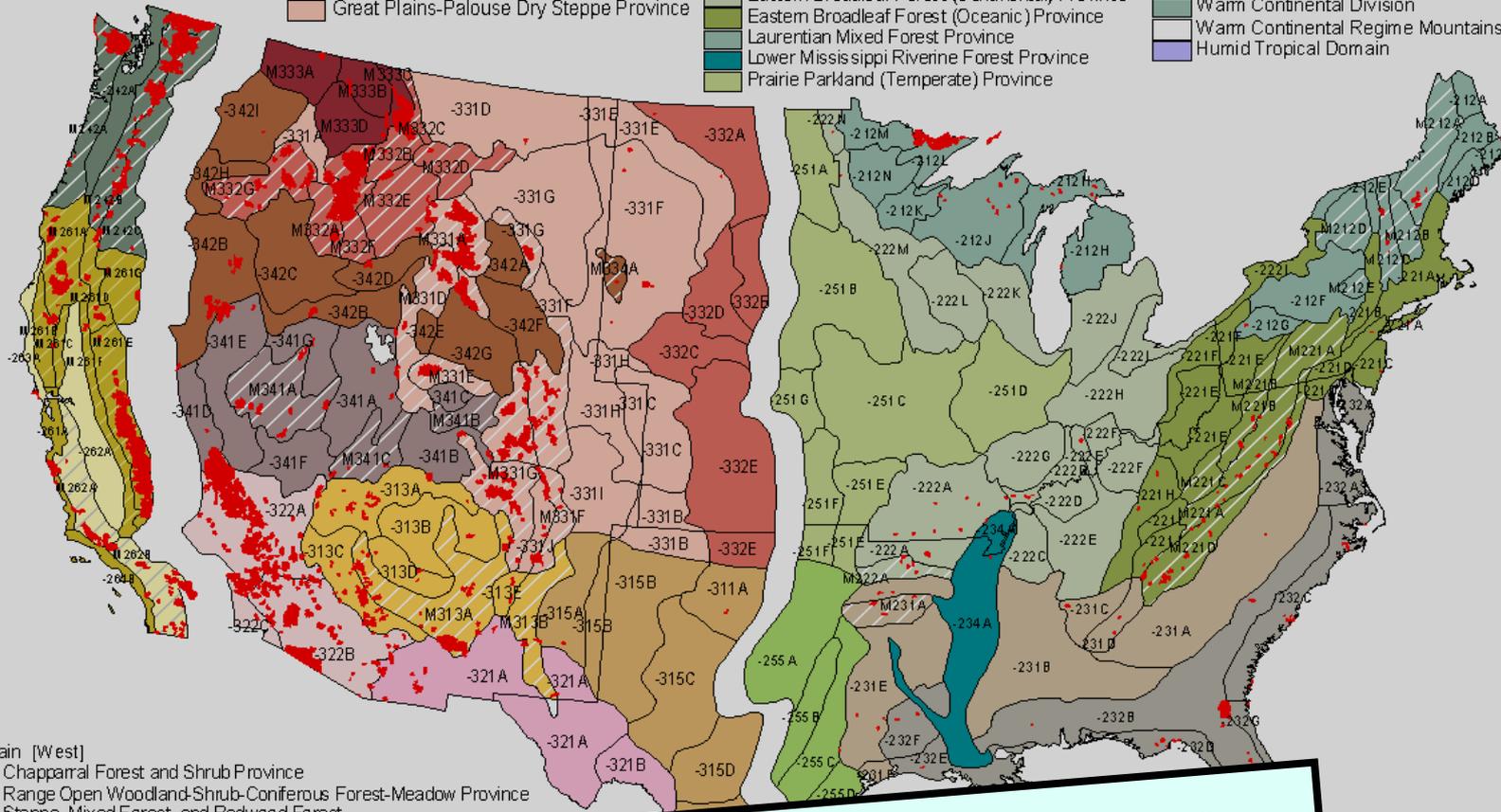
Humid Temperate Domain [Northeast]
Hot Continental Division
Hot Continental Regime Mountains
Warm Continental Division
Warm Continental Regime Mountains
Humid Tropical Domain

Humid Temperate Domain [West]
California Coastal Chaparral Forest and Shrub Province
California Coastal Range Open Woodland-Shrub-Coniferous Forest-Meadow Province
California Coastal Steppe, Mixed Forest, and Redwood Forest
California Dry Steppe Province
Cascade Mixed Forest-Coniferous Forest-Meadow Province
Pacific Northwest Coniferous Forest-Meadow Province

We looked at fragmentation, percent natural cover, distance from roads and terrestrial and aquatic ecosystem representation as measures of "Naturalness"

Nevada-Utah Mountains-Semi-Desert-Coniferous Forest-Alpine Meadow Province
Northern Rocky Mountain Forest-Steppe-Coniferous Forest-Alpine Meadow Province
Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Province
Southwest Plateau and Plains Dry Steppe and Shrub Province

Eastern Broadleaf Forest (Continental) Province
Eastern Broadleaf Forest (Oceanic) Province
Lower Mississippi Riverine Forest Province
Ouachita Mixed Forest - Meadow Province
Outer Coastal Plain Mixed Forest Province
Ozark Broadleaf Forest - Meadow Province
Prairie Parkland (Subtropical) Province
Prairie Parkland (Temperate) Province
Southeastern Mixed Forest Province



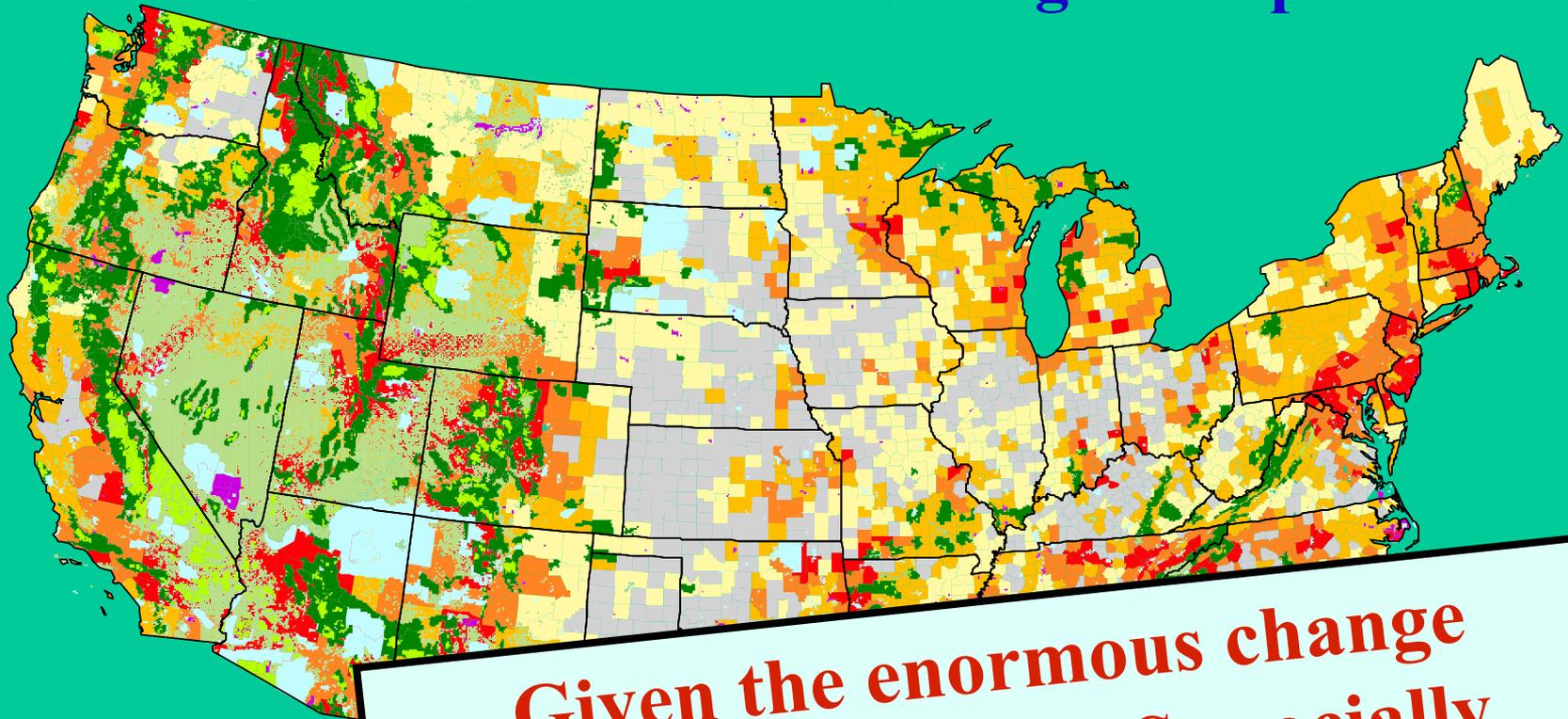
Book Outline

- **History Before, During and After the Act (Sutter and Scott)**
- **Wilderness values and a framework for organizing what we know (Bergstrom, Bowker, and Cordell)**
- **The Context and Natural Character of Wilderness Lands (Cordell, Murphy and Harvard)**
- **The Wilderness Attribute (Aplet, Wilbert and Morton)**
- **Social Values (Schuster, Tarrant and Cordell)**
- **Differences by Social Group (Johnson, Bowker, Cordell)**
- **Economic Values (Bowker, Harvard, Bergstrom and Cordell)**
- **Economic Development Benefits (Rosenberger and English)**
- **Ecological Values (Cordell, Murphy and Harvard)**
- **Intrinsic Values (Gudmunsen and Loomis)**

Intrinsic Value

“When we ask about the true intrinsic value of something, we set ourselves the task of learning what it is, and what it does, quite apart from how we can use it. Ideally, the objective reality of its intrinsic value should be independent of human values and pleasures, or even knowledge for that matter.”

A System of Public Lands and Wilderness Across the United States Where Change is Rapid

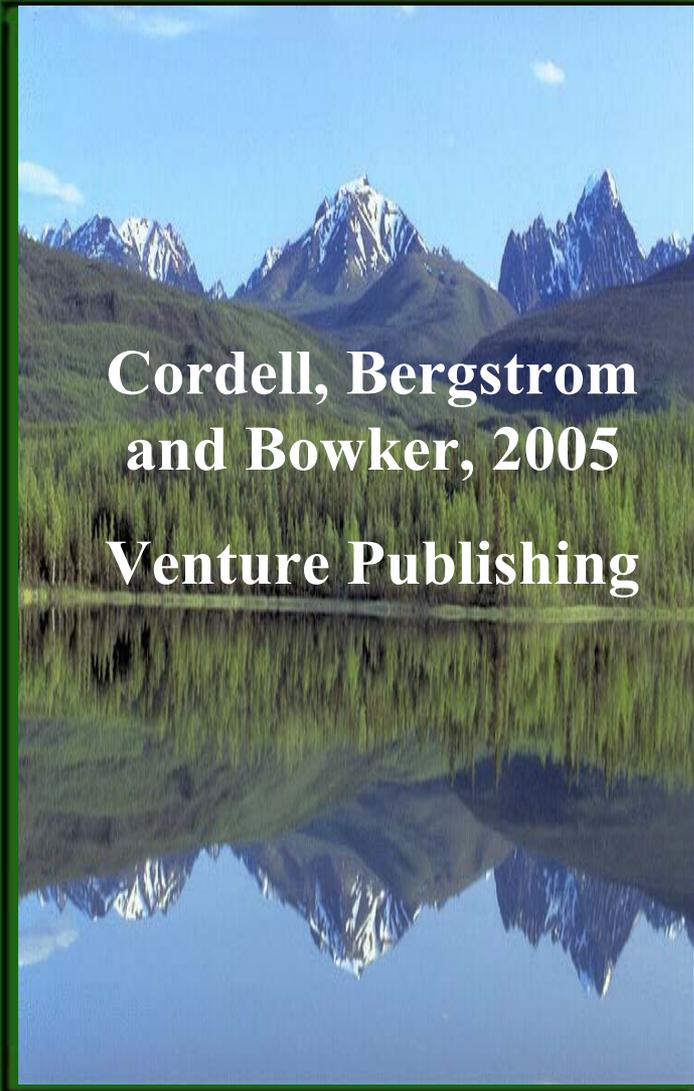


Given the enormous change occurring in the U.S., socially, politically, and environmentally, a broad-scale assessment of values is ever more important

- States
- Fish & Wildlife Service Wilderness
- Bureau of Land Management Wilderness
- National Park Service Wilderness
- National Forest Wilderness
- National Forests
- Bureau of Land Management
- Wildlife Refuges
- National Park Service
- All Other Federal Lands
- 2020 Ambient Public Land x Recreation
- Negligible
- Light
- Moderate
- Moderately heavy
- Heavy

We Propose a Framework for an On-Going Assessment of the Multiple Values of Wilderness

- 
- A person is sitting on a large, mossy rock in a grassy field, looking out over a valley. The background shows rolling hills and a valley with a river or stream. The scene is peaceful and natural.
- **The Context and Natural Character of Wilderness Lands**
 - **The Wilderness Attribute**
 - **Social Values**
 - **Differences by Social Group**
 - **Economic Values**
 - **Economic Development Benefits**
 - **Ecological Values**
 - **Intrinsic Values**



**Cordell, Bergstrom
and Bowker, 2005
Venture Publishing**

The Multiple Values of Wilderness

Cordell
Principal Author



VENTURE

**The Multiple Values
of Wilderness**



H. Ken Cordell
Principal Author

Broad-Scale Assessment of the Multiple Values of Federal Wilderness

Web Site

www.srs.fs.fed.us/trends

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