

**U.S. WILDERNESS IN THE 21ST CENTURY:
A SCOPING REVIEW OF WILDERNESS VISITOR
USE MANAGEMENT RESEARCH FROM 2000-2020**

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WILDERNESS VISITOR USE MANAGEMENT IN THE 21ST CENTURY

“The proactive and adaptive process for managing characteristics of visitor use and the natural and managerial setting using a variety of strategies and tools to achieve and maintain desired resource conditions and visitor experiences.”

- Previous wilderness VUM reviews explored the states of the field in 1987, 2000, and 2012



Three Sisters Wilderness, OR

RESEARCH QUESTIONS

1) What major themes of research inquiry have defined this era?

2) What themes of inquiry, geographic areas, and land management agencies were disproportionately understudied during this era?



Bob Marshall
Wilderness, MT

METHODS

- Scoping Review
- Four databases and four targeted journals
- Inclusion Criteria
 - Published from 2000-2020
 - Published in English
 - Primary focus of VUM in federally designated wilderness
 - Published not as a commentary, editorial, or conference abstract



Marjory Stoneman
Douglas Wilderness, FL

METHODS

- Collected meta-data (e.g., publication outlet & year, wilderness unit, administering agency, and methodology)
- Open coding among the research team for themes and sub-themes & tested for intercoder reliability



Death Valley Wilderness, CA

RESULTS

- 263 Research Items
- 86% (N=225) were empirical
- 83% (N=186) were field-based
- 72% (N=162) were quantitative
- 16% (N=36) were qualitative
- 12% (N=27) were mixed-methods



Sipsey Wilderness, AL

RESULTS

1) What major themes of research inquiry have defined this era?

1. Visitor Experience
2. Wilderness Character
3. Visitor Use
4. Planning and Policy
5. Recreation Ecology
6. Methodology
7. Relevancy/Additional Values
8. Stewardship



Cabeza Prieta Wilderness, AZ

VISITOR EXPERIENCE



Theme	Sub-theme	Frequency (%)
Visitor Experience		108 (41%)
Research focused on emotional and behavioral facets of the wilderness experience (e.g., place research, motivations, conflict), and preferences for settings and/or conditions.	Crowding and high use	23 (21%)
	Motivations, attitudes, behavior, outcomes, and values	22 (20%)
	Experiential dimensions and elements	18 (17%)
	Conflict, stress, constraints, and coping	16 (15%)
	General preferences for settings and conditions	13 (12%)
	Resource impacts from humans and natural processes	13 (12%)
	Tradeoffs between 'qualities' of Wilderness character	11 (10%)
	Place research	8 (7%)
	Relationships	6 (6%)
	Soundscapes, or viewsheds	5 (5%)

WILDERNESS CHARACTER



Theme	Sub-theme	Frequency (%)
Wilderness Character		49 (19%)
Research focused on traditional Wilderness values as described by the 1964 Wilderness Act.	Natural	25 (51%)
	Solitude or primitive and unconfined recreation	24 (49%)
	Untrammeled	12 (24%)
	Undeveloped	11 (22%)
	Other features of ecological, geological, scientific, educational, scenic, or historical value	8 (16%)

VISITOR USE



Theme	Sub-theme	Frequency (%)
Visitor Use		48 (18%)
Research focused on how visitors move through Wilderness such as behavior patterns of where people choose to travel, increasing use, and high visitation.	Travel Patterns	23 (48%)
	Recreation volume	20 (42%)
	Visitor demographics and characteristics	18 (38%)

PLANNING AND POLICY



Theme	Sub-theme	Frequency (%)
Planning and Policy		48 (18%)
Research focused on management and policy, including regulations, planning, management options, policies, policy alignment, and manager perspectives	Support for management action	16 (33%)
	Wilderness system preservation as a whole	9 (19%)
	Program and policy assessments	8 (17%)
	Conceptual frameworks and implementation of frameworks	8 (17%)
	Risk assessment and prioritization	4 (8%)
	Conflict resolution and stakeholder engagement	4 (8%)

RECREATION ECOLOGY



Theme	Sub-theme	Frequency (%)
Recreation Ecology		39 (15%)
<p>Research focused on environmental impacts resulting from recreational activities. Items within this code were focused on non-human subjects such as soil, vegetation, and wildlife.</p>	Campsite impacts	21 (54%)
	Vegetation impacts	14 (36%)
	Soil impacts	11 (28%)
	Trail impacts	5 (13%)
	Restoration	5 (13%)
	Water impacts	4 (10%)
	Wildlife impacts	4 (10%)

METHODOLOGY



Theme	Sub-theme	Frequency (%)
Methodology		34 (13%)
Research focused on developing or testing different methodological approaches.	Modeling	8 (24%)
	Spatial analysis and impact monitoring	8 (24%)
	Indicator and standard development	8 (24%)
	Visitor count methods	7(21%)
	Visitor surveys and communication	5 (15%)

RELEVANCY / ADDITIONAL VALUES



Theme	Sub-theme	Frequency (%)
Relevancy/Additional Values		33 (13%)
Research focused on values of wilderness not explicitly represented in the 1964 Wilderness Act.	Underrepresented wilderness users or cultural minorities (non-Native American)	11 (33%)
	Other or miscellaneous (education, place specific values, value differences among age cohorts)	9 (27%)
	Spirituality	8 (24%)
	Technology	5 (15%)
	Native American values	4 (12%)
	Traditional practices (e.g., subsistence, land management)	4 (12%)

STEWARDSHIP



Theme	Sub-theme	Frequency (%)
Stewardship		22 (8%)
Research focused on ethical intentions or behavior supporting and improving conservation of wilderness resources.	Education and social learning	8 (36%)
	Leave-No-Trace	7 (32%)
	Factors leading to support for wilderness protections	7 (32%)
	Behavior related to protecting the resource	5 (23%)

RESULTS

2) What themes of inquiry, geographic areas, and land management agencies were disproportionately understudied during this era?

Distribution of research items across Wilderness-administering agencies.

Administering Agency	Number of Research Items	Number of Wilderness areas Administered or Co-Administered*	Acres of administered Wilderness
Bureau of Land Management	3 (1.5%)	260 (32.4%)	9.9 million (8.9%)
National Park Service	70 (34.6%)	61 (7.6%)	44.3 million (39.7%)
U.S. Forest Service	114 (56.4%)	448 (55.8%)	36.7 million (32.9%)
U.S. Fish and Wildlife Service	7 (3.5%)	71 (8.8%)	20.7 million (18.5%)
Multiple Federal Agencies	8 (4.0%)	—	—
Total	202	803*	111.6 million

59 research items were not focused on a specific Wilderness area or series of Wilderness areas

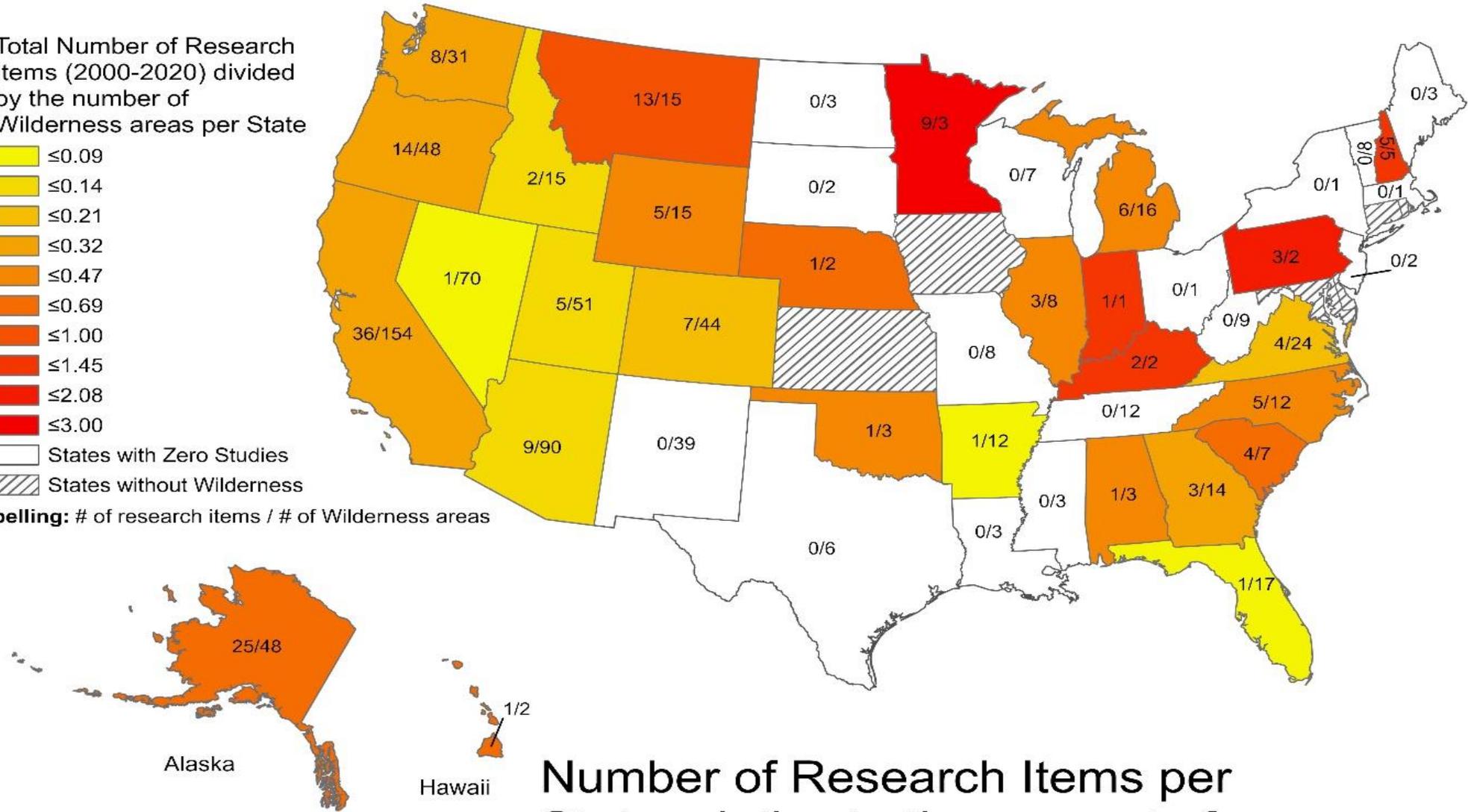
*Some Wilderness areas are administered by multiple federal agencies.

Total Number of Research Items (2000-2020) divided by the number of Wilderness areas per State

- ≤ 0.09
- ≤ 0.14
- ≤ 0.21
- ≤ 0.32
- ≤ 0.47
- ≤ 0.69
- ≤ 1.00
- ≤ 1.45
- ≤ 2.08
- ≤ 3.00

- States with Zero Studies
- States without Wilderness

Labelling: # of research items / # of Wilderness areas



Number of Research Items per State relative to the amount of Wilderness areas within each state

of Research Items per
Wilderness area

• ≤ 1

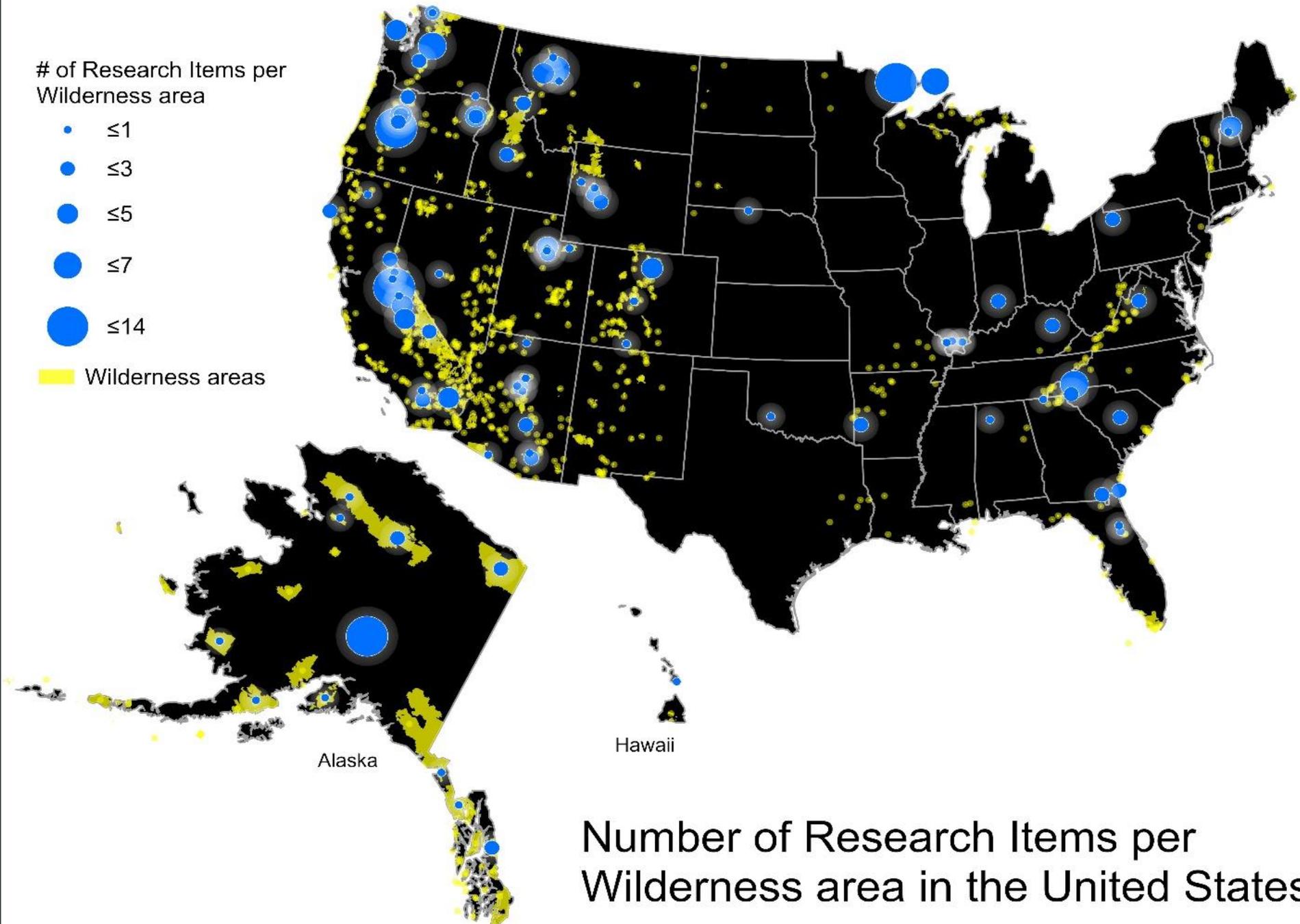
• ≤ 3

• ≤ 5

• ≤ 7

• ≤ 14

■ Wilderness areas



Alaska

Hawaii

Number of Research Items per
Wilderness area in the United States

CONCLUSION

- Wilderness research has covered substantial ground with methodologies and topics.
- Future research should continue monitoring previous areas of study (e.g., campsite degradation and crowding,) but should also respond to the changing world (e.g., climate change & visitor experience, stewardship, and relevancy).
- Monitoring and research should continue in popular areas, however more BLM & USFWS administered areas should be explored, as well as urban-proximate areas.



Unimak Wilderness, AK

THANK YOU! QUESTIONS?

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ALDO LEOPOLD
WILDERNESS RESEARCH INSTITUTE



METHODS

VUM Keywords	Wilderness Keywords
“visitor use”	“Wilderness”
“outdoor recreation”	“solitude”
“wilderness visitors”	“unconfined recreation”
“use allocation”	
“user capacity” or “social carrying capacity”	
“recreation ecology”	

Table 1. Defined keyword search terms.
Boolean search phrase: "Wilderness" AND ("visitor use" OR "outdoor recreation" OR "use allocation" OR "user capacity" OR "social carrying capacity" OR "recreation ecology" OR "solitude" OR "unconfined recreation")



Shenandoah Wilderness, VA