

WILDLIFE & TRAIL RECREATION

Understanding,
managing, and
monitoring the effects

by Meredith Naughton



A hiker in a red shirt and blue shorts is walking on a rocky mountain trail. The background shows a vast mountain range under a cloudy sky. A white rectangular box is overlaid on the top half of the image, containing the text 'WHY THIS RESEARCH?'.

WHY THIS RESEARCH?

- Dual mandate for protected lands: resource for people, protection of wildlife and habitats
- Increasing numbers of recreators
- Increasing pressure to build more trails

WHY THIS RESEARCH?

GOALS

Determine what is and isn't known about the effect of recreation trails on wildlife, specifically related to the northeastern United States

Develop recommendations to apply the relevant ecological information to trail planning and land management to

- Minimize our impact to wildlife
- Provide valuable recreation opportunities



HOW?

- Examine the whole body of scientific literature related to recreation effect on wildlife
- Systematically collect data on those studies most relevant to Vermont
- Use the most prominent variables to guide management recommendations



WILDLIFE & TRAIL RECREATION



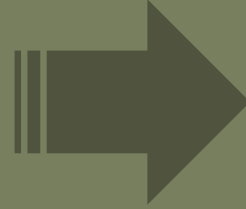
Understanding Effects



Management
Recommendations



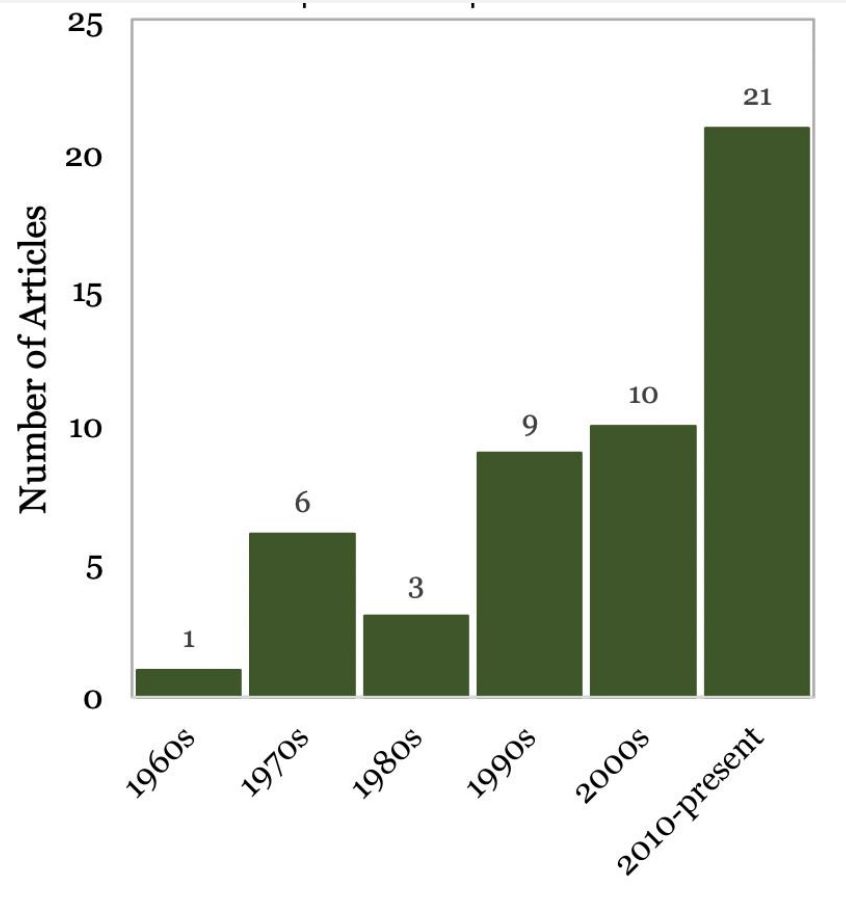
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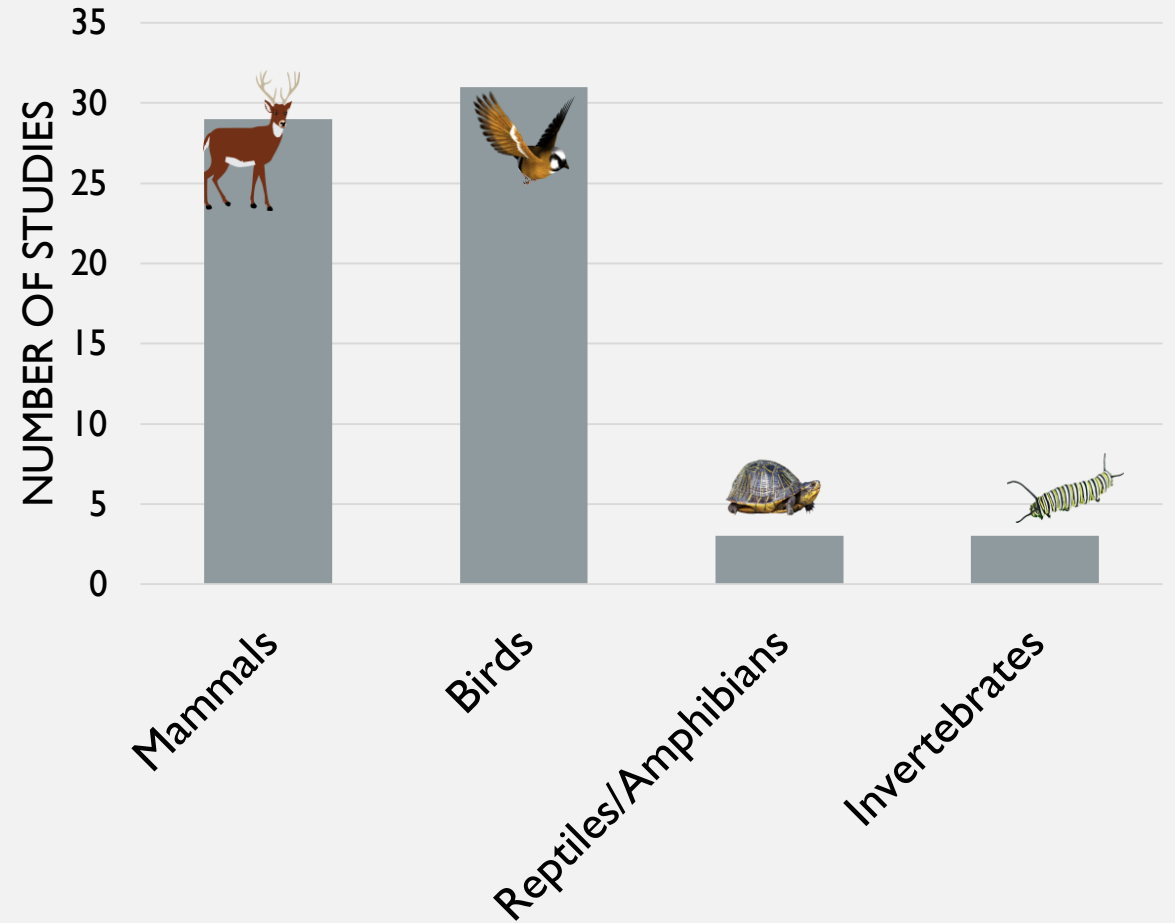
Understanding Effects

PROFILE OF RESEARCH RESULTS

DECADE OF PUBLICATION

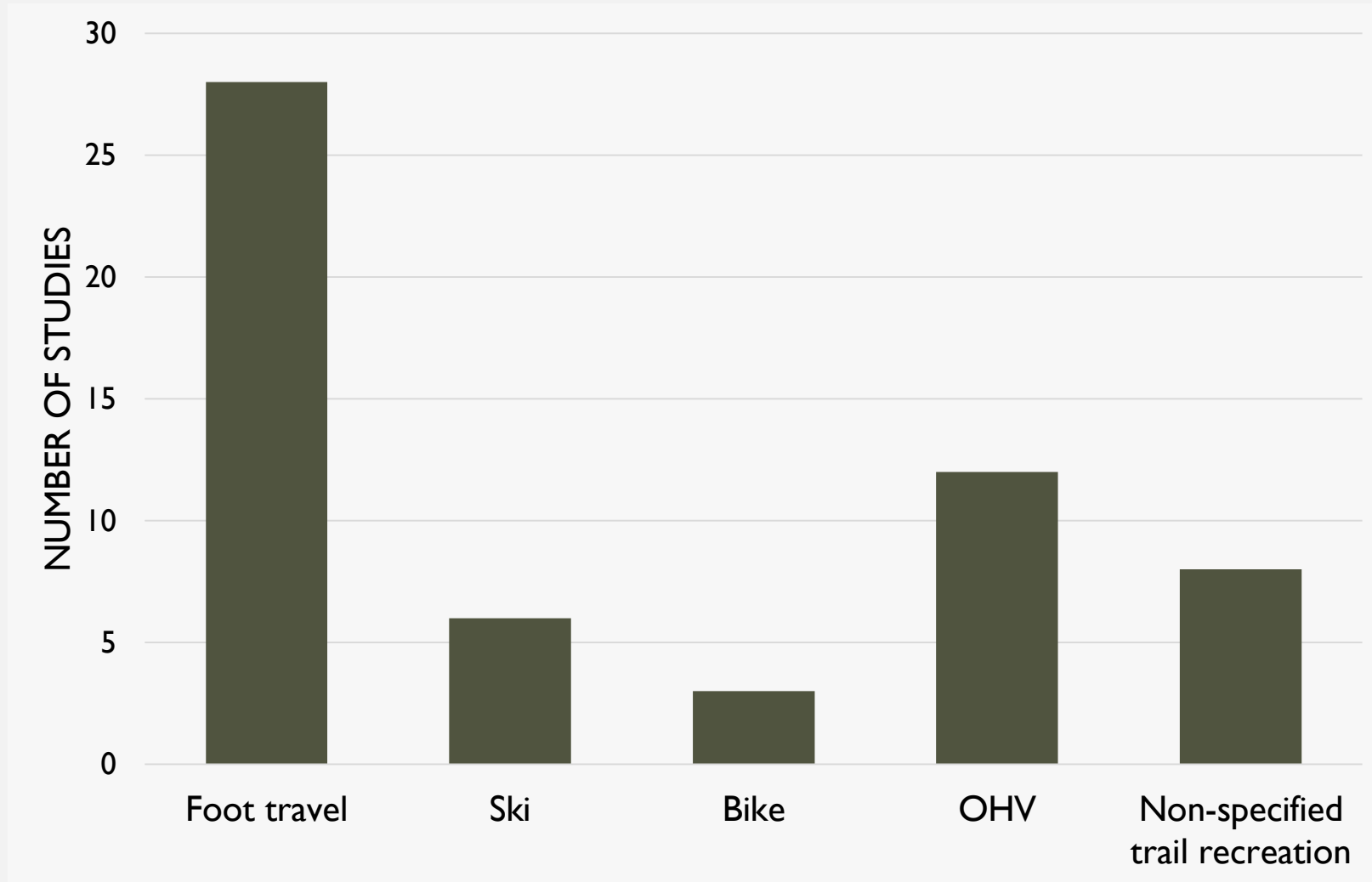


TAXONOMIC GROUPS



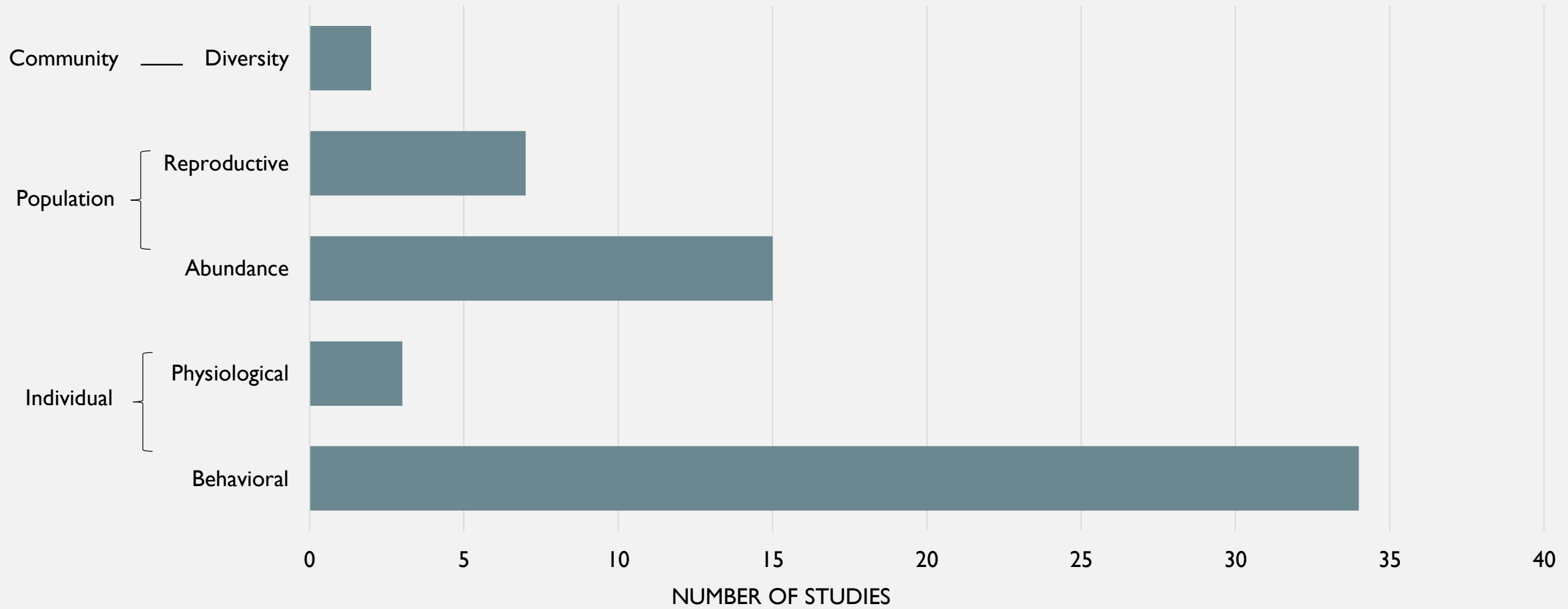
PROFILE OF REVIEWED LITERATURE

STUDIES BY RECREATION ACTIVITY



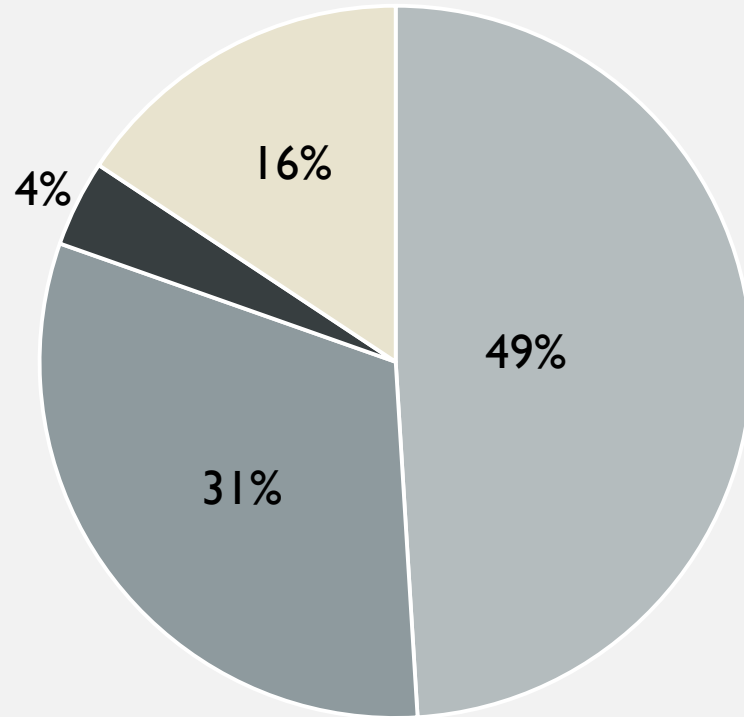
PROFILE OF REVIEWED LITERATURE

WILDLIFE RESPONSE TYPE



PROFILE OF REVIEWED LITERATURE

CATEGORIZED SIGNIFICANT EFFECT OF RECREATION ON WILDLIFE



- Immediate Individual Effect
- Sustained Effect
- Dramatic Population Effect
- Neutral/Inconclusive

Neutral/Inconclusive

- A change is either not observed, is insignificant, or is unknown

Negative Effects

Immediate Negative Effect

- Primarily short term, behavioral
- Use energy, alters necessary behavior

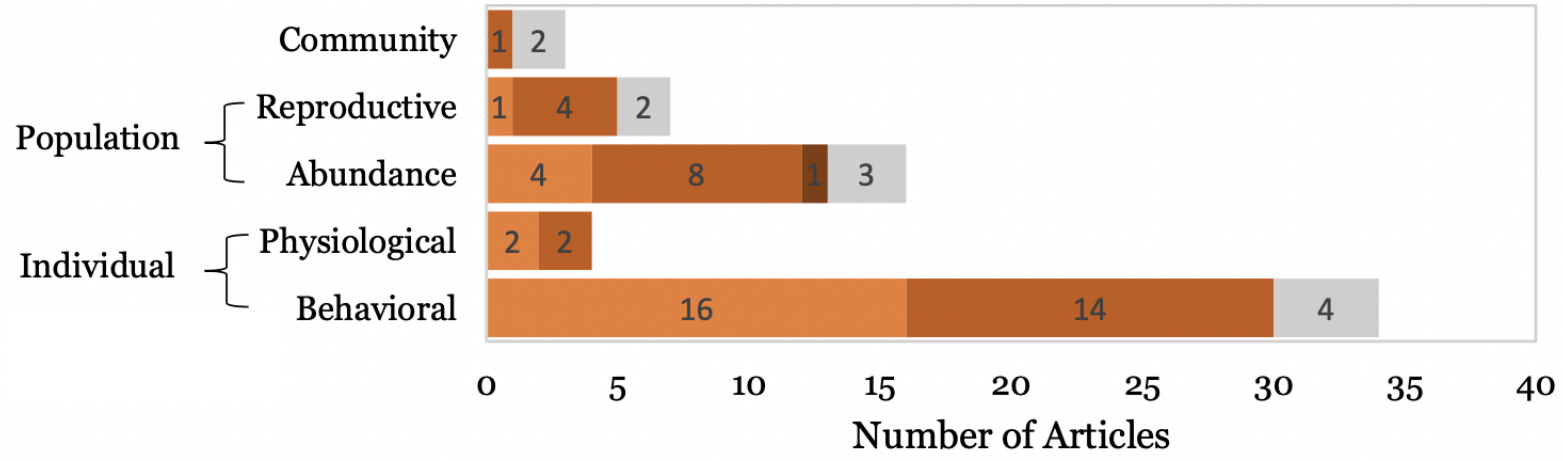
Sustained Negative Impact

- Effect last beyond a direct encounter
- Change in abundance, reproduction, diversity

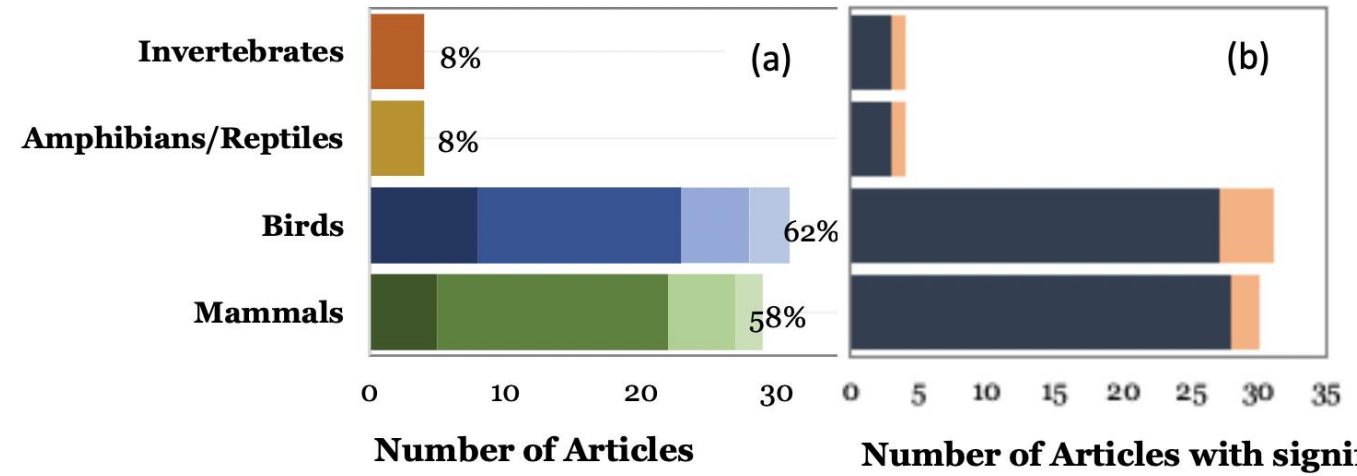
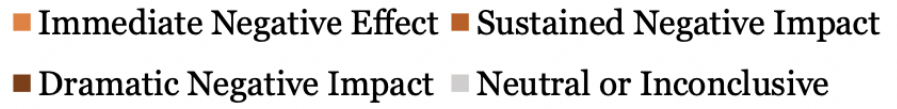
Dramatic Negative Impact

- Reserved for dramatic shifts in health of population such severe decline or extirpation
- Example: Wood turtle extirpation in Connecticut (Garber, 1995)

Categorized Effect by Wildlife Response Type



Response Type



Negative Effect by Taxonomic Group





WILDLIFE & TRAIL RECREATION



Understanding Effects

PRIMARY VARIABLES



SCALE & PLACEMENT OF TRAILS

66% of papers discuss location of trails as important factor

- Most common concepts across literature:
 - “Trail-free areas”
 - Distance of trails to habitat features important for wildlife
- Forest birds in Ontario studied in areas with multi-use recreation trails and areas without trails (Thompson, 2015)
 - Birds, especially ground-dwelling birds, had significantly higher density levels in trail-free habitat
 - Limiting density of trails not as important as minimizing the extent of trail dispersal across the landscape for wildlife protection

MORE PRIMARY VARIABLES

- **Breeding Season**
 - Wildlife most vulnerable to disturbance during this time
 - ~ 40% of papers discuss breeding season
- **Volume of Recreation**
 - Limited information about the effects
 - Threshold – volume or frequency of recreation, above which activates a significant response from wildlife
 - Dependent on species, landscape, season, time of day...
 - 30% of studies discussed volume or frequency of recreation, 10% quantified it



MORE PRIMARY VARIABLES

- **Type of Recreation**
 - Limited evidence
 - Motorized vs non-motorized
 - Motorized consistently less effect than non-motorized (Larson, 2016, 2019)





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Understanding Effects



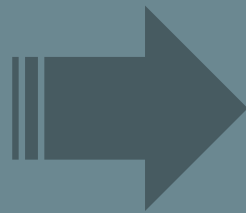
Management
Recommendations



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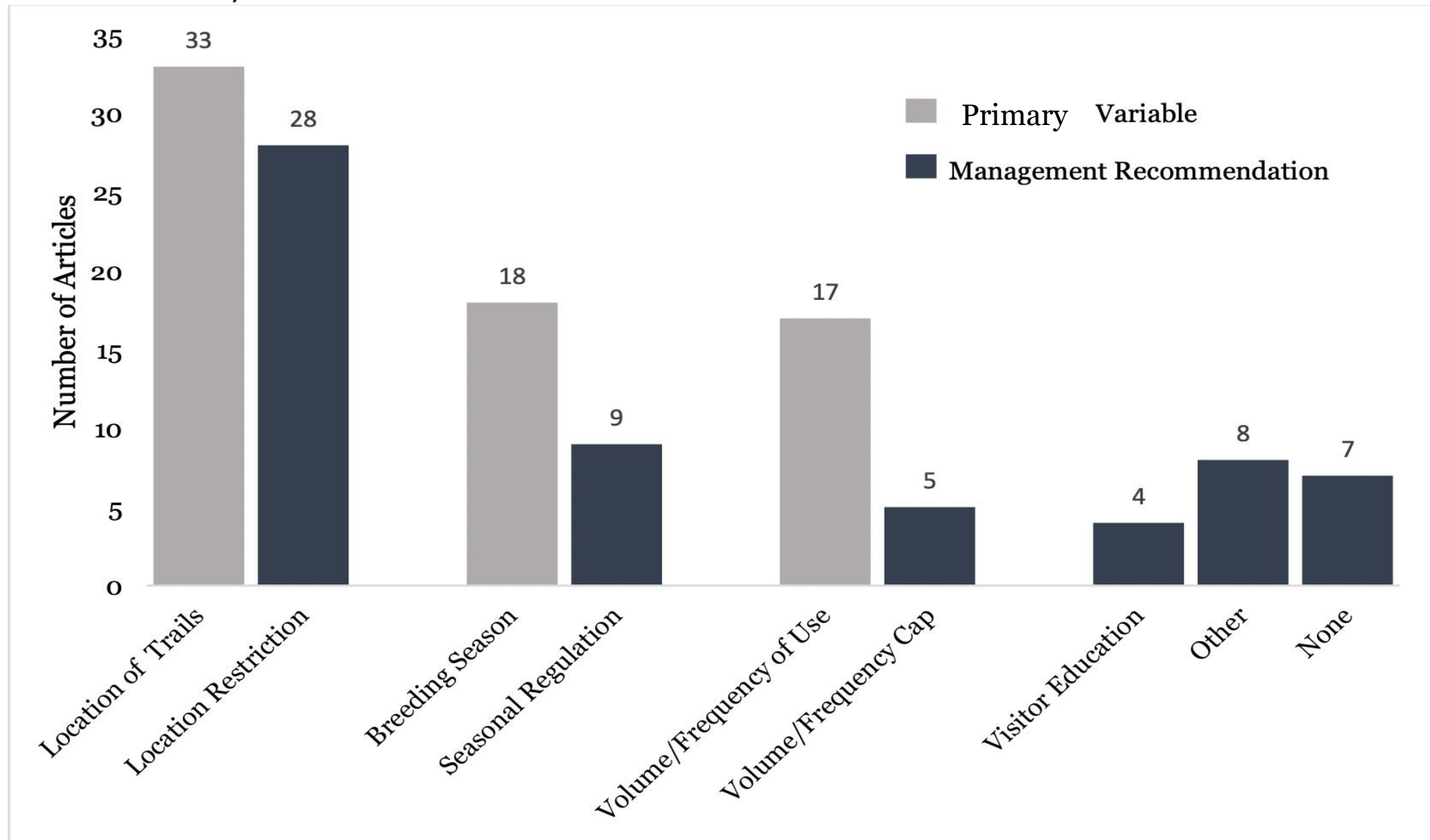


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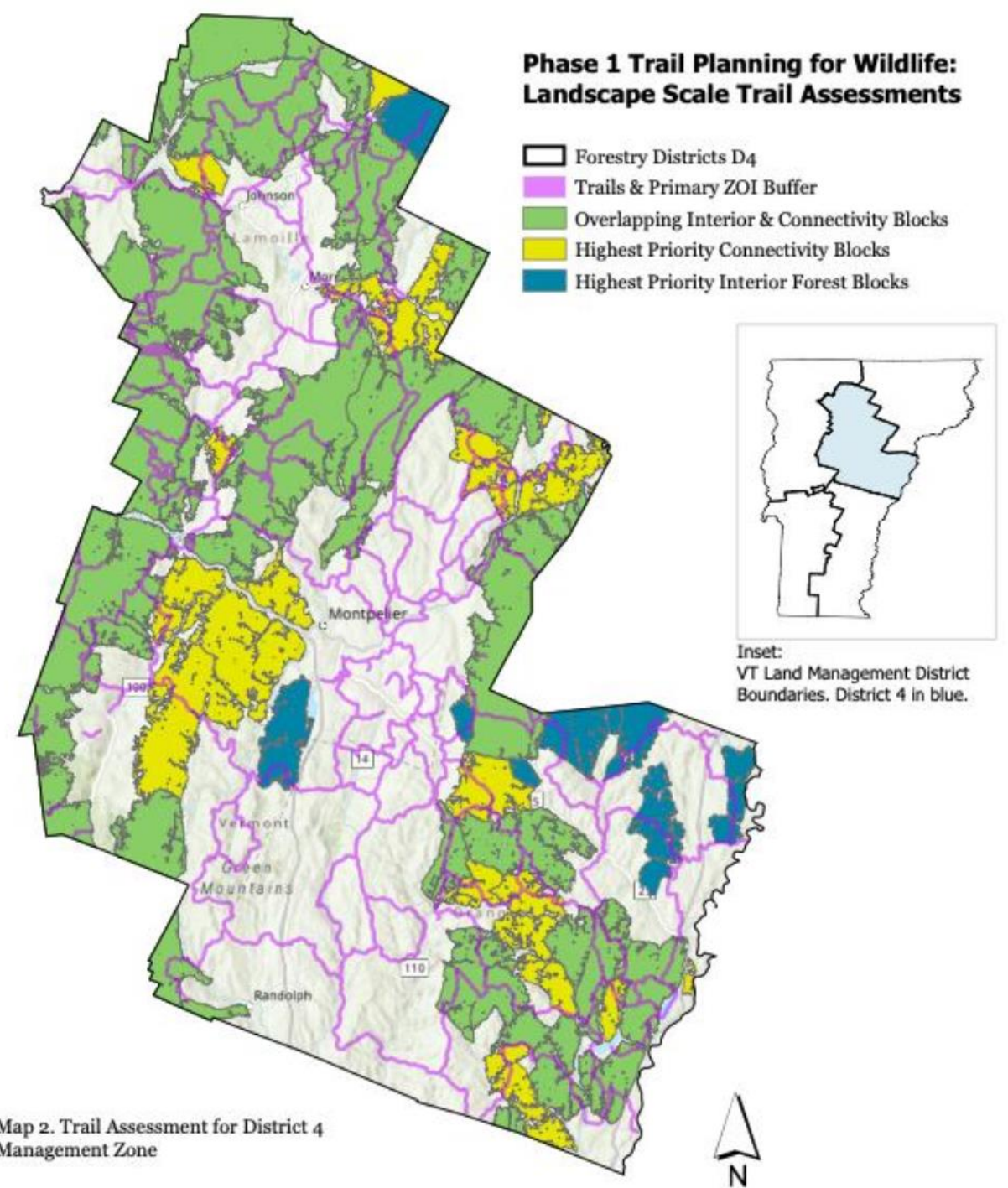
Management Recommendations and Associated Primary Variables



MANAGEMENT RECOMMENDATIONS

PART I: LANDSCAPE-SCALE PLANNING

- Ecological and Recreation Assessments
 - Interior forest blocks
 - Connectivity corridors
 - High-value wildlife crossing areas
 - Existing trails
 - Community requests/needs
- Designations of Trail-Free Areas

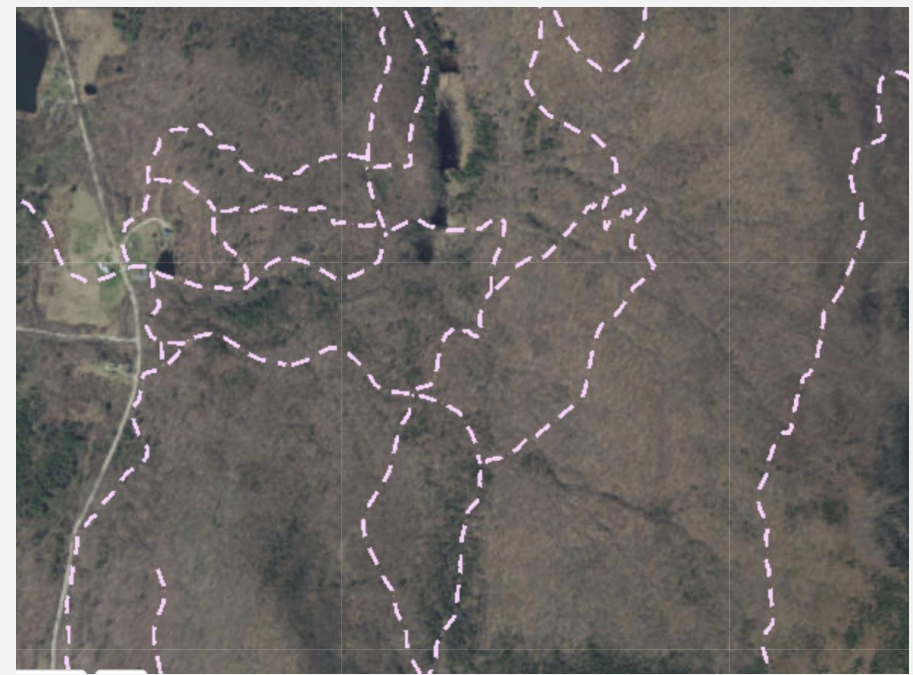


MANAGEMENT RECOMMENDATIONS

PART 2: SITE-SPECIFIC PLANNING

- Consolidate Trails
- Avoid sensitive and uncommon ecological features
 - Use zone of influence to guide buffer distances
 - Uncommon and rare natural communities
 - Wetlands
 - Vernal pools
 - Riparian areas
 - Rare, threatened, and endangered plants

Dispersed Trails



Consolidated
Trails



MANAGEMENT RECOMMENDATIONS

PART 3: MITIGATE IMPACT & MONITOR EFFECTS

Not recommended for management at this time:

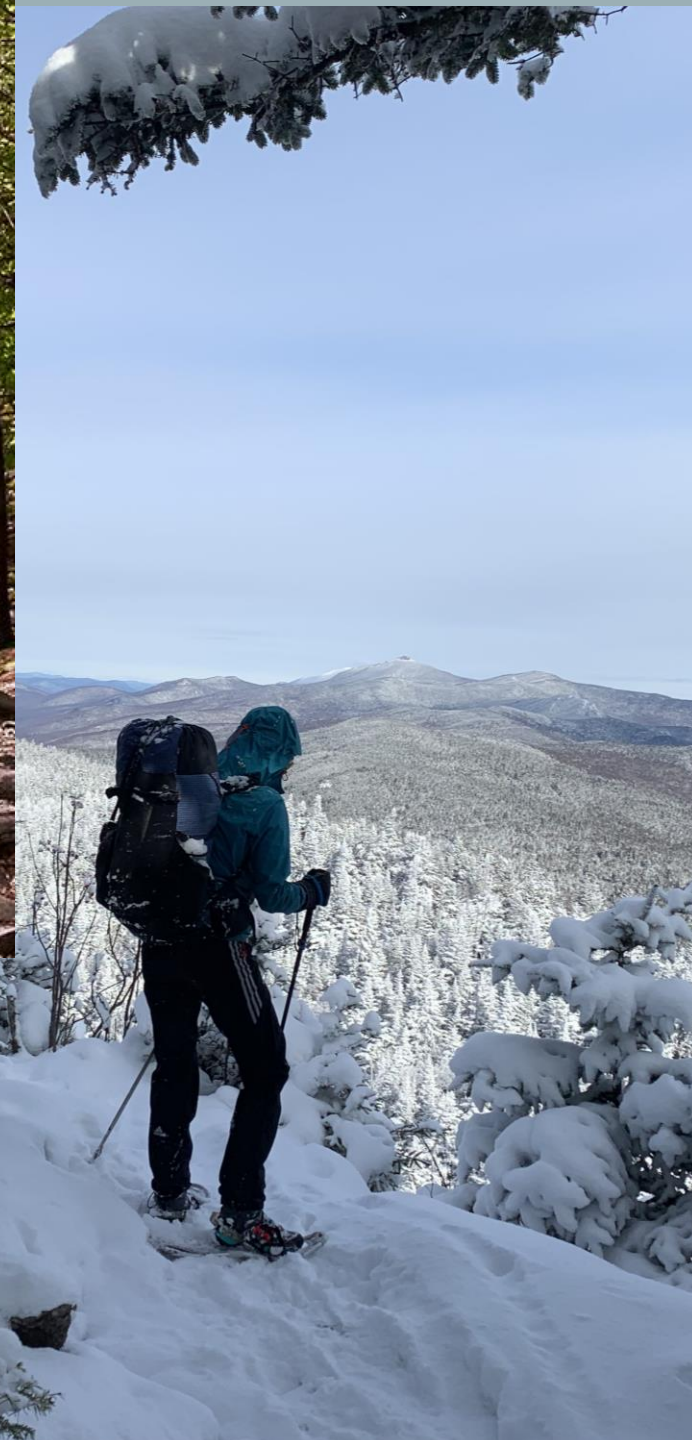
- Recreation Type
- Volume of Visitors



MANAGEMENT RECOMMENDATIONS

PART 3: MITIGATE IMPACT & MONITOR EFFECTS

- Education of trail recreators
- Breeding season closures
- Temporal restrictions: dawn/dusk
- Move or close trails
- Place gathering point locations sited away from sensitive or valuable habitat
- Monitor for adaptive management





QUESTIONS?

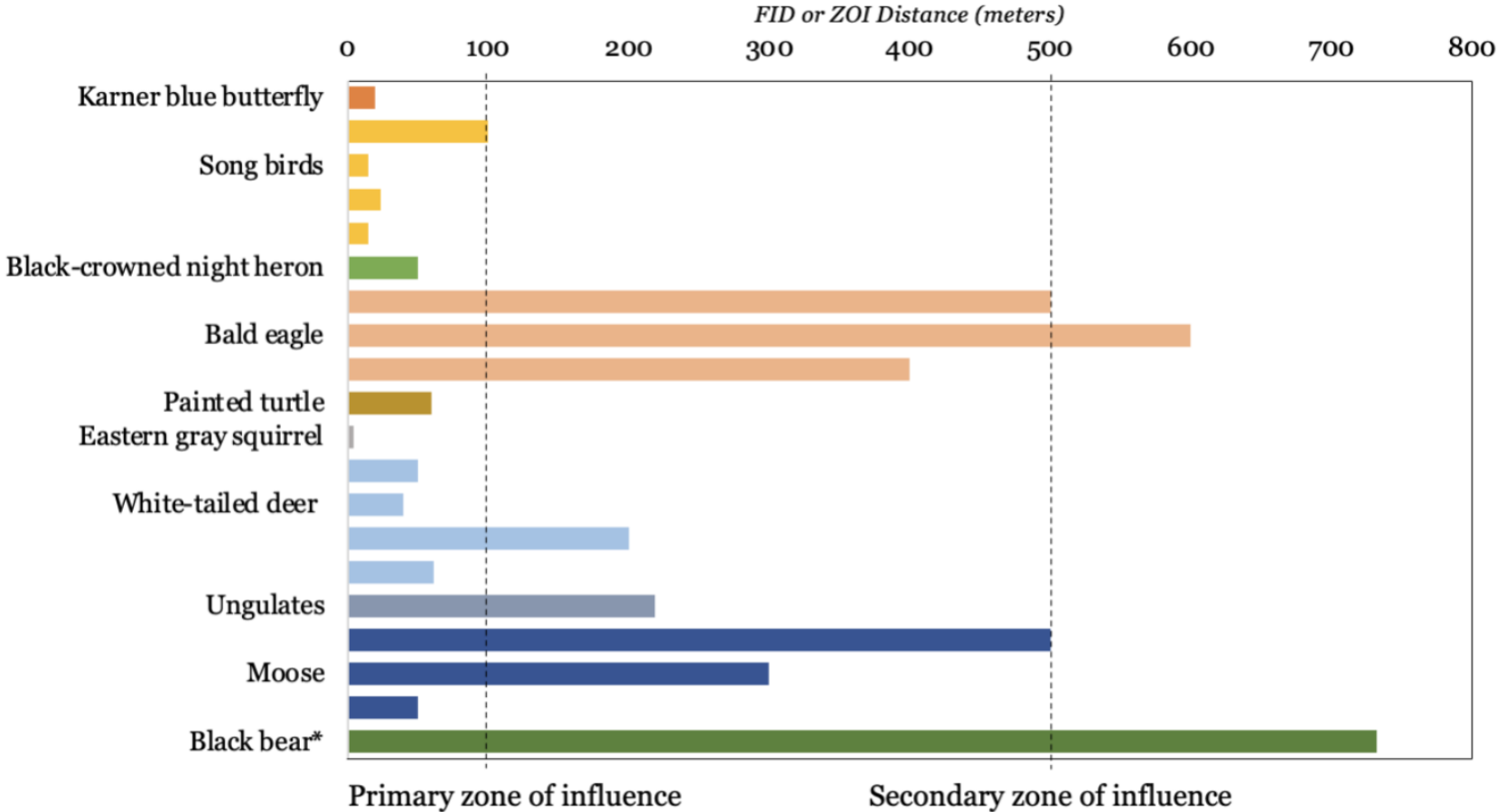
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Thank you!

Dave Barrington, Bob Zaino, John Austin, Brittany Mosher, Jeffrey Hughes, Chloe Sardonis, Grace Glynn, Eric Hagen, Tessa McGann, current & past Field Naturalists, Toni & Dennis Naughton, and many more people

PLACEMENT OF TRAILS

Chart 2. Flight initiation (FID) and zone of influence (ZOI) distances found in the associated literature review. Chart details found in Appendix 1.



UNDERSTANDING WILDLIFE RESPONSES



Physiological response, indicating energetic cost

- Before, during, after behavioral response
- In absence of behavioral response
- White-tailed deer heart-rates measured and behavioral responses observed in response to snowmobiles passing at varying distances (Moen, 1982)



What does behavioral change lead to?

- Study of moose and elk distributions and behavior in Canada in response to cross country skiing (Ferguson, 1982)
 - Behavioral responses (alerting, fleeing) observed
 - Decreased occupancy in areas with skiing