OC Parks Trails Pilot Program

2021 Data Analysis Highlights

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Presentation Outline

1) Overview of Trails Pilot Program

2) 2021 Survey Results

3) Behavioral & Ecological Monitoring

Some perspectives….

- Work with the “trails we have”
- Managers prescribe trail management—we assist with the evaluation
- Adaptive Management Learn By Doing
- Field research designs often have unexpected variability

Trails Pilot Program

Management:

- Use Restrictions
- Direction Designation

Goals

- Safety
- Reduce Conflict
- Evaluate Effectiveness of Trail Management

Study Design:

- Pre/Post
- Control/Treatment

TRAIL USE CHANGES — SANTIAGO OAKS

	Original Trail Use		Trail Use Change
Pony Trail	• Hiking, biking and equestrian • Bidirectional	→	• Hiking and equestrian only • Bidirectional
Yucca Ridge Trail	• Hiking, biking and equestrian • Bidirectional	→	• Hiking, biking and equestrian • Downhill only
Chutes Ridgeline Trail	• Hiking, biking and equestrian • Bidirectional	→	• Biking only • Downhill only
Peralta Hills Trail	• Hiking, biking and equestrian • Bidirectional	→	• Hiking and equestrian only • Bidirectional
Cactus Canyon Trail	• Hiking, biking and equestrian • Bidirectional	→	• Hiking, biking and equestrian • Downhill only

TRAIL USE CHANGES — ALISO AND WOOD CANYONS

	Original Trail Use		Trail Use Change
Lynx Trail	• Hiking, biking and equestrian • Bidirectional	→	• Biking only • Downhill only
Cholla Trail	• Hiking, biking and equestrian • Bidirectional	→	• Biking: uphill only • Hiking and equestrian: bidirectional

TRAIL USE CHANGES — LAGUNA COAST

	Original Trail Use		Trail Use Change
Laguna Ridge Trail	• Hiking, biking and equestrian • Bidirectional	→	• Biking only • Downhill only
Old Emerald Trail	• Hiking and biking • Bidirectional	→	• Biking: downhill only • Hiking: bidirectional

Pilot Program Visitor Evaluations

6 Statements:

- Activity Type Restrictions
  - "*Restricting activity types on some trails creates **safer conditions** for everyone*"
  - "*Restricting activity types on some trails **reduces conflict***"
- Direction Designation
  - "*Designating the direction of trails use creates **safer conditions** for everyone*"
  - "*Designating the direction of trails use **reduces conflict***"
- Visitor Experience
  - "Overall, the new trail regulations have increased the **quality of my experience**"
  - "Overall, the new trail regulations create a **better experience for all visitors**"

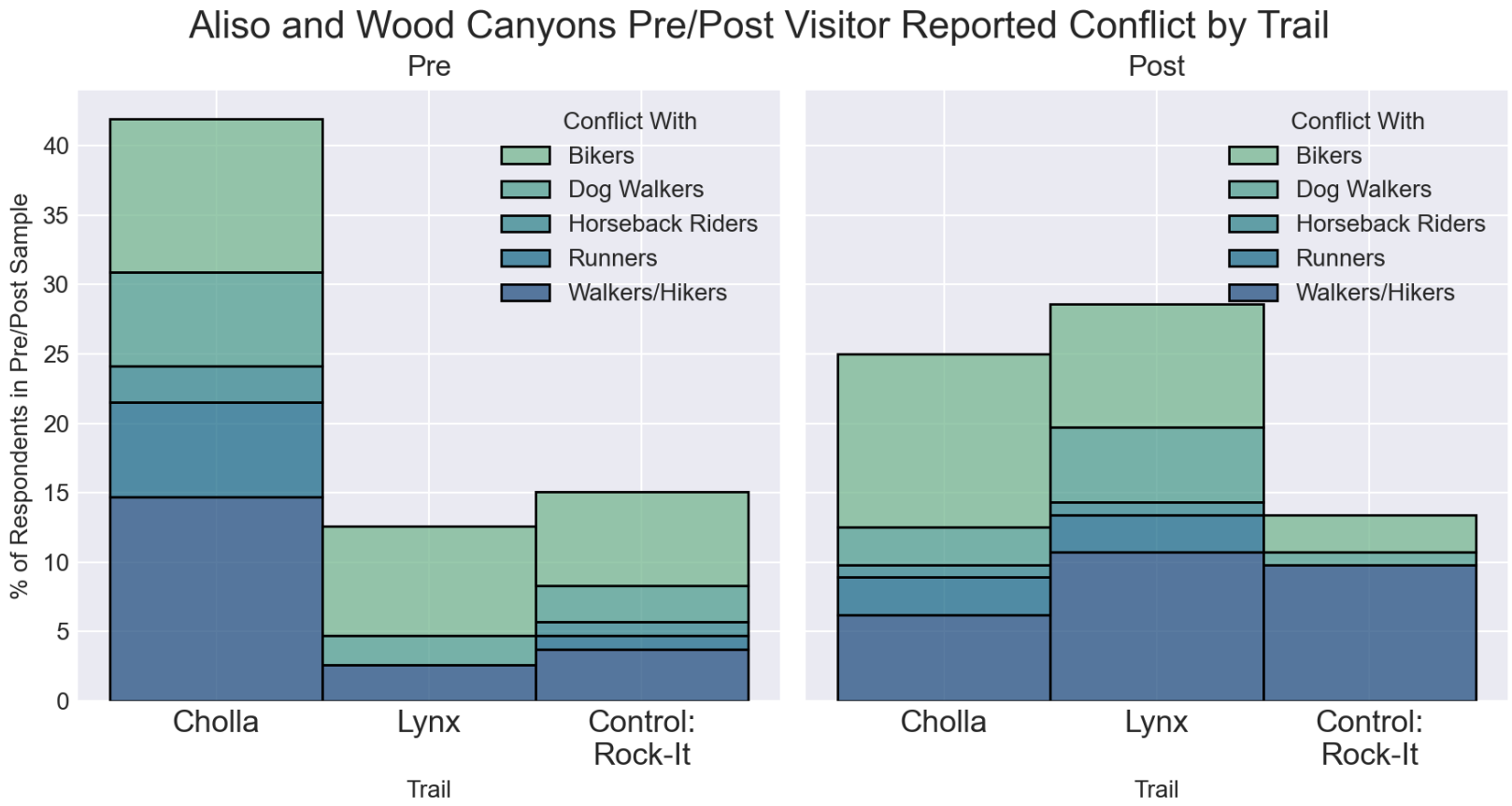
Pilot Program Agreement

Pilot Program Visitor Evaluations

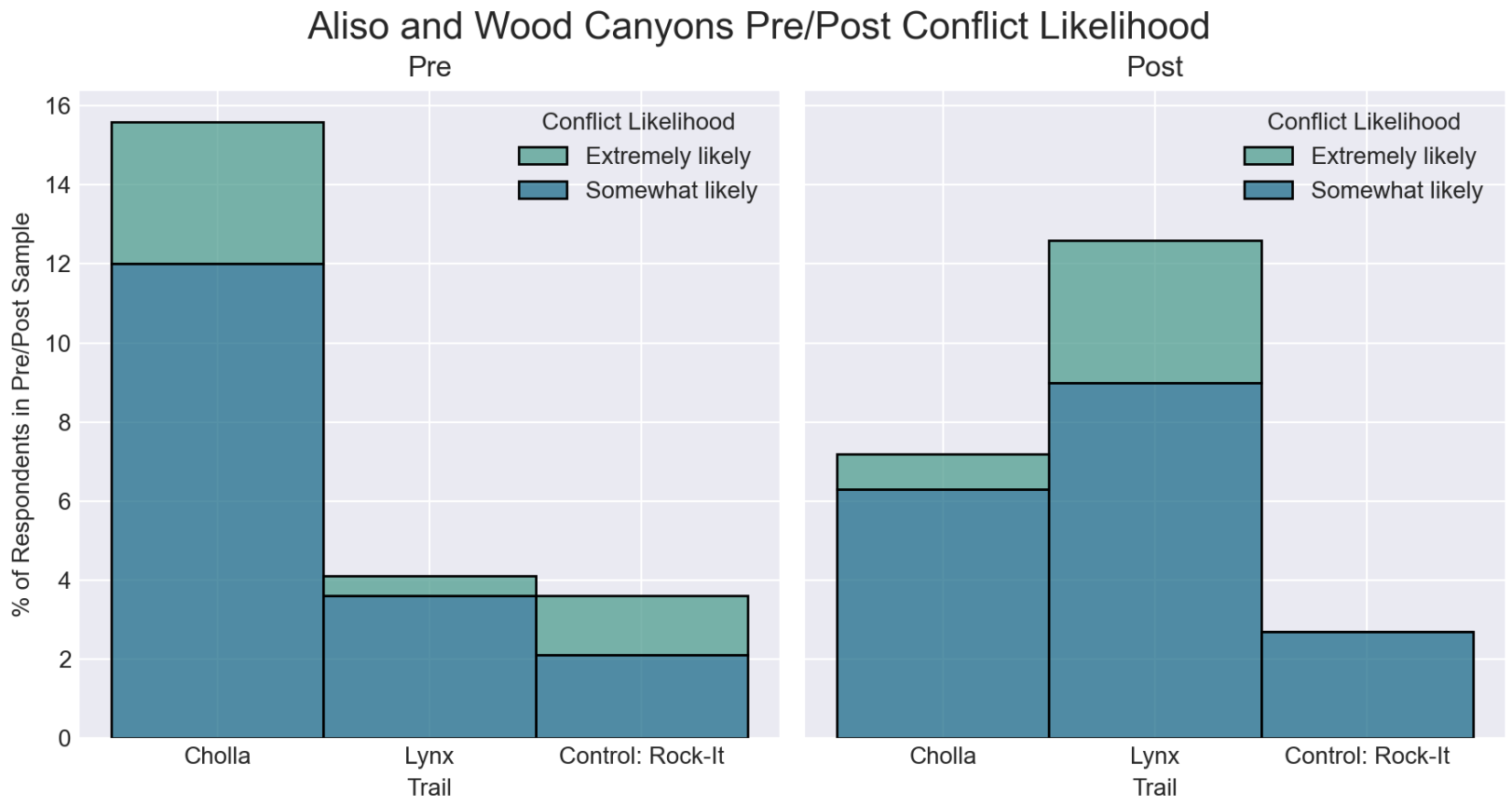
Management	N	Treatment		Control		Overall Mean	
		Pre	Post	Pre	Post	Pre	Post
Restricting activity types on some trails creates safer conditions for everyone.	975	3.56	4.04**	3.83	4.01	3.64	4.03
Restricting activity types on some trails reduces conflict.	950	3.50	3.95**	3.60	3.94	3.52	3.95*
Designating the direction of trail use creates safer conditions for everyone.	959	3.74	4.20**	3.97	4.13	3.81	4.18
Designating the direction of trail use reduces conflict.	948	3.57	4.08**	3.81	3.85	3.64	4.02
Overall, the new trail regulations (i.e. activity type/direction of use) have increased the quality of my experience.	959	3.52	3.80**	3.74	3.82	3.58	3.81
Overall, the new trail regulations (i.e. activity type/direction of use) create a better experience for all visitors.	951	3.64	4.04**	3.89	3.99	3.72	4.03

*p<.05 ,**p<.001

Visitor Reported Conflict Aliso and Wood Canyons

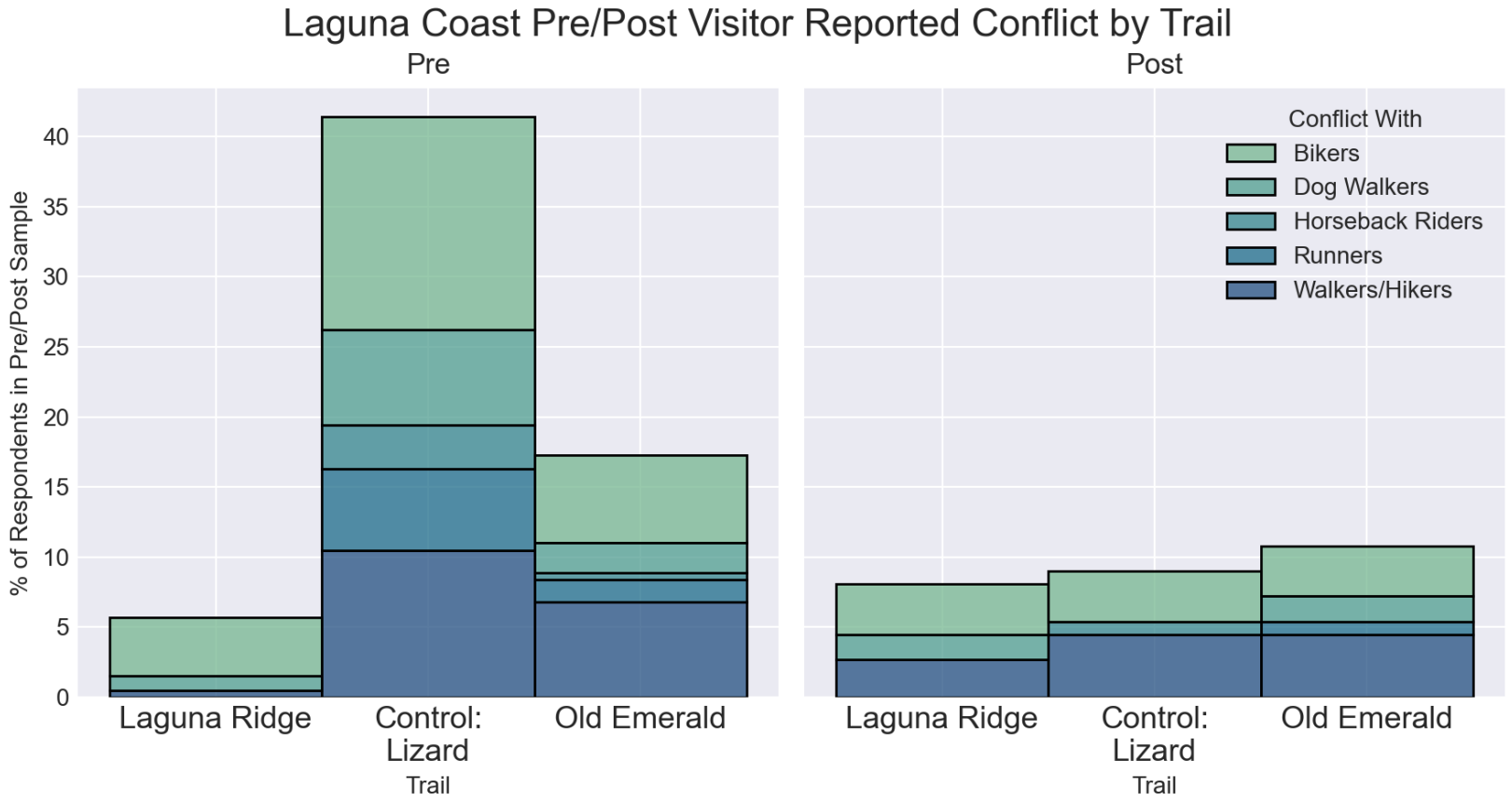


Visitor Reported Conflict Aliso and Wood Canyons

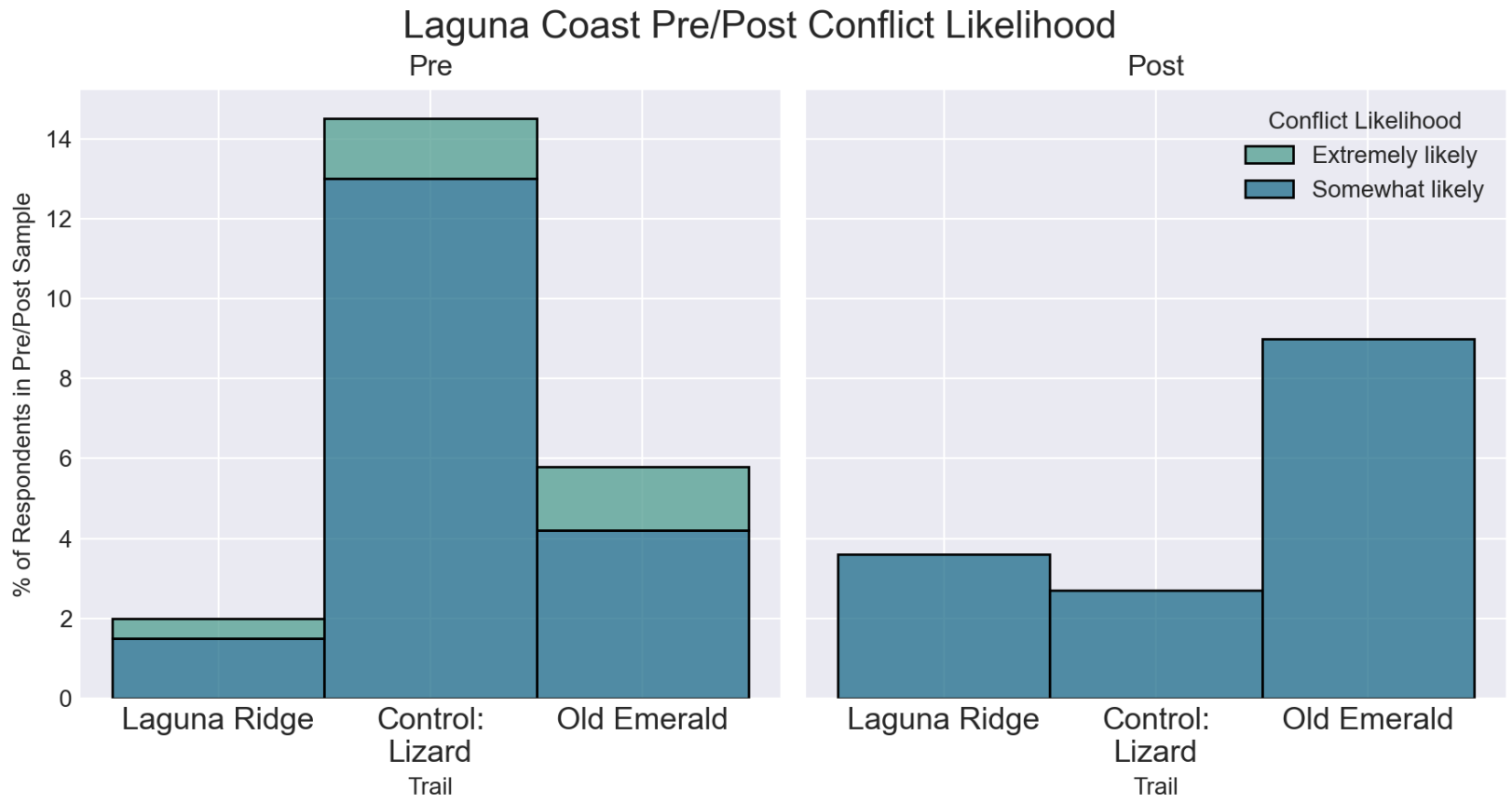


Trail	Conflict Likelihood Mean	
	Pre	Post
Cholla	2.78	2.58
Lynx	2.42	2.97
Rock-it	2.48	2.53

Visitor Reported Conflict Laguna Coast

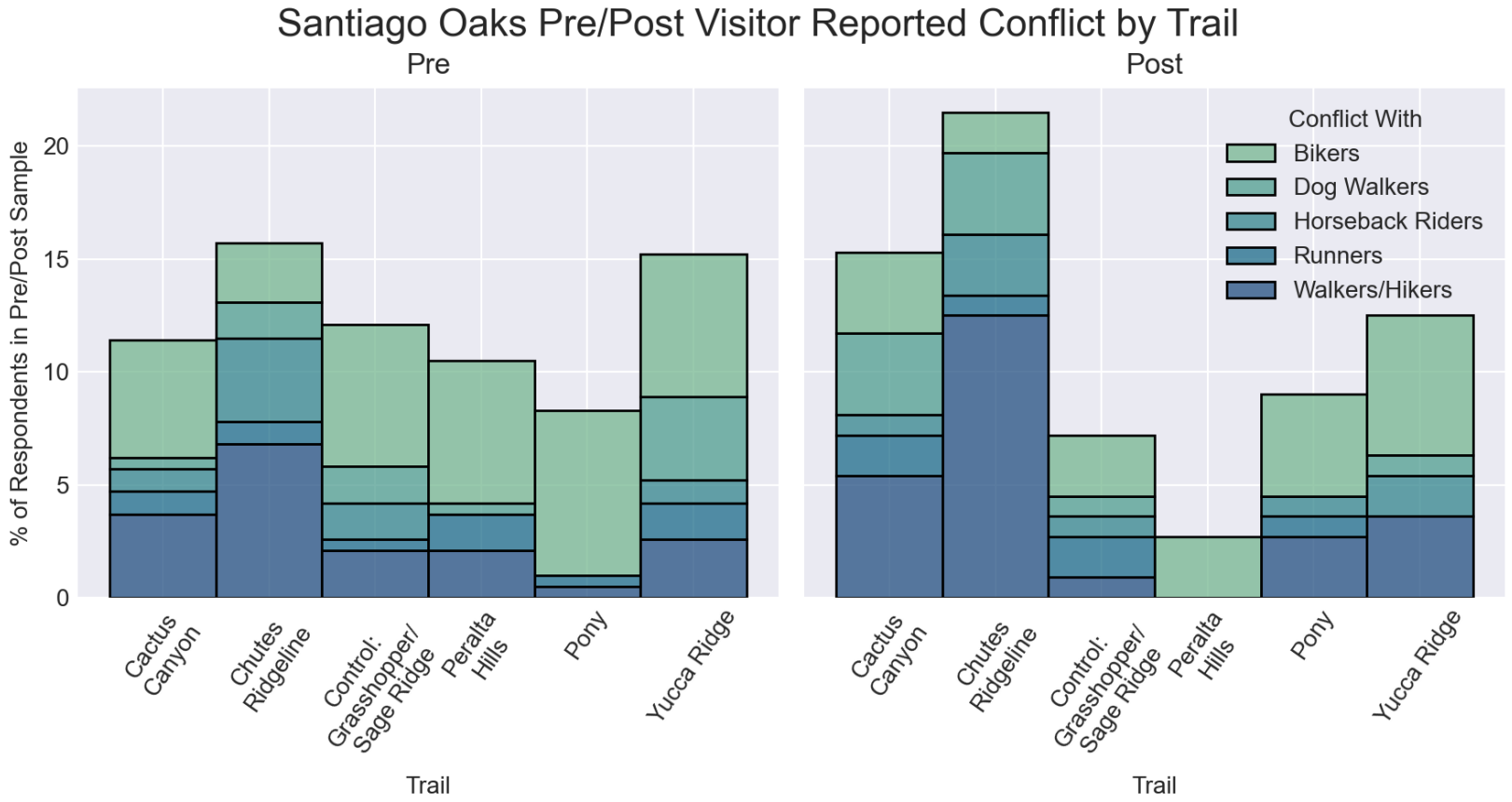


Visitor Reported Conflict Laguna Coast

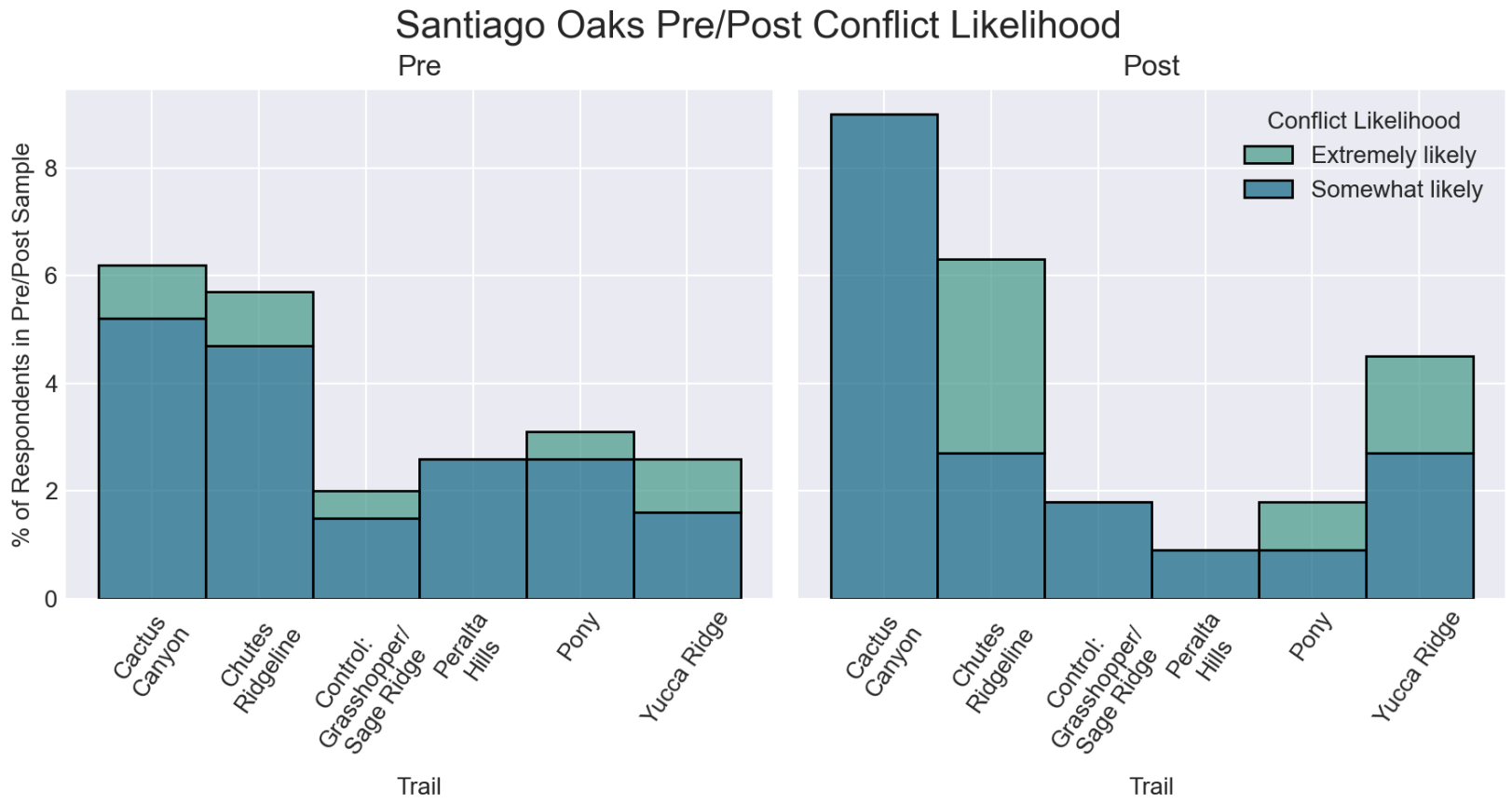


Trail	Conflict Likelihood Mean	
	Pre	Post
Laguna Ridge	2.36	3.12
Old Emerald	2.91	3.58
Lizard	2.77	2.40

Visitor Reported Conflict Santiago Oaks

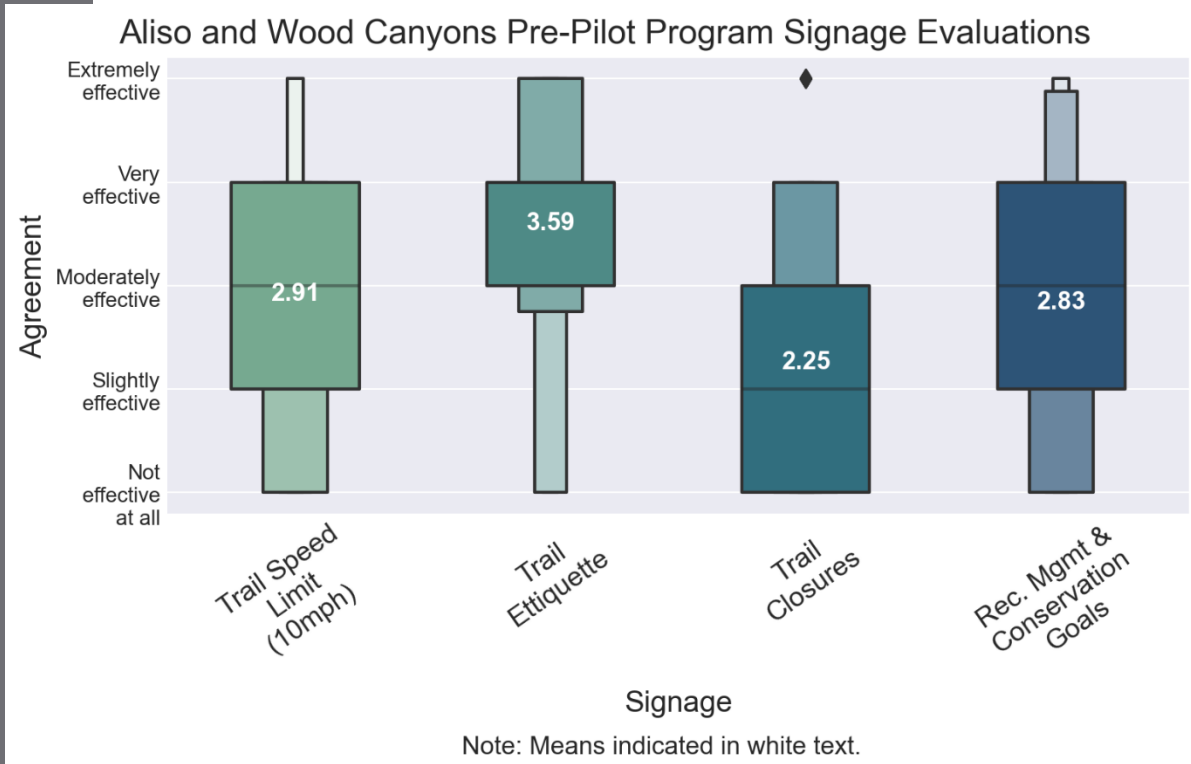


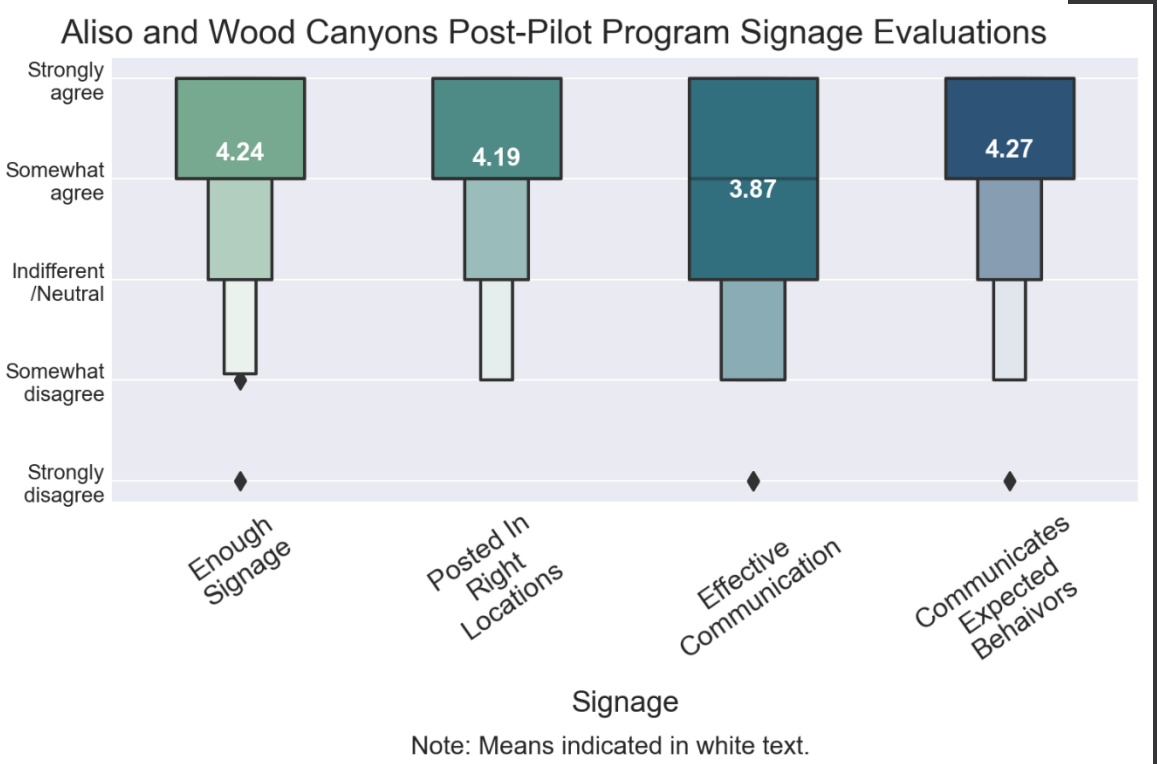
Visitor Reported Conflict Santiago Oaks



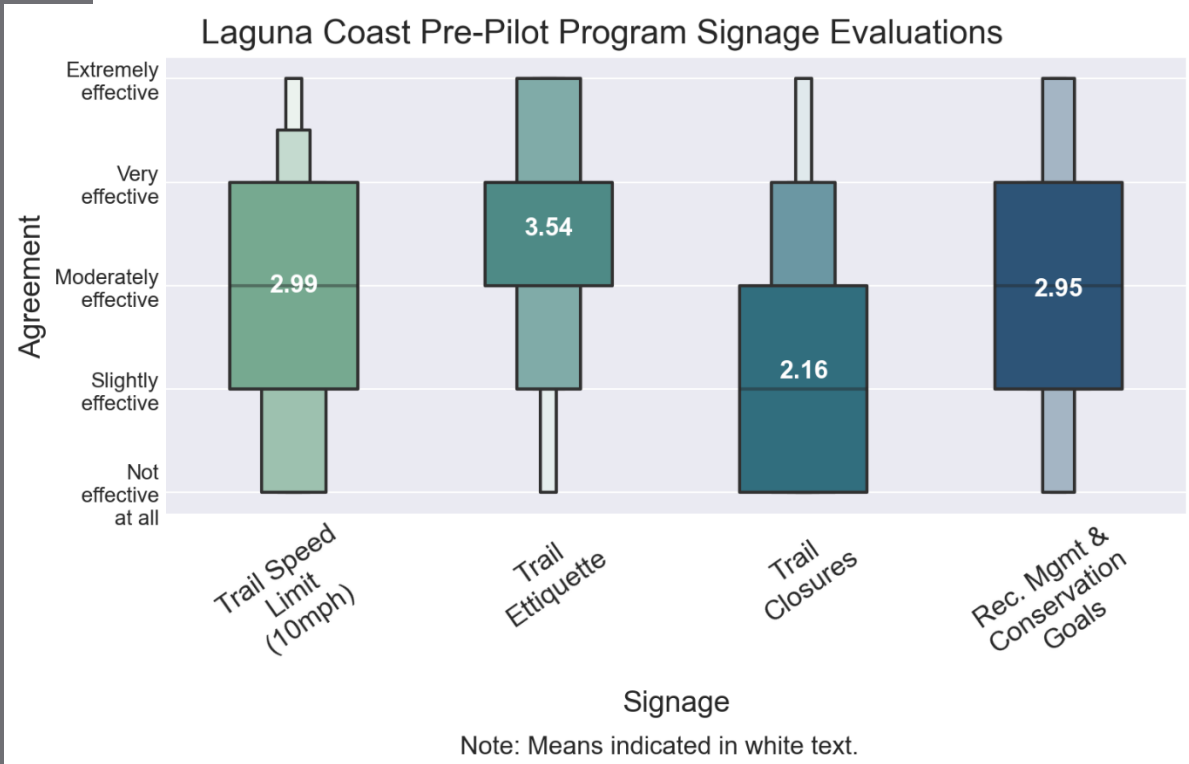
Trail	Conflict Likelihood Mean	
	Pre	Post
Cactus	3.32	3.47
Chutes	2.48	2.74
Grasshopper/ Sage Ridge	2.39	2.50
Peralta	2.28	2.67
Pony	2.87	2.83
Yucca*	1.97	2.79

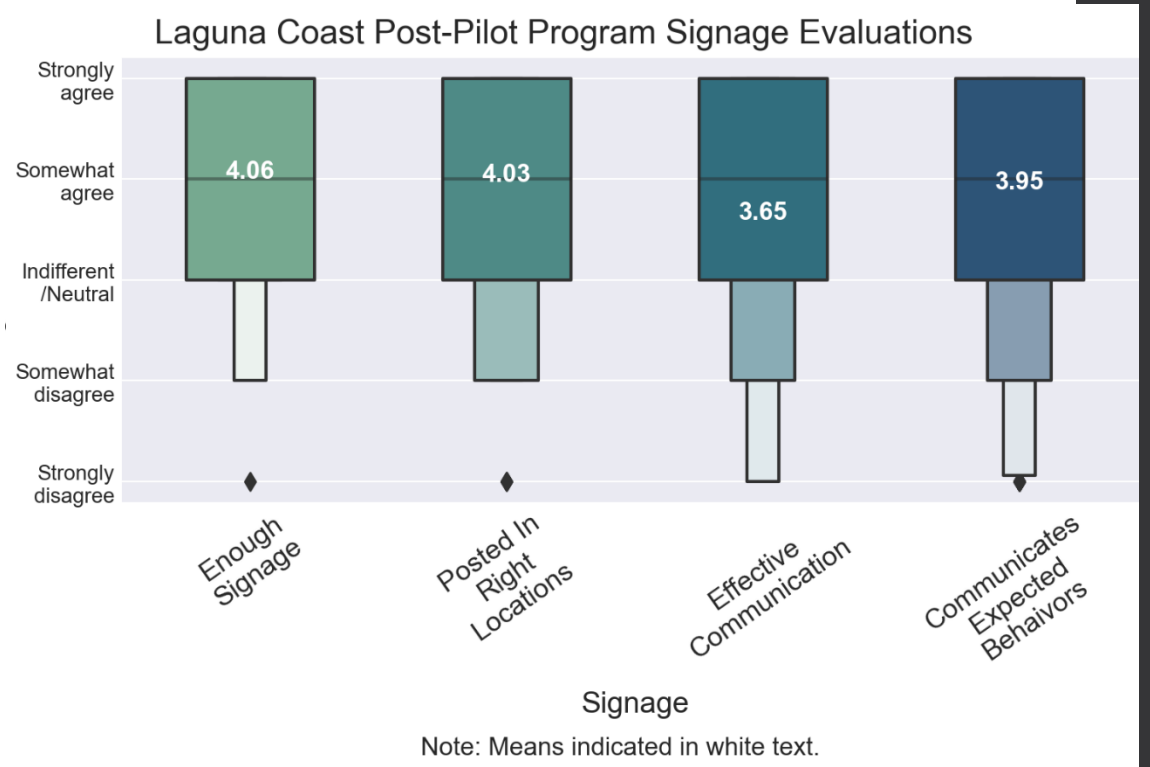
Signage Effectiveness
Aliso and Wood Canyons



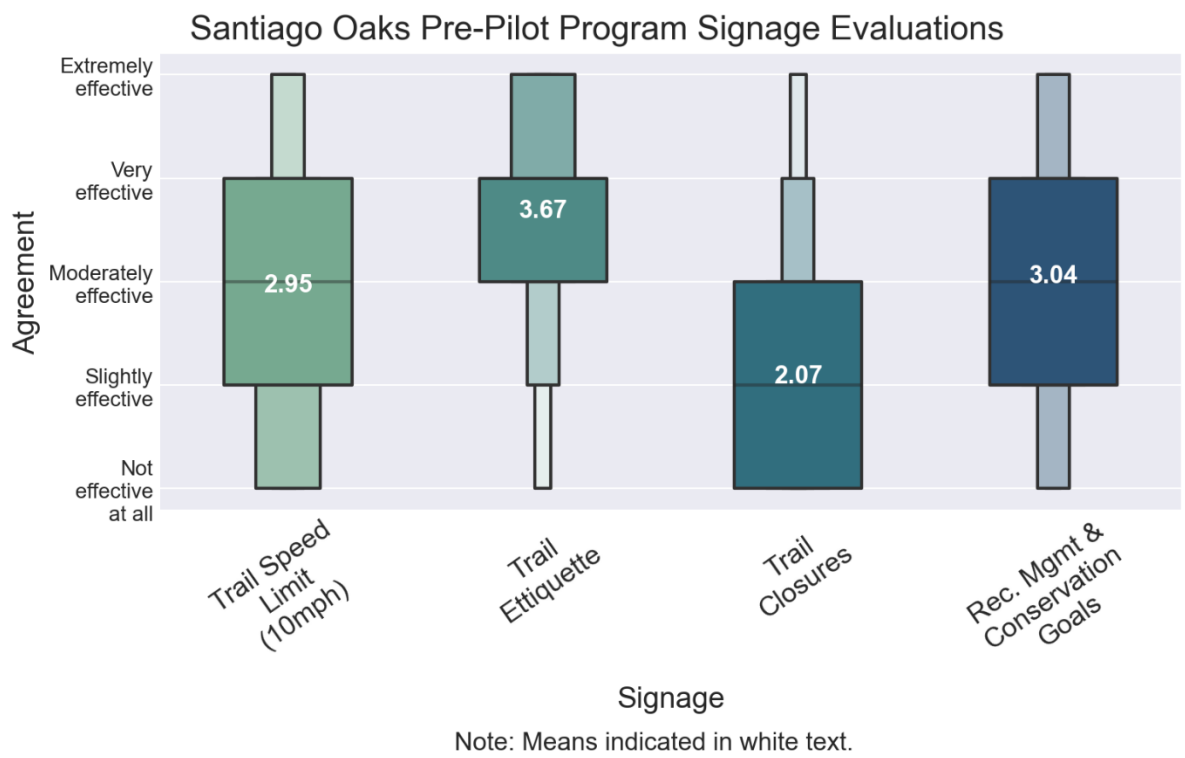


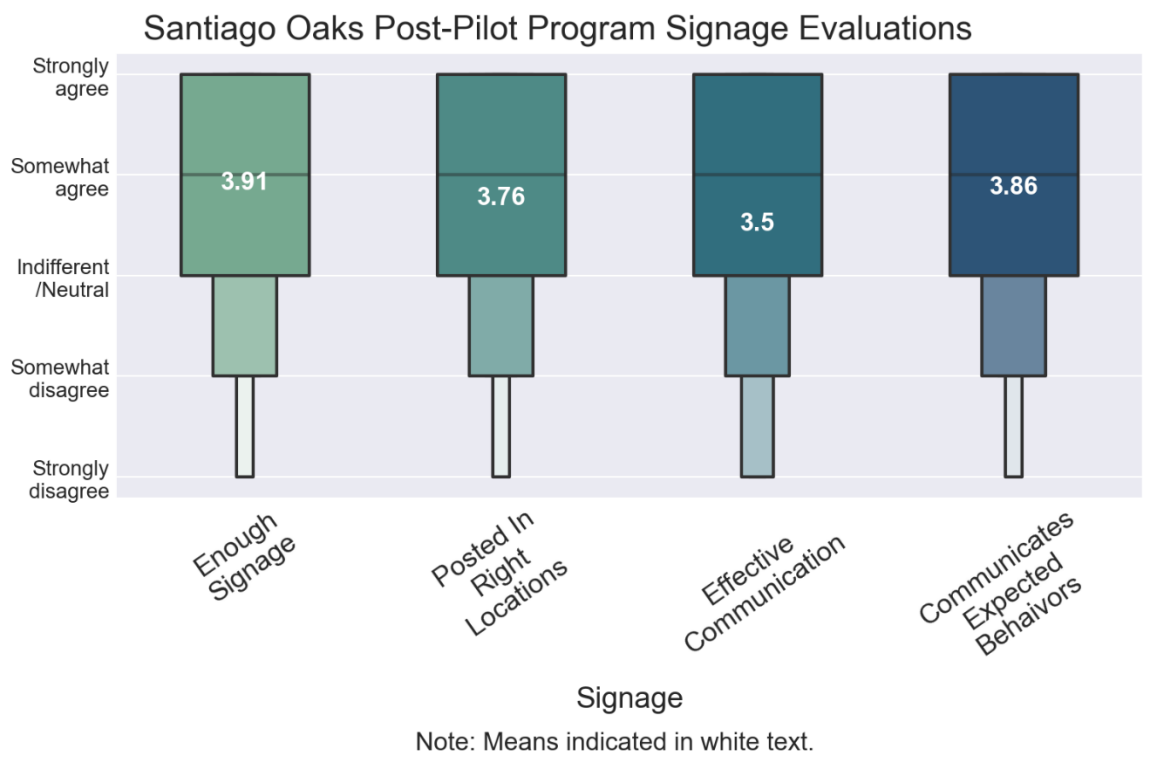
Signage Effectiveness Laguna Coast



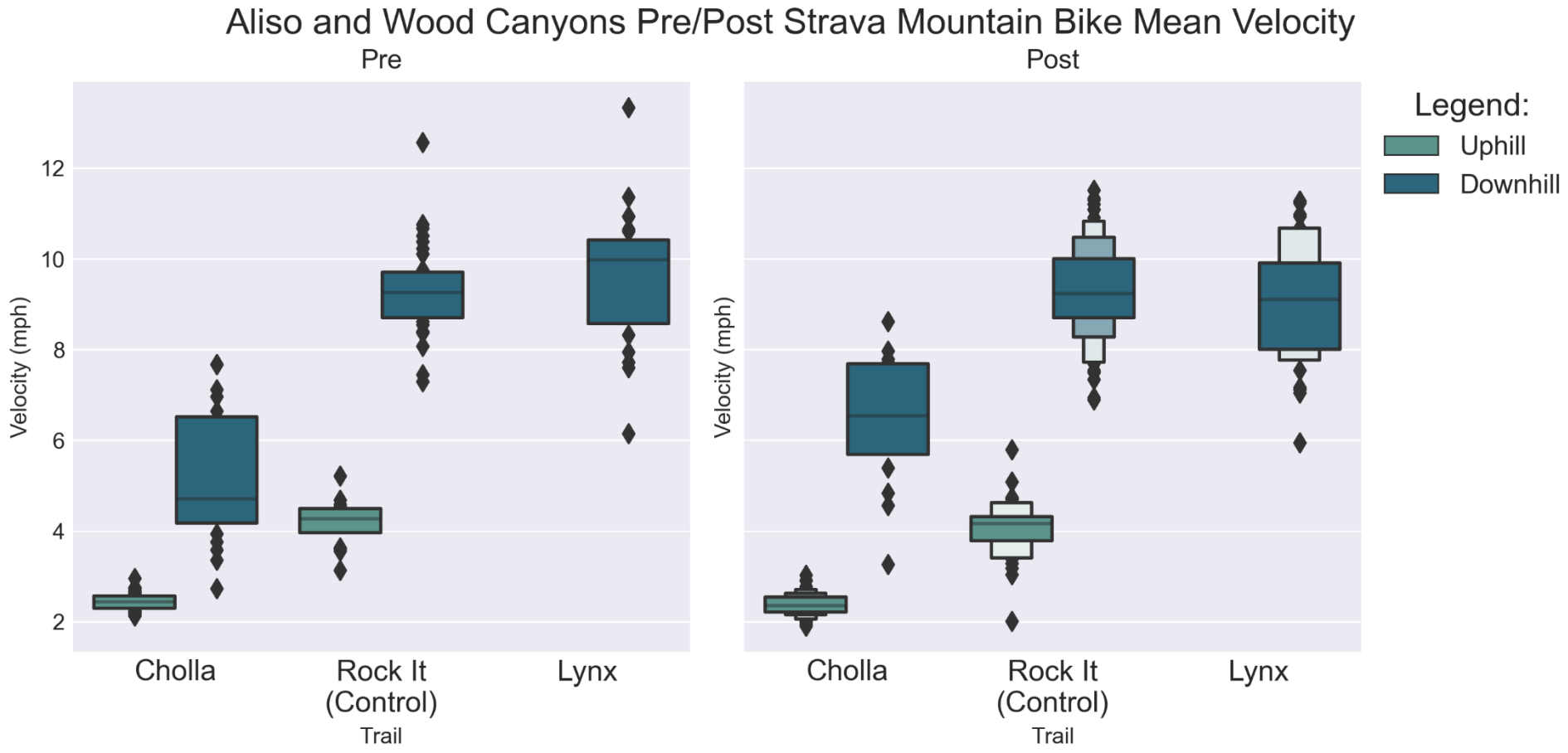


Signage Effectiveness Santiago Oaks

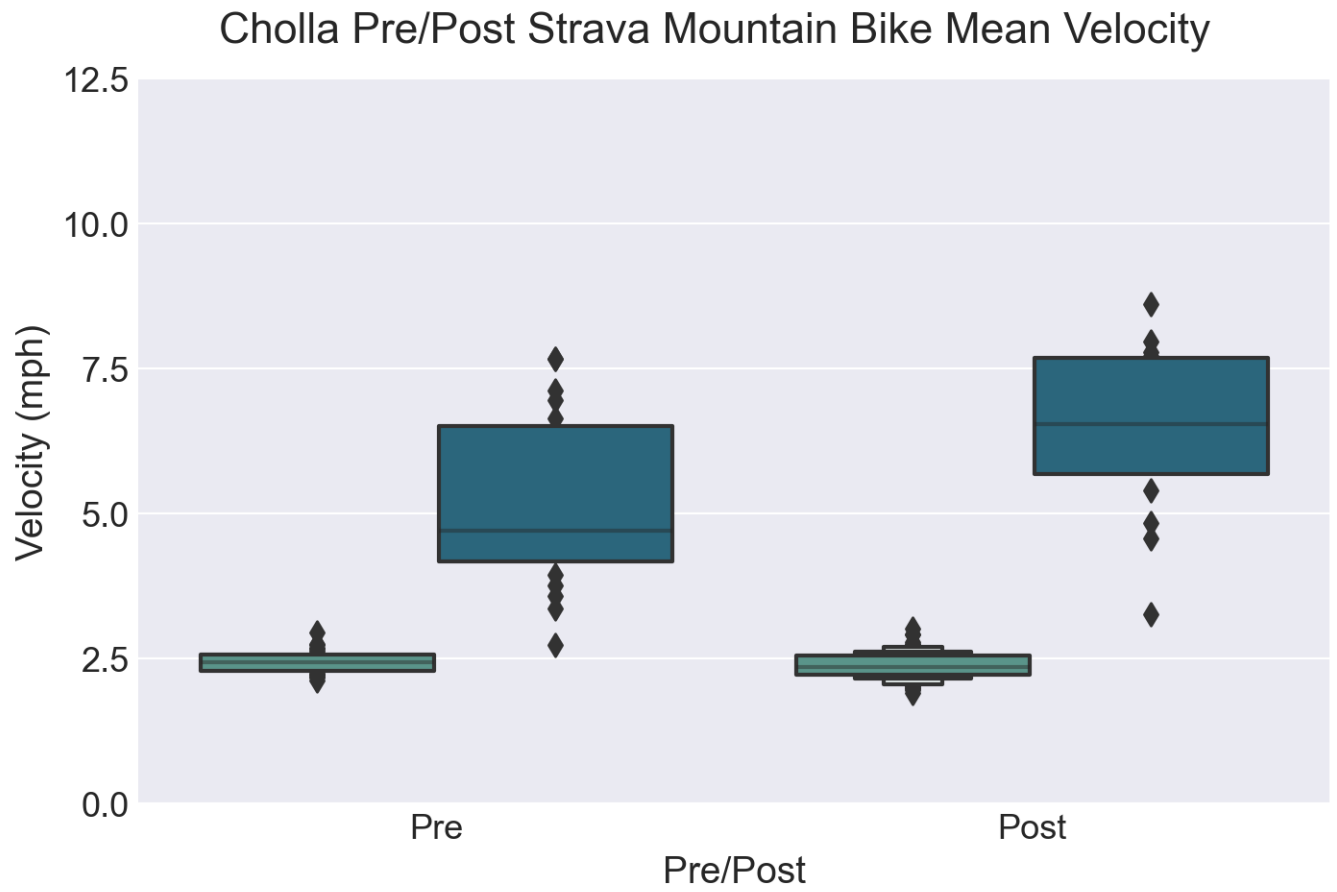




Strava Metro MTB Speed
Aliso and Wood Canyons



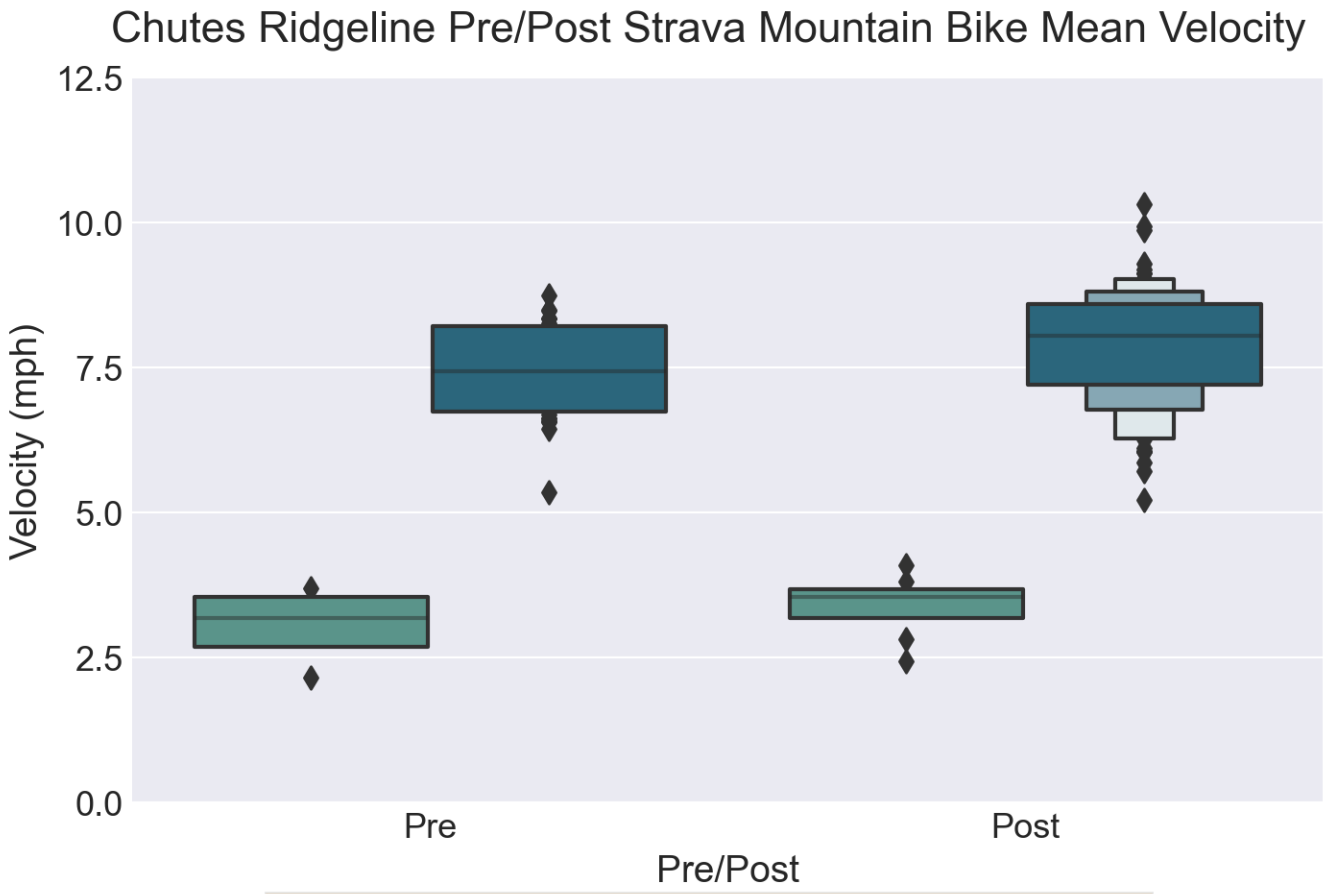
Strava Metro MTB Speed
Aliso and Wood Canyons: Cholla



Uphill: t(50)= 1.444 p=0.155, *d* = .3 | Downhill: t(30)= -2.585 p<.05, *d* = .9

- Despite uphill MTB designation, increase in MTB downhill velocity
- Important to understand existing patterns of spatial behavior when creating new trail management

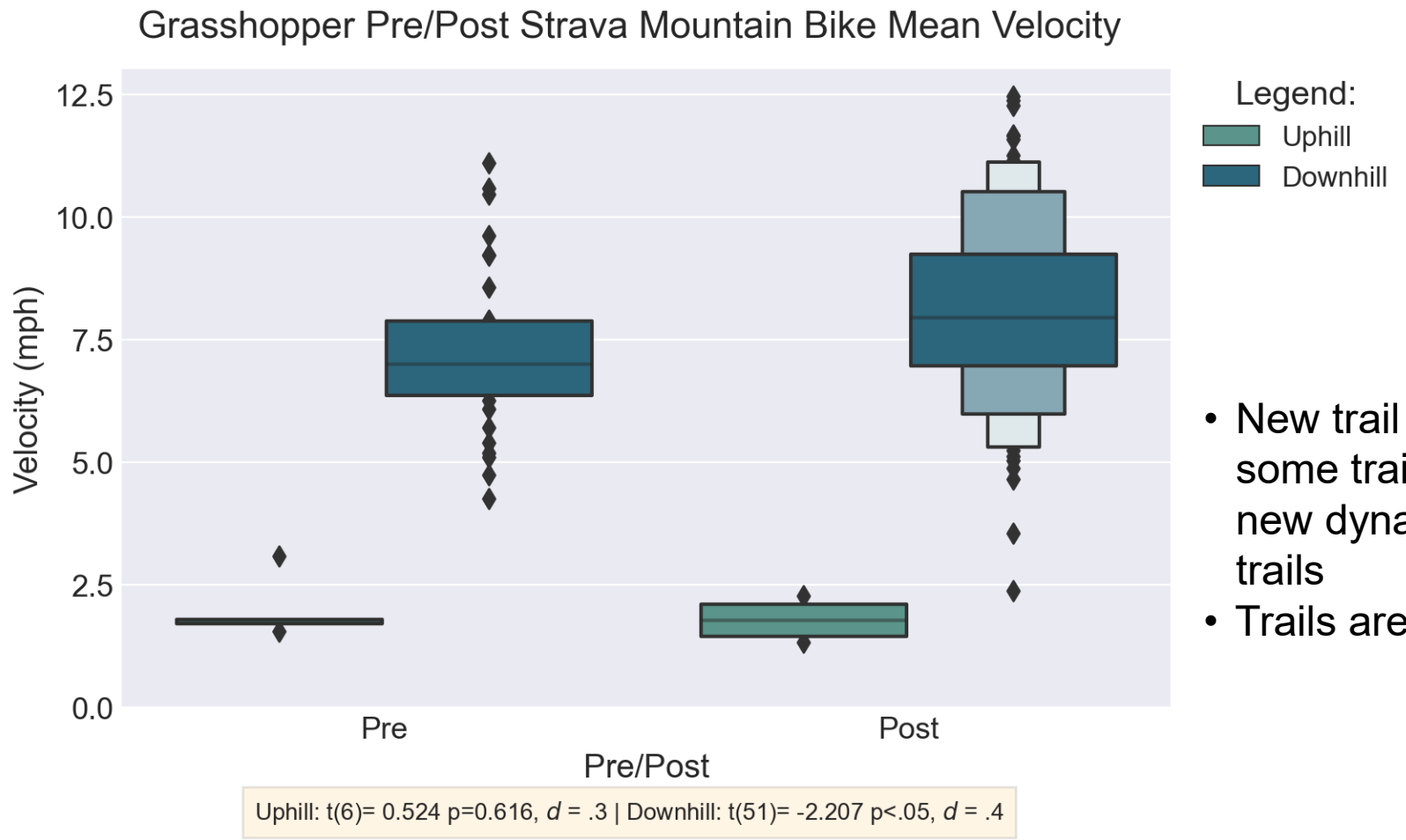
Strava Metro MTB Speed
Santiago Oaks: Chutes Ridgeline



Uphill: t(4)= -0.875 p=0.423, *d* = .6 | Downhill: t(53)= -2.293 p<.05, *d* = .4

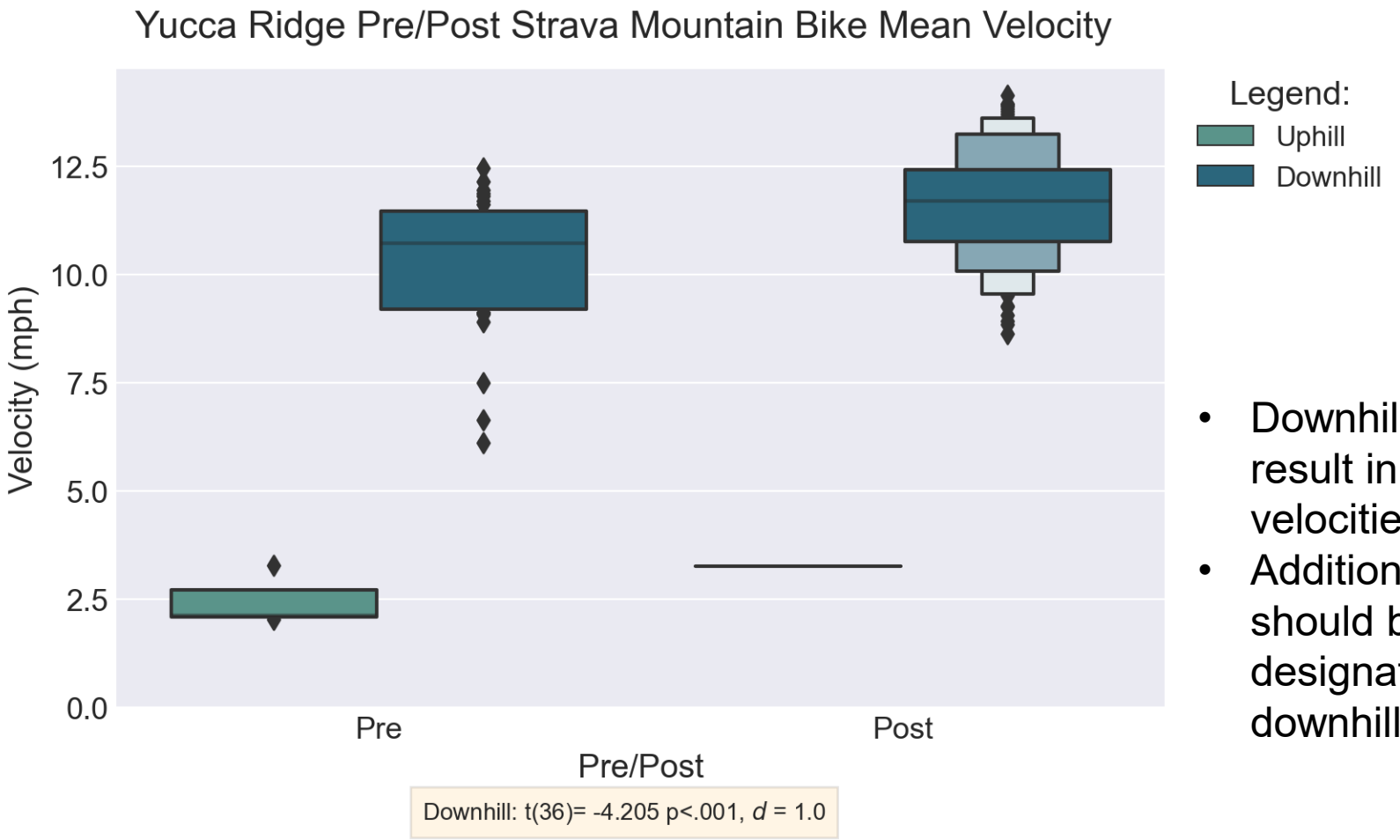
- Downhill designations lead to increases in MTB velocity

Strava Metro MTB Speed
Santiago Oaks: Grasshopper



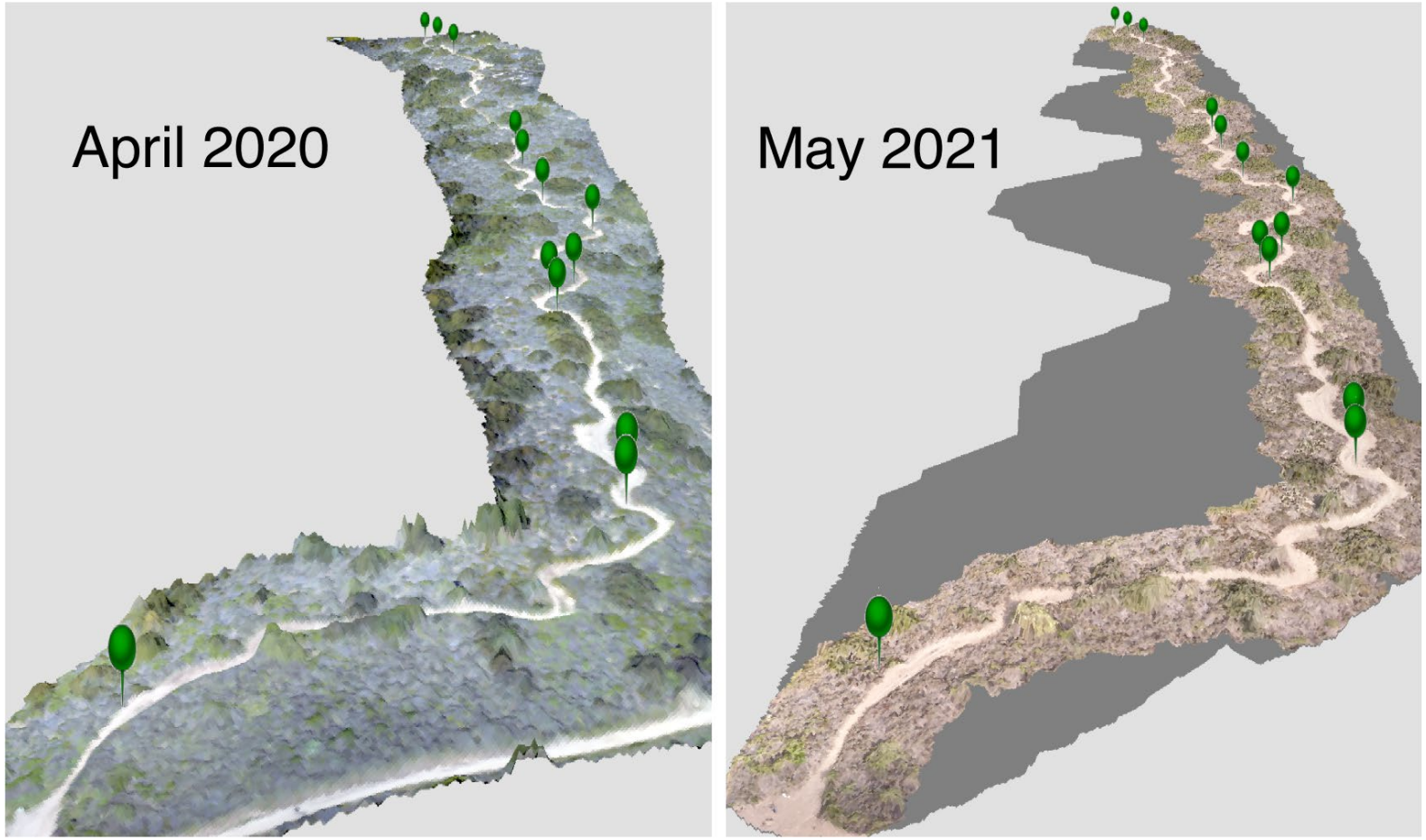
- New trail management on some trails can introduce new dynamics on other trails
- Trails are not independent

Strava Metro MTB Speed
Santiago Oaks: Yucca Ridge



- Downhill designations result in increased velocities
- Additional considerations should be made before designating multi-use trails downhill only

Drone Trail Impact Assessment: Cholla (Aliso and Wood Canyons)

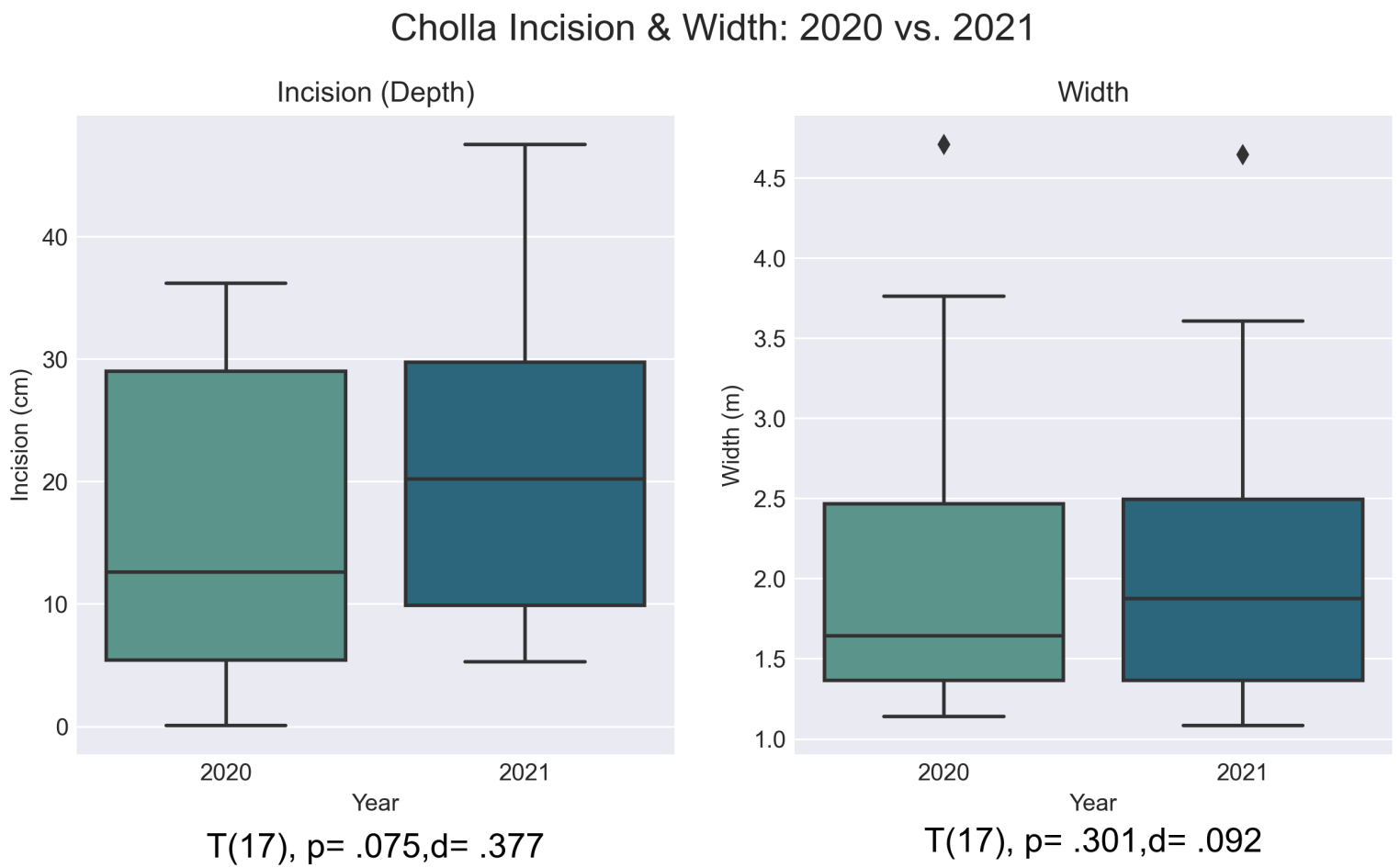


Indicators of Trail Degradation:

- Total area of exposed soil/ trampled vegetation
- **Trail width**
- **Trail Incision**
- Presence of muddy sections
- Presence of informal (visitor created trails)
- Presence of abandoned trail sections
- Small footprint features (informal trial features, garbage, etc.)

Indicators like incision, width are important for managing both ecological and social conditions of trails

Trail Disturbance Indicators:



T(17), p= .075,d= .377

T(17), p= .301,d= .092

- Monitoring ecological change as a result of new trail management.
- 2020-2021 trends suggest increased erosion and vegetation loss.
- “Shifting baselines” for trail management

Summary

- High degree of visitor support for Trails Pilot Program (TPP)
- Trend towards reduced visitor conflicts
- “Spillover” effects on Control trails
- Behavioral responses from TPP direction designations
- Ongoing trail ecological assessments to understand biophysical effects of TPP

Thank You!

Questions?

Outdoor Recreation: Research, Monitoring and Planning

A PROGRAM OF RESEARCH ON THE NATURE RESERVE OF

ORANGE COUNTY

DRAFT PRESENTATION

Recreation Use and Human Valuation on the Nature Reserve of Orange County California

CHRISTOPHER MONZ, PHD UTAH STATE UNIVERSITY

ASHLEY D'ANTONIO, PHD OREGON STATE UNIVERSITY

NOAH CREANY, MS UTAH STATE UNIVERSITY

S.J. & JESSIE E. QUINNEY COLLEGE of NATURAL RESOURCES UtahStateUniversity

Oregon State University

Natural Communities COALITION

RECREATION ECOLOGY LAB at Utah State University

Outline for Today's Presentation

- Brief Overview- Project Goals and Accomplishments
- Human Dimensions of Recreation
- Habitat & Resource Protection
- Exogenous Factors
- Recreation Management Frameworks

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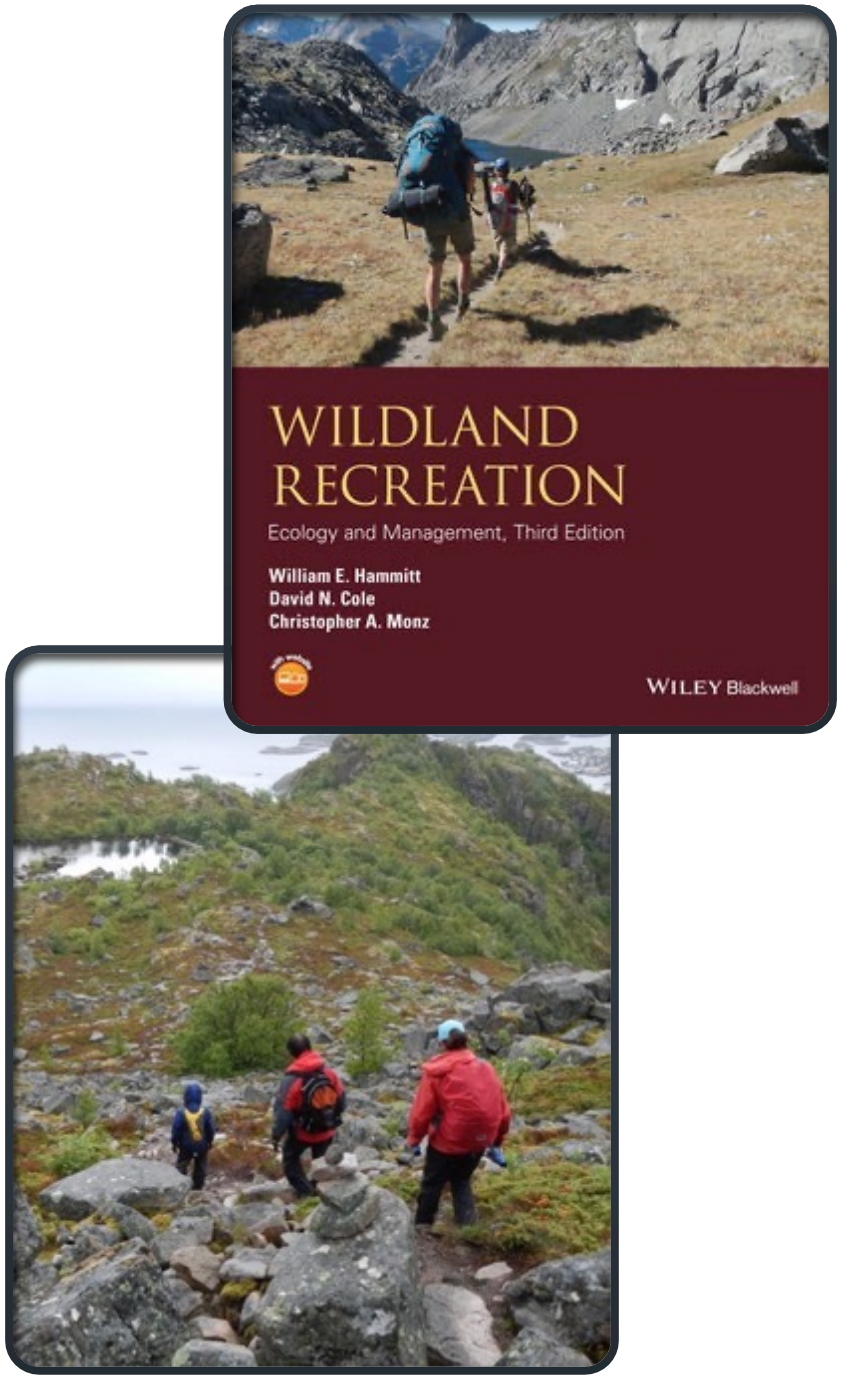
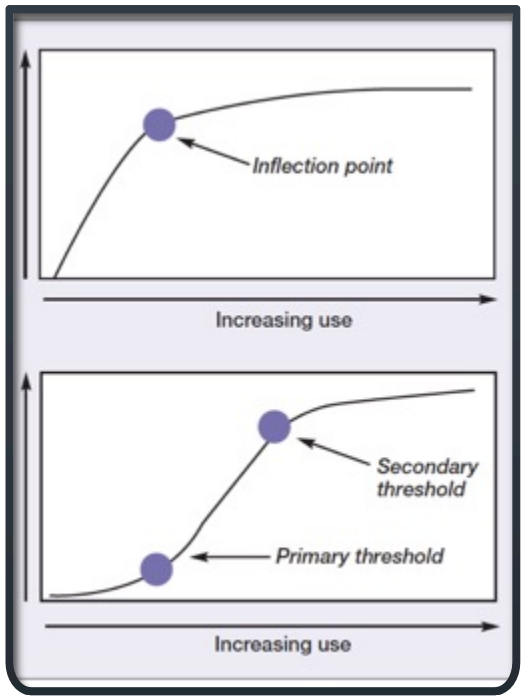
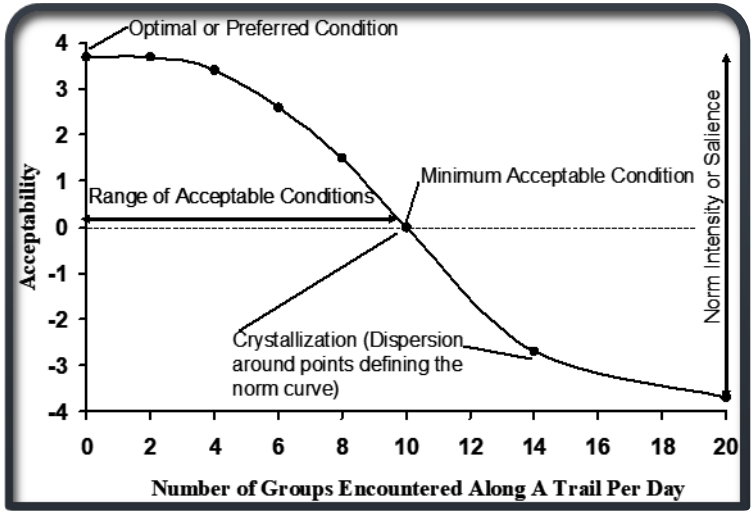
Recreation Ecology

- Origins in the 1920's in Europe and the USA
- Approximately 1300 published studies
- How recreation *activities* affect to soil, vegetation, wildlife, water and air
- How human disturbance affects the visitor experience
- Knowledge informs sustainable management





Use-Impact Theory



Norm Theory

Recreation Ecology Theory:

Social and ecological

- Initial use results in the majority of impact- confinement strategies are often needed
- Visitors often judge the acceptability of conditions and this *can* affect their experience
- Many situational variables influence these responses

Grand Teton NP: Moose-Wilson Corridor Comprehensive Plan

Comprehensive visitor use, experience and ecological assessment to inform management decisions

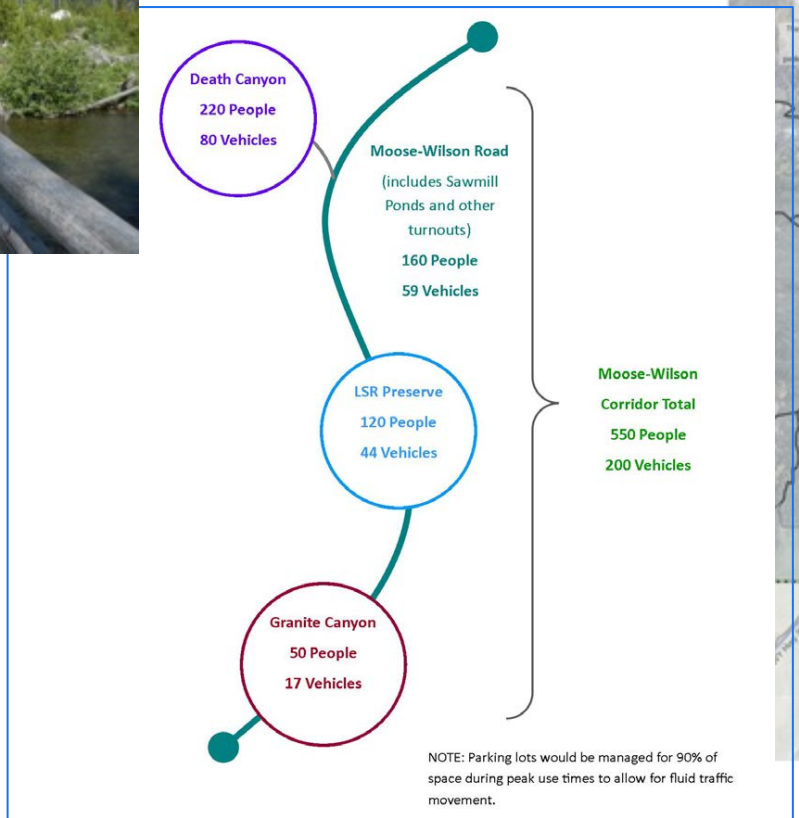
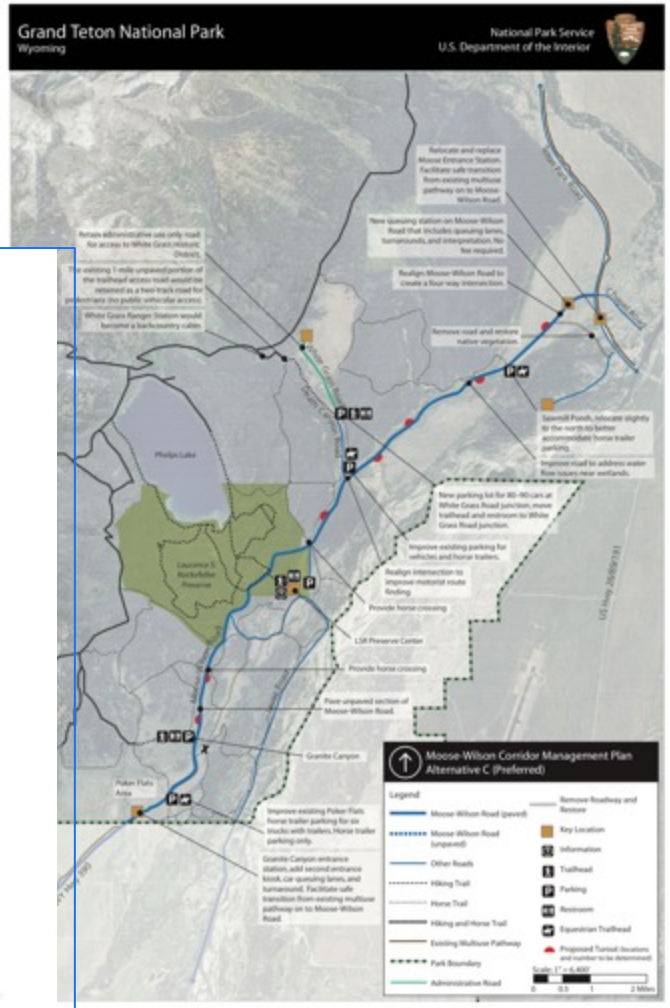
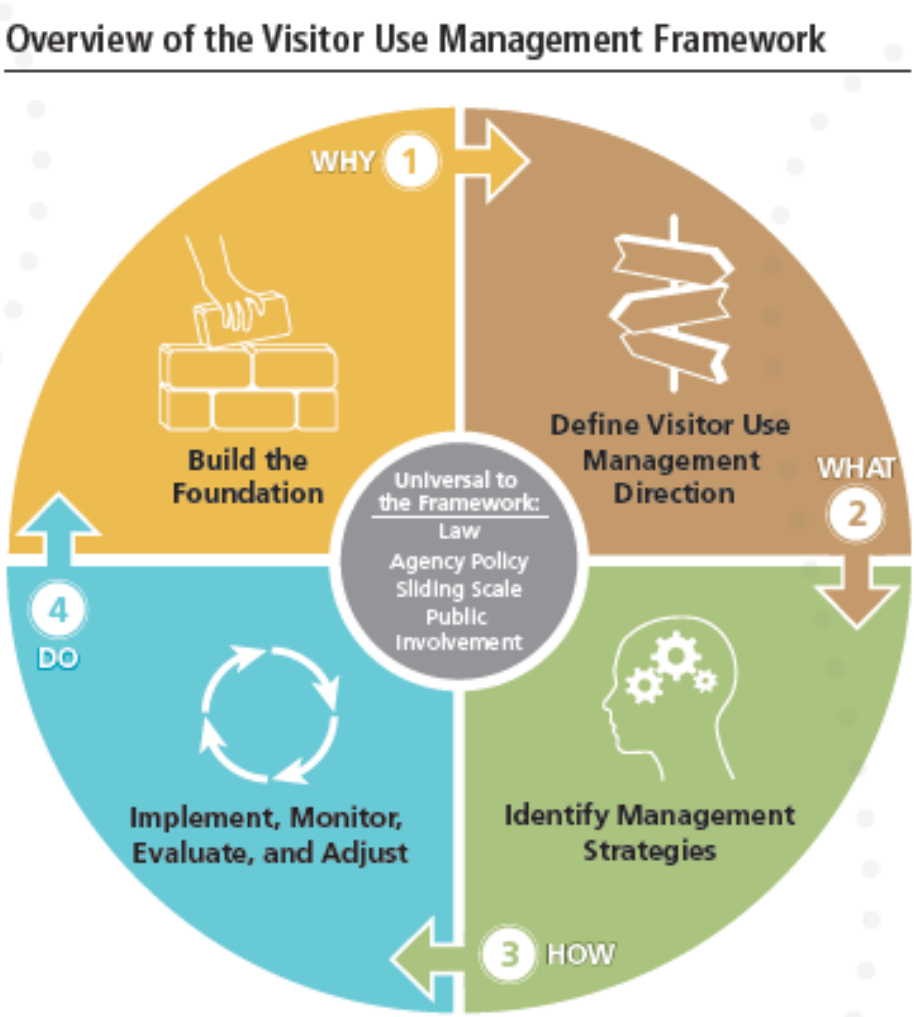


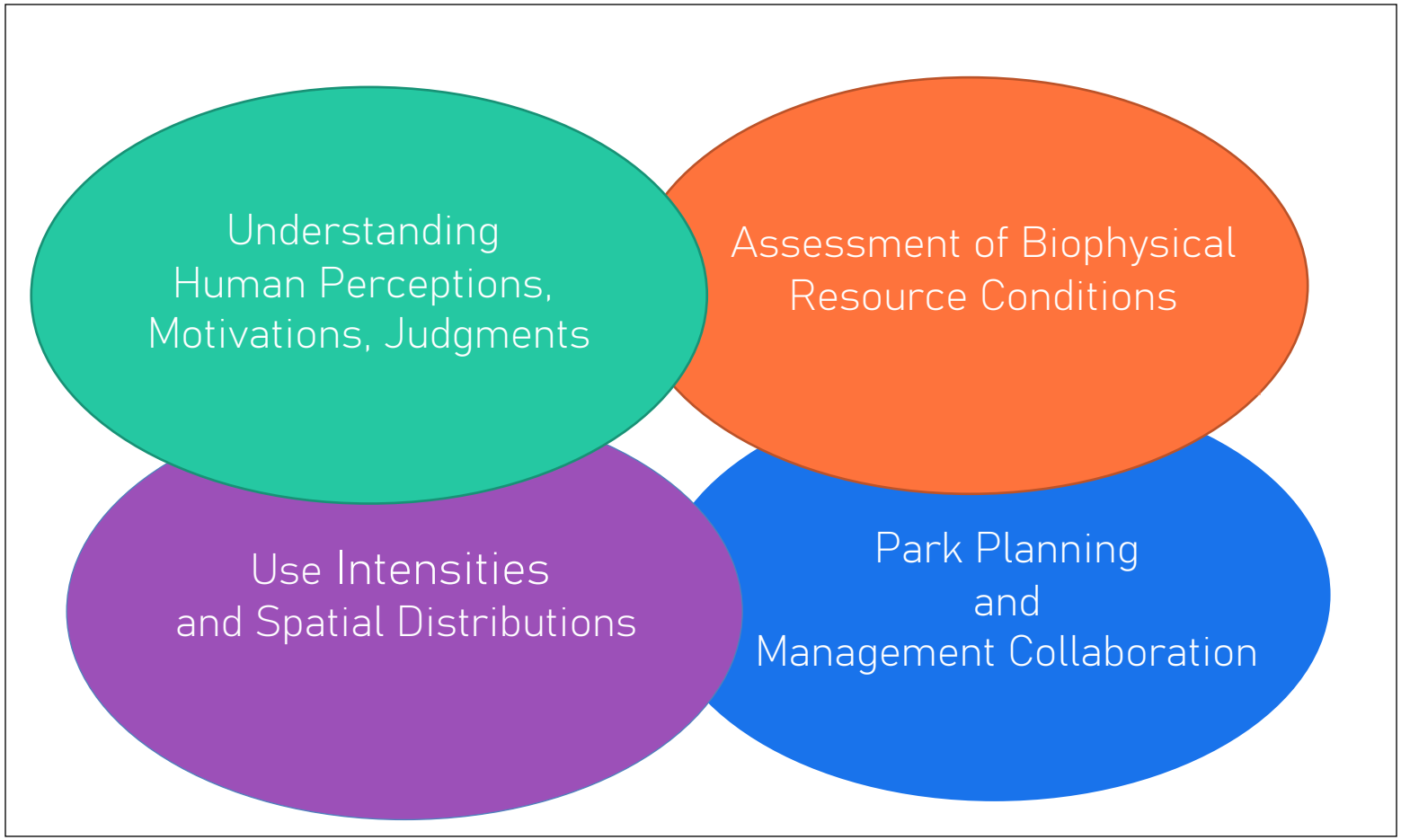
FIGURE1. VISITOR CAPACITY OF THE MOOSE-WILSON CORRIDOR: PEOPLE AND VEHICLES AT ONE TIME



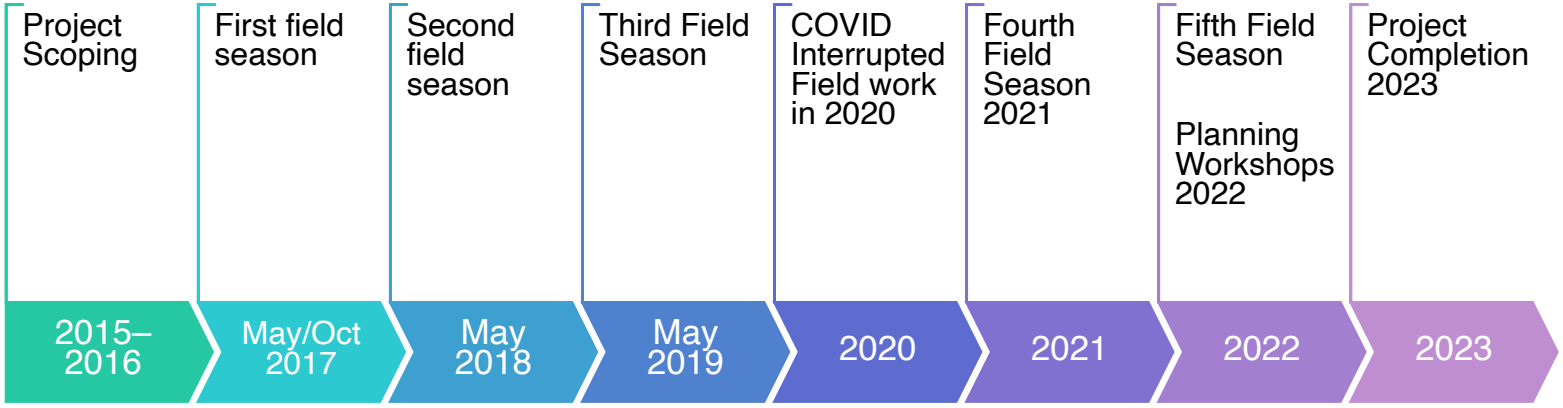
Visitor Use Management Planning Framework



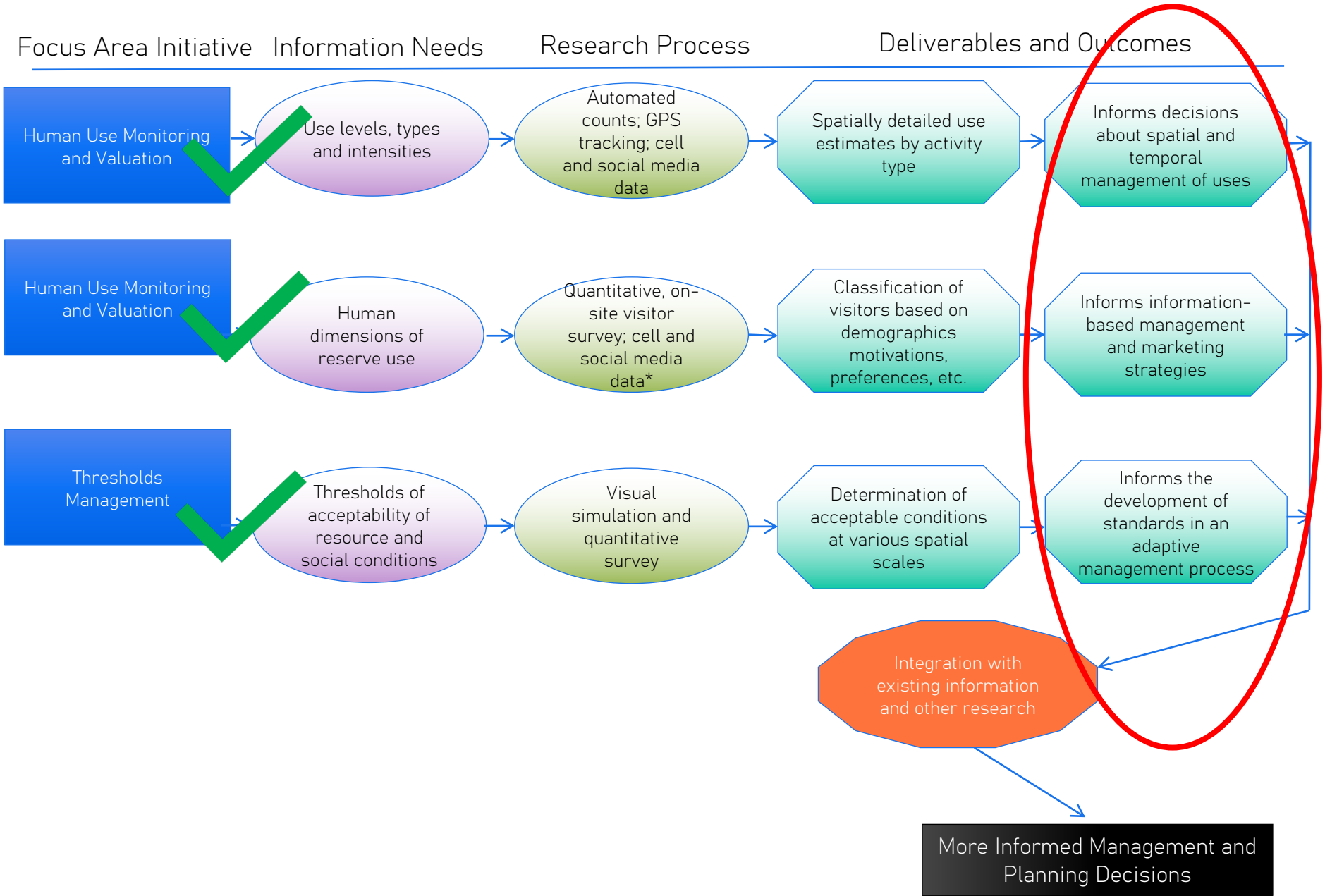
Project Approach



Project Timeline



Project Accomplishments and Outcomes- Where Are We Today?



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- Human Dimensions of Recreation
- Habitat & Resource Protection
- Exogenous Factors
- Recreation Management Frameworks

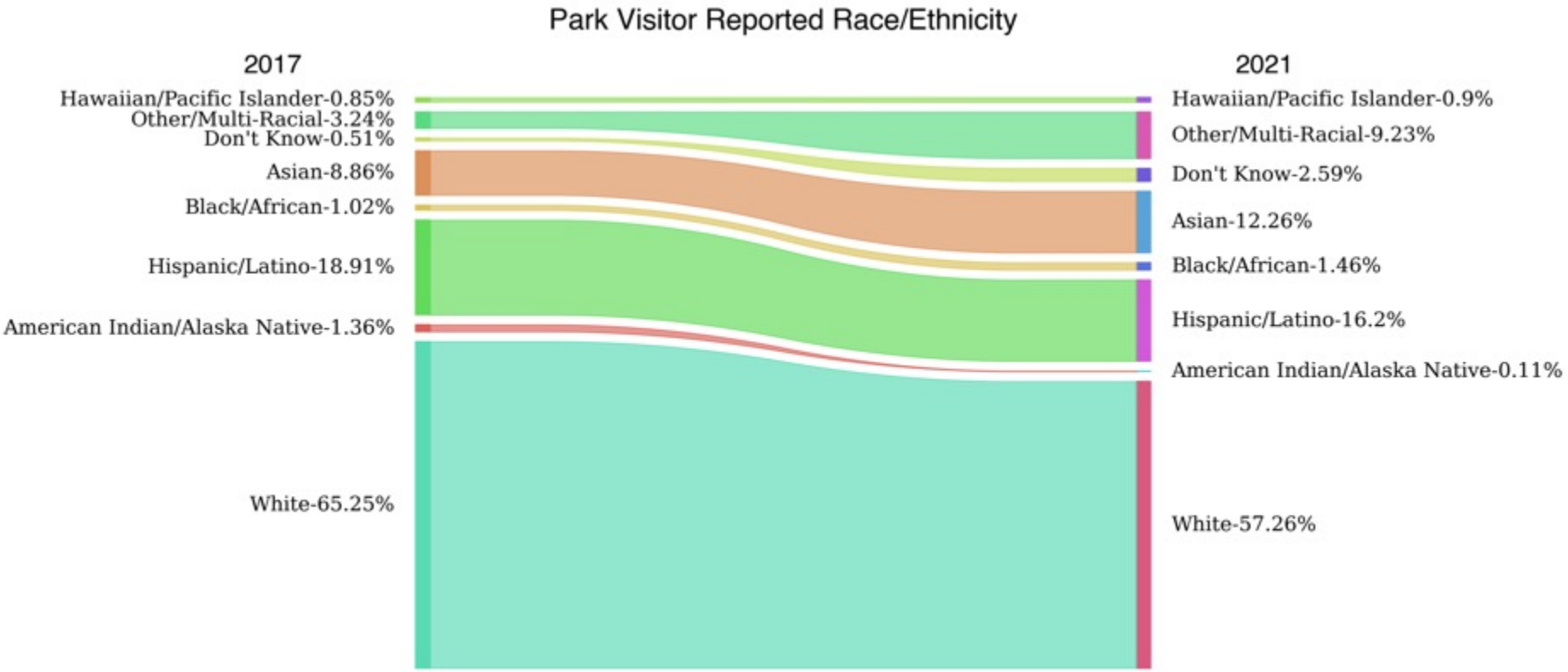
Use estimation study 2017-2018:

>3.2 M visits annually

Social science/visitor questionnaire

- Entrance area/trailhead intercepts
- Descriptive and evaluative responses from visitors post experience
- Generally > 1000 participants and high participation across activity types
- Questions derived from NPS “Pool of Known Questions”

Visitor Demographics

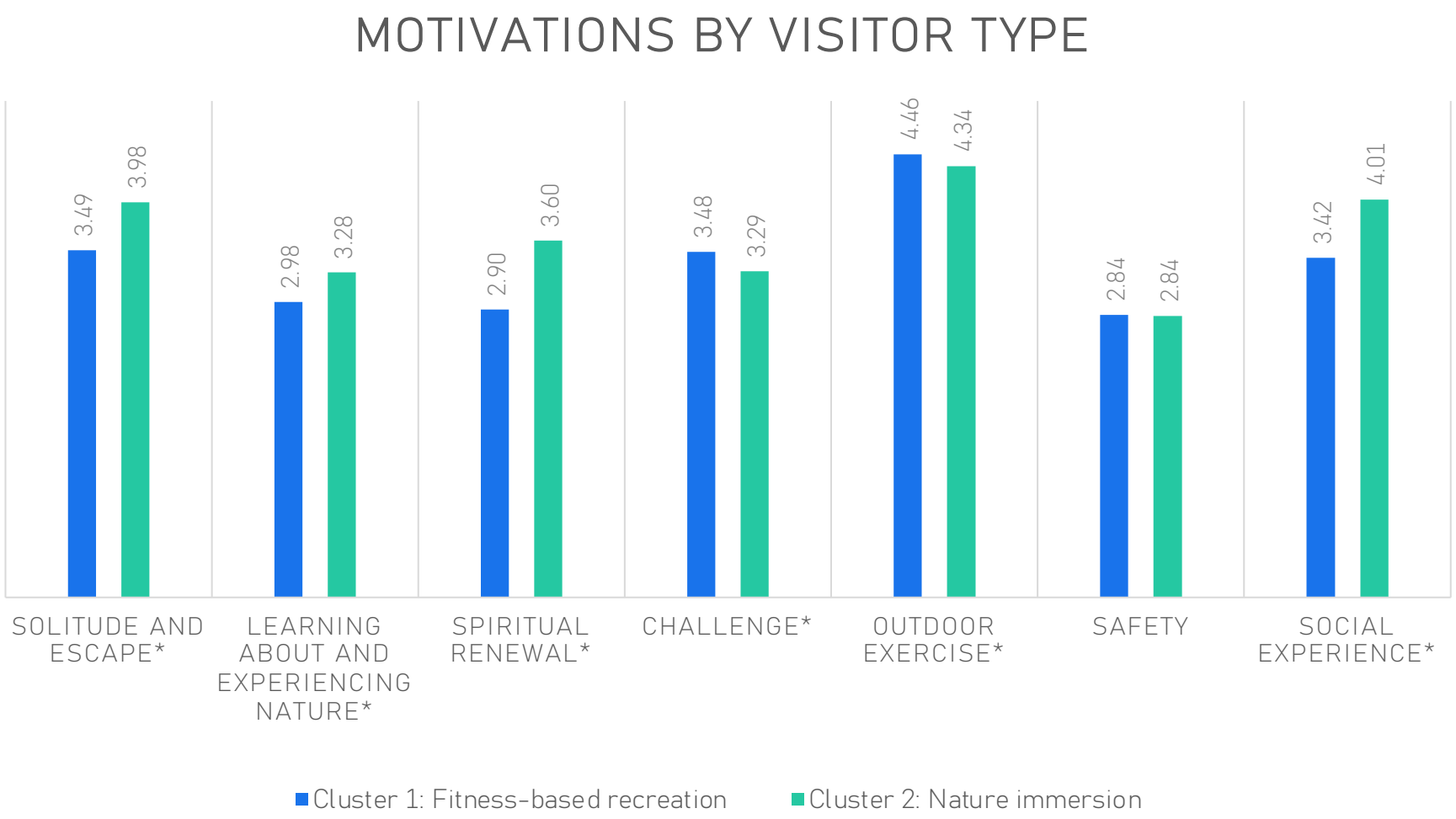


Visitor Motivations

37 question Recreation Experience Preference (REP) scale yielded 7 different latent constructs

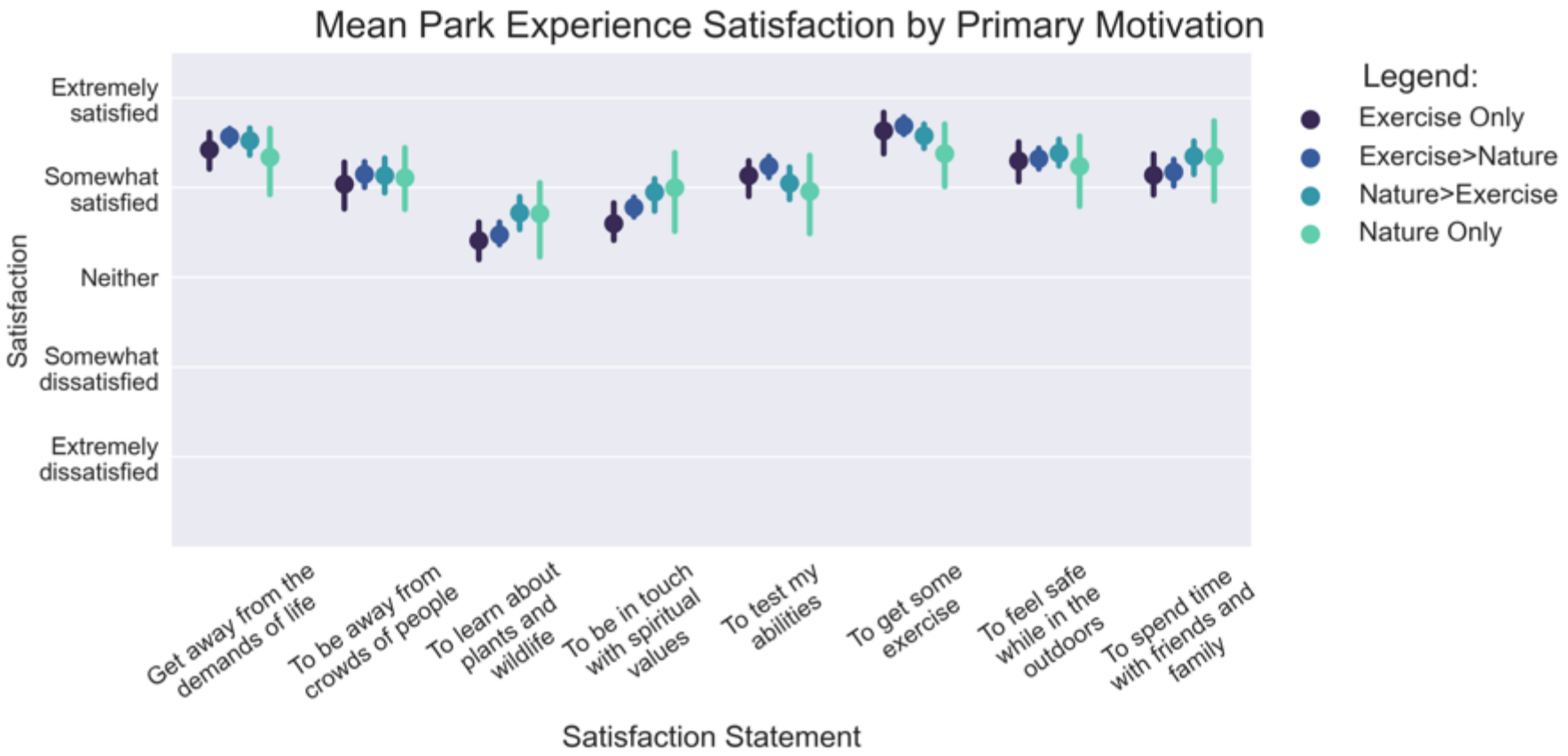
- Solitude and escape
- Learning about and experiencing nature
- Spiritual renewal
- Challenge
- Outdoor exercise
- Safety
- Social experience

Visitor Motivations: Descriptive

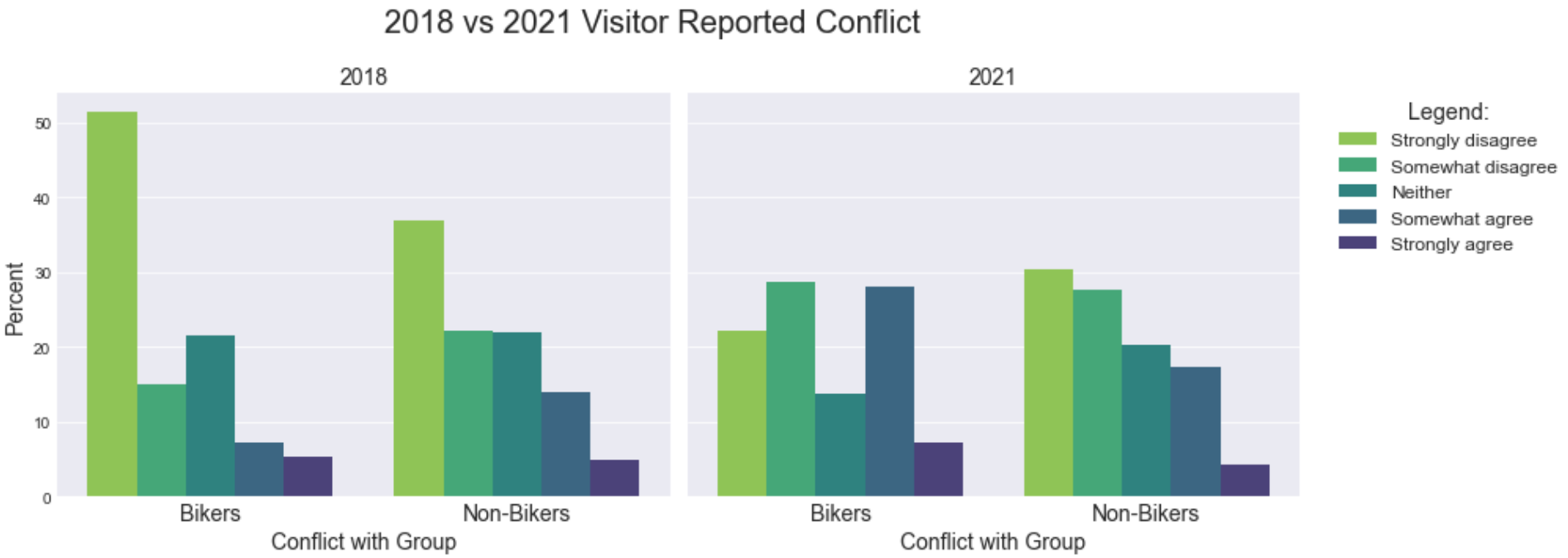


Results from a 37 item motivations scale

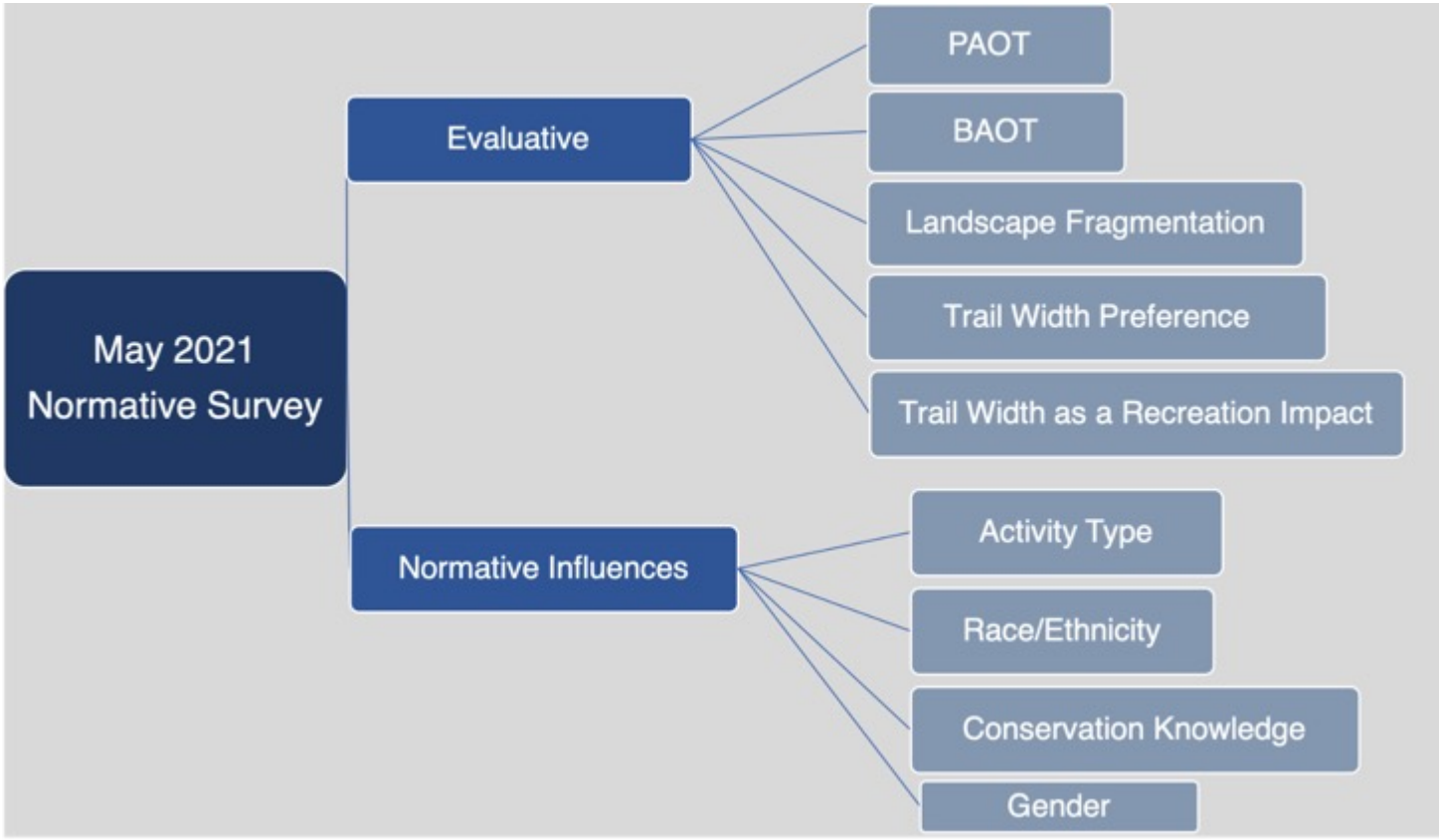
Visitor Motivations: Evaluative



Conflict


2018 vs 2021 Visitor Reported Conflict
2018
2021
Percent
0
10
20
30
40
50
Bikers
Non-Bikers
Conflict with Group
Legend:
Strongly disagree
Somewhat disagree
Neither
Somewhat agree
Strongly agree

Normative Survey Conceptual Design



Crowding Index: People at one Time (PAOT)

PAOT 0

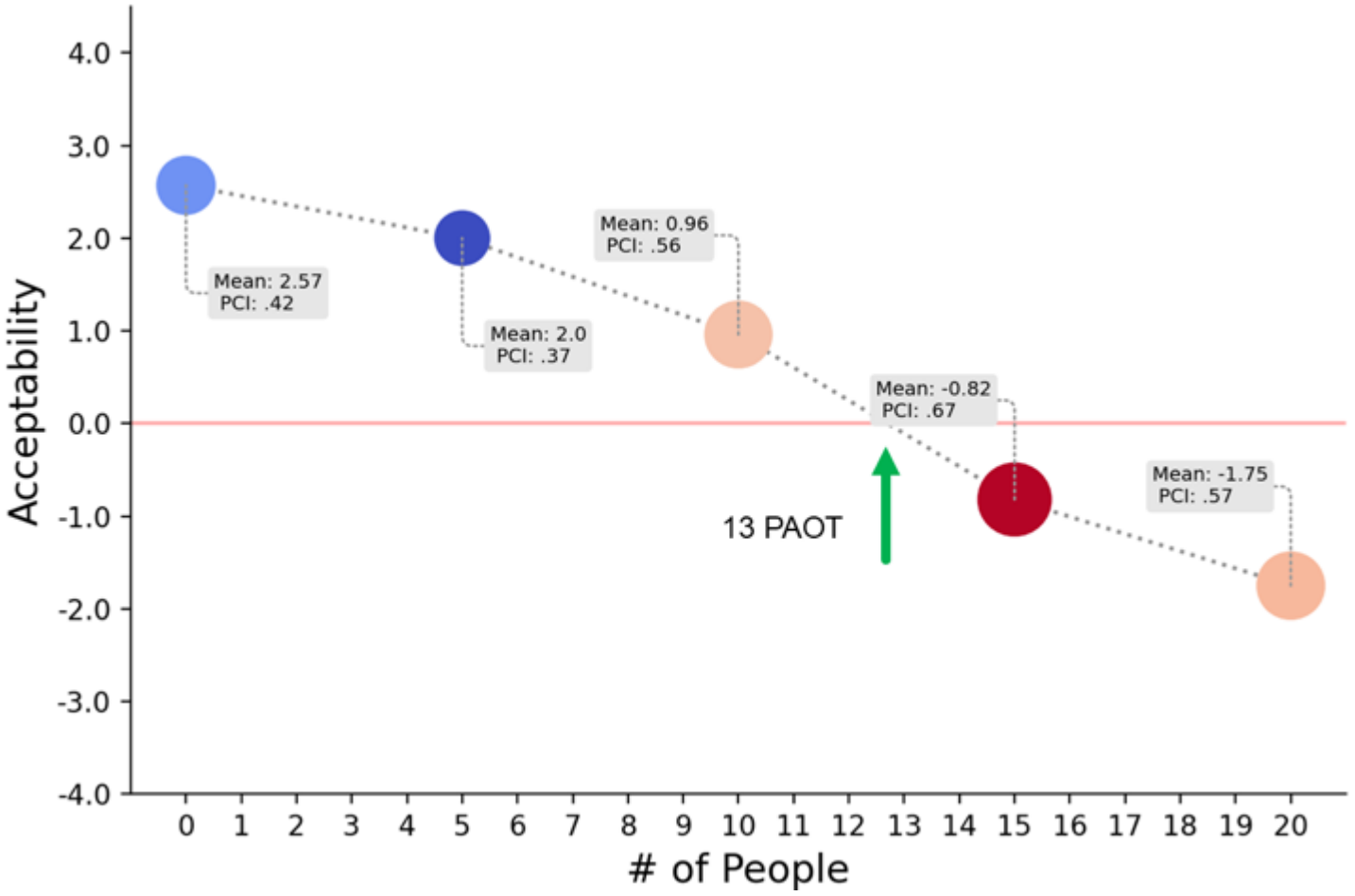
PAOT 5

PAOT 10

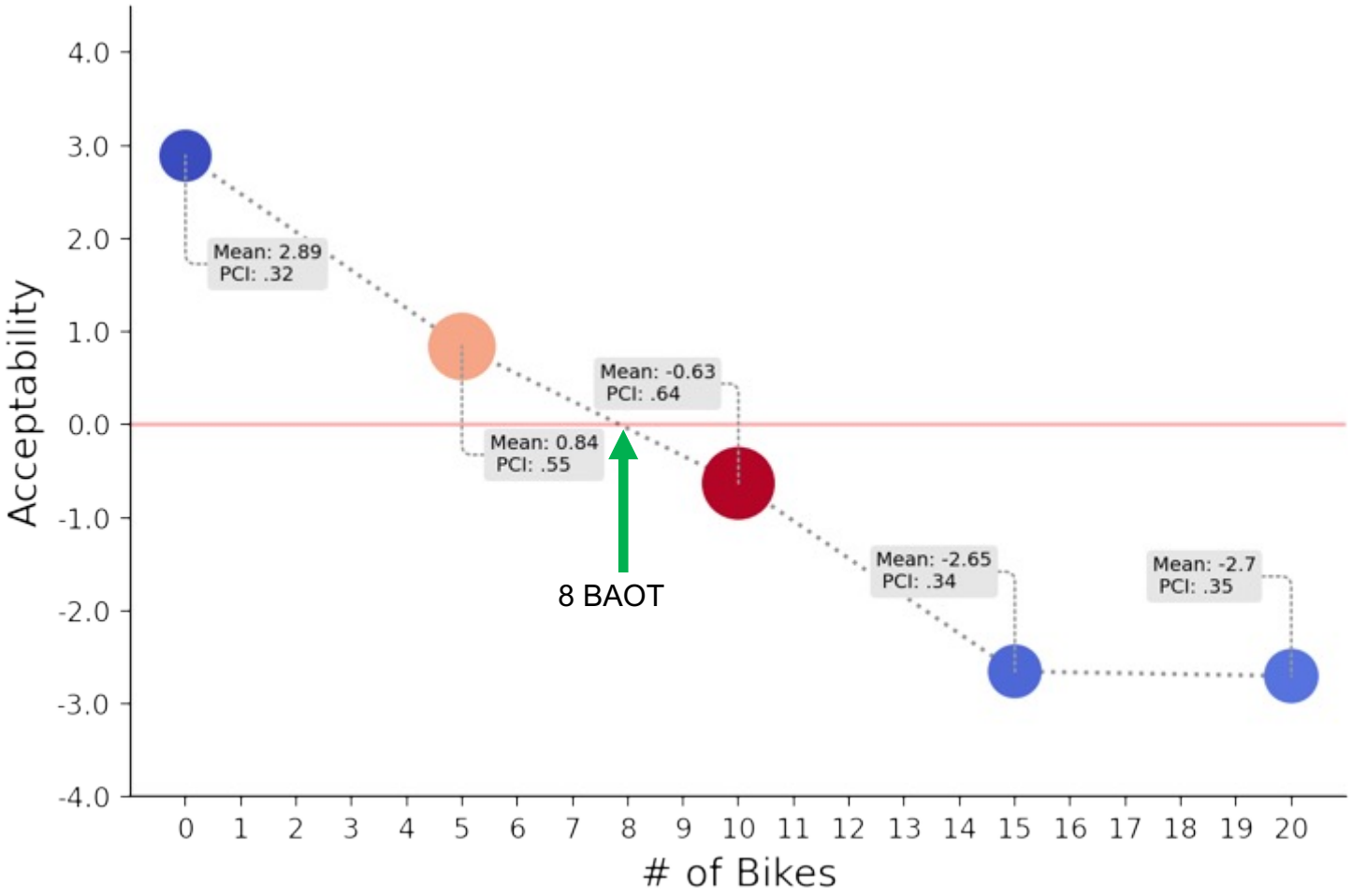
PAOT 15

PAOT 20

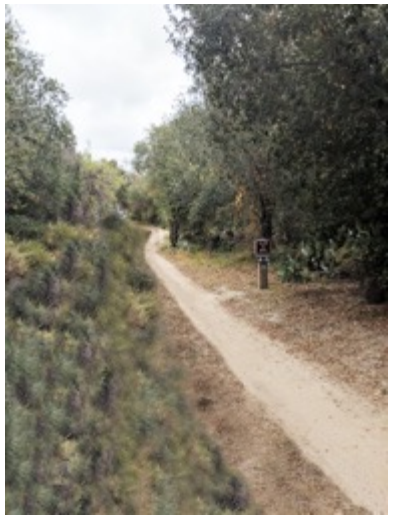
Crowding Index: People at one Time (PAOT)



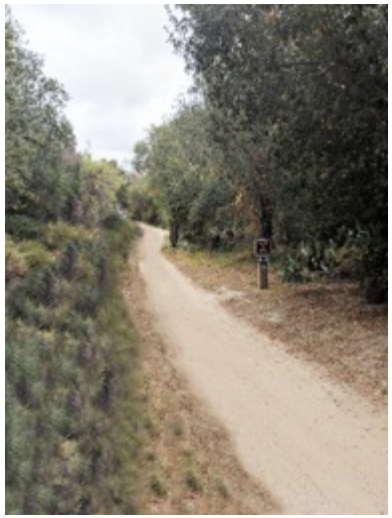
Bikers at one Time (BAOT)



Ecological Indicator: Trail Width

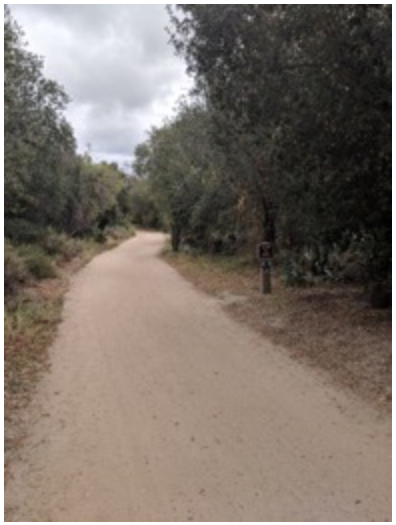


<50cm



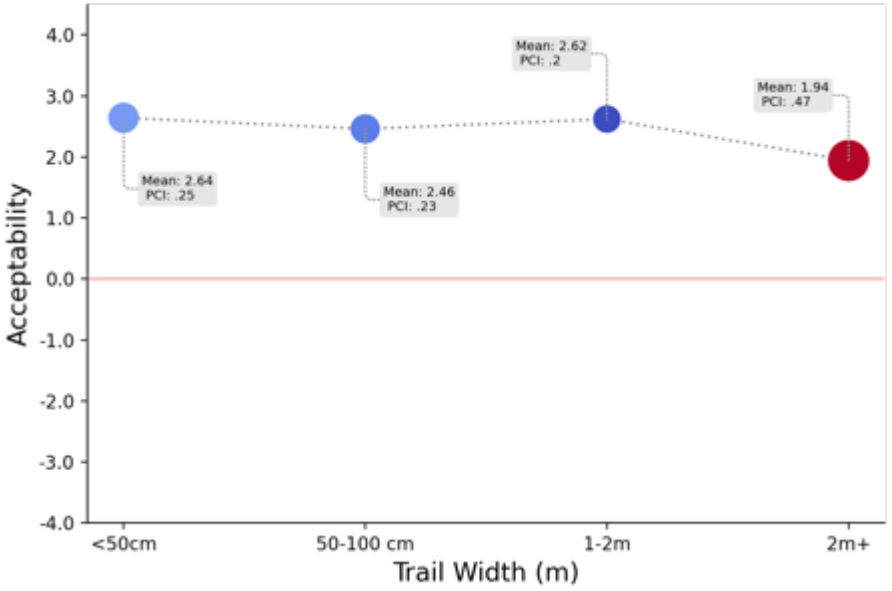
50-100cm

1-2m

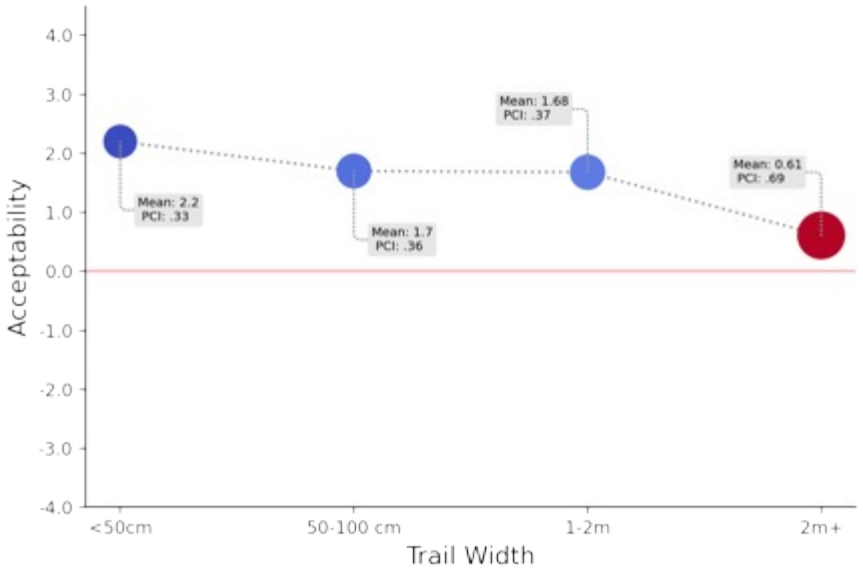


2m +

Trail Width



Recreation Preference



Recreation Impact

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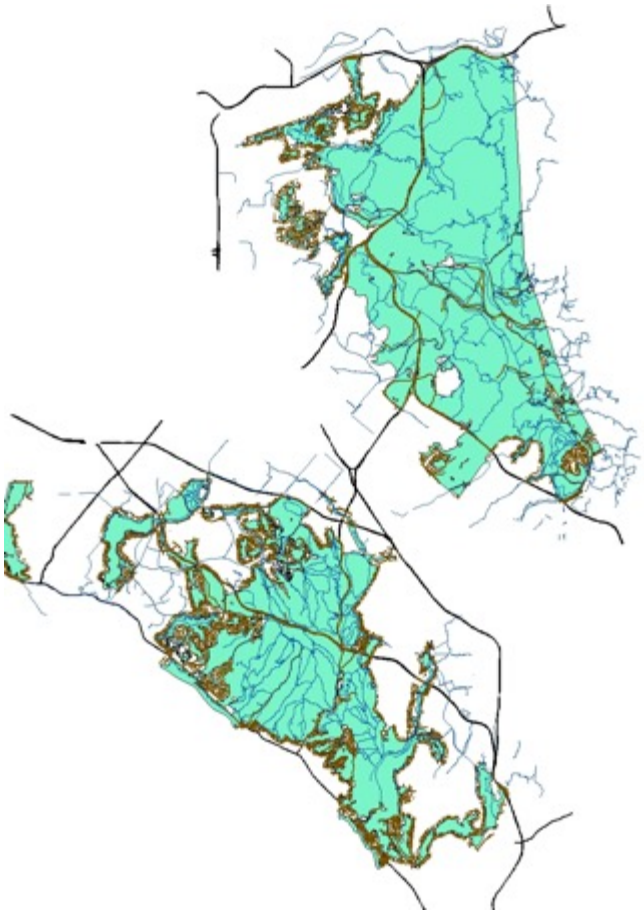
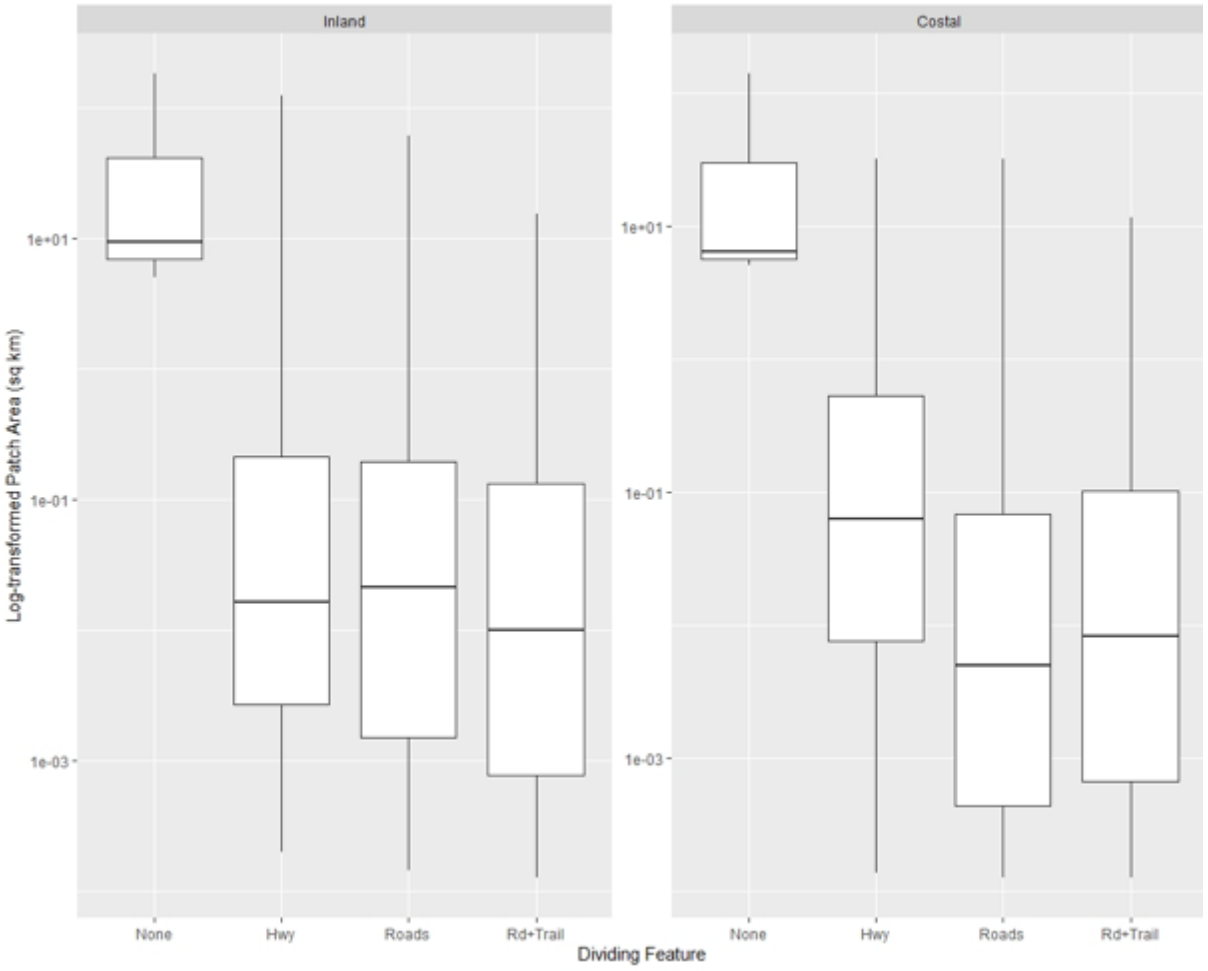
Habitat Analysis Approach

- Examination of resource conditions & potential for impacts to ecological resources
  - Existing vegetation maps & ecological data
  - Existing infrastructure & visitor use patterns
  - Combined social & ecological data
  - Application of new technologies

Applications across both spatial and temporal scales

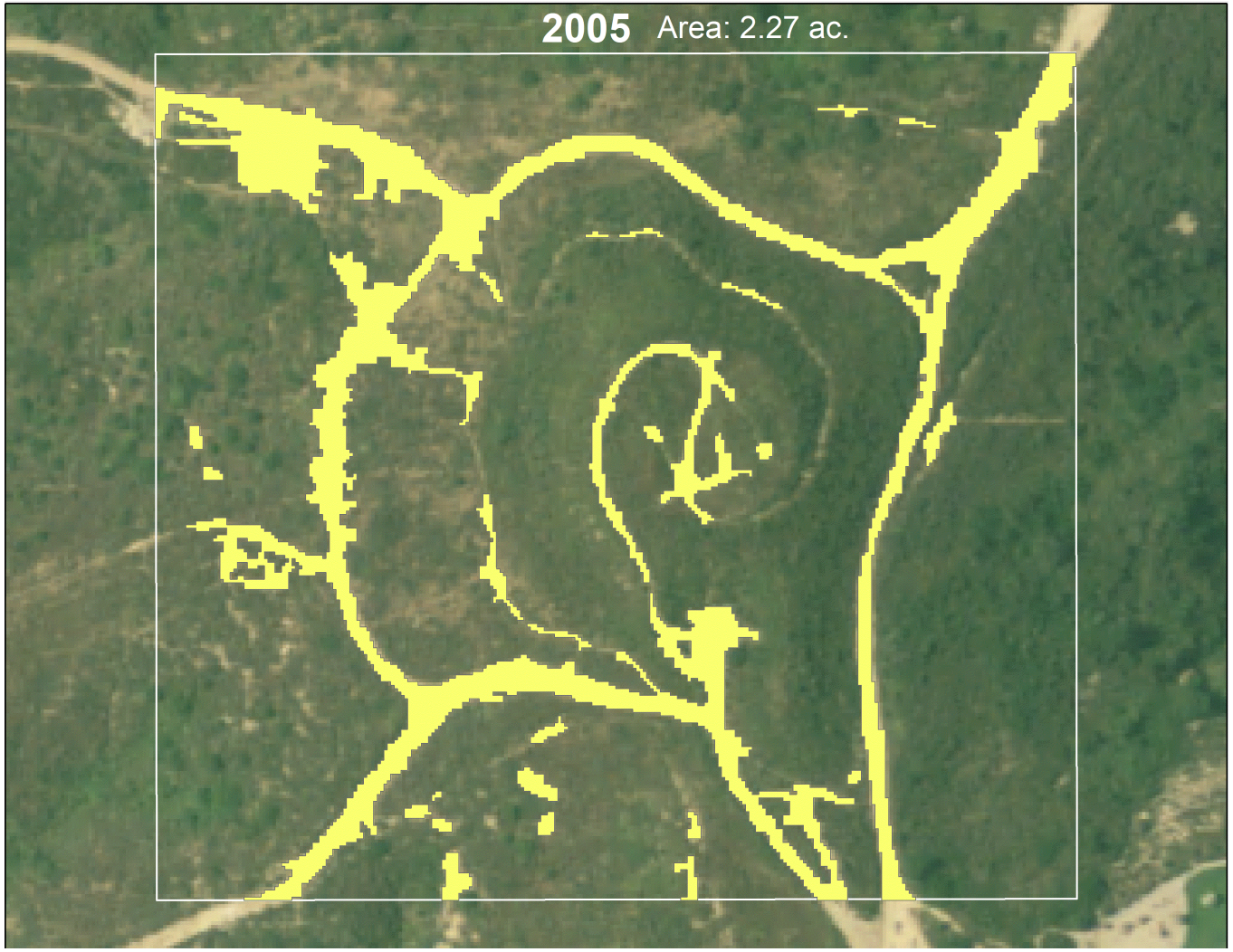
Protected Area Level Fragmentation



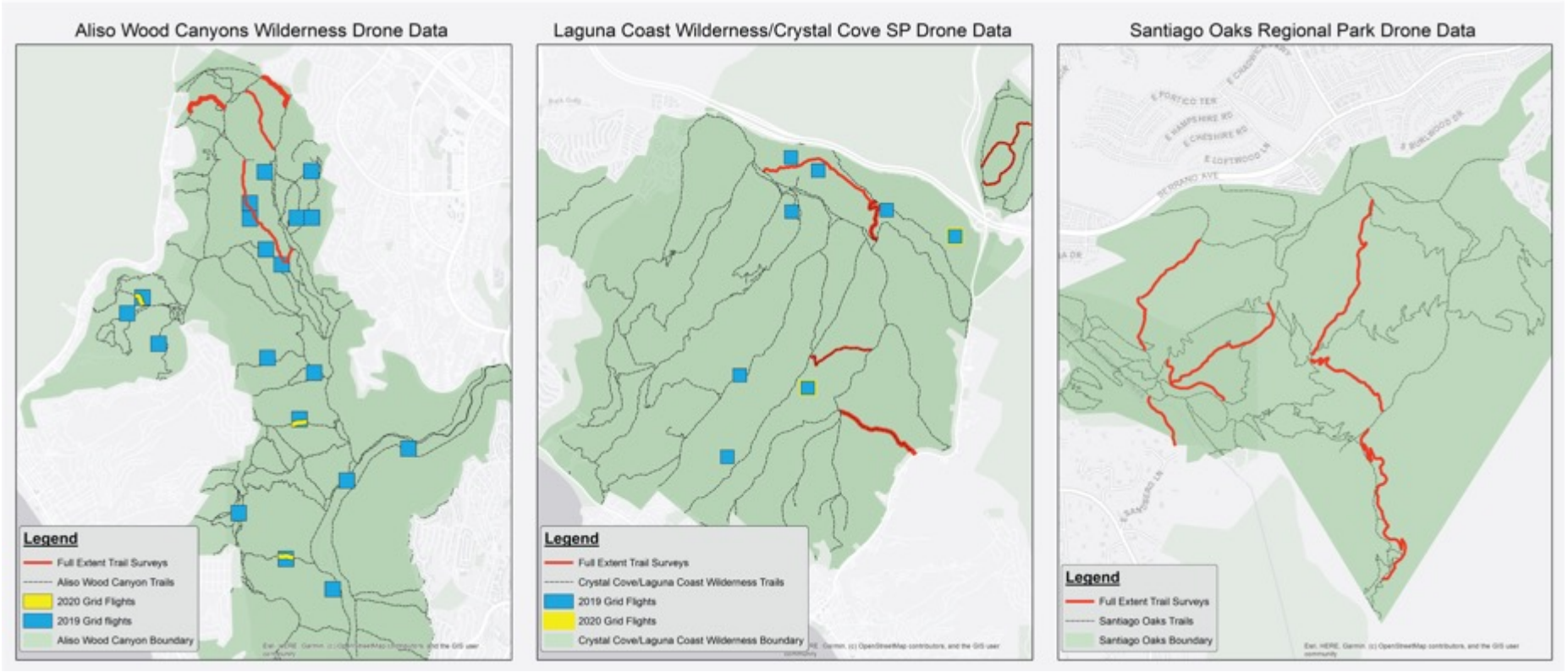


Credit: Dr. Evan Bredeweg, OSU

TOWO Landscape Change



Rec. Resource Conditions

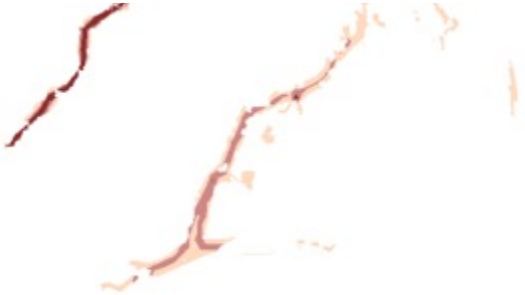


Intersection with Sensitive Habitat

Nature Cluster & Vegetation Layer

Select only sensitive habitat categories

Intersect sensitive habitat with Nature Cluster



- California Maritime Chaparral Group
- Californian Coastal Sage Scrub Group
- Californian Seral Scrub Group
- Protected Oak Species
- Vegetation Restoration Zones

Credit: Carli Schoenleber, M.S.

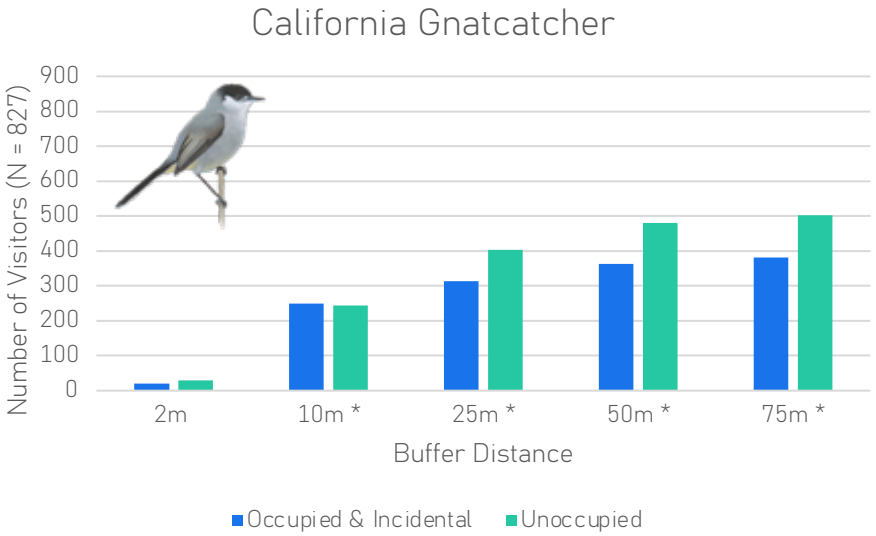
Intersection with Sensitive Habitat

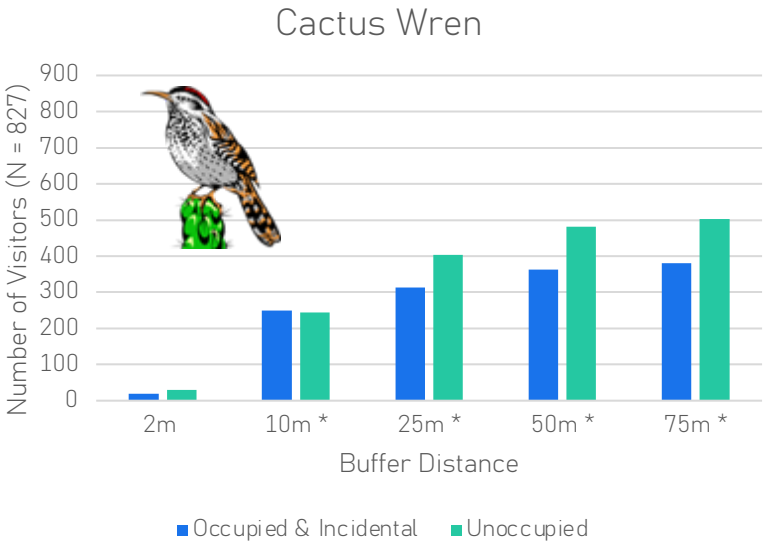
	% of total low density area	% of total medium density area	% of total high density area
All GPS Tracked Visitors	1.1	1.2	1.4
Exercise Group	1.1	1.6	1.4
Nature Group	1.2	1.3	1.2

	% individuals that intersected with sensitive habitat	Average time spent (mm:ss)	+/- SD (mm:ss)
All GPS Tracked Visitors	34.5%	02:23	02:41
Exercise Group	42.8%	02:14	02:40
Nature Group	29.3%	02:32	02:45

Credit: Carli Schoenleber, M.S.

Intersection with Bird Surveys



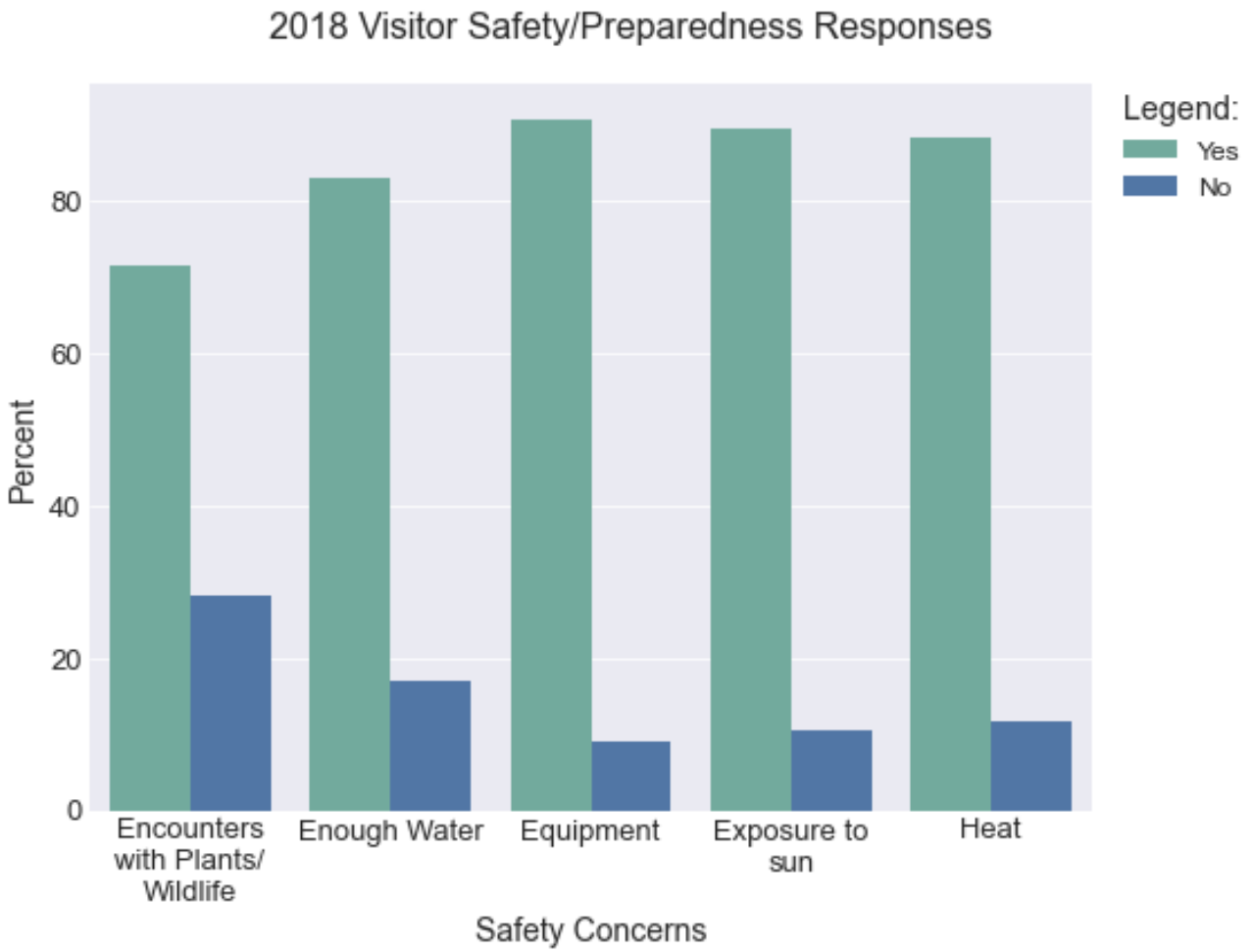


Credit: Carli Schoenleber, M.S.

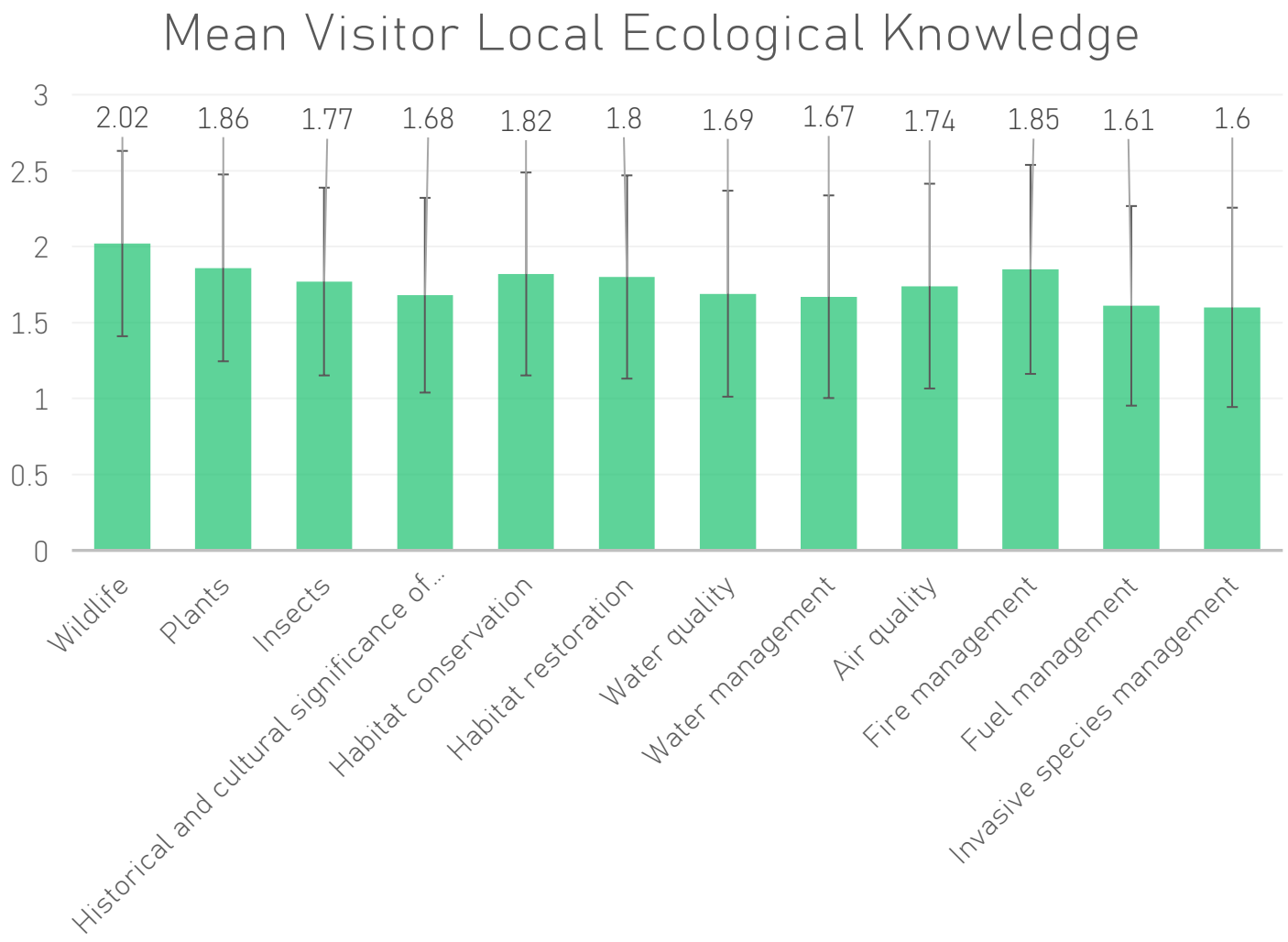
Outline for Today's Presentation

- Brief Overview- Project Goals and Accomplishments
- Human Dimensions of Recreation
- Habitat & Resource Protection
- Exogenous Factors
- Recreation Management Frameworks

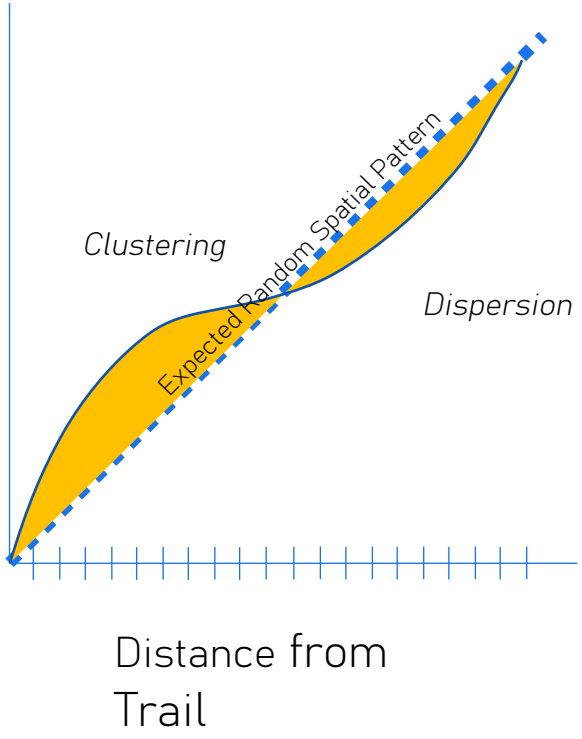
Preparedness/Safety



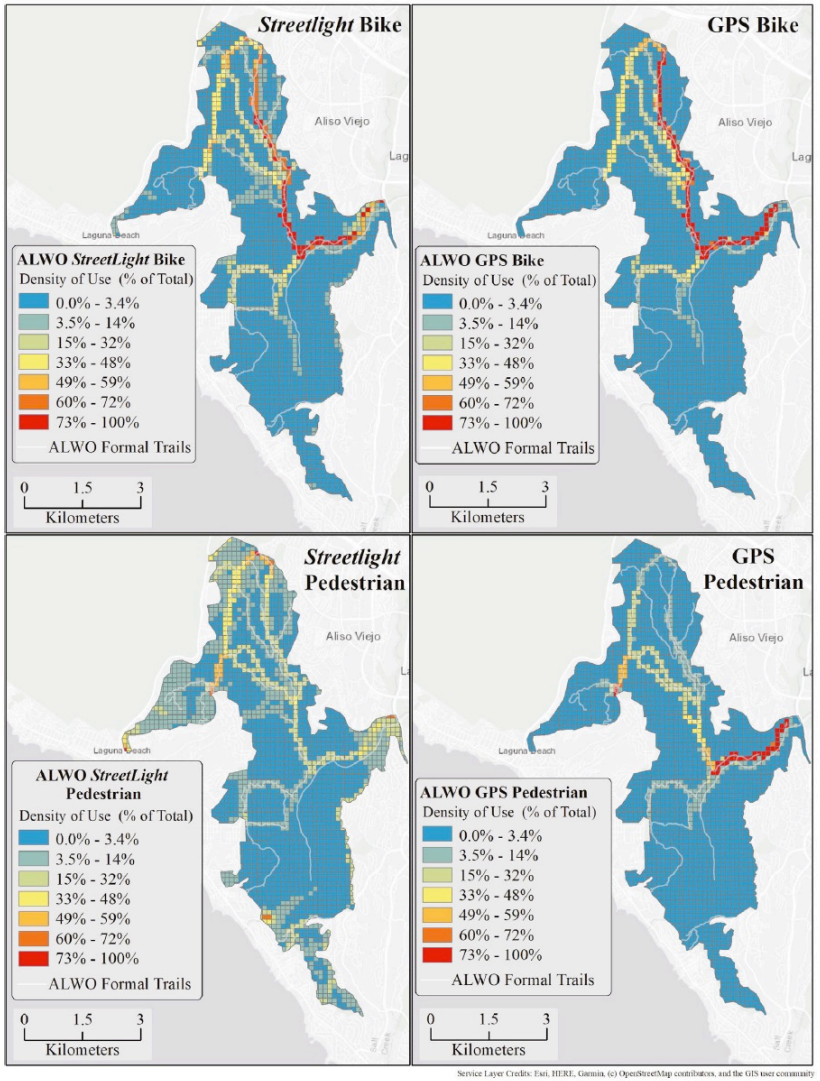
Knowledge of Fire & Invasive Species



Invasive Species

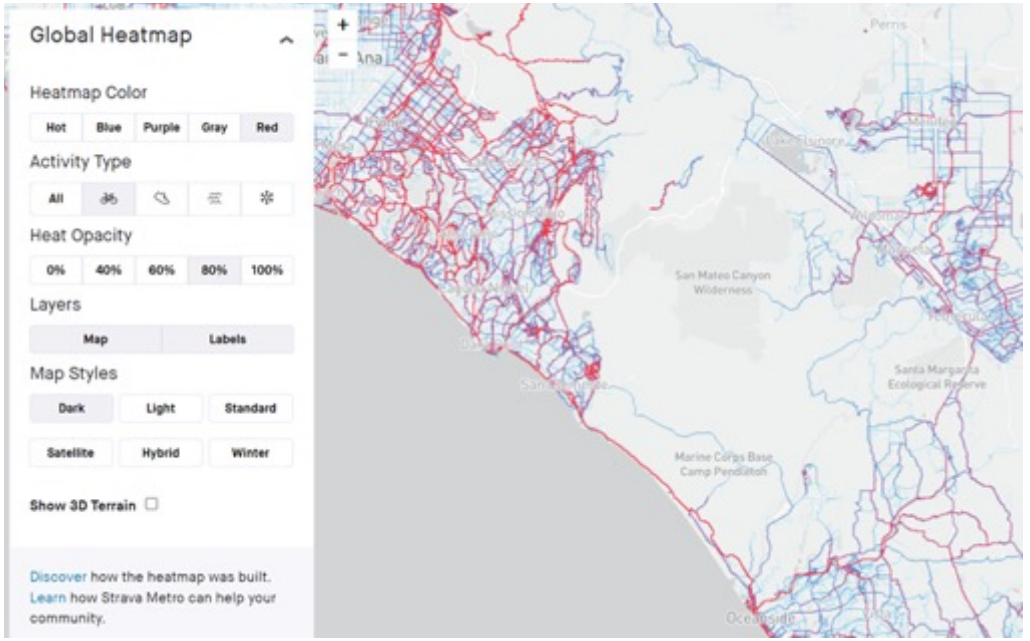


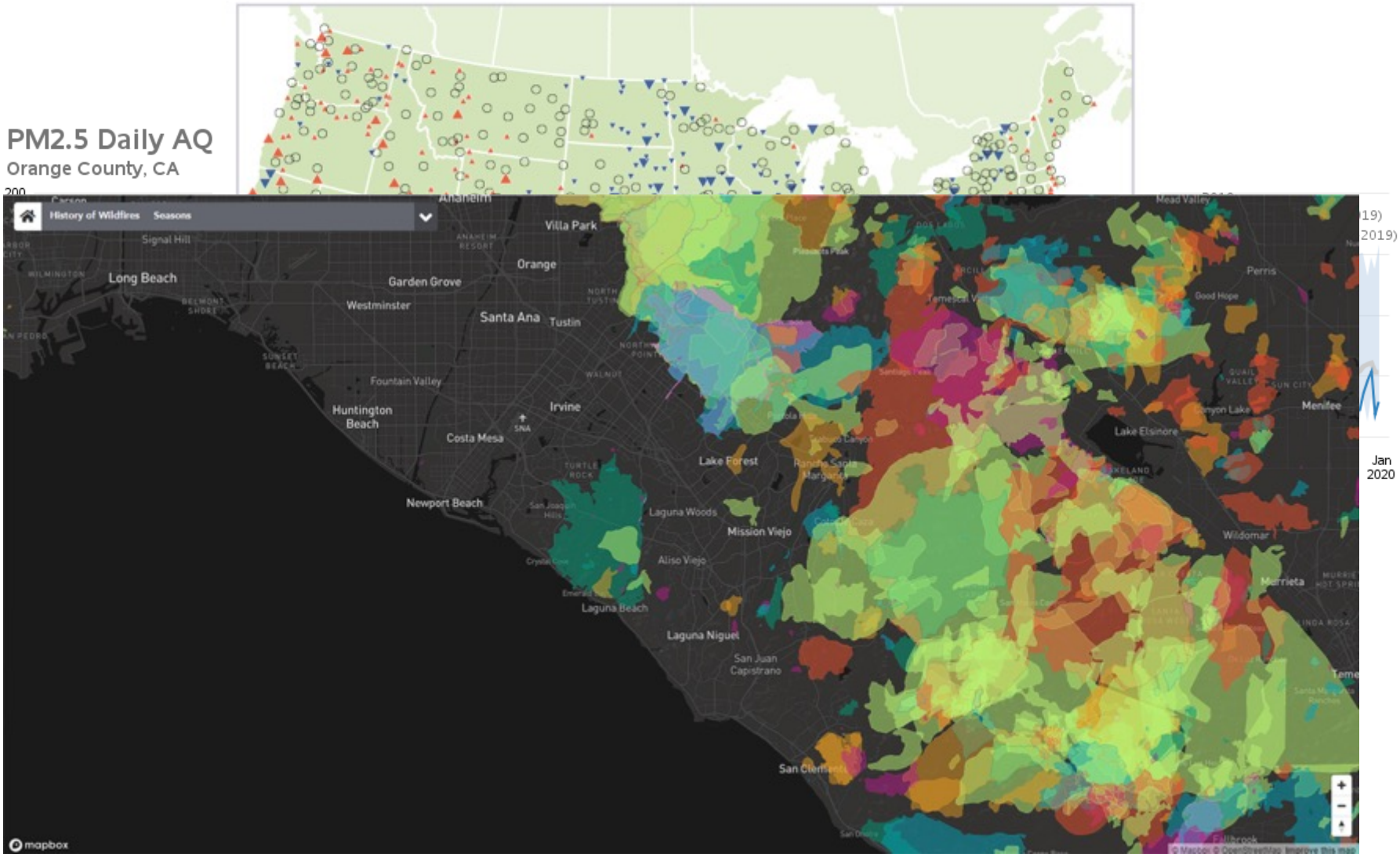
Future Research



Creany et al, 2021

Model changes in recreation behavior & distributions, and associated impacts to vegetation and/or wildlife communities, under increasing visitor-use scenarios & changing climates.





Data & Image Credit: EPA

Outline for Today's Presentation

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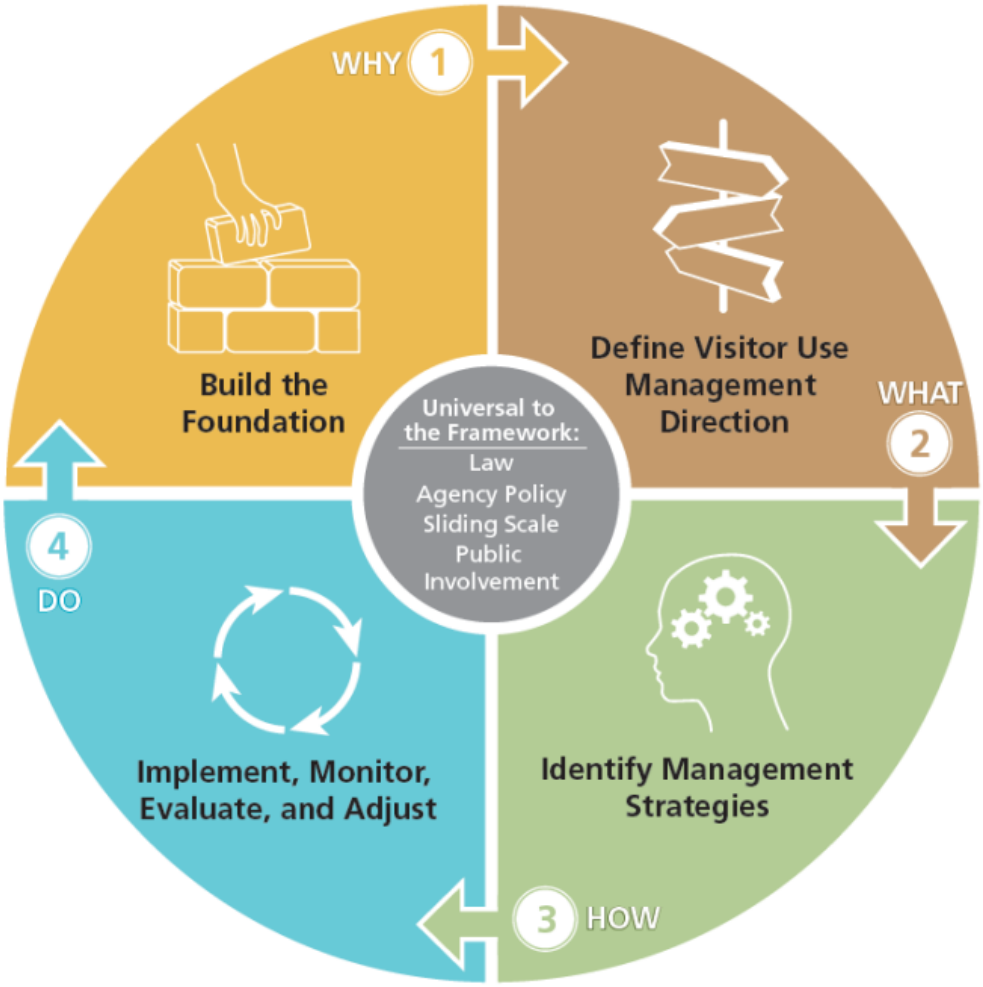
- Recreation Management Frameworks

Recreation management planning frameworks

the **analytical elements** necessary to address recreation use management opportunities and issues, **consistent with applicable law, within existing agency management processes.**

Definition from Visitor Use Management Council: https://visitorusemanagement.nps.gov/

Figure 1. Overview of the Visitor Use Management Framework



Visitor Use Management Framework

Build the Foundation (Why): What is the purpose and/or need? What issues are we facing? What issues can this plan address? What data and information do we have? What do we need?

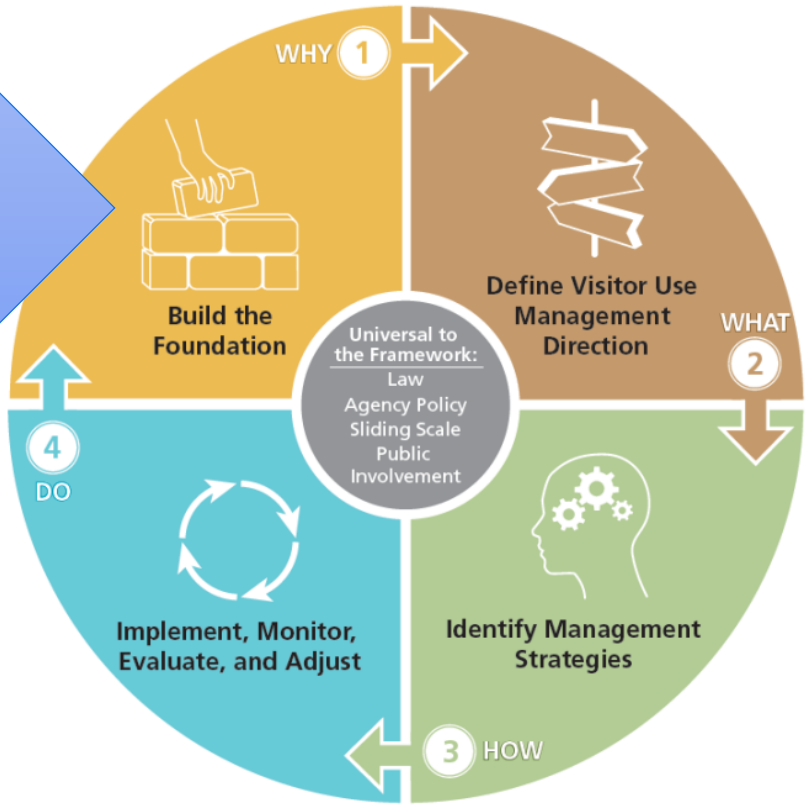
Define Visitor Use Management Direction (What): What are our desired conditions?

Identify Management Strategies (How): What strategies can we use to achieve our desired conditions?

Implement, Monitor, Evaluate, and Adjust (Do): Implement management actions and adjust them based on monitoring data.

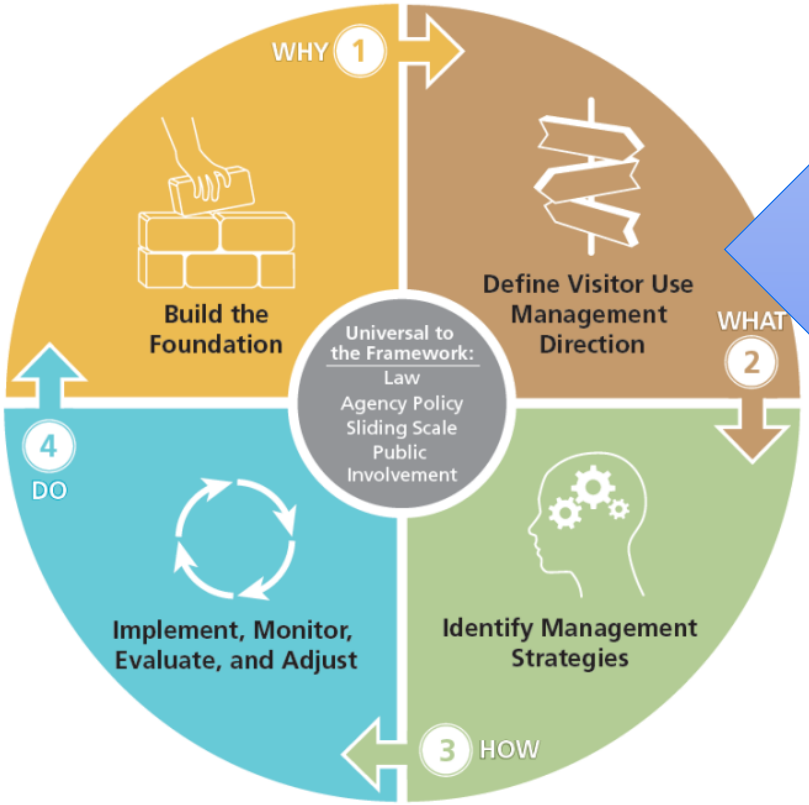
Figure 1. Overview of the Visitor Use Management Framework

Collection of baseline information (use levels, demographics, etc.)



Baseline Data

Figure 1. Overview of the Visitor Use Management Framework



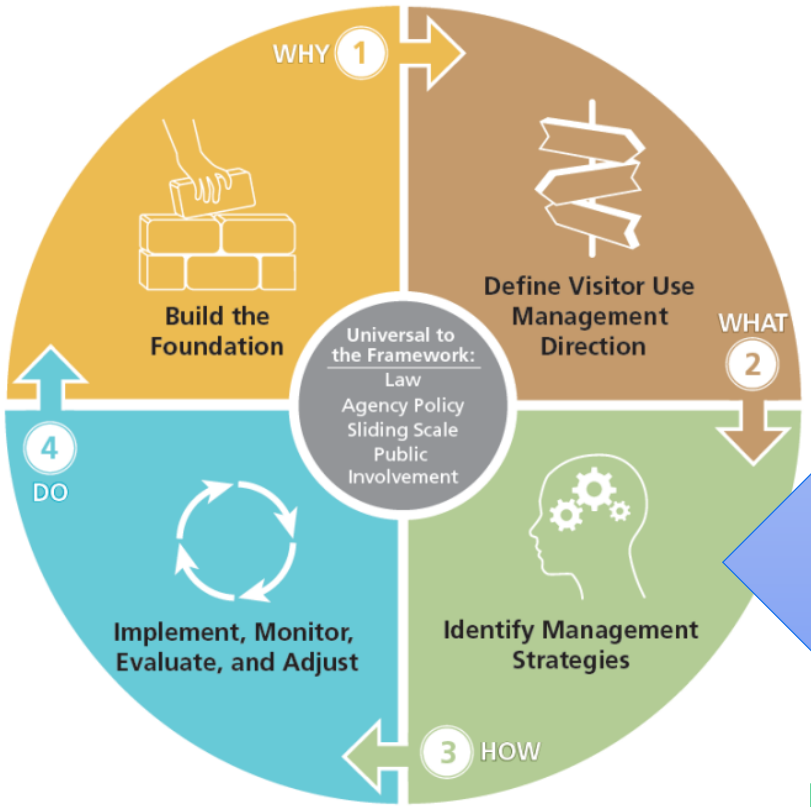
Desired conditions can be informed by visitor perceptions, satisfaction, conflict, current resource conditions, etc.

This information can then be used to inform the selection of indicators of social or ecological resource conditions

(ex: # of social trails, PAOT, trail width, etc.)

Indicators

Figure 1. Overview of the Visitor Use Management Framework

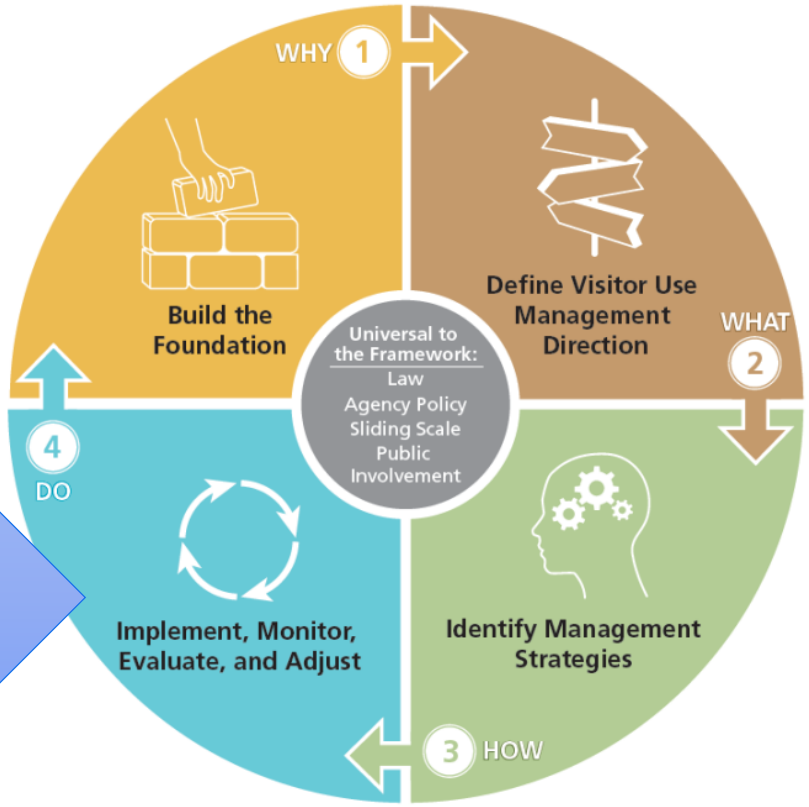


Compare desired conditions from #2 to data collected that describes current conditions

Protocols and survey instruments developed for this research and be used to establish monitoring protocols and strategies.

Monitoring

Figure 1. Overview of the Visitor Use Management Framework

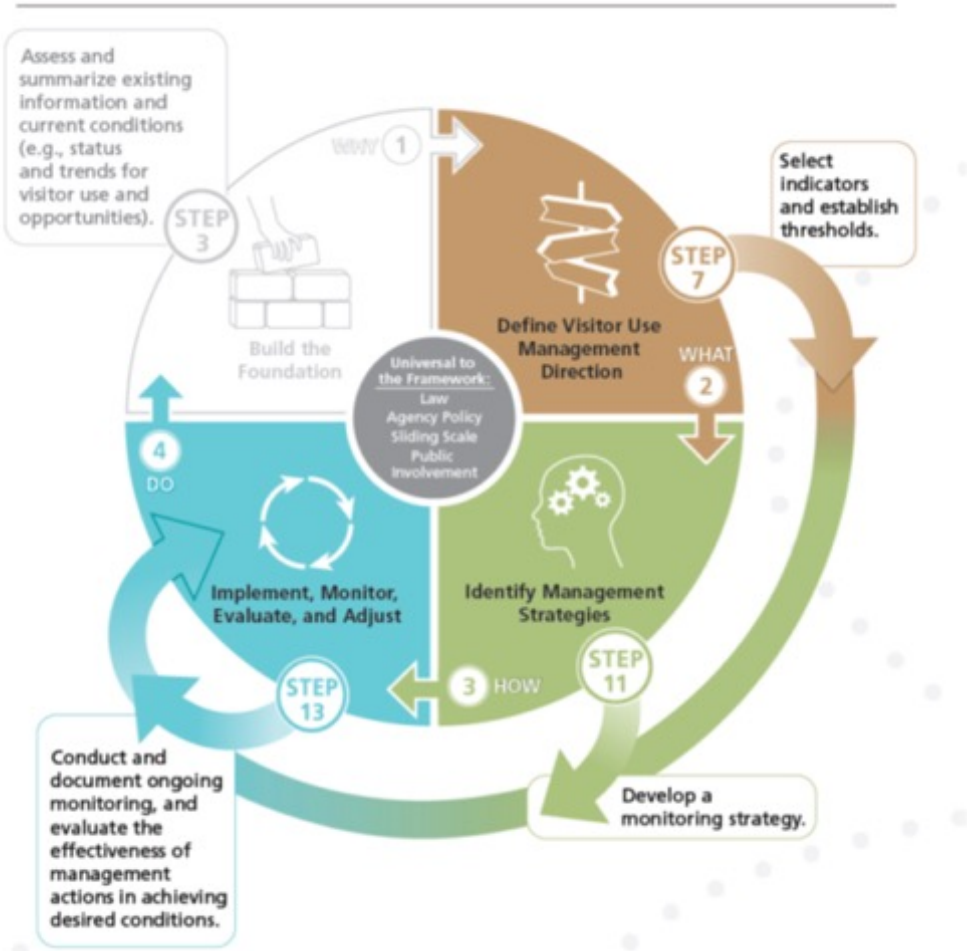


Using monitoring approach, evaluate current conditions and compare to desired conditions.

Adaptive Management

Science-informed, adaptive management!

Using baseline data, indicators and thresholds, and monitoring protocols to evaluate the effectiveness of management actions to achieved manager-developed desired conditions



Thank you!