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## Climbing Across the U.S.: A Narrative Exploration of Trends and Insights

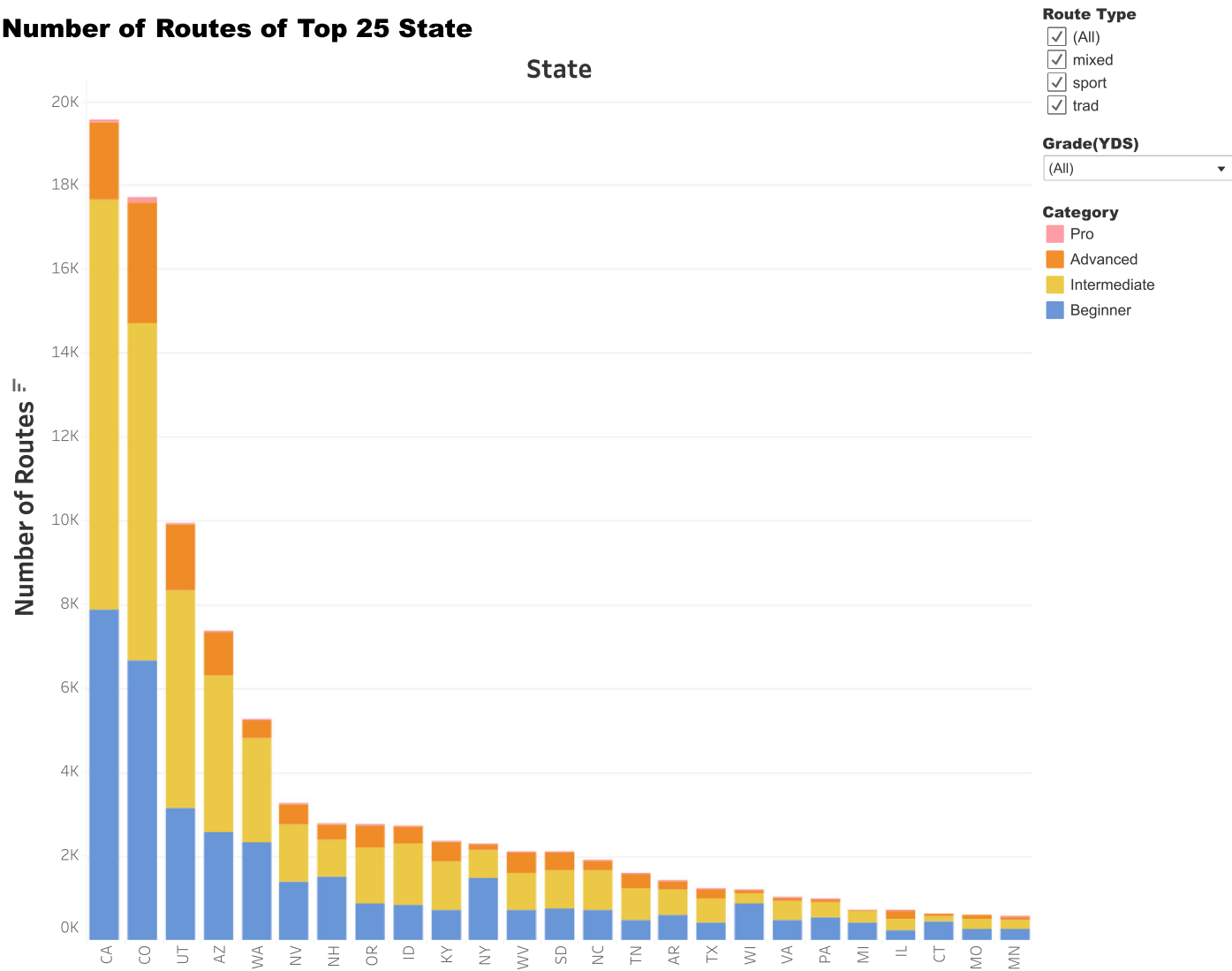
By Luna Liu, Julia Zhang, Kaiwen Zhou



Climbing in the United States is a tapestry woven from the unique geographies and communities that define its landscapes. From the towering granite walls of Yosemite to the sandstone cliffs of Utah, each route tells a story not just of physical challenge but also of cultural and environmental significance. Through data, we can uncover patterns that reveal how climbers interact with these spaces: where the routes are, how they're climbed, and what they mean to the people who tackle them. This narrative blends these insights with a deeper reflection on what they tell us about the present and future of climbing in America.

## Climbing Hotspots: More Than Just Numbers

Our analysis of climbing routes by state reveals striking geographic disparities. California, Colorado, and Utah unsurprisingly emerge as dominant players, with their iconic climbing areas such as Yosemite, Eldorado Canyon, and Indian Creek serving as global magnets for climbers. These states' diverse landscapes support a wide variety of climbing styles, from high-altitude alpine routes to desert sandstone cracks.



Yet, the numbers alone don't tell the full story. Smaller states like Kentucky and West Virginia, while hosting fewer routes overall, offer a concentrated richness in areas like the Red River Gorge and New River Gorge. These regions provide a stark contrast to the sprawling opportunities of the Western states, illustrating how climbing culture adapts to and thrives within different contexts.

This uneven distribution highlights a key reality: climbing is both a reflection of and a response to geography. While climbers in route-dense states may enjoy ease of access, those in areas with fewer routes often cultivate tight-knit communities and travel extensively to pursue their passion. The relationship between geography and climbing culture is symbiotic, shaped by both the natural environment and the human desire to explore it.

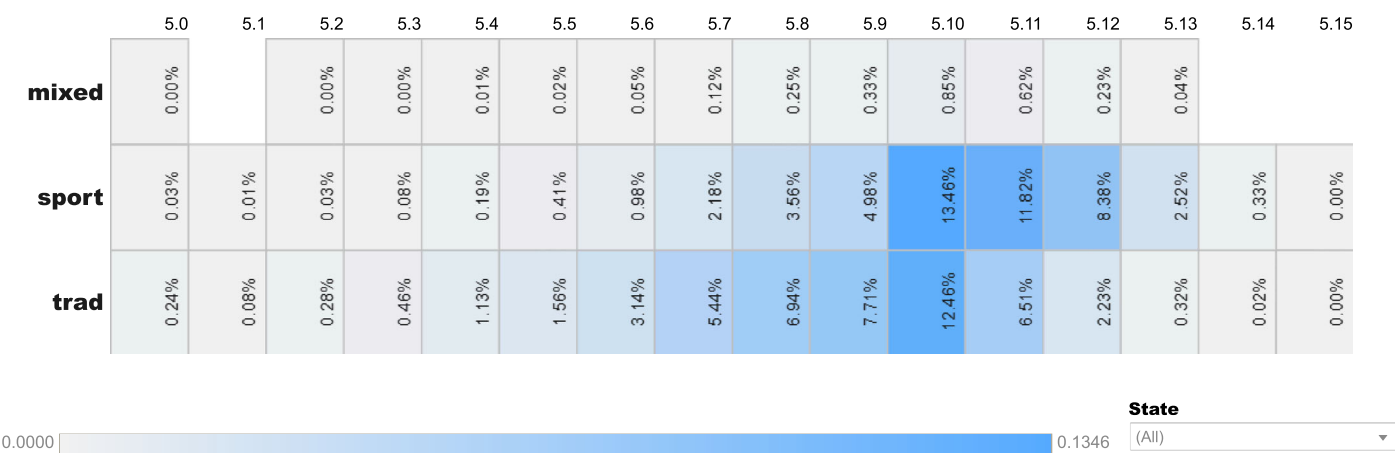
## How Styles Align With Difficulty

The intersection of climbing styles and difficulty grades offers a fascinating glimpse into the evolution of the sport. Trad climbing dominates the lower grades, where natural protection is abundant and the technical demands are less severe. This pattern reflects the historical roots of climbing, which emerged from mountaineering traditions that prioritized self-reliance and minimal environmental impact.

As difficulty increases, sport climbing becomes the prevailing style. Bolted routes, which provide fixed protection, allow climbers to push the limits of physical and technical ability without the additional mental strain of placing gear. This transition underscores how climbing has evolved to accommodate not just safety but also the pursuit of athletic achievement.

Interestingly, mixed routes occupy a niche space, bridging the gap between these two styles. These routes demand versatility, requiring climbers to navigate both bolted sections and areas where natural protection must be placed. Mixed climbing challenges not just physical ability but also adaptability, making it a reflection of the sport's hybridized identity.

Heatmap of Type vs. Grade





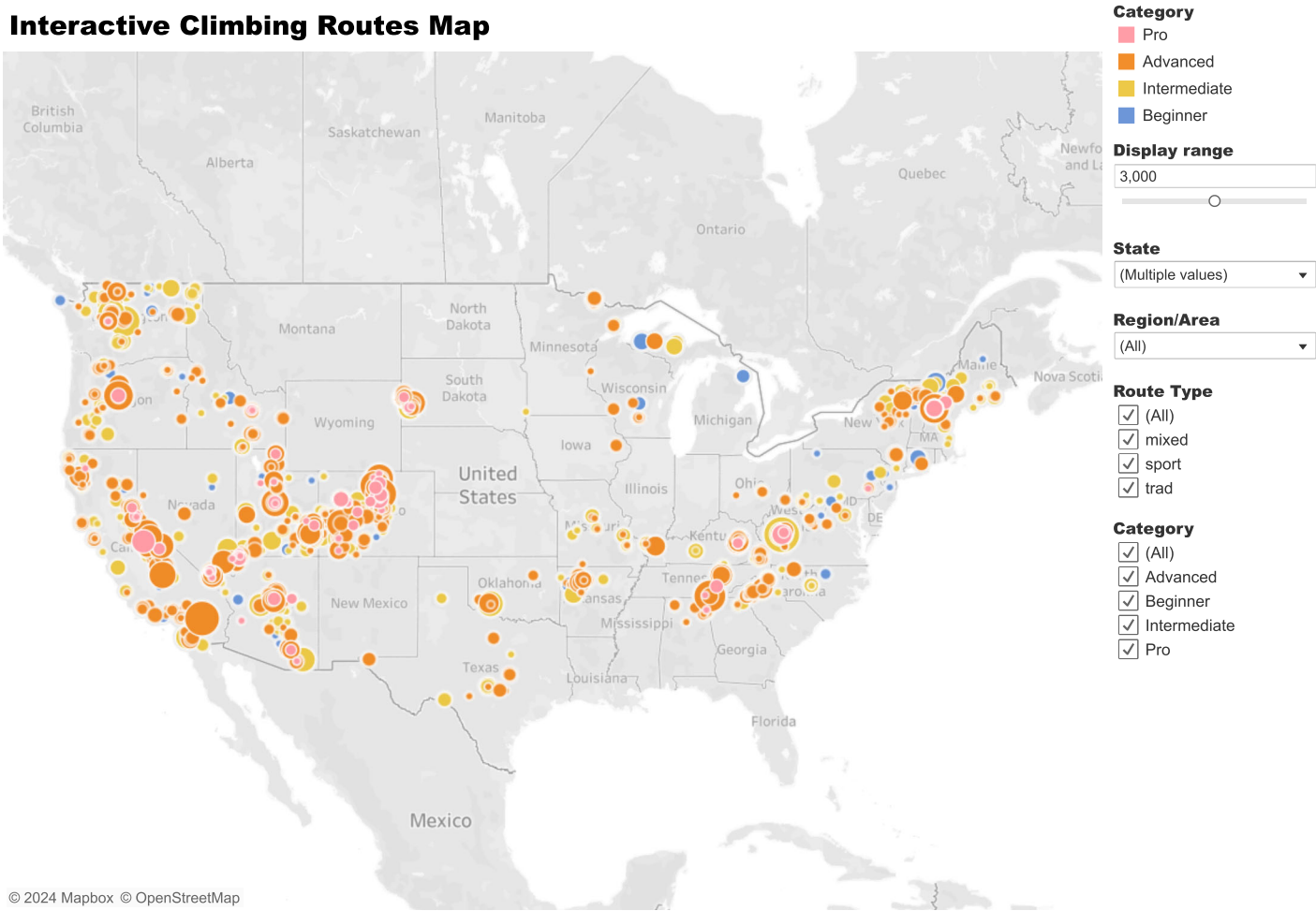
# The Diversity Of Climbing Opportunities

To fully appreciate the climbing landscape, we need to look beyond aggregates and into the details of individual routes. Our interactive map of climbing routes paints a vivid picture of diversity, highlighting how climbing opportunities vary by region, difficulty, and style.

For example, areas like Bishop, California, offer an exceptional range of bouldering problems, catering to climbers of all skill levels. In contrast, Indian Creek in Utah is a paradise for trad climbers, with its endless sandstone cracks presenting both beauty and challenge. These distinctions aren’t just about geography; they reflect how local environments shape the climbing experience, offering unique challenges that define each region’s climbing culture.

Moreover, the map reveals seasonal patterns in climbers’ movements. Cooler regions like Colorado see peak activity in summer, while destinations such as Joshua Tree in California become hotspots in winter. These patterns illustrate how climbers adapt to the natural rhythms of the environment, reinforcing the deep connection between the sport and the landscapes it inhabits.

## Interactive Climbing Routes Map



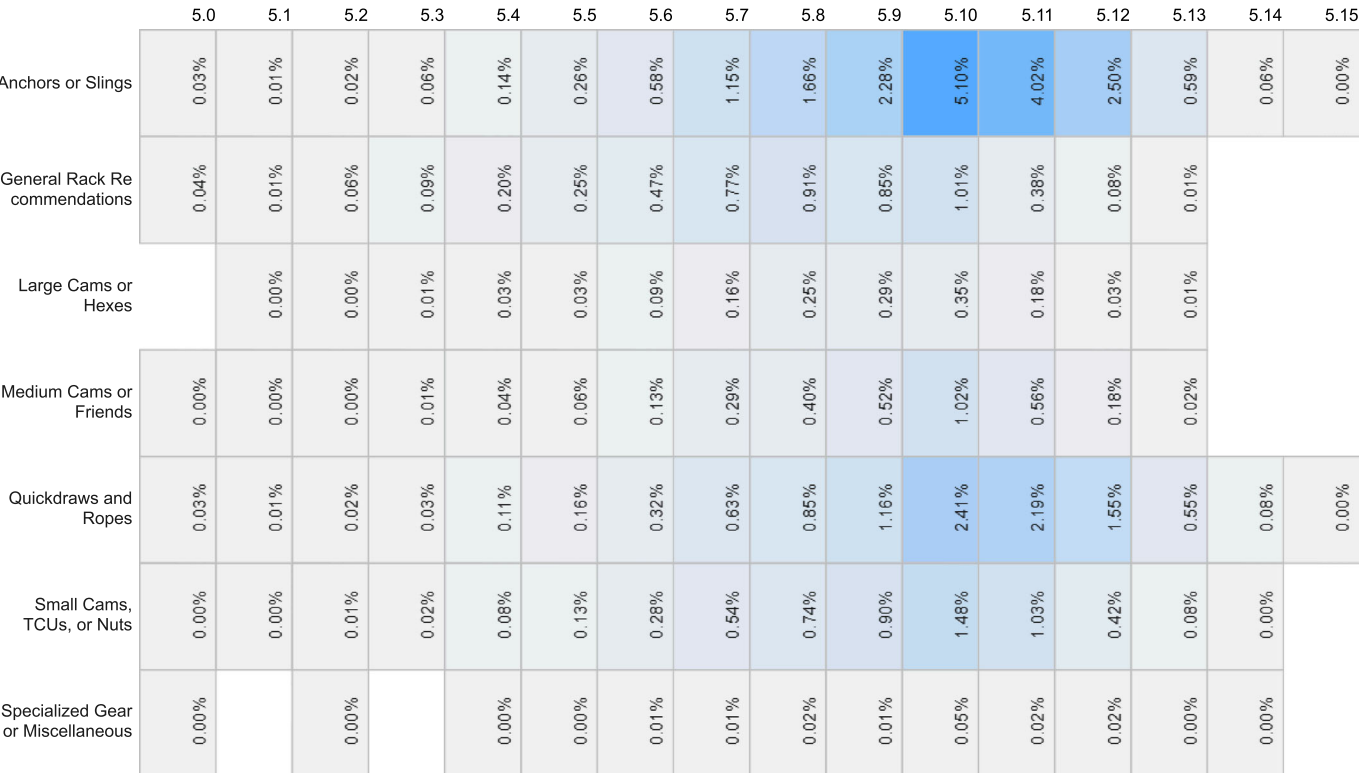
## The Connection Between Protection And Grade

The relationship between protection and climbing grade provides key insights into how climbers adapt their gear choices to the demands of each level. Lower grades (5.0–5.2) are dominated by anchors, slings, and general rack recommendations, reflecting a focus on safety and accessibility. These grades often appeal to beginners, where straightforward protection methods help build confidence and stability.

As the grades progress to 5.5 and beyond, we see a shift toward gear like quickdraws and ropes, which are essential for sport climbing. This transition underscores how climbers prioritize efficiency and performance as technical difficulty increases. Additionally, the reliance on medium cams and small cams grows slightly in the mid-grades (5.6–5.8), emphasizing the need for precise placements in cracks and more technical terrain.

Notably, the use of specialized gear, such as small cams and miscellaneous tools, remains minimal across all grades. This finding highlights that while advanced techniques are required for higher grades, climbers still depend on versatile and familiar gear types. The heatmap below visualizes these patterns, showcasing how protection usage adapts across grades and climbing styles.

Heatmap of Protection vs. Grade



Climbers’ Voices: Sentiment Analysis Of Reviews

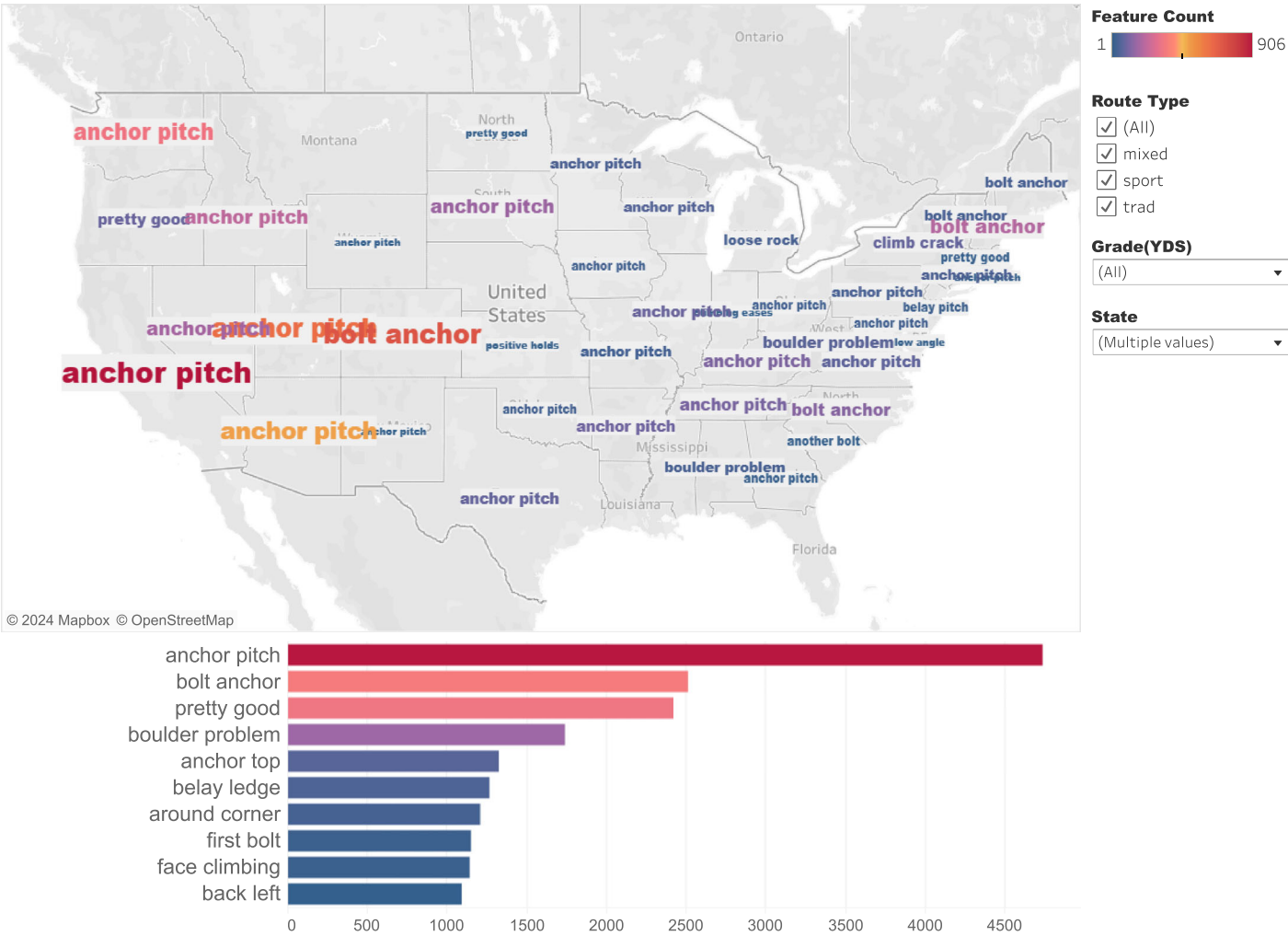
While numbers and maps can tell us where and how people climb, reviews offer insights into the personal experiences that routes inspire. Using Natural Language Processing (NLP), we analyzed climbers’ feedback to uncover recurring

themes in their sentiments.

Positive reviews often highlight features like good protection, well-maintained routes, and rewarding challenges. Words such as “secure,” “fun,” and “beautiful” appear frequently, reflecting climbers’ appreciation for routes that combine physical challenge with aesthetic or emotional satisfaction. These sentiments underline the idea that climbing is as much about the journey as the destination.

On the other hand, negative reviews point to issues such as poor maintenance, overcrowding, and environmental degradation. Complaints about “runout” sections—where protection is sparse—emphasize the mental strain of poorly protected climbs, while concerns about “loose rock” highlight safety risks. These themes serve as reminders of the delicate balance between accessibility and sustainability in climbing areas.

Popular Features of Climbs



The Future Of Climbing: Challenges And Opportunities

The insights gleaned from these visualizations point to both opportunities and challenges for the climbing community. As climbing continues to grow in popularity, its impact on natural areas becomes increasingly significant.

Overcrowding, erosion, and the strain on local ecosystems are pressing issues, especially in popular destinations.

At the same time, the data highlights opportunities for growth and innovation. Areas with fewer routes but high potential—like the Midwest—could benefit from development efforts that prioritize sustainability. Understanding climbers' preferences through reviews can also guide the creation of routes that balance challenge, safety, and environmental impact.

Ultimately, climbing is more than just a sport; it is a dialogue between people and the natural world. By exploring these trends and patterns, we can better understand how to preserve the beauty and integrity of climbing areas while fostering a vibrant and inclusive climbing culture. This journey through data is only the beginning of that conversation.

## Dataset

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The primary data source for this project is the [OpenBeta Climbing Dataset](#), available on GitHub. This dataset includes comprehensive information about climbing routes, locations, and difficulty ratings. Additional contextual information will be gathered from climbing blogs, forums, and scientific publications focusing on environmental impact and climbing culture.

## References

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