

# Assessing Socioeconomic Patterns of Cultural Ecosystem Services Provided by North King and Snohomish County Lakes

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## ABSTRACT

In this study, we explore when and how people use public water access in North King and Snohomish Counties. We obtained hourly counts of the number of people participating in different lake-based activities at 9 lakes in summer 2021. Understanding the spatiotemporal distribution of lake visitation is critical for determining how resources can be allocated to increase access in ways that have the highest positive impact. Availability of amenities – or lack thereof – may indicate why lake users travel farther to a lake rather than visiting a local one. Additional factors that may influence visitation include weather, access via public transportation, and tree cover. This data will aid city and county lake resource managers in ensuring everyone is able to access and appreciate Washington State lakes.

## OBJECTIVE AND APPROACH



**Objective:** Find out who is using the lakes and how, who isn't using the lakes why, and make lakes accessible to all.

- Sampled from 17 lakes in Snohomish and King County
- Lakes include Angle, Bitter, Blackmans, Boren, Cottage, Echo, Fivemile, Flowing, Geneva, Haller, Martha, Meridian, Pine, Silver, Steel, Wilderness.
- Extensive and Intensive sheets were used to determine the amount of lake activity
- Lakes were chosen based off their environmental health disparity (EHD) rating

**W Extensive Visitor Count**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Lake: \_\_\_\_\_

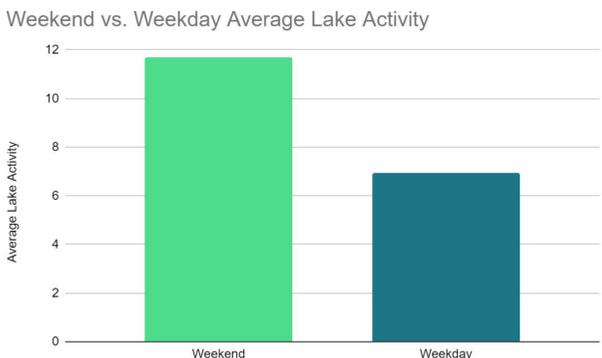
Time	
Weather (Sunny, Partly Cloudy, Overcast)	
Boating (motorized)	
Small Craft (kayak, etc.)	
Fishing (shoreline)	
Shore Activity	
Swimming	
Stationary/Walking	
Exercising	
Traffic	
Dogs	
Care	
Special Events	

Notes: \_\_\_\_\_

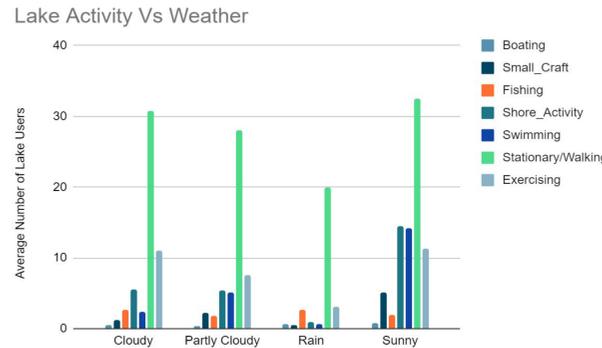
**Figure 1.** Extensive Visitor Count sheet used to tally number of lake visitors. Also established what "boating" and "small craft" meant.

**Figure 2.** Photos from lakes in order from top to bottom: Flowing Lake, Flowing Lake, Echo Lake, Haller Lake, Silver Lake

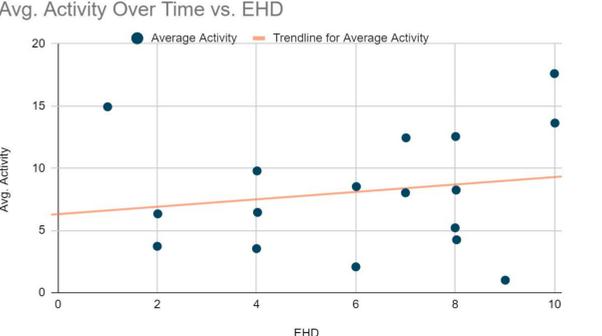
## RESULTS



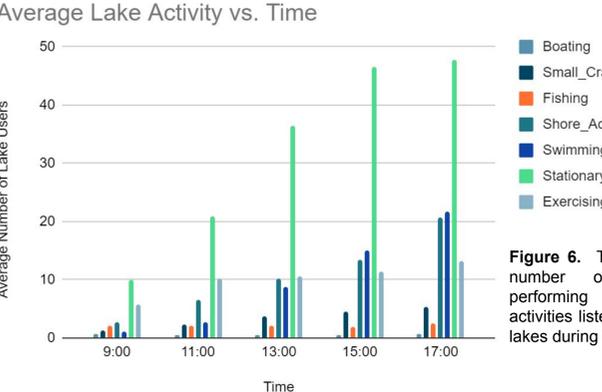
**Figure 3.** This table describes the average lake activity from the weekends and weekdays of the study across all lakes, starting on June 26 and ending on September 21.



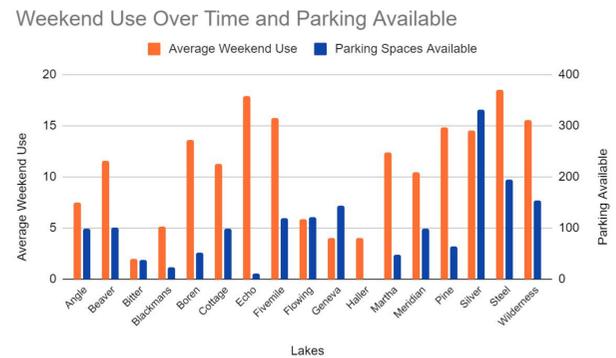
**Figure 4.** Average number of lake users and their corresponding activity per weather event.



**Figure 5.** Average lake activity over time. Each dark blue point represents each lake observed with their corresponding EHD (Environmental Health Disparities) rating. The orange line represents the activity at each of those lakes.



**Figure 6.** The average number of persons performing these lake activities listed across all lakes during these times.

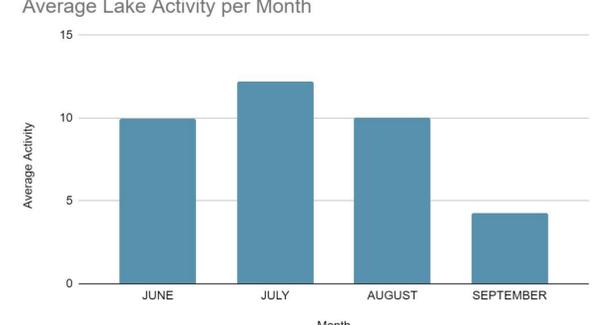


**Figure 7.** This graph the average lake visitation at each lake throughout the course of the study and their corresponding parking. The orange line denotes the weekend participation and follows the left axis, the blue represents the lakes parking and is represented by the right axis.

**Table 1.** Improvements that Could be Made to Increase Lake Visitation

Improvements to Lake Access and Amenities	Percent (%)
Lack of Public Transportation	3.04
Lack of Parking	17.44
Safety of Water (e.g., algae blooms, bacteria)	20.28
Excess Garbage or other Waste	12.37
Nuisance Animals (birds, rodents)	1.22
Too Many Dogs (including off-leash)	2.64
Risk of Drowning (lack of lifeguards)	5.48
Personal Safety	5.68
Improvised Shelters and Homeless People	11.16
Lack of Amenities (dock/fishing pier, bathrooms, playgrounds, playfields, picnic shelters)	10.14
Lack of Shade	7.30
Other	3.25

**Figure 8.** Percentages of people surveyed who have chosen particular issue(s) that could be improved across each lake observed. Statistics are done by totalling the number of issues chosen, and dividing that by the total number of choices available.



**Figure 9.** Average of people visiting lakes per month.

## DISCUSSION

- There is almost double the lake activity during the weekend than on weekdays
- There is significantly less activity during rainy days than on sunny days. The days that were partly and fully cloudy also had less activity than sunny days, but much more activity than rainy ones.
- Of the lakes that are studied, there is a growing trend of lake activity and EHD score.
  - Haller lake had parking circle, but no designated spaces and was not connected to the park itself. Consistently high visitation despite no parking spots.
- While parking spots do not always indicate the amount of visitors the lake will have, it does serve as a guide in understanding the proportions needed to serve on the busiest days.
  - Haller lake had parking circle, but no designated spaces and was not connected to the park itself. Consistently high visitation despite no parking spots.
- There is exponential growth in the number of people doing lake activities later in the day. There is a significant different in population of lake users from 9 am, to 5 pm on the average day.
- There was steady visitation of the lakes from June through August, then a significant decline in September.

## CONCLUSION AND NEXT STEPS

As there is still minimal data on the value and use of Ecosystem services in United States lakes, including It may be worthwhile to find out why this is, and how lake usage across all communities and times of day/week can improve. We found that lake usage is not determined by one variable alone, but that many related factors play a role in an individual's and a community's decision to use a lake. These factors include resources available, distance to transit, weather patterns, water safety, parking, and more. Learning more about these factors and how they are related will help improve public use of lakes and increase equitable access for all.

## ACKNOWLEDGEMENTS AND REFERENCES

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**Figure 10.** Photo to left, the beach of Blackmans Lake on a partly cloudy day. Photo to the right, open green space of Flowing Lake on a clear day.