Point Blue Conservation Science

# Stinson Beach ARC Beach User Analysis

## Using Cell Phone Data to Understand Beach Use Patterns

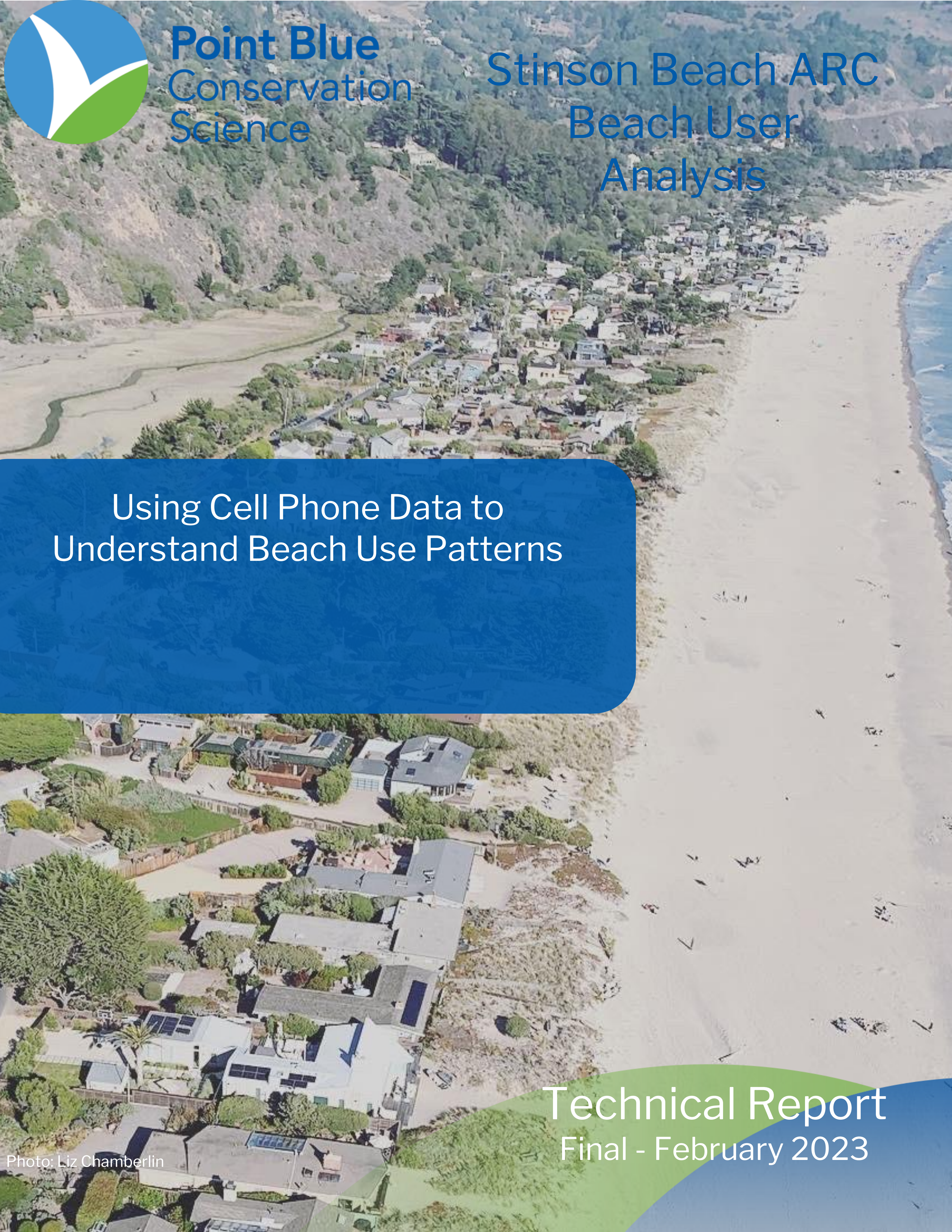

Photo: Liz Chamberlin

Technical Report

Final - February 2023


Photo: Liz Chamberlin

# Stinson Beach ARC Beach User Analysis
# Using cell phone data to understand beach use patterns

## Final Technical Report to the County of Marin Community Development Agency– February 2023

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# INTRODUCTION

Estimates from State of California guidance indicates that Stinson Beach could experience up to 10 feet of sea level rise by 2100 (Griggs et al. 2017). Increased sea-levels combined with intensifying storm flooding and erosion present a special urgency for coastal California (Barnard et al. 2019). The resulting flooding and erosion could cause the loss of this world-renowned beach and permanent inundation of Highway One while also putting hundreds of homes at risk California (Barnard et al. 2019). Developing adequate adaptation strategies to alleviate these threats includes the need to understand the potential socio-economic impacts more accurately from these vulnerabilities.

The Marin County Community Development Agency's Collaboration: Sea-Level Marin Adaptation Response Team (C-SMART) has been working since 2014 to understand the vulnerabilities of coastal resources on Marin County's outer coast and develop community driven adaptation strategies. The C-SMART team received support from the Ocean Protection Council (Prop 68 Chapter 10: Coastal Resilience Grant Funding) to implement their Adaptation and Resilience Collaboration approach in Stinson Beach. This process requires engagement with communities that are affected by or concerned with sea level rise vulnerabilities. Traditionally this engagement has been focused on adjacent communities that are most directly affected by future impacts. Through the ARC approach, the C-SMART team would also like to engage other communities in the county, particularly in historically disadvantaged communities that may depend upon Stinson Beach as a low cost recreational resource and refuge from extreme heat events. Through this engagement the team hopes to better understand the needs of diverse community members to identify adaptation strategies that more effectively meet the needs of the full community.

We investigate beach use patterns by quantifying who is using the beach as a free or low cost recreational and natural resource, and therefore who may lose this resource because of sea level rise. By gathering these data, we will be able to ensure inclusion of *all* interested stakeholders and coastal recreation users in the planning and adaptation process.

## Priority Questions

Our study was focused on understanding where Stinson Beach visitors are coming from, specifically:

- Are there particular disadvantaged communities that beach users tend to come from?
- What are the use patterns (i.e. timing, season)?
- Did beach use change during the COVID-19 epidemic?
- Does use correlate with extreme weather conditions (i.e heat waves)?
    - If so, are there differences in use during these events between disadvantaged communities and other communities?

# METHODS

## Cell phone data

Point Blue purchased summaries of anonymized cell phone data from AirSage (https://airsage.com/). used a polygon of the beach from the Bolinas Lagoon mouth to the edge of the National Park to the south, including National Park Service parking and picnic areas (Figure 1). We used this spatial filter to exclude residences and adjacent roads from the analysis. The summarized data included hourly use patterns, the total number of unique daily visitors to Stinson Beach, and summaries of the home census block group of visitor origin. AirSage does not provide any personal information from cell phone users and the census block groups are so large that it would be extremely difficult if not impossible to identify individuals from the anonymized data. Cell phone data has been used to estimate visitation patterns to over 500 water recreation sites in New England (Merrill et al. 2020) and reserve parks in Orange County, CA (Montz et al. 2020). We obtained daily cell phone data from 2017 – 2021, five full years of hourly and daily visitation data. Since the data report unique daily visitors, summaries aggregating the data across days may be counting the same individual in more than one day. AirSage uses the demographics from the home census block groups to infer the demographics of beach visitors. For example, if 100 cell phone observations came from census block group A, and census block group A is 60% white and 40% Hispanic, the demographic assumptions would be that 60 of the cell phone observations were white and 40 were Hispanic. The 2020 census data was not available at the time of our study, so AirSage was still providing data at the 2010 census block group level.

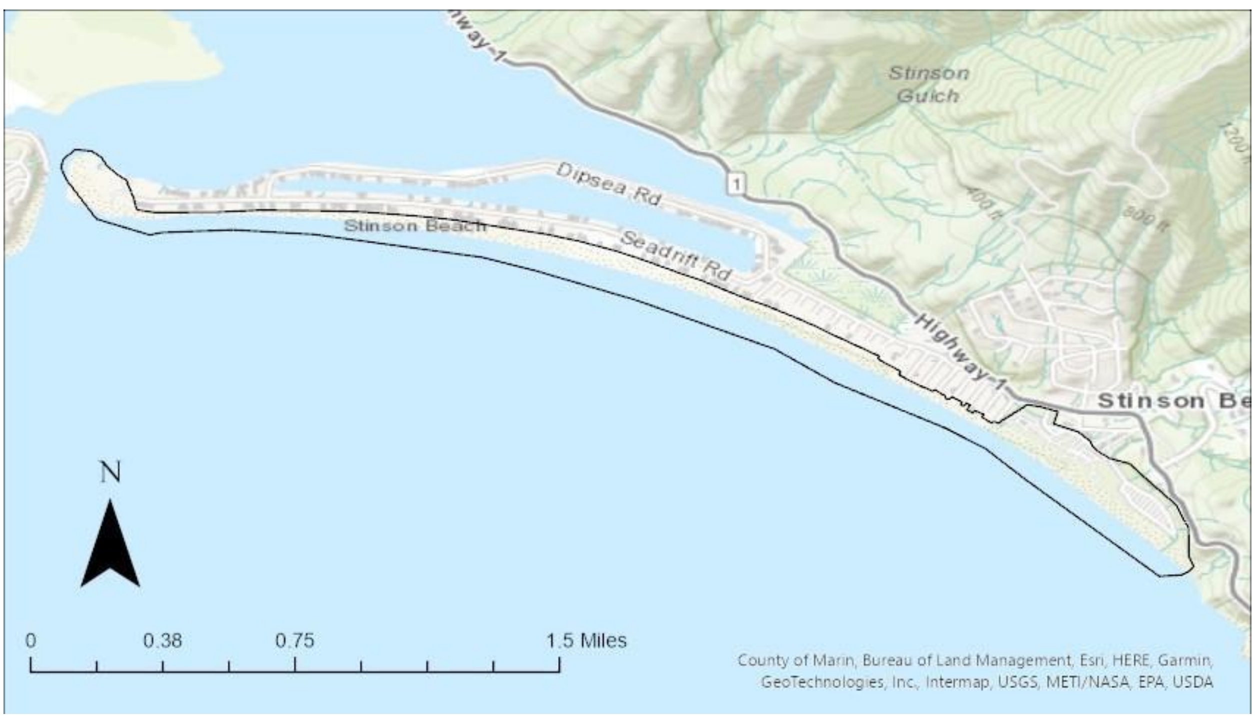


*Figure 1. Stinson Beach study area outlined in black.*

## Defining Disadvantaged Communities

There are several approaches to define disadvantaged communities being used by public agencies in the State of California. The California Department of Water Resources and California State Parks use thresholds of statewide median household income from American Community Survey data to determine disadvantaged communities and severely disadvantaged communities (https://gis.water.ca.gov/app/dacs/, https://www.parksforcalifornia.org/communities/?overlays=parks%2Cdisadvantaged). The California Department of Environmental Protection Agency uses information on income, demographics and pollution burden to create a more flexible and detailed assessment of disadvantage communities (August et al. 2021). Our study was most interested in exploring use patterns by relatively local disadvantaged communities. Our team decided that socioeconomic factors would best represent local disadvantaged communities in our study area. Accordingly, we used the percentile rankings from five factors from the CalEnviroScreen4.0 (August et al. 2021) to categorize disadvantaged communities: educational attainment, housing-burdened low-income households, linguistic isolation, poverty, and unemployment. The CalEnviroScreen4.0 provides summaries of each socioeconomic factor at the census tract level. We standardized and averaged the scores of all the factors in each census tract and applied these scores to all census block groups within each census tract. We defined disadvantaged communities as those communities with the highest 30% of scores from across the state. Each census tract in the study dataset then received a binary attribute of disadvantaged "yes" (in the highest 30%) or not disadvantaged "no" based on the above criterion.

## Identifying Extreme heat events and COVID19 impacts

We downloaded GRIDMET: University of Idaho Gridded Surface Meteorological Dataset maximum daily temperature data for the state of California using Google Earth Engine (Abatzoglou 2013). The data are provided at 4 km x 4 km resolution. We assumed that relatively local residents would be more likely to visit Stinson Beach as a refuge from extreme heat so we restricted our analysis to only include cell phone observations from census tracts in Marin, San Francisco, Contra Costa, Alameda, Sacramento, Sonoma, Solano, San Mateo, Santa Clara, Napa, Yolo and San Joaquin counties. For each day of observations in the cell phone dataset, we calculated the mean of the maximum temperature values for each home census block group from which a cell phone user visited Stinson Beach. We categorized extreme heat days as those days in the hottest 5% of values across all days for each census block group over the previous 30 years. We created an extreme heat variable where days were labeled as "extreme" or "normal" accordingly.

We created a variable representing the effect of COVID19 shelter-in-place restrictions on beach use where all visits prior to March 16 2020 were labeled "before" and visits on or after March 16, 2020 as "after". March 16, 2020 was the date shelter in place restrictions were put in place in the Bay Area.

## Statistical analyses

We used the segmented package in R (Muggeo 2017) in R (R Core Team (2017) to identify points in time when the slope of beach use over time changed. We used this analysis to test for significant changes in these slope values. Our hypothesis is that beach use increased following shelter in place restrictions in response to the COVID19 pandemic since this was one of the few leisure opportunities that was available to all communities during the pandemic.

We used an Analysis of Variance (ANOVA) to test for significant effects of extreme heat days, disadvantaged communities and COVID19 on the number of daily Stinson Beach visitors from every block group in the study area. The beach use data we used for this analysis only includes data when visitors are present from a block group, not when visitors are absent. Therefore, our analysis is conditional on someone from the block group visiting the beach. For this analysis, we only included data from counties in which we extracted daily maximum temperature (see above). Initial models showed non-normal residuals so we log-transformed the cell-phone user data for subsequent analyses. We assumed that residents of counties closer to Stinson Beach would be more likely to use Stinson Beach so we included the county of residence of beach visitors in the model. We also assumed that beach use will vary by month of the year and day of the week, so these variables were also included in the model. We hypothesized that beach visitation in response to extreme heat days would vary by county, month, day of the week and whether the block group represented a disadvantaged community, so we included interactions between heat and each of these variables. We also wanted to test whether beach use as refuge from COVID19 would vary between disadvantaged and non-disadvantaged communities.

## Mapping high use beach areas

We used a separate product from the cell phone data from AirSage which uses the location data from cell phones on the beach to estimate high densities of beach use. AirSage provides a daily estimate of the density of beach based on a 10 x 10 meter grid cell. We summed up all daily beach density layers between March and September to calculate the total density for each grid cell through the entire time-series.

# RESULTS

## Where are Stinson Beach visitors coming from?

Between 2017 and 2021 2,642,297 unique daily visitors came to Stinson beach (Figure 2). Over 37% of these visits were from residents of Marin County (984,519). San Francisco, Sonoma, Alameda, Contra Costa and Sacramento counties all had over 100,000 unique daily visitors. Additionally, visitors to Stinson Beach represented every other state in the nation as well as Puerto Rico and Canada.

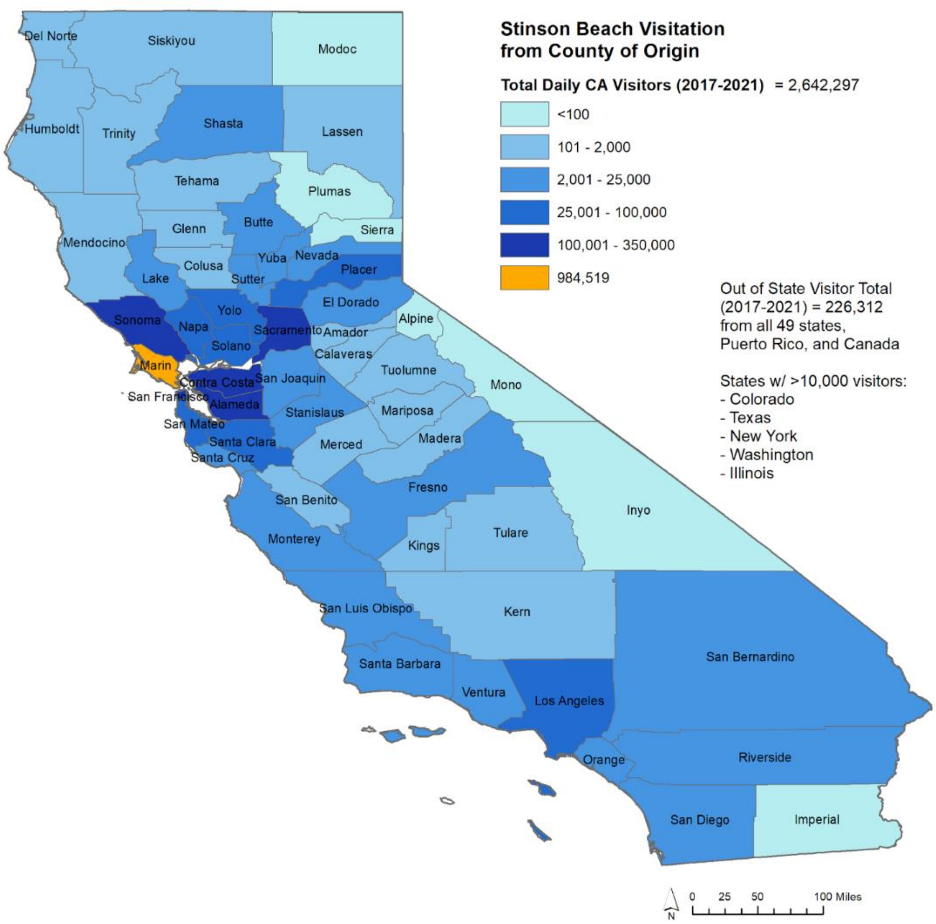


*Figure 2. Summaries of the total number of unique daily visitors to Stinson Beach for each county in California in which the visitor lives.*

We found typical recreational patterns of visitation. Most visits to Stinson Beach occur between noon and 6:00 PM (Figure 3). This pattern is consistent across days of the week (Figure 3) and seasons (Figure 4). The highest visitation rates were on weekends (Figure 3) and in the summer (Figure 4). The lowest visitation rates were on Tuesdays (Figure 3) and in the winter (Figure 4).

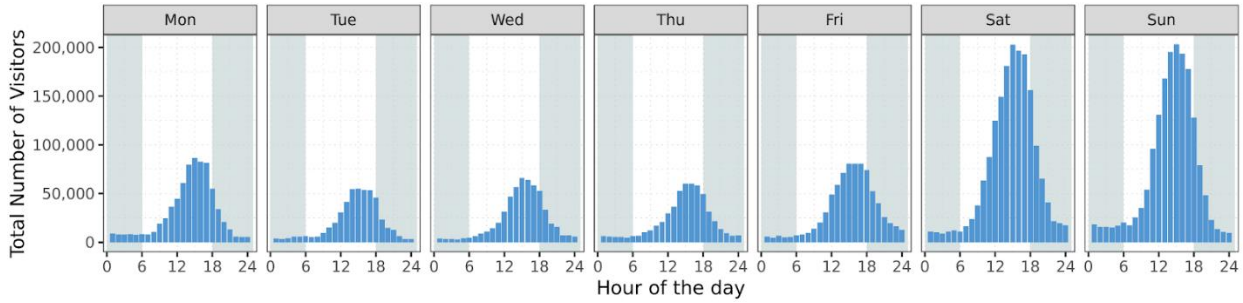


*Figure 3. Hourly beach usage at Stinson Beach for each day of the week based on unique detected cell phones between 2017 and 2021.*

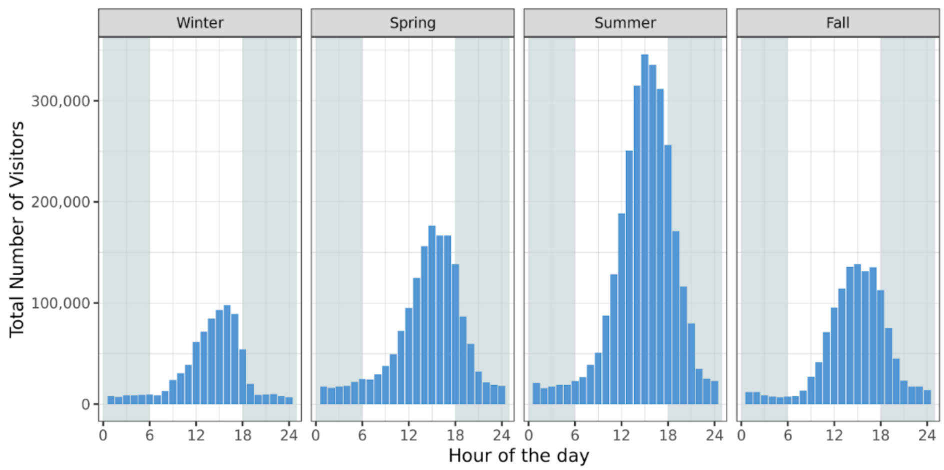


*Figure 4. Hourly beach usage at Stinson Beach for each season based on unique detected cell phones between 2017 and 2021.*

## Demographics of Stinson Beach Visitors

Almost two thirds of visitors to Stinson Beach are White (Figure 5). Among non-white visitors, Hispanic people made up the majority of visitors (40.7%), followed by Asian Americans (34.9 %), Other or multi-ethnicities (12.8 %), African Americans (10.4 %) and Pacific Islanders (1.2%) (Figure 6). However, the distribution of ethnicities varied by county of origin (Figure 6.)

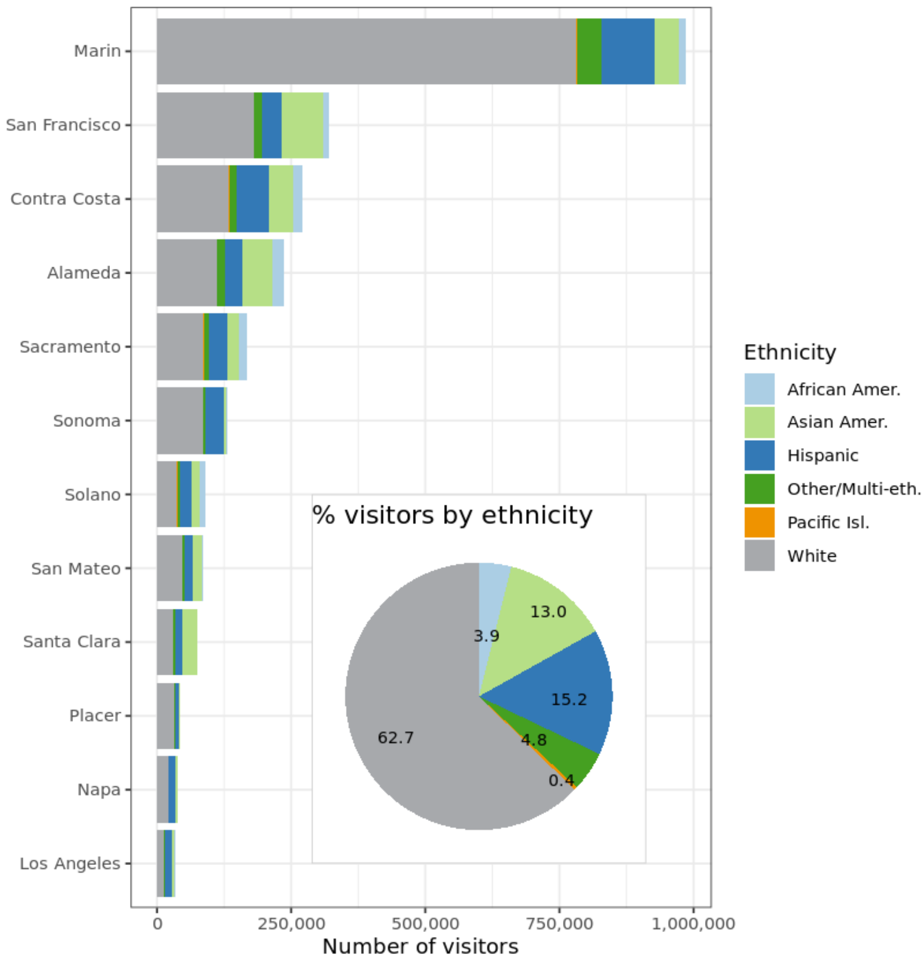


*Figure 5. The ethnicity of Stinson Beach visitors between 2017 and 2021 based on US 2010 Census tract data. The pie chart shows the breakdown by ethnicity across all counties. The bar charts show the distribution of ethnicities from the 12 counties in the state.*

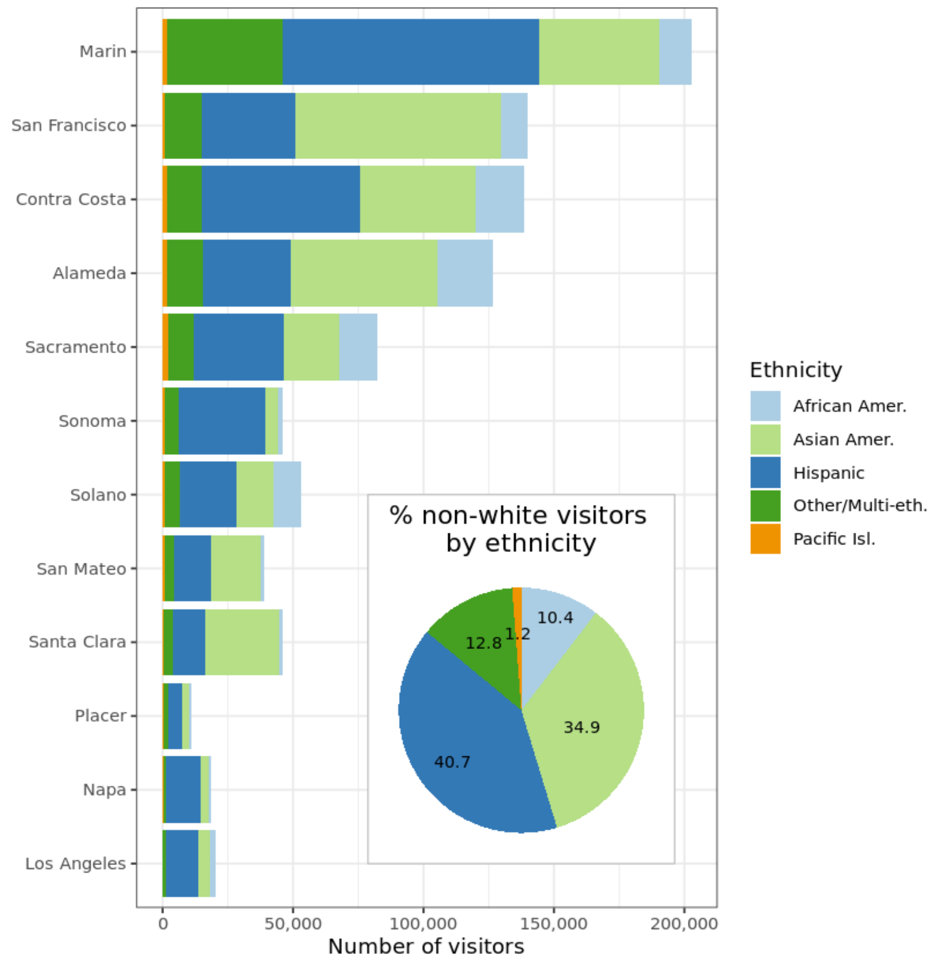


*Figure 6. The ethnicity of non-white Stinson Beach visitors between 2017 and 2021 based on US 2010 Census tract data. The pie chart shows the breakdown by ethnicity across all counties. The bar charts show the distribution of ethnicities from the 12 counties with the highest number of visitors during the study.*

## Disadvantage Community Visitation

When we focus on visitation patterns from the nine Bay Area counties and Sacramento County we find that most visitors are not from disadvantaged communities (96.4%). The proportion of visitors from disadvantaged vs. non-disadvantaged communities is low across all of the counties we examined (Figure 7). The three counties with the greatest number of visitors living in disadvantaged communities that went to Stinson Beach were Sacramento, Contra Costa and Alameda counties (Figure 7).

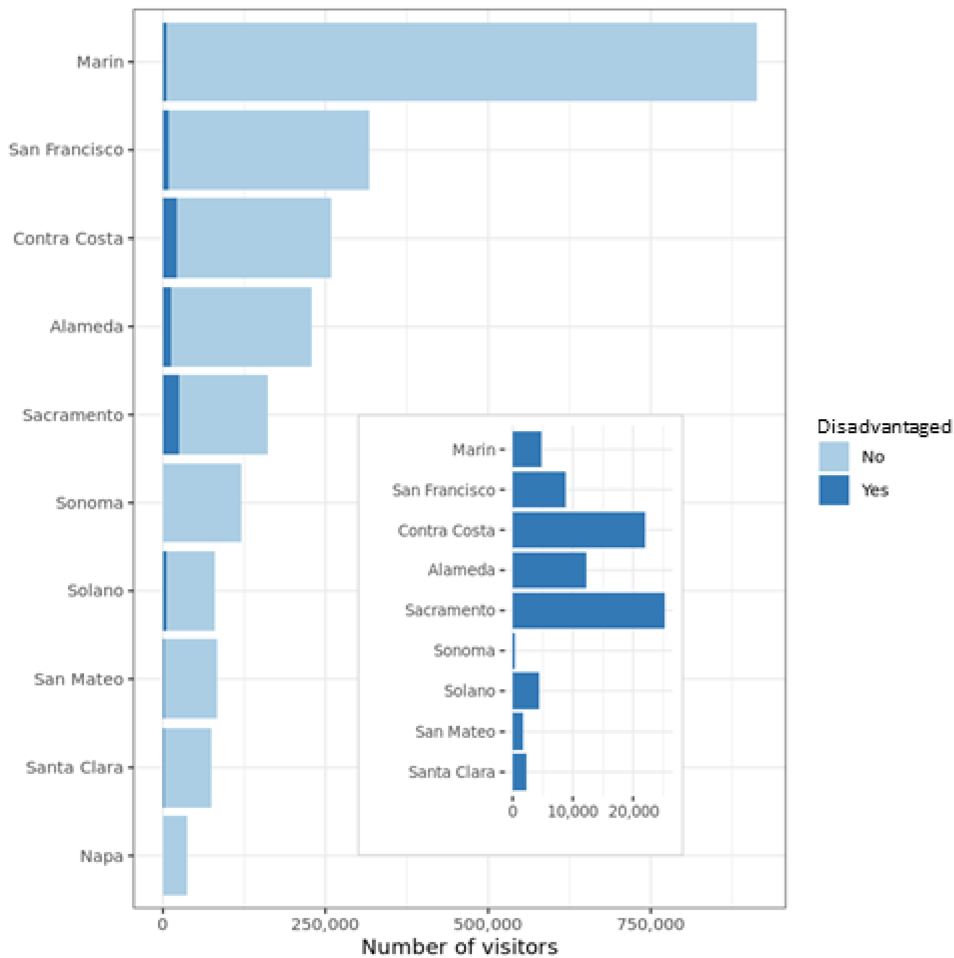


*Figure 7. Distribution of visitors from disadvantaged (Yes) and non-disadvantaged communities (No) across the nine county Bay Area and Sacramento. The inner bar chart shows the results for just disadvantaged communities.*

Using our methods of classifying disadvantaged communities, we only identified two census tracts in Marin County. These tracts occur in the city of San Rafael (Figure 8, Appendix 1). 18,390 total estimated visits originated from the census block groups where these tracts occur during the study period (Figure 8). There was also substantial visitation to Stinson Beach from disadvantaged communities in San Francisco, San Mateo, Alameda and Contra Costa counties (Figure 9).

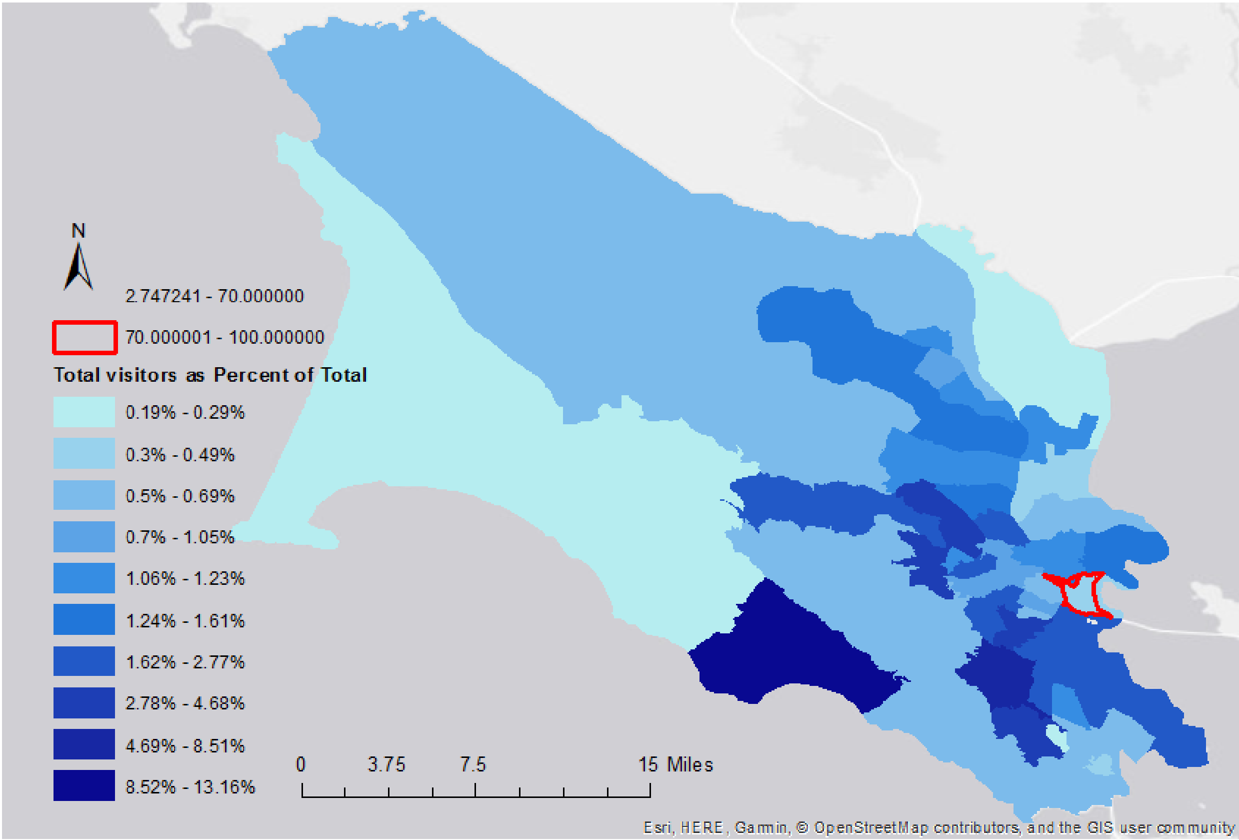


*Figure 8. Census tracts in Marin County showing the percent of total county visitation aggregated from each block group from 2017 - 2021. The two disadvantaged census tracts in the county are outlined in red.*

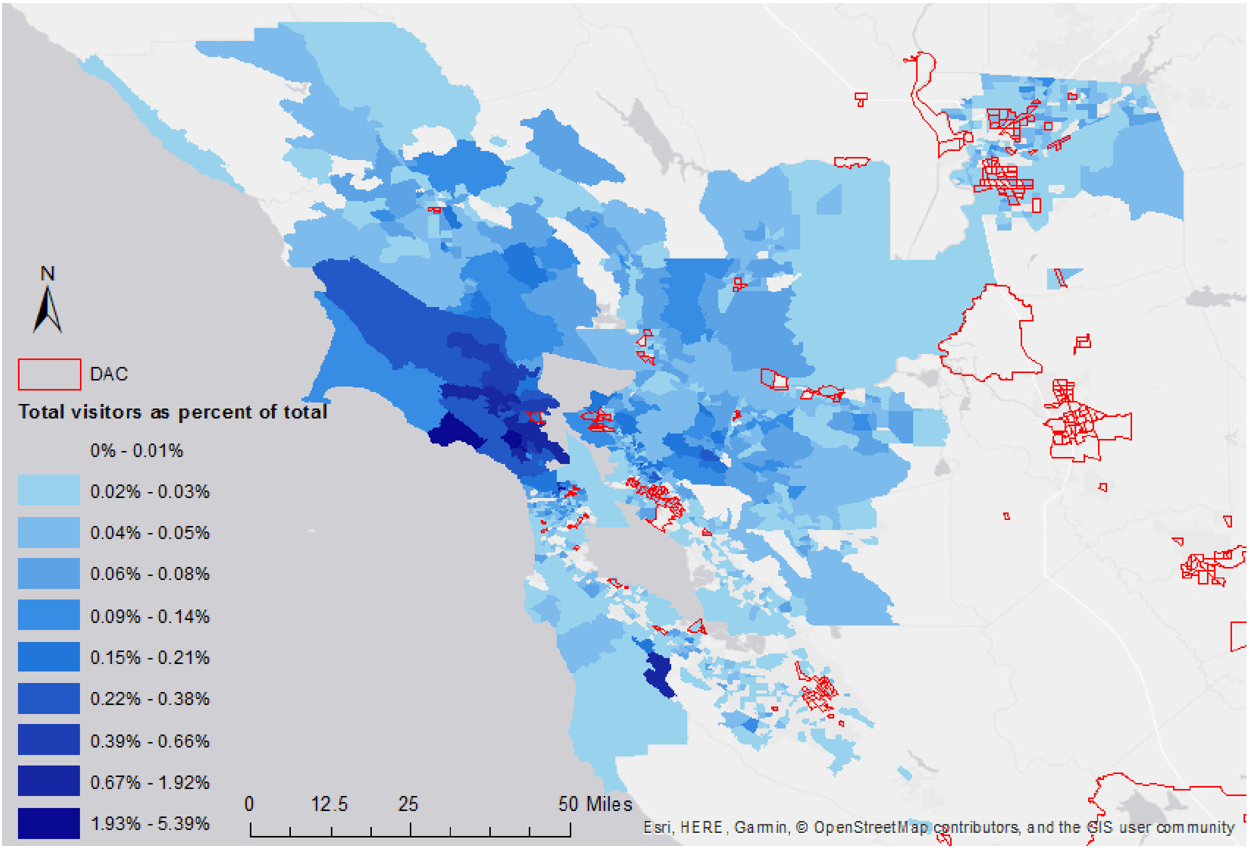


*Figure 9. Census tracts in the greater Bay Area showing the percent of total Bay Area visitation aggregated from each block group from 2017 - 2021. Disadvantaged census tracts are outlined in red.*

## Did beach use change with the COVID-19 pandemic?

We found that beach use (number of people/day) did increase following the implementation of shelter in place restrictions due to the COVID-19 pandemic in March 2020 (Figure 10). Our segmented regression analysis, which looks for breaks in the trends in the data, estimated that the number of beach users was increasing by approximately 0.056 (±0.002, S.E.) people per day between January 1, 2017 and February 17, 2020. The model estimated that the trend in beach use increased to 0.723 (± 0.030, S.E) between February 17, 2020 and December 30, 2020. After December 30, 2020 the model estimated that beach use decreased rapidly -40.792 (± 21.252 S.E.) people per day to January 2, 2021. After January 2, 2021, the model estimates that the decreasing trend in beach users lessened to -0.414 (0.020 S.E.) people per day (Figure 10). These patterns were fairly consistent across the different counties where beach users originated from (Figure 11).

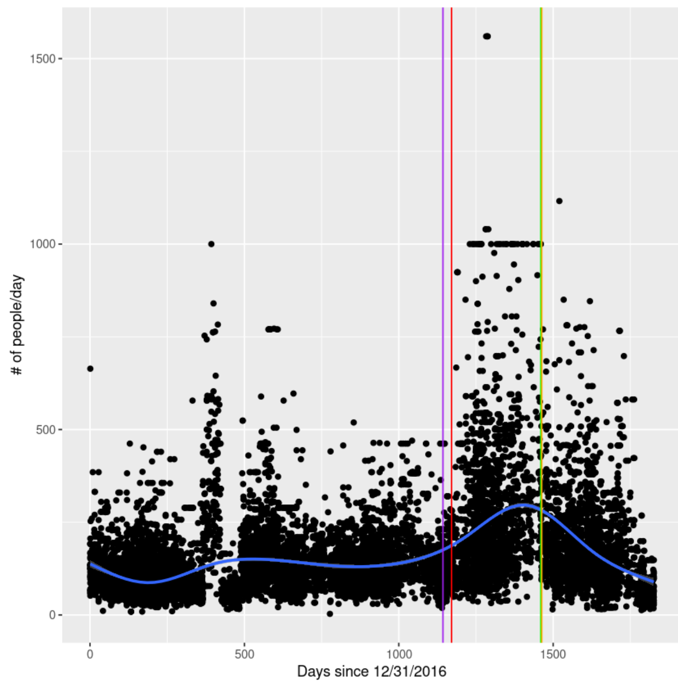


*Figure 10. Number of Stinson Beach visitors per day from January 1, 2017 - September 30, 2021. The date shelter in place due to the Covid-19 pandemic (March 16, 2020) is indicated by the red vertical line. The purple, green and orange vertical lines indicate where trends in beach users per day changed in a segmented regression analysis. Each point represents the number of people from each block group that visited the beach on each day.*

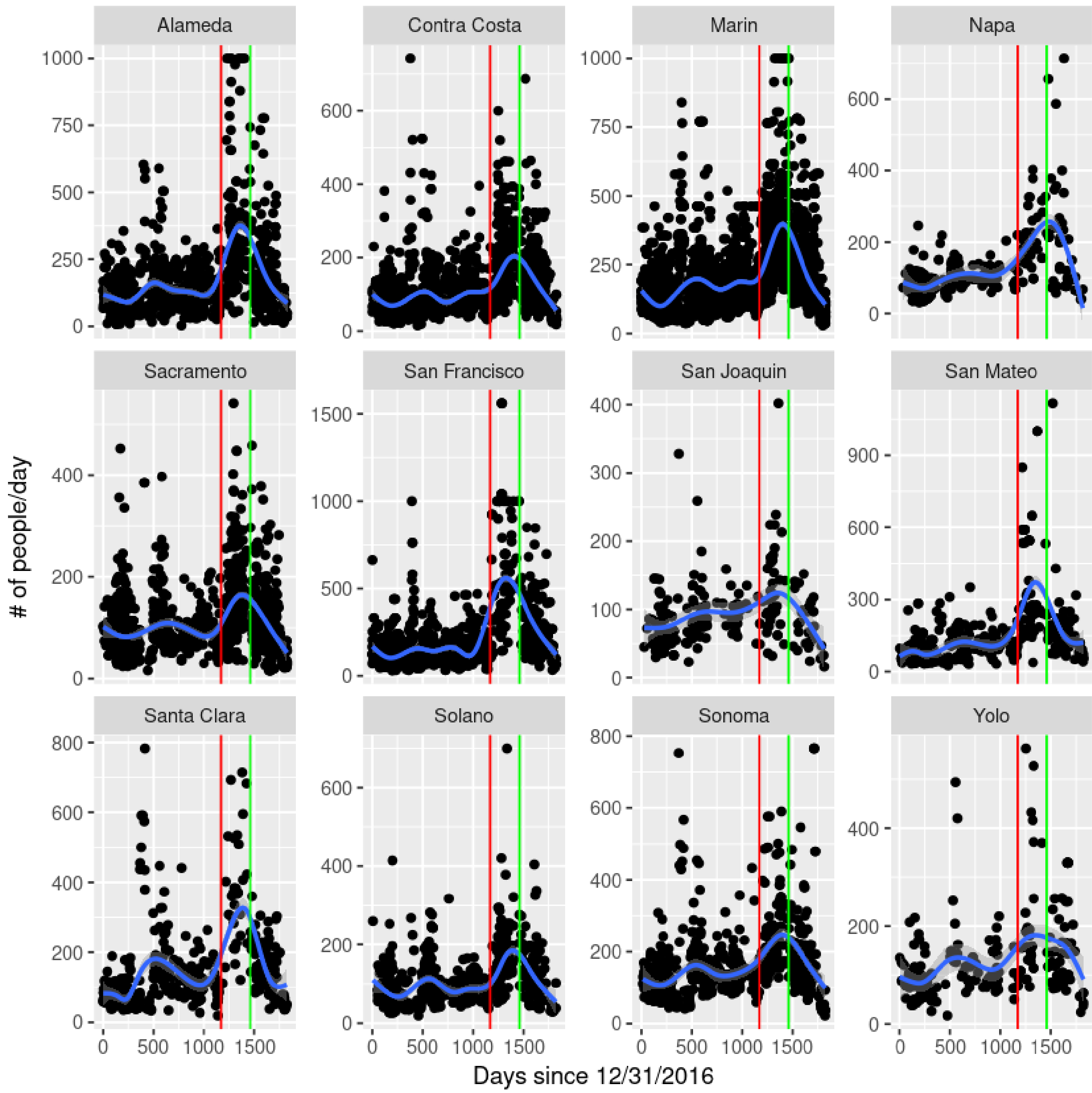


*Figure 11. Number of Stinson Beach visitors per day from January 1, 2017 - September 30, 2021. The date shelter in place due to the Covid-19 pandemic (March 16, 2020) is indicated by the red vertical line. The green vertical lines indicate the peak in beach user users perday estimated from the full dataset. Each point represents the number of people from each block group that visited the beach on each day.*

## Modeling Results

We found significant main effects of County, Month, Day of the week, COVID19 and Extreme heat (Table 1). This means that there was a significant difference in the number of visitors between counties, months in the year and days of the week.

### *Extreme heat days*

The model indicated that beach use is greater on extreme heat days than on normal days, by approximately one additional person per block group per day. We also found significant interactions in the response to extreme heat days by month (Table 1). We did not detect a significant interaction between extreme heat days and Disadvantaged Communities (DAC), meaning that we did not detect a difference between beach visitation between DAC and non-DAC visitors during extreme heat days. Additionally, we did not detect a significant effect of the interaction between extreme heat days and day of the week meaning that the increase in beach visitation due to extreme heat was not different depending on what day of the week it was. Similarly, we did not detect a significant interaction between extreme heat days and county meaning the effect of extreme heat days was similar across the counties in the study.

We did not detect a significant main effect of DAC but the effect was nearly significant (p=0.077, Table 1). However, we did find significant interactions between DAC and COVID19 (Table 1).

*Table 1. Results from analysis of variance testing for the effects on daily Stinson Beach use visitation from Bay Area block groups.*

| | Df | Sum Squares | Mean square error | F value | Probability > F |
|---|---|---|---|---|---|
| County | 11 | 765 | 69.5 | 258.221 | < 0.001 |
| Month | 11 | 204 | 18.6 | 69.058 | < 0.001 |
| Day of the week | 6 | 25 | 4.2 | 15.712 | < 0.001 |
| COVID19 | 1 | 1039 | 1038.8 | 3858.7 | < 0.001 |
| Extreme heat | 1 | 2 | 1.9 | 7.206 | 0.007 |
| DAC | 1 | 1 | 0.8 | 3.133 | 0.077 |
| Month x Heat | 11 | 9 | 0.8 | 3.091 | <0.001 |
| Day of the week x extreme heat | 6 | 3 | 0.4 | 1.636 | 0.133 |
| County x Extreme heat | 11 | 2 | 0.2 | 0.816 | 0.624 |
| Extreme heat x DAC | 1 | 0 | 0.2 | 0.72 | 0.396 |
| COVID19 x DAC | 1 | 6 | 6.1 | 22.507 | < 0.001 |
| Residuals | 16961 | 4566 | 0.3 | | |

## *COVID19*

We found that beach visitation was significantly greater after shelter in place regulations were issued in the Bay Area (Table 1, Figure 12). Beach visitation peaked with approximately 250 people per day per block group in December 2020, and then declined to pre-shelter-in-place numbers, approximately 125 people per day per block group. We also found a significant interaction between the way DAC and non-DAC beach use changed before and after shelter in place restrictions (Figure 13). We used a Tukey honest significant difference test[1] to test for

[1] A Tukey honest significant test is a test used to correct the probability of detecting an actual significant difference based on multiple comparisons within a test. This is a conservative test of significance when testing multiple

significant pairwise differences in this interaction (Table 2). For both DAC and non-DAC, beach visitation increased after shelter in place restrictions in the Bay Area went into effect (Table 2, Figure 13). However, the magnitude of change was smaller for visitors originating from disadvantaged communities. Beach use from DAC's was greater than use from non-DAC before COVID19 restrictions. This pattern switched after COVID19 restrictions (Table 2, Figure 13) where beach use was greater from non-DAC than from DAC. Other than the significant interaction we detected between DAC and COVID19, we did not find any other significant effects of DAC in the model (Table 1).

comparisons meaning that it is harder to find a significant effect using this test and you can generally trust significant results when you find them.

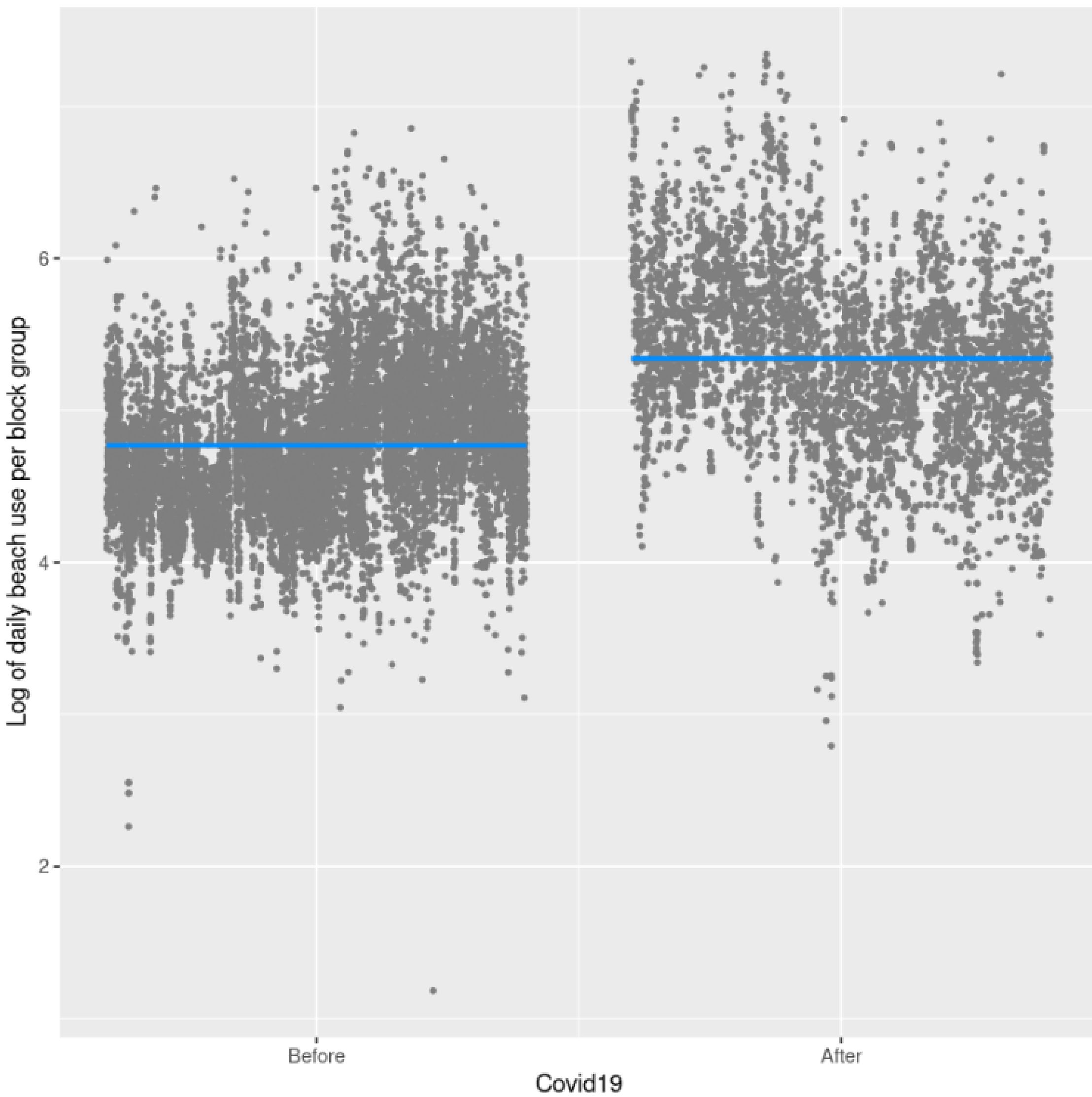


*Figure 12. Results of the statistical model of log count of daily beach users from each Bay Area block group before shelter in place restrictions were enacted on March 16, 2020, and after. The blue horizontal line represents the predicted mean daily beach use before and after COVID19 restrictions were enacted and each point represents the predicted daily value for each block group holding all other variables at their mean value.*

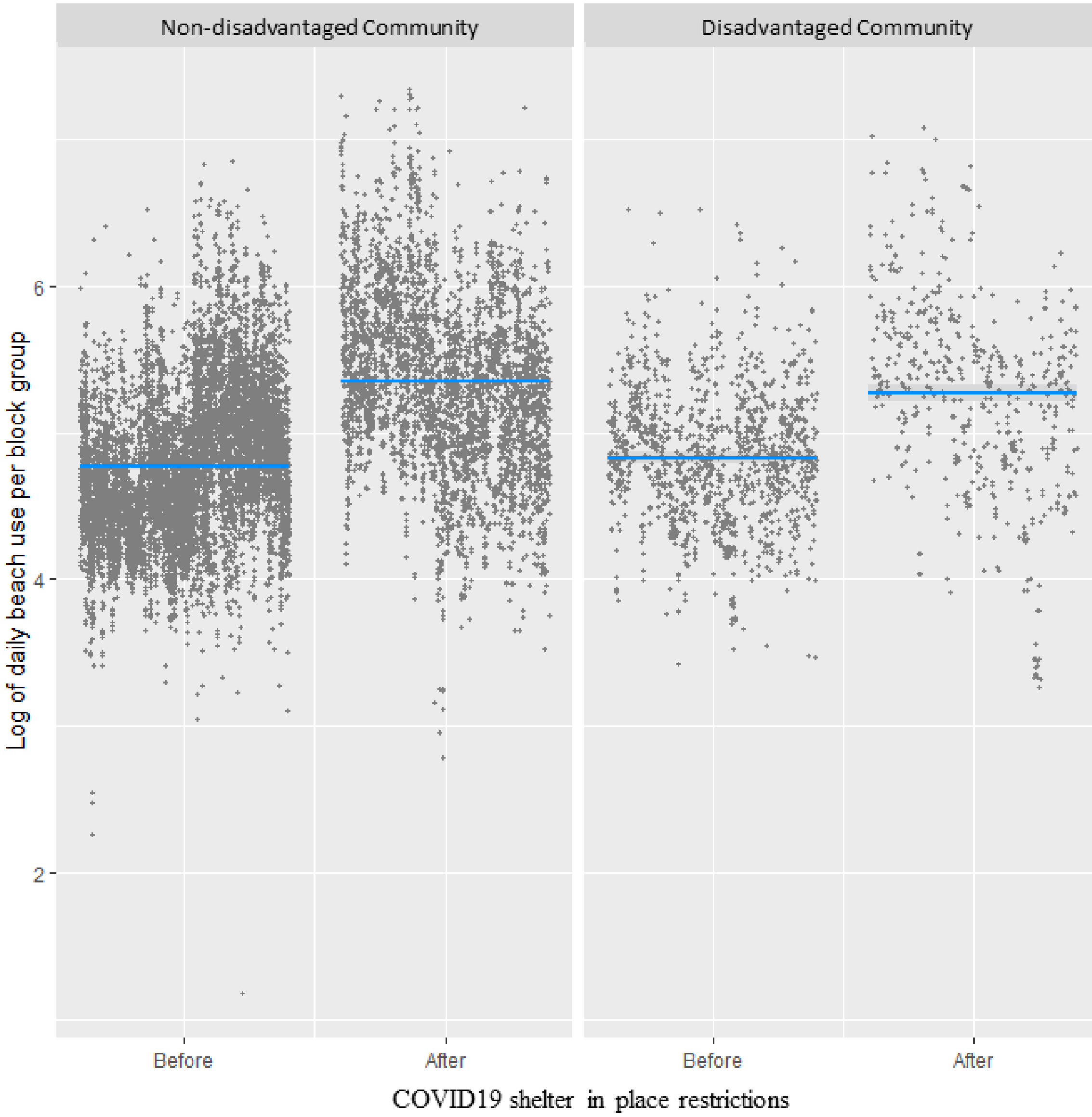


*Figure 13. Log number of beach users per day from non-disadvantaged communities and disadvantaged communities and. Results are grouped on the horizontal axis before Covid19 shelter in place restrictions in the Bay Area were implemented and after Covid 19 restrictions were implemented in the Bay Area. The blue horizontal line represents the predicted mean daily beach use value and each point represents the predicted daily value for each block group holding all other variables at their mean value.*

*Table 2. Tukey honest significant effects to test the significant differences of pairwise comparisons between the effects of COVID19 and Disadvantaged Communities (DAC). See footnote 1 above for a description of this statistical test.*

| | Difference | Lower | Upper | Probability adjusted |
|---|---|---|---|---|
| After COVID19:Non DAC- Before COVID1:Non DAC | 0.553 | 0.529 | 0.577 | 0.000 |
| After COVID1:DAC - Before COVID1:DAC | 0.405 | 0.338 | 0.472 | 0.000 |
| Before COVID1:DAC - Before COVID1:Non DAC | 0.041 | 0.003 | 0.079 | 0.027 |
| After COVID1:DAC - AfterCOVID1:Non DAC | -0.107 | -0.167 | -0.047 | <0.001 |

## High beach use areas

Overall, the highest density of beach use occurs in areas in close proximity to beach access points. For example, the greatest density of beach use is on the Golden Gate National Recreation Area beach, in areas adjacent to the main beach parking areas (Figure 14). Another high use area is located near the beach access road at the end of the Calles section right before the Seadrift gate (Figure 14). Notably, beach use is concentrated towards the back of the beach in places less inundated by high tides or waves during storms. We found much less beach use in front of the Seadrift community likely due to a combination of limited public access and a much narrower beach that can become completely inundated during high tides (Figure 14).

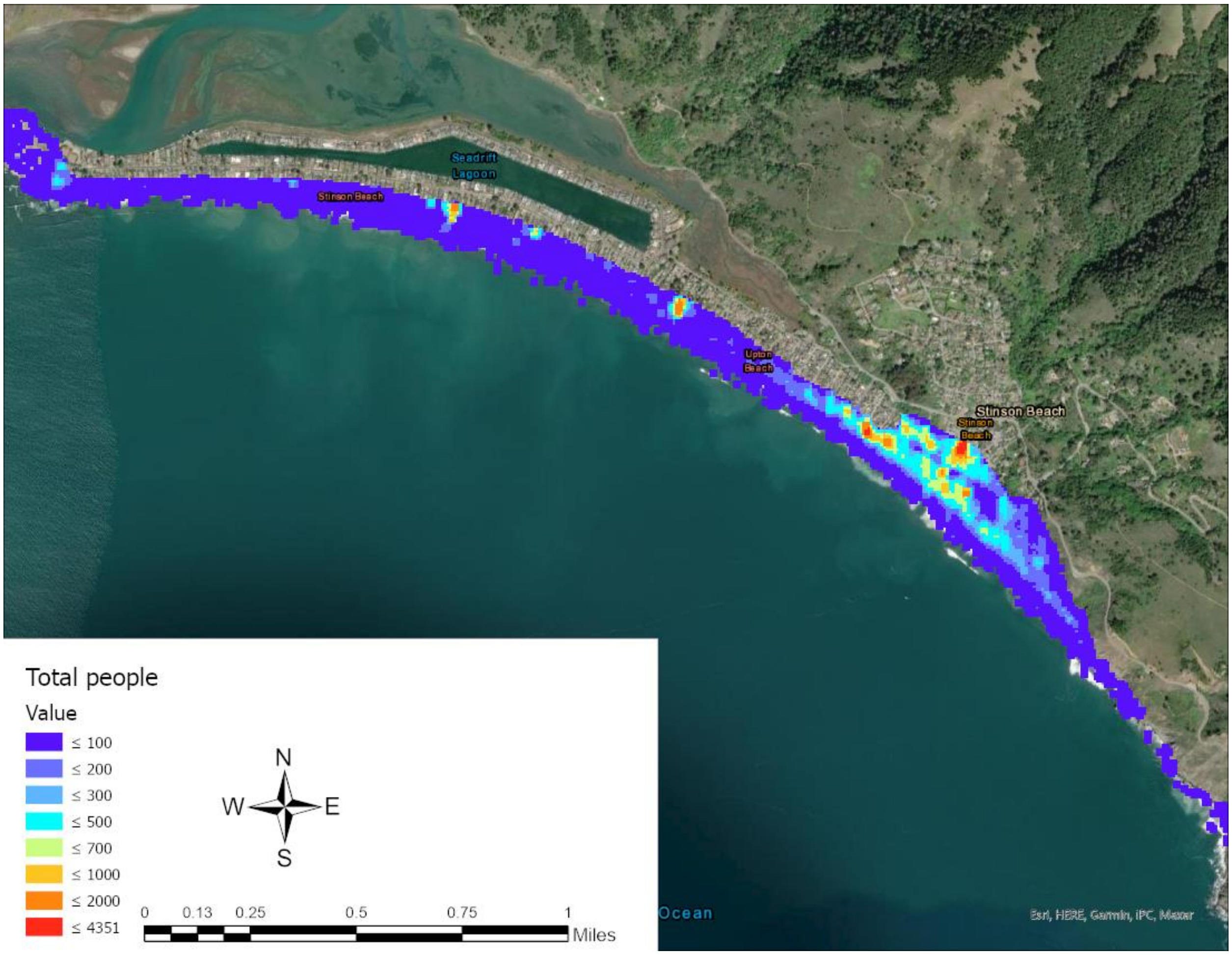


*Figure 14. Estimated number of beach visitors per 10 x 10 meter pixel over the entire five years of the analysis.*

# OUTCOMES AND CONCLUSIONS

Our results demonstrate that Stinson Beach is a valuable community resource with over 2.6 million people visiting the beach between 2017 and 2021. While visitors come from all over the country to visit the beach, the majority come from local Bay Area counties. The C-SMART team can use our analysis to target communities with greater visitation for engagement in the development of sea-level rise adaptation strategies (Appendix 1).

Our results show that the beach is an important recreational refuge that Bay Area residents utilize during heat waves and as a safe outlet during the peak of the COVID19 pandemic. Our study was not designed to pull out the specific reasons why communities value Stinson Beach but we assume that users value the low cost recreation opportunities that are available there.

While visitors to Stinson Beach primarily come from non-disadvantaged communities, our results do suggest that the beach is an important resource for disadvantaged communities in the Bay Area and Sacramento valley. We found that on average, visitation from disadvantaged community block groups throughout the study area was greater on average than use from non-disadvantaged community block groups prior to COVID19 restrictions, and beach use by disadvantaged communities increased following shelter in place restrictions. This points to the importance of engaging these communities in adaptation planning since the outcomes of these planning efforts will affect valuable recreational resources that these communities depend upon. Interestingly though, beach use was greater from non-disadvantaged communities than disadvantaged communities after COVID19 restrictions. Together these results do suggest that low cost outdoor recreation opportunities may be more valuable to disadvantaged communities than non-disadvantaged communities because members of non-disadvantaged communities may have other resources to take advantage of higher cost leisure opportunities. However, the greater use by non-disadvantaged communities after shelter in place restrictions could be due to the fact that many other leisure activities were not available during the COVID19 pandemic.

# REFERENCES

Abatzoglou, J. T. 2013. Development of gridded surface meteorological data for ecological applications and modelling. International Journal of Climatology 33:121–131Barnard, P. L., L. H. Erikson, A. C. Foxgrover, J. A. F. Hart, P. Limber, A. C. O'Neill, M. van Ormondt, S. Vitousek, N. Wood, M. K. Hayden, and J. M. Jones. 2019. Dynamic flood modeling essential to assess the coastal impacts of climate change. Scientific Reports 9:4309.

August, L., K. Bangia, L. Plummer, S. Prasad, K. Ranjbar, A. Slocombe, and W. Wieland. 2021. CalEnviroScreen 4.0. Sacramento, CA

Griggs, G, Árvai, J, Cayan, D, DeConto, R, Fox, J, Fricker, HA, Kopp, RE, Tebaldi, C, Whiteman, EA (California Ocean Protection Council Science Advisory Team Working Group). Rising Seas in California: An Update on Sea-Level Rise Science. California Ocean Science Trust, April 2017.

Merrill NH, Atkinson SF, Mulvaney KK, Mazzotta MJ, Bousquin J (2020) Using data derived from cellular phone locations to estimate visitation to natural areas: An application to water recreation in New England, USA. PLOS ONE 15(4): e0231863. https://doi.org/10.1371/journal.pone.0231863.

Monz, C., Creany, N., Nesbitt, J., & Mitrovich, M. (2020). Mobile device data analysis to determine the demographics of park visitors. Journal of Park and Recreation Administration. doi:10.18666/JPRA-2020-10541

Muggeo, Vito M. R. (2017). Interval estimation for the breakpoint in segmented regression: a smoothed score-based approach. Australian & New Zealand Journal of Statistics, 59, 311-322.

R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

# Appendix 1.

Table A1: Census tracts in Marin County with the aggregated estimates of total visitors from the block groups that occur within each census tract. The Point Blue CalEnviroScreen4.0 score is the index used to determine whether a community was a disadvantaged community (DAC). Tracts with a score of 75 and above are considered a DAC.

| Census Tract Name | Approximate Location | Total Visitors | Education Attainment | Housing-burdened low-income households | Linguistic isolation | Poverty | Unemployment | Point Blue CalEnviroScreen4.0 | DAC |
|---|---|---|---|---|---|---|---|---|---|
| Census Tract 1011 | Novato | 2,818 | 13.11 | 31.17 | 7.38 | 11.44 | 33.58 | 19.33 | No |
| Census Tract 1012 | Novato | 2,461 | 43.41 | 43.89 | 29.53 | 16.56 | 2.29 | 27.14 | No |
| Census Tract 1021 | Novato | 6,169 | 12.02 | 20.63 | 13.30 | 10.72 | 33.58 | 18.05 | No |
| Census Tract 1022.02 | Novato | 11,419 | 18.81 | 32.27 | 22.90 | 21.27 | 8.69 | 20.79 | No |
| Census Tract 1022.03 | Novato | 6,027 | 64.52 | 78.73 | 50.01 | 58.51 | 49.86 | 60.32 | No |
| Census Tract 1031 | Unincorporated Marin County area | 15,875 | 3.87 | 22.69 | 18.11 | 11.67 | 21.11 | 15.49 | No |
| Census Tract 1032 | Novato | 10,340 | 35.54 | 69.46 | 49.09 | 30.78 | 19.59 | 40.89 | No |
| Census Tract 1041.01 | Novato | 11,674 | 41.60 | 72.17 | 35.34 | 46.61 | 7.77 | 40.70 | No |
| Census Tract 1041.02 | Novato | 5,499 | 30.41 | 75.98 | 39.83 | 38.91 | 14.39 | 39.90 | No |
| Census Tract 1042 | Novato | 13,824 | 17.79 | 56.86 | 10.45 | 25.43 | 39.21 | 29.95 | No |
| Census Tract 1043 | Unincorporated Marin County area | 1,874 | 11.35 | 55.13 | 32.03 | 18.91 | 86.75 | 40.84 | No |
| Census Tract 1050 | Novato | 11,495 | 17.79 | 69.91 | 33.31 | 18.91 | 56.19 | 39.22 | No |
| Census Tract 1060.01 | Unincorporated Marin County area | 4,054 | 19.75 | 76.35 | 52.51 | 10.44 | 30.88 | 37.99 | No |
| Census Tract 1060.02 | Santa Venetia | 6,831 | 14.78 | 27.78 | 18.91 | 12.69 | 58.36 | 26.50 | No |
| Census Tract 1070 | Lucas Valley-Marinwood | 11,920 | 25.06 | 24.46 | 3.74 | 14.05 | | 16.82 | No |
| Census Tract 1081 | San Rafael | 12,995 | 13.11 | 16.31 | 17.26 | 5.35 | 5.57 | 11.52 | No |
| Census Tract 1082 | San Rafael | 21,083 | 46.81 | 34.25 | 64.14 | 50.01 | 83.22 | 55.69 | No |
| Census Tract 1090.01 | San Rafael | 12,104 | 27.20 | 54.07 | 34.65 | 25.72 | 2.29 | 28.78 | No |
| Census Tract 1090.02 | San Rafael | 10,234 | 13.67 | 46.46 | 9.46 | 10.72 | 19.59 | 19.98 | No |
| Census Tract 1101 | San Rafael | 12,112 | 50.52 | 60.93 | 45.38 | 47.32 | 28.20 | 46.47 | No |
| Census Tract 1102 | San Rafael | 13,396 | 16.79 | 4.74 | 3.74 | 1.06 | 11.87 | 7.64 | No |
| Census Tract 1110 | San Rafael | 9,912 | 36.18 | 59.28 | 35.34 | 28.86 | 9.72 | 33.87 | No |
| Census Tract 1121 | San Rafael | 6,567 | 46.81 | 74.79 | 40.90 | 47.50 | 17.11 | 45.42 | No |
| Census Tract 1122.01 | San Rafael | 13,548 | 98.73 | 99.20 | 98.97 | 95.84 | | 98.19 | Yes |
| Census Tract 1122.02 | San Rafael | 4,842 | 85.59 | 92.71 | 90.34 | 84.21 | 48.26 | 80.22 | Yes |
| Census Tract 1130 | San Geronimo | 23,628 | 21.37 | 42.29 | 0.00 | 38.91 | 25.23 | 25.56 | No |
| Census Tract 1141 | Fairfax | 29,357 | 16.79 | 72.60 | | 11.27 | 23.75 | 31.10 | No |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Census Tract 1142 | Fairfax | 22,592 | 14.17 | 66.51 | 11.27 | 13.04 | 5.57 | 22.11 | No |
| Census Tract 1150 | Sleepy Hollow | 39,270 | 22.77 | 17.93 | 8.49 | 11.27 | 17.11 | 15.51 | No |
| Census Tract 1160 | San Anselmo | 11,046 | 5.50 | 51.36 | 1.81 | 7.83 | 56.19 | 24.54 | No |
| Census Tract 1170 | San Anselmo | 19,677 | 0.96 | 40.27 | 0.00 | 11.44 | 52.52 | 21.04 | No |
| Census Tract 1181 | Ross | 8,245 | | 28.24 | 6.27 | 11.95 | 62.40 | 27.21 | No |
| Census Tract 1191 | Kentfield | 20,595 | 3.52 | 15.86 | 18.91 | 7.55 | 9.72 | 11.11 | No |
| Census Tract 1192.01 | Larkspur | 5,675 | 17.79 | 66.51 | 47.68 | 40.80 | 4.23 | 35.40 | No |
| Census Tract 1192.02 | Larkspur | 9,107 | 3.11 | 37.48 | 18.11 | 10.90 | 43.09 | 22.54 | No |
| Census Tract 1200 | Larkspur | 30,437 | 4.67 | 46.02 | 14.28 | 13.27 | 25.23 | 20.69 | No |
| Census Tract 1211 | Corte Madera | 20,448 | 0.42 | 56.86 | 5.64 | 5.35 | 61.53 | 25.96 | No |
| Census Tract 1212 | Corte Madera | 20,603 | 23.66 | 51.36 | 27.26 | 24.72 | 18.31 | 29.06 | No |
| Census Tract 1230 | Belvedere | 6,231 | 0.00 | 39.20 | 2.81 | 1.75 | 14.39 | 11.63 | No |
| Census Tract 1241 | Tiburon | 27,318 | 4.67 | 6.10 | 0.00 | 8.07 | 26.86 | 9.14 | No |
| Census Tract 1242 | Tiburon | 21,715 | 0.62 | 12.79 | 2.81 | 26.21 | 39.21 | 16.33 | No |
| Census Tract 1250 | Strawberry | 11,628 | 5.10 | 64.82 | 27.26 | 17.49 | 32.27 | 29.39 | No |
| Census Tract 1261 | Mill Valley | 54,766 | 5.50 | 2.43 | 0.00 | 0.90 | 4.89 | 2.75 | No |
| Census Tract 1262 | Mill Valley | 22,588 | 1.46 | 48.06 | 22.90 | 17.71 | 22.57 | 22.54 | No |
| Census Tract 1270 | Mill Valley | 52,741 | 2.30 | 15.07 | 0.00 | 10.72 | 10.66 | 7.75 | No |
| Census Tract 1281 | Tamalpais-Homestead Valley | 46,071 | 2.71 | 17.41 | 19.87 | 6.28 | 25.23 | 14.30 | No |
| Census Tract 1282 | Tamalpais-Homestead Valley | 83,734 | 10.31 | 11.62 | 12.28 | 9.27 | 15.84 | 11.86 | No |
| Census Tract 1290 | Marin City | 2,627 | 42.66 | 78.73 | 76.33 | 87.19 | 14.39 | 59.86 | No |
| Census Tract 1302.01 | Sausalito | 4,712 | 0.04 | 41.38 | 8.49 | 9.64 | 18.31 | 15.57 | No |
| Census Tract 1302.02 | Sausalito | 5,874 | 2.71 | 33.70 | 12.28 | 17.19 | 9.72 | 15.12 | No |
| Census Tract 1311 | Unincorporated Marin County area | 6,236 | 0.84 | | 17.26 | 25.72 | 9.72 | 13.38 | No |
| Census Tract 1321 | Unincorporated Marin County area | 129,526 | 1.15 | 64.46 | 0.00 | 50.24 | 13.18 | 25.81 | No |
| Census Tract 1322 | Unincorporated Marin County area | 2,400 | 28.45 | 67.26 | 0.00 | 25.72 | | 30.36 | No |
| Census Tract 1330 | Unincorporated Marin County area | 6,599 | 23.30 | 54.63 | 22.90 | 33.20 | 3.21 | 27.45 | No |