Caltrans D9 Origin-Destination Study

Presented to Mono County

December 14, 2020

Agenda

- Background and Study Approach
- Location-based Service (LBS) Data Results
  – Network Expansion of LBS Data
  – Visitor Travel
  – Air Travel
  – Points of Interest
- Origin-Destination Survey Results
  – Visitor Travel
  – Respondent Profiles
- Study Highlights

Caltrans evaluates travel patterns in Inyo and Mono Counties to support planning activities.

- Caltrans District 9 conducts origin-destination studies every ten years since 1979

- Results are used to predict increases or decreases in traffic patterns, economic changes, and challenges for upkeep of the segments of the State Highway System

  - Current study employs new approach using big data combined with targeted surveys
    – Provides larger sample sizes

Big Data Analysis and Results

Big data helps to understand travel patterns.

Advantages

- On any given day, it may be possible to observe 10 – 15% of the population and up to 50% of the population over the course of a month.

- It is straightforward to analyze data spanning multiple weeks, months or years.

- Large samples of data can be collected passively at relatively low cost compared to methods.

Limitations

- There is no information on the device owner, their travel purpose, the activity they are engaged in, who may be traveling with them, or mode of travel.

- Excludes travelers without mobile devices or vehicle navigation services.

- Short-distance trips or short-duration activities are under-represented.

- The protection of privacy involves some loss of information.

Spatial and Temporal Classes

2019

- Winter: February 14 - March 18
- Summer: July 1 - August 1

2020

- Winter: February 13 - March 16
- Summer: July 1 - August 1
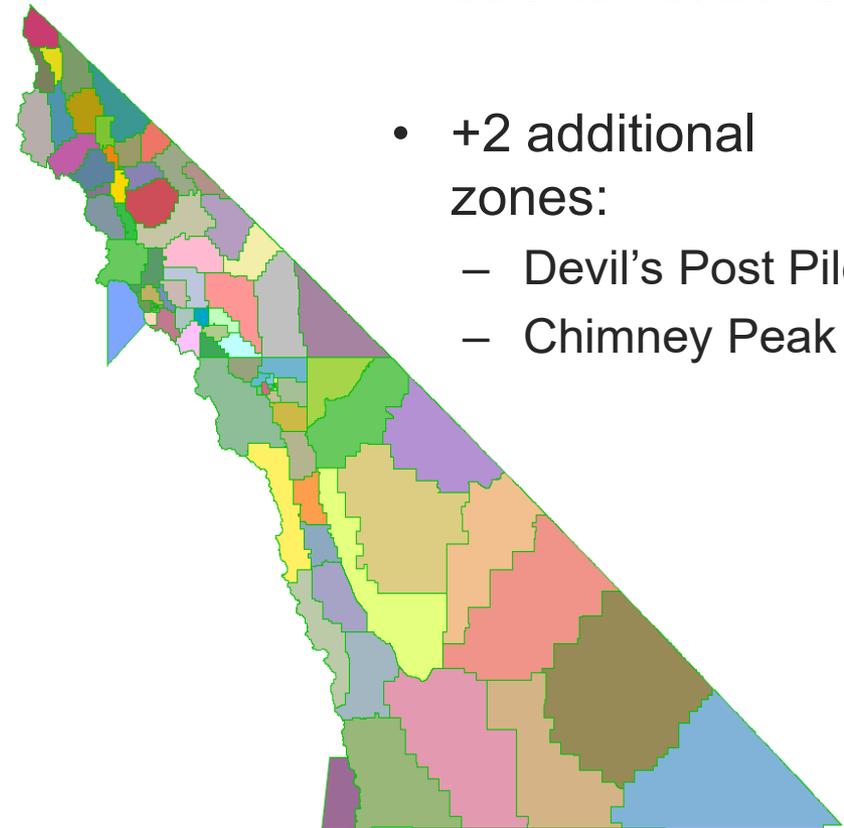
- 90 Internal Zones

- +2 additional zones:
  - Devil's Post Pile
  - Chimney Peak

19 External Stations
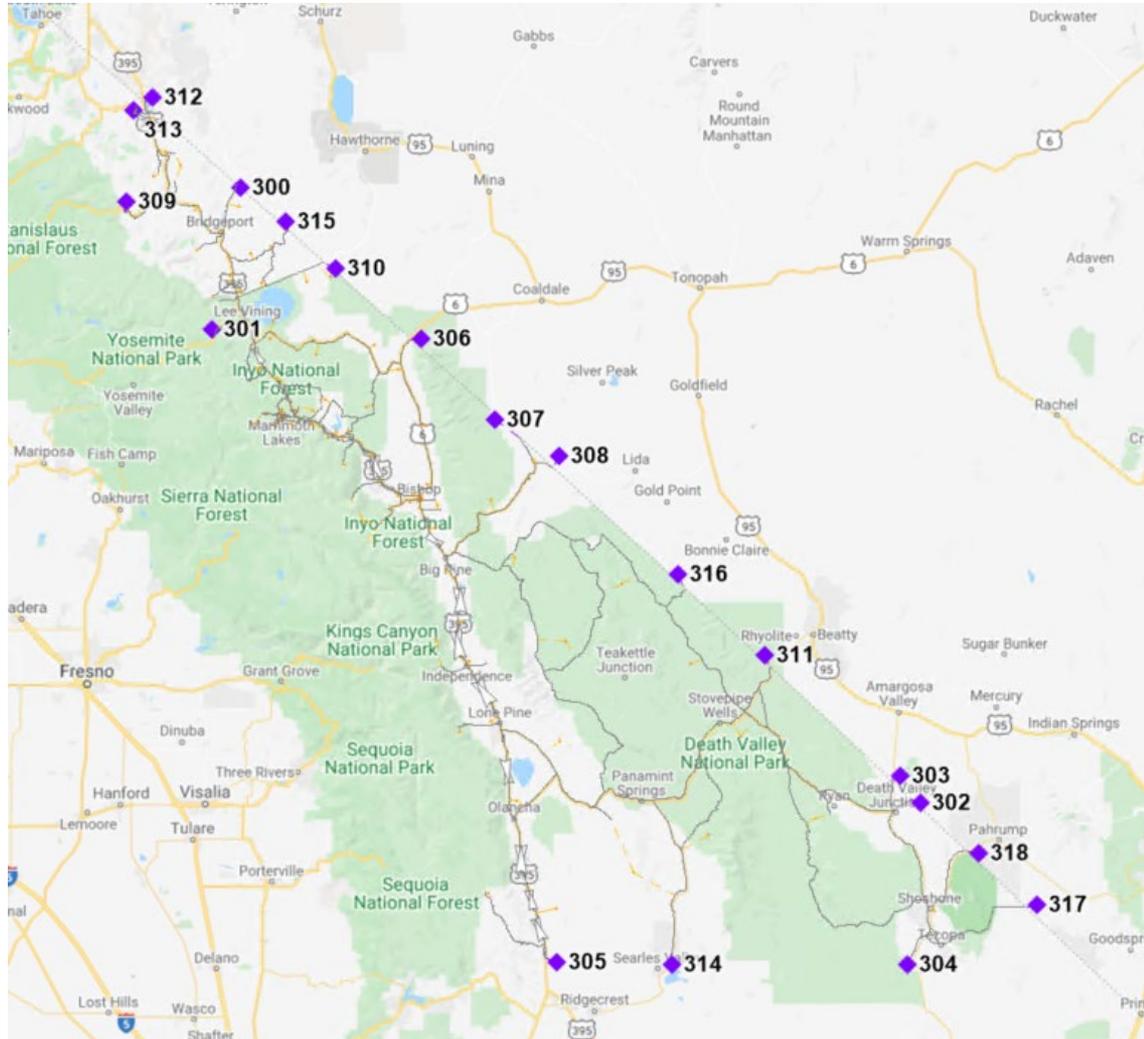
| Zone	Route Name
300	NV 338
301	Tioga Pass
302	Ruud Memorial Hwy
303	US 95 / NV 373
304	CA 127
305	CA 14 / US 395
306	NV 360 / US 6
307	NV 264
308	NV 266
309	CA 108
310	US 95 / NV 359
311	NV 374
312	US 395 / NV 208
313	CA 4 / CA 89
314	CA 178 / Pinnacle Rd / Trona Rd
315	Aurora Rd/Bodie Rd
316	US 95 / NV 267
317	Tecopa Rd
318	NV 160 to NV 372

Location-based services (LBS) were used to evaluate winter and summer patterns.

RSG used only the subset of the total LBS data which provides the highest quality data to produce the highest quality O&D matrices.

	WINTER 2019	SUMMER 2019	WINTER 2020	SUMMER 2020
Sightings	44,949,020	75,088,867	68,076,032	79,244,112
Devices	32,978	39,412	26,501	39,365
Resident	1,784	1,684	1,640	1,953
Sample Rate	5.4%	5.1%	5.0%	6.0%
Visitors	13,865	18,861	15,518	25,588
Removed	17,329	18,867	9,343	11,824
Clusters	217,891	319,310	283,743	364,750
Trips	794,260	1,044,875	949,762	1,046,782

Big data requires extensive data processing.
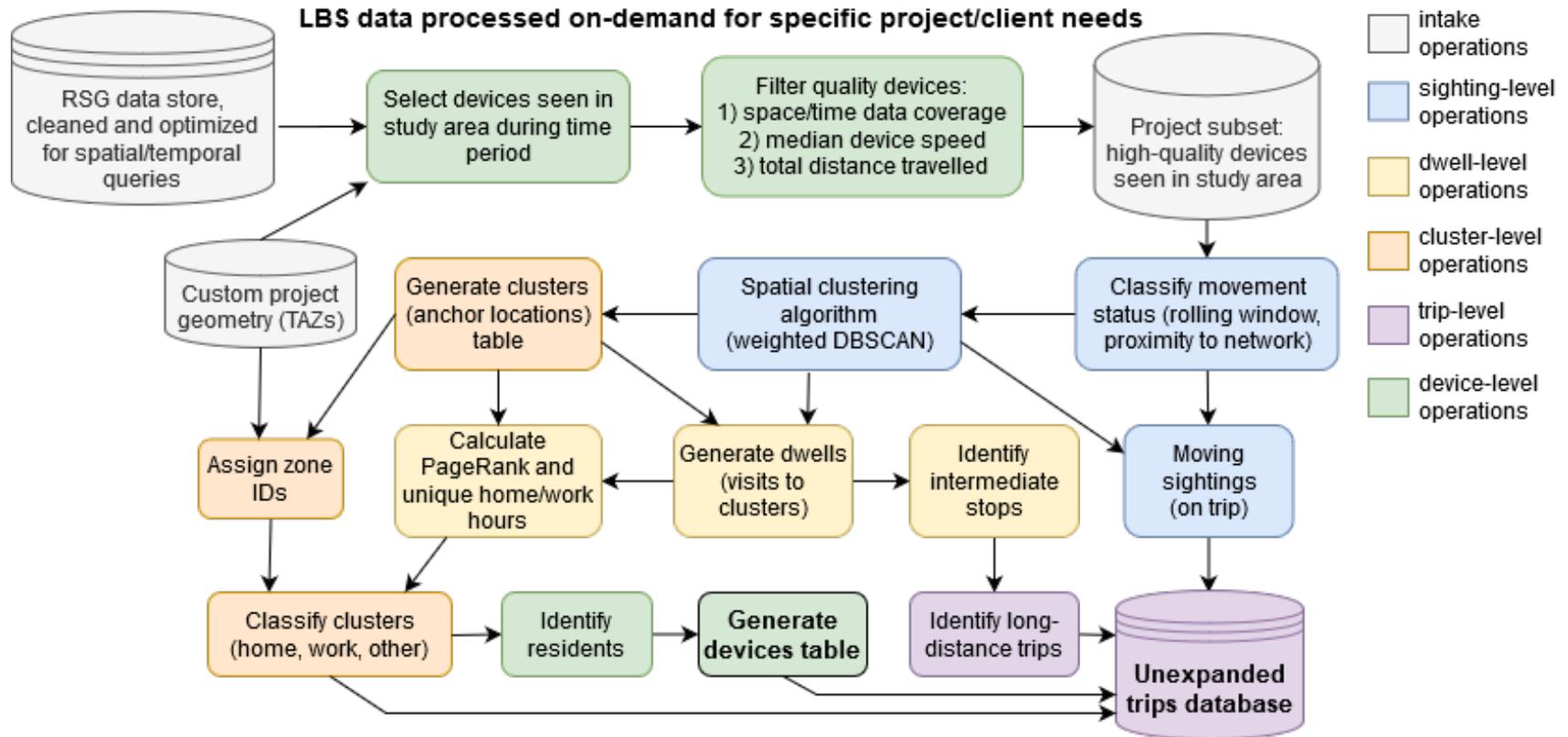
LBS data were expanded to correct for biases and represent the full population of travelers.

The LBS data expansion process involves 5 steps.

Demographic Expansion	Daily Scaling	Fitting to External Counts	Fitting to Screenlines	Constrained Origin-Destination Matrix Estimation (ODME)

LBS data validated well against traffic counts.
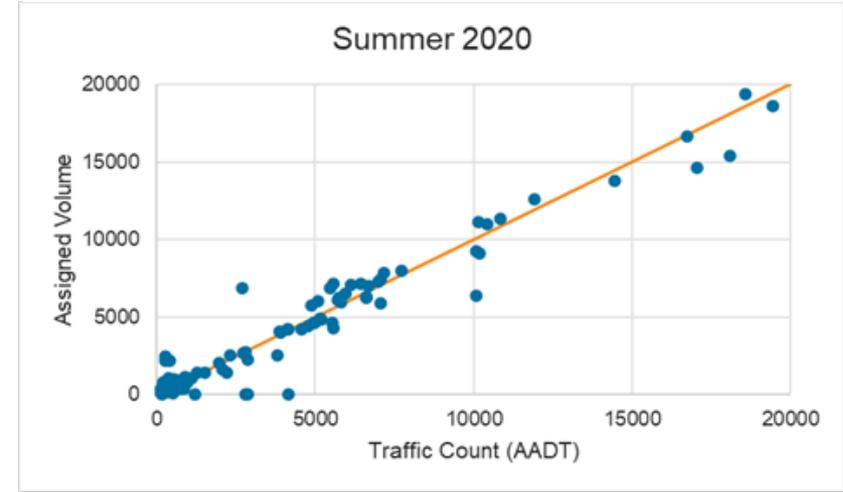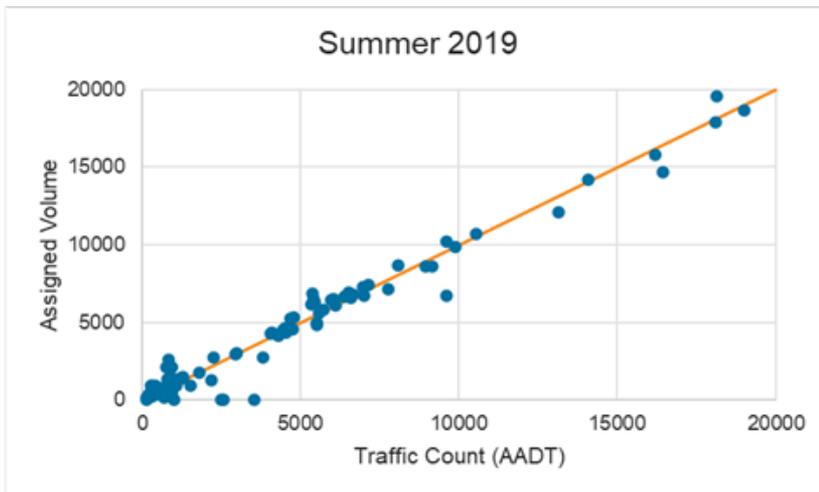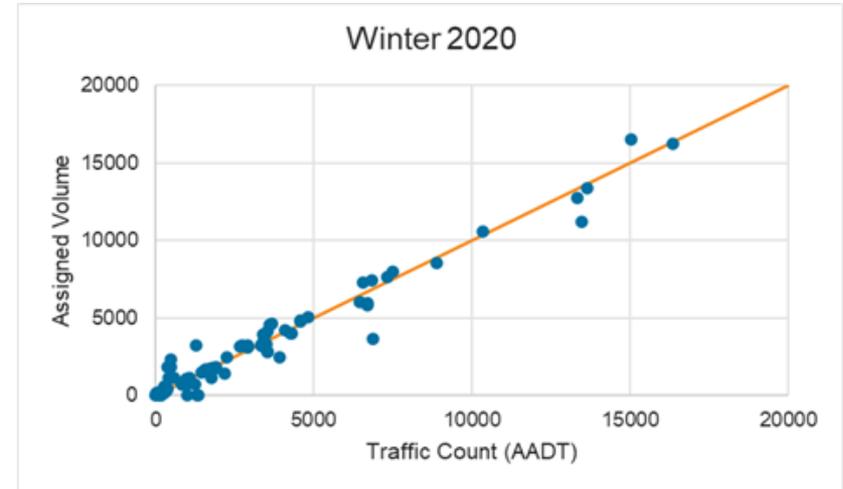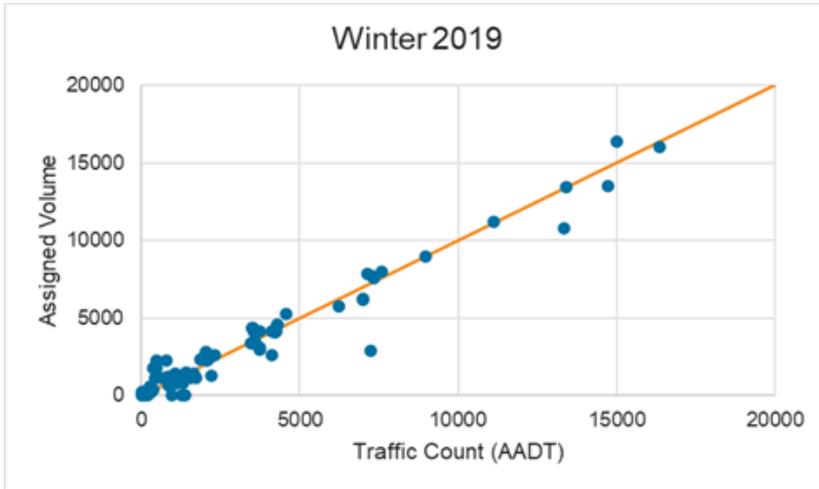
Results show changes in travel patterns by region and season each year.
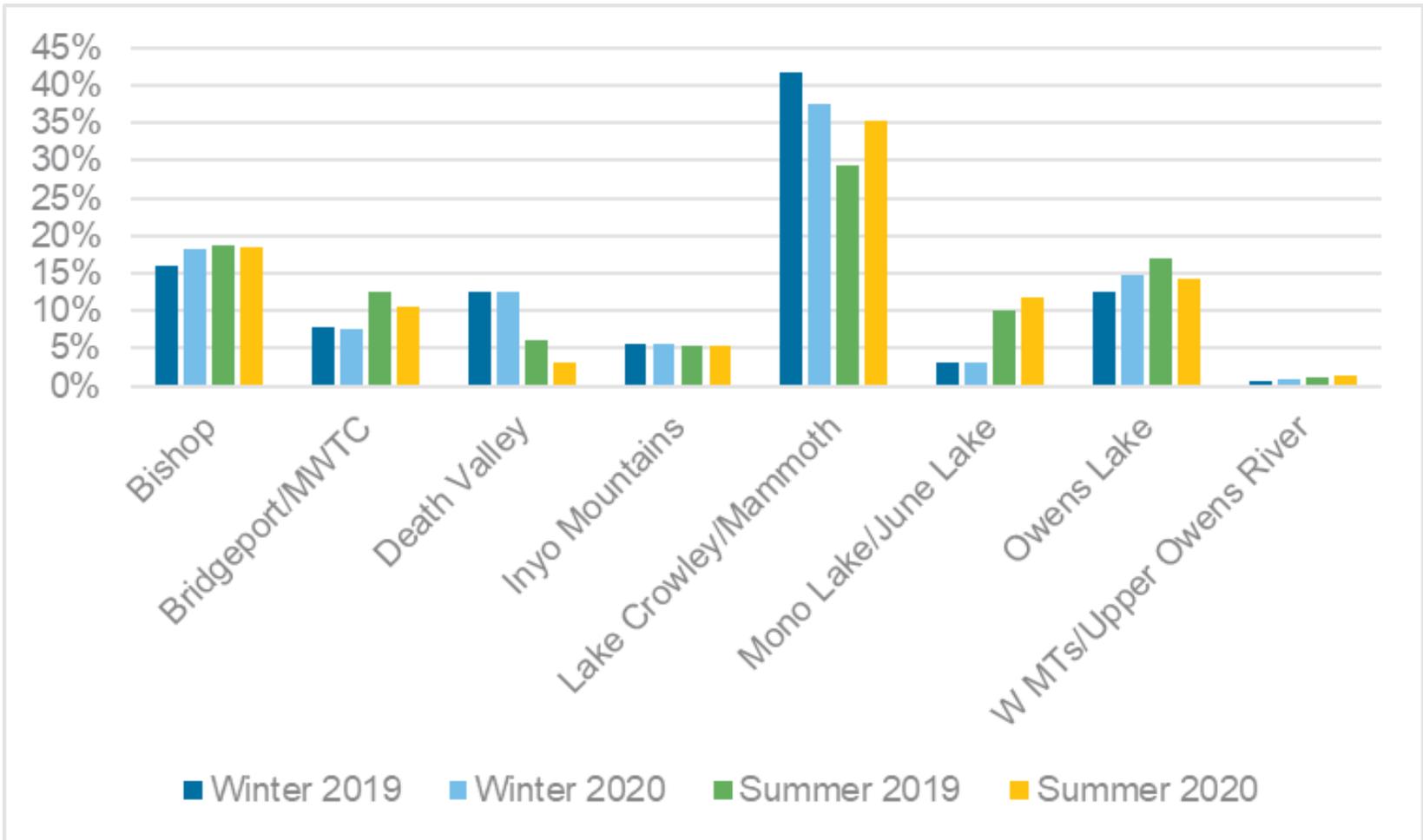
Visitor trip distances have declined from 2019 to 2020.

- 2020 visitors live closer, especially summer 2020
- Average distance
  - Winter 2019: **415** miles   Winter 2020: **369** miles
  - Summer 2019: **376** miles   Summer 2020: **284** miles
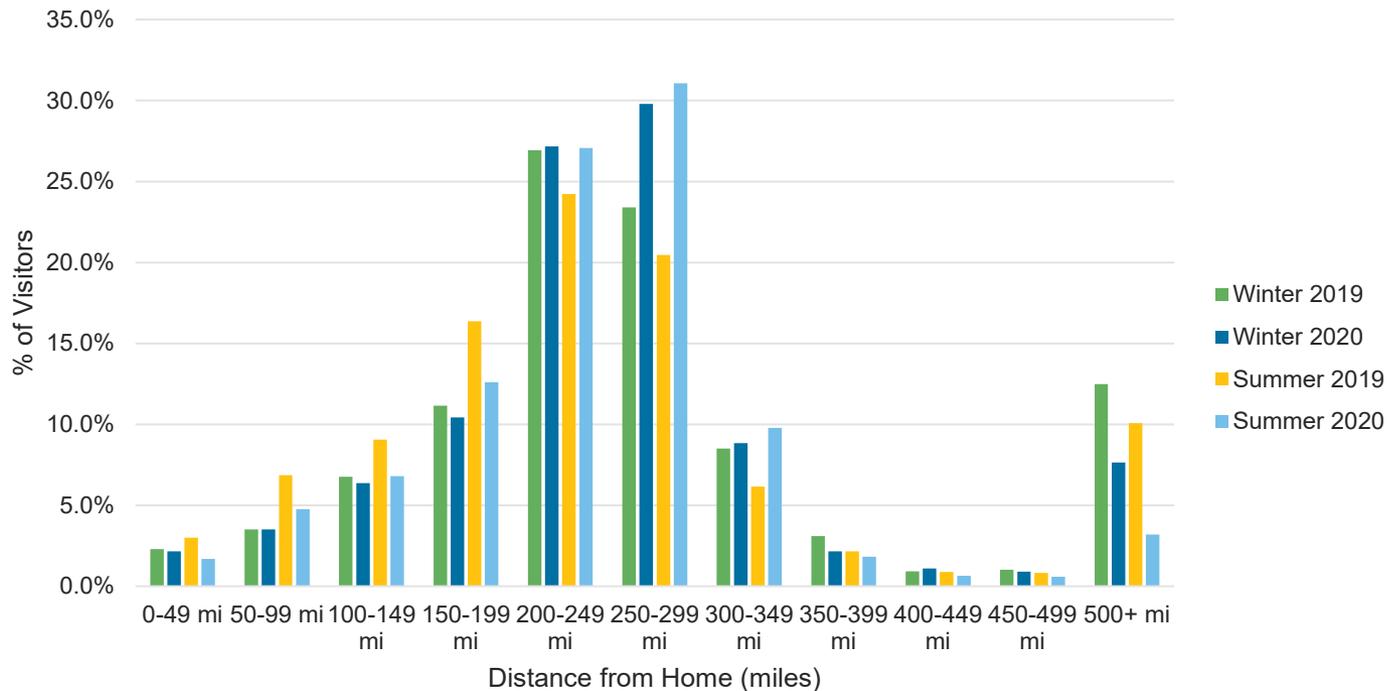
Mammoth Mountain is the top attraction in Winter 2020.

Average daytime device-hours of activity, Winter 2020

Visitor hours   Resident hours
200   200
400   400
600   600
800   800
1000   1000
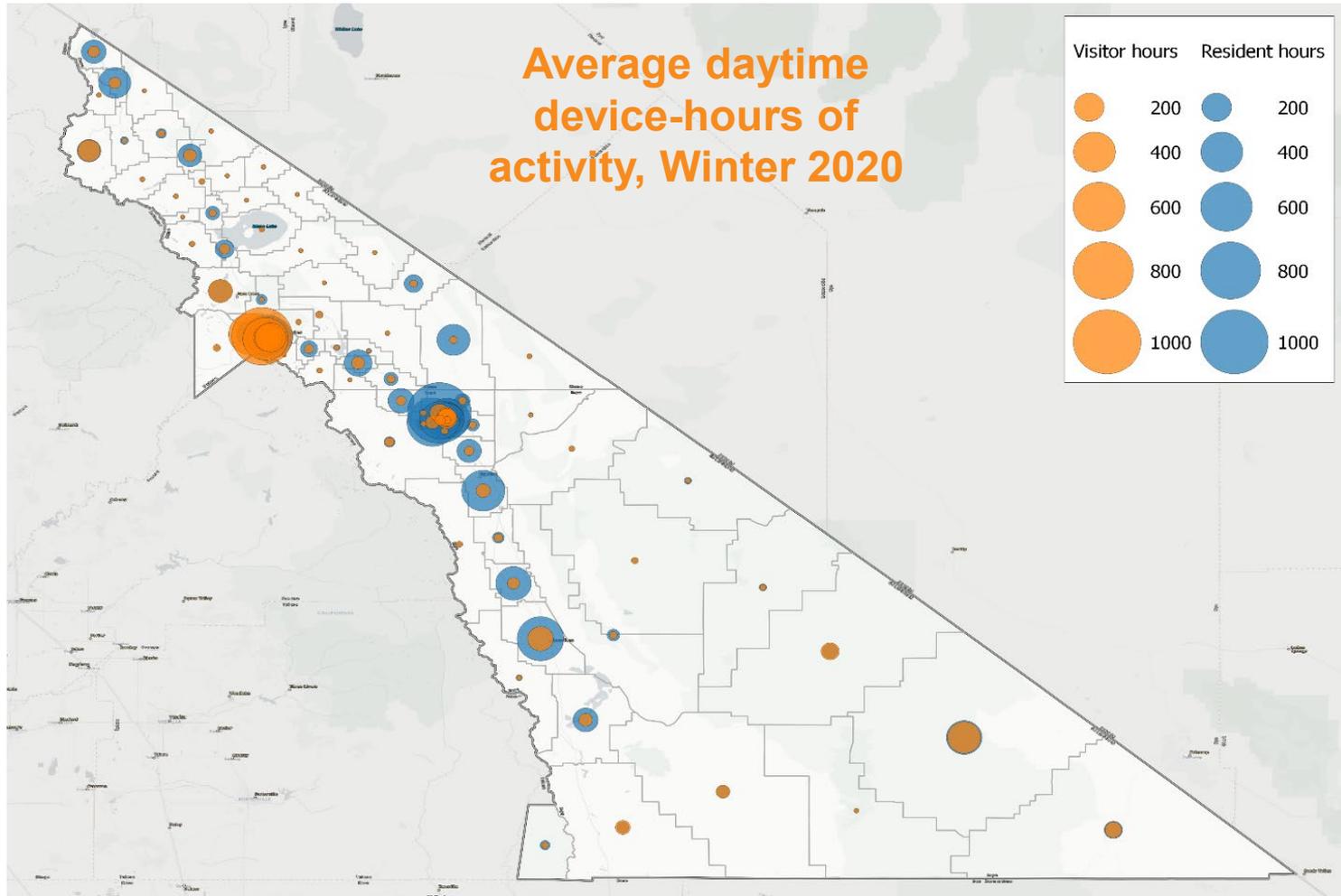
Mammoth business district is the top attraction in Summer 2020.

Average daytime device-hours of activity, Summer 2020

Visitor hours — Resident hours: 200, 400, 600, 800, 1000
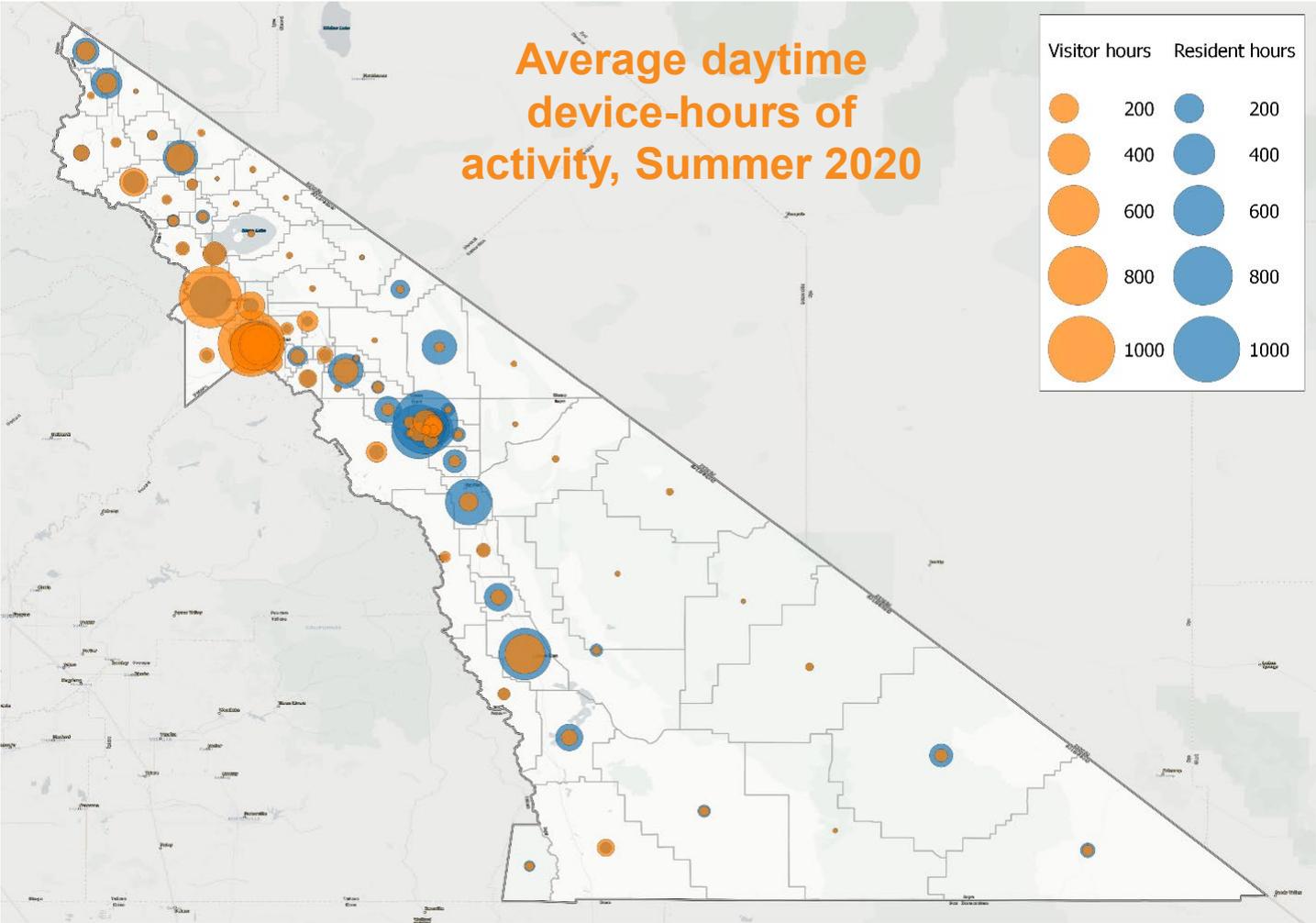
Origin-Destination Survey Results

Origin-Destination Survey Administration

- Facebook ads targeting residents and visitors of Mono and Inyo Counties from August 13th to October 20th
- 41% of respondents are residents of Mono or Inyo county

	Counts
Ad Views	98,550
Ad Viewers	81,810
Ad Clicks	942
Survey Completes	403
Completes after Data Cleaning	388

Majority (86%) of visitors are residents of California.

Visitors from California

Percent
24%

1%

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Majority of respondents visit the region multiple times a year with a most recent average trip of 9 days.

Visit Frequency

- More than once a month: 13%
- Once a month: 7%
- Several times a year (2 to 11 times): 51%
- Once a year: 18%
- Less than once a year: 10%
- This was my first time visiting: 1%

Most Recent Visit Duration

- Less than 1 day: 15%
- 1 to 3 days: 38%
- 4 to 6 days: 20%
- 7 to 9 days: 13%
- 10 or more days: 15%
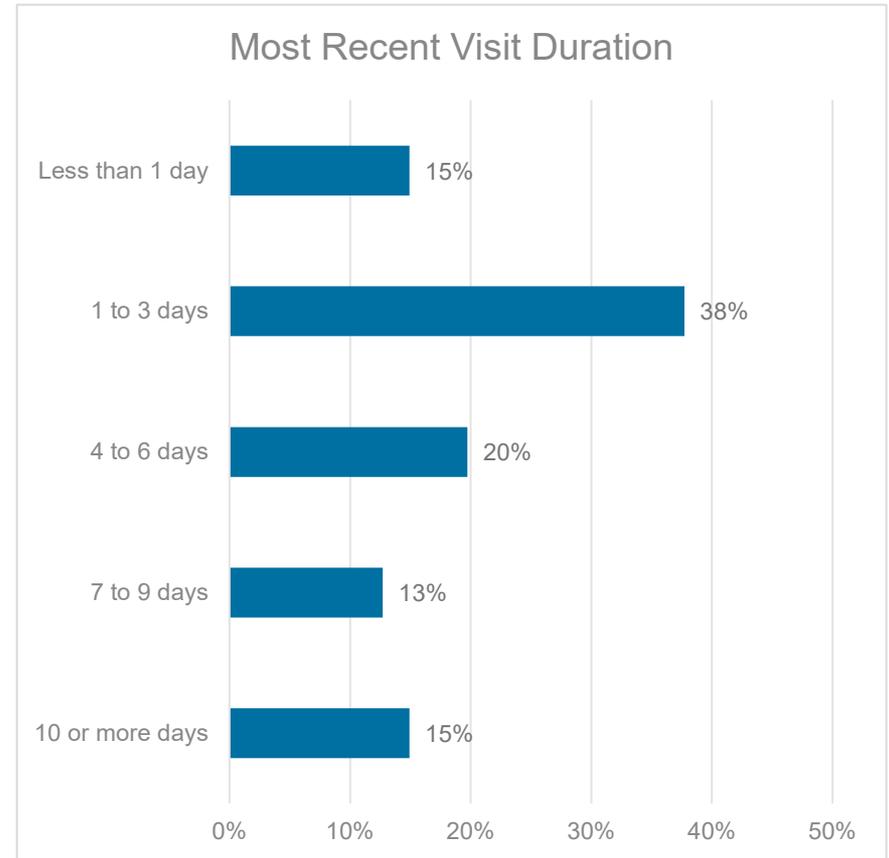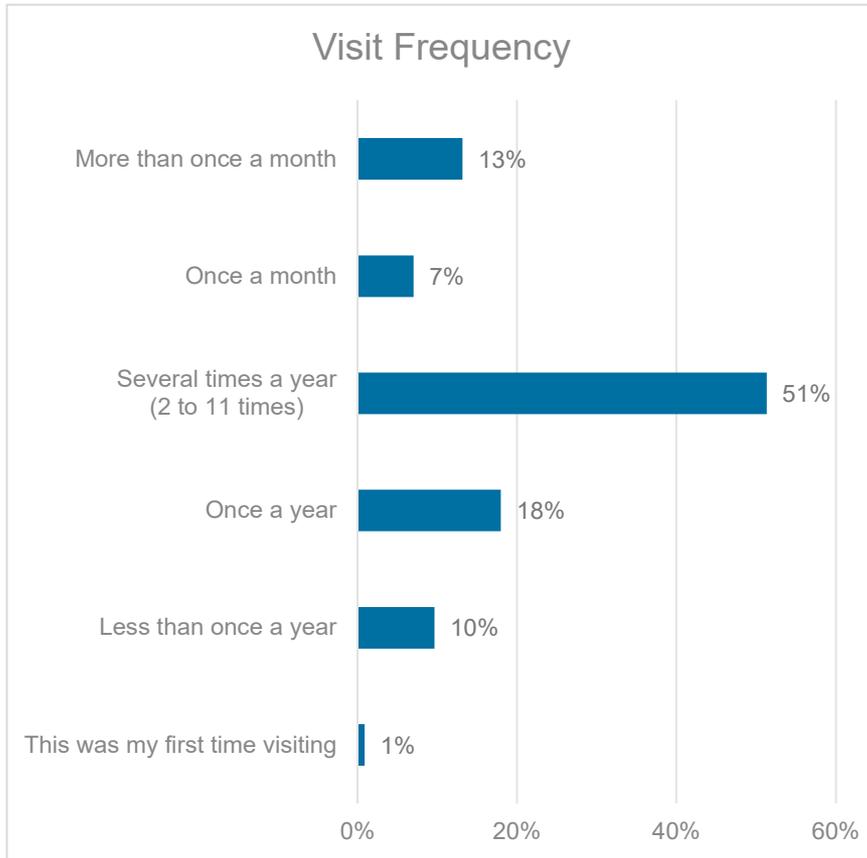
81% of visitor respondents traveled to the region with at least one other person.

Travel Party Size

Traveled alone	19%
1 person	50%
2 people	9%
3 people	9%
4 people	5%
5 or more people	7%

Travel Party Make-up

Family	89%
Friends	21%
Coworkers	1%

n = 228

20
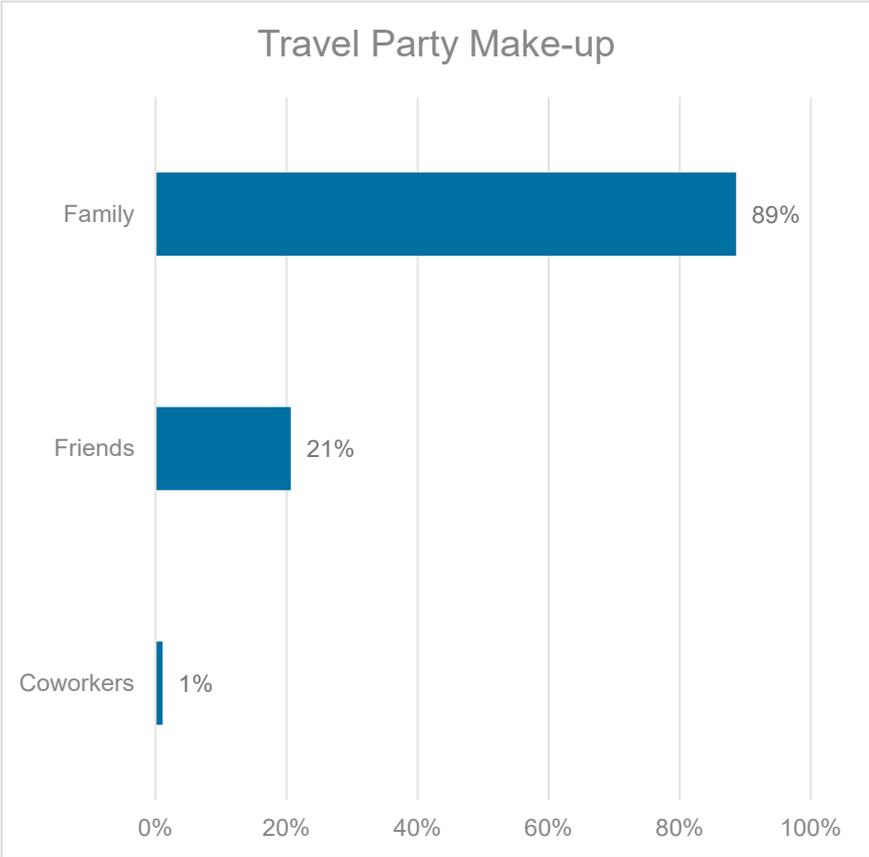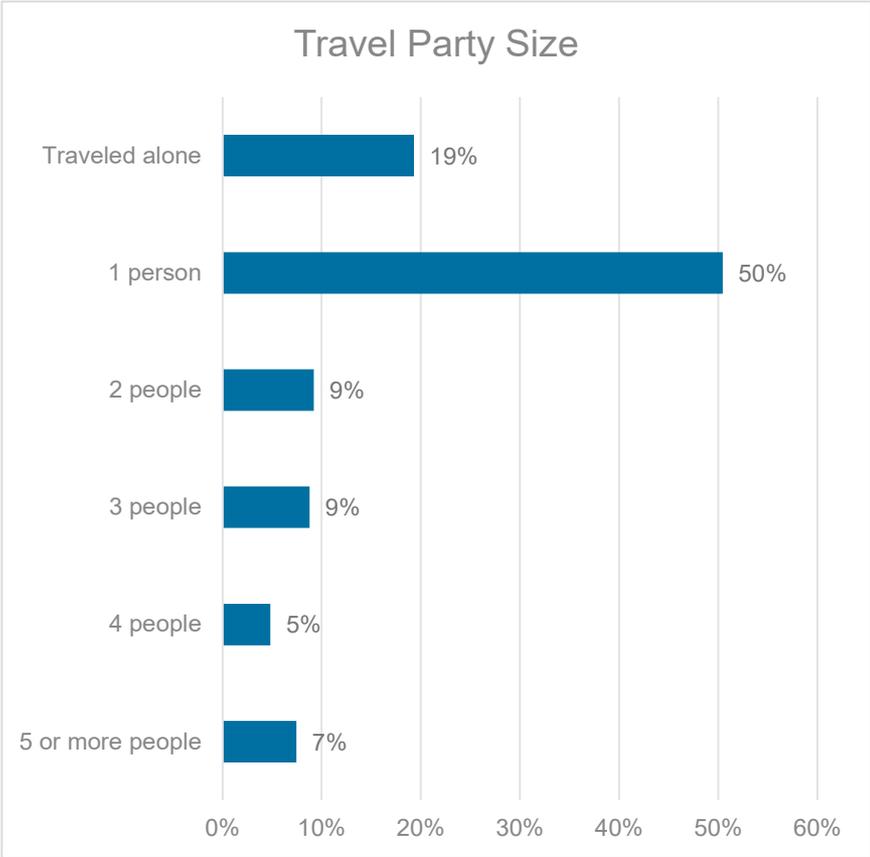
Majority of visitor respondents drove to the region and stayed at a hotel, motel or campground.

Place of Stay

Place	Percentage
Hotel / motel	32%
Campground	26%
My second home in the region	16%
A friend or relative's home	14%
Rental property (e.g., AirBnb, VRBO, timeshare, vacation rental)	11%
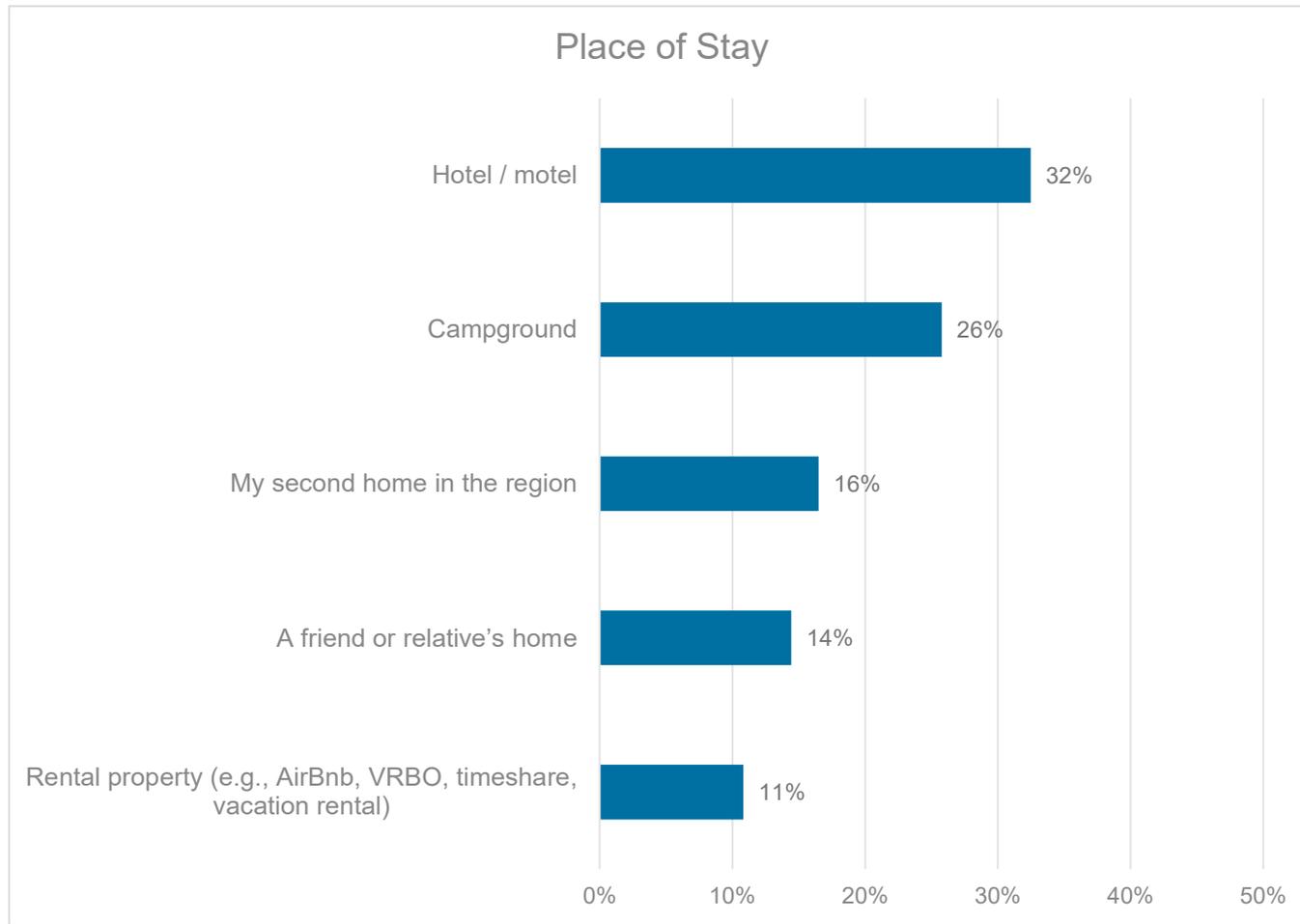
The top activities visitors participated in were wilderness recreation and sightseeing.

Visitor Activities

Activity	Percentage
Wilderness Recreation	74%
Sightseeing	71%
Water Recreation	21%
Shopping	19%
Bicycling	13%
Work	11%
Special events	8%
Golf	7%
None of the above	7%

n = 228
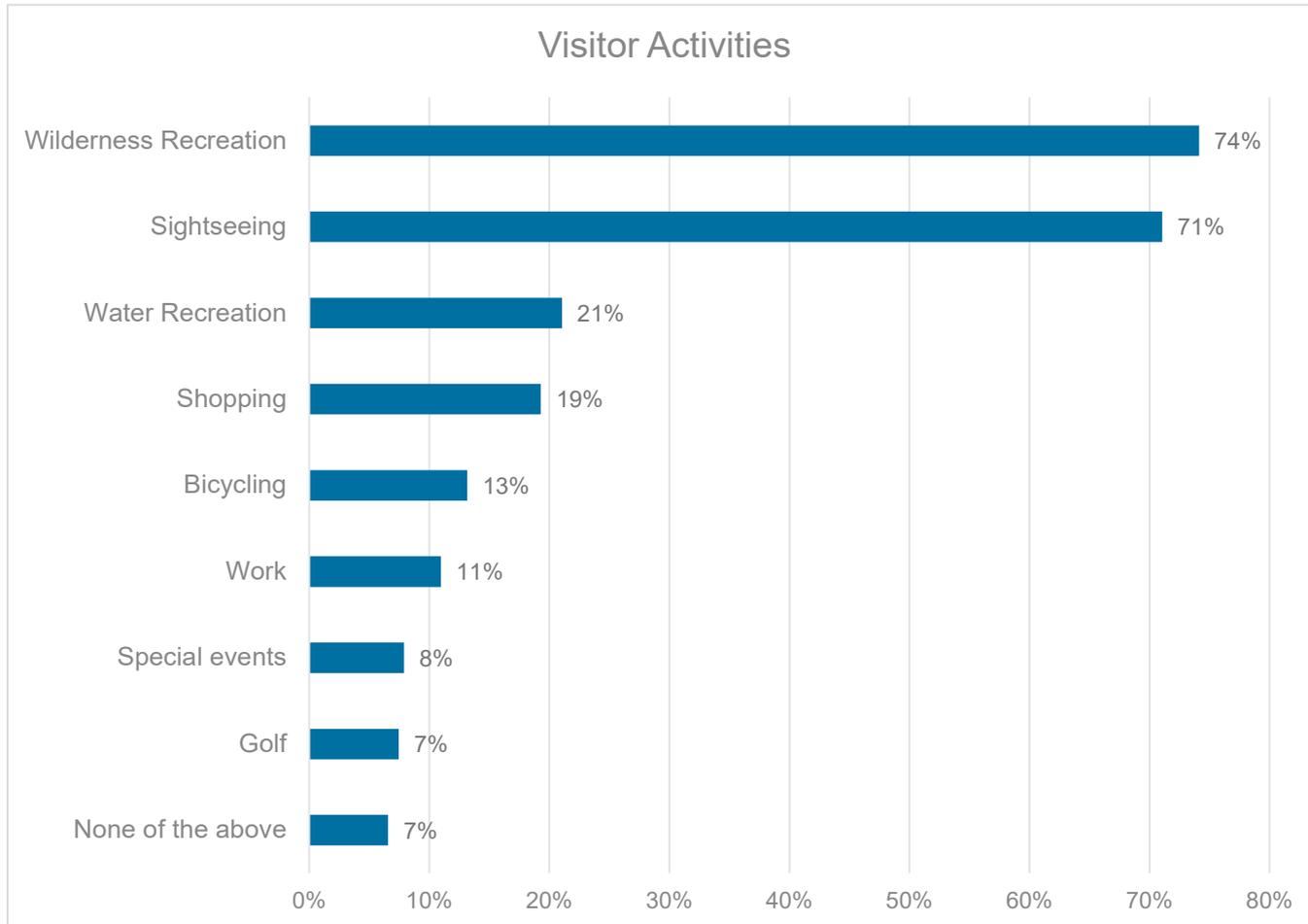
The top locations visited were Mono Lake State Park, Yosemite National Park and Bodie State Park.

Visitor Locations

Location	Percentage
Mono Lake State Park	40%
Yosemite National Park	24%
Bodie State Park	22%
Ansel Adams Wilderness	15%
Bristlecone National Forest	14%
Mt. Whitney	14%
Death Valley National Park	12%
Pacific Crest Trail	11%
None of the above	39%
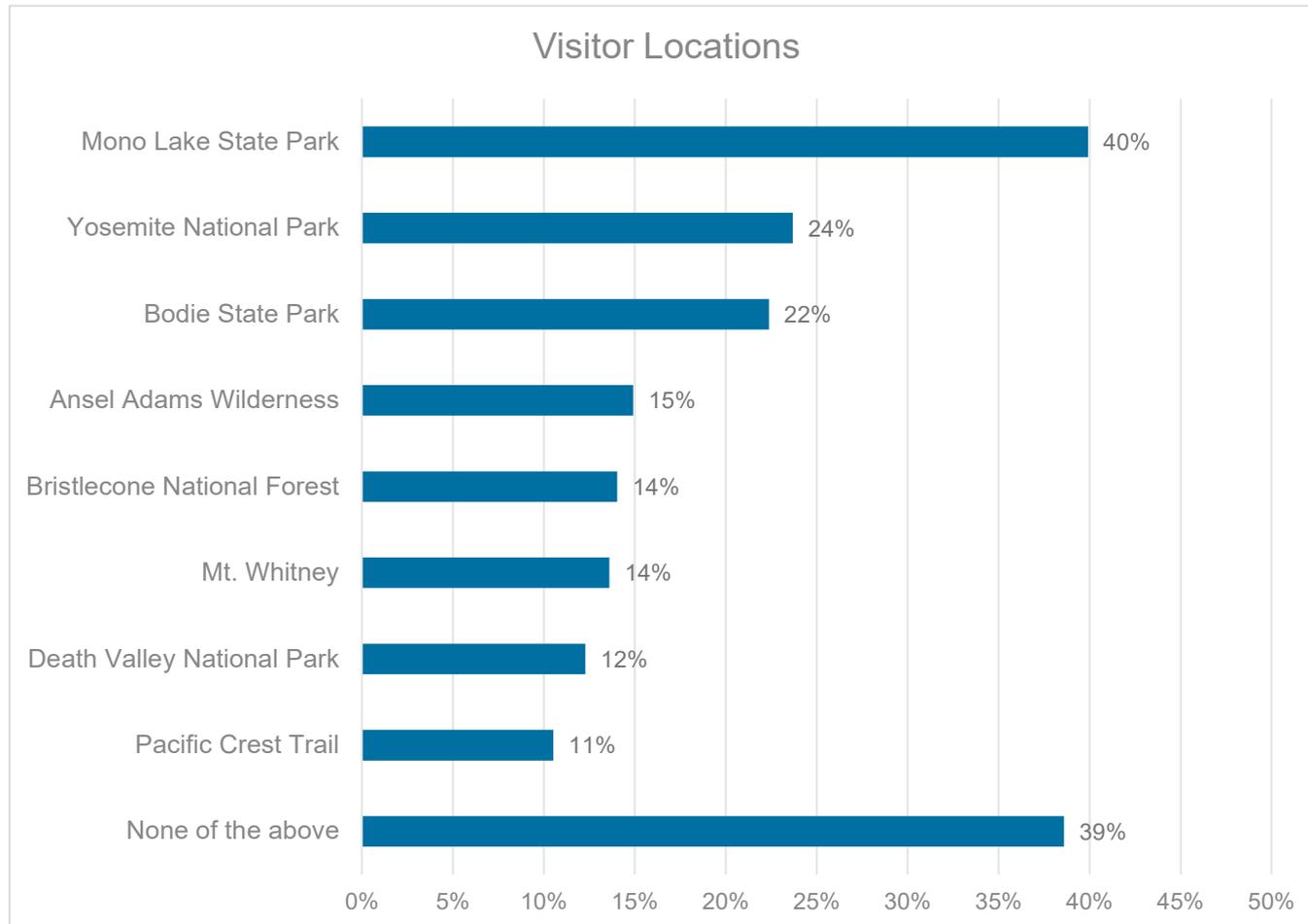
Respondent Profile:
Employment and Age

- ## 66% of all respondents are employed
  - Employment rate was higher among resident respondents

- ## The median age of survey respondents is in the range of 45 to 54 years old
  - Visitor respondents are older than the resident respondents

Employment Status

Status	Resident	Visitor	Overall
Employed	73%	61%	66%
Unemployed	24%	36%	31%
Student	4%	3%	3%

Age

| Age	Resident	Visitor	Overall
Under 18	1%		
18 – 24	4%	2%	3%
25 – 34	19%	7%	12%
35 – 44	16%	16%	16%
45 – 54	24%	21%	22%
55 – 64	23%	30%	27%
65+	13%	24%	19%

Visitor n = 228
Resident n= 160
Overall n = 388

24
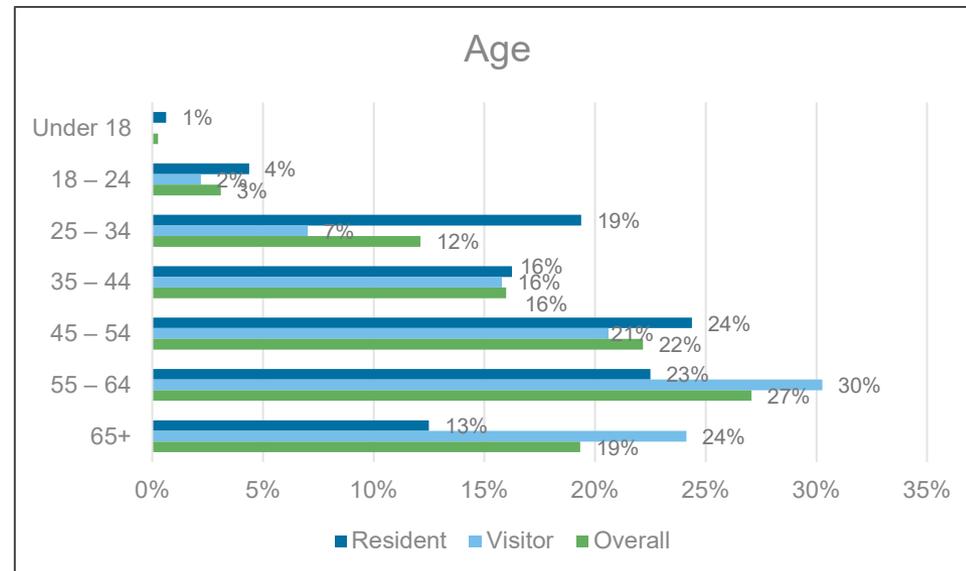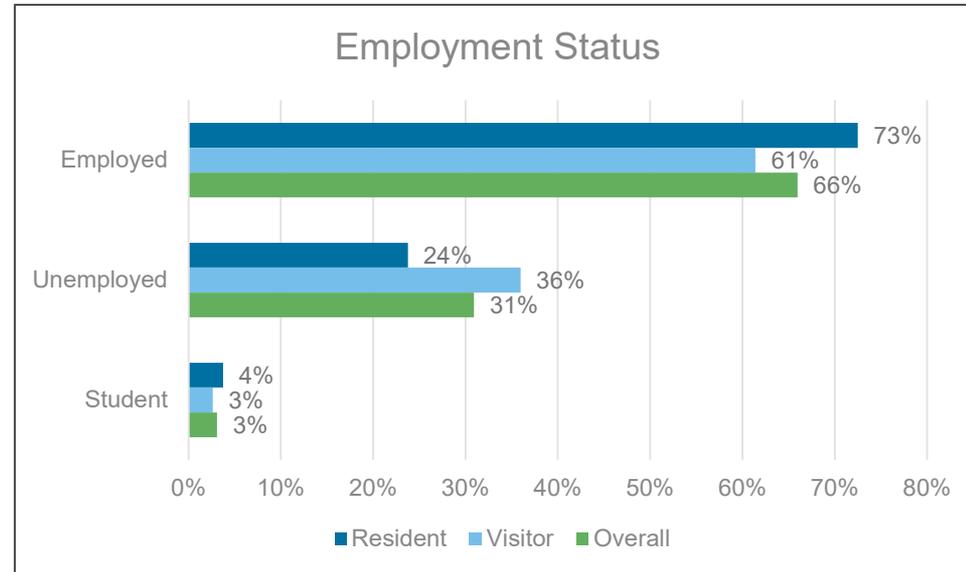
Respondent Profile: Education and Gender

- 52% of respondents have obtained a bachelor's degree or an advanced degree.

- Majority of respondents are female
  - About two-thirds of resident respondents are female, and half of visitor respondents are female

Education

	Resident	Visitor	Overall
Less than high school	2%	1%	1%
High school / GED	11%	7%	9%
Some college	31%	27%	29%
Associate degree	9%	9%	9%
Bachelor's degree	26%	32%	29%
Advanced degree	21%	25%	23%

Gender

	Resident	Visitor	Overall
Female	63%	49%	54%
Male	35%	50%	44%
Other / Prefer not to answer	3%	1%	2%

Visitor n = 228
Resident n= 160
Overall n = 388
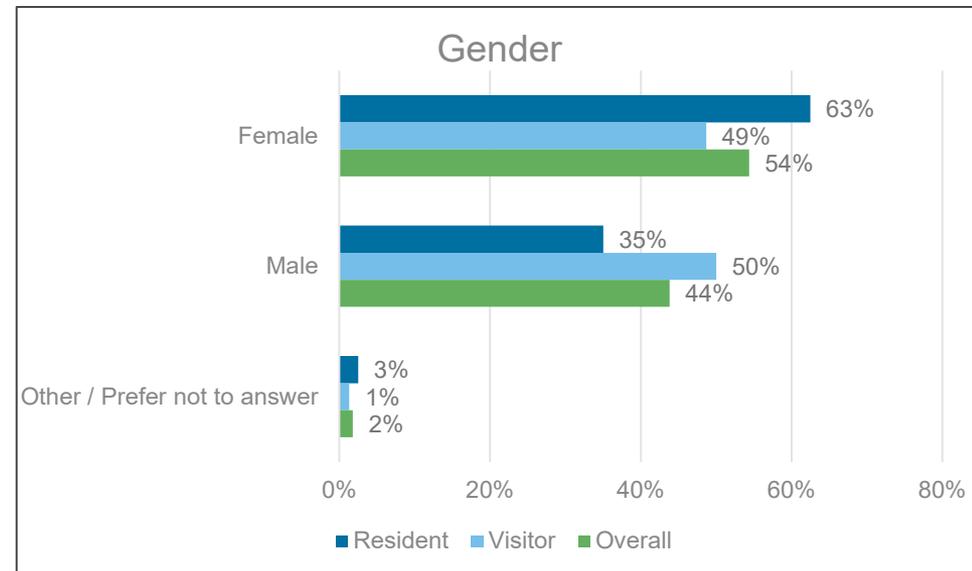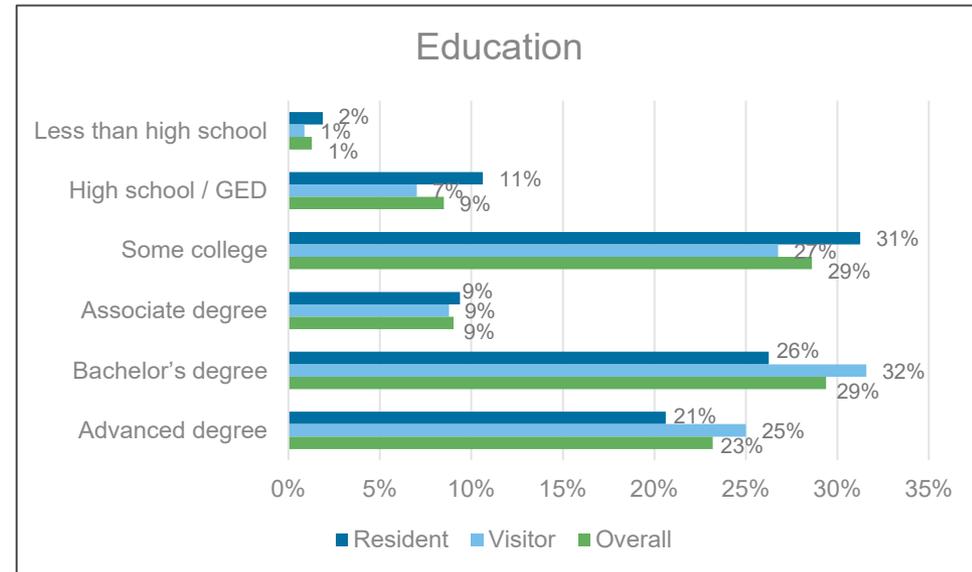
Study Highlights

Trends in Origin-Destination Patterns

- Top Destinations were Mammoth (36%) and Bishop (18%)
- More than half (51%) of visitors come from Southern California
- Most visitors (75-80%) stay less than 4 days.

METRIC	1989	2000	2011	2020
Average Vehicle Occupancy	2.56	2.18	2.05	1.51
Work Purpose	2%	13%	21%	10%
Recreation Purpose	80%	55%	61%	74%
Visitors From Other States	9%	28%	24%	14%
From Other Countries	2%	1%	5%	0%
People Staying in a Hotel/Motel	13%	42%	25%	32%
People Staying Longer than 7 Days	N/A	13%	23%	28%
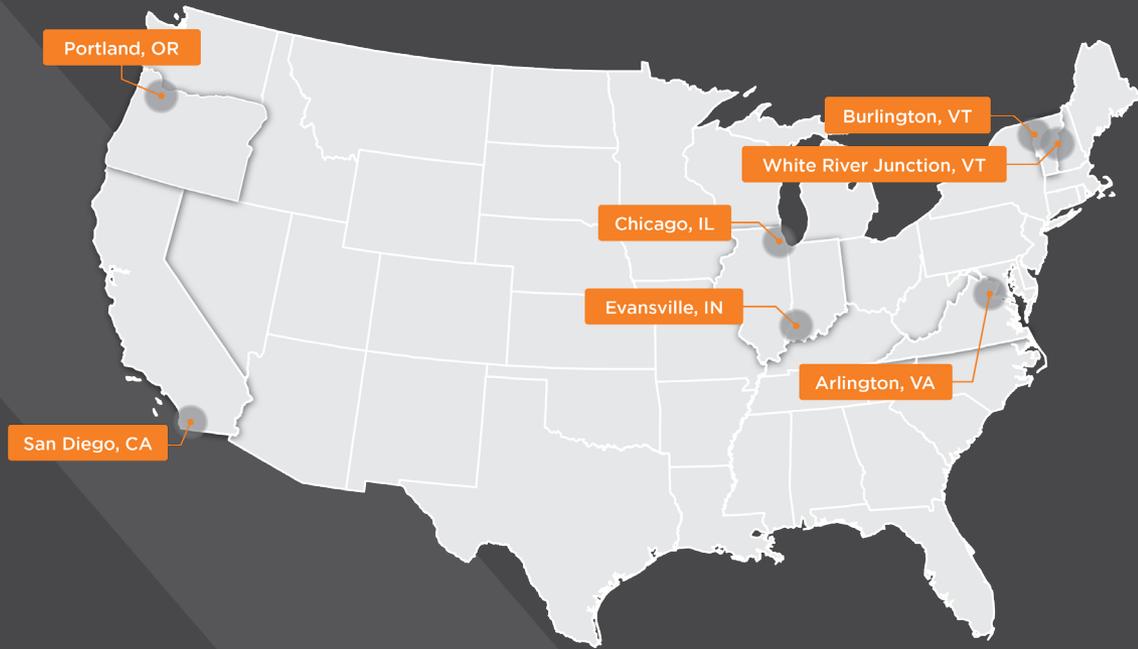
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