

Napa Valley Travel Behavior Study

Planning Commission Presentation

September 18, 2013



Overview

- **Objectives of the Study**
- **Community Advisory Committee**
- **Study Approach**
- **Data Analysis and Integration**
- **Conclusions**
- **Schedule**



Objectives of the Study

- Gather information on the travel behavior of **visitors, employees, residents, and students** who make **work and non-work trips** in Napa County
 - Numerous studies on where visitors come from but very few on visitor travel patterns within Napa County
 - Very few studies on resident and employee travel patterns with Napa County
 - How much of the congestions is from residents, imported workers, winery patrons, etc.?
 - Use the information to help expand transit and paratransit services



Objectives of the Study

- An opportunity to integrate **innovative data collection methods** with **enhancements to traditional methods** to offer an unprecedented look into travel behavior in the region
 - The **integration of multiple advanced data collection methods** and technologies no longer lies in the realm of research
 - Maximize the accuracy and geographic scale of the data while providing a broad range of uses for the data
 - A multi-firm team comprised of Fehr & Peers, AirSage, and MioVision has been created



Community Advisory Committee

- Fehr & Peers worked with NCTPA staff to convene a Community Advisory Committee
 - Comprised of representatives from business and wine industry groups, major employers, and other community stakeholders
 - We understand the importance of effectively reaching out and engaging members of the community
 - This study will provide the **basis for multiple planning efforts** by NCTPA and planning agencies within the County
 - For example, refine the Napa-Solano Travel Demand Model or update the Countywide Transportation Plan



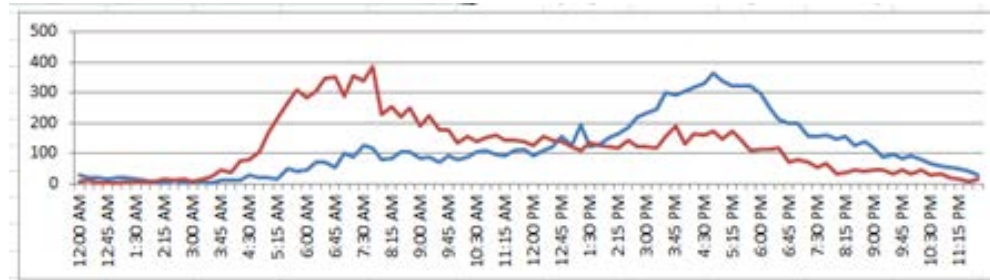
Study Approach

- Will utilize and combine the results of **four data collection methods**
 1. Vehicle Counts
 2. License Plate Matching
 3. License Plate, In-Person, and Online Surveys
 4. Mobile Phone Data



Study Approach

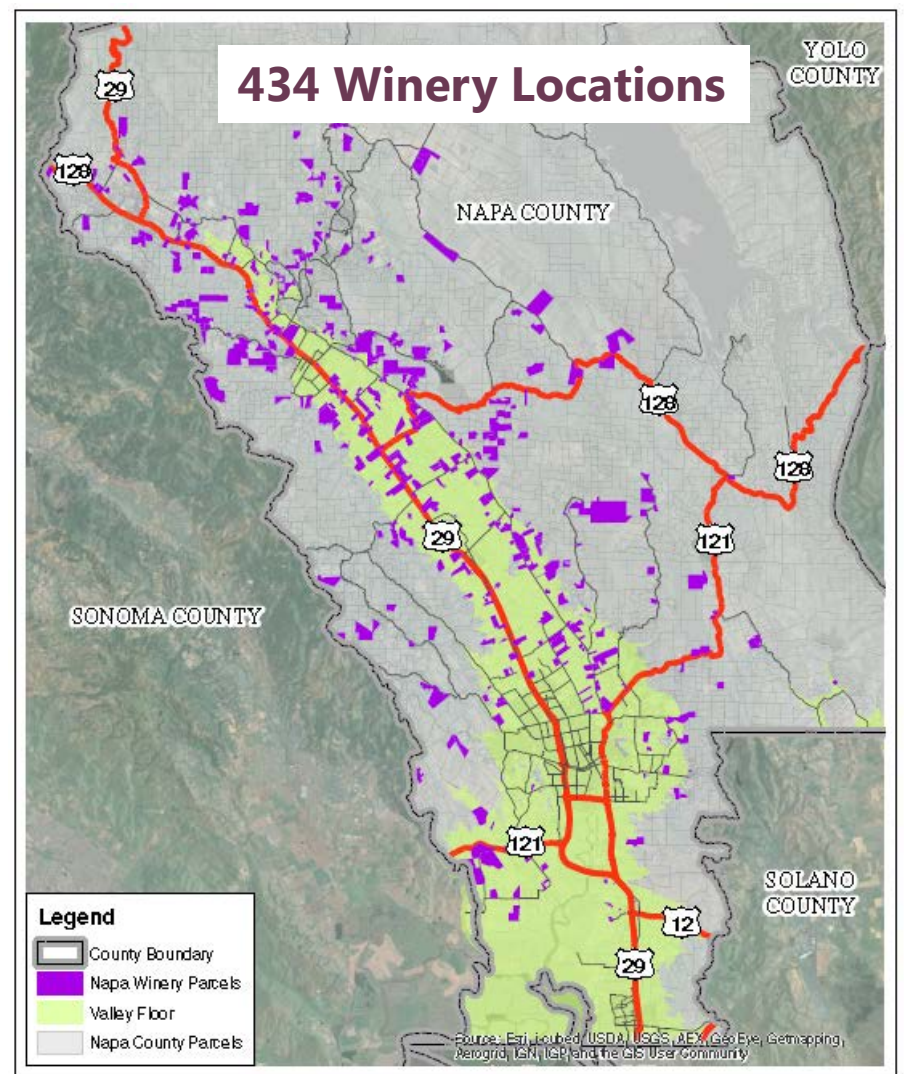
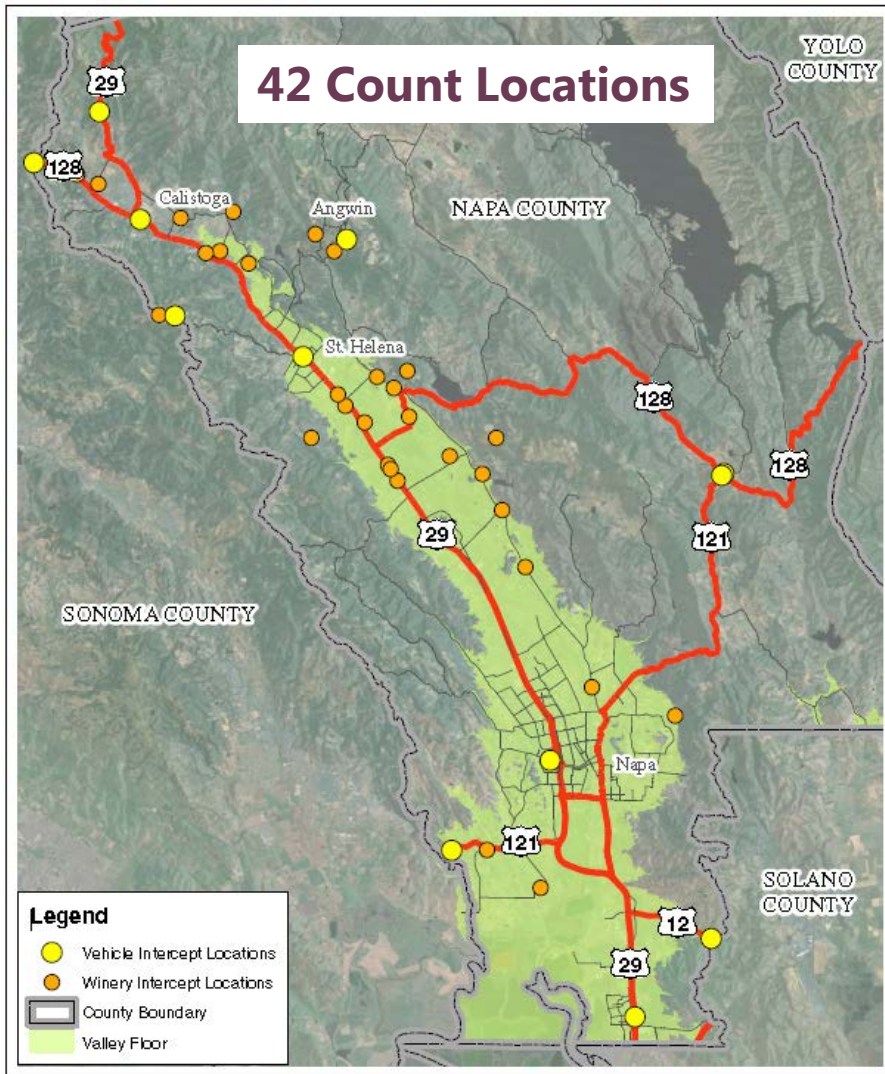
1. Vehicle Counts



- Provides the **total traffic volume** that can be used as a control total for other data collection methods
- Data will be collected at **12 local and external gateway locations**
- Driveway count data will also be collected at **30 wineries** most representative of typical wineries of various sizes and activity levels
- **Regression analysis** will then be used to estimate the vehicle trip generation of the wineries for which traffic counts were not collected



Napa Valley Travel Behavior Study



Study Approach

2. License Plate Matching

- Involves the positioning of cameras at multiple locations to record the license plate of passing vehicles
- Will use **high-speed infrared cameras and sophisticated software**
- License plate listings will be matched between survey data locations and then used to create **origin-destination vehicle trip tables**
 - i.e. leaving one location at 8 AM and coming back at 5 PM is likely a work trip (**inferred trip purpose**)
- Will also be used to develop a list of unique license plate listings from which a calculated number of **randomly selected owners will be surveyed by mail** to obtain more detailed trip making information



Type

Imported

Exported

One-Way In

One-Way Out

Pass-Through



Study Approach

3. License Plate, In-Person, and Online Surveys

- **Three types of surveys** will be conducted to **supplement Visit Napa Survey**
 - A license plate survey will be conducted to gather more detailed travel behavior data for trips made by local residents and visitors
 - In-person surveys will be conducted at thirty wineries to gather more detailed travel behavior data for trips made by winery patrons
 - Online surveys will be provided to major employers and schools to gather travel behavior data for employees and students
- The surveys will provide detailed information on the **trip making and travel characteristics** of a sample of residents, visitors, winery patrons, students, and employees



Napa Valley Travel Behavior Study



AMBAG Travel Survey

Help Improve Travel in the Region

(Monterey, San Benito and Santa Cruz Counties)

The Association of Monterey Bay Area Governments (AMBAG) is studying the travel patterns of residents and visitors to the region. The results will help us predict future travel patterns and prioritize transportation improvements in the area. Fuhr & Pears is conducting this study on behalf of AMBAG. You have been invited to participate because a vehicle registered to your address traveled in or through the region on >>Date<<.

Your Unique Survey ID: >>Survey ID<<

Location Surveyed: >>Location<<

Date and Time: >>Detail and Time<<

Take the survey online on your smart phone at:

www.surveymonkey.com/s/AMBAGTravelSurvey

Once you have completed the short, 5 minute survey, you will have the option to enter a drawing for one of three \$100 gas cards. If you would prefer to fill out this survey on paper and mail it back to us, please simply fill out the survey below and mail it using the enclosed envelope. Thank you for helping to improve transportation in the region!

Win 1 of 3
\$100 gas cards



Please check the boxes next to the answers that best describe your response.

- At the time of travel were you a full-time resident, part-time resident or visitor of the AMBAG region (Monterey, San Benito and Santa Cruz Counties)?
 - Full-time resident
 - Part-time resident
 - Non-resident but employed in the region
 - Visitor
- Where did you begin this auto trip? (Starting location) (Required for prize eligibility)

Address: _____

OR Cross Streets: _____

Business Name (Optional): _____

City: _____
- Where did you come from for this auto trip? Which of the following categories best describes this location? (Only one category) (Required for prize eligibility)
 - Home
 - Work
 - School
 - Shopping
 - Visiting friends/family
 - Personal business
 - Household errands
 - Leisure/entertainment
 - Medical Appointment
- Where did you end this auto trip? (Ending location) (Required for prize eligibility)

Address: _____

OR Cross Streets: _____

Business Name (Optional): _____

City: _____
- Where did you go on this auto trip? Which of the following categories best describes this location? (Only one category) (Required for prize eligibility)
 - Home
 - Work
 - School
 - Shopping
 - Visiting friends/family
 - Personal business
 - Household errands
 - Leisure/entertainment
 - Medical Appointment
- What time did you begin this auto trip? (Enter time and circle am or pm)

Time _____ am / pm
- What was your total travel time for this trip?

Time in Minutes: _____

- How often do you make this trip?
 - Less than 1 to 3 times per month
 - 1 to 3 times per month
 - 1 to 3 times per week
 - 4 or more times per week
- How many passengers were in your vehicle at the time of the auto trip? (Include yourself) (Required for prize eligibility)
 - 1
 - 2
 - 3
 - 4 or more
- Of those, how many were household members? (Include yourself) (Required for prize eligibility)
 - 1
 - 2
 - 3
 - 4 or more
- How many people are in your household? (Include yourself) (Required for prize eligibility)
 - 1
 - 2
 - 3
 - 4 or more
- How many vehicles are available to your household? (Required for prize eligibility)
 - 1
 - 2
 - 3
 - 4 or more
- When is your age?
 - 18 to 24 years of age
 - 25 to 34 years of age
 - 35 to 44 years of age
 - 45 to 54 years of age
 - 55 to 64 years of age
 - 65 to 74 years of age
 - 75 to 84 years of age
 - 85 years or older
- What is your highest level of education?
 - 12th grade or less
 - High school graduate
 - Some college credit
 - Associate or technical school degree
 - Bachelor's or undergraduate degree
 - Graduate degree
 - Other: _____
- What is your annual household income?
 - Less than \$15,000 per year
 - \$15,000 to \$24,999 per year
 - \$25,000 to \$34,999 per year
 - \$35,000 to \$49,999 per year
 - \$50,000 to \$74,999 per year
 - \$75,000 to \$99,999 per year
 - \$100,000 to \$149,999 per year
 - \$150,000 to \$199,999 per year
 - \$200,000 per or more

Please provide any comments or recommendations concerning transportation in the AMBAG region (Monterey, San Benito and Santa Cruz Counties) in the space provided below.

If you would like to be entered in the drawing to win one of three \$100 gas cards, please provide your name, email address and/or contact phone number:

Name: _____

Email: _____

Phone: _____

Eligibility: To be eligible to win, all required responses must be completed and legible. Three winners will be chosen on August 10th, 2012 and will be notified by telephone or email. Winners will have 3 business days to claim their prize - until 5 p.m. PST on Friday, August 17th, 2012.

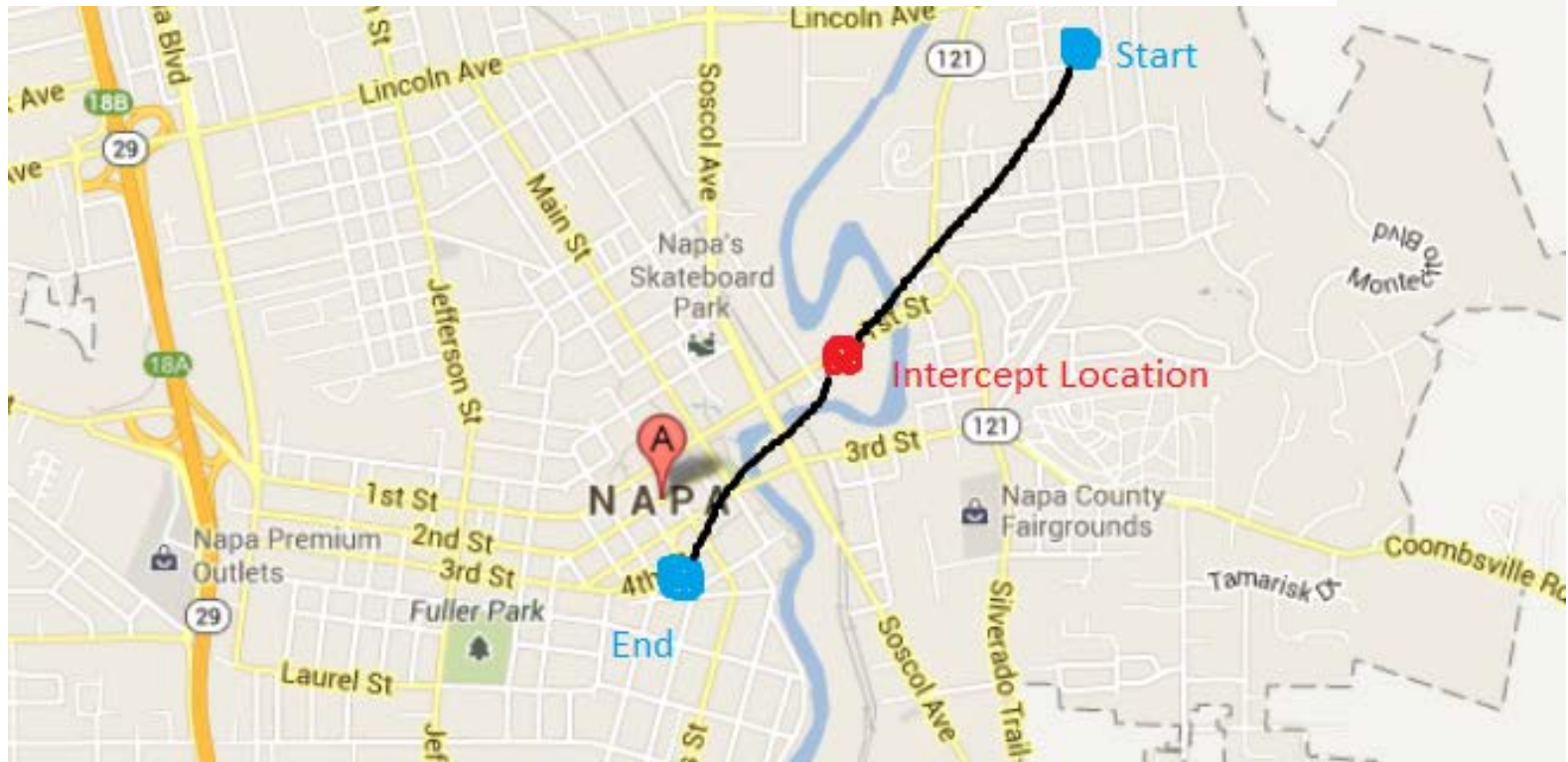
For questions, please email k.johnson@fuhrandpears.com or call (625) 930-7100 ext. 2140

PLEASE CONTINUE SURVEY ON THE BACK OF THIS PAGE.



License Plate Survey:

Will get 3 points for each respondent that can be mapped



Origin and destination data is key to understanding
how people move within, to, and through Napa County



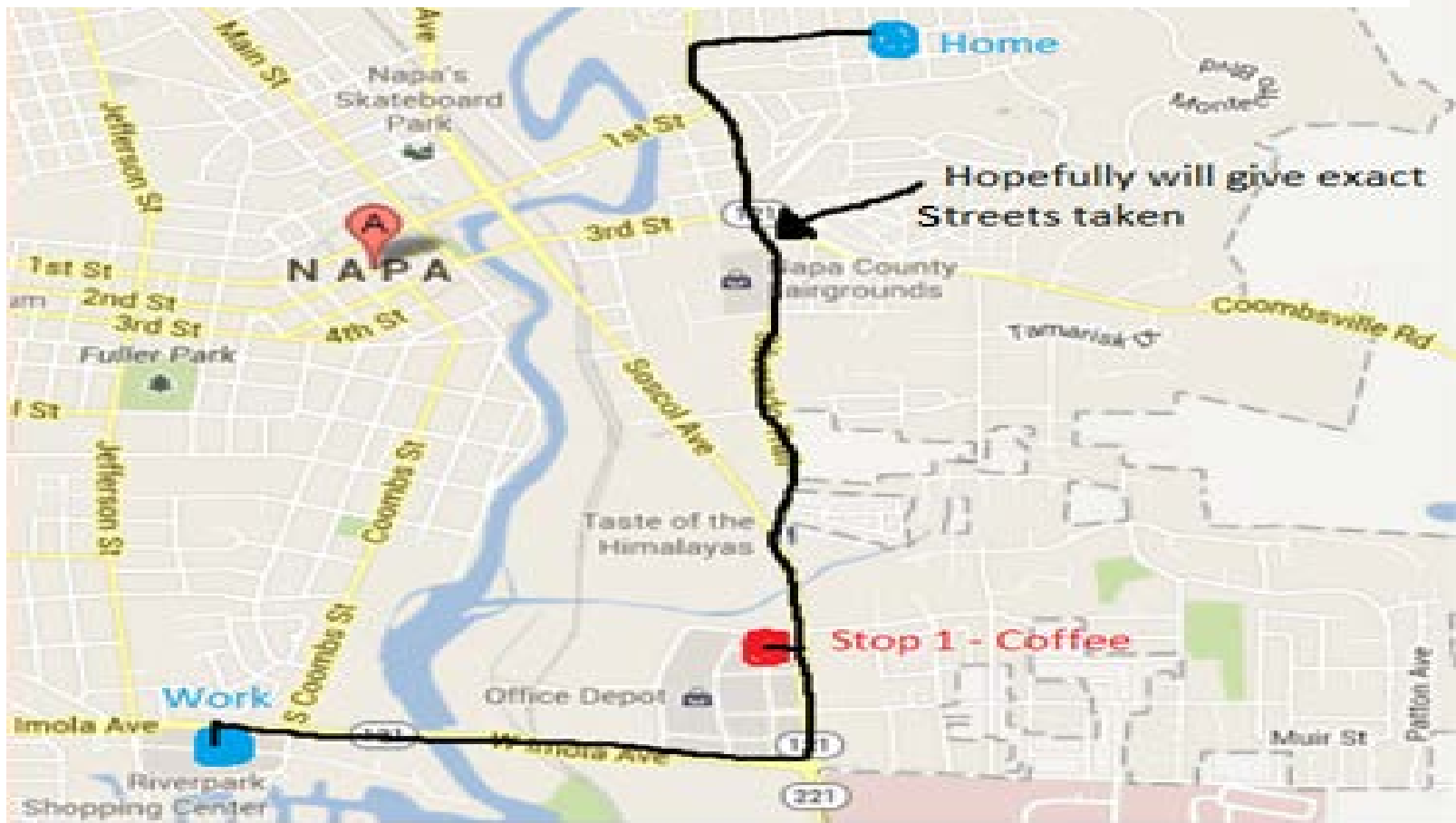
In-Person Winery Survey:

Will get 3 or more points for each respondent that can be mapped



Online Survey:

Will get 2 or more points for each respondent that can be mapped



Study Approach

4. Mobile Phone Data

- AirSage is able to collect and analyze cell phone data while the device is in use to record the **anonymous location** (ensuring user privacy) and **movement of mobile devices** on the roadway network
 - Gathers movement and usage patterns over a multi-day period to determine the “**Home Zone**” and “**Work Zone**” for each mobile device
 - A “Home Zone” is designated if a device spends a majority of nighttime hours (i.e. 9 PM to 6 AM) at a specific location, whereas a “Work Zone” is designated if a device spends a majority of daytime hours (i.e. 8 AM to 5 PM) at a specific location
 - When no “Home Zone” or “Work Zone” is discernible, the device is labeled as a “**Visitor**” to the region



Study Approach

4. Mobile Phone Data

- AirSage provides a **table of trips** with **origin and destination** coordinate points as well as the observed **time period** and inferred **trip purpose**
- Fehr & Peers is able to tag this data to a user-specified geographic layer for seamless integration and **comparison with other sources of data**
 - Will start with the Napa Solano Model TAZ system but add wineries, major employers, etc.
 - Origin-destination trip tables will then be developed that can easily be compared to the trip tables generated by the local travel demand models as well as data from other travel behavior sources



The screenshot shows a software window titled "Matrix1 - AMBAG_Daily_AirSage_OD_Disagg Disaggregate (Total)". It contains a large data matrix with 17 rows and 8 columns, plus a "Sum" column. An inset window titled "Dataview..." shows a summary table with 11 rows and 2 columns: "Matrix" and "Sum".

	1	2	3	4	5	6	7	8	Sum
1	216	—	6	29	5	—	13	25	1027
2	—	30	11	51	—	—	30	13	605
3	8	5	37	175	—	—	—	22	1499
4	36	22	175	823	—	—	—	101	7054
5	5	10	59	270	—	—	—	44	2470
6	13	25	34	159	—	—	—	51	13086
7	—	13	43	203	—	—	—	51	2954
8	30	25	40	180	—	—	—	621	4700
9	13	25	65	304	—	—	—	127	3157
10	13	—	15	72	—	—	—	13	4058
11	—	—	8	36	—	—	—	76	3005
12	—	—	3	14	—	—	—	—	1547
13	—	—	11	51	—	—	—	76	2790
14	—	—	15	72	—	—	—	241	4476
15	—	—	3	14	—	—	—	25	368
16	—	—	12	50	—	—	—	101	800
17	30	13	52	246	127	25	63	203	6023
Sum	951	634	1556	7322	2363	13327	2777	4679	1434691

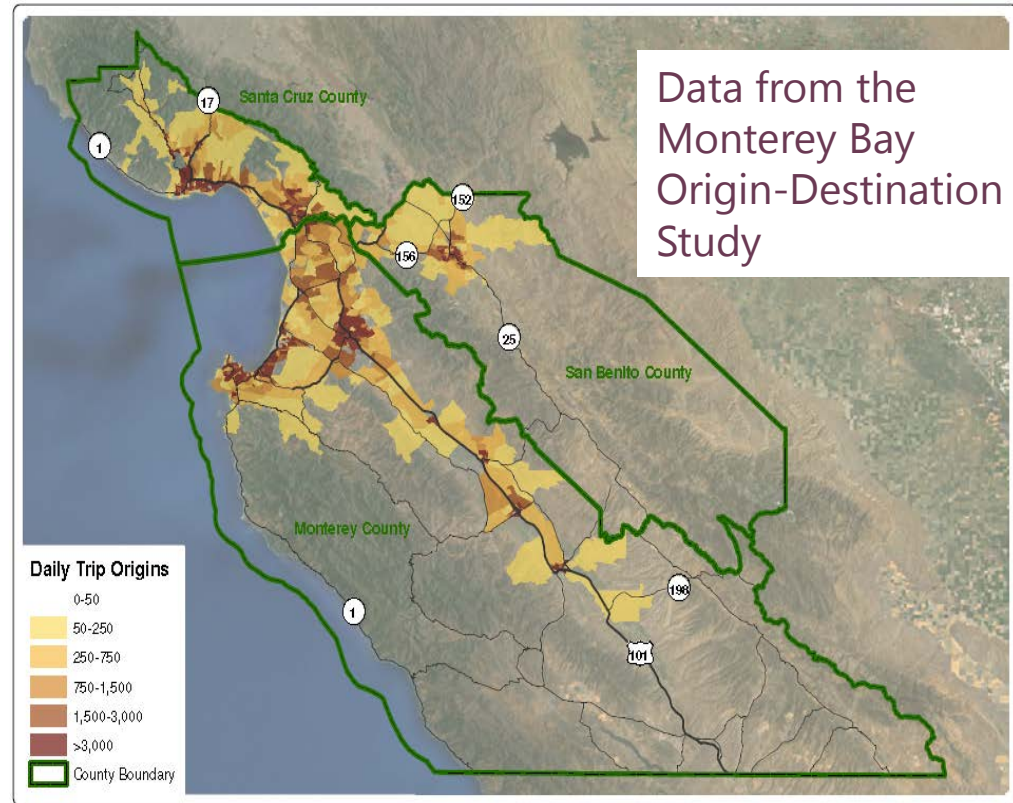
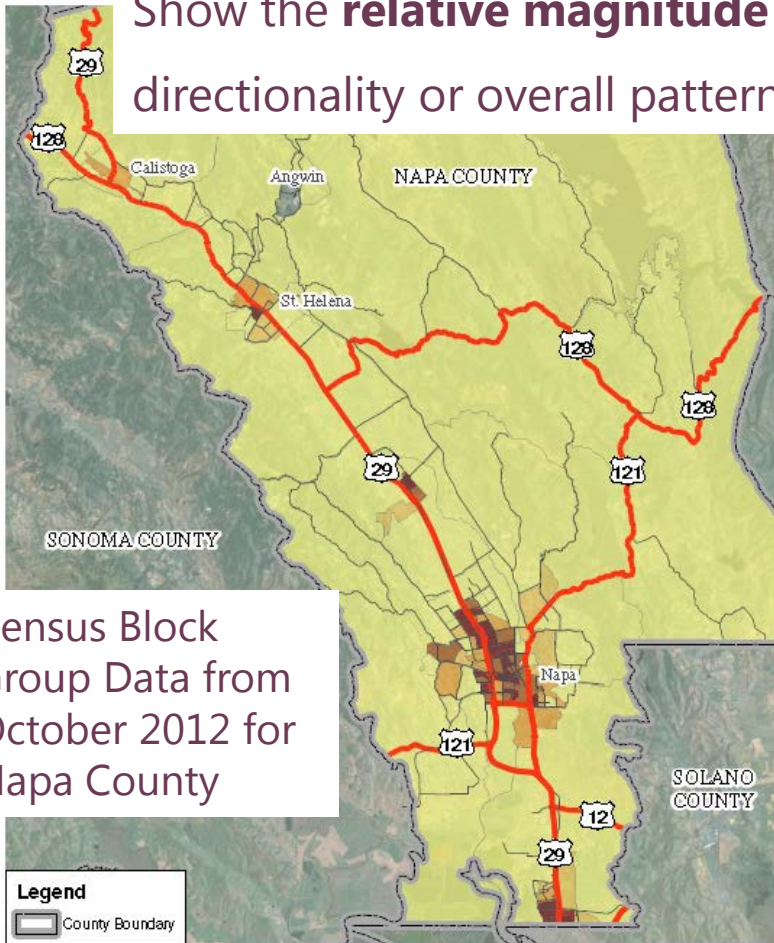
Matrix	Sum
Total	1,434,691
HW	104,052
HO	387,311
HH	214,000
OW	41,565
OO	181,903
OH	344,896
WW	32,144
WO	45,432
WH	82,420

Due to the overwhelming amount of data that will be generated by the mobile phone data collection effort (over **1.4 million records** for the Monterey Study), it will be imperative to develop an **innovative and meaningful way to display the results.**



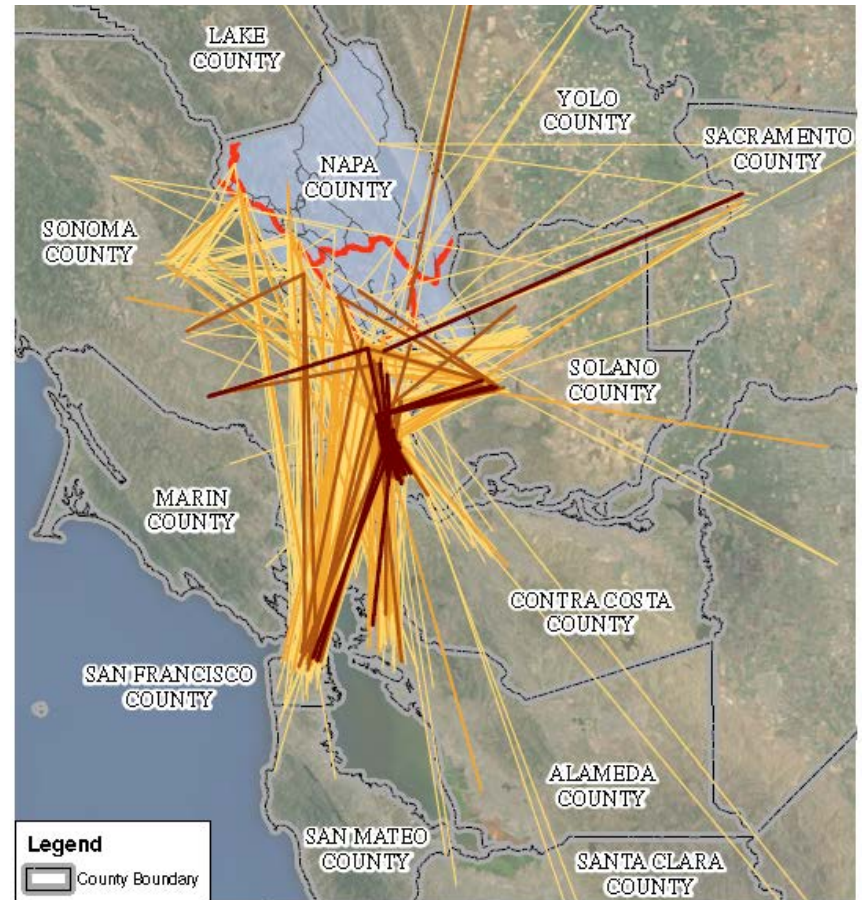
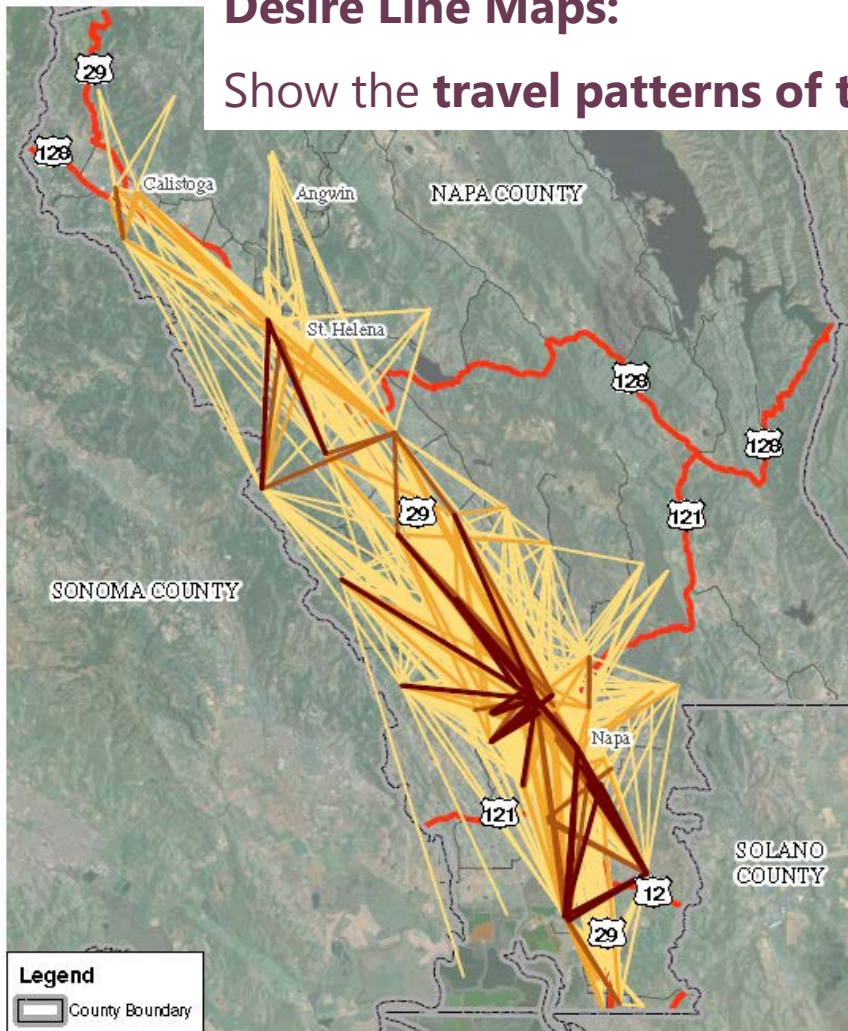
Heat Maps:

Show the **relative magnitude** of trips generated but are unable to show directionality or overall pattern of the generated trips



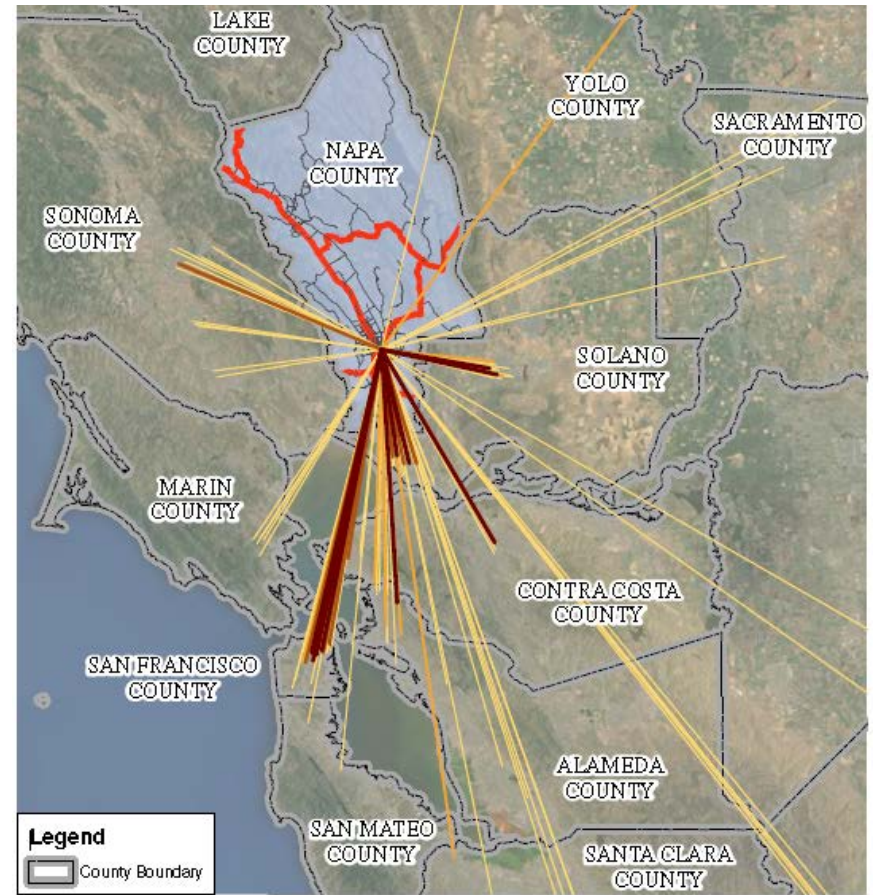
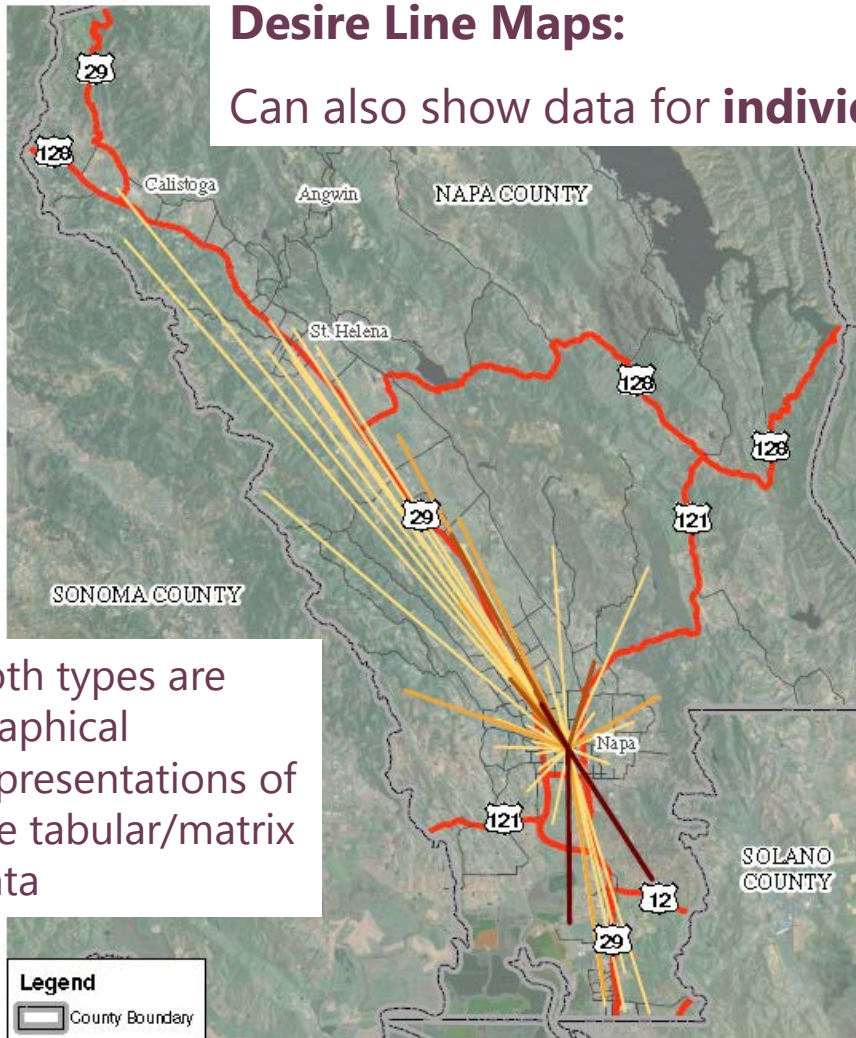
Desire Line Maps:

Show the **travel patterns of trips** (magnitude, direction, and destination)



Desire Line Maps:

Can also show data for **individual zones** (i.e. zone where we are at today)



Both types are graphical representations of the tabular/matrix data



**TABLE 1
NAPA VALLEY TRAVEL BEHAVIOR SURVEY APPROACH**

Method	Pros	Cons
Vehicle Counts	<ul style="list-style-type: none"> • Accurate and directly measure total traffic volume passing through a survey location. Can also obtain license plate information. • Provides control total to refine data collected via other methods. • Can be used to compare to travel demand model roadway volume. • Relatively inexpensive data collection method. 	<ul style="list-style-type: none"> • Does not provide the purpose of the vehicle trip or any other information related to travel behavior such as demographic information or the vehicle's origin or destination.
License Plate Matching	<ul style="list-style-type: none"> • Provides information that can be used to infer trip type and other origin-destination travel data such as the number and percent of vehicles that travel through, are imported or exported, or are one-way in or out of the region. • Provides unique license plate listings to be surveyed. • Provides data in a format more suitable for comparison and integration with travel demand models. 	<ul style="list-style-type: none"> • Unable to provide information regarding trip purpose, frequency, starting or ending point, characteristics of travel or demographics. • Only captures trips that pass through at least one survey location.
License Plate and In-Person Surveys	<ul style="list-style-type: none"> • Provides information regarding origin and destination, trip purpose, occupancy, frequency of travel, demographics, class of vehicle, and other travel characteristics. • Provides data in a format and at a level of disaggregation more suitable for comparison with census data and other travel data sources. 	<ul style="list-style-type: none"> • Depending on the response rate, may only provide detailed trip purpose, occupancy, and class of vehicle information for a percentage of observed trips. Potential for user response error. • Development and implementation of a survey of a sufficient size to be statistically valid can be costly.
Mobile Phone Data	<ul style="list-style-type: none"> • Very large sample size able to provide information regarding work, non-work, visitor, employee, and student person trips. • Provides data in a format more suitable for comparison and integration with travel demand models. • Data can be queried, aggregated and disaggregated to match desired level of analysis. • Data collection method does not require set up time or human transcribing of observed field data which can potentially introduce error. 	<ul style="list-style-type: none"> • Unable to directly measure information regarding trip purpose, frequency, starting or ending point, characteristics of travel or demographics. However, these characteristics can be inferred. • Collection and aggregation of data can be costly.



Data Analysis and Integration

- The integration of the four advanced data collection methods and technologies will offer an unprecedented look into travel behavior in Napa
 - Using multiple sources of data allows the unique advantages of the individual methods to be utilized, **reducing limitations of the data**
 - For instance, cell phone data will provide **some information for a very large sample size** while the surveys will provide **very detailed data for a very small sample of observed trips** (5 to 7% response rate is typical)
 - Additionally, some of the requested data **can only be provided by a single data collection method**, further indicating the importance of combining data from multiple sources
 - For instance, demographic information and other trip making characteristics such as mode of travel and vehicle occupancies can only be reliably obtained from a survey whereas total vehicle trip making can only be obtained from traffic counts



Conclusions

- Integration will allow **conclusions to be drawn for ALL of the requested data from Task 5 of the RFP**

5. Collect and analyze data, reaching conclusions about:

- the number of trips per day, origins and destinations, that are associated with winery visitors and employees;
- the number of trips per day, origins and destinations, that are associated with other major employers in Napa Valley.
- the travel characteristics associated with other tourist destinations in the valley the number of trips per day, origins and destinations, that are associated with lodging, restaurant and retail employees
- the number of trips per day, origins and destinations, that are associated with Napa Valley College, and other schools to be identified
- the predominant modes of travel, vehicle occupancies, and peak times of day/week;
- seasonal variations;
- the effect of winery operations such as various hours of operation, use of pre-arranged appointments and marketing events; and
- whether there are segments of travel demand that can be addressed cost-effectively by expanding transit or paratransit services.
- Existing employer-based programs that reduce traffic congestion and or travel during peak periods such as flexible work schedules, subsidizing van pools or transit, etc. and employer interest in expanded programs;
- Survey tool should include basic demographic information (gender, race, income)
- Travel surveys should include basic questions about willingness to use alternative modes for work and non-work trips (transit, van pool, private excursion services such as limousine, etc.)



Schedule

- Vehicle count, license plate, and in-person winery survey data will be collected on **Friday, October 4, 2013**
- License plate data will be provided by MioVision **3 weeks** from collection
- Mailing addresses will be provided by the DMV in **2 to 3 months**
- Allow **2 weeks** for survey responses
- Mobile Phone Data will be collected for **3 one-week periods** (one of which overlaps October 4) and will take **3 months** for AirSage to process
- **Will have ALL the data around February 2014**
- Final Deliverable will be provided within two months of receiving all the data

