Tribal Road Safety Data Project in California (P20-21780)

Tribal Transportation Safety Data Collection and Analysis (Session 1509)
Tuesday, January 14, 1:30-3:00pm
Transportation Research Board (TRB) Meeting 2020

Berkeley SafeTREC
SAFE TRANSPORTATION RESEARCH AND EDUCATION CENTER

Safe Transportation Research and Education Center

Berkeley SafeTREC

Safe Transportation Research and Education Center (SafeTREC)

- Mission—Utilize capacity of the University (education, research, outreach) to reduce the burden of traffic collisions
- Affiliations
  - ✓ School of Public Health (SPH)
  - ✓ Institute of Transportation Studies (ITS)
  - ✓ Department of City and Regional Planning

Topics

1. Introduction
2. Collision and injury data from SWITRS
3. Example Analysis #1—Road way departure
4. Example Analysis #2—EMS response distance/time
5. Current Task #1—Determine potential underreporting
6. Current Task #2—Tribal data tool
7. Current Task #3—Training, technical support, and resource development
8. Current Task #4—Crowd sourcing
9. Current Task #5—Tribal crash reporting tool
10. Current Task #6—Safety assessments
11. Discussion and wrap up

SafeTREC California Tribal Road Safety Data Project

Evaluate existing traffic crash, infrastructure, and exposure data and make recommendations for improvement in collecting and utilizing data for tribal areas in California.

Overview of Tribal Areas in California

- 110 federally recognized tribes in California. [1]
- Total Area: 1,704 square miles [2]
- Total road mileage: 1,638 miles [3]
- Total Population in Tribal Area: 75,396 [4]; Total Enrolled Population: 362,801.
- Of the estimated 362,801 enrolled tribal members in California, 20.8% live in the service area, which is comparable to the nation as a whole. [5]

1. List of federally updated tribes are updated here: http://www.ncsl.org/research/state-tribal-institute/list-of-federal-and-state-recognized-tribes.aspx
2. Area of tribes are derived from GIS shapefile downloaded from the Bureau of Indian Affairs (BIA) Pacific Region website.
3. Road mileage is derived from California road network shapefile overlaid on tribal land shapefile.
4. Population data are from various sources, including US Department of Interior , ACS 5 YR estimate (factfinder2.census.gov) , tribes' websites as well as Wikipedia. 'Population' refers to 'service population. or American Indians and Alaska Natives who are living on or near the tribe's reservation and who are eligible to receive services funded by Indian Affairs. Service population is not the same as 'enrolled members'. The number of enrolled number of Native Americans in California is estimated to be 362,801.
5. http://www.census.gov/prod/cen2010/briefs/c2010br-10.pdf

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Collision and injury data from SWITRS

i. SWITRS (Statewide Integrated Traffic Record System) does not have a jurisdiction code either for tribal areas generally or for individual tribes.

ii. Therefore, we've identified collisions on tribal areas by (i) geocoding collisions*, (ii) locating tribal area shapefiles, and (iii) overlaying collisions with tribal area shapefiles

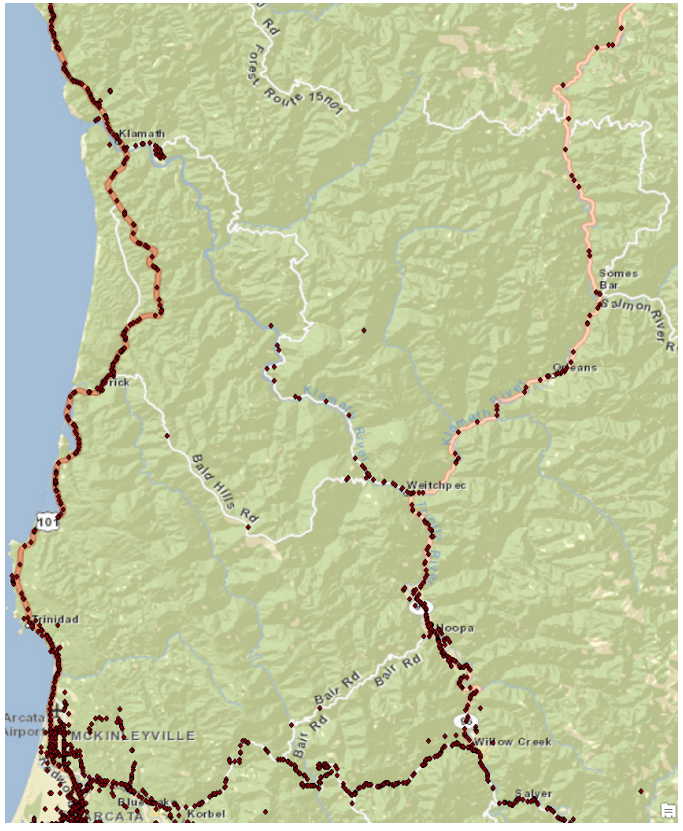
*For the non-state highway, we have geocoded to nearest intersection and adjusted for offset. For the State Highway, we've developed a tool to convert post mile to lat/long.

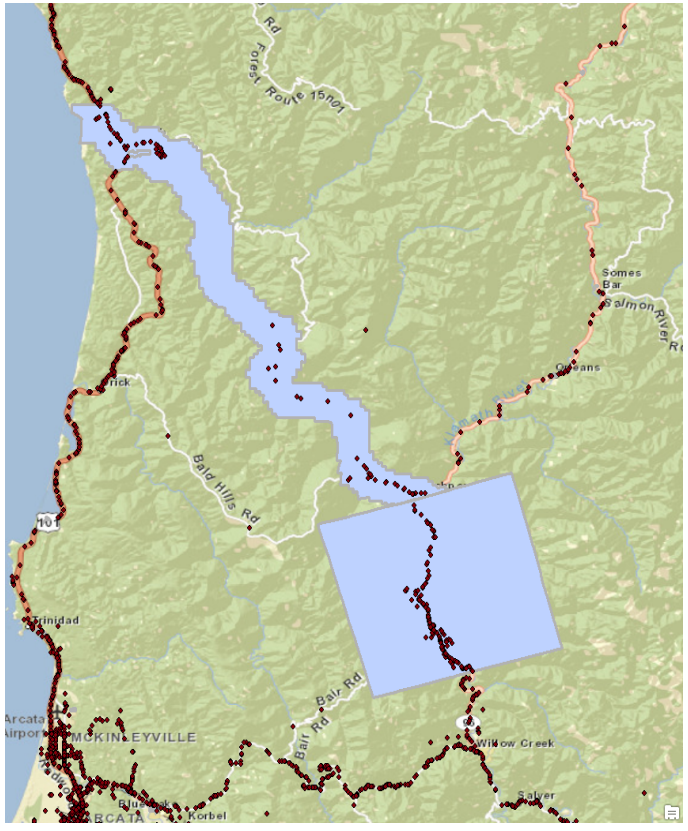
Steps in identifying collisions in tribal areas (Example using Hoopa Valley and Yurok)

Step 1→Collision shapefile

Step 2→Tribal shapefile

Step 3→Overlay shapefiles





Road Network

Currently we are exploring and attempting to reconcile several different sources of network information:

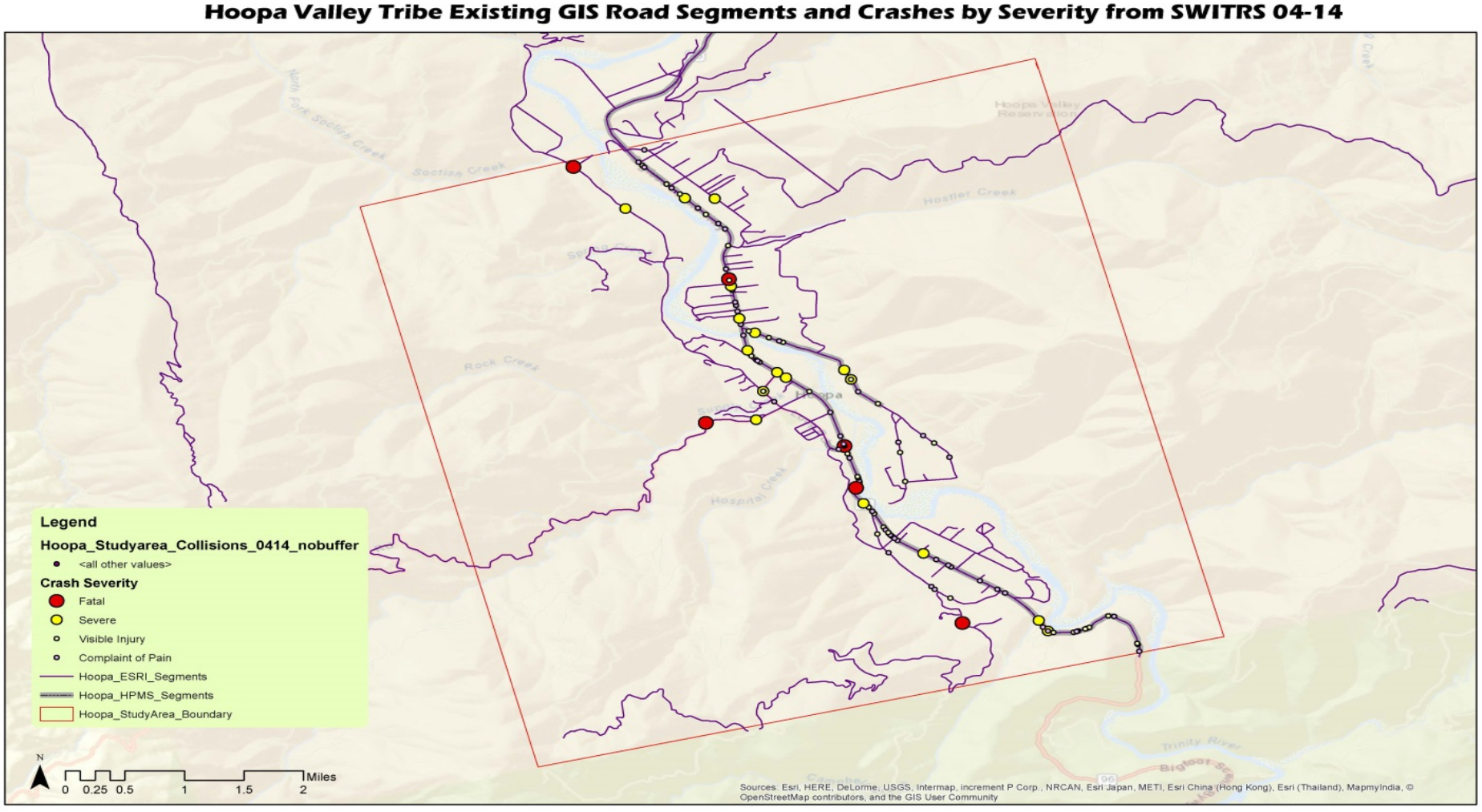
i. IRR / TTP Inventory

ii. ESRI road network (currently using this in conjunction with tribal shapefiles)

iii. Highway Performance Monitoring System (HPMS) (used to represent federal/state inventory of public roads)

iv. Caltrans statewide road network (under development)

Results (compare with ESRI and HPMS data)



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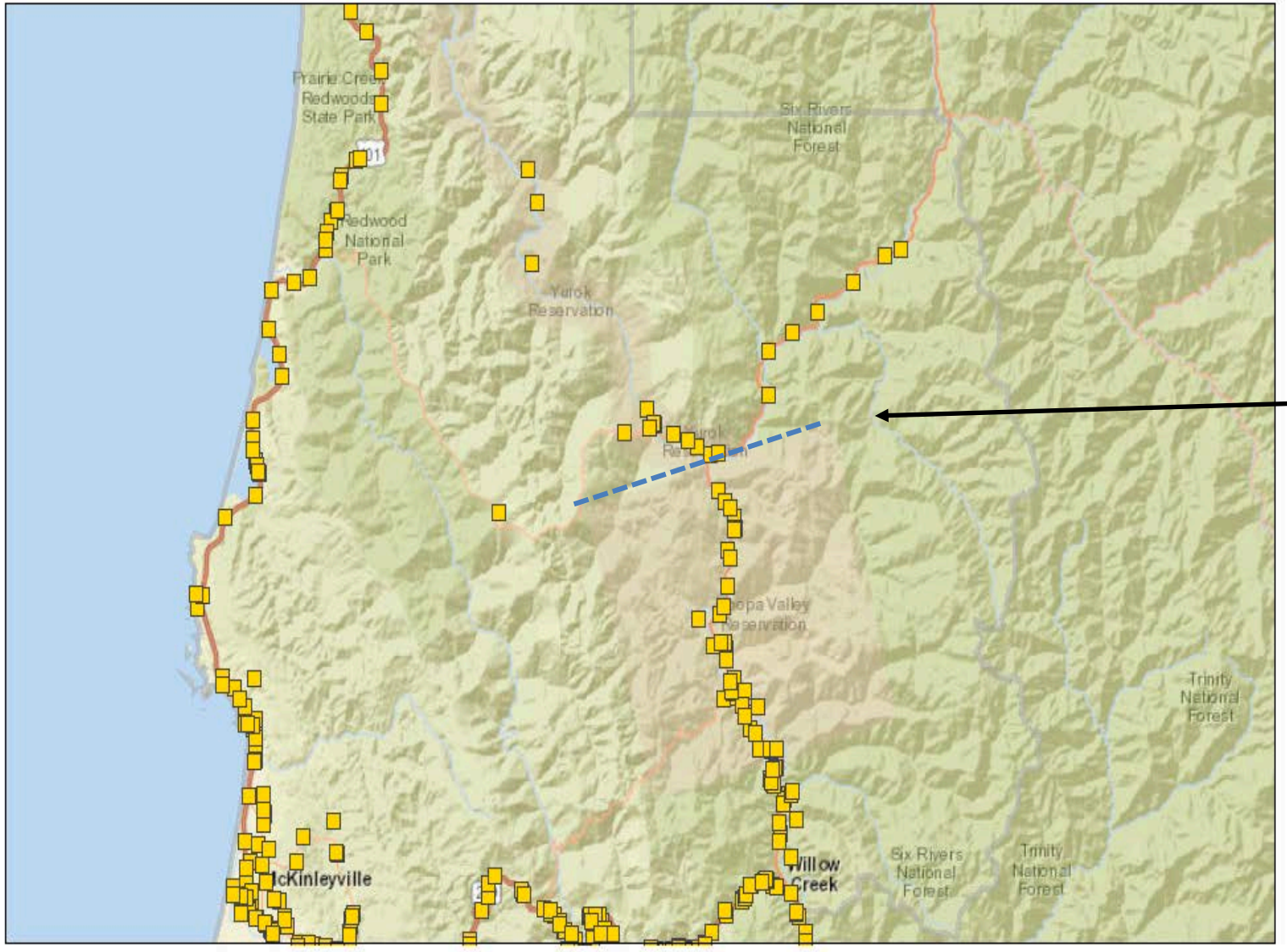
Challenge Area Analysis Comparing Tribal Areas to California as a Whole (Fatal and Severe Injury)

SHSP Challenge Areas	Tribal	California
	%	%
Roadway Departures and Head-On Collisions	57.20%	46.20%
Intersections, Interchanges, and Other Roadway Access	44.10%	45.80%
Alcohol and Drug Impairment	38.20%	33.60%
Occupant Protection	25.80%	15.40%
Motorcycles	19.50%	15.50%
Aging Road Users	18.00%	13.20%
Young Drivers	14.90%	17.70%
Speeding and Aggressive Driving	12.20%	17.30%
Pedestrians	7.60%	15.70%
Commercial Vehicles	6.10%	6.90%
Bicycling	3.00%	6.50%
Work Zone	1.30%	1.50%

SWITRS Collisions from 1-1-05 to 12-31-14, ALL, HUMBOLDT



1:495,636

0 4.25 8.5 17 mi

0 5 10 20 km

Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),

Made by: SWITRS GIS Map at TIMS (http://tims.berkeley.edu)
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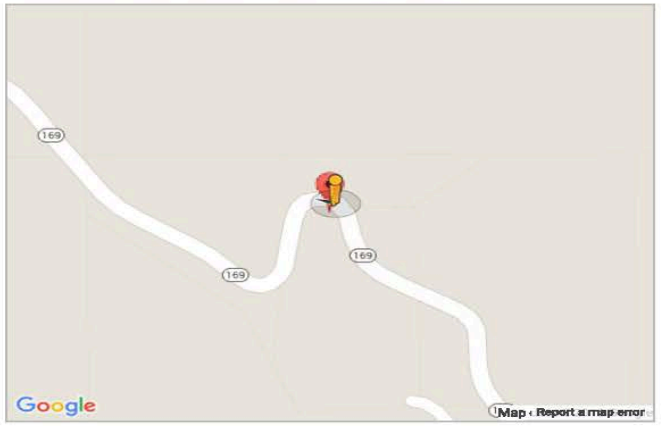
Road Departure Injuries In Northern California on and near Yurok Reservation and Hoopa Valley Tribe, SWITRS 05 - 14

Yurok / Hoopa Valley Boundary, where collisions cluster, see next slide for a zoom-in map

Collision Details: Case ID 2951684



County	HUMBOLDT	**City**	UNINCORPORATED
Date (Y-M-D)	2006-12-11	**Time**	18:00
Nearby Intersection	RT 169 & RT 96		
Coordinate Location	41.192039357, -123.714143987		

State Highway	Y	**Route**	169W	**Postmile**	33.13

Injured Victims	1	**Fatalities**	0
Alcohol	NO	**Weather**	Cloudy
Primary Collision Factor	Improper Turning	**Involved with**	Non-Collision

Collision Example in Cluster 1 – Within Yurok Reservation

Street View

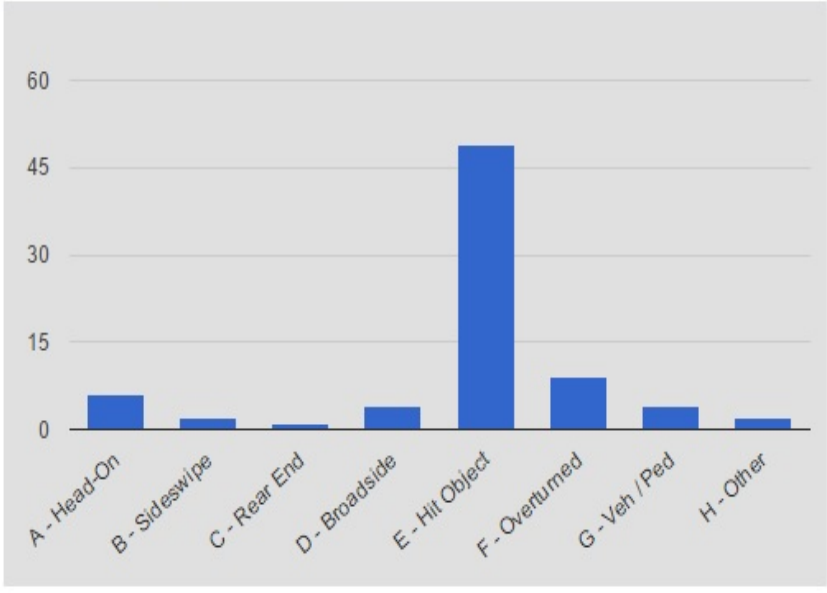
77 collisions in chosen extent.

Summary Statistics for Collisions on and near Yurok and Hoopa Valley boundary during 01-01-05 and 12-31-14

Injury Severity | Collision Type | Primary Collision Factor | Involved With

Primary Collision Factor	Collisions	Percentage
- - Not Stated	1	1.3%
01 - Driving or Bicycling Under the Influence of Alcohol or Drug	15	19.5%
03 - Unsafe Speed	22	28.6%
05 - Wrong Side of Road	7	9.1%
08 - Improper Turning	23	29.9%
09 - Automobile Right of Way	3	3.9%
11 - Pedestrian Violation	1	1.3%
17 - Other Hazardous Violation	1	1.3%
18 - Other Than Driver (or Pedestrian)	3	3.9%

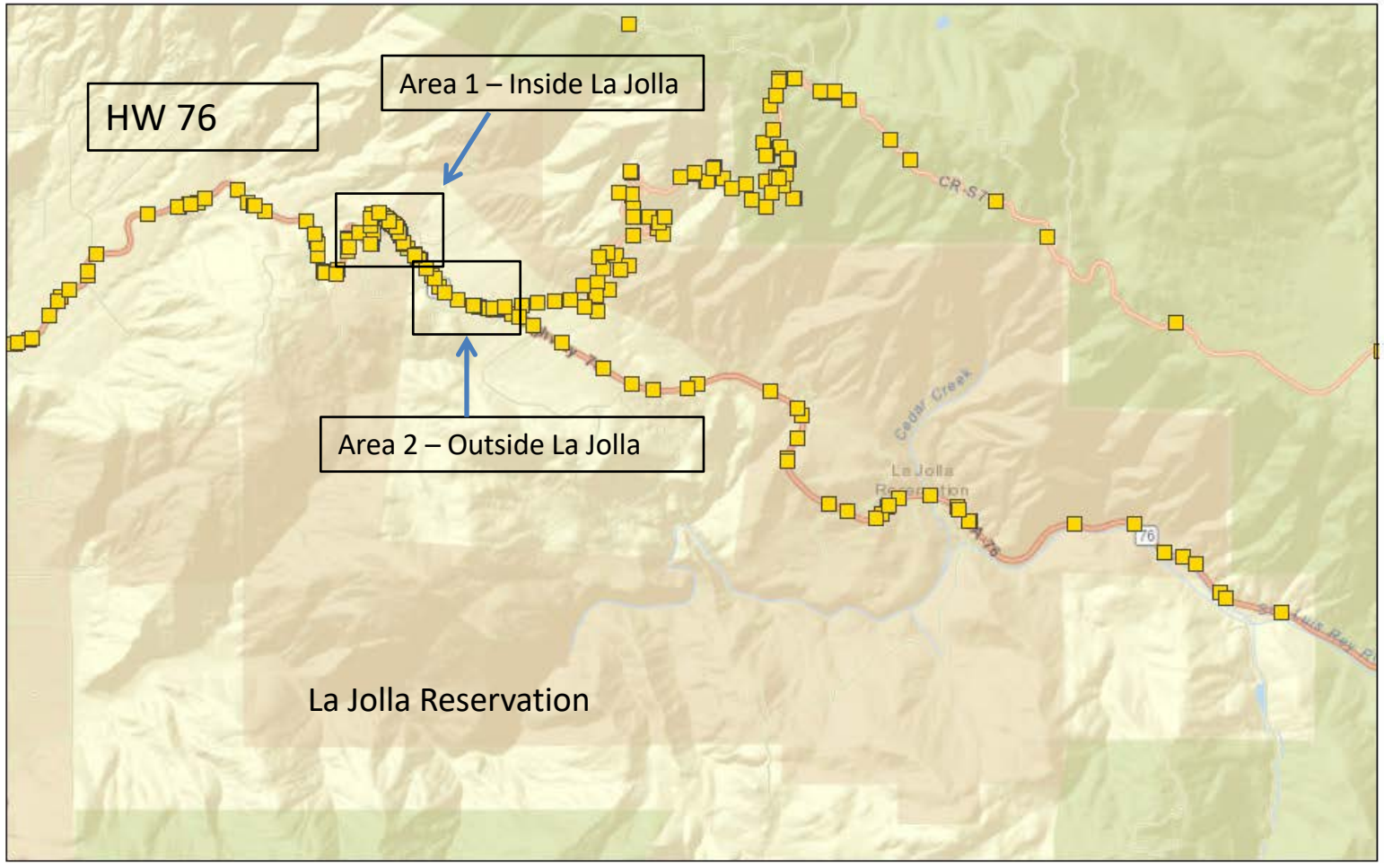
Injury Severity | Collision Type | Primary Collision Factor | Involved With

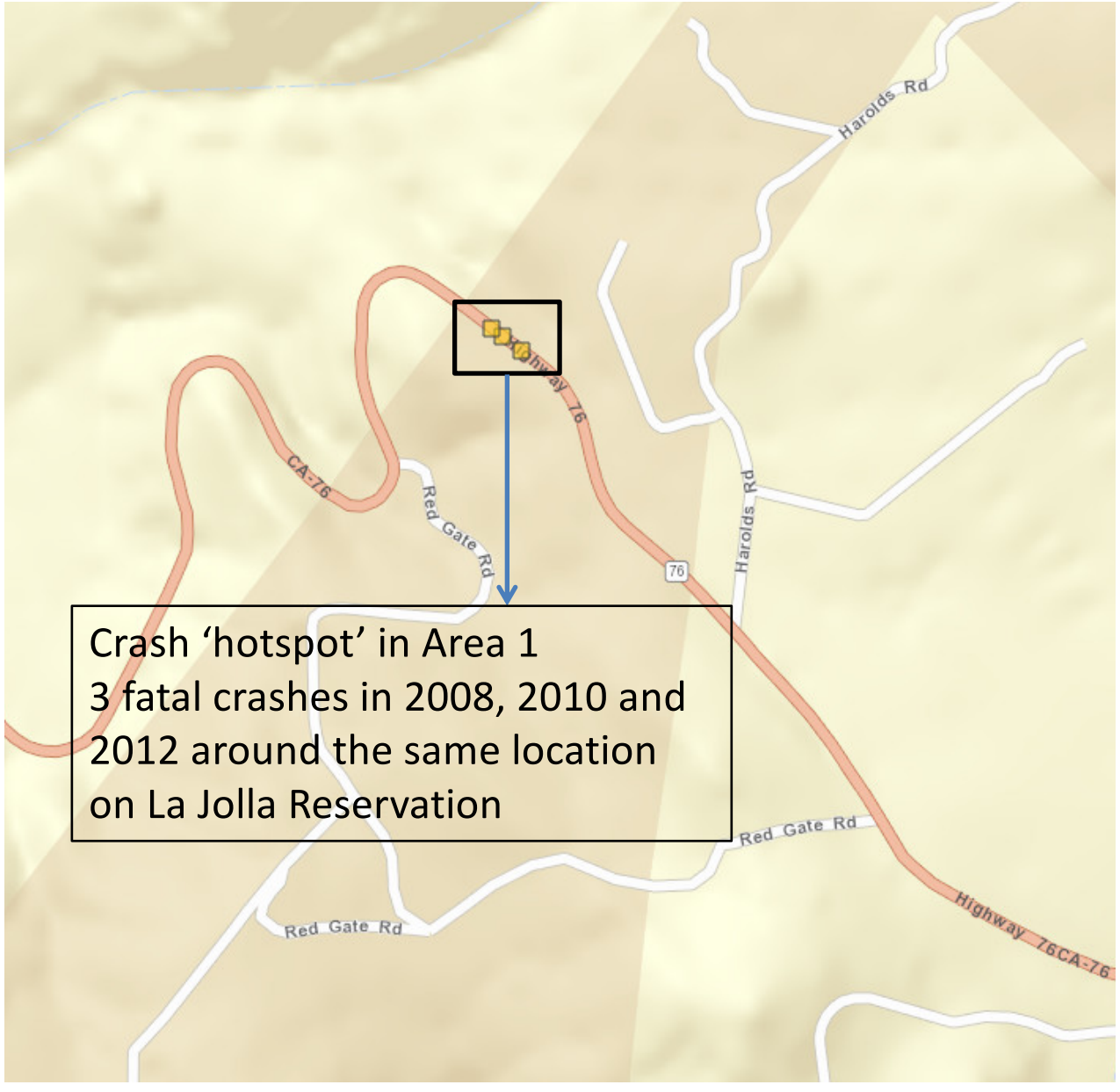


Injury Severity | Collision Type | Primary Collision Factor | Involved With

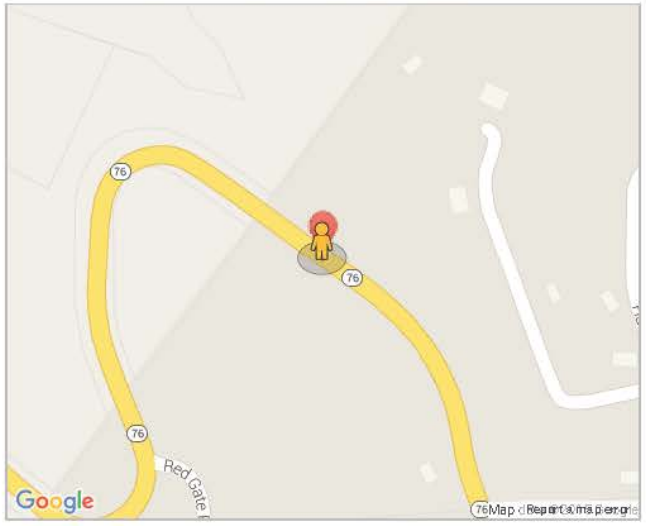
Motor Vehicle Involved With	Collisions	Percentage
A - Non-Collision	10	13%
B - Pedestrian	4	5.2%
C - Other Motor Vehicle	13	16.9%
H - Animal	1	1.3%
I - Fixed Object	44	57.1%
J - Other Object	5	6.5%

SWITRS Collisions from 1-1-04 to 12-31-13, ALL, SAN DIEGO




Harolds Rd
Highway 76
CA-76
Red Gate Rd
76
Harolds Rd
Red Gate Rd
Red Gate Rd
Highway 76CA-76
Crash ‘hotspot’ in Area 1
3 fatal crashes in 2008, 2010 and 2012 around the same location on La Jolla Reservation

Collision Details: Case ID **4843629**

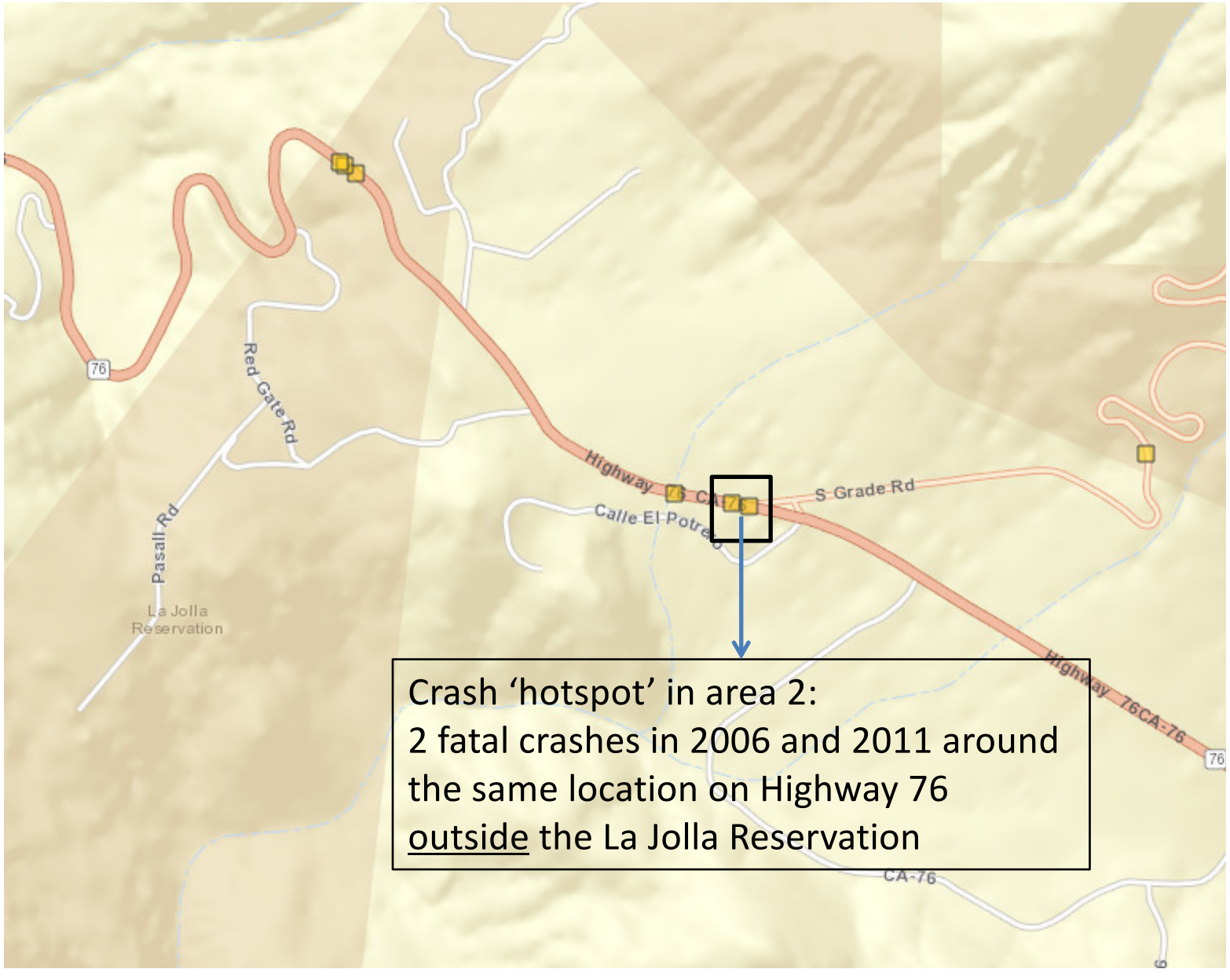


County	SAN DIEGO	**City**	UNINCORPORATED
Date (Y-M-D)	2010-07-25	**Time**	17:55
Nearby Intersection	RT 76 & VALLEY CENTER RD		
Coordinate Location	33.301555685, -116.911833704		

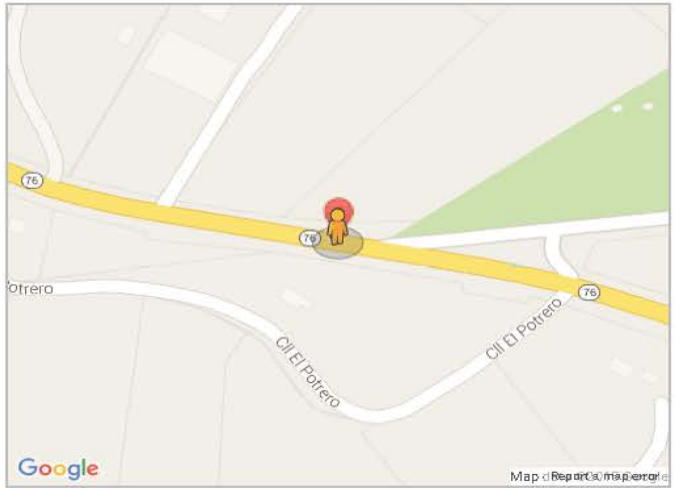
State Highway	Y	**Route**	76W	**Postmile**	37.1

Injured Victims	1	**Fatalities**	1
Alcohol	NO	**Weather**	Clear
Primary Collision Factor	Improper Turning	**Involved with**	Fixed Object

Example in Area 1:
Inside La Jolla


76
Red Gate Rd
Pasall Rd
La Jolla
Reservation
Highway 76
Calle El Potrero
S Grade Rd
Highway 76CA-76
CA-76
Crash ‘hotspot’ in area 2:
2 fatal crashes in 2006 and 2011 around the same location on Highway 76 outside the La Jolla Reservation

Collision Details: Case ID **2876925**



County	SAN DIEGO	**City**	UNINCORPORATED
Date (Y-M-D)	2006-09-17	**Time**	11:35
Nearby Intersection	SOUTH GRADE RD & RT 76		
Coordinate Location	33.293964386, -116.901431841		

State Highway	N	**Route**	-	**Postmile**	-

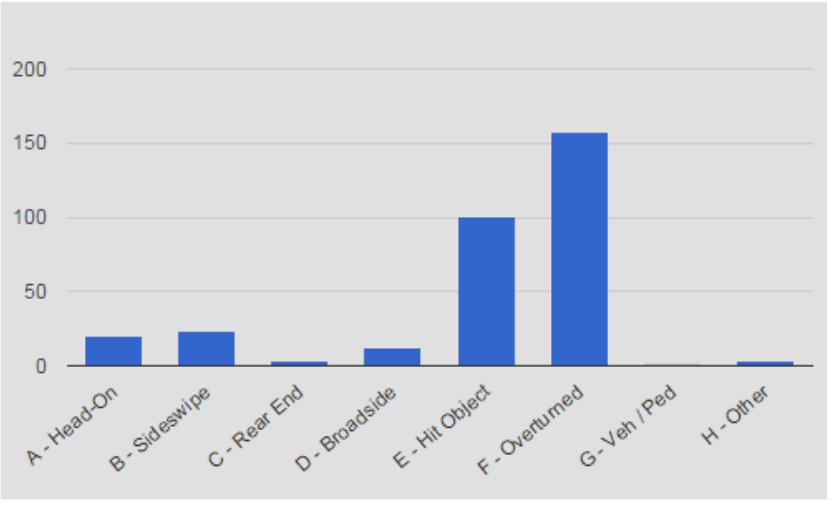
Injured Victims	1	**Fatalities**	1
Alcohol	NO	**Weather**	Clear
Primary Collision Factor	Unsafe Speed	**Involved with**	Fixed Object

Street View

Example in Area 2:
Outside La Jolla

Summary Statistics for Collisions on HW 76 on or near La Jolla Reservation during 01-01-04 and 12-31-13

Injury Severity | Collision Type | Primary Collision Factor | Involved With



Injury Severity | Collision Type | Primary Collision Factor | Involved With

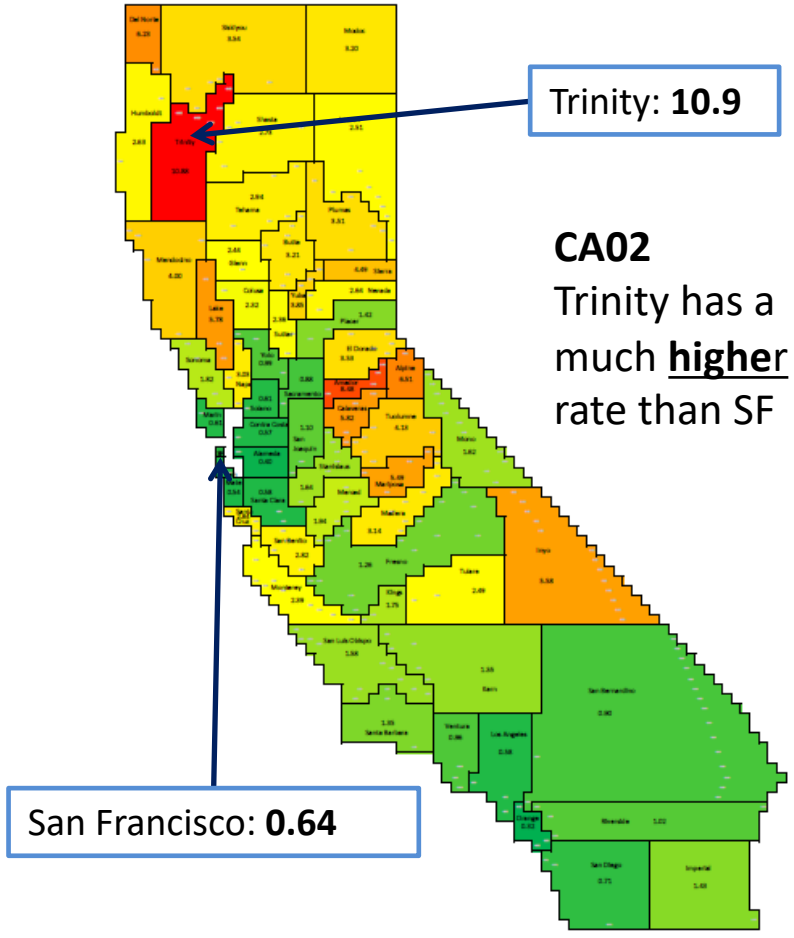
Primary Collision Factor	Collisions	Percentage
01 - Driving or Bicycling Under the Influence of Alcohol or Drug	20	6.3%
03 - Unsafe Speed	142	44.4%
05 - Wrong Side of Road	29	9.1%
06 - Improper Passing	1	0.3%
08 - Improper Turning	108	33.8%
09 - Automobile Right of Way	8	2.5%
11 - Pedestrian Violation	1	0.3%
12 - Traffic Signals and Signs	1	0.3%
17 - Other Hazardous Violation	2	0.6%

Injury Severity | Collision Type | Primary Collision Factor | Involved With

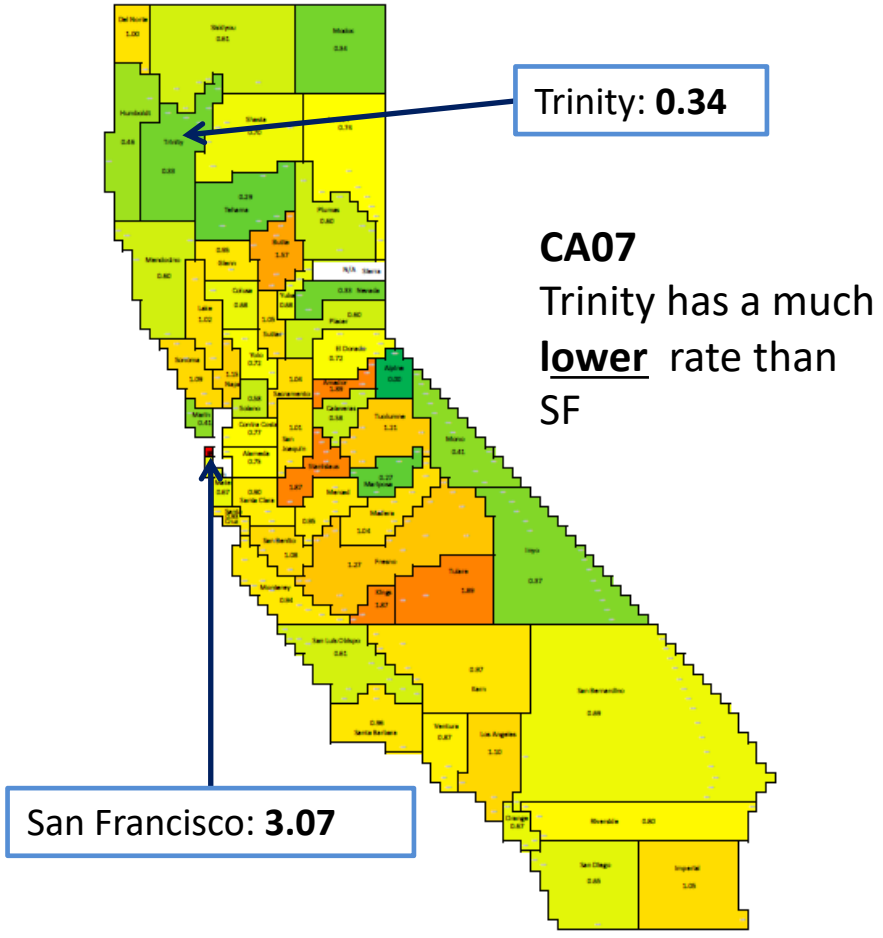
Motor Vehicle Involved With	Collisions	Percentage
A - Non-Collision	156	48.8%
B - Pedestrian	1	0.3%
C - Other Motor Vehicle	53	16.6%
D - Motor Vehicle on Other Roadway	2	0.6%
G - Bicycle	2	0.6%
H - Animal	2	0.6%
I - Fixed Object	96	30%
J - Other Object	8	2.5%

Road Departure versus Intersection (F+S) Injuries (Number per 100m VMT)

Road Departure



Intersection and Interchange



Summary: Roadway Departure Crashes in Tribal Areas

i. Roadway departure crashes are the most frequent type of crash on tribal areas in California

ii. Roadway departure crashes occur in identifiable clusters

iii. Clusters occur both within tribal areas and in roads leading to and from tribal areas

iv. Need to pursue current recommendations for countermeasures

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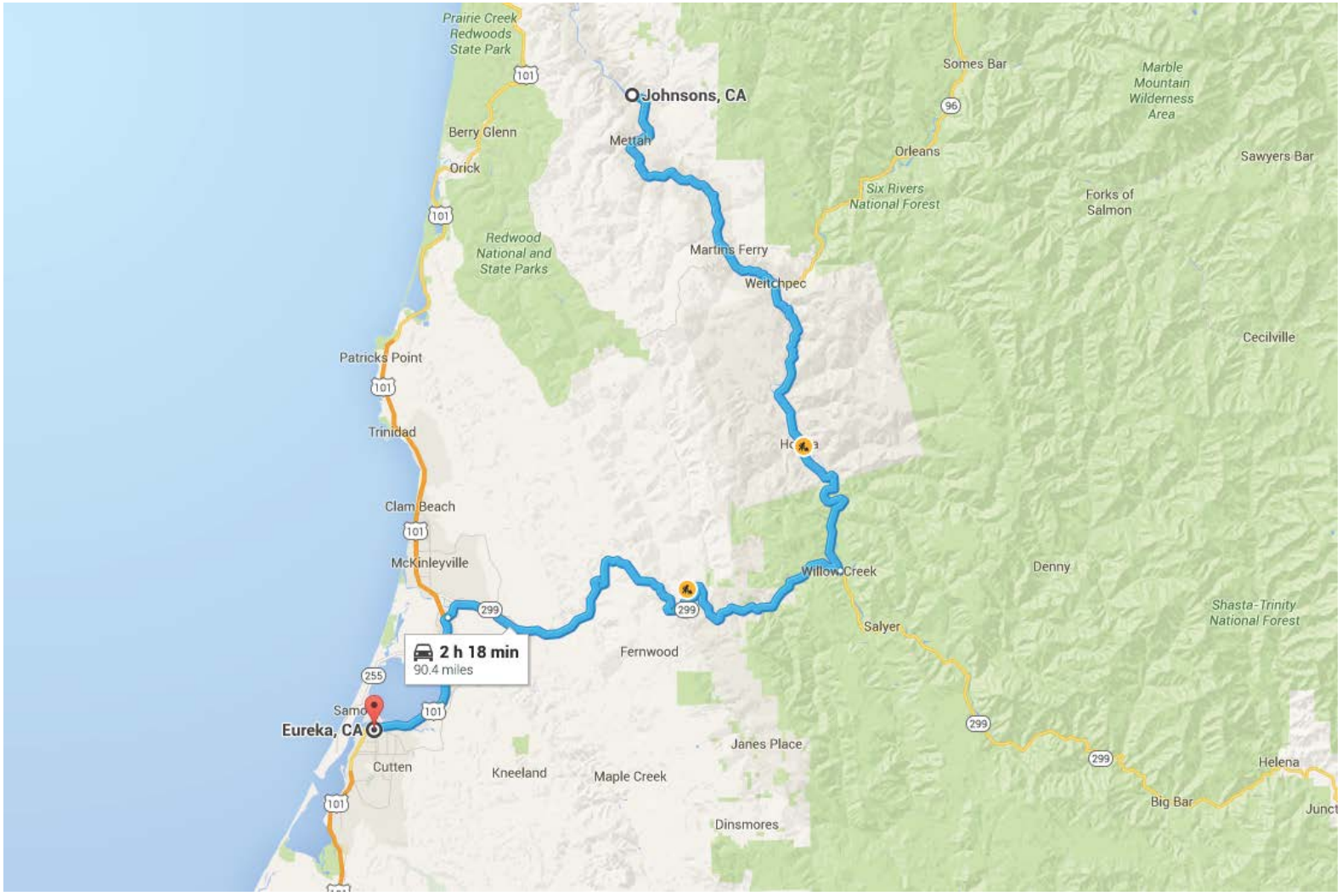
EMS – Distance and Time

Average Time (Minutes) from Crashes to Nearest Trauma Center – Tribes with 10+ Fatal/Severe Injury Collisions

Tribes	Average Total Time (Minutes)
Colorado River Indian Tribes	183.5
Hoopa Valley Tribe	126.5
Round Valley Indian Tribes	99.0
Quechan Tribe of the Fort Yuma Indian Reservation	63.3
La Posta Band of Diegueno Mission Indians	62.1
Campo Band of Diegueno Mission Indians	60.6
Yurok Tribe	55.6
Torres Martinez Desert Cahuilla Indians	49.4
Cahuilla Band of Mission Indians	49.3
Santa Rosa Band of Cahuilla Indians	49.2
La Jolla Band of Luiseno Indians	38.7
Barona Group of Capitan Grande Band of Mission Indians	37.0
Cabazon Band of Mission Indians	33.4
Pala Band of Luiseno Mission Indians	33.0
Sycuan Band of the Kumeyaay Nation	29.4
Rincon Band of Luiseno Mission Indians	26.3
Morongo Band of Mission Indians	23.8
Agua Caliente Band of Cahuilla Indians	7.8

Yurok and Hoopa (distance)

Example of distance/time to nearest ER for a crash on the Yurok reservation



Summary: EMS – Distance and Time

i. Distance/Time to nearest trauma center is generally longer for tribal areas

ii. Time to treatment is a critical factor in reducing fatality and generally reducing the impact of severe injury

iii. Potential factors to address this issue: Improve communication, dispatch, triage

iv. Need to look at response time as well as transport time

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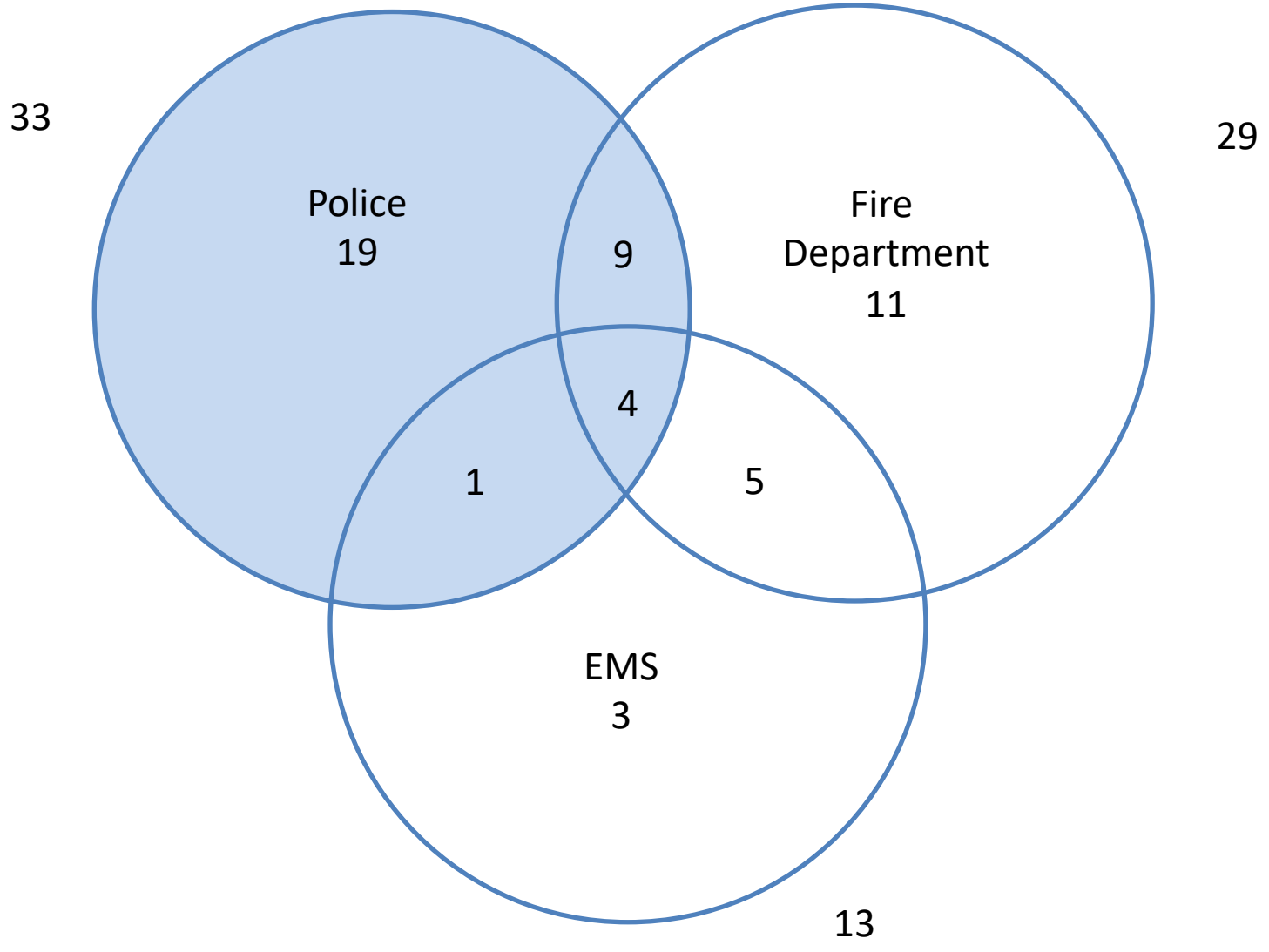
Methods to identify tribal data NOT in SWITRS and assess under-reporting of collisions

- ❑ “Crowd sourcing” – Tested so far at two Community Pedestrian Safety Trainings (CPST) in tribal areas (Hoopa and Tule River)
- ❑ Compare with first responder and/or EMS data
- ❑ Other sources (Tribal data, “SWITRS” private property)

Use of First Responder Data—Example from Karuk Tribe in Northern California

- Karuk Tribe used first responder data for grant application to improve road safety, 2014 (Sandi Tripp, Director of Transportation)
- Data were compared with SWITRS data from 2001 – 2011.
- In or near Orleans area, 11 accidents were reported on SR 96 in SWITRS. An additional 25 accidents were noted in hardcopy accident records.

Tribal Potential Crash Response Resources



Tribal Traffic Safety Resources Summary

- Barriers to collect data:
  - Tribes are concerned that submitting collision data to SWITRS might sidestep tribal police departments' legitimacy
  - Tribal police departments want to be recognized the same as California or Federal Law Enforcement
  - Due to limited resources, responding to crashes and handling of traffic data could be difficult
  - Tribes sometimes are hesitant about submitting crash data to SWITRS because of unresolved jurisdictional issues

Types of Tribal Police

- Our interviews revealed that there are different types of tribal police and varying degree of involvement in enforcing traffic laws
- Public Safety Officers:
  - Not involved in enforcing traffic-related laws (Big Valley)
  - Some tribes take and collect reports but do not enforce traffic laws in general (Cabazon)
- Tribal Police that Do Not Take Crash Reports:
  - Respond to crashes as they get the calls and when they are available;
  - Do not take records or issue citation due to PL 280 because California Vehicle Code (CVC) is regulatory (example: Bishop Paiute, Colorado River Indian Tribes)
  - Several tribes have been developing tribal vehicle code and hope to be recognized the same as California or Federal Law Enforcement (example: Bishop Paiute)
- Tribal Police that Take Crash Reports:
  - Respond to crashes as they get the calls and when they are available (example: Hopland Band of Pomo Indians)
- Cross-deputized Tribal Police with Surrounding Jurisdictions:
  - Depending on the MOU established boundaries between the tribe and surrounding county sheriff, deputized tribal PD officers have state authority to handle criminal cases (example: Hoopa Valley Tribe)

Factors Affecting Crash Response and Reporting

- Crash Severity
- Road Ownership
- Presence of Tribal Police Department

Summary: Methods to Increase Collision Data

- ❑ Enhance resources for tribal police departments
- ❑ Explore first responder data
- ❑ Crowd source data

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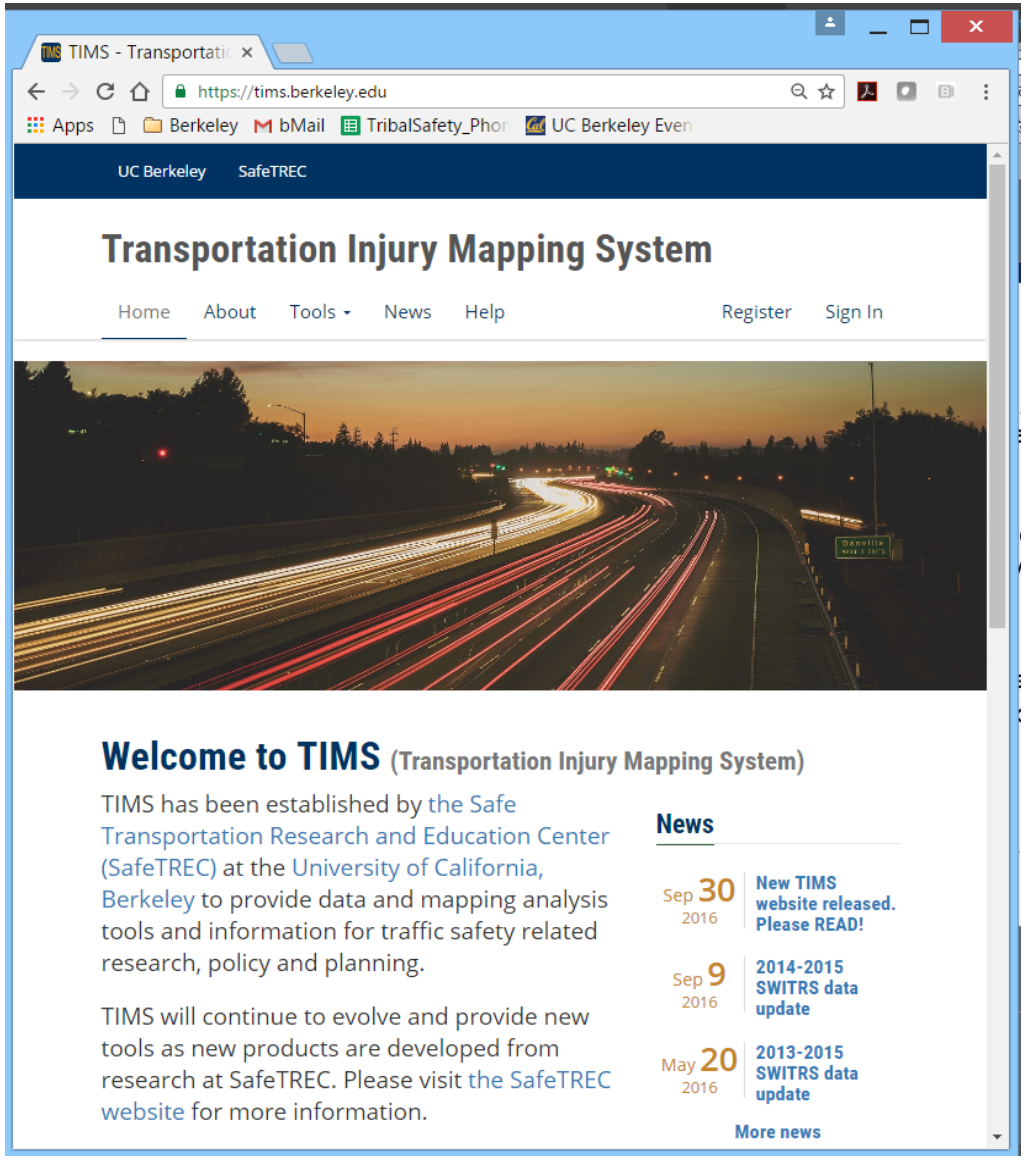
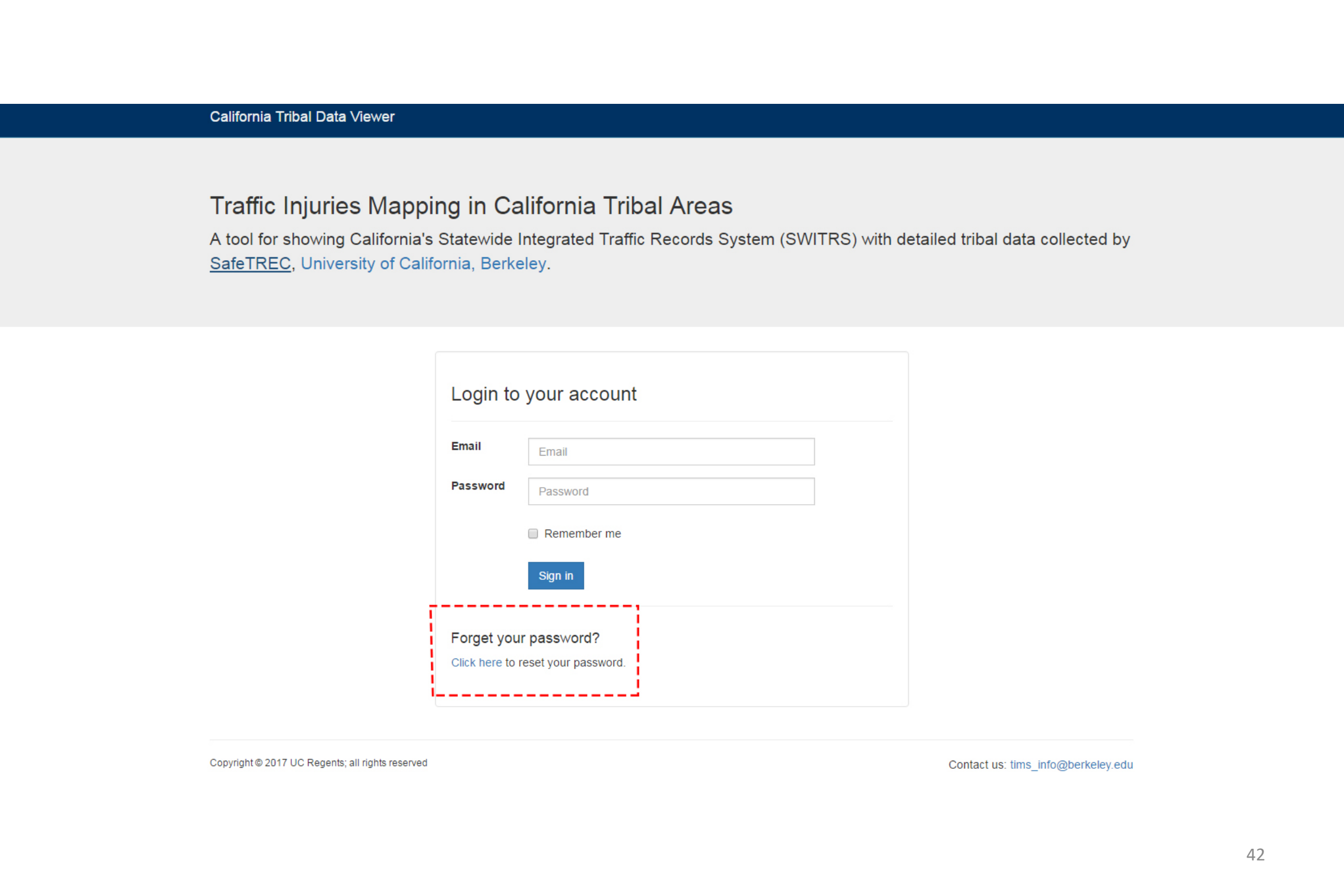
Tribal Transportation Injury Mapping System (Tribal TIMS)

- An online traffic collision data reporting, mapping and analysis tool
- Include all existing TIMS functions
- Take existing SWITRS data and map collision locations
  - Working on allowing data input function
  - Can be password-protected and accessible only to individual tribes



https://tims.berkeley.edu/


California Tribal Data Viewer
Traffic Injuries Mapping in California Tribal Areas
A tool for showing California's Statewide Integrated Traffic Records System (SWITRS) with detailed tribal data collected by SafeTREC, University of California, Berkeley.
Login to your account
Email
Email
Password
Password
Remember me
Sign in
Forget your password?
Click here to reset your password.
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Contact us: tims_info@berkeley.edu

Tribal TIMS

Create reporting charts

Change mapping style

Turn on/off tribe layer

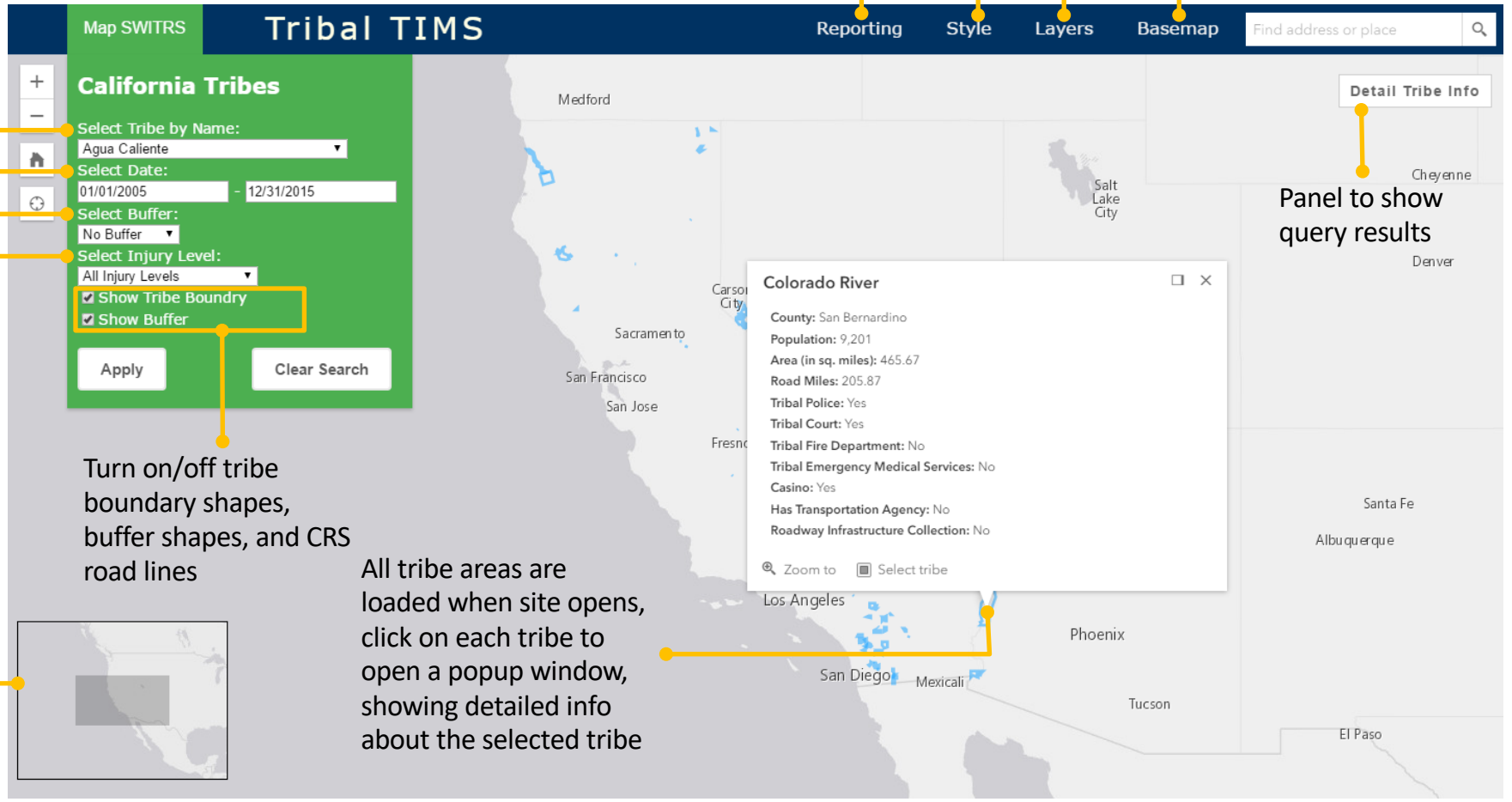
Change basemap

Select Tribe by Name

Select Date Range (2005 - 2015)

Select Buffer
- No Buffer
- 1-Mile Buffer
- 2-Mile Buffer
- 3-Mile Buffer
- 4-Mile Buffer
- 5-Mile Buffer

Select Injury Level
- All Injury Levels
- Fatality Only
- Fatality and Severe Injury



Panel to show query results

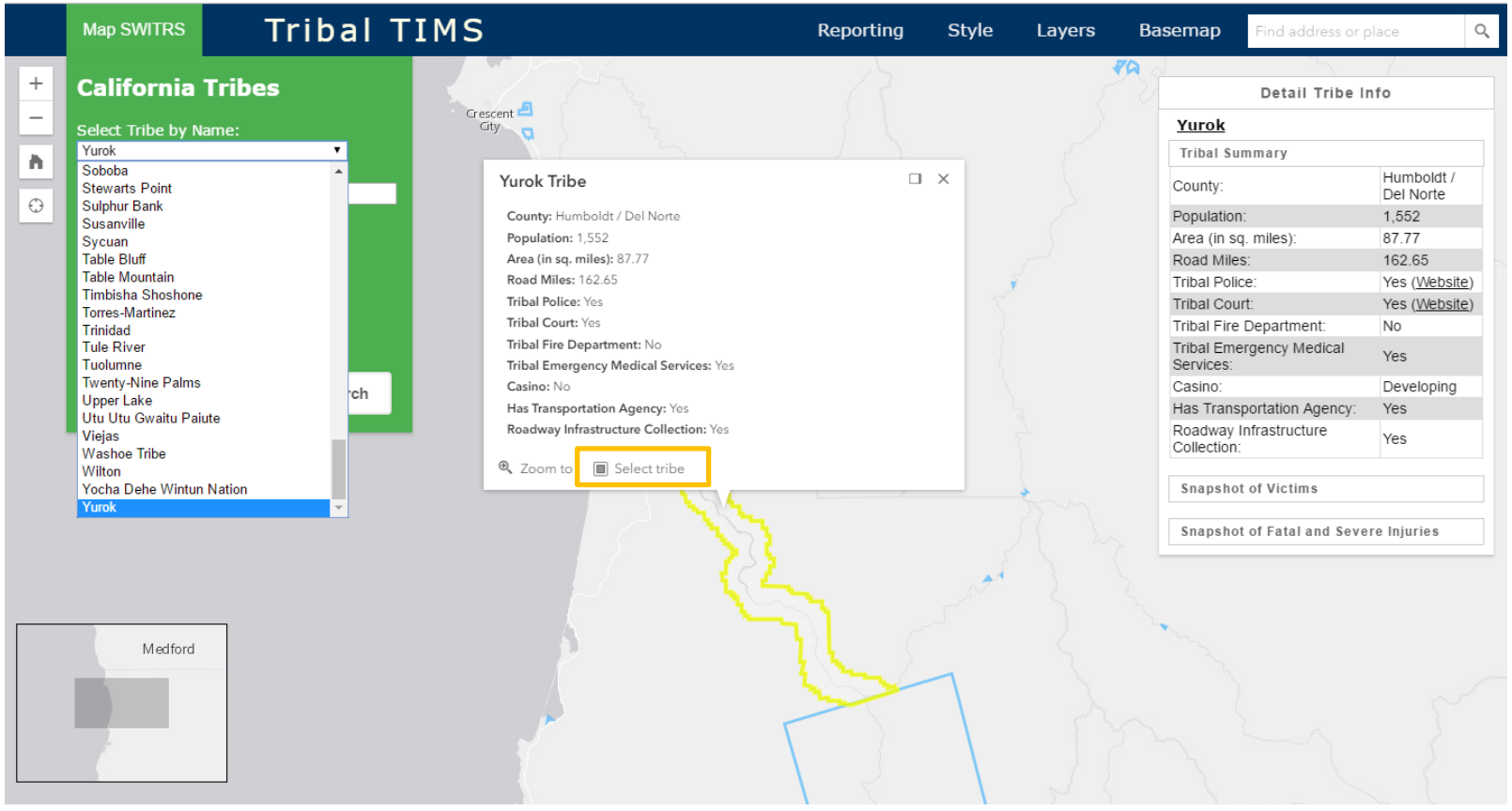
Turn on/off tribe boundary shapes, buffer shapes, and CRS road lines

All tribe areas are loaded when site opens, click on each tribe to open a popup window, showing detailed info about the selected tribe

Map overlook view

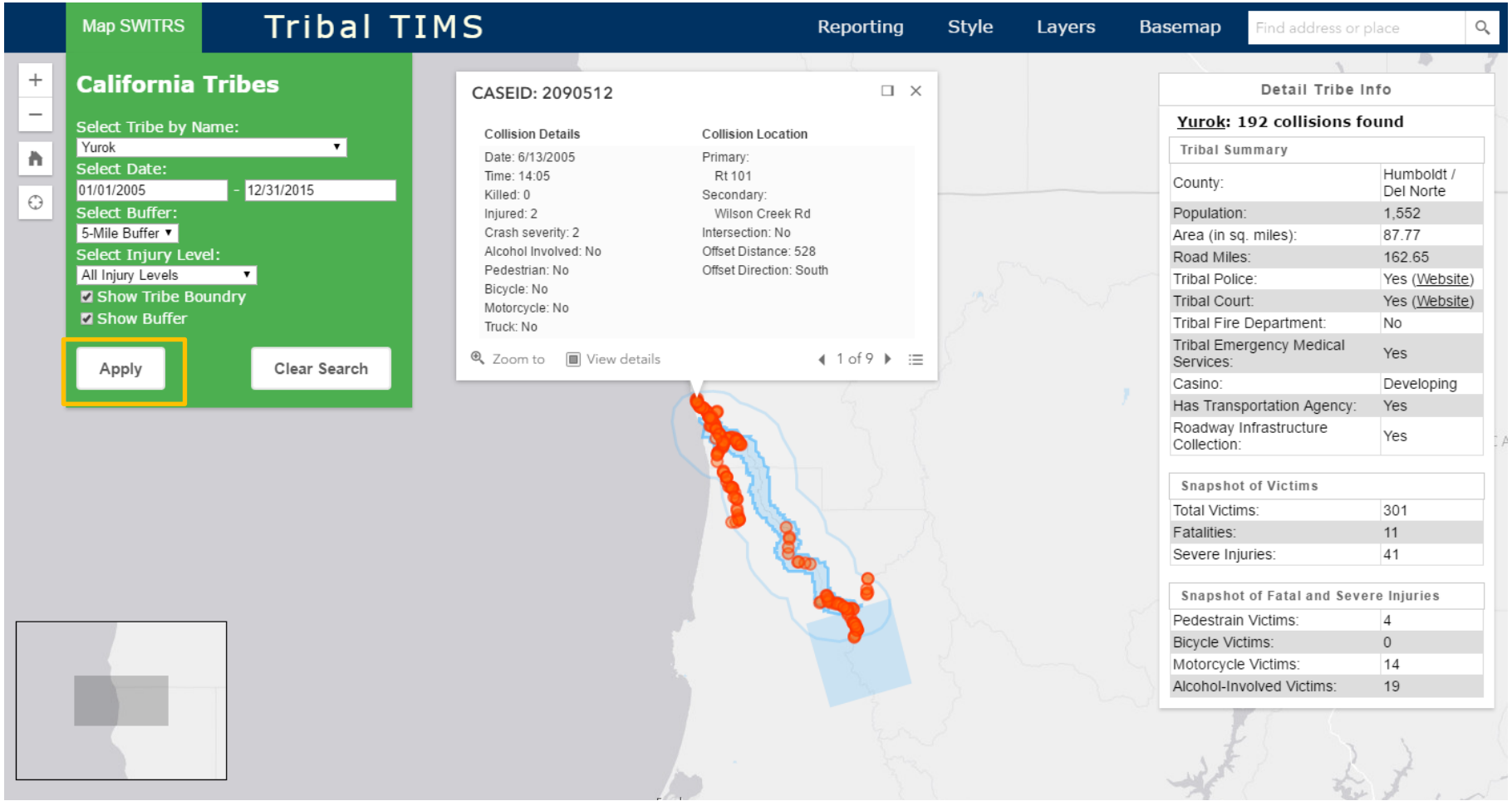
Select Tribe

- Use the drop down list on the left hand side panel to select tribe
- Or click on tribe area on map to open popup window, and click on “Select tribe”
- The map will zoom in to the selected tribe
- The details of the selected tribe will be displayed on the right hand side panel, with links to infrastructure site (if applicable)

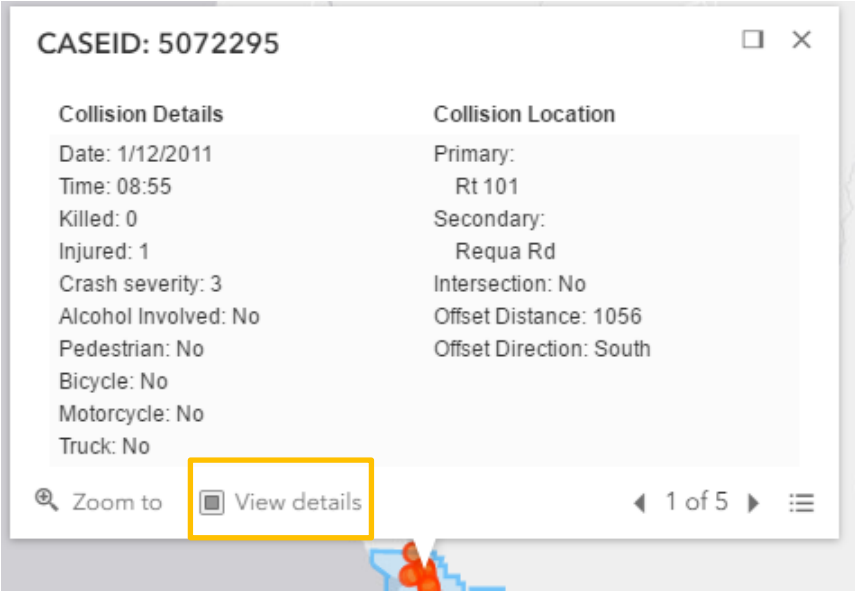


Apply Selection

- Use the left hand side panel to choose interested date range, buffer, etc.
- Click the “Apply” bottom to show results (up to 5000). Each collision is mapped as an orange circle
- The right hand side panel will expand to show victim summary of current selection
- Click on collision points to open a popup window, showing collision details

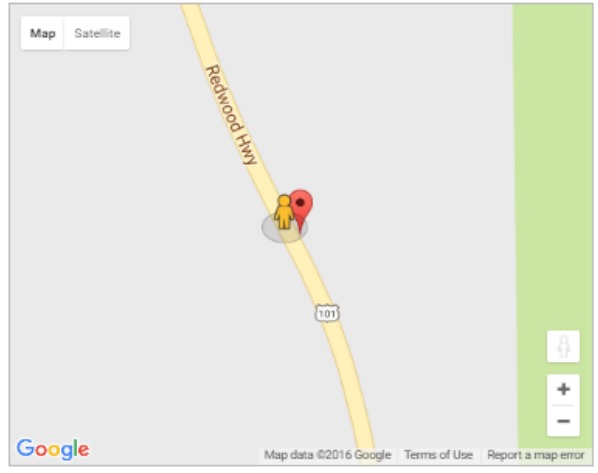


View Collision Details



- Click on “View details” button on popup window to open a collision detail page (the same as the one on current TIMS)
- The page shows information for selected collision, as well as a google street view tool

Collision Details: Case ID **5072295**

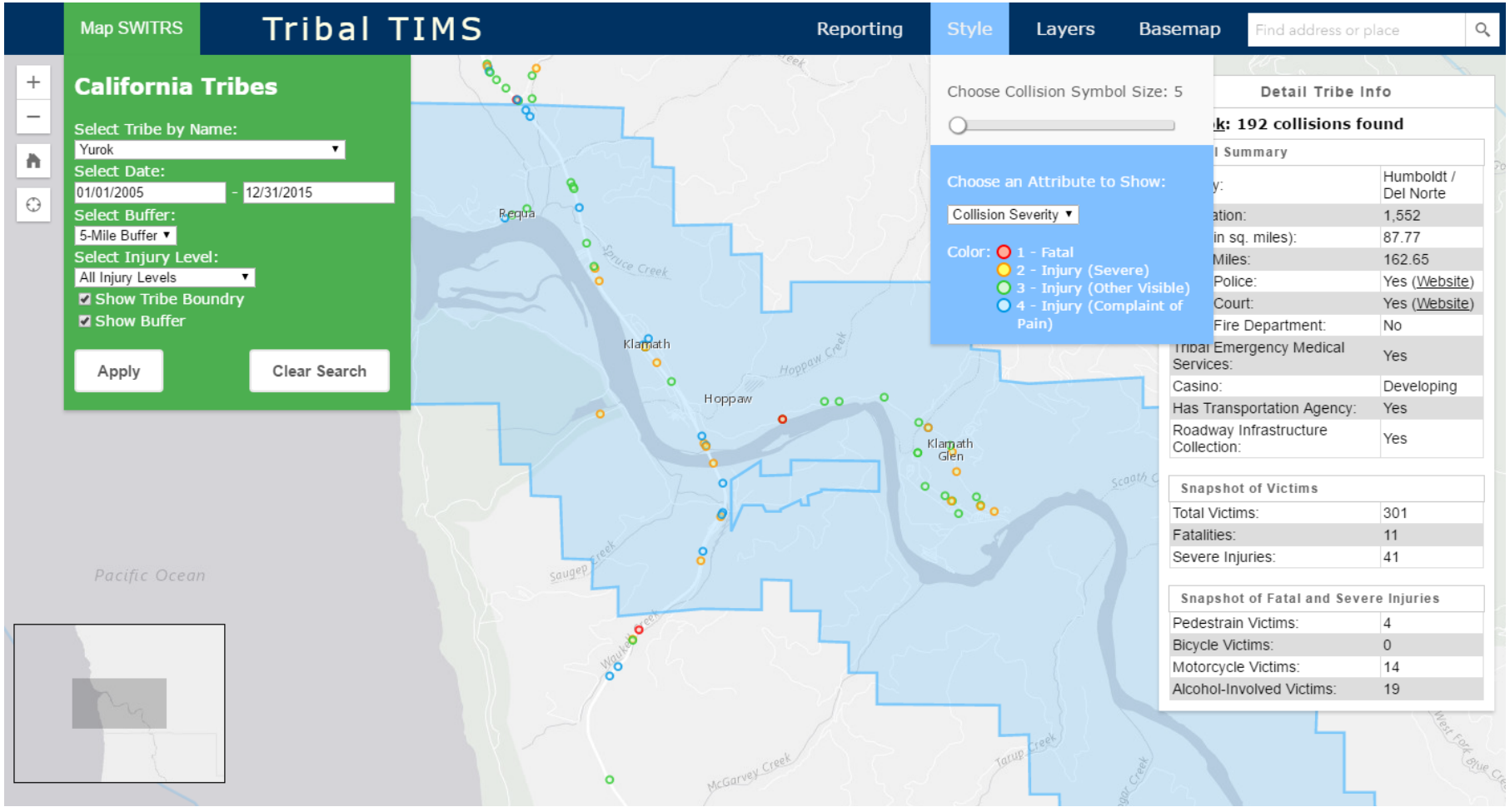


County	DEL NORTE	**City**	UNINCORPORATED
Date (Y-M-D)	2011-01-13	**Time**	08:55
Nearby Intersection	RT 101 & REQUA RD		
Coordinate Location	41.5505801487, -124.053364575		
State Highway	Y	**Route**	101N
Postmile	7.91		
Injured Victims	1	**Fatalities**	0
Alcohol	NO	**Weather**	Cloudy
Primary Collision Factor	Unsafe Speed	**Involved with**	Fixed Object

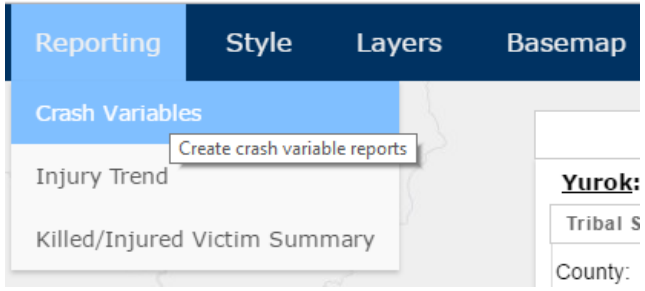
Street View

Change Style

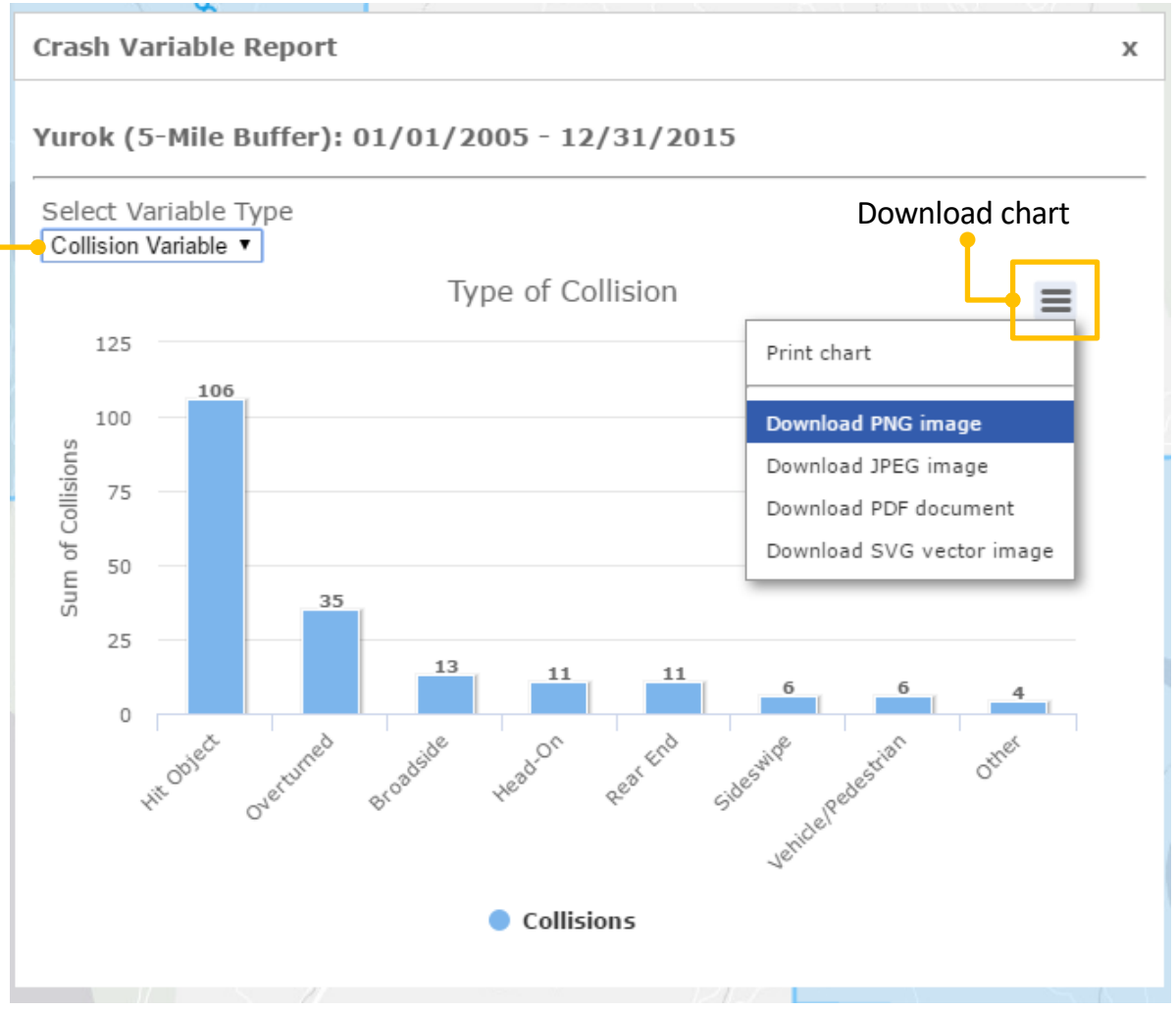
- The “Style” tab offers options to change collision symbol size and mapping style
- Choose to map collision by the severity level in “Choose an Attribute to Show”



Create Crash Variable Reporting Charts

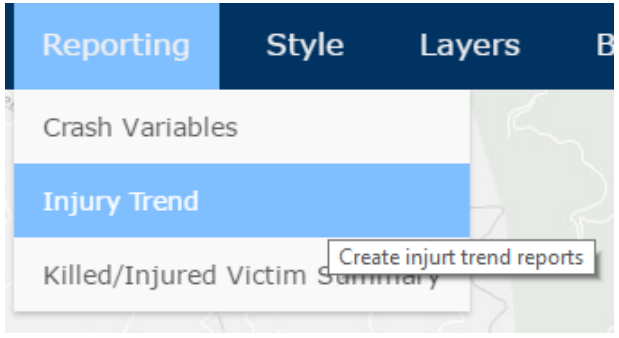


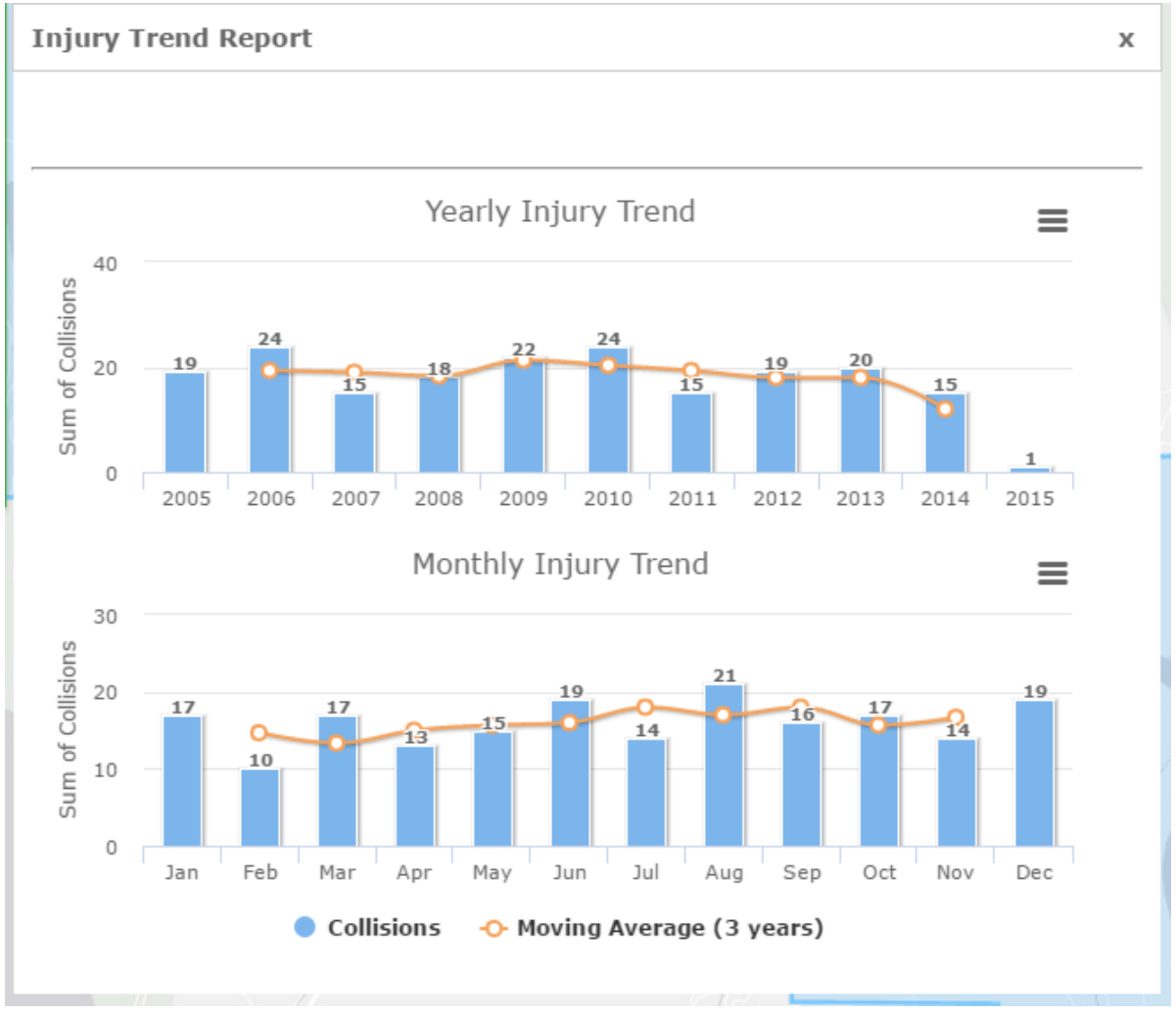
Select Variable Type
- Collision Variable
- PCF Variable
- Party variable
- Victim Variable



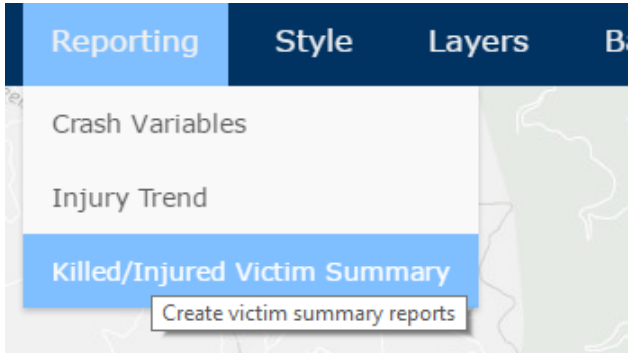
- Use the “Reporting” tab to generate charts
- The charts plot out data for the current selection, so the “Map SWITRS” query needs to be applied first before creating charts

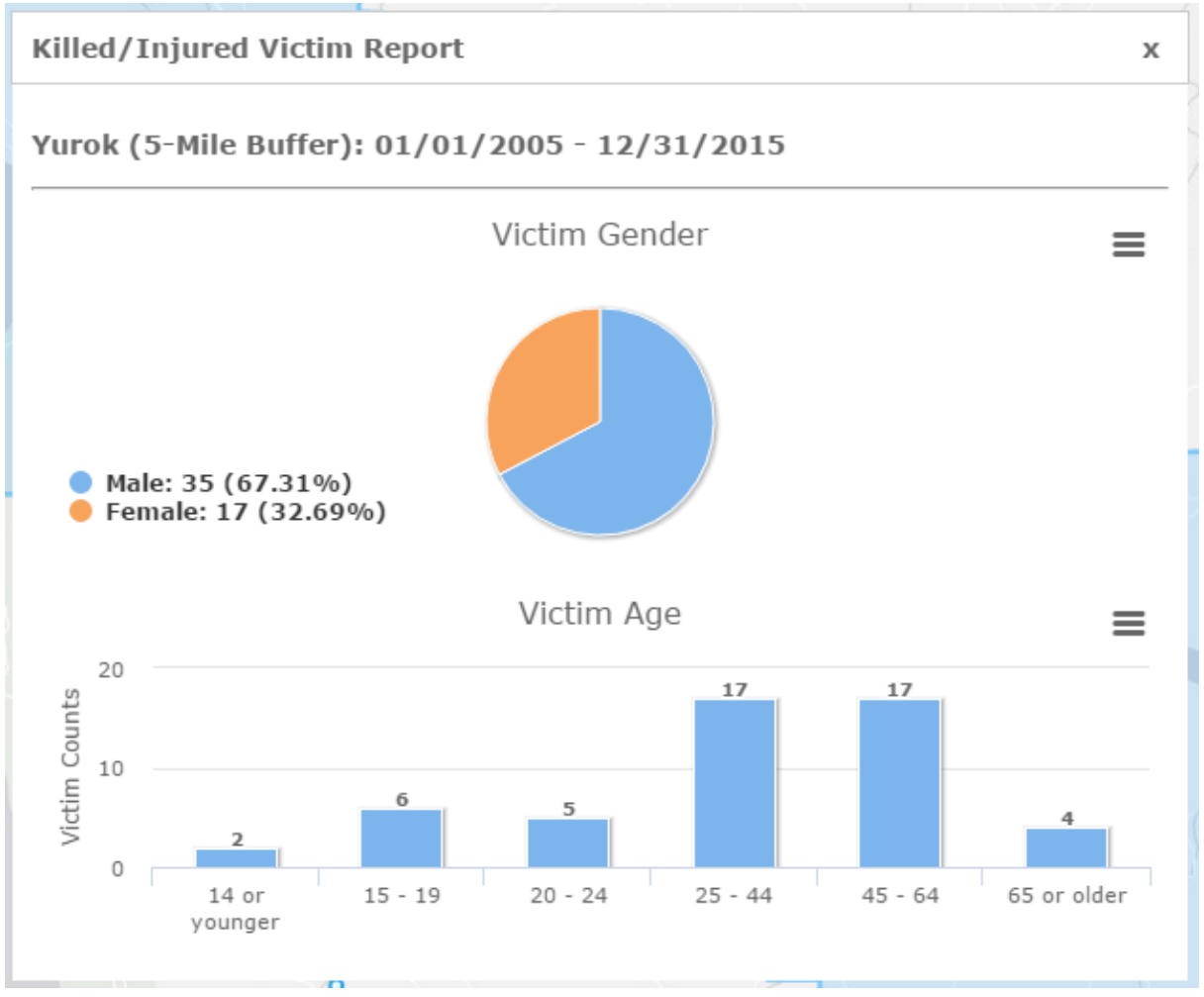
Create Injury Trend Reporting Charts





Create Victim Summary Reporting Charts





Next steps and future plans

- ❑ Feature to be able to add data
- ❑ Additional analyses features
- ❑ Continue pilot testing and deployment

Topics

1. Introduction
2. Collision and injury data from SWITRS
3. Example Analysis #1—Road way departure
4. Example Analysis #2—EMS response distance/time
5. Current Task #1—Determine potential underreporting
6. Current Task #2—Tribal data tool
7. Current Task #3—Training, technical support, and resource development
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Current Task #3 — Training, Resource Development, and Technical Support

- ❑ Coordinate with NIJC to develop and implement a training program for traffic crash data collection, data analysis, countermeasure selection.
- ❑ Coordinate with NIJC to develop proposals for resources for tribes for traffic crash response and data collection.
- ❑ Tribal data coordinating center in collaboration with NIJC

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STREET STORY

Transportation Safety Community Engagement Tool

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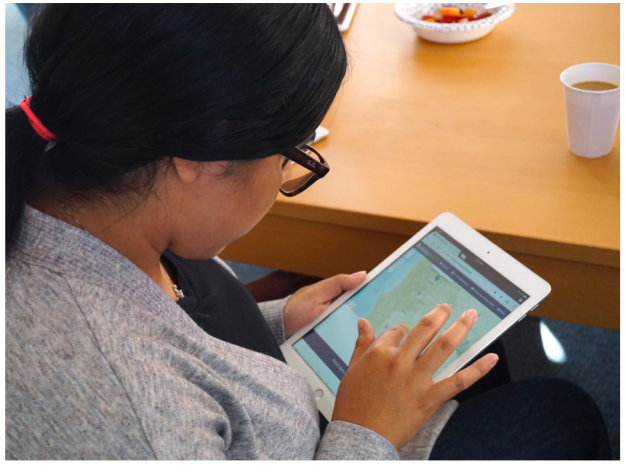
SAFE TRANSPORTATION RESEARCH AND EDUCATION CENTER
OTS CALIFORNIA OFFICE OF TRAFFIC SAFETY

What is Street Story?

- Street Story helps community groups and agencies collect and understand information that is important for transportation safety but is difficult to gather and analyze



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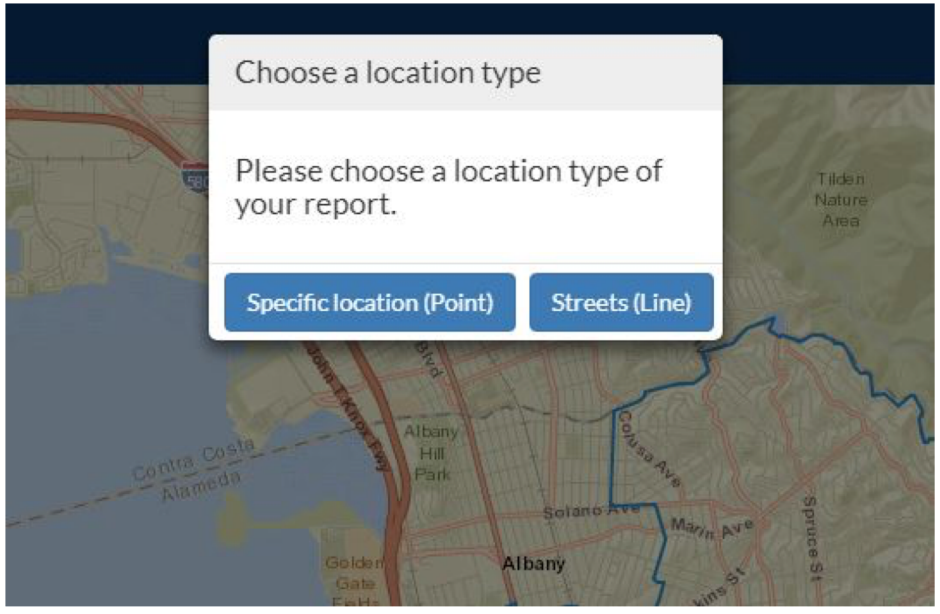
How to Provide Information

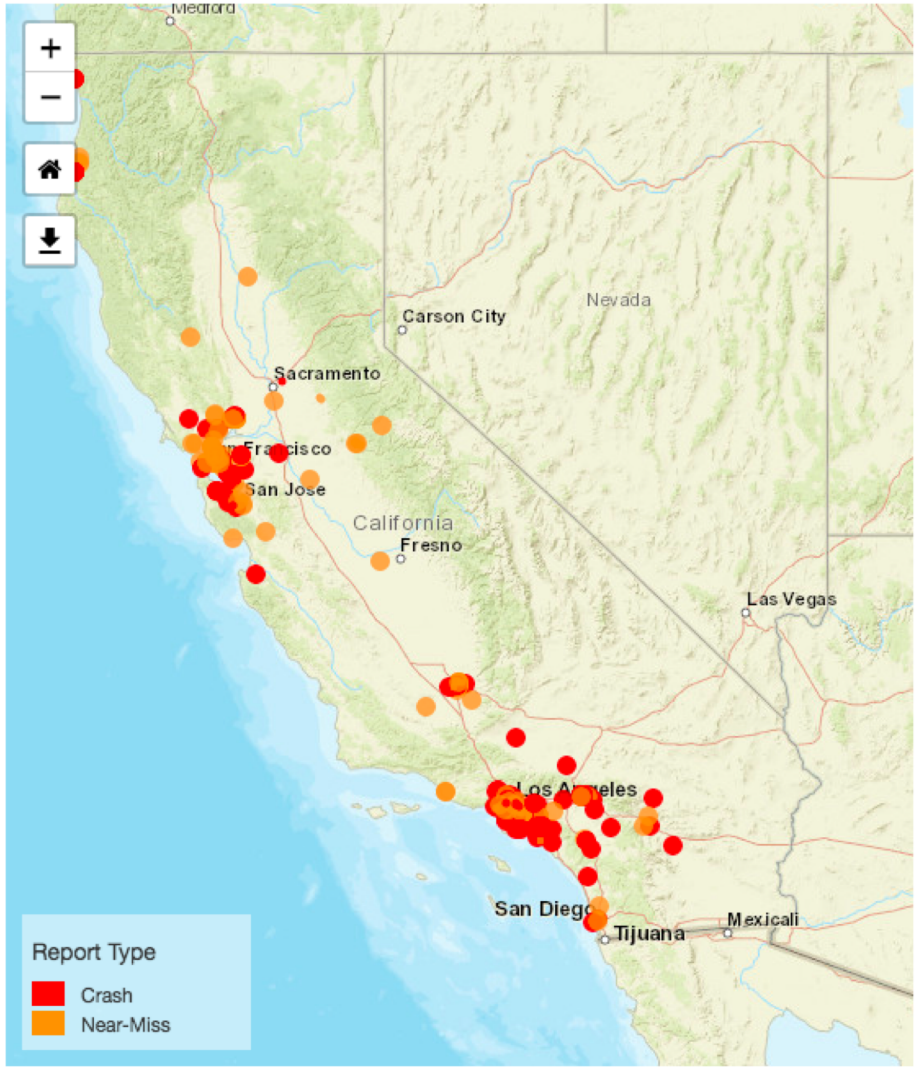
https://streetstory.berkeley.edu/tribal



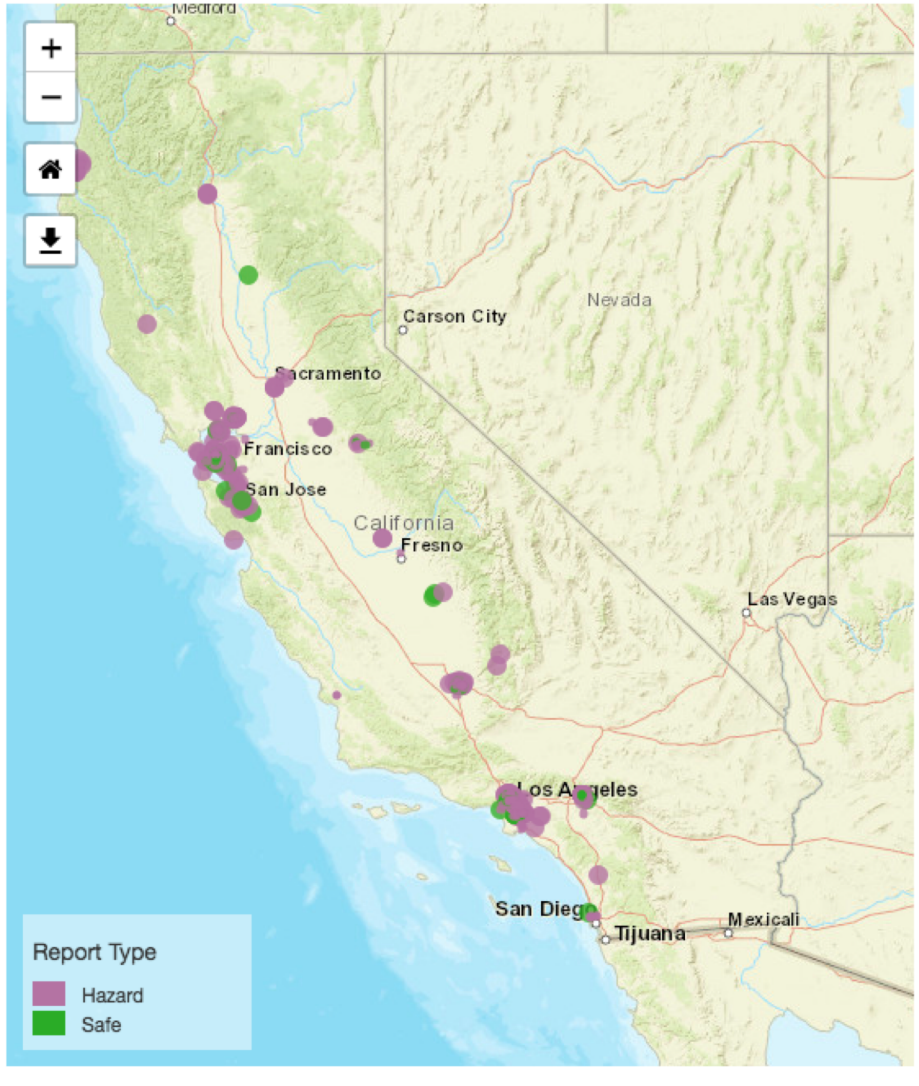
Street Story Data

https://streetstory.berkeley.edu/tribal

Crashes / Near-misses



Hazards / Safe places

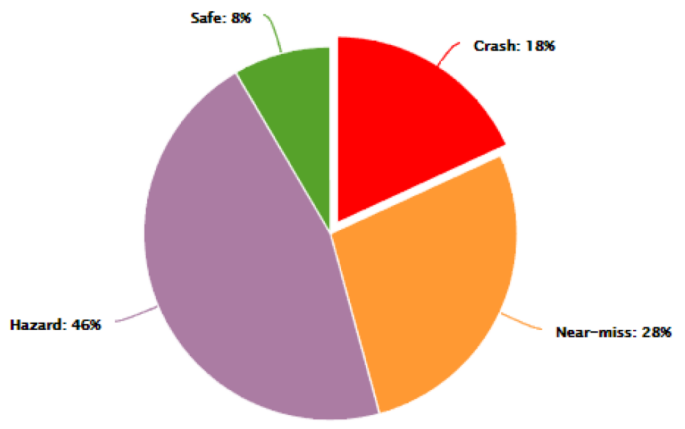


Street Story Data

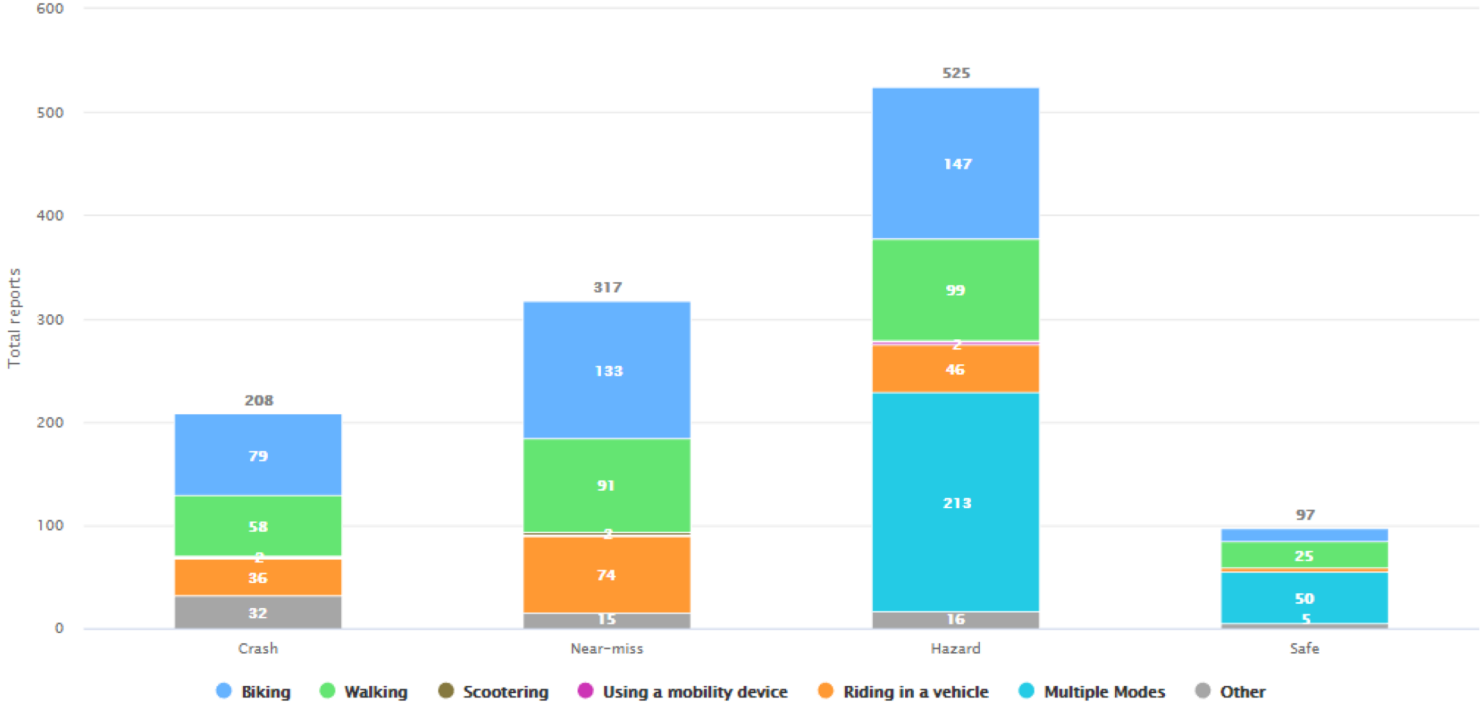
Report Information

Report Type	Count	Percent
Crash	208	18 %
Near-miss	317	28 %
Hazard	525	46 %
Safe	97	8 %
Total	1147	

Report Type Summary



Travel Modes Summary



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Tribal Crash Reporting Toolkit (NHTSA)

- A ready-to-use electronic and printable crash report form based on a subset of the Model Minimum Uniform Crash Criteria (MMUCC).
- A database that works with the included form to establish electronic storage of crash data in the Tribe's internal systems.
- Guidance documents:

  -Toolkit manual describing the Tools

  -An overview of the importance of Tribal crash data collection, describing how crash data can be used and dispelling misunderstandings concerning crash data collection

  -Crash form instructions and data definitions

  -Data analysis tool for identifying problem areas and applying for grant funding

  -Quality control tool outlining edit check procedures

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TRIBAL ROAD SAFETY PROGRAMS

Tribal Crash Data Tool (Tribal TIMS)*

The Transportation Injury Mapping System (TIMS) is a free resource for accessing geocoded collision data in California. TIMS offers maps, summary analysis, graphics, and raw data to view/download. TIMS provides tribes with an interactive analysis and mapping tool for tribal areas. *https://safetrec.berkeley.edu/tools/tribal-crash-data-tool*

Tribal Street Story Tool*

Street Story is a free and publicly accessible community engagement tool with maps and tables for residents, community groups, and agencies to gather information about collisions, near-misses, hazards, and safe locations to travel. *https://safetrec.berkeley.edu/tools/street-story-platform-community-engagement*

Tribal Road Safety Data Collection*

SafeTREC collaborates with the National Indian Justice Center (NIJC) to guide and assist California tribes in improving the quality and quantity of traffic collision d ata o n a nd near tribal areas. Funding for traffic safety improvements is often awarded based on collision data documenting the safety problem. However, collision data for tribal lands is often lacking, putting tribal communities at a disadvantage in the competition for such funds. *https://safetrec.berkeley.edu/programs/tribal-road-safety/tribal-road-safety-data-collection*

Community Pedestrian and Bicycle Safety Program (CPBSP)*

SafeTREC in collaboration with California Walks and Safe Routes Partnership launched the CPBSP to reduce pedestrian and bicyclist fatalities and injuries in California, including Native American tribes, with a focus on the safety needs of high-risk communities including seniors, children, and communities of color. *https://safetrec.berkeley.edu/programs/community-pedestrian-and-bicycle-safety-program-cpbsp*

Active Transportation Needs Assessment (ATNA)

SafeTREC in partnership with NIJC and Cher-Ae Heights Indian Community of the Trinidad, conducts ATNAs that document current and projected pedestrian and bicyclist needs in CA tribal communities. SafeTREC will produce reports for each of the tribes and propose short- and long-term improvements benefiting all transportation users of the participating tribes' lands. *https://safetrec.berkeley.edu/programs/tribal-road-safety/active-transportation-needs-assessments*

Tribal Transportation Safety Assessment (TTSA-SPR)

Funded by Caltrans, TTSAs aim to significantly reduce injuries and fatalities on public roadways that serve California Native American reservations and tribal communities. TTSAs provide tribes with in-depth, expert safety reviews of problem areas, in addition to specific suggestions for safety improvements to roadways on and within their lands. SafeTREC conducts this work in collaboration with NIJC and the Caltrans Division of Transportation Planning (DOTP) Native American Liaison Branch (NALB) with involvement from the Caltrans District Native American Liaisons. *http://safetrec.berkeley.edu/programs/tribal-road-safety/tribal-transportation-safety-assessments*

OTHER RESOURCES

The National Indian Justice Center, Inc. (NIJC)

NIJC is an Indian owned and operated non-profit corporation.Its goal is to design and deliver legal education, research, and technical assistance programs, which seek to improve the quality of life for Native communities and the administration of justice in Indian country. NIJC has designed and conducted effective education programs via regional trainings, on-site training, and conferences, including workshops in tribal road safety and funding opportunities. *https://www.nijc.org*

STAY CONNECTED

For the latest information on events, research, and more, sign up for SafeTREC's newsletter.

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bit.ly/SafeTRECYouTube

* *Funding for this program was provided by a grant from the California Office of Traffic Safety,through the National Highway Traffic Safety Administration.*

SafeTREC's mission is to reduce transportation-related injuries and fatalites through research, education, outreach, and community service.

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Contact Information

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510-642-0655

davidr@berkeley.edu

Safe Transportation Research and Education Center (SafeTREC)

http://safetrec.berkeley.edu/

Transportation Injury Mapping System (TIMS):

http://tims.berkeley.edu/