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UC Davis Road Ecology
Center

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Special Report on Roadkill Hotspots along California Highways (2009-2014)

Using data from the California Roadkill Observation System (<http://wildlifecrossing.net/California>), the Road Ecology Center has mapped stretches of highway that are likely to be hotspots for wildlife-vehicle collisions (WVC).

Photo acknowledgements

Red-tailed hawk – Fraser Shilling
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Data collection acknowledgements

This report and the analyses contained within would not have been possible without the concerted and coordinated efforts of hundreds of volunteer roadkill observers over the last 5 years. Through their endeavors, they have collected >29,000 observations of >390 species, representing one of the largest and most comprehensive wildlife monitoring program in California.

Special thanks to Dr. David Waetjen who developed the California Roadkill Observation System with me in his spare time, putting in hundreds of hours of programming and his own roadkill observations.

The Author

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UC Davis Road Ecology Center

Second Annual Special Report on Roadkill Hotspots along California Highways

Using data from the California Roadkill Observation System (CROS; <http://wildlifecrossing.net/california>), the Road Ecology Center has mapped stretches of California highway that are likely to be hotspots for wildlife-vehicle collisions (WVC). Animals entering roadways pose a hazard to drivers, who may collide with the animal, or try to avoid the animal and have an accident suffering vehicle damage, injury, and even death. Wildlife populations may suffer significant losses due to collisions and highways with high rates of WVC may cause ripple effects into surrounding ecosystems.

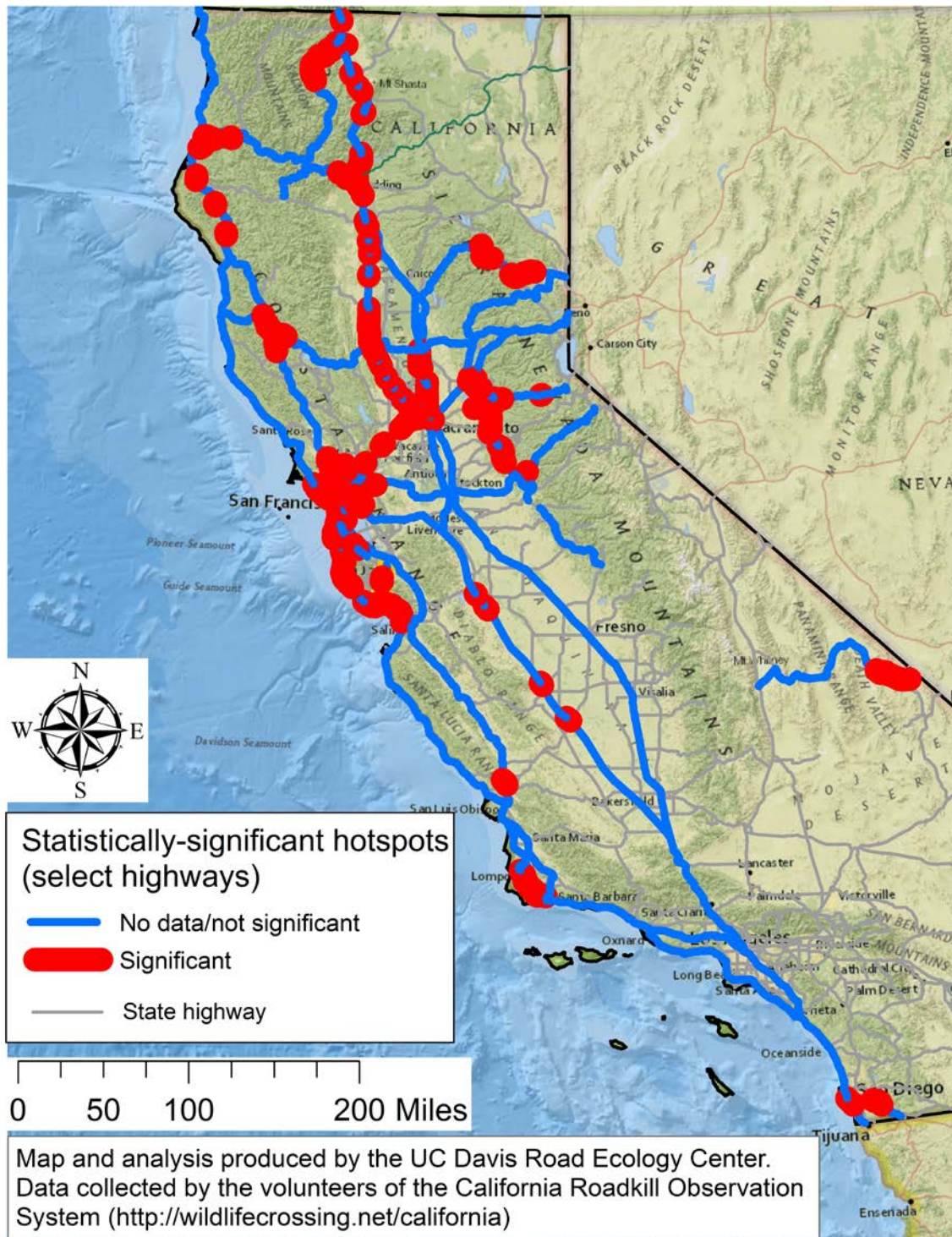
The CROS project includes past and current participation by over 1,000 volunteer-scientists, including several hundred academic, agency, and NGO biologists and natural historians. More than 28,000 WVC observations were logged on the website by volunteers between August 2009 and the end of 2014. The observations were used in a geographic information system (GIS) to find stretches of highway where WVC occur more frequently (high density) and places where there are statistically-significant clusters of WVC (hotspots).

By identifying stretches of highway where WVC are more likely, the UC Davis Road Ecology Center is assisting Caltrans and other responsible entities to develop mitigation to protect driver safety and wildlife populations. Effective measures include building fencing and underpasses along priority highways to allow the safe passage of wildlife across highways. According to Caltrans and California Highway Patrol statistics, there are about 1,000 reported accidents per year on California highways involving deer, other wildlife, and livestock (in that order of importance). Despite the statewide collection of WVC observations by CROS, we know that our ~6,000 observations per year represent only a small fraction of the total animals killed due to collisions with vehicles. We repeatedly request additional WVC data from Caltrans under the California Public Records Act, these data will improve the current hotspot analysis.

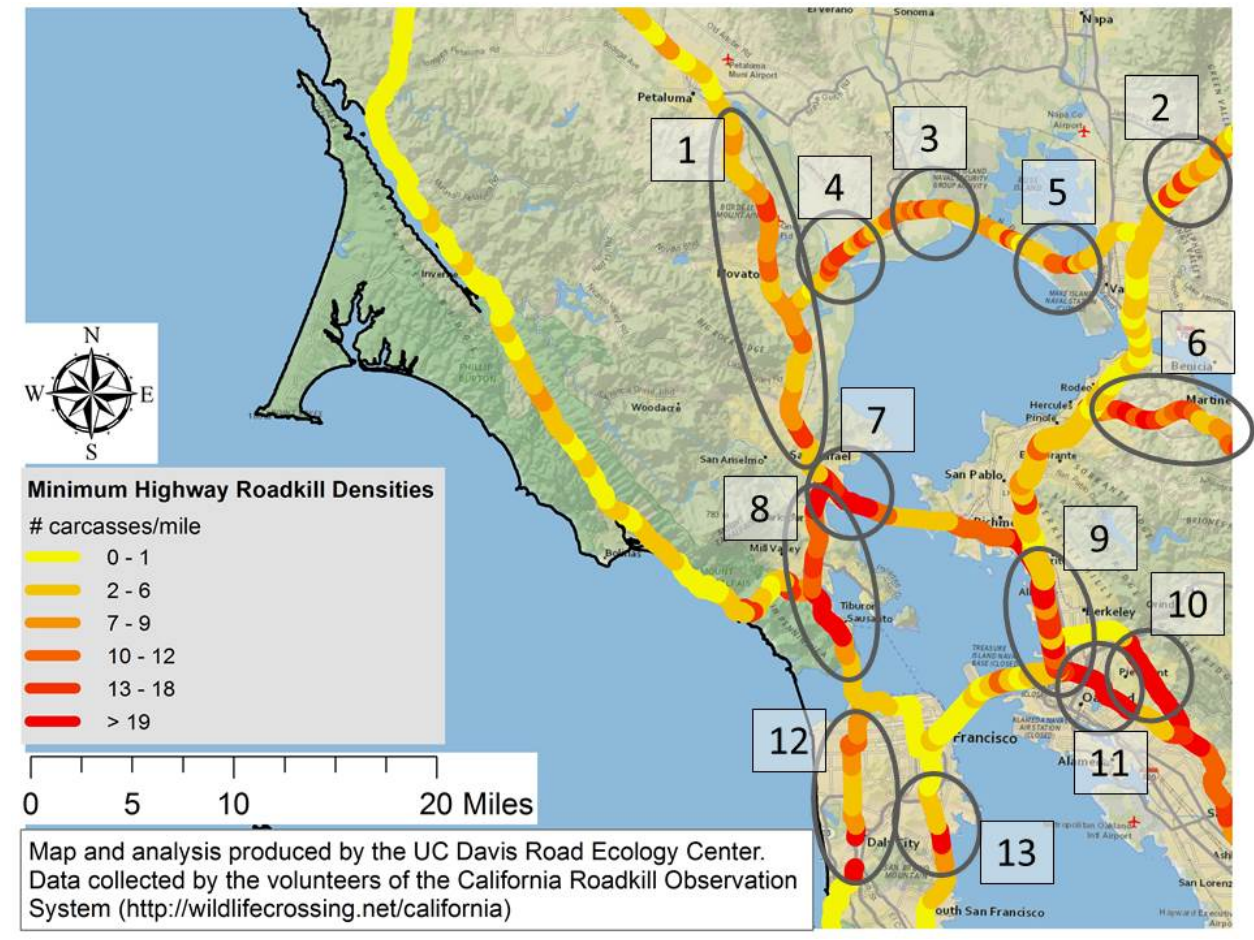
The following maps show the distribution of WVC densities along select state highways. The densities of WVC reported are the minimum for each highway segment and do not represent actual rates, which are likely to be much higher. Also highlighted are WVC hotspots, which are stretches of highway that are statistically different from neighboring stretches. By significantly increasing the systematic treatment of these hotspots and stretches of highway with high rates of collisions, Caltrans and other entities can contribute to driver safety and improve the environmental sustainability of the state highway system.

Statewide Highway Roadkill Hotspots

The map below shows the roadkill hotspots for select state highways throughout the state. This map does not show all hotspots, nor does it show hotspots on non-state roadways. More detailed maps and explanations are given on the following pages.



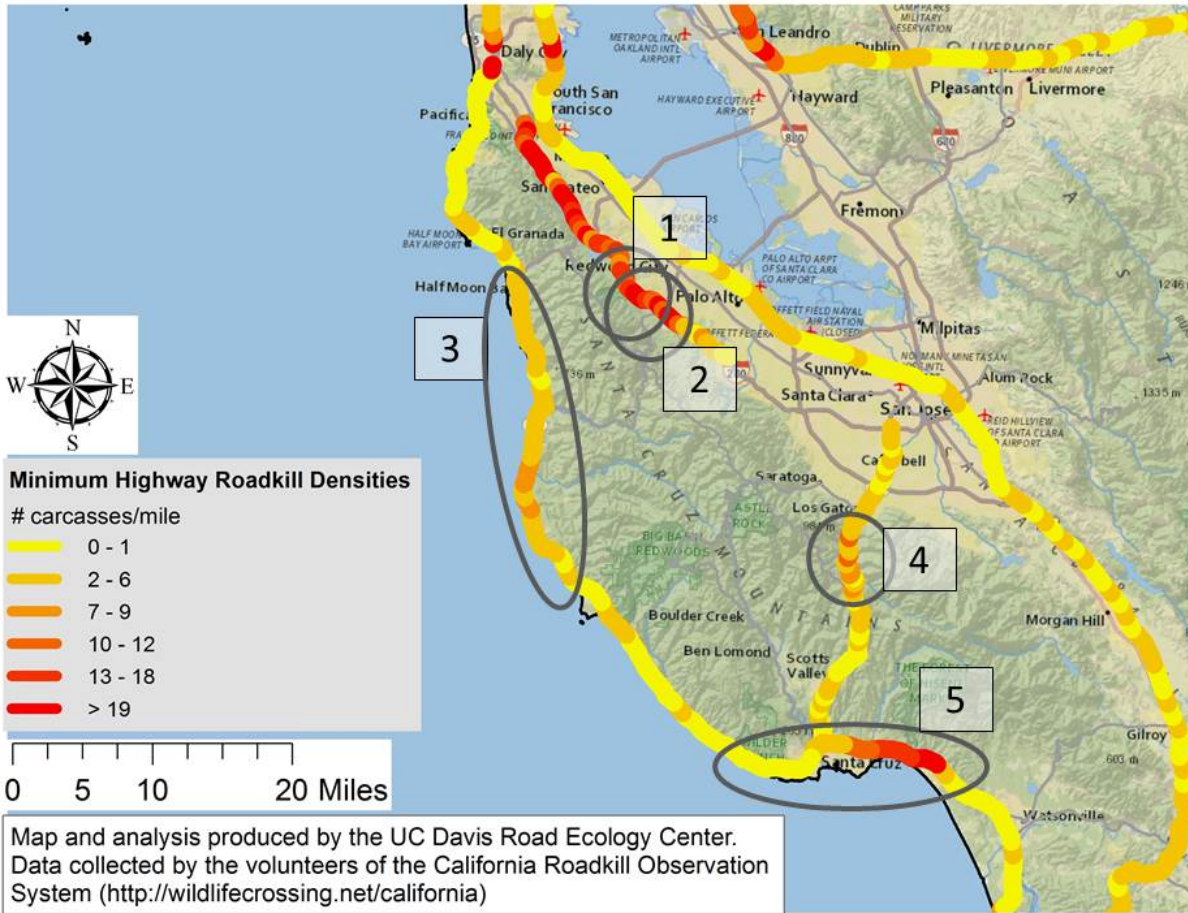
North San Francisco Bay Area, Regional Highway Roadkill Hotspots



North San Francisco Bay Area, Regional Highway Roadkill Hotspots

Hotspot ID#	Highway (Location)	Reason (# individuals, species)	Hotspot in 2013?
1	SR101 (Marin County)	Adjacent habitat (363, 27)	Y
2	I-80 (Cherry Glen)	Landscape pinch point (12, 7)	Y
3	SR37 (Tolay Lagoon)	Adjacent habitat (24, 8)	N
4	SR37 (Petaluma Marsh)	Adjacent habitat (43, 13)	N
5	SR37 (Mare Island)	Adjacent marsh (33, 11)	Y
6	SR4 (Concord)	Adjacent open space (114, 14)	Y
7	I-580 (Richmond Bridge)	Adjacent habitat (42, 15)	N
8	SR101 (Marin County)	Adjacent open space (207, 15)	Y
9	I-80 (Berkeley)	Adjacent marsh (81, 18)	Y
10	SR13 (Oakland Hills)	Adjacent open space (564, 27)	Y
11	I-580 (Oakland)	? (98, 16)	Y
12	SR1 (San Francisco)	Nearby shore & urban parks (74, 12)	Y
13	SR101 (S San Francisco)	Nearby marsh (38, 10)	Y

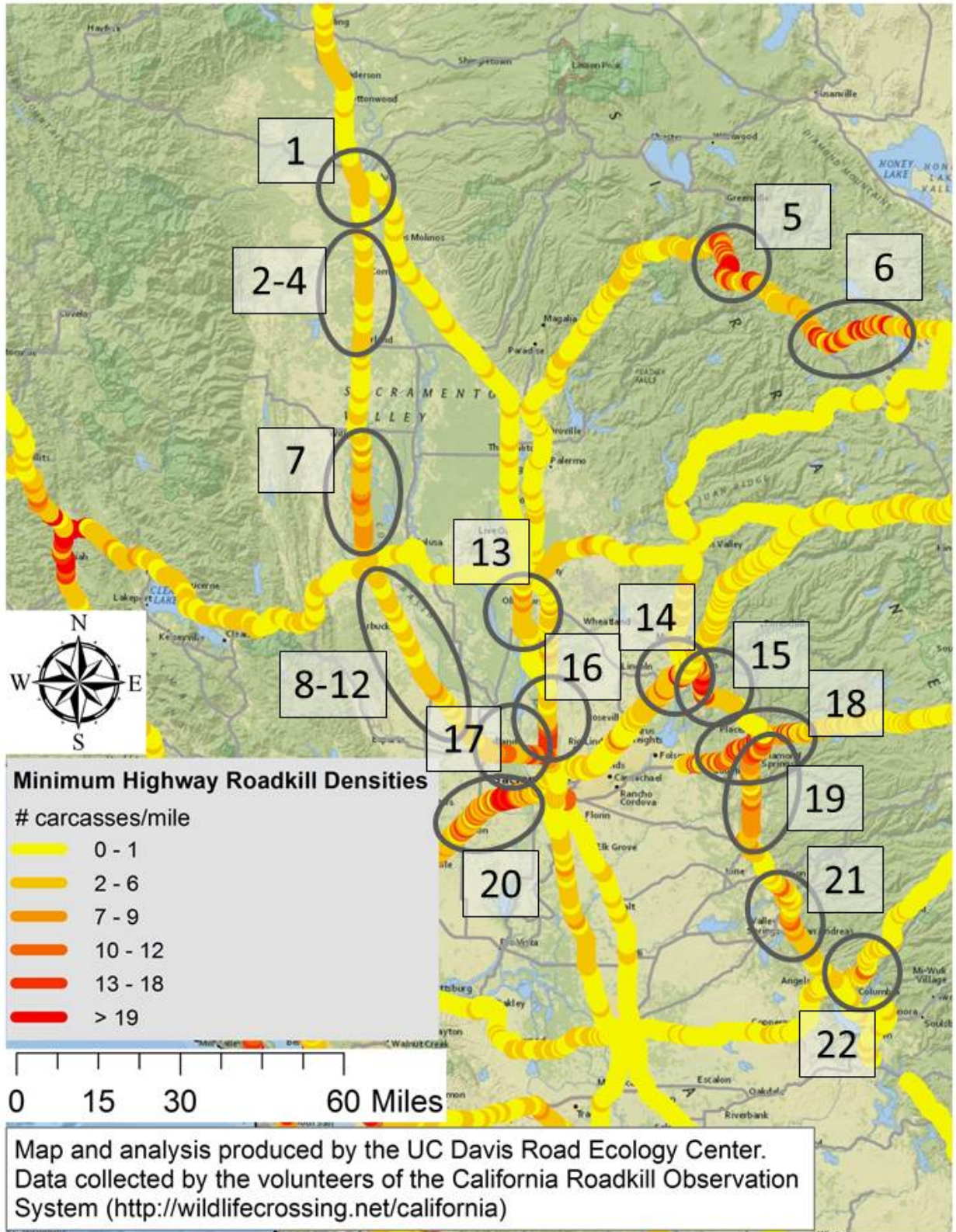
South San Francisco Bay Area, Regional Highway Roadkill Hotspots



South San Francisco Bay Area, Regional Highway Roadkill Hotspots

Hotspot ID#	Highway (Location)	Reason (# individuals, species)	Hotspot in 2013?
1	I-280 (Pulgas Ridge)	Adjacent open space/habitat (15, 4)	N
2	I-280 (Farm Hill Rd)	Adjacent habitat (33, 7)	Y
3	SR1 (Half Moon Bay)	Adjacent coast and forest (86, 29)	N
4	SR17 (St. Joseph's Hill)	Adjacent open space/habitat (28, 8)	Y
5	SR1 (Santa Cruz)	Adjacent coastal habitat (127, 15)	Y

Sacramento Valley and Mountain Areas, Regional Highway Hotspots

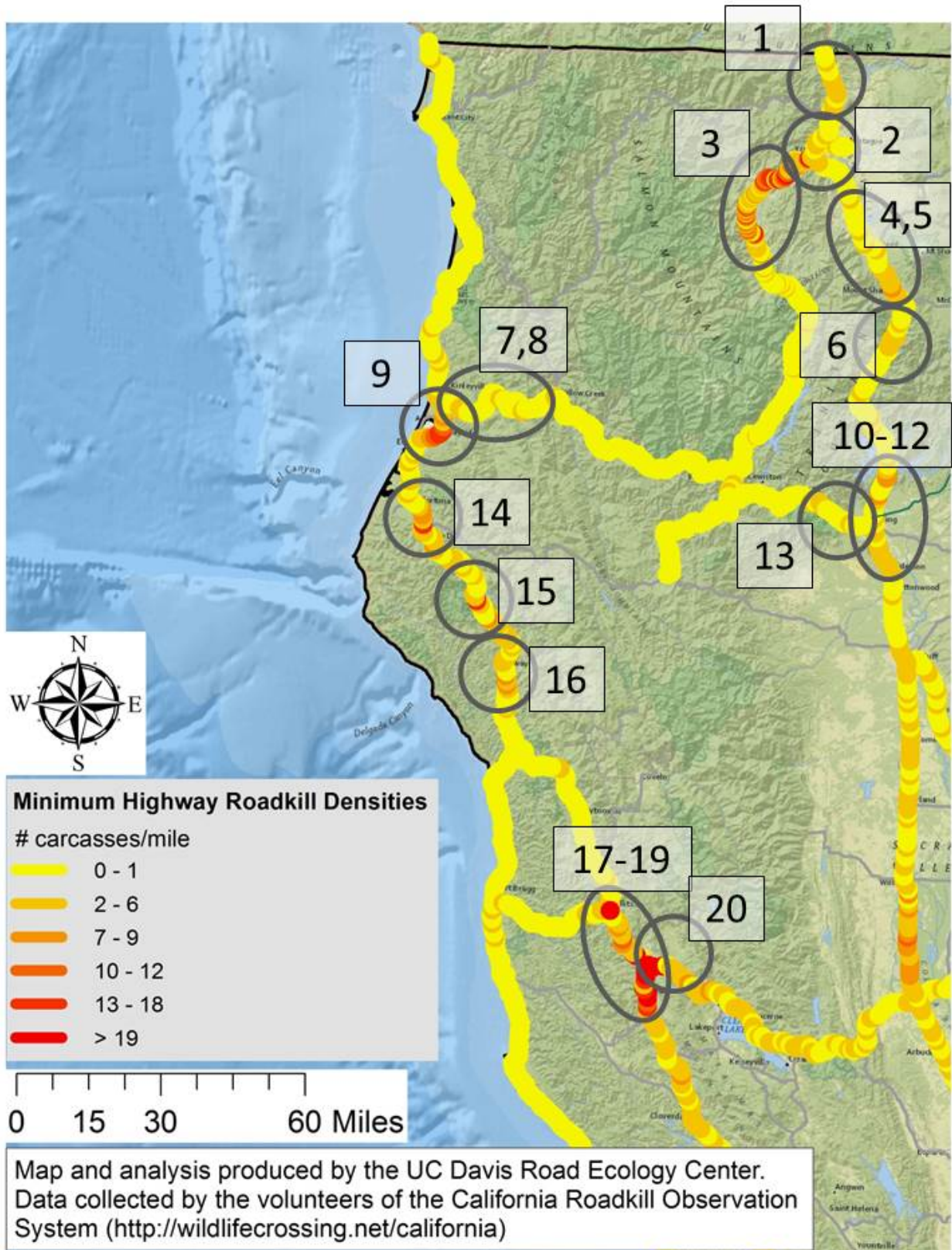


Sacramento Valley and Mountain Areas, Regional Highway Hotspots

Roadkill observations collected by volunteers, between August, 2009 and October, 2014.

Hotspot ID#	Highway (Location)	Reason (# individuals, species)	Hotspot in 2013
1	I-5 (Sacramento River Crossing, Redding)	Sacramento River riparian area (23, 9)	Y
2 - 4	I-5 (Thomas Creek Crossing, Corning)	Creek crossings (17, 11)	Y
5	SR70 (Keddie, Butterfly Valley Curves)	Forest habitat (188, 15)	Y
6	SR70 (Portola Valley)	Forest habitat, creek crossings (343, 25)	Y
7	I-5 (Sacramento National Wildlife Refuge, Maxwell)	Agricultural and preserve lands (125, 19)	Y
8-12	I-5 (Williams to Woodland)	Agricultural fields, creek crossings (44, 11)	Y
13	SR99 (Yuba City)	Agricultural fields/orchards (42, 14)	Y
14	I-80 (Auburn)	Foothills forest and rural (23, 6)	Y
15	SR49 (American River Canyon)	Forest habitat, river crossing (128, 20)	Y
16	Hwy 99 (Natomas Basin)	Agricultural habitat and residential (93, 22)	Y
17	I-5 (Sutter Bypass)	Agricultural fields, river crossing (43, 16)	Y
18	SR50 (El Dorado County)	Foothill woodland, creek crossings, residential (260, 20)	Y
19	SR49 (El Dorado County)	Residential, forest habitat (177, 19)	Y
20	I-80 (Yolo Bypass)	Adjacent habitat (85, 22)	Y
21	SR49, (Mokelumne River, Jackson)	Forest/riparian habitat (73, 17)	Y
22	SR4 (Calaveras River Canyon, Angel's Camp)	Residential/forest (11, 5)	Y

North Coast, Regional Highway Hotspots

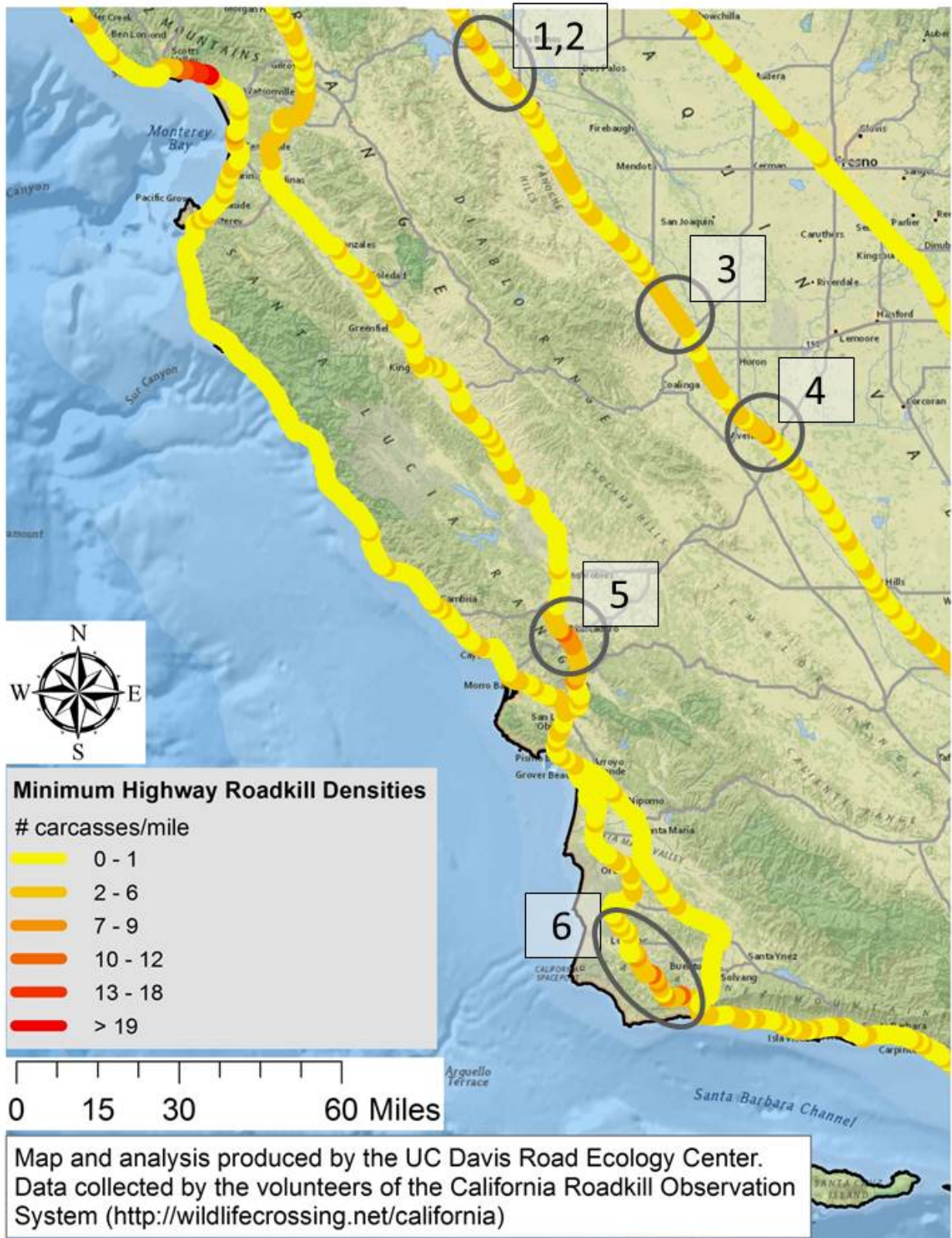


North Coast, Regional Highway Hotspots

Roadkill observations collected by volunteers, between August, 2009 and October, 2014. This is a new region, so no comparison was made with 2013.

Hotspot ID#	Highway (Location)	Reason (# individuals, species)
1	I-5 (Yreka)	Forest habitat (25, 9)
2	I-5/SR3 (Yreka)	Creek crossings (20, 11)
3	SR3 (Scott Valley)	Forest habitat (268, 35)
4, 5	I-5 (Mt Shasta)	Forest habitat (33, 10)
6	I-5 (Lake Shasta)	Forest habitat (36, 14)
7, 8	SR299 (Blue Lake)	Forest habitat (14, 8)
9	SR101 (Humboldt Bay)	Coastal habitat (70, 21)
10-12	I-5 (Redding)	Woodland, riparian, urban (34, 12)
13	SR299 (Whiskeytown)	Forest-woodland (10, 6)
14	SR101 (Fortuna)	Riparian, agriculture, rural (27, 6)
15	SR101 (Humboldt Redwoods)	Adjacent habitat (24, 10)
16	SR101 (Garberville)	Adjacent habitat (21, 5)
17-19	SR101 (Willits-Calpella)	Woodlands, rural (217, 18)
20	SR20 (Lake Mendocino)	Woodlands, rural (232, 21)

Central Coast and Adjacent Areas, Regional Highway Hotspots



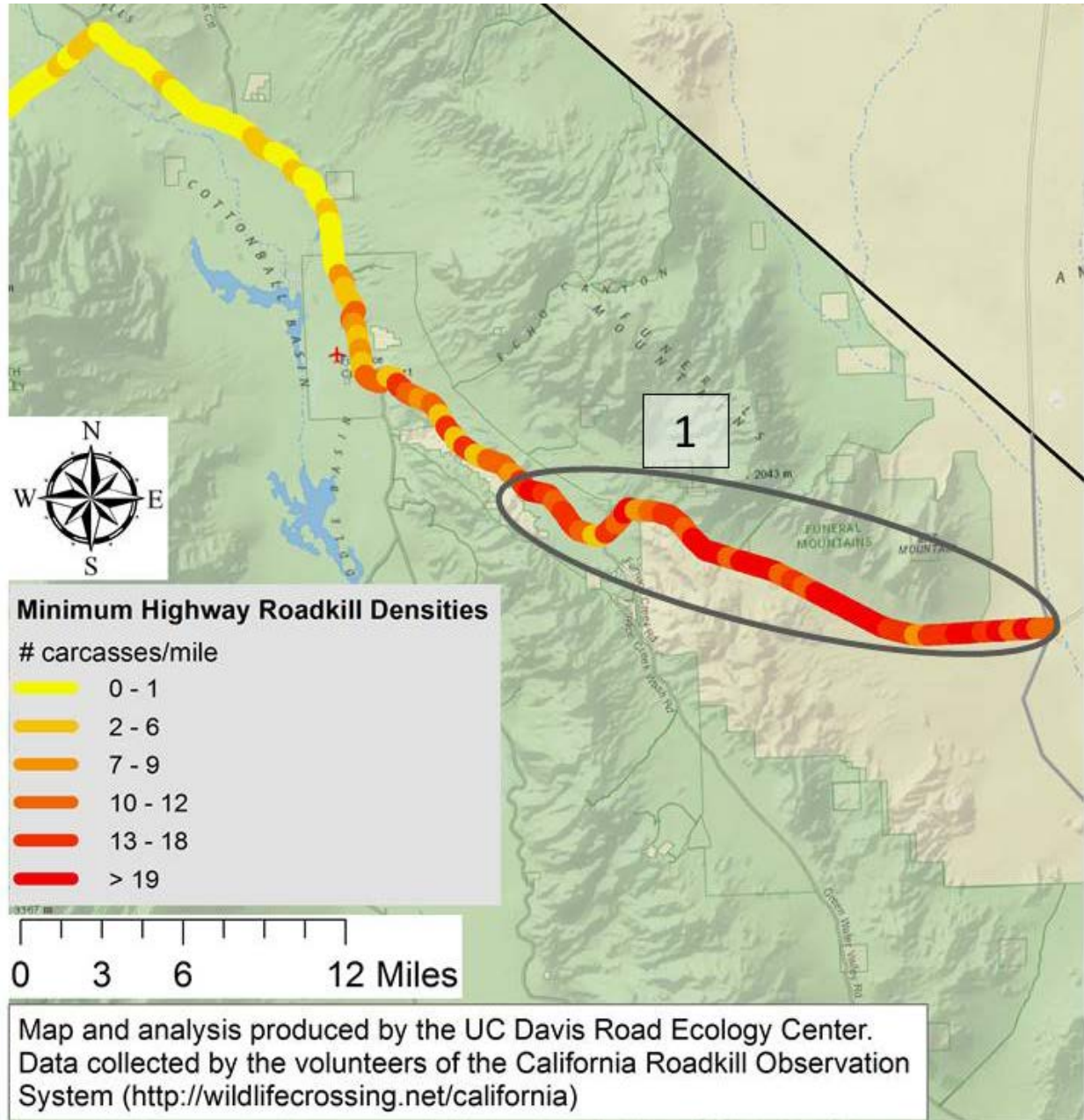
Central Coast and Adjacent Areas, Regional Highway Hotspots

Roadkill observations collected by volunteers, between August, 2009 and October, 2014. This is a new region, so no comparison was made with 2013.

Hotspot ID#	Highway (Location)	Reason (# individuals, species)
1, 2	I-5 (San Luis/Los Banos)	Grassland habitat, agriculture (30, 8)
3	I-5 (Harris "Ranch")	Grassland habitat, agriculture (13, 7)
4	I-5 (Kettleman City)	Grassland habitat, agriculture (14, 5)
5	SR101 (Atascadero)	Woodlands, urban (44, 9)
6	SR1 (Vandenberg/Lompoc)	Coastal habitat, urban (96, 31)

Death Valley and Adjacent Areas, Regional Highway Hotspots

There is essentially one long hotspot in the circled area, representing ~20 miles of SR190. The 419 roadkill observations of 36 species within the hotspot were collected by 6 people associated with the National Park Service, between April 2011 and October, 2014. Between June, 2010 and August, 2014, the NPS staff posted 637 observations for ~37 miles of highway 190 and Stateline Rd, which is equivalent to about 4.3 observations per mile per year.



San Diego County, State Route 94 Hotspots

The long continuous hotspot represents 681 roadkill observations of 57 animal species. This is out of a total for the highway of 899 observations of 66 total species collected by 7 roadkill observers, between October, 2010 and October, 2014. These observations were made along ~25 miles of highway, equivalent to 9 roadkilled animals per mile per year.

