Snakes in the East Glendora Foothills and Adjacent Residential Areas (2016 to July 2024)

Patrick Gavit, September 2024







The city of Glendora is immediately south of the San Gabriel Mountains. Portions of the eastern end of the city extend into the foothills. Snakes in the foothills above Glendora and in the San Gabriel Mountains have been documented previously in other reports: one by Swinney, which is specific to Glendora and the adjacent foothills (1), and another by Schoenherr, which covers the entire San Gabriel Mountain range (2). The observations documented in Swinney's paper cover from 1947 to 2024, however most observations are prior to 2016. Schoenherr's publication was last updated in 1997. Thus, this summary focuses only on recent observations and provides a basis of comparison with the older records. Additionally, during this time period the author has made a significant effort to document snakes in the east Glendora foothills. This report is an analysis of all the snake observations between 2016 and July 20, 2024 in a small section of northeast Glendora and the adjacent foothills. All data in this report is from iNaturalist Research Grade observations. A total of 237 observations qualified for inclusion, with 64% being from the author. Twelve species were documented during this time period in the study zone. The most commonly encountered snakes were Southern Pacific Rattlesnakes and San Diego Gopher Snakes, accounting for 41% and 29% of the total number, respectively. Four species were not seen during this time period that were previously documented by Swinney. April and May had the highest number of snakes with the observations tapering off toward the end of the year. A substantial portion of the snakes were deceased (46%), and most of these were presumed to have been killed by cars as they traversed the two main roads in the foothill portion of the study zone, Glendora Mountain Road (GMR) and Big Dalton Canyon Road (BDCR).

Study Zone

The study zone is comprised of a small section of the San Gabriel Mountain foothills just north of the eastern end of Glendora (Figure 1 and 2). The area also contains some residential areas adjacent to the foothills and some residential zones in the foothills. The study zone is approximately 17 square km in area. The residential areas were included to document encroachment of snakes into these areas, or to document established populations in foothill adjacent housing tracts. Parts of the foothill portions are in the San Gabriel Mountains National Monument and Big Dalton Canyon Wilderness Park. Two of the main roads within the foothill region are Big Dalton Canyon Road (BDCR) and Glendora Mountain Road (GMR). Big Dalton Canyon Road is a paved road that leads up to Big Dalton Canyon Dam (Figures 3-6). There are three gates that control vehicle traffic into Big Dalton Canyon (BDC). The first gate is 0.1 miles from GMR and prevents vehicle traffic into BDC at certain times. The exact time the gate is opened and closed each day varies, but is approximately at sunrise and sunset. Pedestrians are allowed past the gate even when it is closed. Gate number two is about 1.2 miles from GMR and is normally always closed. Vehicles going to Big Dalton Dam have the ability to open the gate but there are only a few each day thus roadkill numbers past this gate are low. Pedestrians can go past this gate and continue up the canyon. The third gate is at 1.7 miles from GMR. This gate can be opened only by vehicles going to the dam. No pedestrians are allowed past this gate and thus this is the edge of the study zone. Due to construction activities beyond the second gate, there were two periods of time greater than three months in duration when no pedestrians were allowed past the gate, thus there were no observations beyond the second gate during those months.

Glendora Mountain Road parallels Little Dalton Canyon (LDC) on the east side and then makes a 180 degree turn through LDC and proceeds to parallel LDC on the west side (Figures 7-10). At the junction

with the Colby Trail, GMR turns north again and proceeds up the coastal slope of the San Gabriel Mountains. There is one gate on GMR that is 0.6 miles from BDCR. On certain occasions the gate is closed such as on holiday weekends or if there is a fire in the mountains. Pedestrians can normally go past the gate when it is closed. Early in 2024 a berm was created along most of GMR (Figure 9). This may have acted as a barrier for some snakes to enter the road.

In the extreme eastern portion of Glendora, the foothills extend south all the way to Foothill Blvd. There are some streets and houses in this section of the foothills.

The elevation ranges from about 250 meters at the south end of the zone to about 860 meters in the foothills.

The survey area is characterized by oak woodland, chaparral, and riparian areas. The most common oak species in the oak woodland habitat is the Coast Live Oak. Other plant species in this habitat include California Wood Fern, Toyon, California Sycamore, Lemonade Sumac, and Poison Oak (Figure 5).

The riparian zones are along Big Dalton and Little Dalton streams and are characterized by California Sycamore, Bigleaf Maple, White Alder, and Mulefat among others (Figure 11-14).

Water flow into the Big Dalton stream is dependent on water release from Big Dalton Dam. The Big Dalton stream flows through the south side of the debris basin and past the debris dam. The flow can be directed either into settling ponds for underground storage or into the Big Dalton Wash where it eventually ends up in the San Gabriel River (Figure 15). In years of high rainfall the stream can flow year-round all the way to Big Dalton Wash, as was the case in 2023. Also, in high rainfall years a significant pond forms in the debris basin (Figure 16). During normal rainfall Pavil Canyon accumulates runoff that feeds into Big Dalton Stream and during heavy rainfall other tributaries bring water into the stream. In years of low rainfall, the stream bed is mostly dry during the summer and fall with stagnant pools in some areas. The stream flow dissipates earlier farther downstream of the dam.

The flow into Little Dalton Canyon proceeds through the Little Dalton Debris Dam (Figure 7 and 8). In years of above average rainfall, a pond can form upstream of the dam. As the water flows past the debris dam it can be channeled into spreading basins or the Little Dalton Wash, which ultimately leads to the San Gabriel River.

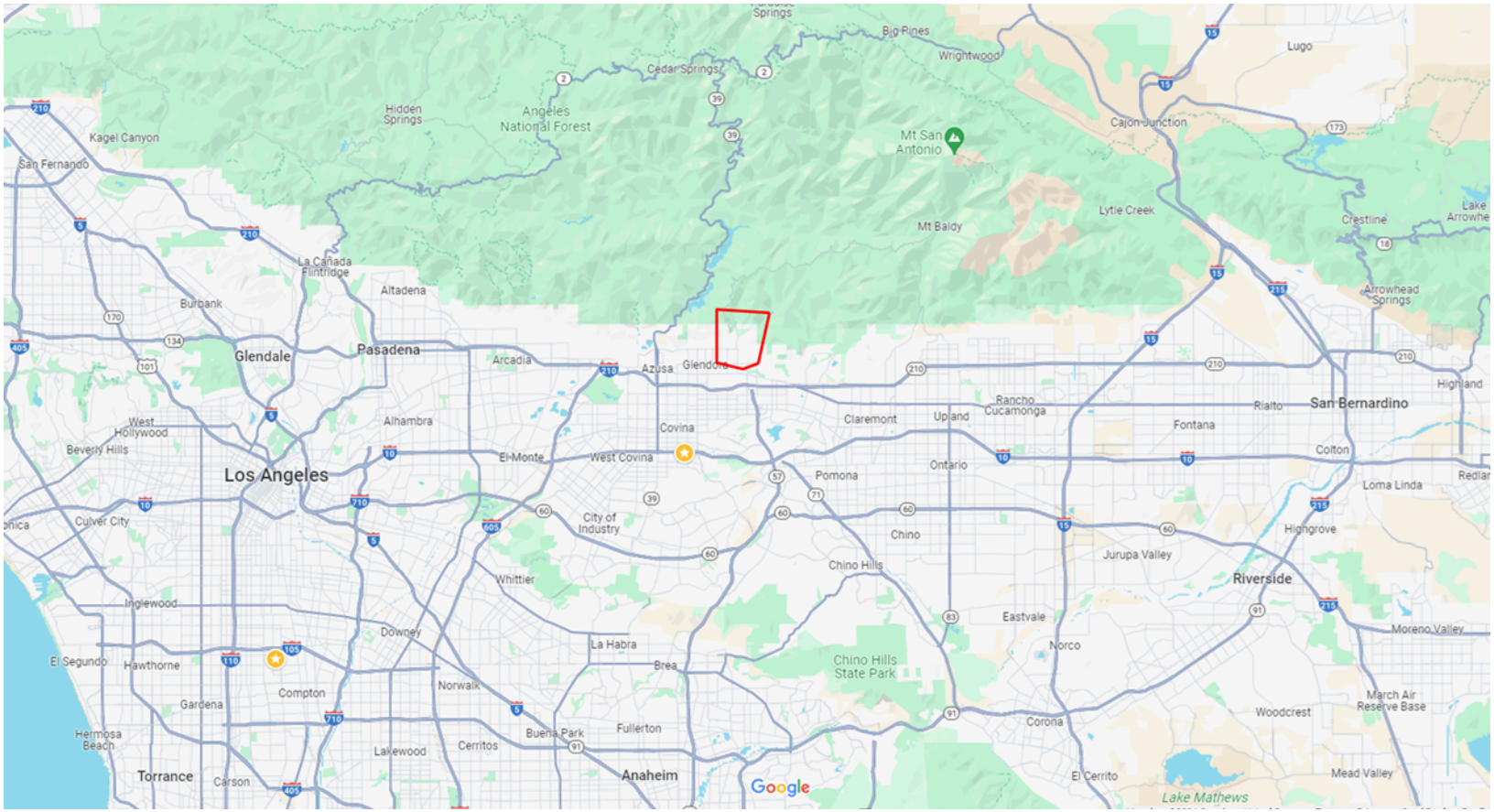


Figure 1: Survey area indicated by red box

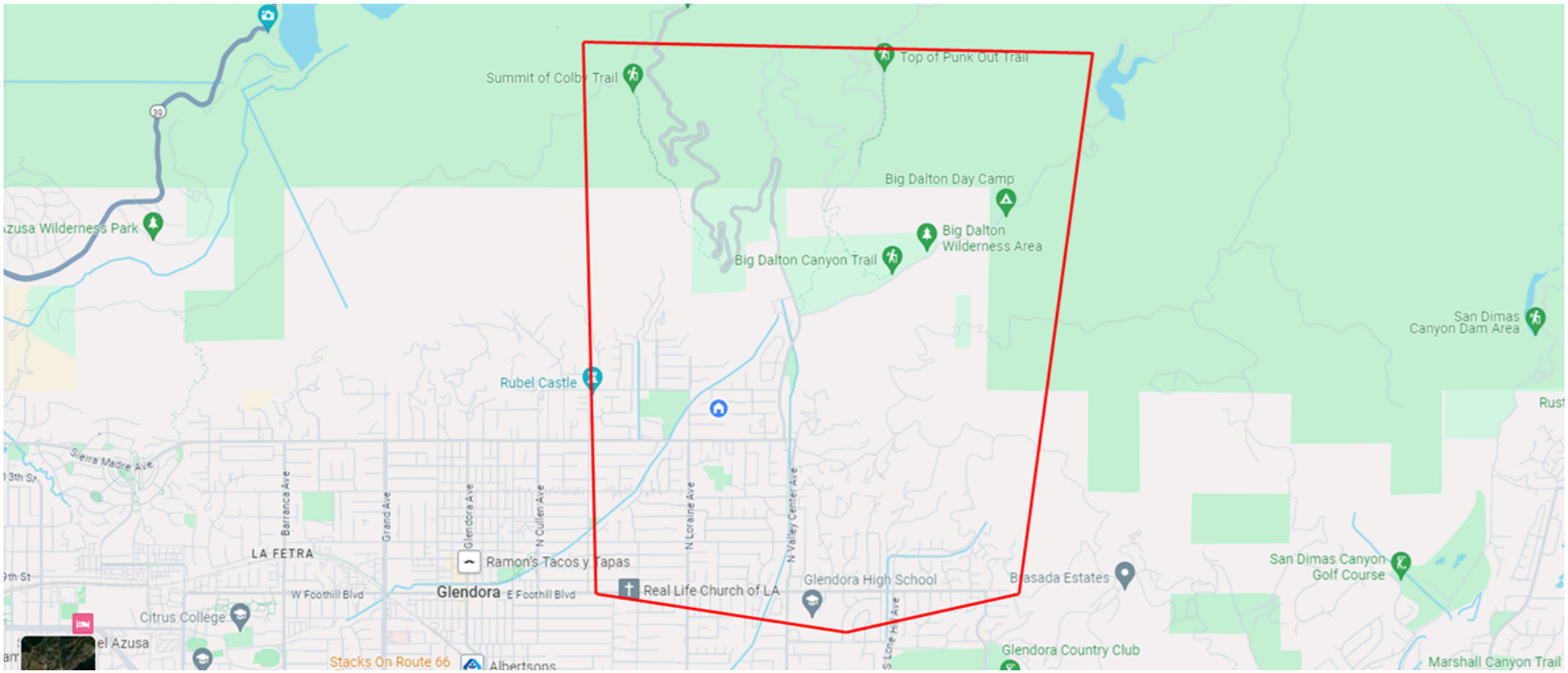


Figure 2: Survey area indicated by red box

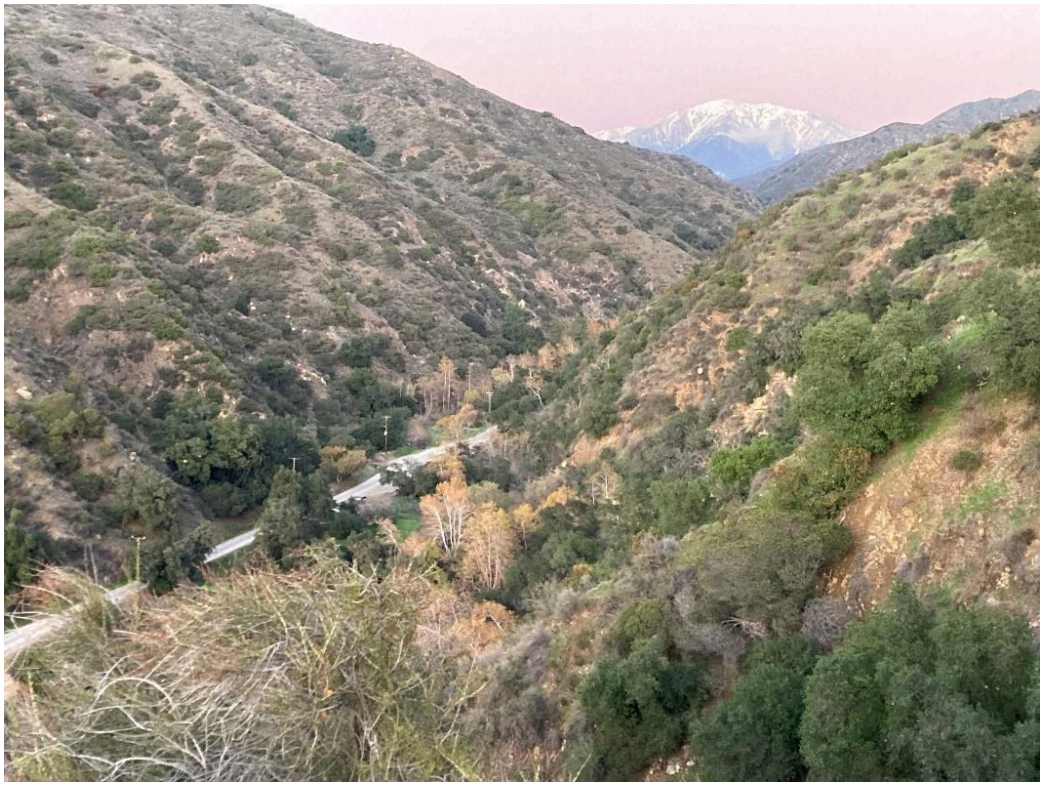


Figure 3: Looking northwest into Big Dalton Canyon Dec. 13, 2022. Mt Baldy is in the background.



Figure 4: Big Dalton Canyon looking east, August 14, 2024



Figure 5: Big Dalton Canyon looking east, August 14, 2024



Figure 6: Big Dalton Canyon looking west, August 14, 2024



Figure 7: Little Dalton Debris Dam at delta of Little Dalton Canyon. Glendora Mountain Road is seen at the other end of the canyon. Photo taken Dec. 24, 2022.



Figure 8: Looking Southeast at the south end of Little Dalton Canyon. The Little Dalton Debris Dam is seen at the canyon bottom. Glendora Mountain Road is seen at the other end of the canyon. Photo taken March 19, 2023.

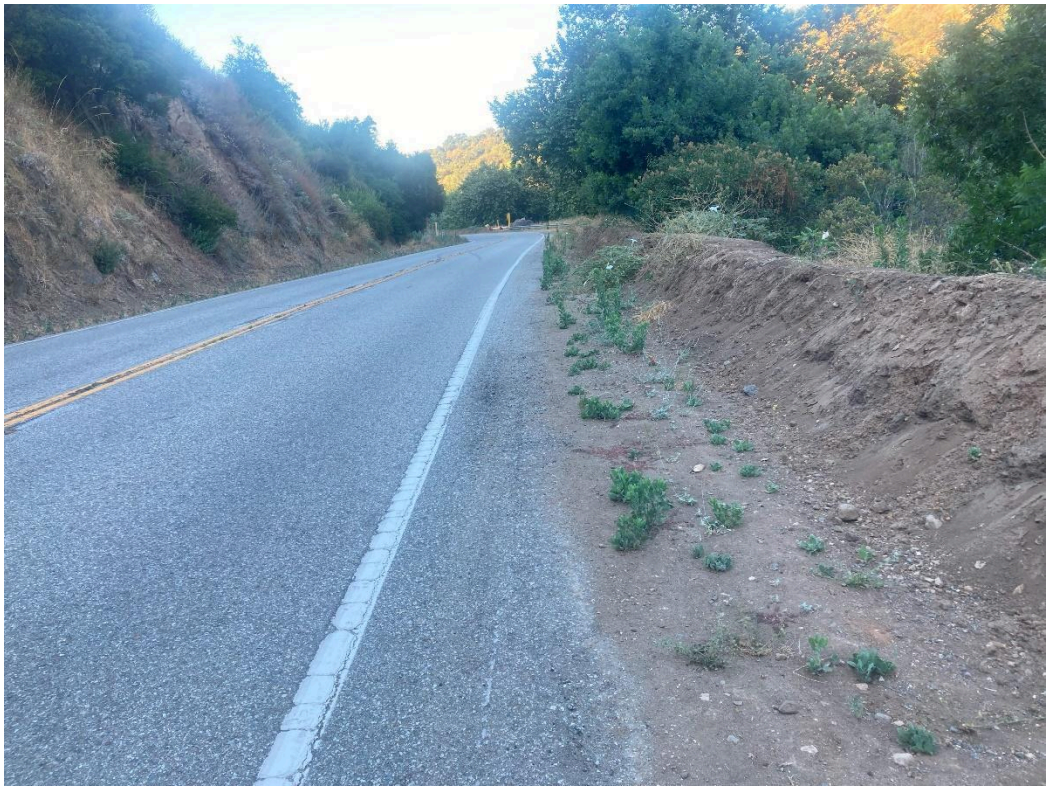


Figure 9: Glendora Mountain Road facing south showing berm on side of road, July 29, 2024.



Figure 10: Looking north up Little Dalton Canyon, Dec. 24, 2022.



Figure 11: Little Dalton Canyon looking north, April 29, 2023.



Figure 12: Looking West from GMR across Little Dalton Canyon. The seasonal streambed is populated with Sycamores and other riparian plants. Photo taken Jan. 15, 2023.



Figure 13: Big Dalton Stream, Sept. 17, 2024.

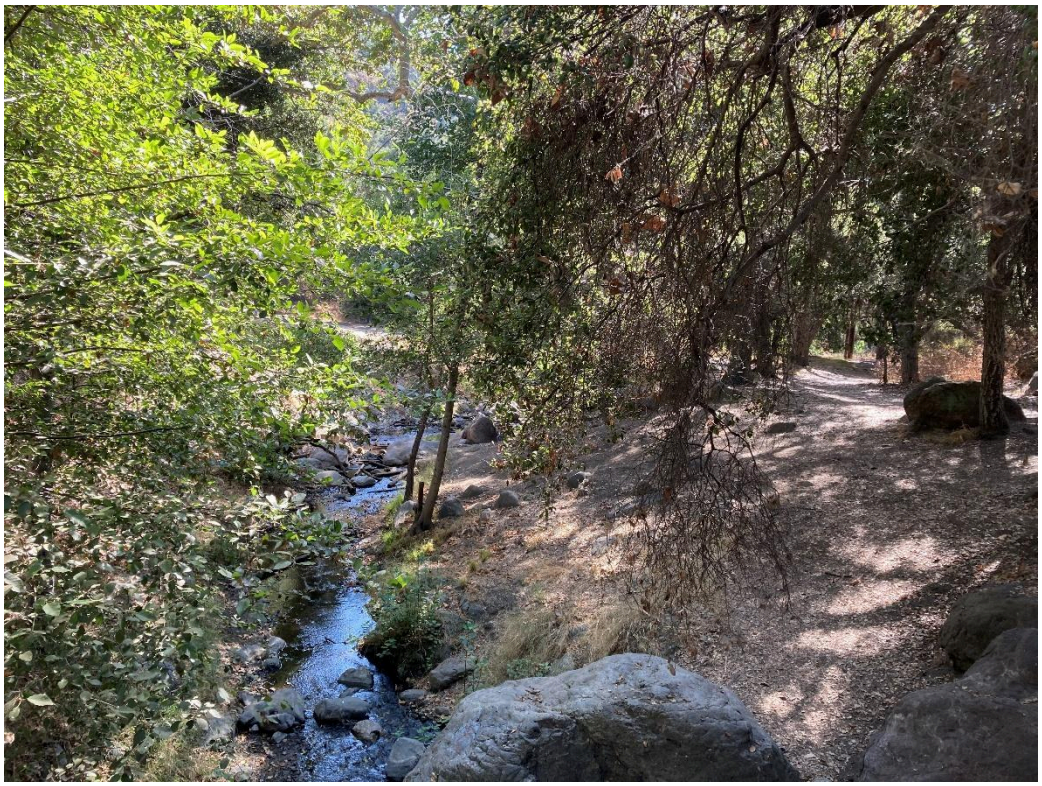


Figure 14, Big Dalton Stream, Sept. 17, 2024.

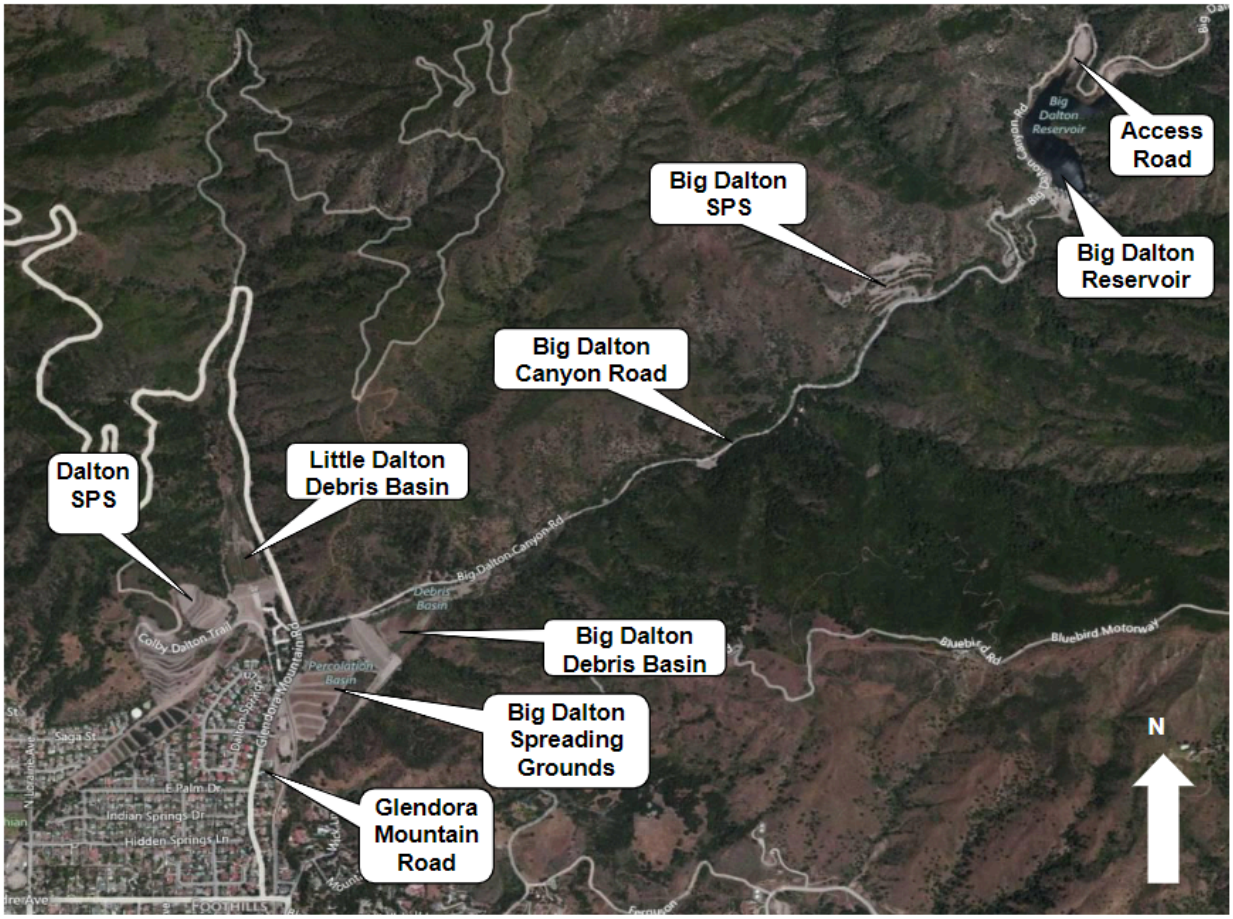


Figure 15: Water drainage in Big Dalton and Little Dalton Canyons. The Big Dalton Reservoir contains water held up by the Big Dalton Dam. Water is released into Big Dalton stream and flows to the debris basin. It can then be diverted to the spreading grounds or into the Big Dalton wash where it ends up in the San Gabriel River. The Dalton and Big Dalton SPS are sediment placement sites where sediment from the debris basins is temporarily placed before being trucked out of the area.



Figure 16, Big Dalton Debris Dam and Basin. The basin is only filled with water in wet years. Photo taken April 7, 2023.

Coverage

Data for this survey comes from Research Grade observations on iNaturalist (one exception is an entry from the author listed as Snake species as it was just a skeleton). Effort is not documented on iNaturalist. However, since 64% of the observations are from the author, it is worth commenting on the effort since it is known. In general, the author made one trip per week to either BDCR or GMR between 2016 and 2018 at a time of day when conditions were good for snakes to be active. From 2019 to 2021, the survey frequency increased to twice per week and after that, three times per week. Trips to either BDCR or GMR were mostly as part of a run, but sometimes as part of a walk/hike or a drive along the road. The majority of the author's surveys in the coverage area were along BDCR and/or GMR up to the Colby Trail intersection, and in the residential areas north of Sierra Madre between Loraine and GMR where the author lives. The author did very little searching under rocks, logs, or boards. There are a few portions of the study area off limits to the public. These include the Big Dalton Debris Basin (BDDB) just upstream of the debris dam, the spreading ponds downstream of the Big Dalton debris dam, and the spreading basin downstream of the Little Dalton debris dam.

Results

A total of 237 snakes were documented on iNaturalist from Jan 1, 2016 to July 20, 2024. The location of each observation is shown in Figure 17. Of these observations 151 were from the author. These snakes represent a total of 12 different species (Figure 18). The species of one snake was unidentified as it

consisted of a skeleton only. Forty six percent of the snakes were deceased and most were likely run over by cars as they were either on the road or very close to the road (Figure 19). Snake totals in the first three years of the survey were much smaller than subsequent years (Figure 20). This is the result of less effort by the author and likely fewer people using iNaturalist to document their observations. Between 33 and 40 snakes were seen each year from 2019 to 2023. In 2024 (through July 20th) 31 snakes had been documented, which is a pace that would exceed the previous high total of 40 (2023). Southern Pacific Rattlesnakes and San Diego Gopher Snakes were the most commonly seen species representing 41% and 29% of the total individuals, respectively (Figure 18). California Striped Racers were 15% of the total with the remaining 9 species covering the last 15%. The highest percentage of snakes were seen in April and May and the numbers tapered off in the remaining months of the year (Figure 21). No snakes were reported in January. Figure 22 shows the time range when the snakes were observed. Only live snakes are included in the data on this graph as they provide the best indication of when snakes are active. Most snakes were seen between 3PM and 6PM. This data could also be influenced by a differential effort and coverage during each of the time ranges. While the author conducted many surveys during the late evening and night time hours, it is not likely that others were hiking in the study zone during those hours. As expected, snakes were primarily diurnal in the spring, became nocturnal or nonactive in the summer, and returned to a diurnal behavior in the fall.

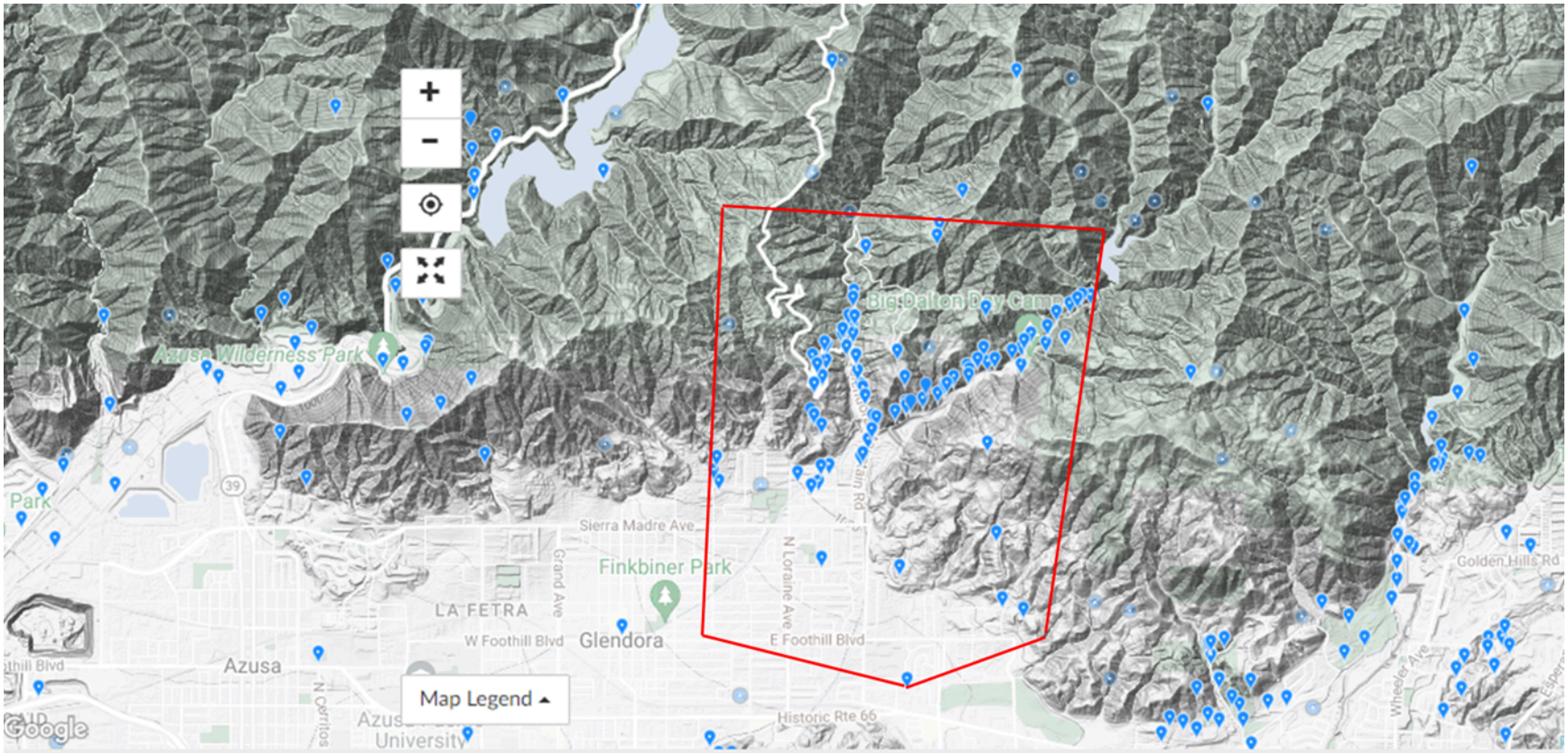


Figure 17: Location of iNaturalist observations in the survey area that are a part of this report.

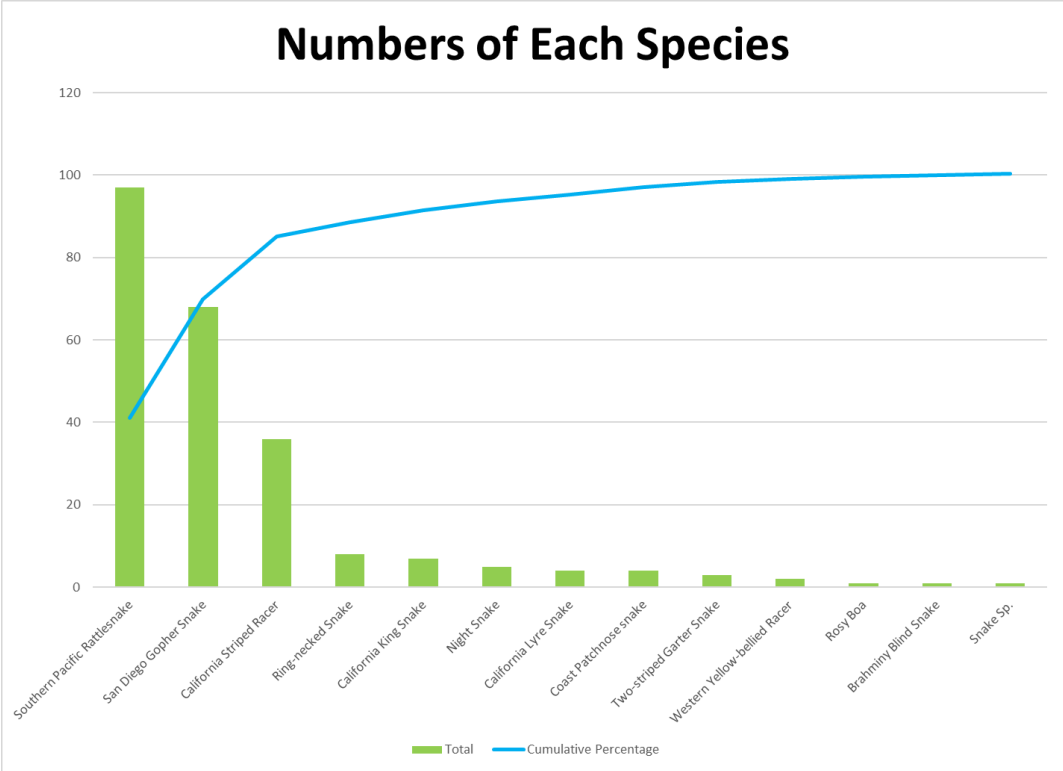


Figure 18: Pareto chart of species seen during survey period.

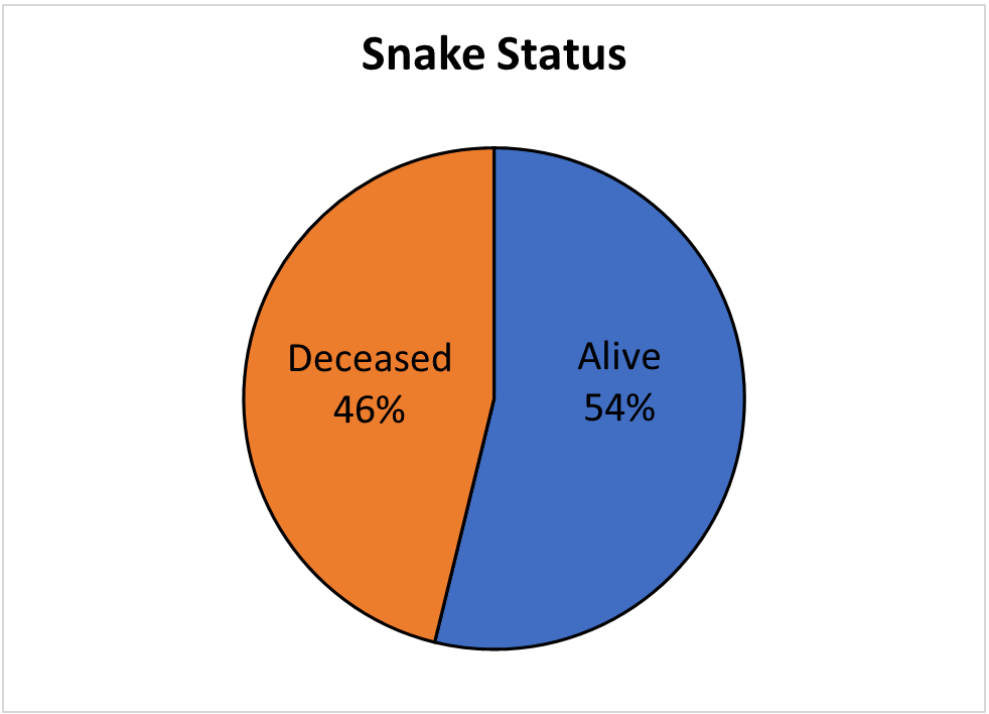


Figure 19: Proportion of deceased and live snakes.

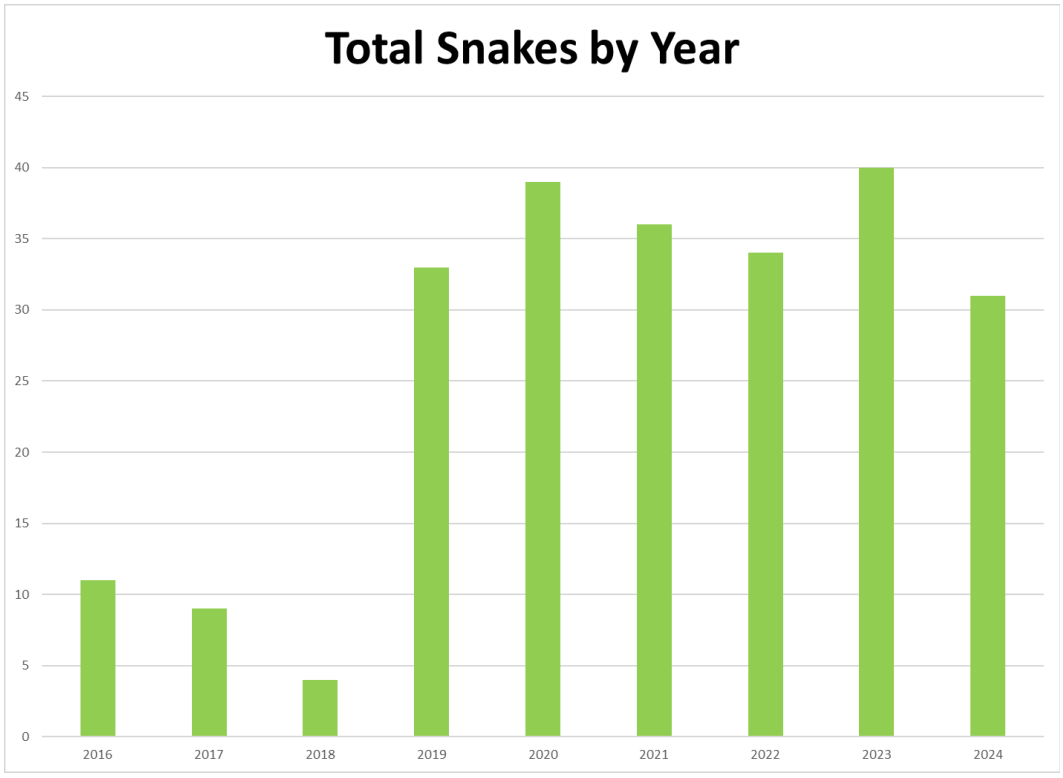


Figure 20: Total snakes documented in each year from 2016 to July 20, 2024.

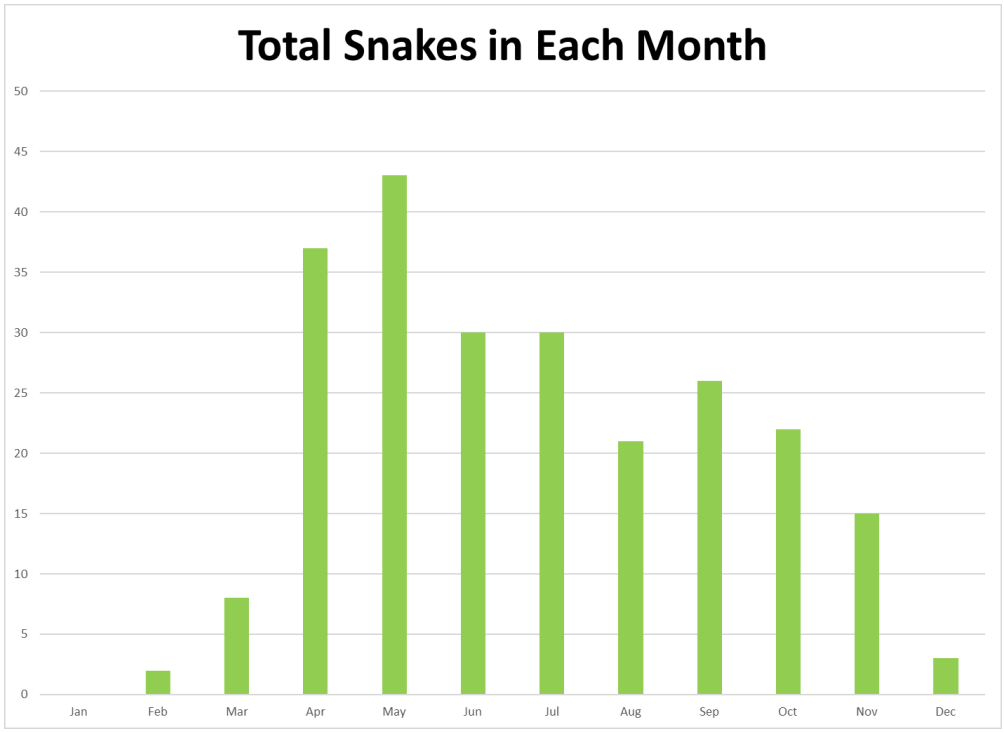


Figure 21: Total snakes documented each month

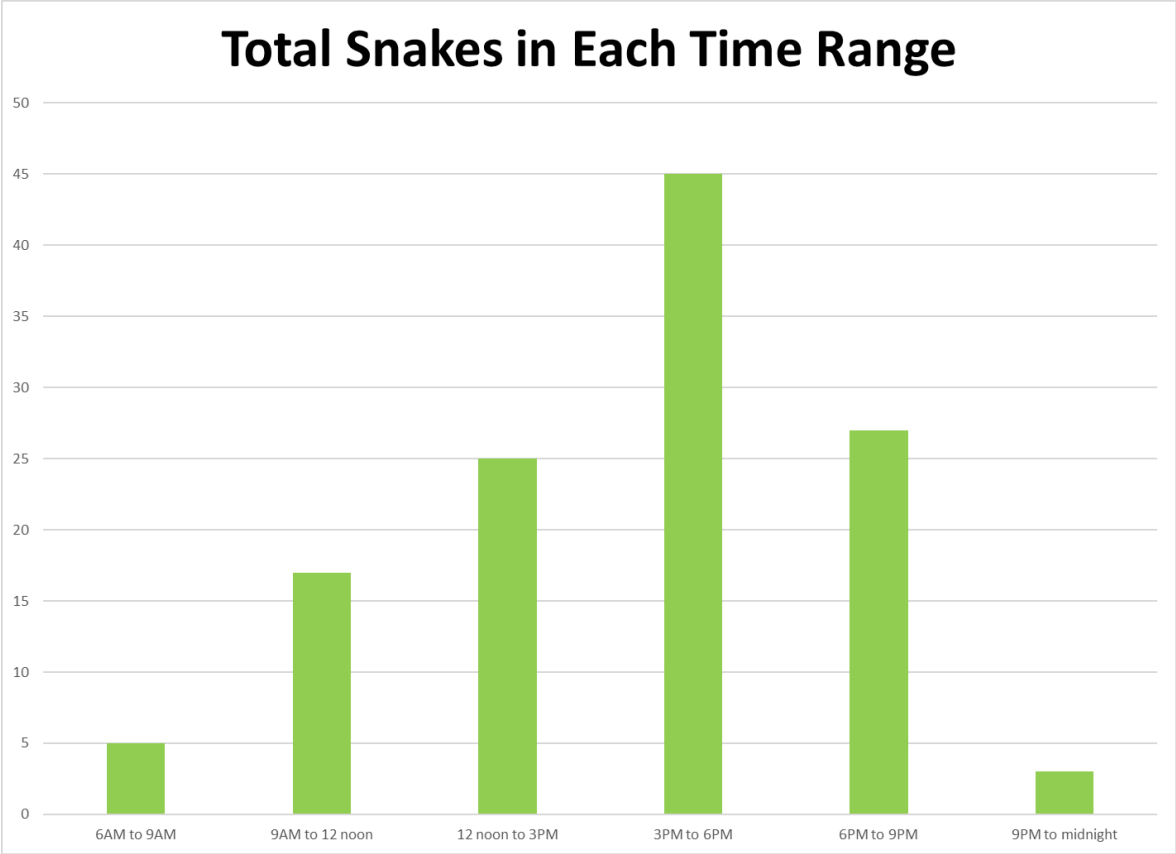


Figure 22: Time range for the live snakes

Southern Pacific Rattlesnake (Crotalus oreganus helleri)

This species was the most commonly posted snake on iNaturalist during the survey period with a high of 21 individuals documented in 2021 (Figure 23). The numbers declined to 9 in 2023 even with similar or more effort by the author. The highest numbers were seen in July and then dropped off in subsequent months (Figure 24). A higher percentage of Southern Pacific Rattlesnakes were seen in the 3-6 PM and 6-9 PM time windows (Figure 25). Of all the surveys the author conducted after sunset, this is the only species encountered.

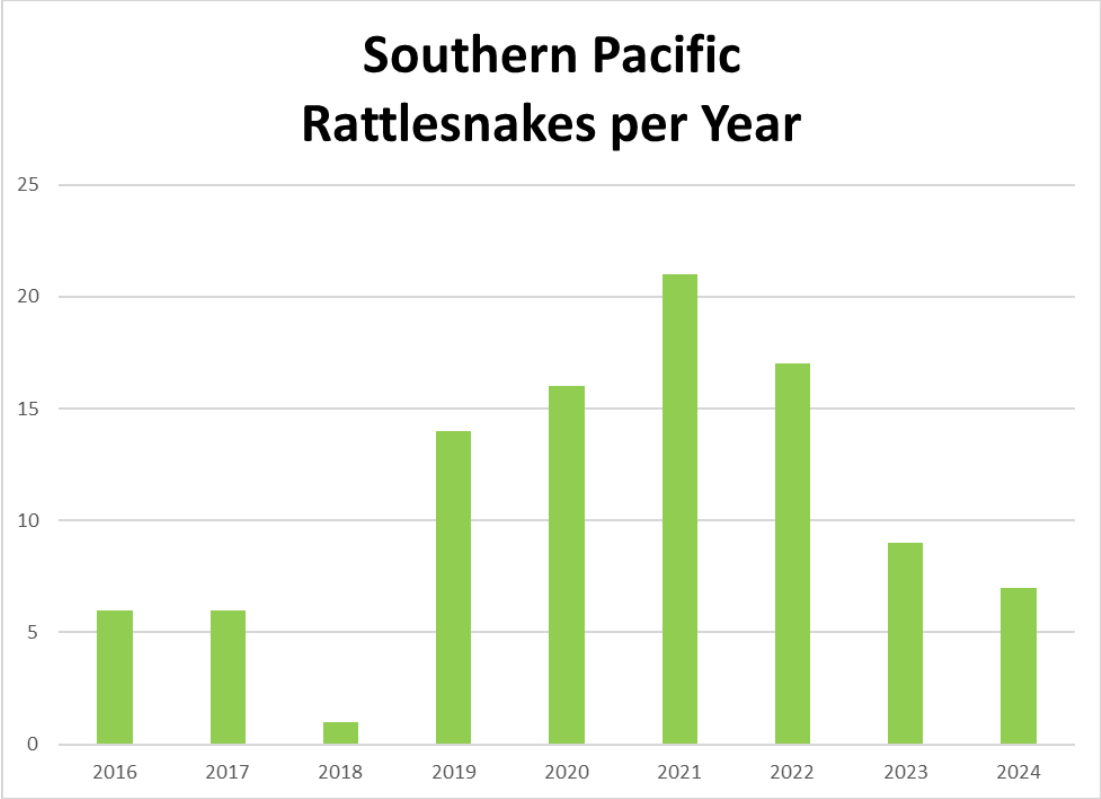


Figure 23: Southern Pacific Rattlesnakes seen each year from 2016 to July 20, 2024

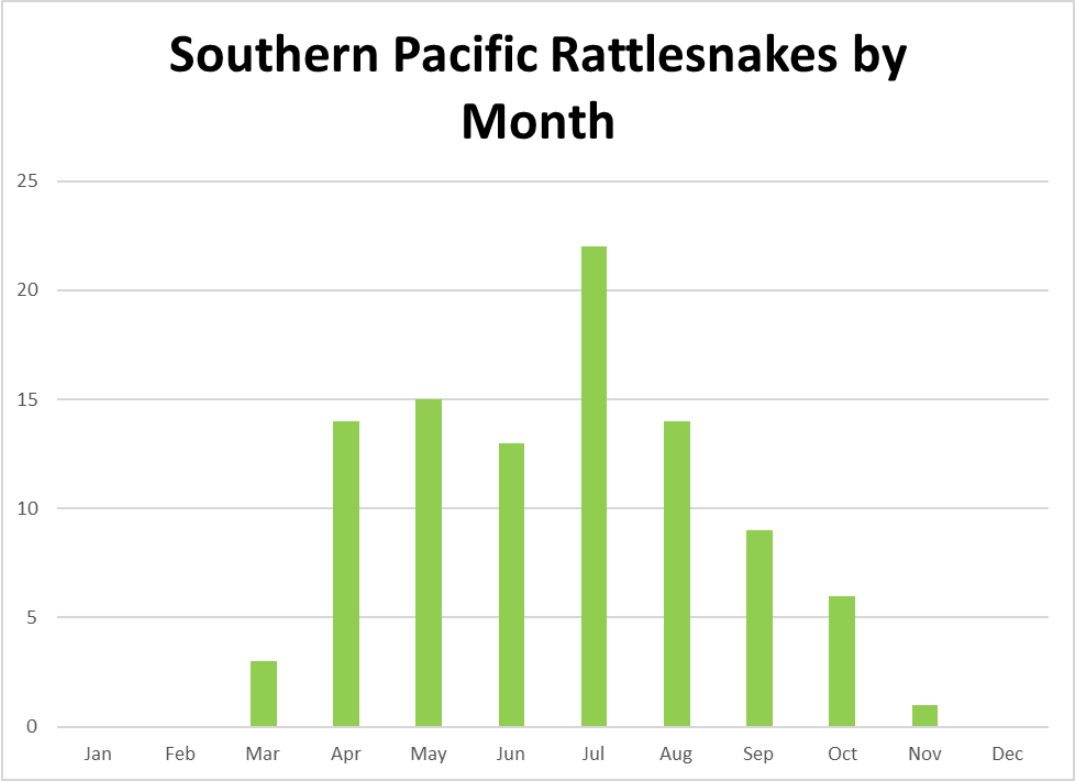


Figure 24: Southern Pacific Rattlesnakes by month

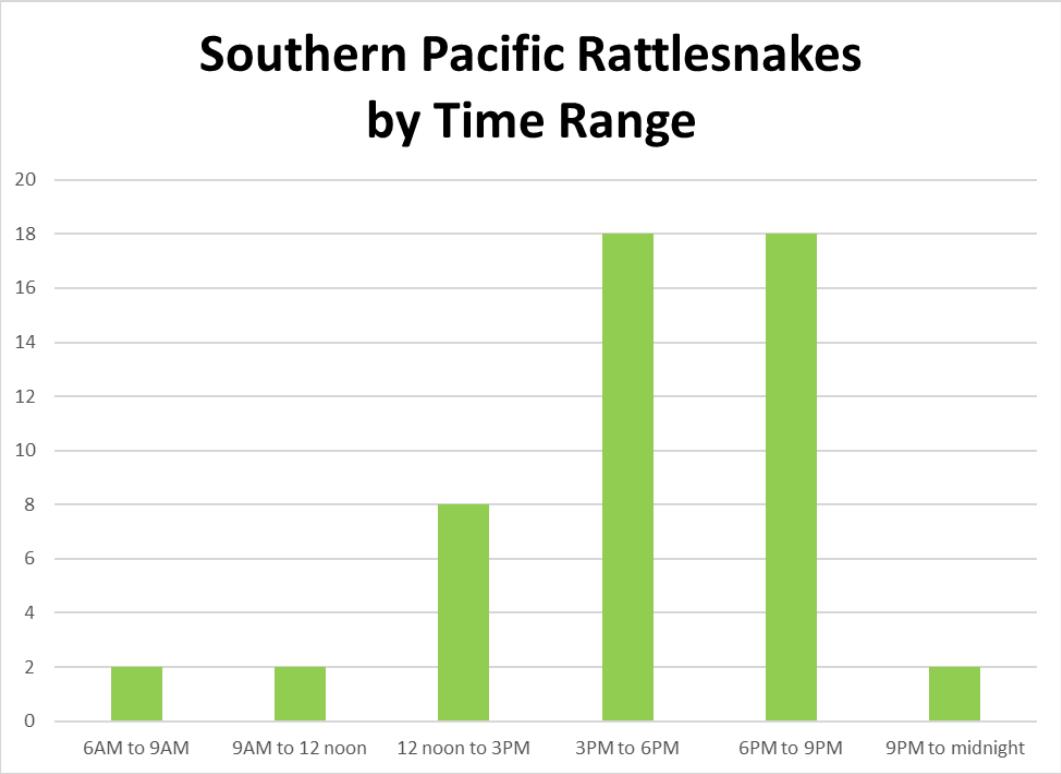


Figure 25: Time range for Southern Pacific rattlesnakes

San Diego Gopher Snake (Pituophis catenifer annectens)

The San Diego Gopher Snake was the second most common snake seen during the survey period. The highest total was in 2023 and 2024 with 15 individuals (Figure 26). Since the 2024 data is only up to July 20, 2024, it is likely the final 2024 total will exceed any previous year. Over the last six years 2021 had the fewest of this species, while 2021 had the most Southern Pacific Rattlesnakes. Conversely, the years 2023 and 2024 had the lowest number of Southern Pacific Rattlesnakes over the last six years, while these two years had the most San Diego Gopher Snakes (Figure 27). More study would be needed to determine if there is a cause for this inverse relationship. When all the iNaturalist research grade snake observations in Los Angeles County from 2019 to Sept. 17, 2024 are considered, there is not an inverse relationship (Figure 28). The relative San Diego Gopher Snake numbers in the Glendora study zone are consistent with the Los Angeles County numbers between 2019 and 2024. For example, the two years with the fewest San Diego Gopher Snakes in the Glendora study zone were the same two years with the fewest individuals in Los Angeles County (2019 and 2021). Additionally, the two years with the greatest number of San Diego Gopher Snakes in the Glendora study zone were the same two years with the highest numbers in Los Angeles County (2023 and 2024) (See Table 1). San Diego Gopher Snakes numbers were highest in April, May, and November (Figure 29). The numbers decline in June, July, and August with no August observations. There is another spike in observations in September and November. There is a similar trend throughout Los Angeles County as can be seen in Figure 30. Los Angeles County Gopher

Snake numbers peak in April and May and decline in July and August. This species may be more cold tolerant than other species. One observation by the author was at an approximate temperature of 17°C (that observation is not included in this report since it was outside of the study zone) (3). The most common time range for this species was 3-6 PM (Figure 31). Of all the snakes seen by the author of any species, the earliest live snake encountered was a San Diego Gopher Snake at 7:37 AM (4).

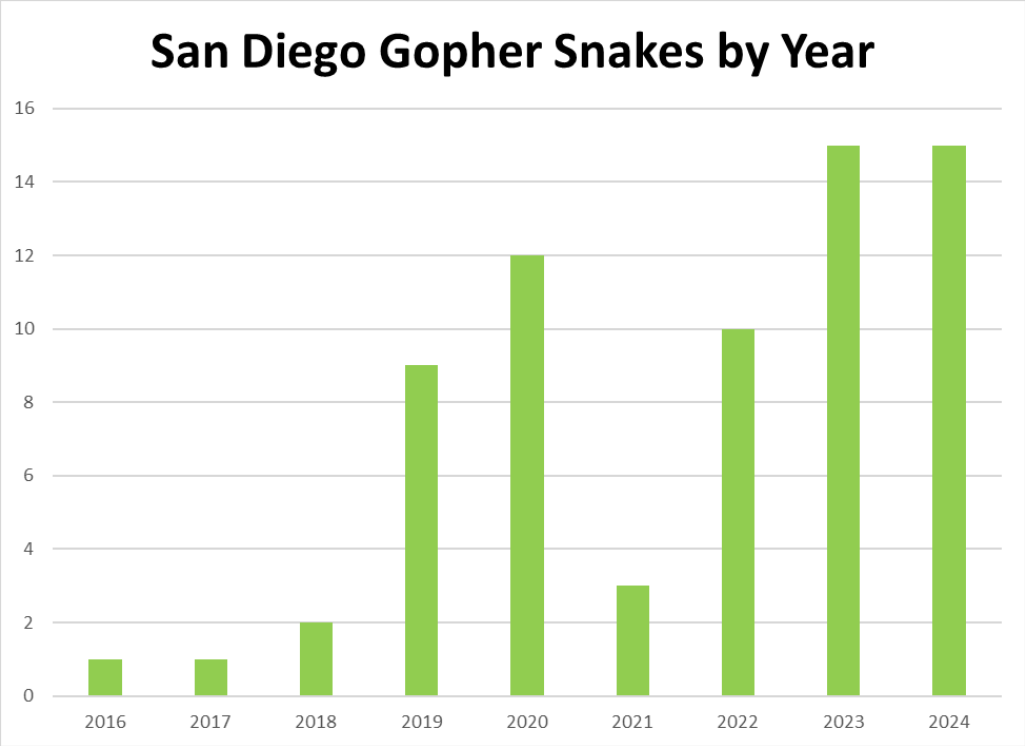


Figure 26: San Diego Gopher Snakes seen each year from 2016 to July 20, 2024

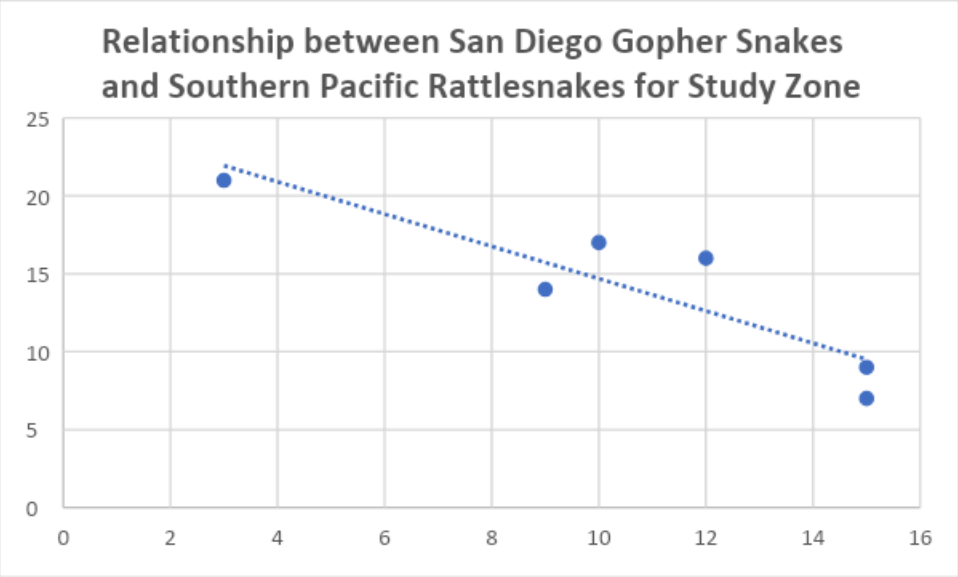


Figure 27: Inverse relationship between San Diego Gopher Snakes (X-axis) and Southern Pacific Rattlesnakes (Y-axis) in the study zone from 2019 to 2024.

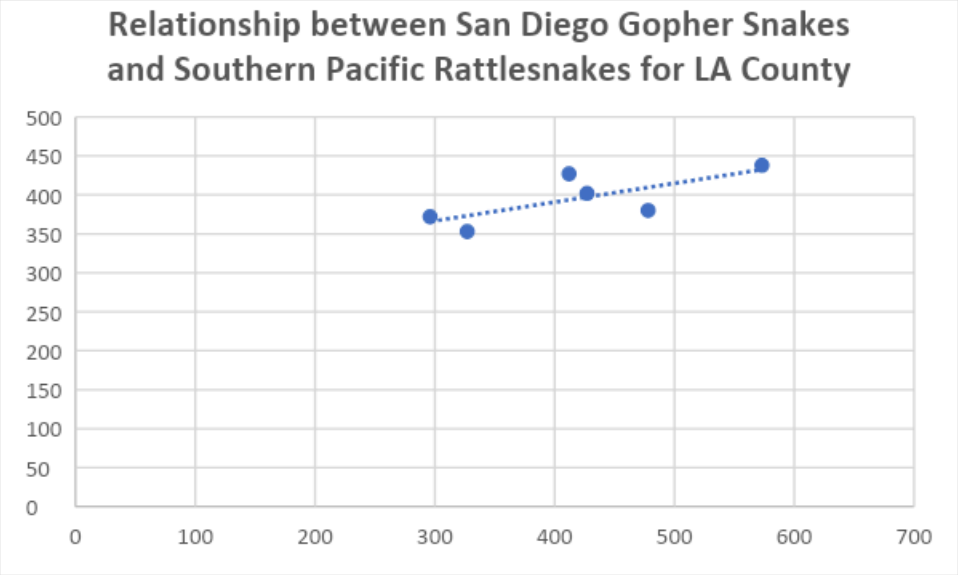


Figure 28: Relationship between San Diego Gopher Snakes (X-axis) and Southern Pacific Rattlesnakes (Y-axis) in LA County on iNaturalist up to July 20, 2024.

Table 1: San Diego Gopher Snakes in Last Six Years

Year	Glendora Study Zone	Los Angeles County
2019	9	296
2020	12	427
2021	3	327
2022	10	412
2023	15	573
2024	15	478

Data for 2024 is through July 20.

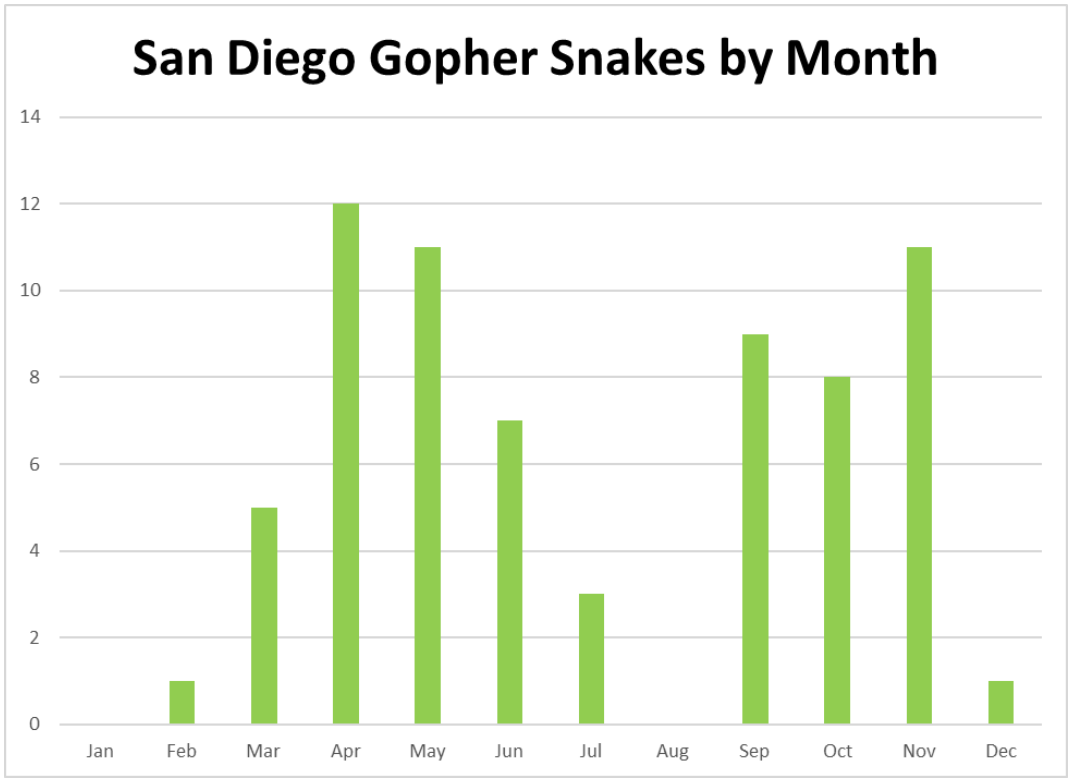


Figure 29: San Diego Gopher Snakes seen each month in Glendora study zone.

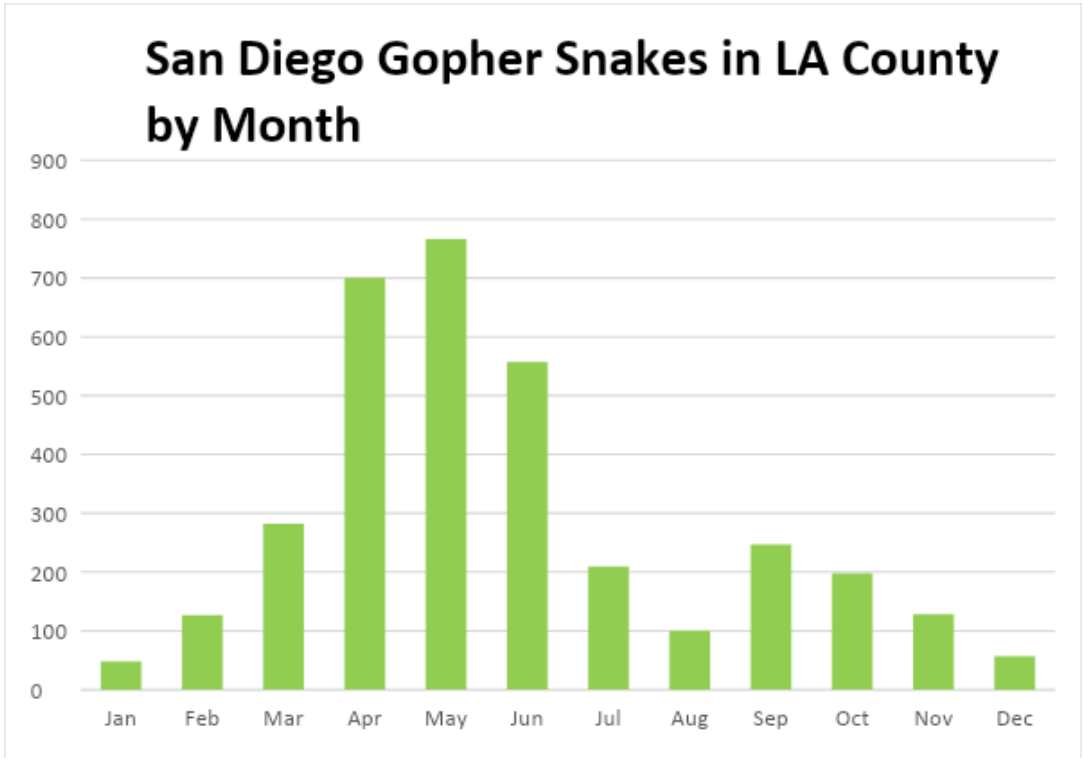


Figure 30: San Diego Gopher Snakes in Los Angeles County each month. The data is from all iNaturalist research grade observations over all years.

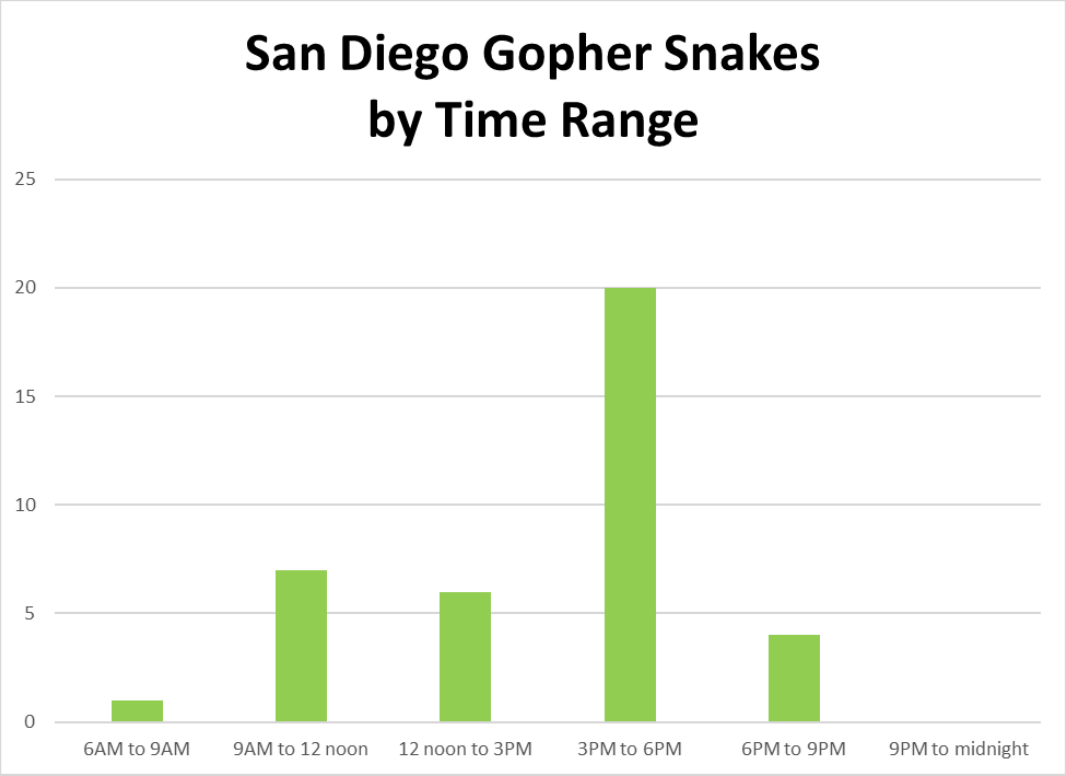


Figure 31: Time range for San Diego Gopher Snakes.

California Striped Racer (Masticophis lateralis lateralis)

Thirty-six California Striped Racers were observed and documented on iNaturalist. Eleven were in residential areas in a few blocks area around the author's home on Indian Springs Dr. It is possible that some of these observations were the same individuals seen on different days or even years. No California Striped Racers have been seen in this neighborhood since May 1, 2022. The question of whether there is a sustained breeding population centered in the residential area is still open but it seems unlikely since no individual has been seen in over two years. It may be that on occasion an individual snake encroaches on the residential area from an adjacent hillside and is in that area for a few years, or it can move back and forth between the residential area and foothill habitat. One was observed eating a Western Fence Lizard in the residential area (5).

Ring-necked Snake (Diadophis punctatus)

Eight individuals have been documented on iNaturalist during the study period. Swinney indicates that the species was commonly encountered prior to 1965 and since 2000, there were eight sightings that would be in the study zone covered by his paper (1). Two individuals were mentioned by Schoenherr (2).

California King Snake (Lampropeltis californiae)

Seven California King Snakes have been seen in the survey zone. Three of the individuals were in residential areas. It is interesting that the first time the species was documented in BDC during the survey period was in 2024, when four were documented. It is possible that they represent just one or two individuals since they were all seen between May 9 and May 29 within about 500 meters of each other. Swinney mentions four observations, with two of them being since 2000 (1). Only one was mentioned by Schoenherr (2).

Coast Night Snake (Hypsiglena ochrorhynchus)

Five Coast Night Snakes were documented during the survey period. One of them was a juvenile in a residential area. Swinney's document lists only three individuals that would be in the study zone, with all between 1990 and 2007 (1).

California Lyresnake (Trimorphodon lyrophanes)

Of the four Lyresnakes in the survey zone, all have been deceased and presumably roadkill. Thirteen sightings were documented by Swinney with eight of them occurring during a three month period in 2006 that were fairly close in proximity (1).

Coast Patchnose Snake (Salvadora hexaplis virgultea)

Four individuals of this species were documented during the study period. Swinney documents 16 since 1948 including ten since 2000 (1). One was documented by Scheonherr (2).

Two-Striped Garter Snake (Thamnophis hammondii)

Since the locality data for this species is obscured, only the author's observations are included in the data. The first were seen in 2023 with an additional individual in 2024. All but one were seen in the Big Dalton stream. The stream flowed year-round in 2023 and through July 20, 2024. In most years the stream flow is greatly reduced or non-existent in the late spring, summer, and fall. Frogs and tadpoles were present in the pools where the snakes were seen. Two of the observations were likely of the same individual as they were on back-to-back days at the same location. One individual was a road killed snake on GMR near the intersection with BDC. This is about 75 meters from the nearest water source, which was the pond behind the Little Dalton Debris Dam. Swinney mentions that many were sighted in 2005 and 2006 and four in 2008 (1).

Western Yellow-Bellied Racer (Coluber constrictor mormon)

Two snakes of this species have been confirmed in BDC and both were dead on the road. One was a juvenile. Interestingly, these are the only 2 individuals in the entire San Gabriel Mountain range documented on iNaturalist. The typical habitat is open fields which is not a common habitat type in these mountains. This habitat type is also not common in the study zone. The BDC and LDC debris basins offer the best habitat that is typically associated with this species. Both individuals were not close to this habitat area, however. Observations of this species are obscured and so only the author's observations are included here. Eleven individuals were documented by Swinney since 1947, including five since 2000. Only one was documented by Schoenherr (2).

Coastal Rosy Boa (Lichanura orcutti)

Only one individual has been seen in the study zone. It is possible that some obscured observations may be in the study zone. Swinney documents eight records since 1947 (1), and Schoenherr mentions one individual (2).

Brahminy Blindsnake (Indotyphlops braminus)

One snake of this species was found in a residential area.

Species Not Seen

Species that were not documented during the survey period in the study zone that have been previously documented by either Swinney or Schoenherr were Western Threadsnake (Rena humilis), Mountain Kingsnake (Lampropeltis multifasciata), Western Black-Headed Snake (Tantilla planiceps), and Red Coachwhip (Masticophis flagellum piceus). Observations of Mountain Kingsnake on iNaturalist are obscured so it is possible that they have been seen in the study zone. The author whose observations account for 62% of the total has not seen any. Swinney's account of the Mountain Kingsnake indicates the species was fairly common in the BDC area between 1960 and 1967. (his area of coverage includes the road all the way to the Big Dalton Dam, which was not covered in this survey) and 16 observations from 1967 to 2011 (1), while Schoenherr has three records that may be in the study zone (2).Some species such as Western Threadsnake and Western Black-Headed Snake may not have been seen due to their propensity to stay underground or under surface objects during the day, and there was not much effort to search under these objects. There are only two Western Threadsnakes mentioned in Swinney but they are outside the study zone (1). Schoenherr mentions only one Western Threadsnake in the entire San Gabriel Mountain range and that was in BDC (collected by Klauber in 1940) (2). Several Black-Headed Snakes are mentioned by Swinney that would be in the survey area but Schoenherr does not mention any (1,2). Two Red Coachwhip records are mentioned by Swinney that would be in the survey area in the 1970s (1). There are no records mentioned by Schoenherr.

Snakes in residential areas

Nineteen snakes were seen in residential yards or streets that are not in the foothills. These include 12 California Striped Racers, two Southern Pacific Rattlesnakes, two San Diego Gopher Snakes, one Coast Night Snake, one California King Snake, and one Brahminy Blindsnake. Three additional snakes were in residential areas that are in the foothills (two Southern Pacific Rattlesnakes and one California King Snake).

References

1) Swinney D., Reptiles of Glendora, 2024.
2) Schoenherr A., The Herpetofauna of the San Gabriel Mountains, Lops Angeles County California, Including Distribution and Biogeography, Special Publication of the Southwestern Herpetologists Society, May 1996.May 1996.
3) iNaturalist reference https://www.inaturalist.org/observations/112426319

4) iNaturalist reference https://www.inaturalist.org/observations/174487710
5) iNaturalist reference https://www.inaturalist.org/observations/53524025