HUMAN AND VEHICLE IMPACTS ON WILDLIFE ACTIVITY AT CULVERTS
Roads are harmful to wildlife
  - Habitat destruction
  - Habitat fragmentation

Fragmentation requires animals to cross roads for mating, dispersal, and foraging

This can lead to collisions that kill animals and cause property damage, and sometimes injury to humans

Source: Klaus Leidorf
One way to mitigate the effects of roads are wildlife culverts. However, culverts are only effective if animals use them. Several factors can discourage animals from using culverts, but 2 stand out:

- Road activity
- Human activity
PROJECT GOALS

1. Assess road and human activity at multiple sites

2. Determine animal activity at those sites

3. Check for a correlation

   Prediction: animal activity will move away from midday (12:00 pm) as road activity and human activity increase
Road activity (also called traffic density) is measured in AADT, or average annual daily traffic

- It is monitored by Caltrans; each site has 2 AADT values, back and ahead
- AADT is calculated each year at specific sites along major highways

I averaged AADT values at my sites from 2011-2016 (the most recent year available) as my animal data dates back to 2011

Source: LA Times
Animal activity was measured in terms of percent activity.

The Wildlife Observer Network (WON) keeps record of animals recorded on camera traps at certain wildlife culverts along major highways.
- I used data from 13 sites along highways I-280, I-80, and I-680, as those highways run through similar habitats.

Site data was sorted by animal, then by occurrence time, then the number of observations in each time bin (0:00 to 1:00, 1:00 to 2:00, etc.) was noted.
Taking percentage of observations in each time bin gives an activity profile for the site, like the one below:
Human activity was estimated by number of observed humans at the site; those numbers were gotten from site data.

Finally, a regression (like the ones below) was run for AADT and number of humans against time of peak activity for carnivores and herbivores at each site.
The general trend for carnivores had a positive slope before 12:00 and a negative slope after 12:00, meaning more activity closer to 12:00 as traffic level increased.

The trend for herbivores was increased activity closer to 12 as AADT increased for values before 12:00, but activity moved away from 12:00 as AADT increased for values after 12:00.

Both carnivores and herbivores had a similar response to human activity: a shift away from 12:00 and toward earlier or later hours as number of humans increased.
The P values for all regressions were over 0.05, and therefore they cannot be deemed statistically significant; perhaps due to a relatively small sample size.

However, these trends indicate that there may be a relationship worth exploring, particularly between traffic volume and animal activity as those trends were the opposite of what was predicted.

These regressions indicate that traffic and human activity do have some effect worth exploring.
NEXT STEPS

- More research!

- Larger sample sizes (more sites should be examined)

- Time-specified traffic data (how much traffic during the day vs. during the night) or traffic data captured real-time alongside animal observations
  - This would help clarify why the activity trends relating to traffic seem to move the opposite way of what we would expect
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