Sarah Theriot

Milestone 2

DSC680

Wildlife-Vehicle Collisions in Florida State Parks

Topic

Protecting Wildlife on Florida's Roads: A Data-Driven Look at Wildlife-Vehicle Collisions

This project explores where and when wildlife-vehicle collisions happen across Florida's state parks to help support smarter planning for wildlife crossings and safer roads for animals and people.

Business Problem

Every year, animals are killed on Florida's roads. These collisions aren't just sad, they're dangerous for drivers and devastating for wildlife populations. As a conservation educator, I spend a lot of time helping people understand how roadways cut through habitats and how wildlife crossings can reconnect them. This project will analyze wildlife collision patterns using data from Florida state parks to identify hotspots and trends. The goal is to figure out where these collisions happen most often so that we can start thinking about where wildlife crossings or other solutions could help the most. While the problem definitely extends beyond parks, state parks may offer some of the best opportunities for building crossings because they already protect wildlife and don't face the same development pressures as urban areas.

Dataset

The dataset I'm using comes from Dryad and includes over 9,000 wildlife-vehicle collision records across 42 Florida state parks from 2005 to 2015. While 9,000 records across a decade might not sound like much in the world of big data, for something like wildlife collisions, where so many go unnoticed, it's actually a lot. Each entry includes the name of the park, the species involved, how many animals were hit, what kind of road it happened on, and even park attendance numbers. That last piece is especially interesting to me because it makes it possible to look at how the human presence might be influencing wildlife risk. Of course, some species are more likely to be reported than others, and smaller animals probably don't get counted as often. But even with those limitations, this dataset gives us a rare chance to study patterns across both time and space (Gunther, 2020).

Methods

First, I used summary statistics and a few simple data visualizations to figure out which parks had the most collisions and whether certain months or road types were riskier than others. I also explored whether things like park attendance or park size might relate to the number of collisions. For now, I focused mostly on bar charts, scatter plots, and some grouped counts. I might make a simple model later to try predicting risk, but I'm keeping things visual and straightforward at this stage.

Analysis

The data shows that wildlife-vehicle collisions don't happen evenly across Florida's state parks. Some parks experience way more collisions than others, with a few clearly standing out. John Pennekamp Coral Reef State Park, Big Talbot Island, and Jonathan Dickinson are among the most affected. Those are likely the first places we should consider for interventions like wildlife crossings. When looking at collisions across the months, late summer and fall tend to be the most dangerous times for animals. Spring is also high, while winter months like January and February show fewer incidents. That could be tied to things like breeding seasons or migration. Road type plays a big role too. Roads that go through parks, where cars are likely moving faster, have more reported collisions than smaller internal park roads. That's not super surprising, but it's important. Speed and traffic flow could be two big drivers here.

One thing I was really curious about was whether park attendance impacts the number of collisions. I made a scatter plot comparing the two, and it looks like there's not a strong connection. Some parks with lots of visitors have high wildlife collisions, and some don't. This tells me that it's not just about the number of people. It might be more about road layout, traffic speed, or even what kind of wildlife lives in the area.

The top species involved in collisions are also interesting. Opossums and raccoons lead by far. That might be because they're more likely to be near roads or just more visible to drivers and staff who report them. Other common species include armadillos, squirrels, and snakes. It shows how broad the impact is across different types of animals.

Assumptions and Limitations

There are some assumptions baked into this kind of work. One of the biggest ones is that the reported collisions reflect the true number of incidents. I know that's not always the case. Smaller animals might not get reported, and some parks may keep better records than others. Also, since the data ends in 2015, I can't say for sure what's happening today. Development, road changes, or climate shifts could have changed patterns in the years since. That's why I'm trying to be careful not to overgeneralize. This project is a starting point, not the final answer. But even with those limitations, I think this analysis can still support real conversations about road safety and wildlife protection.

Recommendations

Even though this dataset ends in 2015, I think it could still help guide future work. For example, parks that showed high collision numbers back then are probably still risky now unless something major has changed. It would be helpful to get updated records and compare them to this older set to see if trends have stayed the same or shifted. This kind of comparison could show whether existing strategies are working or if new ones are needed. This work could help park managers make decisions about where to place signs, reduce speed limits, or even build new wildlife crossings. It's not just about identifying problems. It's about giving people tools to solve them.

Implementation Plan

One idea I'd love to see put into action is a shared reporting system for all state parks. If everyone used the same format, it would make future data more consistent and easier to analyze. There could even be an app where visitors report animal sightings or roadkill in real time. That would help fill in gaps and give us better coverage between formal surveys. As for getting things like wildlife crossings built, I know it takes funding and community support. That's why I think this kind of storytelling, backed by data, matters. If people can see the patterns for themselves, they're more likely to support changes that protect both wildlife and drivers.

Ethical Assessment

Throughout this whole project, I've tried to keep the ethical side front and center. It's easy to treat data like this as just numbers on a page, but I don't want to lose sight of what it represents. These are wild animals that died because our roads were in their way. I think we have a responsibility to take that seriously. I'm not just doing this to write a paper. I'm doing it because I believe that data can be a powerful tool for change when it's used with care and respect. Another thing I've thought about a lot is how this data might be misunderstood or misused. If someone just sees that a park has a high number of collisions, they might assume that the park is doing something wrong. But that's not fair. In some cases, a high number might just mean the park is doing a better job reporting. Or it could mean the park has a lot of healthy wildlife, which is actually a good thing. Context matters. That's why I've tried to be really careful in how I describe the patterns and avoid making assumptions I can't support. This isn't about blaming. It's about learning and making better choices.

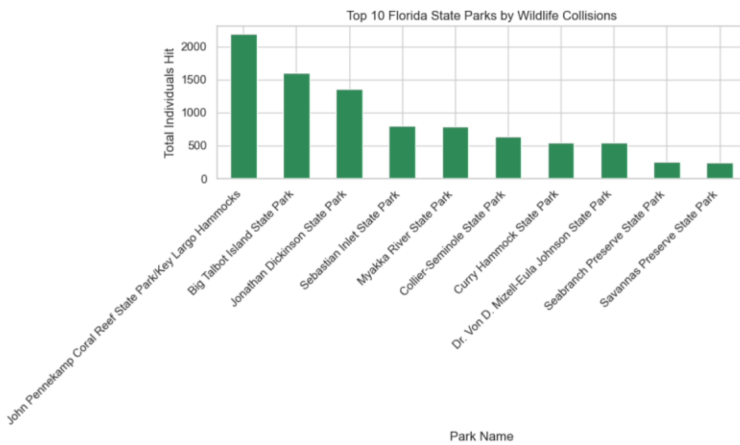
Appendix

Dataset:

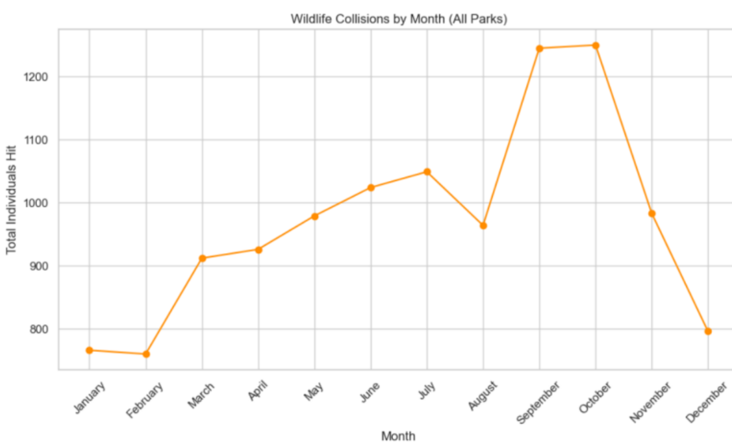
ParkName	ParkCode	Month	Year	Park_or_Thru_Road	CommonName	LatinName	Family	Class	Individuals	County	ParkLatitude	ParkLongitude	Total.Thru.Park_km	Total.In.Park_km	attendance	Area_ha
Alafia River State Park	Ala_Riv	2	2008	P	Chuck Wills Widow	Antrostomus carolinensis	Caprimulgidae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	5951	3121.72998
Alafia River State Park	Ala_Riv	10	2006	T	Great horned owl	Bubo virginianus	Strigidae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	4927	3121.72998
Alafia River State Park	Ala_Riv	3	2007	T	Red shoulder hawk	Buteo lineatus	Accipitridae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	6804	3121.72998
Alafia River State Park	Ala_Riv	4	2007	T	Red shoulder hawk	Buteo lineatus	Accipitridae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	5250	3121.72998
Alafia River State Park	Ala_Riv	10	2012	T	Red shoulder hawk	Buteo lineatus	Accipitridae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	4644	3121.72998
Alafia River State Park	Ala_Riv	1	2008	T	Turkey vulture	Cathartes aura	Cathartidae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	6241	3121.72998
Alafia River State Park	Ala_Riv	2	2011	T	Turkey vulture	Cathartes aura	Cathartidae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	5712	3121.72998
Alafia River State Park	Ala_Riv	5	2005	T	Black vulture	Coragyps atratus	Cathartidae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	3907	3121.72998
Alafia River State Park	Ala_Riv	6	2005	T	Black vulture	Coragyps atratus	Cathartidae	Aves	1	Hillsborough	27.7733994	-82.12010193	10	38.8	1900	3121.72998

Visualizations:

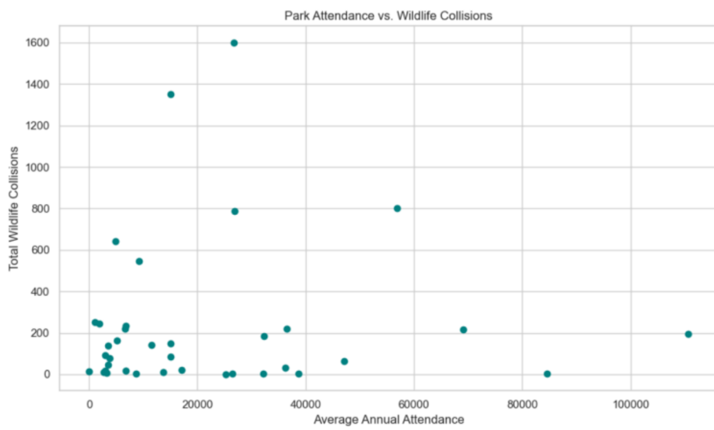
Visual A:



Visual B:

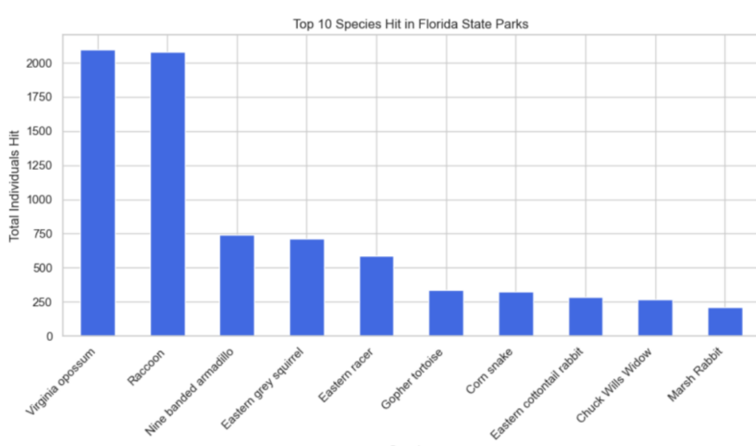


Visual C:



Visual D:

Visual E:



References:

Gunther, M. S., et al. (2020). Wildlife-vehicle collisions at 42 Florida state parks. Dryad. Dryad | Data -- Wildlife-vehicle collisions at 42 Florida State Parks, 2005-2015

Questions:

1. How did you handle the fact that your dataset ends in 2015?
2. Were there any parks that surprised you by how many collisions they had?
3. Could the attendance number be skewing the collision data?
4. Why do you think certain species show up more often?
5. Were there any patterns by month that stood out?
6. What would you say to someone to help them decide if it is worth investing in building wildlife crossings?
7. What was your biggest challenge in analyzing the data?
8. How do you think this kind of analysis can help the real world?
9. How did you decide what visuals to use in your project?
10. What is one thing you wish your dataset included, but did not?