Cause-Specific Mortality of Florida Panthers

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Introduction

Research shows that Florida panthers have a high mortality rate, largely due to human-induced kills, which has decimated their population and left them a critically endangered species. These causes of death, such as lethal removal, hunting, vehicular trauma, and intraspecific aggression, were prevalent amongst the *Puma concolor* species nationwide, with vehicular trauma being most common in Florida.[1,2,3] Thus, this project explored the question: **'how does cause-specific mortality relate to *Puma concolor* specimens within the Florida Museum of Natural History's Mammalogy collection?'**

It was hypothesized that:

- male and subadult specimens would have higher death rates than females and adults/juveniles.
- vehicular trauma would be the most common type of death.
- there would be an increase in vehicular trauma during Florida's 'busy' months of June-July and November-December.

Methods

- In the Mammalogy lab, each *Puma concolor* cabinet was accessed for a total of 306 Florida panthers. Using the catalogue numbers, the specimens were searched in the Specify database in order to organize and compare data, including age, sex, date collected, and causes of death.
- Necropsy data was also examined to add missing/background information to cases, such as intraspecific aggression.
- The skulls of **71** specimens were visually assessed to record notable damage.
- This information was then organized and recorded into spreadsheets.

Figure 1: Skull damage shown in the form of bite wounds (see arrows) on male Florida panther specimen 30938. This was from a case of intraspecific aggression.

Results

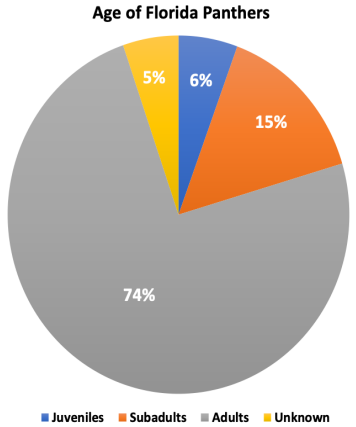

Figure 2: Shown is the frequency of death among the different age classifications of the Florida panther specimens.

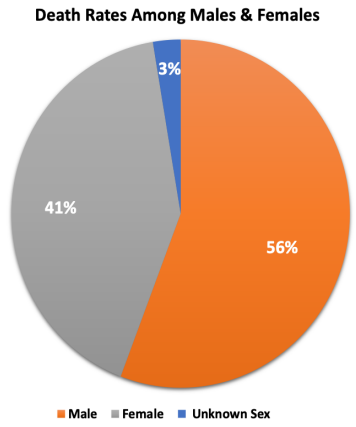

Figure 3: Shown is the death rates between males and females, with males at 56% and females at 41%.

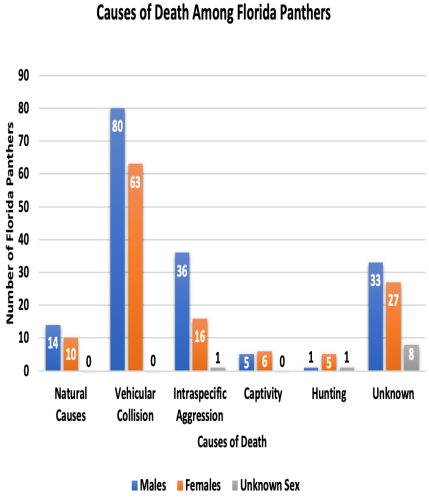

Figure 4: Shown is the common causes of death for the Florida panther specimens, with vehicular collision highest for males and females, and intraspecific aggression following after.

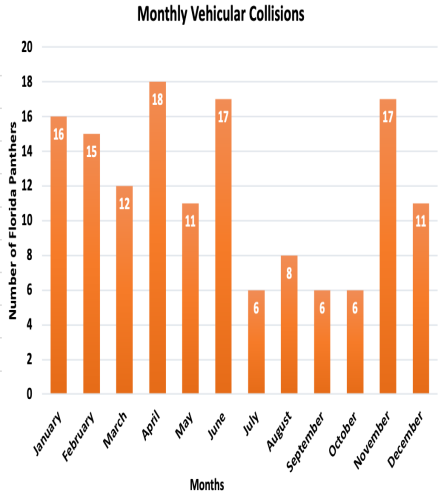

Figure 5: Shown is the frequency of vehicular collision in the months of January-December. Of all, April has the most vehicular-related incidents.

Table 1: Shown is the skull damage of **71** of the collection's Florida Panther specimens. The numbers below each category represent the catalogue numbers of the specific specimens. **Bold** numbers indicate damages that belong to multiple categories. * indicates more significant damage in the specimens.

Broken Nasals	Crushed Skulls	Skull Breaks/ Fractures	Bite/ Puncture Wounds	Missing Parts of Skull	Broken Teeth	Broken Mandible
20777	*30948	24931	27616	24096	27146	27618
25908	*30936	24611	30938	24268	30960	31106
	*31012	**31162**	31555		31759	**31162**
	*31018	31734	31851			**31551**
	*31022	31939	*30935			31850
	*31102	**31309**	30391			30393
	*31104	**31311**	30064			**31309**
	*31396	**31208**	31173			**31311**
	*31554	31186	**32161**			**31208**
	***31551**	31181				31175
	*30366	31177				32157
	29263	*31176				**32161**
	31299	31964				**32230**
	31180	**32230**				32231
	32156	**32318**				32236
	32159	32321				**32318**
	*32235	32331				32332
	32133	***32335**				
	32358					
	32361					

Results and Conclusions

- Data provided a holistic view of Florida panther cause-specific mortality. The findings contributed to pre-existing literature and the Mammalogy collection's pre-existing data. Most hypotheses were partially incorrect.
  - Adult and male specimens exhibited the highest death rate, at **74%** and **56%** respectively.
  - Vehicular trauma was the most common cause of death, with **142** panthers, while intraspecific aggression came after with **53** panthers.
  - April, June, and November had the highest numbers of vehicular deaths, with **18** panthers in April and **17** in June and November.
  - The most notable types of skull damage included **crushed skulls**, **skull fractures**, and **broken mandibles**.
- Future research can be done to further explore conservation efforts, such as highway underpasses.[4] As intraspecific aggression was the second most common cause of death, further research can also be conducted to find correlations between intraspecific aggression and other areas, such as time of the year.

Literature Cited

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