



May 2019

# Effects of sport fishing on harbor seal hunting success

Madison McKay  
*Western Washinton University*

Follow this and additional works at: <https://cedar.wvu.edu/scholwk>



Part of the [Higher Education Commons](#)

---

McKay, Madison, "Effects of sport fishing on harbor seal hunting success" (2019). *Scholars Week*. 31.  
[https://cedar.wvu.edu/scholwk/2019/2019\\_poster\\_presentations/31](https://cedar.wvu.edu/scholwk/2019/2019_poster_presentations/31)

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Scholars Week by an authorized administrator of Western CEDAR. For more information, please contact [westerncedar@wwu.edu](mailto:westerncedar@wwu.edu).



# EFFECTS OF SPORT FISHING ON HARBOR SEAL HUNTING SUCCESS

WESTERN WASHINGTON UNIVERSITY // BIOLOGY DEPARTMENT // MADISON MCKAY

## INTRODUCTION

- Competitive interactions between fisheries and pinnipeds are well studied<sup>1,2</sup>. However, the relationship between sport fishermen and pinnipeds are not well documented, despite the fact that both utilize the same resources.
- Studying this can help us better understand the dynamic between humans and pinnipeds, and can give us more insight on factors that may determine hunting success in pinniped populations.
- Whatcom Creek, a small and accessible river located in downtown Bellingham, WA, is a common place for sport fishers and harbor seals (*Phoca vitulina*) to aggregate and capture returning salmon (*Oncorhynchus spp.*). This makes it an ideal location to study the interactions between the two.
- I aimed to investigate whether sport fishermen affect the hunting success of harbor seals.



## METHODS

- Combined observational field data on seal behavior from 2012-2017 with salmon escapement data from Bellingham Technical College<sup>3</sup>.
- Included only data where seals were present (September-December) and with high salmon arrivals (>100).
- Ran correlations on the number of fishermen and number of seals compared to the number of fish caught by seals.
- Ran a mixed-effects linear model with year as a random factor to determine which fixed factors best predict the number of fish caught by seals: number of fishermen, number of seals, and number of fish arrivals as a predictor of prey availability.

## RESULTS

- Based on AIC value, the number of seals was the only predictor of the number of salmon caught by seals (Table 1).
- There was no correlation between the number of fishermen and the number of fish caught by seals (Figure 1). There was a positive correlation between the number of seals and the number of fish caught by seals (Figure 2).

## ACKNOWLEDGEMENTS

Dr. Alejandro Acevedo-Gutierrez for guidance, Dr. Benjamin Miner for help with statistics, Alicia Prozinski for help with design, Bellingham Technical College for hatchery data. Lab members: Delaney Adams, Glenna Dyson-Roberts, Megan Hills, Amanda Rueda, Jane Schrock & Savannah Smith. Thank you to all former lab members!

## REFERENCES

1. DeMaster, D.P., Fowler, C.W., Perry, S.M. & Richlen, M.F. (2001) Predation and competition: the impact of fisheries on marine-mammal populations over the next one hundred years. *Journal of Mammalogy* 82:641-651.
2. Ferrari, E.J., Schakner, Z.A., Villafana, C.A., Enriquez, L.S. & Lawson, D.D. (2015) Pilot study of underwater observations of interactions between harbor seals, California sea lions, and cormorants with halibut trawl fisheries in Southern California. *Aquatic Mammals* 41:333-340.
3. Whatcom Creek Hatchery (2012-2017) Salmon escapement data. Bellingham Technical College.
4. Perrin, W.F., Wursig, B. & Thewissen, J.G.M. (2018) Cooperative foraging, food sharing and cultivation. *Encyclopedia of Marine Mammals* 419-420.

Table 1. Mixed-effect linear models of number of salmon caught by harbor seals. Lowest AIC indicates the best model (circled).

Predictor	AIC Value
Number of seals+Year	36.14617
Number of fishermen+Number of seals+Year	45.23461
Number of seals+Fish arrivals+Year	50.3209
Number of fishermen+Year	56.26644
Year	56.49157
Number of fishermen+Number of seals+Fish arrivals+Year	60.46869
Fish arrivals+Year	61.75945
Number of fishermen+Fish arrivals+Year	71.85034

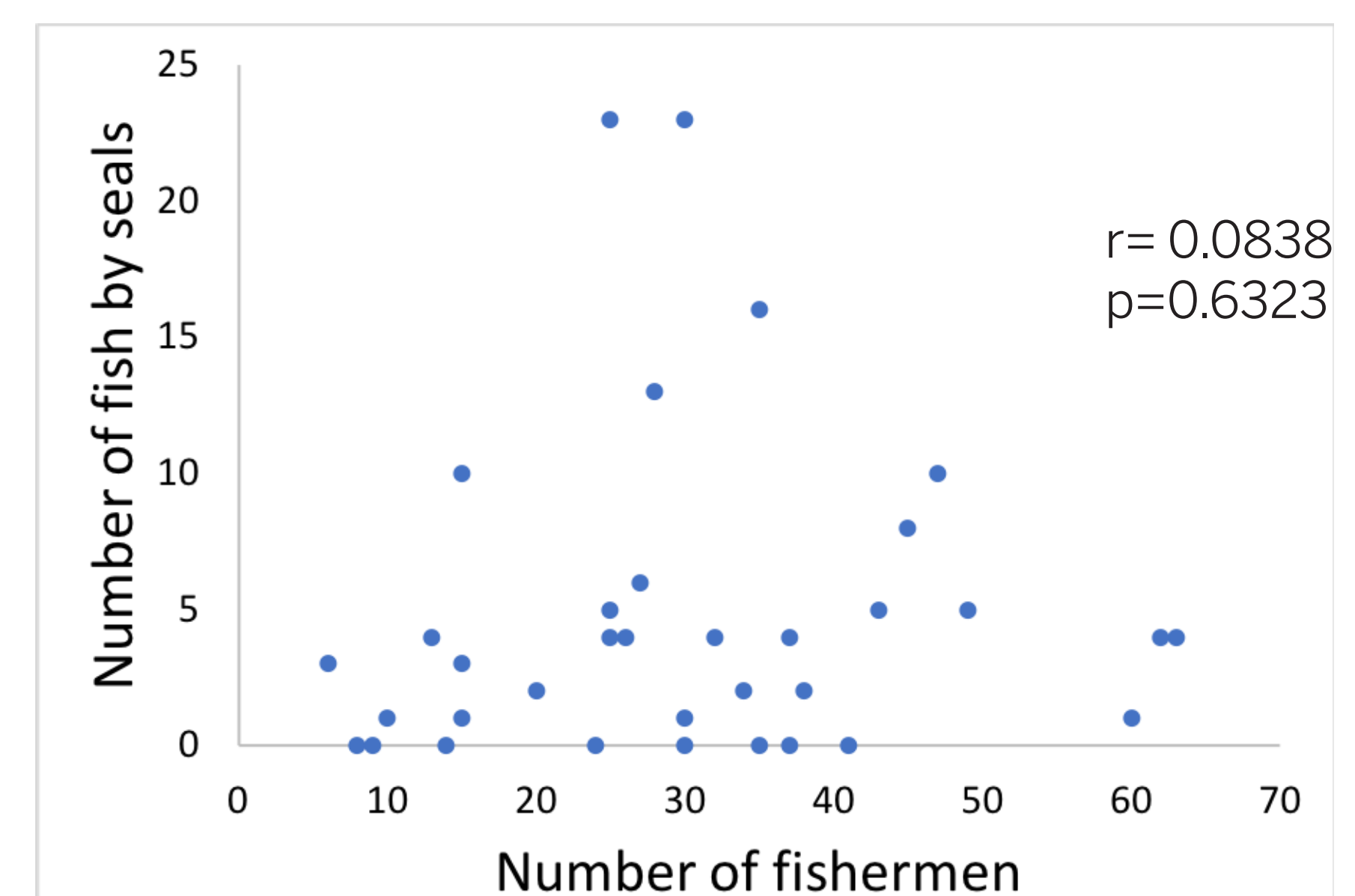


Figure 1. Correlation between the number of fishermen and the number of fish caught by seals

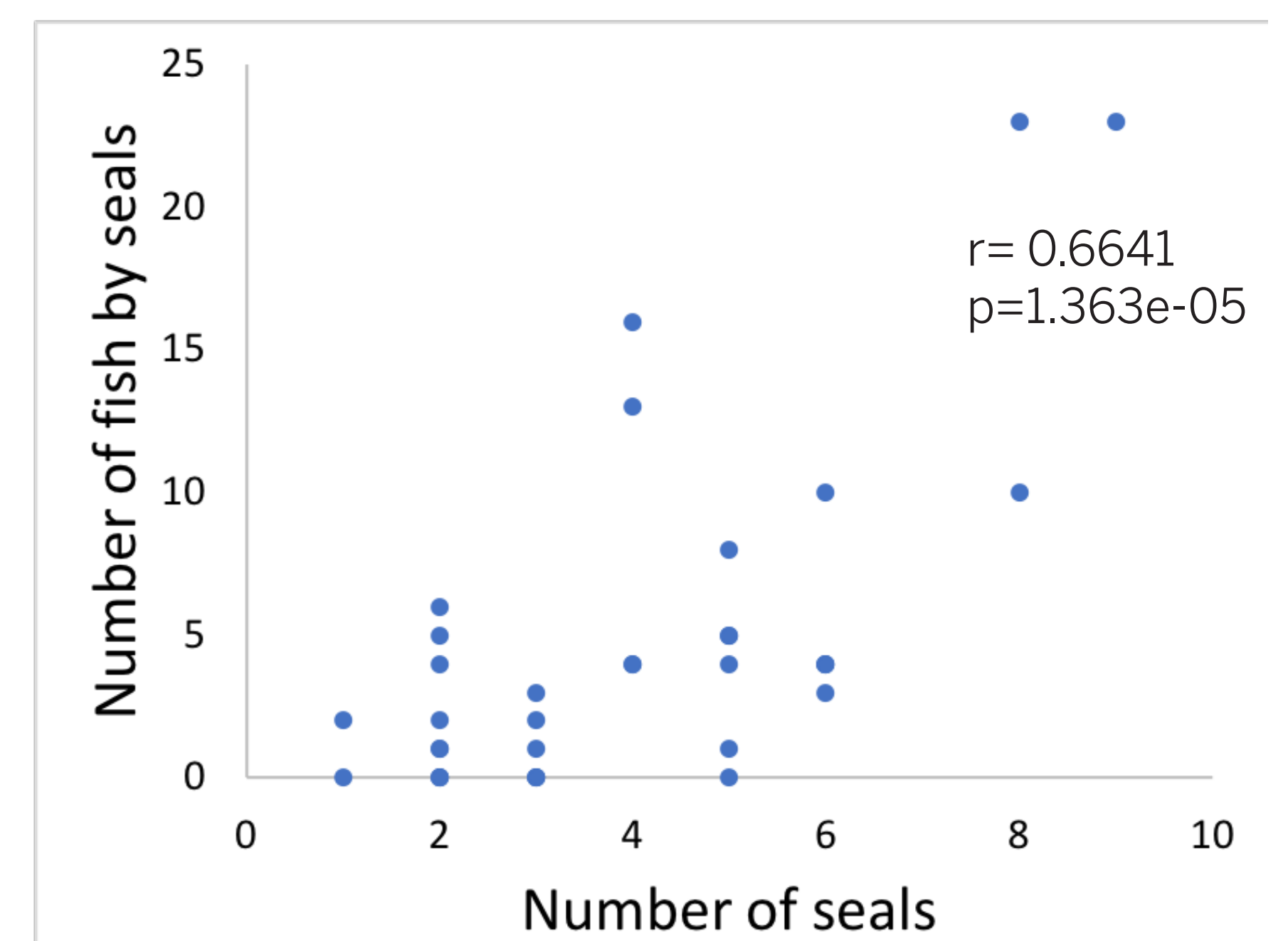


Figure 2. Correlation between the number of seals and the number of fish caught by seals

## DISCUSSION

- Sport fishermen do not affect harbor seal hunting success, but the number of seals present does.
- This could suggest that the seals are working together to hunt, or that the number of seals present is a better indicator of salmon availability.
- Individuals sharing salmon and surfacing/hunting close together have been observed in the creek. There is also data from other pinniped species where cooperative hunting has been observed<sup>4</sup>. These both support the former hypothesis.
- Future work should measure distances between foraging and non-foraging seals, and describe in detail their movement to determine if they hunt cooperatively.

