# Using genomics to determine origins and dispersal patterns of invasive northern pike (*Esox lucius*) in southcentral Alaska

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## Background

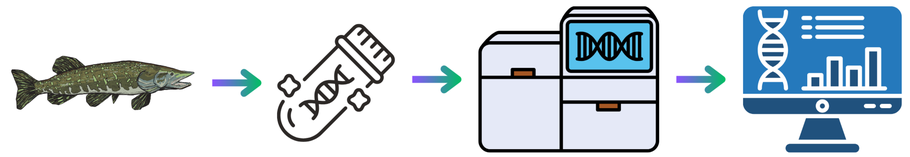
Invasive species significantly threaten local ecosystems, economies, ant native cultures; however, little is known about the mechanisms, especially genetic mechanisms, that predispose some species to becoming successful invaders. One such invader, the northern pike (*Esox lucius*), is native to the northern and central Alaska, but was introduced to southcentral Alaska in the 1950s (Figure 1). Since introduction, invasive pike have dramatically altered native fish communities, especially local salmonids, negatively impacting the local economy and local ecosystems.

Until recently, North American pike were considered a freshwater species unable to survive in seawater. However, otolith microchemistry analyses suggest they spend some degree of time in marine environments in Alaska, suggesting they may be able to occupy and disperse through the marine environment to colonize new watersheds. Understanding salinity tolerance mechanisms is critical for predicting dispersal routes and developing effective management strategies.

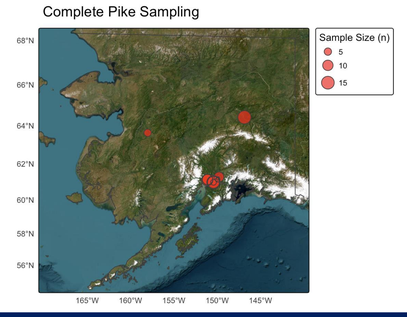
**Research Questions**

1) Is there a genetic adaptation to marine dispersal in invasive pike?
2) What populations of pike have the genetic component that allows them to disperse?

## Methods

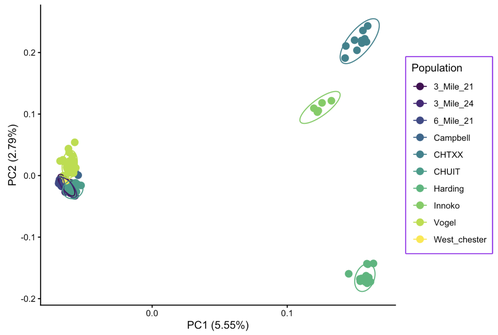


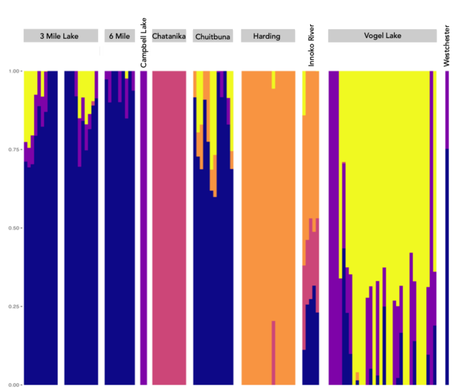

| | Population | n |
|---|---|---|
| Native Populations | Chatanika River | 10 |
| | Harding Lake | 16 |
| | Innoko River | 5 |
| Invasive Populations | 3 Mile Lake | 20 |
| | 6 Mile Lake | 9 |
| | Campbell Lake | 2 |
| | Chuitbuna Lake | 12 |
| | Vogel Lake | 32 |
| | Westchester Lagoon | 1 |
| | | N = 107 |

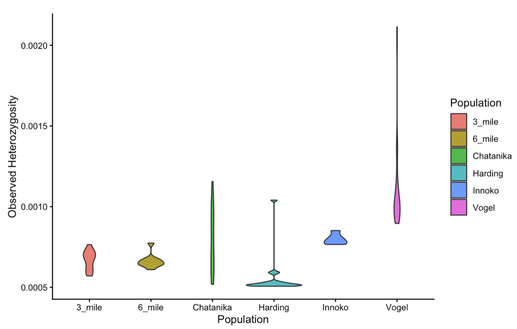



## Results

### Population Structure




| | Chuitbuna | 3 mile | 6 mile | Harding | Chatanika |
|---|---|---|---|---|---|
| Chuitbuna | | | | | |
| 3 mile | 0.012 | | | | |
| 6 mile | 0.036 | 0.030 | | | |
| Harding | 0.227 | 0.236 | 0.262 | | |
| Chatanika | 0.210 | 0.214 | 0.228 | 0.171 | |
| Vogel | 0.040 | 0.051 | 0.067 | 0.236 | 0.193 |

## Conclusions & Future Chapters

## Funding and Acknowledgments