

Dietary differences between male and female river otters: evaluation with non-invasive genetic sampling



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Outline

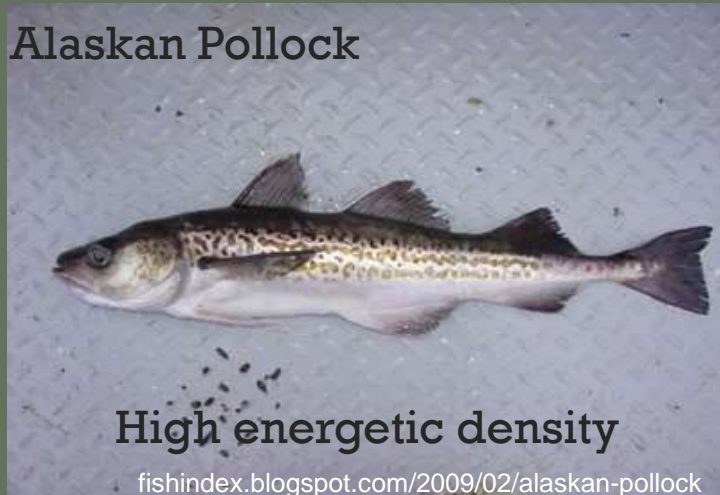
- Field observations
- Scientific question
- Background information
- Methods
- Results
- Future research



Field Observations

- Males are more often in large social groups, foraging on schooling pelagic fish¹.
- Females more often asocial foraging on intertidal fishes^{2,3}.
 - Schooling fish are lipid and protein rich compared to intertidal fish which have less energy density².

Alaskan Pollock

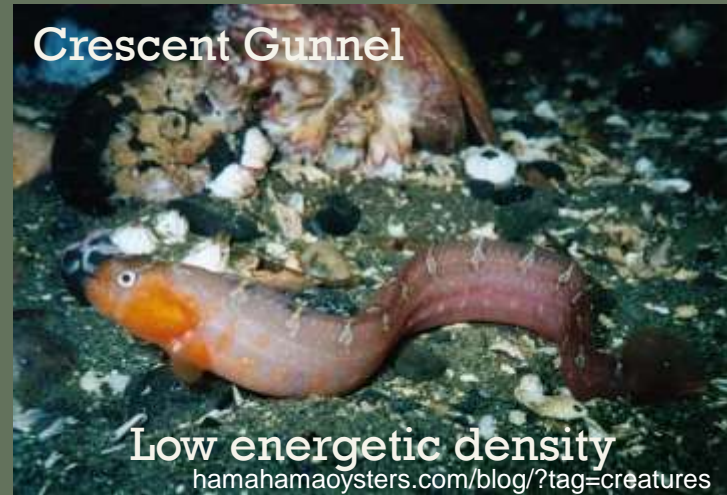


High energetic density

fishindex.blogspot.com/2009/02/alaskan-pollock

Schooling pelagic fish

Crescent Gunnel



Low energetic density

hamahamaoysters.com/blog/?tag=creatures

Intertidal fish

Question

- Do observed differences in male and female behavior and social interactions lead to drastic differences in the diets between sexes?



Background Information

- Differences between sexes:
 - Dispersal¹
 - Space use²
 - Social interactions³
 - Foraging⁴



WHY DO WE CARE?

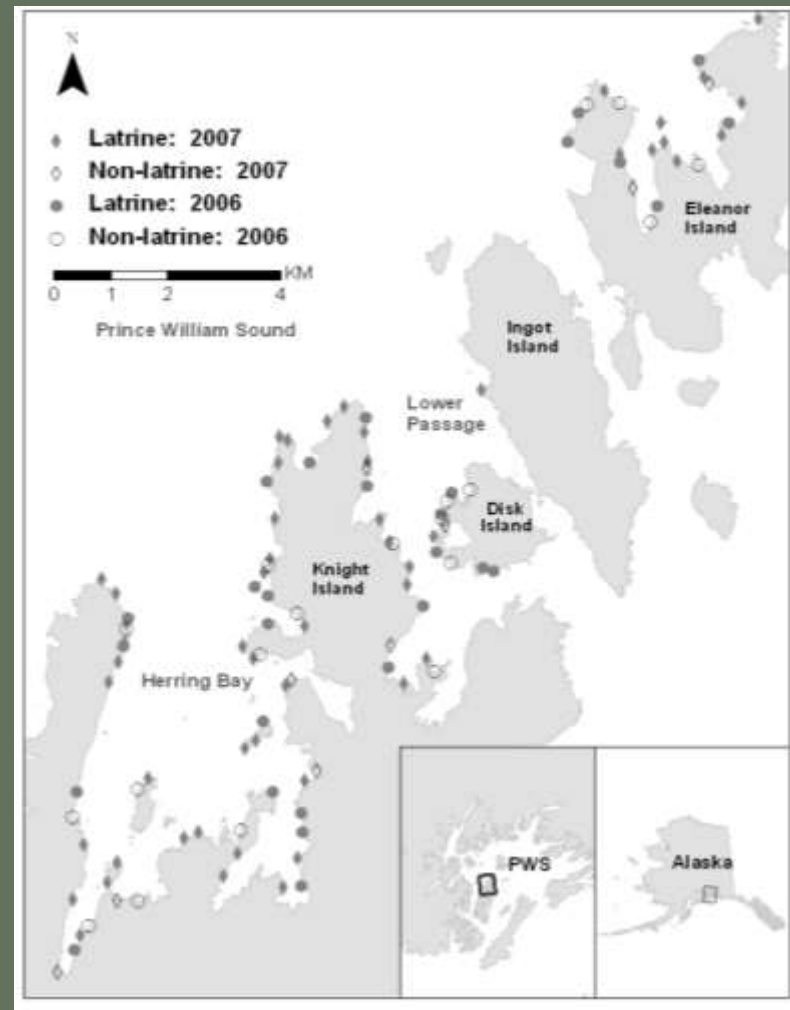
Impact on the population:

- Energy differences in forage type²
- Female susceptibility to environmental⁵ conditions
- Female population persistence
- Population persistence⁶



Methods

- Collection of fecal samples
 - Samples obtained from previous research efforts in South-central Alaska.



Map made by S. Albeke

Methods cont.

- Sieving
- DNA extraction
- DNA analysis
 - Genotyped samples
 - Polymerase Chain Reaction (PCR)
 - Amplification with a sex-linked primer (SRY)
- Diet analysis
- Data analysis
 - Sex ID error rate and standard error
 - Sex ratio
 - Differences in the diet between males and females



Error Rate Results

- Error rate for identification of females was higher (0.353 ± 0.054) than that of males (0.045 ± 0.023).
- This is expected because SRY amplifies a region of the Y-chromosome⁷.



Sex Ratio Results

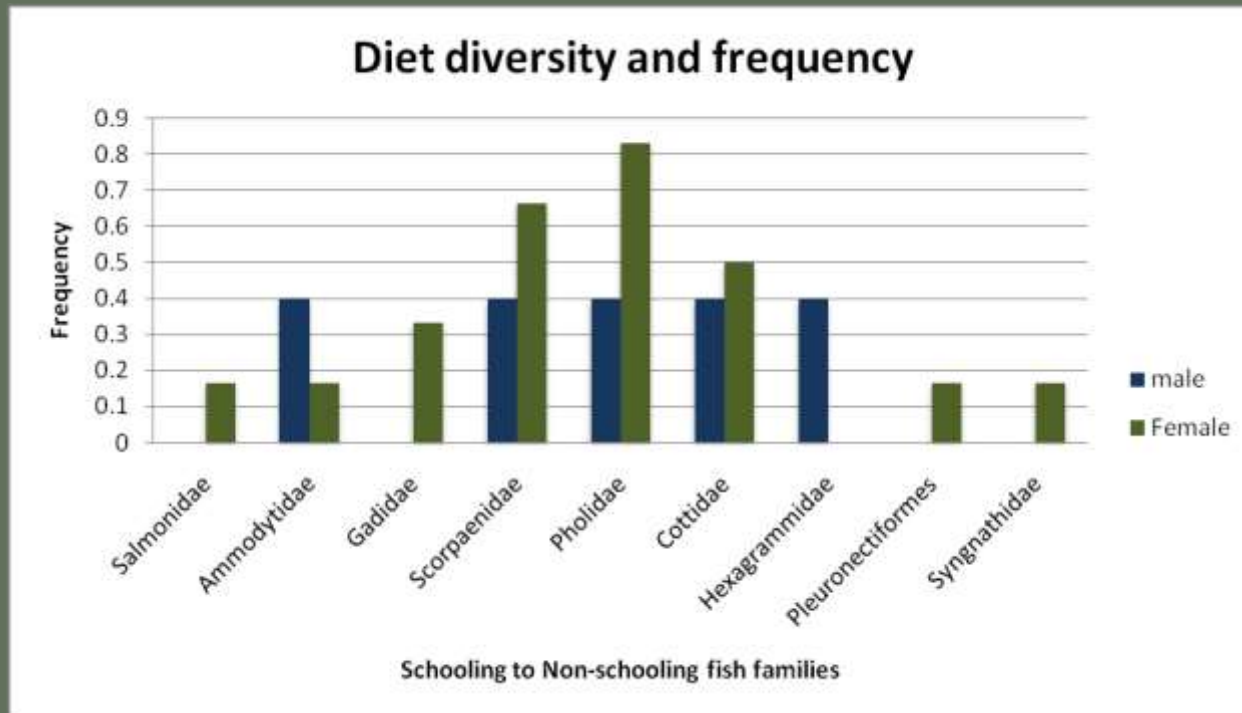
- After accounting for error rates, sex ratio (female: male) of samples was 1:3.
- This is comparable to sex ratios of live captured individuals⁸.



Steven Senne

Diet Result

- Diet analysis suggests females have a more diverse diet than males containing high amounts of inter-tidal fish.
- These findings agree with results from stable isotope analysis from hair samples of live captured otters⁴.



Summary

- What does this indicate for population management?
- What does this show about the capabilities of non-invasive sampling?



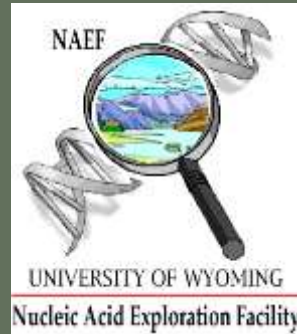
Future Research

- Larger sample size
- Improve methods to reduce contamination



Brian Switek

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References

1. Hanson, H., M. Ben-David and D. B. McDonald. 2008. Effects of genotyping protocols on success and errors in identifying individual river otters (*Lontra canadensis*) from their faeces. *Molecular Ecology Reserves* 8: 282-289.
2. Ben-David, M., G.M. Blundell, J.W. Kern, J.A.K. Maier, E.D. Brown and S.C. Jewett. 2005. Communication in river otters: creation of variable resource sheds for terrestrial communities. *Ecology* 86(5) 1331-1345.
3. Blundell, G. M., M. Ben-David, P. Groves, R. T. Bowyers and E. Geffen. 2002. Characteristics of sex-biased dispersal and gene flow in costal river otters: implications for natural recolonization of extirpated populations. *Molecular Ecology* 11: 289-303.
4. Blundell, G. M., M. Ben-David and T. Bowyer. 2002. Sociality in river otters: cooperative foraging or reproductive strategies?. *Behavioral Ecology* 13:134-141.
5. Blundell, G. M., R. T. Bowyer, M. Ben-David, T. A. Dean and S.C. Jewett. 2000. Effects of food resources on spacing behavior of river otters: Does forage abundance control home- range size? Pages 325–333 in J. H. Eiler, D. J. Alcorn, and M. R. Neuman, editors. *Biotelemetry* 15: Proceedings of the 15th International Symposium on Biotelemetry, Juneau, Alaska, USA. International Society on Biotelemetry, Wageningen, The Netherlands.
6. Bowyer, T. R., G. M. Blundell, M. Ben-David, S. C. Jewett, T. A. Dean and L. K. Duffy. 2003. Effects of the *Exxon Valdez* oil spill on River Otters: Injury and recovery of a sentinel species. *Wildlife Monographs* 153: 1-53.
7. Dallas, J. F., D.N. Carss, F. Marshall, K. Koepfli, H. Kruuk, S.B. Piertney and P. J. Bacon. 2000. Sex identification of the Eurasian otter *Lutra lutra* by PCR typing spraints. *Conservation Genetics* 1:181-183.
8. Blundell, G.M., J.W. Kern, R. T. Bowyer and L. K. Duffy. 1999. Capturing river otters: a comparison of Hancock and leg-hold traps. *Wildlife Society Bulletin* 27(1): 184-192.

Questions?



Robert Bateman