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PBDEs/Methylmercury and Immune Function in Non-Stranded Male California Sea Lions (*Zalophus californianus*)

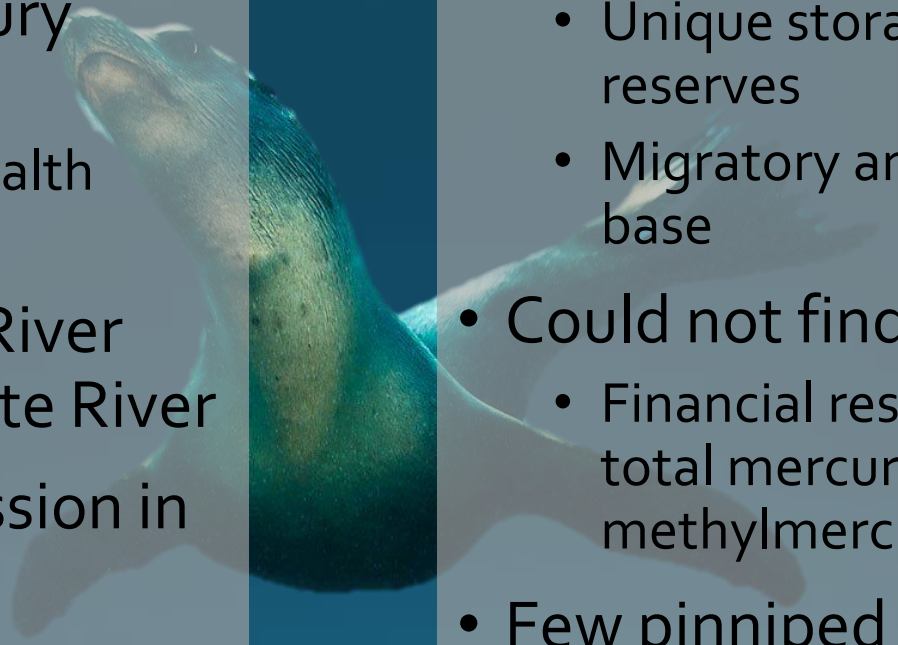
A Literature Review

Research Project Background

- In partnership with ODFW and CRITFC
- Non-breeding California sea lion males in Columbia River Basin preying on migratory salmon
- Willamette Falls and Bonneville Dam
- Hazing strategies not effective, decided on lethal removal
- Marine Mammal Protection Act: issue taken to Washington, D.C.
- Unique opportunity for fresh tissue samples
- Literature review (19 publications)

Current Information

- Polybrominated diphenyl ethers (PBDEs) and methylmercury persistent ecotoxins
  - Increasing international health concern
- Rising levels in Columbia River Basin, especially Willamette River
- Linked to immunosuppression in fish and marine mammals
- Lipophilic/Bioaccumulative
  - Trophic Magnification



Areas for Improvement

- Very few pinniped studies
  - Unique storage and use of fat reserves
  - Migratory and coastal – shared food base
- Could not find holistic studies
  - Financial restrictions – focus on total mercury rather than methylmercury specifically
- Few pinniped studies inconclusive due to differences in life history, feeding strategy, sex, and age – limited samples

Significance of this Research Project

- Relatively large sample size
- Blood is best biomarker for methylmercury and blubber is best for PBDEs – will provide a holistic idea of exposure
  - Few studies examining blood mercury levels
  - Annual pelage molt offers discrete data
- Accuracy of fresh samples vs. degraded
- Indication of coastal marine ecosystem, ocean, and human health
  - Can inform wildlife management, coastal communities, and tribal governments