

# Isotopic Analysis of Salmon Otoliths

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# The Problem:

Fish from different origins or treatments

Discriminate origin, treatment, history

Prime Example: wild and hatchery salmon

“Passive” tagging system

# Questions

Otolith data

normal distribution?

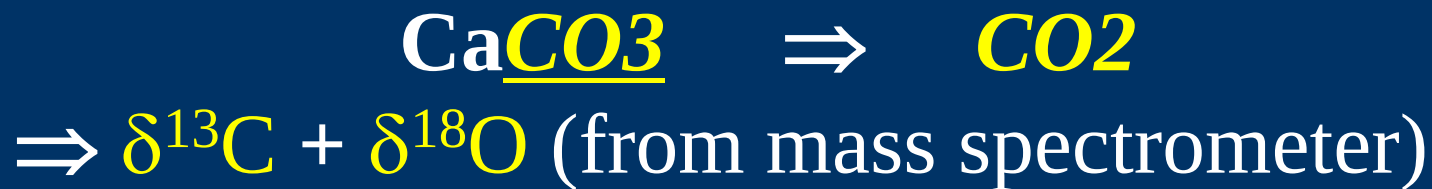
analyses?

Sample sizes required?

Identification possible?

# OTOLITH ISOTOPE ANALYSIS

In fish otoliths, we analyze aragonite powder samples:

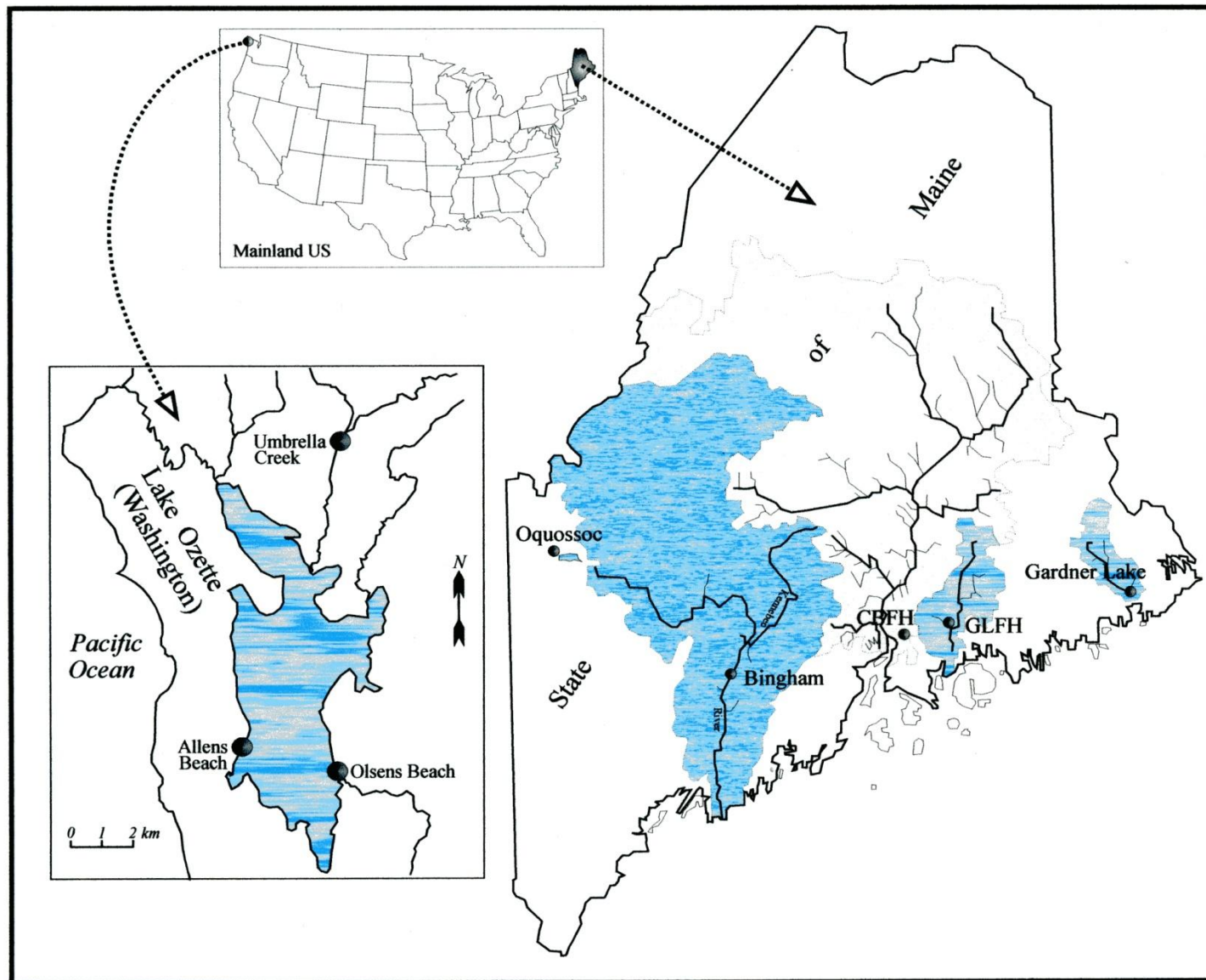


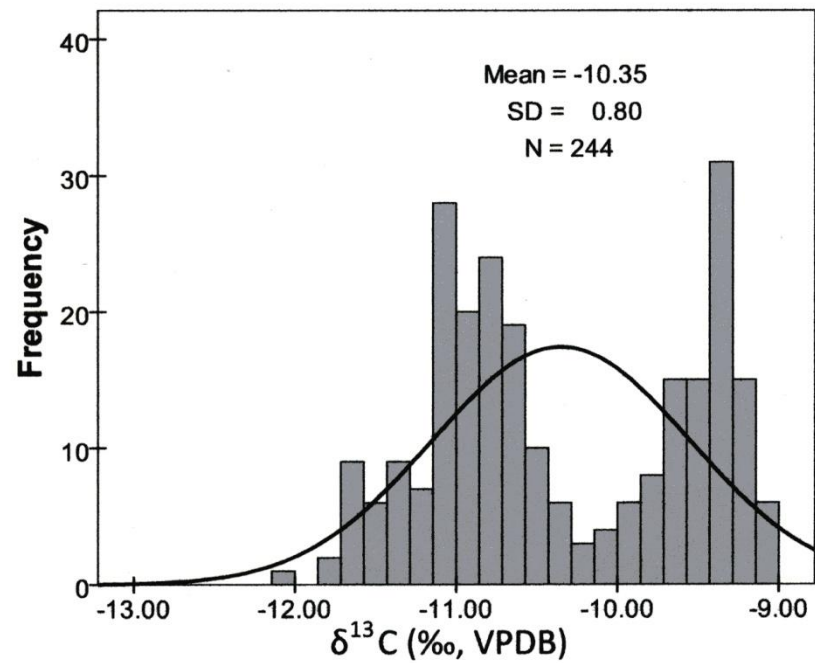
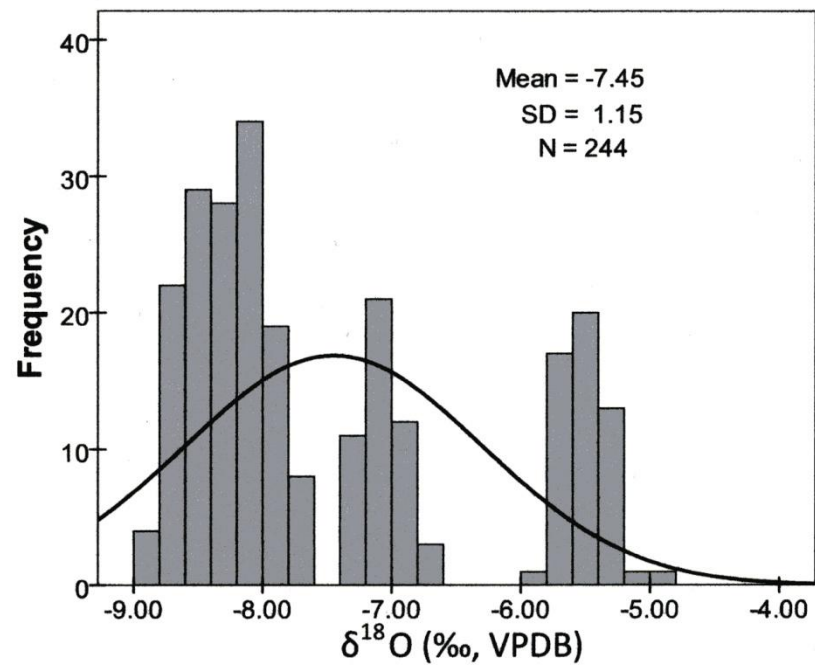
$\delta^{13}\text{C}$ : *Food, metabolic sources; dietary shifts; trophic-level*

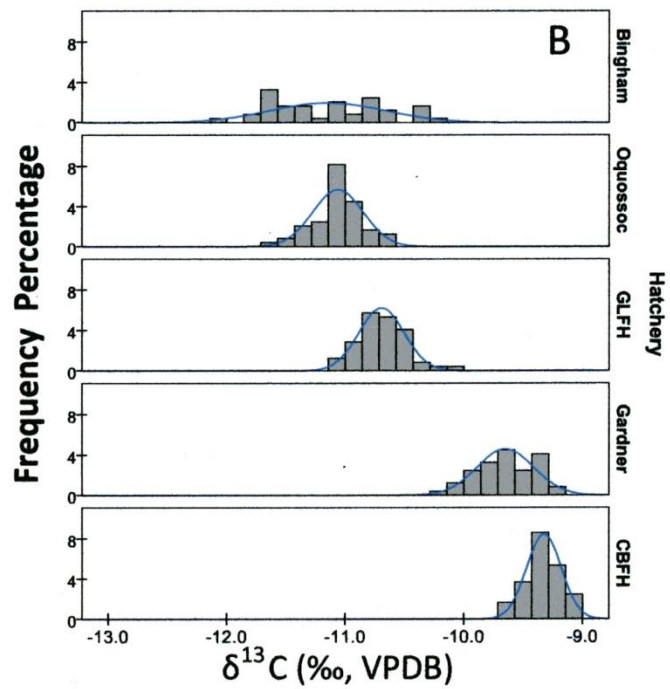
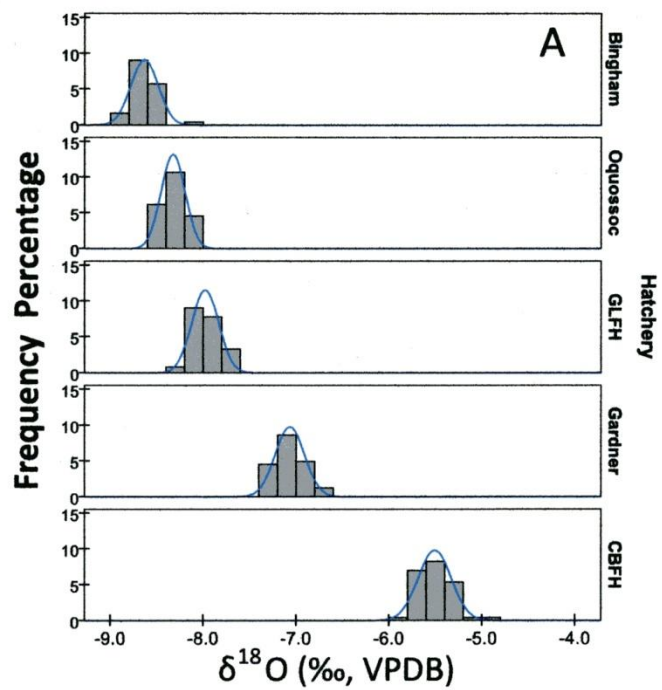
$\delta^{18}\text{O}$ : *Water conditions (T; Salinity; chemical composition)*

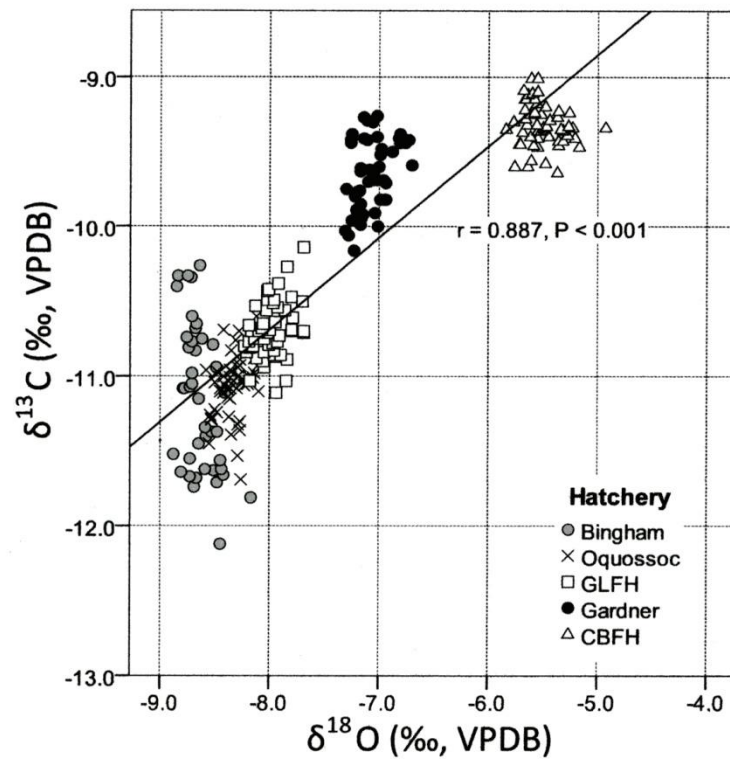
# Sources of otoliths

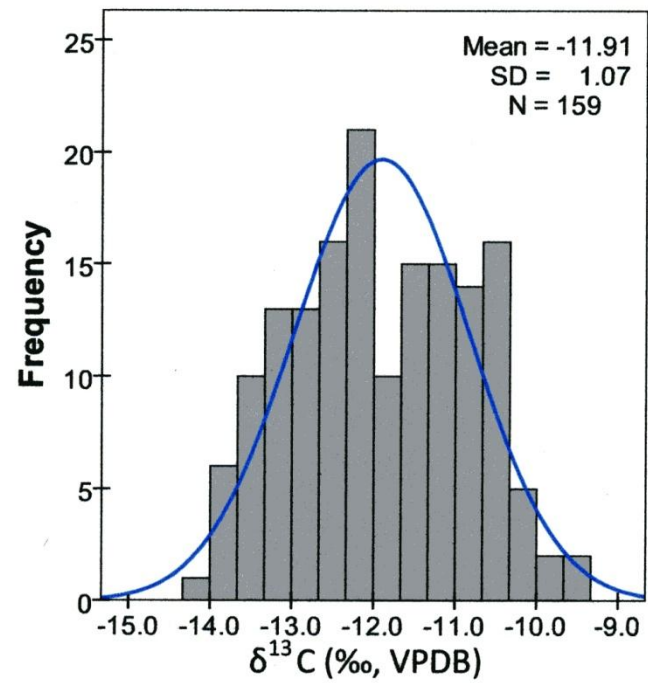
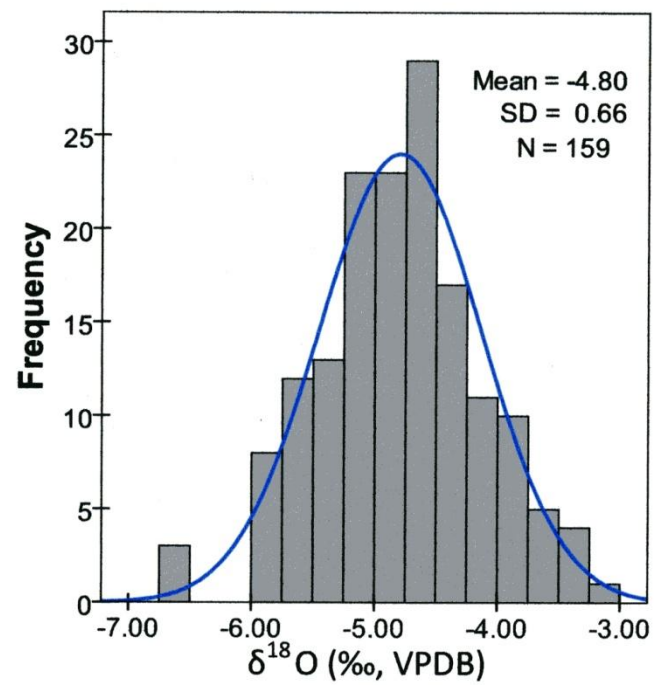
- *Salmo salar*
  - Maine – 5 hatcheries (known origin)
- *Oncorhynchus nerka*
  - Washington – wild & hatchery (some known origin, some mixed origin)

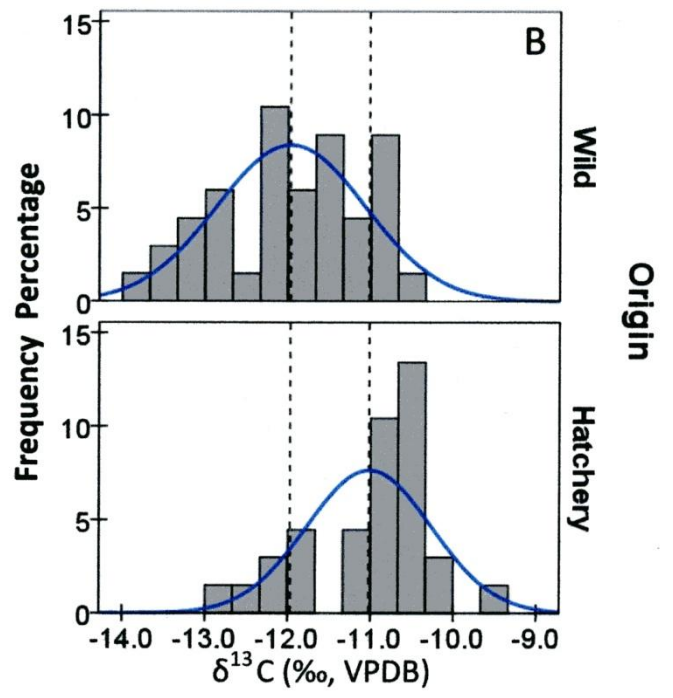
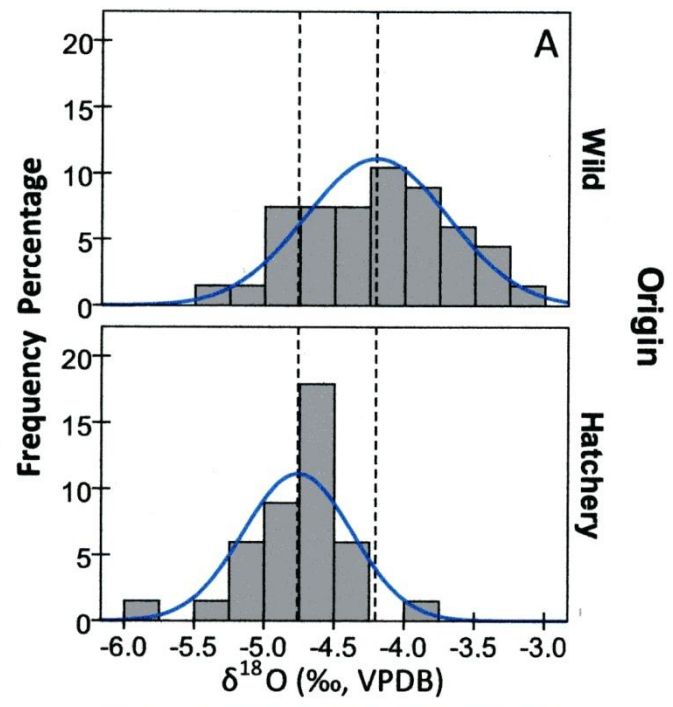


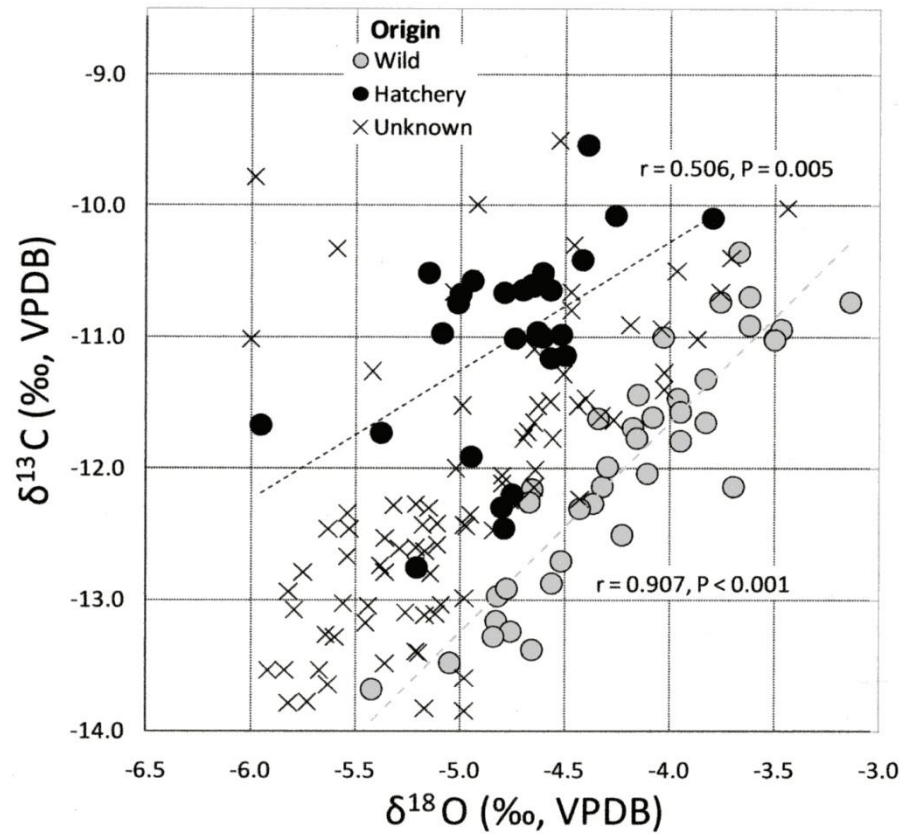












# Conclusions

We can:

Discriminate among salmon hatcheries

Discriminate between wild & hatchery salmon

# Conclusions

- Data
  - not normally distributed
- Analyses
  - Non-parametric
- Sample Sizes required
  - “relatively small” ( $< 30$ )

# Acknowledgements

- Hatcheries
  - Maine (private, USFWS, GLNFH, CBNFH)
- Sockeye salmon otoliths
  - Makah Fisheries Management
- University of Michigan Stable Isotope Laboratory