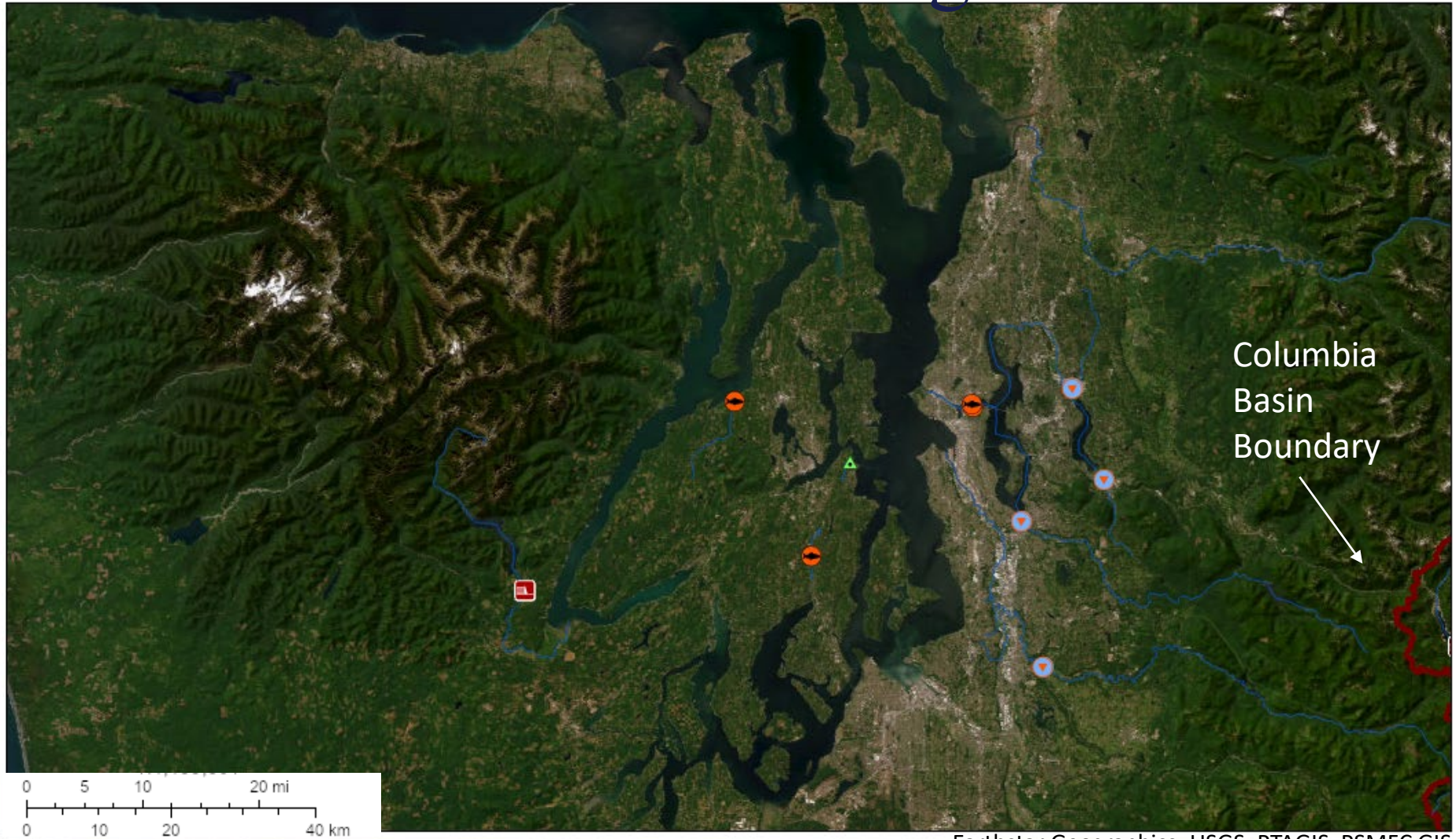


# AModel of a Regional PIT-Tag Data Management System in Puget Sound

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Elliot Koontz  
January 31, 2024

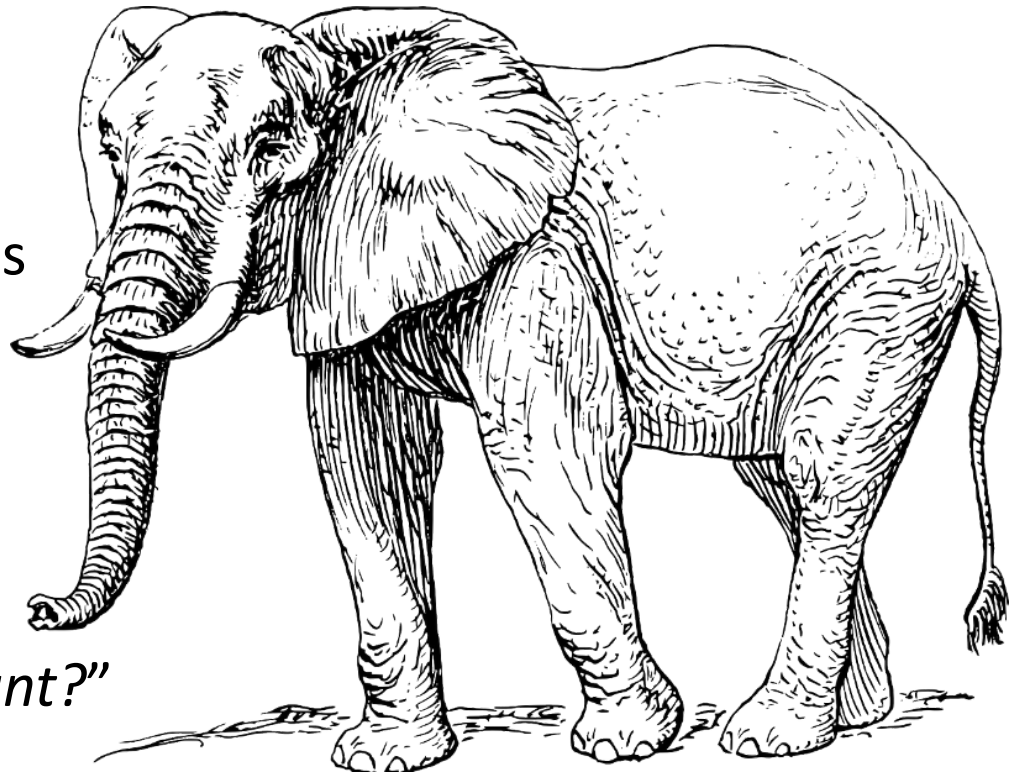
# PTAGIS MRR Sites in Puget Sound



Earthstar Geographics, USGS, PTAGIS, PSMFC GIS

# Challenges in Building a Regional Database

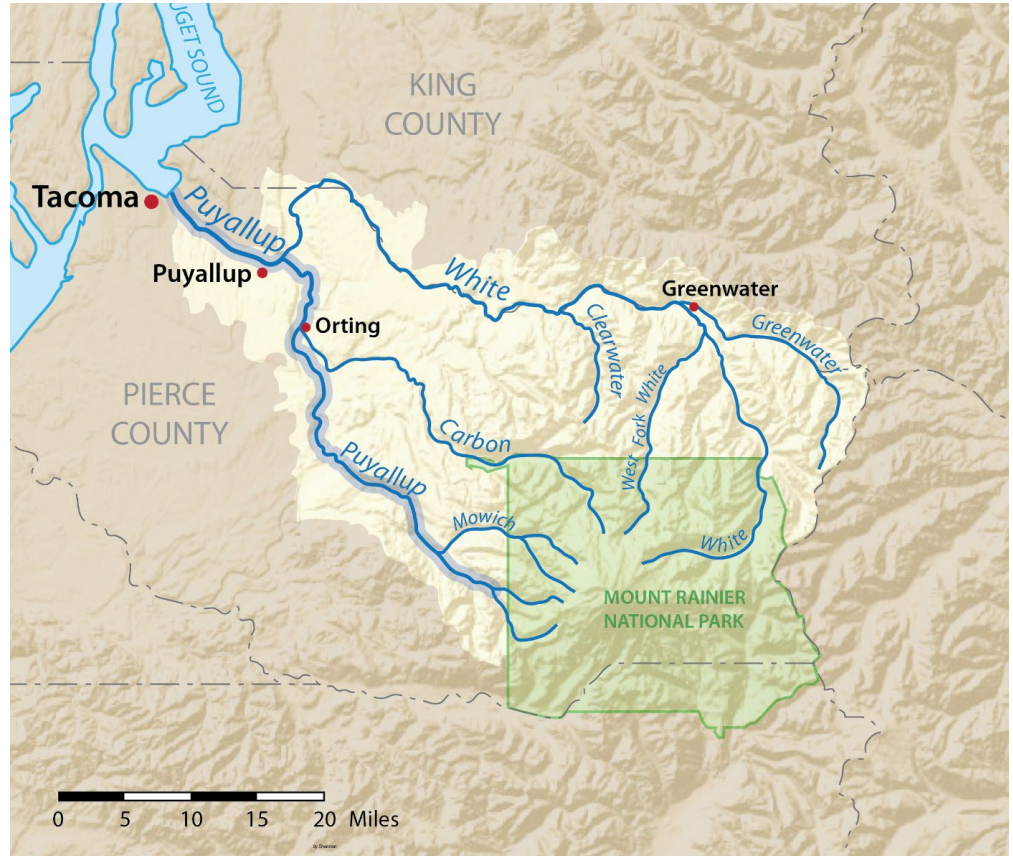
- Large number of agencies with different scopes, budgets, capabilities and goals
- Widely distributed data with varying scales, granularities and formats
- Consolidating methods for data ingest and data access



*“How do you eat an elephant?”*

# A Case Study: The Puyallup River

- Approach for consolidating different types of data
  - PIT detections
  - Fish releases
  - Environmental time series
- Challenges in antenna servicing, data consistency, and establishing standards
- Considerations for a larger regional model



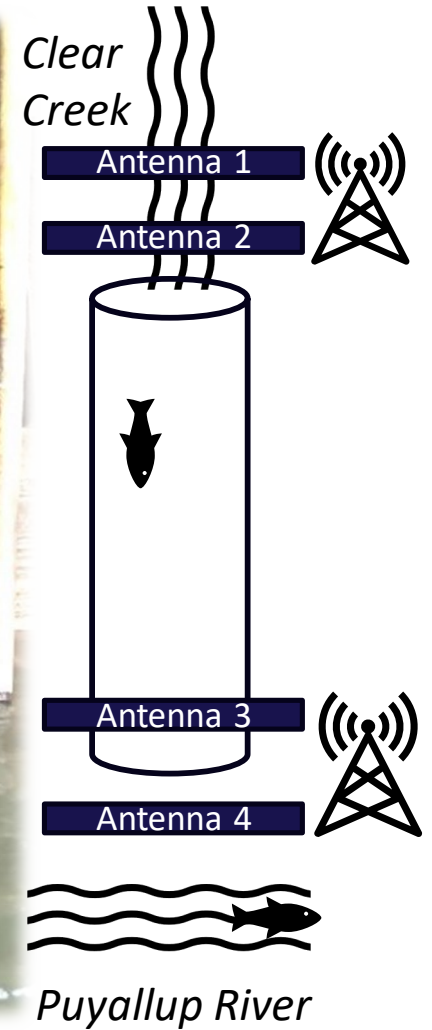
Shannon1, CC BY-SA.  
Made using USGS National Map data, via Wikimedia Commons.

# Building a Database – It Takes a Village

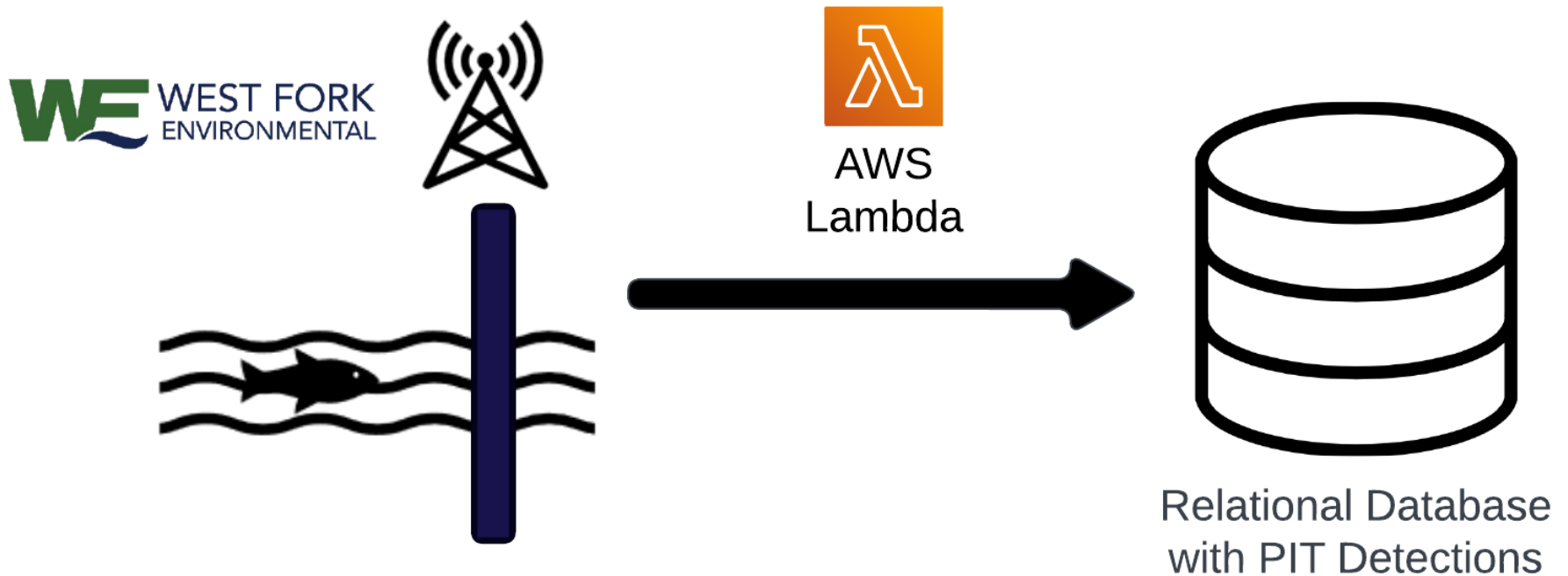


- Organized by South Puget Sound Salmon Enhancement Group, with funding from Floodplains for the Future Partnership
- Substantial PIT tagging, antenna maintenance and collaboration from Puyallup Tribe of Indians
- Habitat data collection and data organization by U.S. Fish & Wildlife Service
- Database hosting and dashboard by Four Peaks

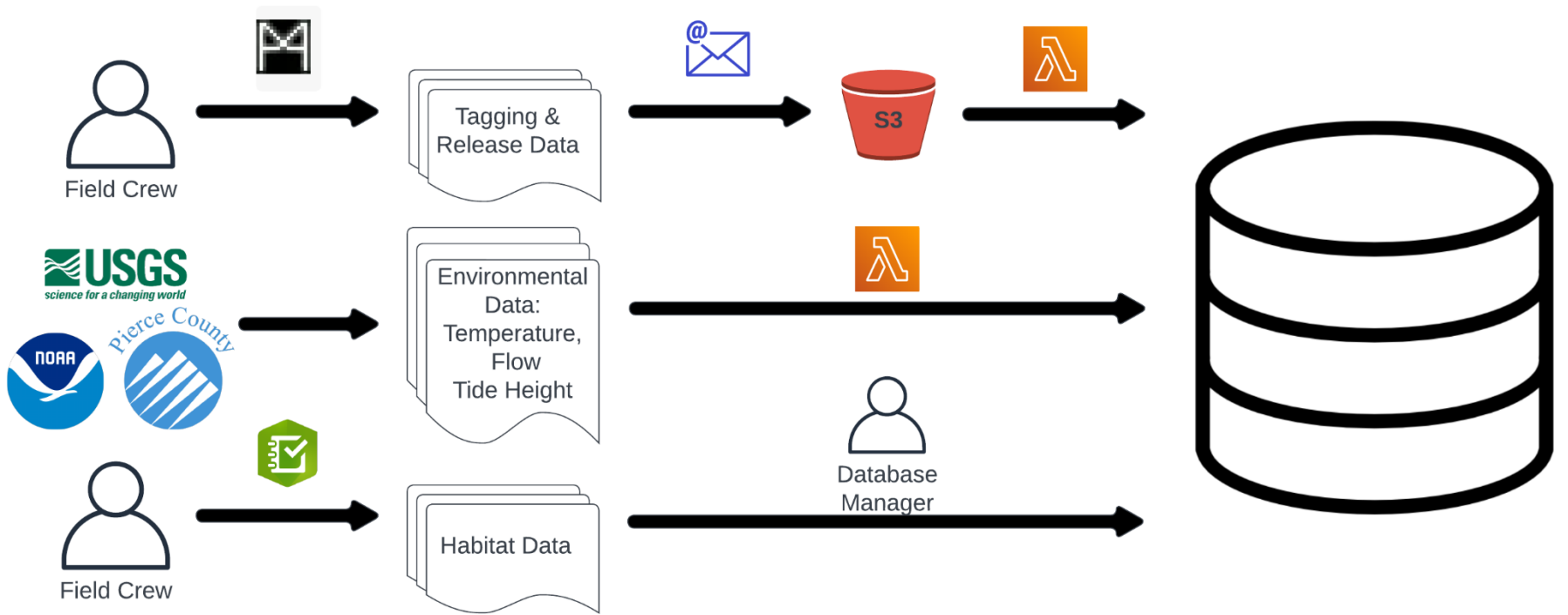
# Antenna Configuration



# Automatic PIT Detection Data Processing



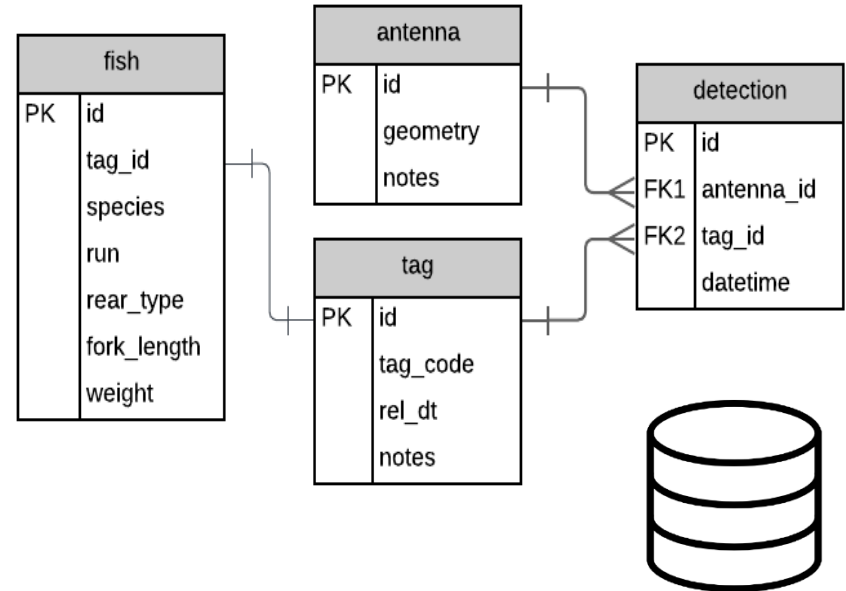
# Environmental and Habitat Data Processing



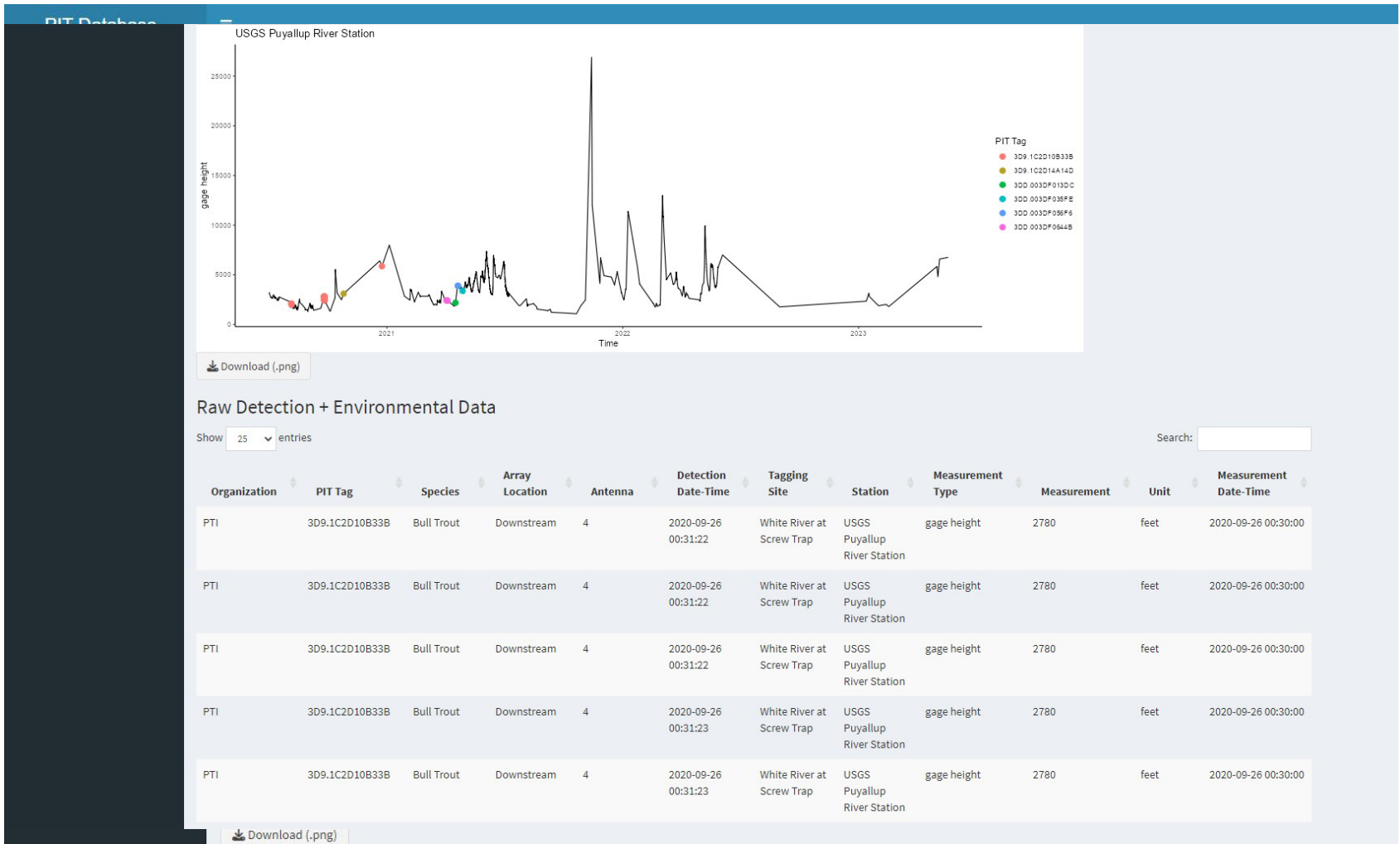


# Benefits of Relational Databases

- Allows for automated ingest and access
- Enforce consistency by limiting operator variability and automating quality control processes
- Entity relationship diagrams (ERDs) provide a context to communicate data structures and format

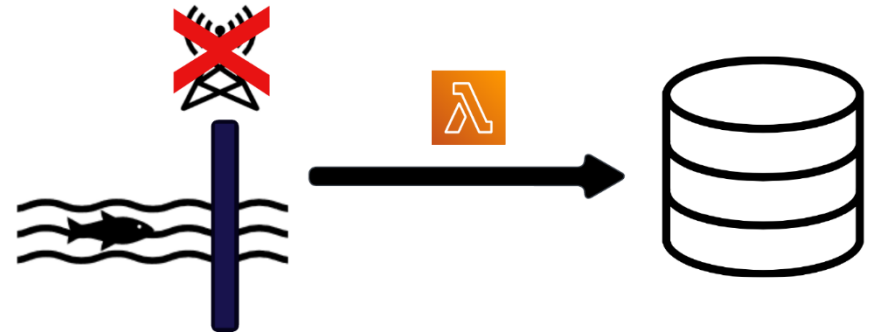


# Data Access through Shiny Dashboard



# Antenna Connectivity Remains a Challenge

- Antennas experience downtime due to construction (e.g., flood gate installation) and connectivity issues
- Automatic data querying can give near real-time updates of antenna status
- On-the-ground antenna maintenance will be necessary until hardware is improved



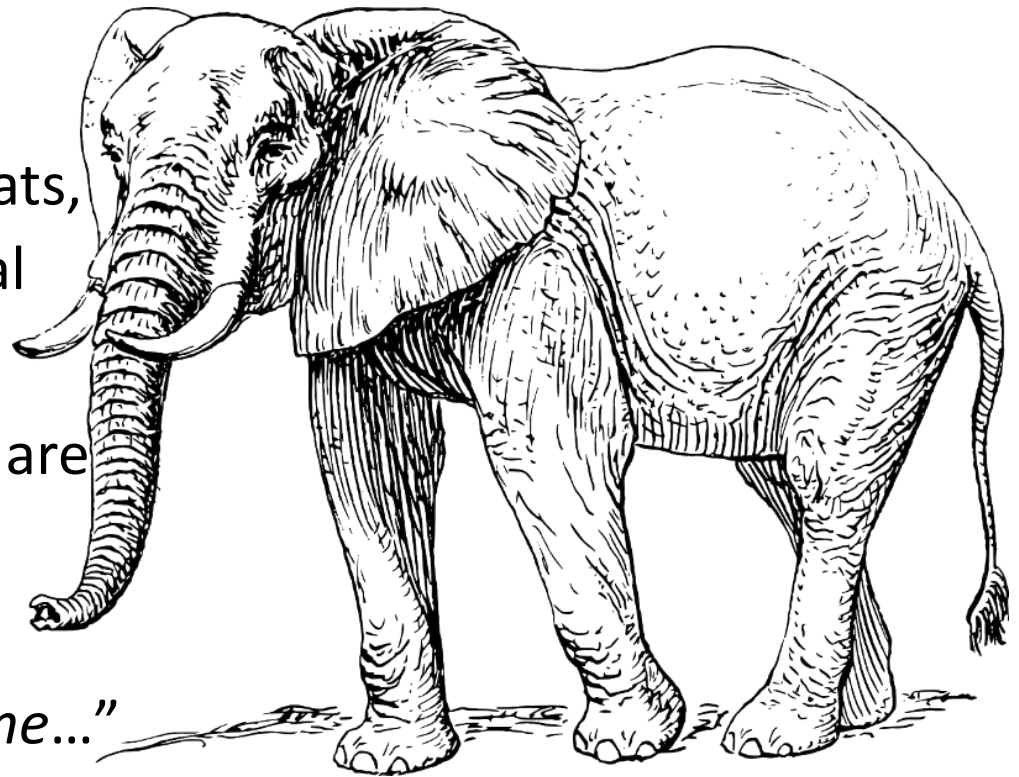
# How to Standardize Historical/ Current Data?

- Varying data standards and specificities by releases – balance between data quality and data quantity
- Restrictions in P4 can make utilization outside of the Columbia River Basin difficult
- Formalizing data standards becomes an even bigger task at larger spatial scales

Release Date	PIT Tag	Species
Aug 2021	3D6.1D59C01E60	Chinook
06/04/2022	985121015087778	OTrout
Dec 12, 2021, 12:50:33 pm	989.0010342060XX	COCO

# Lessons Learned

- Cloud computing and remote PIT download capabilities provide huge opportunity
- Challenges remain in maintaining hardware, standardizing data formats, and designing a universal database structure
- Smaller-scale databases are the building blocks of a regional database



*“One ~~bite~~ database at a time...”*

# Acknowledgements

- Floodplains for the Future Partnership: The Puyallup, White and Carbon Rivers
- Kristin Williamson (SPSSEG)
- Andrew Berger (Puyallup Tribe of Indians)
- Roger Peters and Keala Pelekai (USFWS)
- Lucius Caldwell and Lauren Kemper (Four Peaks)
- West Fork Environmental, Gabriel Brooks at NOAA, PMFSC, and many more!



**FLOODPLAINS  
FOR THE FUTURE**  
PUYALLUP, WHITE & CARBON RIVERS





# Questions & Discussion

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