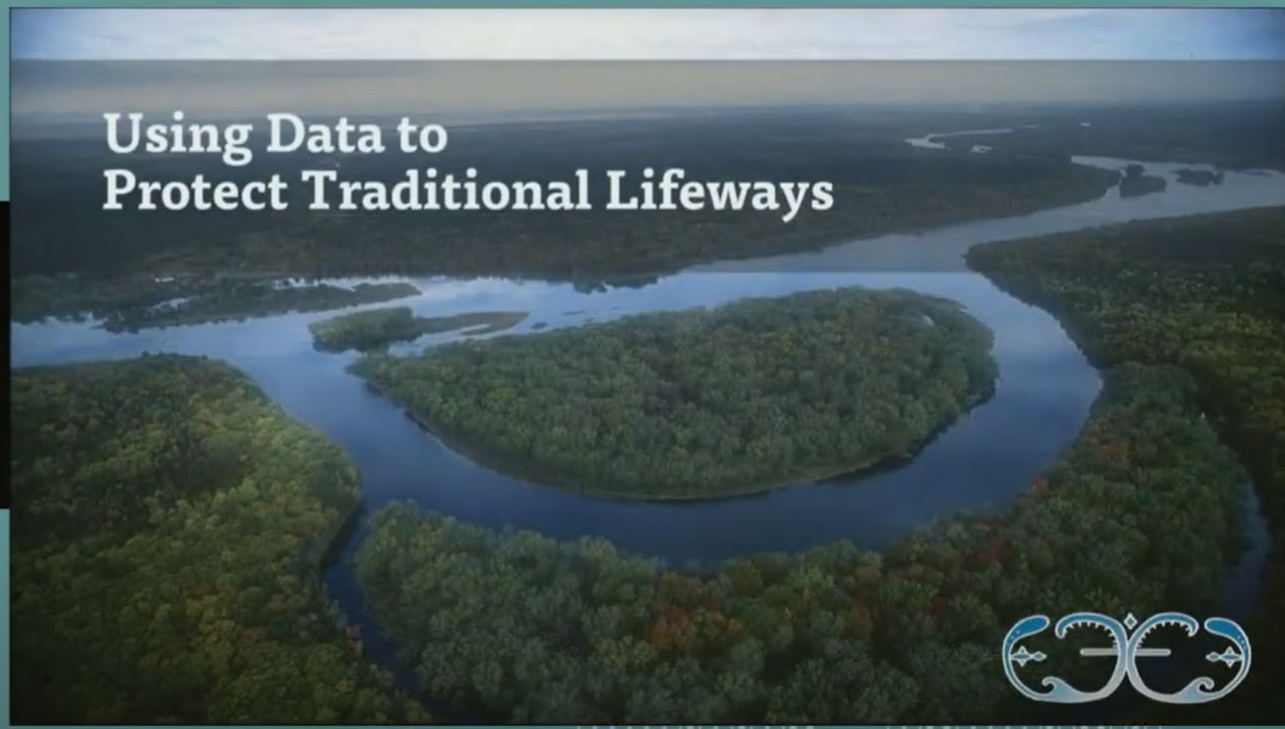
Using Data to Protect Traditional Lifeways

Indian
Island

posit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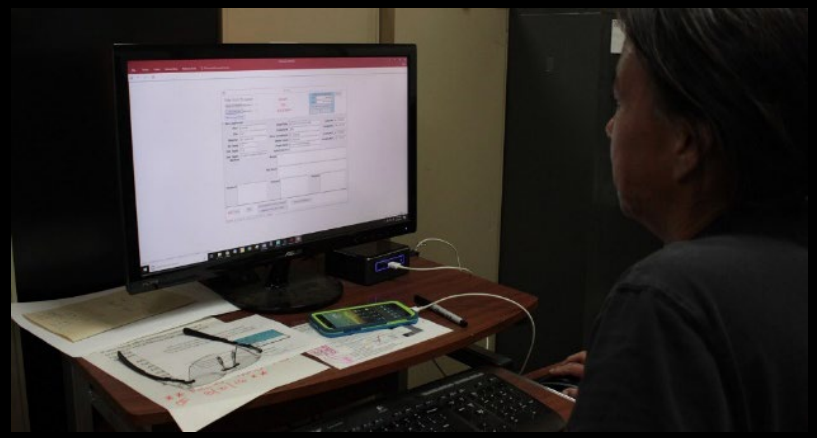
Protect Traditional Lifeways



Digital Data Entry – since 2006

Photo credit: Tyler Quiring

Somewhat reluctantly

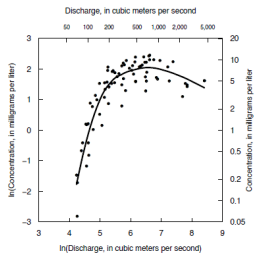
Using R – since 2012 (Dennis Helsel)

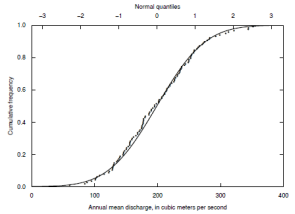
R Commander

USGS
science for a changing world

Statistical Methods in Water Resources

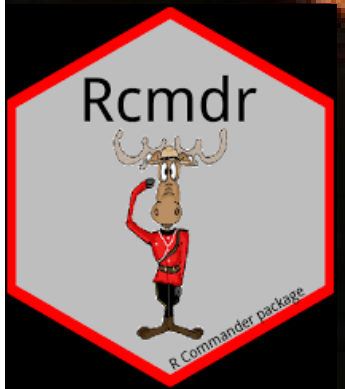
Chapter 3 of
Section A, Statistical Analysis
Book 4, Hydrologic Analysis and Interpretation





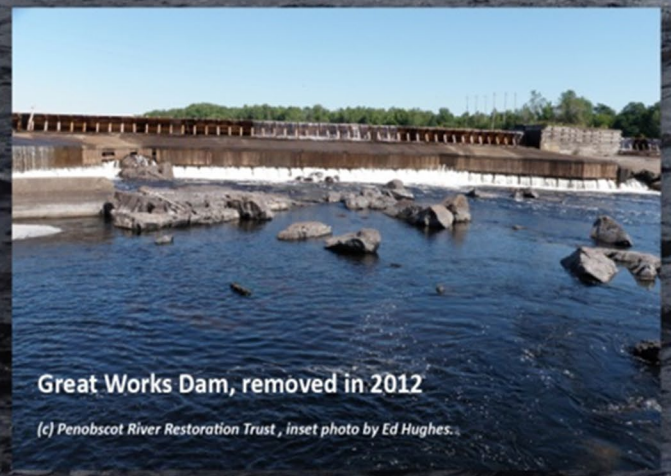
Techniques and Methods 4–A3
Supersedes USGS Techniques of Water-Resources Investigations, book 4, chapter A3

U.S. Department of the Interior
U.S. Geological Survey



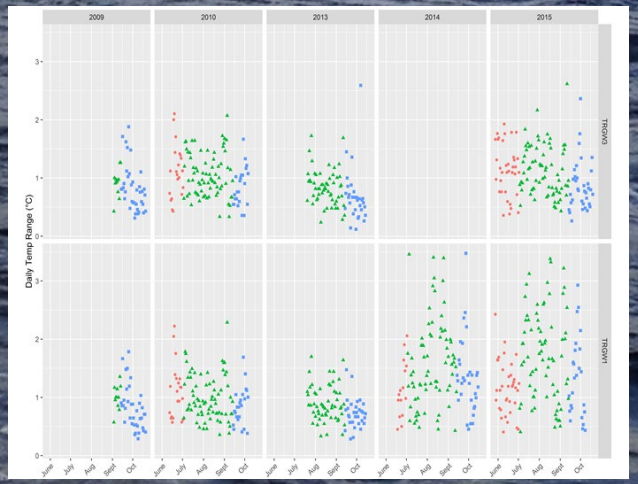
"Artwork by @allison_horst"

Restores Temperatures



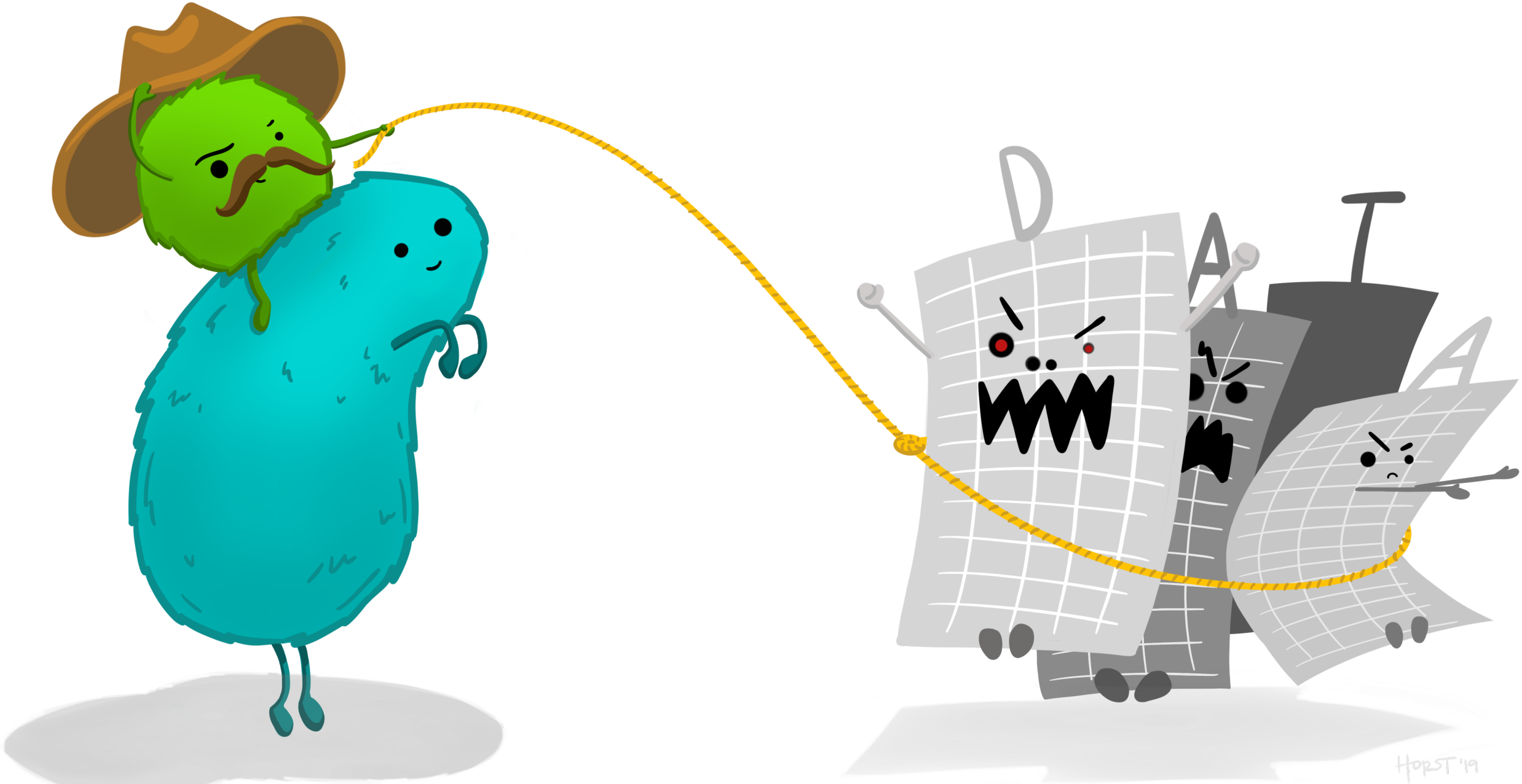
Great Works Dam, removed in 2012

(c) Penobscot River Restoration Trust , inset photo by Ed Hughes.



dplyr : go wrangling

"Artwork by @allison_horst"



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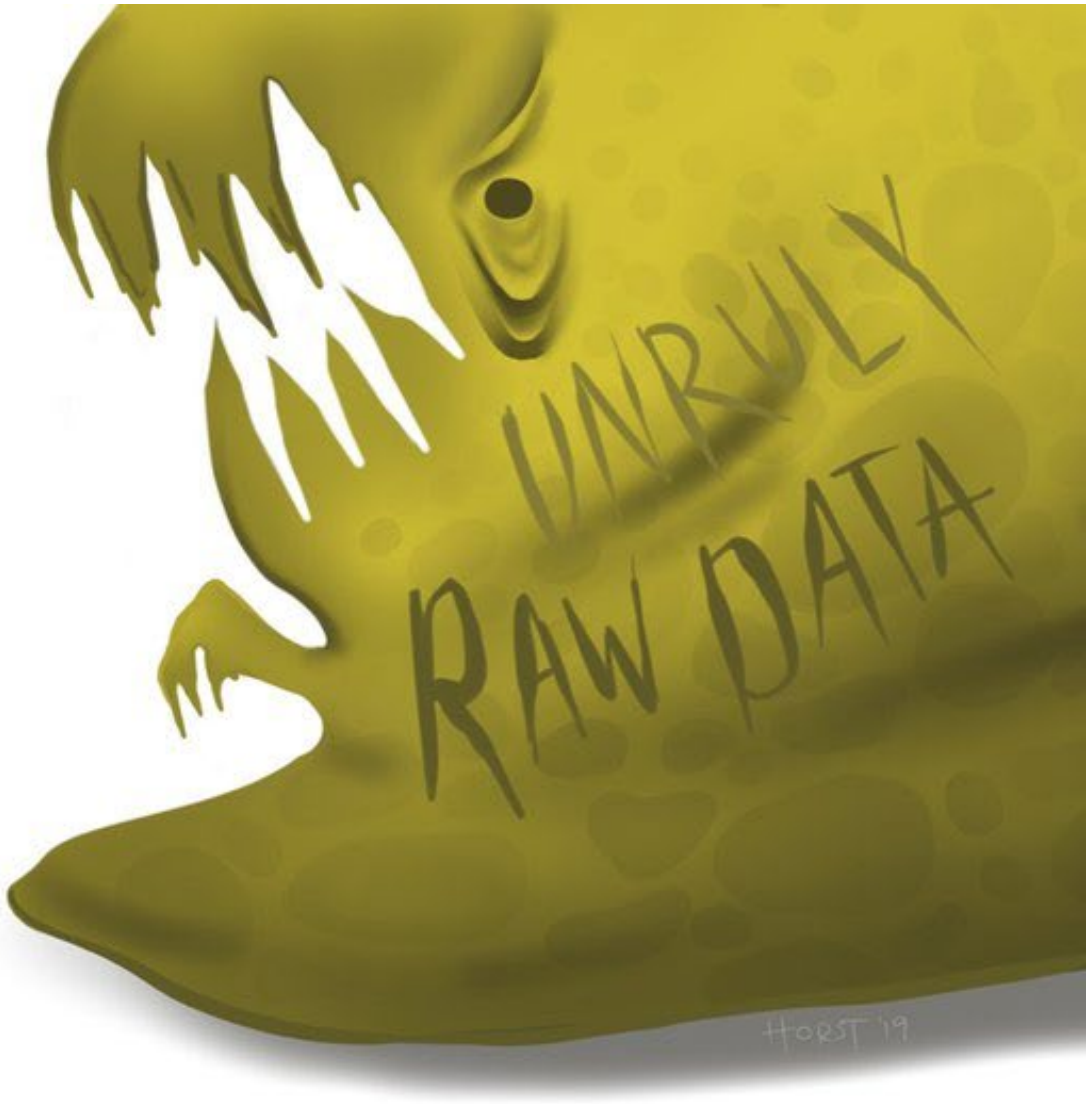
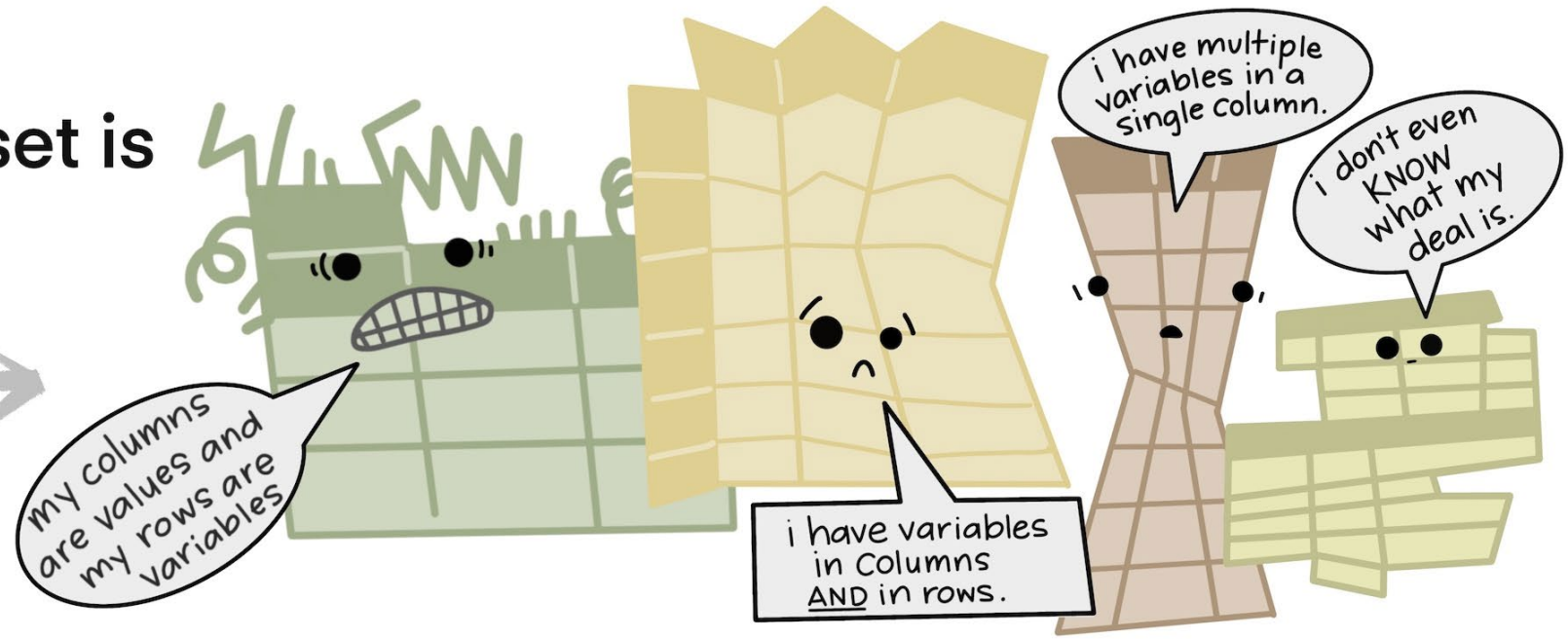


"Artwork by @allison_horst"

"...but every messy dataset is messy in its own way."

–HADLEY WICKHAM



"Artwork by @allison_horst"

Rmarkdown

TEXT. CODE. OUTPUT.

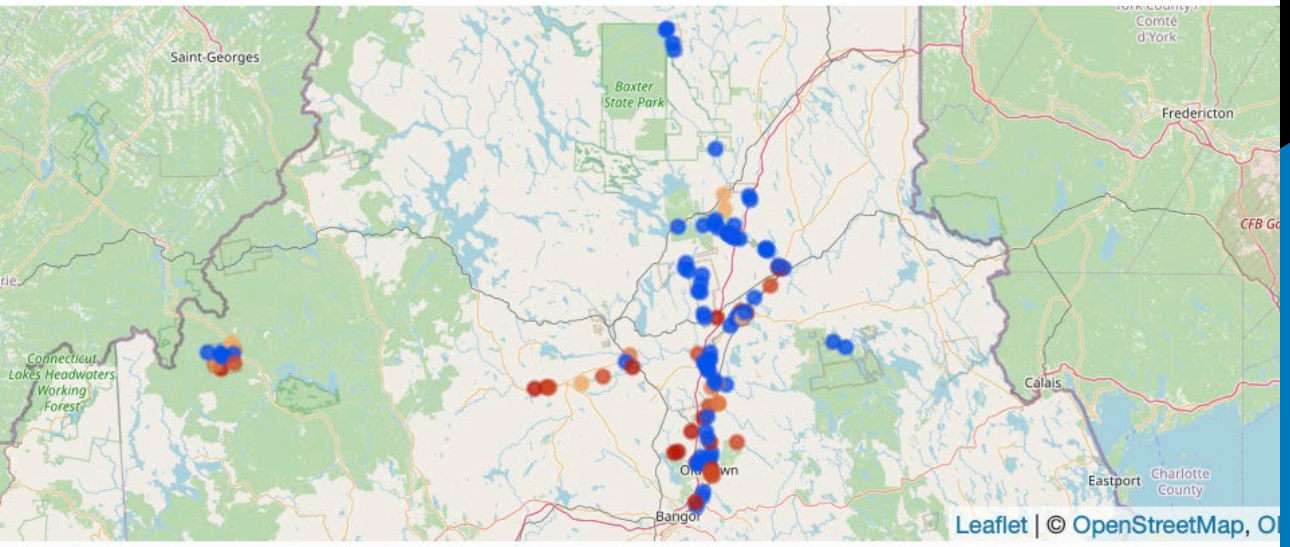
(GET IT TOGETHER, PEOPLE.)

"Artwork by @allison_horst"

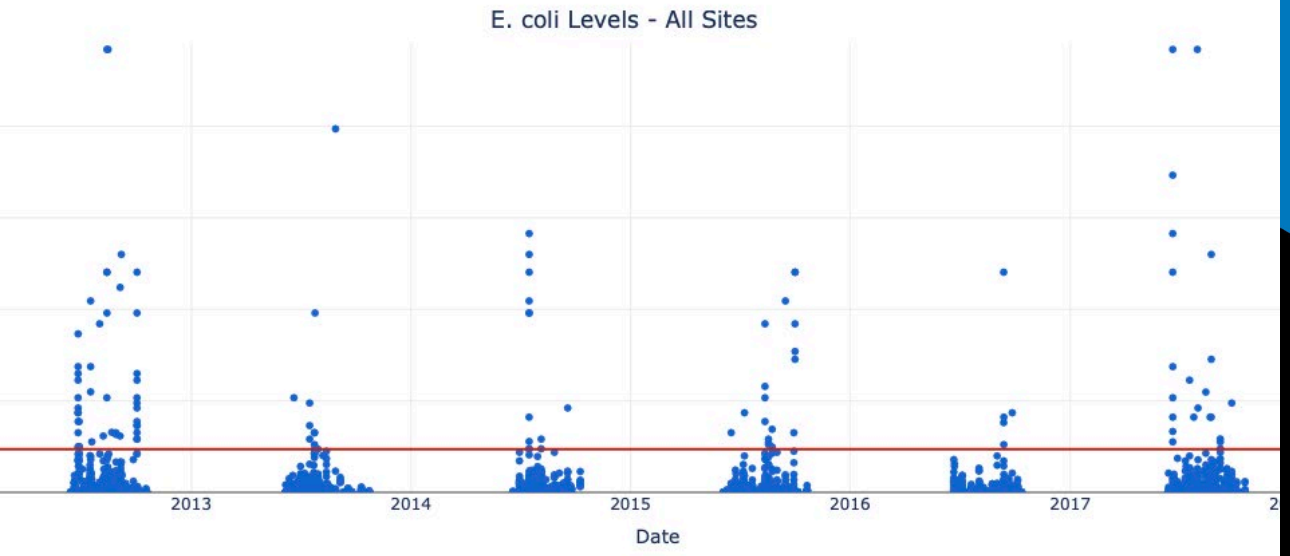
Water Quality Map

Welcome to the Water Quality Map! Check E. Coli levels in your local waterways.

Click on a marker to view a history of E.coli levels for that site.



and red markers indicate sites where at least one violation has been found. Markers are coloured based on highest
n recorded.



Connections

01

TRAININGS & EVENTS

Tribal Data & Technology Academy workshops

Tribal Exchange Network Conference

02

TRIBAL ASSISTANCE

Developing skills & knowledge through peer-to-peer support.

03

COMMUNITIES OF PRACTICE

Creating spaces to share experiences and connect with other professionals

04

RESOURCES & ADVOCACY

Promoting tribal access, equity, & inclusion in the EN.

TRIBAL EXCHANGE NETWORK GROUP

TXG SUPPORTS **TRIBAL** MANAGEMENT, ANALYSIS, AND SHARING OF ENVIRONMENTAL DATA

FREE TRAININGS & EVENTS

(travel scholarships available)

TRIBAL EXCHANGE NETWORK CONFERENCE

Networking and information sharing opportunity on EN projects, grants, & technology

TRIBAL DATA ACADEMY WORKSHOPS

- Excel
- Database Management
- Geospatial systems & mapping tools
- Basic coding (R and Python), data analysis, and data science

COMMUNITIES OF PRACTICE

UPCOMING:

Monthly Data Drop-In Sessions, 10am Pacific/1pm Eastern

- Thursday, June 26
- Thursday, July 17
- Thursday, August 21
- Thursday, September 18
- Thursday, October 16

TRIBAL DATA DROP-IN SESSIONS

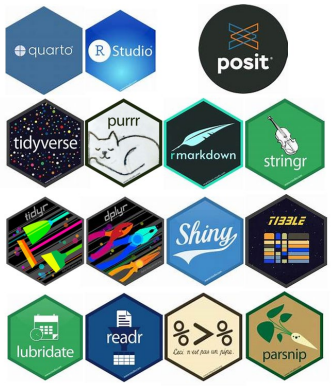
- LOTS of topics, many breakout rooms
- Demos, presentations, work along exercises
- Bring your own data-related question and get help!

OTHERS

- **Pacific Northwest Tribal Coding Group**
- The Carpentries, R Consortium, ROpenSci, Openscapes collaborations
- GitHub repositories
- Tribal Carpentries Instructor Trainees
- Network of volunteers

FREE TRIBAL ASSISTANCE (TA)

One – on – One
Using your data
A product you need
At your pace



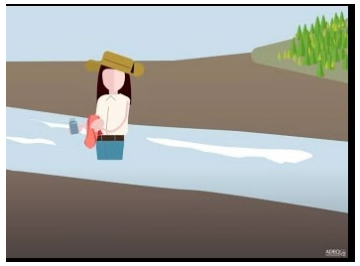
Northwest Indian Fisheries Commission

UNIVERSITY of WASHINGTON
Department of STATISTICS

JAMESTOWN S'KLALLAM TRIBE
THE STRONG PEOPLE

2025 UW- Summer Tribal Project with JST

Field Data Collection



Discrete data

WQXClient -

JST-TWQD

Tribal WQ Exchange (v2.13/v3.0)

Exchange Network Products

WQX Database

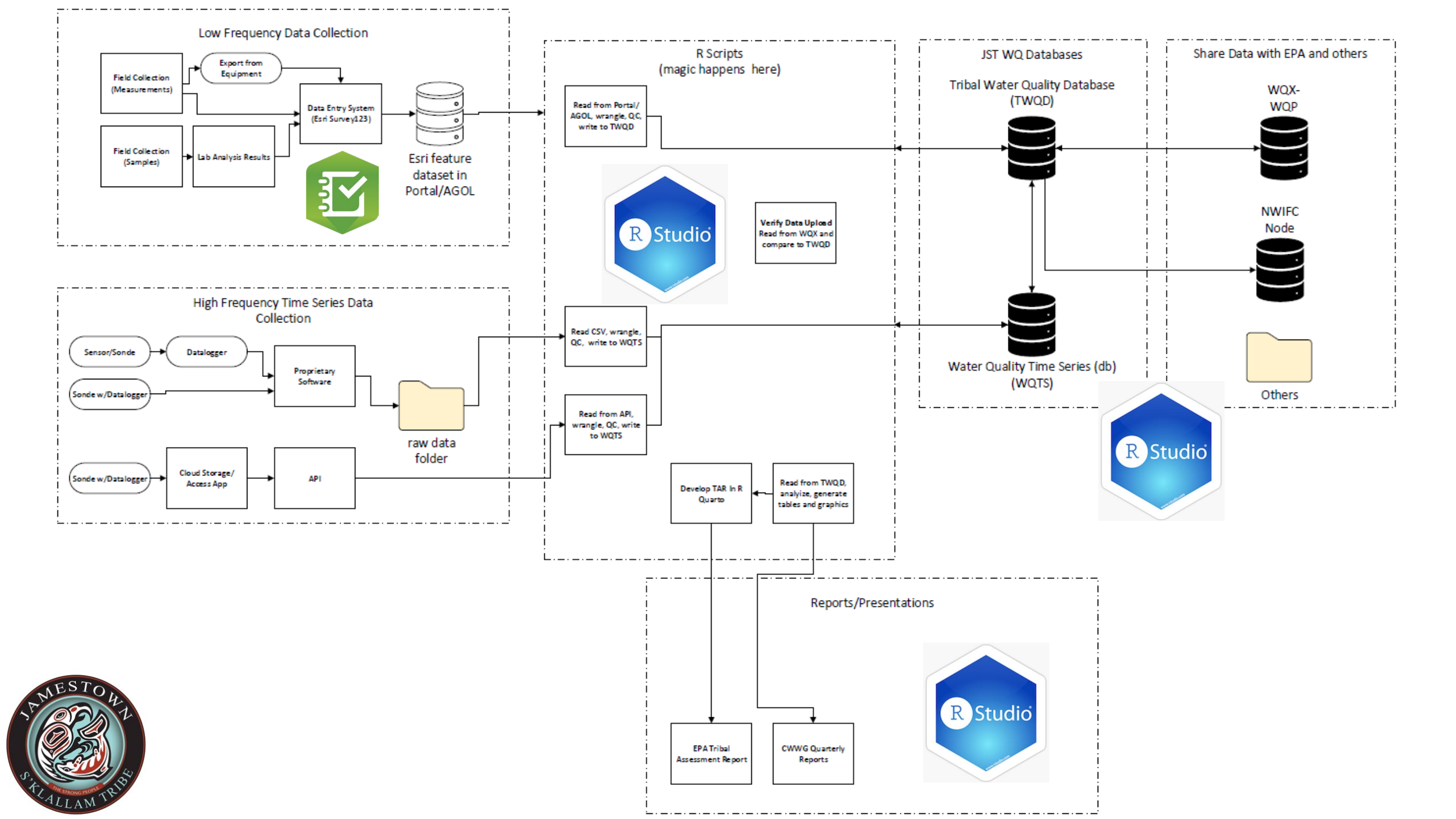
WQP Water Quality Portal

www.waterqualitydata.us
WQX, STORET, NWIS, STEWARDs...

Field Data Collection datalogger

Time-series data

JST-WQTS


Low Frequency Data Collection
Field Collection (Measurements)
Export from Equipment
Data Entry System (Esri Survey123)
Field Collection (Samples)
Lab Analysis Results
Esri feature dataset in Portal/AGOL
High Frequency Time Series Data Collection
Sensor/Sonde
Datalogger
Proprietary Software
Sonde w/Datalogger
raw data folder
Sonde w/Datalogger
Cloud Storage/ Access App
API
R Scripts (magic happens here)
Read from Portal/ AGOL, wrangle, QC, write to TWQD
RStudio
Verify Data Upload Read from WQX and compare to TWQD
Read CSV, wrangle, QC, write to WQTS
Read from API, wrangle, QC, write to WQTS
Develop TAR In R Quarto
Read from TWQD, analyize, generate tables and graphics
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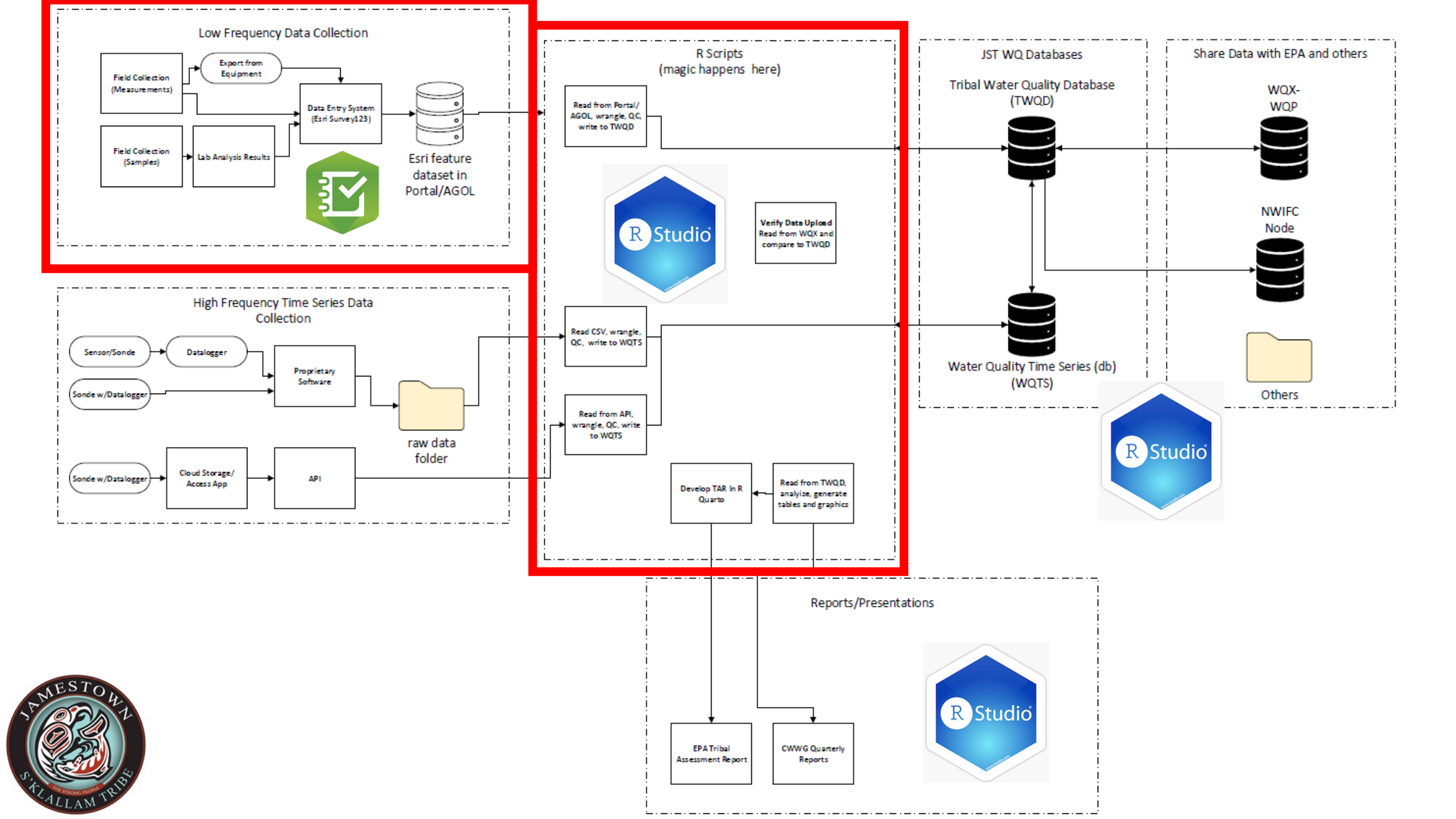
Water Quality Time Series (db) (WQTS)
Share Data with EPA and others
WQX-WQP
NWIFC Node
Others
RStudio
Reports/Presentations
EPA Tribal Assessment Report
CWWG Quarterly Reports
RStudio
JAMESTOWN S'KLALLAM TRIBE
THE STRONG PEOPLE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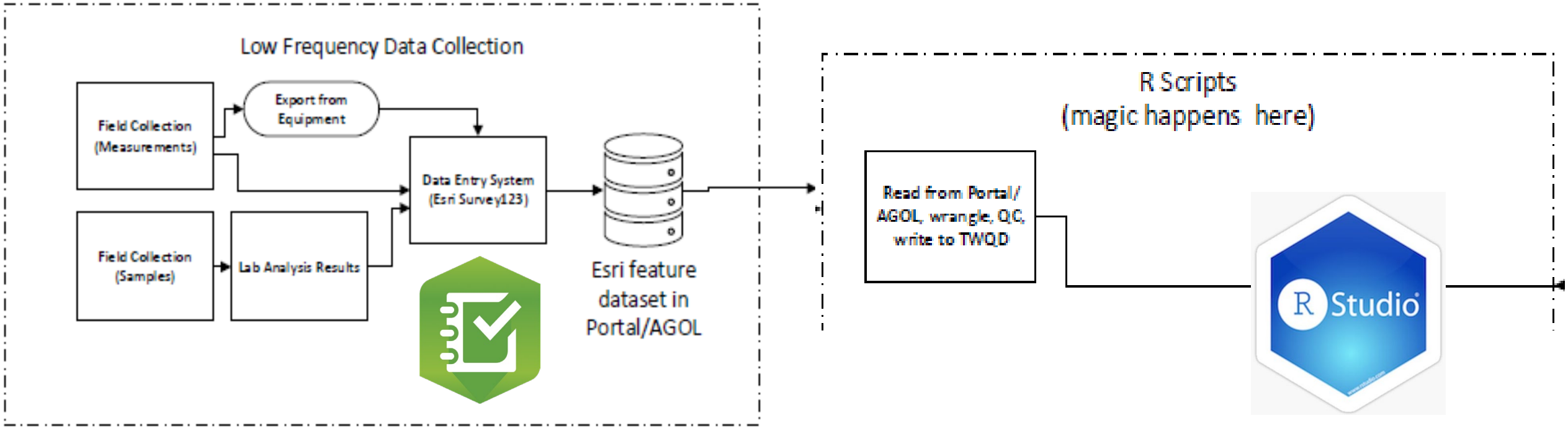
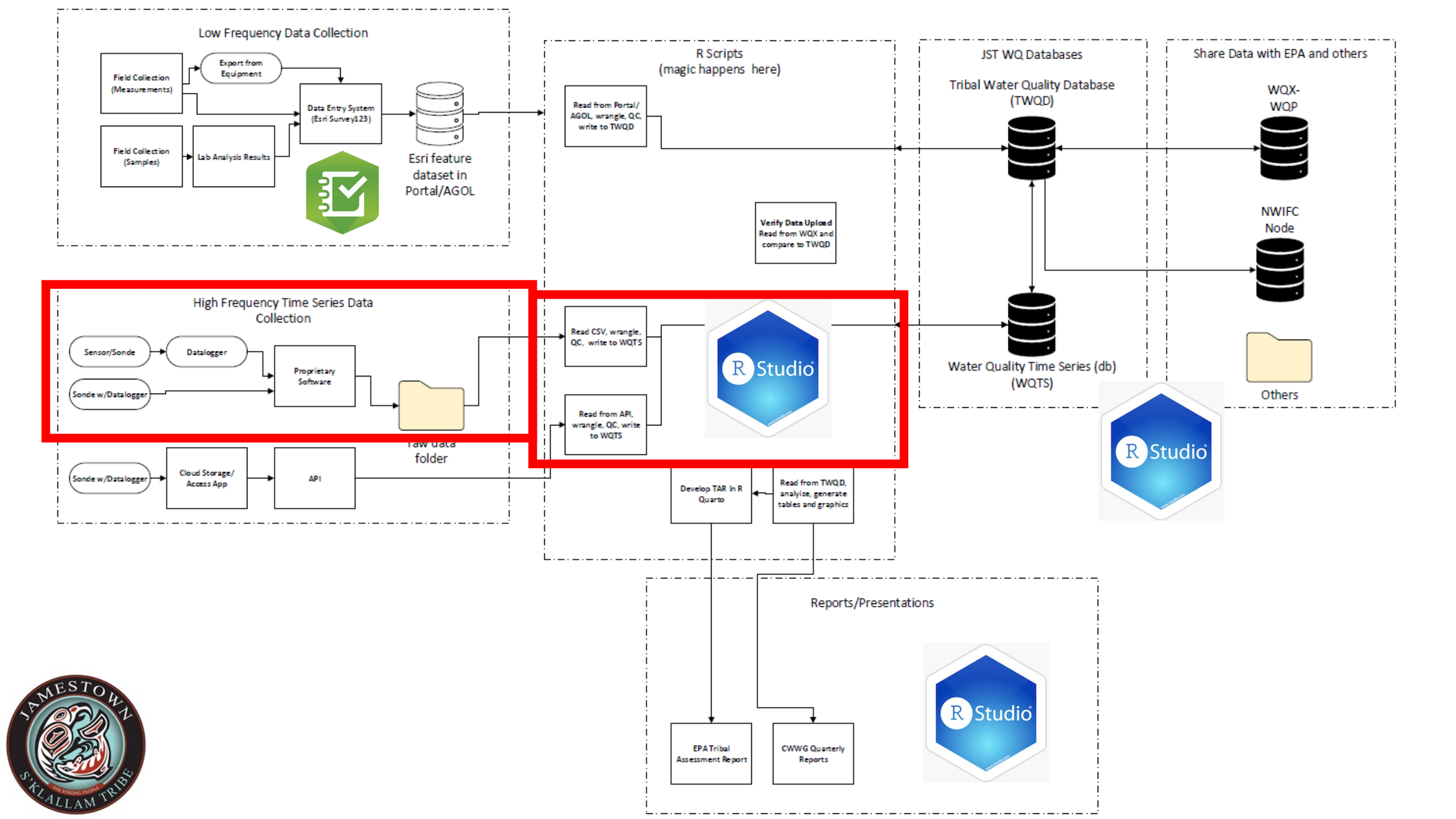


Water Quality Portal – Tools for Automated Data Analysis (TADA)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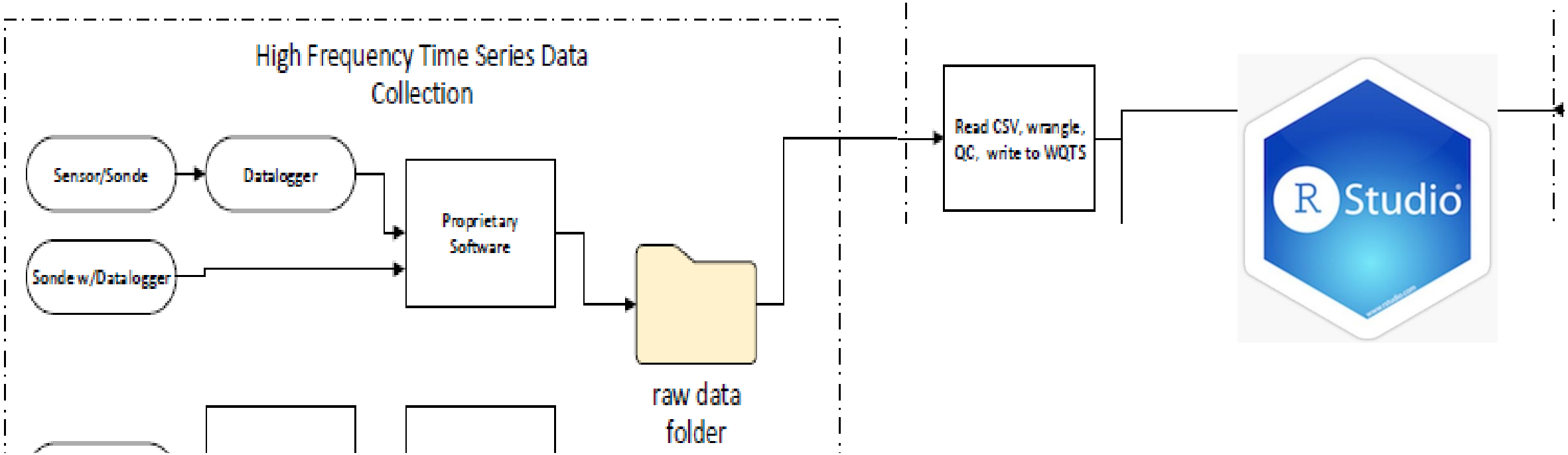

ContDataQC Shiny App Workflow

The table below lays out the general workflow for using the ContDataQC app.

Action	Main Tab	Subtab(s) or Dropdown(s)
Organize sensor files	Data Preparation	Organizing Files
Name sensor files	Data Preparation	Naming Files
Format sensor files	Data Preparation	Formatting Files, Automated Reformatting
Evaluate QC test thresholds	Main Functions	QC Thresholds >> Evaluate Thresholds
Customize thresholds if necessary	Main Functions	QC Thresholds >> Edit Thresholds
Save and upload customized configuration file (if needed)	Main Functions	QC Thresholds >> Upload Custom Thresholds
Generate QC reports; review results; remove or correct data points as needed	Main Functions	Run Functions >> QC Raw Data
Combine QC'd data files from the same site/different time periods into a single file	Main Functions	Run Functions >> Aggregate QC'd data
Generate summary and visualization outputs	Main Functions	Run Functions >> Summary Statistics

EPA United States Environmental Protection Agency

Water Quality Portal – Tools for Automated Data Analysis (TADA)

JAMESTOWN S'KLALLAM TRIBE

RESOURCES & CONTACTS

TRIBAL EXCHANGE NETWORK GROUP

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Penobscot Nation
Water Resources Program
207.356.5167
angie.reed@penobscotnation.org

quarto
ggplot2
knitr
stringr
rmarkdown
tidyverse
RStudio
janitor
QUARTO
RSTUDIO
FIELD NOTES