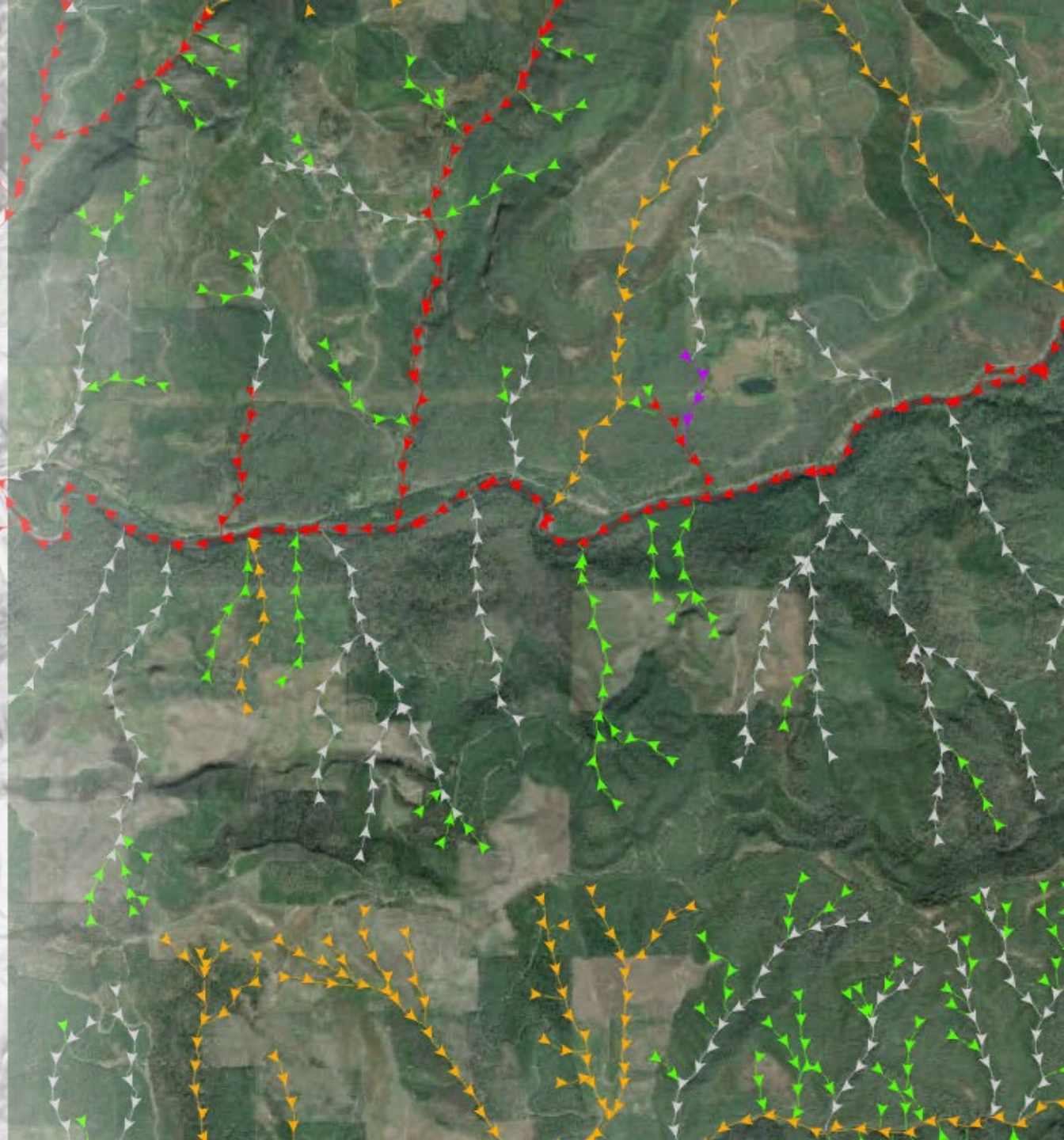
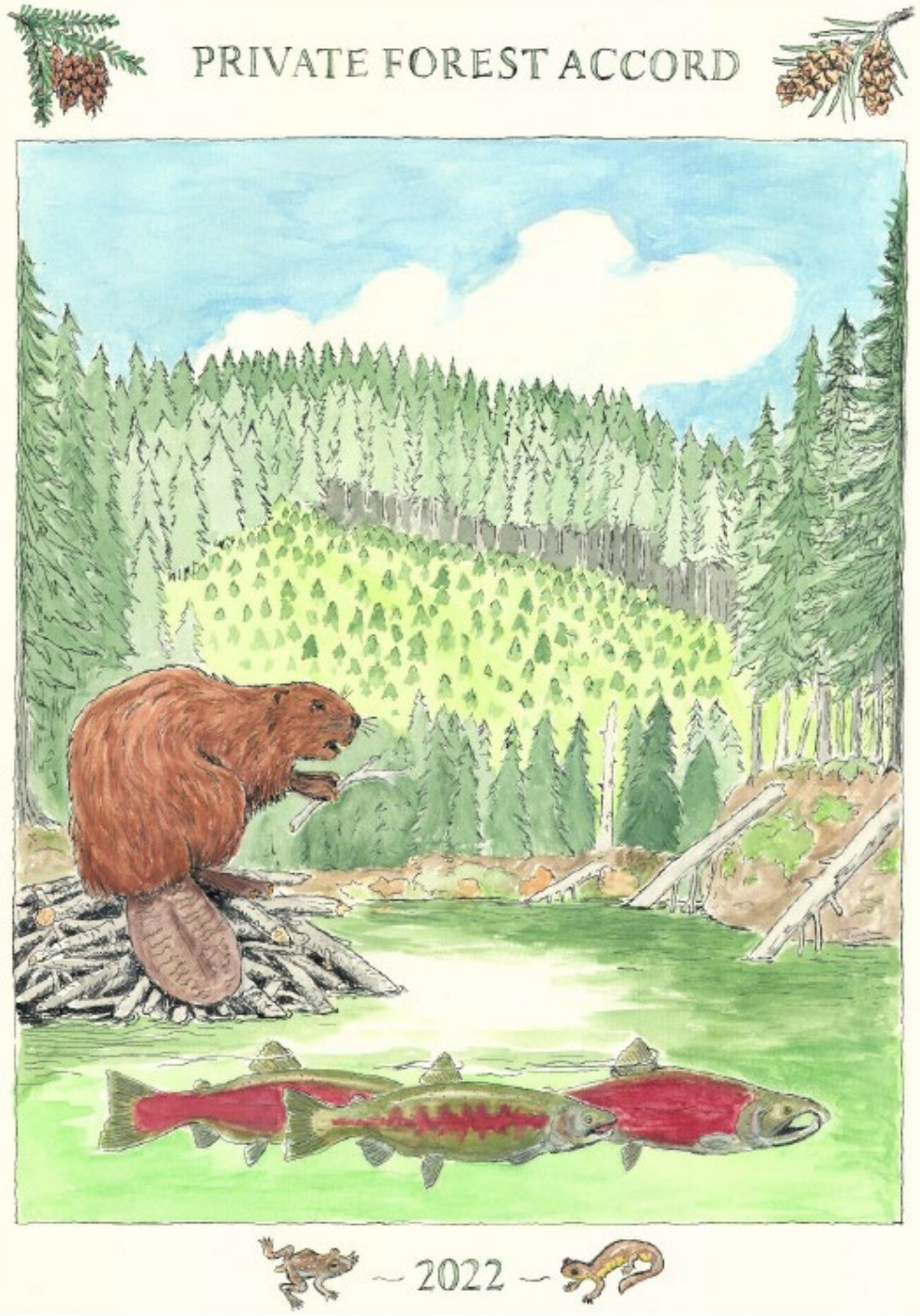
# Going with the Flow: Developing the Statewide Flow Line Dataset



**Arthur Rodriguez, GIS Coordinator**

**Oregon Department of Forestry**




# Private Forest Accord

- Negotiation between timber and conservation groups
  - Forest road management
  - Compliance monitoring
  - Mitigation programs
- Increased stream protections around fish habitat

# The Map Request

- “Develop and maintain statewide hydrography on private forest lands based on the highest-resolution digital elevation models…”
- “A map will be developed by TerrainWorks to identify Type F streams based on… [the Fransen] fish distribution model…”
- “…map … will be modified to incorporate historical ‘ODF End of Fish’ information obtained from physical habitat surveys or direct sampling of fish presence, subject to a quality assurance and quality control review where data are available.”
- Final data must be available in FERNS on July 1, 2023

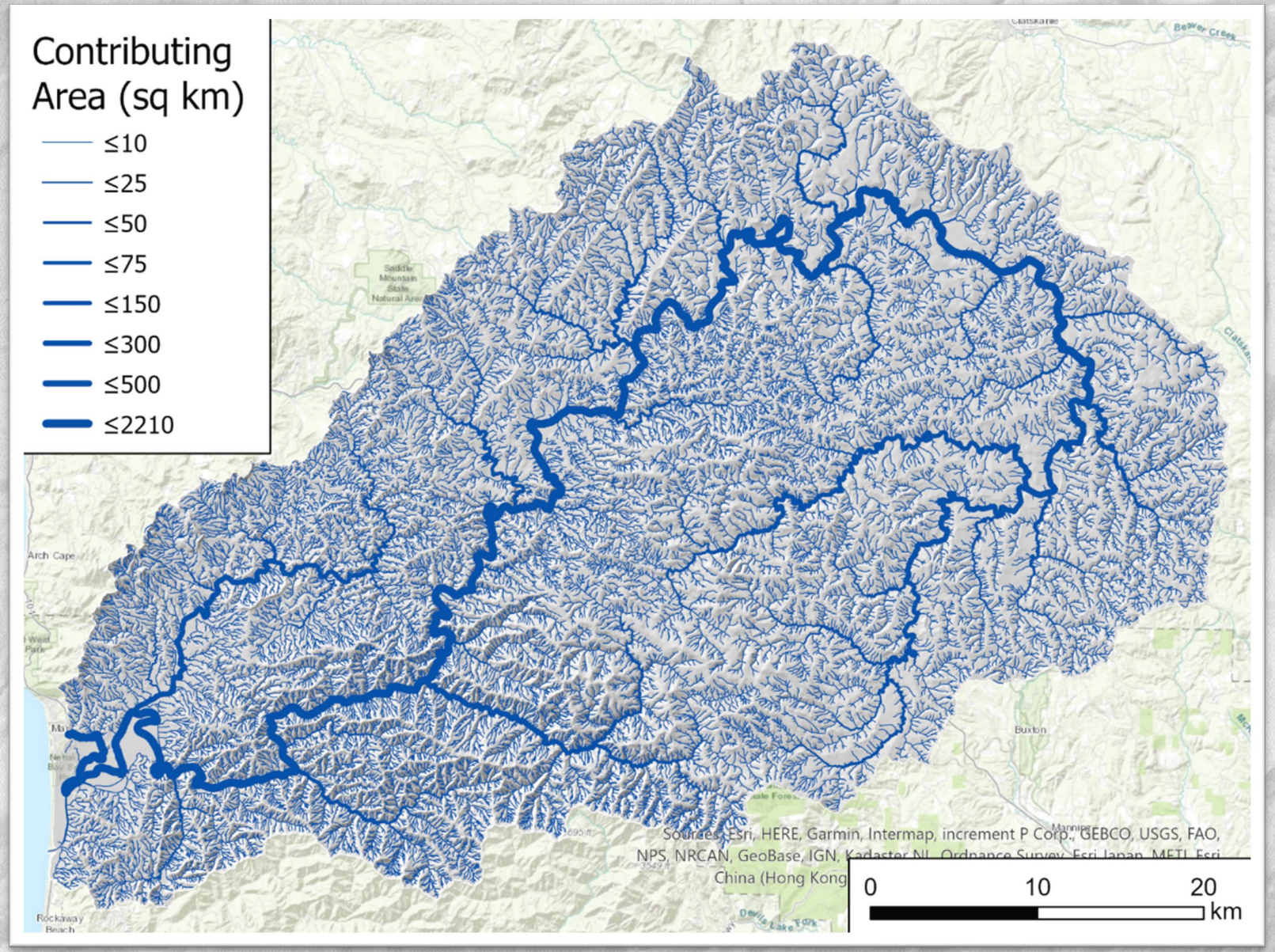
# Primary Collaborators

- Oregon Department of Forestry
- Oregon Department of Fish and Wildlife
- TerrainWorks

# Statewide Hydrography and Fish Model

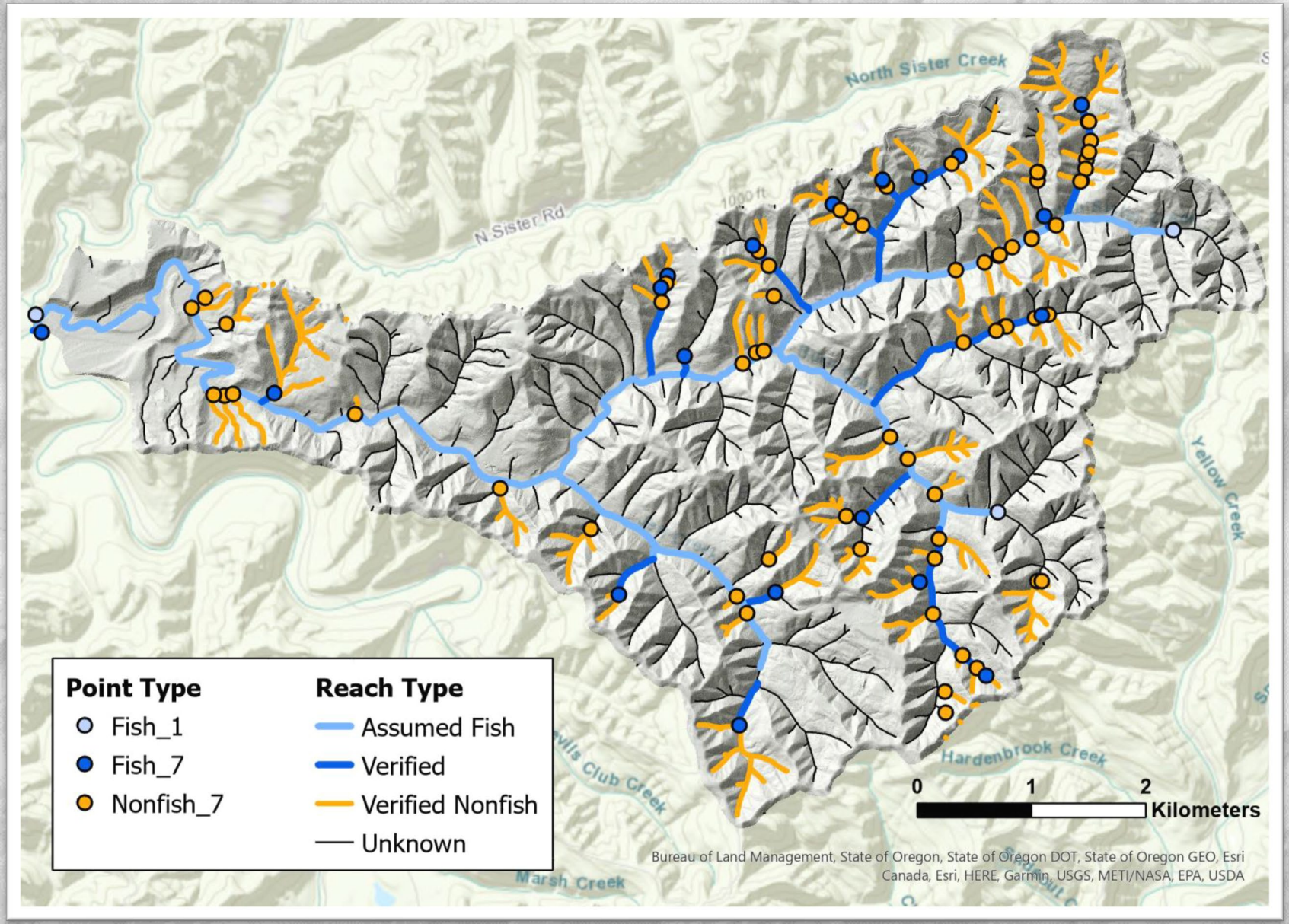
Synthetic Stream Network potential calculations:

Drainage area; Elevation; Stream width, depth, order, classification, flow; Precipitation effects; Fish habitat, Floodplain width; Climate change predictions

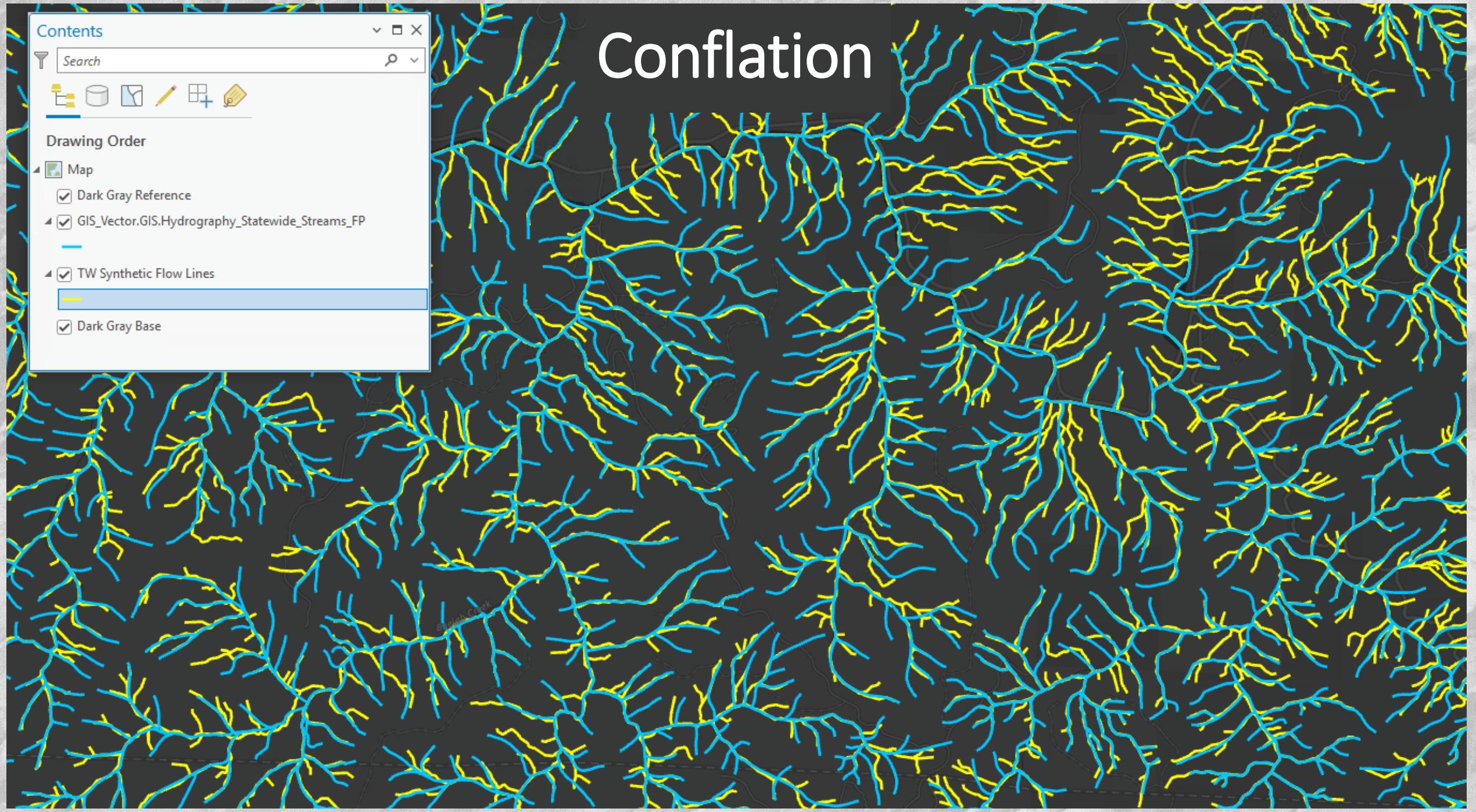


# Incorporate Historic Fish Surveys

- Convert ODF Streams to “End of Survey Points”
- Conflate ODF Survey points to Synthetic Stream Network



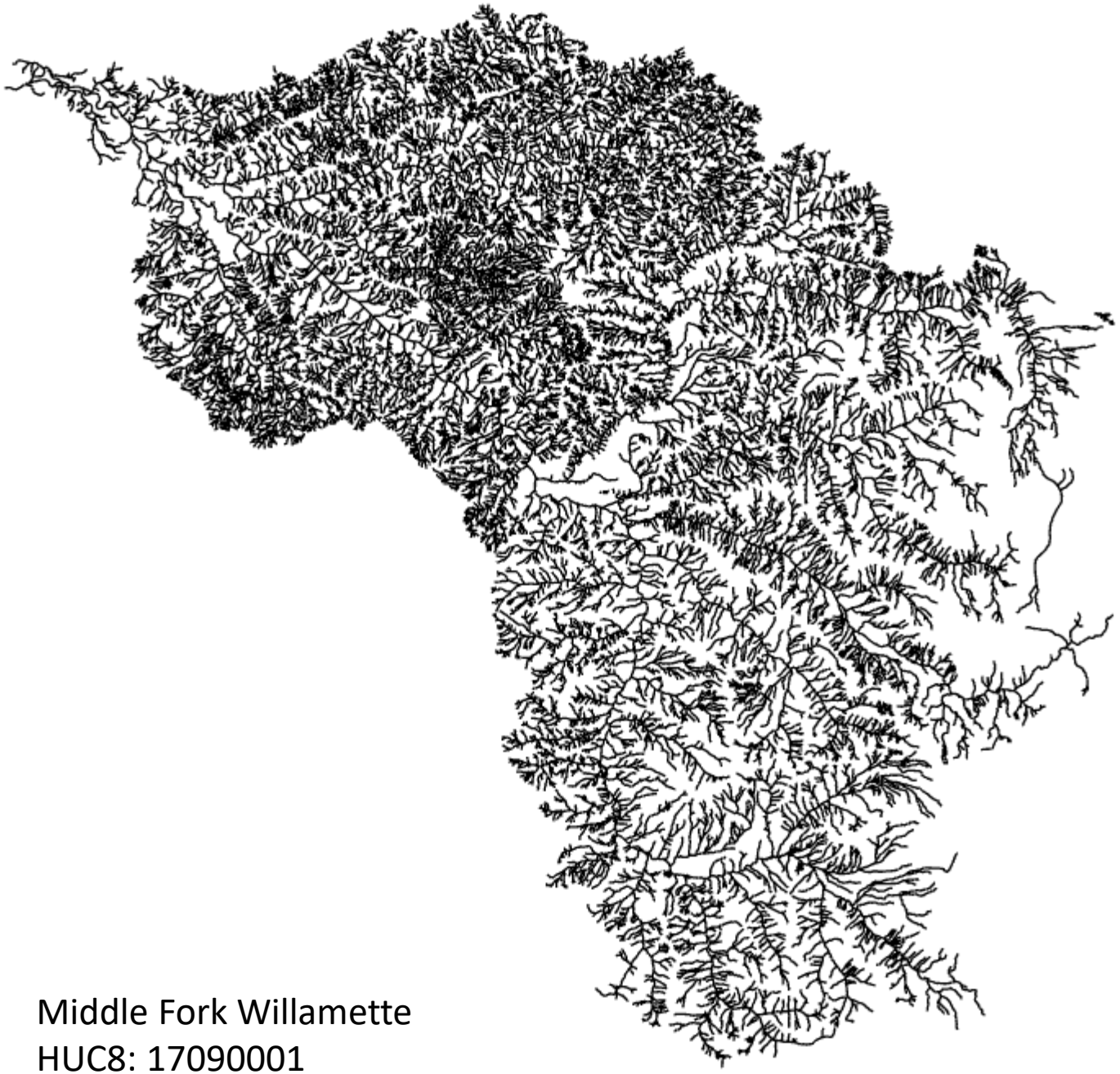
# Conflation


Contents
Search
Drawing Order
Map
Dark Gray Reference
GIS_Vector.GIS.Hydrography_Statewide_Streams_FP
TW Synthetic Flow Lines
Dark Gray Base

# Data Cleanup

# Data Cleanup Workflow

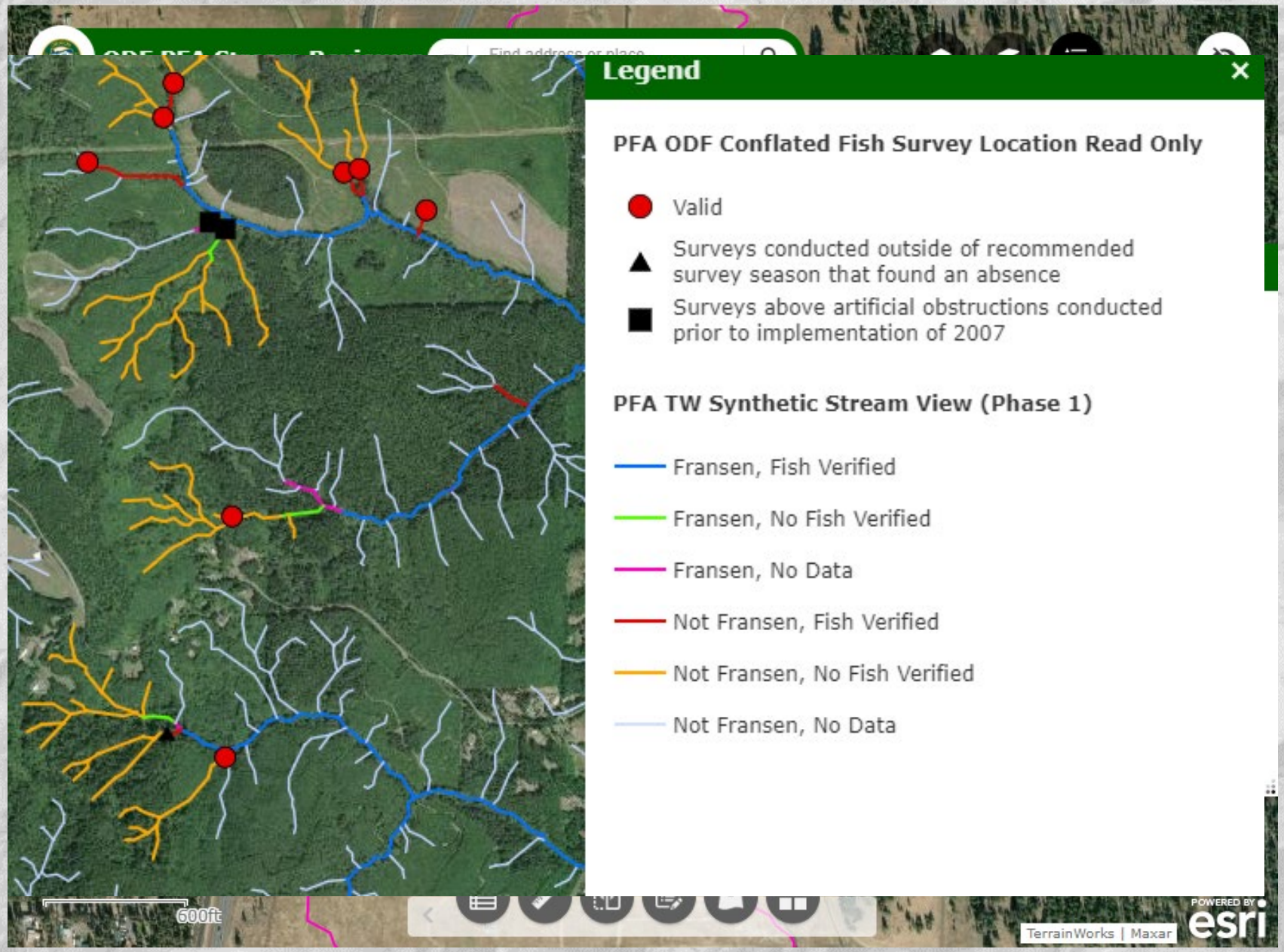
- Create Replica from Enterprise Feature Class
- Topology Rules
  - Must not intersect
  - Must not self-intersect
  - Must be single part
  - Must not be dangles
- Trace Network
- Check-in Replica



Middle Fork Willamette
HUC8: 17090001

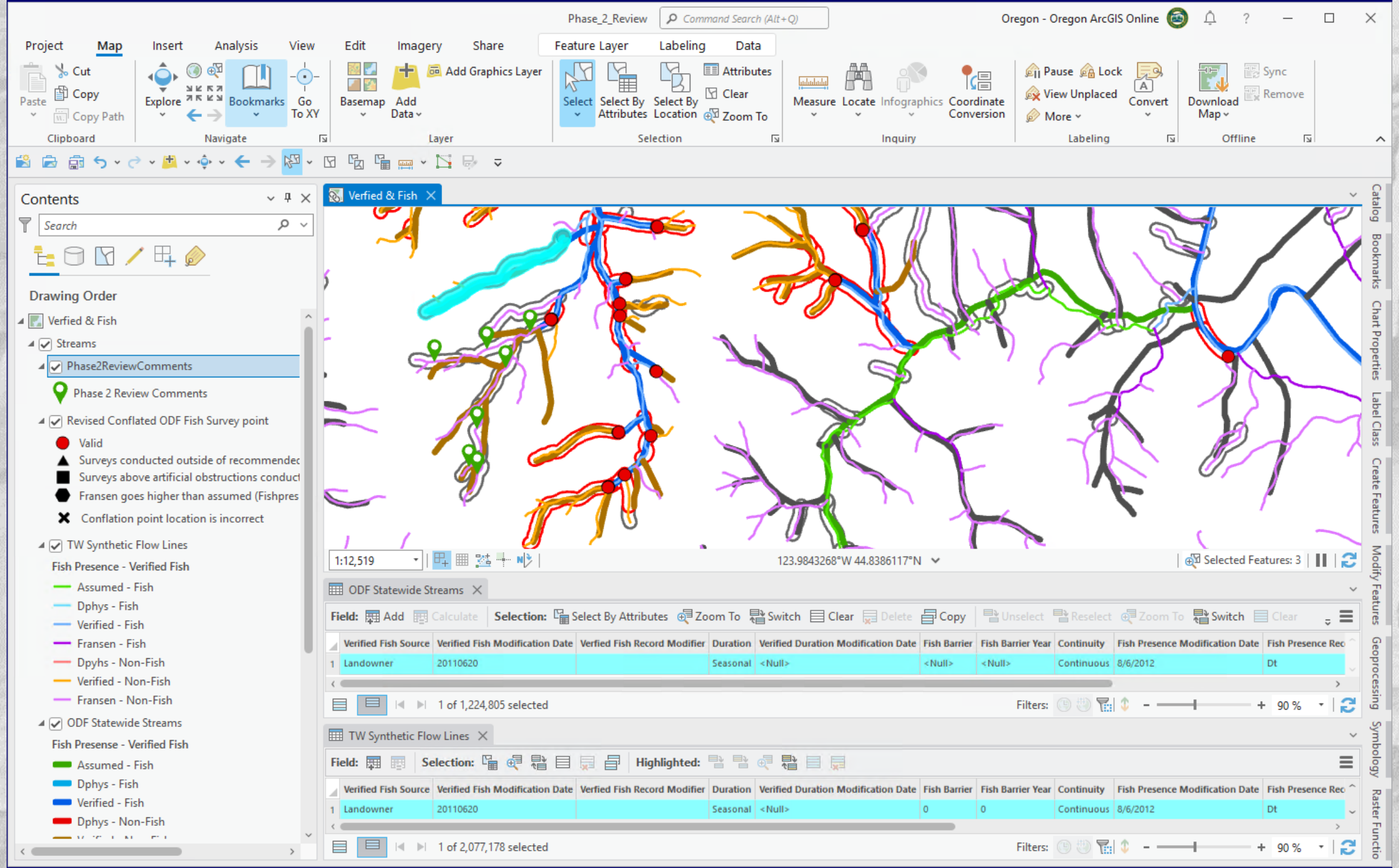
# Data Review: Phase 1

- ODF: Web application to allow multiple programs and staff to review geometry and initial conflation
- ODFW: Provide editable feature service to validate historic surveys



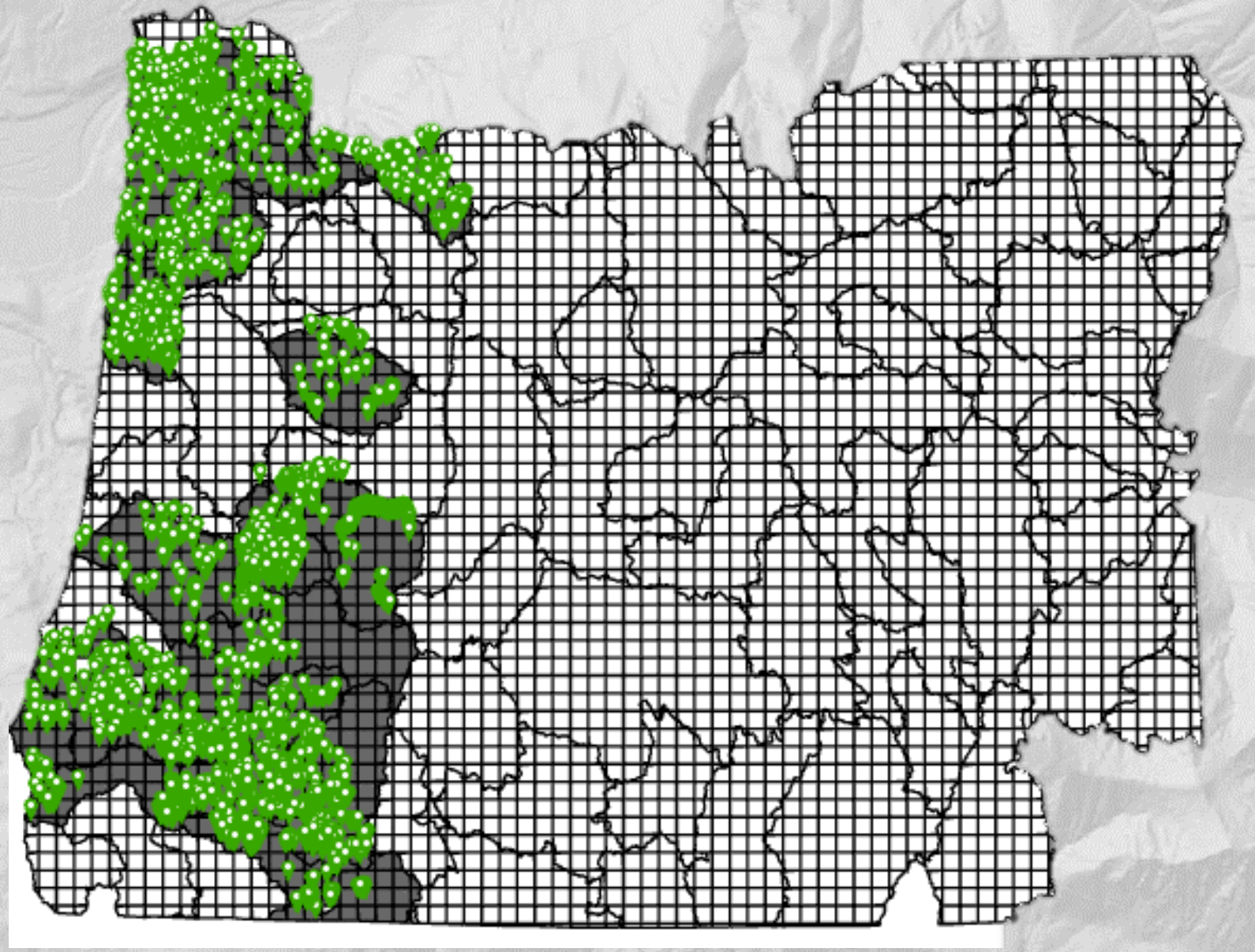
# Data Review: Phase 2

- Contract requirements: Check 20% of streams and ensure a 90% conflation success rate
- Condensed Timeline
  - Automated selection of streams to check
  - Streamline review in ArcGIS Pro
  - Ability to add new staff quickly


Phase_2_Review
Command Search (Alt+Q)
Oregon - Oregon ArcGIS Online
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Feature Layer
Labeling
Data
Paste
Cut
Copy
Copy Path
Clipboard
Explore
Bookmarks
Go To XY
Navigate
Basemap
Add Data
Add Graphics Layer
Layer
Select
Select By Attributes
Select By Location
Attributes
Clear
Zoom To
Selection
Measure
Locate
Infographics
Coordinate Conversion
Inquiry
Pause
Lock
View Unplaced
More
Convert
Labeling
Download Map
Sync
Remove
Offline
Contents
Search
Drawing Order
Verfied & Fish
Streams
Phase2ReviewComments
Phase 2 Review Comments
Revised Conflated ODF Fish Survey point
Valid
Surveys conducted outside of recommendec
Surveys above artificial obstructions conduct
Fransen goes higher than assumed (Fishpres
Conflation point location is incorrect
TW Synthetic Flow Lines
Fish Presence - Verified Fish
Assumed - Fish
Dphys - Fish
Verified - Fish
Fransen - Fish
Dpyhs - Non-Fish
Verified - Non-Fish
Fransen - Non-Fish
ODF Statewide Streams
Fish Presense - Verified Fish
Assumed - Fish
Dphys - Fish
Verified - Fish
Dphys - Non-Fish
Verfied & Fish
1:12,519
123.9843268°W 44.8386117°N
Selected Features: 3
ODF Statewide Streams
Field: Add Calculate
Selection: Select By Attributes Zoom To Switch Clear Delete Copy Unselect Reselect Zoom To Switch Clear
Verified Fish Source | Verified Fish Modification Date | Verfied Fish Record Modifier | Duration | Verified Duration Modification Date | Fish Barrier | Fish Barrier Year | Continuity | Fish Presence Modification Date | Fish Presence Rec
1 | Landowner | 20110620 | | Seasonal | <Null> | <Null> | <Null> | Continuous | 8/6/2012 | Dt
1 of 1,224,805 selected
Filters:
90 %
TW Synthetic Flow Lines
Field:
Selection:
Highlighted:
Verified Fish Source | Verified Fish Modification Date | Verfied Fish Record Modifier | Duration | Verified Duration Modification Date | Fish Barrier | Fish Barrier Year | Continuity | Fish Presence Modification Date | Fish Presence Rec
1 | Landowner | 20110620 | | Seasonal | <Null> | 0 | 0 | Continuous | 8/6/2012 | Dt
1 of 2,077,178 selected
Filters:
90 %
Catalog
Bookmarks
Chart Properties
Label Class
Create Features
Modify Features
Geoprocessing
Symbology
Raster Functio

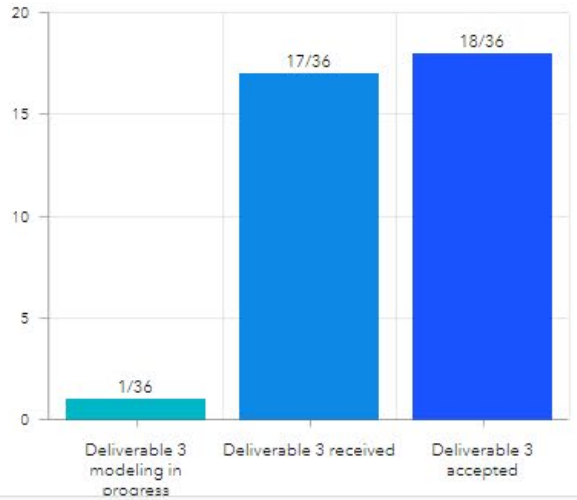
# Project Tracking

- Review Feature Services
- Project Dashboard

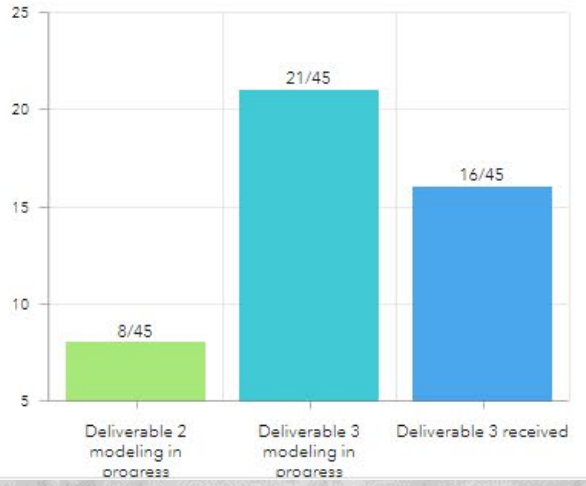


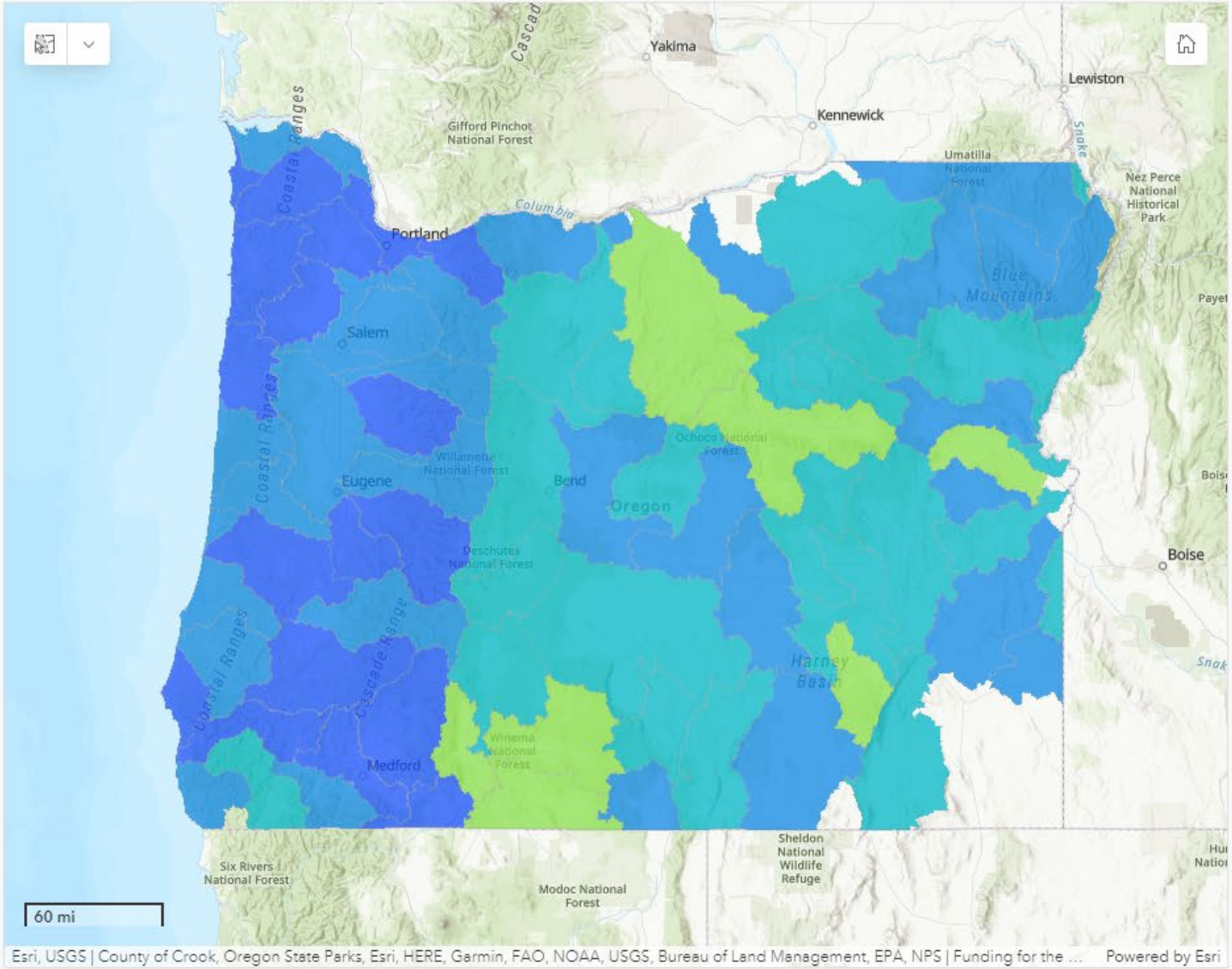
# ODF PFA Streams Watershed Tracking Dashboard

## Western Oregon Area Watershed by Status




## Eastern Oregon Area Watershed by Status




## PFA Watershed Status

- ODF data prep
- Deliverable 2 modeling in progress
- Deliverable 2 received
- Deliverable 3 modeling in progress
- Deliverable 3 received
- Deliverable 3 accepted
- Deliverables 4-6 received
- All deliverables accepted

**Deliverable 2:** An initial attributed synthetic stream dataset delineated using highest resolution digital elevation model available. Attributed data will include information from current ODF stream product, including location of the end of fish use from ODF field surveys. Data will be reviewed by ODF and ODFW before being accepted.

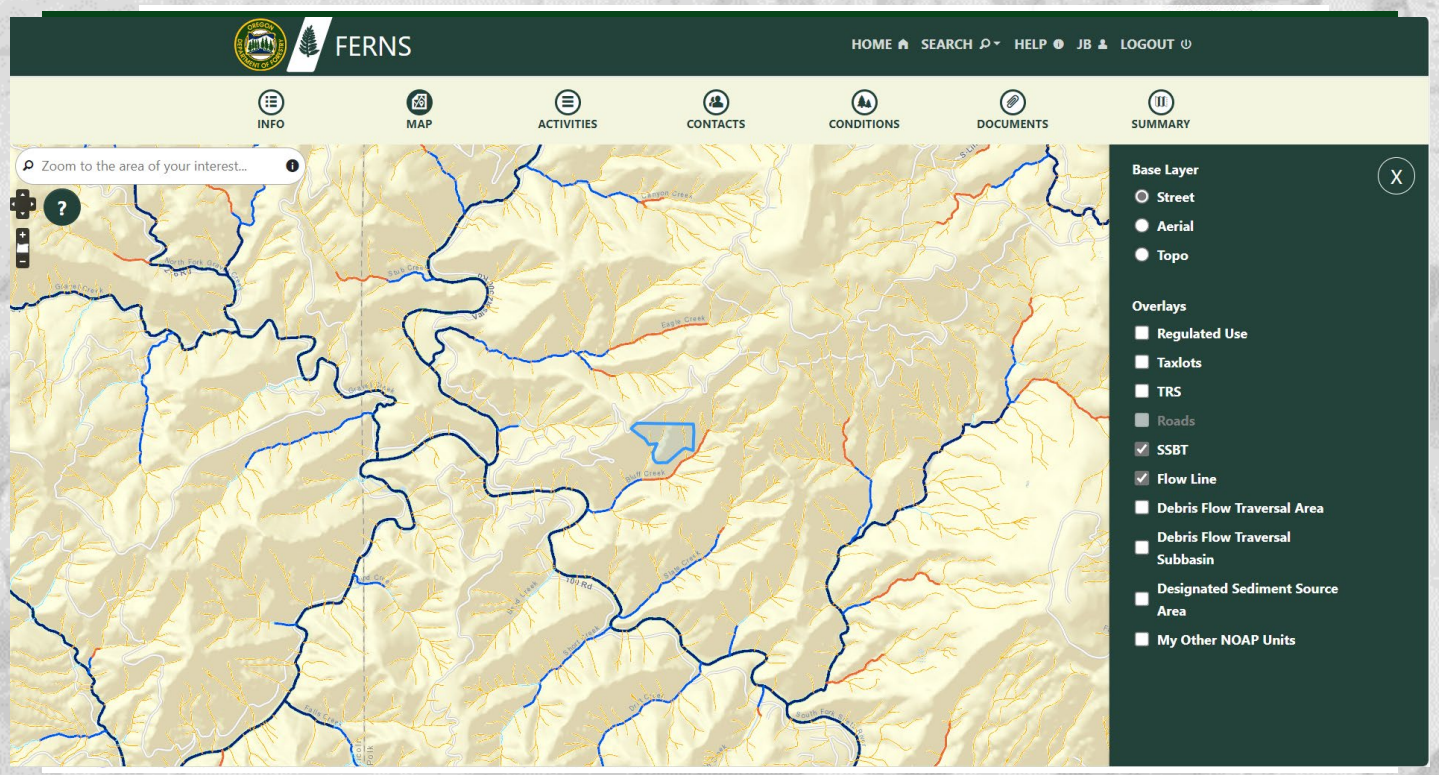
**Deliverable 3:** Final synthetic stream dataset using feedback from Deliverable 2 and will include ALL stream reach attributes as required in the PFA report. Data will be reviewed by ODF and ODFW before accepting as final stream data.

**Deliverables 4-6:** Modeling outputs generated based off of streams accepted in Deliverable 3 including landslide and debris flow susceptibility, sediment source areas, and Trigger Sources for high volume debris flow. *Note that per the PFA these products

| Del. 2 | Del. 3 | Del. 4-6* | Accepted |
|---|---|---|---|
| 8/81 | 55/81 | 18/36 | 0/81 |

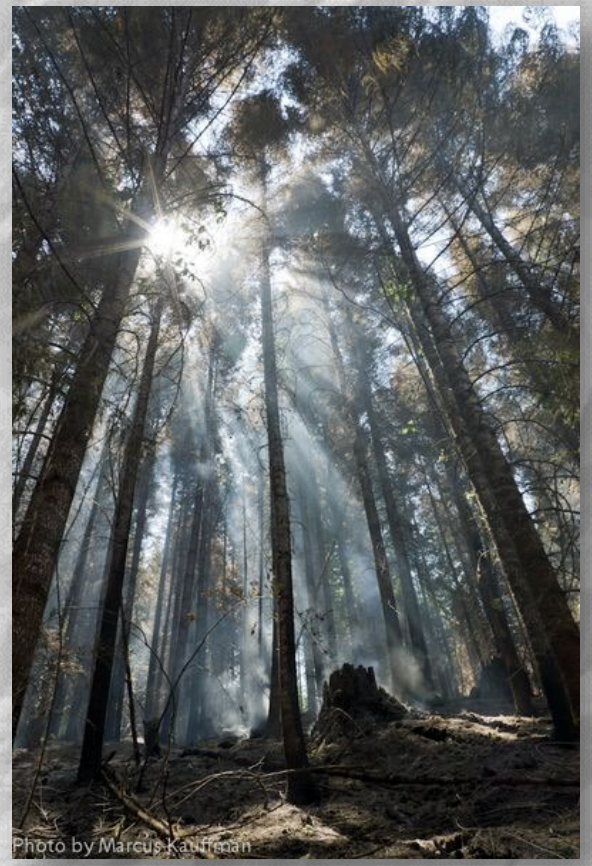
# Flow Line Data Released on July 1, 2023

- Data management considerations
- Public data access
- Incorporating data into rules and required processes



# Unique Challenges

- Transitioning modeled information into a regulatory dataset
  - Maintaining complex attributes
  - Flow Line accuracy
  - Compiling information
- Standardizing the data update process
  - Survey collection
  - Review process
  - Tracking



# Lessons Learned

- Standardized workflows
- Take advantage of new technologies
- Specific contract requirements
- Need for more GIS input in legislative process

## Thank you….

- ODF
  - GIS Unit, Forest Resources, State Forests
- ODFW
- TerrainWorks

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https://oregon-department-of-forestry-geo.hub.arcgis.com/