


# Routing Water Right Data on Stream Networks

Ken Smith

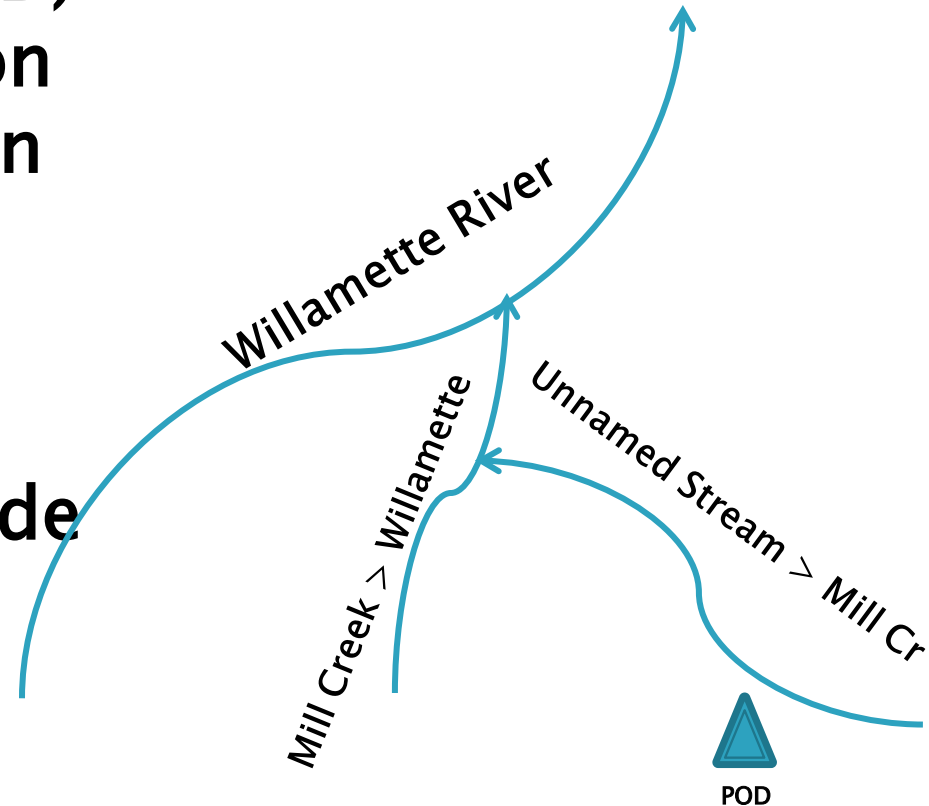
February 26, 2016

# Agenda

- ▶ How do we tie water rights to streams?
  - ▶ What is a stream code and how it is used?
  - ▶ The history of stream coding and its limitations
  - ▶ Project to move to National Hydrography Data with flow direction, confluences, and measures
  - ▶ Demonstrate New Web Query tools using this technology
  - ▶ Questions
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# How do we tie water rights to streams?

- ▶ Points of diversion (POD) are mapped based upon the location specified in the document
- ▶ POD is assigned to a stream via a stream code



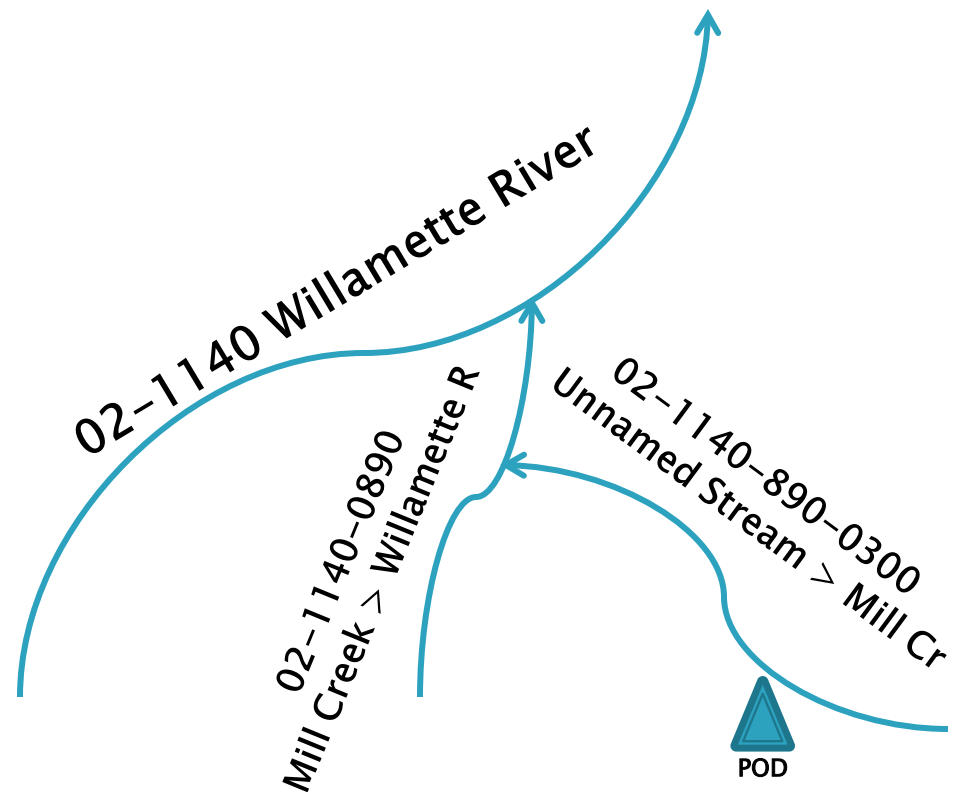
# What is a Stream Code

- ▶ Describes the relationship of that stream to all streams in it's downstream path.

*Example:*

Unnamed Stream > Mill Cr:  
*02-1140-890-0300*

02 - Basin 2  
1140 - Willamette River  
0890 - Mill Creek  
0300 - Unnamed Stream



# Stream Code Usage

- ▶ **Find rights for a stream system:**
  - Searching for rights with a stream code that start with *02-1140* would return all rights on the Willamette River and all of it's tributaries.
- ▶ **Limitations**
  - Can not limit it to a section of the Willamette River.
  - Can not tell if a right is upstream or downstream of other rights
  - This would be similar to just having the street name of a house without knowing the house number.

# Stream Code/Mapping History

## Early 1980s – Basin Maps

- ▶ Manually determined and written on a basin map.
- ▶ This basin map was about 1:126,000 scale.



Only streams with water rights were coded.

# Stream Code/Mapping

## Mid 1990's - 100k

- ▶ Stream codes were manually assigned from the paper basin maps to 1:100,000 scale stream data
- ▶ Not all basin stream codes were able to be mapped onto the 100k data
- ▶ Stream cartography did not have flow directions or measures



*Not all 100K streams have stream codes.*

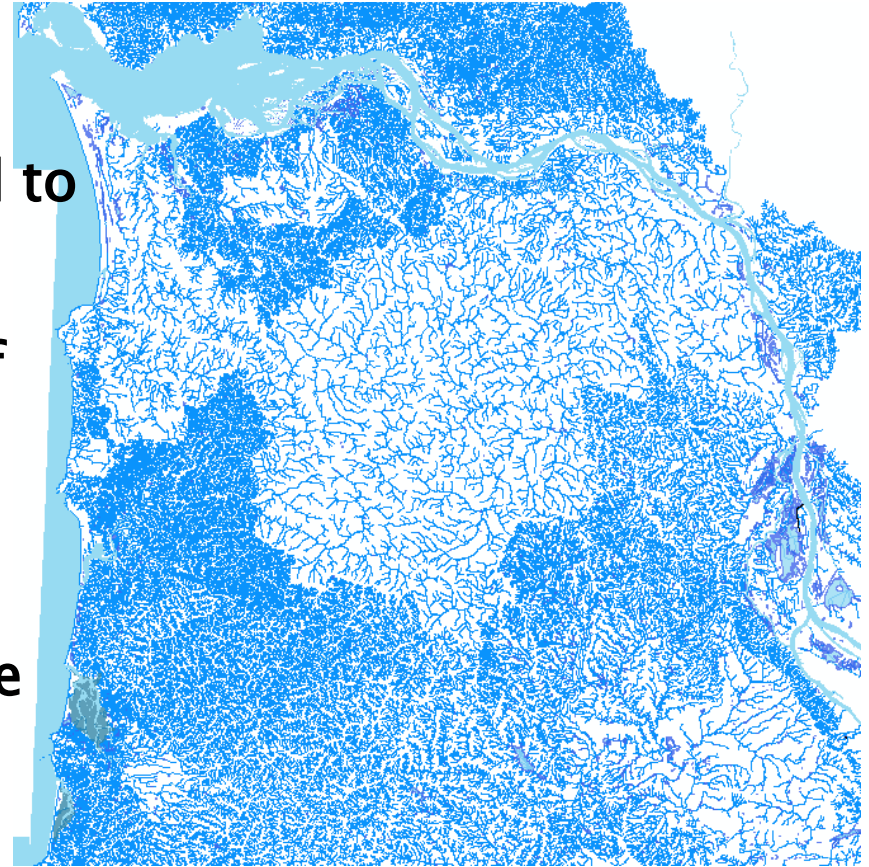
Total: 82,000 streams

Stream coded: 23,880 streams

# Stream Code/Mapping

## Mid 2000 - 24k

- ▶ 100k stream data was conflated to 1:24,000 scale stream data.
- ▶ More accurate representation of the streams
- ▶ More streams in 24k data
- ▶ Stream cartography did not have flow directions or measures



*More streams represented than the 100k,  
but still not all are stream coded*

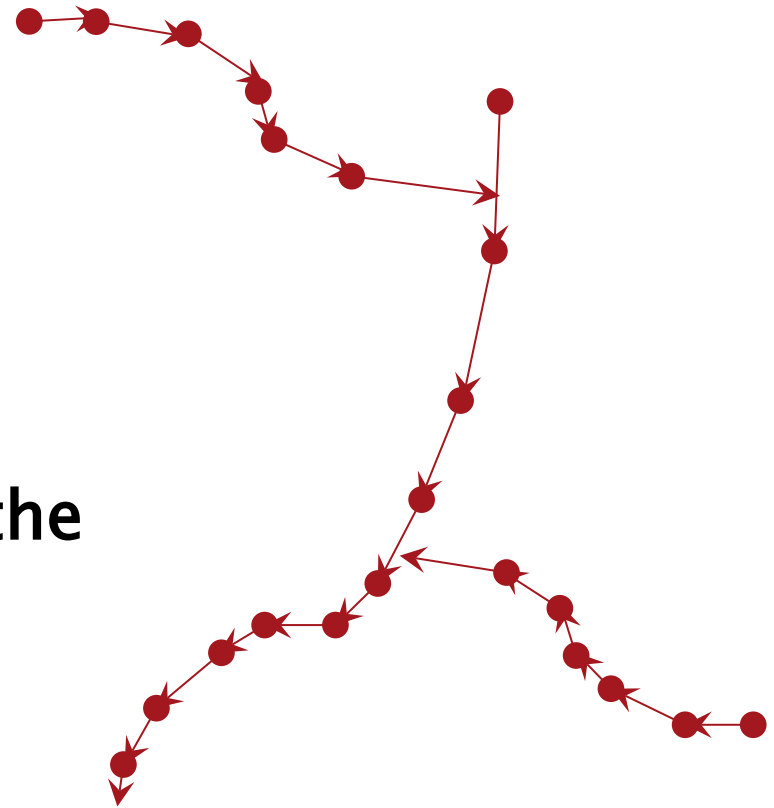
Total: 710,984 streams  
Stream coded: 26,790



# Stream Code/Mapping

## 2015 – National Hydrography Dataset

- ▶ National standard
- ▶ Based on 24k stream data
- ▶ Includes flow direction lines
- ▶ Includes measurements for the lines
- ▶ In 2014 we started a pilot in the Klamath to test NHD



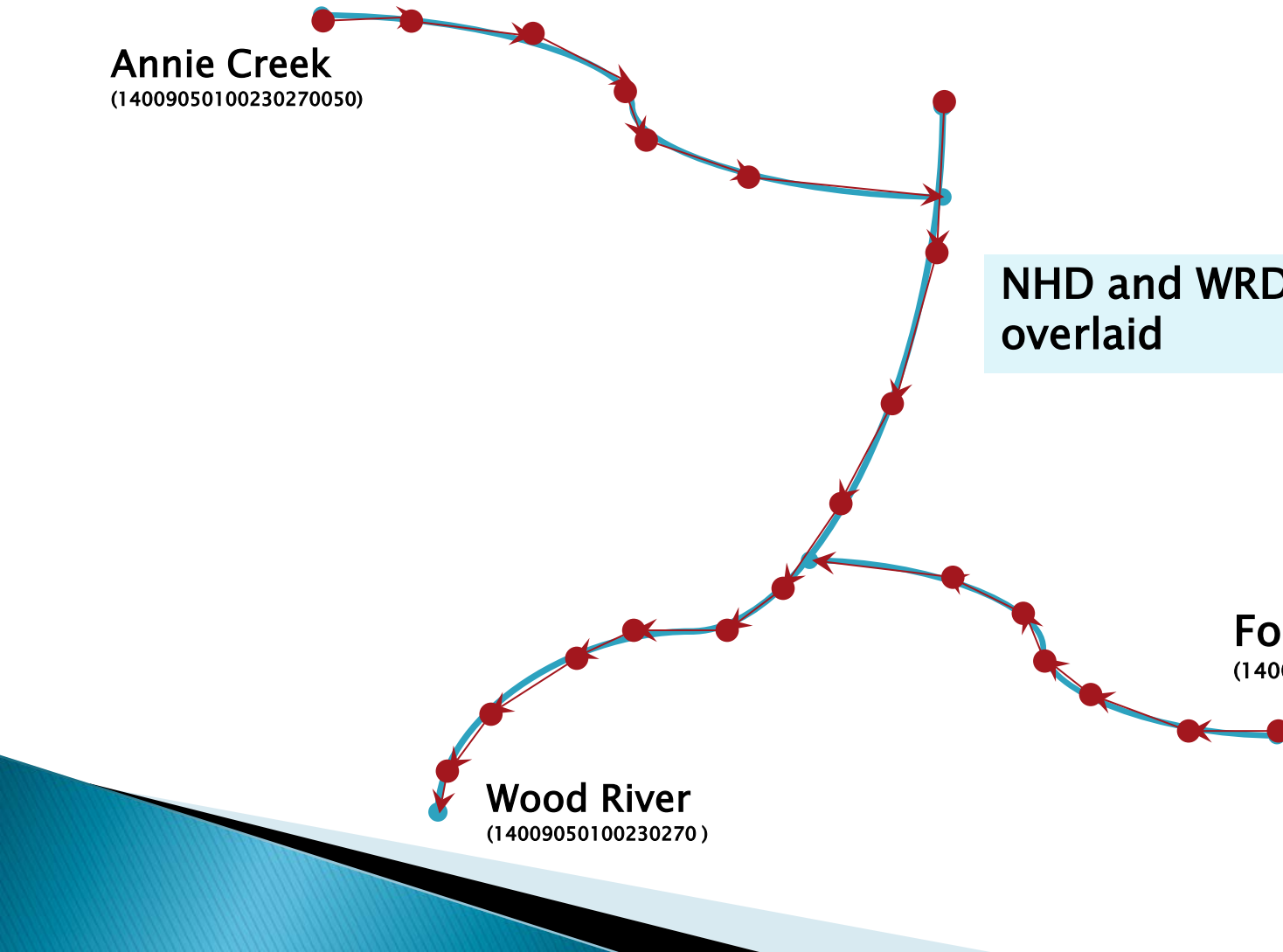
# Conflate NHD & WRD Streams

**Annie Creek**  
(14009050100230270050)

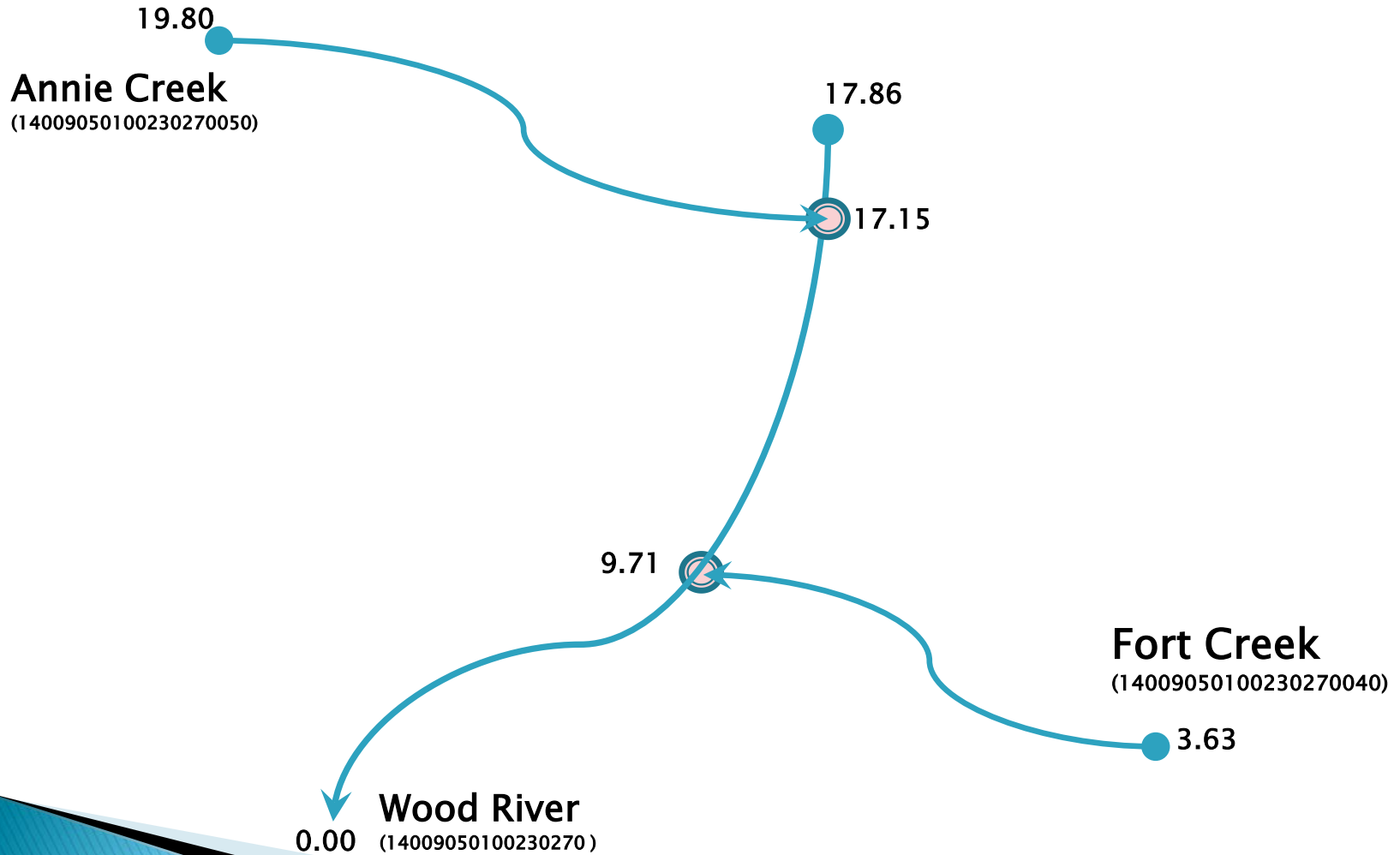
NHD and WRD streams are overlaid

**Fort Creek**  
(14009050100230270040)

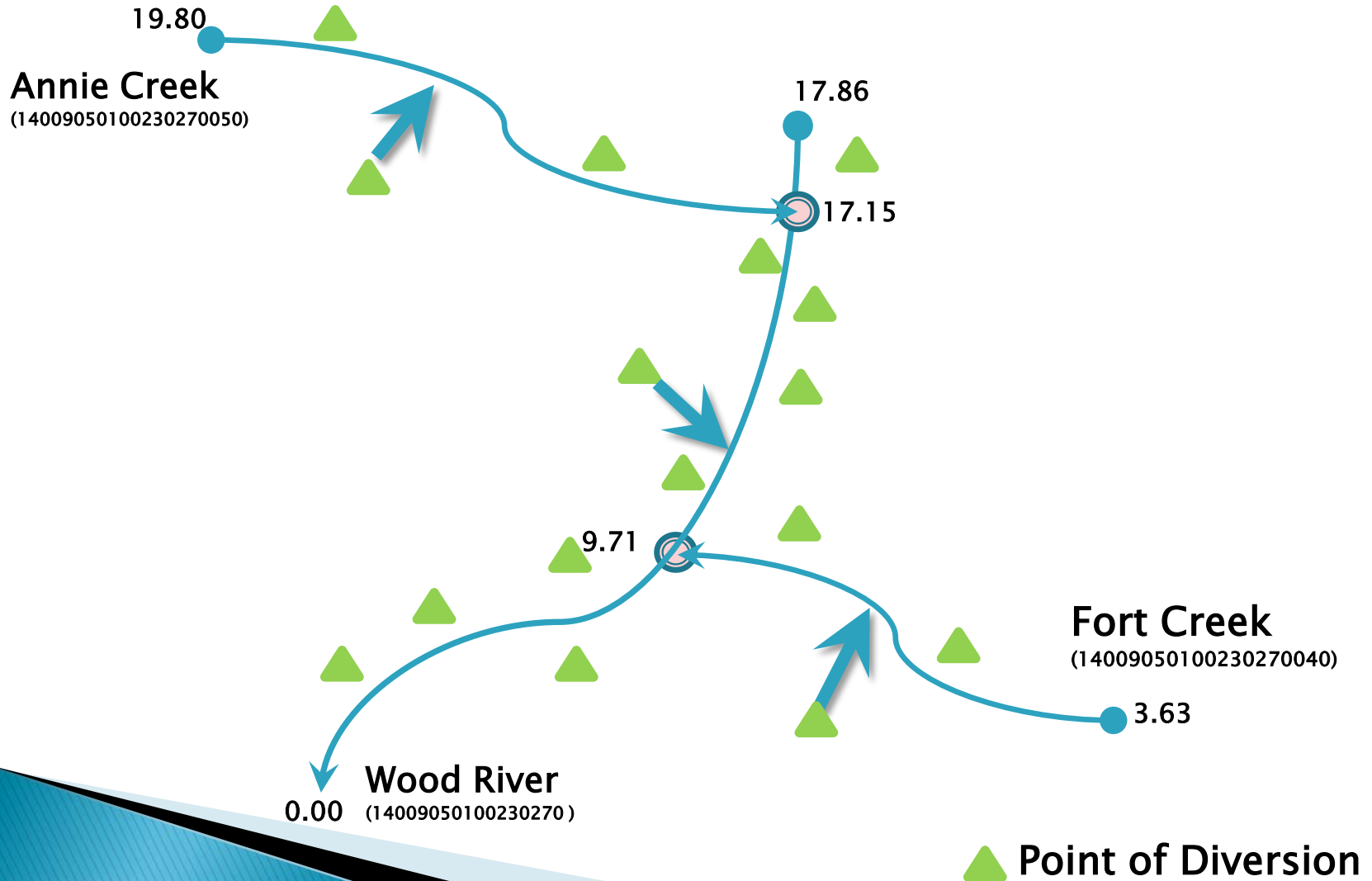
**Wood River**  
(14009050100230270)



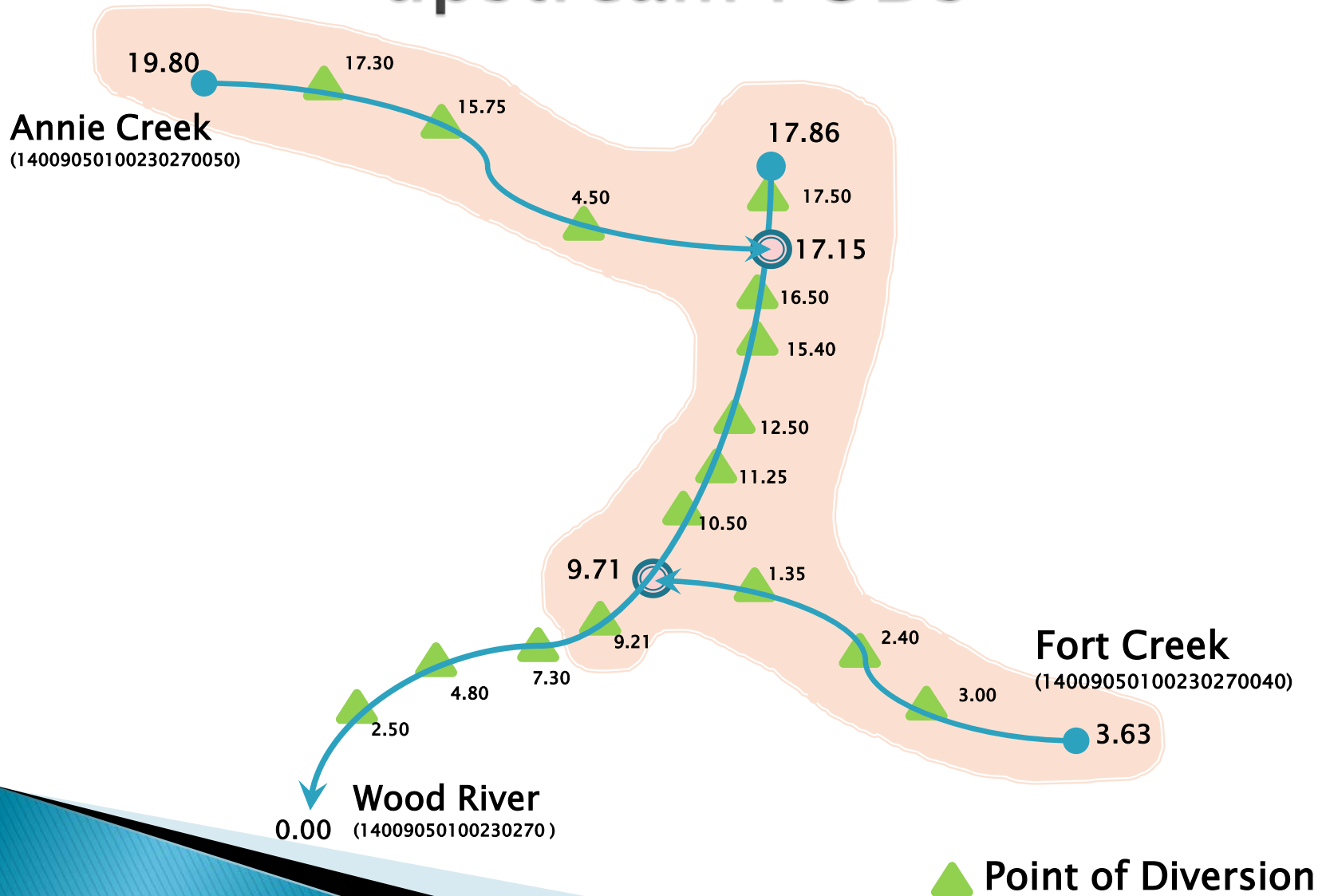
# WRD Streams with Directionality, Indexing, and Confluences




# POD Indexes are Created for the Routed Stream Network



# It is now possible to select upstream PODs



# Project Status

- ▶ **Klamath basin pilot completed**
  - ▶ **Statewide conflation of WRD stream codes to NHD completed**
    - For the entire state, all streams that have a surface water point of diversion have been conflated to NHD.
  - ▶ **Water Right Updates are ongoing**
    - Changed procedure for new rights to add stream codes as needed.
    - Fixing issues where PODs are mapped more than 10 miles away from the stream they are coded to.
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# How can we use this data?

- ▶ We can now perform queries and analysis based upon the stream network. Here are just a few samples:
  - What junior rights are upstream from a POD?
  - What senior rights might be injured downstream for a transfer review?
  - What is downstream of a dam?
  - What is between two gages?
  - What rights are in the Middle Deschutes?



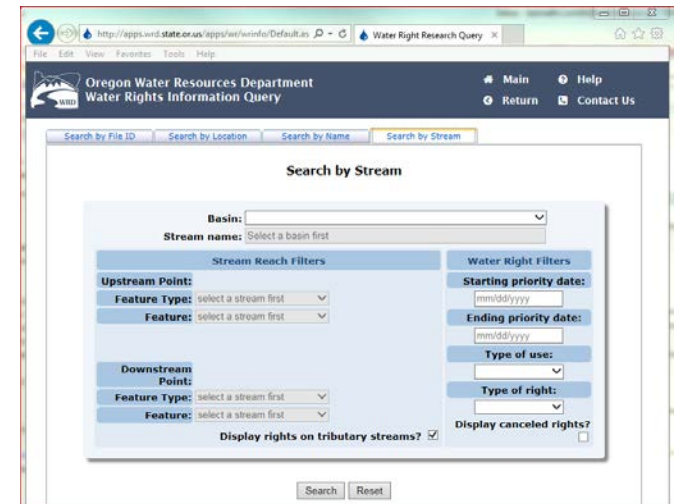
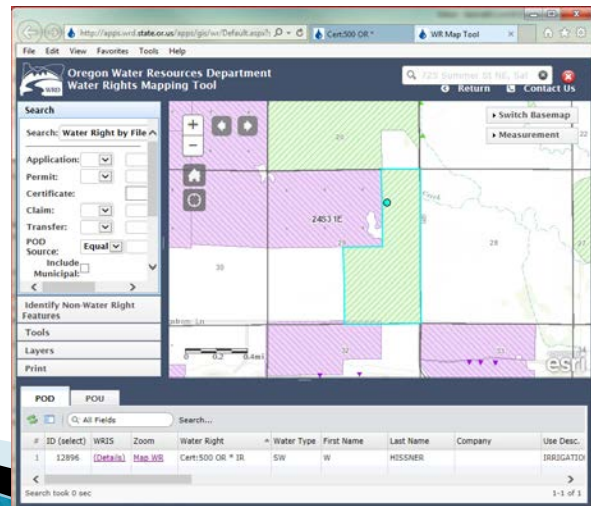
**RESEARCH  
QUESTIONS**

# New Water Right Research Tools

- ▶ On Feb 8, 2016 we released new versions of Water Right Query Tools to the public
  - Updated and improved user interface
  - Added ability to query water rights by stream reach

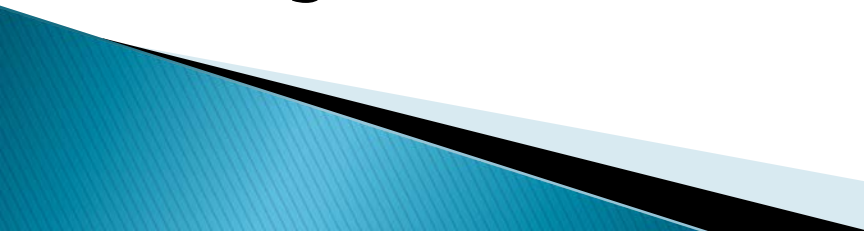
- ▶ Demonstration of New WRIS Query

- ▶ Demonstration of New Web Mapping





# Summary

- ▶ **Being able to select items like water rights, stream gages, dams, etc. by their location on a stream network will make it easier for staff to perform analysis and research.**
  - ▶ **This will allow the Agency to streamline the process for water right transactions and field staff research.**
  - ▶ **This will provide tools for external customers to get the information they require.**
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# Questions?

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