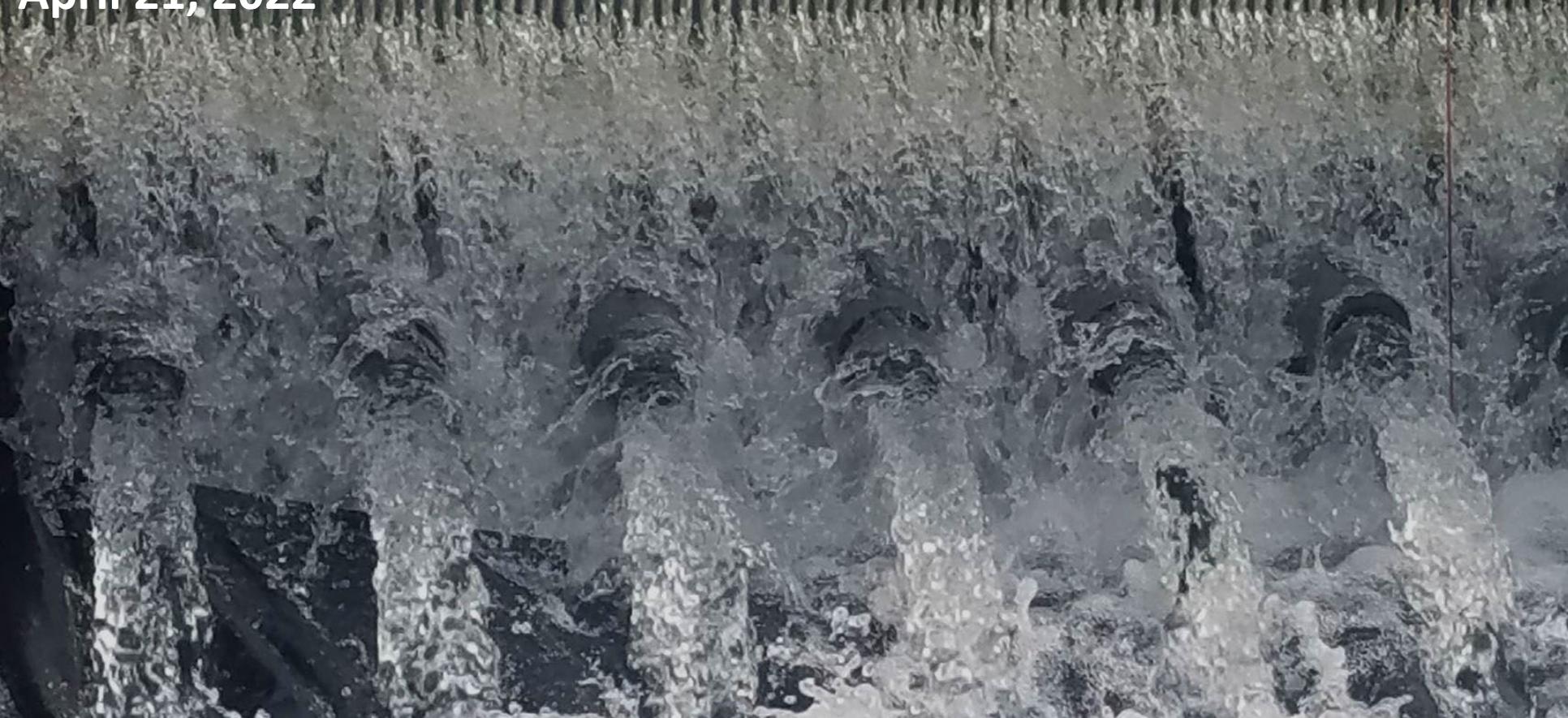


# Cowlitz Trout Hatchery Steelhead Enumeration

Trevor Johnson TPU Cowlitz Project Monitoring and Evaluation  
Cowlitz Annual Program Review and Science Conference  
April 21, 2022



# Overview

- How fish were counted
- Why make a change?
- Changes made to address problems
- Results of changes
- More changes made for 2022

# Fish Counting at Cowlitz Trout Hatchery



# Exit Structure Diagram

□ Conductance Counter

-- Temporary barrier



# Counting Problems

- 2016 – Up to 70% of summer run steelhead ponded into lakes were not counted at the conductance counter.
- 2017 – More fish were counted at the conductance counter than were ponded into the lakes.

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# Potential causes of counting problems

- Water conditions
- Fish health
- Predators
- Release practices
- Mixing of stocks

# What changes were made?

- Closer collaboration between TPU and WDFW
- Engage contractors
- Compartmentalizing stocks
- Increased monitoring efforts
- New hazing practices implemented

# Conductance counter

- Sent in for assessment and laboratory calibration
- Engaged Smith-Root for on-site field calibration and development of calibration protocol
- Deployed water quality sonde in front of conductance counters
- Multiple calibration trials throughout the season
- Added camera system for finer temporal control
- Checked fish size of groups (summers and winters) prior to initiation of any release
- Monitored results on daily basis and compared with additional methodology (PIT array)

# PIT array

- Engaged BioMark to install and maintain PIT array
- Complete multiple calibration trials for both summer and winter steelhead
- Monitor results on a daily basis and compare with the conductance counter results

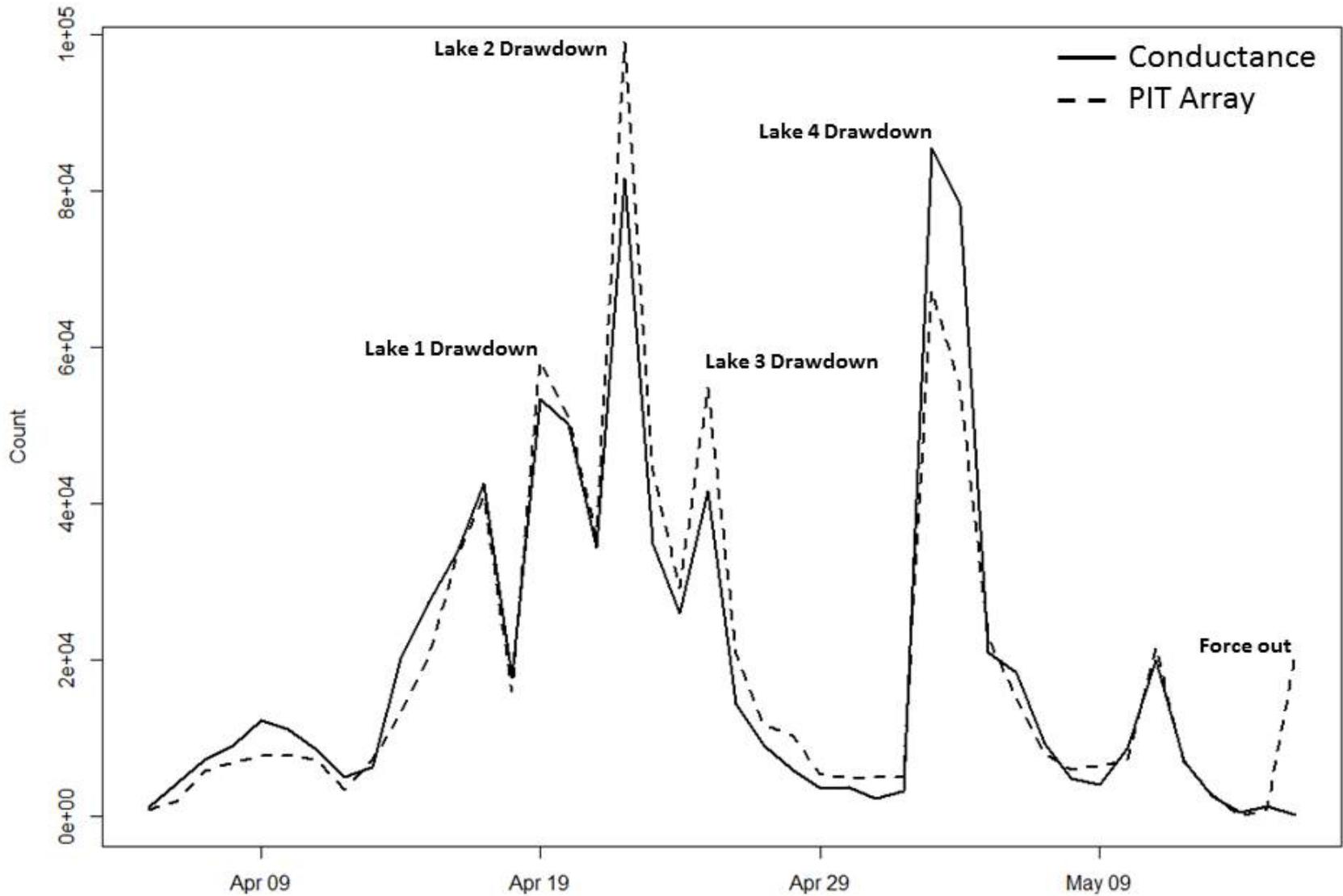


# New Exit Structure Diagram

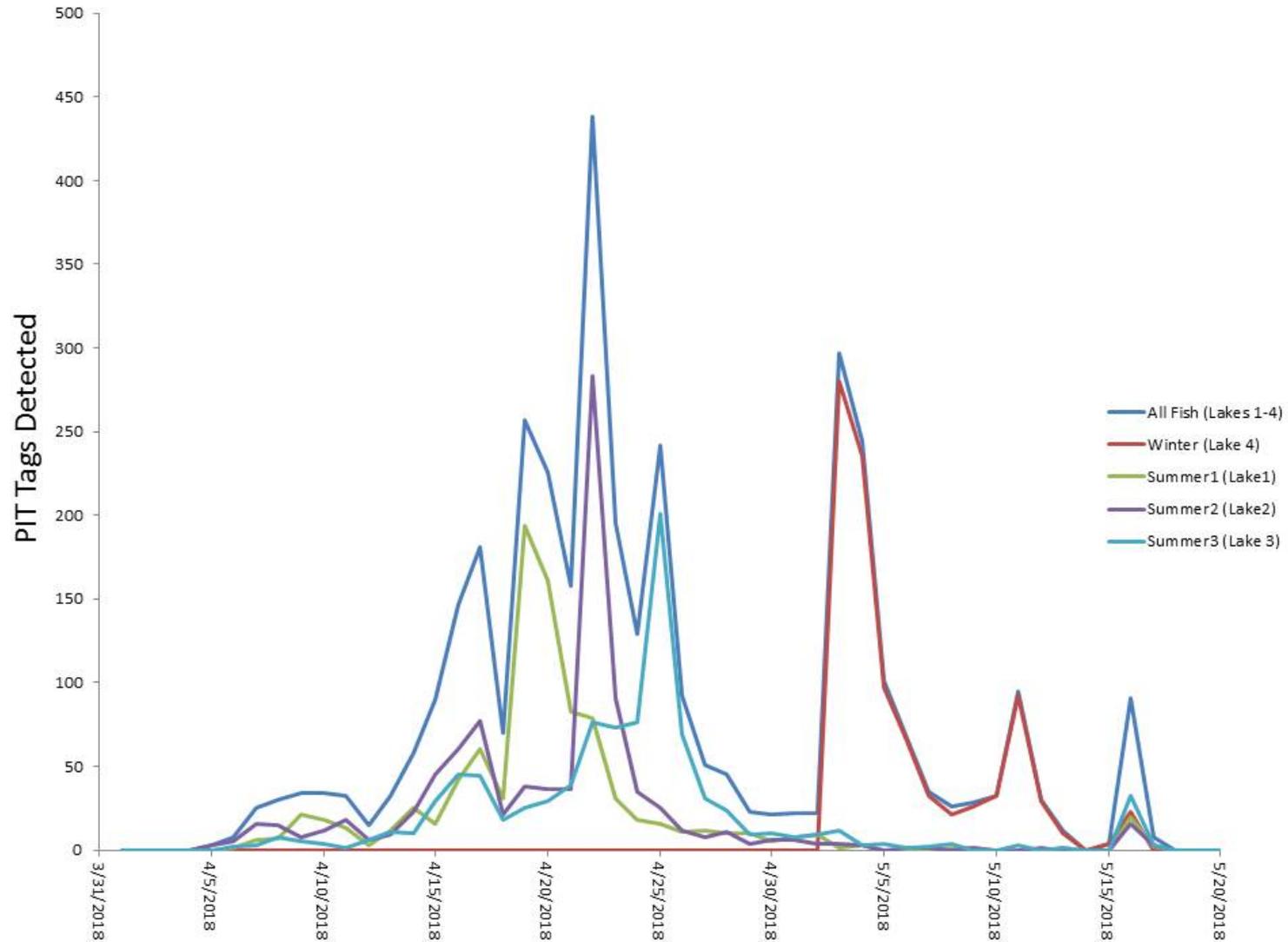
-  PIT Antenna
-  Conductance Counter
-  CTD
-  Temporary barrier



# Two methods to monitor fish exiting



# Advantage of using a PIT array



# Estimates

## 2018

	Counter	PIT	Final
Summer	595,327	592,532	590,000
Winter	270,130	259,399	266,000
Total	865,457	851,931	856,000

## 2019

	Counter	PIT	Final
Summer		592,000	
Winter		255,000	
Total	850,000	847,000	849,000

## 2020

	Counter	PIT	Final
Summer	538,886	538,672	548,443
Winter	246,314	235,400	240,857
Total	785,200	774,072	789,300

## 2021

	Counter	PIT	Final
Summer	653,696	644,696	638,017
Winter	255,650	252,650	271,906
Total	909,346	897,346	909,923

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# Takeaways

- Changes in practices have led to an improved ability to estimate fish exiting the facility
- PIT array had high detection efficiency and both methodologies yielded similar results

# More changes for 2022

- Ponding strategy
- PIT tags associated with each stock of winter steelhead

# 2022 in season results

- In season PIT array data based on tags detected.
  - [PIT array app](#)
- Conductance counter data not adjusted for calibrations.

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Counter	PIT array
276,784	234,459

\* As of 4/19/2022

# Acknowledgements

- **Tacoma Power**

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Dan Rawding, Clint Fitch, John Serl, Bryce Glaser, Sam Gibbons and Mara Zimmerman, Thomas Beuhrens, Chris Gleizes, Chip Nissell

Questions?