METHODS AND OVERVIEW FOR COMPLIANCE STUDIES AT MCNARY AND JOHN DAY DAMS, 2014

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ERDC Engineer Research and Development Center

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Project Overview

BiOp Standards

Tags

Receivers

JDA

MCN

Dam Modifications/Operations

Collection

Surgeries

Releases

Data

Assumption Testing

Results

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Goal

- Evaluate survival and associated passage metrics for yearling and subyearling Chinook and juvenile steelhead relative to performance standards stipulated in the 2008 FCRPS BiOp and the 2008 Fish Accords
  - Spring
    - Yearling Chinook and juvenile steelhead
    - McNary Dam
  - Summer
    - Subyearling Chinook
    - McNary and John Day dams

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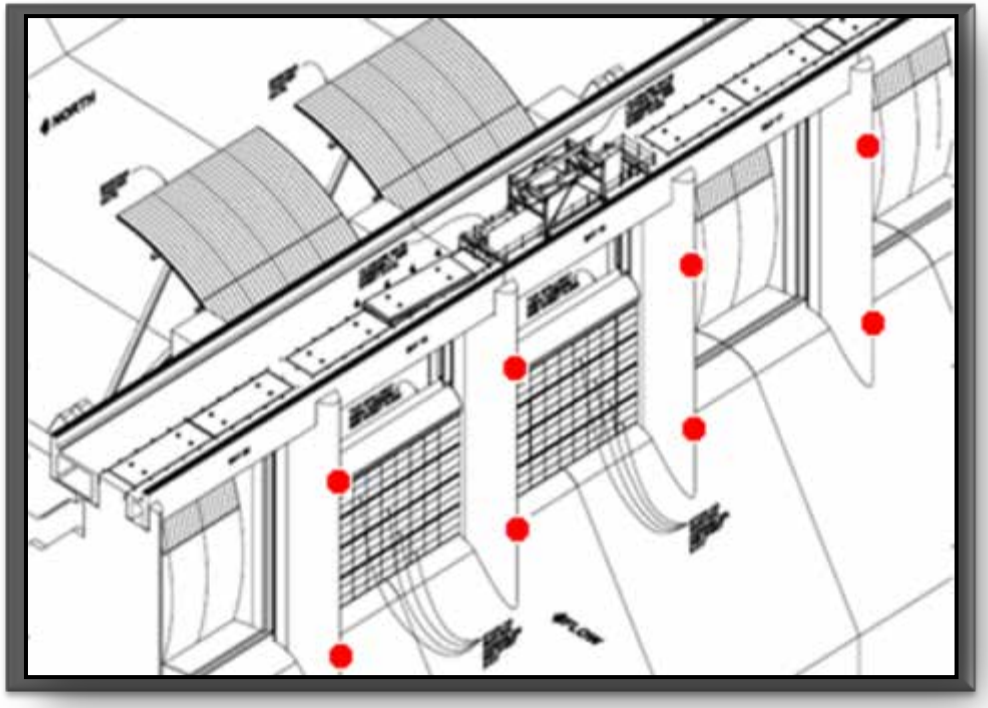
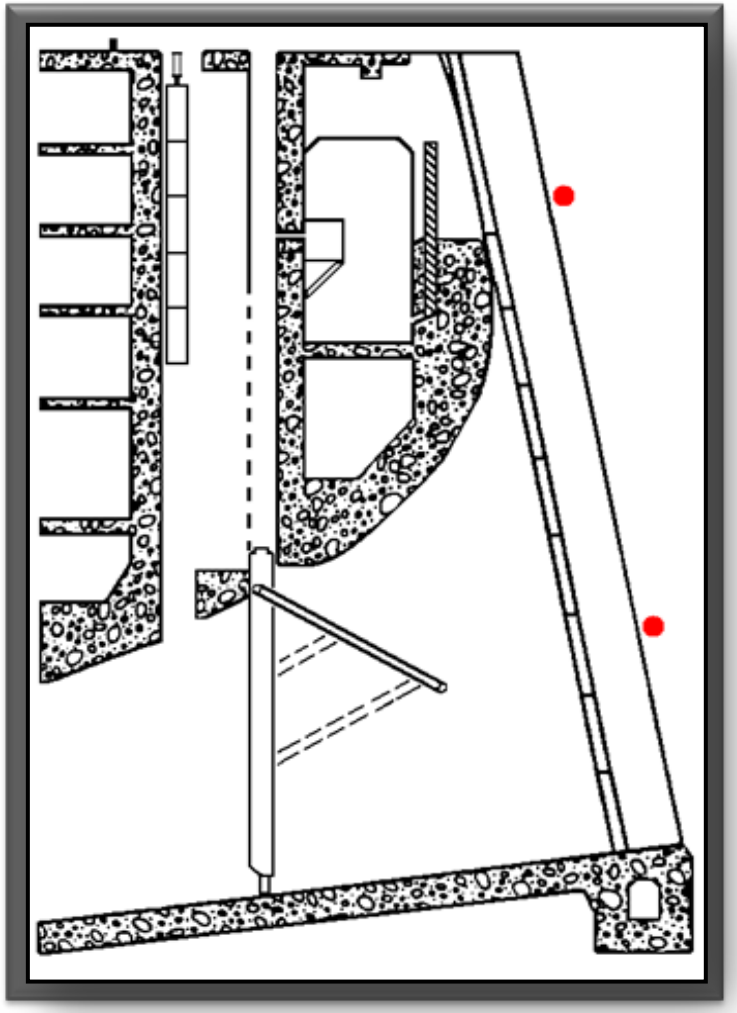
Detections Systems: Cable Array

- Dam Coverage
  - Cable Array
    - Hydrophones – 174
    - Computer systems – 45
    - 3-D tracking





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Detections Systems: Autonomous Nodes

- Autonomous Node Arrays
  - 10 survival study arrays
  - 7 fish loss arrays
  - 472 rkm uppermost
  - 236 rkm lowest
  - 236 rkm covered
  - 3-10 auto' nodes per array
  - 114 total auto' nodes deployed

Dam Operations/Modifications

- MCN
  - Spring
    - TSWs Spillbays 19 and 20
    - 40% spill
  - Summer
    - No TSWs
    - 50% spill
- JDA
  - Summer
    - TSWs Spillbays 18 and 19
    - 30/40% spill 2-day blocks/treatment

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Collection: Non-Candidate Fish

- "Non-Candidate"
  - Fish not considered for project criteria

- Project Criteria
  - Species
    - Any fish not a steelhead or Chinook
  - Previously Tagged Fish
    - Presence of a PIT tag or other active tag
  - Fish Size
    - < 95 mm in FL or > 300 mm in FL
  - Moribund/Mortalities
    - Fish that have severe or lethal symptoms

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Collection: Candidate Fish

- "Candidate"
  - Met project criteria, then assessed for maladies

- Exclusion Criteria for Candidate Fish
  - Descaling
    - >20% on either flank, with no regrowth, mucous coat absent
  - Disease
    - Fungus, ulcerations, necrotic gills, furunculosis
      - >5% on either flank
    - >2 copepod on gill filaments (excl. arch, operculum, etc.)
  - Injury
    - Open wounds and active hemorrhaging; >5% on either flank
  - Fin Damage
    - Caudal fin has eroded/disintegrated to stage 5
  - Skeletal Deformities
    - AT could not "fit" into cavity or swimming compromised

Collection: Inclusion

- Inclusion Statement
  - If 5% of the sample on a given day has a particular malady/infection, fish with the same malady collected the following day are included as acceptable candidate fish for tagging.

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Non-Candidate Fish

Category	CH1	% CH1	ST	%ST	CH0	% CH0
Total Handled	7,995	100	8,012	100	10,112	100
Previously Tagged	256	3.2	233	2.9	79	0.8

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Candidate Fish

Category	CH1	% CH1	ST	%ST	CH0	% CH0
Retained for Tagging	6,893	98.0	6,912	96.8	9,105	98.0
Excluded for Condition	138	2.0	231	3.2	190	2.0

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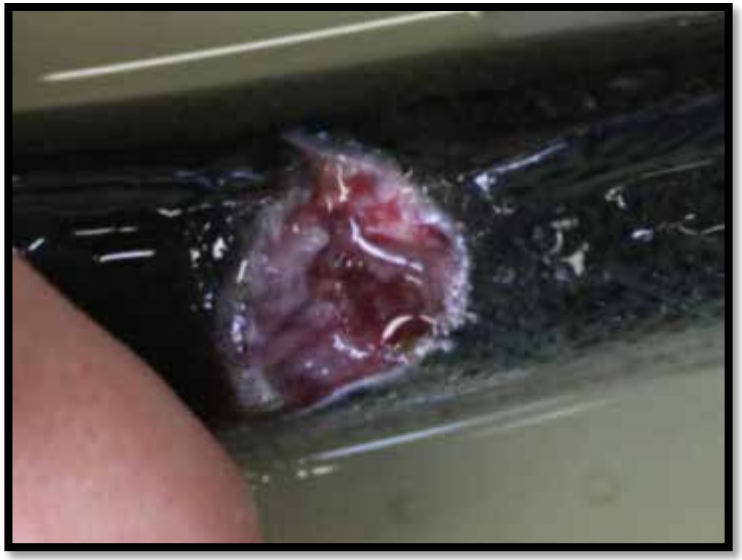
Examples of Non-Candidate Fish



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Tagging at JDA SMF

- JSATS acoustic micro-transmitter
  - ATS SS300
    - Source level: 156dB re:1µPa@1m
    - 0.308 g in air, 0.19 g in water
    - 10.71 x 5.19 x 3.04 mm
    - PRI: 3 sec
    - Mean Tag Life: 23.99 days (SE±0.10)
- Passive Integrated Transponder
  - Biomark HPT 12
    - 12.5 x 2 mm

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Tagging at JDA SMF

- Surgical implantation protocol
  - System wide guidelines
  - Panel approved exceptions
    - 1x1x1x1 knot
    - Chlorhexidine

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Tagging at JDA SMF

- Spring
  - Tagging days – 34
    - April 26 to May 29, 2014
  - Yearling Chinook –6502
  - Steelhead – 6498
  - Tagged 24 hr mortalities – 14

- Summer
  - Tagging days – 34
    - June 10 to July 13, 2014
  - Subyearling Chinook – 8473
  - Tagged 24 hr mortalities – 17

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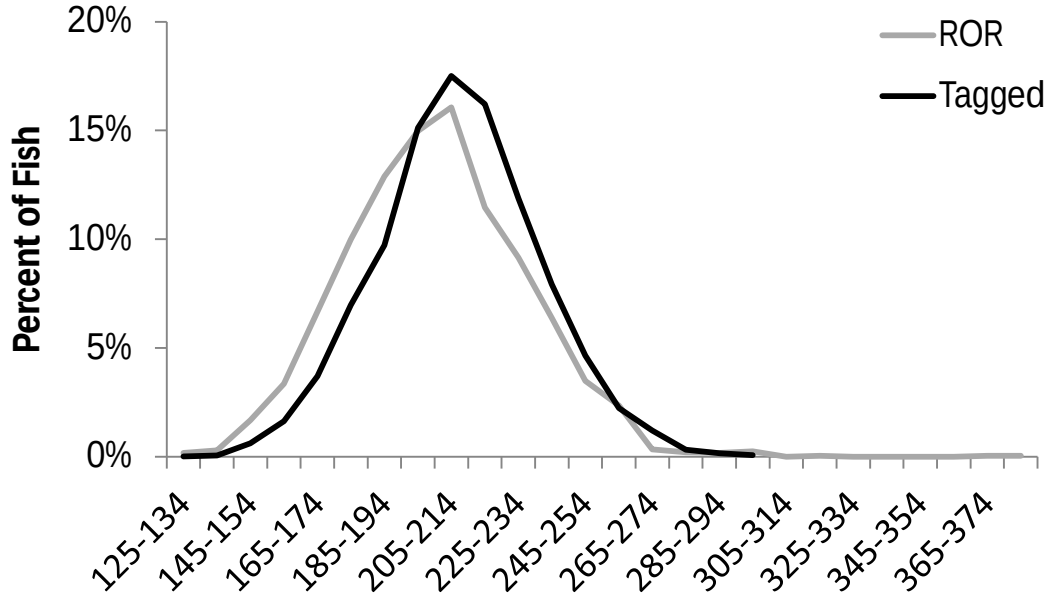
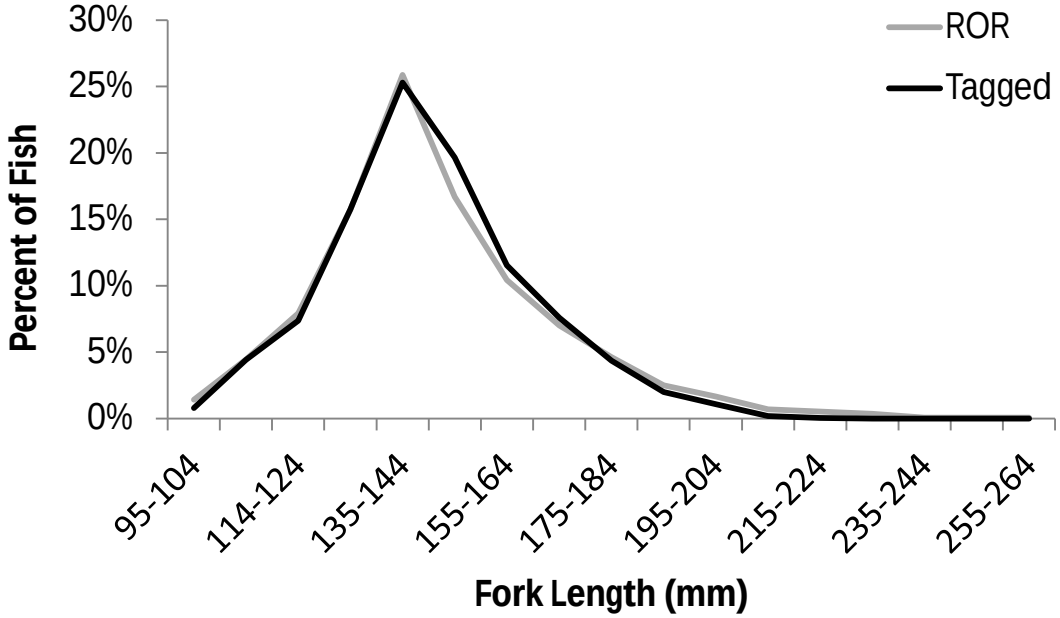
Comparison of Tagged to Run-of-River Fish

- Spring
  - Steelhead
    - 134-300 mm FL

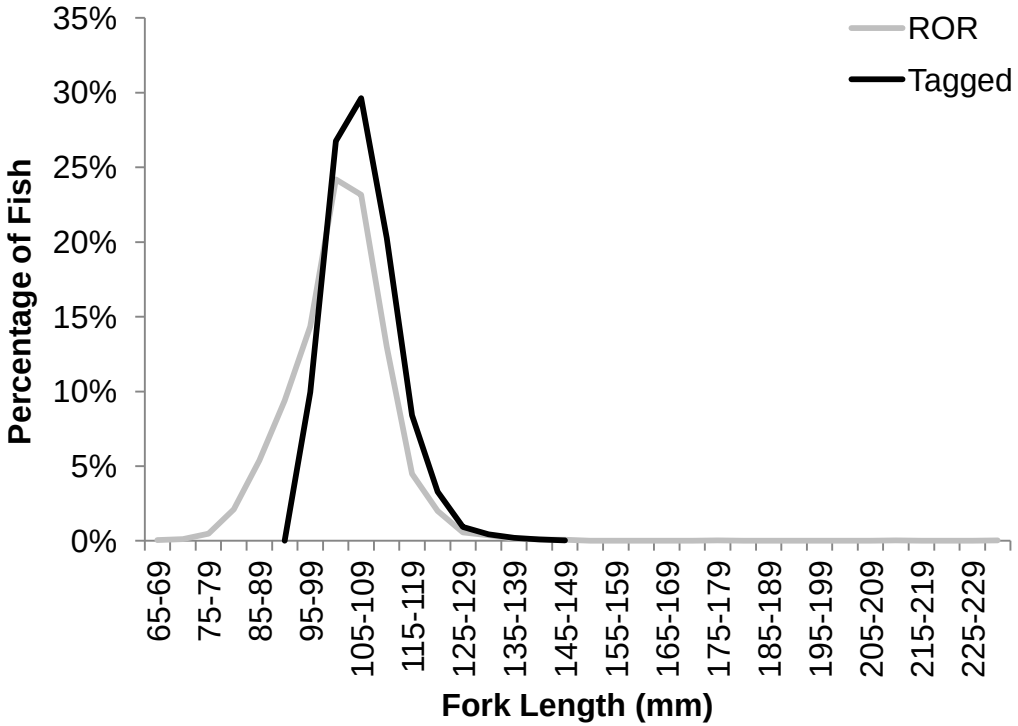


  - Yearling Chinook
    - 95-221 mm FL



Comparison of Tagged to Run-of-River Fish

- Summer
  - Subyearling Chinook
    - 95-149 mm FL



Releases and Tracking- Spring

- Spring
  - Total fish released – 13,000
    - 503 rkm uppermost release
    - 449 rkm lowest release
    - 3 release “locations”
      - 5 release points per location
      - 32 releases at each location
    - 1-3 releases per day
    - Day and night “balanced”

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Releases and Tracking- Summer

- Summer
  - Total fish released – 8473
    - 503 rkm uppermost release
    - 325 rkm lowest release
    - 5 release “locations”
      - 5 release points per location
      - 32 releases at each location
    - 1-5 releases per day
    - Day and night “balanced”

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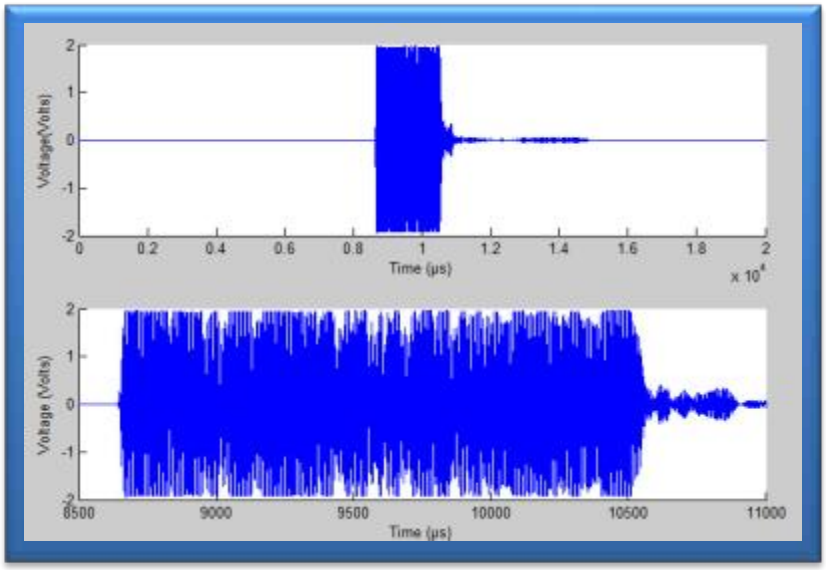
Study Area and Release Locations

MCN Node and Release Locations

JDA Node and Release Locations

Data Flow



- Data is
  - Generated at 18 physical locations
  - Processed at 5 physical locations
- Data "Systems" – 23
  - A System has an identifiable start-end
  - Most have discrete data origination
  - Most have in- and out-flow processes
  - All are dependent on other Systems
    - Operate in sequence and in parallel
  - *QA/QC is extensively conducted within/between Systems*

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Acknowledgements

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