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**Idaho Department of Fish and Game/Pacific States Marine Fisheries Commission**

# **SNAKE RIVER CHINOOK SCALE AGEING**

## **CHINOOK AGEING MEETING APRIL 2-3, 2014**

# COLLECTIONS

- ❖ Snake River  
Spring/Summer  
Chinook
- ❖ ESA - Classified  
threatened in 1992
- ❖ Seven Major  
Population Groups
- ❖ Wild stream Type
- ❖ Status monitoring

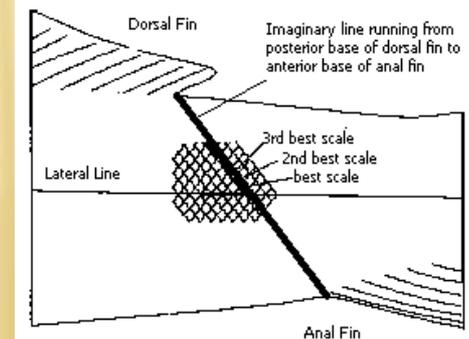
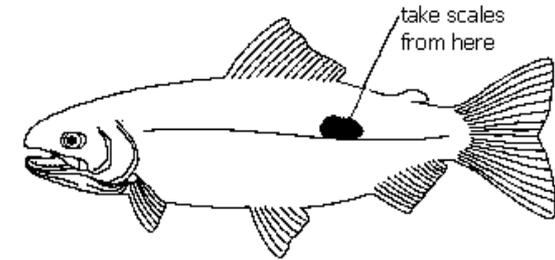


# LOWER GRANITE DAM



# SAMPLE COLLECTION

- ❖ Scales are removed from the preferred location
- ❖ Scale and tissue samples
- ❖ Envelopes labeled for easy data collection
- ❖ Unique sample IDs, format YY-XXXXX



# SAMPLE COLLECTION CONTINUED...

- ❖ Electronic data from sample site
  - ❖ Collection Date
  - ❖ Species, Run, Rear Type
  - ❖ Sex
  - ❖ Fork Length
  - ❖ Marks (Fin Clips)
  - ❖ Tags (Type & Number)
- ❖ QC fish data and enter into database

Species, Adult  
Location:

YY-XXXXX

Date: \_\_\_\_\_ Male Female Unknown (circle one)  
Markings: None AD LV RV OP (circle all that apply)  
Fork Length: \_\_\_\_\_ (cm)  
PIT Tag #: \_\_\_\_\_  
Comments: \_\_\_\_\_  
Collector (Full Name): \_\_\_\_\_

The screenshot shows the Microsoft Access interface for the 'Biological Samples Database'. The main form is titled 'Biological Samples Database' and is part of the 'Idaho Dept of Fish and Game'. The form is divided into several sections:

- Required Fields:** Sample # (1210001), Date Collected (5/5/2012), Life Stage (Adult), Species (Chinook), Run (Runt), Rear (Unknown), Wild/Natural.
- Aging Information:** Known Age, Fin Aging, Scale Aging, Otolith Aging, DNA Aging. Includes a table for Fin Reader, Age, and Comments.
- DNA:** DNA Location (Eagle Health Lab - IDFG), Fin Location, Scale Location (Nampa Research - IDFG), Otolith Location.
- Marks:** Marks (Unmarked), Reference Numbers, Comments.

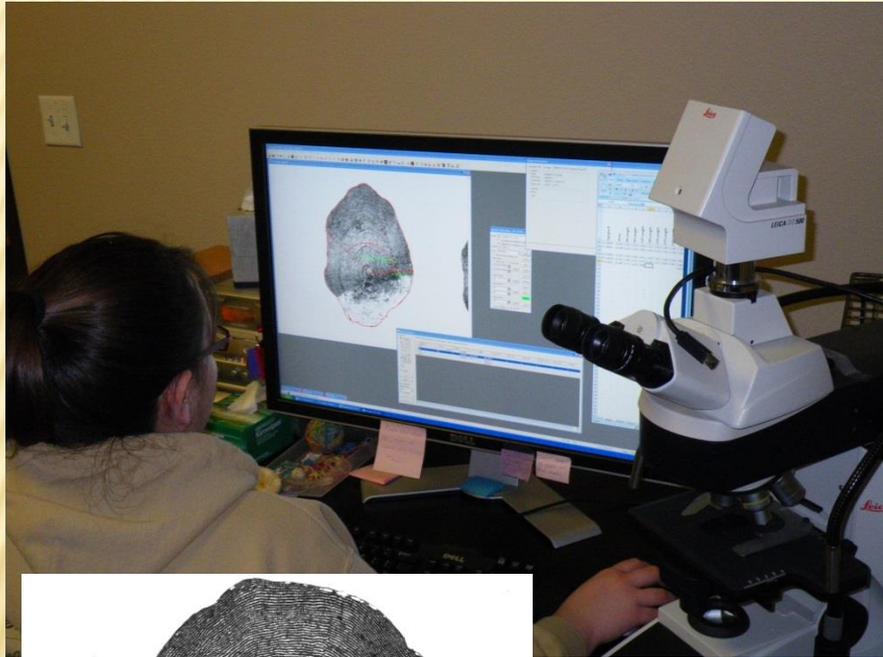
The interface includes a menu bar (File, Home, Create, External Data, Database Tools, Add-Ins), a ribbon with various options (Filter, Sort & Filter, Refresh, Save, Spelling, Find, Go To, Text Formatting), and a left-hand pane showing 'All Access Objects' (Tables, Queries, Forms, Macros).

# PROCESSING METHODS: MOUNTING

- ❖ Select best scales for mounting
- ❖ Cleaned
- ❖ Mounted between two glass microscope slides



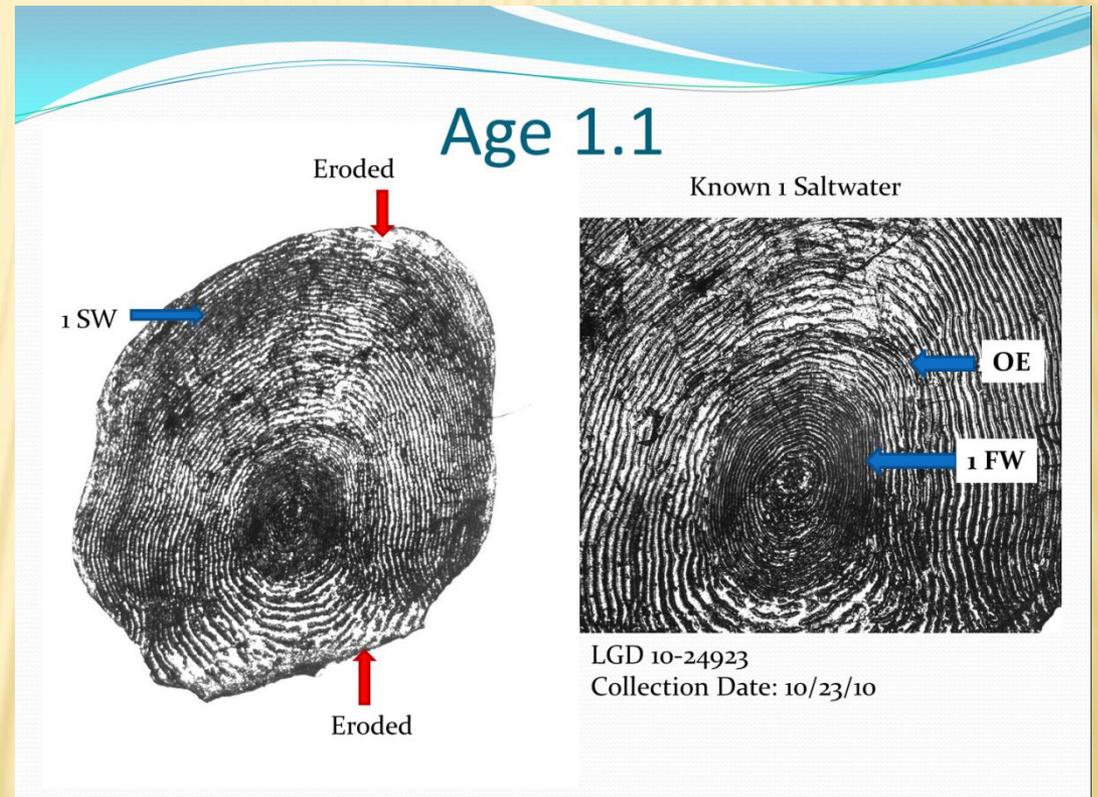
# PROCESSING METHODS: IMAGING



- ❖ Leica DM4000B compound microscope
- ❖ Leica DC500 digital camera
- ❖ Image Pro Express software
- ❖ 6 images taken for each adult fish
  - ❖ 3 of whole scale 12.5x
  - ❖ 3 of freshwater region 40x
- ❖ Images saved as .jpg

# PROCESSING METHODS: AGEING

- ❖ Supporting Info Used
  - ❖ Location
  - ❖ Date
  - ❖ W vs. H
- ❖ Identify Patterns
  - ❖ Ocean entrance
  - ❖ Freshwater age
  - ❖ Saltwater age
- ❖ Assign Confidence
  - ❖ High, medium, low, unreadable



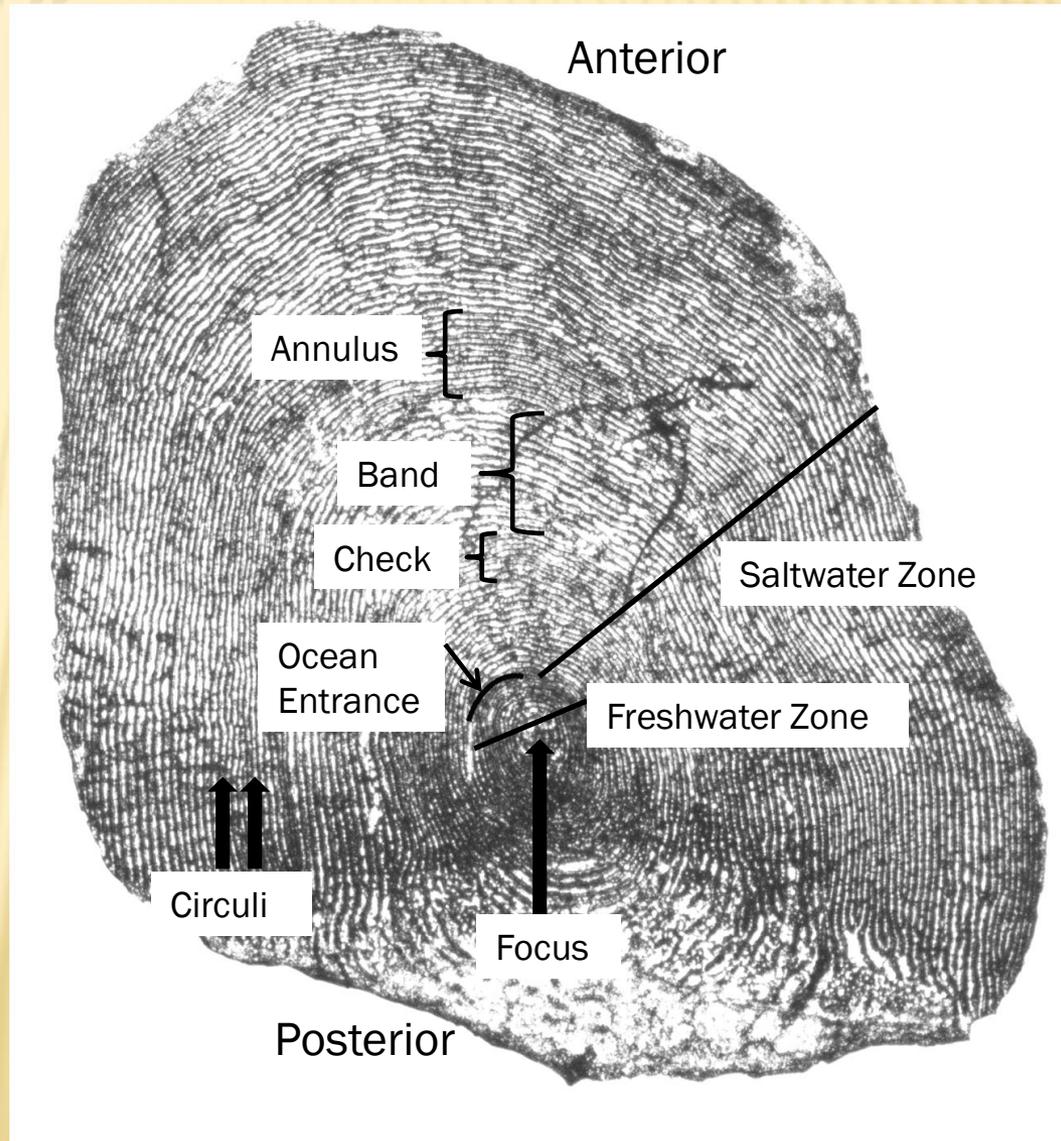
# QUALITY CONTROL

- ❖ Two independent readers
- ❖ Discrepancies resolved with 3<sup>rd</sup> reader
- ❖ Training and practice
- ❖ Known age validation



# TRAINING METHODS

- ❖ PowerPoint training presentations
- ❖ Reference samples
- ❖ Blind test on set of 50 scale samples
  - ❖ Multiple tests for each species and life stage
  - ❖ Must achieve >90% before contributing to ageing



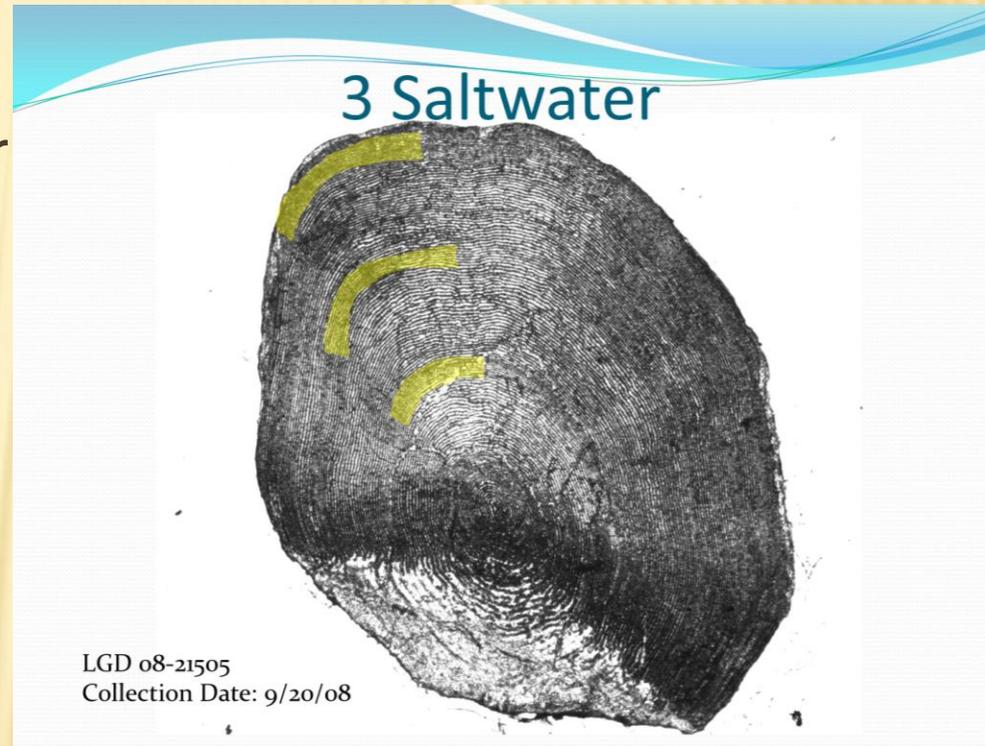
# VALIDATION

## Saltwater Validation

- ❖ PIT tags mark-recapture
- ❖ 100 samples desired for accuracy rate

## Total Age Validation

- ❖ Parental Based Tagging (PBT)
  - ❖ Genetic markers, assign fish to brood year



# ACCURACY & PRECISION

- ❖ **“Seasonal Training”** - Examine known-age before ageing
  - ❖ Discuss new or distinct patterns as a group
- ❖ **Coefficient of Variation**
  - ❖ 2013: Freshwater 3.1% ; Saltwater 3.9%
  - ❖ 2012: Freshwater 2.0% ; Saltwater 1.5%

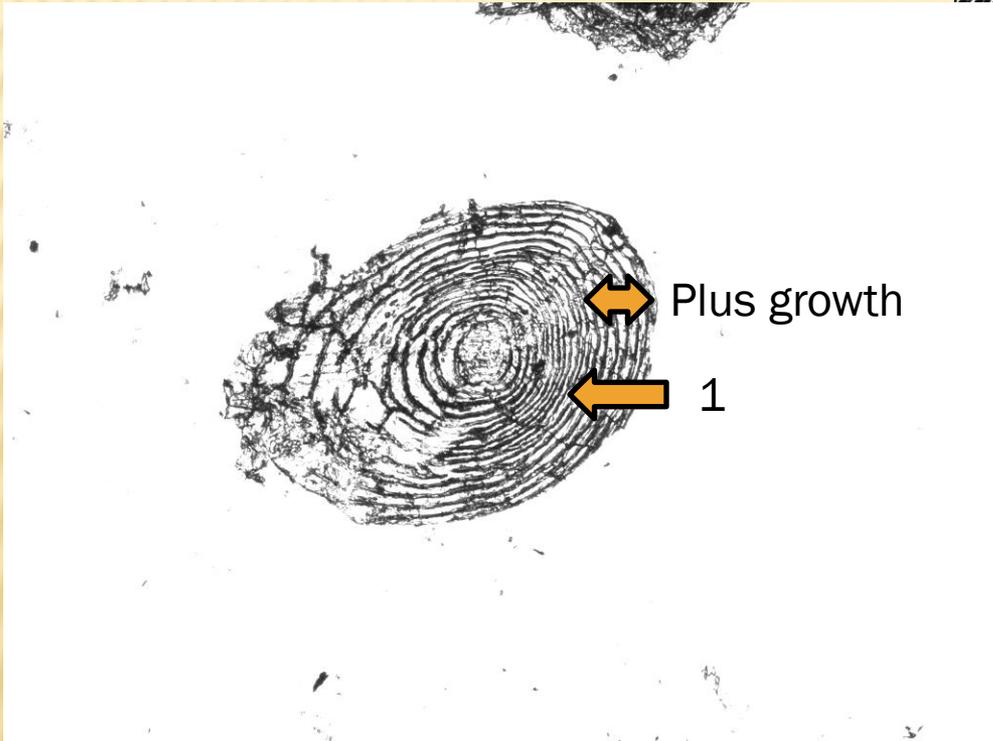


# SUMMARY OF AGEING CHALLENGES

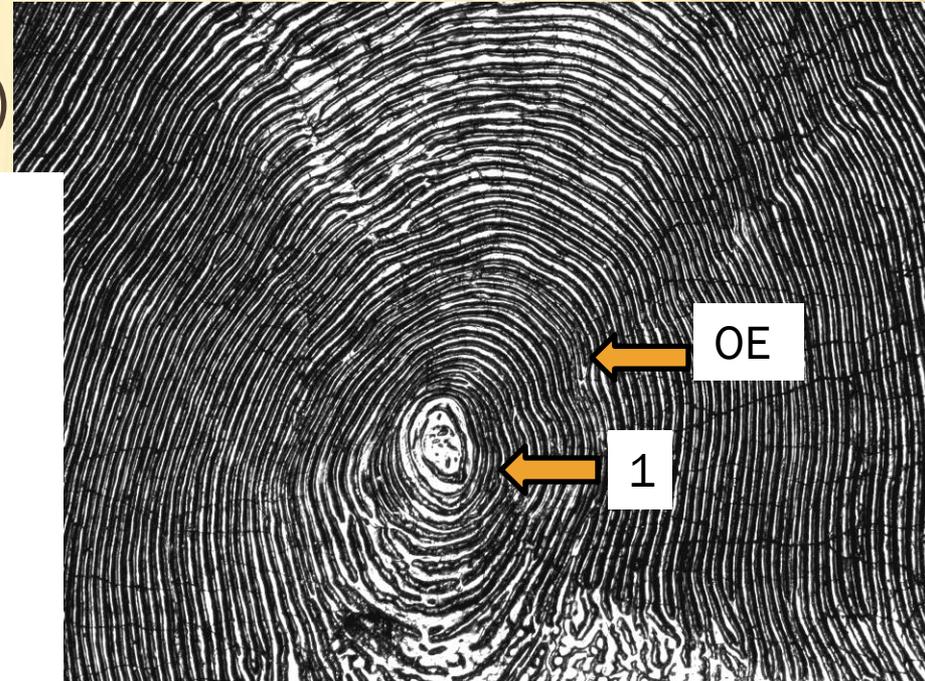
- ❖ Ocean entrance
- ❖ Freshwater age (0 vs. 1 vs. 2)
- ❖ “Summer” check
- ❖ 4 salt fish
- ❖ Minijacks (3-4 months in saltwater/estuary)
- ❖ Resorption of scale margin

# AGEING CHALLENGES

Ocean Entrance (or annulus?)



Lower Granite Dam  
5/12/11  
11.4 cm



Lower Granite Dam  
5/10/13  
80 cm  
Female

# AGEING CHALLENGES

## Freshwater Age



Hayden Creek  
9/10/09  
8.4 cm



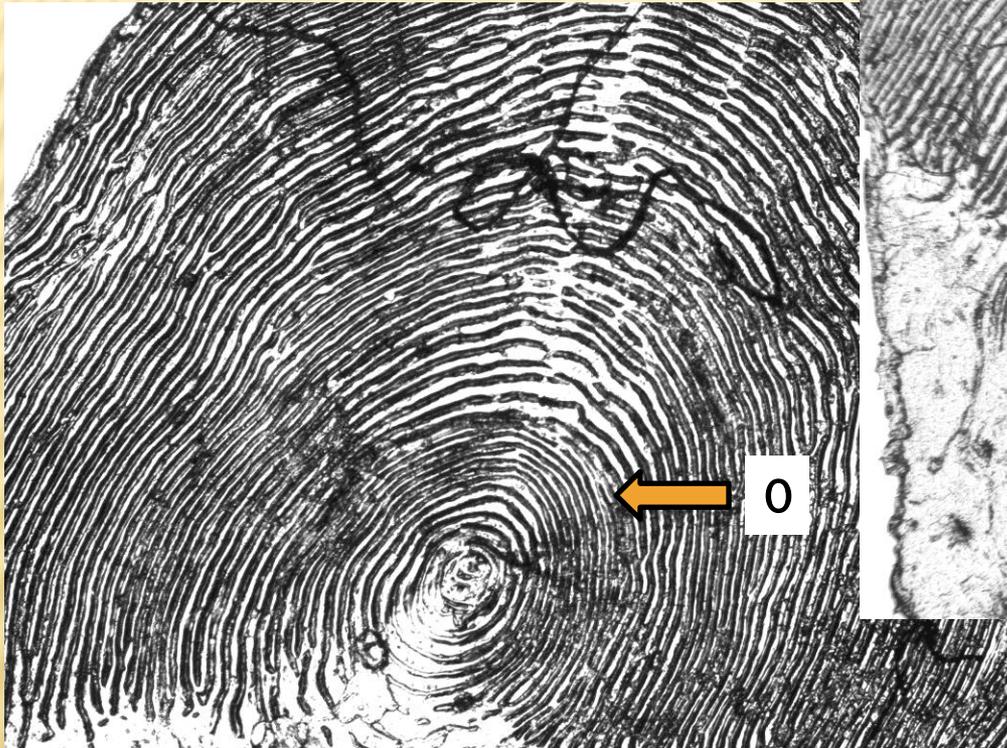
Secesh River  
5/13/10  
10.7 cm



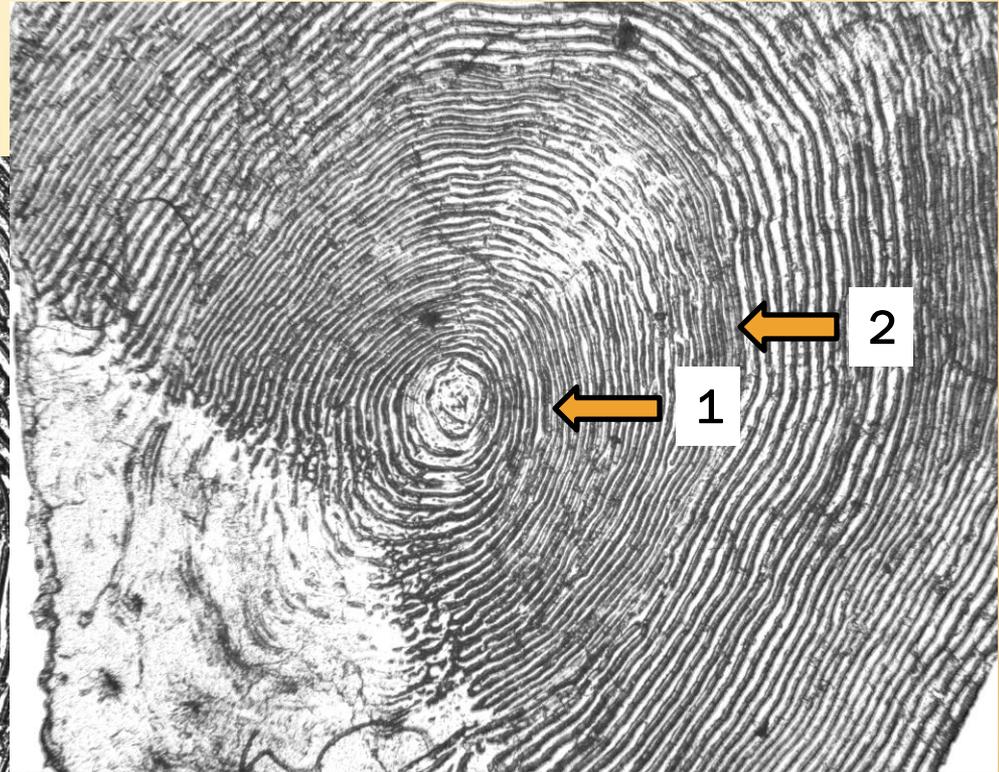
Lemhi River  
5/12/09  
10 cm

# AGEING CHALLENGES

## Freshwater Age Continued



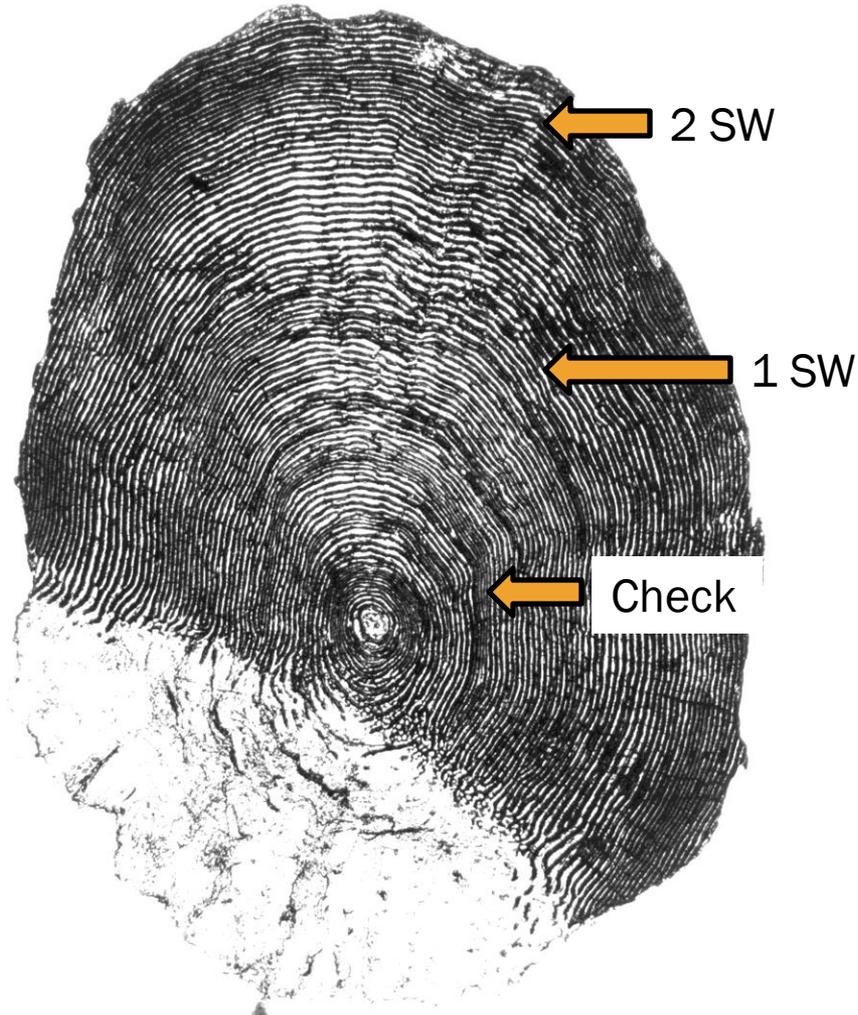
Lower Granite Dam  
7/5/13  
49 cm  
Male



Lower Granite Dam  
7/19/10  
54 cm  
Male

# AGEING CHALLENGES

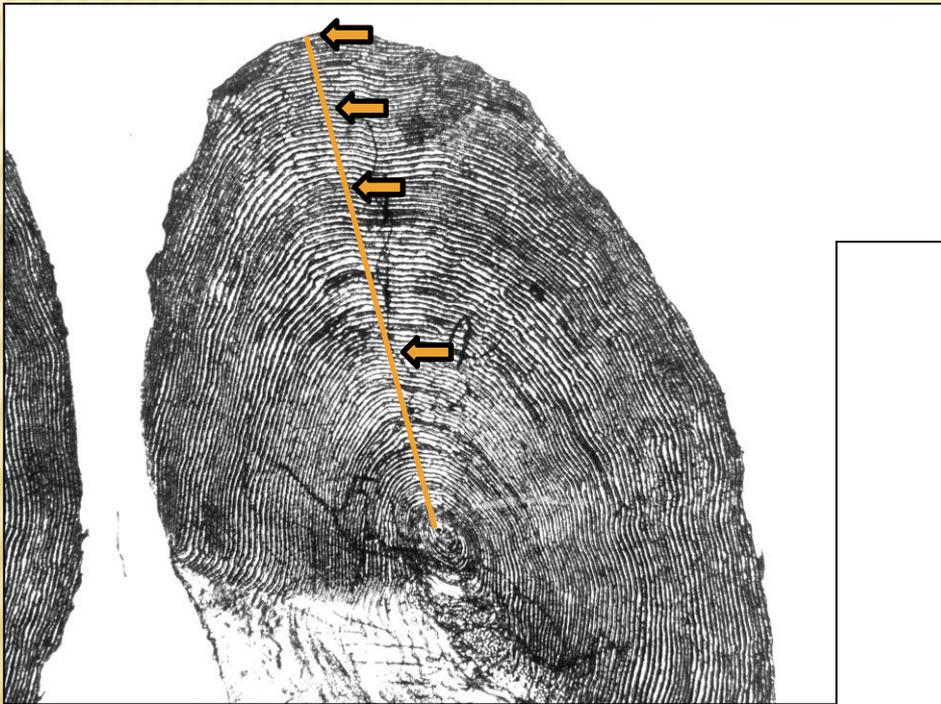
## “Summer” Check



Lower Granite Dam  
5/21/12  
63 cm  
Female  
Known: 2 Salt

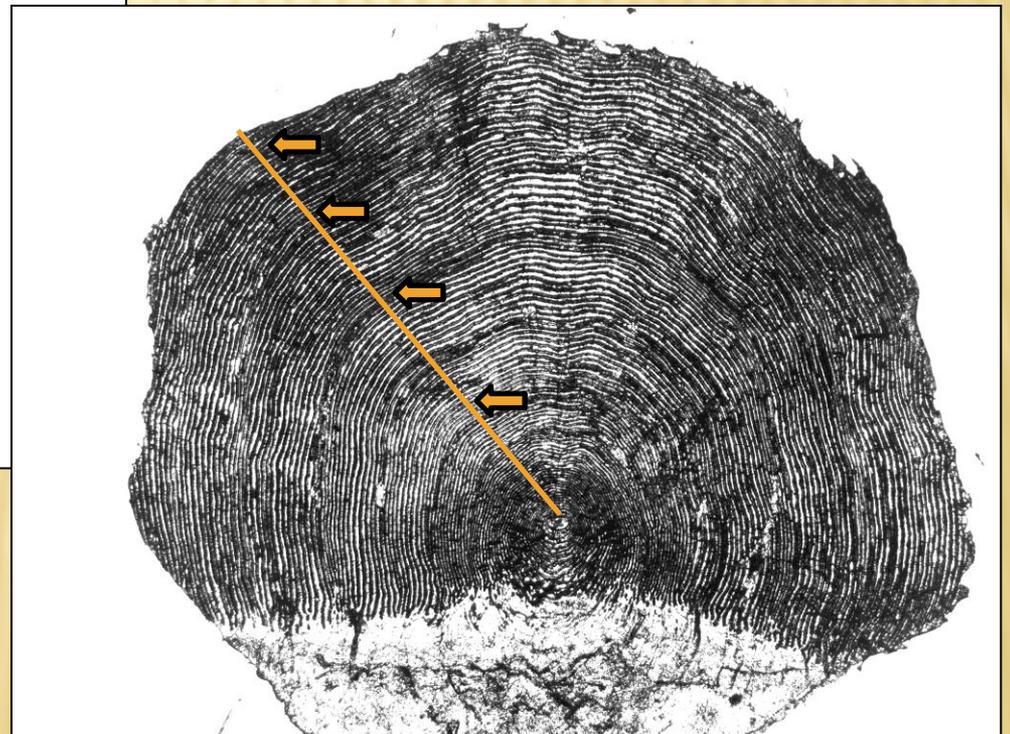
# AGEING CHALLENGES

## Identification of 4 Saltwater



Lower Granite Dam  
6/16/2012  
90 cm  
Female

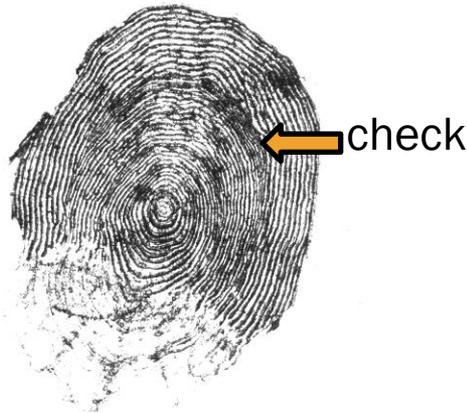
Lower Granite Dam  
7/20/12  
97 cm  
Male



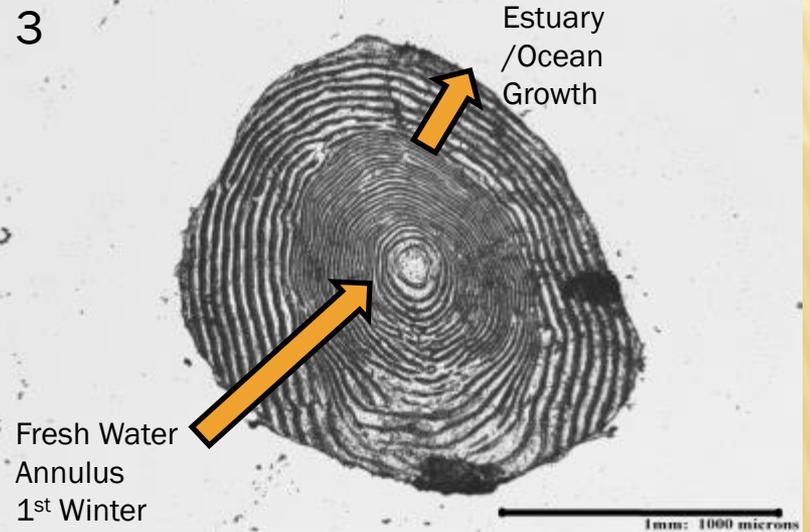
# AGEING CHALLENGES

## Minijack Identification

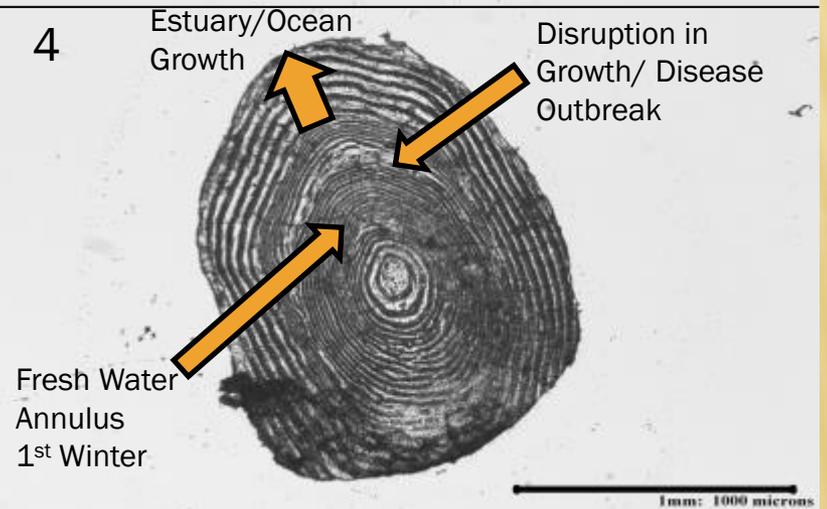
Lower Granite Dam  
8/3/11  
33 cm  
Male



3

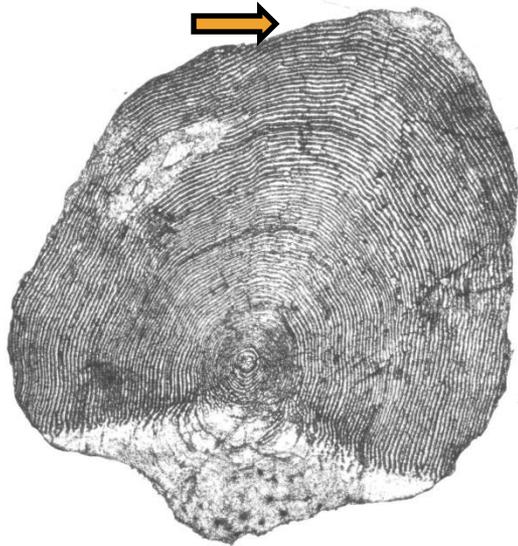


4



# AGEING CHALLENGES

## Resorption on Scale Margin



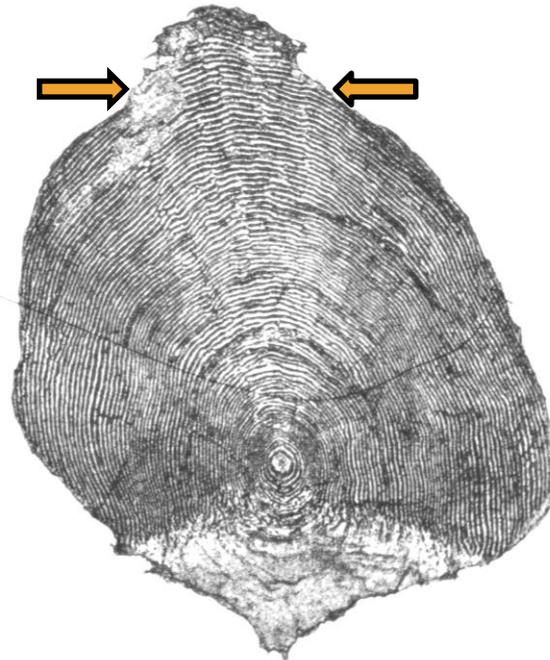
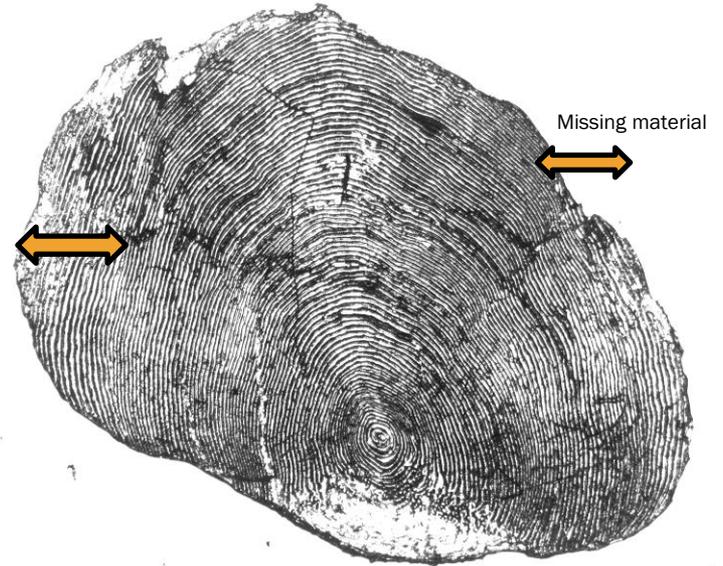
Pahsimeroi River

7/26/05

84 cm

Female

Hernandez et al. In Review TAFS (STHD)



Lower Granite Dam

8/2/11

94 cm

Male

Known: 3 Salt

Lower Granite Dam

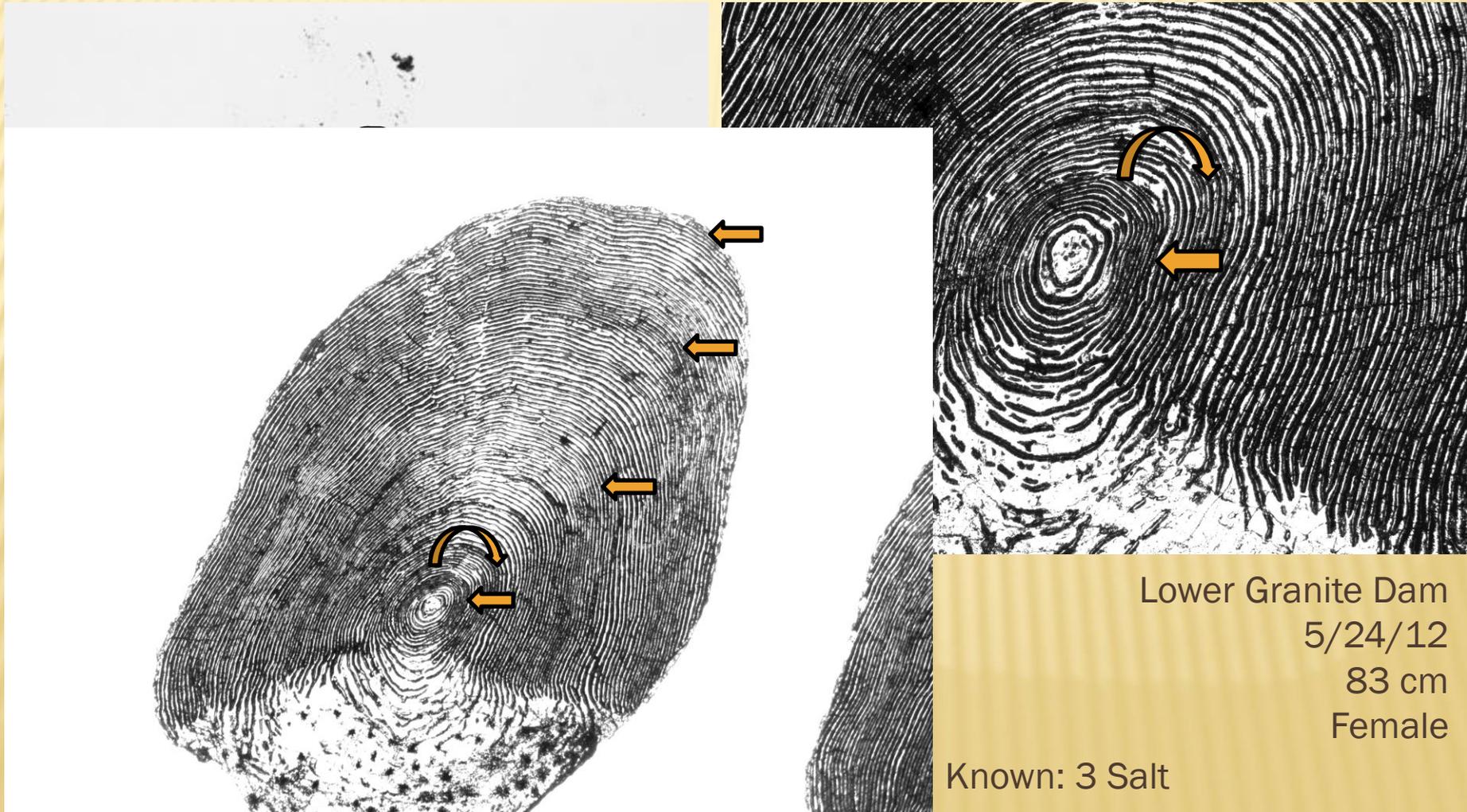
7/14/09

79 cm

Male

# LONGITUDINAL SAMPLE

Mark Recapture: Juvenile and Adult Collection



Lower Granite Dam  
5/24/12  
83 cm  
Female

Known: 3 Salt



**QUESTIONS??**