

# Southeast Alaska Herring Scale Aging Errors and Corrections

2012 Report to the Alaska Board of Fisheries

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by

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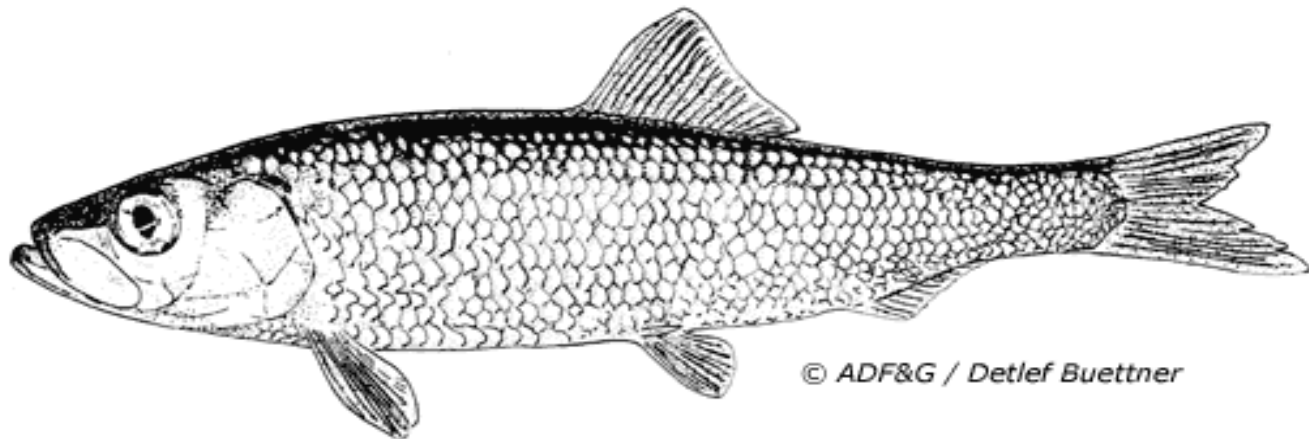
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**Oral Report:  
RC 3 – Tab 23**

# Issue: from 2003 to 2010, herring ages in SE Alaska were overestimated

## Topics:

- How the age errors were detected
- How the errors were corrected
- How we are preventing future errors



*“Age Sex Length” Herring collected in 5 gallon buckets*

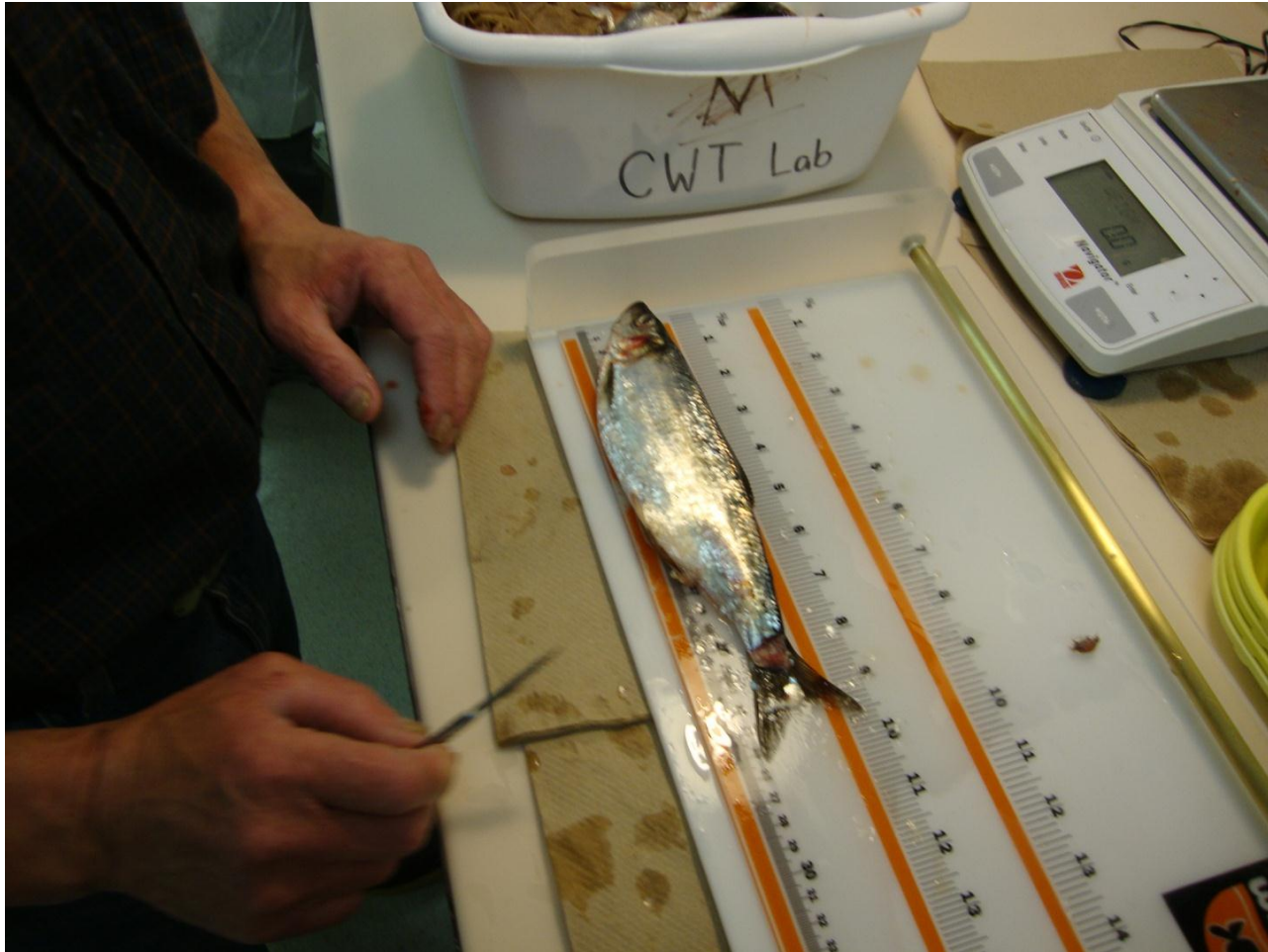


## *Gender determination*

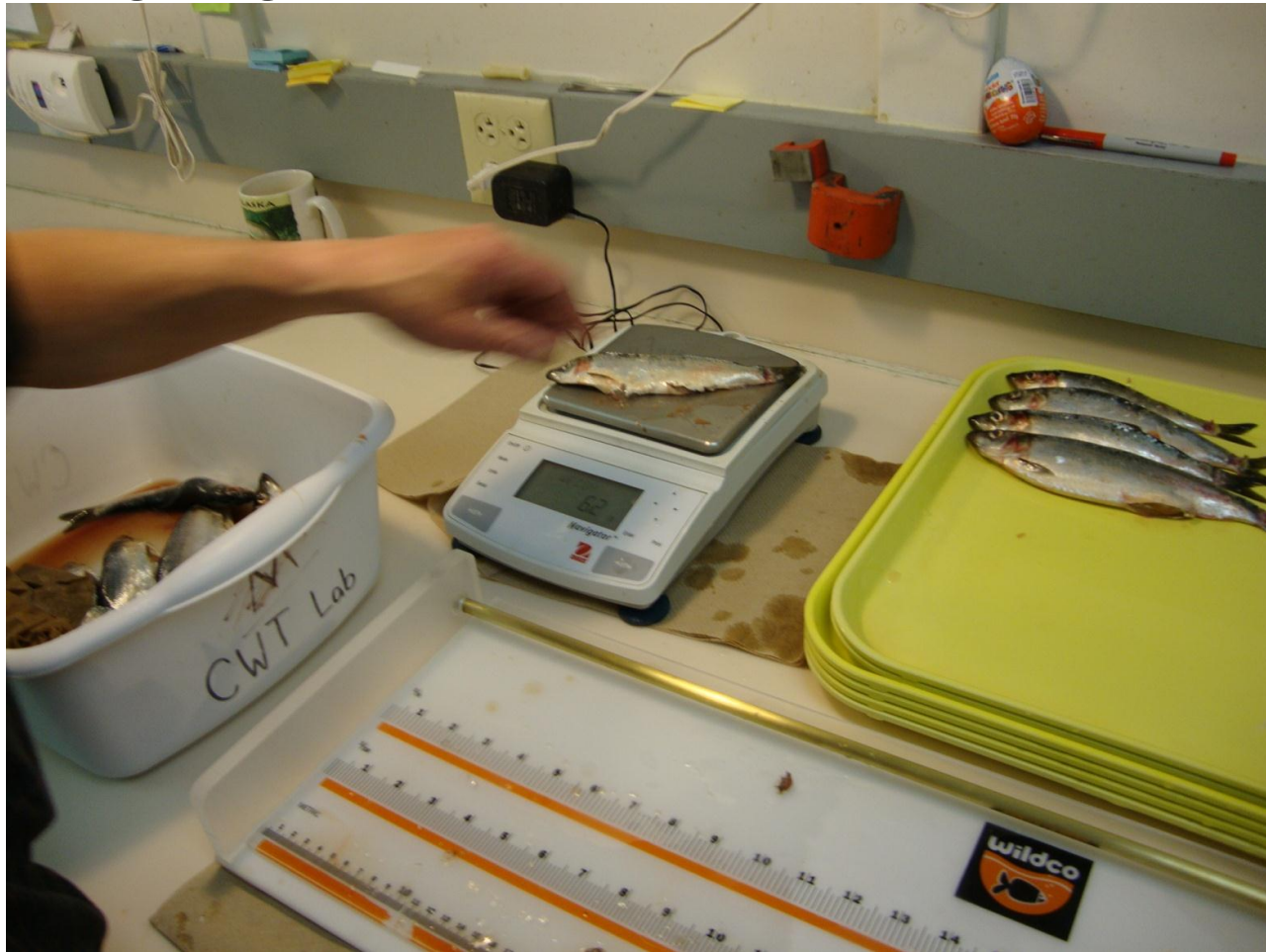




# Measuring



# Weighing



## *Plucking scales*

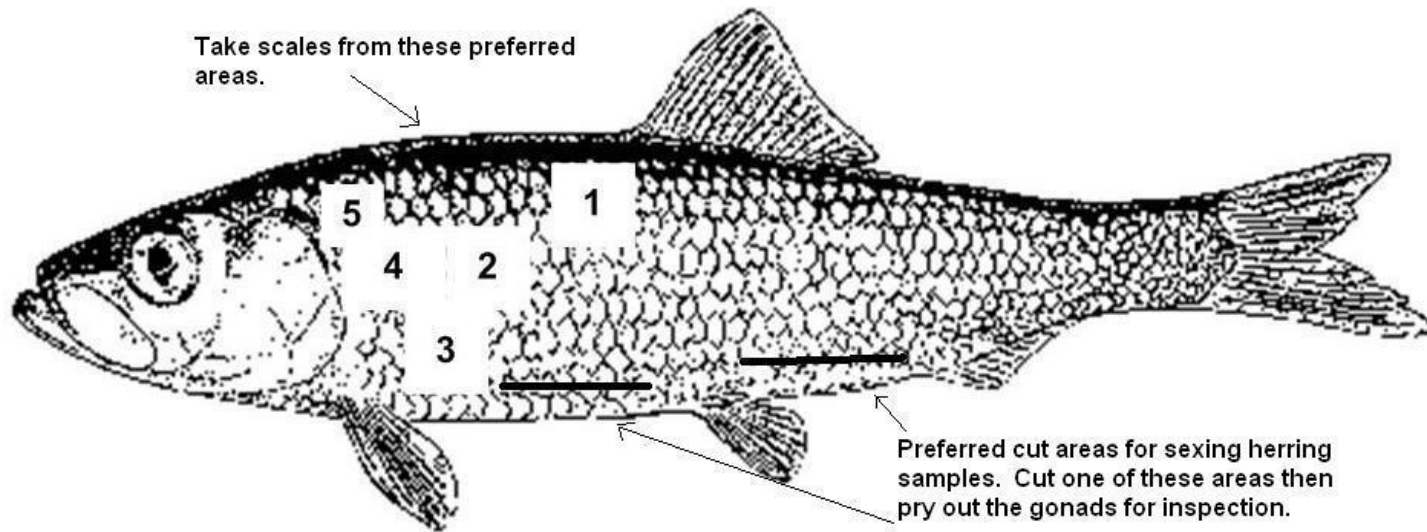




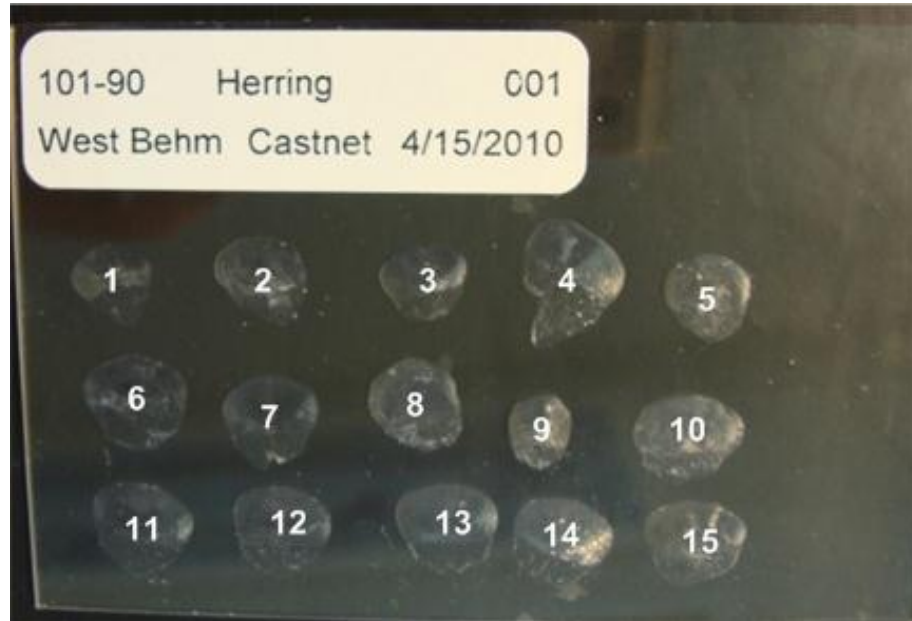
## *Mounting scales to slide*







Herring scales: 15 per slide, 1 scale per fish



# *Adult scale projected on a Microfiche reader*



# Scale terminology

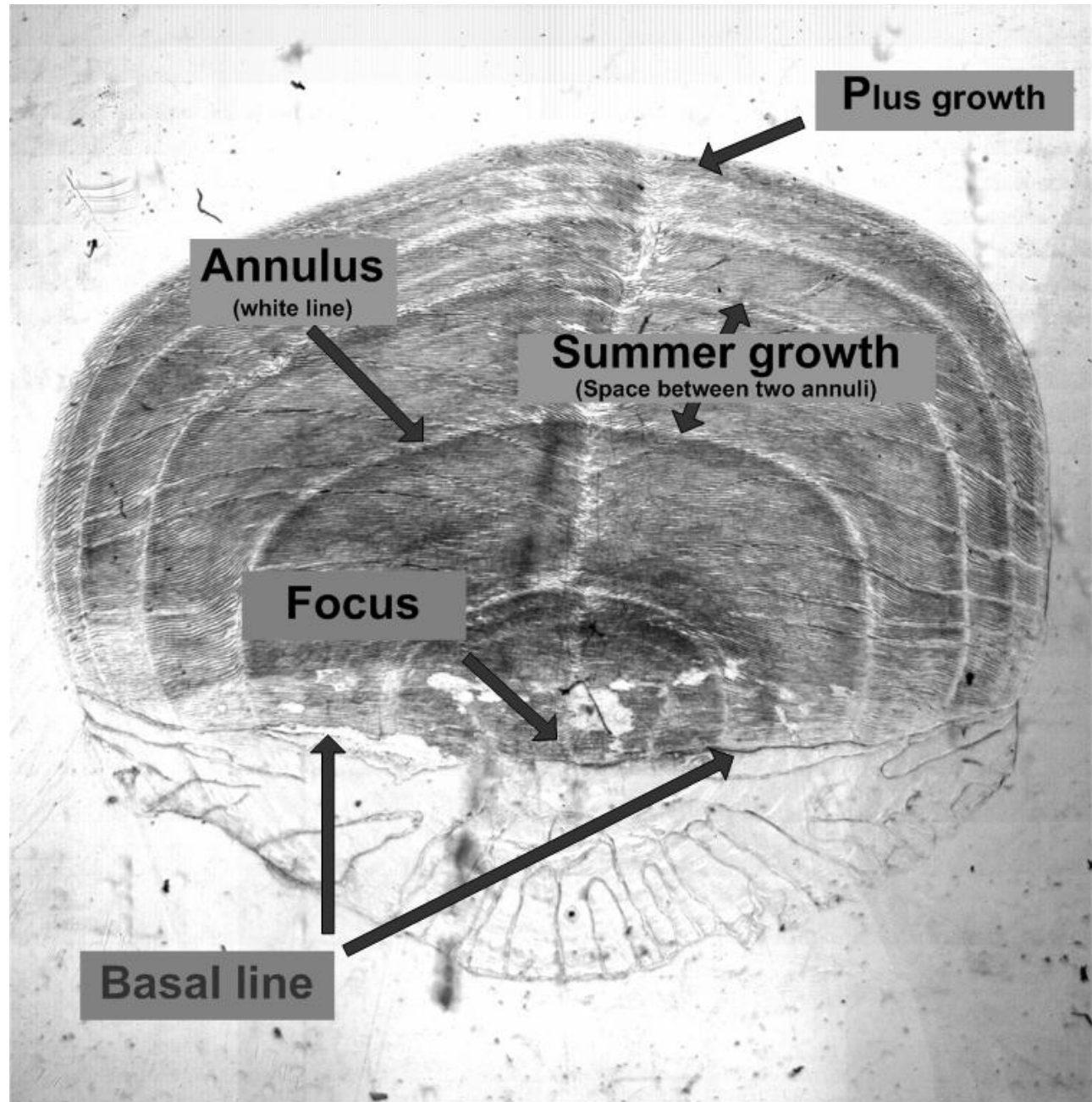
*Focus*

*Annulus*

*Summer growth*

*Plus growth*

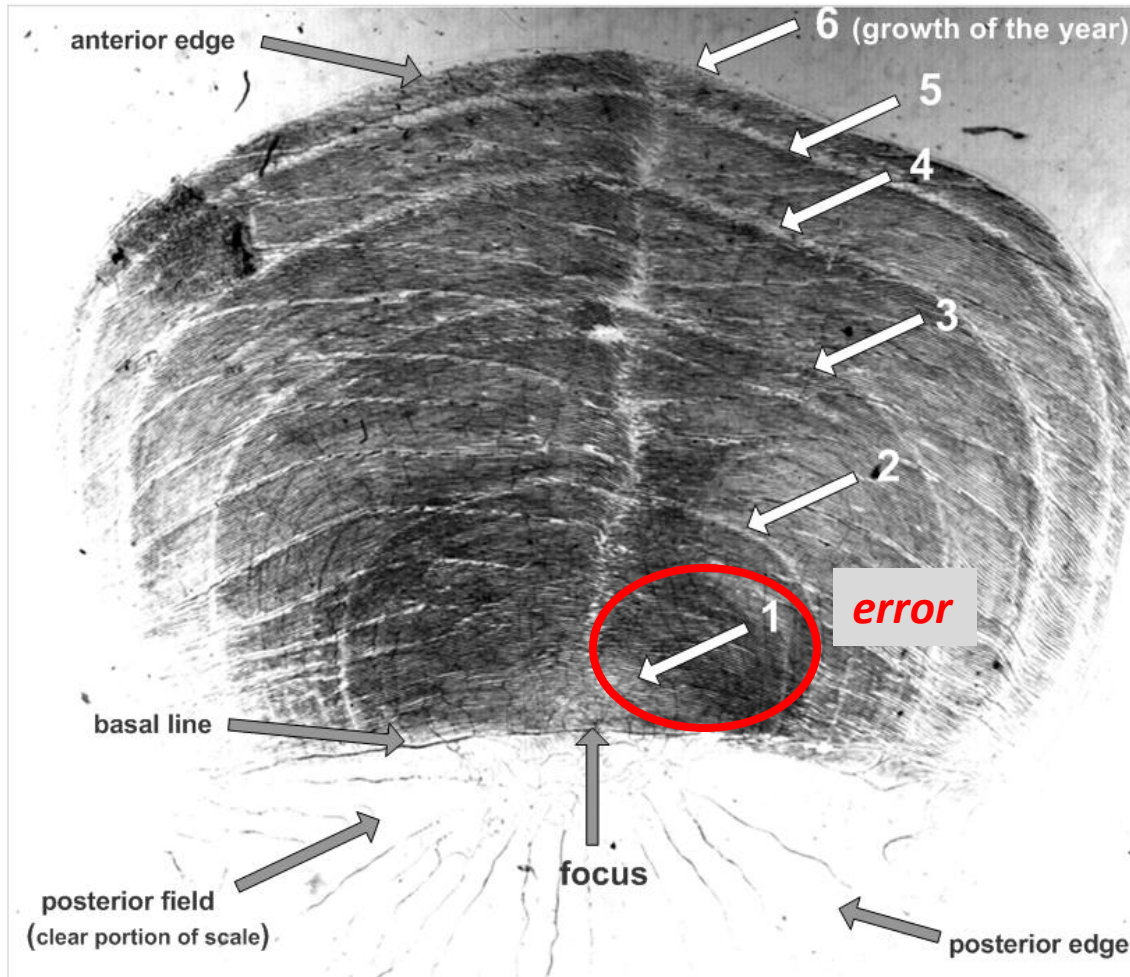
*Basal line*





# How aging errors at the MTA lab were discovered:

- Directive to create an ASL herring sampling manual
- Image of herring scale below sent to former Region I herring ager
- Discrepancy in scale aging methodology discovered

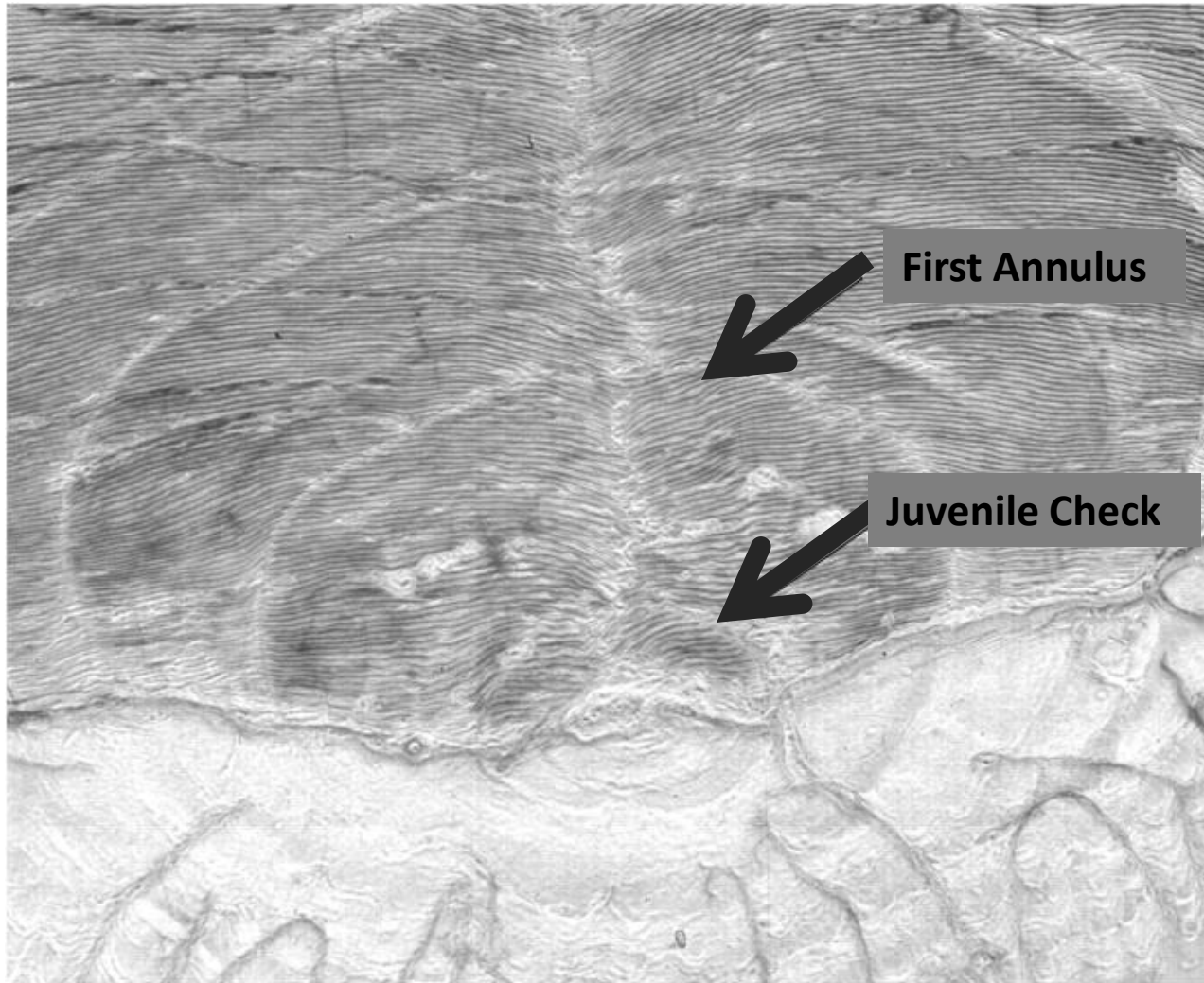


*Red oval indicates an error (not a true annulus). Correct age is 5 (not 6). Most of the age errors were 1 or 2 years higher than re-read ages.*

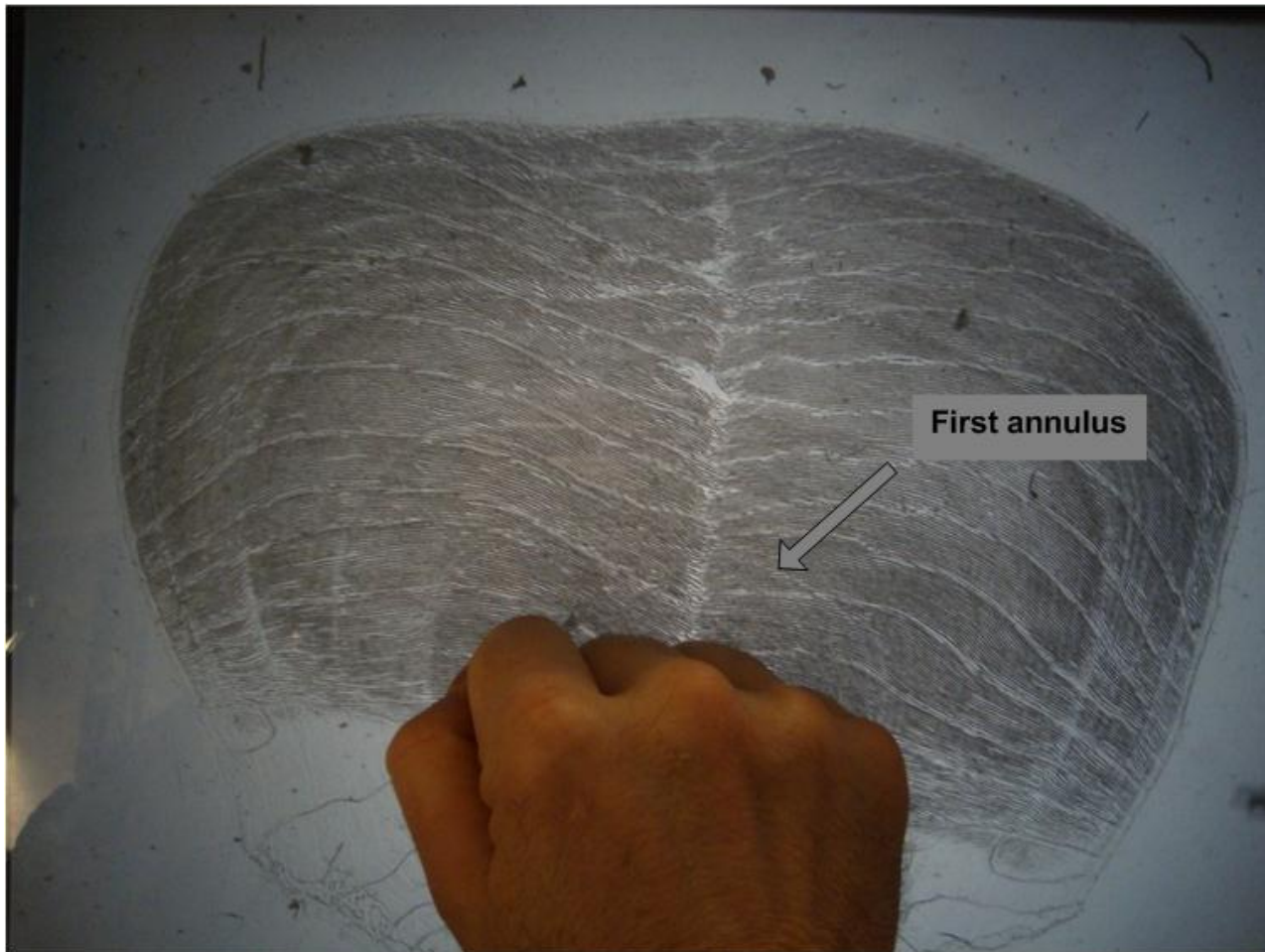


*Juvenile checks are much smaller than first annulus.*

*The juvenile check below is about same size as a scale from a 40 mm juvenile herring.*



*First annulus is typically the size of a fist*



*42X magnification on microfiche*

## Extent of aging error:

- 1999-2002 no significant errors
- 2003-2005 over-aging predominantly by one year
- 2006-2010 over-aging predominantly by two years
- All SE Alaska stocks were affected by the aging drift (gradual change in methodology)
- Determined all 1999-2010 herring scales needed to be re-aged to ensure data consistency

## What we did to correct the aging errors:

- Examined scale ages from 1998 (pre-Lab ages)
- Re-examined and defined herring scale aging methodology
- Created aging test on 1998 calibration scales
- Re-aged 60,000+ scales for years 1999-2010  
(Craig, Ernest Sound, Hobart/Houghton, Hoonah, Lynn Canal, Seymour, Sitka, Tenakee and West Behm)
- Spot checked selected years - 1980-1997 Sitka and Seymour
- Method verification at Pacific Biological Station, Nanaimo, DFO  
(June 2011)



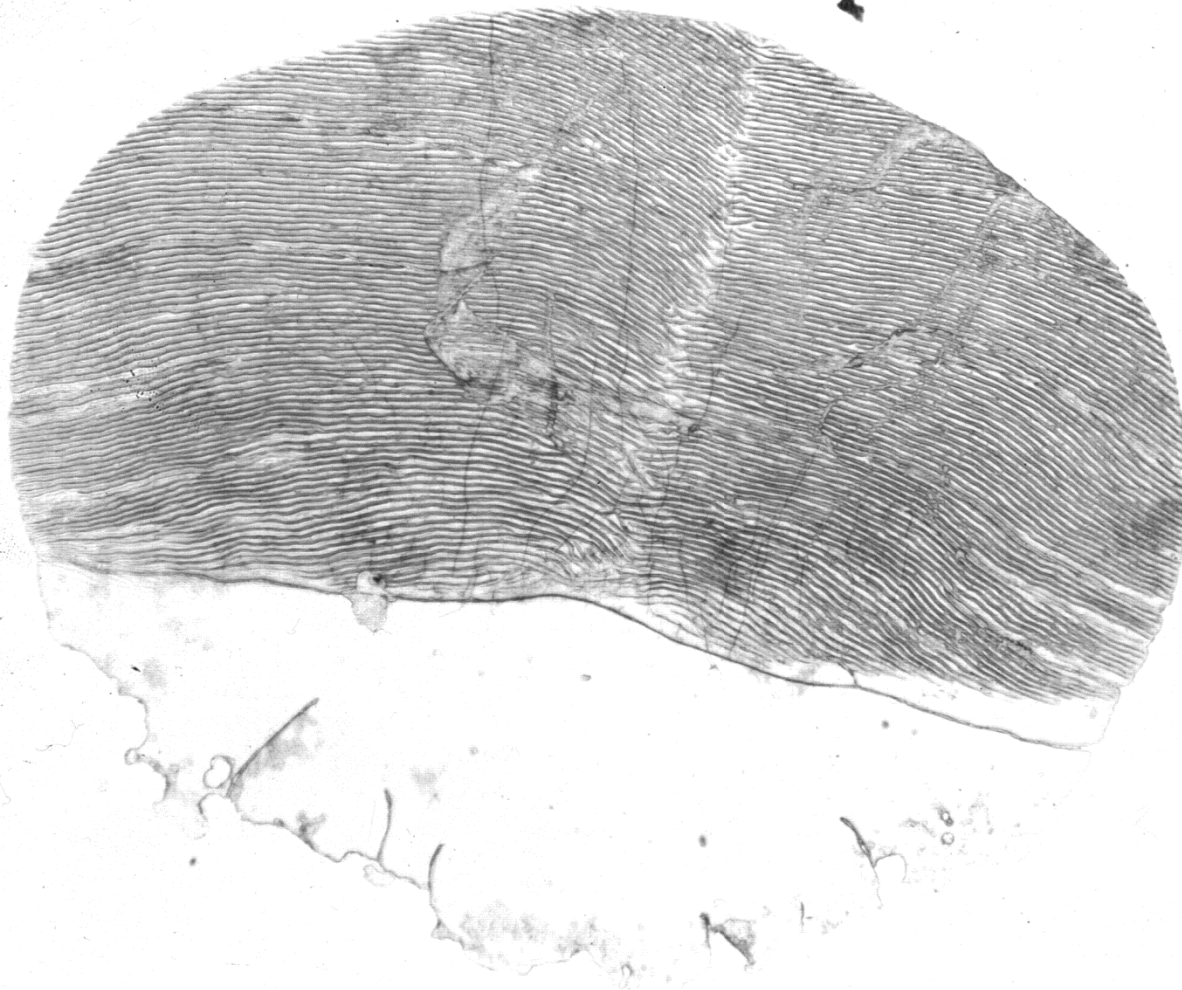
# Validation – determining when annuli form

## *One and two year old herring*



*(ADF&G, sampled in Sitka, February 25<sup>th</sup>, 2011)*

Validation Method: Sampling monthly in the spring  
Scale of one-year old herring – No annulus present in April



*(ADF&G, sampled in Sitka, April 14<sup>th</sup>, 2011)*

# Scale of one-year old herring

New annulus has formed by mid-May



*(ADF&G, sampled in Sitka, May 19<sup>th</sup>, 2011)*

## What we are doing to prevent this problem from occurring again:

- Validate the scale aging method
- Follow established aging protocol
- All agers must pass an 80% precision test on 1998 calibration scales
- 10% spot check performed on all aged herring samples
- Re-read all samples that fail 80% precision
- Prevent reader isolation through teamwork
- Teach all lab technicians basic herring aging skills



## Additional projects:

- Develop a library of scale images
- Post season: Exchange slides with other labs to verify scale ages
- Use statistical models to test for potential reader bias