Bristol Bay Chinook Salmon ASL Program

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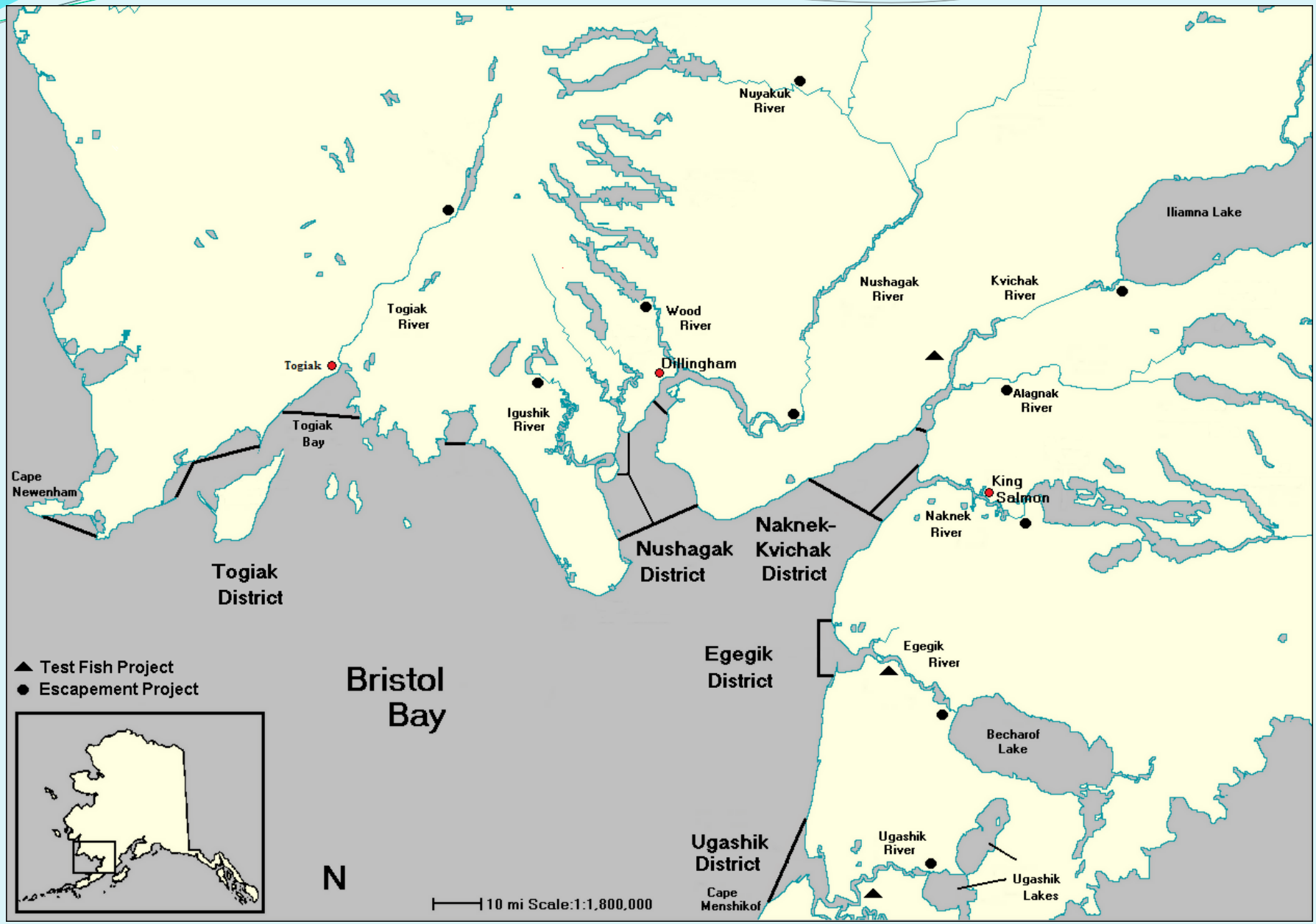
Bristol Bay

- **Primarily a Sockeye salmon fishery but still supports one of the largest Chinook salmon runs in Alaska.**
- **Nushagak River Chinook**
  - **Average annual total run of 235,000.**
  - **Average spawning escapement is 157,000.**
- **Other Significant Chinook Populations in Bristol Bay.**
  - **Togiak River**
  - **Naknek River**
  - **Alagnak River**

Bristol Bay


Nuyakuk River
Iliamna Lake
Nushagak River
Kvichak River
Togiak River
Wood River
Togiak
Dillingham
Alagnak River
Igushik River
Togiak Bay
Cape Newenham
King Salmon
Naknek River
Naknek-Kvichak District
Nushagak District
Togiak District
Egegik District
Egegik River
Test Fish Project
Escapement Project
Bristol Bay
Becharof Lake
Ugashik River
Ugashik District
Ugashik Lakes
Cape Menshikof
N
10 mi Scale:1:1,800,000

Bristol Bay Scale Sampling Work Flow

- Sample Collection
  - Sampling is done in one of two ways.
    - The first sampling approach is at the processors for commercially caught salmon.
      - Samplers are deployed by ADF&G staff at least once a day during the season.
      - Electronic handheld computers and measuring calipers are used.
    - The second method of sampling is completely manual, and is usually preformed out at remote field sites such as escapement counting projects.

Commercial Catch Sampling

- Sample Collection
  - The senior scale reader takes the lead in creating a daily catch sampling schedule.
    - Sample goals, fisheries openings/closings, tide tables, processors, and samplers are considered in building the plan.
    - Samplers are deployed during one or both tides depending on the days catch.
  - Sockeye samples are collected from all 5 districts.
  - Chinook samples are collected from the Nushagak and Togiak districts.

Bristol Bay Commercial Sampling Goals

Catch sampling and Genetics sampling goals for Bristol Bay,

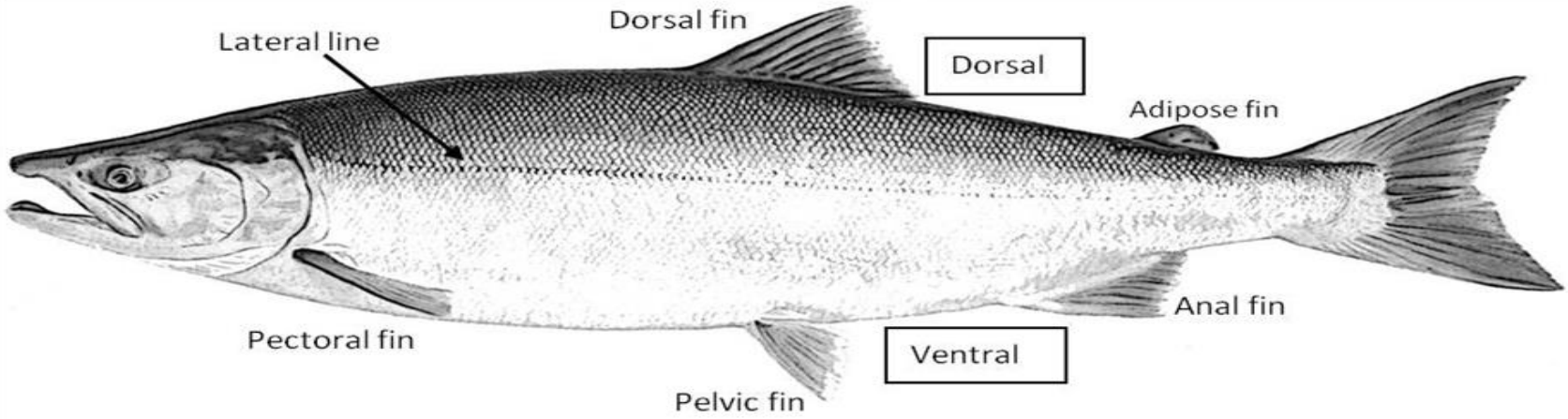
	Age Samples				Genetic Samples		
	Eastside Districts	Nushagak District	Togiak District		Eastside Districts	Nushagak District	Togiak District
Sockeye	480/period [a]	480/period [a]	480/period [a]		240/period [a]	240/period [a]	240/period [a]
Chinook	None	480/week-peak 240/week-low catchs	240/week		None	None	None
Chum	None	240/week	240/week		None	None	None

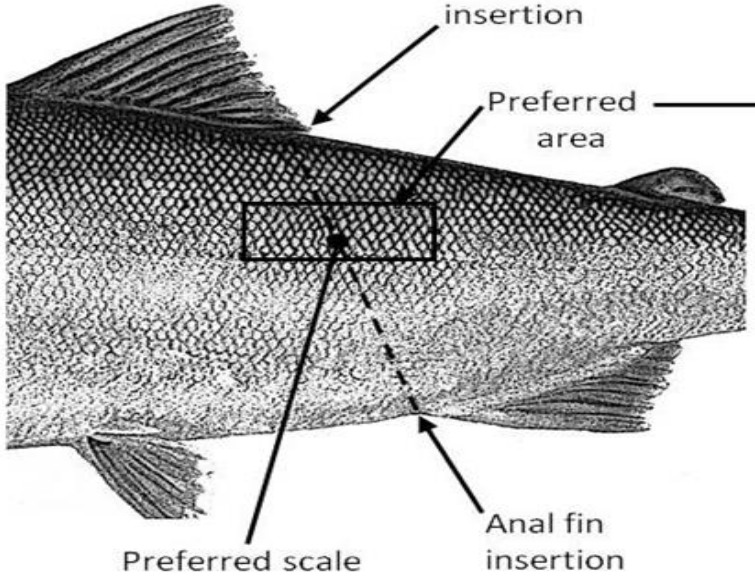
[a] Eastside and Nushagak sockeye districts: Period definition to be no less than 48 hours, hence if fully sampled on a Tuesday, do not sample on a Wednesday. Togiak sockeye and all other species sampling periods are defined as a week.

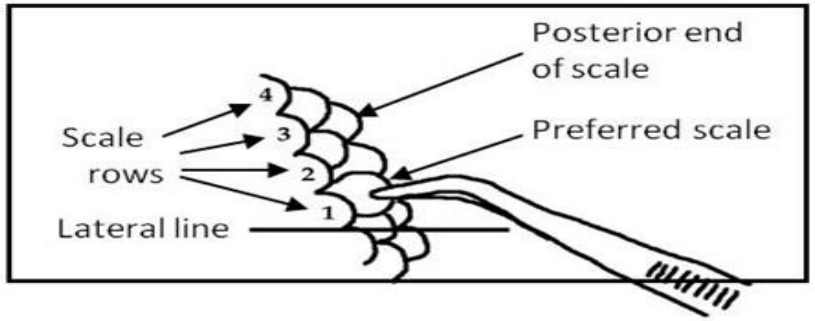
Escapement Sampling

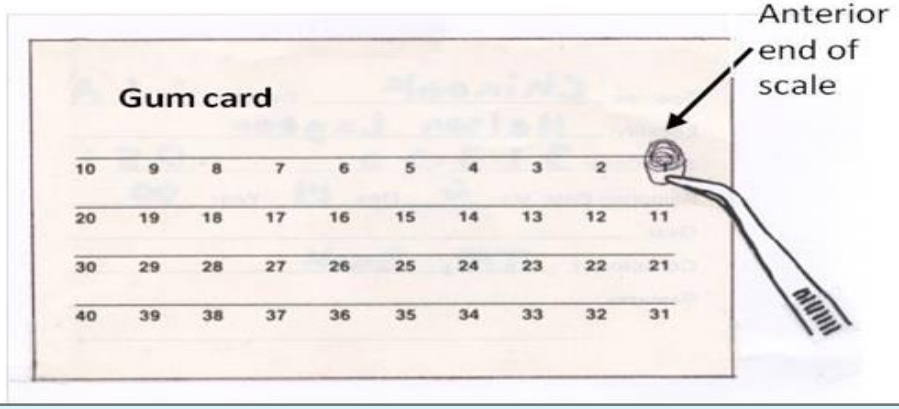
- Sample Collection
  - Sockeye are collected from all 8 escapement projects.
  - Chinook are only collected from Nushagak River Sonar.
    - Fish are sampled from the test fish program.
  - All data is taken manually and processed in King Salmon.

Bristol Bay Salmon ASL Sampling









Bristol Bay ASL Sampling

Table 1. ASL Samples collected in Bristol Bay for the last five years.

	Year					
Species	2013	2012	2011	2010	2009	Average
Sockeye	35,741	35,754	43,009	43,226	44,666	40,479
Chum	1,547	3,080	1,699	2,609	1,363	2,060
Chinook	1,425	2,191	1,449	1,453	2,509	1,805
Nushagak Esc	641	640	644	480	254	532
Nushagak Catch	674	849	598	637	1,773	906
Togiak	110	702	207	336	482	367
Total Samples	38,713	41,025	46,157	47,288	48,538	44,344

Bristol Bay Scale Aging

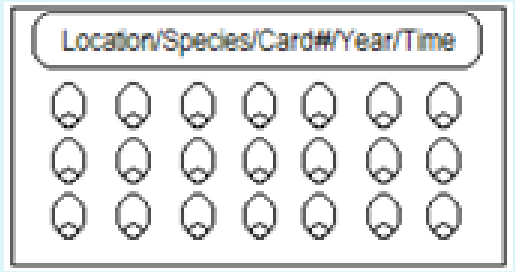
- We currently do not have a formal protocol for aging Chinook scales.
- We have a team of two scale readers inseason. The senior ager and an assistant. The field biologist will help with post season aging of scales not read inseason.
- Senior Scale reader Cathy Tilly. 20 + yrs experience in the bay.
  - Primarily sockeye
- High volume of scales collected and read each season.
- Sockeye is our main concern and Chinook scales are read as time permits.
- 95% of scales are read inseason.
- Age composition estimates are distributed to the public inseason.
- We are attending this meeting to develop a scale aging protocol that is consistent throughout the state.

Bristol Bay Scale Aging

- Receiving and Organizing Scale Samples
  - All scales are sent to King Salmon for reading.
  - Data will be delivered as electronic data stored on memory cards or hard copies of ASL forms.
  - ASL forms and electronic data are looked over for mistakes and missing data.
  - The forms are used to record the ages of the fish before they are scanned. Electronic data is aged once uploaded to database.
  - The manual sample gum cards are treated the same way as the electronic samples and they will eventually be read and filed.
  - The samples are temporarily filed as one of the following; to be uploaded, to be labeled, to be pressed, to be read, or problem scales.

Bristol Bay Scale Aging

- Scale Pressing
  - Scale pressing is very important, and needs to be done precisely and with minimal mistakes.
  - A quality press would have well defined scales that are dark enough to be able to read, the scale impressions should not fade into the acetate
  - The scales are all correctly oriented on the card in the same direction.



Age Training Methods

- All training is conducted hands on during the season.
- Senior Ager (Cathy) will work in conjunction with the assistant reader and show them what to look for.
  - Once Cathy is comfortable with reading scales together she will let new reader age a sample on their own. Cathy will then also read the same scales to confirm ages.
  - We have packets of scales and bubble sheets with known ages for new ager to practice with.
  - Once new ager is in agreement with senior ager 95% of the time, they are left to age on their own.
  - Cathy will check periodically throughout the season to confirm ages.
- Our aging is more based on patterns than actual specific items to check for.
  - High volume of scales read inseason. Limited time to go back and proofread ages.

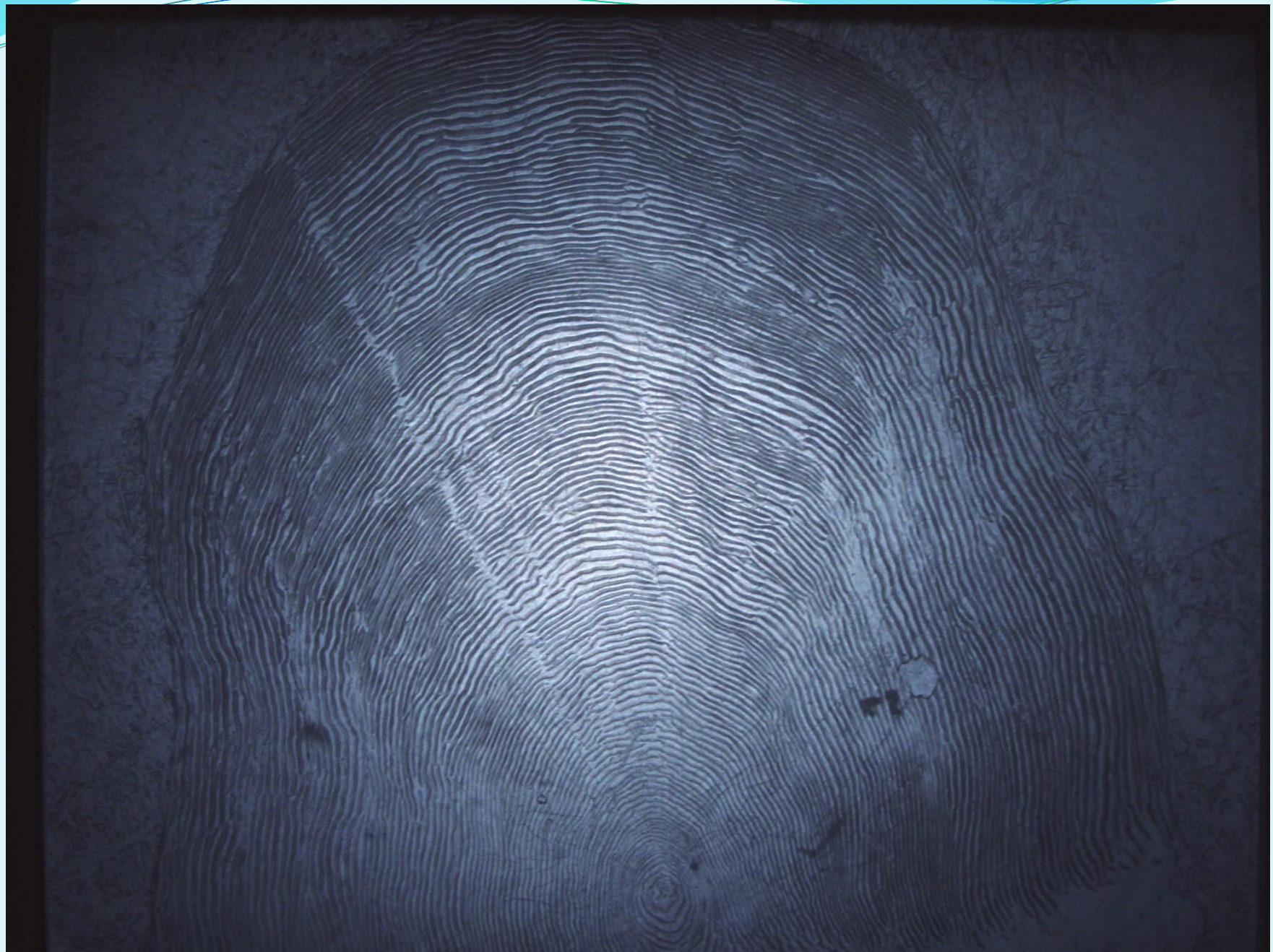
Bristol Bay Scale Aging

- Species Identification
- Chinook Salmon: what we know
  - Chinook salmon scales usually have more than 6 complete circuli and as many as 18 broken circuli in the posterior portion of the scale. Outside the area of the focus, circuli seldom project into the posterior field, although some of the first ocean circuli may be followed into this area as weak irregular markings unlike true circuli.
  - Chinook scales are large for the size of the fish with a large first ocean zone. Mature Chinook often have 3 to 4 winter checks in the ocean zone.
  - Reticulation is uncommon. Strong radial striations are often present.

Chinook Ages

- When aging Chinook salmon in Bristol Bay, we find that they usually have 1 winter freshwater check.
- Most common ages we find are; age-1.2, age-1.3, age-1.4, and age-1.5.
- The number of marine winter checks found, directly correlates to the age given.
- For instance, in the Nushagak River age-1.5 example, there is simply one freshwater check and five notable marine checks.
- Each of the transitions zones includes a small amount of freshwater plus-growth.

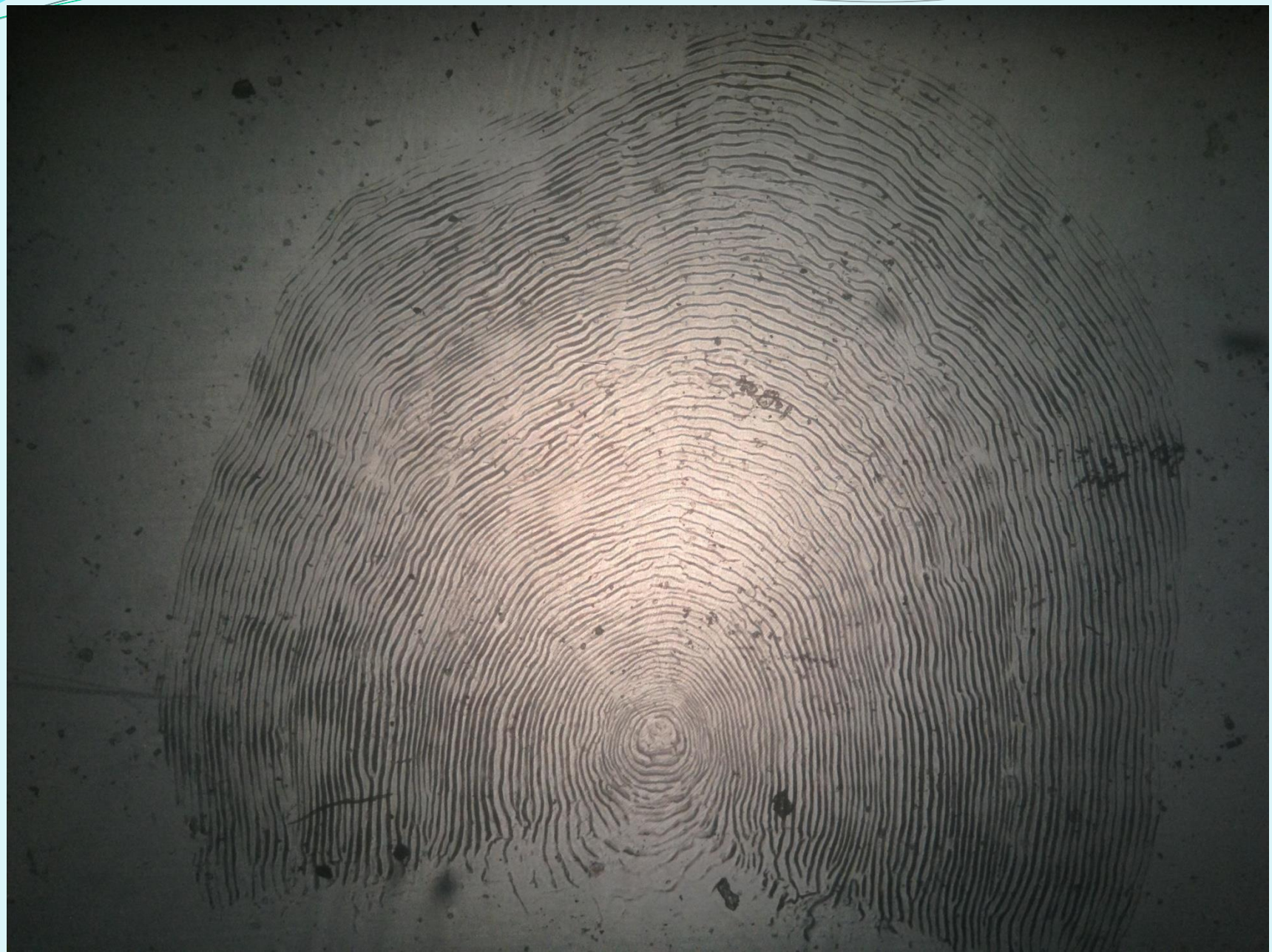
Age 1.5 Nush Chinook



Chinook Scale Aging Challenges

- If scale reabsorbed, hard to determine last ocean check.
- Determining first ocean check. Some Nushagak Chinook have a false check as it transitions from freshwater to ocean that sometimes is mistaken for the first ocean age. See following example:

Age 1.3 Nushagak Chinook



Aging Error Codes

- During the aging process, an age determination is not possible because of a defect with the scale or it was missing altogether
- There are eight common error codes used in aging.

Code	Description
2	Inverted
3	Regenerated
4	Illegible
5	Missing
6	Re-absorbed
7	Wrong Species
8	Non-preferred
9	Double Scale

Age 1.1 Nushagak Chinook

Age 1.2 Nushagak Chinook

Age 1.4 Nushagak Chinook

The End

- Questions