

Brood Year 2013 Mark Characteristic Report



- Agency: Seattle Public Utilities
- Facility: Cedar River Hatchery
- Brood Year: 2013
- Species: Sockeye
- Target Mark:
 - 3H3
 - 3H4
 - 3H2-2
- Duration Cycle:
 - 24hr chill
 - Hyphen = 4*24hr
- Temperature Shift:
 - Down 5.0 – 6.7 Celsius

[illegible]

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

4	4	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4																						
8	9	0	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	8	8	8	8	8	8	8	8	8	5	5	5	5	6	7	6	4	3	4	3	2	2	3	3	3	5	5	5	5	5	5	5	5	4	5	6	7	5	4	4	4	8	8	8	8	8	8	3	4	3	4	3	9	8	8	8	5

2: 3H3

CHILL	ASW
TSW	Swimout
W error	Released

Released

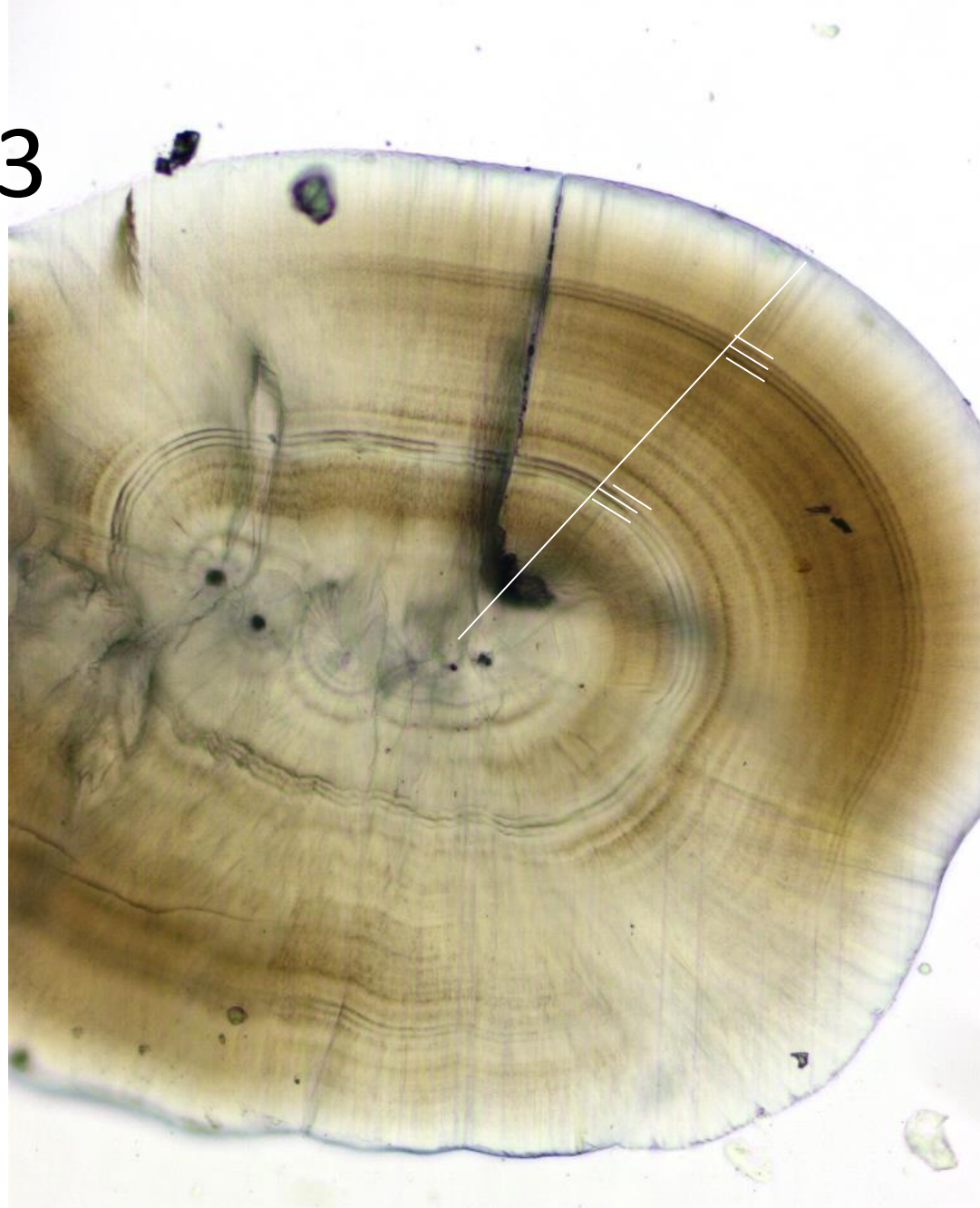
[illegible]

[illegible]

A micrograph of a fish scale showing concentric growth rings. A white line is drawn across the scale, with three short vertical tick marks on each side, indicating specific growth increments. The scale has a yellowish-brown color with darker brown rings.

[illegible]

K14: 3H3



Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

[illegible]

K20: 3H3

CHILL ASW
TSW Swimout
HATCH TSW error Released

[illegible]

[illegible][illegible]

K26: 3H3

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

[illegible]

[illegible][illegible][illegible]

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

[illegible]

[illegible]

K43: 3H4

Faint 4th ring

Began	CHILL	ASW
hock/pick	TSW	Swimout
HATCH	TSW error	Released

[illegible]

K44: 3H4

Faint 4th ring

Began

CHILL

ASW

Shock/pick

TSW

Swim out

HATCH

TSW error

Released

[illegible]

K49: 3H4

Faint 4th ring

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

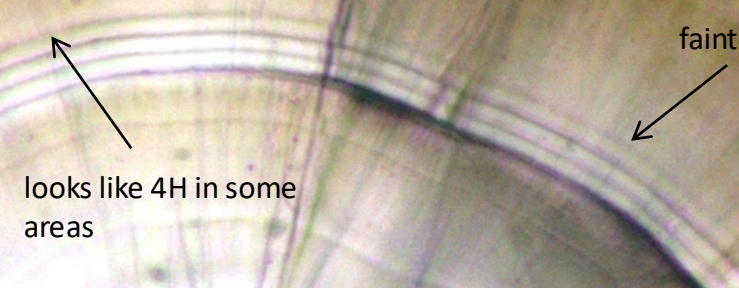
[illegible]

[illegible]

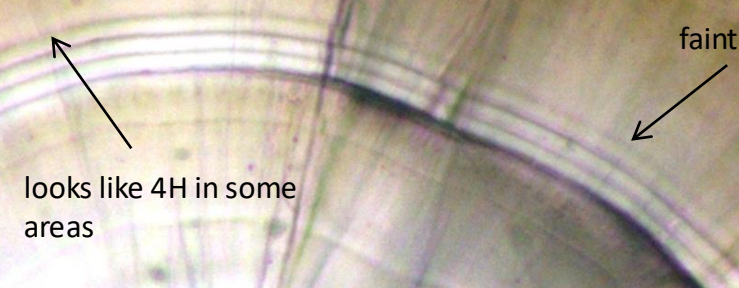
Extra ring

This image is a close-up photograph of a shell, likely a gastropod, showing its growth lines. A black arrow points to a specific line, labeled "Extra ring", which is an additional growth line that has formed between the regular annual rings, indicating a period of rapid growth or environmental change.

[illegible]

[illegible]

Micrograph showing a curved surface with several parallel, slightly wavy lines. An arrow points to a region on the left with the text "looks like 4H in some areas". Another arrow points to a region on the right with the text "faint".



Micrograph showing a curved surface with annotations:

- Annotation: "looks like 4H in some areas" with an arrow pointing to a region on the left.
- Annotation: "faint" with an arrow pointing to a region on the right.

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

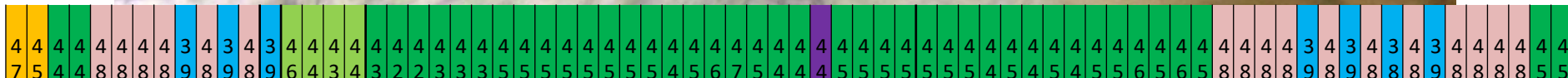
Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

K62: 3H4

A white line with three tick marks is drawn across the image, indicating a specific feature or measurement.

CHILL	ASW
TSW	Swimout
TSW error	Released

Released



[illegible][illegible][illegible]

[illegible]

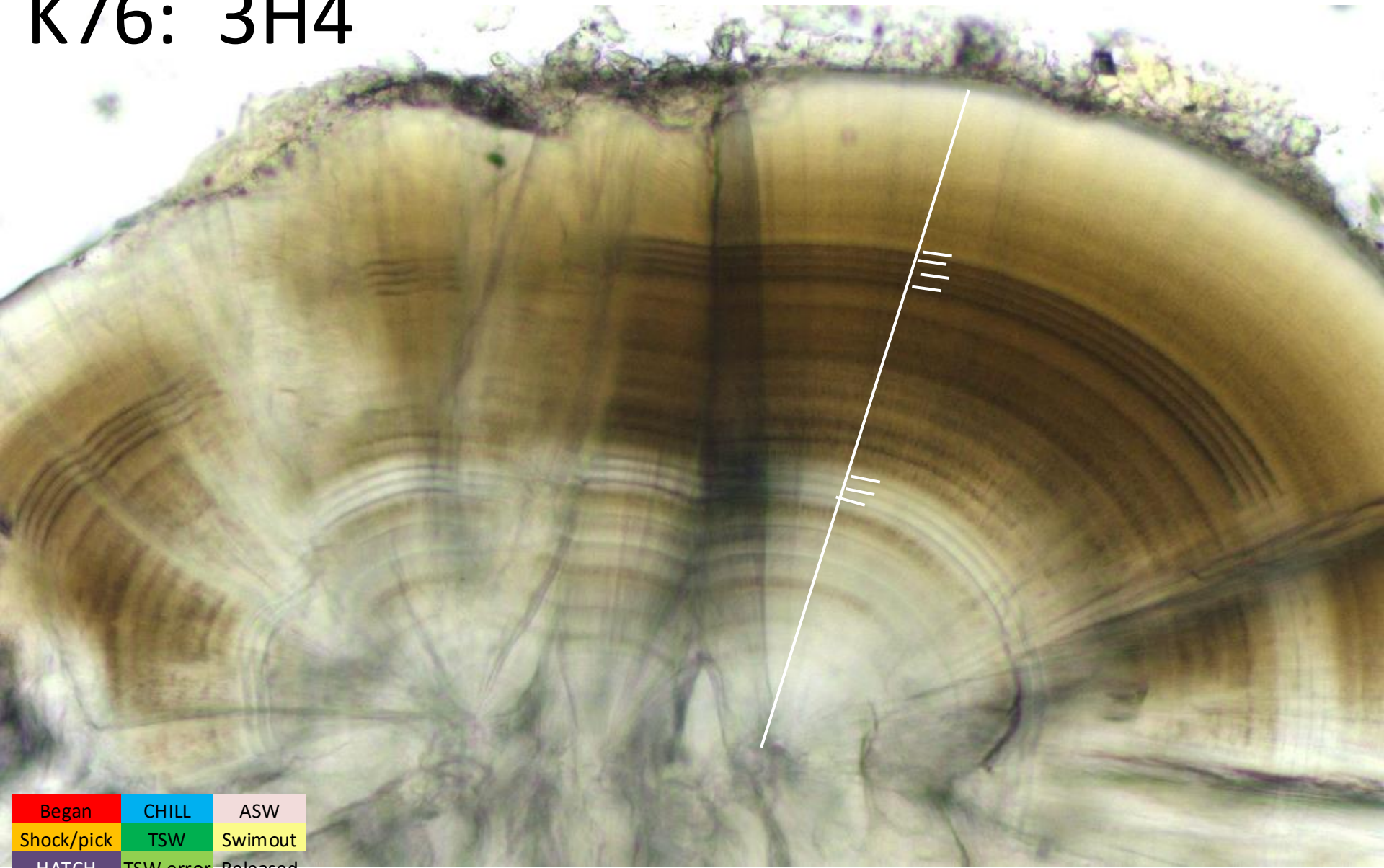
ASW

Swim out

Released

[illegible]

K76: 3H4



HATCH										ISW error										Released																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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[illegible]

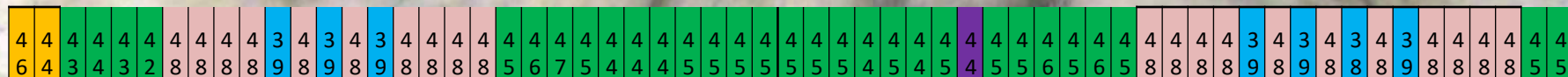
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[illegible][illegible]

[illegible][illegible][illegible]

[illegible][illegible][illegible]

K94: 3H4



K100: 3H2-2

41 days post hatch. 2nd
band faint.

hatch

hatch

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

[illegible]

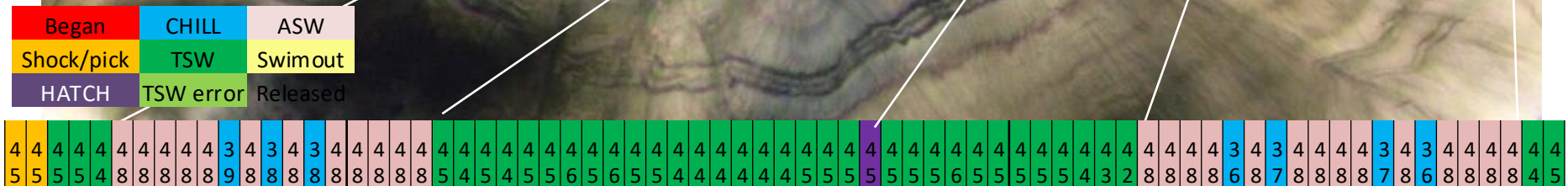
K112: 3H2-2

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

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[illegible]

K118:
3H2-2

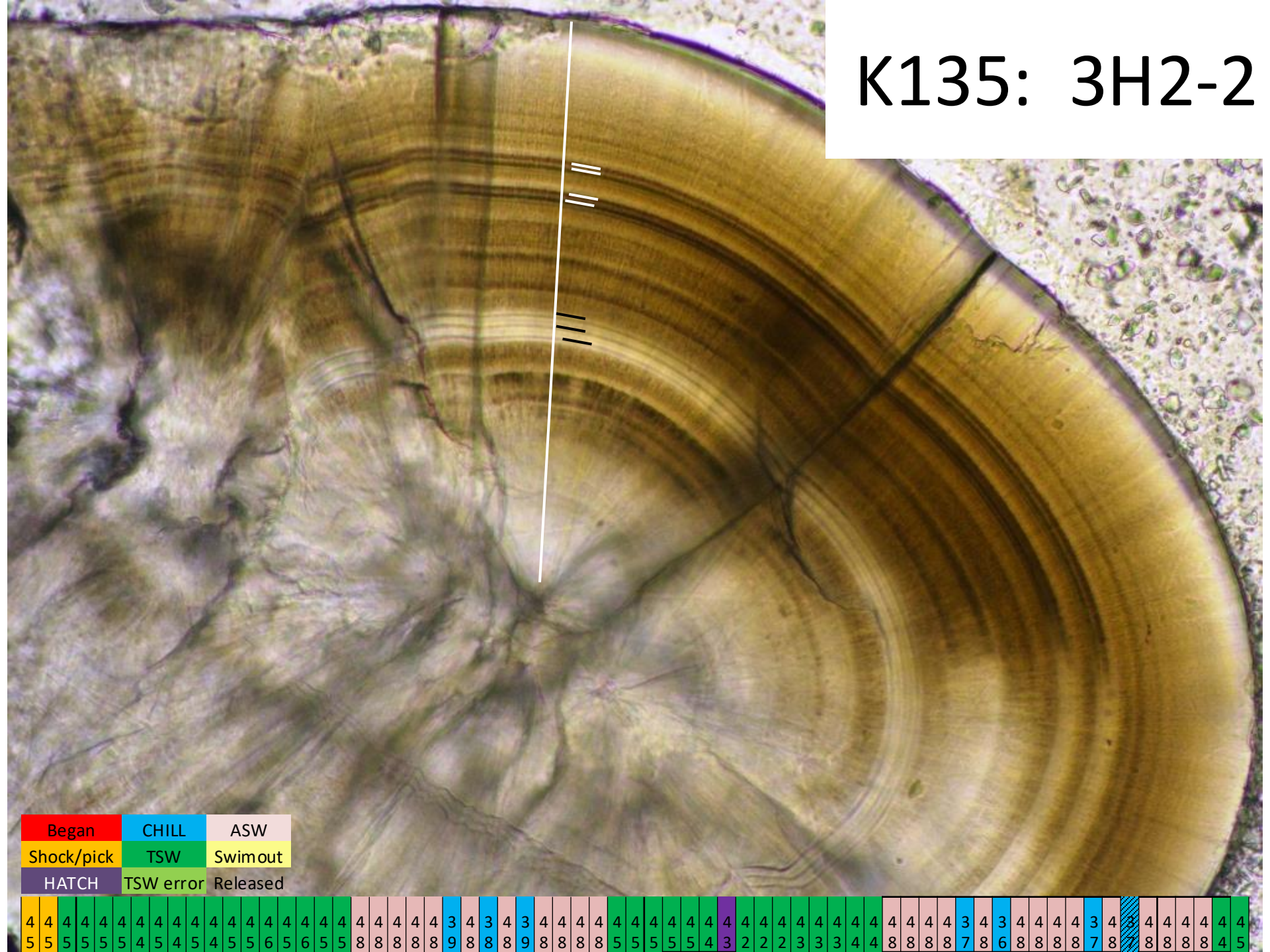




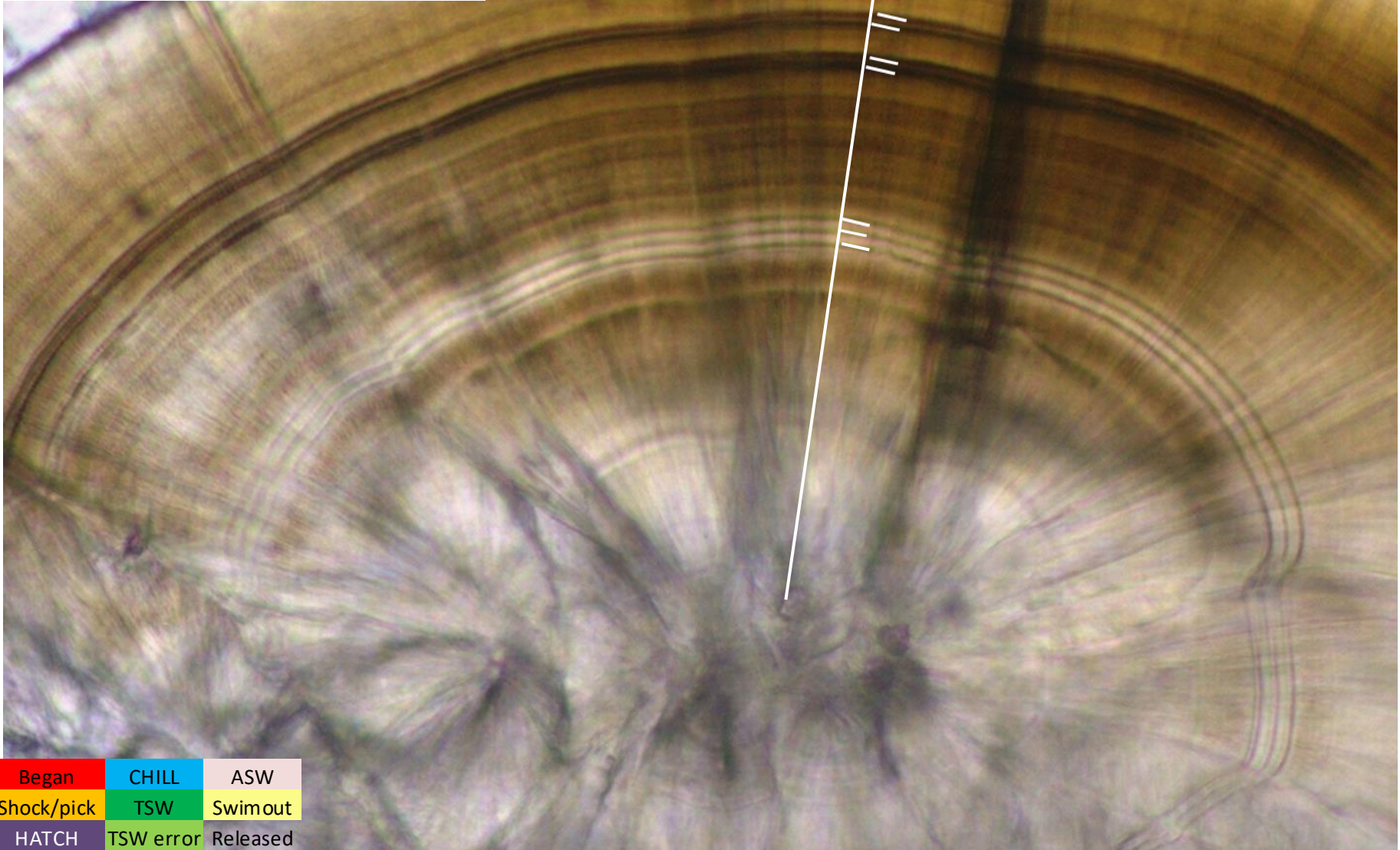
[illegible]

4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
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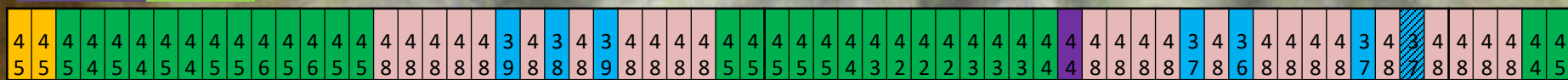
K135: 3H2-2

[illegible]

K136: 3H2-2

[illegible]

K4: 3H2-2



[illegible][illegible][illegible]

K16: 3H2-2

Began	CHILL	ASW
Shock/pick	TSW	Swimout
HATCH	TSW error	Released

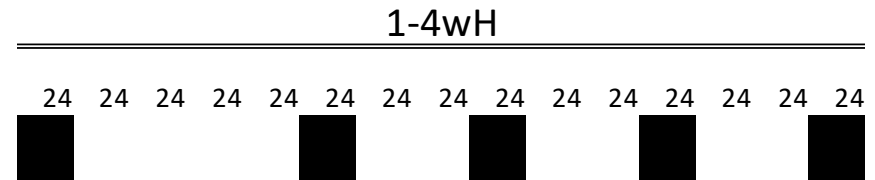
4	4	4	4	4	4	4	3	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	8	8	8	8	9	8	8	8	9	8	8	8	8	5	5	5	5	5	4	3	2	2	2	3	3	3	4	4	4	4	4	5	3	3	4	4	4	4

Recommendations

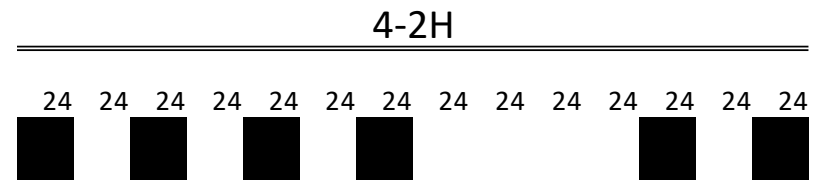
- Start thermal marking >7 days after shocking/picking to distance thermal mark from noise.
- Post hatch marks should be completed <30 days after hatch to avoid faint & narrow bands.
- Stop using ASW. Switching back and forth from TSW to ASW is creating a single thermal mark.
- If temperature fluctuations in TSW affect thermal mark then we can adjust future brood year codes to compensate.

Brood Year 2014 Mark Codes

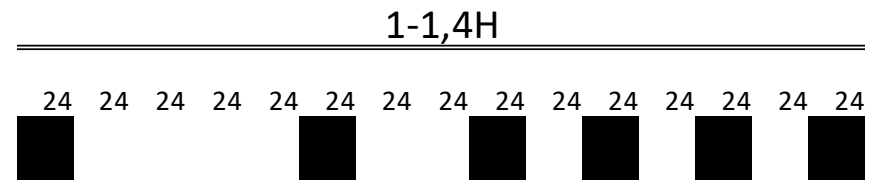
- 1-4wH



- 4-2H



- 1-1,4H



- , = 2x's chilling event

- - = 4x's chilling event

- / = 6x's chilling event