

2018 Imnaha River Chinook Salmon and Bull Trout summaries

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Noteable Highlights/Data issues

- Imnaha Weir installation date: **11 June, 2018.**
 - A staff injury on June 11th precluded the ladder from being watered to allow fish passage.
 - The ladder was potentially watered either Tuesday the 12th or Wednesday the 13th. (**check with weir staff**)
- On June 11th, 2018 we discovered that IR5 had not been uploading tag detections to PTAGIS since 5/26. Joseph contacted BioMark staff to help diagnose and fix the problem. All other tag detection sites were working correctly (e.g. IR4 & IML).
 - Last tag detected before IR5 went offline was on May 25th at 3:14 a.m.
 - IR5 was brought back online on June 13th and almost immediately started detecting Bull trout tags at 1:10 p.m.
 - The cause of the downtime was attributed to a faulty master controller.

Unique PIT-tag observations within the Imnaha Basin by species

Mark.Species	Origin	Unique_Tags
Bull Trout	Nat	185
Chinook	Hat	16
Chinook	Nat	45
Chinook	Unk	9

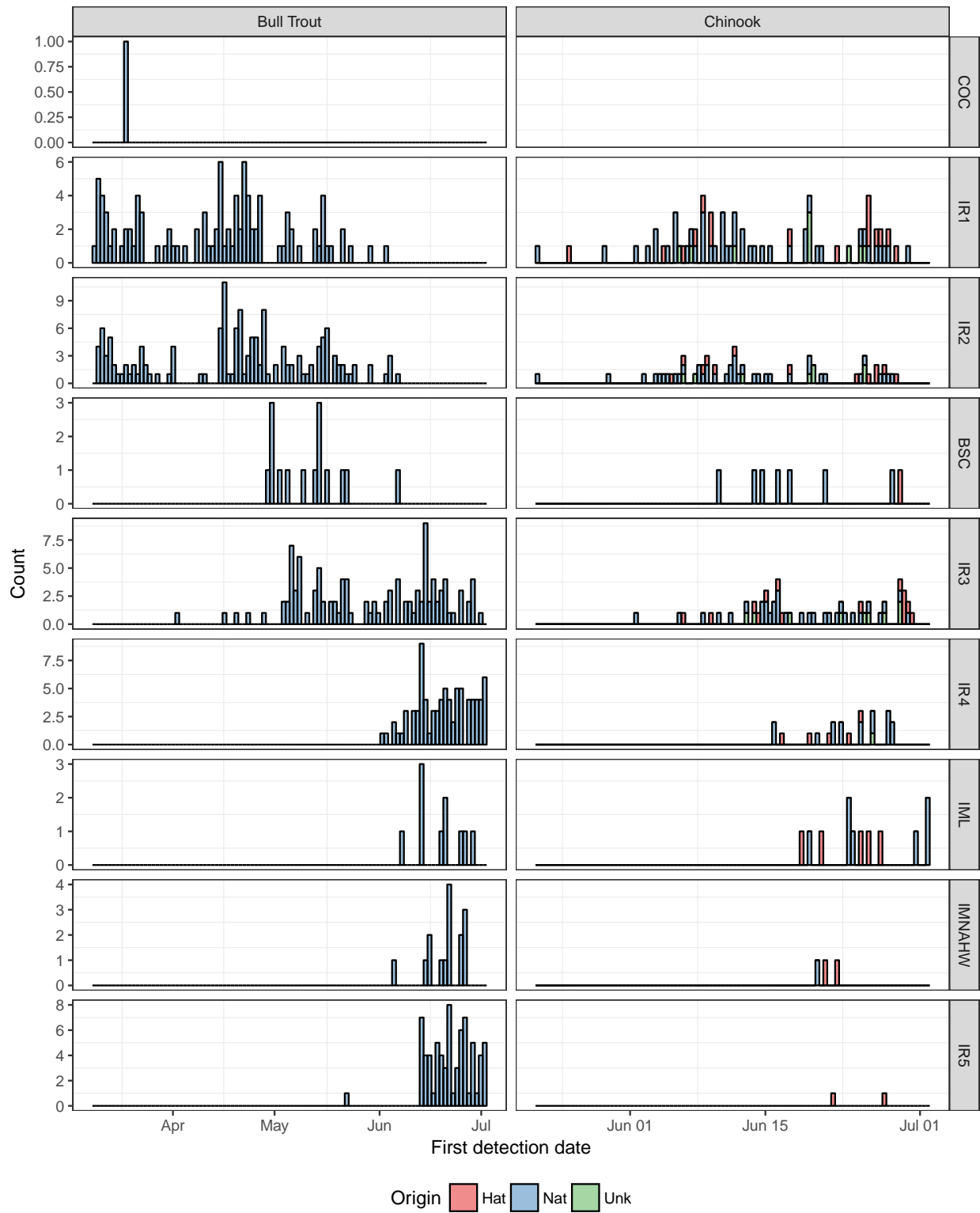
Unique PIT-tag observations within the Imnaha Basin by obervation site, species, origin and release site

Mark.Species	Origin	Release.Site.Code	Unique_Tags
Bull Trout	Nat	IMNAHW	36
Bull Trout	Nat	IMNTRP	15
Bull Trout	Nat	SNAKE3	13
Bull Trout	Nat	SNAKE4	121
Chinook	Hat	IMNAHR	2
Chinook	Hat	IMNAHW	10
Chinook	Hat	LGRLDR	4
Chinook	Nat	IMNTRP	8
Chinook	Nat	LGRLDR	37
Chinook	Unk	BONAFF	9

Unique PIT-tag observations within the Imnaha Basin by species, SiteID and origin

Mark.Species	SiteID	Origin	Unique_Tags
Bull Trout	COC	Nat	1
Bull Trout	IR1	Nat	101
Bull Trout	IR2	Nat	151
Bull Trout	BSC	Nat	15
Bull Trout	IR3	Nat	111
Bull Trout	IR4	Nat	82
Bull Trout	IML	Nat	10
Bull Trout	IMNAHW	Nat	15
Bull Trout	IR5	Nat	70
Chinook	IR1	Hat	16
Chinook	IR1	Nat	45
Chinook	IR1	Unk	9
Chinook	IR2	Hat	13
Chinook	IR2	Nat	39
Chinook	IR2	Unk	8
Chinook	BSC	Hat	1
Chinook	BSC	Nat	7
Chinook	IR3	Hat	14
Chinook	IR3	Nat	32
Chinook	IR3	Unk	9
Chinook	IR4	Hat	5
Chinook	IR4	Nat	16
Chinook	IR4	Unk	1
Chinook	IML	Hat	5
Chinook	IML	Nat	7
Chinook	IMNAHW	Hat	2
Chinook	IMNAHW	Nat	1
Chinook	IR5	Hat	2

Unique PIT-tag observations within the Imnaha Basin by species, origin and arrival date



Unique PIT-tag observations at the Imnaha Weir by trap status (based on observation date at IR4)

Mark.Species	TrapStatus	SiteID	Unique_tags
Bull Trout	Not Seen at IR4	IML	2
Bull Trout	Not Seen at IR4	IMNAHW	9
Bull Trout	Not Seen at IR4	IR5	15
Bull Trout	Panels Closed	IML	8
Bull Trout	Panels Closed	IMNAHW	5
Bull Trout	Panels Closed	IR4	71
Bull Trout	Panels Closed	IR5	55
Bull Trout	Panels Open	IMNAHW	1
Bull Trout	Panels Open	IR4	11
Chinook	Not Seen at IR4	IML	1
Chinook	Not Seen at IR4	IR5	1
Chinook	Panels Closed	IML	11
Chinook	Panels Closed	IMNAHW	3
Chinook	Panels Closed	IR4	22
Chinook	Panels Closed	IR5	1

Passage routes of PIT-tagged fish successfully reaching and being detected at IR5

Mark.Species	TrapStatus	PassageRoute	Unique_tags
Bull Trout	Not Seen at IR4	Handled	1
Bull Trout	Not Seen at IR4	Passed Panels - No Ladder Attemp	6
Bull Trout	Panels Closed	Handled	3
Bull Trout	Panels Closed	Passed Panels - Ladder Attempt	2
Bull Trout	Panels Closed	Passed Panels - No Ladder Attemp	50
Bull Trout	Panels Open	Passed Panels - No Ladder Attemp	10
Chinook	Not Seen at IR4	Passed Panels - Ladder Attempt	1
Chinook	Panels Closed	Handled	1

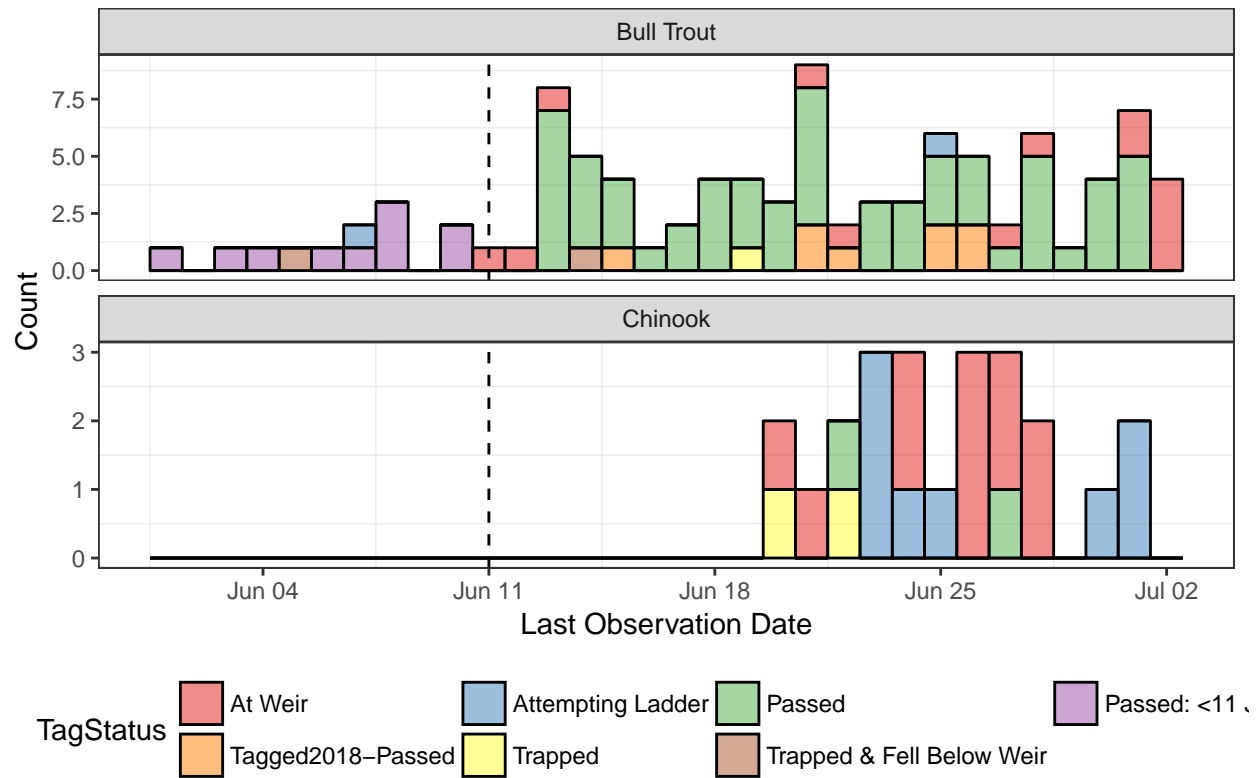
Unique PIT-tag observations by site, detection efficiencies and estimated tags

Mark.Species	SiteID	Unique_Tags	det_eff	N_tags	lwr_N	upr_N	Conversion
Bull Trout	IR1	101	0.54	188.3	182.7	194	NA%
Bull Trout	IR2	151	0.81	186.5	179.9	193.2	99%
Bull Trout	IR3	111	0.7	158	149.3	166.8	85%
Bull Trout	IR4	82	0.79	104.4	97.2	111.5	66%
Bull Trout	IML	10	0.5	20	17.44	22.56	NA%
Bull Trout	IMNAHW	15	1	15	15	15	75%
Bull Trout	IR5	70	1	70	70	70	67%
Chinook	IR1	70	1	70	70	70	NA%
Chinook	IR2	60	0.87	68.75	65.72	71.78	98%
Chinook	IR3	55	1	55	55	55	80%
Chinook	IR4	22	0.96	23	23	23	42%
Chinook	IML	12	1	12	12	12	NA%
Chinook	IMNAHW	3	1	3	3	3	25%
Chinook	IR5	2	1	2	2	2	9%

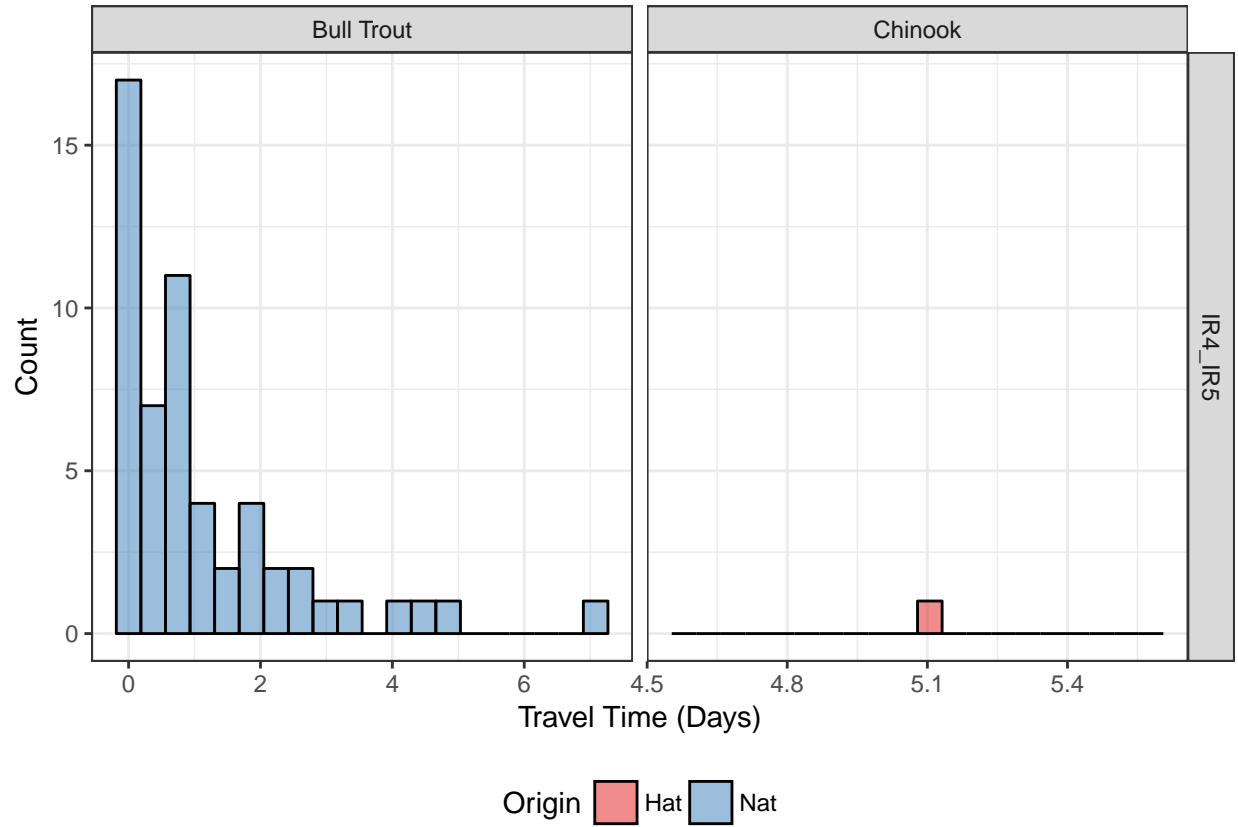
Unique PIT-tag observations by tag status

Mark.Species	Origin	TagStatus	Unique_Tags
Bull Trout	Nat	At Weir	13
Bull Trout	Nat	Attempting Ladder	2
Bull Trout	Nat	Last obs: BSC	11
Bull Trout	Nat	Last obs: IR1	5
Bull Trout	Nat	Last obs: IR2	21
Bull Trout	Nat	Last obs: IR3	50
Bull Trout	Nat	Passed	62
Bull Trout	Nat	Passed: <11 June	10
Bull Trout	Nat	Tagged2018-Passed	8
Bull Trout	Nat	Trapped	1
Bull Trout	Nat	Trapped & Fell Below Weir	2
Chinook	Hat	At Weir	1
Chinook	Hat	Attempting Ladder	2
Chinook	Hat	Last obs: BSC	1
Chinook	Hat	Last obs: IR2	1
Chinook	Hat	Last obs: IR3	8
Chinook	Hat	Passed	2
Chinook	Hat	Trapped	1
Chinook	Nat	At Weir	9
Chinook	Nat	Attempting Ladder	6
Chinook	Nat	Last obs: BSC	7
Chinook	Nat	Last obs: IR1	2
Chinook	Nat	Last obs: IR2	4
Chinook	Nat	Last obs: IR3	16
Chinook	Nat	Trapped	1
Chinook	Unk	At Weir	1
Chinook	Unk	Last obs: IR3	8

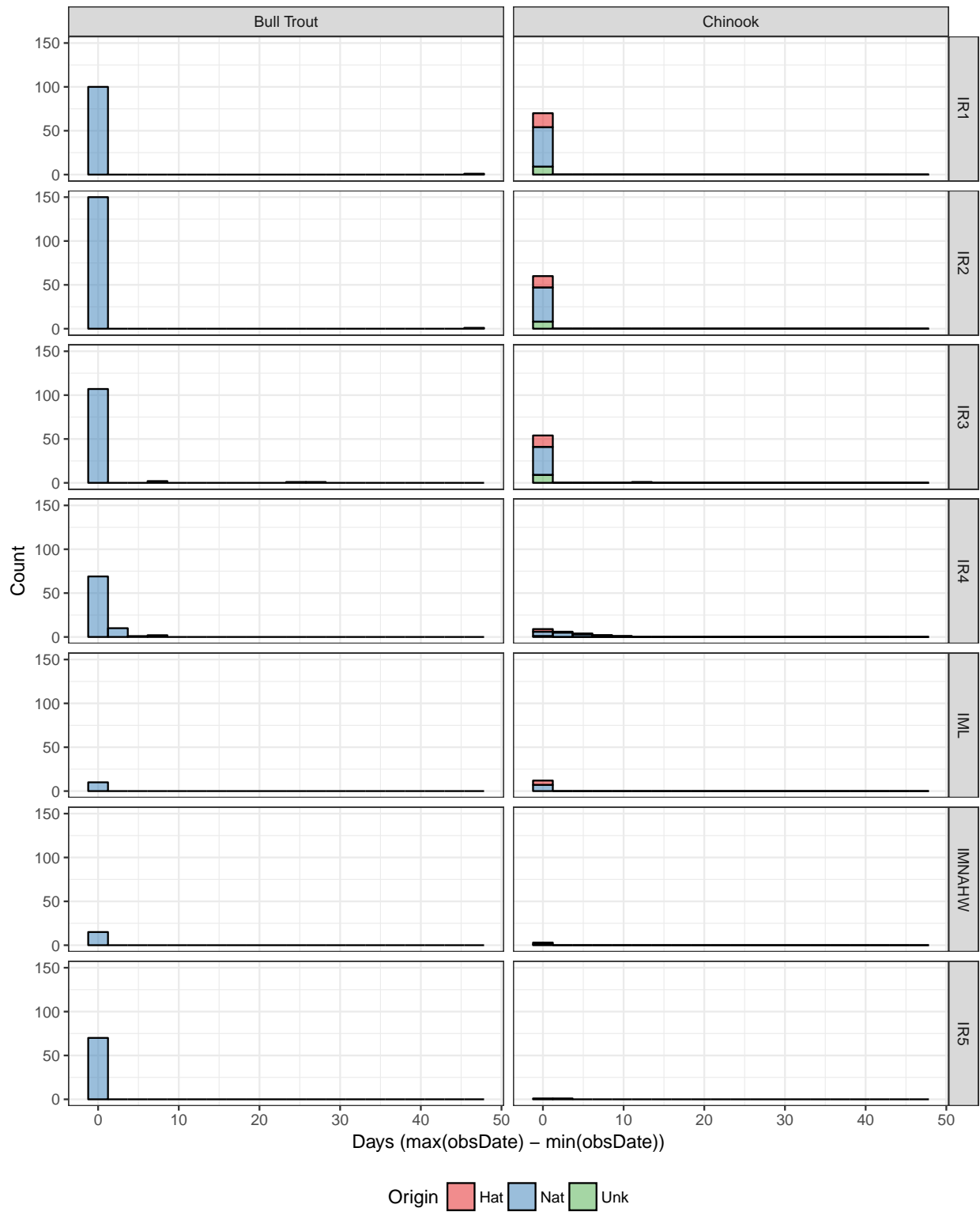
Tag status: last detection at IR4/IR5/IML/IMNAHW after 5/31/18



Travel time between sites



Number of days spent at a site



Source Data

The complete PIT-tag histories for Chinook Salmon and Bull trout detected during 2018 in the Imnaha River Basin were downloaded as two separate files located on the PTAGIS ftp server. The files are the result of running “Complete Tag History” queries that were parameterized on the PTAGIS website and set-up to run and save automatically at 6:00 a.m. each day. The first file contains Chinook Salmon PIT-tag detections and is stored at the “*feldhauj/2018_Imnaha_CompleteTagHistory.csv*” file path within the ftp server. The second file contains Bull trout detections and is stored within the “*rkinzer/Imnaha_Bull_Complete_Tag_History.csv*” filepath. We are then using an R-script to download the files from the PTAGIS ftp server and combine them into a single file. Once the file is combined all Chinook Salmon and Bull trout tag detections are processed using the R package PITcleanR. The final dataset provides a simplified tag history with the first and last detection dates at each PIT-tag detection node (i.e., a single spanning array or antenna) and information regarding upstream and downstream movements and a more general migration direction.

Creating the PTAGIS Chinook Complete Tag History report:

- *Tag list #1:* Static Tag list for all Chinook tagged in 2018 and released at BONAFF or LGRLDR.
- *Tag list #2:* Static Tag list for Chinook released into the Imnaha River for MY2015-2017 and detected at a mainstem adult ladder interrogatoin site in 2018.
- *Event Date:* Between 5/1/2018 and 10/1/2018
- *Event Sites:* IR1, IR2, IR3, IR4, IR5, IML, IMNAHW, BSC, IMNAHR
- *Mark Species:* Chinook
- *Event Type:* Observation, Recapture, Recovery

Creating the PTAGIS Bull Trout Complete Tag History report:

- **Query:* All PIT-tagged Bull trout detected in the Imnaha River Basin in 2018.
- *Event Date:* Between 1/1/2018 and 10/1/2018
- *Event Sites:* IR1, IR2, IR3, IR4, IR5, IML, IMNAHW, COC, BSC, IMNAHR
- *Mark Species:* Bull Trout
- *Event Type:* Observation, Recapture, Recovery

Output Files:

- *PITcleanr_2018_chs_bull.xlsx:* The complete tag histories from 2018_Imnaha_CompleteTagHistory.csv and Imnanha_Bull_Complete_Tag_Histories.csv combined into a single file and processed with the PITcleanR R-package.
- *detect_hist.xlsx:* A pivot table style summary. Each row = a unique PIT tag code. Columns correspond to first detection dates at IR1-IR5, IML, and IMNAHW. The LastObs date is the last obsevation date/time in the complete tag history file. This file contains the Trap Status, TagPath, Passage Route, and TagStatus fields. Trap status references the dates the weir was opeating (ryan, want to expand). TagPath is a character string representing detections at PIT tag observations sites. TagStatus represents the last known location of the tag and whether the tag has arrived at the weir, has attempted the ladder (i.e., detected at IML), passed the weir (i.e., detected at IR5), or has been trapped (i.e., detected at IMNAHW). The tag pathway describes the passage route through the weir.