Porter Creek Streamflow Enhancement Project

TROUT UNLIMITED

CA.GOV WCB State of California Wildlife Conservation Board

SONOMA RESOURCE CONSERVATION DISTRICT

E&J. Gallo Winery

Berkeley UNIVERSITY OF CALIFORNIA

Sea Grant California

Porter Creek: Juvenile Coho Stocking

Russian River Salmon and Steelhead Monitoring Program

Sea Grant California

Hatch year	Number released	Number PIT-tagged	Proportion PIT-tagged
2010	12,424	0	0.00
2011	9,122	0	0.00
2012	10,198	0	0.00
2013	8,045	1,207	0.15
2014	8,084	1,212	0.15
2015	0	0	0.00
2016	6,096	913	0.15
2017	6,062	1,728	0.29
2018	5,073	1,010	0.20

Porter Creek

Press Creek

2014: ~20 large wood structures

2015: 10 large wood structures and 1 partial barrier removal

Russian River

Westside Rd

Westside Rd

Russian River

River Rd

coho stocking reach

0 0.13 0.25 0.5

Miles

Projection: NAD 1983 UTM Zone 10N
Source: Streams (County of Sonoma),
Map Prepared By: California Sea Grant, Santa Rosa, CA
Map Name:

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Porter Creek: Salmonid Redd Distribution, Winter 2015/16

Russian River Salmon and Steelhead Monitoring Program

Sea Grant California

Porter Creek

Press Creek

Russian River

Westside Rd

River Rd

Coastal Monitoring Program Spawner Surveys

Return Winter	Coho Salmon	Steelhead	Unknown Salmonid
2014-2015	0	2	1
2015-2016	2	10	5
2016-2017	4	13	1
2017-2018	1	0	1
2018-2019	8	9	3

Redd Species

- CHINOOK SALMON
- COHO SALMON
- SALMONID SP
- STEELHEAD

0 0.13 0.25 0.5

Miles

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Porter Creek: Juvenile Salmonid Distribution, Summer 2016

Russian River Salmon and Steelhead Monitoring Program

Sea Grant California

Porter Creek

Press Creek

Russian River

Westside Rd

River Rd

Coastal Monitoring Program Snorkel Surveys

Minimum and expanded Salmonid Counts

Year	Coho Salmon Yoy	Steelhead Yoy
2013	827 (1,654)	213 (426)
2014	0	1,011 (2,022)
2015	504 (1,008)	549 (1,098)
2016	323 (646)	2,834 (5,668)
2017	98 (196)	3,104 (6,208)
2018	475 (950)	1,228 (2,456)

Coho
- 0
- 1-10
- 11-50

Steelhead
- 0
- 1-10
- 11-50

- 51-100
- 101-300

0 0.13 0.25 0.5
Miles

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Source: Streams (County of Sonoma),
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Porter Creek: Summer Wetted Habitat 2016

Russian River Salmon and Steelhead Monitoring Program

Sea Grant California

Porter Creek

Press Creek

Russian River

Westside Rd

Westside Rd

Russian River

River Rd

Wet/Dry Mapping Surveys

Surface Flow Condition

Dry — Intermittent — Wet

0 0.13 0.25 0.5

Miles

Projection: NAD 1983 UTM Zone 10N
Source: Streams (County of Sonoma),
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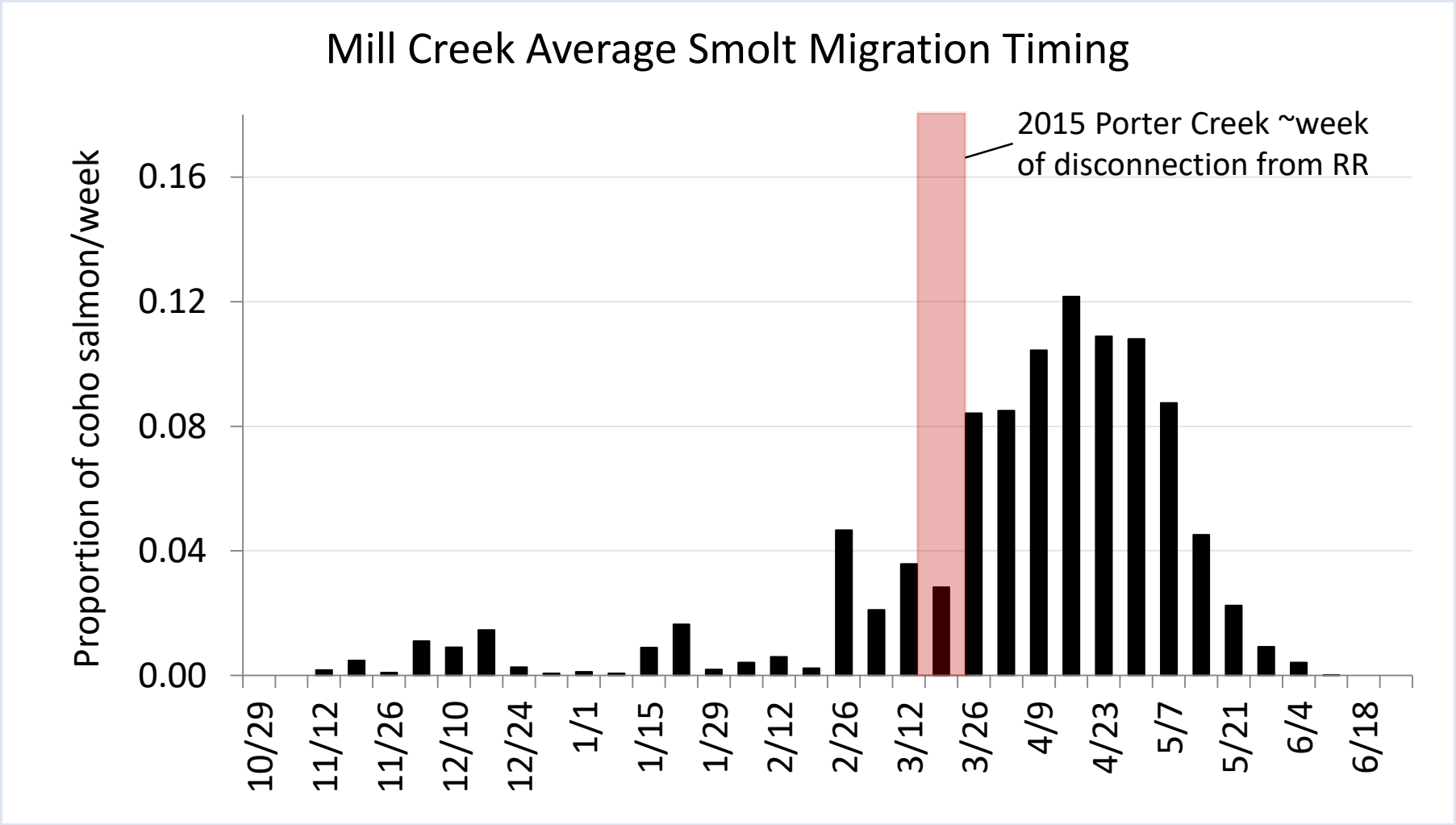
Does Low Streamflow Limit Smolt Passage?



Problem: Low streamflow is limiting survival of summer-rearing juvenile salmonids and passage for emigrating smolts

Opportunity: E. & J. Gallo has a water storage pond and is willing to release water from the pond into the stream channel on an annual basis for the benefit of fish

Missing piece: permanent flow release infrastructure and guidance as to the timing, quantity and duration of flow releases

Porter Creek Streamflow Enhancement Project

- **Wildlife Conservation Board grant (2017-2019):**
  - **Sonoma RCD, Trout Unlimited, CA Sea Grant**
  - **Build permanent flow release system**
  - **conduct streamflow and smolt monitoring to help inform recommendations for the long-term operation and management of the flow release system**

- **California Institute for Water Resources (2017-2018):**
  - **UC Berkeley**
  - **Physical habitat monitoring at multiple flow releases**
  - **Fish behavior pilot study**

Porter Creek Streamflow Enhancement Project

Project goals:

- **Augment streamflow in spring to improve fish passage for downstream migrating coho smolts**
- **Sustain in-stream pool habitat for summer-rearing juvenile coho**
- **Improve our understanding of how streamflow influences physical habitat characteristics and biological responses (e.g., fish movement and behavior)**

Porter Creek Streamflow Enhancement Project

Project objectives:

- Install automated flow release system and monitoring infrastructure
- Identify flow rate necessary to allow passage for smolts in spring
- Identify summer flow rates necessary to protect summer rearing juvenile salmonids
- Determine whether Porter Creek streamflow can be can be predicted from an online gage on a neighboring stream (Austin Creek USGS gage)
- Provide a recommended strategy for long-term flow releases in Porter Creek

Flow release infrastructure completed in 2017

- **Water release system that can provide up to 150 acre feet of water with controlled release rates (0-390 gpm (0.87 cfs))**

PIT tag antenna array installed in March 2017

- **PIT tag transceiver records tag number and time of every tagged fish that passes through**

Porter Creek: Flow Release and Monitoring Sites

Russian River Salmon and Steelhead Monitoring Program

Sea Grant California

PIT antenna

Stage logger

0 0.13 0.25 0.5

Miles

Projection: NAD 1983 UTM Zone 10N
Source: Streams and Canopy (Sonoma Veg Map), Multidimensional Hillshade (Esri)
Map Prepared By: California Sea Grant, Santa Rosa, CA
Path: G:\Maps\ArcPro_Projects\Project_Specific\PorterCreek\PorterCreek\PorterCreek.aprx

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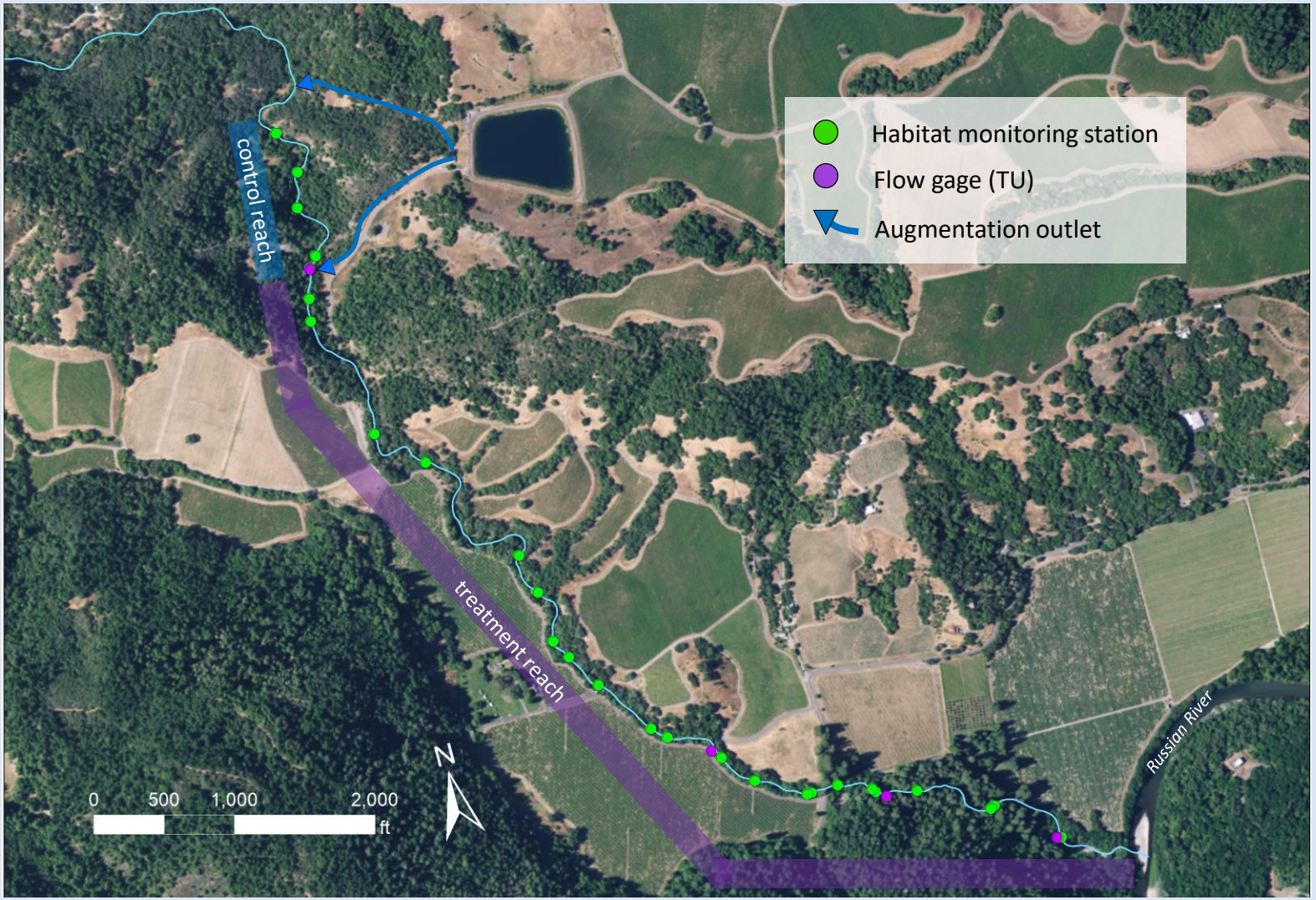
UC Berkeley Summer Habitat and Fish Behavior Study Reaches



Porter Creek Streamflow Enhancement Project

Project objectives:

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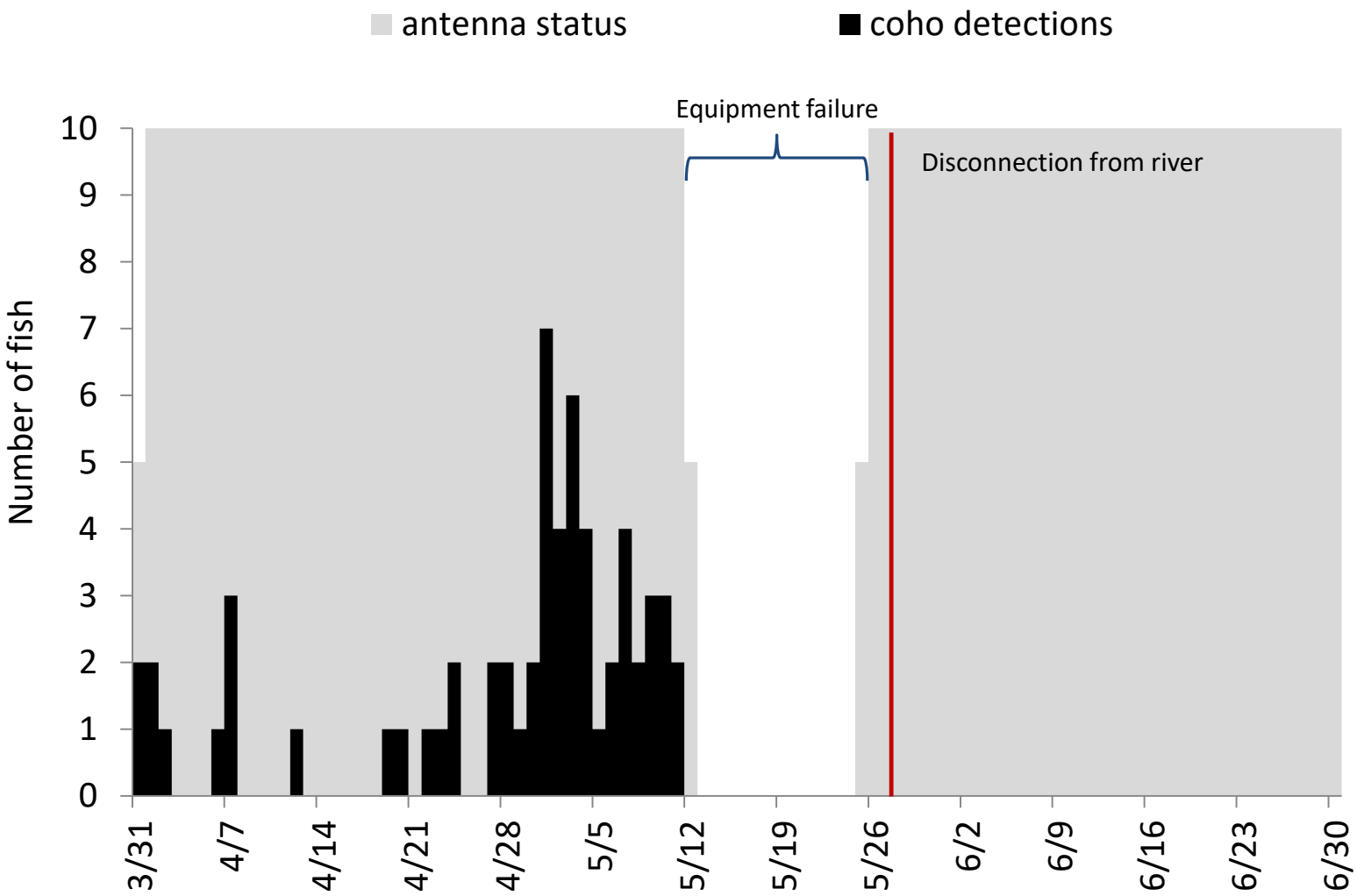
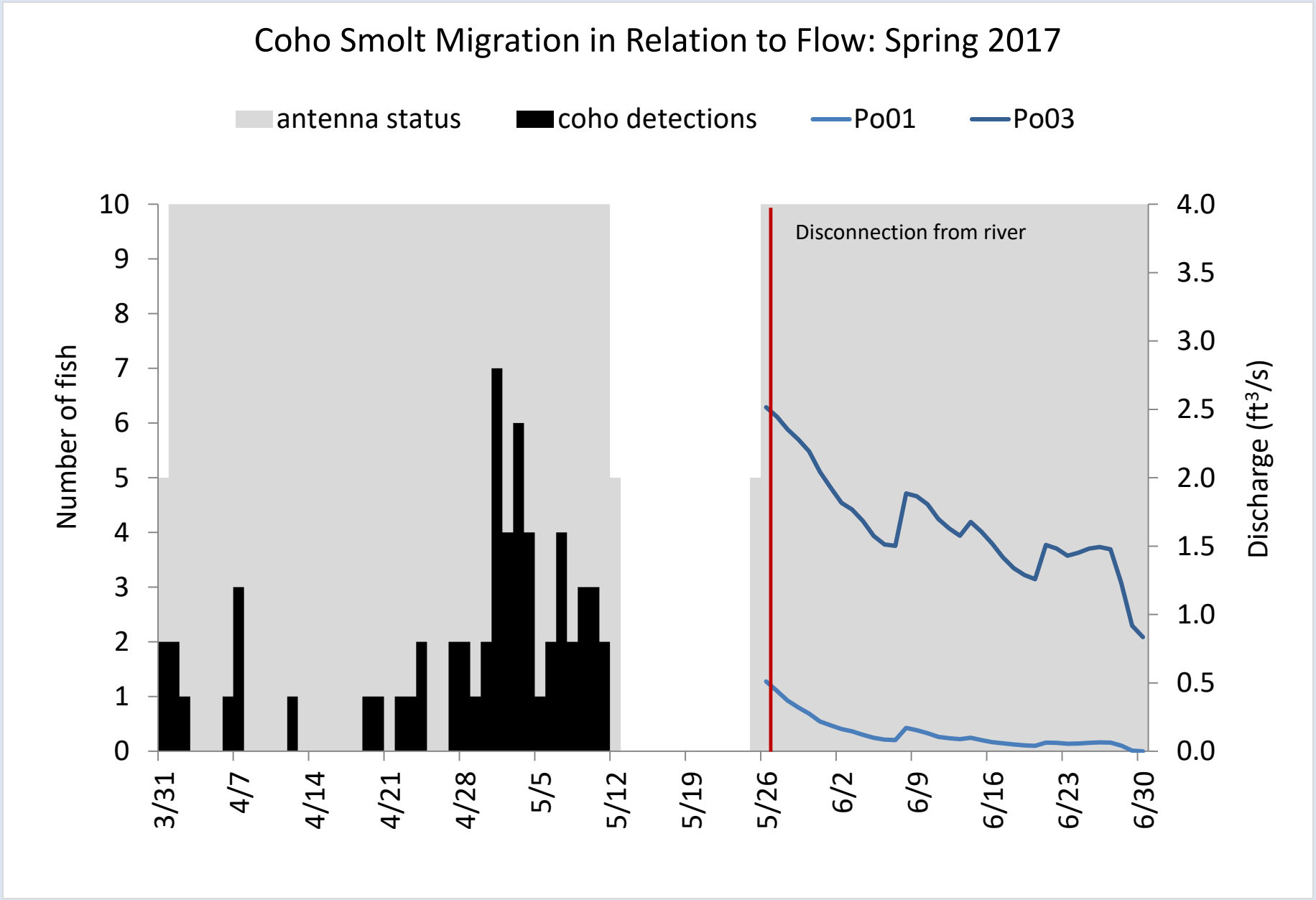
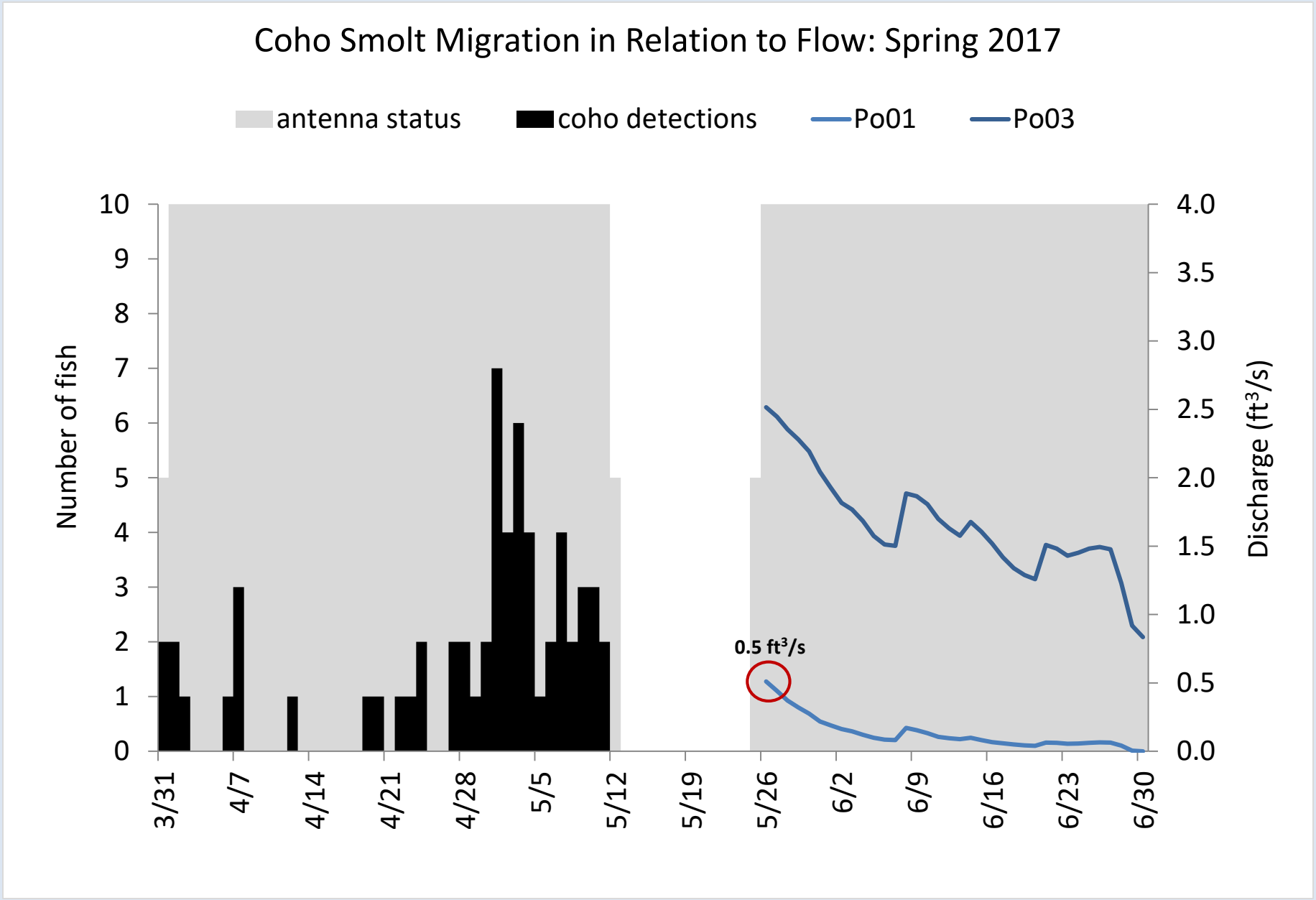
Coho Smolt Migration in Relation to Flow: Spring 2017

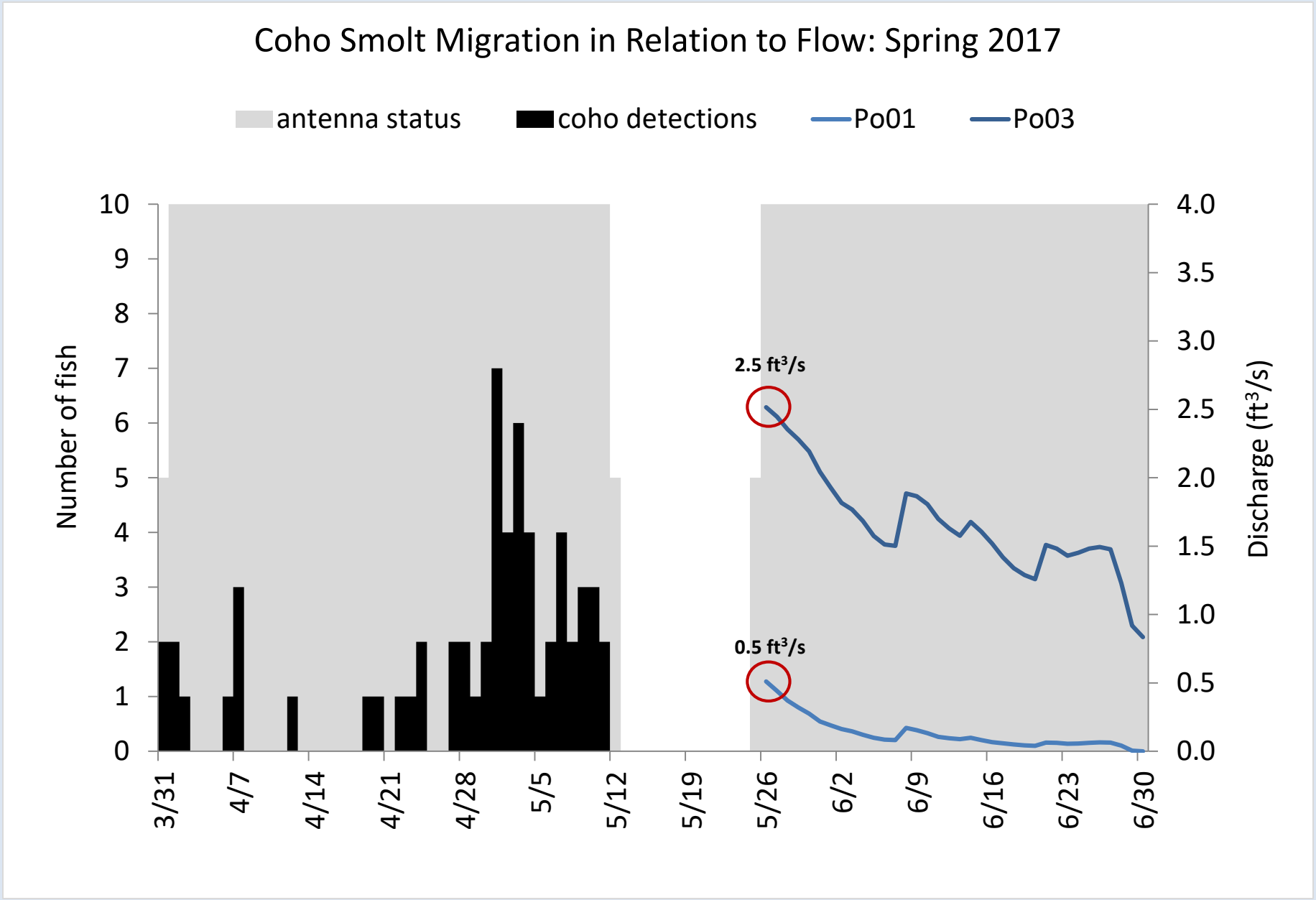


2017 Coho Smolt Timing

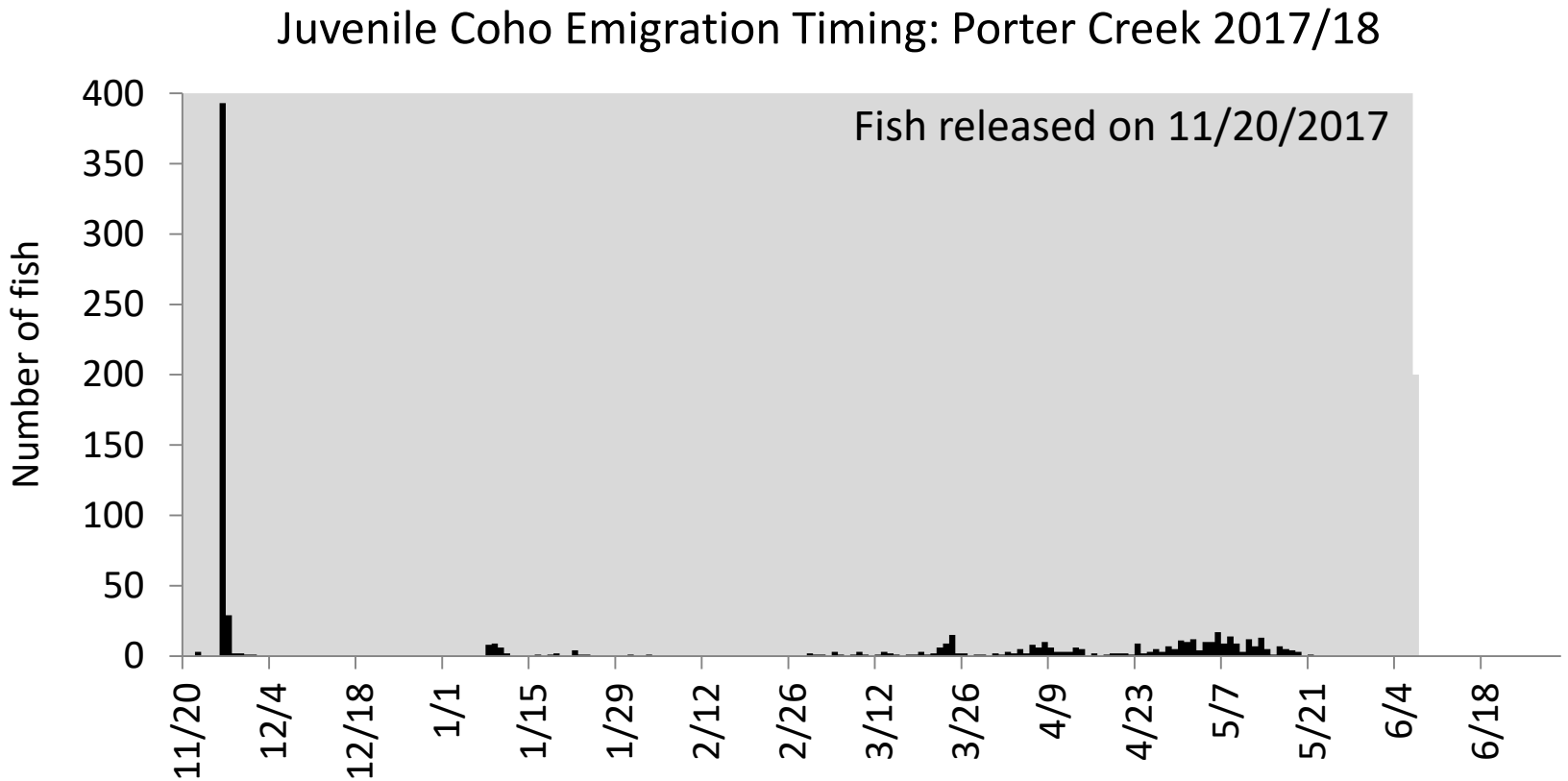
- Porter became disconnected from RR on 5/27 or 5/28
- Conducted snorkeling surveys upstream of dry point to count how many fish were trapped: 5 coho smolts on 6/1, 1 smolt on 6/22
- No pulsed releases- majority of smolts already left


Coho Smolt Migration in Relation to Flow: Spring 2017
antenna status
coho detections
Po01
Po03
Disconnection from river
Number of fish
Discharge (ft3/s)
0
1
2
3
4
5
6
7
8
9
10
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/31
4/7
4/14
4/21
4/28
5/5
5/12
5/19
5/26
6/2
6/9
6/16
6/23
6/30

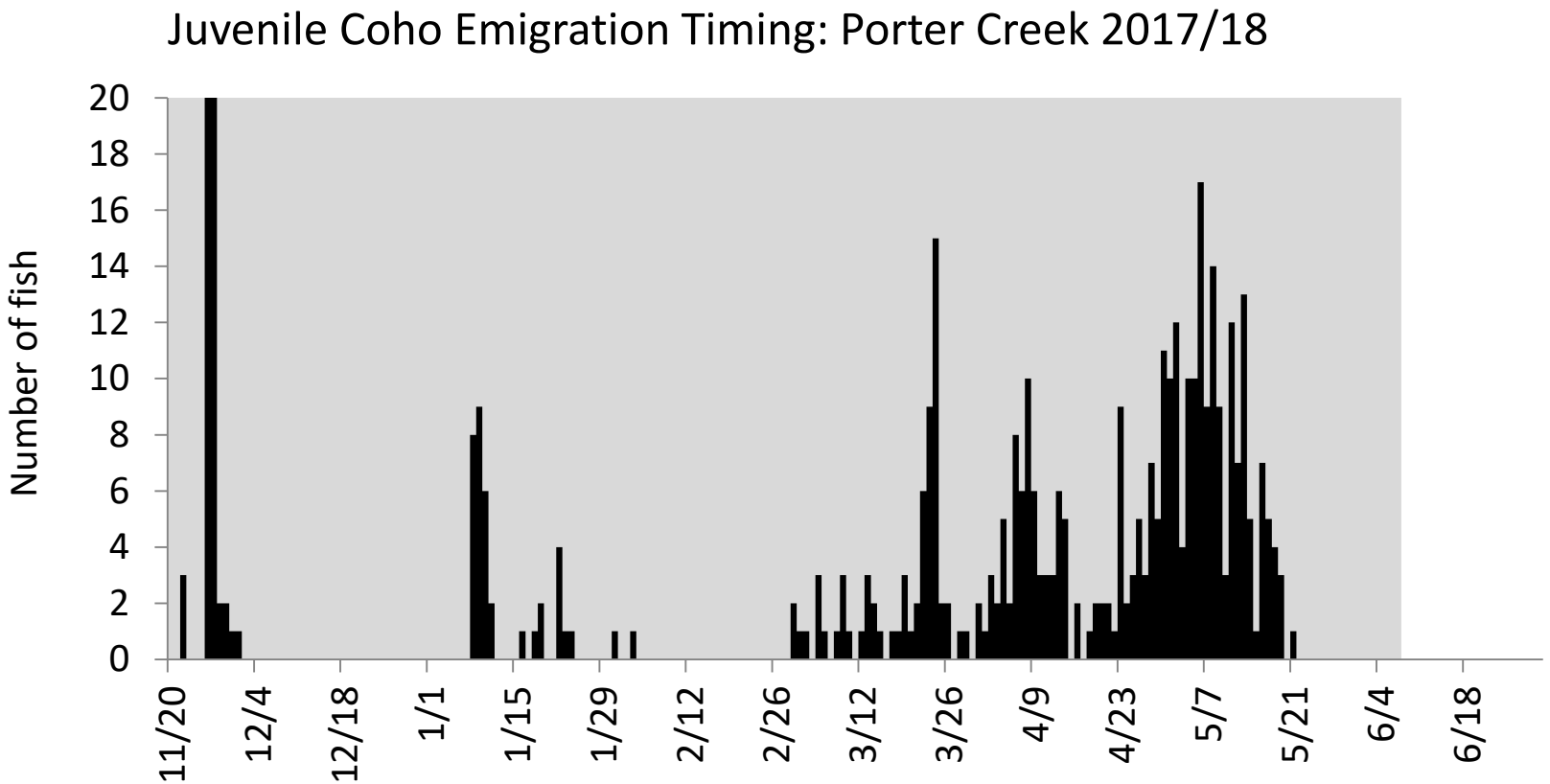

Coho Smolt Migration in Relation to Flow: Spring 2017
antenna status
coho detections
Po01
Po03
Number of fish
Discharge (ft³/s)
0.5 ft³/s
0
1
2
3
4
5
6
7
8
9
10
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/31
4/7
4/14
4/21
4/28
5/5
5/12
5/19
5/26
6/2
6/9
6/16
6/23
6/30


Coho Smolt Migration in Relation to Flow: Spring 2017
antenna status
coho detections
Po01
Po03
Number of fish
Discharge (ft³/s)
2.5 ft³/s
0.5 ft³/s
0
1
2
3
4
5
6
7
8
9
10
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/31
4/7
4/14
4/21
4/28
5/5
5/12
5/19
5/26
6/2
6/9
6/16
6/23
6/30

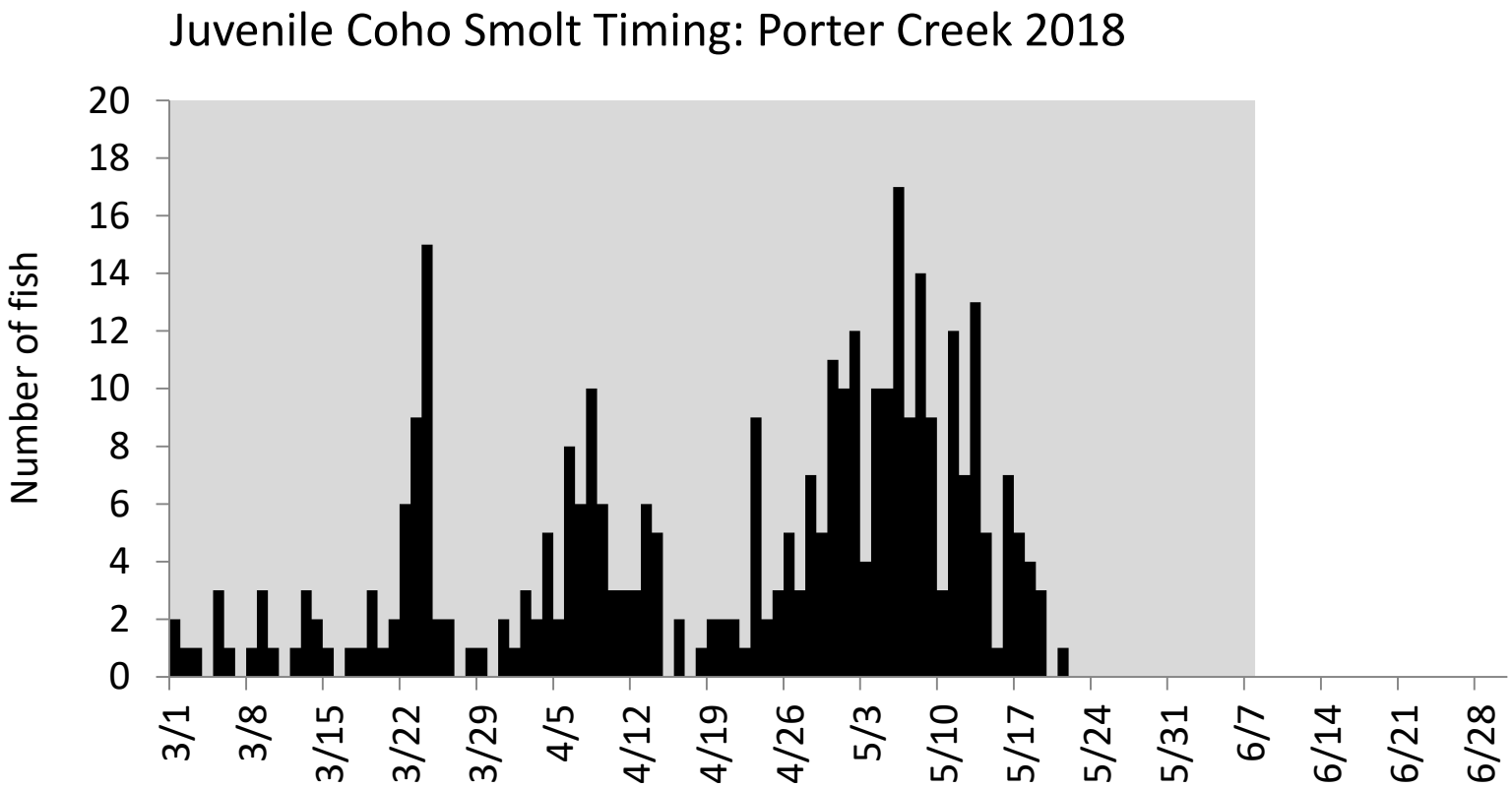
2018 Coho smolt timing in relation to flow



2018 Coho smolt timing in relation to flow



2018 Coho smolt timing in relation to flow



2018 Spring Disconnection and Flow Releases

5/4: Porter became disconnected from RR

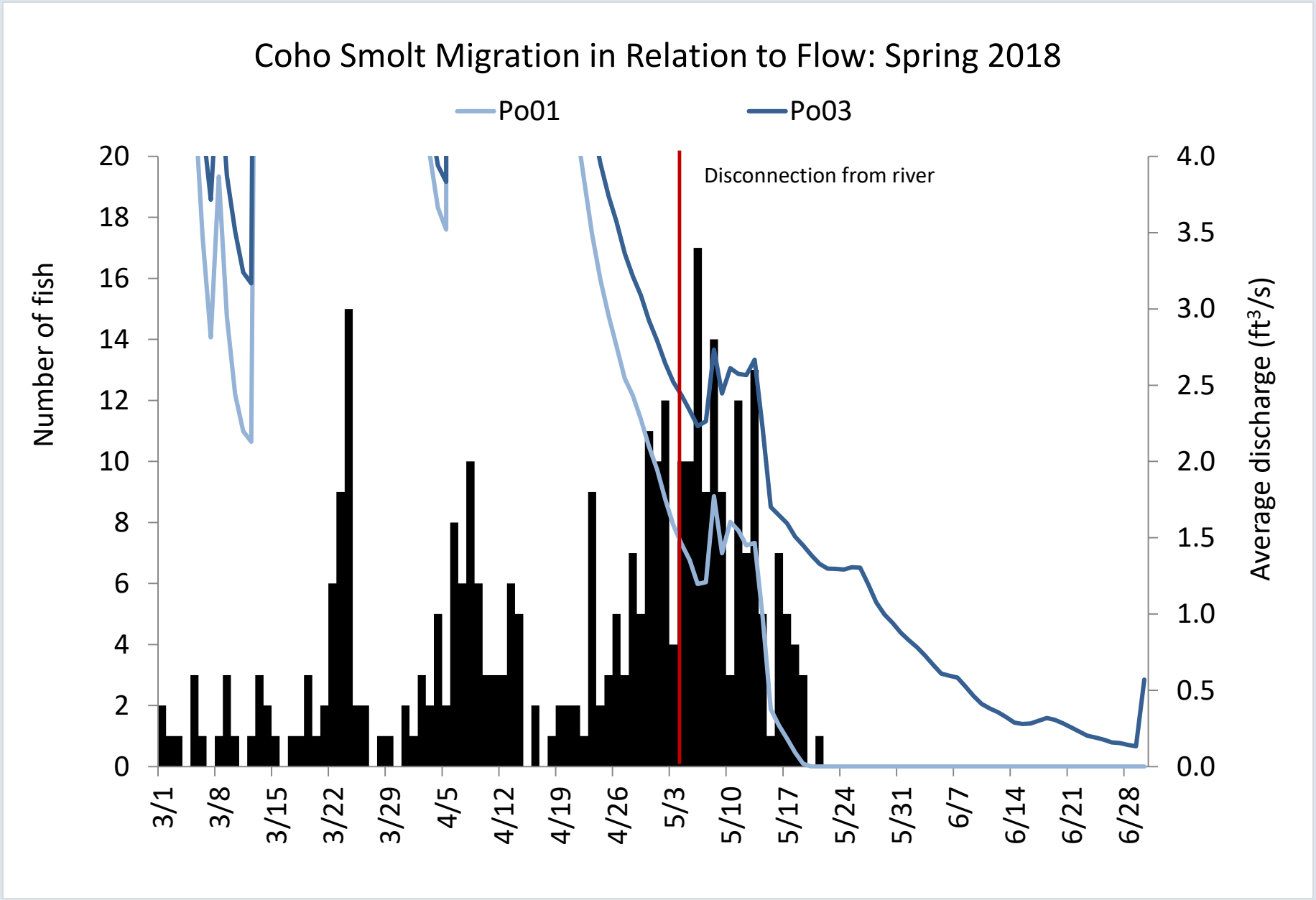
5/7: Initiated flow release: 390 gpm (0.87 ft^3/s)

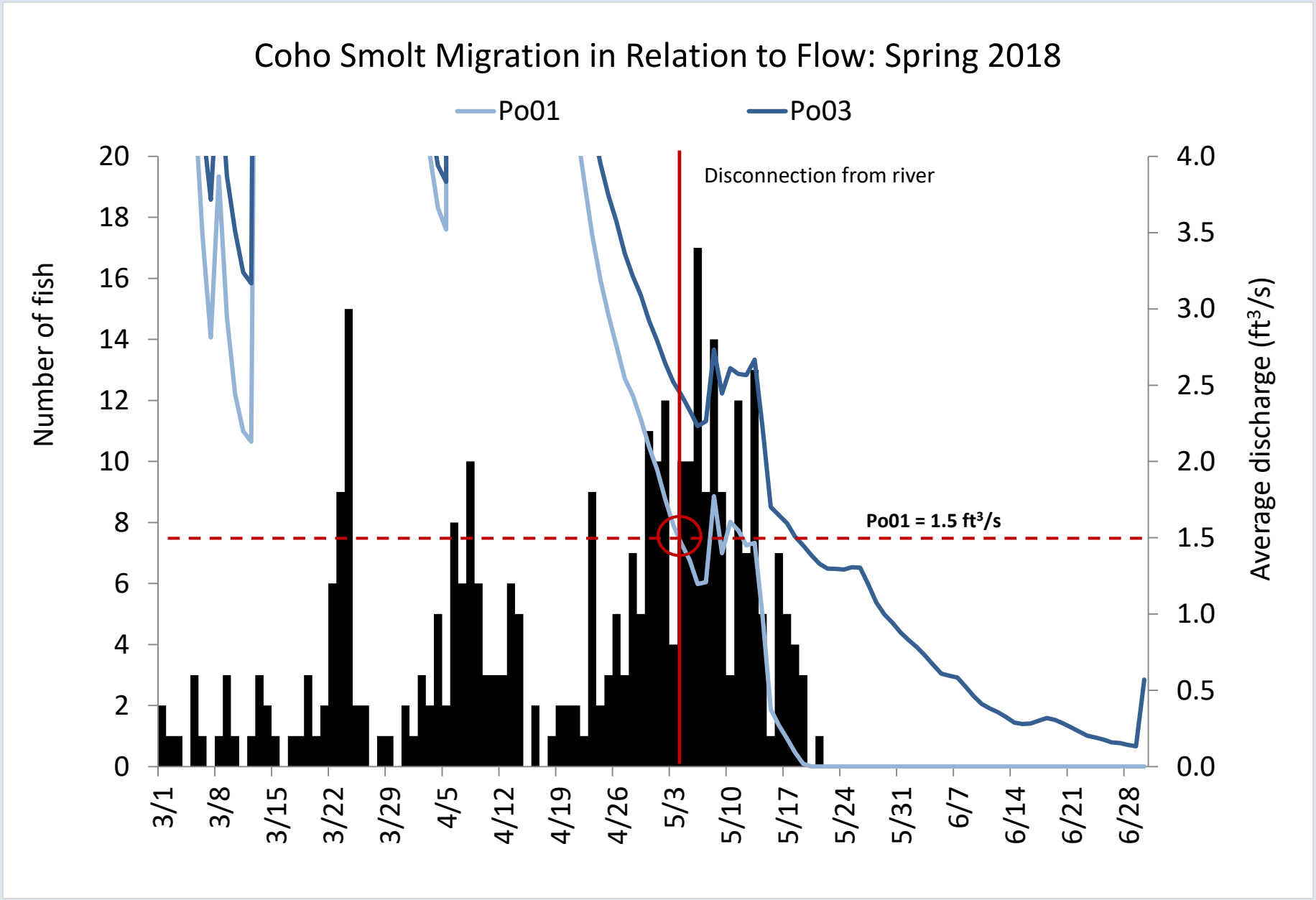
5/8: Porter reconnected to RR, reduced release to 230 gpm (0.51 ft^3/s)

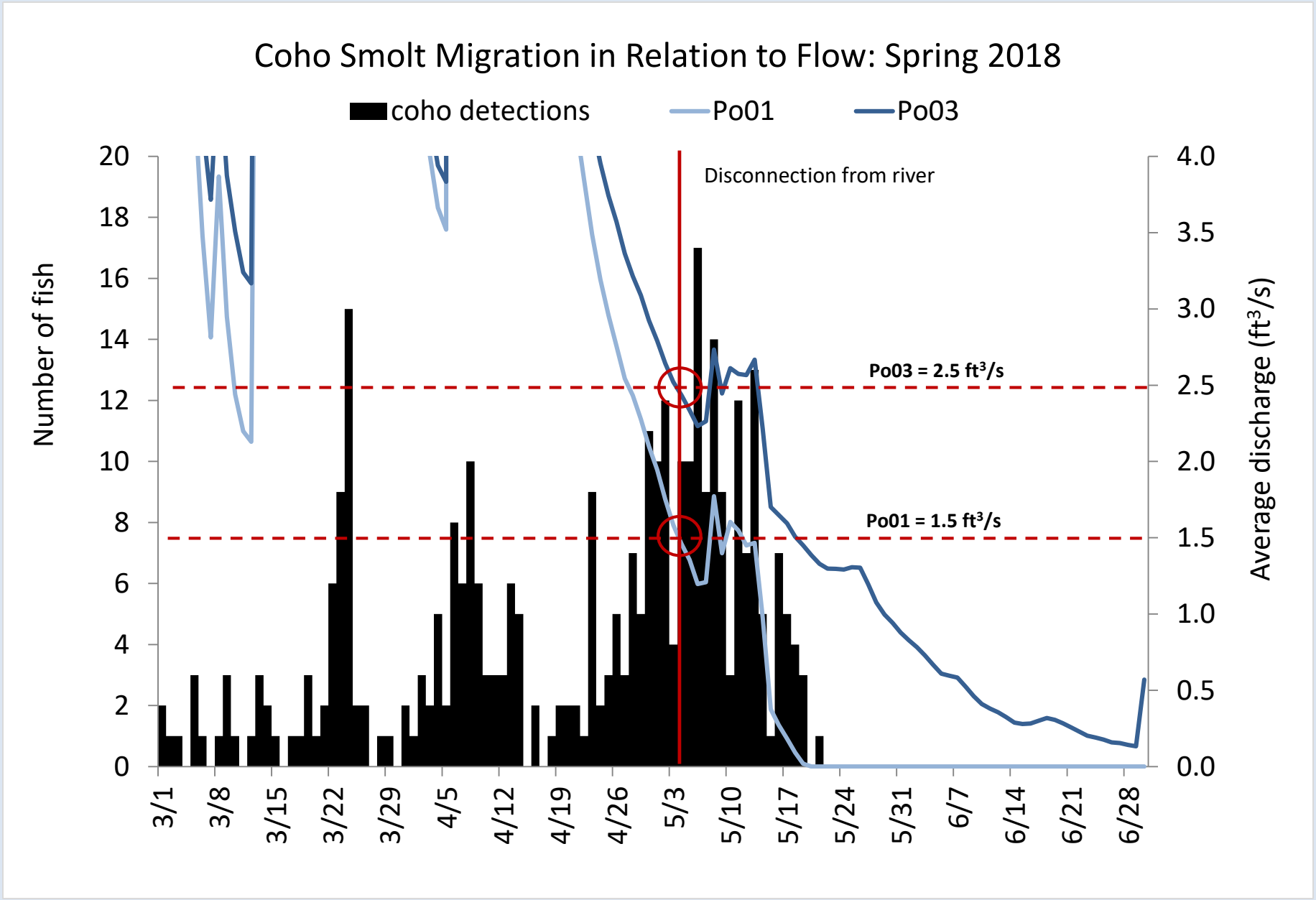
5/9: Porter disconnected, increased back to 390 gpm (0.87 ft^3/s)

5/10: Porter reconnected

5/12: Porter disconnected (even with max augmentation)


Coho Smolt Migration in Relation to Flow: Spring 2018
Po01
Po03
Disconnection from river
Number of fish
Average discharge (ft3/s)
0
2
4
6
8
10
12
14
16
18
20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/1
3/8
3/15
3/22
3/29
4/5
4/12
4/19
4/26
5/3
5/10
5/17
5/24
5/31
6/7
6/14
6/21
6/28


Coho Smolt Migration in Relation to Flow: Spring 2018
Po01
Po03
Disconnection from river
Po01 = 1.5 ft³/s
Number of fish
Average discharge (ft³/s)
0
2
4
6
8
10
12
14
16
18
20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/1
3/8
3/15
3/22
3/29
4/5
4/12
4/19
4/26
5/3
5/10
5/17
5/24
5/31
6/7
6/14
6/21
6/28


Coho Smolt Migration in Relation to Flow: Spring 2018
coho detections
Po01
Po03
Disconnection from river
Po03 = 2.5 ft³/s
Po01 = 1.5 ft³/s
Number of fish
Average discharge (ft³/s)
0
2
4
6
8
10
12
14
16
18
20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/1
3/8
3/15
3/22
3/29
4/5
4/12
4/19
4/26
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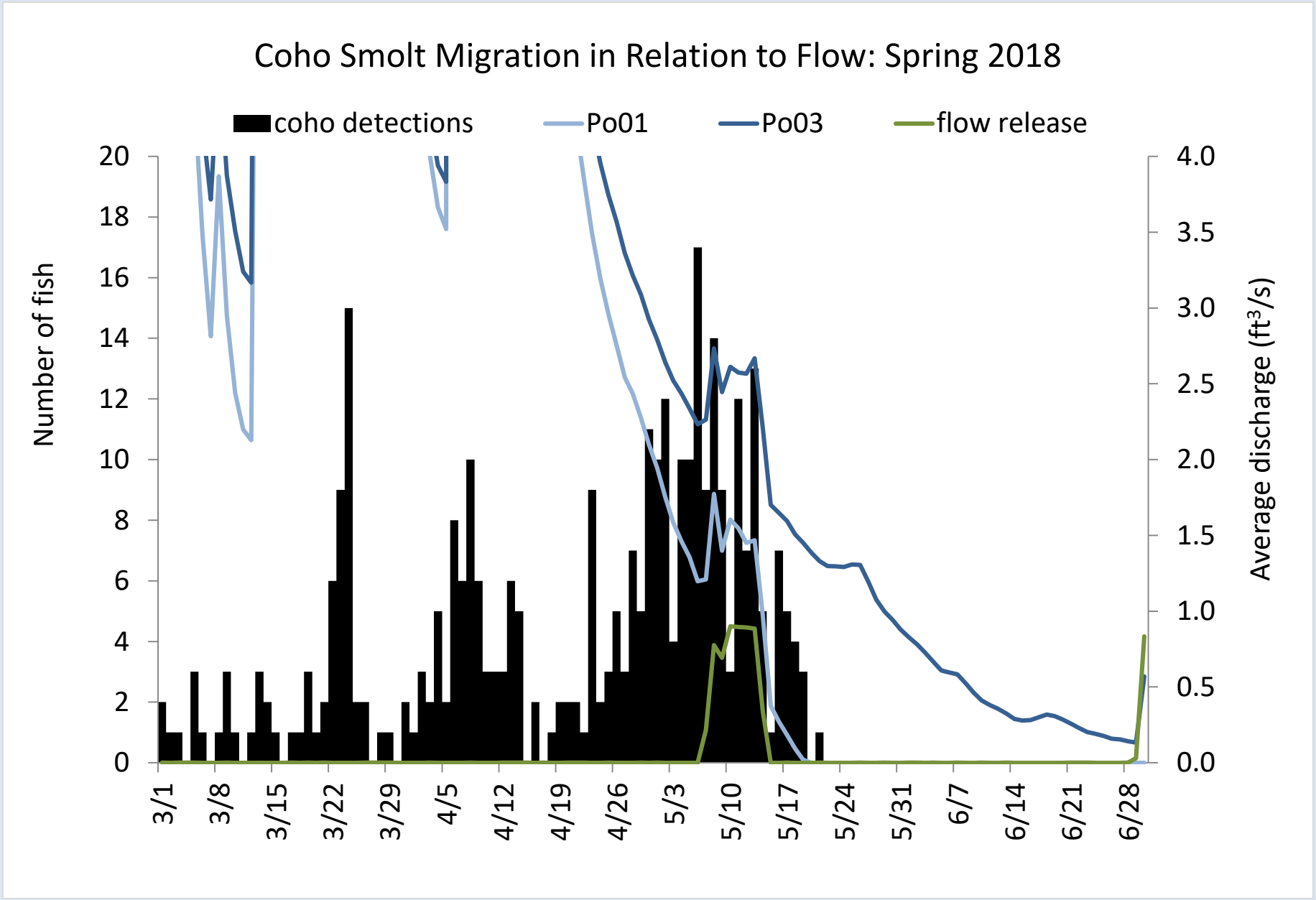
5/31
6/7
6/14
6/21
6/28


Coho Smolt Migration in Relation to Flow: Spring 2018
coho detections
Po01
Po03
flow release
Number of fish
Average discharge (ft3/s)
0
2
4
6
8
10
12
14
16
18
20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/1
3/8
3/15
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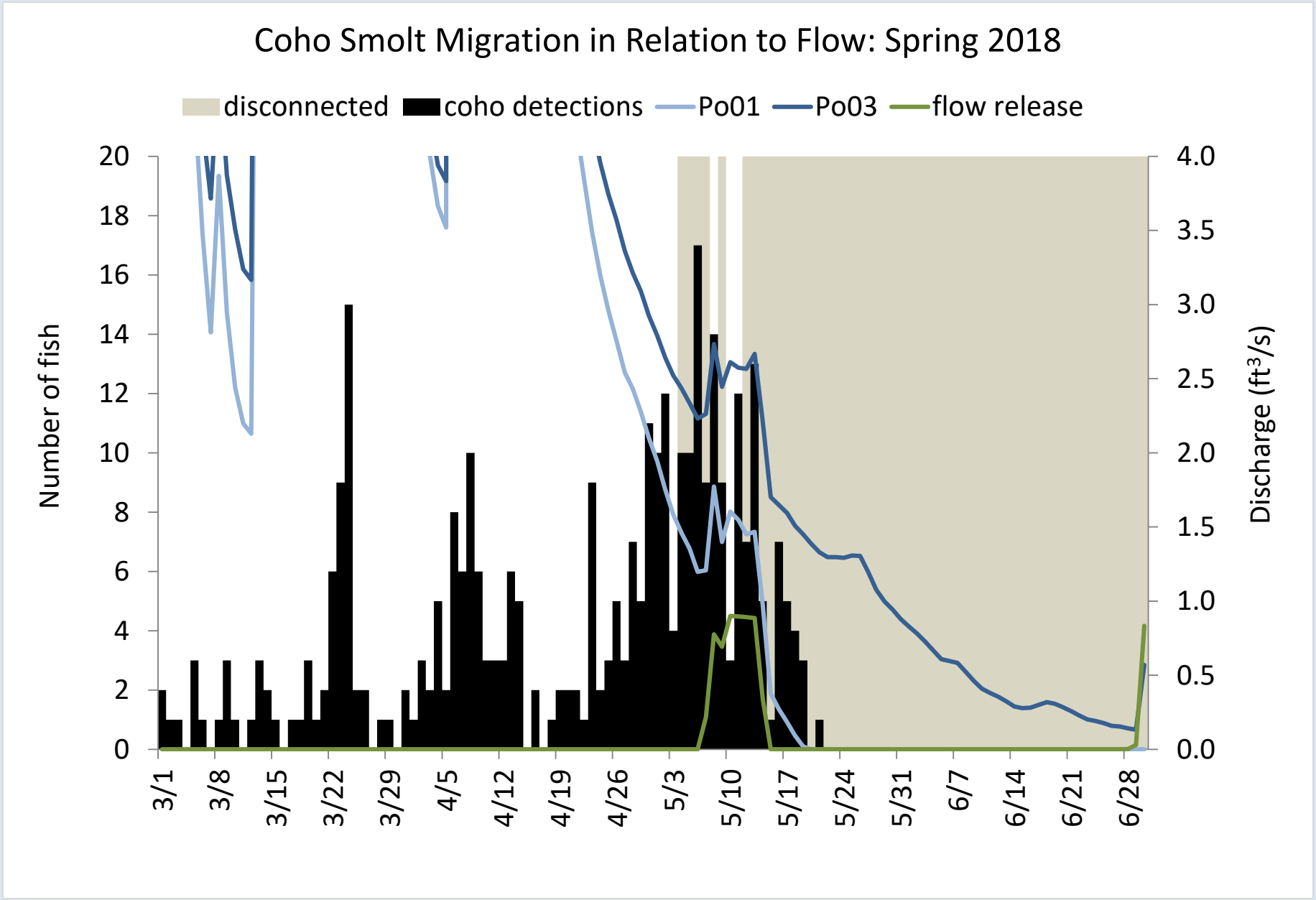
6/28


Coho Smolt Migration in Relation to Flow: Spring 2018
disconnected
coho detections
Po01
Po03
flow release
Number of fish
Discharge (ft3/s)
0
2
4
6
8
10
12
14
16
18
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0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/1
3/8
3/15
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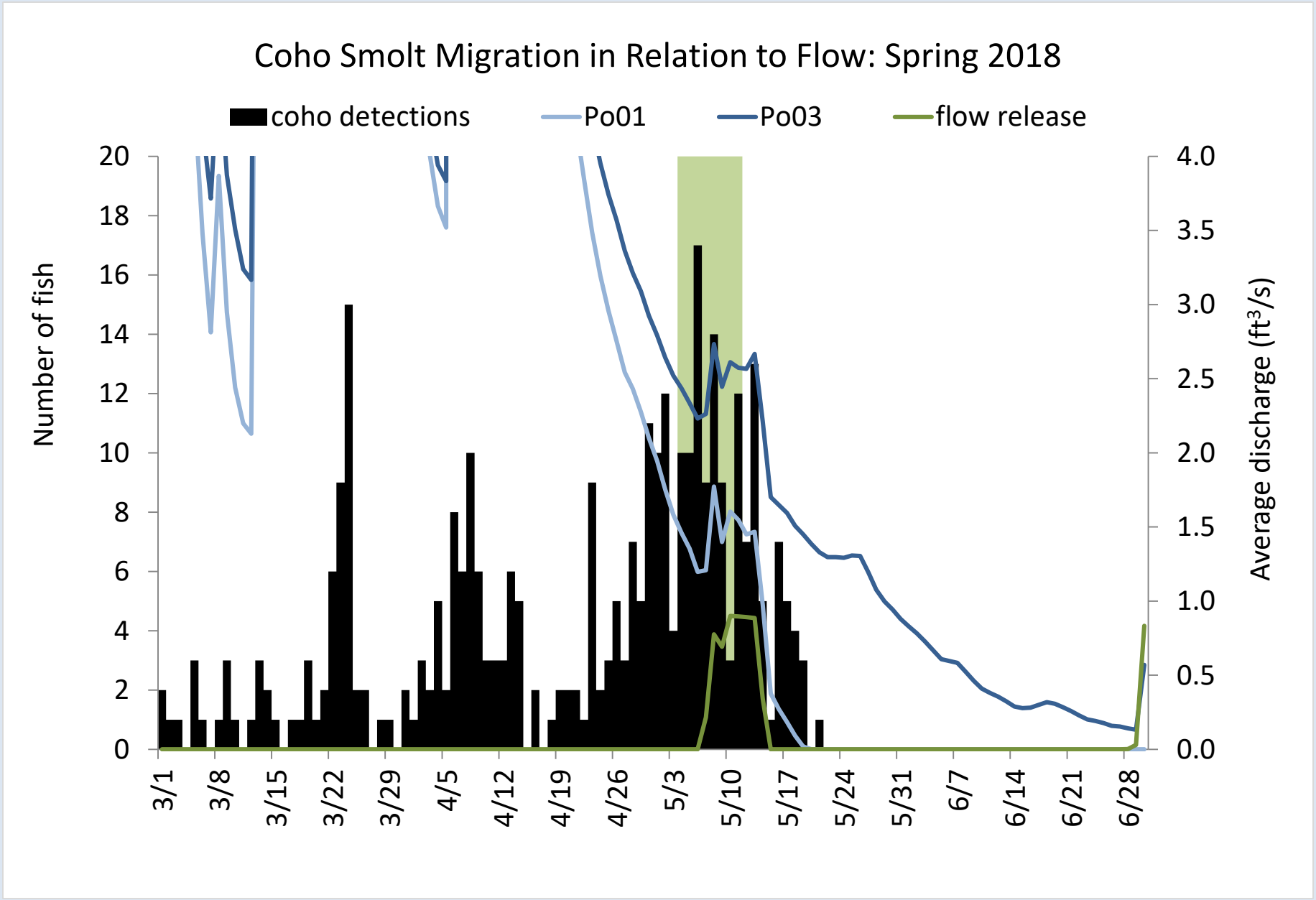
Coho Smolt Migration in Relation to Flow: Spring 2018
coho detections
Po01
Po03
flow release
Number of fish
Average discharge (ft3/s)
0
2
4
6
8
10
12
14
16
18
20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
3/1
3/8
3/15
3/22
3/29
4/5
4/12
4/19
4/26
5/3
5/10
5/17
5/24
5/31
6/7
6/14
6/21
6/28

Summary of 2018 Spring Pulse Flow Results

- 340 unique PIT-tagged coho smolts were detected between 3/1 and 6/30 (smolt window)
- 130 (38%) of these were detected on or after 5/4 (date of first disconnection)
- 25% of the smolt run was provided access as a result of the flow releases
- Expanded number of fish = 295 (based on tagged to untagged ratio)

Summary of 2018 Spring Pulse Flow Results

- Maximum release flows (~390 gpm) were required to reconnect Porter to the Russian
- Even with maximum flow release, Porter disconnected after 5 days
- Weather conditions and likely the river level/water table will influence how effective the spring releases are at reconnecting Porter
- If disconnection occurs during the peak of the smolt migration (late April through mid May), flow releases could still be a huge benefit