Kokanee Fry Abundance Monitoring Informs Supplementation Adaptive Management

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PHOTO – USFWS

Kokanee ↑

↓ Supplementation

PURPOSES:

- Assess a long-term monitoring project led by Bellevue-Issaquah Chapter of Trout Unlimited.
- Calculate annual fry abundance → informs survival of supplementation program fry.
- Calculate annual **stream productivity** (egg-to-fry survival rate) → informs indirect impacts of land management practices.

Kokanee Work Group Active Partners

Conservation
Educational/Outreach
Sportsman
Landowners

- Trout Unlimited
- Save Lake Sammamish
- Friends of Issaquah Salmon Hatchery
- Friends of Pine Lake
- Mountains to Sound Greenway
- Friends of Lake Sammamish Park
- Mid-Sound Partnership
- Numerous private landowners

Tribal Government

- Snoqualmie Tribe

Local Government

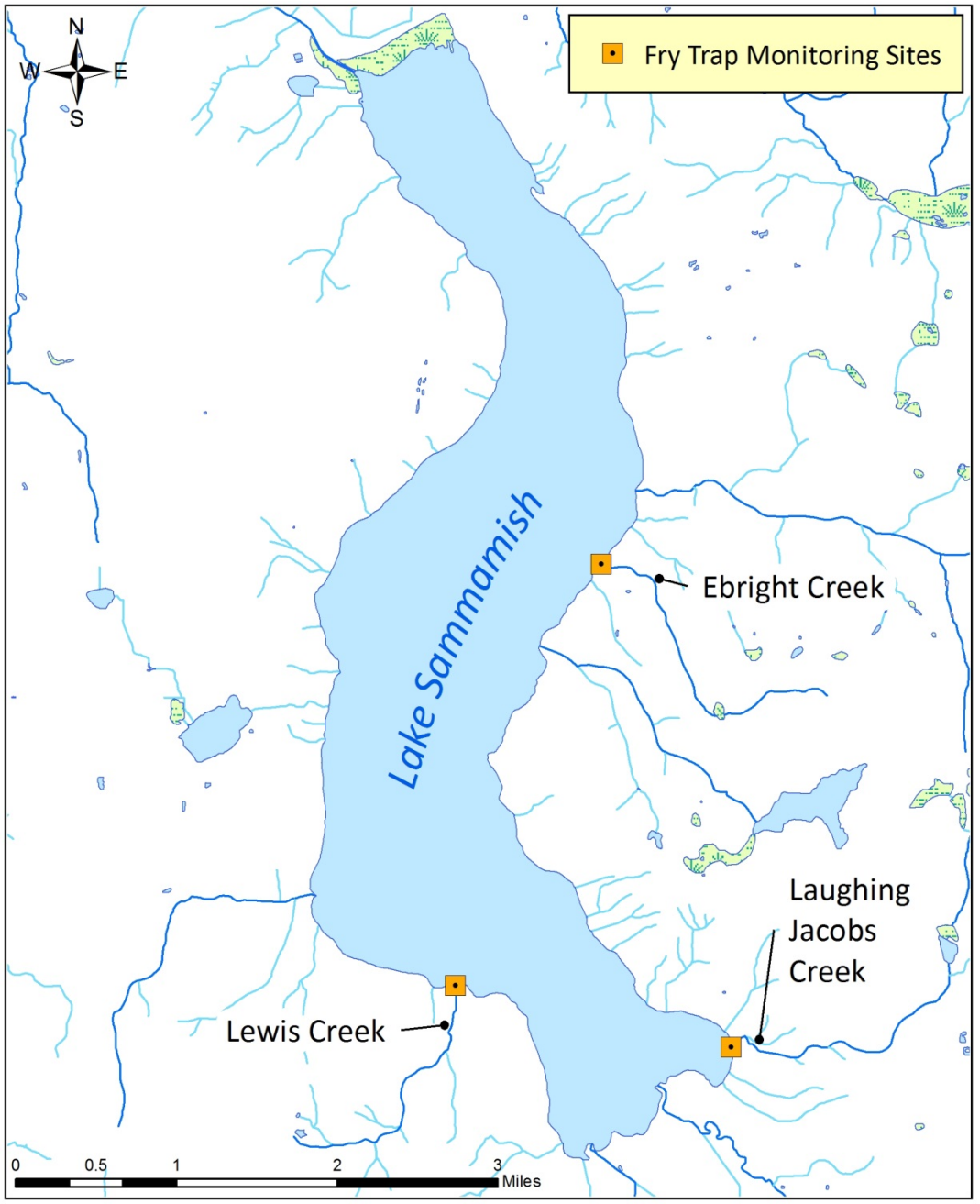
- City of Issaquah
- City of Sammamish
- City of Redmond
- City of Bellevue
- King County

COORDINATION and TECHNICAL lead for the Kokanee Work Group

State and Federal Government

- WA State Parks
- WA Department of Fish and Wildlife
- US Fish and Wildlife Service

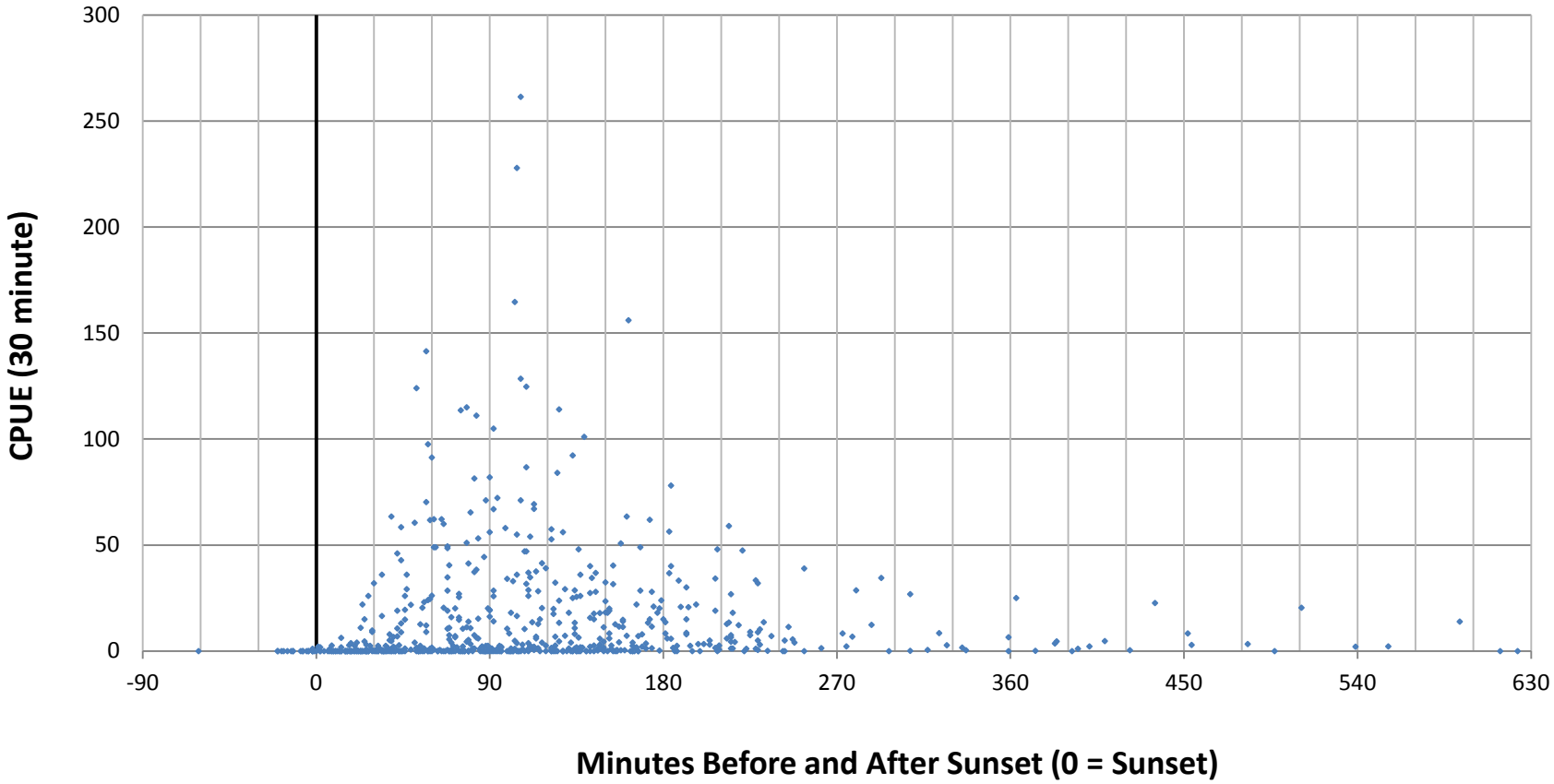
Monitoring Locations

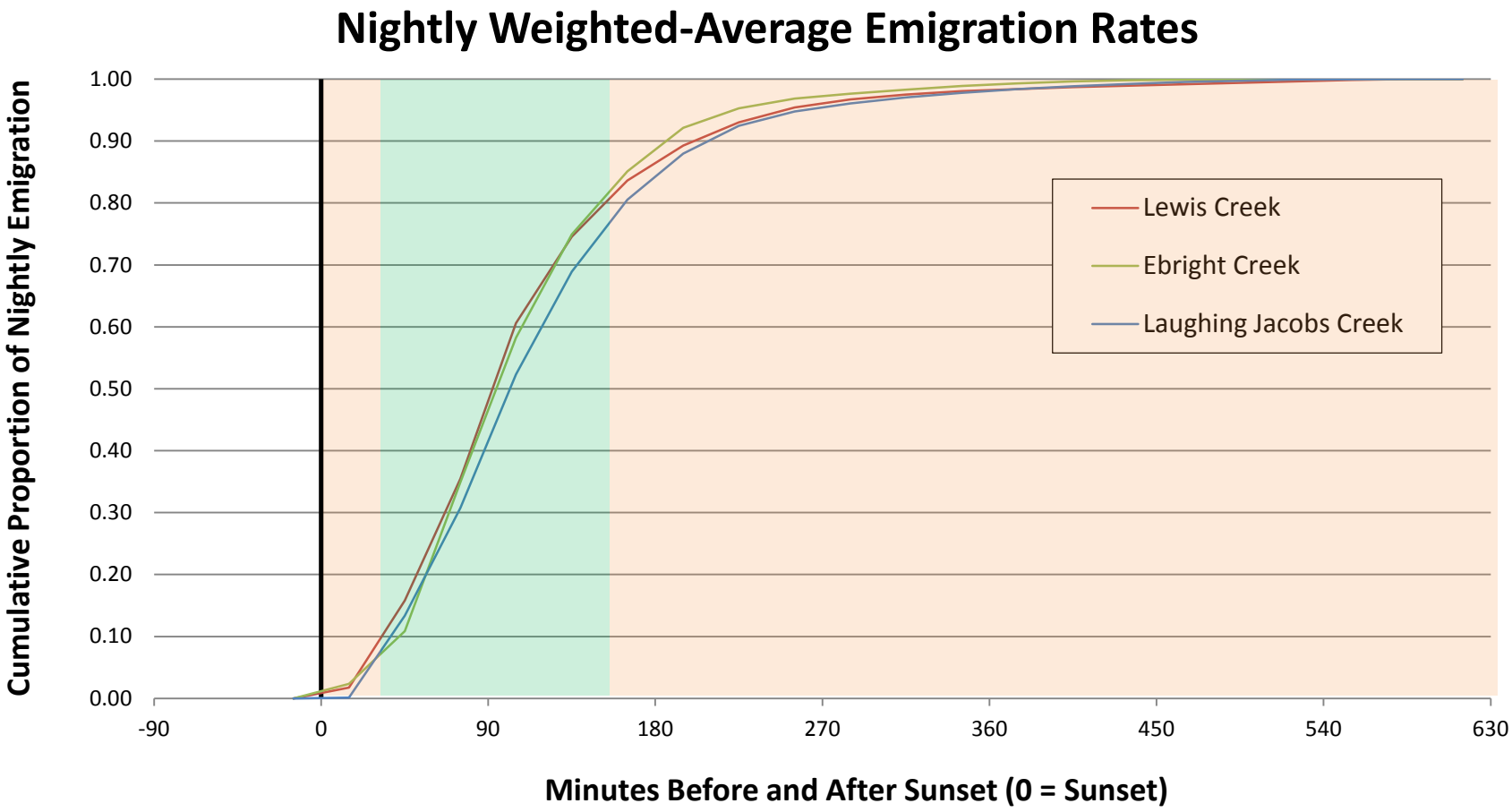


ANALYSIS METHODS

- Estimated catch during 3 **sample periods**:
  - whole night
  - partial night
  - missed night

Lewis Creek - All Fry Trapping Results (2007-2016) (n = 627)




Nightly Weighted-Average Emigration Rates
Cumulative Proportion of Nightly Emigration
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-90
0
90
180
270
360
450
540
630
Minutes Before and After Sunset (0 = Sunset)
Lewis Creek
Ebright Creek
Laughing Jacobs Creek

ANALYSIS METHODS

- Calculated ‘missed night’ sample periods using straight line interpolation
- Calculated variances for each sample period
- Calculated trap efficiency → measurement method is accurate but not precise
- Calculated total estimated abundance and variance using a **stratified efficiency approach**

ANALYSIS METHODS

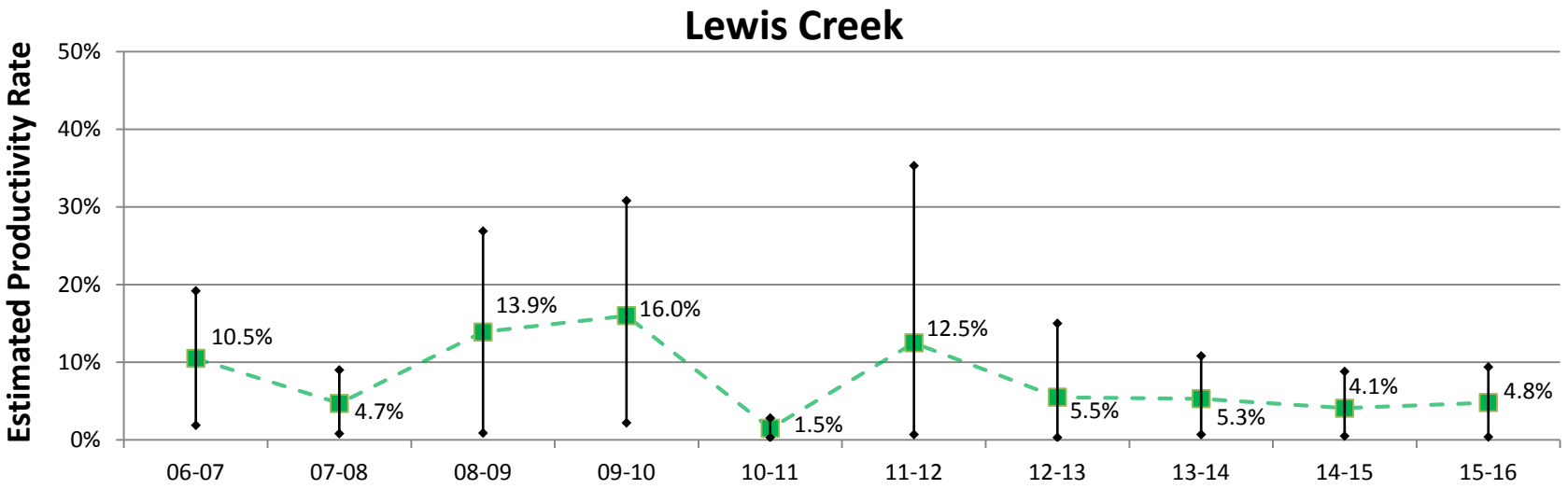
- **Total Fry Abundance**

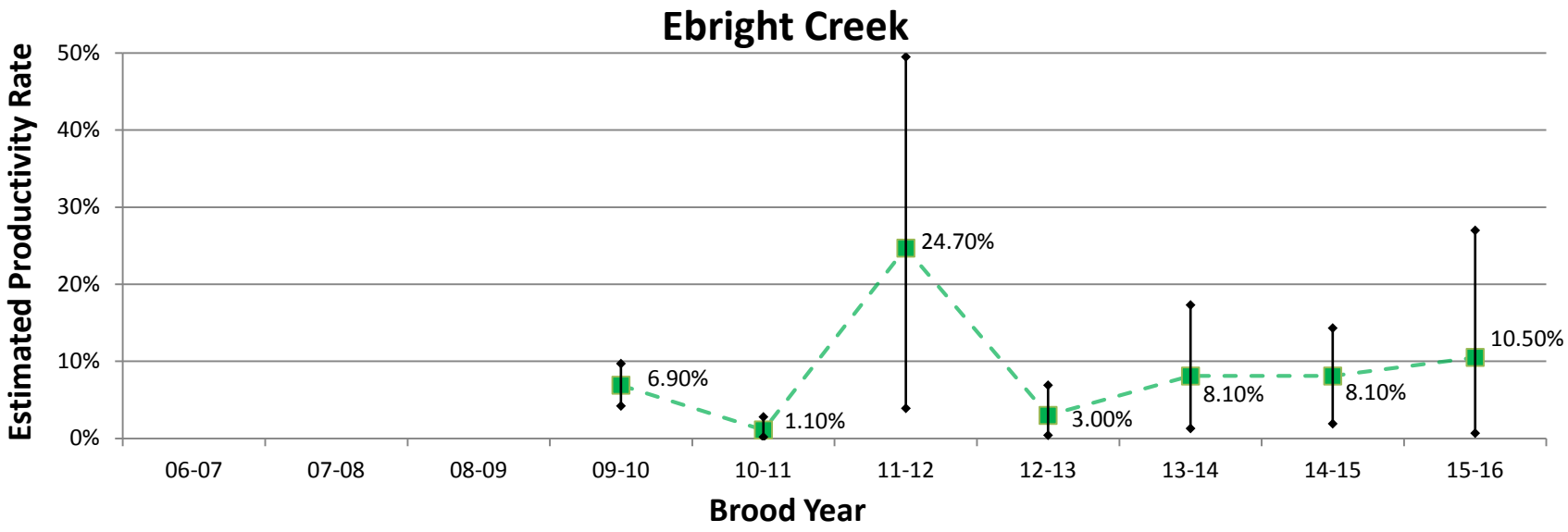
$$Total\ fry\ abundance = \frac{\sum Sample\ Periods}{Efficiency}$$

- **Stream Productivity**

$$Number\ of\ eggs = Number\ of\ females\ * fecundity$$

$$Productivity = \frac{Total\ fry\ abundance}{Number\ of\ eggs}$$


Lewis Creek
Estimated Productivity Rate
50%
40%
30%
20%
10%
0%
10.5%
4.7%
13.9%
16.0%
1.5%
12.5%
5.5%
5.3%
4.1%
4.8%
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16


Ebright Creek
Estimated Productivity Rate
50%
40%
30%
20%
10%
0%
6.90%
1.10%
24.70%
3.00%
8.10%
8.10%
10.50%
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
Brood Year

What does this tell us about *applied land management*?

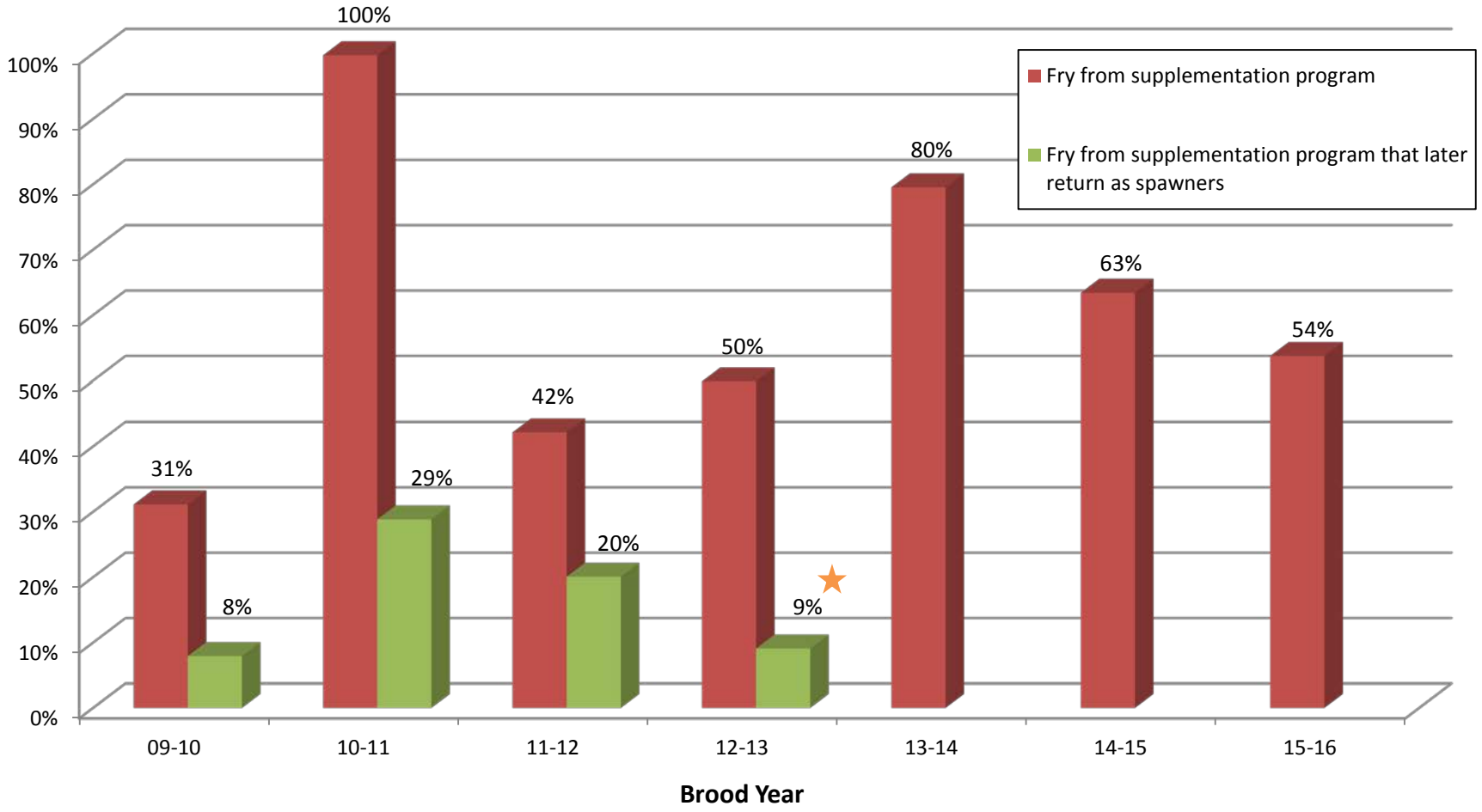
- Begins to provide additional support for expanding **habitat capacity and connectivity**.

- Begins to build additional rationale for **floodplain protection and restoration**.

What does this tell us about the *supplementation program*?

- Provides a strong basis for the need to perform **adaptive management**.

Estimated return rate of fry produced and released by first 4 years of supplementation program



Possible adaptive management strategies for the supplementation program.

- Colder water at the hatchery.
- Reduce crowding, flow velocities, and other potential sources of stress at hatchery.
- Assess condition of fed fry relative to prey availability upon lake entry.
- Continue annual program reviews.
- Remote site incubators.

Thank you

King County
Steve Brady, Josh Kubo, Kate Macneale, Dan Lantz, Chris Gregersen

Bellevue-Issaquah Trout Unlimited
Brad Throssell, Mark Taylor, Robert Metzger, Mark Getzendaner

Estimated return rate of fry produced and released by first 4 years of supplementation program