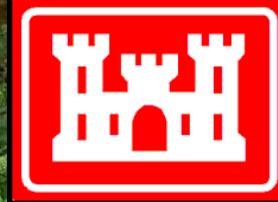


# Juvenile spring Chinook migrant estimates, copepod intensity updates at various Willamette Valley Projects and *O.mykiss* movement in the South Santiam River (2015)



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# Project Objectives

- Determine migration timing and size of salmonids entering and exiting WVP reservoirs
- Provide abundance estimates where possible
- Contribute additional information on factors potentially affecting juvenile survival in Willamette Reservoirs

## Topics covered in this presentation

- Migrant estimates for subyearling Chinook entering and exiting the Cougar Project
- Trends in copepod infection on Chinook gills in Cougar, Detroit and Fall Creek reservoirs
- Movement of *O.mykiss* in the South Santiam River associated with the Foster Project and beyond

## Breitenbush River migrant estimate



Brood Year (BY)	Migrant estimate	95% CI	Number of BY females	Total Number of redds (peak)
2014	55,951	±10,457	80	79

Migrant estimate = estimated number of subyearling Chinook moving downstream past our trap.

# South Fork McKenzie River migrant estimates

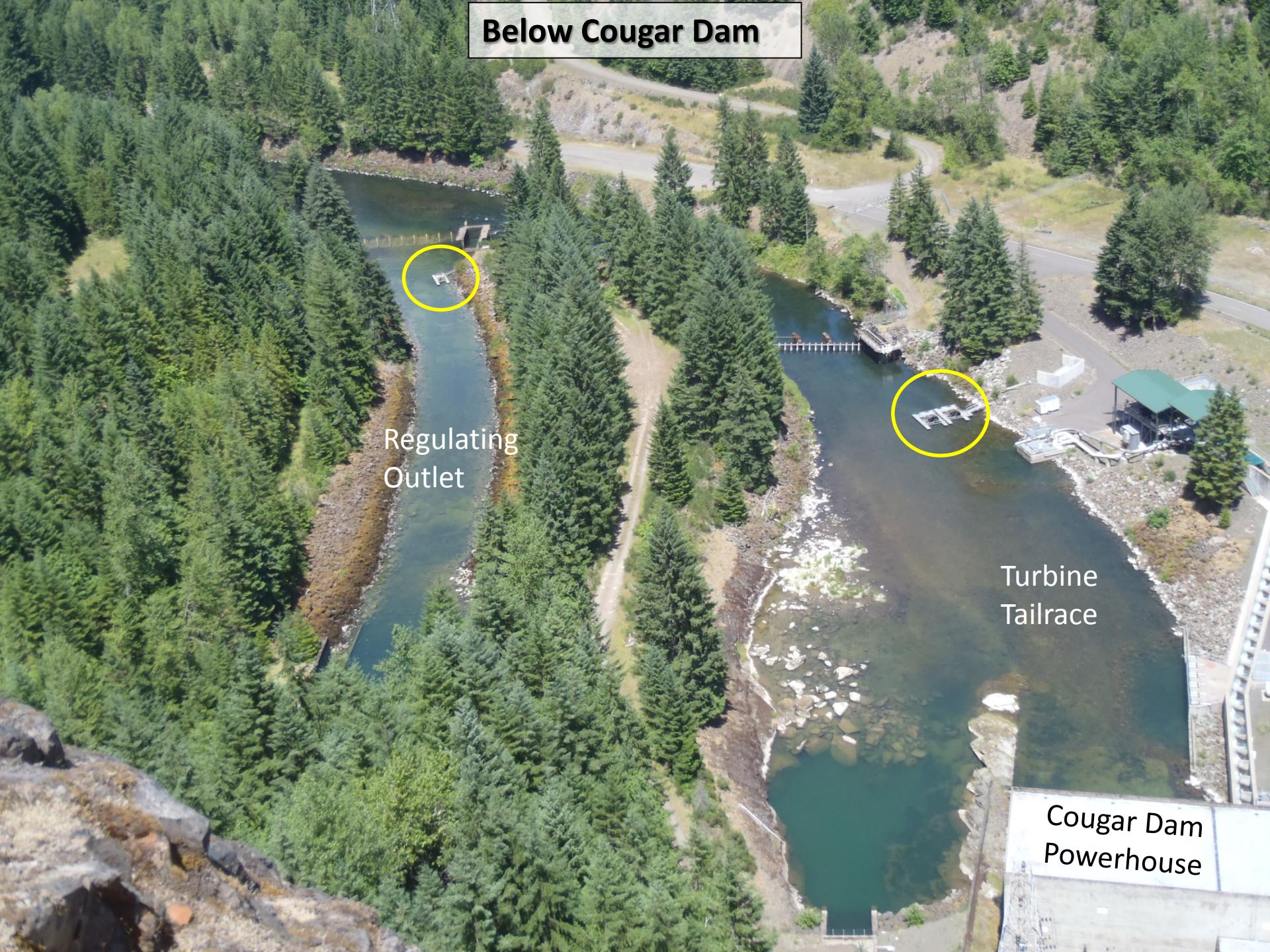


Brood Year (BY)	Migrant estimate	95% CI	Number of BY females	Total Number of redds (peak)	Number of redds below trap
2009	685,723	±72,519	629	274	< 5
2010	152,159	±26,665	320	190	--
2011	228,241	±34,715	336	241	29
2012	557,526	±66,031	448	249	33
2013	413,515	±56,164	337	146 <sup>a</sup>	-- <sup>b</sup>
2014	227,780	±44,765	462	222	-- <sup>b</sup>

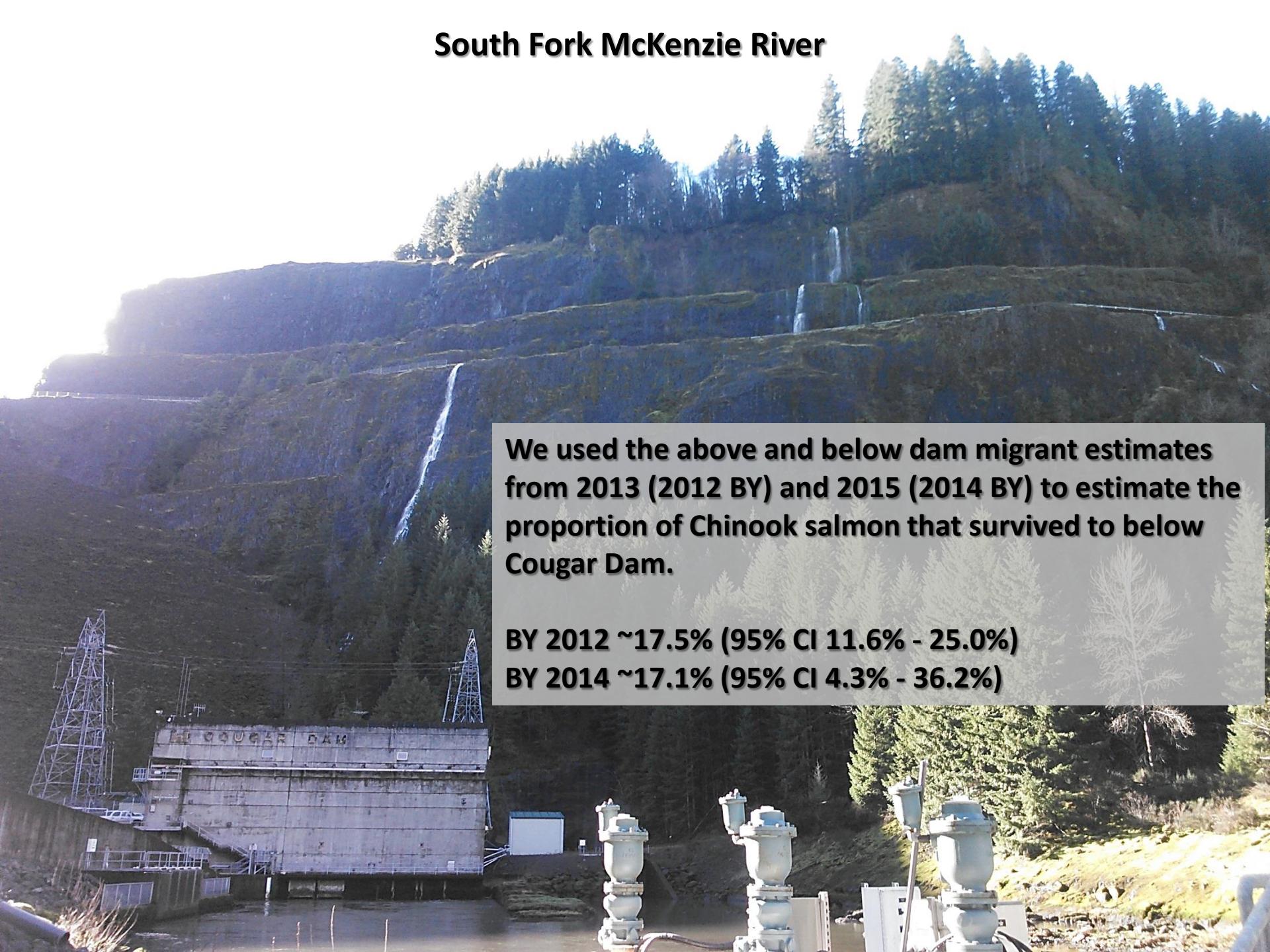
<sup>a</sup> Storm event in fall 2013 near peak spawn decreased redd numbers by flattening redds (2013) brood year.

<sup>b</sup> Redds below trap were not surveyed.

## Below Cougar Dam



# South Fork McKenzie River



**We used the above and below dam migrant estimates from 2013 (2012 BY) and 2015 (2014 BY) to estimate the proportion of Chinook salmon that survived to below Cougar Dam.**

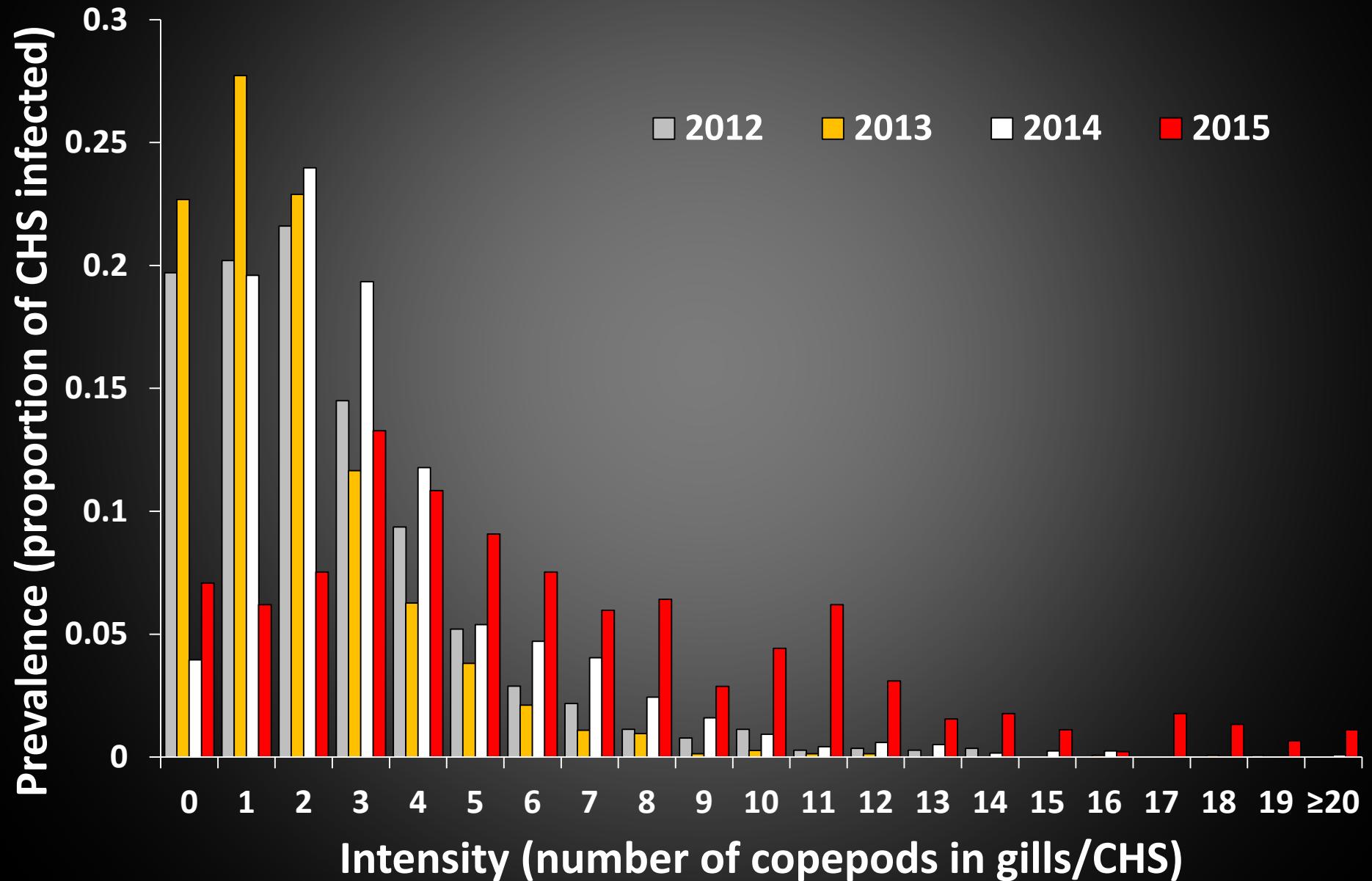
**BY 2012 ~17.5% (95% CI 11.6% - 25.0%)**

**BY 2014 ~17.1% (95% CI 4.3% - 36.2%)**

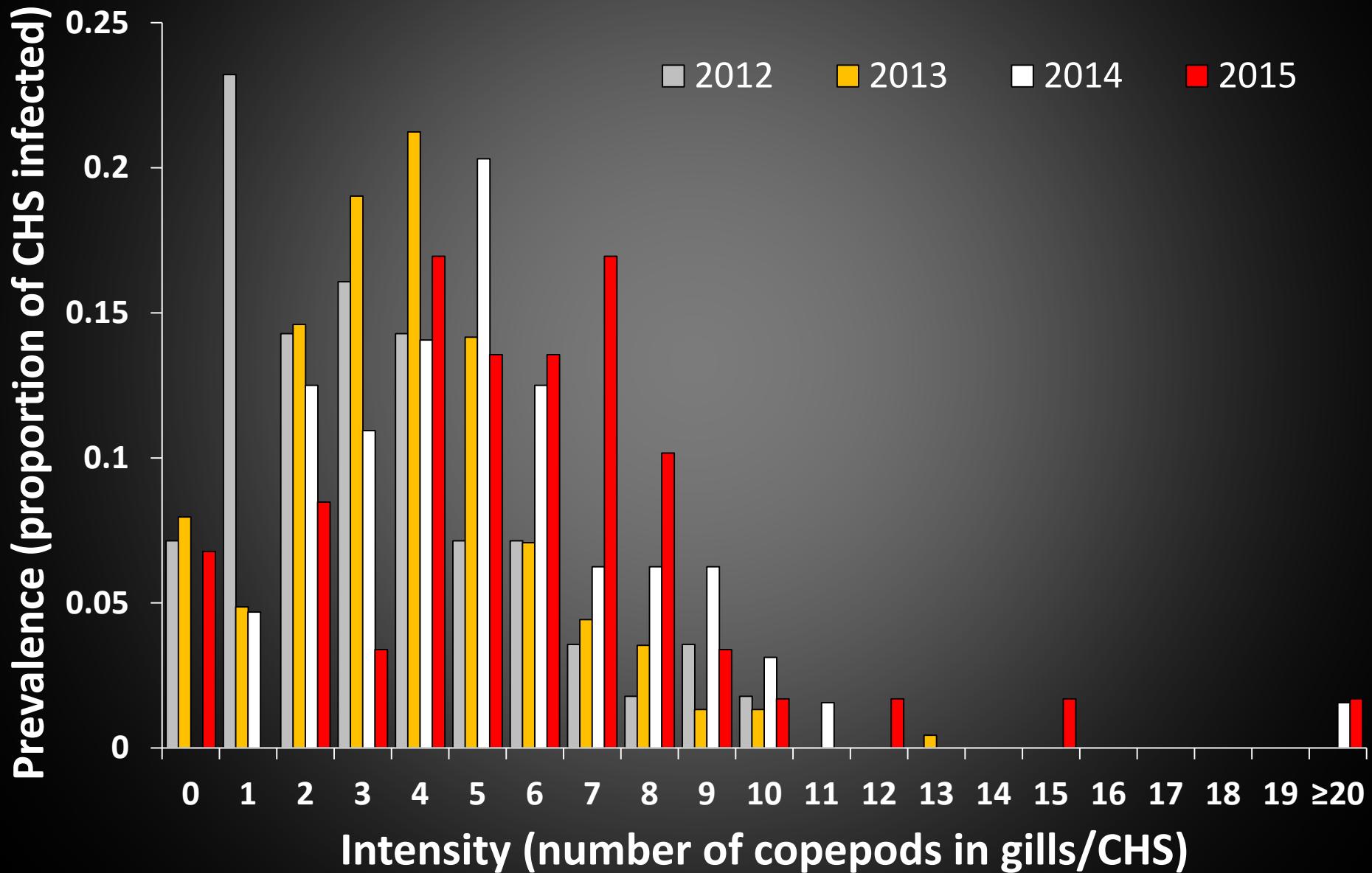
## Copepod infection trends in Cougar, Detroit, and Fall Creek reservoirs 2012 - 2015



# Copepods on gills of subyearling Chinook in Cougar Reservoir (Nov-Dec)

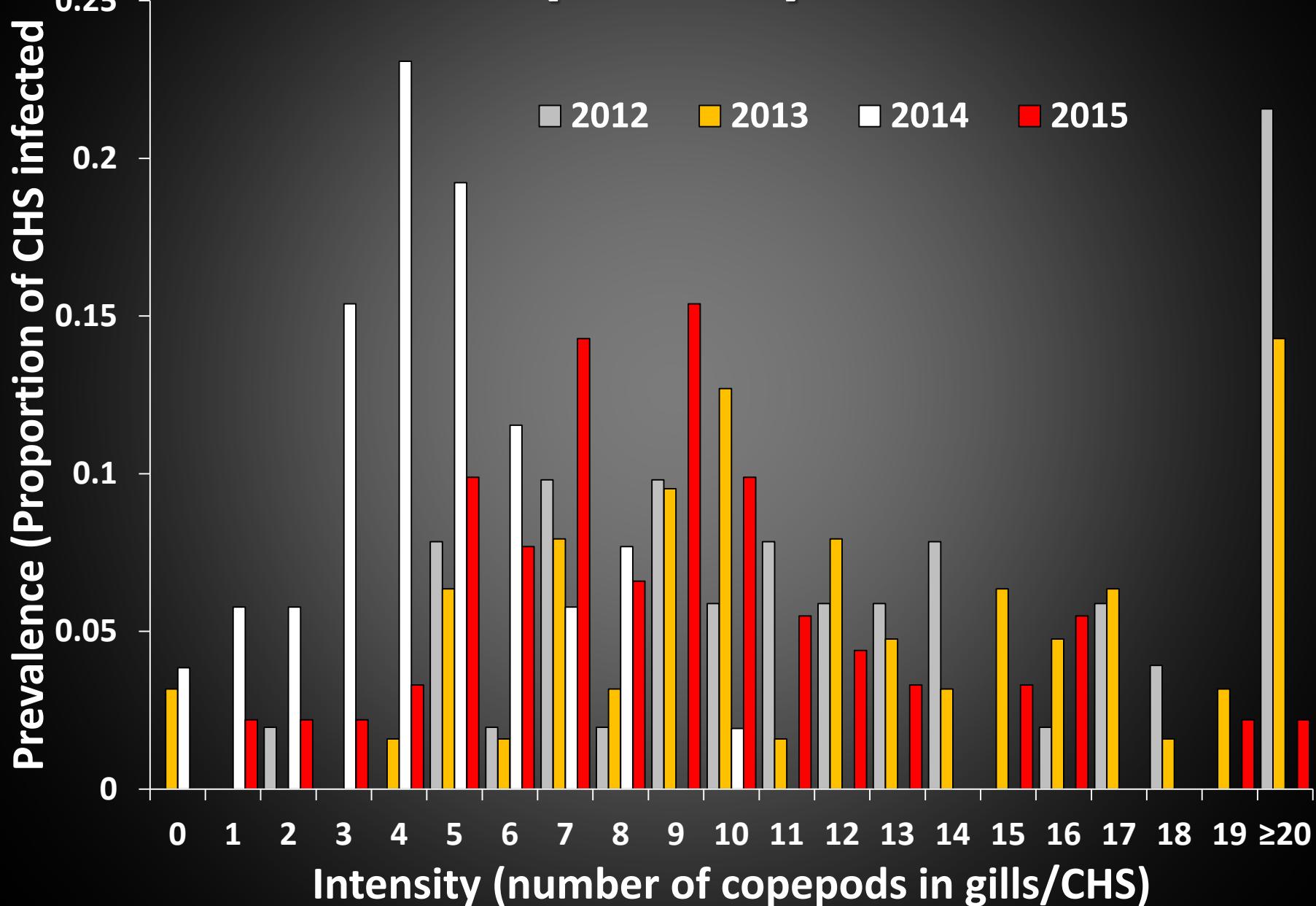


# Copepods on gills of subyearling Chinook in Detroit Reservoir (Nov-Dec)



# Copepods on gills of subyearling Chinook in Fall Creek Res. (Oct - Nov)

## [USACE data]



# Copepod infection trends among reservoirs

COUGAR	n	Intensity		Prevalence	
		Mean	Median	w	0.803
2012	1,141	3.1	2	w	0.803
2013	1,135	2.5	2	x	0.773
2014	1,142	3.4	3	y	0.960
2015	658	6.3	5	z	0.929

2015 mean intensity x2 greater than previous years

DETROIT	n	Intensity		Prevalence	
		Mean	Median	z	0.929
2012	52	3.5	3	z	0.929
2013	208	4.1	4	z	0.920
2014	64	5.3	5	y	1.000
2015	55	6.1	6	y	0.932

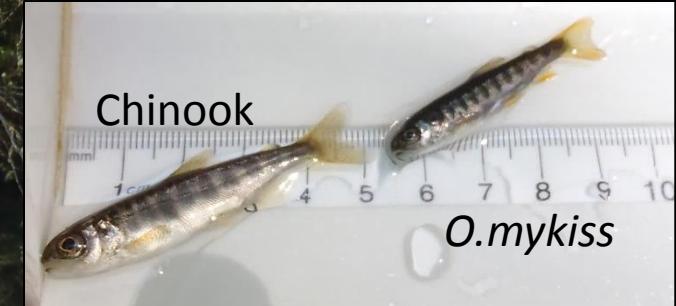
Mean intensity increased each year but 2014-15 not statistically different

FALL CREEK	n	Intensity		Prevalence	
		Mean	Median	z	1.000
2012	51	13.3	12	z	1.000
2013	61	13.0	12	z	0.968
2014	50	4.6	4	y	0.962
2015	91	8.9	9	x	1.000

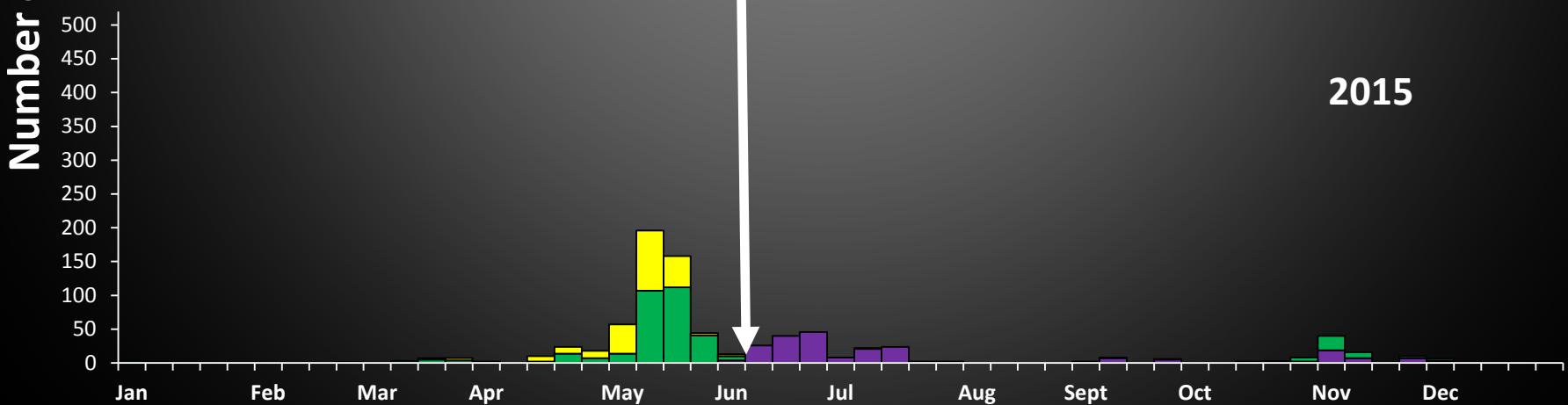
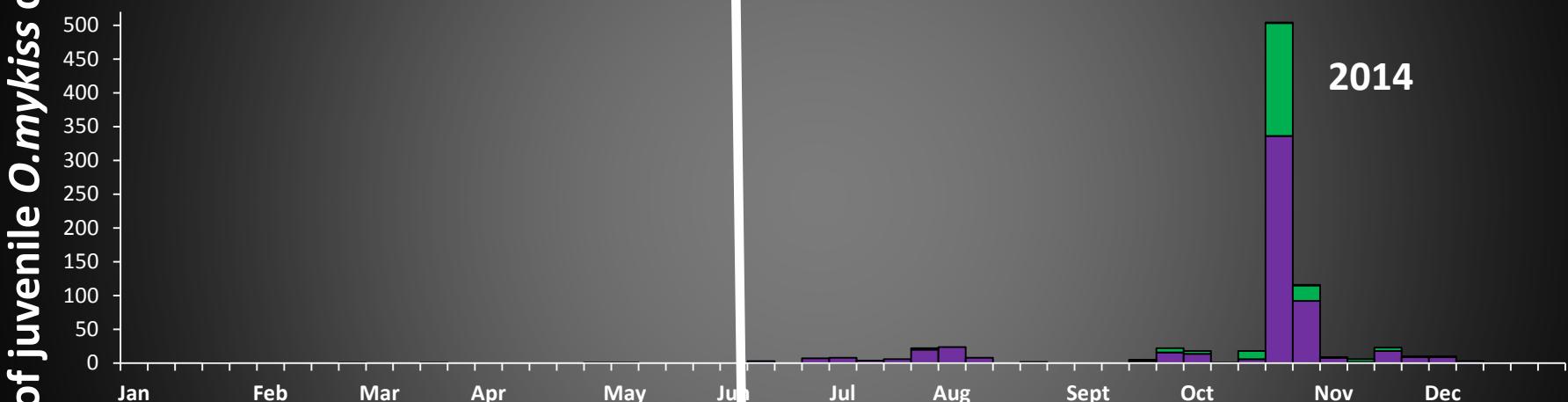
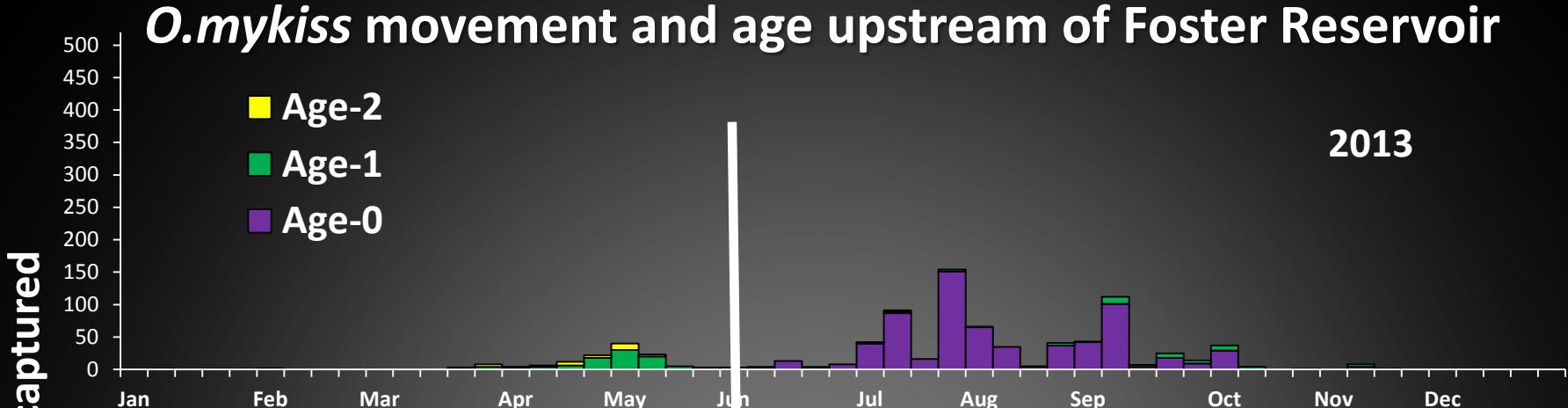
2015 intensity rebounded from low in 2014

n = number of Chinook where copepods were counted (used for mean and median)

# South Santiam River *O.mykiss* movement above Foster Reservoir



# *O.mykiss* movement and age upstream of Foster Reservoir



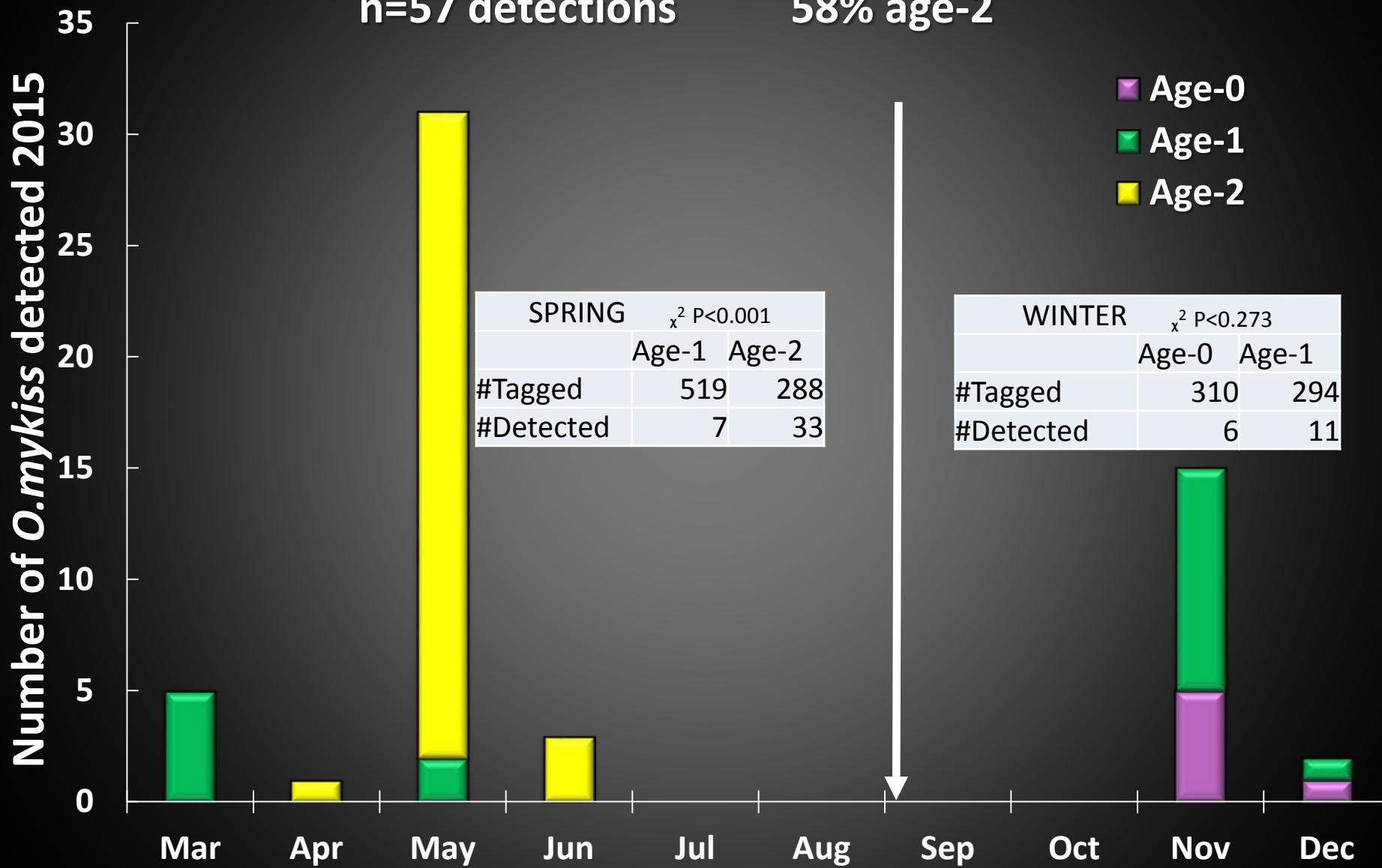
# Foster Dam Weir



# *O.mykiss* PIT-tag detections at Foster Weir (2015)

n=57 detections

58% age-2



## Lebanon antennas (x4)

28 rkm below Foster

Spanning antenna LD4



Photo ODFW: Derrek Faber

South antenna LD1 (River Rd)

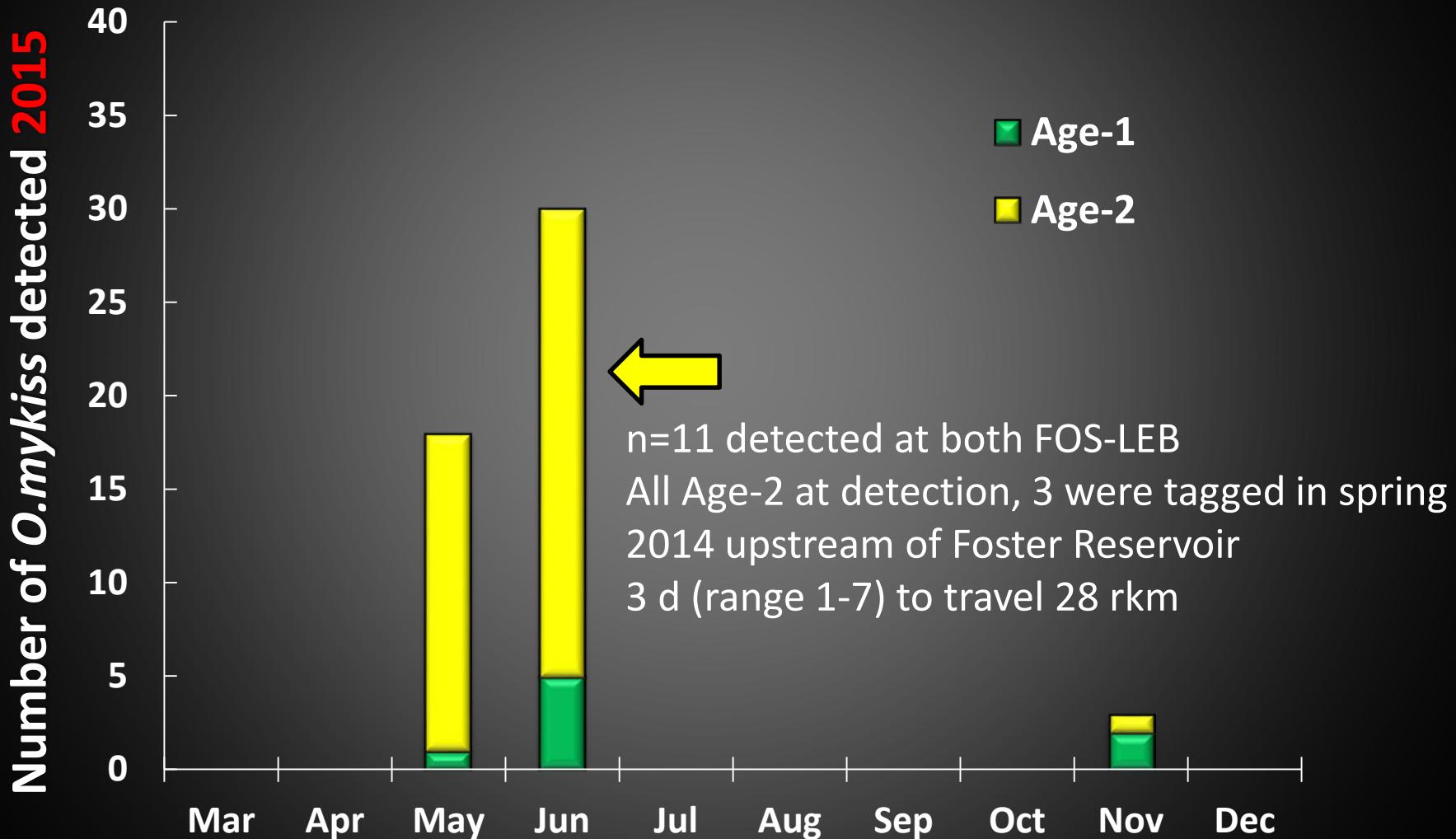


North antenna LD2 (Berlin Rd)



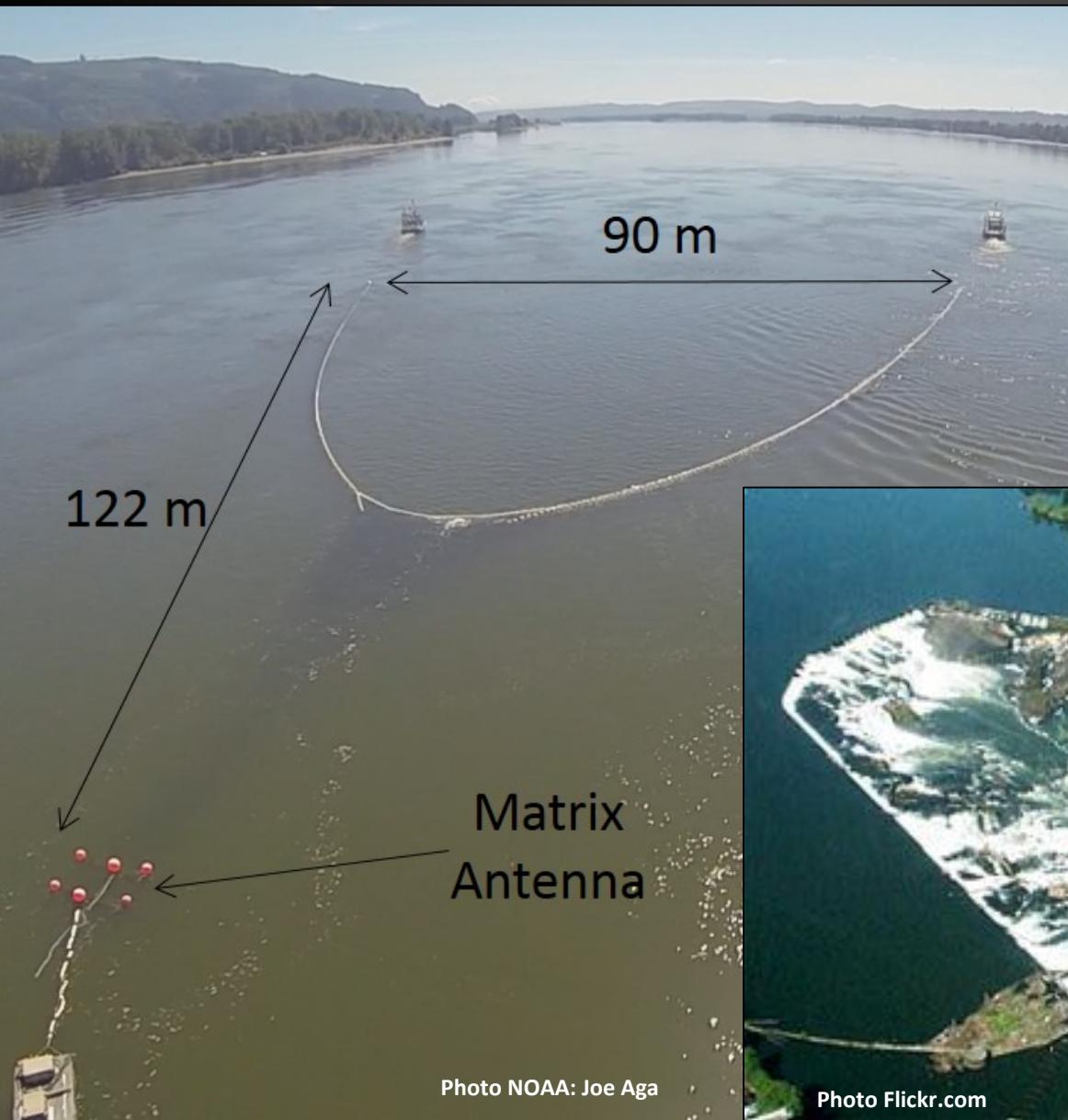
# *O.mykiss* PIT-tag detections at Lebanon Dam (tagged 2014 - 2015)

n=51 84% age-2



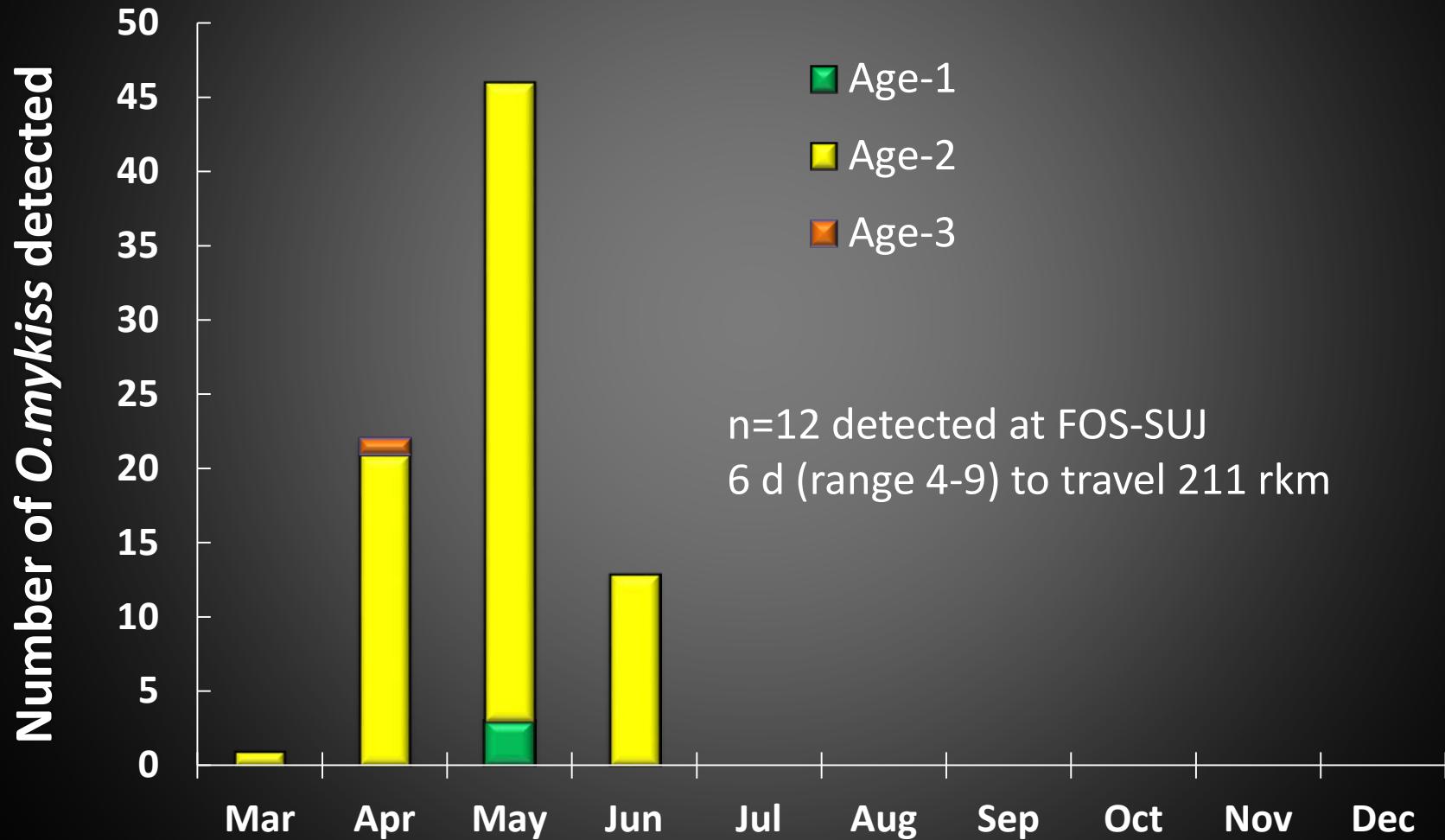
# Columbia River Trawl Vessel / Willamette Falls

211 rkm below Foster



# *O.mykiss* PIT-tag detections at Willamette Falls (tagged 2011 - 2015)

n=82    95% age-2



# *O.mykiss* age at tagging vs. age at detection at Willamette Falls or Columbia River Estuary.

			Age at Tagging (Age Detected)					
Year Tagged	Number Tagged	Number Detected	0	1	2	3	% Smolt Detections Migrating at Age-2	
2011	205	2		2	(2)			100
2012	370	1		1	(1)			100
2013	800	18	2	2	14 (18)			100
2014	1,802	36	3	32 (3)	1 (32)	(1)		89
2015	1,468	25			25 (25)			100

Fun facts – longest time from tagging to detection thus far 646 d  
 No adults have been detected returning to date (March-April 2016)

# Summary

## Juvenile Chinook above and below WVP dams

- Migrant estimates between consecutive years can be highly variable.
- Estimated survival for juvenile Chinook through the Cougar Project for both brood years (2012, 2014) were ~ 17% (wide CI).

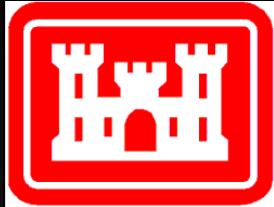
## Copepod trends in WVP reservoirs

- Juvenile Chinook had higher intensity of copepod infection in all reservoirs in 2015 compared to 2014.
- Infection prevalence for subyearlings exiting reservoirs in the fall was ~90% in all years and reservoirs sampled.
- Infection intensity is consistently higher in Fall Creek Reservoir

## **Juvenile *O.mykiss* in the South Santiam River**

- **Migration timing for different age classes into Foster Reservoir is highly variable among years.**
- **95% migrated as age-2 smolts from March – June (peak May) regardless of age tagged.**
- **Mean migration time from detection at Foster Weir to Willamette Falls (n=12) was 6 days (211 rkm)**

# Acknowledgments



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Meghan Horne-Brine  
Kevin Stertz  
Andrew Nordick  
Ryan Flaherty  
Matt Price**



**Jeff Ziller  
Kelly Reis**

# *O.mykiss* movement and age upstream of Foster Reservoir

Number of juvenile *O.mykiss* captured

