


Ecosystem Monitoring Project 2014 Fish Sampling Update

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**Lower Columbia Estuary
Partnership Science Workgroup
Meeting
October 27, 2015**

2015 Update

- **2015 Field sampling**
 - Fish habitat occurrence and salmon health at five trend sites
 - Pilot sampling at tributaries (Grays River and Lewis River)
- **Additional data from 2014**
 - Chinook salmon stock composition
 - Chinook salmon growth study results
 - Contaminants in Columbia Gorge fish
- **PIT tag array results**
 - Campbell Slough
 - Horsetail Creek

2015 Fish Sampling Sites



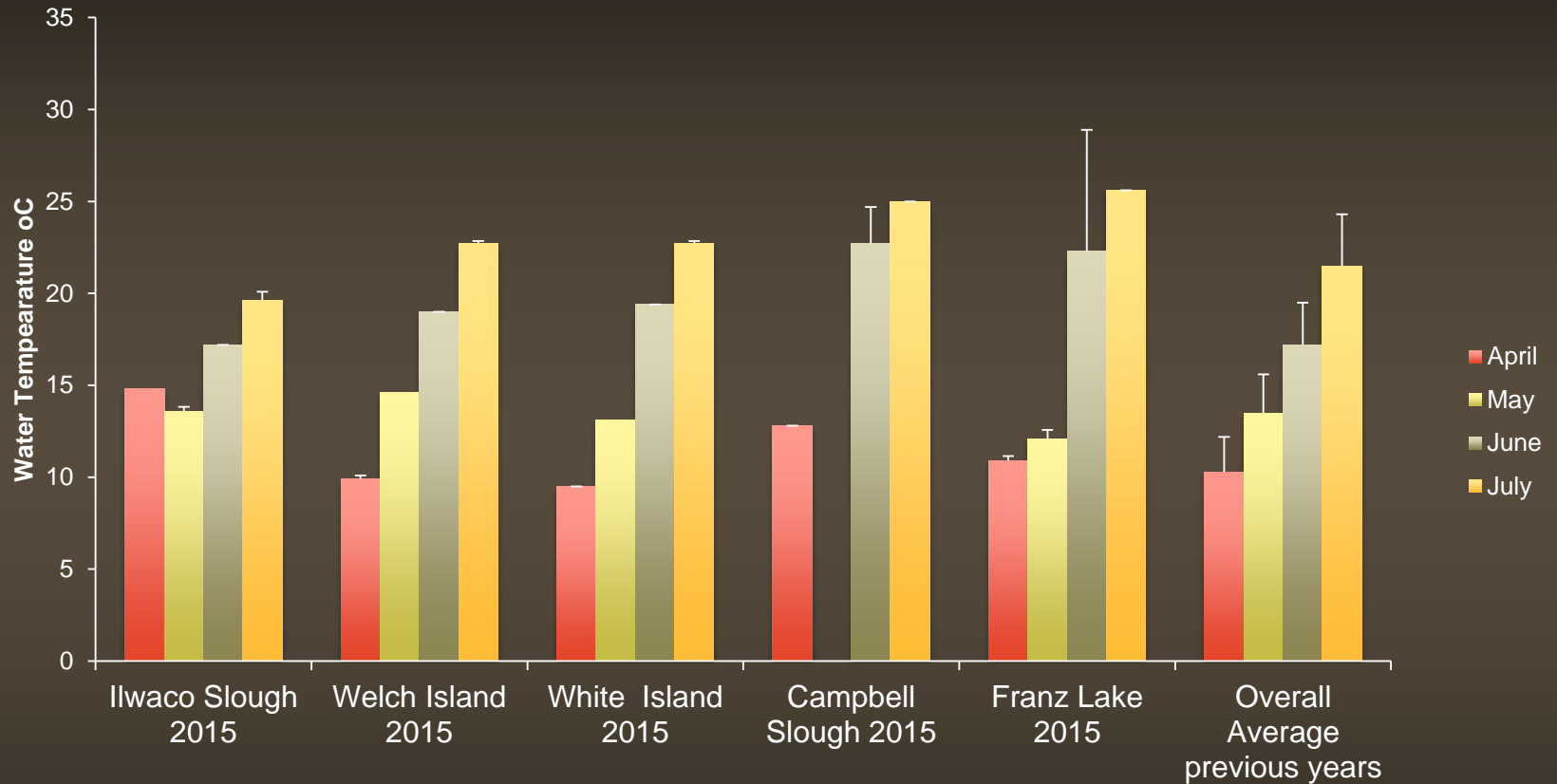
Parameters measured

- **Fish community**
 - Species richness
 - Species diversity
 - % non-native species
 - % fish that could be salmon predators
- **Salmon species composition and habitat occurrence**
 - % of salmon species in catches
 - Density of salmon species
 - Chinook salmon stock composition
- **Salmon condition**
 - Length, weight, condition factor, size ranges
 - Lipid content
 - Growth rate (otoliths)
 - Contaminants



Salmon Habitat Occurrence

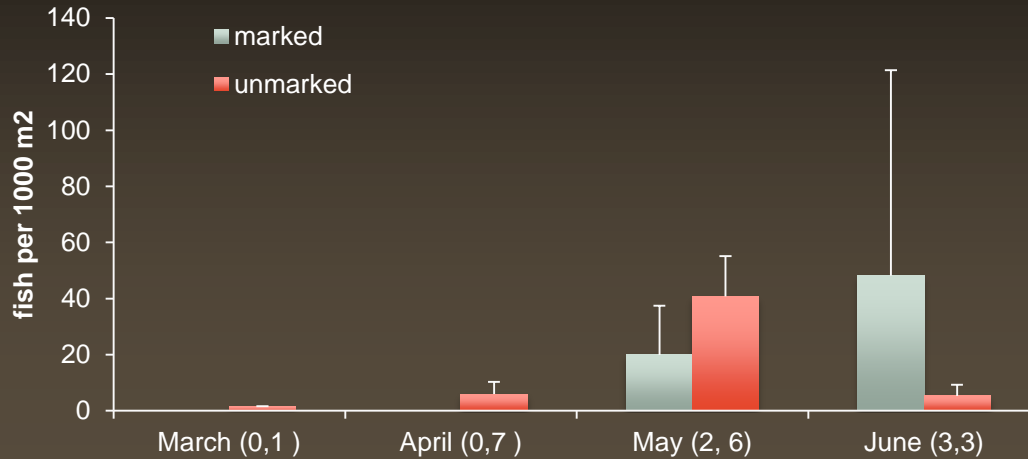
2015 Water Temperatures



2015 water temperatures higher than average at most sites, especially in June and July

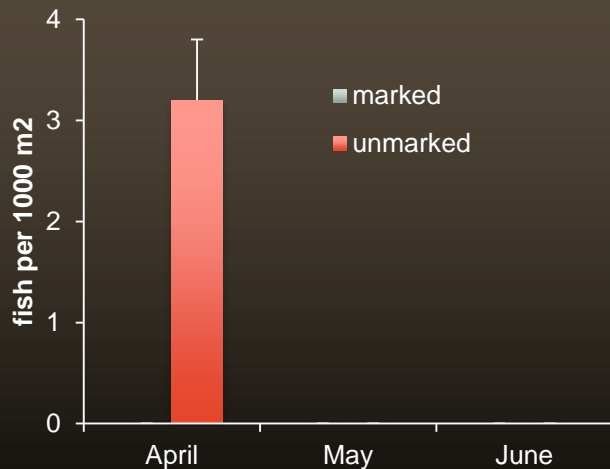
Season salmon occurrence

Chinook salmon

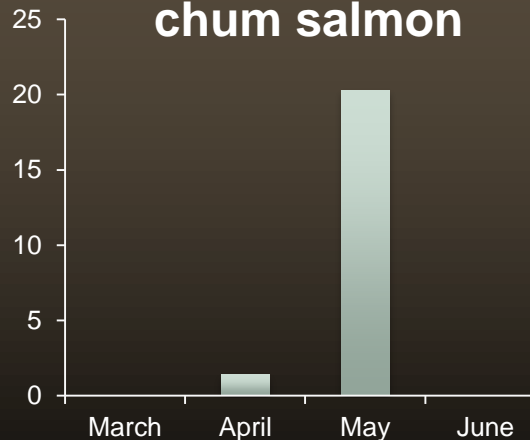


- Restricted sampling in 2015 due to high water temperature
- Chinook present through June
- Chum present in April and May; coho only in May
- Sockeye salmon and trout spp. absent in 2015

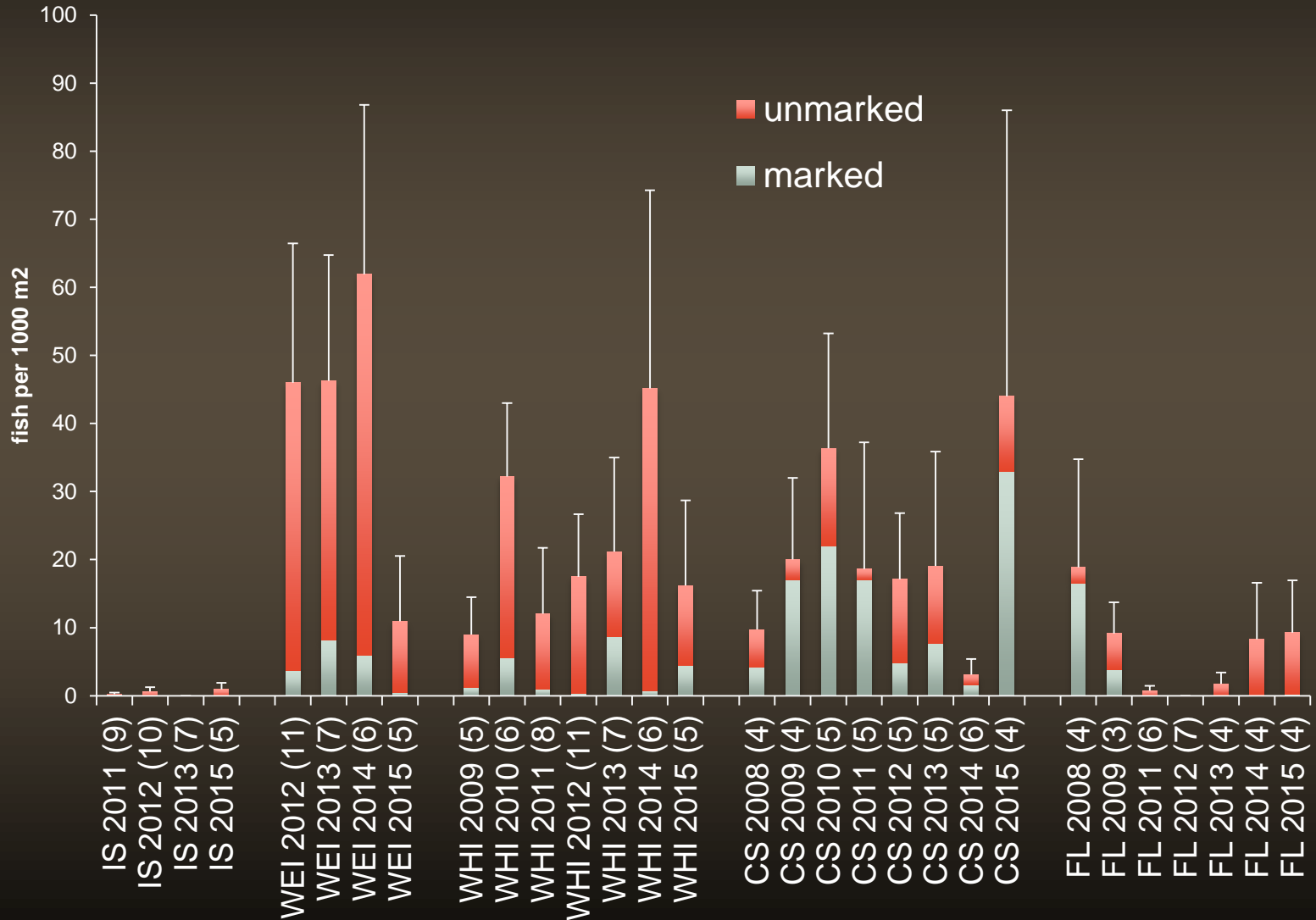
coho salmon



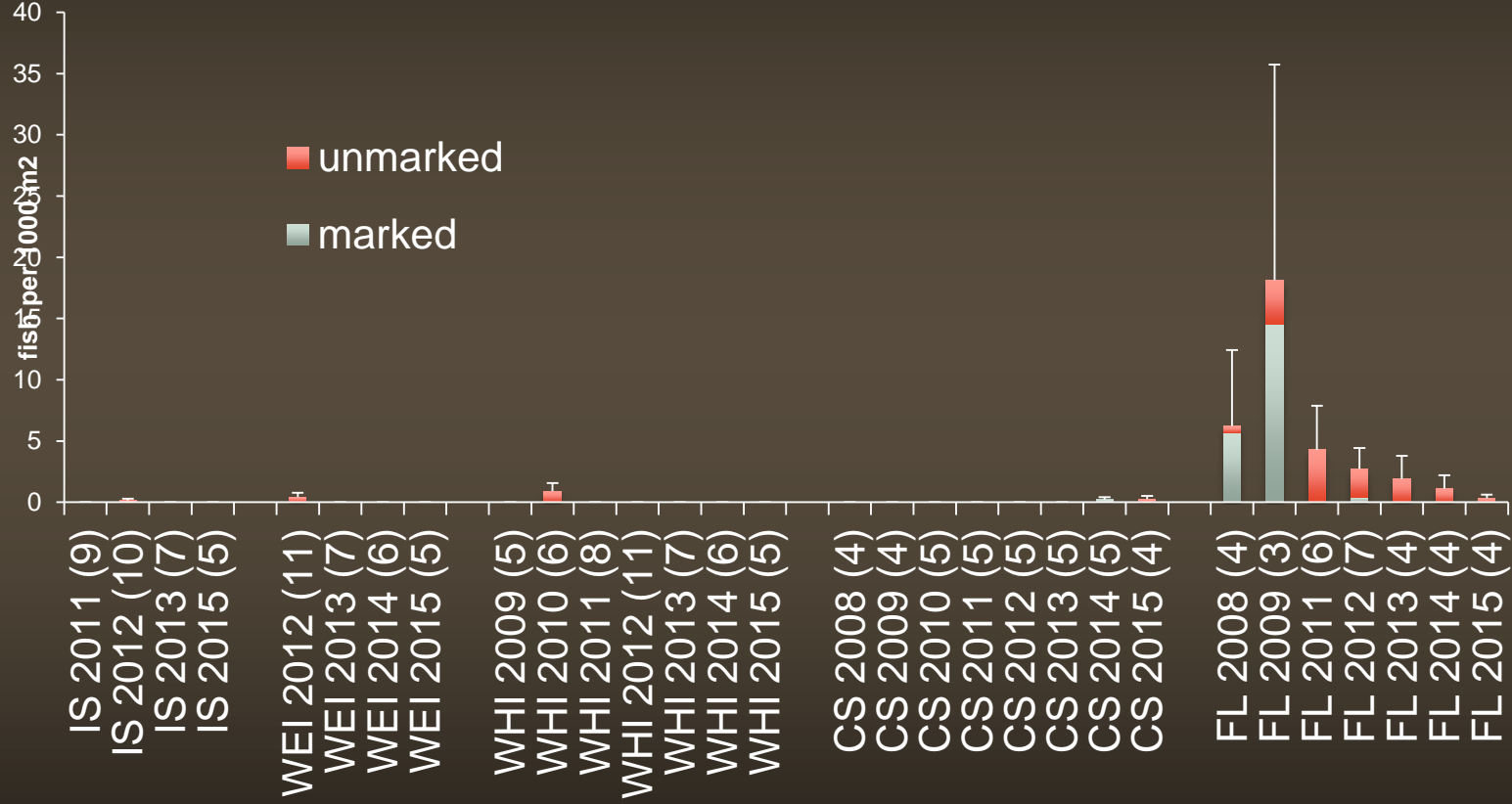
chum salmon



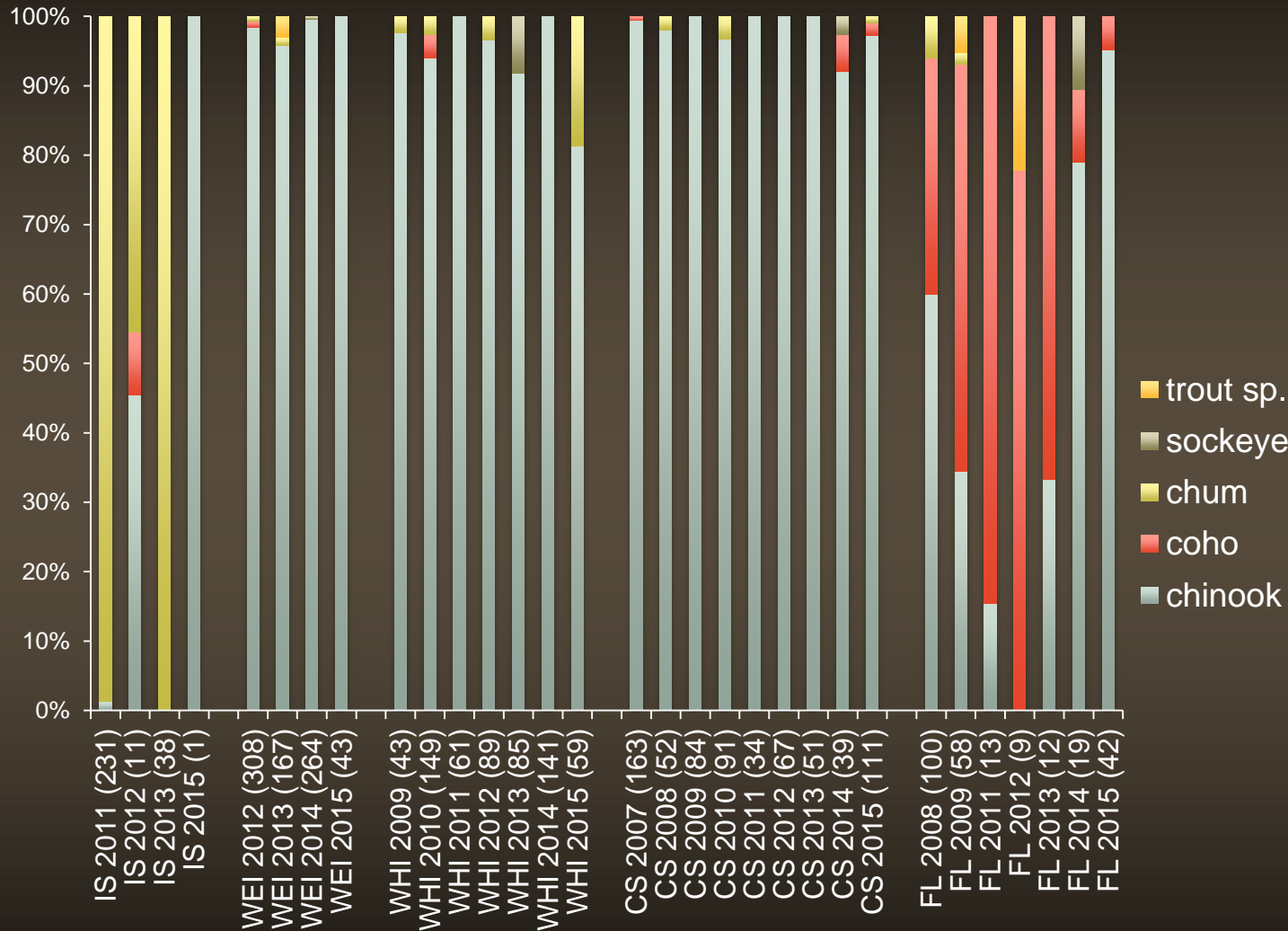
Chinook salmon catches - temporal trends



Coho salmon catches - temporal trends



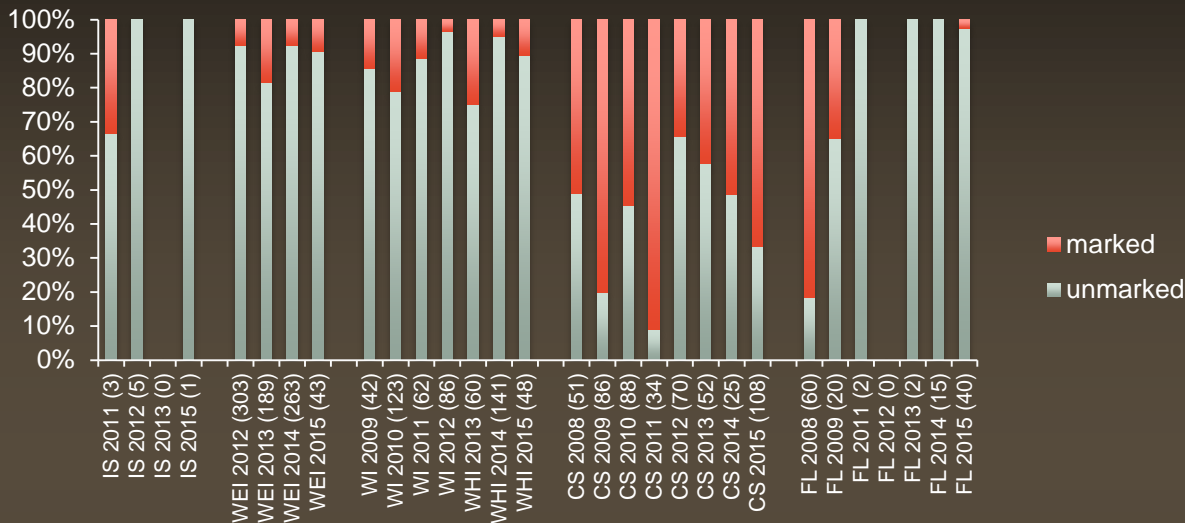
Salmon species composition: 2015 vs. previous years



- Generally similar patterns at Welch Island, Whites Island and Campbell Slough
- Variable catch at Ilwaco Slough
- Less diversity at Franz Lake in 2014 and 2015, mostly Chinook
- No trout or sockeye salmon in 2015

Proportions of marked and unmarked salmon

Chinook salmon



- Unmarked Chinook predominate at all sites except Campbell Slough

- Trend of fewer marked chinook at Franz Lake

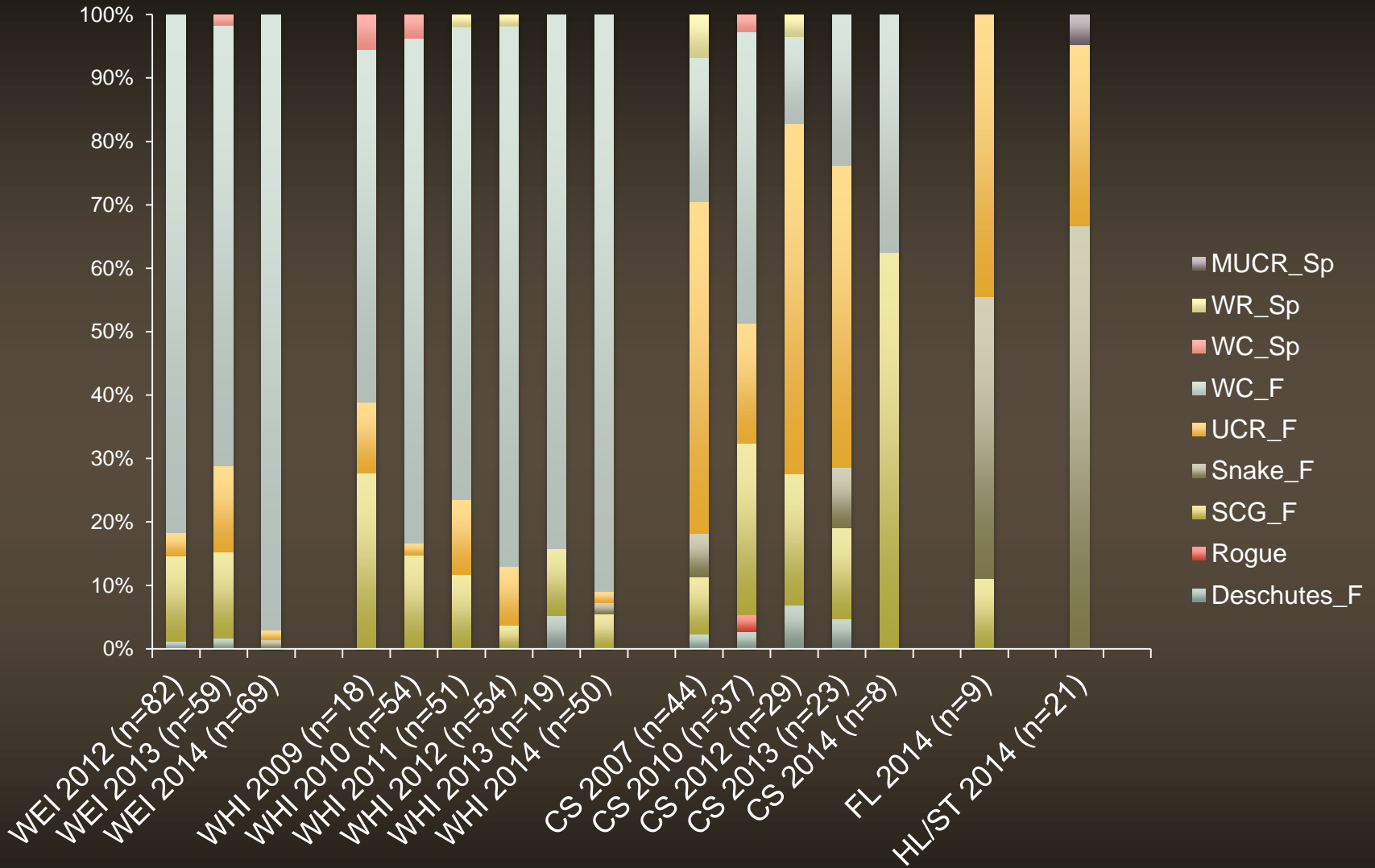
- Coho found consistently only at Franz Lake

- Trend of fewer marked coho at Franz Lake

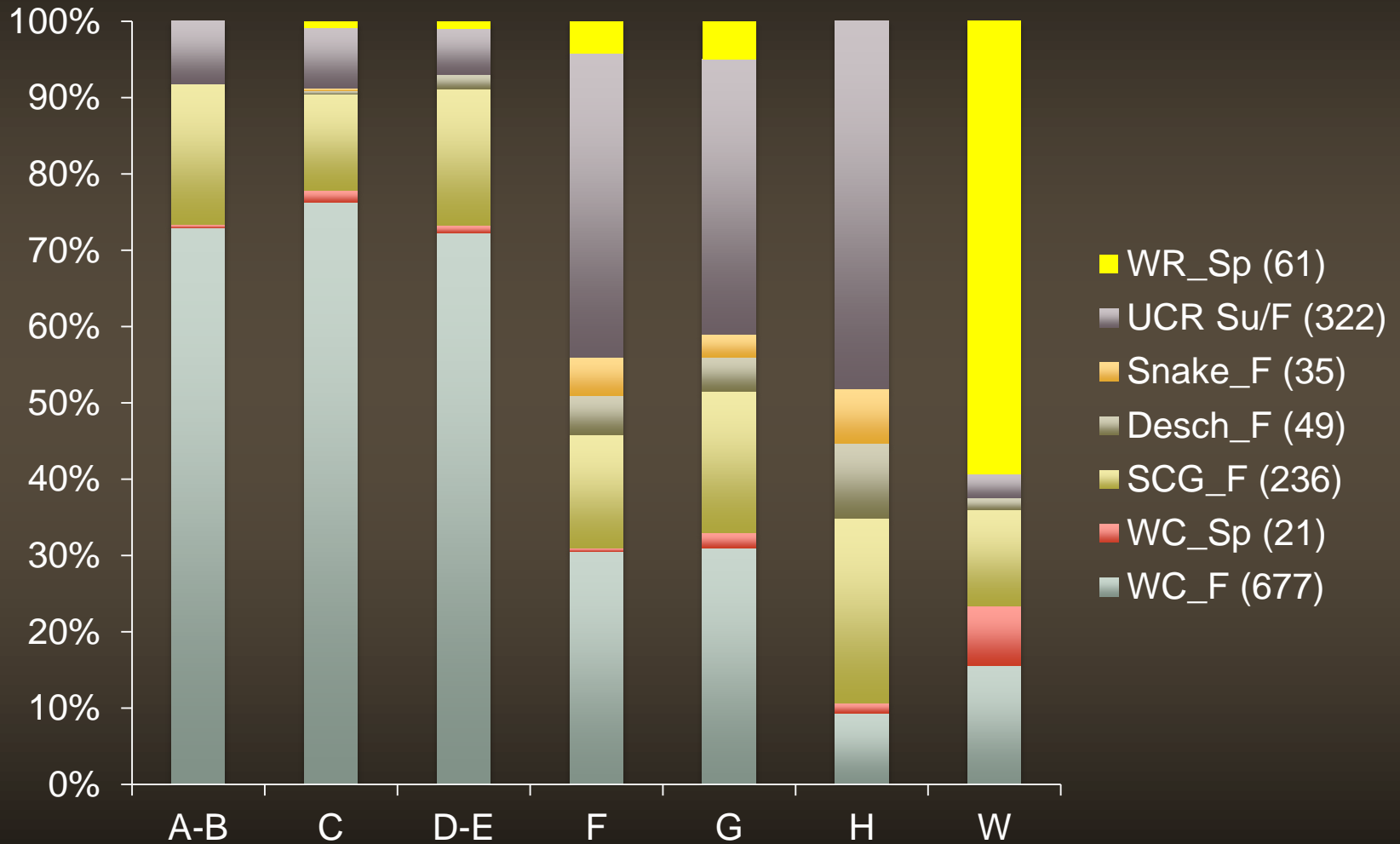
Coho salmon



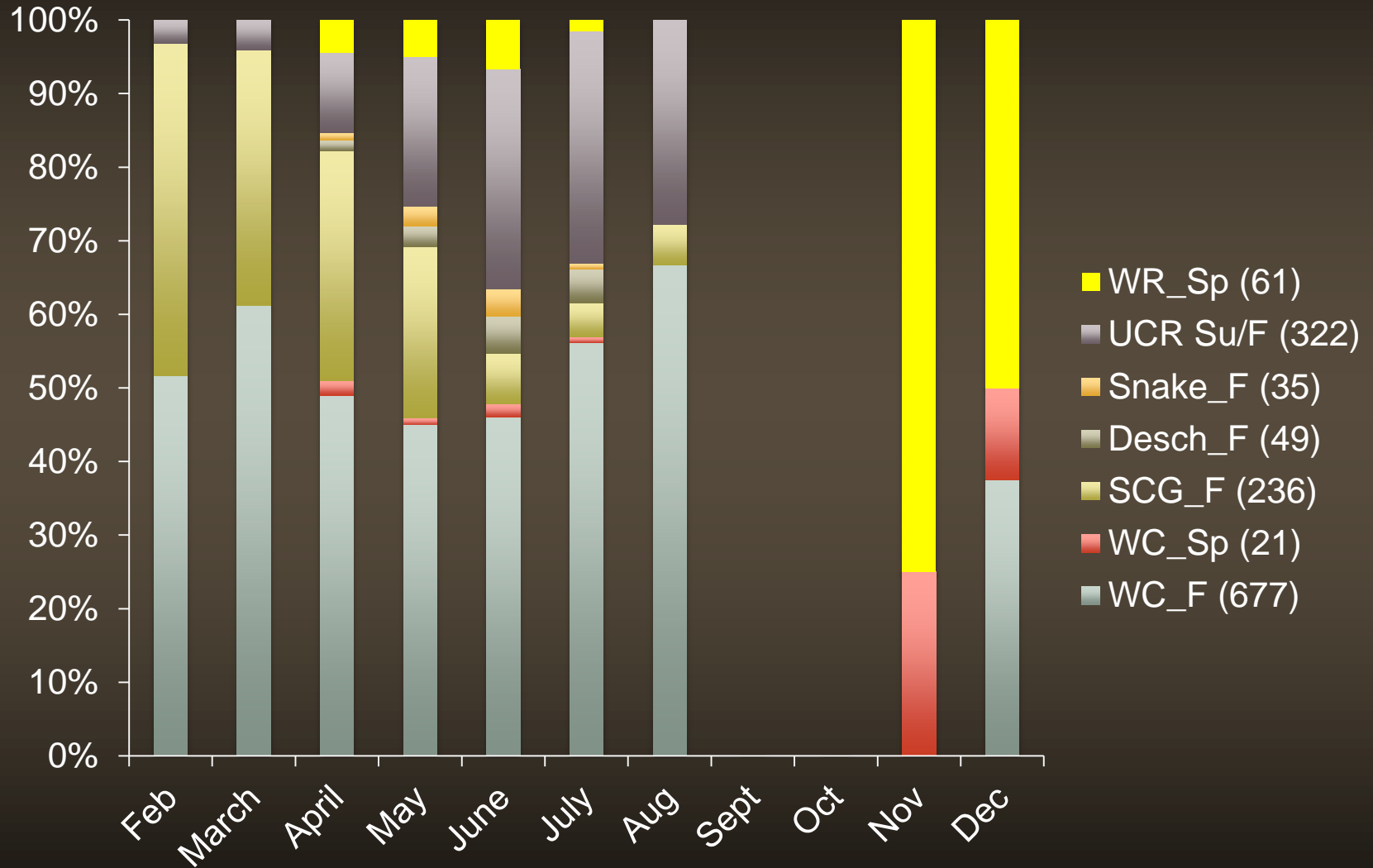
Unmarked Chinook salmon stock composition 2014



Spatial distribution of Chinook stocks (unmarked)



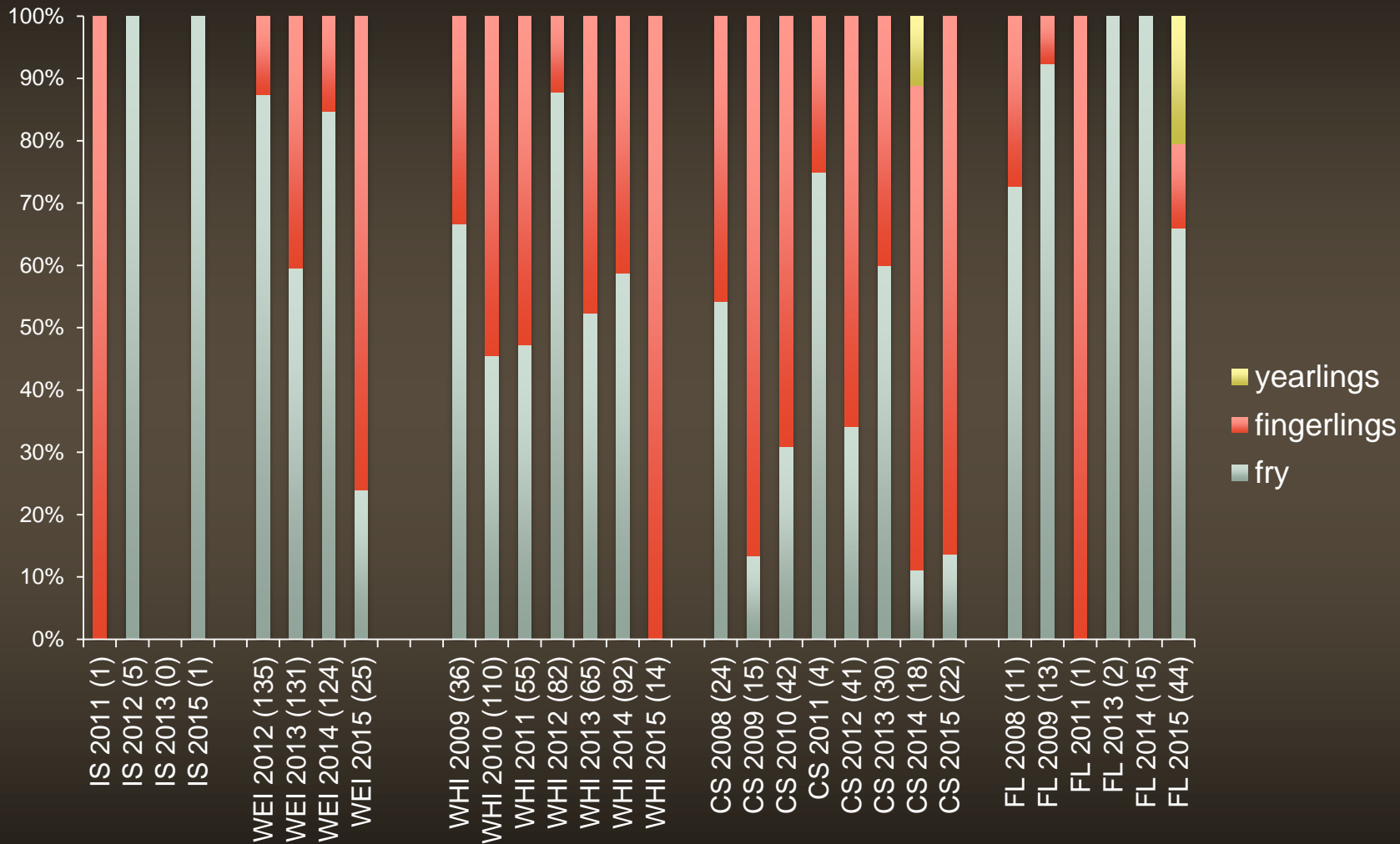
Temporal distribution of Chinook stocks (unmarked)



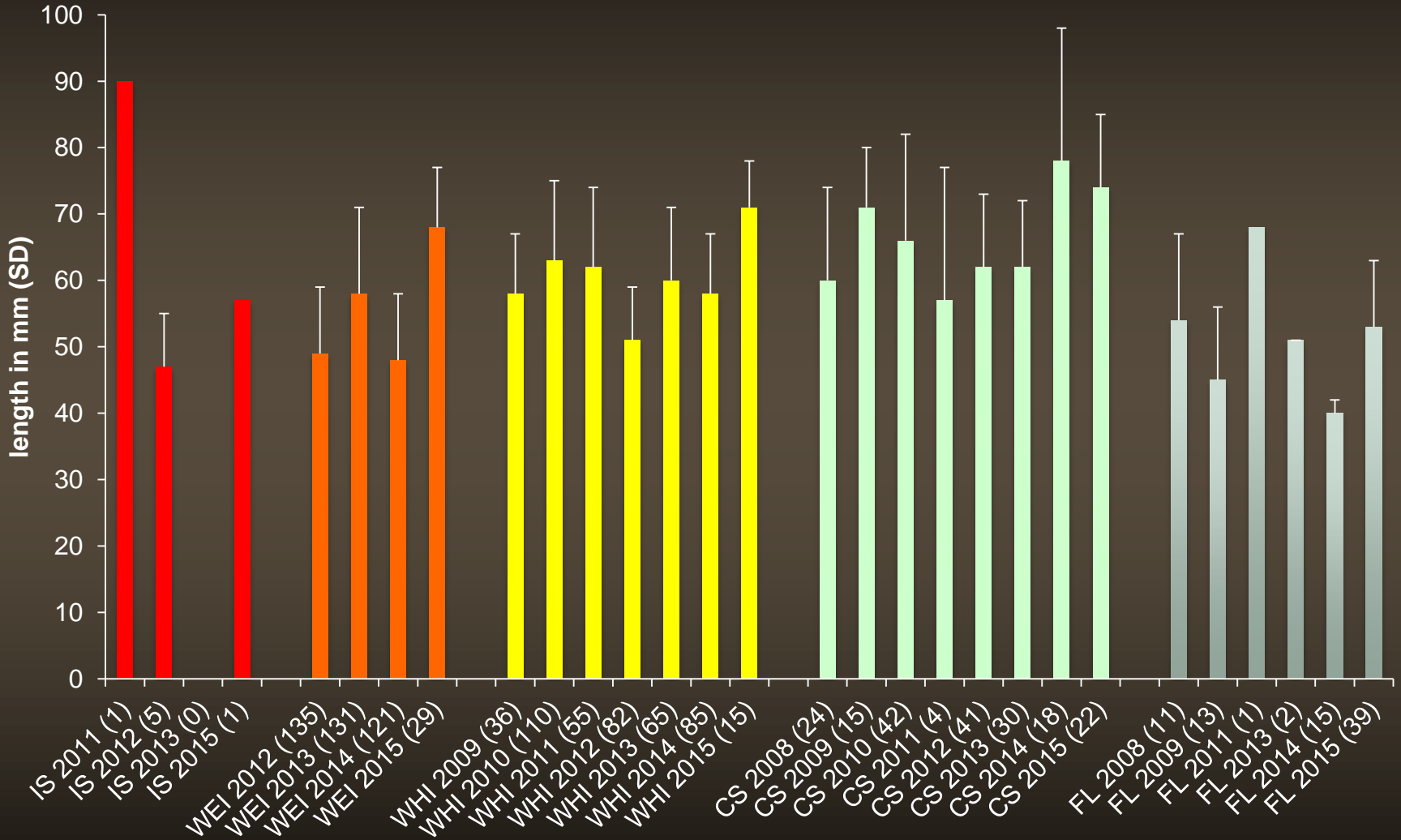


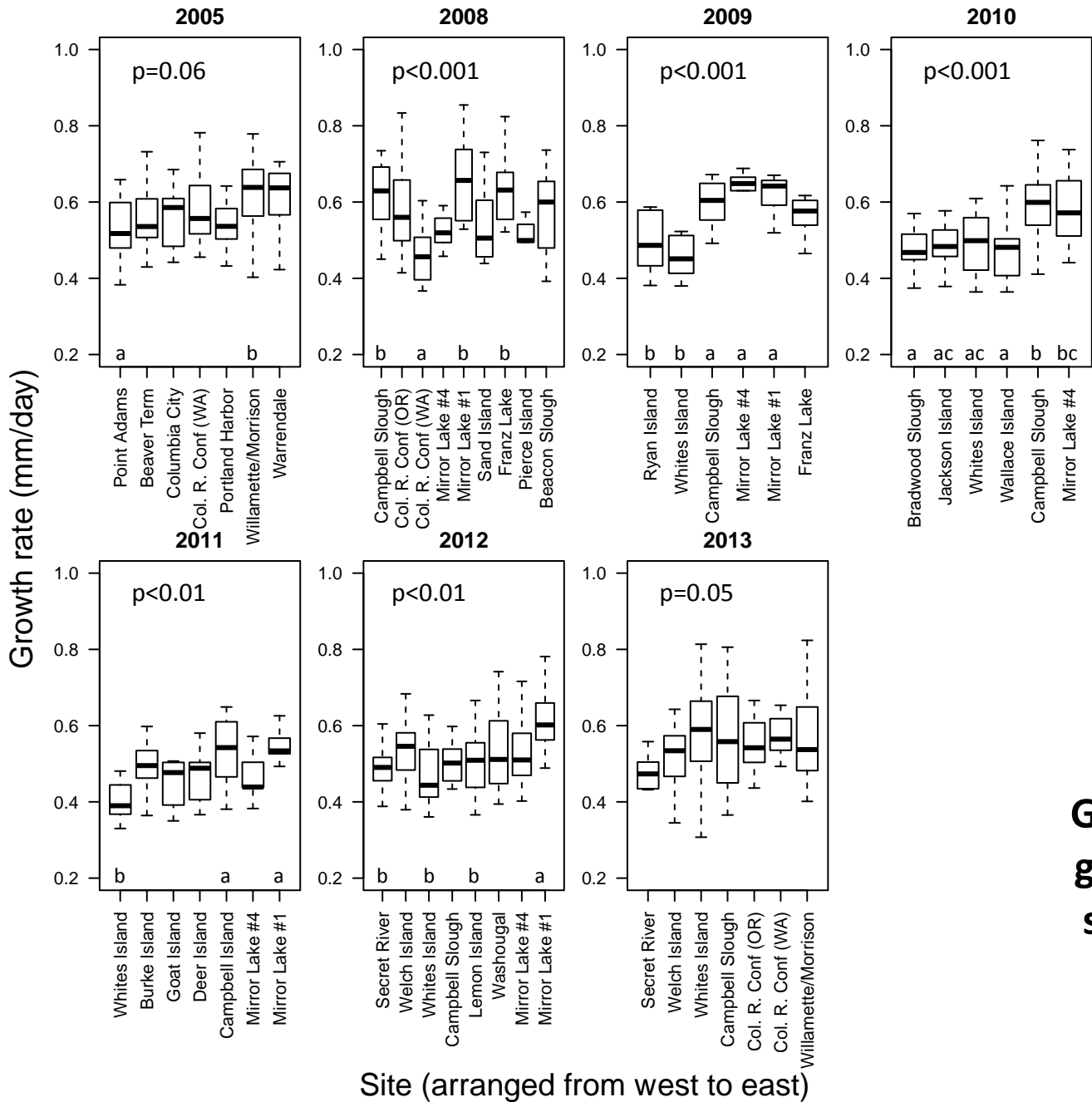
Salmon Health
and Condition

Unmarked chinook size class distribution- temporal trends



Unmarked Chinook Condition Factor - temporal trends





**Growth Rate
By Site**

**Generally higher
growth rates for
sites farther up
river**

2005

2008

2009

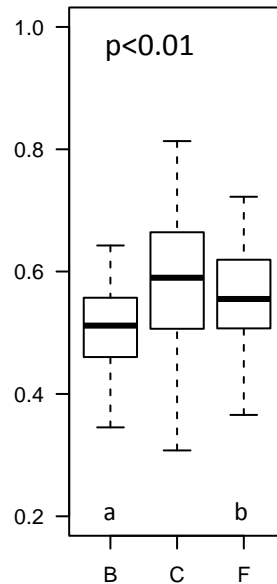
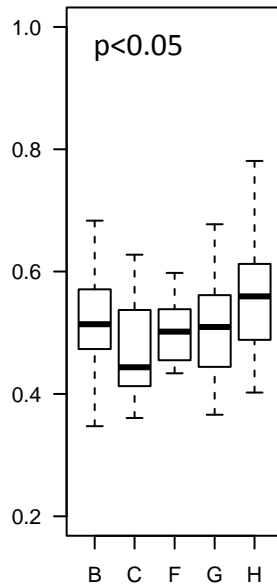
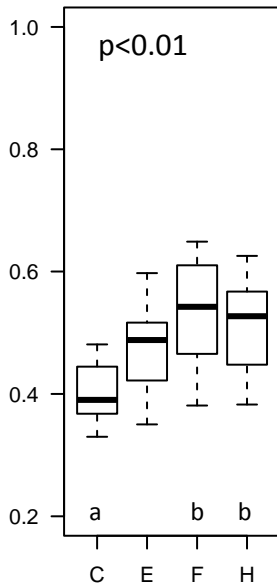
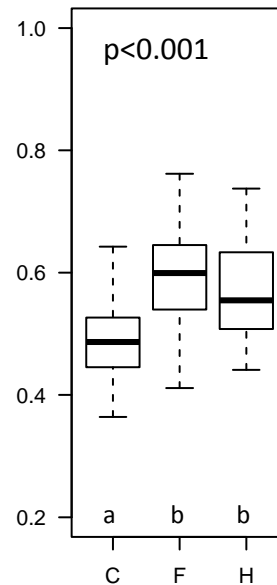
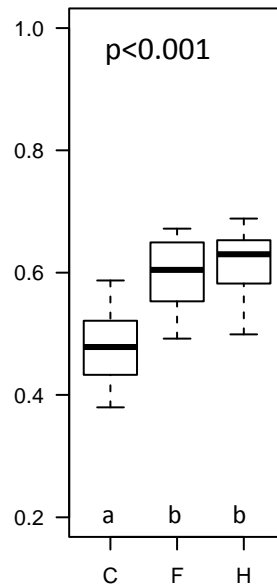
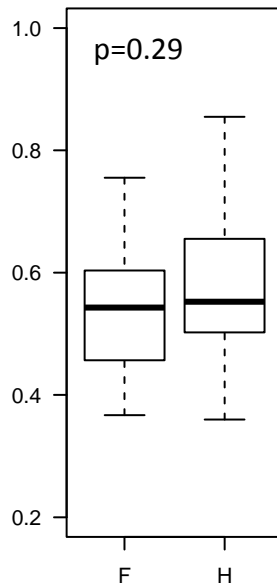
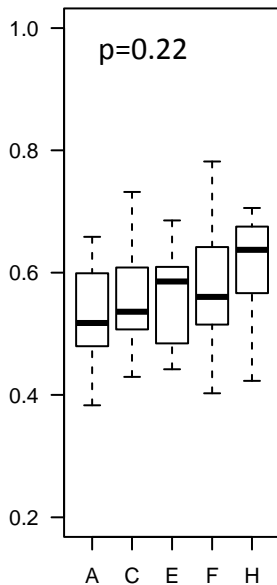
2010

2011

2012

2013

Growth rate (mm/day)



Reach

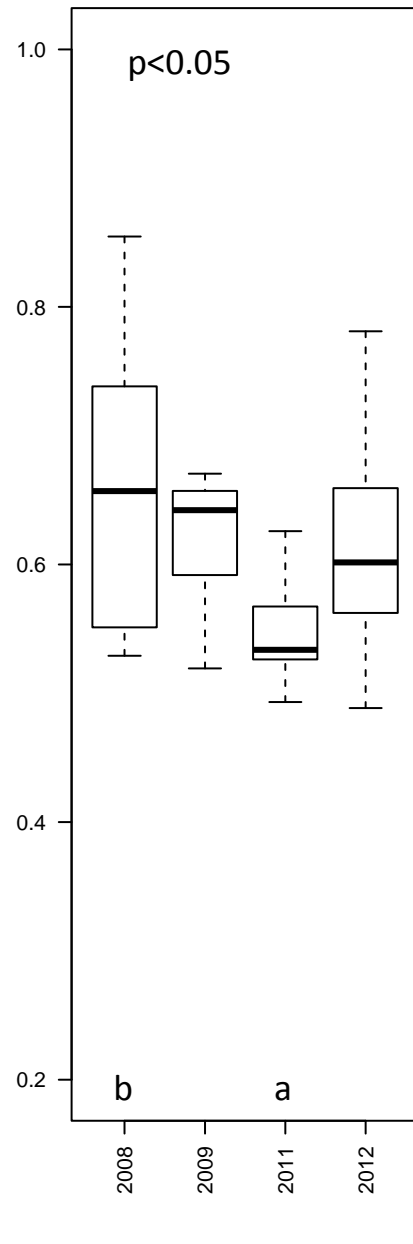
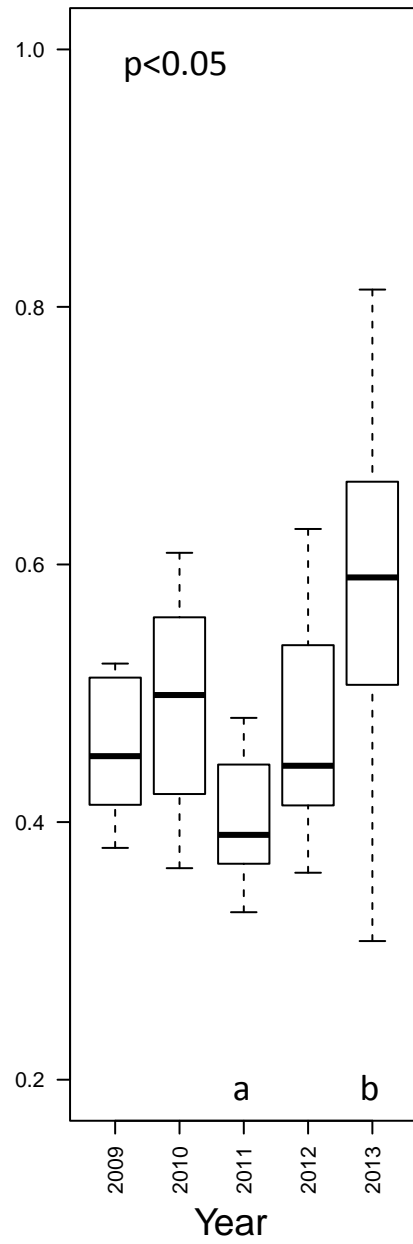
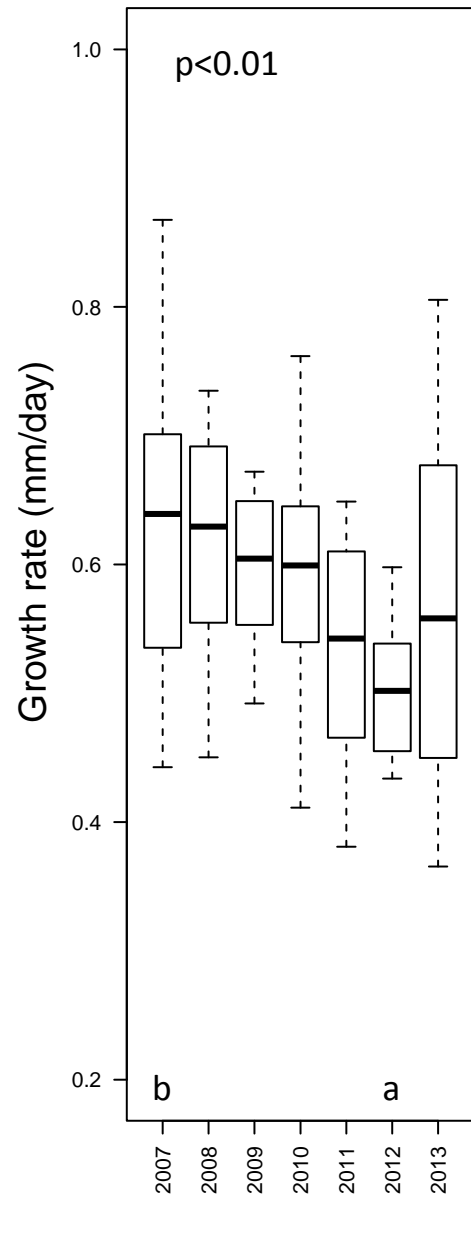
Growth Rate By Reach

Similar pattern; generally higher growth rates for upper reaches

Campbell Slough

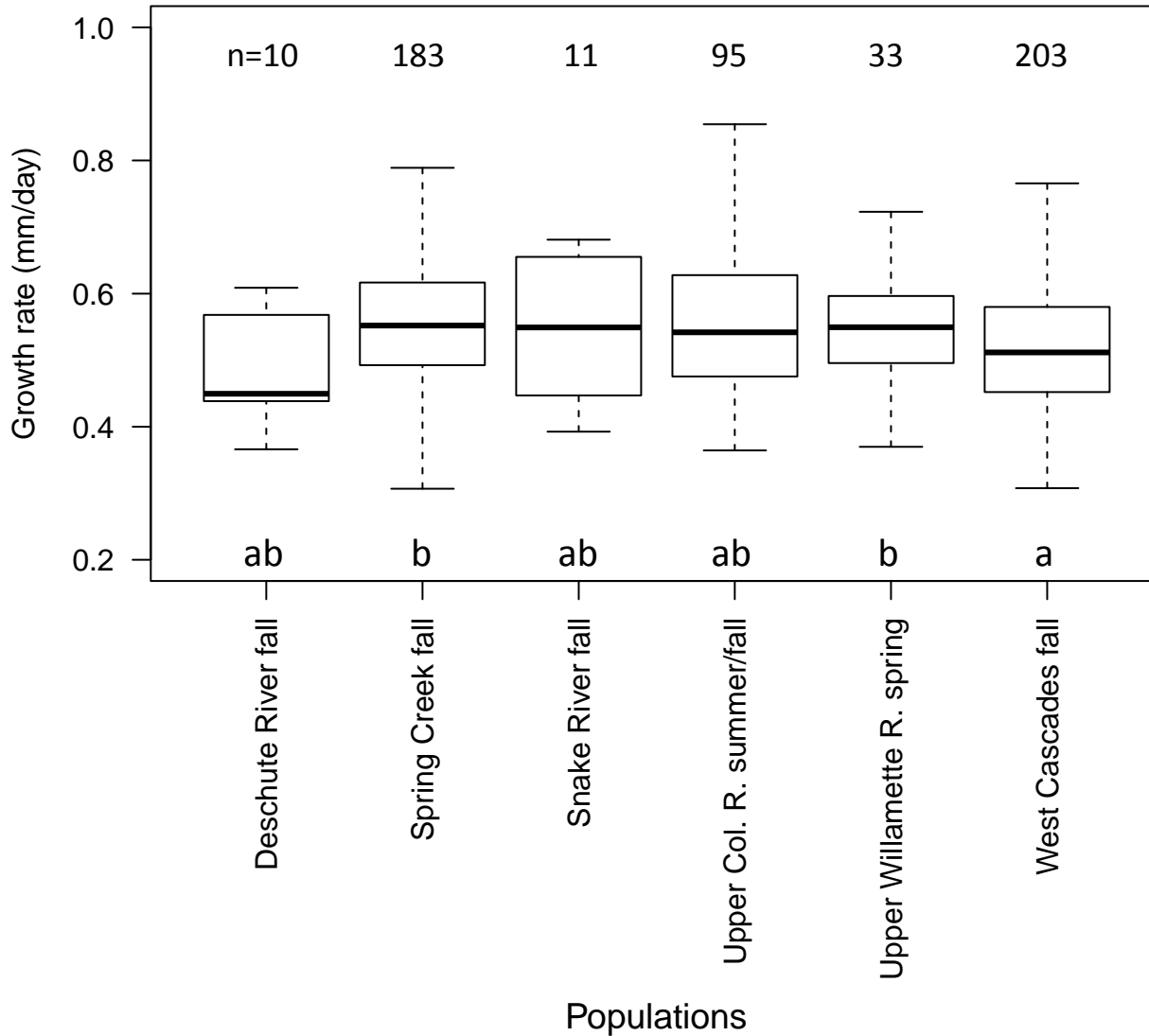
Whites Island

Mirror Lake #1



**Growth Rate
By Year**

**Significant year to
year variability,
but no consistent
increasing or
decreasing trends**



**Growth Rate
By Stock**

**Significant
differences among
stocks; higher
growth rate in
Spring Creek and
Willamette Stocks,
lower in West
Cascades**

Coal Train study sampling sites

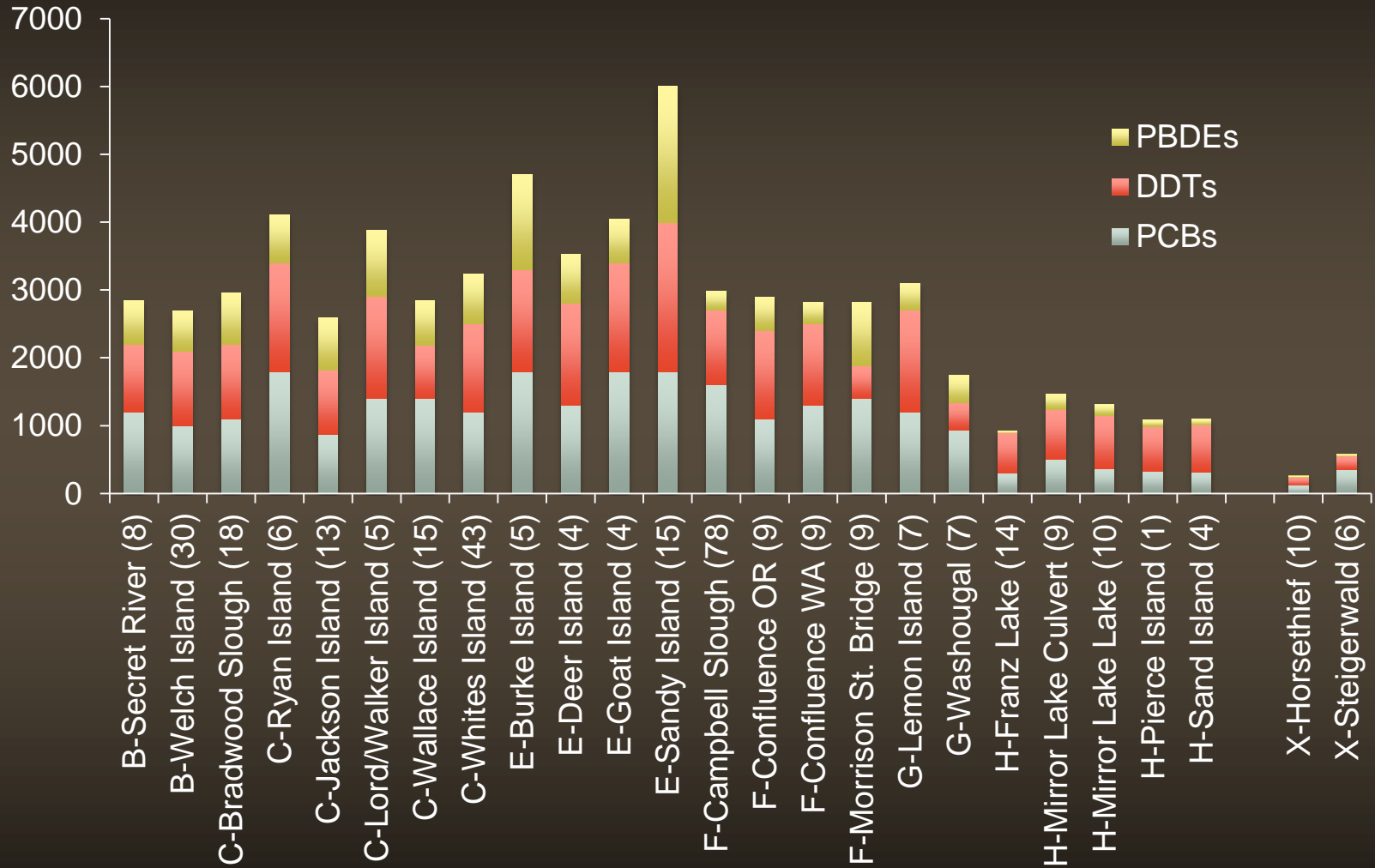


Horsethief
Lake



Steigerwald
Lake

Chinook contaminants – low levels in Columbia Gorge



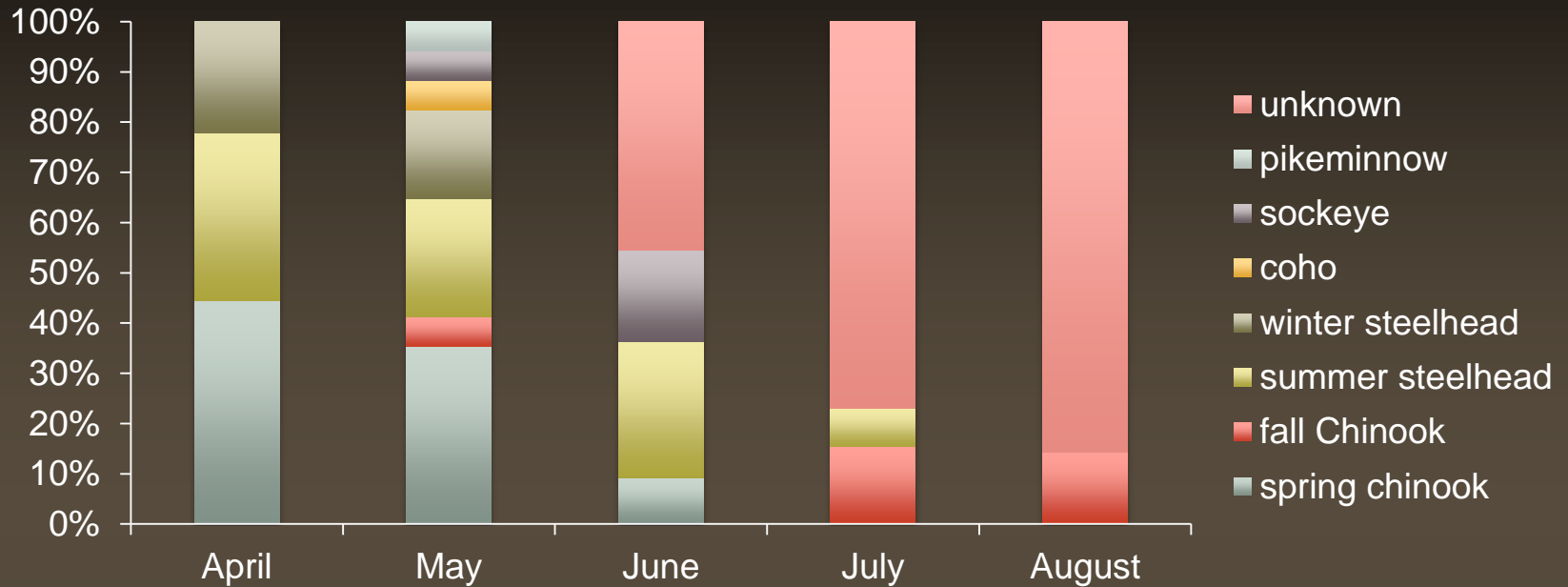
Highlights

- Unusually high water temperatures/drought in 2015
- Associated with shorter period of estuary occurrence and lower catches for Chinook salmon
- Fewer fry at Welch and Whites Island
- Trend toward increasing proportions of unmarked chinook and coho at Franz Lake
- No sockeye or trout in 2015
- Genetic stock composition
 - 2014 generally similar to previous years, but somewhat lower interior stocks
 - Consistent seasonal and spatial patterns of stock occurrence
- Growth rate study
 - Generally higher growth rates in upper reaches
 - Year to year variability in growth rates but no obvious consistent trends
 - Growth rate differences among stocks; Spring creek higher than West Cascades
- Contaminants low in Snake and Upper Columbia River Chinook from Gorge

PIT tag array studies



Horsetail Creek PIT tag array data



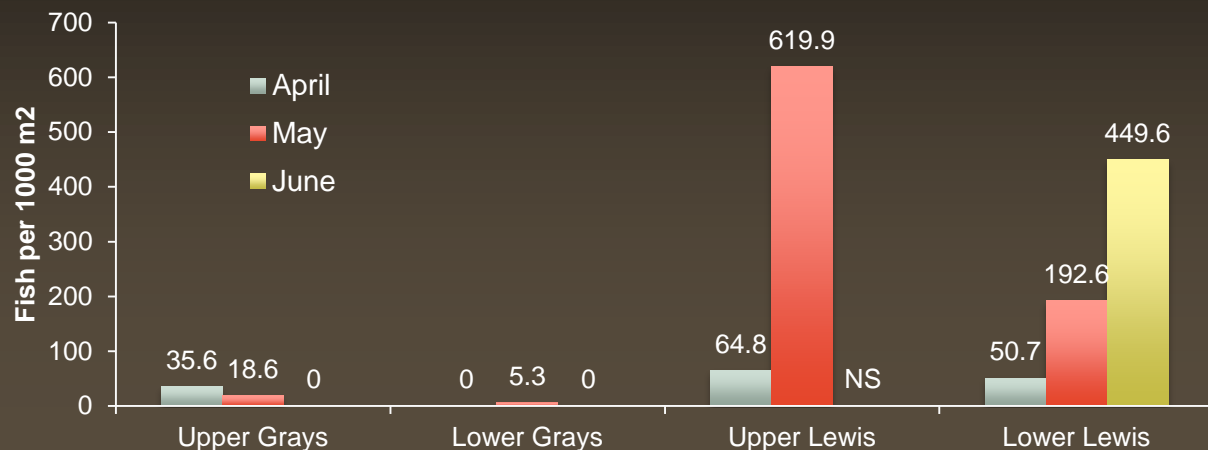
- Total of 54 detects between April and October
- A variety of stocks using the site, including chinook, sockeye, coho, and steelhead
- Majority are juveniles; more than in past years
- More navigating through the culvert than in past years
- Most detected over a day or so, a few in the area for 2 or more weeks

Chinook occurrence in tributaries



Chinook occurrence in tributaries

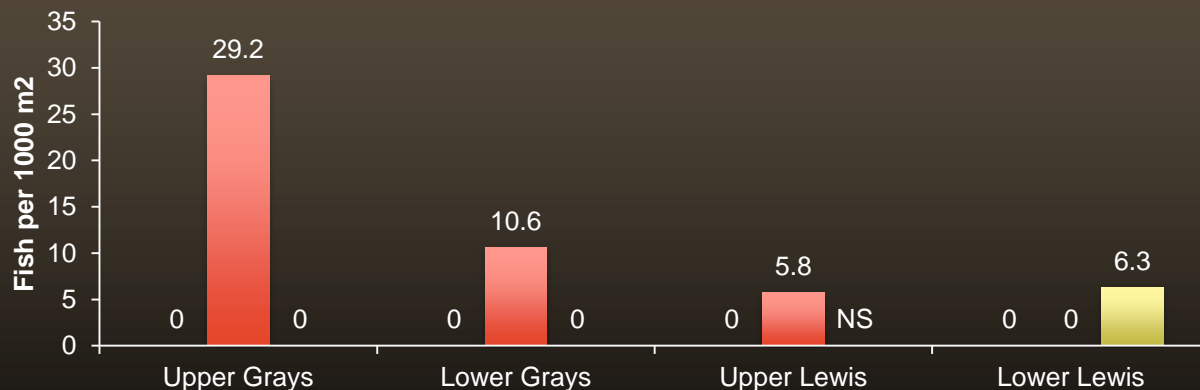
Unmarked Chinook salmon



No marked salmon at any site

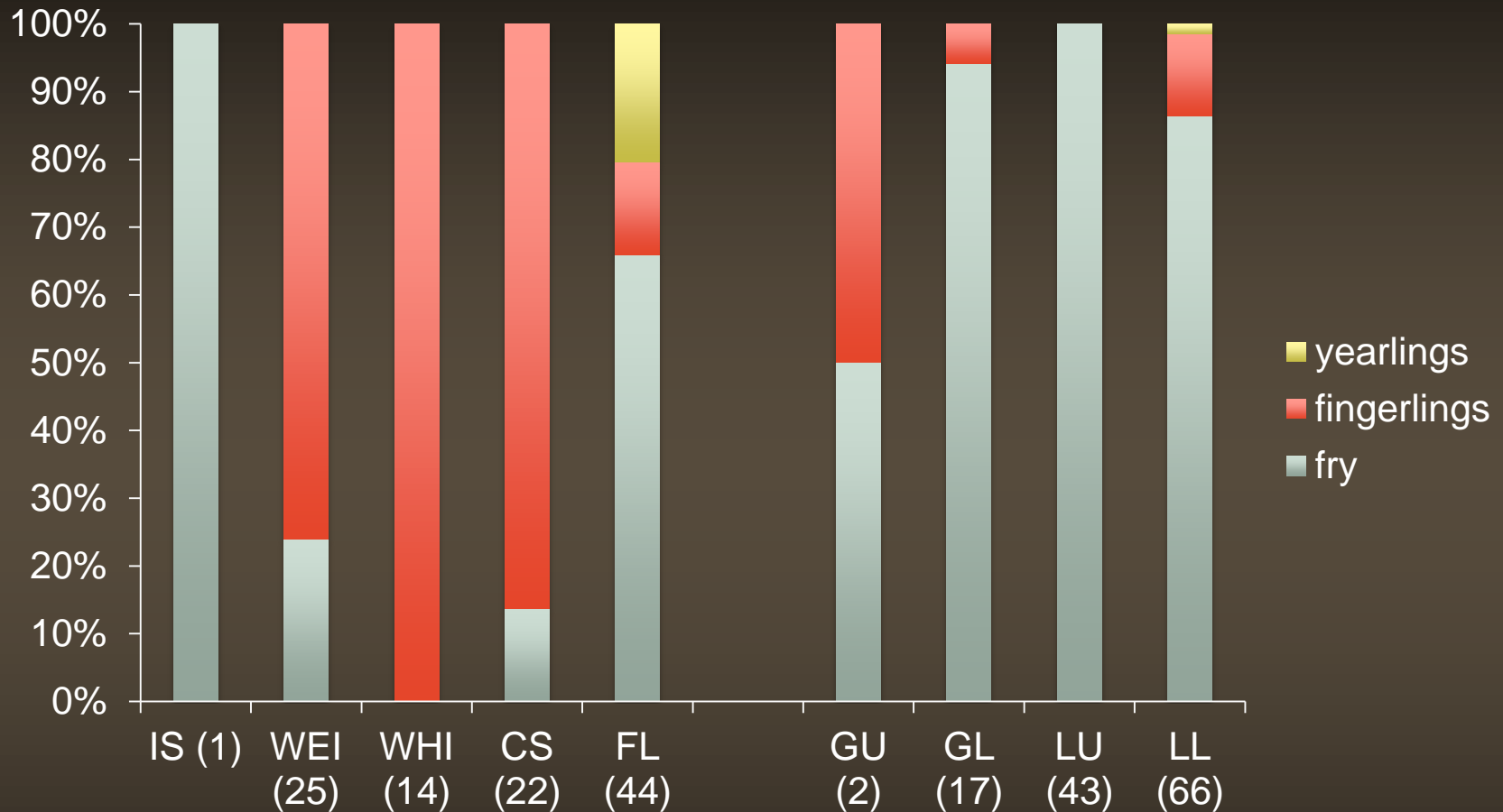
Sites used by both chinook and coho salmon

unmarked coho salmon



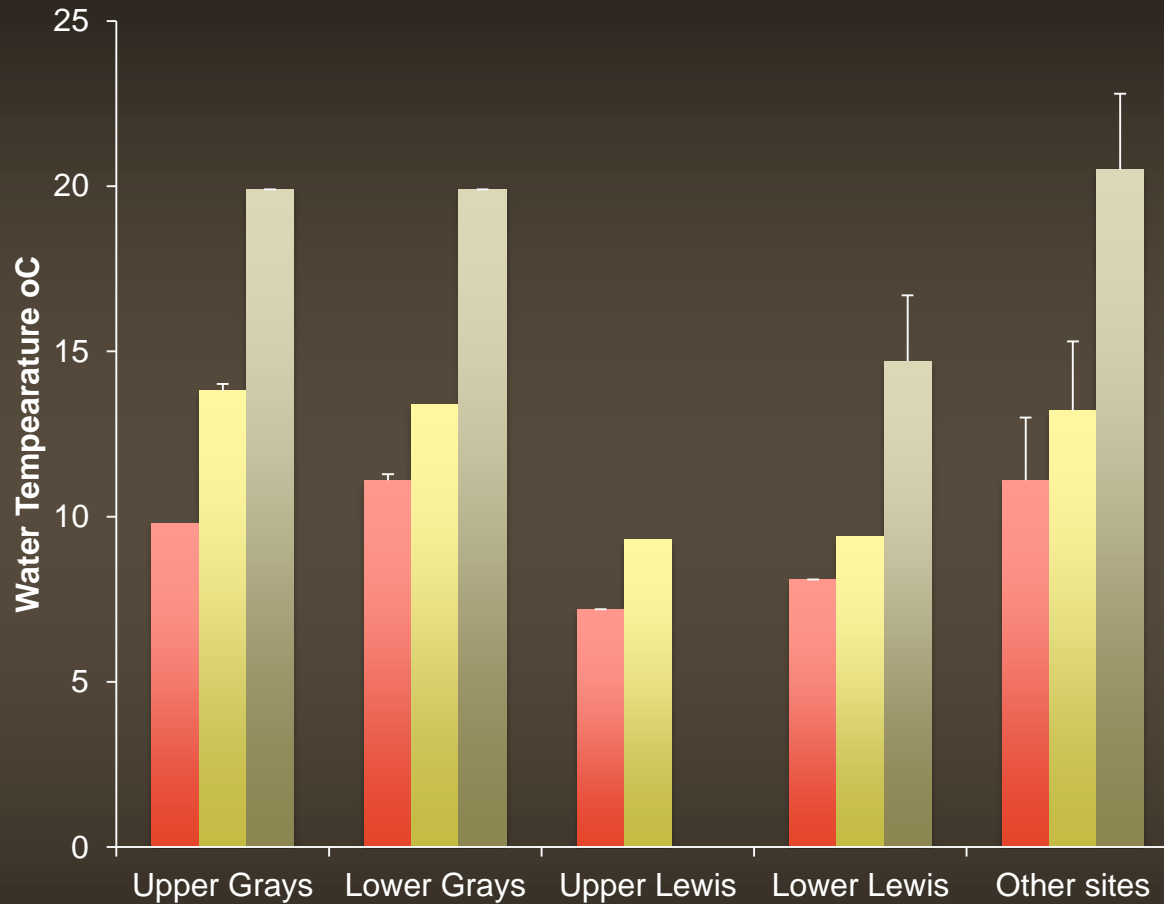
Chum (not shown) found only in Upper Grays in April

Chinook size classes in tributaries



High proportion of fry as compared to river sites; suggests may be of local origin

Water temperatures in tributaries



- Water temperatures at Grays River similar to those at other sites
- Water temperatures in the Lewis River lower

A scenic landscape featuring a dense forest of tall, thin trees with bare branches, reflecting in a calm body of water. The background shows distant mountains under a pale sky. The text "Questions??" is overlaid in the center in a large, white, sans-serif font.

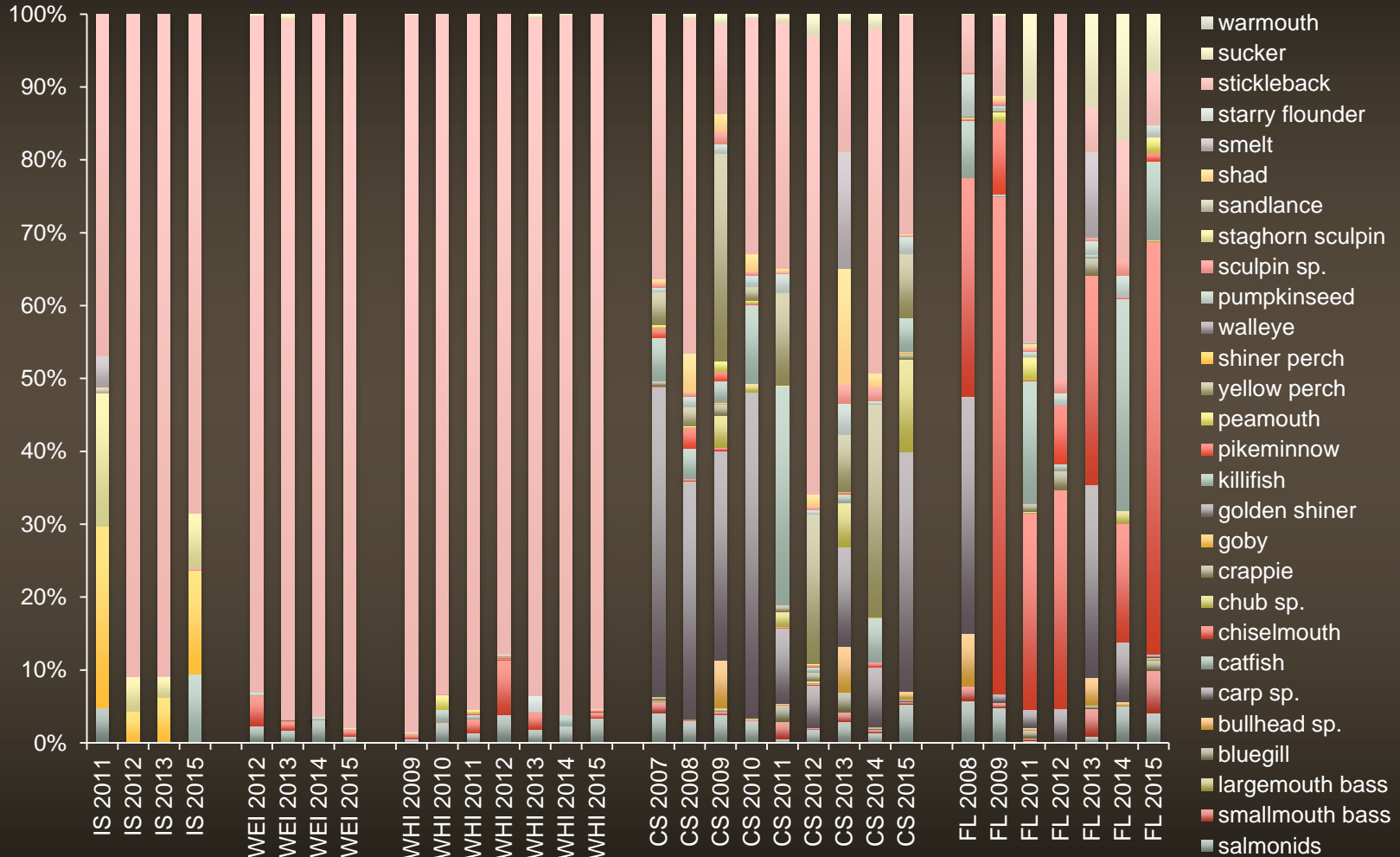
Questions??

Extra slides

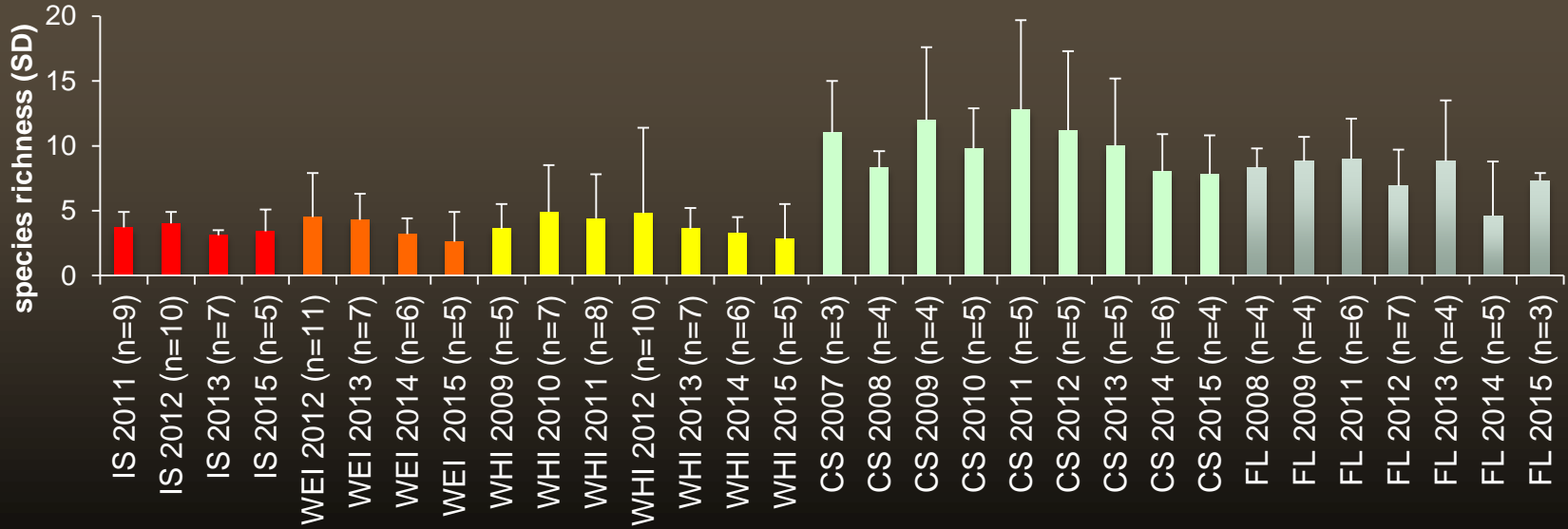
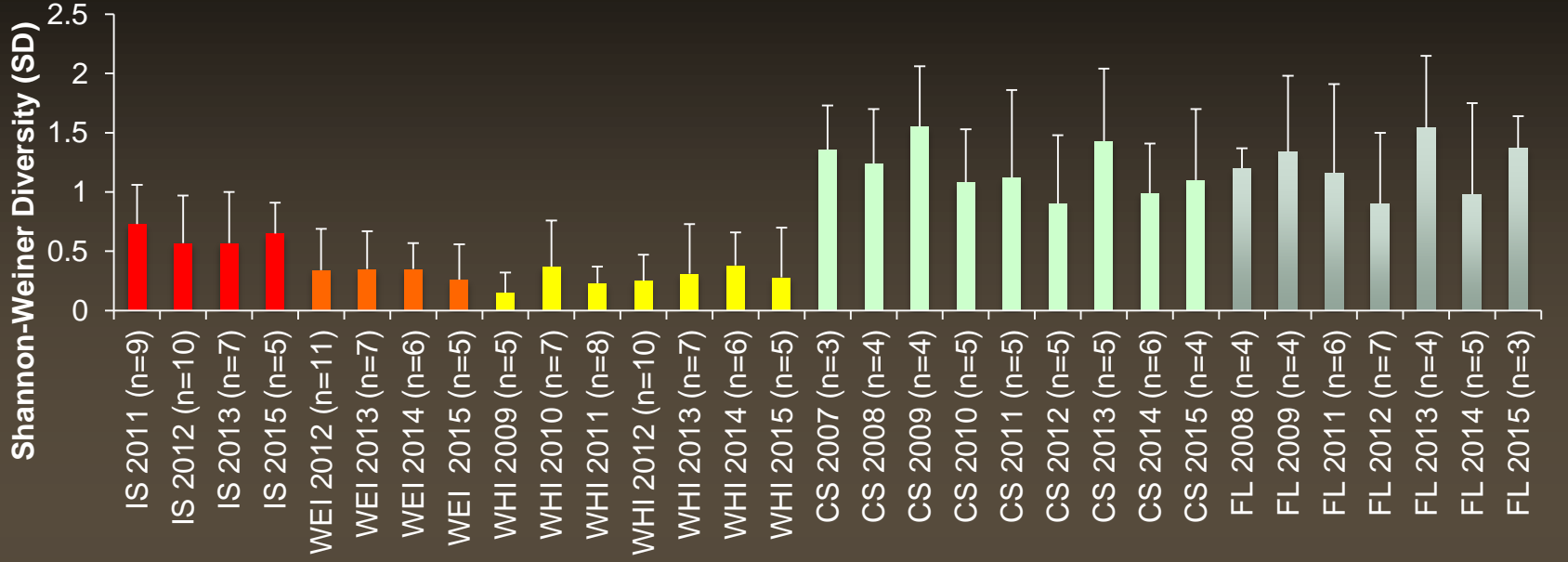


Fish Community Characteristics

Fish Community Composition

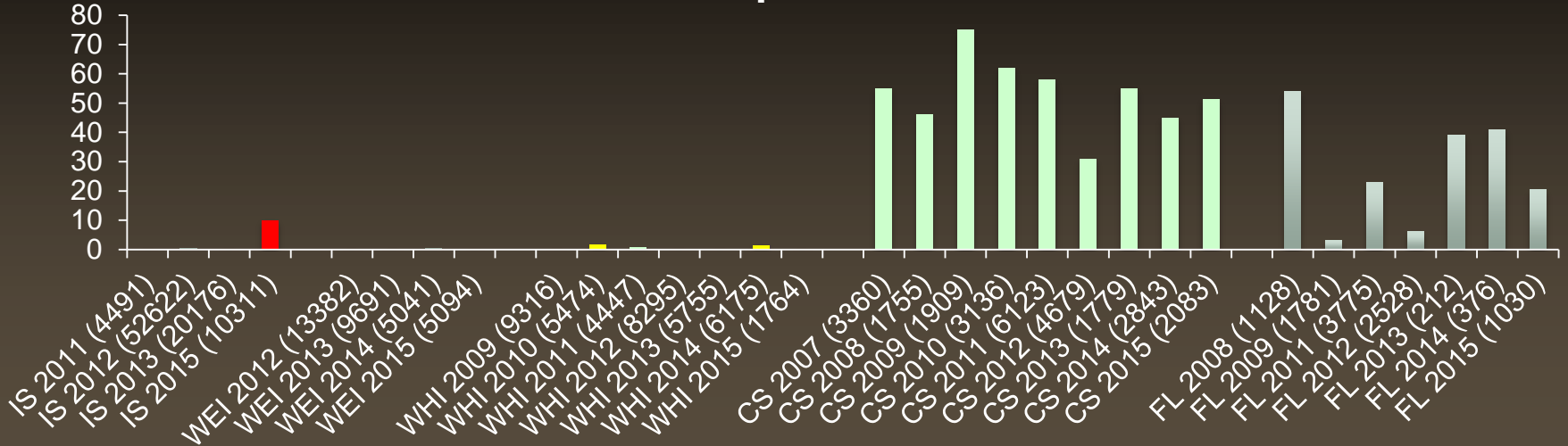


Species diversity and richness – temporal trends



Non-native and predatory fish – temporal trends

% non-native species in catch



% predatory fish in catch

