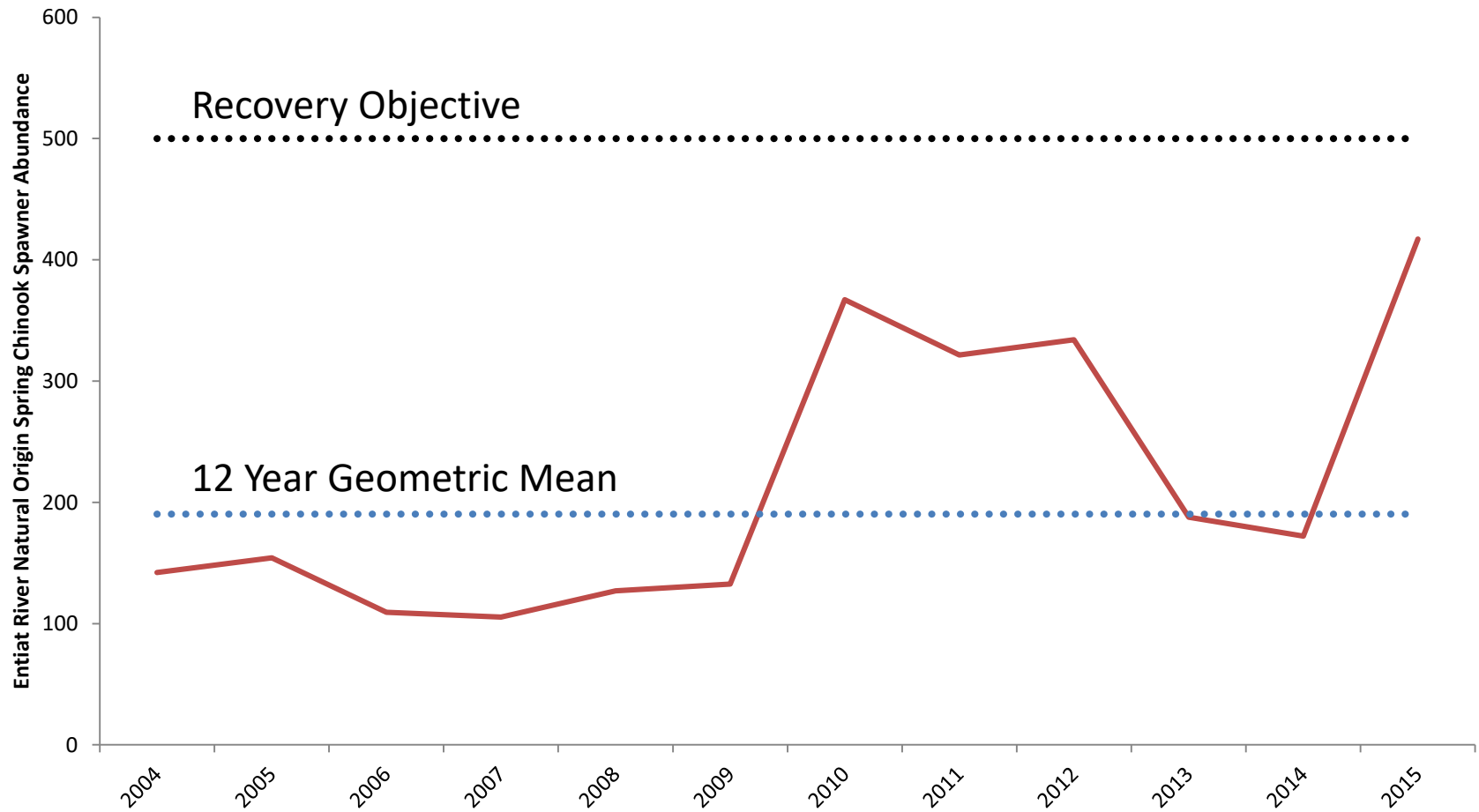


# Entiat spring Chinook Response to Recovery Efforts



# What is Life-History Diversity?

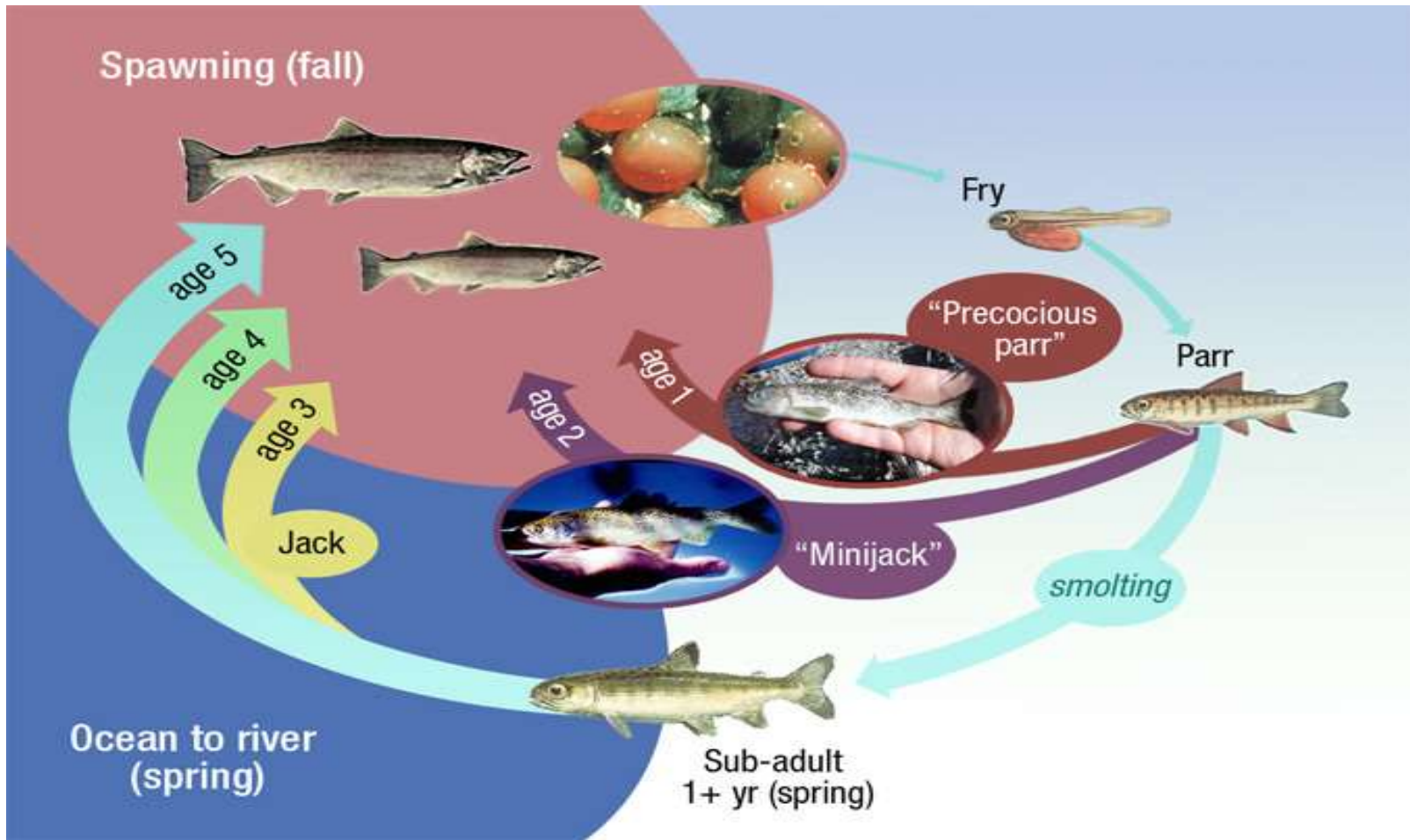
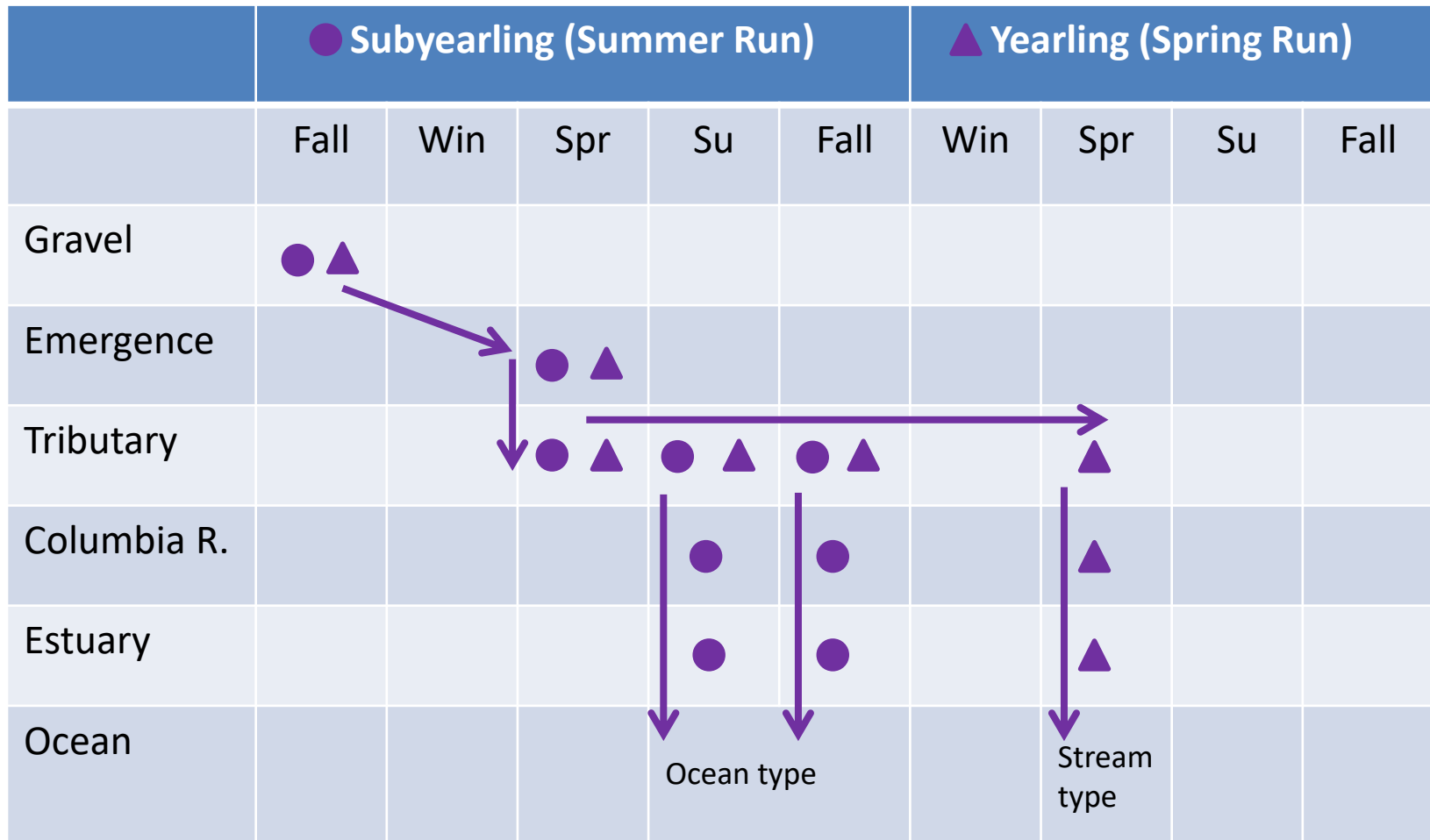
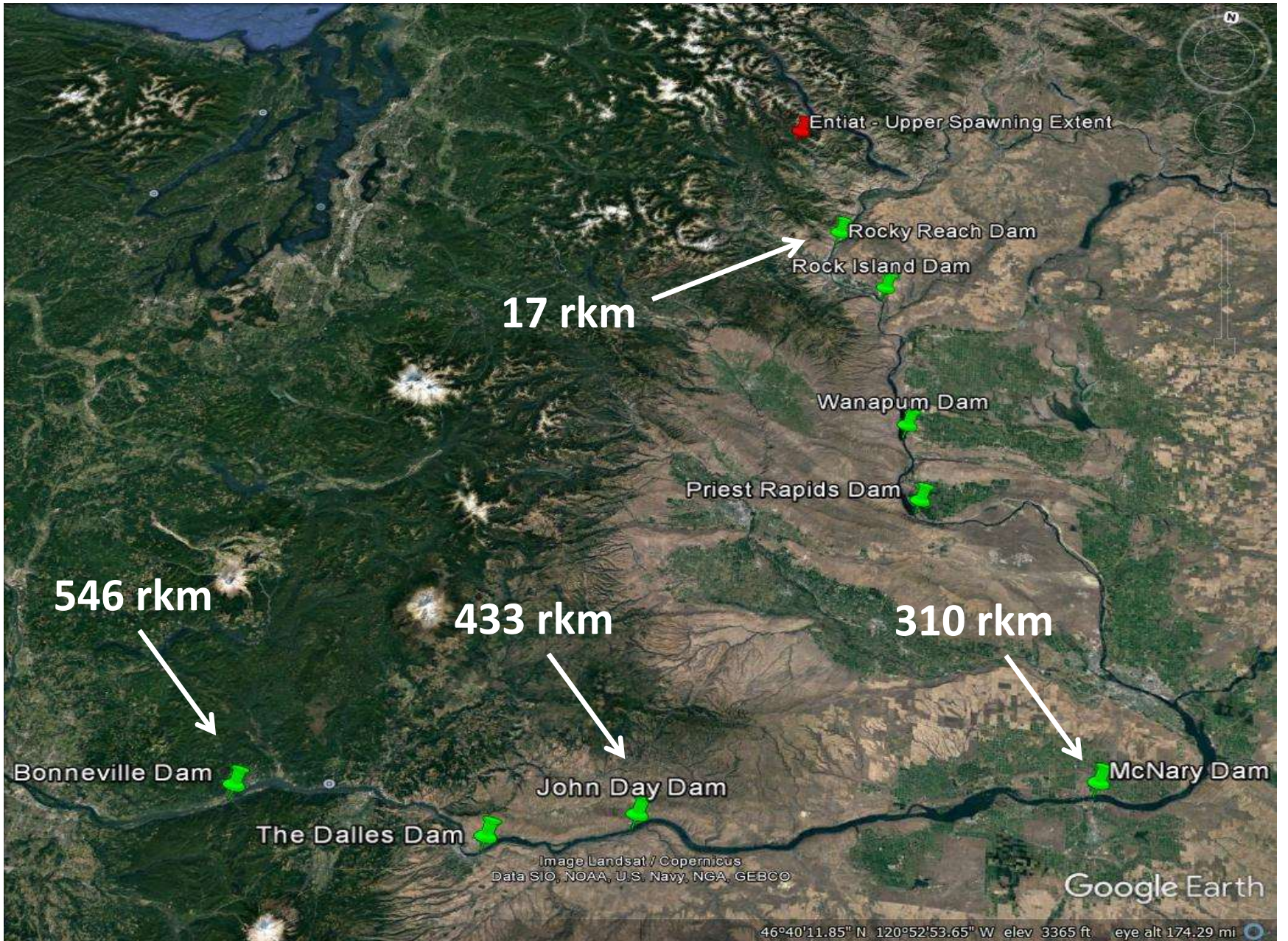


Figure credit: NOAA, Northwest Fishery Science Center

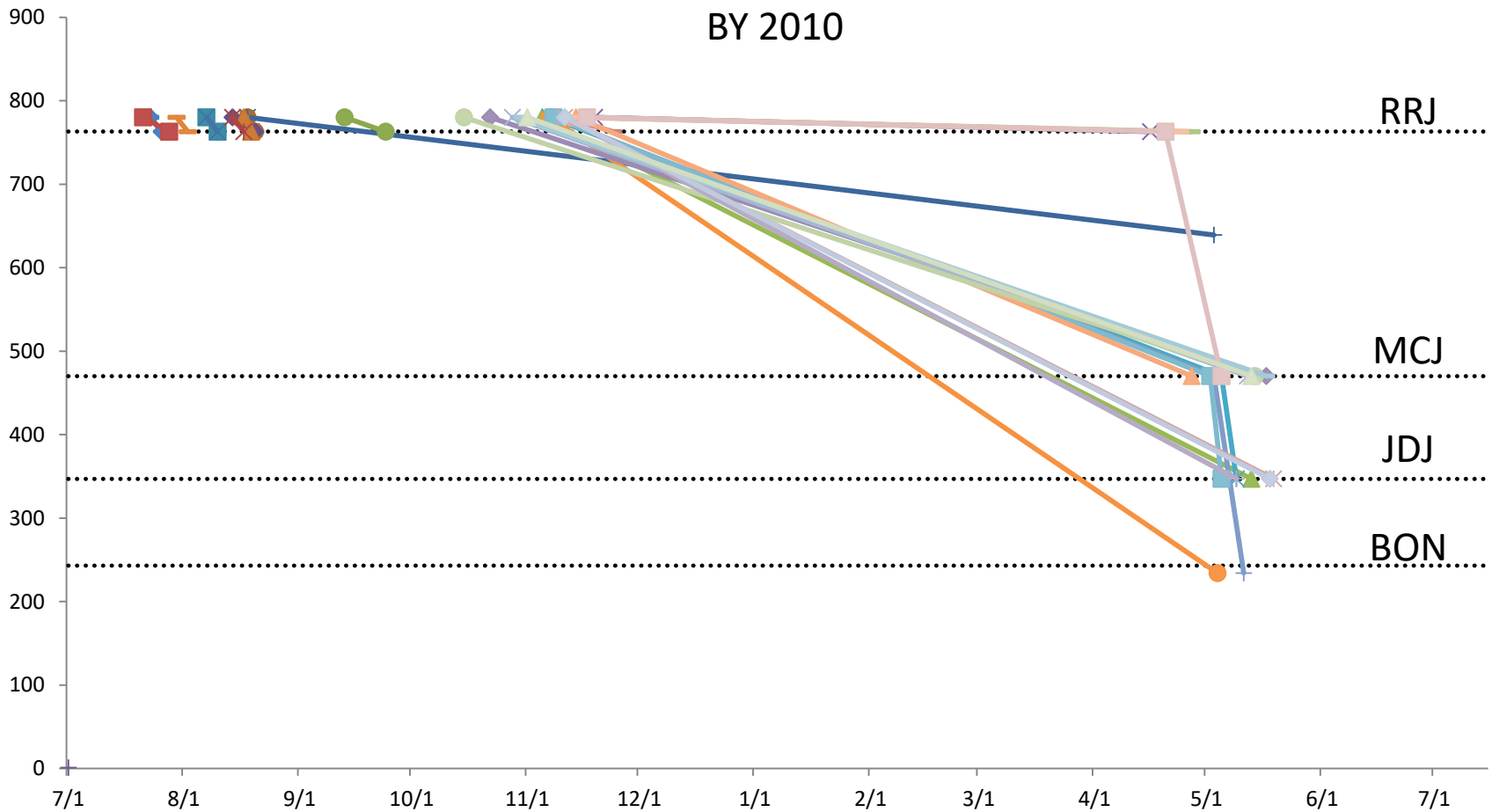
# 'Classic' Life-History Strategies of Upper Columbia Chinook Populations



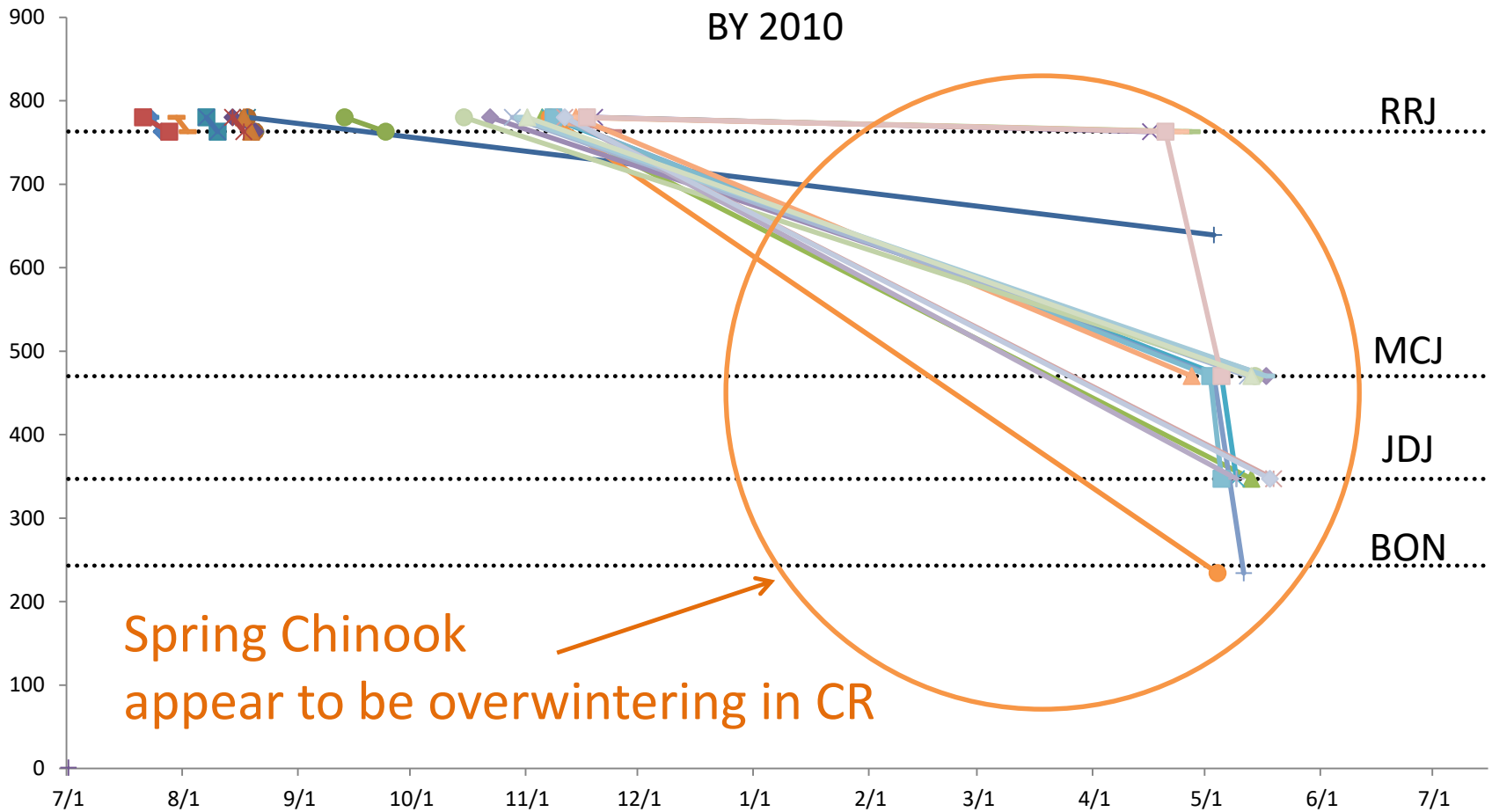
Modified from Bourret et al. (2016)



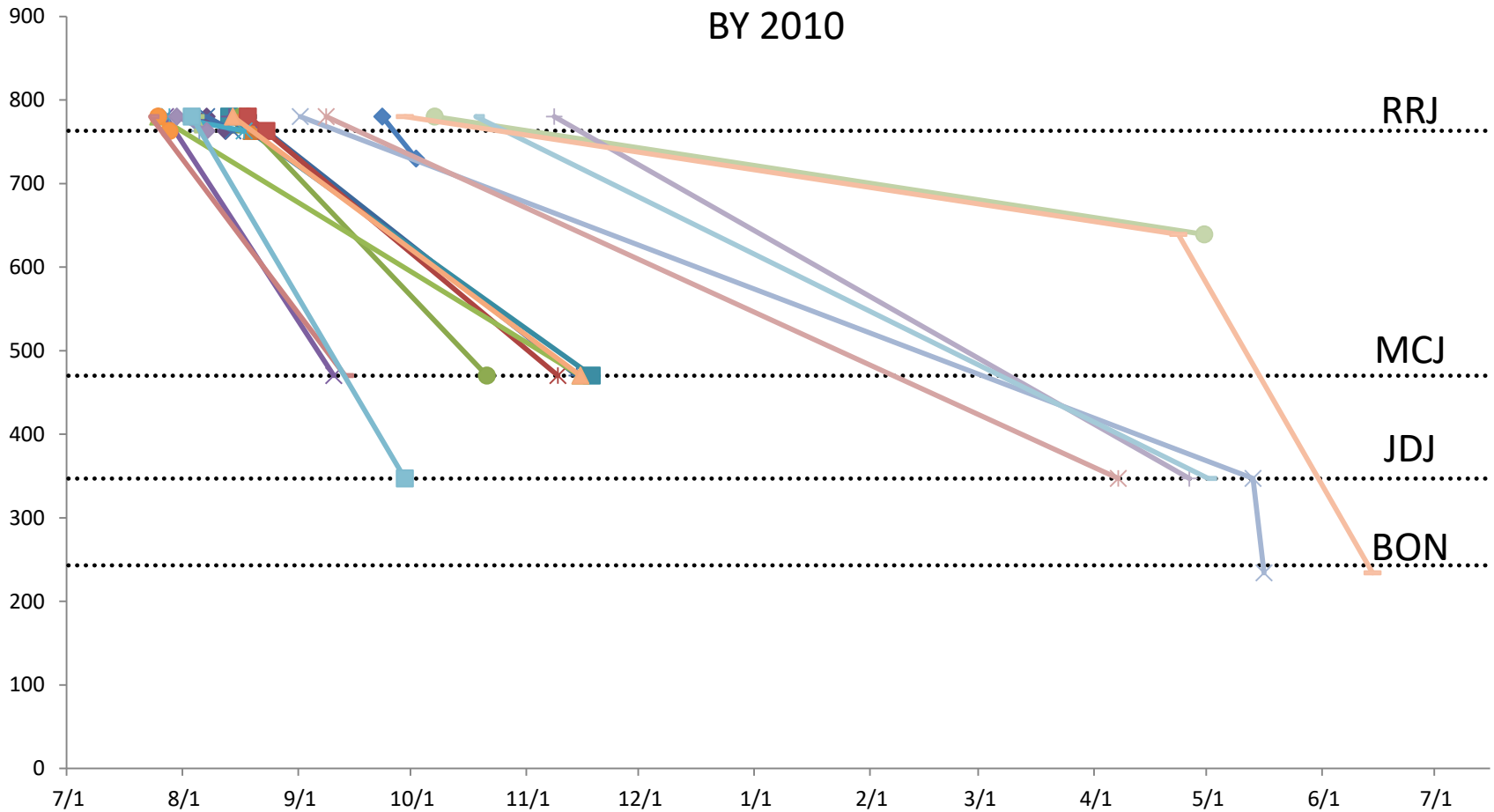
# Subyearling Spring Run Chinook Out-Migrant Movement through the Columbia River Hydrosystem



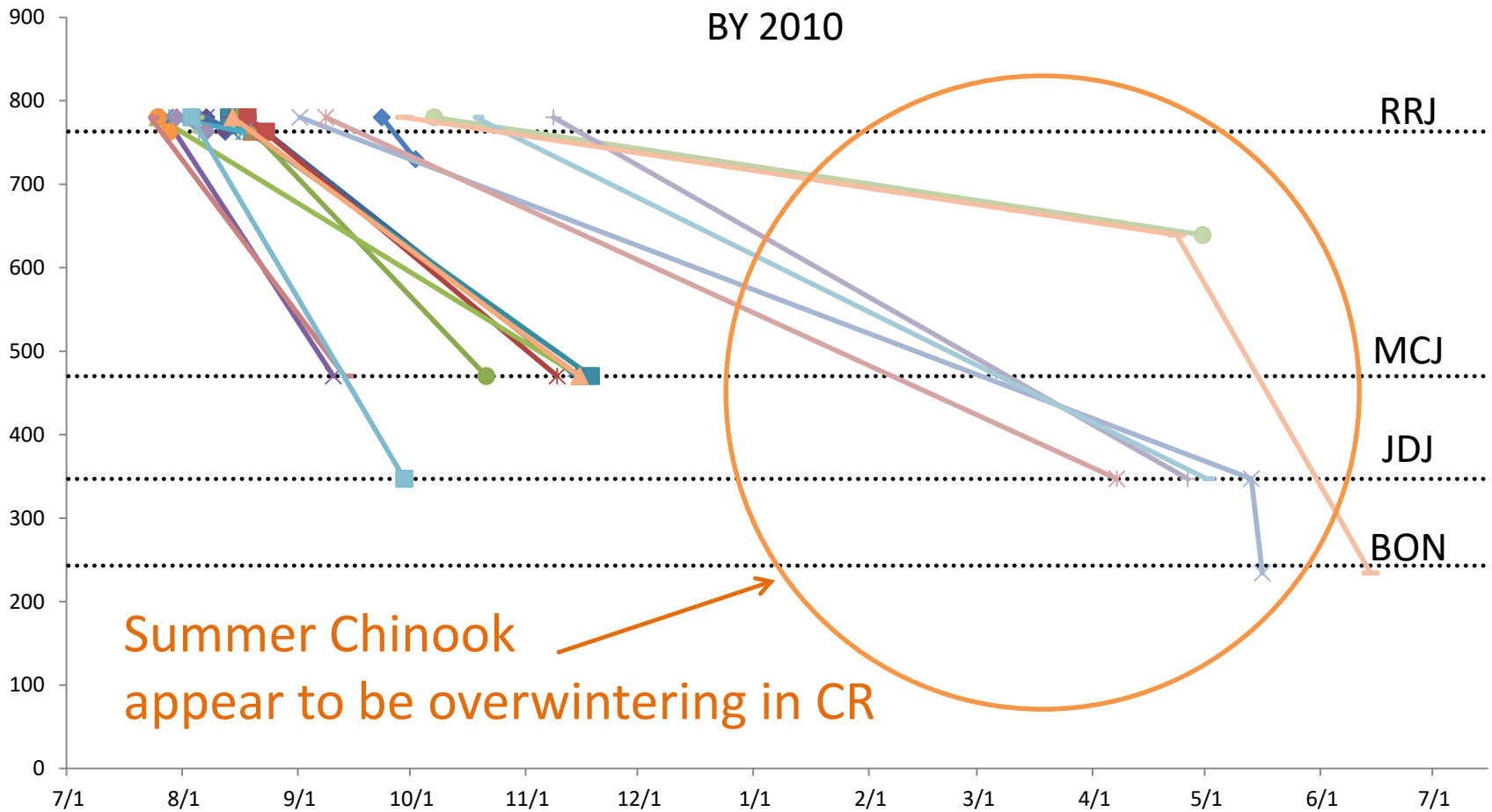
# Subyearling Spring Run Chinook Out-Migrant Movement through the Columbia River Hydrosystem



# Subyearling **Summer Run** Chinook Out-Migrant Movement through the Columbia River Hydrosystem

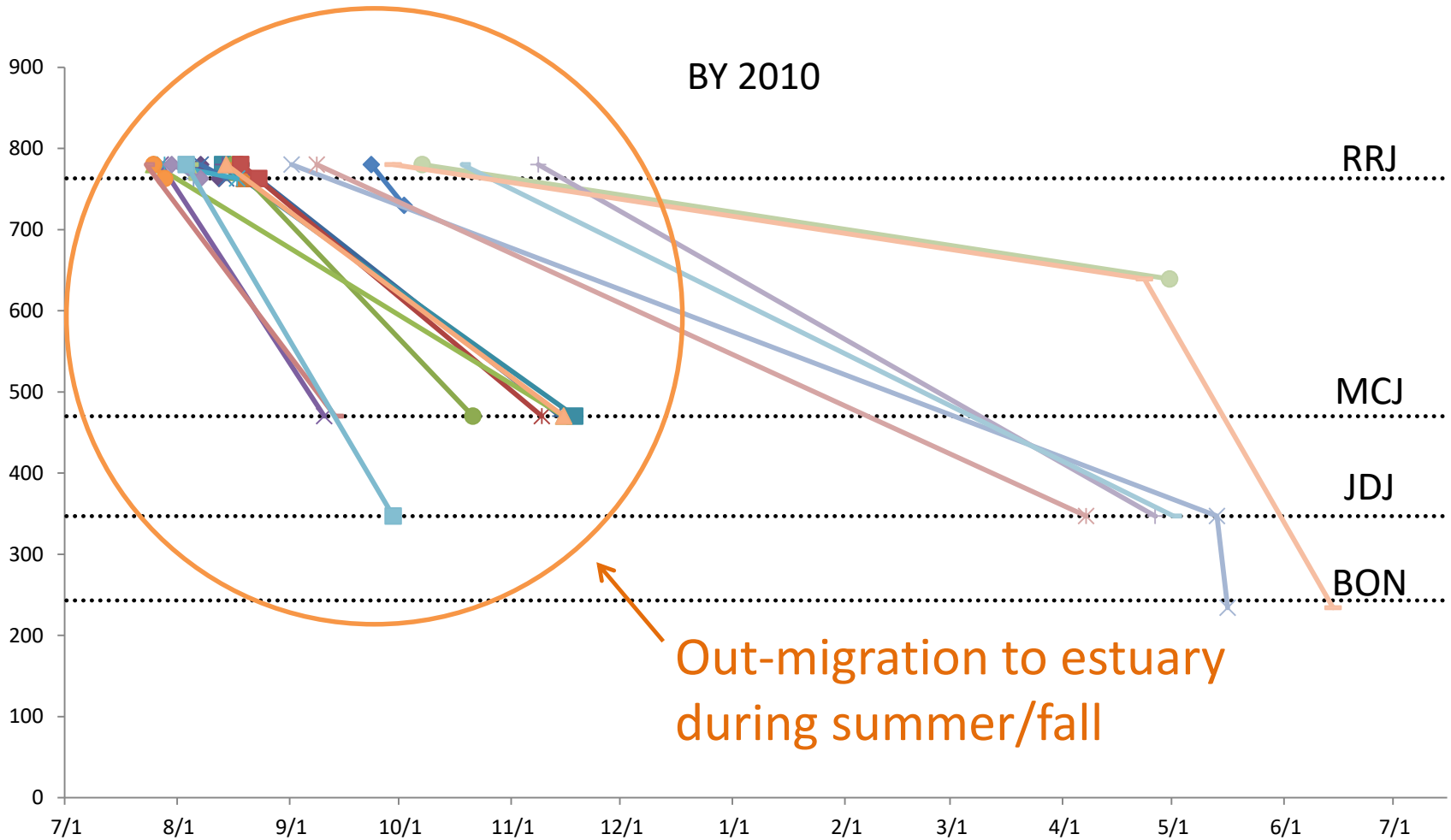


# Subyearling **Summer Run** Chinook Out-Migrant Movement through the Columbia River Hydrosystem

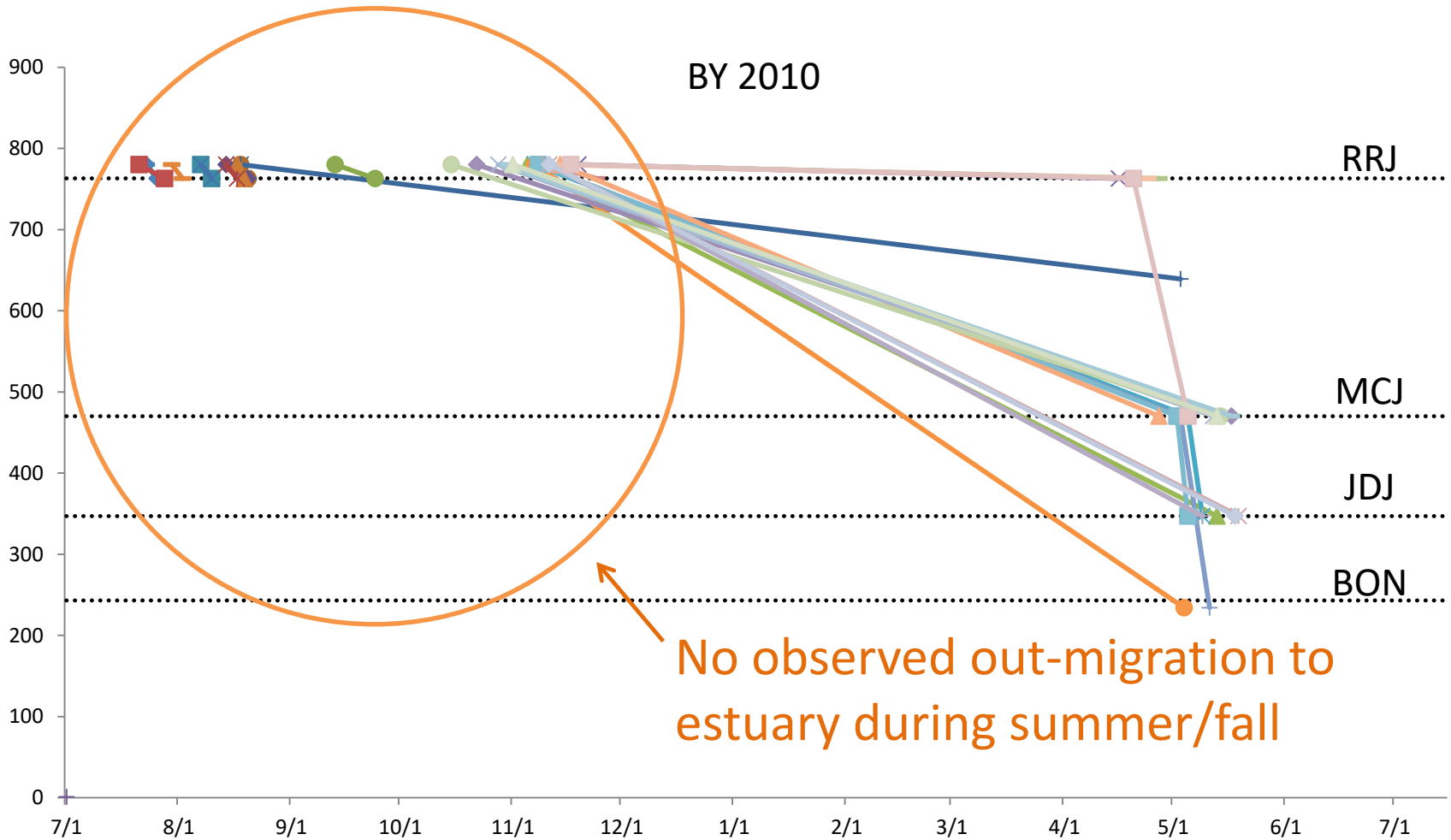




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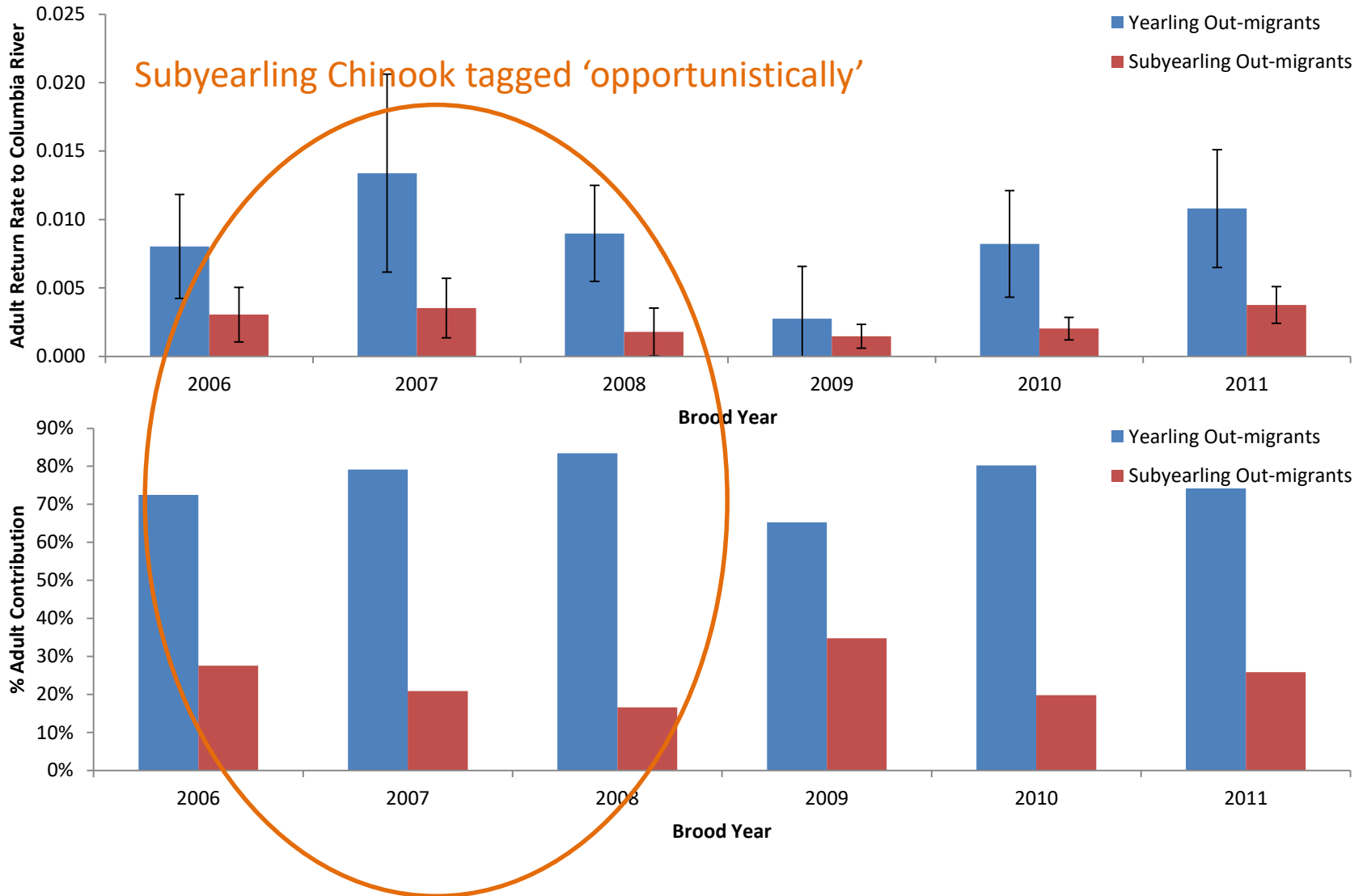
# Subyearling **Spring Run** Chinook Out-Migrant Movement through the Columbia River Hydrosystem



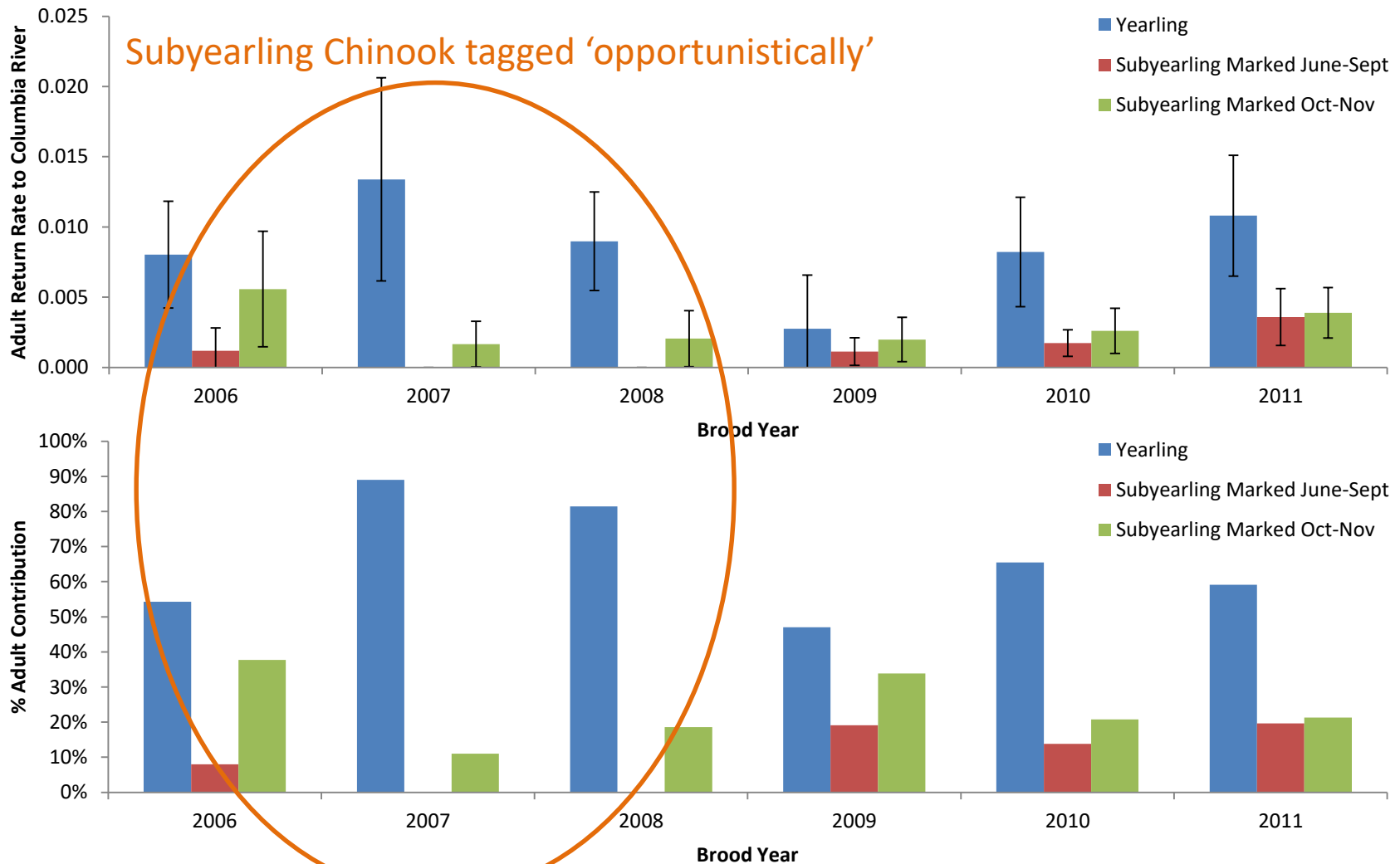
# Current Management of Subyearling Spring Run Chinook within the CR Hydrosystem

*“Limited observation suggests that the residence time of juvenile stream-type spring Chinook salmon in the Rocky Reach Project Reservoir is no more than a few days to a week because these fish use the Columbia River only as a navigation route, not rearing habitat (Chelan PUD, 1991). Therefore, it is assumed that stream-type spring Chinook juveniles are not using the project reservoir for extended rearing, but are migrating actively while in the reservoir.”*

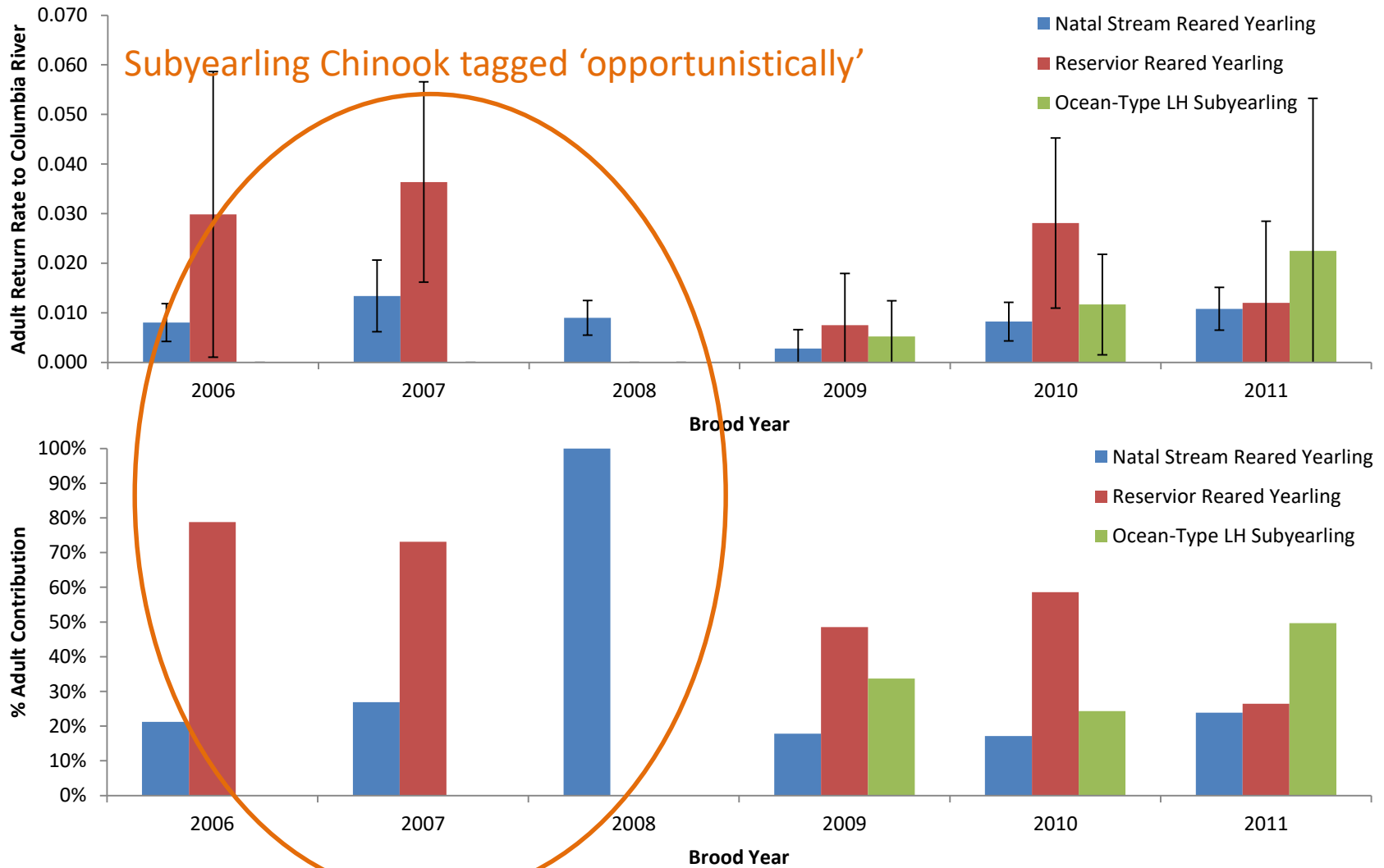
# How Do Observed Life-Histories Contribute to Spawning Populations?



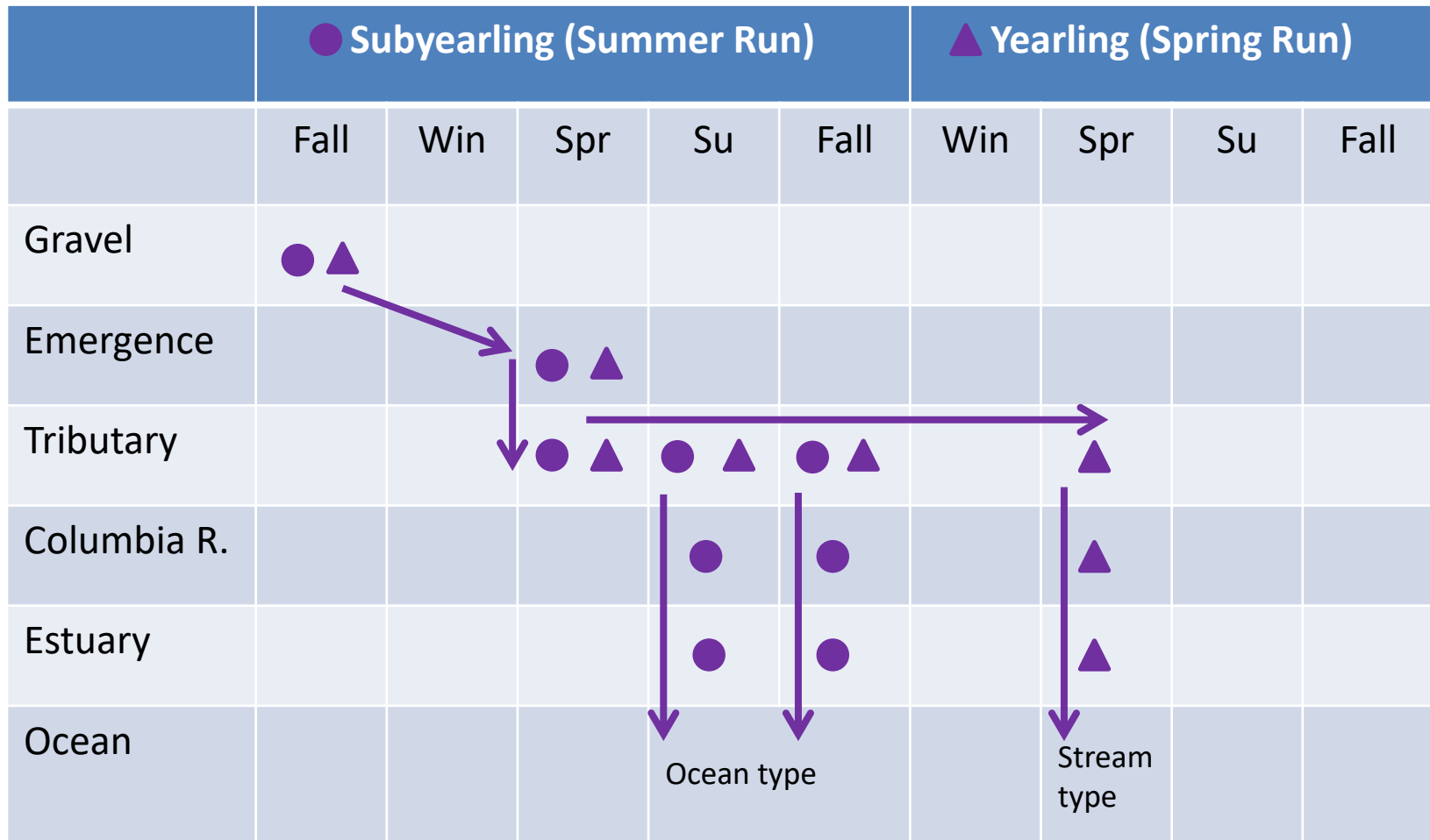
# Subyearling Chinook Life-History Strategies Beyond the Entiat



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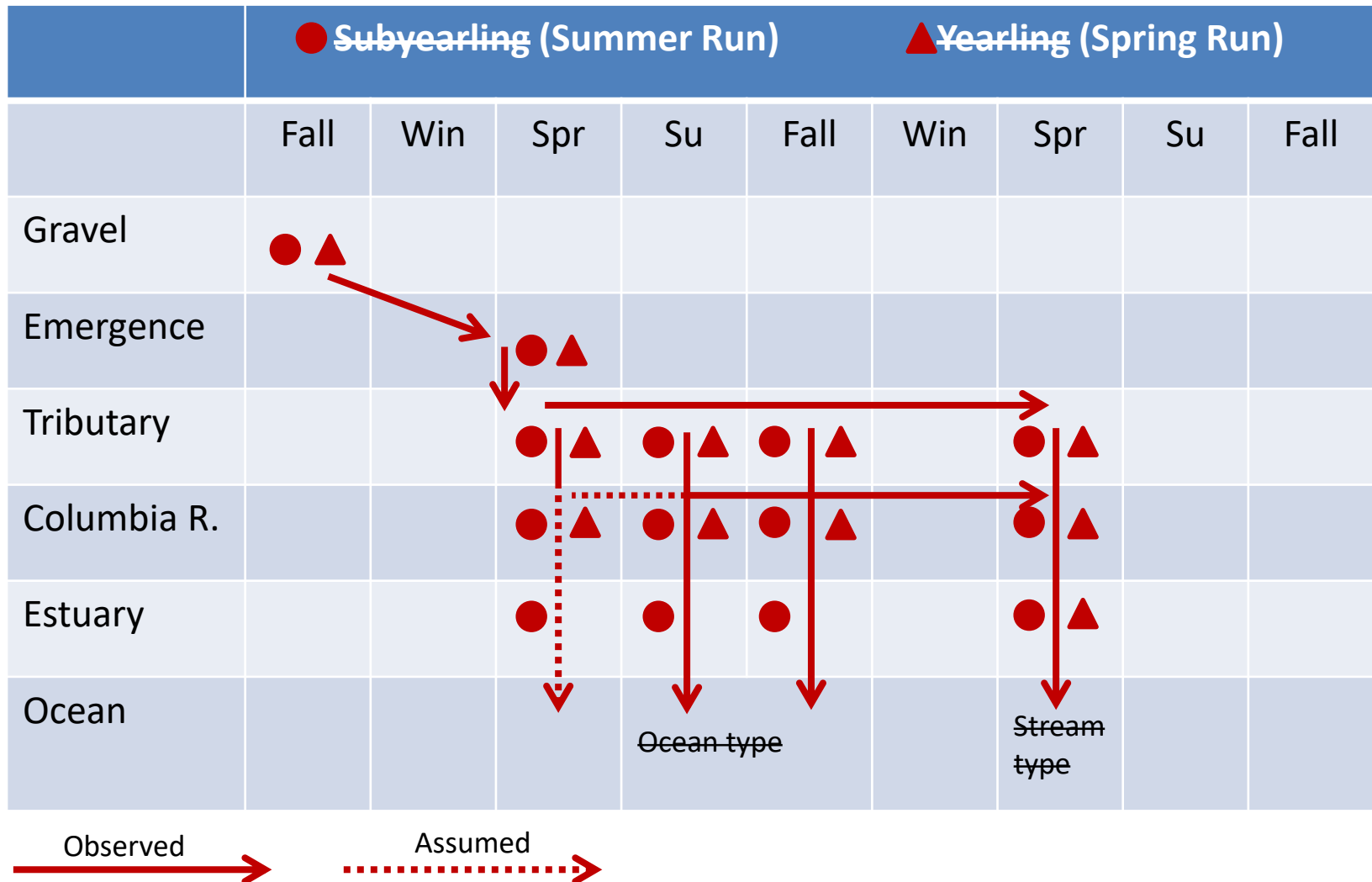


# 'Classic' Life-History Strategies of Upper Columbia Chinook Populations



Modified from Bourret et al. (2016)

# Observed Life-History Strategies of Entiat River Chinook





# Key Points

- I. Subyearling outmigrants may represent a larger, more important life-history pathway than previously thought.
  - Outmigration from the Entiat River may be nearly continuous representing fry-smolt life-stages.

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- II. Overwinter rearing location is not limited to the Entiat River.
  - Genetic analysis coupled with PIT tag detection histories have documented spring Chinook reservoir rearing.
  - Management of Mid- and Upper-Columbia River Hydroelectric facilities currently do not account for ESA listed spring Chinook utilizing project areas for extended rearing.

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- III. Additional analysis needed.
  - Are observations of reservoir rearing reflective of long term population trend or merely a ‘hicup’?
  - Impacts to population fitness/productivity?