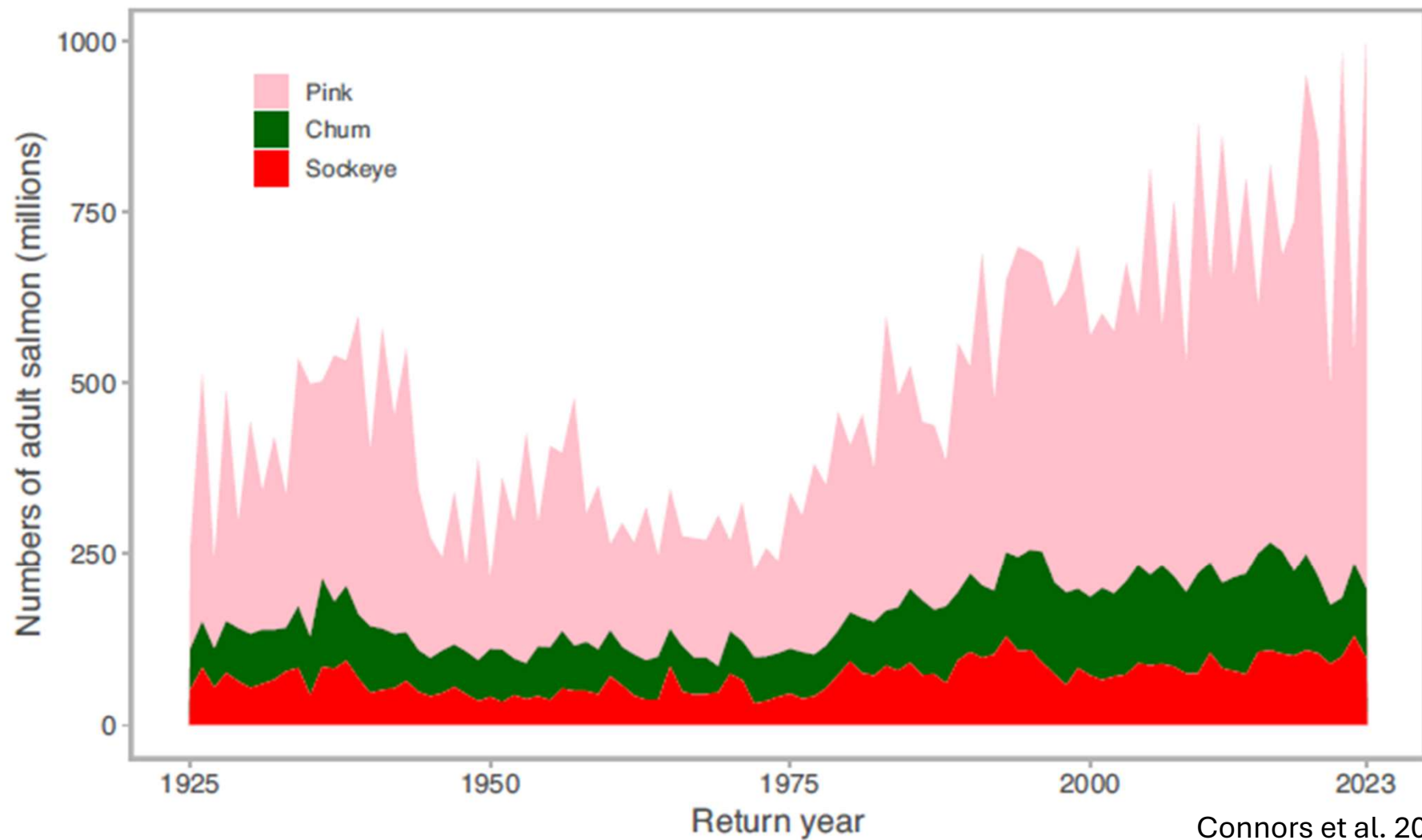




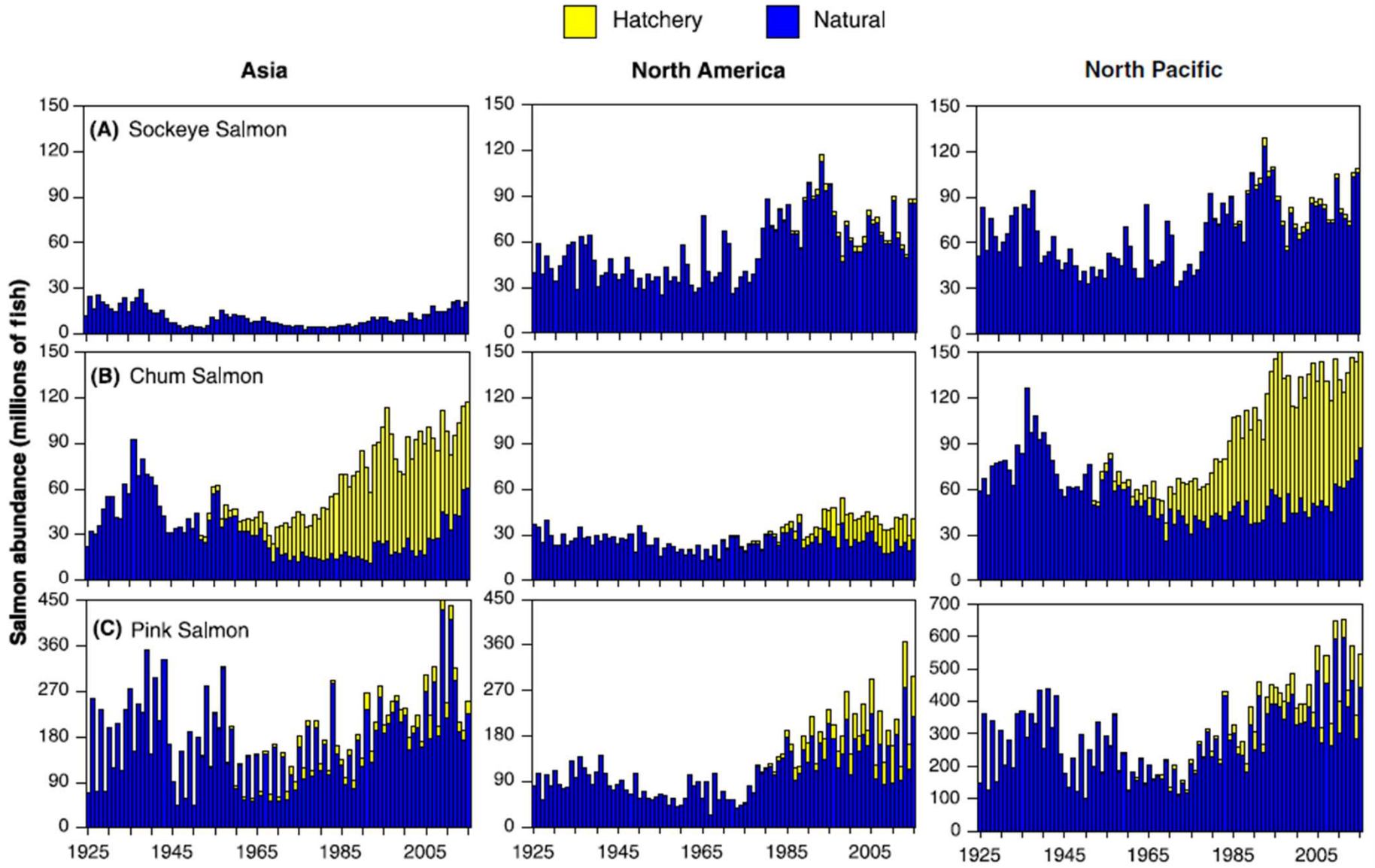
# Effects of Pink Salmon in the Pacific Ocean -Real and Hypothesized-

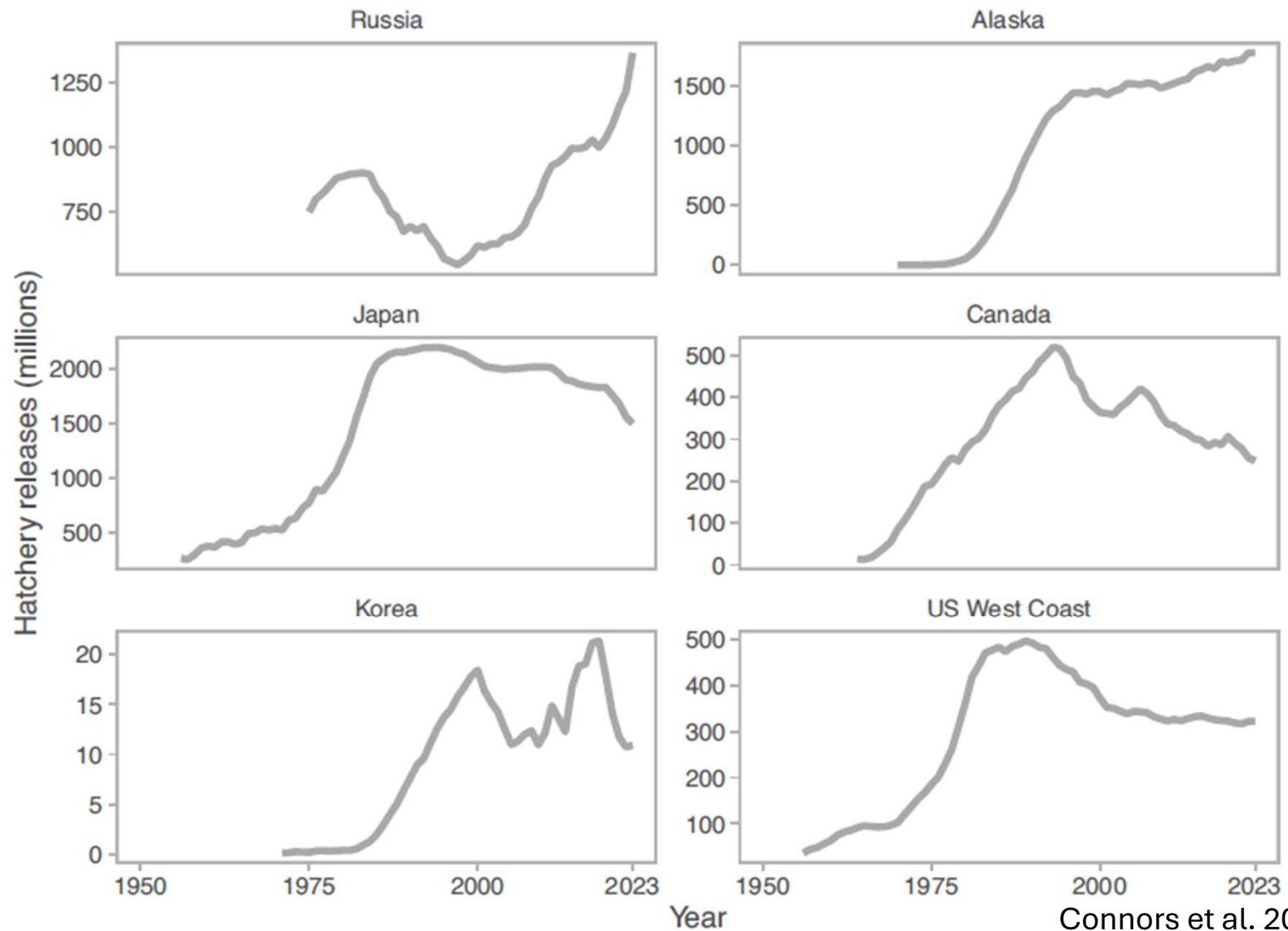
Nick Chambers  
The Conservation Angler  
Dec. 2025





Connors et al. 2025





Connors et al. 2025

## A global synthesis of peer-reviewed research on the effects of hatchery salmonids on wild salmonids

John R. McMillan<sup>1</sup> | Brian Morrison<sup>2</sup> | Nick Chambers<sup>3</sup> | Greg Ruggerone<sup>4</sup> |  
Louis Bernatchez<sup>5</sup> | Jack Stanford<sup>6</sup> | Helen Neville<sup>1</sup>

- Reviewed 23 studies on effects of hatchery salmonids in ocean
- Effects primarily ecological – competition for food
- 13 studies focused on local effects
  - 9 adverse (69%)
  - 1 minimally adverse (8%)
  - 3 no effect (23%)

## A global synthesis of peer-reviewed research on the effects of hatchery salmonids on wild salmonids

John R. McMillan<sup>1</sup> | Brian Morrison<sup>2</sup> | Nick Chambers<sup>3</sup> | Greg Ruggerone<sup>4</sup> |  
Louis Bernatchez<sup>5</sup> | Jack Stanford<sup>6</sup> | Helen Neville<sup>1</sup>

- Reviewed 23 studies on effects of hatchery salmonids in ocean
- Effects primarily ecological – competition for food
- Declines in growth and productivity common effect of density dependence
- Numerous additional studies document density dependence at sea

# Hatchery effects or Shifting Ocean?

## **Factors influencing wild smolt abundance**

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- Density dependence
- Food availability
- Weather/Climate

## **Factors influencing hatchery smolt abundance**

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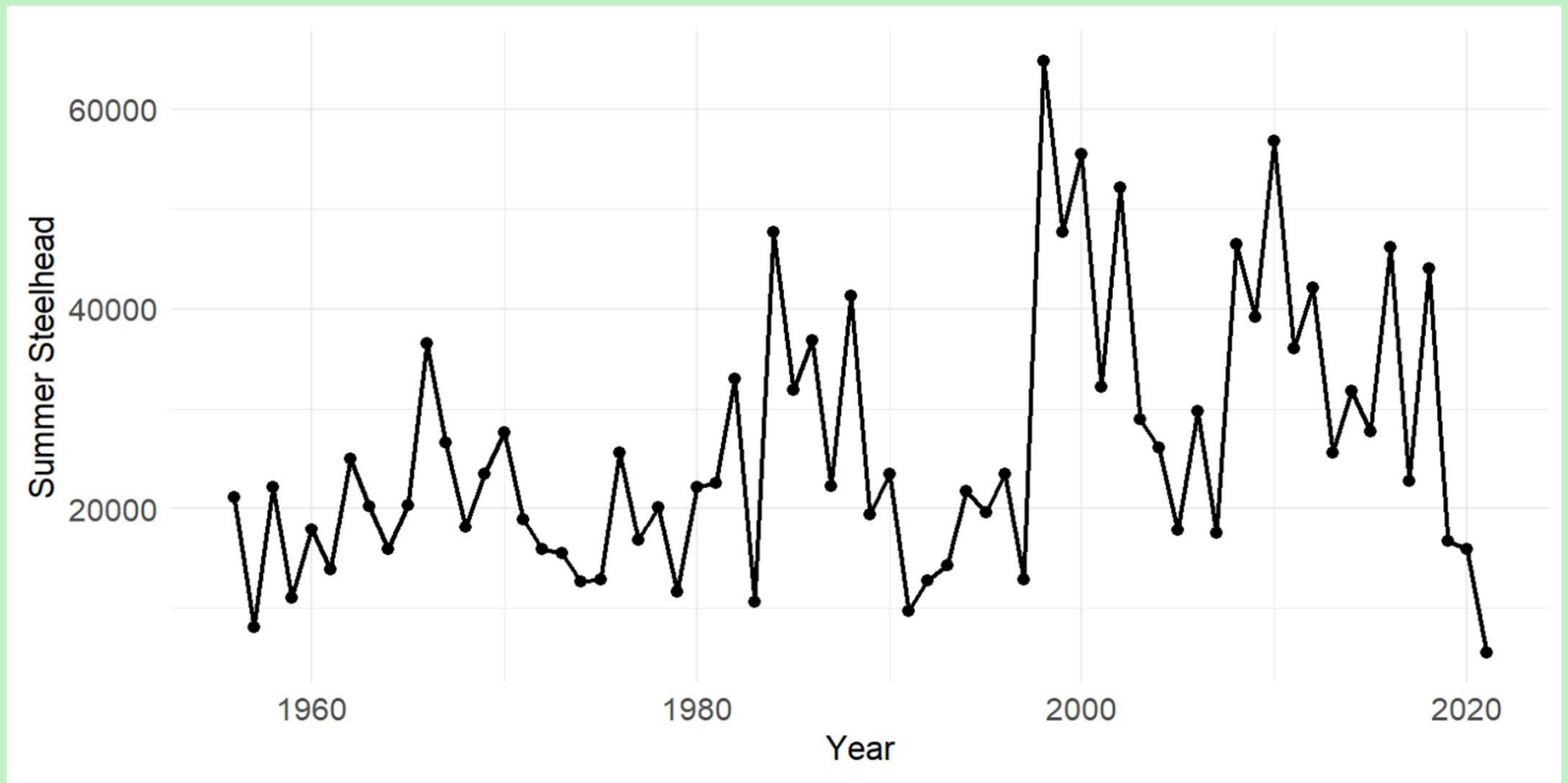
- Budget
- Human error
- Equipment malfunction

# Density Dependence vs. Freshwater Subsidy

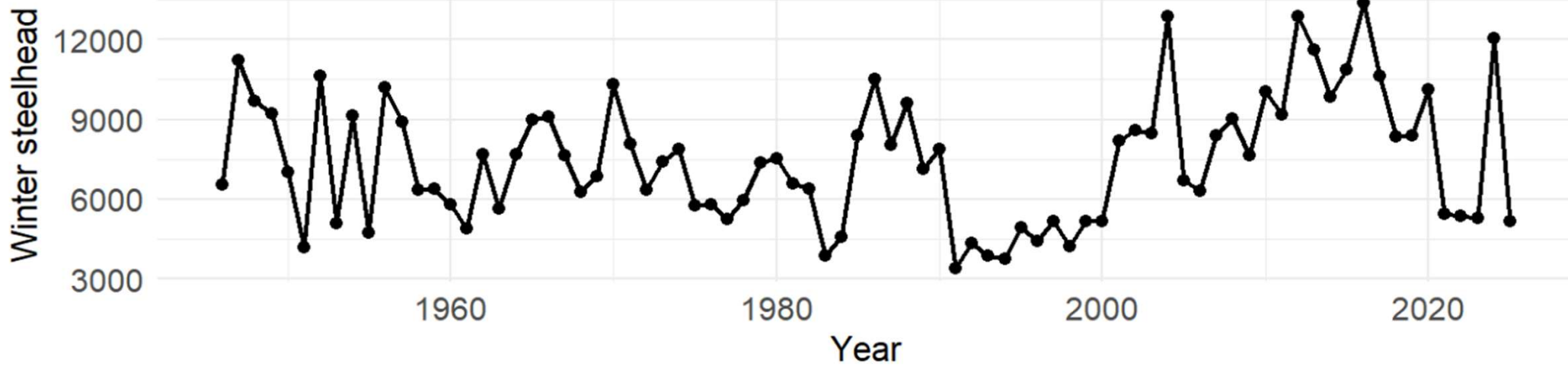
- Klungle et al 2014 – increased smolt size 7%, proportion of age 1 smolts increased by 73.7% and age 3 smolts were 16% larger.
- Bailey et al. 2018 – Pink Salmon spawner abundance was positively associated with smolt production, and nutrient enhancement was positively associated with smolt size



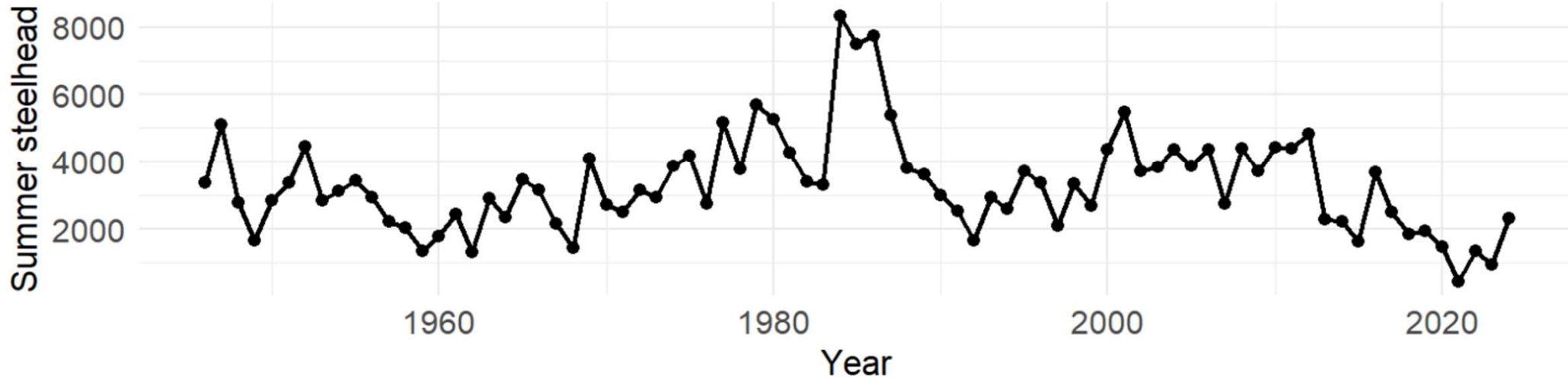
# Skeena Summer Steelhead



**North Umpqua Winter Steelhead (spawn year)**



**North Umpqua Summer Steelhead (return year)**



# Spatiotemporal Overlap by Life Stage

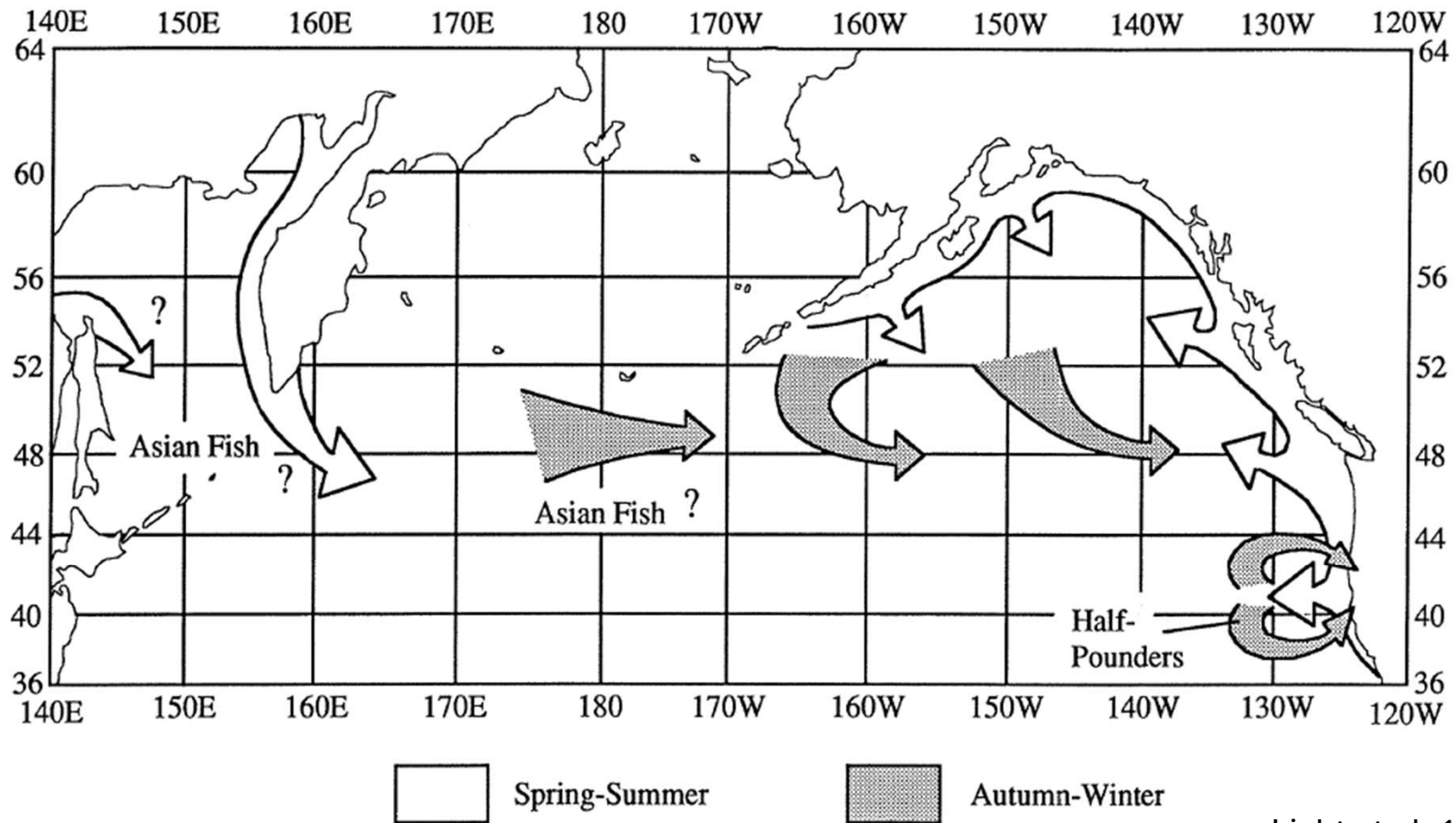
## Winter Run

- 2021 – Spawn
- 2022 – Rear
- 2023 – Smolt
- 2023 – Ocean age 0
- 2024 – Ocean age 1
- 2025 - Spawn

## Summer Run

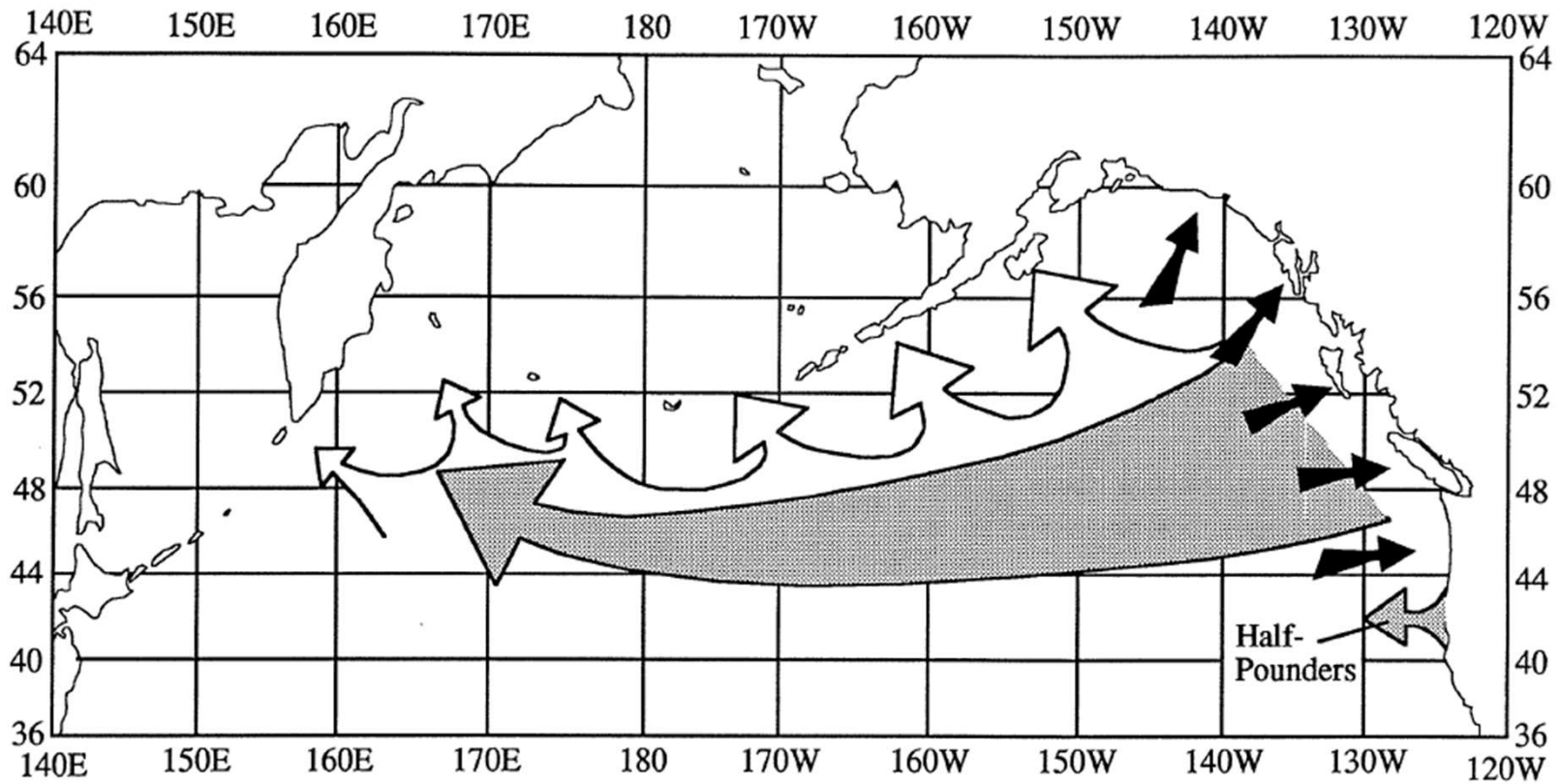
- 2021 – Spawn
- 2022 – Rear
- 2023 – Smolt
- 2023 – Ocean age 0
- 2024 – Return
- 2025 - Spawn

# Ocean Age .0 Movements



Light et al. 1989

# Ocean Age .1 Movements



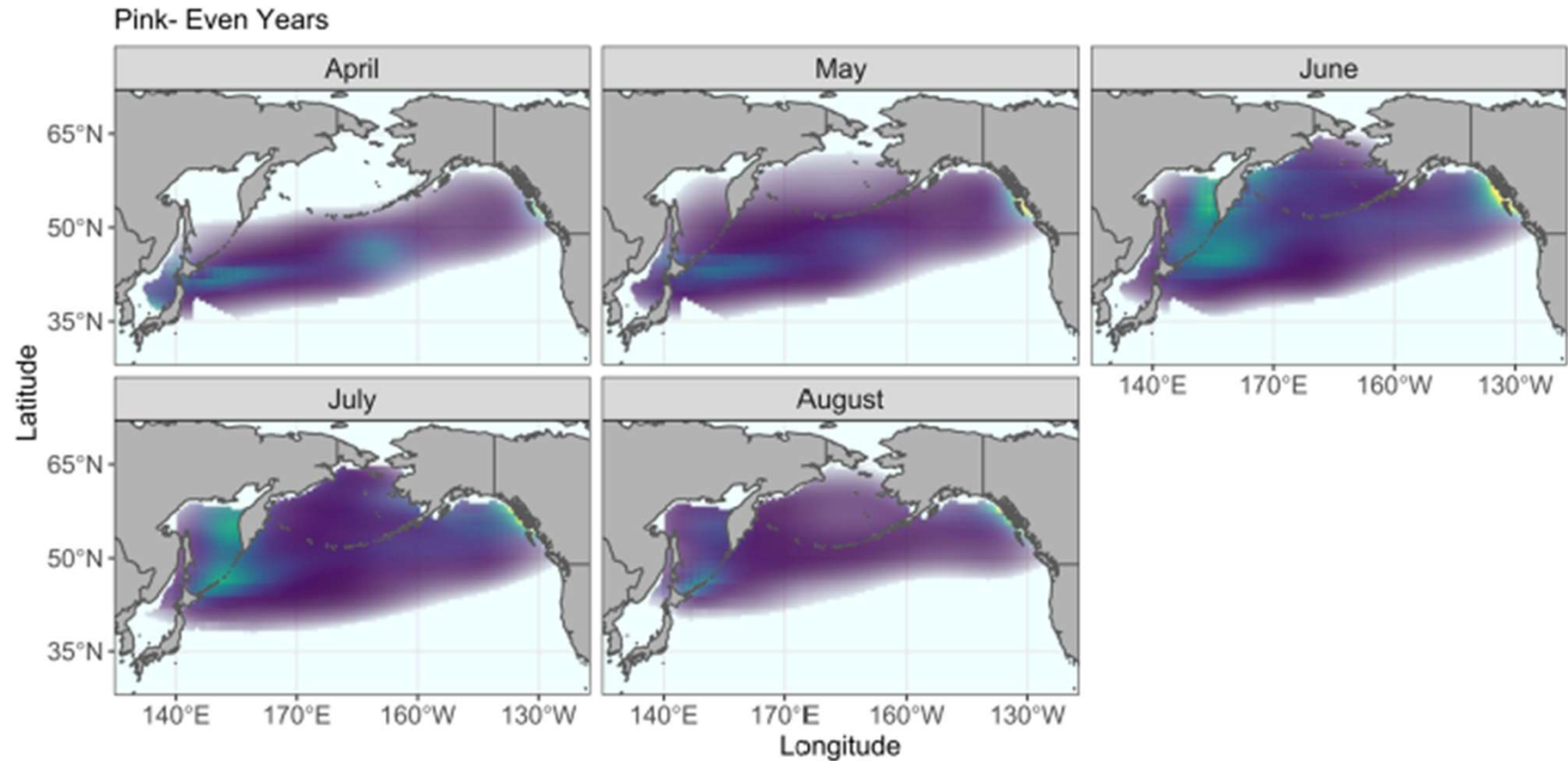
Spring

Summer

Maturing summer-run fish

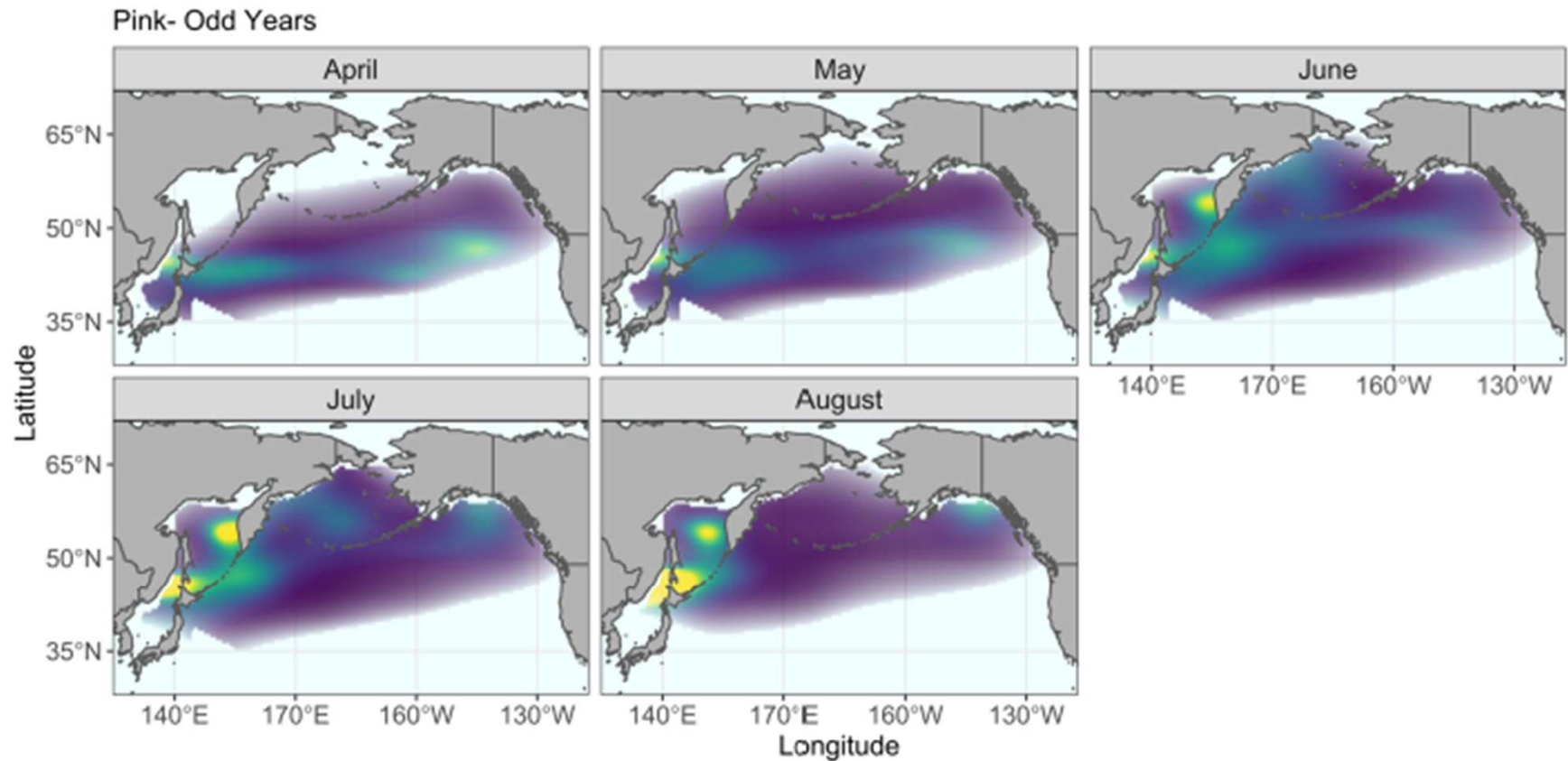
Light et al. 1989

# Even Year Pink Distribution



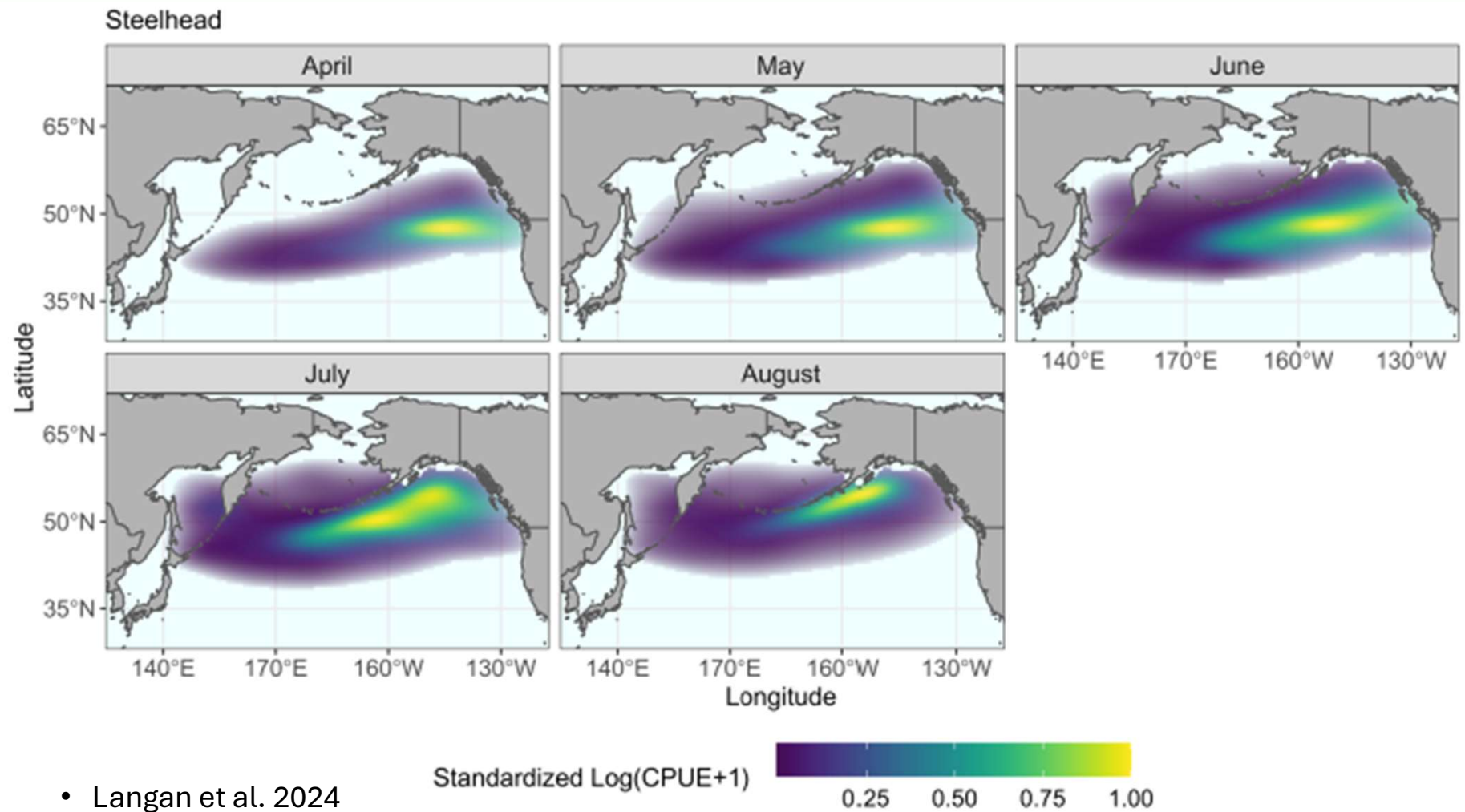
- Langan et al. 2024

# Odd Year Pink Distribution



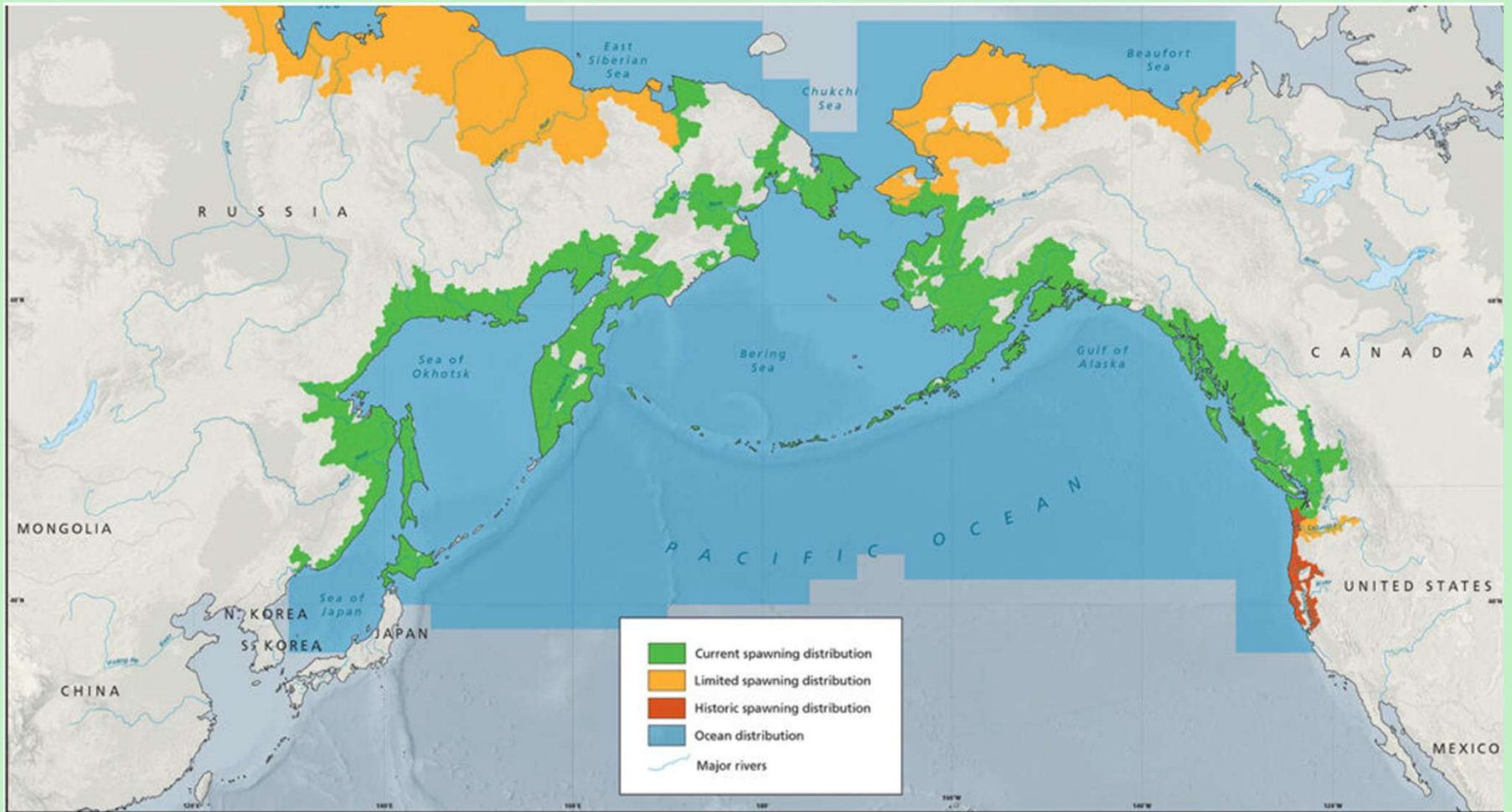
- Langan et al. 2024

# Steelhead Distribution



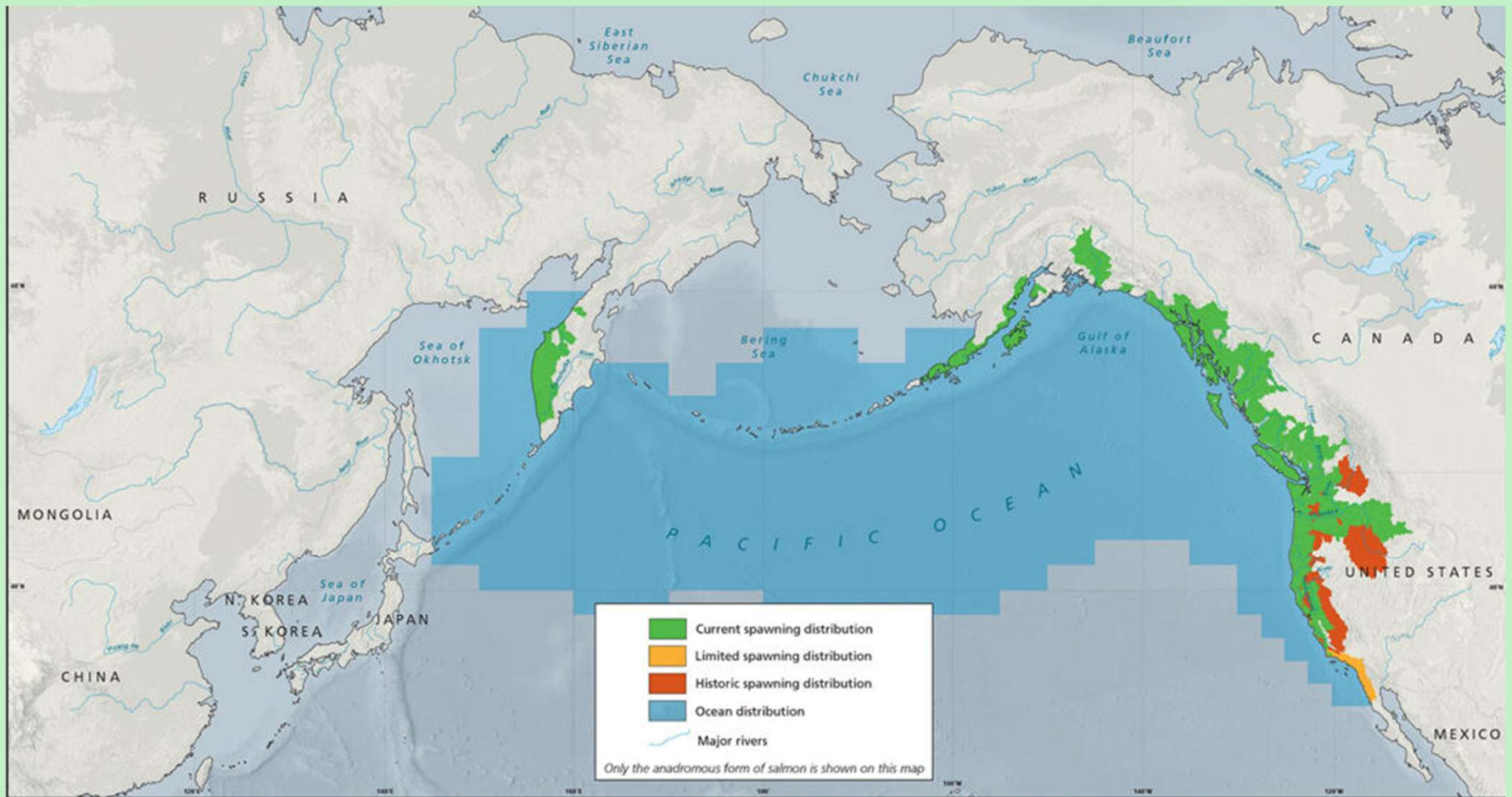
- Langan et al. 2024

# Transitional Problem?



PINK DISTRIBUTION: © Atlas of Pacific Salmon (X. Augerot) 2005

# Transitional Problem?



STEELHEAD DISTRIBUTION: © Atlas of Pacific Salmon (X. Augerot) 2005

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