Unclassified - Non-Classifié

Using habitat information to inform reference points for Canadian Pacific salmon populations: new approaches for actionable data-limited science

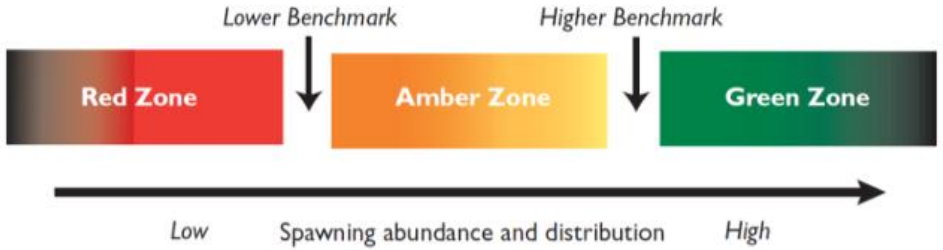


Tor **Kitching**, Paul van Dam-Bates and Carrie A. Holt

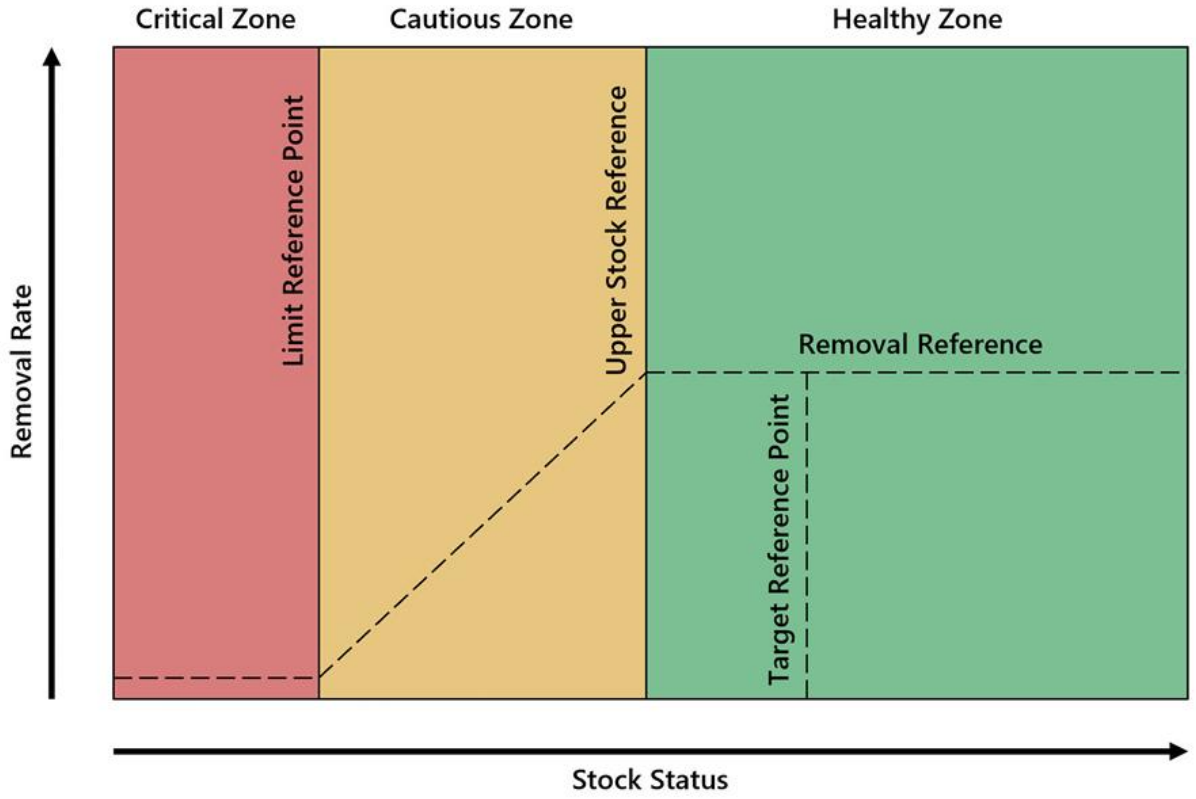
Fisheries and Oceans Canada, Nanaimo, Canada.

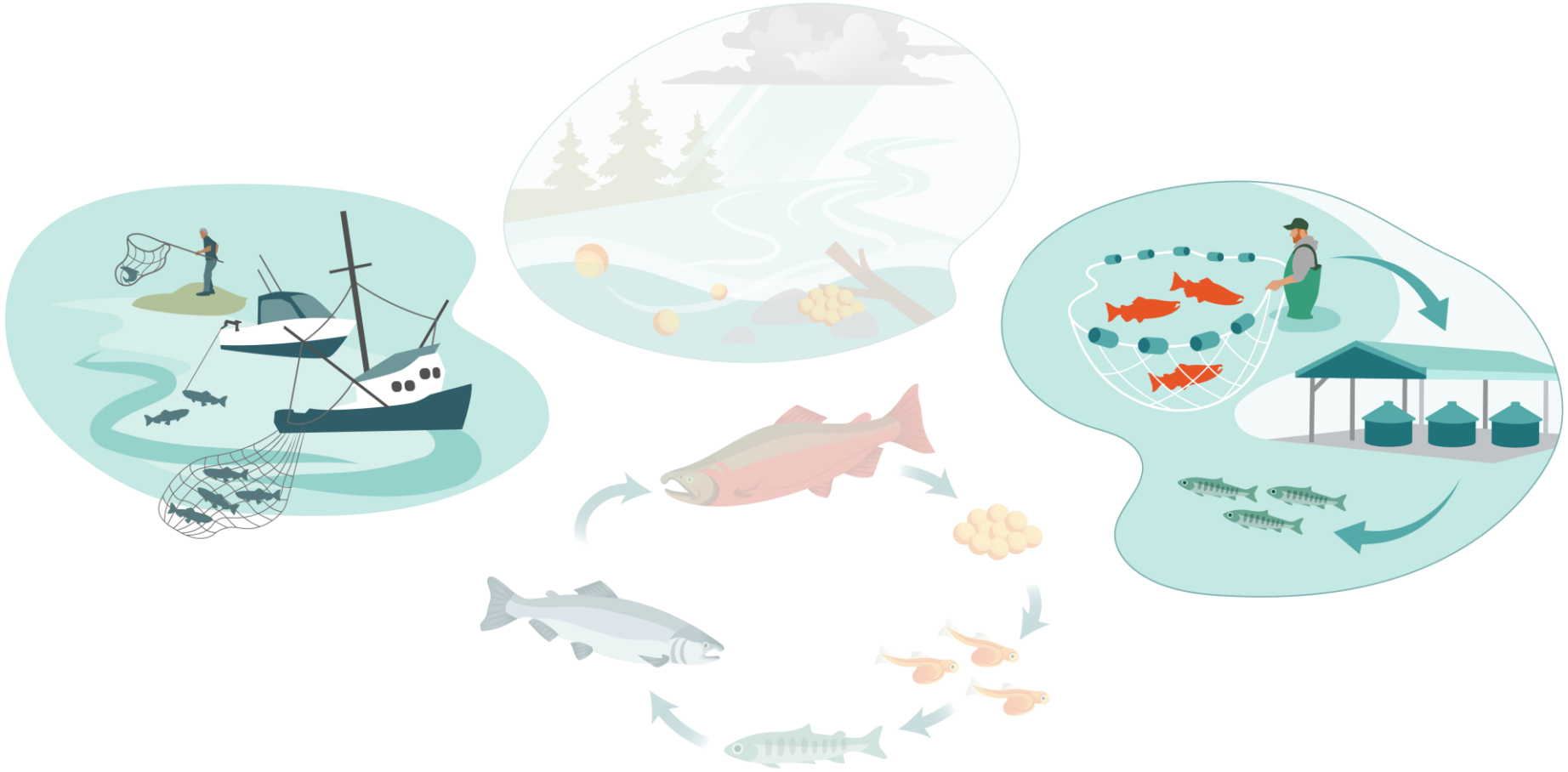
E-mail: tor.kitching@dfo-mpo.gc.ca

Wild Salmon Policy status zones (*Red*, *Amber*, and *Green)*

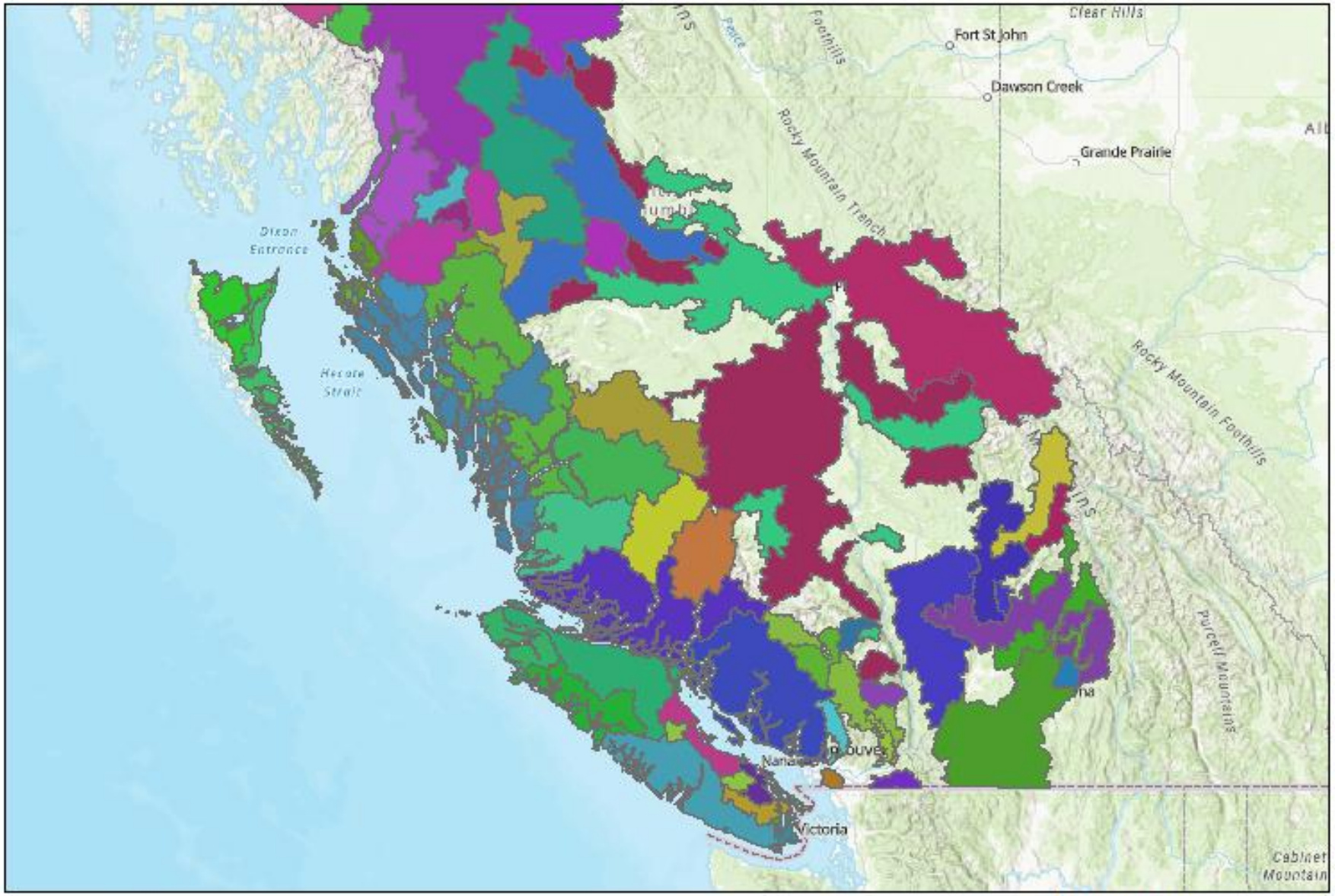


DFO's Precautionary Approach





Canadian Pacific Chinook Conservation Units



Created with Salmon Space

“Nearly half of Canada’s Pacific salmon CUs [Conservation Units] with publicly available data currently lack sufficient information to assess status using the recent generational metric, …”

Price and Moore 2026

Michael H.H. Price and Jonathan W. Moore. 2026. From policy to practice: declines in monitoring and Pacific salmon conservation in Canada. *Canadian Journal of Fisheries and Aquatic Sciences*. **83**: 1-11. https://doi.org/10.1139/cjfas-2025-0123

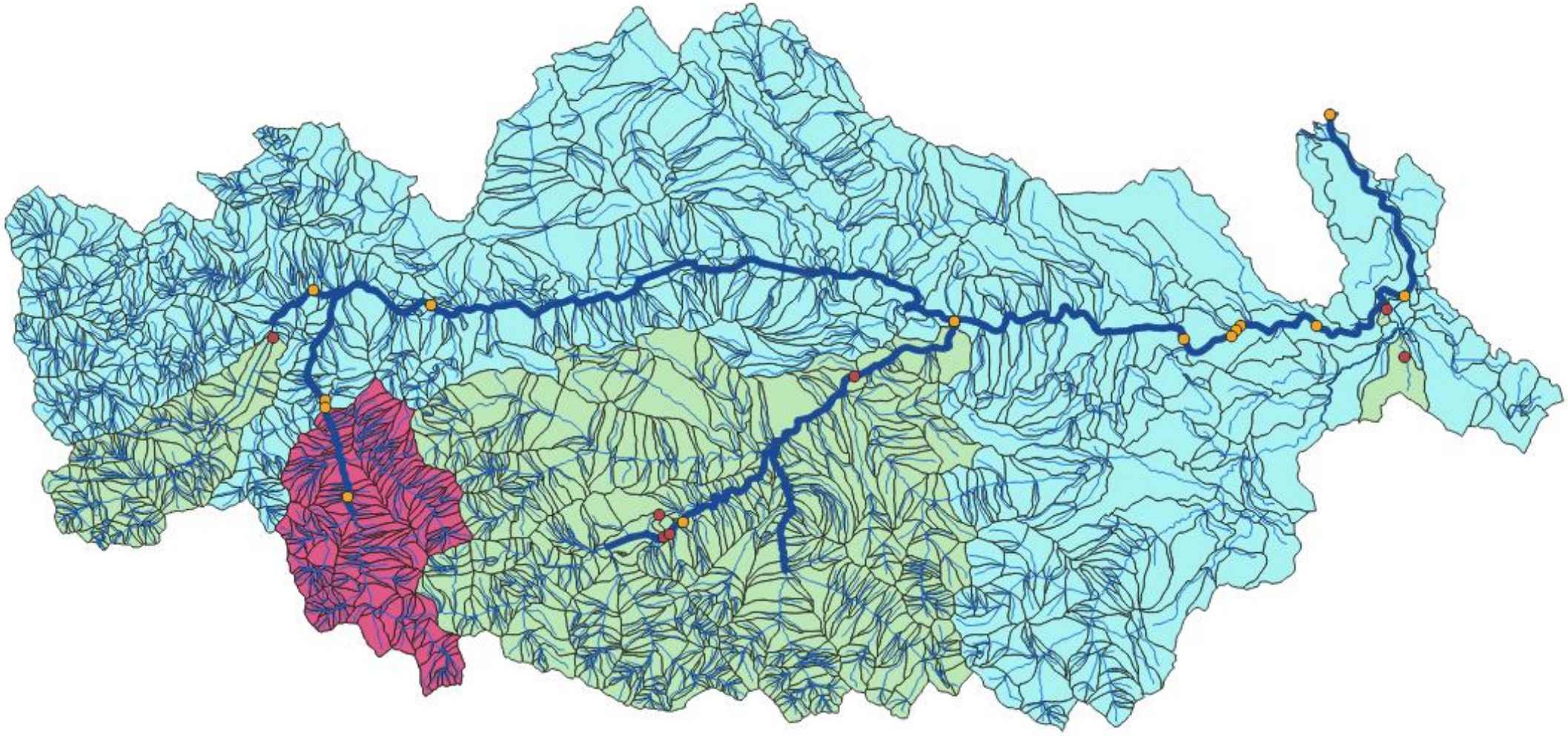



iwam

Canadian Pacific Chinook Conservation Units



Created with Salmon Space

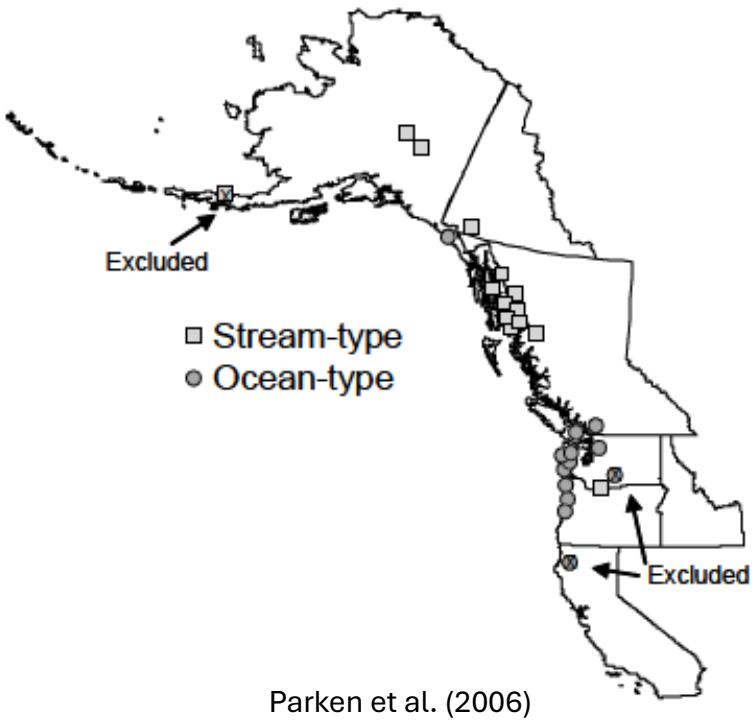


The Nanaimo River Watershed

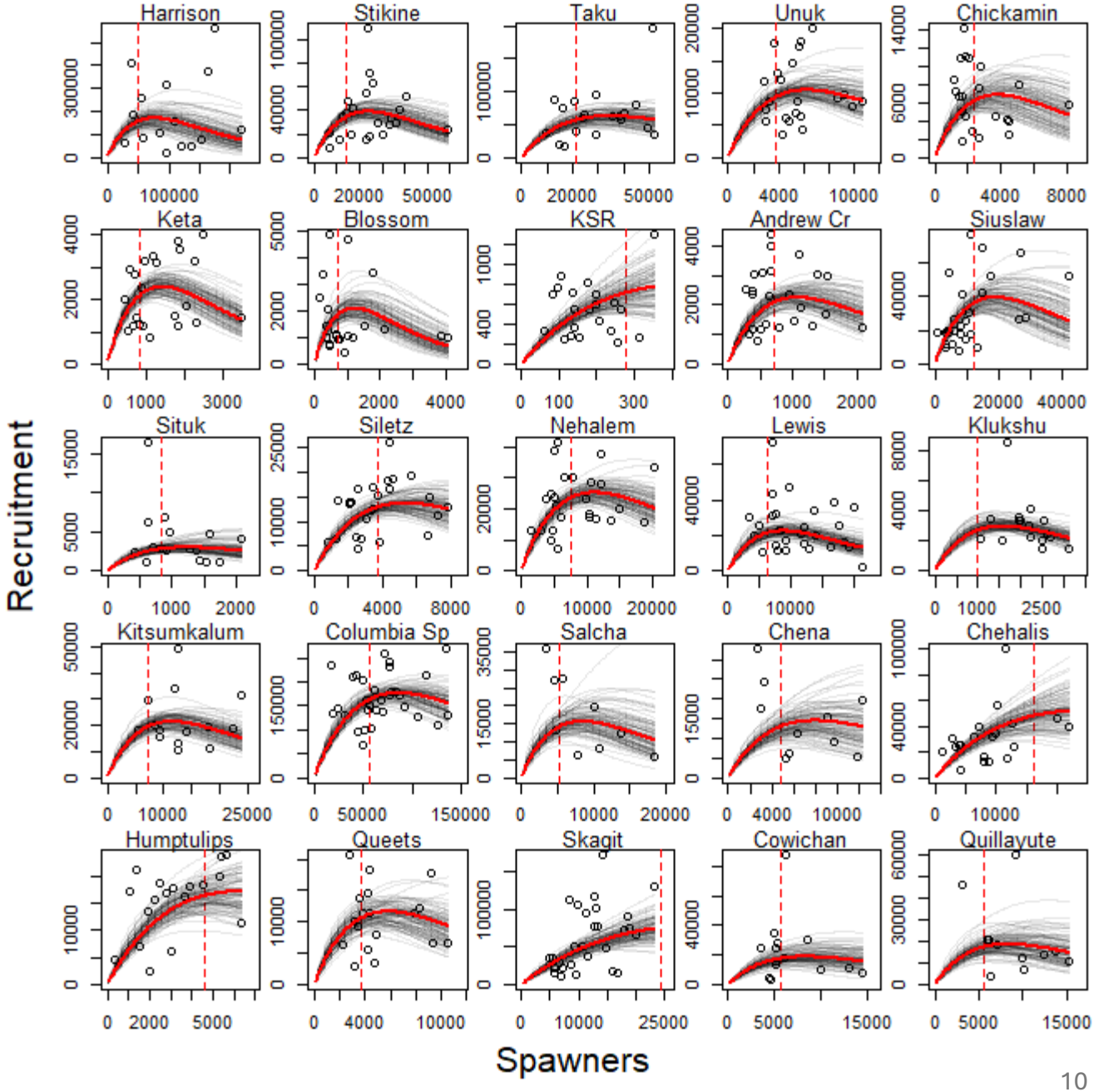
Blue: Accessible Watershed Area (540 km^2)
Green: Restricted by Dam
Red: Restricted by Waterfall

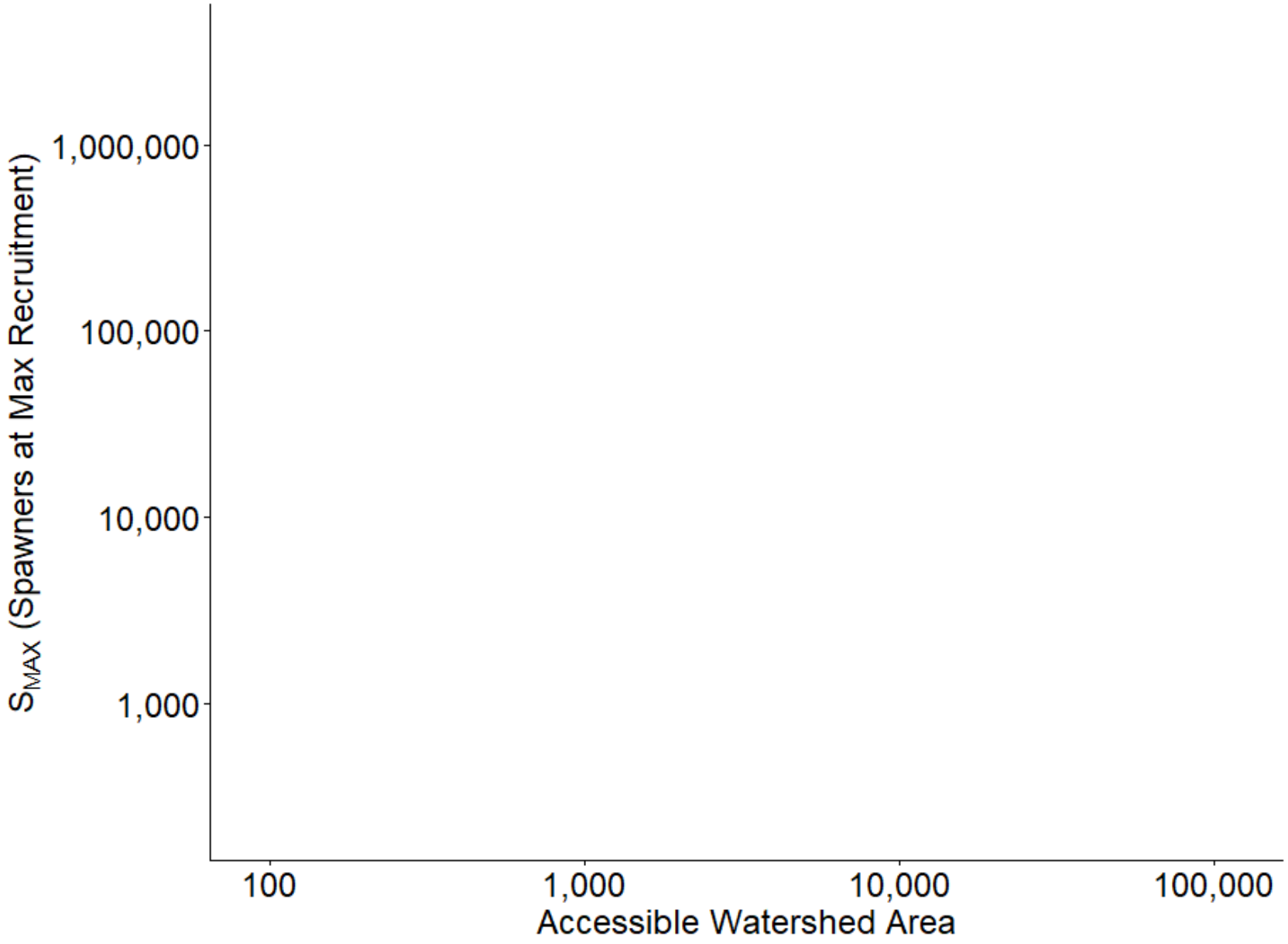
Spawner-Recruit Relationships

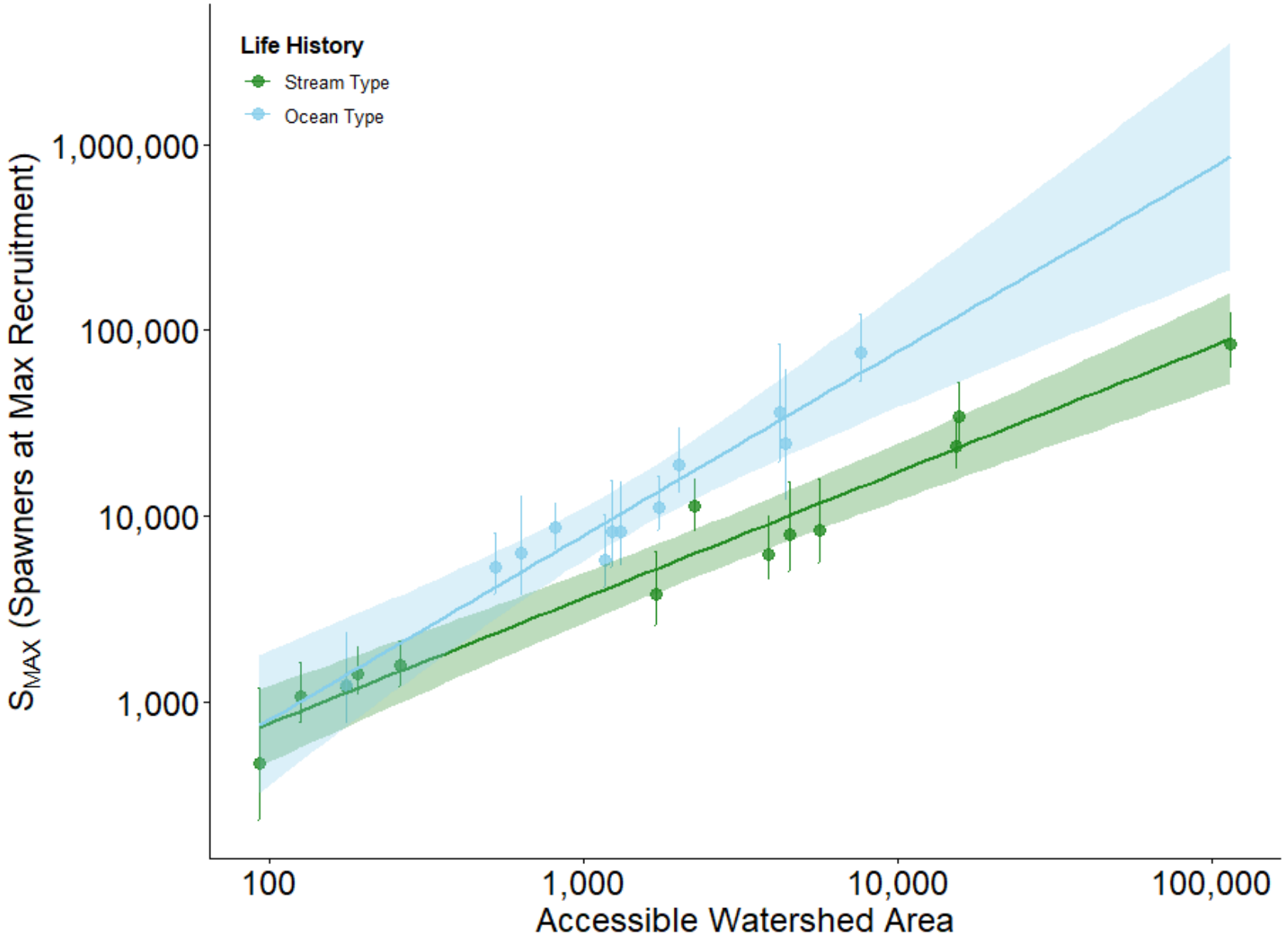
- 25 data-rich populations from the Northeast Pacific (Washington, BC, and Alaska)

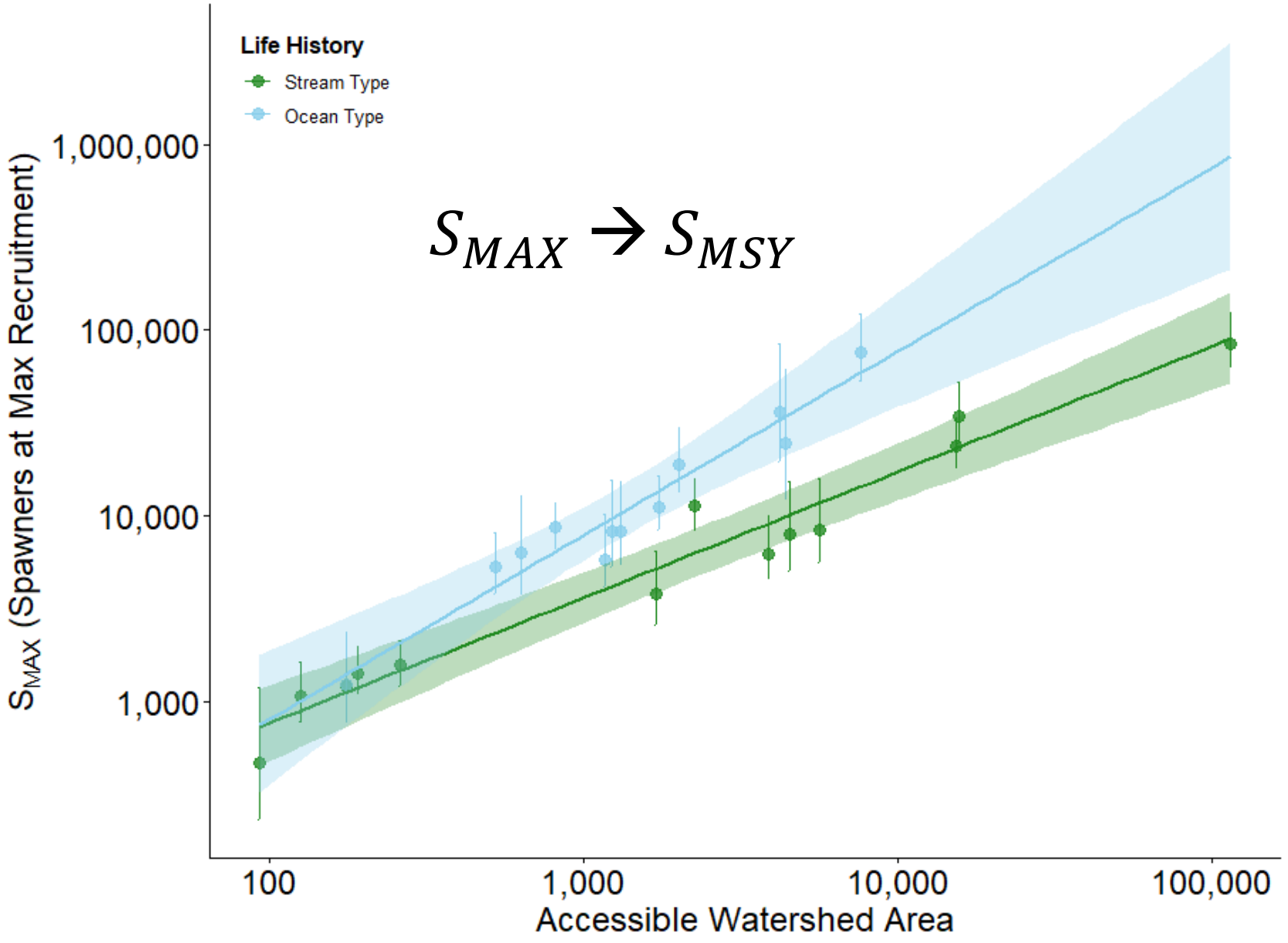


Parken et al. (2006)




1,000,000
100,000
10,000
1,000
S_{MAX} (Spawners at Max Recruitment)
100
1,000
10,000
100,000
Accessible Watershed Area


Life History
Stream Type
Ocean Type
1,000,000
100,000
10,000
1,000
S_{MAX} (Spawners at Max Recruitment)
100
1,000
10,000
100,000
Accessible Watershed Area


Life History
Stream Type
Ocean Type
$S_{MAX} \rightarrow S_{MSY}$
S_{MAX} (Spawners at Max Recruitment)
1,000,000
100,000
10,000
1,000
100
1,000
10,000
100,000
Accessible Watershed Area

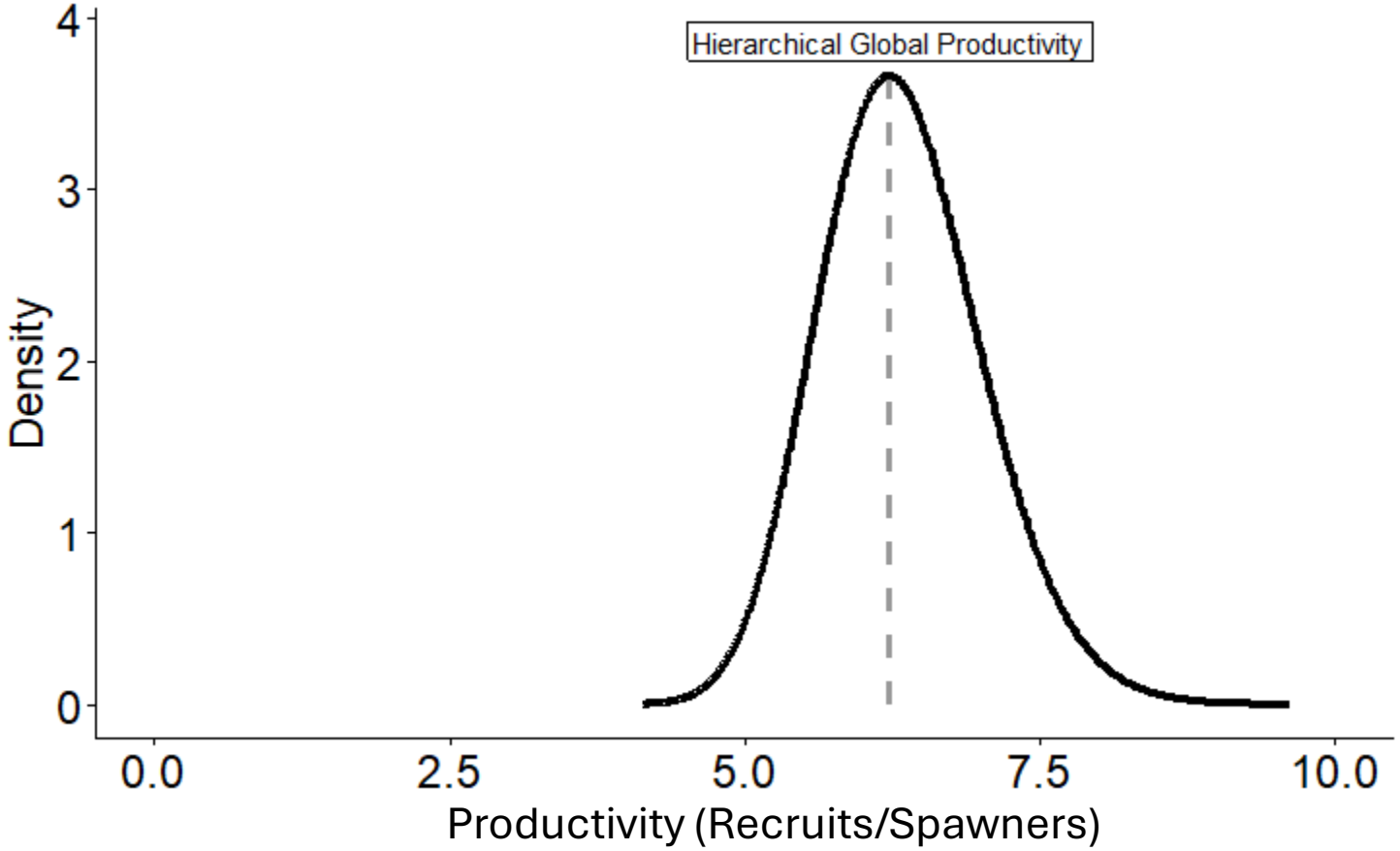
BRITISH ECOLOGICAL SOCIETY Ecological Solutions and Evidence

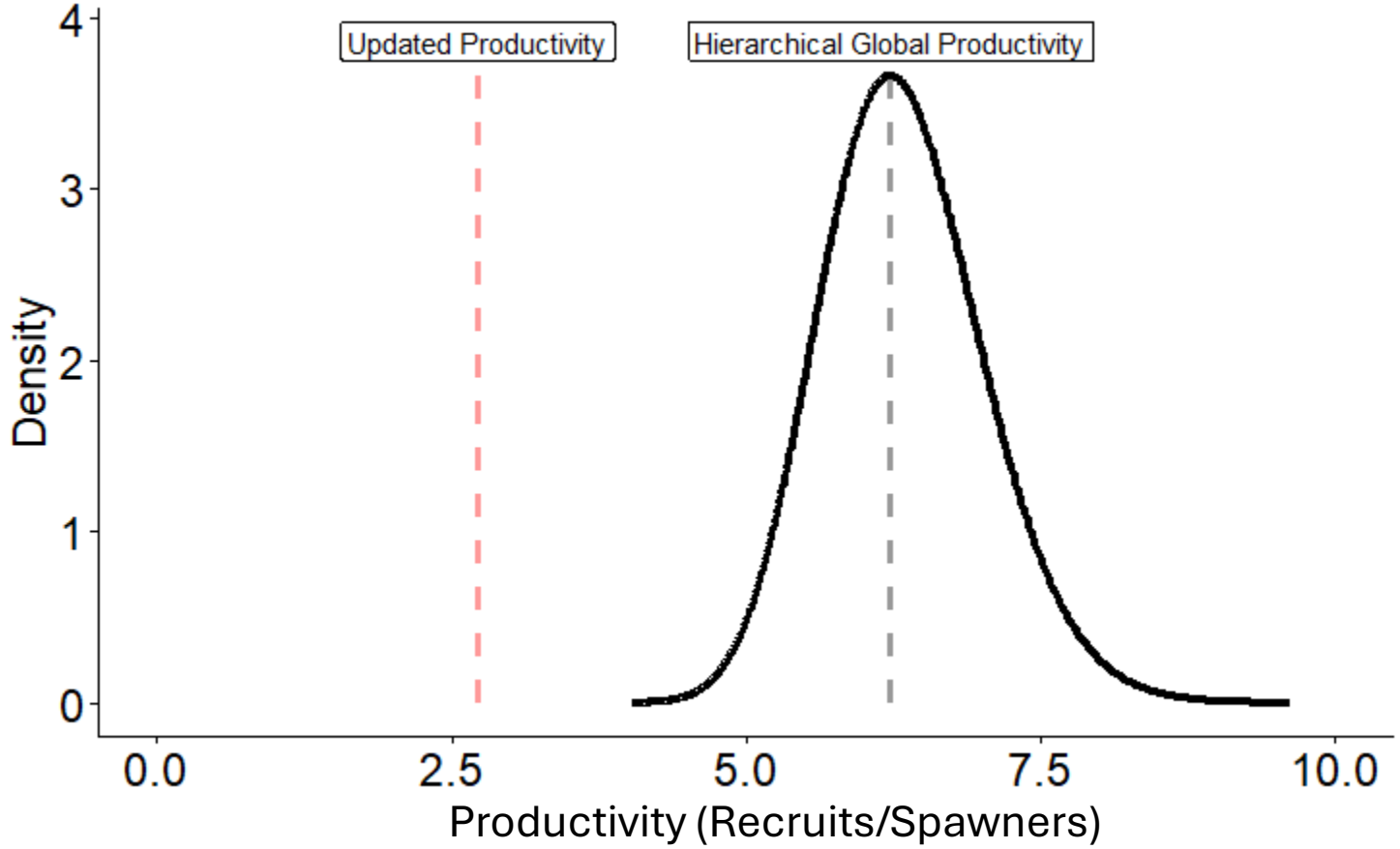
RESEARCH ARTICLE | Open Access

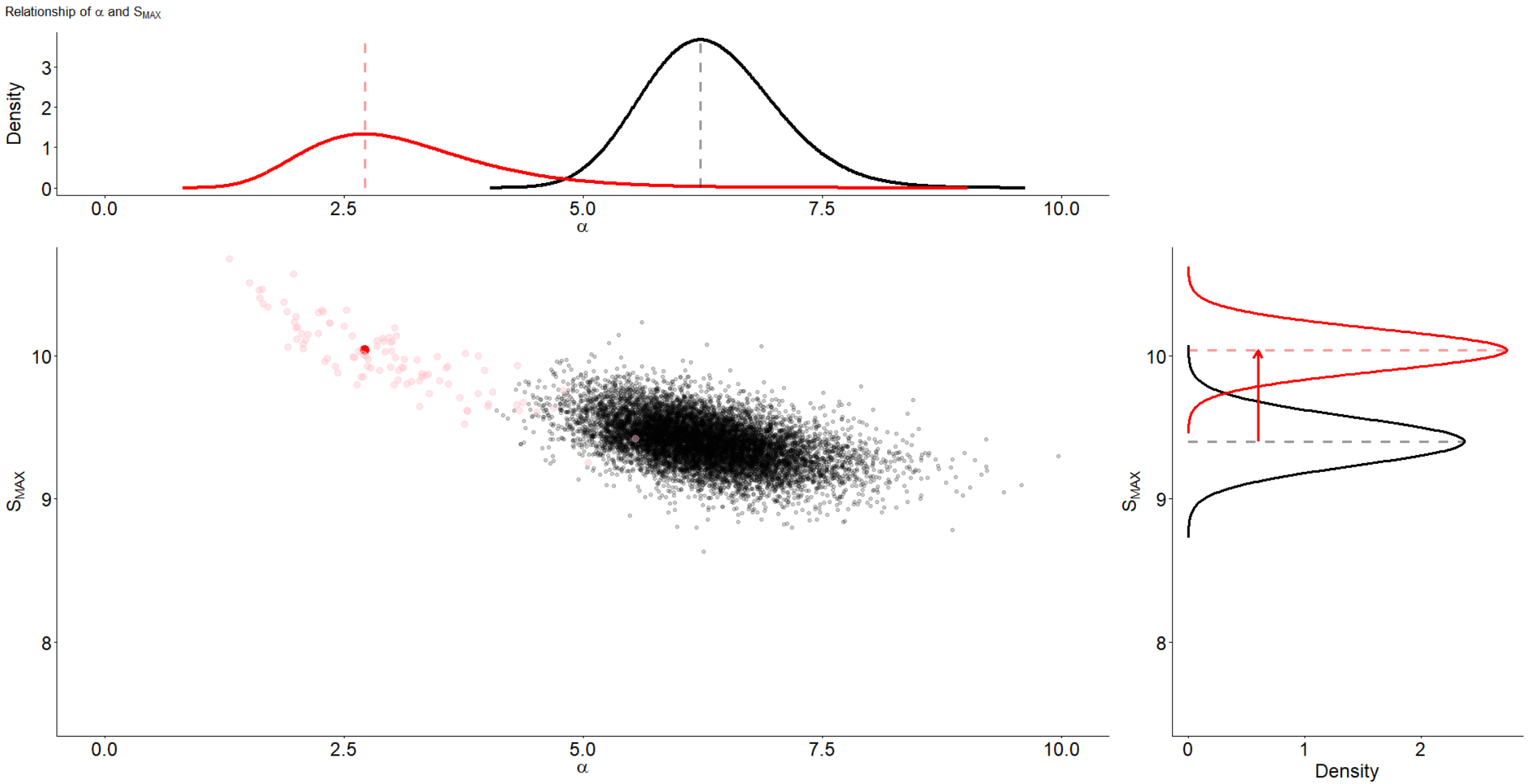
Low summer river flows associated with low productivity of Chinook salmon in a watershed with shifting hydrology

Luke Warkentin, Charles K. Parken, Richard Bailey, Jonathan W. Moore

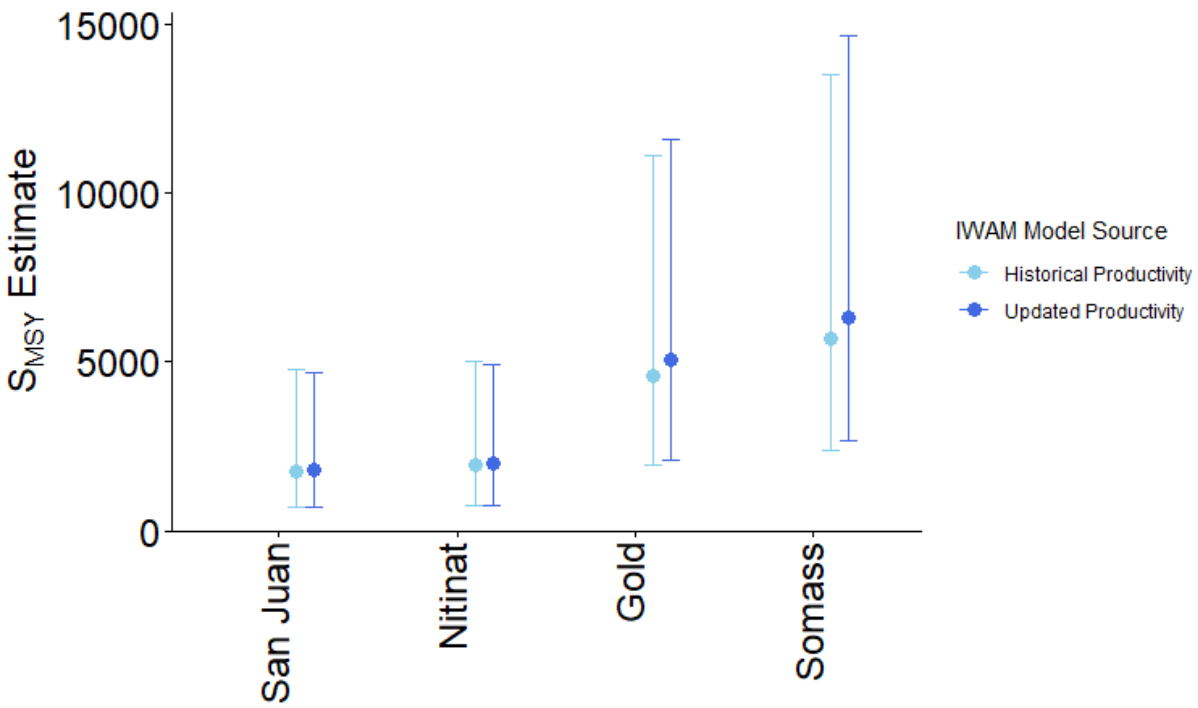
First published: 20 January 2022 | https://doi.org/10.1002/2688-8319.12124 | VIEW METRICS

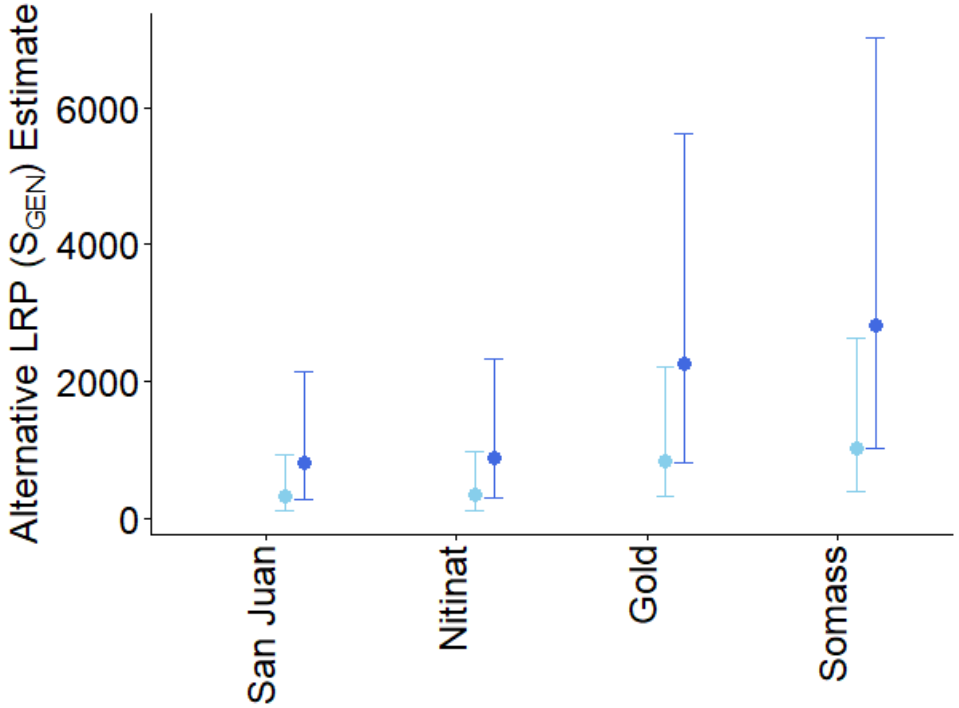

Hierarchical Global Productivity
Density
0
1
2
3
4
0.0
2.5
5.0
7.5
10.0
Productivity (Recruits/Spawners)


Updated Productivity
Hierarchical Global Productivity
Density
4
3
2
1
0
0.0
2.5
5.0
7.5
10.0
Productivity (Recruits/Spawners)


Relationship of α and S_{MAX}
Density
3
2
1
0
0.0
2.5
5.0
7.5
10.0
α
S_{MAX}
10
9
8
0.0
2.5
5.0
7.5
10.0
α
S_{MAX}
10
9
8
0
1
2
Density

Predicting Population Benchmarks





Pulling it all together

- Statistically integrated and hierarchical model for estimating benchmarks/reference points for data-limited CUs for Chinook salmon
- Improves upon previous methods and accounts for changing productivity in the adjustment of benchmarks
- Provides rapid results for fisheries and population enhancement managers
- A generalized model framework gives opportunities to include time-varying parameters and environmental covariates
- Next Steps:
  - Update and expand the underlying dataset
  - Open source and available with package documentation soon



Acknowledgements

Chuck Parken[1], Lauren Weir[1], Martin Liermann[2], Brooke Davis[1], Anna Potapova[1], Brendan Connors[1], Dan Greenberg[1], Catarina Wor[1], Cameron Freshwater[1], Colin Bailey[1], Michael Thom[1], Lian Kwong[1], Katie Davidson[1]

[1] Fisheries and Oceans Canada, Pacific Region, Canada

[2] NOAA, Northwest Fisheries Science Center, Watershed Program