

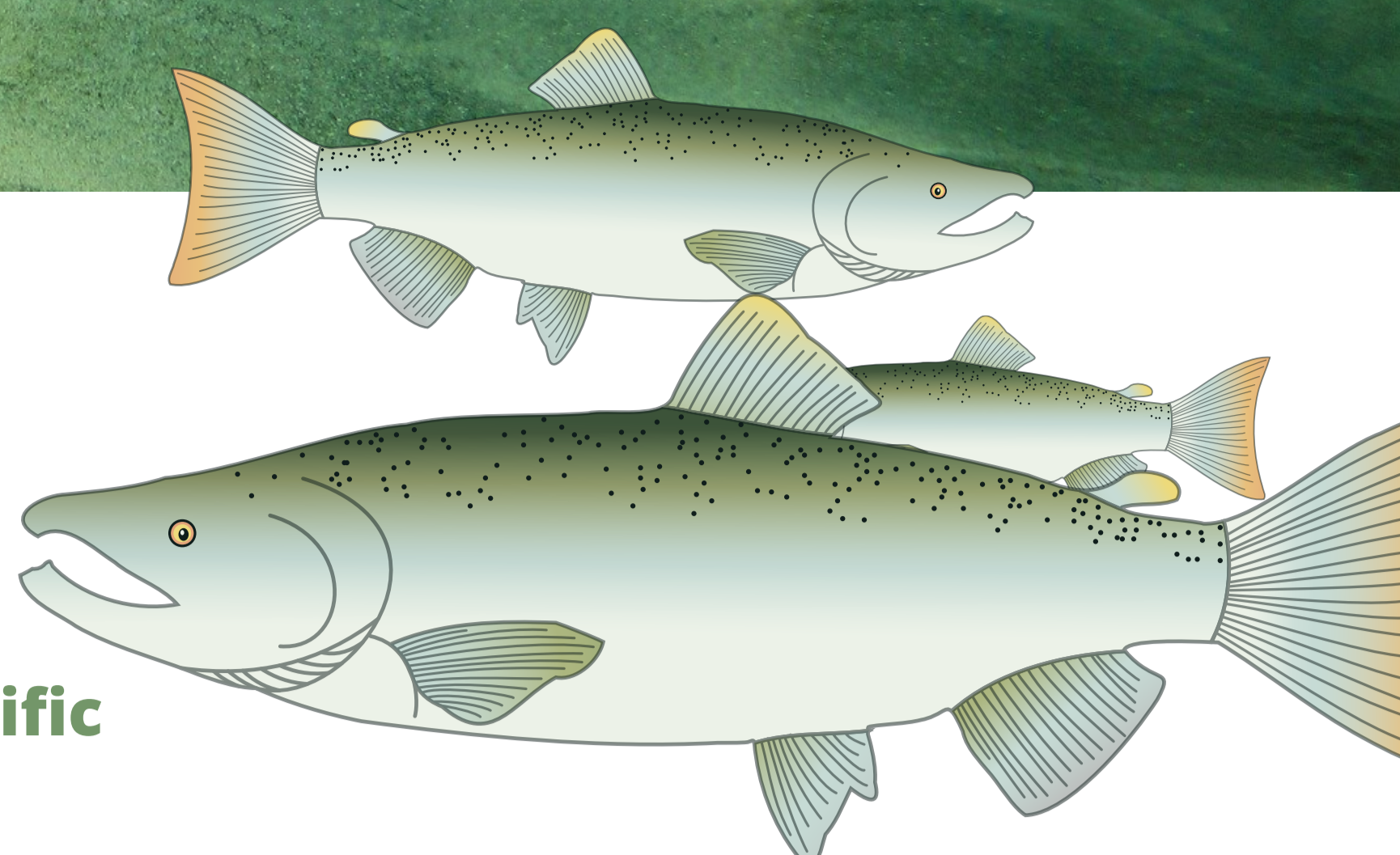
An integrated model of seasonal changes in stock composition and abundance with an application to Chinook salmon

BACKGROUND

In order to manage human impacts and identify processes that regulate species abundance, **population-specific distribution data are required.**

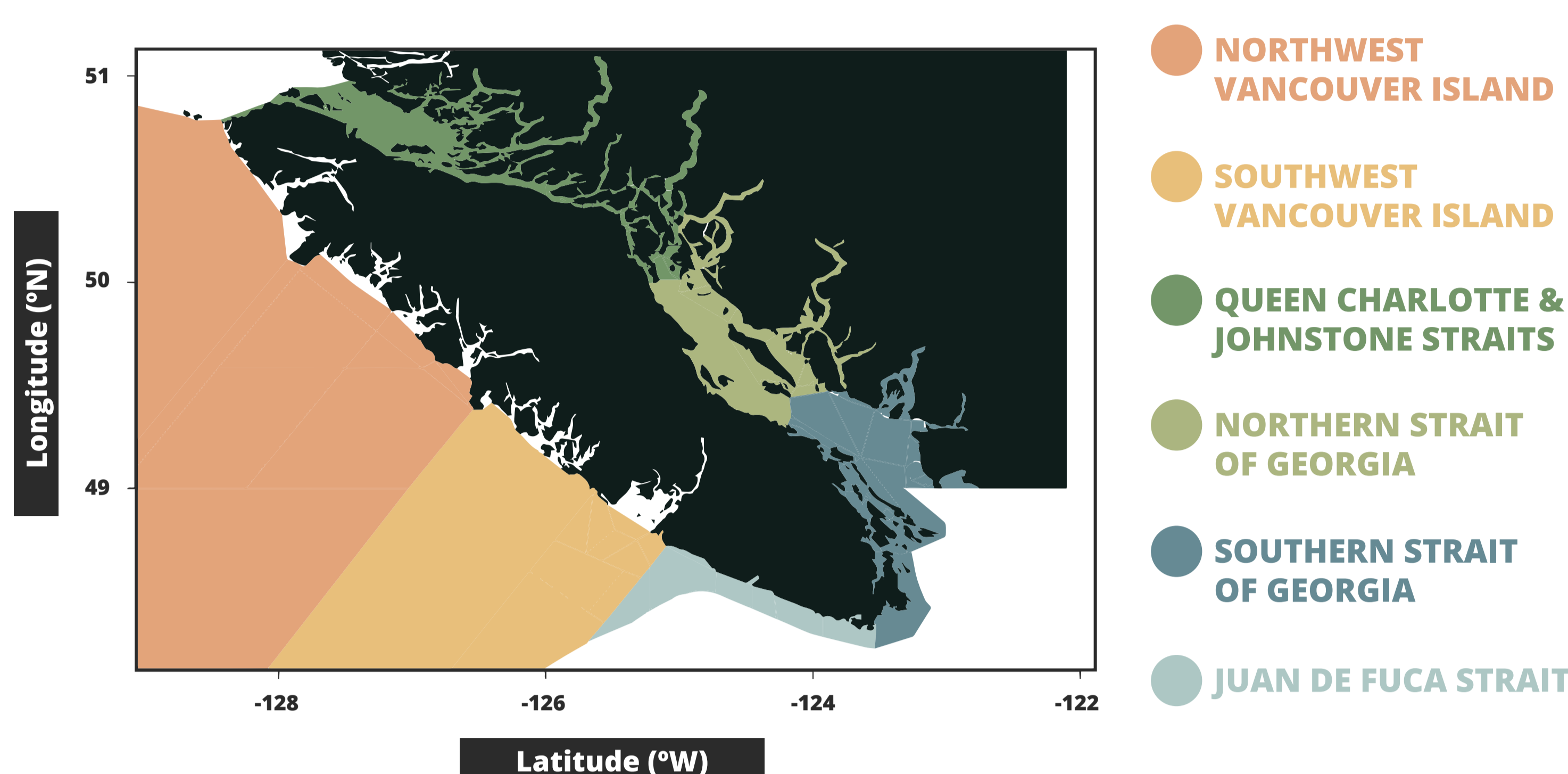
However, **distributions of species that undergo extensive migrations are often difficult to identify,** particularly when multiple populations' movements overlap.

We present an integrated model to estimate trends in abundance and population composition using data from a variety of commercial and recreational Chinook salmon (*Oncorhynchus tshawytscha*) fisheries located in southern British Columbia.



METHODS

Focusing on Pacific Fishery Management Areas (PFMAs) throughout southern British Columbia, **we grouped multiple PFMAs into six regions based on proximity and shared oceanographic features.**



Tissue samples were collected from commercial and recreational fisheries for genetic stock identification. **We linked genetic, catch, and effort data in a novel integrated model** (R package *stockseasonr*), which simultaneously estimates seasonal changes in abundance and stock-composition.

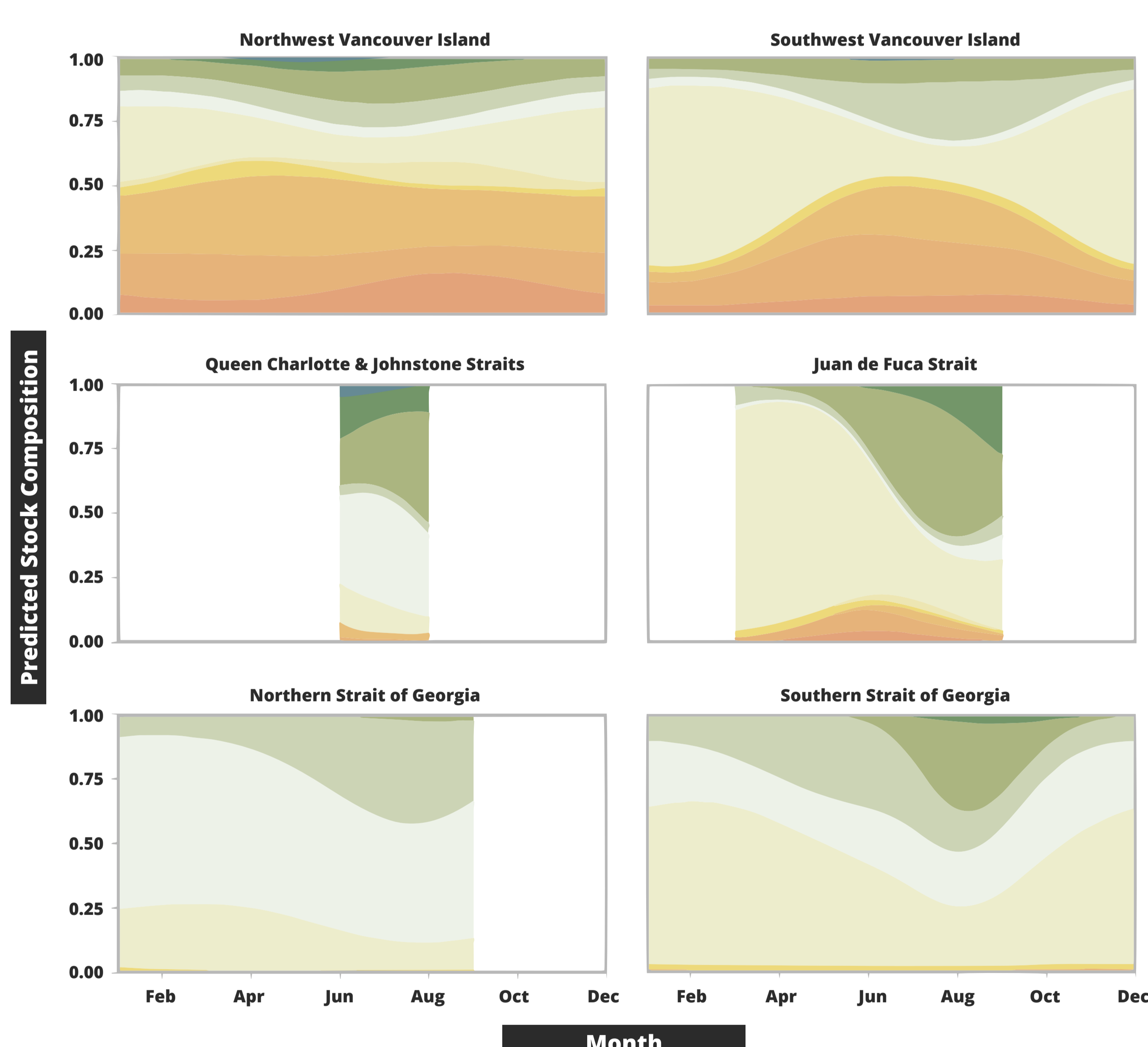
The model can be adjusted to different ecological scales and incorporates multiple dimensions of uncertainty, including stock assignment error.



RESULTS

We found striking differences in how populations use specific regions, with evidence of seasonal changes in stock composition present in all regions.

We also noted **certain areas function predominantly as migratory corridors** and **others serve as year-round foraging habitats.**



CONCLUSION

Our findings demonstrate that **Chinook salmon have population-specific distributions at fine scales, which will determine how they interact with the broader ecosystem.**

Seasonal patterns of composition and population-specific abundance derived from genetic stock identification data **can continue to improve fisheries management** and our understanding of Chinook salmon marine ecology.

