

The winter ecology of juvenile coho salmon (*Oncorhynchus kisutch*) in interior British Columbia streams.

I investigated seasonal patterns in habitat related movement, distribution and abundance of juvenile coho salmon in two interior British Columbia streams, and in particular, used individual and categorical marks to examine how size-dependent overwinter growth and survival relate to freshwater production. Counter to results from coastal streams, I found no evidence of autumnal movement into off-channels or other sites considered favourable winter habitat. Abundance in these habitat types remained relatively constant throughout both years indicating juveniles utilized suitable areas year-round, not just during winter. During a year when overall juvenile abundance was relatively high, the proportion of both fall and post-winter standing stock in off-channels was comparable to the availability of this habitat in the streams (~20%). However, during a year when juvenile production was likely limited by spawner abundance, off-channels accounted for much higher proportions (~55%) of estimated standing stock. These habitat types may therefore be particularly important to coho production when spawning stocks are low. Results suggested relatively short, low gradient streams on the North Thompson River floodplain may contribute much more to regional coho production than previously recognized, and counter to some suggestions, adequately seeded interior systems may exhibit production levels comparable to those of coastal streams (~0.2 to 0.4 smolts·m⁻²).

Investigations of size-dependent dynamics also differed from some previous findings. Smaller juveniles grew more during the winter than their larger conspecifics, and differences in specific growth rate were greater than predicted from allometric growth. Greater growth by smaller fish may have been driven by selective pressure for individuals to attain a certain threshold smolt size. However, in a cold stream with relatively unfavourable winter growth conditions, the smallest juveniles grew the least overwinter, indicating that in some situations it may be favourable for fish to delay smolting and spend an additional year in freshwater. Counter to some previous studies, there were no consistent trends in size-related overwinter survival, and higher winter growth rates by small juveniles were not associated with decreased overwinter survival. Fall location appeared to explain more of the variation in overwinter survival than initial fish size, and in one year, juveniles in off-channels exhibited both higher recapture probabilities and growth rates than fish in mainstem areas. Results from this study indicate an existing production model based on a positive size-dependent survival function may not be applicable in interior streams.