Life history pathways of wild spring Chinook salmon from the McKenzie basin

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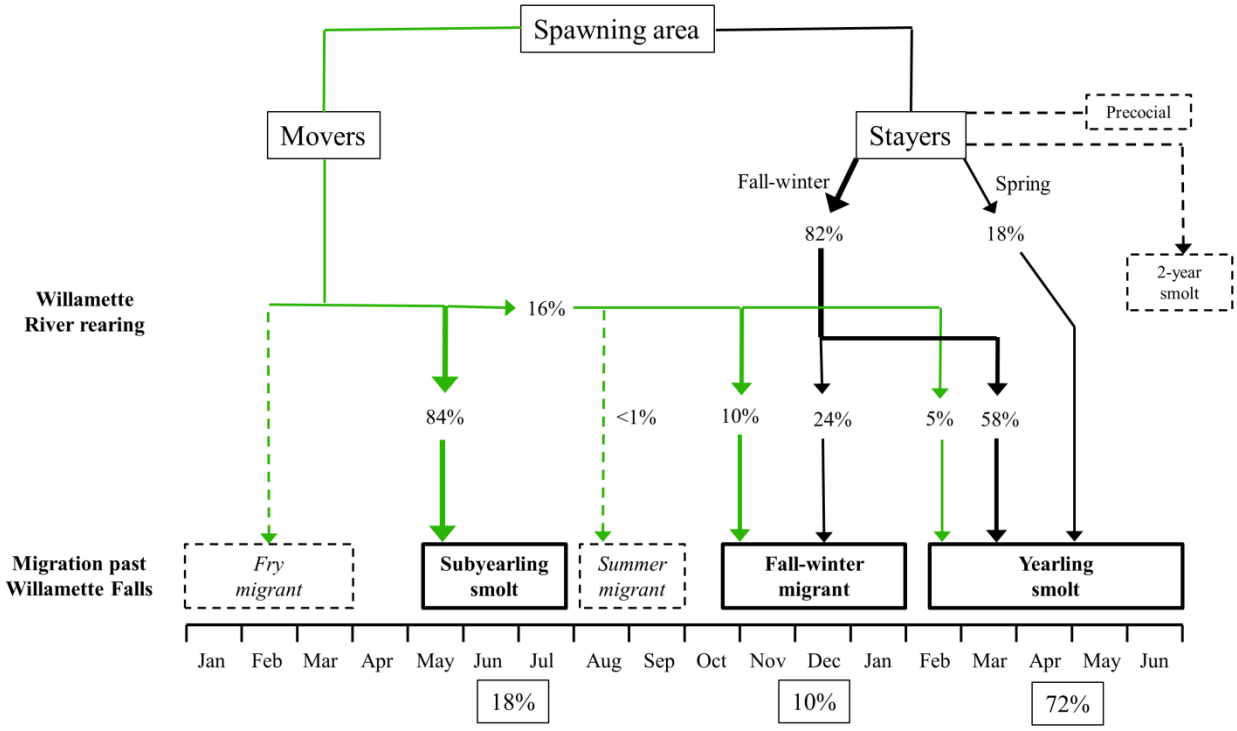
Spring Chinook salmon from the Willamette basin follow different life history pathways as they migrate to the Columbia River estuary as smolts. We have quantified the variation seen in migration patterns of naturally produced juveniles from the McKenzie River. The two primary life history types are those juveniles that migrate to the estuary as subyearlings and those that migrate as yearlings, although migration timing and growth can vary within these two pathways. Analysis of adult scales shows variation among brood years in the proportions of fish that followed the subyearing or yearling pathways.

Recently emerged fry were sampled with seines throughout the McKenzie basin, in the spawning areas and in the lower river. Juvenile salmon were caught with seines or at the trap on the Leaburg bypass and implanted with PIT tags. Tagged individuals were recaptured through continued sampling, which provided data on individual growth. PIT antennae at Leaburg and Willamette Falls detected juvenile fish as they migrated. The catch of fry was used to estimate the proportion that migrated out of the spawning area soon after emergence. We estimated the proportion of each group of juveniles that follow a given life history pathway based on the number of tagged fish recaptured or detected.

Scales were sampled from adult carcasses on the spawning grounds in the upper McKenzie basin. These scales were read to determine if the fish entered saltwater before or after the first annulus, so they could be assigned as subyearling (age-0) or yearling (age-1) migrants. After an entire brood year had returned as adults to spawn, we estimated the proportion of subyearling and yearling migrants for each brood year. Most fish from the McKenzie migrated to saltwater as yearlings, although the proportion of the two migrant types varied among brood years.


Spawning area
Movers
Stayers
Precocial
Fall-winter
Spring
82%
18%
2-year smolt
Willamette River rearing
16%
84%
<1%
10%
24%
5%
58%
Migration past Willamette Falls
Fry migrant
Subyearling smolt
Summer migrant
Fall-winter migrant
Yearling smolt
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun
18%
10%
72%