**Somatic lipid content of winter and summer steelhead trout returning to the Kalama River, WA**

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**Abstract**

*Oncorhynchus mykiss* express complex life history strategies to maximize lifetime fitness. One strategy is to migrate to the nutrient-rich marine environment to maximize growth and energy storage for return migration, maturation, and behavioral demands of spawning. In this study, we tested hypotheses about the amount of stored somatic lipid content at return as it relates to run-type, age, origin, sex, and time in freshwater. Percent somatic lipid content was quantified non-lethally for natural and hatchery-origin, winter and summer steelhead returning to the Kalama River, WA using a handheld microwave energy meter (Distell Fish Fatmeter, Model FM – 692, Old Levenseat, Scotland). Data were collected at a stationary sample point (i.e., Kalama Falls Hatchery) approximately 135 km from the ocean. A full ANOVA model was run with four main effects (month-at-return [month], origin, sex, and ocean age [OA]) and all interactions. For winter steelhead, three main effects (month, sex and OA) and four interaction terms (month \*origin, month \*sex, month\*OA, and sex\*OA) were significant (*α* = 0.05). The results suggest hatchery steelhead matured more quickly and over a shorter time period than natural-origin steelhead, and hatchery steelhead had consumed more somatic lipids than natural-origin steelhead at the peak of spawning. Also, timing of somatic lipid depletion in freshwater was earlier for females (presumably due to gonadal maturation) than males (presumably due to behavioral costs of spawning). Finally, younger (OA 2) female steelhead had lower somatic lipids than older (OA 3) female steelhead whereas lipid content of male steelhead did not differ by age. Comparisons of winter and summer steelhead somatic lipid content will be discussed.