Abstract Submitted for the DFD10 Meeting of The American Physical Society

Maneuver of juvenile chinook salmon during feeding in streams JIFENG PENG, University of Alaska Fairbanks — Before they head to the ocean, juvenile chinook salmon O. tshawytscha habitat in freshwater rivers and feed on small invertebrates drifting in streams. During drift-feeding, these fish hold fairly steady positions in the flow facing upstream, and maneuver to intercept drifting prey as it passes. They have a large arsenal of maneuver modes, which presumably enable them to maximize prey encounter while keeping energy expense low. Moreover, because these fish often gather in schools, they utilize their maneuvers so that they do not invade others' territories. In this study, we measured three-dimensional motion of juvenile chinook salmon in situ during feeding. The kinematics of some of the widely-used maneuvers, including slow lateral motion, sharp U-shaped turn and fast S-shaped turn, were analyzed. A computational model based on ideal fluid theory was developed to estimate the dynamics of these maneuvers. Energetics of the maneuvers was evaluated, together with effects on prey encounter, in order to compare and explain the choices of maneuvers in different situations. The effects of neighbors in a fish school on individual maneuvers were also studied.

> Jifeng Peng University of Alaska Fairbanks

Date submitted: 05 Aug 2010

Electronic form version 1.4