ABSTRACT

Migratory fish are known to seasonally enter coastal stream systems but the magnitude of the effects these migrations have on stream energy budgets is not fully understood. The Laurentian Great Lakes have several introduced and native adfluvial fish, where only a few studies have investigated the impacts of their migration on energy budgets in Michigan coastal streams. We quantified the contribution of energy from Chinook salmon (*Oncorhynchus tshawytscha*) muscle and eggs, steelhead (*Oncorhynchus mykiss*) eggs, and larval white suckers (*Catostomus commersonii*) to coastal stream energy budgets. Energy densities and energy delivered to streams were estimated using bomb calorimetry and annual return data from the Little Manistee River Weir and other recent studies. In addition, we compared the energy contribution of these adfluvial fish tissues and aquatic insects to resident stream fish diets in two rivers in western Michigan. Specifically, we examined the energy contribution of Chinook eggs to steelhead parr diets in Bigelow Creek, MI and the contribution of energy by larval white suckers to brown trout (*Salmo trutta*) and non-migratory rainbow trout (*Oncorhynchus mykiss*) diets in the Big Manistee River, MI. Our measured energy density values differed markedly from values typically used in the literature, and indicate that some invertebrate groups (Trichoptera) have energy densities that do not significantly differ from salmon eggs which are typically perceived to be energy dense. Our results suggest that steelhead parr in Bigelow Creek consume more energy during the fall when salmon eggs are present. In contrast, large numbers of drifting larval white suckers in the Big Manistee River does not result in an increase in energy intake for trout during spring, but may satisfy base energy needs. Our results suggest that adfluvial fish are an important component of energy transfer between systems and contribute substantial energy to coastal stream energy budgets in Michigan.