**Figure Captions**

Figure 1. Schematic of inputs and outputs used in bioenergetics modeling to estimate fish growth under future climate and growth scenarios. Field data from 2015-2016 were used as inputs in season-length bioenergetics simulations of growth under current summer conditions, and feeding rate (p-value; or proportion of theoretical maximum consumption) estimates were output. Next, future simulations were fit to a range of consumption scenarios scaled relative to these current feeding rates. Water temperature inputs for future scenarios were based on empirical air-water sensitivity relationships and air temperature projections from downscaled climate models. The term “cohort” in the figure refers to a unique combination of site, fish species (Chinook or Coho Salmon), and fish age (age-0 or 1).

Figure 2. Map of Kenai River watershed with study tributaries and fish sampling sites highlighted. Map modified from Schoen et al. (2017).

Figure 3. Observed water temperatures by site and year (observations at 0.25 hour intervals). Water temperatures shown include those from the subset of time common to all sites and years, June 1st to August 20th. Mid-lines in each box represent median temperatures, with lower and upper boxes corresponding to lower and upper quartiles. Vertical lines correspond to minimum and maximum observations, and point representing outliers.

Figure 4. Linear regressions fit to weekly mean air and water temperature values for each site (lower, middle, and upper reaches of each study watershed). Statistically significant relationships (*p* < 0.05) are shown with a trend line and 95% confidence band. Model output and estimates for individual regressions are available in supplementary table S4.

Figure 5. Observed and modeled water temperature (monthly means; May-September) for each site and period. Modeled monthly mean temperature values shown are from the RCP 8.5 (rapid increase CO2 emissions) scenario. Monthly means were not significantly different between the RCP 6.0 (mid-range CO2 emissions) and RCP 8.5 climate scenarios (Wilcoxon rank-sum, *p* = 0.46, *W* = 12971), and only the RCP 8.5 scenario is shown here. For growth simulations, monthly decadal average values were input at a daily time step.

Figure 6. Overall diet proportions segregated by cohort (age and species) and drainage. Prey category values are calculated from mean wet mass (*n* = 772 stomachs).

Figure 7. Final mean size (g) on August 6th for fish populations by age and species from 2015 and 2016 data. Error bars indicate the maximum and minimum values for all years and cohorts within a drainage. Error bars are missing when a small range of minimum and maximum values are obscured behind the point. Lowland stream is Beaver Creek, Montane is Russian River, Glacial is Ptarmigan Creek, and Mainstem is the Kenai River.

Figure 8. Mean change in simulated juvenile salmon size at end of summer (Sept 4th) relative to 2010-2019, based on RCP 8.5 emissions scenarios, ranging from +2.6% to -23.3%. Consumption scenarios indicate mean or ± 20% of observed feeding rate. Error bars are standard deviation among multiple sites within a watershed. Absence of error bars indicates only one site within a watershed had sufficient population data to perform simulations. See Table S5 for full complete results of percent change in simulated size relative to 2010-2019.