

Plants and algae need light, warm temperature and nutrients to grow. In the Colorado River, gross primary productivity is limited by temperature, turbidity (which limits light) and flow. We also expect phosphorus (a nutrient derived from minerals), is limiting in some locations and times.

Increasing temperatures generally lead to increasing metabolic rate.

Hypothesis: We expected GPP to increase throughout the mainstem (Colorado River in Grand Canyon in response to warmer river \ temperatures in 2022. \checkmark

Alternate hypothesis: Increased water temperature leads to increased calcite precipitation which can bind phosphorus and make it unavailable. This may limit GPP production under warm water temperatures.

We saw elevated GPP with warmer water temperatures in some but not all reaches. At sixty mile, GPP may have been limited by other factors such as phosphorus.



Increased GPP is related to fish growth in Grand Canyon. Flannelmouth sucker, a bottom feeder, grows more quickly when GPP is higher.

combined with flow, gas transfer, river velocity and light data to model GPP

estimate oxygen production through photosynthesis. This example contains two days of dissolved oxygen data.











temperature for all gage locations. These data represent only those GPP estimates calculated in low turbidity conditions (turbidity <12 FNU). By removing GPP values habitat variables and GPP. GPP estimates from 2022 are colored in red to represent



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