Estimation of Stream Metabolism in Urban Study Sites

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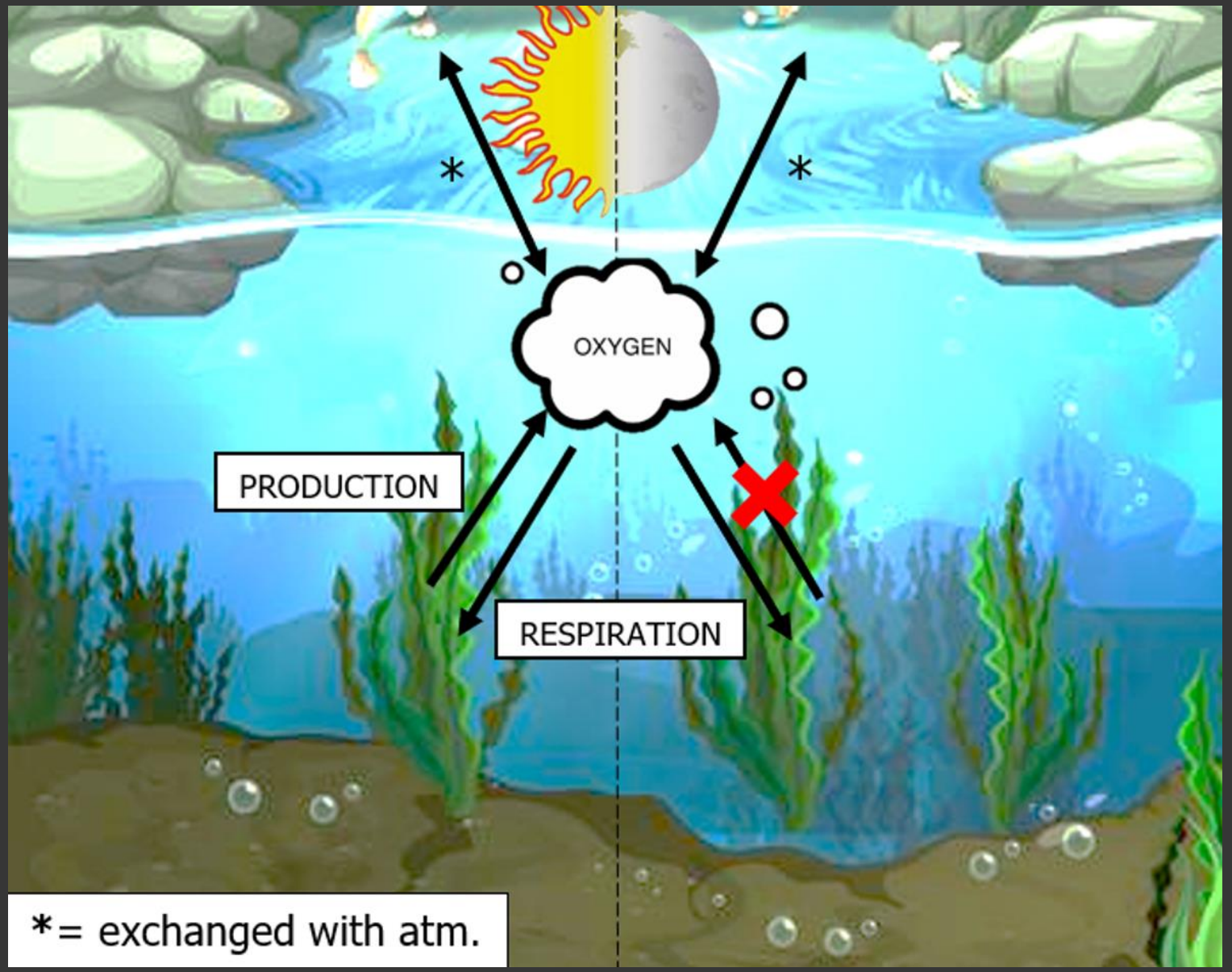
The Lab's Focuses:

- Influence of human activities on water quality
- Ecosystem stressors on algae biomass in lakes

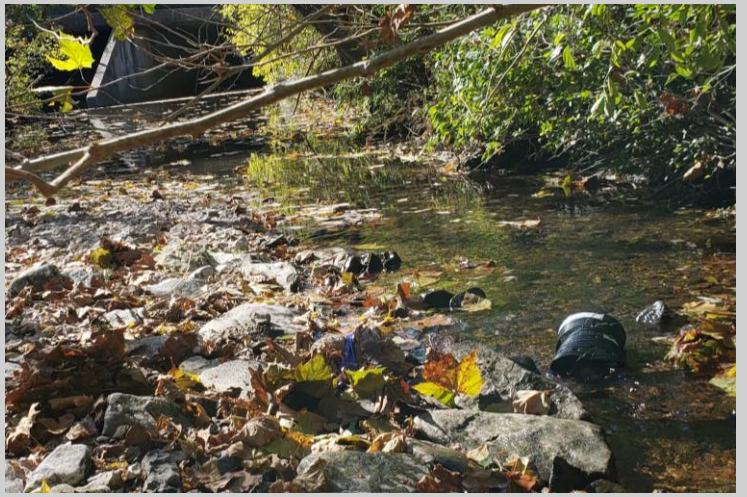
Background

- Primary production: organisms synthesize organic compounds from simpler, inorganic compounds using through photosynthesis
  - Gross Primary Production (GPP): total amount of matter organisms create within a period of time
- Respiration: chemical energy stored in organic compounds is converted to energy usable for organisms
  - Ecosystem Respiration (ER): total amount of energy used by organisms to convert compounds (like carbon into carbon dioxide) within a period of time


OXYGEN
PRODUCTION
RESPIRATION
*= exchanged with atm.

Urban Stream Sites

1



2

1 = Downstream of Flat Branch Creek, Columbia, MO
Lydia Jefferson, November 2020

2 = Downstream of Lone Elm Creek, Joplin, MO
Jessica Wilson, February 2021

Data Collection

MiniDOT Data Logger

MiniDOT Sensor in Flat Branch Creek, Columbia, MO

Data has been collected in both streams every 5 minutes from mid-November 2020

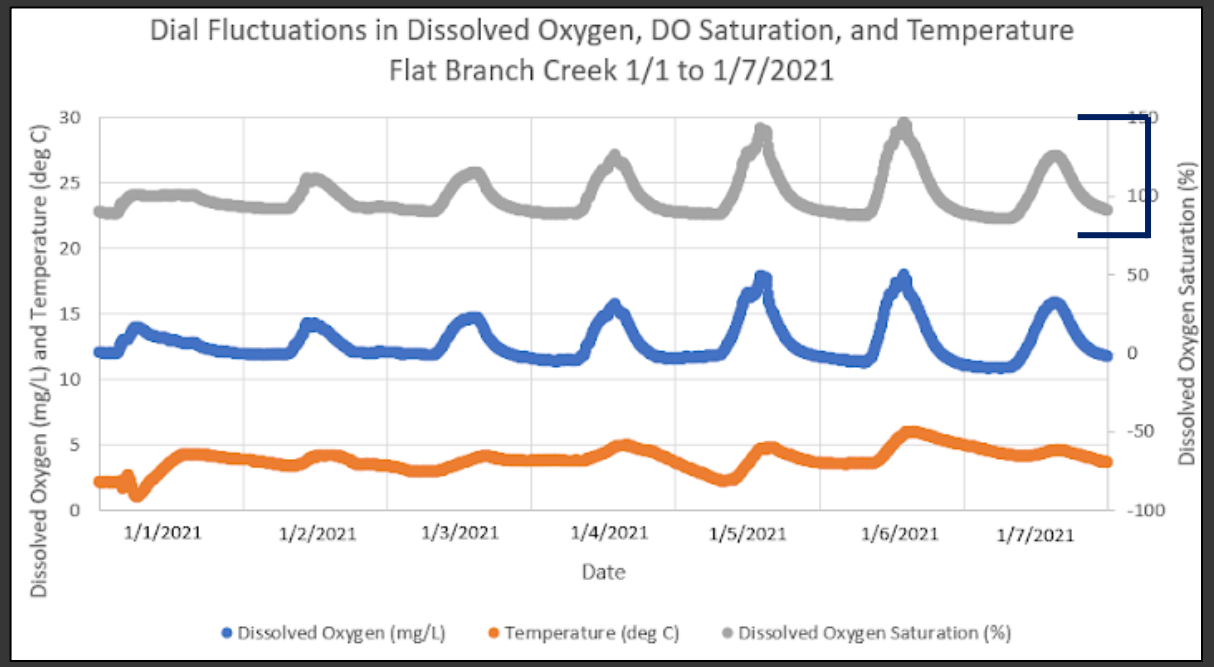
Hypothesis

1. The stream site that has lower temperatures will have higher levels of dissolved oxygen.

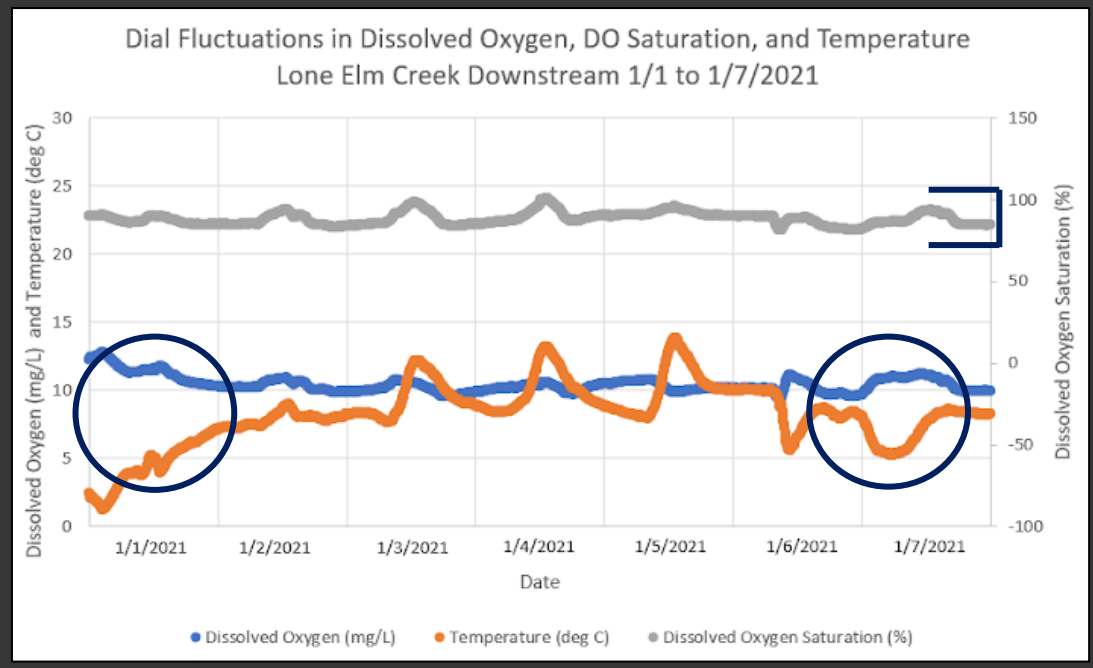
2. This might reflect differences in streamflow conditions, riparian canopy cover, and general water quality.

Results and Conclusions

Flat Branch Creek, Columbia, MO
(No Legacy Mining)



Lone Elm Creek, Joplin, MO
(Legacy Mining)



January 1st to 7th, 2021

- Flat Branch Creek = Lower temperature, higher dissolved oxygen concentration
- Lone Elm Creek = Higher temperature, lower dissolved oxygen concentration

Next Steps

- Differences observed in the streams will be replicated via in lab column experiments
  - Series of enclosed flow-through column experiments using sediments and water from both streams
  - Temperature of water will be manipulated to observe interactions between water temperature and heavy metals

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