

## DIATOMS AND IN-VIVO CHLOROPHYLL-*a* FLUORESCENCE: A CASE STUDY OF FLUORESCENCE RESPONSE TO CHANGES IN COMMUNITY STRUCTURE

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Total Maximum Daily Loads (TMDLs) have been established under authority of the Federal Clean Water Act for the Hells Canyon reach of the Snake River, on the border between Idaho and Oregon, to improve water quality and to preserve beneficial uses such as public consumption, recreation, and aquatic habitat. The TMDLs set targets for seasonal average and annual maximum concentrations of chlorophyll-*a* in phytoplankton at 14 µg/L and 30 µg/L, respectively. These criteria were meant to target “nuisance algae”. Two sites on the Snake River near the Idaho-Oregon border were sampled up to five times in 2010 for taxonomic analysis of sestonic algae. Meanwhile, continuous monitors measured chlorophyll-*a* fluorescence every 15 minutes. Continuous chlorophyll-*a* fluorescence probes were calibrated using lab results for chlorophyll-*a* analysis, as well as Rhodamine dye standards. Variations in the agreement between in-vivo chlorophyll-*a* fluorescence and chlorophyll-*a* concentration in sestonic algae determined by various laboratory methods have been evaluated as signals for population and physiological changes in the phytoplankton community. Several dynamics are illustrated when comparing chlorophyll-*a* results with community structure. First, increased numbers of non-diatom sestonic algae are negatively correlated with chlorophyll-*a* fluorescence response. Second, sestonic algal diversity is also negatively correlated with chlorophyll-*a* lab results. Third, agreement between chlorophyll-*a* fluorescence and chlorophyll-*a* lab results improves as diversity increases. This presentation will explore specific sestonic algal species and their characteristics as possible explanations for the trends observed in fluorescence response. Ultimately, this study concluded that continuous chlorophyll-*a* fluorescence probes alone were not the best measure of “nuisance algae”. Monitoring the extent of macrophyte and periphyton communities as well as dissolved oxygen response likely provides a more direct measure of impacts on beneficial uses.

ORAL PRESENTATION