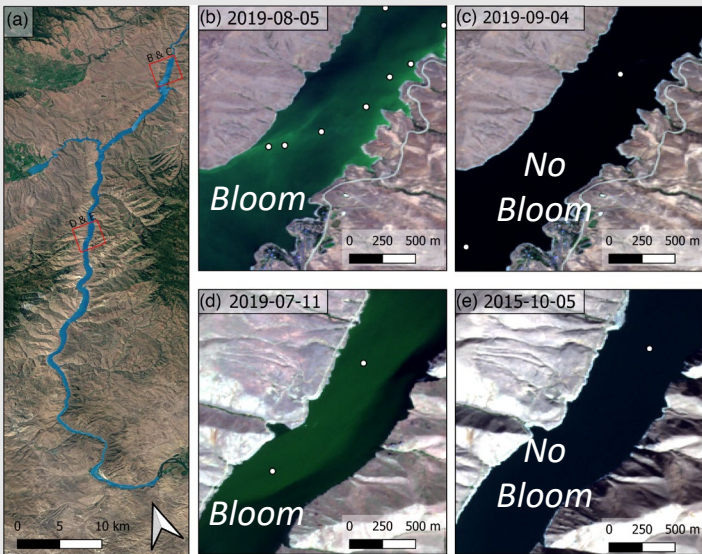




Imagery derived bloom observation examples

Index ID	Index name	Equations using Sentinel-2 bands	Citation	Sensor used in citation
S01	Be162Bsub	$b5 - b4$	Beck et al. ³⁹	MSI
S02	BR23	$\frac{2}{b3}$	O'Reilly et al. ⁴⁴	OLI and MSI
S03	BR54	$\frac{b5}{b4}$	Gons et al. ⁴⁰	MSI
S04	BR8a4	$\frac{b8a}{b4}$	Tebb et al. ⁴⁵	OLI
S05	Go04MCI	$b5 - b6$	Gower et al. ⁵⁸	MERIS
S06	KIVU	$\frac{b2 - b4}{b3}$	Beck et al. ³⁰	OLI
S07	L83BDA	$\left(\frac{1}{b2} - \frac{1}{b4}\right) * b3$	Beck et al. ³⁰	OLI
S08	FLHviolet	$b3 - (b4 + (b1 - b4))$	Beck et al. ³⁰	OLI
S09	MCI	$b5 - b4 - (b6 - b4) * \left(\frac{704.1 - 664.6}{740.5 - 664.6}\right)$	Le et al. ⁴¹	MERIS
S10	Moses3b	$\left(\frac{1}{b4} - \frac{1}{b5}\right) * b6$	Moses et al. ⁴³	MSI
S11	NDCi54	$\frac{(b5 - b4)}{(b5 + b4)}$	Mishra et al. ⁴²	MSI
S12	NDCi8a4	$\frac{(b8a - b4)}{(b8a + b4)}$	Beck et al. ³⁰	OLI
S13	S23BDA	$\left(\frac{1}{b4} - \frac{1}{b5}\right) * 8$	Beck et al. ³⁰	MSI
S14	FLHblue	$b3 - (b4 + (b2 - b4))$	Beck et al. ³⁰	MSI
S15	SABI	$\frac{(b8a - b4)}{(b2 + b3)}$	Alawadi ³⁸	OLI
S16	Toming	$b5 - \left(\frac{b4 + b6}{2}\right)$	Toming et al. ⁴⁸	MSI
S17	ZhFLH	$b8a - (b5 + (b4 - b5))$	Zhao et al. ⁵⁹	MERIS

Seventeen spectral indices evaluated

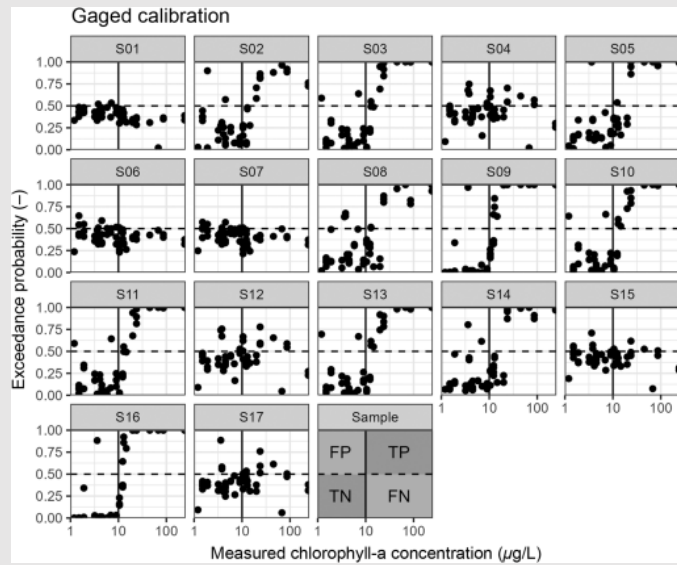
Key Points:

1. Bloom presence/absence models trained without in-situ data were 79% accurate in bloom classification
2. 11 of 17 common spectral indices are highly correlated and do not provide unique information
3. Multivariate models with 6 most unique indices outperformed univariate models and were 82% accurate in bloom classification
4. Webapp in production for select Idaho waterbodies

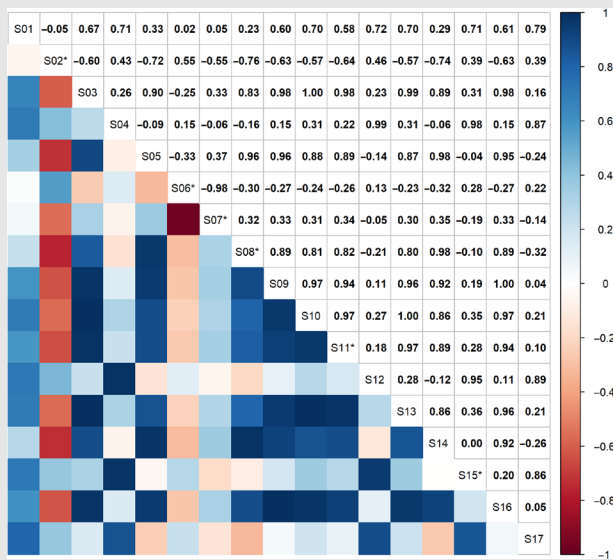
Data: [Sentinel-2 MSI Imagery, in-situ chlorophyll-a concentrations](#)

Bloom Definition: $> 10 \mu\text{g Chlorophyll-a/L}$

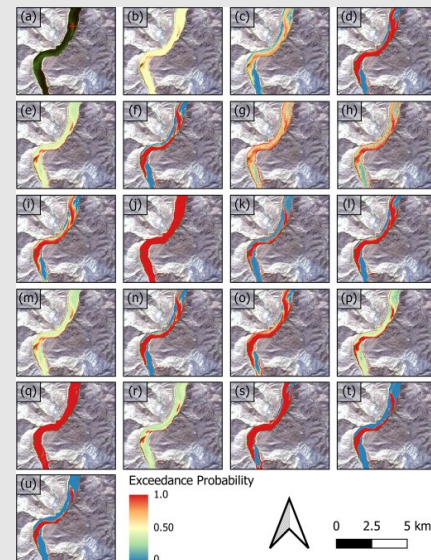
Location: Brownlee Reservoir, ID



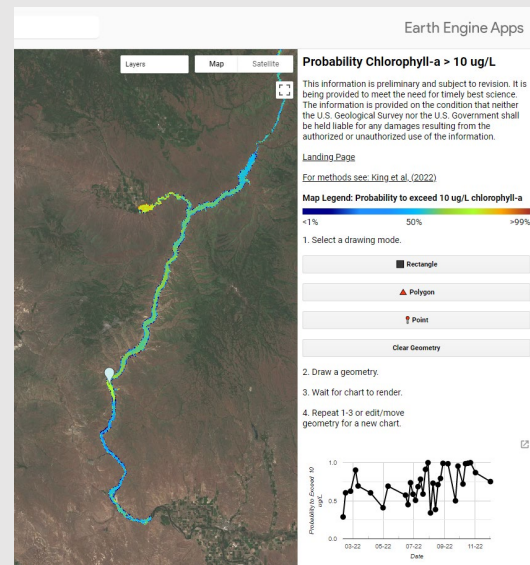
Univariate model examples



11 of 17 indices are highly correlated



Multivariate model 82% accurate



Web application in production