**Tetra Tech Project Description**

**Project Summary:**

Satellite data and field data are often not collected at the same time, resulting in a source of error in ocean color algorithm development that is frequently cited in the literature, but is poorly constrained. In this study, we want to model particle movement over time under a range of wind speed and direction conditions and compare the results to the pixel size of Planet, Sentinel 2, and Sentinel 3 satellite imagery on Jordan Lake, North Carolina.

**Tetra Tech Approach:**

We will us the existing 2014-2018 Jordan Lake 3D EDFC model to track surface water particle movement using the climatological data that Tetra Tech has already sourced for Jordan Lake. Ideally, Tetra Tech will not have to reparametrize or change anything in the existing model. We will use the output coordinates to create a time series of particle location and will track where that particle travels over a six-hour time frame.

**Parameters:**

* Time Period: 2014 -2018
* Study Site: Jordan Lake, NC
* Spatial Resolution: 500m
* Temporal Intervals: Measurements every 15min from 9am - 3pm, for a 6 hour modeling duration. We can filter for our desired time constraints.

**Questions**

Do we track multiple particles across the study site? If so, how do we decide how to spatially distribute them?

**Desired Outputs:**

* x,y,z coordinates at 15 min intervals
  + No need for water quality information, just particle location.
  + We can also aggregate data as needed (seasonal and month binning, storm events), we don't need any post-processing applied to the data.
* Wind Speed (m/s)
* Wind Direction (degrees)
* Flow rate at 1m intervals up to 2m depth (max satellite penetration depth), ideally cubic feet per second, but we can also do our own conversions.

**Sample Output Table for One Particle**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time | x-coordinate | y-coordinate | z-coordinate | Wind speed (m/s) | Wind direction (degrees) | Flow rate 0m | Flow rate 1m | Flow rate 2m |
| 0900 |  |  |  |  |  |  |  |  |
| 0915 |  |  |  |  |  |  |  |  |
| 0930 |  |  |  |  |  |  |  |  |
| 0945 |  |  |  |  |  |  |  |  |
| 1000 |  |  |  |  |  |  |  |  |