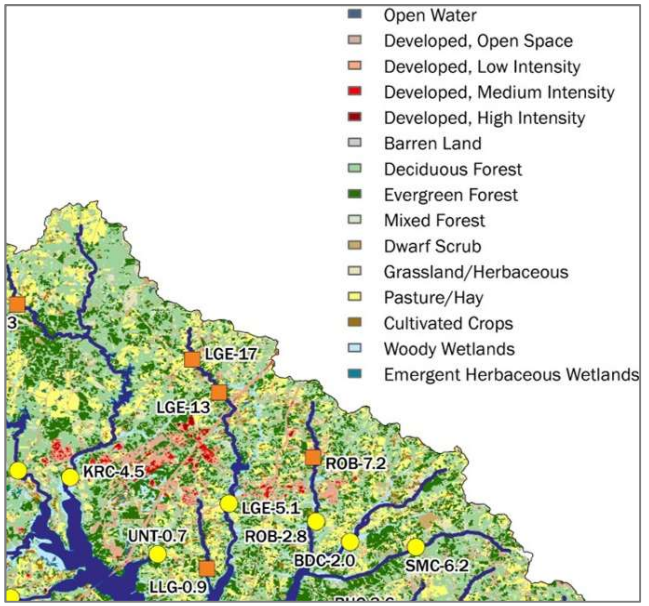
UNRBA Path Forward Committee Meeting

MRS Project
Status Update

May 23, 2018

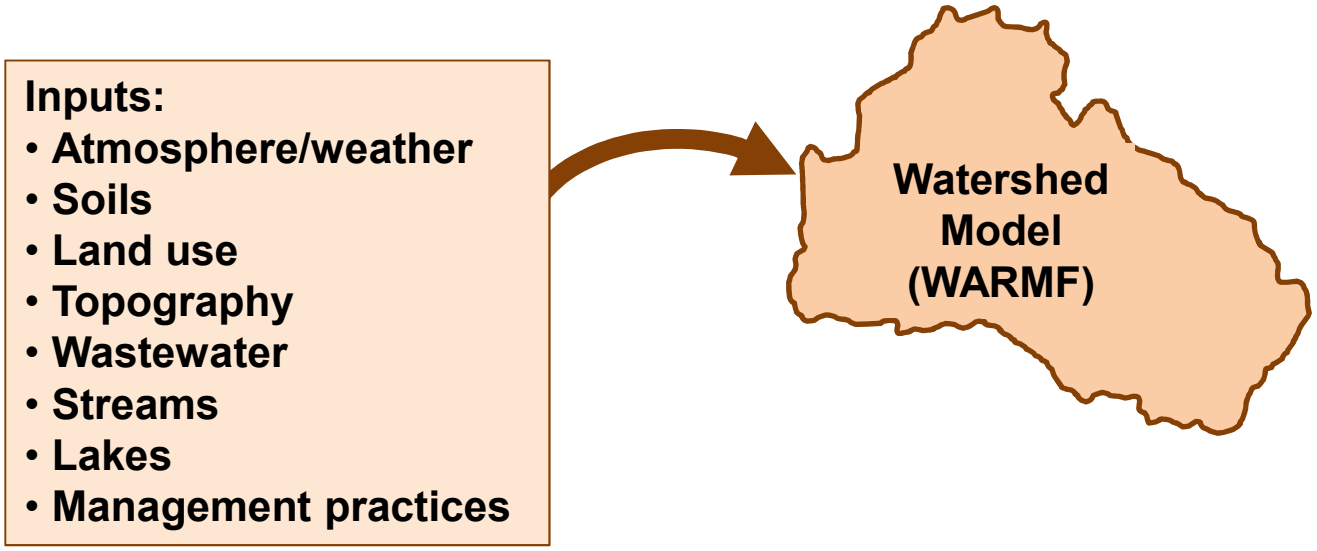
Data Management Plan and Description of the Modeling Process

- Describes the procedures for managing model inputs and outputs
  - Time series
  - Spatial data
- Describes development of the input files
  - WARMF watershed and lake model
  - EFDC lake hydrodynamic/water quality model
- Describes modeling process
- Document is under review by the Executive Director and Subject Matter Experts
- Review by the MRSW and PFC in June



Watershed Data Collection

- Received approximately 75 percent of the data expected from UNRBA members and agricultural representatives
- Continuing to compile and summarize data
- Propose two stakeholder meetings in FY2019
  - Review data and discuss preliminary assumptions
  - Focus on time series inputs and model configuration in the Fall
  - Discuss land use, soils, and associated inputs in the Spring

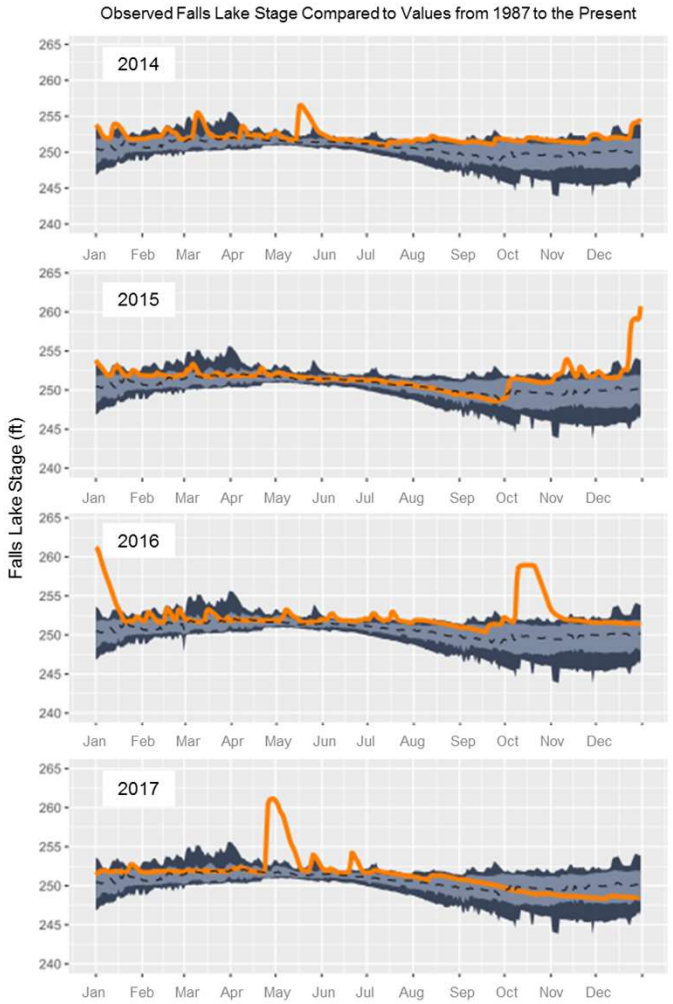


Work Planning for FY2019

- Continue to compile and summarize data for the watershed
- Process USGS NLCD data when released in December 2018
  - Year 2016 release
  - Years 2001, 2006, 2011 - reharmonized
- Two stakeholder meetings
  - Fall meeting would focus on model configuration and time series inputs
  - Spring meeting would focus on soils and land use data and associated inputs

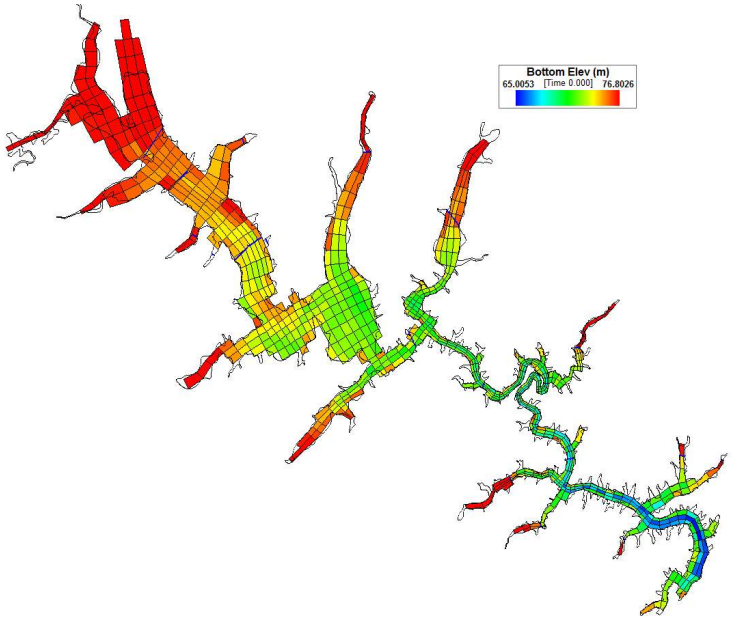
Work Planning for FY2019, continued

- WARMF watershed model
  - Develop input files based on data received
  - Focus on hydrologic calibration after land use data is processed and incorporated
- EFDC lake model
  - Develop input files based on publically available data (USGS, USACE, NOAA, etc.)
  - Focus on hydrodynamic calibration
- Statistical analyses
  - Conduct analyses requested by modelers (load estimates, lake water quality cluster analyses, lake profile analyses)
  - Evaluate performance of spatial meteorological models
  - Preliminary water quality analyses to support Bayesian modeling



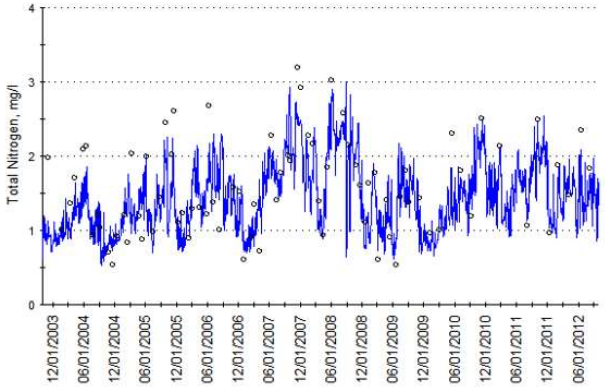
Purpose of the Fall Stakeholder Meeting

- Provide a status update on modeling efforts
- Present a subset of data received
  - Provide an opportunity to comment
  - Elicit feedback for specific topics
- Describe next steps for modeling including data to be presented at Spring Meeting



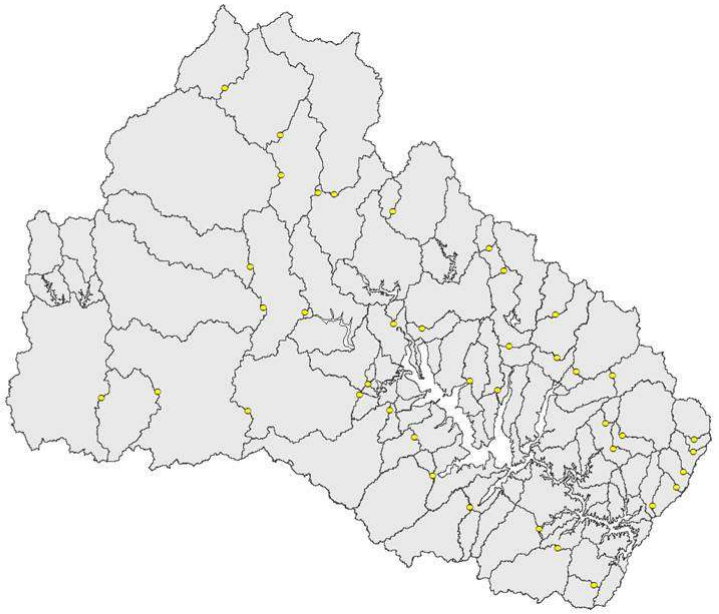
Discuss a Subset of Time Series Inputs

- Major wastewater treatment plants
- Withdrawals from impoundments
- Air quality data
- Meteorological data and options for processing
  - Use point locations to represent regions, or
  - Use NASA simulation models to provide more spatial resolution
  - Evaluate these options in FY2019
  - Discuss and receive input from stakeholders



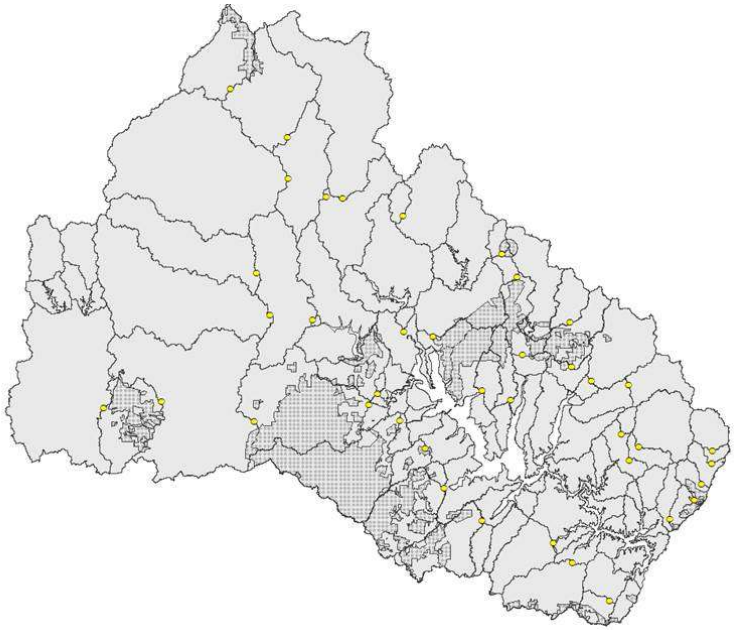
Discuss Catchment Delineation

- Watershed modelers have delineated preliminary catchments for the watershed model
- Based on USGS StreamStats Tool
- Discuss with stakeholders
  - Goal of modeling is to assign jurisdictional loading
  - Potential need for further delineations



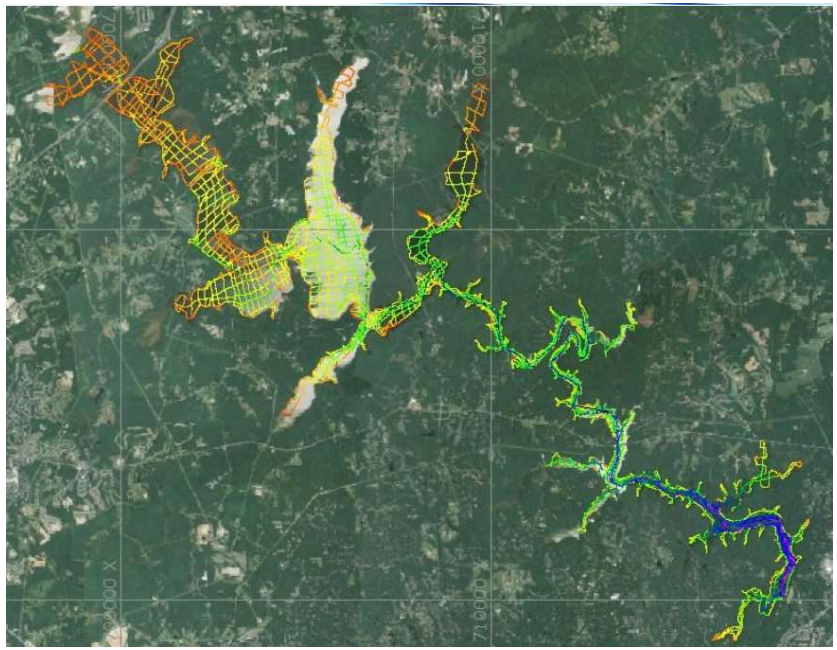
Discuss Further Catchment Delineation

- One option is to further delineate catchments using municipal boundaries and county lines
- Need to use one set of delineations across all model periods
  - 2005-2007
  - 2014-2018
- Annexation results in changes to boundaries
- Discuss with stakeholders the best sources of municipal boundaries and best period for the boundaries



Present Hydrodynamic Grid Development

- Lake modelers developed a model grid for the EFDC model
- Uses data collected by the UNRBA
  - Lake Bathymetry Study
- Established 804 grid cells
  - 454 cells in lower lake
    - Smaller cells are required to capturing meandering section of the lake
  - 350 cells in upper lake
    - Lake bathymetry varies gradually, so larger cells are sufficient to capture changes in water quality

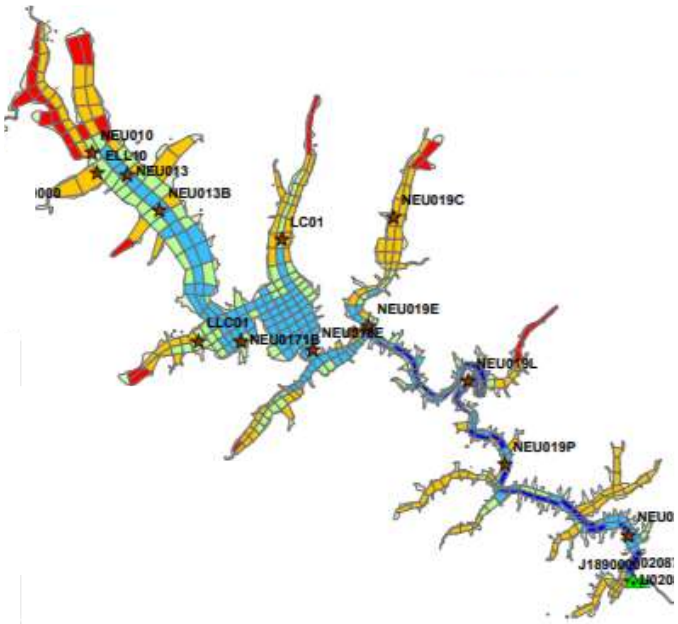


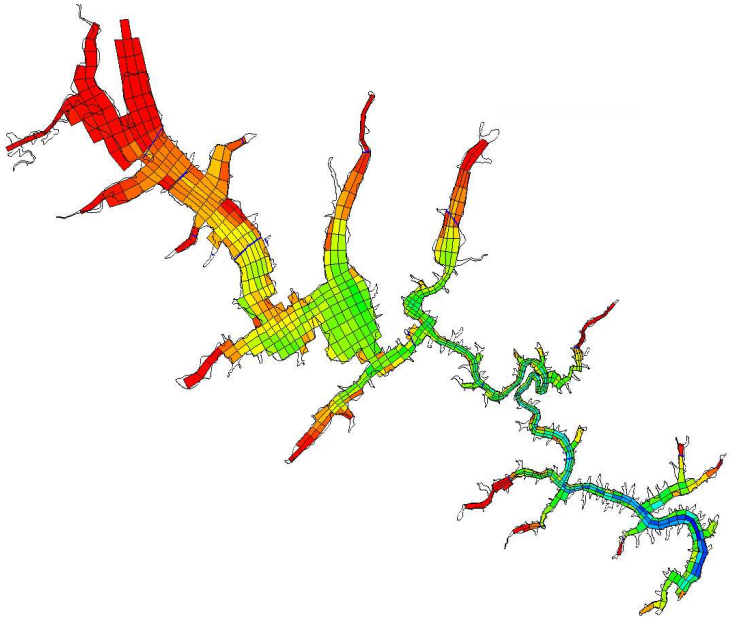
UNRBA transects for the bathymetry study

Comparison of DWR and UNRBA EFDC Model Grids

The DWR model grid had 519 grid cells. It was developed using 17 transects measured across Falls Lake.

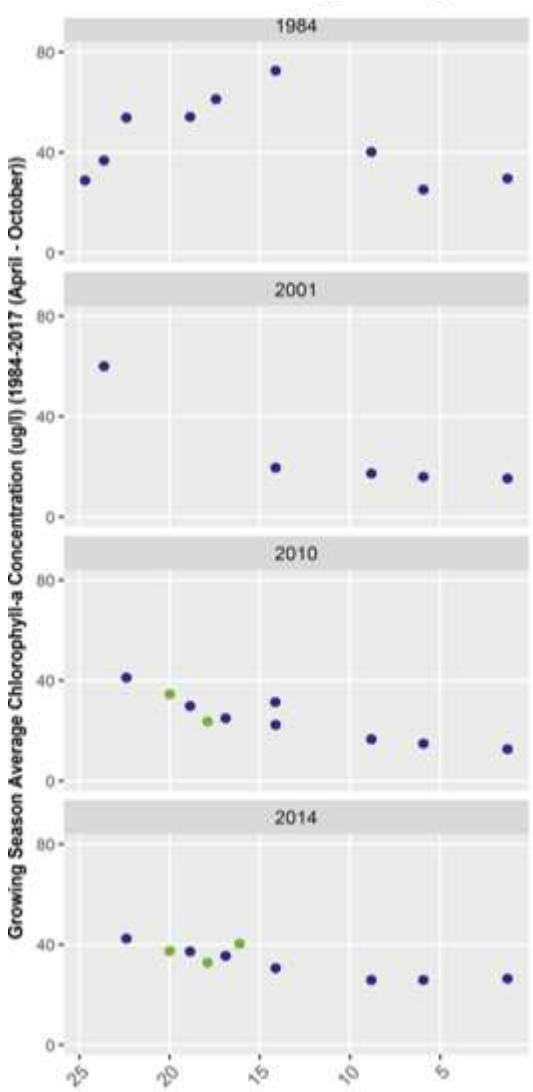
The UNRBA model grid has 804 grid cells. It was developed using sonar data measured along many transects across Falls Lake.



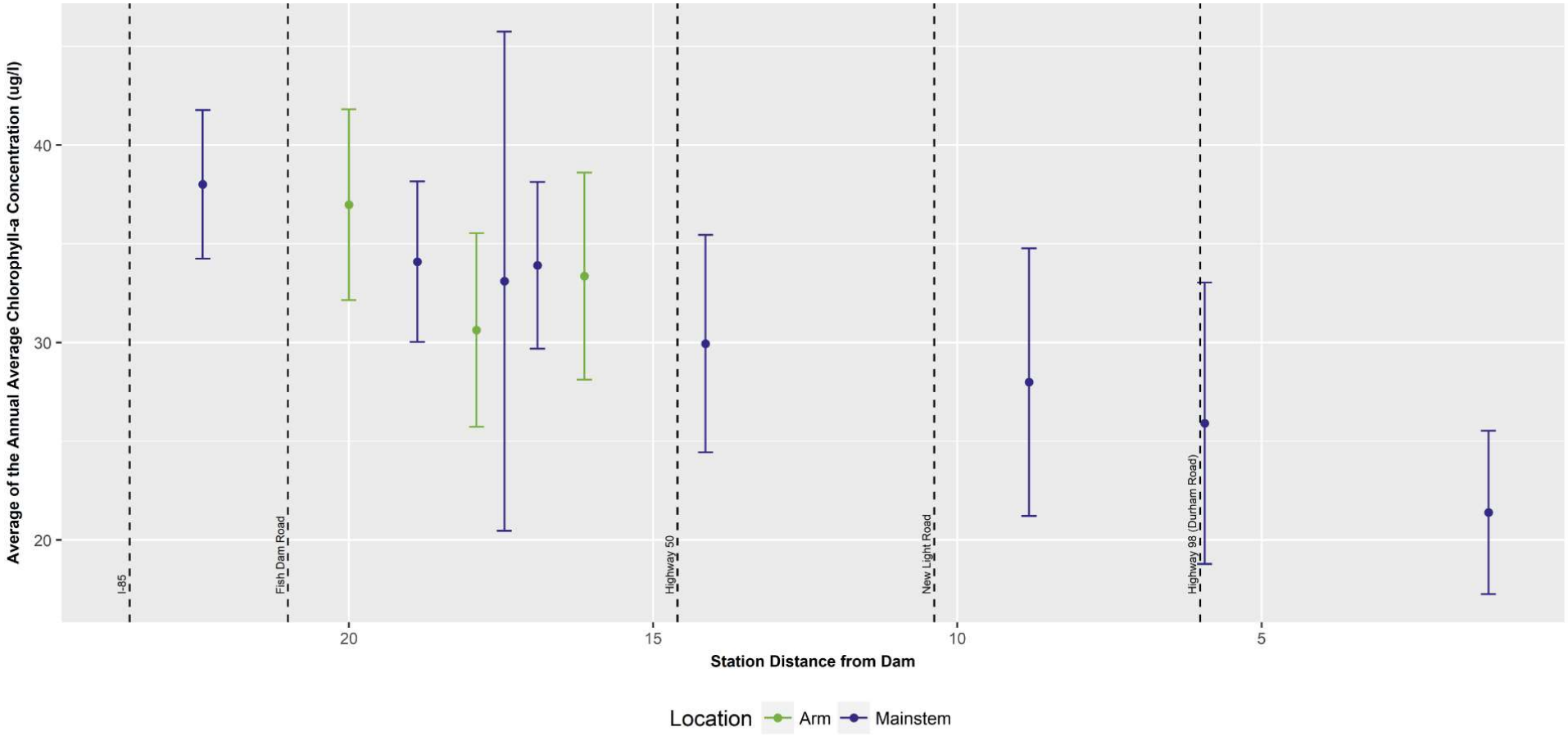


Discuss Analyses for Lake Segmentation

- Statisticians evaluated historic water quality data in Falls Lake
  - 1984 to 2017
  - Annual and seasonal statistics
  - Arithmetic and geometric means
- Consistent improvements in water quality from upstream to downstream
- No clear indication for additional lake segments beyond bridge constrictions
- Additional analyses will be performed in FY2019 to confirm

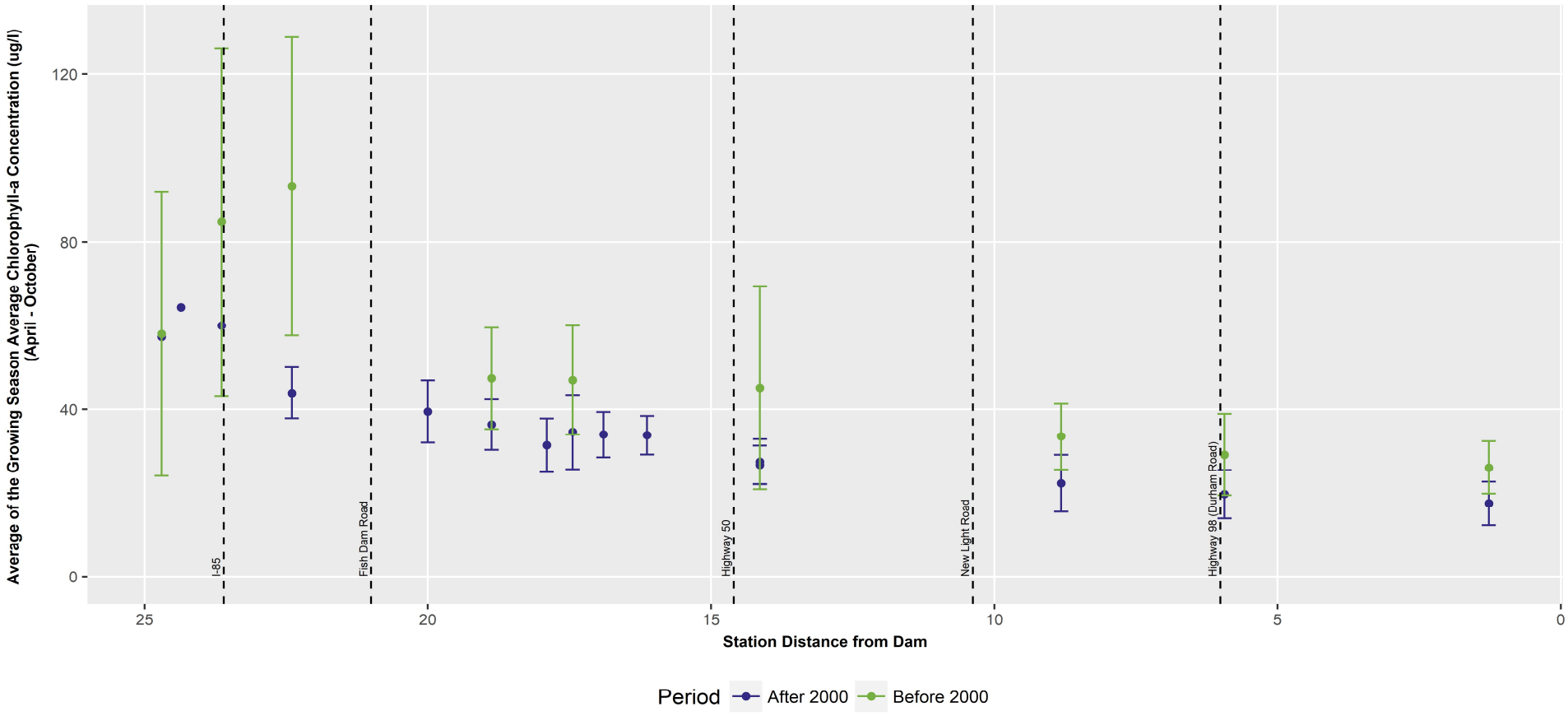


Chlorophyll *a* – Upstream to Downstream



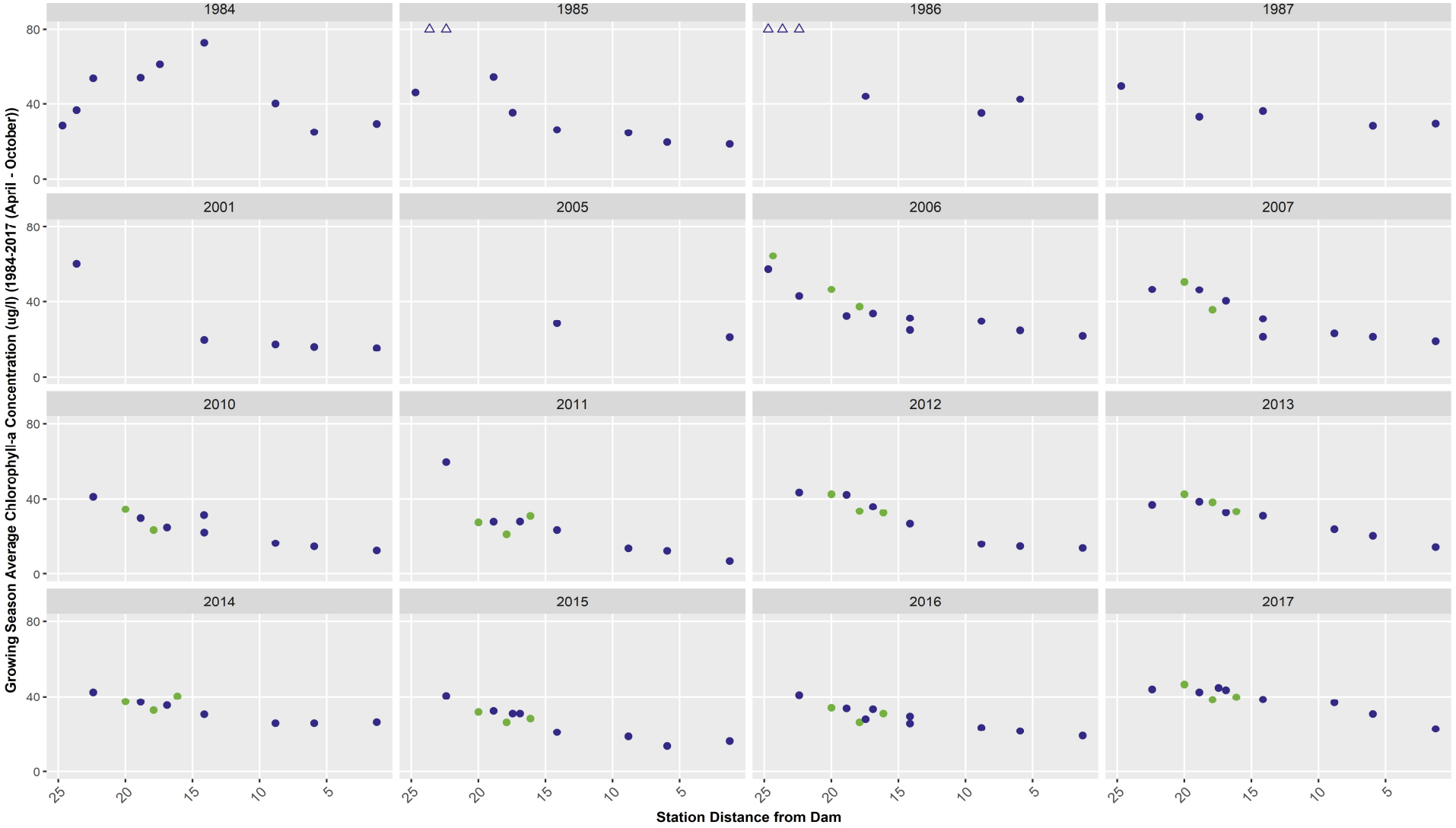
*Only Stations with at least 10 samples per year are included

Chlorophyll *a* – Before and After 2000



*Only Stations with at least 3 samples per season are included

Chlorophyll *a* – Through Time



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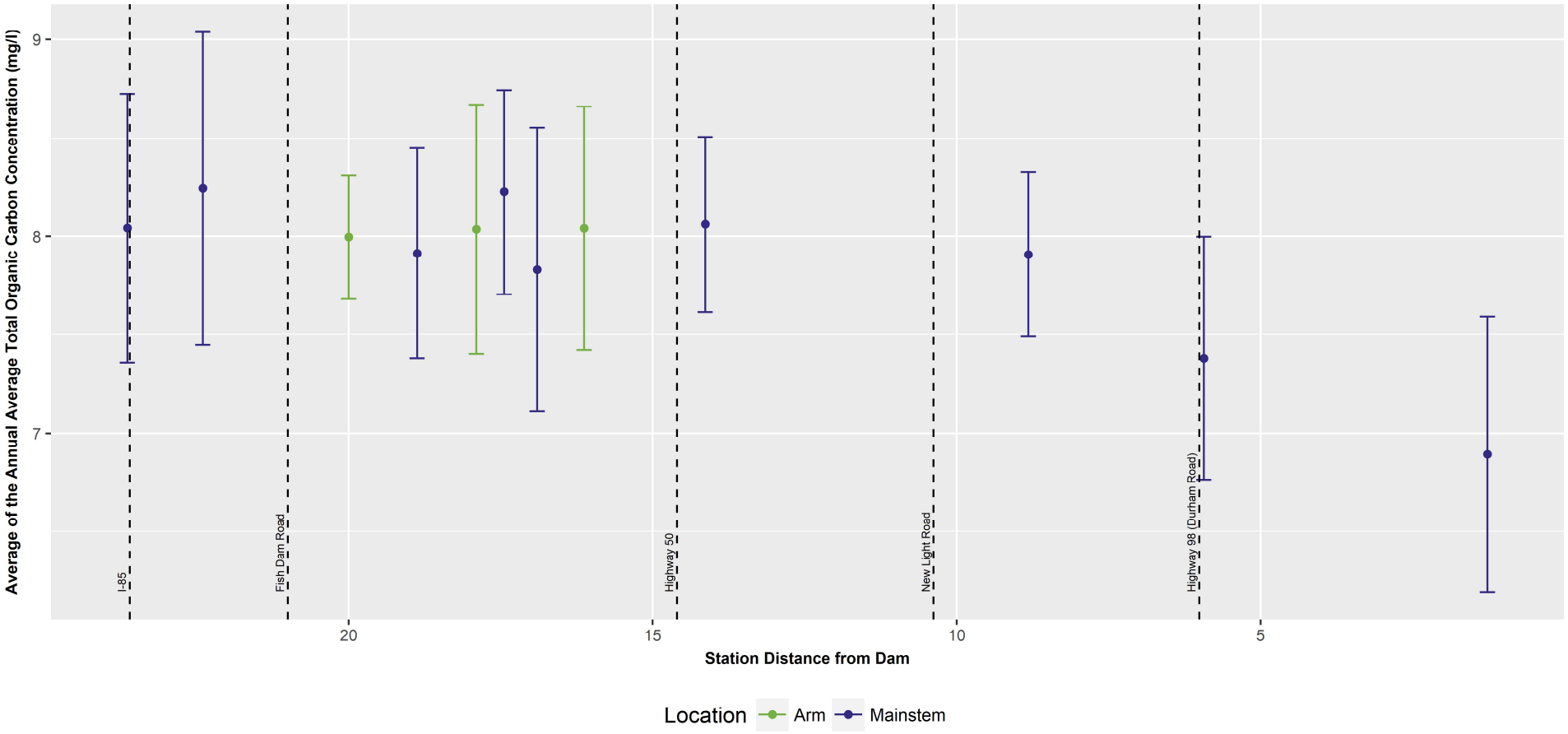
TOC – Upstream to Downstream



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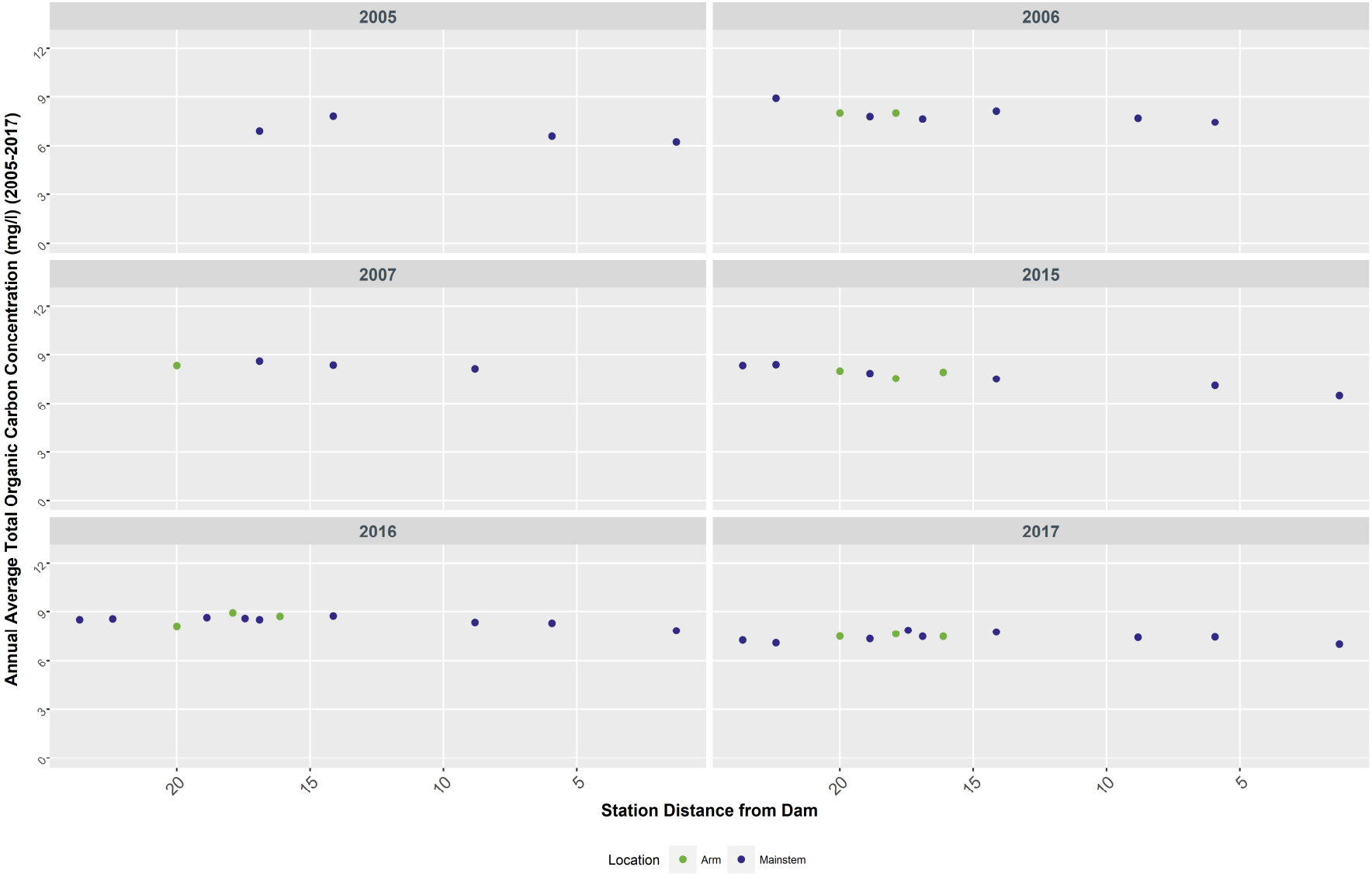
TOC – Through Time



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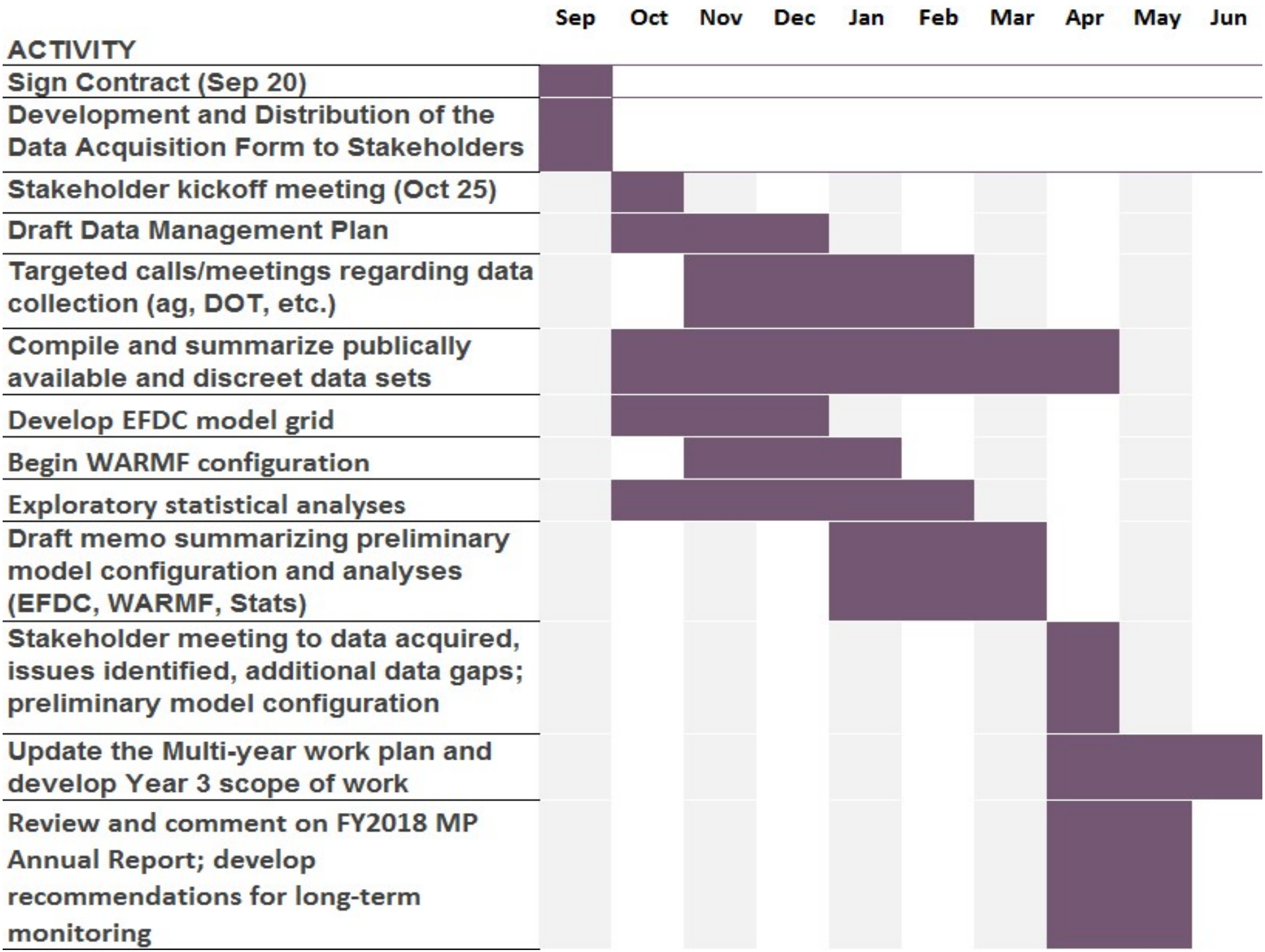
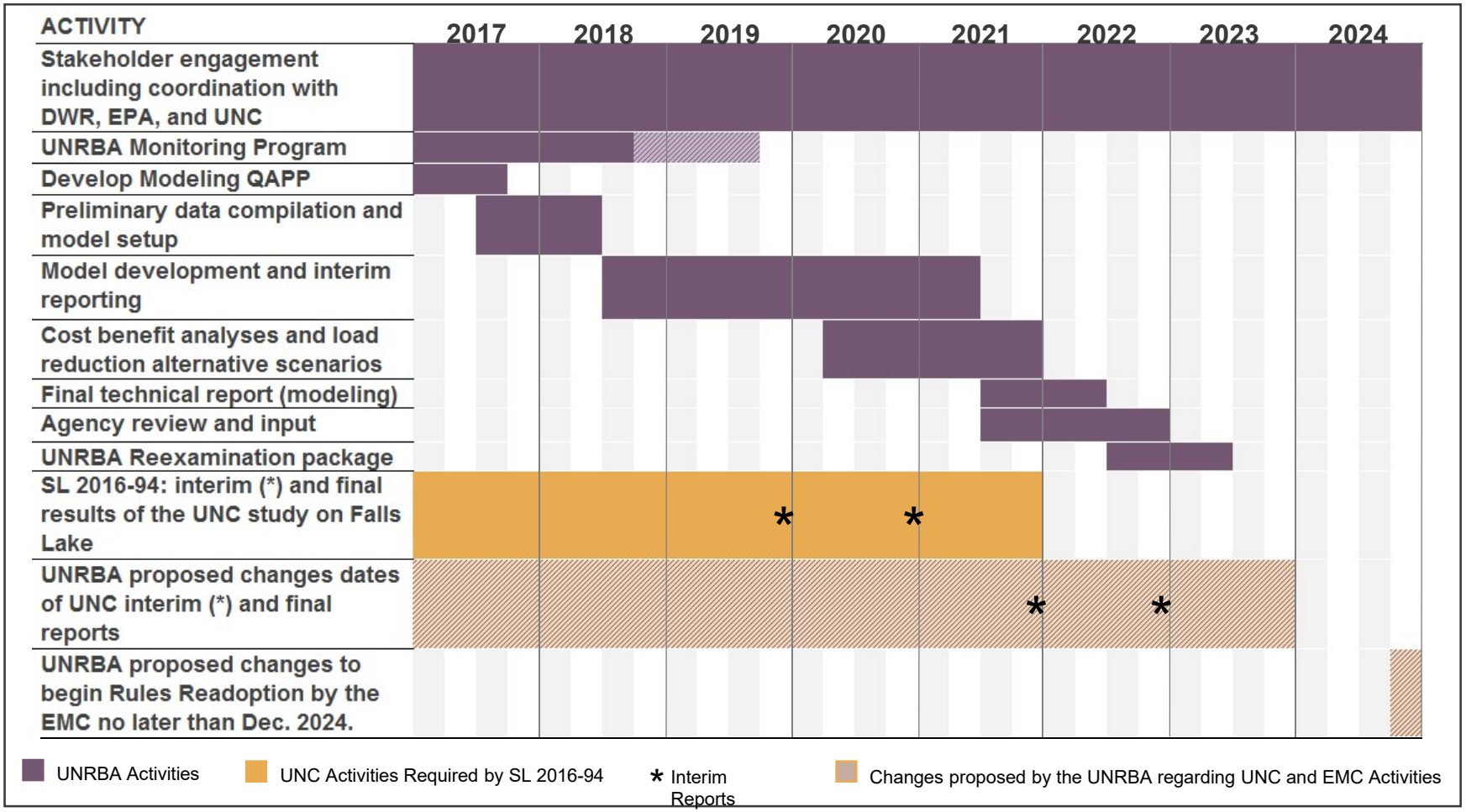
Memorandum to Support Fall 2018 Meeting

- Describe the data sets that will be discussed
- Present lake grid and preliminary catchments
- Highlight key points of discussion and input
  - Potential further catchment delineation
    - Source of boundaries
    - Representative period
  - Meteorological inputs
    - Representative point locations
    - Spatial simulation models
- List data sets that will be discussed at Spring meeting

Questions ?


Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
ACTIVITY
Sign Contract (Sep 20)
Development and Distribution of the Data Acquisition Form to Stakeholders
Stakeholder kickoff meeting (Oct 25)
Draft Data Management Plan
Targeted calls/meetings regarding data collection (ag, DOT, etc.)
Compile and summarize publically available and discreet data sets
Develop EFDC model grid
Begin WARMF configuration
Exploratory statistical analyses
Draft memo summarizing preliminary model configuration and analyses (EFDC, WARMF, Stats)
Stakeholder meeting to data acquired, issues identified, additional data gaps; preliminary model configuration
Update the Multi-year work plan and develop Year 3 scope of work
Review and comment on FY2018 MP Annual Report; develop recommendations for long-term monitoring


ACTIVITY
2017
2018
2019
2020
2021
2022
2023
2024
Stakeholder engagement including coordination with DWR, EPA, and UNC
UNRBA Monitoring Program
Develop Modeling QAPP
Preliminary data compilation and model setup
Model development and interim reporting
Cost benefit analyses and load reduction alternative scenarios
Final technical report (modeling)
Agency review and input
UNRBA Reexamination package
SL 2016-94: interim (*) and final results of the UNC study on Falls Lake
UNRBA proposed changes dates of UNC interim (*) and final reports
UNRBA proposed changes to begin Rules Readoption by the EMC no later than Dec. 2024.
UNRBA Activities
UNC Activities Required by SL 2016-94
* Interim Reports
Changes proposed by the UNRBA regarding UNC and EMC Activities