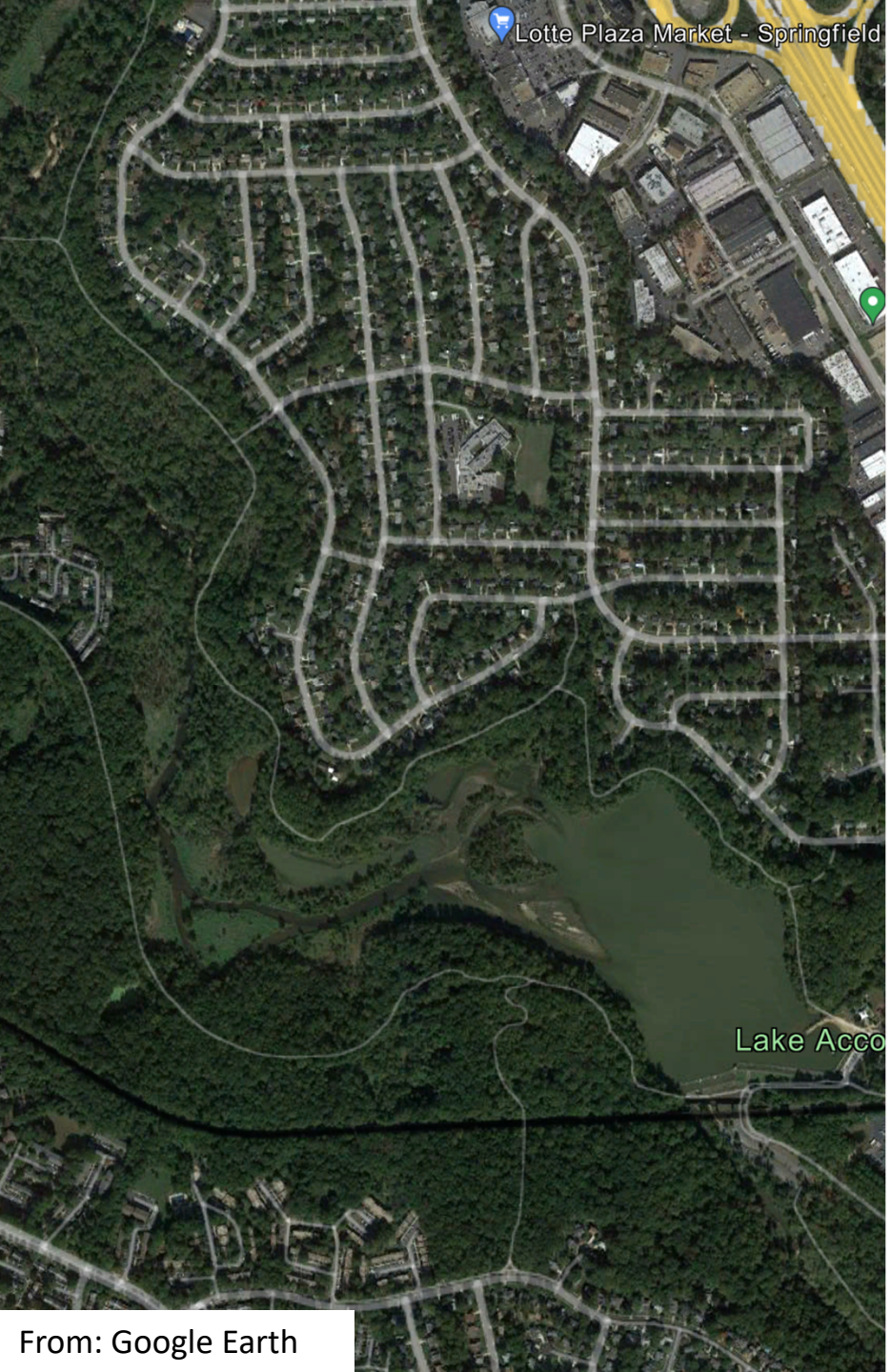


From: Google Earth

LAKE ACCOTINK FORECASTING

TASK FORCE MEETING – NOVEMBER 27, 2023

CRAIG TAYLOR

Note: all materials in this presentation are based on high-level assessments and should be considered preliminary.

LimnoTech
Water Environment | Scientists Engineers

ROUGH ORDER OF MAGNITUDE (ROM) COSTING

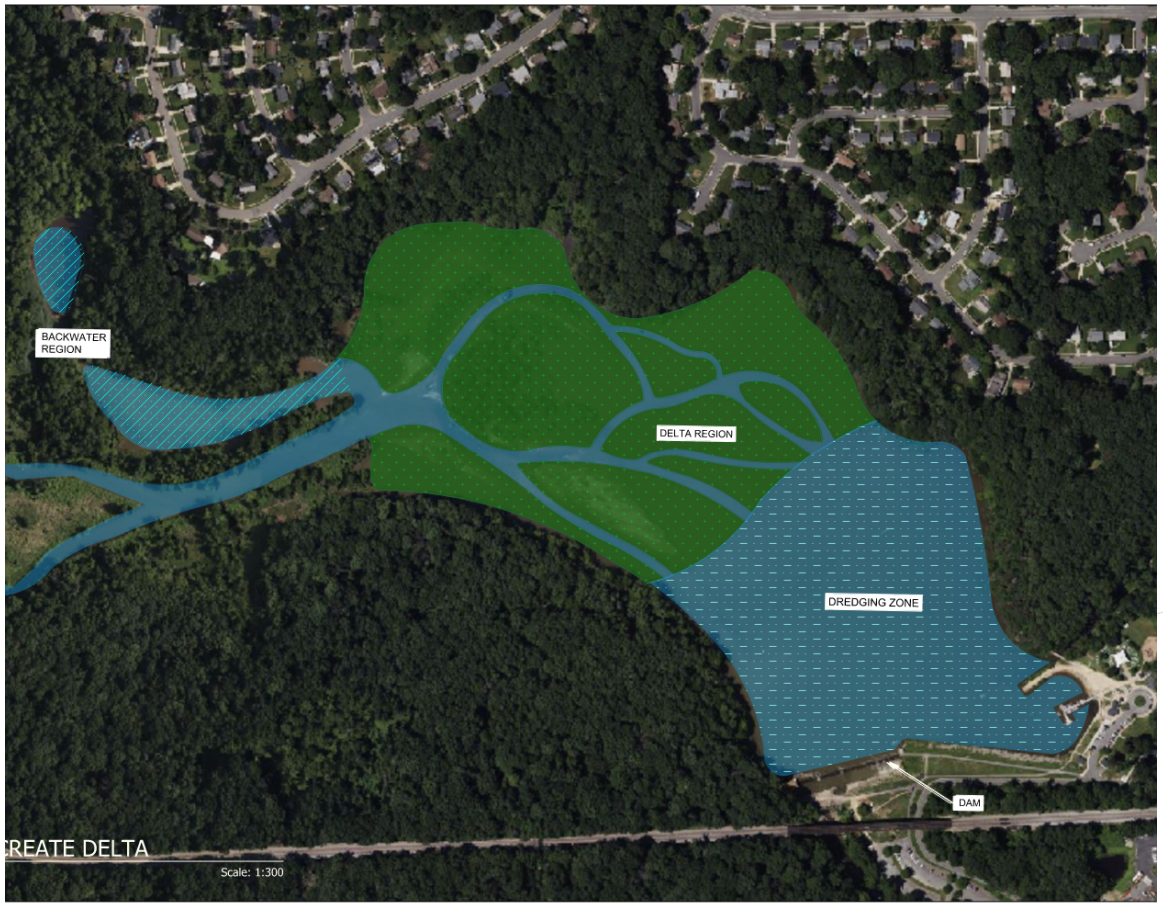
- AACE Class 5 Level Estimates
  - Accuracy range between -30% to +50%.
- Extreme fluctuations of commodities
  - post-Covid shutdowns
  - Energy price fluctuations due to the Russia/Ukraine War
  - Global crises
  - Workflow changes
- Relative Price Analysis

Unit Dredging Costs

ARCADIS COSTS	$/CY
Dredging	$46.00
Dewatering	$26.00
Material processing/Transportation and Disposal	$118.60
Total	$190.60

Project	Project Location	Project Status	Volume of Sediment Dredged (CY)	Type of Dredging	Estimated Project Cost	Estimated Cost/CY
Lake Accotink	Fairfax County, VA	Conceptual	500,000	Hydraulic	$67 - $143M	$134 - $286
Little Seneca Forebays	Montgomery County, MD	In Design	150,000	Mechanical	$26 - $40M	$173 - $266
Arrowhead Cove	Garrett County, MD	In Construction	15,000	Mechanical	$2.2M	$146
Lake Linganore	Frederick County, MD	Completed in 2021	150,000	Hydraulic	$21M	$140
Falling Creek Reservoir	Chesterfield County, VA	Construction Bids	112,000	Mechanical	$15-$22M	$134 - $196

2H. MANAGED WETLAND



Initial Construction (Multiple Iterations Possible)

DESCRIPTION OF WORK	VALUE	Unit Cost Reference and Assumptions
Dredging (Base)	$6,827,642.00	➢ Based on Arcadis dredge program cost (1/2 open water (23 acres), dredged by 4 ft)
Dewatering	$3,859,102.00	➢ Same unit cost as ARCADIS and dewatering assumptions
Material Processing / Transportation & Disposal	$8,831,466.00	➢ Same unit cost as ARCADIS. Keeping 1/2 of the material to construct and grade wetland features
Grading, conversion of dredged material to features (islands within the lake)	$1,391,500.00	➢ Unit price for island creation for current project in Austin, Texas +25%
Amenities / Trails, bridge, boardwalks, dock	$750,000.00	➢ BPJ
Riparian Planting	$350,000.00	➢ BPJ
Design/Permitting	$1,000,000.00	➢ BPJ; Represented as approximately 5% of construction cost
TOTAL	**$23,009,710.00**	

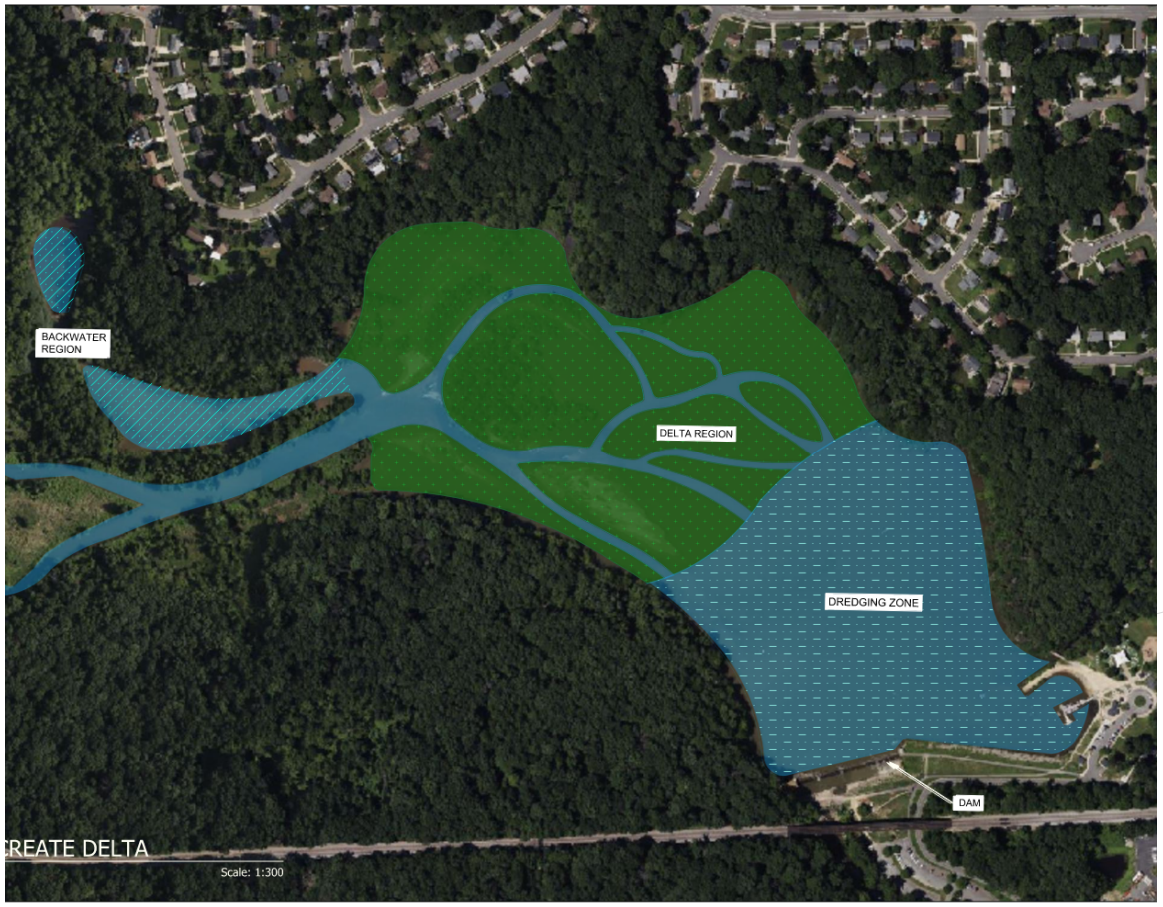
Wetland Maintenance (Annual)

DESCRIPTION OF WORK	VALUE	Unit Cost Reference and Assumptions
Annual Maintenance	$50,000.00	➢ Huntley Meadows Park
Total	**$50,000.00**	

Maintenance Dredging (3-7 Years)

DESCRIPTION OF WORK	VALUE	Unit Cost Reference and Assumptions
Dredging (Base)	$6,827,642.00	➢ Based on Arcadis dredge program cost (1/2 open water (23 acres), dredged by 4 ft)
Dewatering	$3,859,102.00	➢ Same unit cost as ARCADIS and dewatering assumptions
Material Processing / Transportation & Disposal	$17,662,813.00	➢ Same unit costs as ARCADIS. Disposal of all material
Total	**$28,349,557.00**	

3F. MAINTAIN OPEN WATER



Management Only for 5-15 Years

DESCRIPTION OF WORK	VALUE	Unit Cost Reference and Assumptions
Annual Maintenance	$500,000	➢ Huntley Meadows Park
Total	**$500,000.00**	

Maintenance Dredging (3-7 Years after target area achieved)

DESCRIPTION OF WORK	VALUE	Unit Cost Reference and Assumptions
Dredging (Base)	$6,827,642.00	➢ Based on Arcadis dredge program cost (1/2 open water (23 acres), dredged by 4 ft)
Dewatering	$3,859,102.00	➢ Same unit cost as ARCADIS and dewatering assumptions
Material Processing / Transportation & Disposal	$17,662,813.00	➢ Same unit costs as ARCADIS. Disposal of all material
Total	**$28,349,557.00**	

4E. DAM MODIFICATION COSTS

- How would Lake Accotink Dam be incorporated into a managed wetland option?
  - Could the dam remain as is?
  - Could the dam be modified to improve wetland function and maintenance?
  - Would management options be improved by removal of any portion of the dam?
  - How could fish passage be incorporated into dam/lake management options?

- How much would it cost to modify the dam under the scenarios.

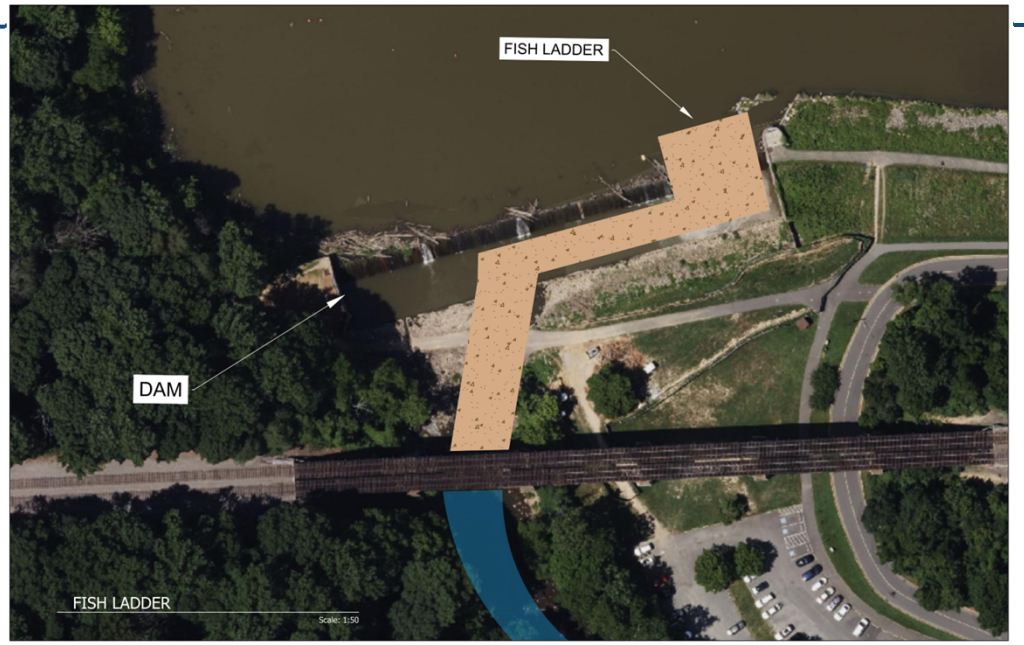
4E. DAM MODIFICATION COSTS

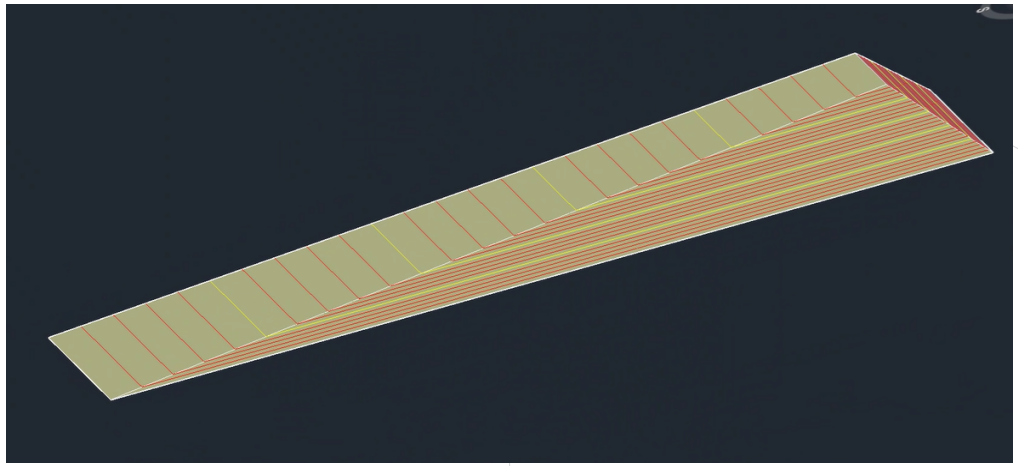
- How would Lake Accotink Dam be incorporated into a managed wetland option?
  - Could the dam remain as is? $0
  - Could the dam be modified to improve wetland function and maintenance? Annual Maintenance
  - Would management options be improved by removal of any portion of the dam? N/A
  - How could fish passage be incorporated into dam/lake management options?

- How much would it cost to modify the dam under the scenarios.

4E. FISH PASSAGE COSTS

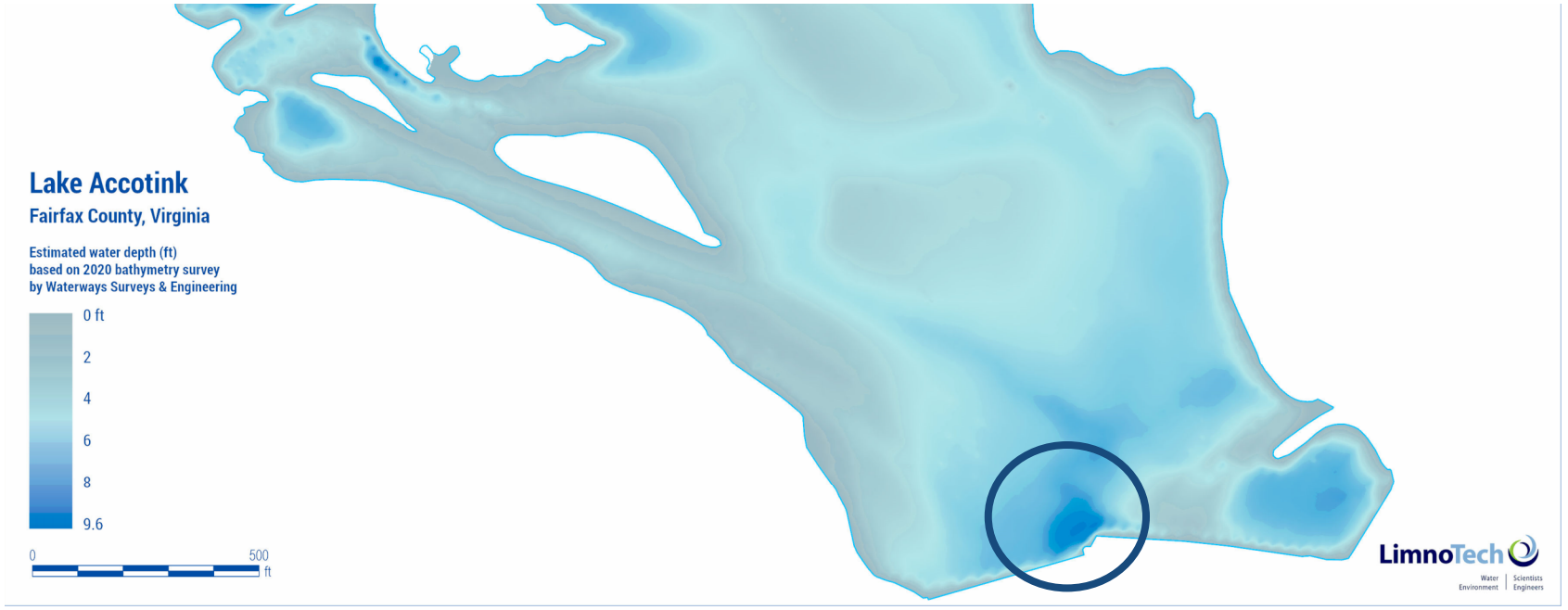
DESCRIPTION OF WORK	VALUE	Unit Cost Reference and Assumptions
Fish Ladder	$6,548,374.00	➢ Rock Ramp. Fairfax County EQR unit prices (2023-2024 for rock structures for streams) +25%
Mobilization/Erosion and Sediment Control/Pump Around	$1,500,000.00	➢ Approximately 20% of construction cost
Design /Permitting	$850,000.00	➢ BPJ; Represented as approximately 10% of construction cost
Total	**$8,898,374.00**	





“HIDDEN FEES”

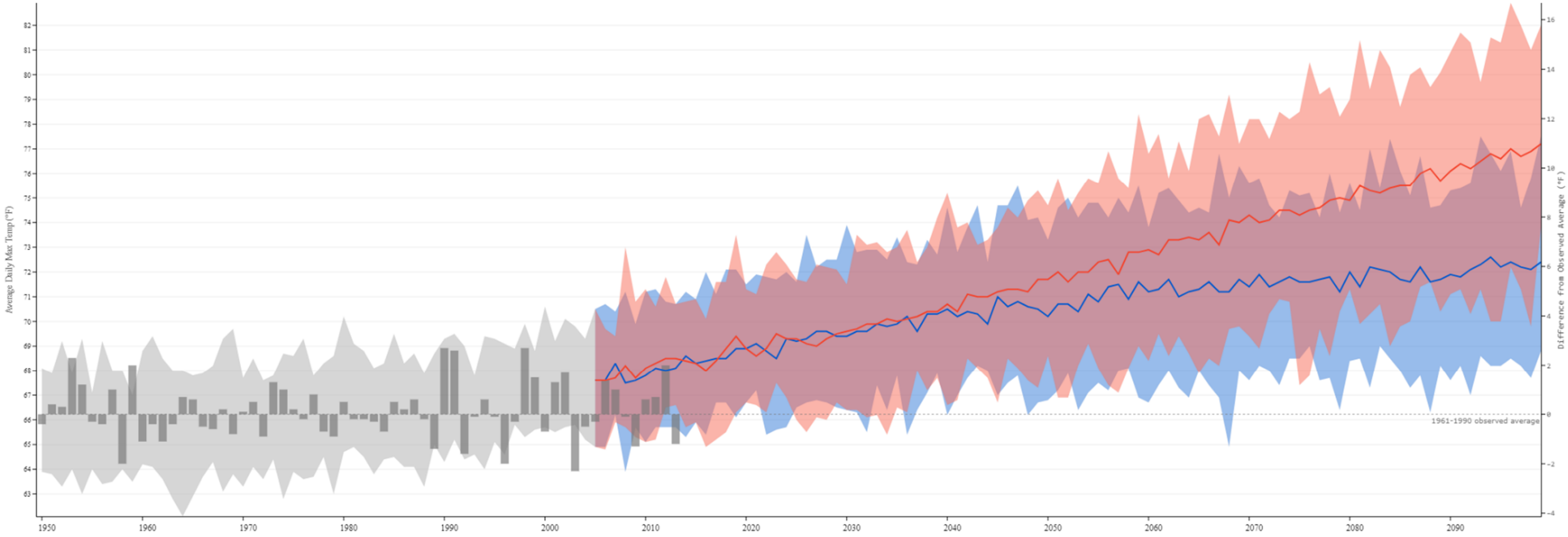
- Dam near end of service life
- Currently only passes 60% of the Probable Maximum Flood (Goal is 90%)
- Sluice may need overall if lake fills in
- Ongoing permitting and flashboard maintenance costs



8A. CLIMATE CHANGE ANALYSIS

[Climate Explorer (nemac.org)]

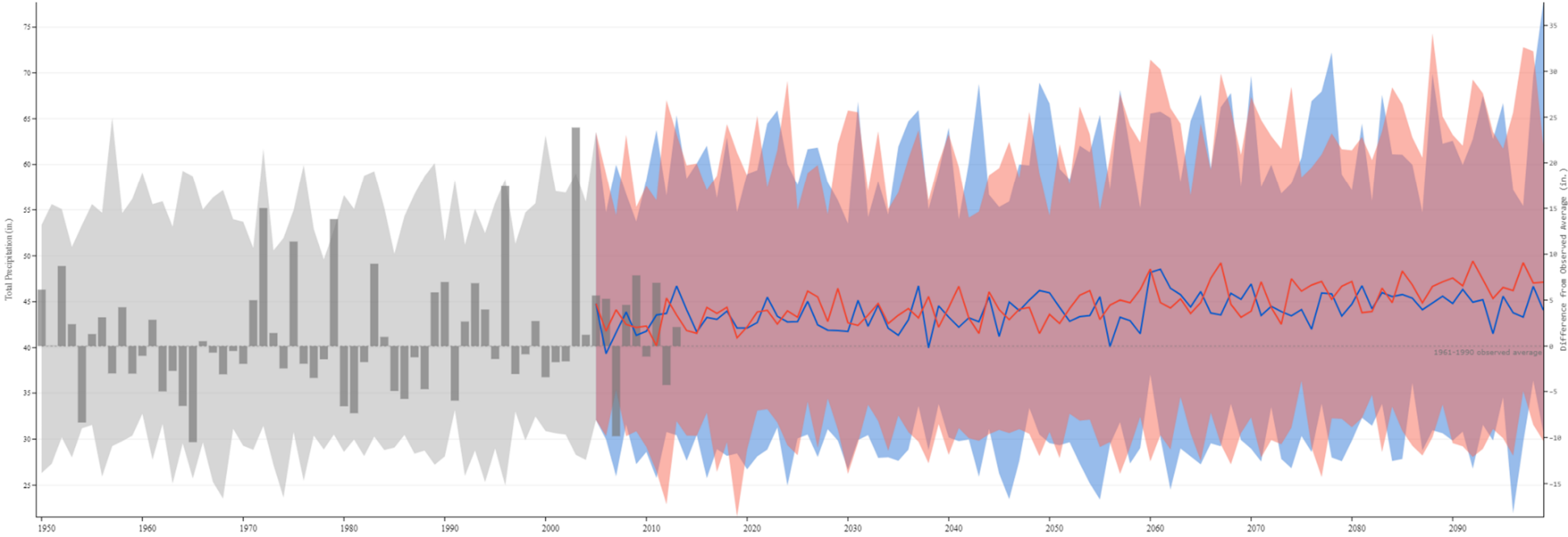
Average Daily Max Temperature



8A. CLIMATE CHANGE ANALYSIS

[Climate Explorer (nemac.org)]

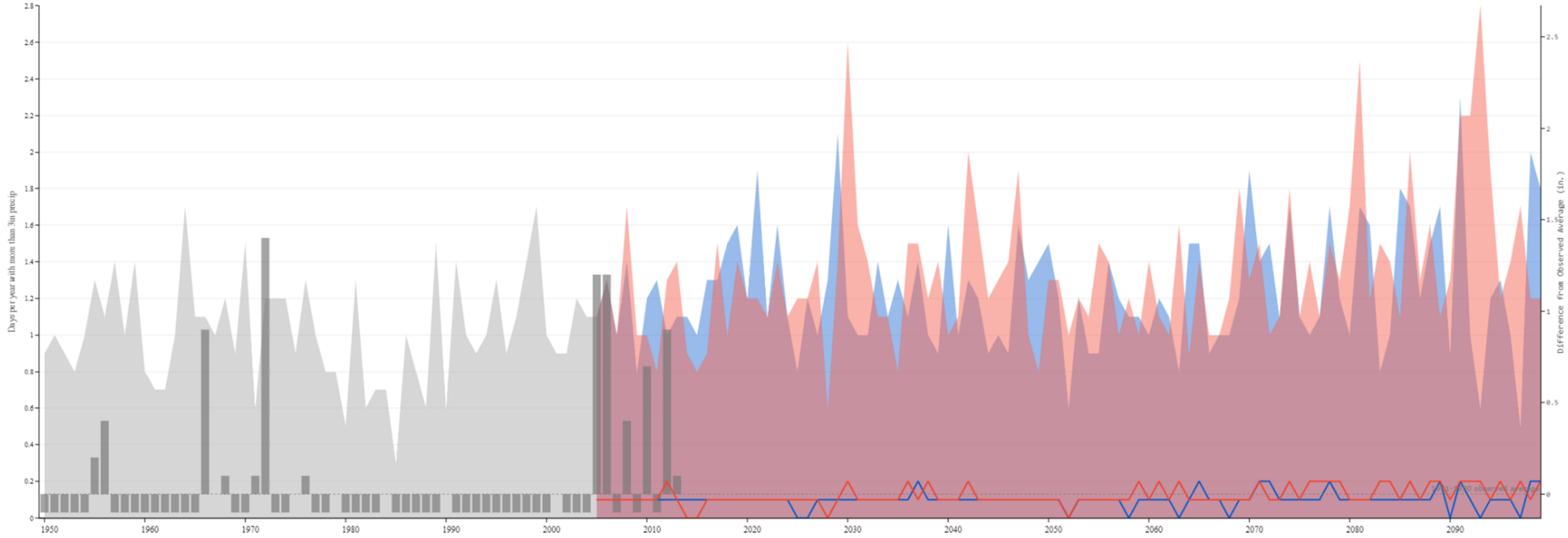
Total Annual Precipitation



8A. CLIMATE CHANGE ANALYSIS

# of Storms >3”

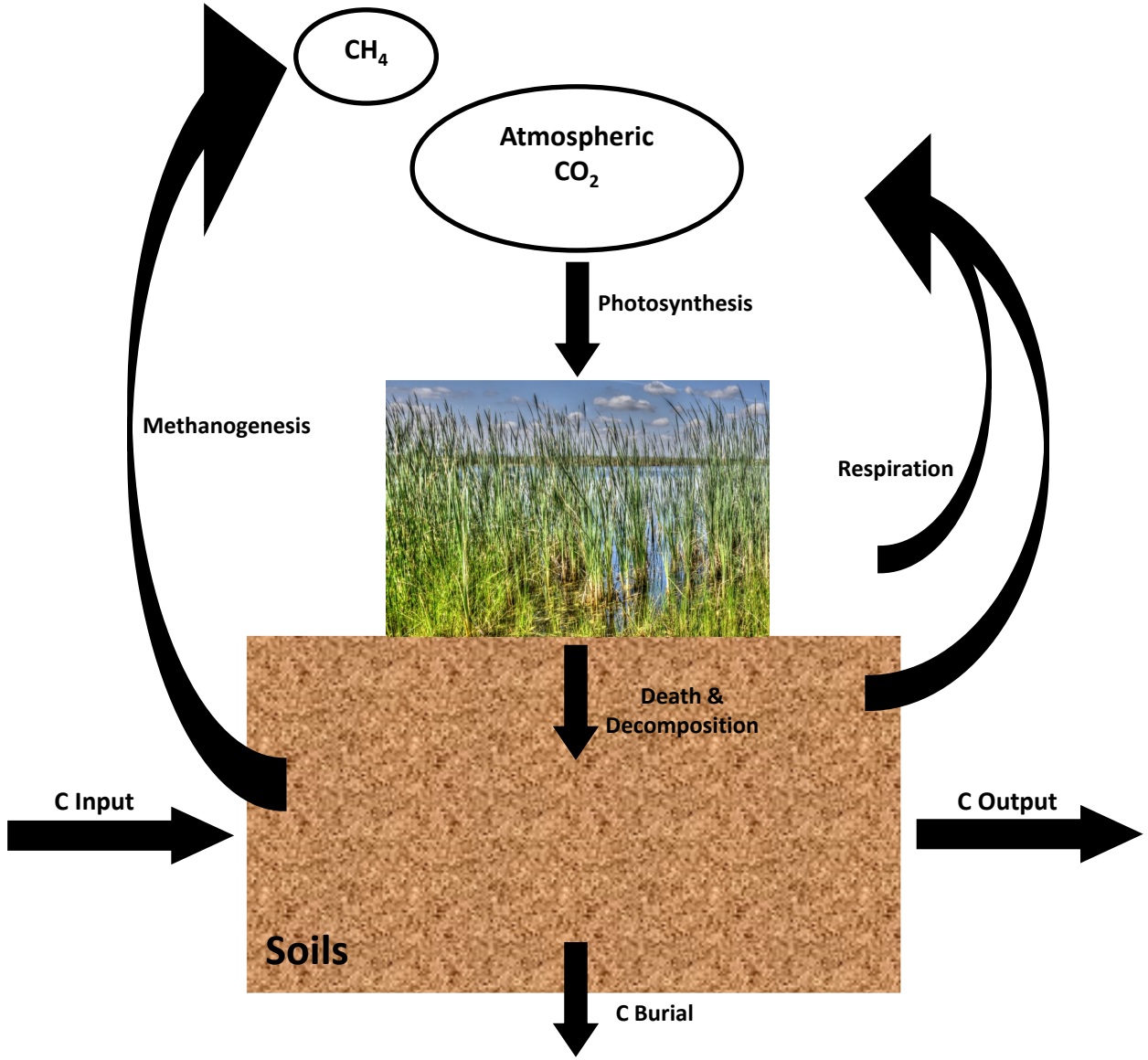
[Climate Explorer (nemac.org)]



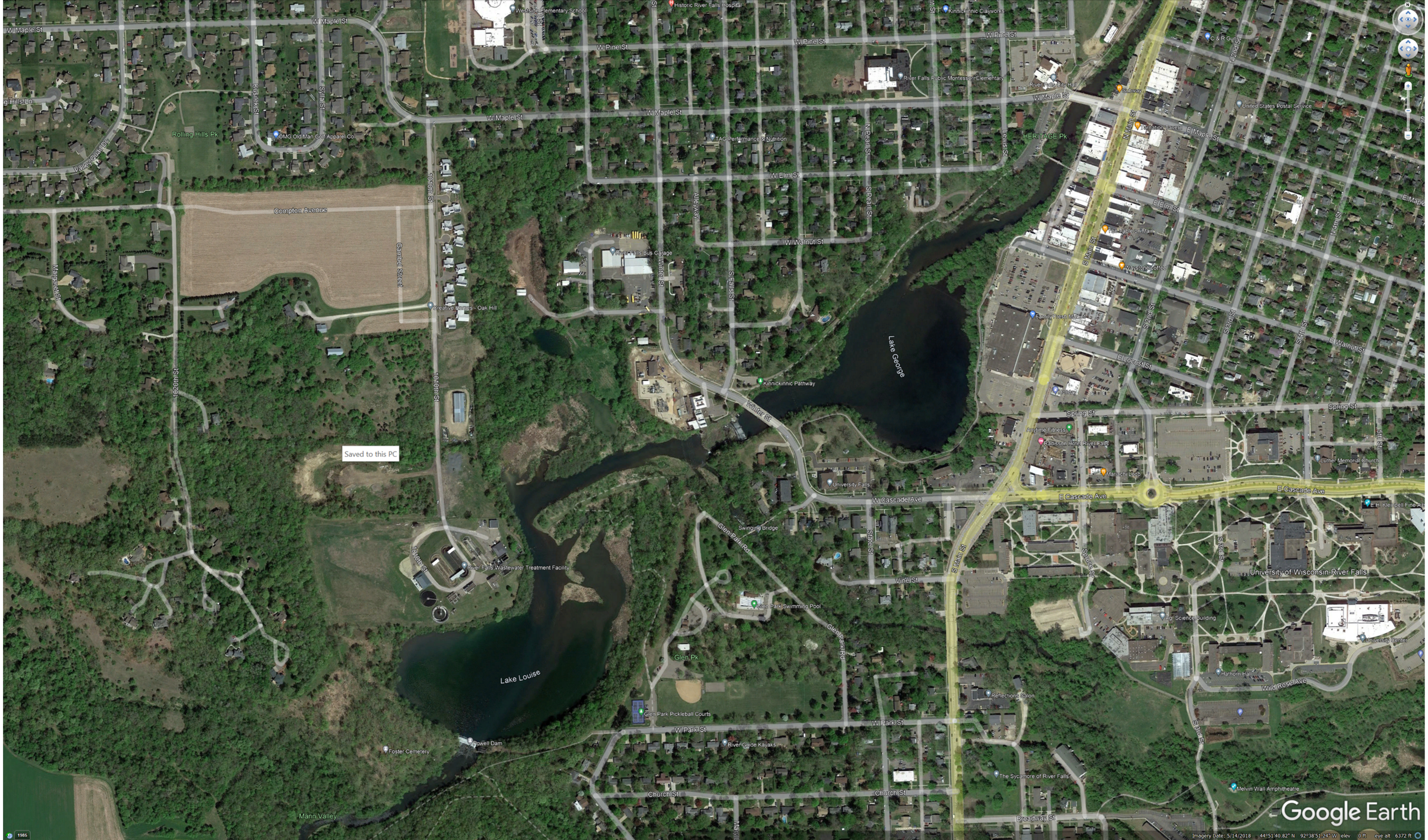
8B. CARBON SEQUESTRATION

- Mechanisms for Capturing Carbon
  - Photosynthesis
    - Some studies Wetlands = Forests
  - Burial in delta and wetland
  - Settling in Lake

- Mechanisms for Releasing Carbon
  - Methanogenesis
    - Bury deep to reduce this
  - Scour
  - Dredging
    - Exposing carbon deposits
    - Burning fossil fuels



Adapted from: Carbon Sequestration by Wetlands: A Critical Review of Enhancement Measures for Climate Change Mitigation (researchgate.net)



W Maple St
W Pine St
Westside Elementary School
Historic River Falls Hospital
River Falls Public Montessori Elementary
United States Postal Service
Rolling Hills Pk
HERITAGE Pk
W Elm St
W Walnut St
Compton Avenue
Lake George
Kinnickinnic Pathway
Spring St
Saved to this PC
W Cascade Ave
E Cascade Ave
Swinging Bridge
Glen Park Rd
River Falls Wastewater Treatment Facility
Vine St
University of Wisconsin River Falls
Glen Park Swimming Pool
Glen Pk
Lake Louise
Glen Park Pickleball Courts
W Park St
Wild Rose Ave
Powell Dam
Foster Cemetery
River Guide Kayaks
The Sycamore of River Falls
Melvin Wall Amphitheatre
Church St
Broadway St
Mann Valley
Google Earth