

MEETING MINUTES

UPPER CAPE FEAR RIVER BASIN ASSOCIATION TECHNICAL ADVISORY COMMITTEE

Tuesday, April 28, 2020 | 9:30 – 11:00 AM
Remote meeting hosted by TJCOG Webex

Attendees

NAME	AGENCY	CONTACT INFO
Mark Vander Borgh	NC DWR	Mark.Vanderborgh@ncdenr.gov
Cameron Colvin	PTRC	ccolvin@ptrc.org
Maya Cough-Schulze	TJCOG	mcough-schulze@tjcog.org
Jonathan Miller	NCSU	Jwmille7@ncsu.edu
Dan Obenour	NCSU	drobenour@ncsu.edu
Kimia Karimi	NCSU	Kkarimi2@ncsu.edu
Jen Schmitz	TJCOG	jschmitz@tjcog.org
Tonya Mann	City of Graham	tmann@cityofgraham.com
Monica Dodson	OWASA	mdodson@owasa.org
Michael Rhoney	City of Asheboro	mrhoney@ci.asheboro.nc.us
Donna Setliff	City of Reidsville	dsetliff@reidsville.nc.us
Jonathan Baker	City of Durham- Stormwater	Jonathan.baker@durhamnc.gov
Patrick Beggs	NC DWR	patrick.beggs@ncdenr.gov
Steve Tedder	Tedder Farm Consulting	tedderfarmconsulting@gmail.com
Chuck Smith	City of Reidsville	csmith@reidsville.nc.us
David Huffman	NC DWR	David.huffman@ncdenr.gov
Bob Patterson	City of Burlington	bpatterson@burlingtonnc.gov
Maria Vanderloop	Town of Cary	Maria.vanderloop@townofcary.org
Dawn Molnar	City of High Point	Dawn.molnar@highpointnc.gov
Ben Bani	City of Reidsville	bbani@ci.reidsville.nc.us
Ruth Rouse	OWASA	rrouse@owasa.org
Jennifer Hunter	OWASA	jhunter@owasa.org

The meeting opened at 9:30am. Maya noted the agenda should be changed to remove QA/QC report, as this will be held until the QA/QC committee is able to meet and review hard copies from Meritech.

MOA Updates and Annual Report Updates (Cameron Colvin)

The DWR Director has signed MOA and Mark will be getting it online in the next week.

UCFRBA staff is wrapping up the 2019 Annual Report to submit to DWR. Cameron will forward this to the TAC and Board as soon as it is finished.

Maya summarized an opportunity for COVID testing in wastewater which Jen Schmitz sent to the listservs at the end of March. Company Biobot Analytics has repurposed opioid testing methods to offer pro bono COVID-19 sewage testing. Interested wastewater systems can register

[at this link](#) to receive sampling kits (\$120) which they can mail back for analysis. The goal of this effort is to more accurately map the spread of the virus than is possible with limited patient testing and given the prevalence of asymptomatic individuals.

Officer Nominations

Board Vice-Chair, TAC Chair, and TAC Vice-Chair seats are up for re-election in June. Please email nominations to Cameron or Maya. Elections will take place at the next Board meeting.

Jordan Lake Watershed Model (Jonathan Miller, NCSU)

Jonathan Miller presented the model he developed with Kimia Karimi and Sankar Arumagan under the direction of Dan Obenour at NCSU. He began the presentation with a quote that has been attributed to several modelers: “All models are wrong, but some models are useful.”

The Jordan Lake Watershed Model incorporated 1982-2017 data from stations that had >5 years of daily flow data and >50 TN and TP samples. Some data was included from the Falls as well as Jordan Lake watersheds. The smallest spatial extent modeled was the HUC12.

Research questions included: source allotments of TN and TP in watershed; the extent to which urban TN export exceeds natural and agricultural land covers; how to quantify inter-annual variation; whether management practices are helping; and what percent of TN and TP sources are reaching Jordan Lake.

Background on Water Quality Modeling:

Water quality models range from very general statistical models to very detailed deterministic models. Models can also vary in spatial and temporal extent. The Jordan Lake Watershed Model is most like the SPARROW model. Specifically, it is a hybrid Bayesian watershed model, which incorporates yearly inputs. Bayesian modeling incorporates prior research, a predicted distribution that the data implies, and a final distribution that is somewhere in between the two.

The challenge of modeling nutrient loads is that daily flow data is available, but daily TN and TP concentration data is not. Thus, NCSU had to estimate the monthly or yearly nutrient loads using a model called “Weighted Regression on Time, Discharge and Season” (WRTDS) which models/predicts daily nutrient loads and captures high peaks during high flow events.

How the Jordan Lake Watershed Model was developed:

- Incorporated land uses including agriculture, urban pre-1980, urban post-1980, and undeveloped (land use data was sourced from NWALT because it has a long record and consistent land use types for the whole period of record, unlike NLCD.)
- Included yearly precipitation data was incorporated from Oregon State’s PRISM Climate Groups. Precipitation drives much of nutrient loading.
- Incorporated land cover nutrient export, discharger data from DEQ, livestock numbers from USDA, and subtracted upstream load retention.

Model Results Summarized:

- Point source discharges make up 50% TN and 25% TP loading; thus remain substantial relative to NPS loads.
- Pre-1980 development are hotspots for NPS nutrient export. They release more than double the TN and TP of agricultural and post-1980 urban lands (per unit area).
- Undeveloped lands export about an order of magnitude (~10x) less TN and TP than agricultural and urban lands (per unit area). Thus, development of natural lands will substantially increase nutrient loading to Jordan Lake.
- Nutrient retention in watershed streams and waterbodies is less than 20% of total point and nonpoint loads, except where TP is intercepted by reservoirs with long residence times. As a result, most of the load from the upstream portions of the watershed (e.g., Triad area) reaches Jordan Lake.

Further Detail on Model Results:

- Lands developed before 1980 were hotspots for nonpoint nutrient export—they exported twice as much as agricultural lands and post-1980 land covers. This difference was highly statistically significant, whereas the other time breakpoint they tested, before and after 2000, was not.
- Agriculture and post-1980 development had similar export. Undeveloped land was an order of magnitude lower. Livestock exported much less.
- Lands developed before 1980 may be nutrient hotspots due to denser development which creates more runoff, scour and sediment in streams. 1980 was also approximately when sediment and erosion control rules were put in place. Older infrastructure could also play a role.
- The modeled precipitation impacts indicate that agricultural nutrient loading is much greater in wet than dry years. Pre-1980 development exports about the same nutrient loads in wet or dry years; it is not clear why.
- Stream nutrient retention rates were low; reservoir nutrient retention rates were higher. In general, about 13% of TN and 17% of TP is retained in the watershed before reaching the lake. (TN and TP retention rates were modeled by subwatershed to get loading to Jordan Lake.)
- Modeled loads are more variable in the Haw than in the New Hope arm.
- Point source discharges represent 38-55% of TN and 23-38% of TP loading to the reservoir.

- The model includes a coefficient for the percent of WWTP nutrient discharge that gets to reservoir, which is typically around 0.85, reflecting that nutrients coming out of WWTPs are more accessible than NPS loading.
- “Watershed random effects” were included in the model to reflect spatially specific loads not captured by the averages in overall model.
- The model performed well compared to observed (WRTDS estimates.)
- The 2014 Tetra Tech model used different land use categories (high/medium/low density) than this model. The NCSU watershed model seemed to align better with the observed data.

Questions/discussion:

Cameron: Can you explain how you arrived at the retention rates?

Jonathan: For point sources, we used distance from NHD flowlines and typical water velocity between the discharge point and the reservoir. The model also included stream and reservoir retention rates. I think there’s general understanding that nutrients from WWTPs are more bioavailable.

Maya: Where does the point source discharge coefficient come from?

Jonathan: The point source discharge coefficient takes account for how different sources of nutrients vary in bioavailability.

Dan Obenour: Kimia Karimi (NCSU co-PI)’s future research intends to quantify where and when BMP implementation in cities may affect nutrient loading.

Jonathan Baker: Have you received feedback on how DEQ will use this information in the Jordan Lake Rules?

Jonathan Miller: Not yet.

Updates from around the Upper Basin

Monica Dodson, OWASA:

OWASA worked with the state for a year to update OWASA’s NPDES permit, which is now complete. Their new N limit will go into effect in January of 2021.

Mark Vander Bourgh, DWR:

DWR’s Water Sciences Section has suspended all sampling for April and is still in discussion about the best course of action for May. The lab is the bottleneck for social distancing—DWR staff are trying to stagger shifts and figuring out how to return to full function. Mark appreciates the coalitions being able to continue monitoring and working safely. Brian Wrenn has moved on from being Director of WSS to DEMLR. The AMS coordinator also left, so Mark is quite busy.

WSS staff are deemed essential and are work remotely when possible. Mark has seen NPDES permits being written, thus can report that their workflow is continuing as normal.

The meeting adjourned at 10:38am.

Action items (all)

Email Cameron and Maya regarding:

- Nominating yourself or others as Board Vice-Chair, TAC Chair, or TAC Vice Chair (descriptions below)
- Ideas for future speakers/meeting topics
- Whether you have any preference between holding the next Board meeting in July or June, prior to the end of the fiscal year
- Questions for DWR or Jonathan Miller

The duties of officer positions that turn over in July (Board Vice Chair, TAC Chair, TAC Vice Chair) as set out in the Bylaws are as follows:

Vice Chair: During the absence or incapacity of the Chair, the Vice Chair shall perform the duties of the Chair and when so acting shall have all the powers and be subject to all the responsibilities of the office of the Chair and shall perform such duties and functions as the Board of Directors may prescribe.

Meeting Frequency: Officers shall meet at least semi-annually to conduct the business of the Corporation and shall be responsible for conducting the day-to-day activities of the Corporation. The Chairman may call additional meetings of the Officers as necessary.

TAC Chair responsibilities are not provided for in the Bylaws; however, they outline the duties and responsibilities of the TAC as follows:

A standing Technical Advisory Committee (TAC) shall be responsible for providing the Board of Directors with assistance and recommendations concerning the development of proposed annual work programs, specific project plans, and alternative funding sources and strategies.