Hydrologic Model Planning Meeting

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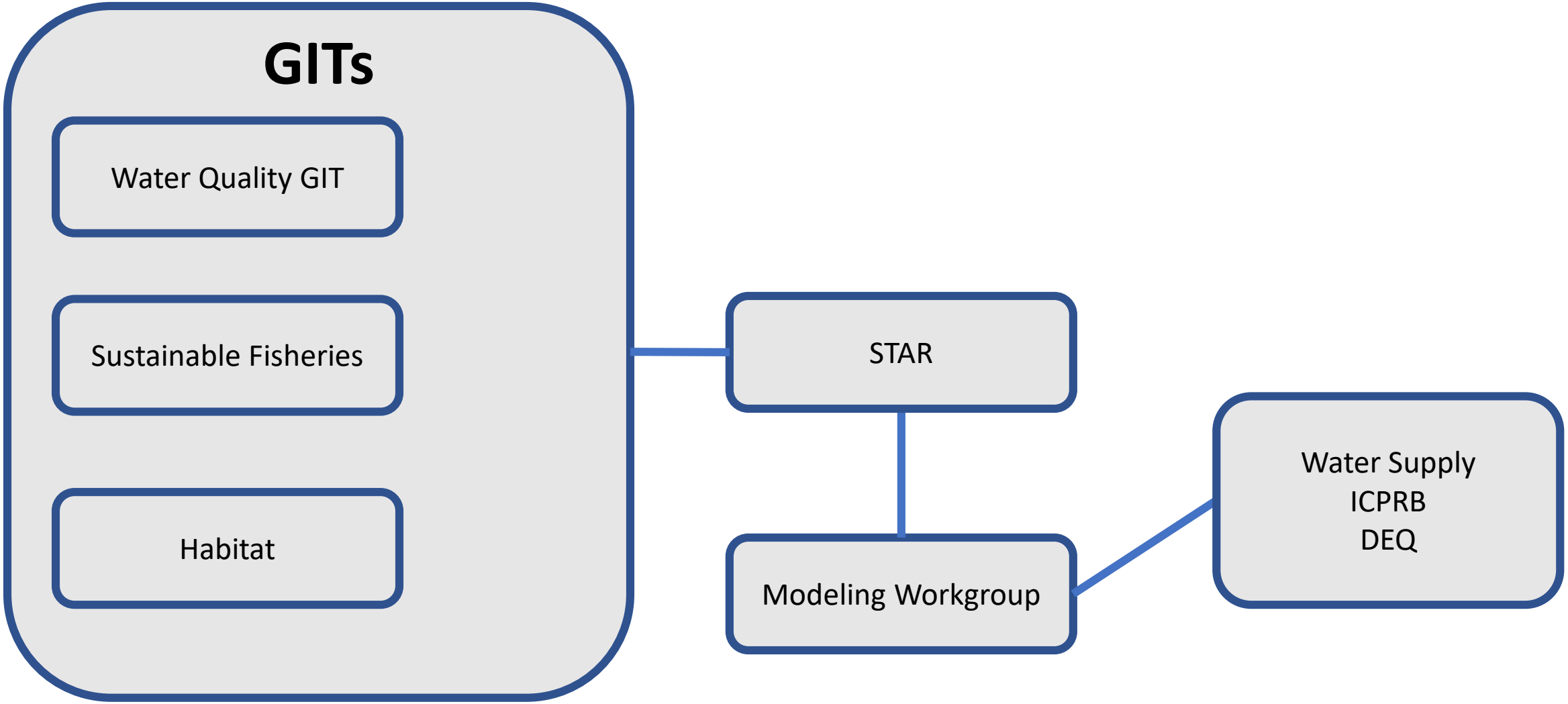
Presentation to MWG 1/8/20

Motivation

- Multiple STAC and partnership recommendations for the CBP to refine spatial scale of TMDL model
- CBP-identified science needs for fine-scale hydrology to develop living resource and habitat models in the watershed
- ICPRB and DEQ typically use CBP watershed model as part of their water supply modeling after development. CBP would like to involve them on the front end

MWG customers



Hydrologic Model Planning Workshop 9/18/2019

- Purpose
  - Define management needs
  - Identify resources
  - Develop an initial plan

Hydrologic Planning Workshop Participants

- Customers
  - GITs
  - River Basin Commissions
  - State government
- Experts
  - Universities
  - ARS
- Developers
  - CBPO
  - River Basin Commissions
  - Universities
  - USGS
  - State Governments

Hydrologic management needs

Management Priority	TMDL and targeting	Water Supply	Living Resource Models
Direct Customers	CBPO modelers	DEQ, ICPRB, DEP	USGS
Landscape Spatial Scale	Several meters for surface runoff prediction	No preference	No preference
Riverine Spatial Scale	NHD100k or HUC12	NHD100k or HUC12	NHD100k or NHD24k
Landscape temporal Scale	Hourly	No preference	No preference
Riverine Temporal Scale	Minutes to hours	Minutes to hours	Hourly

Hydrologic management needs

Management Priority	TMDL and targeting	Water Supply	Living Resource Models
Direct Customers	CBPO modelers	DEQ, ICPRB, DEP	USGS
Landscape management metrics	Average annual	None	None
Riverine management metrics	Average annual	1,3,7,30,60,90 day low flow, extreme droughts, eco flows	Wastewater contribution to flows and quality; hourly and daily flows, temperature, and bed mobilization
Temporal extent	1984-current	[1930,1966,1980]-current + forecast	1970-Current

Hydrologic management needs

Management Priority	TMDL and targeting	Water Supply	Living Resource Models
Direct Customers	CBPO modelers	DEQ, ICPRB, DEP	USGS
Sensitivities	Climate change, Watershed properties Management actions, land use	Surface and groundwater Withdrawals, reservoir operations, forest loss	Wastewater flow and quality, climate change, stream shading
Parameters	Flow, temperature, oxygen, sediment fractions, species of nutrients and carbon	Flow, temperature, oxygen	Flow, temperature, sediment mobilization

Chesapeake Regional Hydrologic Model 2020

- Finer-scale river simulation based on Phase 6 dynamic model
- Use same land simulation
- Simulate NHD or HUC12 rivers
  - HSPF
  - Simple mass-balance
- Purpose
  - Provide input to living resources models
  - Develop methods of river simulation to be used in later models
  - Develop new calibration metrics
  - Expand and revise data sets

Chesapeake Regional Hydrologic Model 2020

- CBPO
  - Develop simulation
  - Calibrate
  - Test enhancements
- Water supply partners
  - Reservoir operations models
  - Water withdrawal
  - Participate in development
- USGS living resource modelers
  - Evaluate model output
  - Provide data as needed
  - Develop flow metrics

Chesapeake Regional Hydrologic Model 2023

- Finer-scale land and river simulation
- Take advantage of new hydrologic feature data sets
  - Significant knowledge development effort

- Purpose
  - Emphasize nutrient and sediment production areas
  - Local effects of groundwater
  - Management action effects on hydrology

Chesapeake Regional Hydrologic Model 2023

- CBPO
  - develop and calibrate the land and river simulation
  - develop datasets necessary for the nutrient simulation
  - participate in the development of statistical models relevant to hydrology
  - model the effects of management actions on hydrology
- Water supply partners
  - Reservoir operations models
  - Water withdrawal
  - Participate in development
- Non-CBPO USGS
  - Evaluate model output for living resource models
  - Provide data as needed
  - Develop flow metrics
  - Develop statistical models to determine important landscape features for hydrologic simulation

CHRM beyond 2025

- Distributed models are the models of the future (and always will be?)
- STAC recommended starting with small watersheds
- …

Next Steps

- Detailed Plan
- Try simple routing model

- Improve reservoirs