Wekiva Basin
HSPF and HEC-RAS Models
Independent Technical Review
Initial Comments

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Oct. 22, 2018

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Agenda

- Type of data needed for the models;
- Adequacy and appropriateness of the data;
- Validity, defensibility and appropriateness of the model; and
- Summary

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Type of Data Needed

- Data needed for the HSPF model
  1. Topo data for watershed and sub-watershed delineation;
  2. Land use and land cover for various hydrological parameters;
  3. Hydrological soil group for infiltration parameter;
  4. Rainfall and potential evapotranspiration data;
  5. Springs and point source discharges; and
  6. Observed flow data for model calibration.

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Type of Data Needed *(cont'd)*

- Data needed for the HEC-RAS model
  1. Stream/river cross sectional data;
  2. Hydraulic structure data;
  3. Boundary condition data – flow and stage;
  4. Channel roughness data/info – photos and field observation notes etc.; and
  5. Observed stage for model calibration.

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Adequacy & Appropriateness of the Data

- Was “best info available” utilized?
  - HSPF - Hydrological soil group was not used for model development although the calibrated index values (0.001-1.09) to infiltration capacity are acceptable.
  - HEC-RAS – yes, the data utilized is sufficient
    - Please state the data used to define the river centerline (NHD, aerial photography, surveys, other)

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Adequacy & Appropriateness of the Data

- Are there any deficiencies regarding data availability
  - HSPF – no deficiencies
  - HEC-RAS – no deficiencies

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Adequacy & Appropriateness of the Data

- Was relevant info available that was discarded without appropriate justification? Would use of discarded info significantly affect results?
  - Yes, 58 permitted point source discharges were not used in the HSPF models without appropriate justification.
  - No, do not expect the those point source discharges significantly affect results as they are small.

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Adequacy & Appropriateness of the Data *(cont'd)*

- Was relevant info available that was discarded without appropriate justification? Would use of discarded info significantly affect results?
  - HEC-RAS – a DEM is shown in the HEC-RAS files but not identified in the report as a data source.

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Validity, Defensibility & Appropriateness of the Models

- Determine if the model is appropriate, defensible, and valid, given the District's MFL approach
  - Yes for the HSPF models with additional data (soil and topo data) and appropriate justification without using the other point source, discussion of water budget, and summary and discussion of the key hydrological parameters;
  - HEC-RAS – Yes, the model is defensible and valid.

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Validity, Defensibility & Appropriateness of the Models *(cont'd)*

- Validity and appropriateness of all assumptions used in the HSPF models
  - 3 key assumptions (1. contributions from closed sub-watershed; 2. non-riparian wetland on baseflow; and 3. relationship between springs and UFA levels and between springs and nearby springs) used are reasonable and consistent given the best info available.
  - No other info available that could have been used to eliminate these assumptions.

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Validity, Defensibility & Appropriateness of the Models *(cont'd)*

- Validity and appropriateness of all assumptions used in the HEC-RAS model
  - HEC-RAS – assumptions for the model are not stated in the report. Critical assumption is:
    - Water levels simulated by the model are most accurate at or near surveyed cross-sections, use caution for water levels further from surveyed cross-sections

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Validity, Defensibility & Appropriateness of the Models *(cont'd)*

- Review HSPF model input and output
  - Input files of rainfall, PET, springs discharges, and point source flows appear to be fine;
  - Values of the key parameters (LZSN, INFILT, DEEPFR, UZSN) are reasonable but not summarized and discussed in the report;
  - No model instability are observed; and
  - Water budget are not provided in the report and output file.

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Validity, Defensibility & Appropriateness of the Models *(cont'd)*

- Review HEC-RAS model input and output
  - Full-extent, geo-referenced cross-sections should be shown in the model and report
  - Unbounded cross-sections exist on reaches of the Wekiva and Little Wekiva
    - XS's should be extended to fully contain the highest flows
    - The width of the XS's within the Saint Johns River floodplain at downstream end does influence stage in the lower river → width in model should be near as possible to the true width of the active conveyance
  - Model boundary conditions for steady and unsteady models are defined appropriately

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Validity, Defensibility & Appropriateness of the Models *(cont'd)*

- Review HEC-RAS model input and output
  - Manning's n values are reasonable and defensible
  - Models (steady and unsteady) are stable
    - warnings reference cross-section spacing, which is covered in recommended assumptions
  - Vertical variation in Manning's n is physically based on stage (over discharge, see Figure 30)
    - Fig 30a: evaluate 2008 – present data to develop Manning's n – Stage relationship

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Summary

- HSPF Models
  - Models are reasonable and defensible
  - Suggestions for improvements:
    - Provide hydrological soil data or state the reason why it was not used;
    - Summarize and discuss the key hydrological parameters;
    - Provide water budget and discussion;
    - Provide justification without including the other point source; and
    - Provide a consistent number of springs discharges in the model and report.

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Summary *(cont'd)*

- HEC-RAS Models
  - Models are reasonable and defensible
  - Suggestions for improvements:
    - State assumptions
    - Discuss use (or not) of the DEM in model development
    - Provide full-extent, geo-referenced model cross-sections (including horizontal projection)

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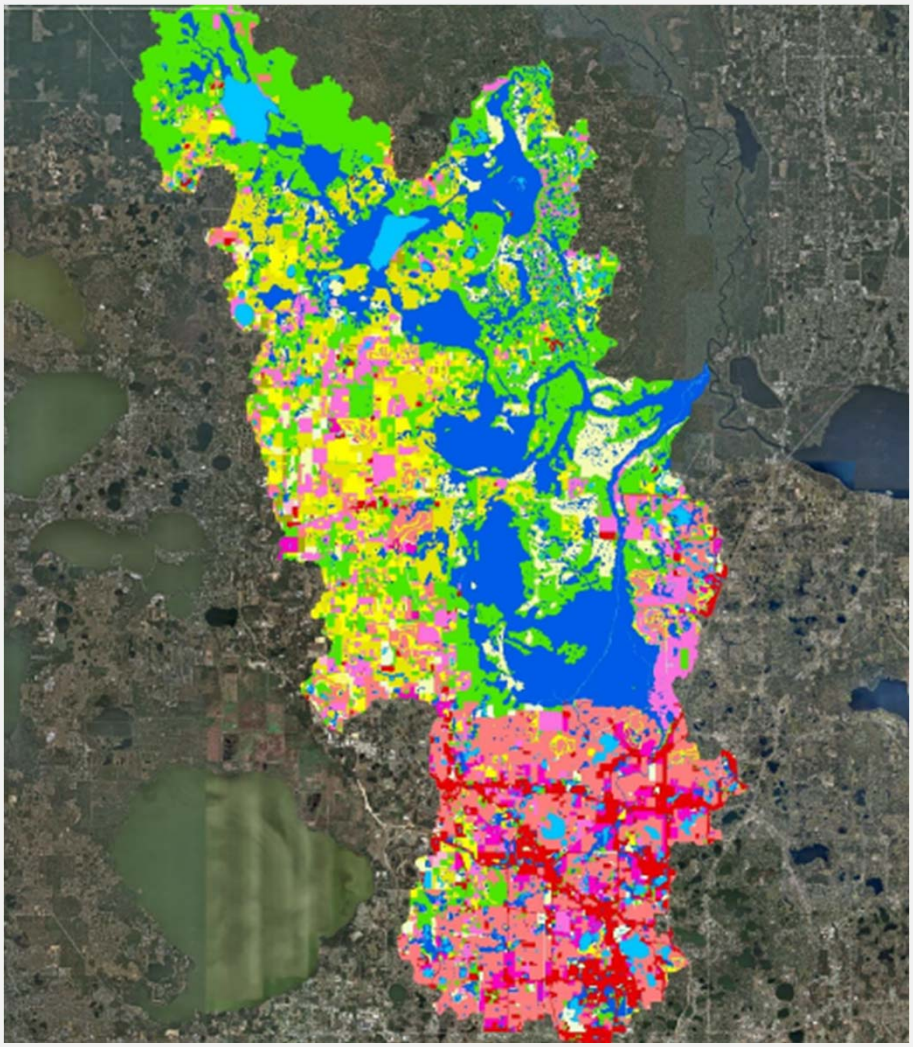
Questions & Discussion



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