Watershed Baseline Modeling & Scenarios

TAIMUR SHAIKH, PH.D.

EPA REGION 6

EPA United States Environmental Protection Agency

Outline

- Baseline Run
- HSPEXP+ MultiSim
- Scenarios
- Conclusions and Next Steps

United States Environmental Protection Agency

Baseline Run

- Incorporates all changes from the Workgroup review of the calibration
  - Litter and Fertilizer Applications
  - Flow Balancing
  - Surface and Upper Layer Fractioning
  - Atmospheric deposition of Nitrogen
  - Denitrification

ED_002032_00000725-00003

Baseline Run

- Incorporates the dataset changes recommended by the Workgroup including
  - 2009 Litter Application Rates
  - 2011 National Land Cover Data
  - 2015 DMR flows and Permit Limits
  - 2015 Point Sources
  - Meteorological data from 1992 – 2009

EPA United States Environmental Protection Agency

HSPEXP+ MultiSim

United States Environmental Protection Agency

What is HSPEXP+?

- HSPEXP+ is an enhanced expert system that can perform additional functions and has evolved into a comprehensive tool for hydrologic and water quality calibration, quality assurance/quality control (QA/QC), sensitivity analysis, uncertainty analysis, and scenario comparisons for HSPF models.

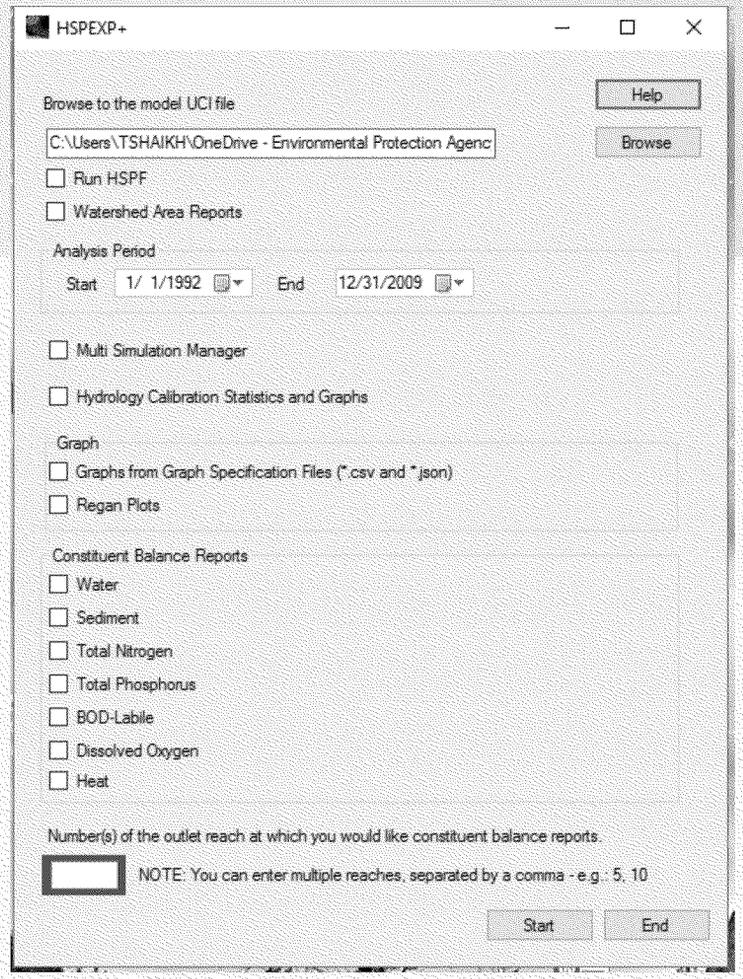
EPA United States Environmental Protection Agency

What can HSPEXP+ do?

- Generate graphs, error statistics, and reports to assist in HSPF hydrology and water quality calibration and validation
- Conduct QA/QC of existing HSPF models
- Conduct sensitivity and uncertainty analyses of an HSPF model
- Conduct HSPF model scenario analysis, and TMDL development

EPA United States Environmental Protection Agency

HSPEXP+ Interface



United States Environmental Protection Agency

What does MultiSim do?

- Runs multiple HSPF runs varying parameters input in the MultiSim input file
- Generates an HPSF run for each variation
- Generates an .xml output file for comparison

- Demo Files…

EPA United States Environmental Protection Agency

Scenarios

United States Environmental Protection Agency

Scenario Colloquialisms…Slightly Modified

- There are lots of ways to skin the proverbial cat…assuming you don't like cats
- All roads lead to Rome…but not always
- A bird in the hand is worth…Wait!
  - …I have no bird. I have no bush.

EPA United States Environmental Protection Agency

To Meet the Current Standard as Written…

- TP shall not exceed 0.037 mg/L rolling 30-day geometric mean
  - Applies to Illinois River as well as Flint Creek and Baron Fork

- From Baseline, most of Arkansas needs a 69% reduction
  - Point and non-point
  - Flint Creek in Arkansas need a 90% reduction
  - Gentry WWTP needs a 95% reduction

EPA United States Environmental Protection Agency

To Meet the Current Standard as Written…

- Oklahoma generally needs a 93% reduction from baseline
  - Point sources need a 98% reduction
  - Baron Fork Oklahoma needs a 71% reduction everywhere in the watershed except for reach 712 which needs 75% reduction

EPA United States Environmental Protection Agency

Conclusions and Next Steps

- HSPEXP+ simplifies scenario runs
- What do you need to be able to evaluate your own scenarios?
- Time and Training

United States Environmental Protection Agency