WASP Modeling: Eagle Mountain Reservoir

Eagle Mountain
NCTWQP Stakeholder Meeting
July 17, 2009
3-D Reservoir Model
EM WASP Vertical Segmentation

- West Fork
- Trinity
- Indian Creek
- (17)
- (6)
- (11)
- (1)
- (13)
- (14)
- (15)
- (16)
- (10)
- (9)
- (8)
- (12)
- Dosier Creek
- Dam
- Walnut Creek
- Ash Creek
- (1)
- (4)
- (3)
- (2)
- (7)
- (5)
- (17)
Eagle Mountain SWAT to WASP Connections

<table>
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<tr>
<th>WASP</th>
<th>RCH</th>
<th>BSB</th>
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Flow Balance

- Surface Inflows from SWAT
  - Tributary Inflows
  - Runoff from areas adjacent to lake
- Precipitation
- Evaporation
- Customer Water Use
- Spills/Releases
External Flows to EM WASP

4% Difference between SWAT and Historic Inflows

Flow Volume Comparison

KGL_historic
Taesoo_Swat
West Fork Inflows to WASP

Segment 6

- KGL
- SWAT_070709
Inflows to Minor Tributaries

Segment 14 (Dosier Creek)

Segment 15 (Ash Creek)

Segment 16 (Walnut Creek)

Segment 17 (Indian Creek)
Nutrient Loading to WASP

- SWAT Watershed Loads
  - NPS Loads
  - Watershed WWTP Loads
- 2 WWTP Directly to Lake
- Atmospheric Deposition
- Flux Releases
Total Nitrogen Loads to WASP

TN Contribution by Tributary

- 85% West Fork
- 10% Dosier
- 3% Ash
- 1% Walnut
- 1% Indian
Total Phosphorus Loads to WASP

TP Contribution by Tributary

- West Fork: 80%
- Dosier: 12%
- Ash: 2%
- Walnut: 4%
- Indian: 2%
8 State Variables

- Ammonia (NH3)
- Nitrate (NO3)
- Organic Nitrogen (ON)
- Ortho-Phosphorus (OPO4)
- Organic Phosphorus (OP)
- Chlorophyll-a (Chl-a)
- Biological Oxygen Demand (BOD)
- Dissolved Oxygen (DO)
Temp Curves for WASP Simulation Period
Light Curves for WASP Simulation

EM Ke Curves

Ke' (1/m)


Curve 4
Curve 3
Curve 2
Curve 1
Curve 5
EM Annual DO Profiles

EM-07
January

EM-07
April

EM-07
July

EM-07
October
WASP Results: TP
WASP Results: Org-N

Segment 1
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 2
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 3
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 4
Jan-94 Nov-94 Sep-95 Jul-96 May-97 Mar-98 Dec-98
Segment 5
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 6
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 16
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 15
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 17
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 7
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 8
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 9
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 10
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 11
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04
Segment 12
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 13
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
Segment 14
Jan-94 Jan-96 Jan-98 Jan-00 Jan-02
WASP Results: Chl-a
FIGURE 8
WASP4 STATE VARIABLE KINETIC INTERACTIONS
More to Come...

► Complete WASP Calibration
► Complete Source Sensitivity Analysis
► Complete Loading Sensitivity Analysis