# APPENDIX E

# MODELING

This page intentionally left blank

# Model Documentation Report

## Dynamic Model for Stormwater Treatment Areas
## A-1 Flow Equalization Basin Environmental Impact Statement

**March 29, 2013**

---

## 1.0 Overview

*Identification*

This report documents assumptions and decisions made during the development of the Dynamic Model for Stormwater Treatment Areas (DMSTA) in support of the U.S. Army Corps of Engineers' A-1 Shallow Flow Equalization Basin (FEB) Environmental Impact Statement (EIS). This work was completed by the Office of Everglades Policy and Coordination and the Hydrologic and Environmental Systems Modeling section at the South Florida Water Management District (SFWMD or District).

*Scope and Objectives*

The intent of the DMSTA modeling was to represent a projection of surface water routing within the Everglades Agricultural Area (EAA) and estimate long-term average outflow total phosphorus (TP) concentrations from Stormwater Treatment Area (STA) 2 and STA-3/4 for the A-1 FEB EIS alternatives. The A-1 FEB EIS evaluated the environmental effects of four (4) alternatives: 1.) No Action, 2.) shallow FEB (the District's Preferred Alternative), 3.) deep FEB, and 4.) STA. DMSTA-simulated projections are dependent on several assumptions, including daily flows, source basin phosphorus concentrations, rainfall, evapotranspiration (ET), regional operating protocols, operating protocols of FEBs and STAs, STA configuration, cell size, flow path width, vegetation type, estimates of hydraulic mixing, inflow and outflow hydraulics, seepage estimates and phosphorus removal rates (i.e. settling rates) and other phosphorus cycling parameters.

The primary area of interest for the A1 FEB EIS is in and in the vicinity of the central flow-path of the EAA, specifically related to the basins that contribute flow to STA-2 and STA-3/4 (see **Figure 1**). The central EAA is mainly comprised of the S-2, S-3, S-6, S-7, and S-8 drainage basins and also includes the following independent water management or drainage districts established by Chapter 298 Florida Statutes (commonly referred to as 298 Districts): South Florida Conservancy District and South Shore Drainage District. A portion of the S-5A basin also contributes runoff to the central EAA.

Throughout the development of the DMSTA alternatives, the modeling and project teams determined the appropriate modeling techniques and assumptions to be used while also levering the knowledge and information gained during the previous implementation of DMSTA during the development of the Restoration Strategies Regional Water Quality Plan (SFWMD, 2012).

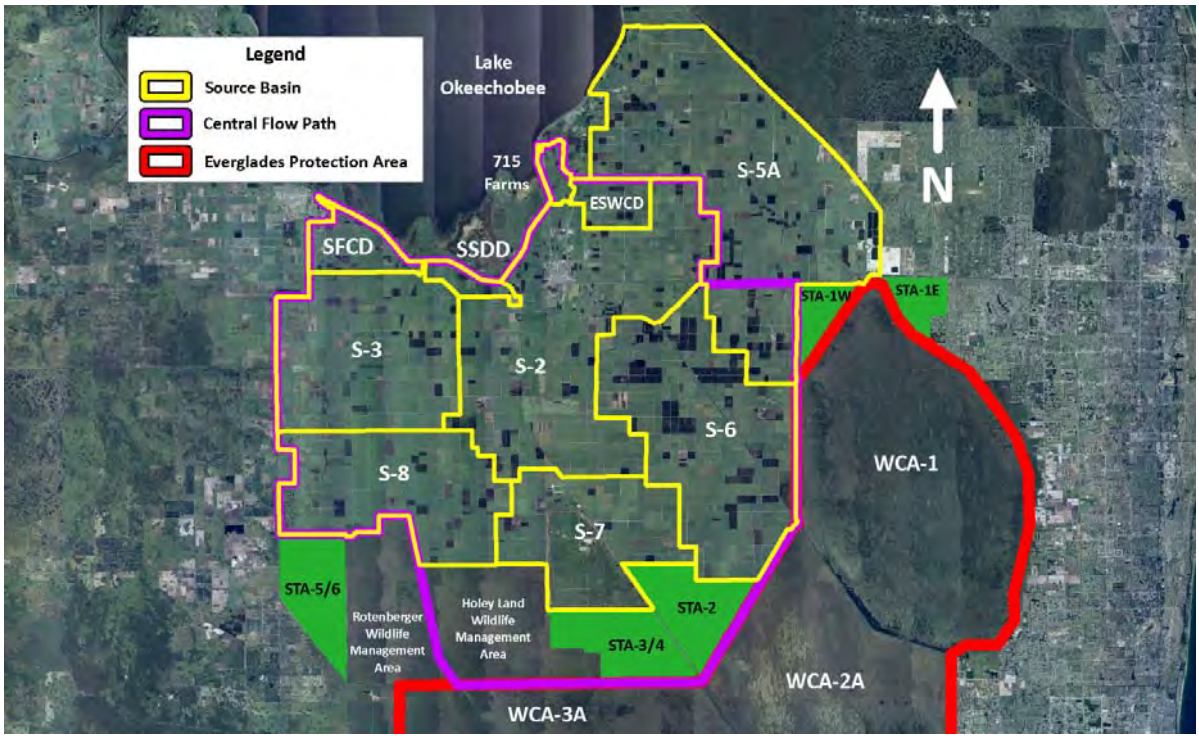



**Figure 1. Central Everglades Agricultural Area Source Basins**

## *Intended Use of Results*

The simulation of the A-1 FEB EIS alternatives with DMSTA is required to enable estimates of long-term average outflow TP concentrations and for the production of daily flows from STA-2 and STA-3/4 to the Everglades Protection Area that are representative of the projects being evaluated by the A-1 FEB EIS. These flows are post-processed and utilized in subsequent modeling performed using the Glades and Lower East Coast Service Area (LECSA) application of the Regional Simulation Model (hereafter, Glades LECSA RSM), in order to evaluate potential environmental effects that could result from implementation of the alternatives.

# 2.0 Basis

## *Assumptions, Considerations and Constraints*

For the purposes of the A-1 FEB EIS, the South Florida Water Management Model (SFWMM or 2x2) Restoration Strategies Baseline 2 (RS_BASE2) scenario provides hydrologic estimates for the areas identified in **Figure 1**. For each basin, daily flow time series are provided from the RS_BASE2 model output. This dataset provides the basis for the generation of inputs to the DMSTA model by utilizing a method that is consistent with previous DMSTA modeling efforts (Gary Goforth, Inc., 2009). During this process, some aspects of the SFWMM-estimated hydrology are recalculated or rescaled to more closely approximate observed historical data. The aggregated source basin average annual volumes are provided in **Table 1**.

**Table 1. Source Basin Flow Volumes**

| Source Basins | Average Annual Flow Volume (acre-feet per year) |
|---|---|
| **S-5A** | 44,500 [1] |
| **S-6** | 181,400 |
| **S-7** | 263,900 [2] |
| **S-8** | 218,400 |
| **East Shore Water Control District and 715 Farms (Closter Farms)** | 22,700 |
| **South Florida Conservancy District** | 19,100 |
| **South Shore Drainage District** | 11,700 |
| **C-139 (via C136)** | 14,700 |
| **Lake Okeechobee (Regulatory Releases)** | 58,300 |
| **Total** | 834,700 |

Notes:
1. Assumes runoff reduction resulting from the future 6,500-acre STA-1W expansion in the S-5A Basin.
2. S-7 runoff is reduced to 231,000 acre-feet per year for Action Alternatives due to runoff no longer occurring from the project site.

The alternatives developed for the A-1 FEB EIS DMSTA modeling used many of the same assumptions documented in the Restoration Strategies Regional Water Quality Plan, dated April 27, 2012 (SFWMD, 2012). Many of these DMSTA model assumptions could be considered safety factors. In other words, the assumptions used were conservative so as to provide greater assurances that the DMSTA-simulated results can be achieved by the proposed projects. The assumptions implemented for the A-1 FEB EIS that are equivalent to the assumptions in the Restoration Strategies Regional Water Quality Plan are as follows:

- Effective Treatment Areas for STA-2 and STA-3/4
  One of the model parameters required by DMSTA is the surface area of the treatment wetland, or effective treatment area. While various DMSTA modeling methodologies are appropriate, the District simulated each STA cell individually within DMSTA. For example, all eight (8) treatment cells at STA-2 were individually parameterized within DMSTA. **Table 2** provides an overview of effective treatment areas for STA-2 and STA-3/4 that were assumed. The total project area (which includes inflow, outflow, seepage canals, and upland areas) for STA-2 and STA-3/4 is approximately 36,400 acres.

**Table 2. Summary of Effective Treatment Areas for STA-2 and STA-3/4**

| Stormwater Treatment Area | Effective Treatment Area (acres) | | |
|---|---|---|---|
| | Target Vegetation | | Total |
| | Emergent Aquatic Vegetation (EAV) | Submerged Aquatic Vegetation (SAV) | |
| **STA-2 (with Comp. B)** | 5,269 | 10,226 | 15,495 |
| **STA-3/4** | 7,941 | 8,386 | 16,327 |
| **Total** | 13,210 | 18,612 | 31,822 |

- Source Basin Total Phosphorus Concentration Period of Record
  For the A-1 FEB EIS, it was assumed that the total phosphorus (TP) concentrations for the basins tributary to the Everglades STAs would be based on historical data obtained during the 10-year period of record, Water Years 2000-2009 (May 1, 1999 through April 30, 2009). This 10-year period of record is considered a reasonable representation of future anticipated conditions and is suited for use in long-term regional water quality

planning efforts. It incorporates a range of hydrologic and meteorological conditions (i.e. it includes periods with both hurricanes and droughts). Historical daily flows and TP concentrations and loads, that were calculated using data collected via the District's hydrological monitoring network and water quality monitoring programs, were used to develop twelve (12) mean monthly TP concentration values for each source basin. Where data were available, mean monthly TP concentrations were also developed for water management or drainage districts established by Chapter 298, Florida Statutes (commonly referred to as 298 Districts). The method used to develop the mean monthly TP concentrations for this planning project is consistent with the methodology documented in the report entitled "Updated STA Phosphorus Projections For the 2015 Planning Period" (Gary Goforth, Inc., 2009). **Table 3** provides the mean monthly TP concentrations for each of the source basins used for this planning project.

**Table 3. Source Basin Mean Monthly Total Phosphorus Concentrations**

| Month | S5A DIV | EAA Hillsboro | EAA NNRC | EAA MIA | ESWCD & 715 Farms | SSDD MIA |
|---|---|---|---|---|---|---|
| January | 208 | 70 | 130 | 69 | 64 | 114 |
| February | 296 | 128 | 132 | 163 | 107 | 130 |
| March | 170 | 106 | 105 | 70 | 99 | 145 |
| April | 178 | 130 | 132 | 119 | 121 | 163 |
| May | 116 | 118 | 139 | 115 | 80 | 136 |
| June | 377 | 85 | 85 | 85 | 106 | 131 |
| July | 103 | 91 | 75 | 78 | 123 | 123 |
| August | 303 | 136 | 81 | 68 | 122 | 141 |
| September | 217 | 144 | 116 | 85 | 156 | 123 |
| October | 188 | 130 | 105 | 66 | 224 | 137 |
| November | 79 | 67 | 46 | 98 | 167 | 135 |
| December | 119 | 63 | 104 | 54 | 65 | 113 |
| **Month** | **SSDD NNRC** | **SFCD** | **C139 (G136)[1]** | **Lake NNRC** | **Lake MIA** | **Lake Hillsboro** |
| January | 71 | 90 | 32 | 147 | 165 | 147 |
| February | 108 | 94 | 307 | 122 | 176 | 122 |
| March | 117 | 94 | 33 | 158 | 118 | 158 |
| April | 97 | 107 | 56 | 158 | 157 | 158 |
| May | 97 | 116 | 28 | 131 | 120 | 131 |
| June | 74 | 115 | 205 | 144 | 138 | 144 |
| July | 60 | 101 | 185 | 93 | 89 | 93 |
| August | 98 | 111 | 151 | 93 | 151 | 93 |
| September | 89 | 114 | 148 | 115 | 148 | 115 |
| October | 97 | 112 | 124 | 125 | 164 | 125 |
| November | 121 | 125 | 83 | 170 | 148 | 170 |
| December | 71 | 80 | 59 | 164 | 127 | 164 |

Note: 1. See C-139 Basin Rule section for more information

- <u>Lake Okeechobee Total Phosphorus Concentrations</u>
  Both regulatory releases and urban water supply deliveries from Lake Okeechobee may be conveyed to the STAs and the A-1 FEB. Due to the distance between Lake Okeechobee outlet structures and Everglades STA inlet structures, and the phosphorus dynamics that exist within the regional water management system, the TP concentrations of Lake Okeechobee water measured at lake outlet structures are 50-70 ppb higher than TP concentrations measured at STA inlet structures (using data from Water Years 2000-2009). For the A-1 FEB EIS, the TP concentrations as measured at Lake Okeechobee outlet structures were used for all Lake Okeechobee water simulated to be conveyed to the A-1 FEB and STAs. In other words, no changes in TP concentrations of Lake Okeechobee water were assumed between Lake Okeechobee outlet structures and Everglades STA inlet structures.

- STA Duty Cycle Factor
  The STA duty cycle factor is intended to represent the portion of time that an STA is projected to be offline for major maintenance or rehabilitation activities. For example, a duty cycle factor of 0.95 corresponds to an STA being offline 5% of the time (i.e. 1 year offline within a 20 year period). DMSTA applies the duty cycle factor as a multiplier to the net phosphorus settling rate, which effectively reduces the simulated phosphorus removal performance for the entire period of simulation. For the A-1 FEB EIS, a duty cycle factor of 0.95, which is consistent with the offline time documented for the existing Everglades STAs, was assumed for STA-2 and STA-3/4.

- Internal Improvements to STAs
  Internal improvements within the STAs, to address short circuiting, vegetation, topographic, and other issues, will continue to be implemented and are expected to further improve treatment performance. This improvement in performance is not accounted for in the DMSTA modeling, therefore current modeled treatment performance is conservative.

- Flow Equalization Basin Performance
  Phosphorus removal performance of the shallow FEB (Alternative 2) was assumed to be consistent with emergent aquatic vegetation (EAV). This is based on the anticipated establishment of native marsh vegetation due to the hydrologic conditions expected at the site, coupled with projected vegetation management activities. The primary goal of vegetation management will be to establish and maintain healthy EAV dominated communities, a community of plant species that have roots anchored to the bottom of the marsh and leaves that grow up through the water and emerge above the surface. The vegetative community structure that is anticipated within the shallow FEB includes EAV with native plant species such as sawgrass (*Cladium jamaicense*), bulrush (*Scirpus californicus*), and cattail (*Typha* spp.).

- C-139 Basin Rule
  The Everglades Forever Act mandates that the TP load from the C-139 Basin not exceed the phosphorus load during an established historic period, adjusted for rainfall. Therefore, in order to simulate STA inflows with future achievement of mandated historical loads from the C-139 Basin, the mean monthly TP concentrations for the C-139 Basin that were derived based on historical data obtained during Water Years 2000-2009 were scaled down by approximately 35 percent (to replicate a historical period load of 38.15 metric tons per year). The mean monthly C-139 TP concentrations assumed for this planning study are provided in **Table 3**. It should be noted that Water Year 2000-2009 mean monthly TP concentrations when combined with SFWMD-simulated flows may result in higher TP loads from the C-139 Basin than is currently being observed. Furthermore, the assumption that the historical period loads will be achieved is justified by the C-139 Basin Rule's recently improved BMP implementation requirements and specific actions necessary if the basin is determined to not meet those levels into the future.

The assumptions implemented for the A-1 FEB EIS that are different than the assumptions used in the Restoration Strategies Regional Water Quality Plan are as follows:

- STA Diversions
  The intent of STA diversion operations is to prevent or minimize damaging depth and flow conditions within the STAs, ensure the continued health of treatment vegetation and thus maintain phosphorus removal performance, and to ensure flood damage is minimized in the Everglades Protection Area tributary basins. STA diversions were assumed to occur consistent with the Everglades Forever Act and National Pollutant Discharge Elimination System permits for the Everglades STAs that were issued to SFWMD by the Florida Department of Environmental Protection on September 10, 2012. In other words, STA diversions were assumed to occur to maintain flood control in tributary basins and to avoid substantial damage to the STA treatment facilities. This resulted in STA diversions when inflows exceeded the capacity of the STA inflow structures or when water depths within the STA were equal to or greater than 4 feet.

- Urban Water Supply Deliveries
  For this planning project, urban water supply deliveries from Lake Okeechobee were also simulated to be diverted (i.e. not treated within the STAs), consistent with the Everglades Forever Act and National Pollutant Discharge Elimination System permits for the Everglades STAs that were issued to SFWMD by the Florida Department of Environmental Protection on September 10, 2012. During the dry season when regional water availability is typically limited, and treatment of water supply deliveries would result in additional losses due to STA seepage, evapotranspiration, etc., diversion of urban water supply deliveries is often required to maximize efficiencies and help ensure regional water supply responsibilities are met.

- Flow Equalization Basin Operations
  Operational constraints were implemented so that FEB inflows from the North New River Canal (NNRC) and FEB outflows to the NNRC do not occur on the same day. Also, FEB outflows are constrained to only occur when FEB water depths are at or above 1 foot. In addition, enhanced outflow protocols were implemented to allow FEB outflows to be reduced based on target STA inflows (Note: Default DMSTA outflow algorithms are only driven by upstream water depths, which can result in FEB outflows that are above target STA inflows). These FEB operations assumptions are consistent with the intermediate design of the A-1 FEB, completed in February 2013.

- Flow Equalization Basin Performance
  Due to the anticipated variable hydrology of the deep FEB (range of water depths expected is from 1 to 12 feet) and the anticipated frequency of water depths above 4 feet (30 percent of the time), it is not anticipated that the deep FEB would support stable emergent or submerged aquatic vegetation communities. In other words, the deep FEB would act more like a reservoir. Therefore, no phosphorus removal was assumed for the deep FEB (Alternative 3).

## *Model Limitations*

DMSTA is the best available tool to simulate phosphorus removal performance and long-term average outflow TP concentrations for existing or planned storage reservoirs and STAs in south Florida. However, like all simulation models, some level of forecast uncertainty may result when applying the model, reflecting the limitations of the calibration datasets (data range, measurement error, short duration, etc.). For example, DMSTA assumes that the specified vegetation types (emergent, submerged, etc.) are constant over the 40-year hydrologic period.

Another specific limitation of DMSTA is that the model may not reproduce phosphorus spikes observed in some STA cells following periods of extended dry-out. Also, due to the uncertainty associated with DMSTA-simulated low level TP concentrations, annual values less than 12 parts per billion (ppb) were replaced with a value of 12 ppb. In addition, modeling uncertainty for DMSTA results is estimated at +/-15% of the predicted long-term flow-weighted mean TP concentration for each STA without accounting for uncertainty in the assumed future flows and loads (USEPA, 2010).

## 3.0 Simulation

### *Modeling Tools Used*

Dynamic Model for Stormwater Treatment Areas (DMSTA), Version 2c2b, Modified April 2012 (Microsoft Excel)

DMSTA project filenames:

- Alternative 1: project_sfwmd_ec_01mar2012_NEPA_NA.xls
- Alternative 2: project_sfwmd_ec_01mar2012_NEPA_SFEB.xls
- Alternative 3: project_sfwmd_ec_01mar2012_NEPA_DFEB_non.xls
- Alternative 4: project_sfwmd_ec_01mar2012_NEPA_STA.xls

**Note:** DMSTA Version 2c2b is the result of SFWMD modifications to Version 2c2 (Version Date: July 20, 2010) implemented in April 2012 to constrain STA and/or FEB releases to the maximum overland outflow using the default weir equation. This is triggered by setting minimum depth for release to a negative value.

## 4.0 Results

### *Identification of Simulation*

DMSTA results filenames:

- Alternative 1:
  - project_sfwmd_ec_01mar2012_NEPA_NA_net_central_feb34_out.xls
  - project_sfwmd_ec_01mar2012_NEPA_NA_net_central_feb_34.xls
  - project_sfwmd_ec_01mar2012_NEPA_NA_net_central_sta2b.xls
  - project_sfwmd_ec_01mar2012_NEPA_NA_net_central_sta34.xls
- Alternative 2:
  - project_sfwmd_ec_01mar2012_NEPA_SFEB_net_central_feb34_out.xls
  - project_sfwmd_ec_01mar2012_NEPA_SFEB_net_central_feb_34.xls
  - project_sfwmd_ec_01mar2012_NEPA_SFEB_net_central_sta2b.xls
  - project_sfwmd_ec_01mar2012_NEPA_SFEB_net_central_sta34.xls
- Alternative 3:
  - project_sfwmd_ec_01mar2012_NEPA_DFEB_non_net_central_feb34_out.xls
  - project_sfwmd_ec_01mar2012_NEPA_DFEB_non_net_central_feb_34.xls
  - project_sfwmd_ec_01mar2012_NEPA_DFEB_non_net_central_sta2b.xls
  - project_sfwmd_ec_01mar2012_NEPA_DFEB_non_net_central_sta34.xls

- Alternative 4:
  - project_sfwmd_ec_01mar2012_NEPA_STA_net_central_feb34_out.xls
  - project_sfwmd_ec_01mar2012_NEPA_STA_net_central_feb_34.xls
  - project_sfwmd_ec_01mar2012_NEPA_STA_net_central_sta2b.xls
  - project_sfwmd_ec_01mar2012_NEPA_STA_net_central_sta34.xls

## *Project Specific Results*

The primary objective of this DMSTA modeling effort was to develop estimates of long-term average outflow TP concentrations from STA-2 and STA-3/4 and generate estimated daily flows from STA-2 and STA-3/4 to the Everglades Protection Area that are representative of the projects being evaluated by the A-1 FEB EIS. These flows were then be post-processed and utilized in subsequent modeling performed using Glades LECSA RSM, in order to evaluate potential environmental effects that could result from implementation of the A-1 FEB EIS alternatives. **Table 4** provides average annual source basin flow volumes, TP loads and TP concentrations used for all four A-1 FEB EIS alternatives. **Table 5** provides a detailed summary of STA Flow Volumes for all four A-1 FEB EIS alternatives.

**Table 4. Source Basin Flow Volumes and Total Phosphorus Loads and Concentrations**

| Source Basins | Average Annual Flow Volume (acre-feet per year) | Total Phosphorus Load (metric tons per year) | Total Phosphorus Concentration (ppb) |
|---|---|---|---|
| **S-5A** | 44,500 [1] | 11.7 | 213 |
| **S-6** | 181,400 | 24.8 | 111 |
| **S-7** | 263,900 [2] | 31.9 [3] | 98 |
| **S-8** | 218,400 | 22.5 | 83 |
| **East Shore Water Control District and 715 Farms (Closter Farms)** | 22,700 | 3.7 | 132 |
| **South Florida Conservancy District** | 19,100 | 2.5 | 108 |
| **South Shore Drainage District** | 11,700 | 1.7 | 116 |
| **C-139 (via C136)** | 14,700 | 2.8 | 154 |
| **Lake Okeechobee (Regulatory Releases)** | 58,300 | 10.4 | 145 |
| **Total** | 834,700 | 112.0 | 109 |

Notes:
1. Assumes runoff reduction resulting from the future 6,500-acre STA-1W expansion in the S-5A Basin.
2. S-7 runoff is reduced to 231,000 acre-feet per year for Action Alternatives due to runoff no longer occurring from the project site.
3. S-7 total phosphorus load is reduced to 28.4 metric tons per year for the Action Alternatives due to runoff no longer occurring from the project site.

**Figures 2 through 6** provide DMSTA-simulated ponding depth hydrographs, ponding depth duration curves, and box and whisker plots of monthly depths for the project site for Alternatives 2, 3 and 4. **Figure 7 and 8** present DMSTA-simulated ponding depth hydrographs for Alternatives 2, 3 and 4 for STA-2 and STA-3/4, respectively. **Figures 9 and 10** provide DMSTA-simulated ponding depth duration curves for all four A-1 FEB EIS alternatives for STA-2 and STA-3/4, respectively. **Table 6** provides STA-2 and STA-3/4 Flows, TP loads and TP concentrations for all four A-1 FEB EIS alternatives.

**Table 5. Detailed Summary of STA Flow Volumes**

| | Parameter | Average Annual Volume (acre-feet per year) | | | |
|---|---|---|---|---|---|
| | | Alternative 1: No Action | Alternative 2: Shallow FEB | Alternative 3: Deep FEB | Alternative 4: STA |
| STA-2 | Inflow | 301,000 | 387,000 | 386,000 | 253,000 |
| | Diversion | 17,000 | 5,000 | 5,000 | 5,000 |
| | Outflow | 307,000 | 391,000 | 389,000 | 259,000 |
| | Outflow and Diversion | 324,000 | 396,000 | 394,000 | 264,000 |
| STA-3/4 | Inflow | 504,000 | 401,000 | 407,000 | 275,000 |
| | Diversion | 12,000 | 6,000 | 1,000 | 5,000 |
| | Outflow | 495,000 | 392,000 | 397,000 | 269,000 |
| | Outflow and Diversion | 507,000 | 398,000 | 398,000 | 274,000 |
| A-1 STA | Inflow | NA | NA | NA | 252,000 |
| | Diversion | NA | NA | NA | 5,000 |
| | Outflow | NA | NA | NA | 245,000 |
| | Outflow and Diversion | NA | NA | NA | 250,000 |
| STA-2, STA-3/4, and A-1 STA | Inflow | 805,000 | 788,000 | 793,000 | 780,000 |
| | Diversion | 29,000 | 11,000 | 6,000 | 15,000 |
| | Inflow and Diversion | 834,000 | 799,000 | 799,000 | 795,000 |
| | Outflow | 802,000 | 783,000 | 786,000 | 773,000 |
| | Outflow and Diversion | 831,000 | 794,000 | 792,000 | 788,000 |
| | Urban Water Supply | 27,000 | 27,000 | 27,000 | 27,000 |
| | Outflow, Diversion and Urban Water Supply | 858,000 | 821,000 | 819,000 | 815,000 |

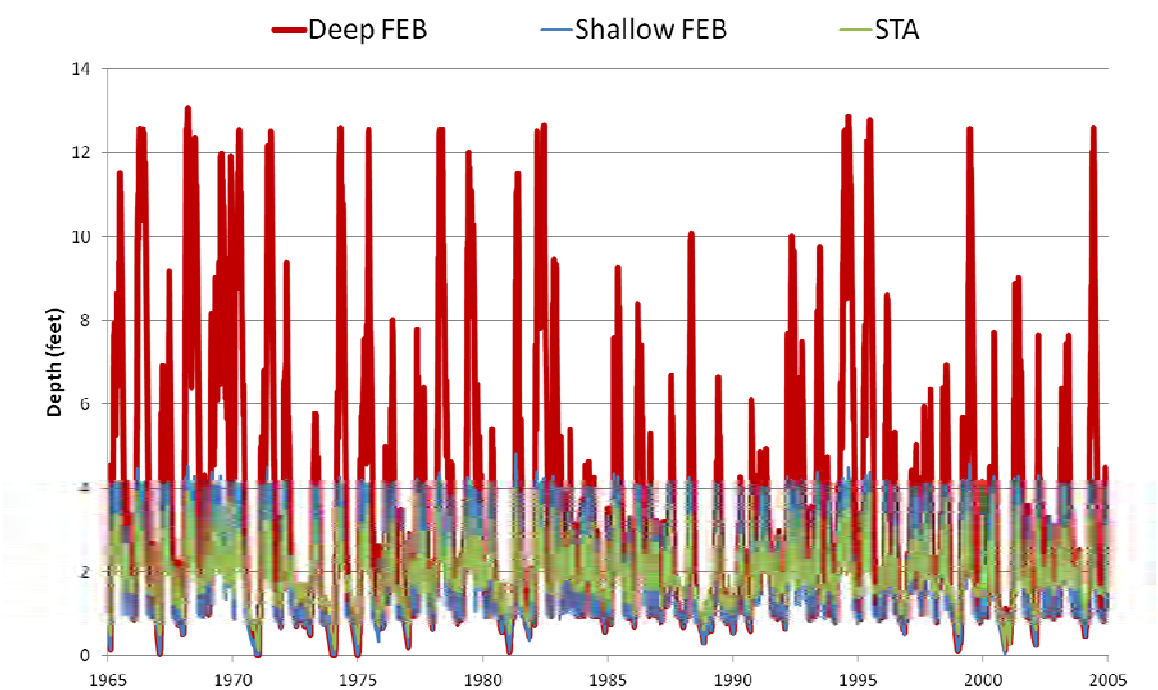



**Figure 2. Ponding Depth Hydrographs for Project Site – Action Alternatives**

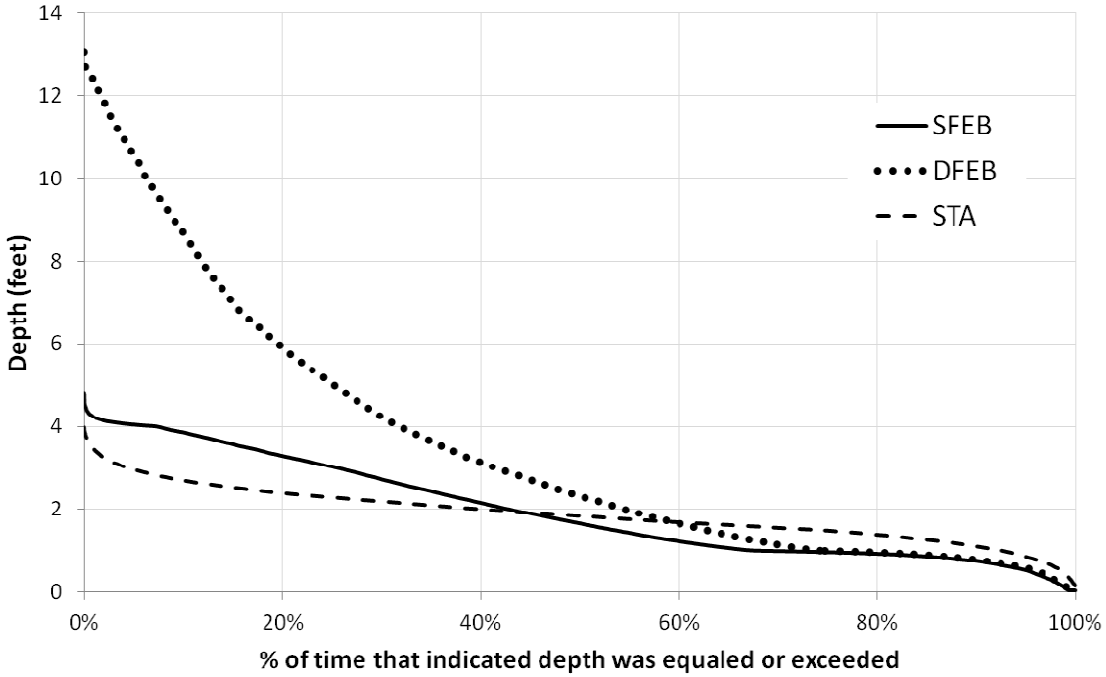



**Figure 3. Ponding Depth Duration Curves for Project Site – Action Alternatives**

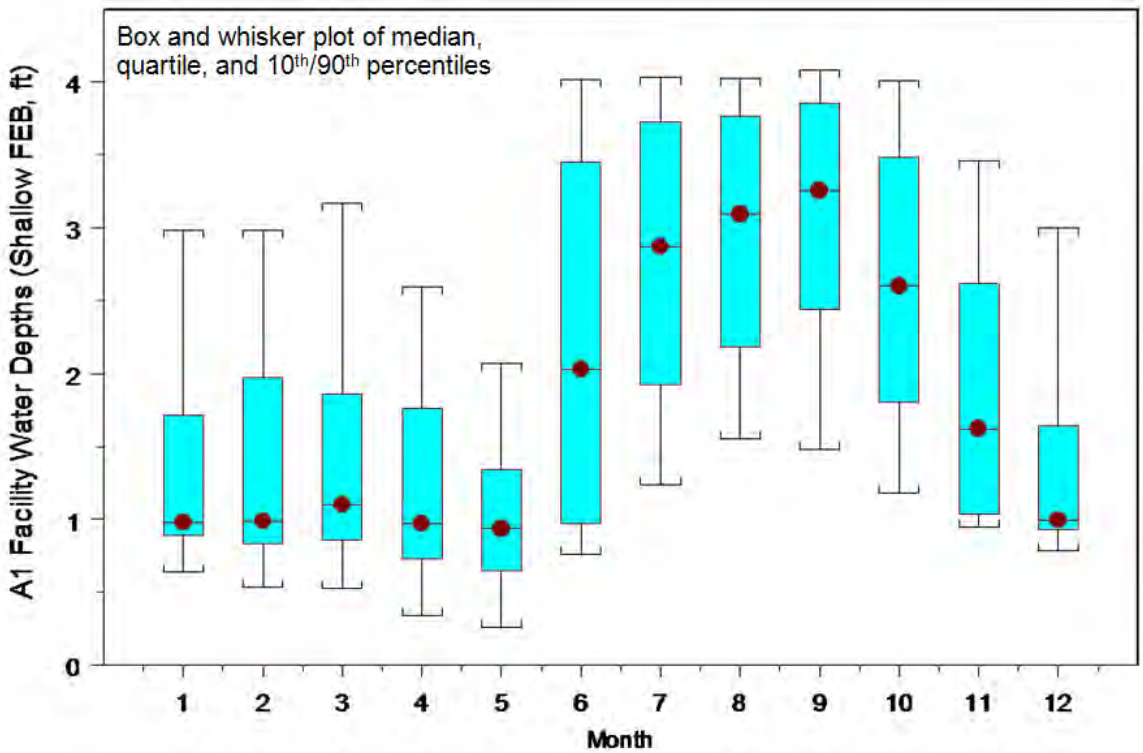



**Figure 4. Box and Whisker Plot of Monthly Depths for Project Site – Alternative 2 (SFEB)**

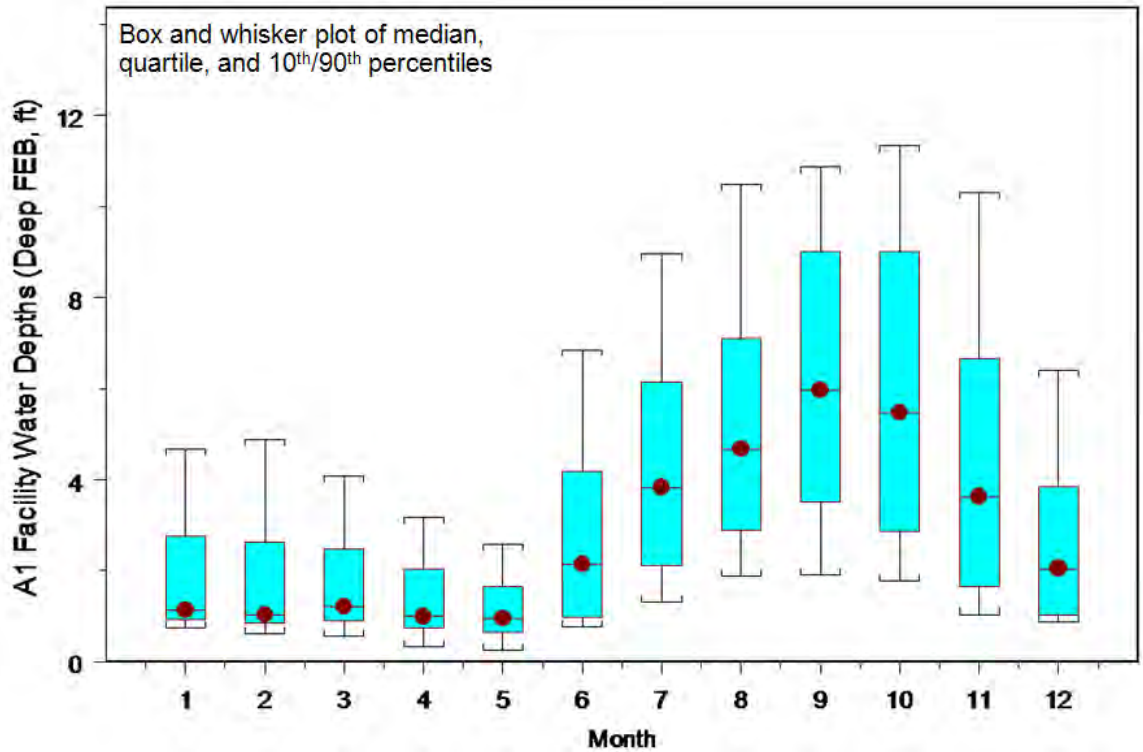



**Figure 5. Box and Whisker Plot of Monthly Depths for Project Site – Alternative 3 (DFEB)**

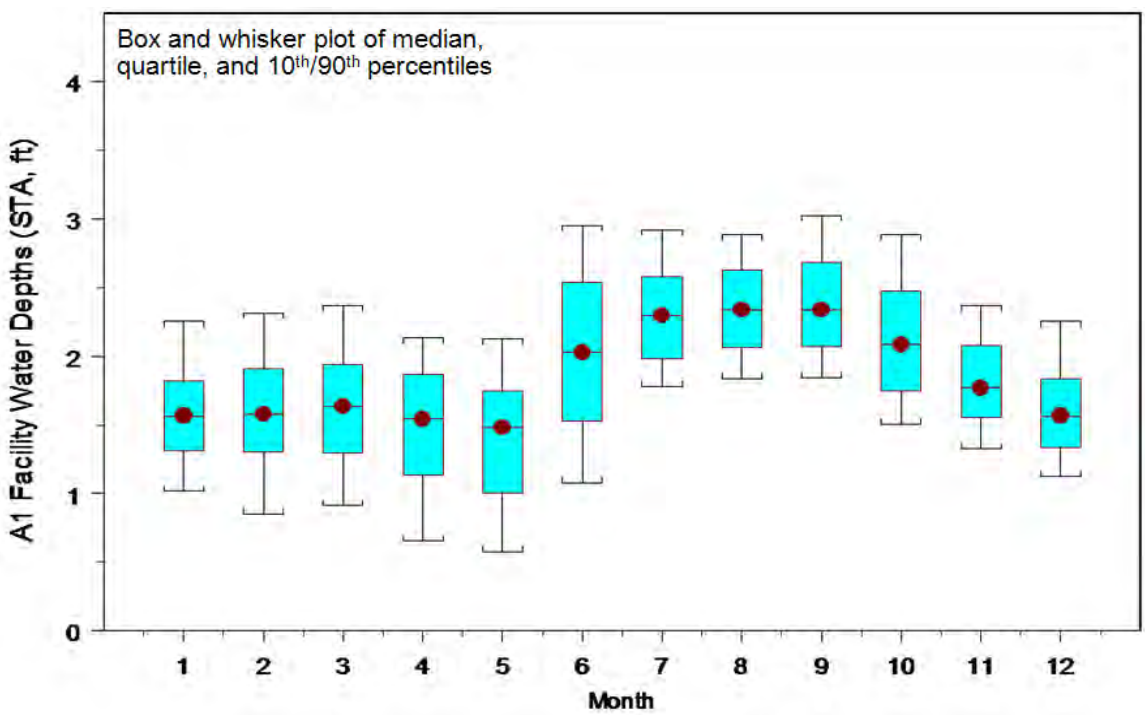



**Figure 6. Box and Whisker Plot of Monthly Depths for Project Site – Alternative 4 (STA)**

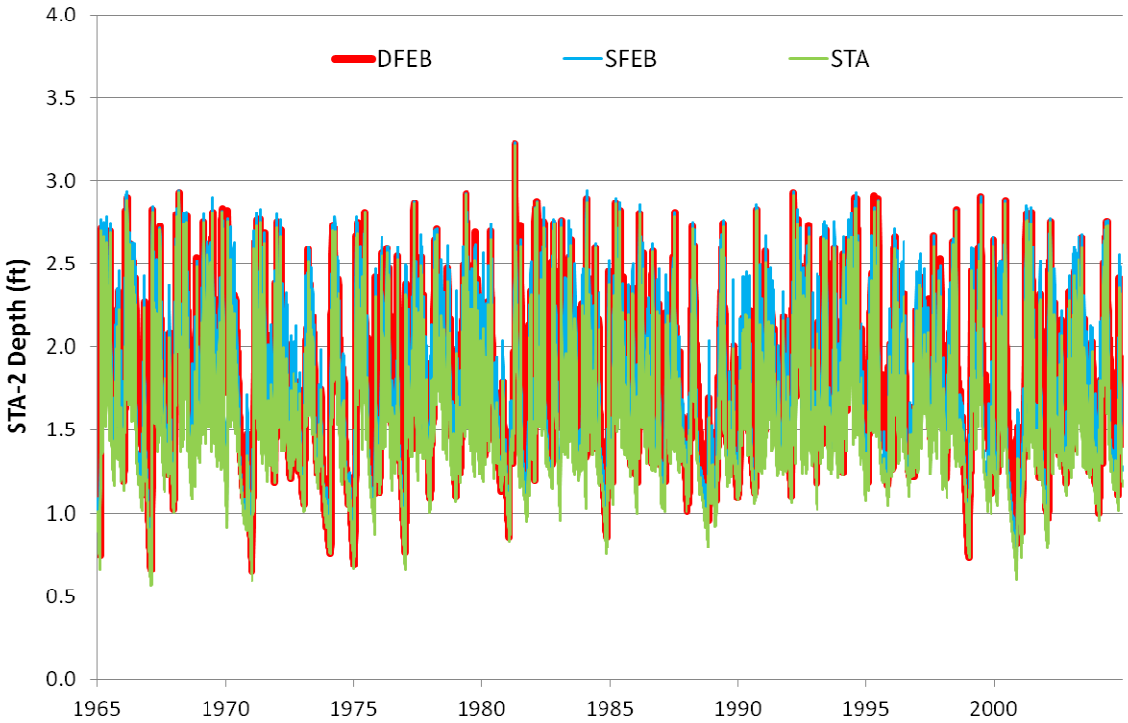



**Figure 7. Ponding Depth Hydrographs for STA-2 – Action Alternatives**

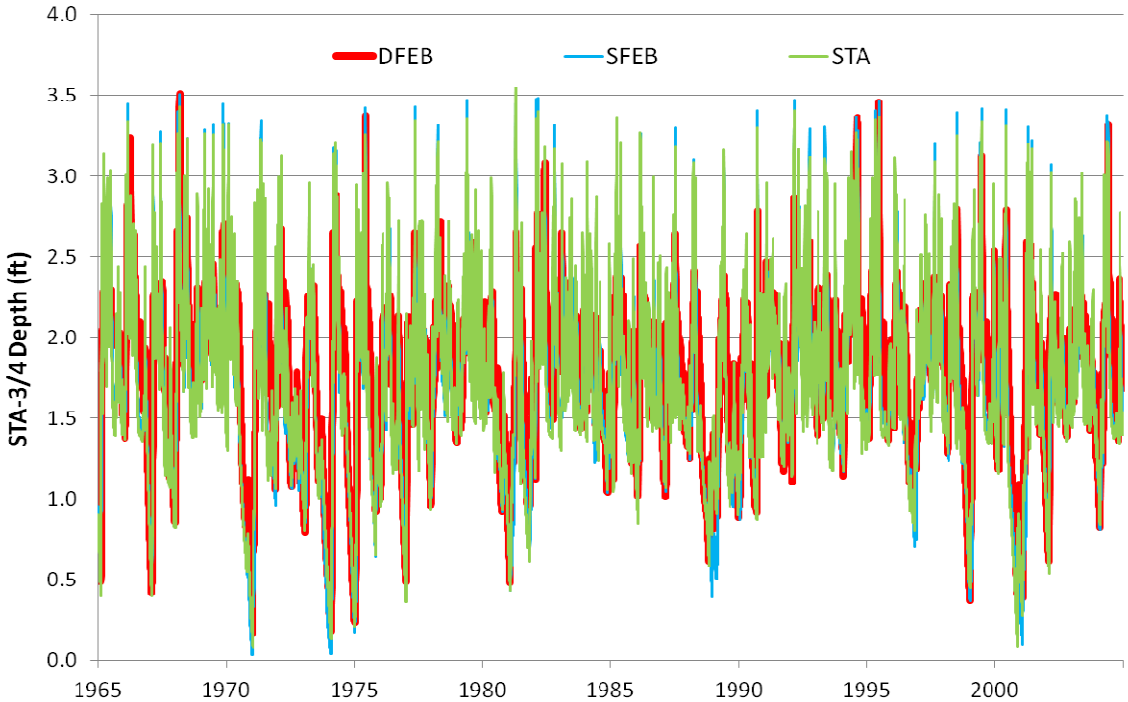



**Figure 8. Ponding Depth Hydrographs for STA-3/4 – Action Alternatives**

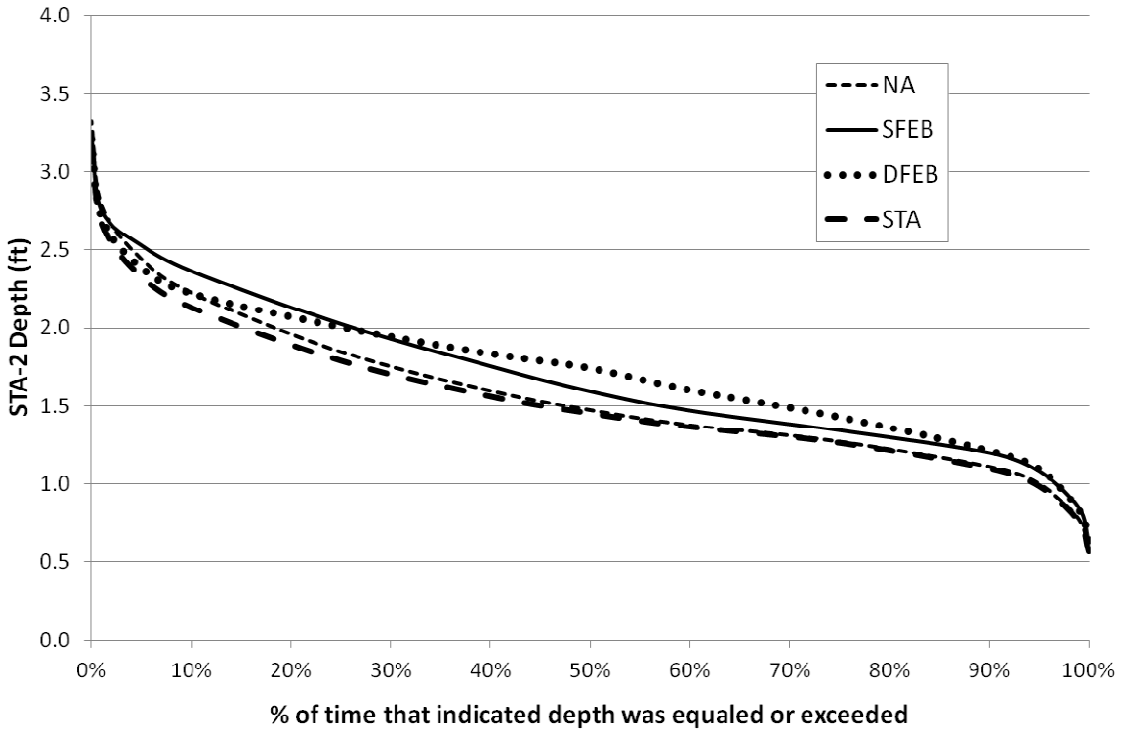



**Figure 9. Ponding Depth Duration Curves for STA-2 – All Alternatives**

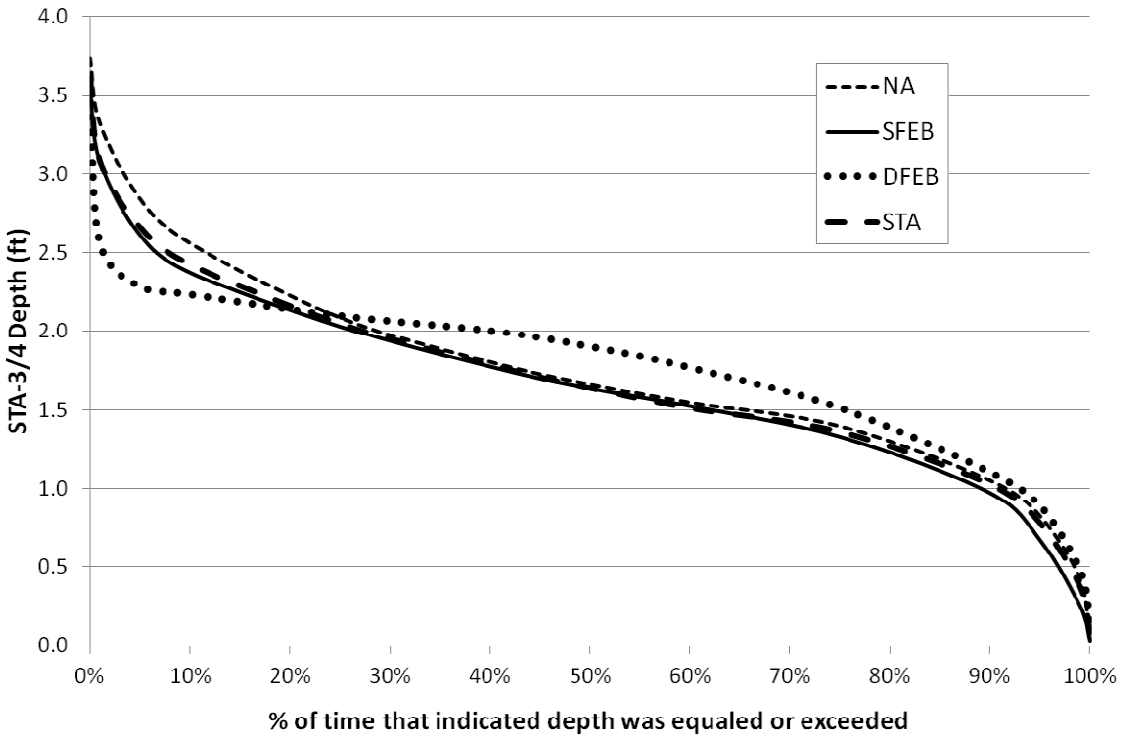



**Figure 10. Ponding Depth Duration Curves for STA-3/4 – All Alternatives**

**Table 6. STA-2 and STA-3/4 Flows, TP Loads and TP Concentrations**

| | Parameter | Alternative 1: No Action | Alternative 2: Shallow FEB | Alternative 3: Deep FEB | Alternative 4: STA |
|---|---|---|---|---|---|
| STA-2 | Inflow Volume (acre-feet per year) | 301,000 | 387,000 | 386,000 | 253,000 |
| | Outflow Volume (acre-feet per year) | 307,000 | 391,000 | 389,000 | 259,000 |
| | Inflow TP Load (metric tons per year) | 46.2 | 53.2 | 57.1 | 40.6 |
| | Outflow TP Load (metric tons per year) | 4.6 | 6.0 | 5.5 | 3.4 |
| | Inflow TP Concentration (ppb) | 124 | 112 | 120 | 130 |
| | Outflow TP Concentration (ppb) [1] | 13 | 13 | 12 | 12 |
| STA-3/4 | Inflow Volume (acre-feet per year) | 504,000 | 401,000 | 407,000 | 275,000 |
| | Outflow Volume (acre-feet per year) | 495,000 | 392,000 | 397,000 | 269,000 |
| | Inflow TP Load (metric tons per year) | 62.0 | 29.4 | 52.1 | 34.1 |
| | Outflow TP Load (metric tons per year) | 11.2 | 5.6 | 5.6 | 3.5 |
| | Inflow TP Concentration (ppb) | 100 | 59 | 104 | 100 |
| | Outflow TP Concentration (ppb) [1] | 18 | 13 | 13 | 12 |

Note: 1. Due to the uncertainty associated with DMSTA-simulated low level TP concentrations, annual values less than 12 ppb were replaced with a value of 12 ppb.

## References

Gary Goforth, Inc. (2009). Updated STA Phosphorous Projections for the 2015 Planning Period. Prepared for the South Florida Water Management District. September 2009.

SFWMD. (2012). Restoration Strategies Regional Water Quality Plan. South Florida Water Management District, West Palm Beach, Florida. April 27, 2012.

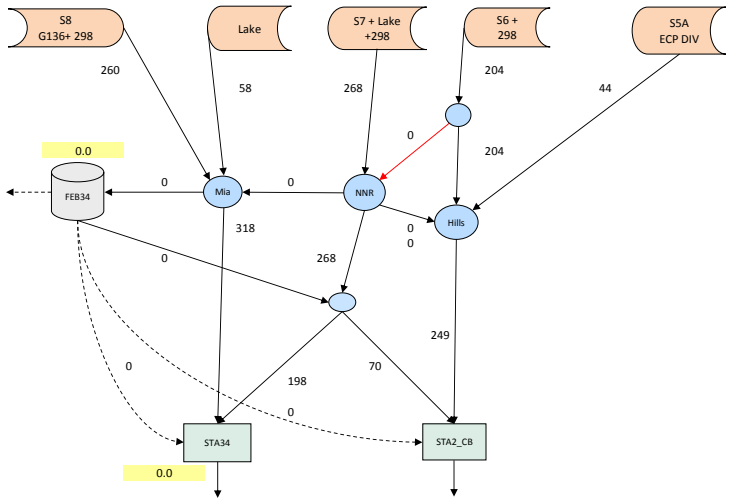
USEPA. (2010). Amended Determination, Attachment H: Assumptions and Modeling Report, Evaluation of Alternatives to Achieve Phosphorus WQBELs in Discharges to the Everglades Protection Area. United States Environmental Protection Agency. September 3, 2010.

## Attachment A – DMSTA Modeling Sheets

# ALTERNATIVE 1: NO ACTION

Scenario: A1FEB EIS No Action Displayed: Flow kac

STA Expansion kac




| | | |
|---|---|---|
| STA Outflow TP ppb | 18.3 | 12.1 |
| STA Expansion kac | 0.0 | |
| STA Total Area kac | 16.3 | 15.5 |
| STA Outflow kacf/yr | 495 | 307 |
| WCA Inflow kacft | | 307 |

| | |
|---|---|
| Starting Date for Simulation | 01/01/65 |
| Ending Date for Simulation | 04/30/05 |
| Starting Date for Output | 05/01/65 |

Inputs for Scenario A1FEB EIS No Action

Run Date ##########

Diversion Rules

| Diversion | Default | Diverted to | Fraction | Qmax | Description |
|---|---|---|---|---|---|
| C51E Diversion | C51W Canal | EAST | 0 | | |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | divert to hills up to qmax |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | low-flow bypass to WPB |
| S5A Div to FEB North | FEBS5A | FEBS5A_N | 0 | | northern STA.FEB |
| FEB S5A Outflow | HILLS_C | STA1DW | 1 | 9999 | diversion to Hills |
| C51W Outflow | EAST | STA1E | 0.613 | | direct to STA1E |
| C51W Outflow | EAST | STA1_DW | 0 | | direct to STA1DW |
| C51W Outflow | EAST | FEB_S5A | 1 | | remainder to East |
| STA1W Distrib | STA1W | STA1E | 0 | | WPB C STA1E |
| S6 Runoff | STA2CB | NNRC | 0 | | S6 divert to NNR |
| NNR Canal | FEB34 | STA34 | 1 | 9999 | NNR LowQ Bypass to STA34 |
| STA56 Distrib | STA5 | STA6 | 0.365 | | Balance STA56 Loads, Hint= |
| L8 to STA1N | North | FEBS5A_N | 0 | | To FEB S5AN (Rest to C51W) |
| L8 to C51W | North | C51W | 1 | 700 | CERP |
| NNR to CB | STA34 | Comp B | 0 | 500 | Original Design for Comp B =1 |
| NNR to CB 2 | STA34 | Comp B | 0 | 500 | Additional NNR Diversion to CB |
| S5A to WS | S5A Div | WS | 0 | 2000 | |
| FEB34 Distrib | STA34 | STA2B | 0.261 | 1600 | |
| Other | | | | | |
| Other | | | | | |

Mass Balance Summary A1FEB EIS project_a1feb eis .xls

| | Inflows Area kac | Inflows Flow kac-ft | Inflows Load mt | Inflows Conc ppb | Outflows Flow kac-ft | Outflows Load mt | Outflows Conc ppb | HLR cm/d | HLR Max cm/d |
|---|---|---|---|---|---|---|---|---|---|
| STA | | | | | | | | | |
| STA1E | 5.0 | 107 | 19.6 | 148 | 101 | 1.4 | 11.0 | 1.80 | 13.8 |
| STA1W | 12.4 | 312 | 67.2 | 174 | 305 | 4.2 | 11.1 | 2.10 | 26.0 |
| STA2B | 15.5 | 301 | 46.2 | 124 | 307 | 4.6 | 12.1 | 1.62 | 14.3 |
| STA34 | 16.3 | 504 | 62.0 | 100 | 495 | 11.2 | 18.3 | 2.58 | 21.7 |
| STA5 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| STA6 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| Total STA | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | |

| | STA Areas | | | | | |
|---|---|---|---|---|---|---|
| #REF! | STA1E | R | STA1W+E | 406.0 | 5.5 | 11.1 |
| | STA1W | R | STA2+34+B | 801.6 | 15.7 | 15.9 |
| | STA2B | R | STA5+6 | #REF! | #REF! | #REF! |
| | STA34 | R | | | | |
| | STA56 | W2 | | | | |

L = Levee; W = Waterbody; P = Published; R = Draft 2011 Revised; AD = USEPA AD 2010; W2 = Comp. C mitigation area removed

Refer to Sheet "STA_Areas" for Effective Treatment Area calculations

| FEB Calculations | FEB_S5A | FEB_34 | FEB_56 | FEBS5A_N | Release Mutiplying factor | |
|---|---|---|---|---|---|---|
| DMSTA calibration | none | EMG_3 | RES_3 | EMG_3 | FEB5A_STA1W | 1 |
| Area kac | 0.786 | 0 | 0 | 0 | FEB34_STA34 | 5 |
| HRT days | 30 | 30 | 30 | 30 | FEB34_STA2B | 5 |
| Bypass Depth ft | 58.5 | 4 | 4 | 4 | FEB56_STA5 | 1 |
| LowQ Bypass cfs | 250 | 200 | 50 | 100 | | |
| Max Qin cfs | 2000 | 5500 | 1000 | 2000 | | |
| Max Qout cfs | 450 | 9999 | 9999 | 500 | | |
| Control Depth ft | 5 | 0.5 | 1.25 | 1 | | |
| Min Release Depth ft | 5 | 0.5 | 1.25 | 1 | Optional: | |
| Regulation Schedule | FEB_REG | | | | See FEB_Design Sheet | |
| STA WS Release | Rel_opt | | | | See input series sheet | |
| Farm WS Release | | | | REL_FARM | "" | |
| Frac Irrig Demand | 0.5 | | | 0.25 | A1 Res Seep | 0 |
| Frac C51 Urban WS | 1 | | | | | |
| STA Expansion | STA1WX | STA34X | STA56X | Exist Cell Calib | | |
| Area kac | 5.9 | 0 | 0 | | | |
| Fraction SAV | -0.8 | 0.67 | 0.4 | | 1 or <0= Series, 0-0.99 = Paralle | |
| Enhanced | SAV_3 | SAV_3 | EMG_3 | SAV_3 | | |
| Treat C139 Annex Runoff in STA56 | FALSE | | | | | |
| Base Period for Concs | 3 | 1=2005-2009, 2=1995-2009, 3=2000-2009 | | | | |
| Use Lake P Concs | TRUE | for Lake Releases | | | | |
| C139 Load Reduc | 35% | Max TP ppb | 0 | | C139 calc | 35.23% |
| STA Duty Cycle | 0.95 | New Lake Rel kal | 0 | | | |
| Target Conc ppb | 12.5 | Iterations | 1 | use iter=1 for testing, 2 for final | | |
| Output Interval | 1 | S5A/C51 Cmax | 0 | | | |
| S5A Load Reduc | 0% | S678 Cmax | 0 | | | |
| EBWCD Load Reduc | 0% | C139 Cmax | 0 | | | |
| Treat Urban WS | FALSE | Modify Lake WS to STA6 | | TRUE | | |

| FEBs | Treated Inflow Area kac | Treated Inflow Flow kac-ft | Treated Inflow Load mt | Treated Inflow Conc ppb | Outflows Flow kac-ft | Outflows Load mt | Outflows Conc ppb | Depth cm Mean | Depth cm Min |
|---|---|---|---|---|---|---|---|---|---|
| FEBS5A_N | 0.0 | 0 | 0.0 | #N/A | 0 | 0.0 | #N/A | 0 | 0 |
| FEB_S5A | 0.8 | 161 | 35.3 | 178 | 0 | 0.0 | #N/A | 734 | 117 |
| FEB_34 | 0.0 | 0 | 0.0 | #N/A | 0 | 0.0 | #N/A | 0 | 0 |
| FEB_56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| Total FEB | 0.8 | 161 | 35.3 | 178 | 0 | 0.0 | #N/A | | |

| Input Time Series | Flow kac-ft | Load mt | Conc ppb | Flow cfs | Flow CV - | Flow Max cfs |
|---|---|---|---|---|---|---|
| TS_FEBS5A_N | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_FEBS5A | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1DW | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1W | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1E | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA2B | 248.6 | 40.2 | 131 | 343 | 1.99 | 3626 |
| TS_FEB34 | 0.0 | 0.0 | 0 | 0 | #N/A | 0 |
| TS_STA34 | 318.0 | 39.4 | 100 | 439 | 1.85 | 4734 |
| TS_FEB56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| Total | #REF! | #REF! | #REF! | 0 | 0.00 | 0 |

| Watershed Areas | Land kac | Fraction | New STA kac | FEB kac | Runoff Rescale |
|---|---|---|---|---|---|
| Scale_S5A | 107 | 1 | 5.9 | 0.8 | 0.99 |
| Scale_S6 | 105 | 1 | | | 1.00 |
| Scale_S7 | 120 | 1 | 0.0 | 0.0 | 1.00 |
| Scale_S8 | 120 | 0 | | | 1.00 |
| Scale_Annex | 18 | 1 | 0.0 | 0.0 | 0.00 |
| Scale_S5A_DIV | 23 | 1 | 5.9 | | 0.74 |

S5A Runoff Adj. Location for STA1WX 2 1 = S5A/WBWCD, 2 = S5A ECP DIV

End of Design Input Parameters .....

# DMSTA2 - Network Simulation

Model Release: 7/29/2011a
Current Date: 10/23/12

Forecast Type: Base

Network Name: NET_Central
Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_I
Stop after Case Num:

Description: Network for EAA Basins

Routing Table — Enter a downstream CASE name or OUTLET number (1-5) in rows 9-13

| Case Name--> | FEB_34 | FEB34_OUT | STA2B | STA34 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Send Bypass to --> | STA34 | STA34 | 1 | 2 | | | | | | |
| Send Release 1 to --> | STA34 | | | | | | | | | |
| Send Release 2 to --> | STA2B | | | | | | | | | |
| Send Outflow to --> | FEB34_OUT | STA2B | 1 | 2 | | | | | | |
| Send Seepage to --> | FEB34_OUT | | | | | | | | | |

| Overall Mass Balance | | Flow | Load | FWC | Geo Mn |
|---|---|---|---|---|---|
| Outlet Number | Outlet Description | hm3/yr | kg/yr | ppb | ppb |
| Outlet 1 | STA2B | 400.5 | 7067 | 17.6 | 7.6 |
| Outlet 2 | STA34 | 625.1 | 12488 | 20.0 | 12.7 |
| Outlet 3 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 4 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 5 | | 0.0 | 0 | #N/A | #N/A |
| Total Outlets | | 1025.6 | 19555 | 19.1 | |
| Watershed Inputs | | 1030.3 | 112024 | 108.7 | 126.4 |
| Storage Increase | | 0.3 | 360 | | |
| Rain - ET | | -4.4 | 4228 | | |
| Net Seepage Losses | | -0.1 | -121 | | |
| Burial | | 0.0 | 96489 | | |
| Mass Balance Check | | 0.0 | -31 | | |
| Input/Outlet Reduction | | 4.7 | 92469 | 89.7 | |
| Reduction % | | 0% | 83% | 82% | |

**Select Network:**

**Select Simulation Type:**

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_NA**

Model Release:
Current Date:

| Input Variable | Units | Value | Case Description: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Case Name | - | FEB_34 | S5A Flow Equalization Basin | | | | Area kac | 0 | Control Z | 0.5 | Duty Cyc: | 1 | |
| Input Series Name | | TS_FEB34 | TS Contains Rule for Irrigation Withdrawal | | | | HRT Days | 30 | Release Z | 0.5 | | | |
| Starting Date for Simulation | - | 01/01/65 | Outflow & Bypass to STA1 Inflow Distr | | | | Byp Depth ft | 4 | Low Q Byp | 200 | | | |
| Ending Date for Simulation | - | 04/30/05 | Network inflow from FEB34_IN | | | | Qin max cfs | 5500 | Calibration | EMG_3 | | | |
| Starting Date for Output | - | 05/01/65 | TS_FEB34 has rainfall, release, reg | | | | Qo Max cfs | 9999 | | | | | |
| Integration Steps Per Day | - | 4 | Simulation Type: | | | | | | | | | | |
| Number of Iterations | - | 1 | Output Variable | | Mean | Lower CL | Upper CL | | Diagnostics | | | | |
| Output Averaging Interval | days | 1 | FWM Outflow C (ppb) | | #N/A | #N/A | #N/A | | H20 Balance Error Mean & Max | | | 0.0% | #N/A |
| Inflow Conc Scale Factor | - | 1 | GM Outflow C (ppb) | | #N/A | #N/A | #N/A | | Mass Balance Error Mean & Max | | | 0.0% | #N/A |
| Rainfall P Conc | ppb | 10 | Load Reduction % | | #N/A | #N/A | #N/A | | Iterations & Convergence | | | 1 | 0.0% |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 | Bypass Load (%) | | #N/A | | | | Warning/Error Messages | | | 5 | |
| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| Cell Label | - | LowQByp | FEB_34 | | RES_3 | EMG_3 | EMG_3L | | | | | | |
| Vegetation Type | --> | none | EMG_3 | | RES_3 | EMG_3 | none | | | | | | |
| Inflow Fraction | - | 1 | | | | | | | | | | | |
| Downstream Cell Number | - | 2 | | | | | | | | | | | |
| Surface Area | km2 | | | | | | | | | | | | |
| Mean Width of Flow Path | km | | | | | | | | | | | | |
| Number of Tanks in Series | - | | 3.0 | | 1.0 | 3.0 | 1.0 | | | | | | |
| Minimum Depth for Releases | cm | | -15 | | | | | | | | | | |
| Release 1 Series Name | | | Rel_opt34 | | | | | | | | | | |
| Release 2 Series Name | | | Rel_opt2B | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | 9999 | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | 4 | | 1 | 4 | 4 | | | | | | |
| Outflow Coefficient - Intercept | - | | 1 | | | 1 | 1 | | | | | | |
| Bypass Depth | cm | | 121.9512 | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 13.46651 | | | | | | | | | | |
| Maximum Outflow | hm3/day | -0.4896911 | 24.48211 | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | 10 | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | 1000 | | | | | | | | | | |
| Initial Water Column Depth | cm | | 15 | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | 3 | | | | 3 | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | 22 | | | | 13 | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | 300 | | | | 300 | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | 16.8 | | | | 10.0 | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | 40 | | | | 40 | | | | | | |
| Z2 = Lower Penalty Depth | cm | | 100 | | | | 100 | | | | | | |
| Z3 = Upper Penalty Depth | cm | | 200 | | | | 200 | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_NA**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | FEB34_OUT |
| Input Series Name | | TS_FEB34_OUT |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

Splits FEB Outflow to STA34 or STA2B — Duty Cyc: 1

Fraction t STA2B 0.261

Max Flow STA2B 1600

Bypass goes to STA34 Outflow goes to STA2B

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 97.7 | #N/A | #N/A |
| GM Outflow C (ppb) | 95.4 | #N/A | #N/A |
| Load Reduction % | 0% | #N/A | #N/A |
| Bypass Load (%) | 73.9% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 4 | |

| Cell Number --> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | toSTA2B | toSTA34 | | | | | | | | | | |
| Vegetation Type | --> | none | none | | | | | | | | | | |
| Inflow Fraction | - | 0.261 | 0.739 | | | | | | | | | | |
| Downstream Cell Number | - | | | | | | | | | | | | |
| Surface Area | km2 | | | | | | | | | | | | |
| Mean Width of Flow Path | km | | | | | | | | | | | | |
| Number of Tanks in Series | - | | | | | | | | | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | | | | | | | | | | | |
| Outflow Coefficient - Intercept | - | | | | | | | | | | | | |
| Bypass Depth | cm | | | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 0.00001 | | | | | | | | | | |
| Maximum Outflow | hm3/day | 3.917528765 | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | | | | | | | | | | | |
| Initial Water Column Depth | cm | | | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | | | | | | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | | | | | | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | | | | | | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | | | | | | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | | | | | | | | | | | |
| Z2 = Lower Penalty Depth | cm | | | | | | | | | | | | |
| Z3 = Upper Penalty Depth | cm | | | | | | | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_NA**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | STA2B |
| Input Series Name | | TS_STA2B |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

STA-2/Comp. B
Southern 70% of Cell 2 assumed to be SAV

Area kac = 15.487192
No Expansion
S6 Runoff Diversion to STA34 = 0.00

Duty Cycle 0.95

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 12.1 | #N/A | #N/A |
| GM Outflow C (ppb) | 7.2 | #N/A | #N/A |
| Load Reduction % | 85% | #N/A | #N/A |
| Bypass Load (%) | 5.1% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | 0.0% |
| Mass Balance Error Mean & Max | 0.0% | 0.1% |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 22 | |

| Cell Number --> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | 1 | 2N | 2S | 3 | 5N | 5S | 6N | 6S | 4 | 7-Jan | 8 | |
| Vegetation Type | --> | PEW_3 | PEW_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | |
| Inflow Fraction | - | 0.11874703 | 0.153145 | | 0.148176 | 0.208506 | | 0.178087 | | | 0.1933397 | | |
| Downstream Cell Number | - | | 3 | | | 6 | 9 | 8 | 9 | | 11 | | |
| Surface Area | km2 | 7.45 | 3.17 | 6.43 | 9.29 | 2.42 | 6.42 | 2.07 | 5.48 | 7.86 | 6.22 | 5.90 | |
| Mean Width of Flow Path | km | 1.58 | 2.00 | 2.00 | 2.00 | 3.51 | 2.70 | 2.99 | 2.30 | 2.50 | 2.00 | 1.50 | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 6.0 | 1.0 | 2.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 52.73 | 29.26 | 29.26 | 35.97 | 42.9768 | 42.9768 | 42.9768 | 42.9768 | 46.0248 | 41.45 | 41.45 | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| Outflow Coefficient - Intercept | - | 0.815 | 1 | 2.098 | 2.852 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Bypass Depth | cm | 121.92 | 121.92 | | 121.92 | 121.92 | | 121.92 | | | 121.92 | | |
| Maximum Inflow | hm3/day | 2.44845548 | 2.485182 | | 2.448455 | 1.444589 | | 1.444589 | | | 1.1752586 | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | 0.017819 | 0.006695 | | | 0.0064 | 0.0133 | 0.0164 | |
| Inflow Seepage Control Elev | cm | | | | | 48 | 48 | | | 60 | 53 | 63 | |
| Inflow Seepage Conc | ppb | | | | | 75 | 75 | | | 75 | 75 | 15 | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | |
| Initial P Storage Per Unit Area | mg/m2 | 1102.46303 | 2272.59 | 403.2181 | 777.1397 | 3255.381 | 934.0044 | 3267.193 | 949.6516 | 252.99096 | 2624.3453 | 553.9087 | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | |
| K = Net Settling Rate at Steady State | m/yr | 34.9 | 34.9 | 52.5 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 52.5 | 16.8 | 52.5 | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_NA**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | STA34 |
| Input Series Name | | TS_STA34 |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:** STA34 (ArcHydro levee centerline areas) with Expansion Cells

duty cycle 0.95

| | | | |
|---|---|---|---|
| Expansion Area = | 0 | 16.31864 | 16.31864 |
| SAV Fraction= | 0.67 | 0.513628 | 0.513628 |

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 18.3 | #N/A | #N/A |
| GM Outflow C (ppb) | 12.5 | #N/A | #N/A |
| Load Reduction % | 80% | #N/A | #N/A |
| Bypass Load (%) | 2.1% | | |

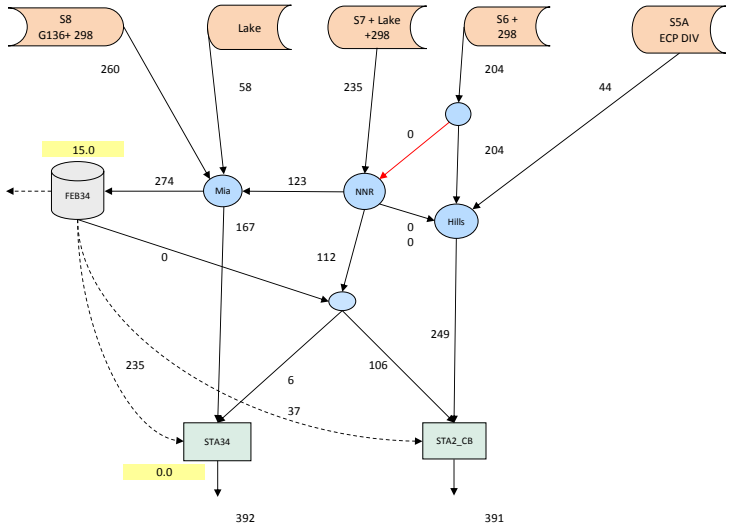
| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 16 | |

| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | 1A | 1B | 2A | 2B | 3A | 3B | 34X-A | 34X-B | | | | |
| Vegetation Type | --> | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | | | | |
| Inflow Fraction | - | 0.3966436 | | 0.327617 | | 0.27574 | | | | | | | |
| Downstream Cell Number | - | 2 | | 4 | | 6 | | 8 | | | | | |
| Surface Area | km2 | 12.22 | 13.99 | 10.14 | 11.51 | 9.77 | 8.45 | | | | | | |
| Mean Width of Flow Path | km | 3.42 | 4.50 | 2.89 | 4.02 | 4.88 | 4.88 | | | | | | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 40 | 40 | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | |
| Outflow Coefficient - Intercept | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Bypass Depth | cm | 121.92 | | 121.92 | | 121.92 | | | | | | | |
| Maximum Inflow | hm3/day | 5.3229422 | | 4.847942 | | 4.142787 | | | | | | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | 0.000808 | 0.000873 | 7.88E-05 | 0.000935 | 7.88E-05 | 0.001316 | 0.00075 | 0.00075 | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 52 | 12 | 55 | 15 | 55 | 15 | 30 | 30 | | | | |
| Initial P Storage Per Unit Area | mg/m2 | 2664.2963 | 823.3365 | 2668.729 | 838.3753 | 2550.364 | 853.2694 | 1000 | 1000 | | | | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | | | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | | | |
| K = Net Settling Rate at Steady State | m/yr | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | | | | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | | | |

# ALTERNATIVE 2: SHALLOW FLOW EQUALIZATION BASIN

Scenario: A1FEB EIS Shallow FEB Displayed: Flow kac

STA Expansion kac




| | | |
|---|---|---|
| STA Outflow TP ppb | 11.6 | 12.4 |
| STA Expansion kac | 0.0 | |
| STA Total Area kac | 16.3 | 15.5 |
| STA Outflow kacf/yr | 392 | 391 |
| WCA Inflow kacft | 491.6 | 490 |

| | |
|---|---|
| Starting Date for Simulation | 01/01/65 |
| Ending Date for Simulation | 04/30/05 |
| Starting Date for Output | 05/01/65 |
| Run Date | ######### |

Inputs for Scenario A1FEB EIS Shallow FEB

Diversion Rules

| Diversion | Default | Diverted to | Fraction | Qmax | Description |
|---|---|---|---|---|---|
| C51E Diversion | C51W Canal | EAST | 0 | | |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | divert to hills up to qmax |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | low-flow bypass to WPB |
| S5A Div to FEB North | FEBS5A | FEBS5A_N | 0 | | northern STA.FEB |
| FEB S5A Outflow | HILLS_C | STA1DW | 1 | 9999 | diversion to Hills |
| C51W Outflow | EAST | STA1E | 0.613 | | direct to STA1E |
| C51W Outflow | EAST | STA1_DW | 0 | | direct to STA1DW |
| C51W Outflow | EAST | FEB_S5A | 1 | | remainder to East |
| STA1W Distrib | STA1W | STA1E | 0 | | WPB C STA1E |
| S6 Runoff | STA2CB | NNRC | 0 | | S6 divert to NNR |
| NNR Canal | FEB34 | STA34 | 0 | 1500 | NNR LowQ Bypass to STA34 |
| STA56 Distrib | STA5 | STA6 | 0.365 | | Balance STA56 Loads, Hint= |
| L8 to STA1N | North | FEBS5A_N | 0 | | To FEB S5AN (Rest to C51W) |
| L8 to C51W | North | C51W | 1 | 700 | CERP |
| NNR to CB | STA34 | Comp B | 0 | 500 | Original Design for Comp B =1 |
| NNR to CB 2 | STA34 | Comp B | 0 | 500 | Additional NNR Diversion to CB |
| S5A to WS | S5A Div | WS | 0 | 2000 | |
| FEB34 Distrib | STA34 | STA2B | 0.950 | 1600 | |
| Other | | | | | |
| Other | | | | | |

Mass Balance Summary A1FEB EIS project_a1feb eis .xls

| | Inflows Area kac | Inflows Flow kac-ft | Inflows Load mt | Inflows Conc ppb | Outflows Flow kac-ft | Outflows Load mt | Outflows Conc ppb | HLR cm/d | HLR Max cm/d |
|---|---|---|---|---|---|---|---|---|---|
| STA | | | | | | | | | |
| STA1E | 5.0 | 107 | 19.6 | 148 | 101 | 1.4 | 11.0 | 1.80 | 13.8 |
| STA1W | 12.4 | 312 | 67.2 | 174 | 305 | 4.2 | 11.1 | 2.10 | 26.0 |
| STA2B | 15.5 | 387 | 53.2 | 112 | 391 | 6.0 | 12.4 | 2.08 | 12.4 |
| STA34 | 16.3 | 401 | 29.4 | 59 | 392 | 5.6 | 11.6 | 2.05 | 21.7 |
| STA5 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| STA6 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| Total STA | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | |

| | | | | | |
|---|---|---|---|---|---|
| | STA Areas | | | | |
| #REF! | STA1E | R | STA1W+E | 406.0 | 5.5 | 11.1 |
| | STA1W | R | STA2+34+B | 783.5 | 11.6 | 12.0 |
| | STA2B | R | STA5+6 | #REF! | #REF! | #REF! |
| | STA34 | R | | | | |
| | STA56 | W2 | | | | |

L = Levee; W = Waterbody; P = Published; R = Draft 2011 Revised; AD = USEPA AD 2010; W2 = Comp. C mitigation area removed

Refer to Sheet "STA_Areas" for Effective Treatment Area calculations

| FEB Calculations | FEB_S5A | FEB_34 | FEB_56 | FEBS5A_N |
|---|---|---|---|---|
| DMSTA calibration | none | EMG_3 | RES_3 | EMG_3 |
| Area kac | 0.786 | 15 | 0 | 0 |
| HRT days | 30 | 30 | 30 | 30 |
| Bypass Depth ft | 58.5 | 4 | 4 | 4 |
| LowQ Bypass cfs | 250 | 200 | 50 | 100 |
| Max Qin cfs | 2000 | 5460 | 1000 | 2000 |
| Max Qout cfs | 450 | 2000 | 9999 | 500 |
| Control Depth ft | 5 | 9999 | 1.25 | 1 |
| Min Release Depth ft | 5 | 1 | 1.25 | 1 |
| Regulation Schedule | FEB_REG | | | |
| STA WS Release | Rel_opt | | | |
| Farm WS Release | | | | REL_FARM |
| Frac Irrig Demand | 0.5 | | | 0.25 |
| Frac C51 Urban WS | 1 | | | |
| STA Expansion | STA1WX | STA34X | STA56X | Exist Cell Calib |
| Area kac | 5.9 | 0 | 0 | |
| Fraction SAV | -0.8 | 0.67 | 0.4 | |
| Enhanced | SAV_3 | SAV_3 | EMG_3 | SAV_3 |
| Treat C139 Annex Runoff in STA56 | FALSE | | | |
| Base Period for Concs | 3 | 1=2005-2009, 2=1995-2009, 3=2000-2009 | | |
| Use Lake P Concs | TRUE | for Lake Releases | | |
| C139 Load Reduc | 35% | Max TP ppb | 0 | |
| STA Duty Cycle | 0.95 | New Lake Rel kal | 0 | |
| Target Conc ppb | 12.5 | Iterations | 1 | |
| Output Interval | 1 | S5A/C51 Cmax | 0 | |
| S5A Load Reduc | 0% | S678 Cmax | 0 | |
| EBWCD Load Reduc | 0% | C139 Cmax | 0 | |
| Treat Urban WS | FALSE | Modify Lake WS to STA6 | | TRUE |

| Release Mutiplying factor | | FEBs | Treated Inflow Area kac | Treated Inflow Flow kac-ft | Treated Inflow Load mt | Treated Inflow Conc ppb | Outflows Flow kac-ft | Outflows Load mt | Outflows Conc ppb | Depth cm Mean | Depth cm Min |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FEB5A_STA1W | 1 | FEBS5A_N | 0.0 | 0 | 0.0 | #N/A | 0 | 0.0 | #N/A | 0 | 0 |
| FEB34_STA34 | 5 | FEB_S5A | 0.8 | 161 | 35.3 | 178 | 0 | 0.0 | #N/A | 734 | 117 |
| FEB34_STA2B | 5 | FEB_34 | 15.0 | 274 | 31.9 | 94 | 0 | 0.0 | #N/A | 54 | 1 |
| FEB56_STA5 | 1 | FEB_56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| | | Total FEB | 15.8 | 435 | 67.2 | 125 | 0 | 0.0 | #N/A | | |

Optional:

| | |
|---|---|
| See FEB_Design Sheet | |
| See input series sheet | |
| "" | |
| A1 Res Seep | 0 |
| 1 or <0= Series, 0-0.99 = Paralle | |

| Input Time Series | Flow kac-ft | Load mt | Conc ppb | Flow cfs | Flow CV - | Flow Max cfs |
|---|---|---|---|---|---|---|
| TS_FEBS5A_N | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_FEBS5A | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1DW | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1W | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1E | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA2B | 248.6 | 40.2 | 131 | 343 | 1.99 | 3626 |
| TS_FEB34 | 441.4 | 54.4 | 100 | 609 | 2.23 | 8167 |
| TS_STA34 | 0.0 | 0.0 | 0 | 0 | #N/A | 0 |
| TS_FEB56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| Total | #REF! | #REF! | #REF! | 0 | 0.00 | 0 |

| | | |
|---|---|---|
| C139 calc | 35.23% | |
| use iter=1 for testing, 2 for final | | |

| Watershed Areas | Land kac | Fraction | New STA kac | FEB kac | Runoff Rescale |
|---|---|---|---|---|---|
| Scale_S5A | 107 | 1 | 5.9 | 0.8 | 0.99 |
| Scale_S6 | 105 | 1 | | | 1.00 |
| Scale_S7 | 120 | 1 | 0.0 | 15.0 | 0.88 |
| Scale_S8 | 120 | 0 | | | 1.00 |
| Scale_Annex | 18 | 1 | 0.0 | 0.0 | 0.00 |
| Scale_S5A_DIV | 23 | 1 | 5.9 | | 0.74 |

S5A Runoff Adj. Location for STA1WX 2 1 = S5A/WBWCD, 2 = S5A ECP DIV

End of Design Input Parameters .....

# DMSTA2 - Network Simulation

Model Release: 7/29/2011a
Current Date: 10/28/12

Forecast Type: Base

Network Name: NET_Central

Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_ Stop after Case Num:

Description: Network for EAA Basins

Routing Table — Enter a downstream CASE name or OUTLET number (1-5) in rows 9-13

| Case Name--> | FEB_34 | FEB34_OUT | STA2B | STA34 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Send Bypass to --> | STA34 | STA34 | 1 | 2 | | | | | | |
| Send Release 1 to --> | STA34 | | | | | | | | | |
| Send Release 2 to --> | STA2B | | | | | | | | | |
| Send Outflow to --> | FEB34_OUT | STA2B | 1 | **2** | | | | | | |
| Send Seepage to --> | FEB34_OUT | | | | | | | | | |

Overall Mass Balance

| Outlet Number | Outlet Description | Flow hm3/yr | Load kg/yr | FWC ppb | Geo Mn ppb |
|---|---|---|---|---|---|
| Outlet 1 | STA2B | 489.6 | 6787 | 13.9 | 9.0 |
| Outlet 2 | STA34 | 491.8 | 6298 | 12.8 | 6.8 |
| Outlet 3 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 4 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 5 | | 0.0 | 0 | #N/A | #N/A |
| Total Outlets | | 981.4 | 13085 | 13.3 | |
| Watershed Inputs | | 989.7 | 108049 | 109.2 | 126.7 |
| Storage Increase | | 0.5 | 382 | | |
| Rain - ET | | -6.5 | 6225 | | |
| Net Seepage Losses | | 1.2 | -187 | | |
| Burial | | 0.0 | 100971 | | |
| Mass Balance Check | | 0.0 | 22 | | |
| Input/Outlet Reduction | | 8.2 | 94964 | 95.8 | |
| Reduction % | | 1% | 88% | 88% | |

**Select Network:**

**Select Simulation Type:**

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_SFEB**

Model Release:

Current Date:

| Input Variable | Units | Value | Case Description: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Case Name | - | FEB_34 | S5A Flow Equalization Basin | | | | Area kac | | 15 | Control Z | 9999 | Duty Cyc: | 1 |
| Input Series Name | | TS_FEB34 | TS Contains Rule for Irrigation Withdrawal | | | | HRT Days | | 30 | Release Z | 1 | | |
| Starting Date for Simulation | - | 01/01/65 | Outflow & Bypass to STA1 Inflow Distr | | | | Byp Depth ft | | 4 | Low Q Byp | 200 | | |
| Ending Date for Simulation | - | 04/30/05 | Network inflow from FEB34_IN | | | | Qin max cfs | | 5460 | Calibration | EMG_3 | | |
| Starting Date for Output | - | 05/01/65 | TS_FEB34 has rainfall, release, reg | | | | Qo Max cfs | | 2000 | | | | |
| Integration Steps Per Day | - | 4 | Simulation Type: | | | | | | | | | | |
| Number of Iterations | - | 1 | Output Variable | | Mean | Lower CL | Upper CL | | Diagnostics | | | | |
| Output Averaging Interval | days | 1 | FWM Outflow C (ppb) | | #N/A | #N/A | #N/A | | H20 Balance Error Mean & Max | | | 0.0% | 0.0% |
| Inflow Conc Scale Factor | - | 1 | GM Outflow C (ppb) | | 20.1 | #N/A | #N/A | | Mass Balance Error Mean & Max | | | 0.0% | 0.0% |
| Rainfall P Conc | ppb | 10 | Load Reduction % | | 44% | #N/A | #N/A | | Iterations & Convergence | | | 1 | 0.0% |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 | Bypass Load (%) | | 41.4% | | | | Warning/Error Messages | | | 2 | |
| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| Cell Label | - | LowQByp | FEB_34 | | RES_3 | EMG_3 | EMG_3L | | | | | | |
| Vegetation Type | --> | none | EMG_3 | | RES_3 | EMG_3 | none | | | | | | |
| Inflow Fraction | - | 1 | | | | | | | | | | | |
| Downstream Cell Number | - | 2 | | | | | | | | | | | |
| Surface Area | km2 | | 60.73 | | | | | | | | | | |
| Mean Width of Flow Path | km | | 7.79 | | | | | | | | | | |
| Number of Tanks in Series | - | | 3.0 | | 1.0 | 3.0 | 1.0 | | | | | | |
| Minimum Depth for Releases | cm | | -30 | | | | | | | | | | |
| Release 1 Series Name | | | Rel_opt34 | | | | | | | | | | |
| Release 2 Series Name | | | Rel_opt2B | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | 304769.5 | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | 4 | | 1 | 4 | 4 | | | | | | |
| Outflow Coefficient - Intercept | - | | 1 | | 0.259773 | 1 | 1 | | | | | | |
| Bypass Depth | cm | | 121.9512 | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 13.36857 | | | | | | | | | | |
| Maximum Outflow | hm3/day | -0.4896911 | 4.896911 | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | 10 | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | 1344.038 | | | | | | | | | | |
| Initial Water Column Depth | cm | | 15 | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | 3 | | | | 3 | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | 22 | | | | 13 | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | 300 | | | | 300 | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | 16.8 | | | | 10.0 | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | 40 | | | | 40 | | | | | | |
| Z2 = Lower Penalty Depth | cm | | 100 | | | | 100 | | | | | | |
| Z3 = Upper Penalty Depth | cm | | 200 | | | | 200 | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_SFEB**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | FEB34_OUT |
| Input Series Name | | TS_FEB34_OUT |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

Splits FEB Outflow to STA34 or STA2B — Duty Cyc: 1

Fraction t STA2B 0.95

Max Flow STA34 1600

Bypass goes to STA34 Outflow goes to STA2B

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 97.3 | #N/A | #N/A |
| GM Outflow C (ppb) | 55.1 | #N/A | #N/A |
| Load Reduction % | 0% | #N/A | #N/A |
| Bypass Load (%) | 5.0% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 4 | |

| Cell Number --> | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | toSTA2B | toSTA34 | | | | | | | | | | |
| Vegetation Type | --> | none | none | | | | | | | | | | |
| Inflow Fraction | - | 0.95 | 0.05 | | | | | | | | | | |
| Downstream Cell Number | - | | | | | | | | | | | | |
| Surface Area | km2 | | | | | | | | | | | | |
| Mean Width of Flow Path | km | | | | | | | | | | | | |
| Number of Tanks in Series | - | | | | | | | | | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | | | | | | | | | | | |
| Outflow Coefficient - Intercept | - | | | | | | | | | | | | |
| Bypass Depth | cm | | | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 0.00001 | | | | | | | | | | |
| Maximum Outflow | hm3/day | 3.917528765 | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | | | | | | | | | | | |
| Initial Water Column Depth | cm | | | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | | | | | | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | | | | | | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | | | | | | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | | | | | | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | | | | | | | | | | | |
| Z2 = Lower Penalty Depth | cm | | | | | | | | | | | | |
| Z3 = Upper Penalty Depth | cm | | | | | | | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_SFEB**

Model Release:
Current Date:

| Input Variable | Units | Value | Case Description: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Case Name | - | STA2B | STA-2/Comp. B | | | | | | | | | | Duty Cycle | 0.95 |
| Input Series Name | | TS_STA2B | Southern 70% of Cell 2 assumed to be SAV | | | | | | | Area kac = 15.48719 | | | | |
| Starting Date for Simulation | - | 01/01/65 | | | | | | | | No Expansion | | | | |
| Ending Date for Simulation | - | 04/30/05 | | | | | | | | S6 Runoff Diversion to STA34 = | | | 0.00 | |
| Starting Date for Output | - | 05/01/65 | | | | | | | | | | | | |
| Integration Steps Per Day | - | 4 | Simulation Type: | | | | | | | | | | | |
| Number of Iterations | - | 1 | Output Variable | | Mean | Lower CL | Upper CL | | | Diagnostics | | | | |
| Output Averaging Interval | days | 1 | FWM Outflow C (ppb) | | 12.4 | #N/A | #N/A | | | H20 Balance Error Mean & Max | | | 0.0% | 0.0% |
| Inflow Conc Scale Factor | - | 1 | GM Outflow C (ppb) | | 8.8 | #N/A | #N/A | | | Mass Balance Error Mean & Max | | | 0.0% | 0.1% |
| Rainfall P Conc | ppb | 10 | Load Reduction % | | 87% | #N/A | #N/A | | | Iterations & Convergence | | | 1 | 0.0% |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 | Bypass Load (%) | | 1.5% | | | | | Warning/Error Messages | | | 22 | |
| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| Cell Label | - | 1 | 2N | 2S | 3 | 5N | 5S | 6N | 6S | 4 | 7-Jan | 8 | | |
| Vegetation Type | --> | PEW_3 | PEW_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | | |
| Inflow Fraction | - | 0.118747 | 0.153145 | | 0.148176 | 0.208506 | | 0.178087 | | | 0.1933397 | | | |
| Downstream Cell Number | - | | 3 | | | 6 | 9 | 8 | 9 | | 11 | | | |
| Surface Area | km2 | 7.45 | 3.17 | 6.43 | 9.29 | 2.42 | 6.42 | 2.07 | 5.48 | 7.86 | 6.22 | 5.90 | | |
| Mean Width of Flow Path | km | 1.58 | 2.00 | 2.00 | 2.00 | 3.51 | 2.70 | 2.99 | 2.30 | 2.50 | 2.00 | 1.50 | | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 6.0 | 1.0 | 2.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 52.73 | 29.26 | 29.26 | 35.97 | 42.9768 | 42.9768 | 42.9768 | 42.9768 | 46.0248 | 41.45 | 41.45 | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | |
| Outflow Coefficient - Intercept | - | 0.815 | 1 | 2.098 | 2.852 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Bypass Depth | cm | 121.92 | 121.92 | | 121.92 | 121.92 | | 121.92 | | | 121.92 | | | |
| Maximum Inflow | hm3/day | 2.4484555 | 2.485182 | | 2.448455 | 1.444589 | | 1.444589 | | | 1.1752586 | | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | 0.017819 | 0.006695 | | | 0.0064 | 0.0133 | 0.0164 | | |
| Inflow Seepage Control Elev | cm | | | | | 48 | 48 | | | 60 | 53 | 63 | | |
| Inflow Seepage Conc | ppb | | | | | 75 | 75 | | | 75 | 75 | 15 | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | | |
| Initial P Storage Per Unit Area | mg/m2 | 1186.197 | 2319.121 | 493.9108 | 850.6499 | 3099.355 | 1104.219 | 3106.195 | 1112.554 | 340.4175 | 2652.353 | 736.5517 | | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | |
| K = Net Settling Rate at Steady State | m/yr | 34.9 | 34.9 | 52.5 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 52.5 | 16.8 | 52.5 | | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_SFEB**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | STA34 |
| Input Series Name | | TS_STA34 |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

STA34 (ArcHydro levee centerline areas) with Expansion Cells — duty cycle 0.95

| | | | |
|---|---|---|---|
| Expansion Area = | 0 | 16.31864 | 16.31864 |
| SAV Fraction= | 0.67 | 0.513628 | 0.513628 |

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 11.6 | #N/A | #N/A |
| GM Outflow C (ppb) | 6.7 | #N/A | #N/A |
| Load Reduction % | 79% | #N/A | #N/A |
| Bypass Load (%) | 2.3% | | |

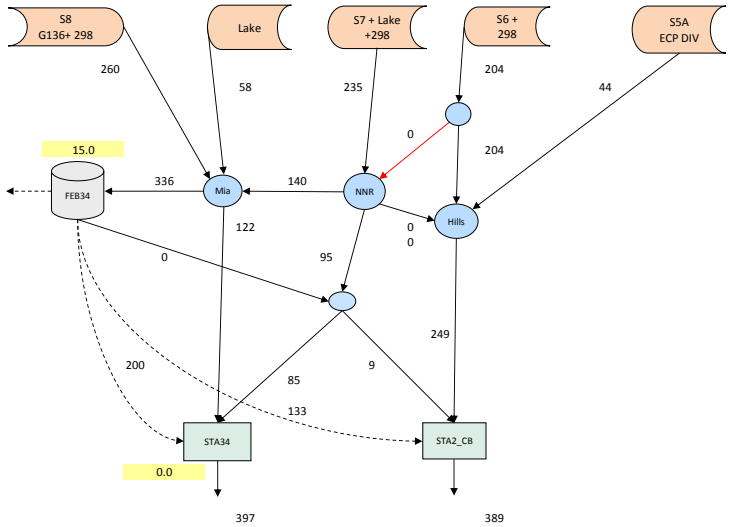
| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 19 | |

| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | 1A | 1B | 2A | 2B | 3A | 3B | 34X-A | 34X-B | | | | |
| Vegetation Type | --> | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | | | | |
| Inflow Fraction | - | 0.3966436 | | 0.327617 | | 0.27574 | | | | | | | |
| Downstream Cell Number | - | 2 | | 4 | | 6 | | 8 | | | | | |
| Surface Area | km2 | 12.22 | 13.99 | 10.14 | 11.51 | 9.77 | 8.45 | | | | | | |
| Mean Width of Flow Path | km | 3.42 | 4.50 | 2.89 | 4.02 | 4.88 | 4.88 | | | | | | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 40 | 40 | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | |
| Outflow Coefficient - Intercept | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Bypass Depth | cm | 121.92 | | 121.92 | | 121.92 | | | | | | | |
| Maximum Inflow | hm3/day | 5.3229422 | | 4.847942 | | 4.142787 | | | | | | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | 0.000808 | 0.000873 | 7.88E-05 | 0.000935 | 7.88E-05 | 0.001316 | 0.00075 | 0.00075 | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 52 | 12 | 55 | 15 | 55 | 15 | 30 | 30 | | | | |
| Initial P Storage Per Unit Area | mg/m2 | 1484.7308 | 360.0596 | 1487.015 | 366.0286 | 1408.644 | 369.3325 | 1000 | 1000 | | | | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | | | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | | | |
| K = Net Settling Rate at Steady State | m/yr | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | | | | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | | | |

# ALTERNATIVE 3: DEEP FLOW EQUALIZATION BASIN

Scenario: A1FEB EIS Deep FEB No Treatment Displayed: Flow kac

STA Expansion kac




| | | |
|---|---|---|
| STA Outflow TP ppb | 11.5 | 11.5 |
| STA Expansion kac | 0.0 | |
| STA Total Area kac | 16.3 | 15.5 |
| STA Outflow kacf/yr | 397 | 389 |
| WCA Inflow kacft | 491.8 | 487 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Starting Date for Simulation | 01/01/65 | |
| Inputs for Scenario | A1FEB EIS | Deep FEB No Treatment | | | | | | | | | | | Ending Date for Simulation | 04/30/05 | |
| | | | | | | | | | | | | | Starting Date for Output | 05/01/65 | |
| Diversion Rules | | | | | | Mass Balance Summary | | | A1FEB EIS | project_a1feb eis .xls | | | Run Date | ########## | |
| Diversion | Default | Diverted to | Fraction | Qmax | Description | | | Inflows | | | Outflows | | | | |
| C51E Diversion | C51W Canal | EAST | 0 | | | | Area | Flow | Load | Conc | Flow | Load | Conc | HLR | HLR Max |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | divert to hills up to qmax | STA | kac | kac-ft | mt | ppb | kac-ft | mt | ppb | cm/d | cm/d |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | low-flow bypass to WPB | STA1E | 5.0 | 107 | 19.6 | 148 | 101 | 1.4 | 11.0 | 1.80 | 13.8 |
| S5A Div to FEB North | FEBS5A | FEBS5A_N | 0 | | northern STA.FEB | STA1W | 12.4 | 312 | 67.2 | 174 | 305 | 4.2 | 11.1 | 2.10 | 26.0 |
| FEB S5A Outflow | HILLS_C | STA1DW | 1 | 9999 | diversion to Hills | STA2B | 15.5 | 386 | 57.1 | 120 | 389 | 5.5 | 11.5 | 2.08 | 12.4 |
| C51W Outflow | EAST | STA1E | 0.613 | | direct to STA1E | STA34 | 16.3 | 407 | 52.1 | 104 | 397 | 5.6 | 11.5 | 2.08 | 21.7 |
| C51W Outflow | EAST | STA1_DW | 0 | | direct to STA1DW | STA5 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| C51W Outflow | EAST | FEB_S5A | 1 | | remainder to East | STA6 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| STA1W Distrib | STA1W | STA1E | 0 | | WPB C STA1E | Total STA | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | |
| S6 Runoff | STA2CB | NNRC | 0 | | S6 divert to NNR | | | | | | | | | | |
| NNR Canal | FEB34 | STA34 | 0.7 | 1200 | NNR LowQ Bypass to STA34 | | STA Areas | | | STA1W+E | 406.0 | 5.5 | 11.1 | | |
| STA56 Distrib | STA5 | STA6 | 0.365 | | Balance STA56 Loads, Hint= | #REF! | STA1E | R | | STA2+34+B | 786.9 | 11.2 | 11.5 | | |
| L8 to STA1N | North | FEBS5A_N | 0 | | To FEB S5AN (Rest to C51W) | | STA1W | R | | STA5+6 | #REF! | #REF! | #REF! | | |
| L8 to C51W | North | C51W | 1 | 700 | CERP | | STA2B | R | | | | | | | |
| NNR to CB | STA34 | Comp B | 0 | 500 | Original Design for Comp B =1 | | STA34 | R | | | | | | | |
| NNR to CB 2 | STA34 | Comp B | 0 | 500 | Additional NNR Diversion to CB | | STA56 | W2 | | | | | | | |
| S5A to WS | S5A Div | WS | 0 | 2000 | | | L = Levee; W = Waterbody; P = Published; R = Draft 2011 Revised; AD = USEPA AD 2010; W2 = Comp. C mitigation area removed | | | | | | | | |
| FEB34 Distrib | STA34 | STA2B | 0.100 | 1600 | | | Refer to Sheet "STA_Areas" for Effective Treatment Area calculations | | | | | | | | |
| Other | | | | | | | | | | | | | | | |
| Other | | | | | | | | Treated Inflow | | | Outflows | | | | |
| | | | | | | | Area | Flow | Load | Conc | Flow | Load | Conc | Depth cm | |
| FEB Calculations | FEB_S5A | FEB_34 | FEB_56 | FEBS5A_N | Release Mutiplying factor | FEBs | kac | kac-ft | mt | ppb | kac-ft | mt | ppb | Mean | Min |
| DMSTA calibration | none | none | RES_3 | EMG_3 | FEB5A_STA1W 1 | FEBS5A_N | 0.0 | 0 | 0.0 | #N/A | 0 | 0.0 | #N/A | 0 | 0 |
| Area kac | 0.786 | 15 | 0 | 0 | FEB34_STA34 5 | FEB_S5A | 0.8 | 161 | 35.3 | 178 | 0 | 0.0 | #N/A | 734 | 117 |
| HRT days | 30 | 30 | 30 | 30 | FEB34_STA2B 5 | FEB_34 | 15.0 | 336 | 39.0 | 94 | 0 | 0.0 | #N/A | 106 | 1 |
| Bypass Depth ft | 58.5 | 12.5 | 4 | 4 | FEB56_STA5 1 | FEB_56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| LowQ Bypass cfs | 250 | 200 | 50 | 100 | | Total FEB | 15.8 | 496 | 74.3 | 121 | 0 | 0.0 | #N/A | | |
| Max Qin cfs | 2000 | 5460 | 1000 | 2000 | | | | | | | | | | | |
| Max Qout cfs | 450 | 2000 | 9999 | 500 | | | | | | | | | | | |
| Control Depth ft | 5 | 9999 | 1.25 | 1 | | | | | | | | | | | |
| Min Release Depth ft | 5 | 1 | 1.25 | 1 | Optional: | | | | | | | | | | |
| Regulation Schedule | FEB_REG | | | | See FEB_Design Sheet | Input Time Series | | Flow | Load | Conc | Flow | Flow CV | Flow Max | | |
| STA WS Release | Rel_opt | | | | See input series sheet | | | kac-ft | mt | ppb | cfs | - | cfs | | |
| Farm WS Release | | | | REL_FARM | "" | TS_FEBS5A_N | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | | |
| Frac Irrig Demand | 0.5 | | | 0.25 | A1 Res Seep 0 | TS_FEBS5A | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | | |
| Frac C51 Urban WS | 1 | | | | | TS_STA1DW | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | | |
| STA Expansion | STA1WX | STA34X | STA56X | Exist Cell Calib | | TS_STA1W | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | | |
| Area kac | 5.9 | 0 | 0 | | | TS_STA1E | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | | |
| Fraction SAV | -0.8 | 0.67 | 0.4 | | 1 or <0= Series, 0-0.99 = Paralle | TS_STA2B | | 248.6 | 40.2 | 131 | 343 | 1.99 | 3626 | | |
| Enhanced | SAV_3 | SAV_3 | EMG_3 | SAV_3 | | TS_FEB34 | | 458.1 | 56.4 | 100 | 632 | 2.19 | 8167 | | |
| Treat C139 Annex Runoff in STA56 | FALSE | | | | | TS_STA34 | | 0.0 | 0.0 | 0 | 0 | #N/A | 0 | | |
| Base Period for Concs | 3 | 1=2005-2009, 2=1995-2009, 3=2000-2009 | | | | TS_FEB56 | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | | |
| Use Lake P Concs | TRUE | for Lake Releases | | | | Total | | #REF! | #REF! | #REF! | 0 | 0.00 | 0 | | |
| C139 Load Reduc | 35% | Max TP ppb | 0 | C139 calc | 35.23% | | | | | | | | | | |
| STA Duty Cycle | 0.95 | New Lake Rel kal | 0 | | | | | | | | | | | | |
| Target Conc ppb | 12.5 | Iterations | 1 | use iter=1 for testing, 2 for final | | | | | | | | | | | |
| Output Interval | 1 | S5A/C51 Cmax | 0 | | | | | | | | | | | | |
| S5A Load Reduc | 0% | S678 Cmax | 0 | | | | | | | | | | | | |
| EBWCD Load Reduc | 0% | C139 Cmax | 0 | | | | | | | | | | | | |
| Treat Urban WS | FALSE | Modify Lake WS to STA6 | | TRUE | | | | | | | | | | | |
| Watershed Areas | Land kac | Fraction | New STA kac | FEB kac | Runoff Rescale | | | | | | | | | | |
| Scale_S5A | 107 | 1 | 5.9 | 0.8 | 0.99 | | | | | | | | | | |
| Scale_S6 | 105 | 1 | | | 1.00 | | | | | | | | | | |
| Scale_S7 | 120 | 1 | 0.0 | 15.0 | 0.88 | | | | | | | | | | |
| Scale_S8 | 120 | 0 | | | 1.00 | | | | | | | | | | |
| Scale_Annex | 18 | 1 | 0.0 | 0.0 | 0.00 | | | | | | | | | | |
| Scale_S5A_DIV | 23 | 1 | 5.9 | | 0.74 | | | | | | | | | | |
| S5A Runoff Adj. Location for STA1WX | 2 | 1 = S5A/WBWCD, 2 = S5A ECP DIV | | | | | | | | | | | | | |
| End of Design Input Parameters ..... | | | | | | | | | | | | | | | |

# DMSTA2 - Network Simulation

Model Release: 7/29/2011a
Current Date: 10/22/12

Forecast Type: Base

Network Name: NET_Central
Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_
Stop after Case Num:
Description: Network for EAA Basins

Routing Table — Enter a downstream CASE name or OUTLET number (1-5) in rows 9-13

| Case Name--> | FEB_34 | FEB34_OUT | STA2B | STA34 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Send Bypass to --> | STA34 | STA34 | 1 | 2 | | | | | | |
| Send Release 1 to --> | STA34 | | | | | | | | | |
| Send Release 2 to --> | STA2B | | | | | | | | | |
| Send Outflow to --> | FEB34_OUT | STA2B | 1 | 2 | | | | | | |
| Send Seepage to --> | FEB34_OUT | | | | | | | | | |

Overall Mass Balance

| Outlet Number | Outlet Description | Flow hm3/yr | Load kg/yr | FWC ppb | Geo Mn ppb |
|---|---|---|---|---|---|
| Outlet 1 | STA2B | 486.8 | 6265 | 12.9 | 9.2 |
| Outlet 2 | STA34 | 491.8 | 5743 | 11.7 | 9.8 |
| Outlet 3 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 4 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 5 | | 0.0 | 0 | #N/A | #N/A |
| Total Outlets | | 978.6 | 12009 | 12.3 | |
| Watershed Inputs | | 989.7 | 108049 | 109.2 | 126.7 |
| Storage Increase | | 0.7 | 534 | | |
| Rain - ET | | -6.8 | 6225 | | |
| Net Seepage Losses | | 3.5 | 29 | | |
| Burial | | 0.0 | 101692 | | |
| Mass Balance Check | | 0.0 | 10 | | |
| Input/Outlet Reduction | | 11.0 | 96040 | 96.9 | |
| Reduction % | | 1% | 89% | 89% | |

**Select Network:**

**Select Simulation Type:**

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_DFEB_NON**

Model Release:

Current Date:

| Input Variable | Units | Value | Case Description: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Case Name | - | FEB_34 | S5A Flow Equalization Basin | | | | Area kac | | 15 | Control Z | 9999 | Duty Cyc: | 1 |
| Input Series Name | | TS_FEB34 | TS Contains Rule for Irrigation Withdrawal | | | | HRT Days | | 30 | Release Z | 1 | | |
| Starting Date for Simulation | - | 01/01/65 | Outflow & Bypass to STA1 Inflow Distr | | | | Byp Depth ft | | 12.5 | Low Q Byp | 200 | | |
| Ending Date for Simulation | - | 04/30/05 | Network inflow from FEB34_IN | | | | Qin max cfs | | 5460 | Calibration | none | | |
| Starting Date for Output | - | 05/01/65 | TS_FEB34 has rainfall, release, reg | | | | Qo Max cfs | | 2000 | | | | |
| Integration Steps Per Day | - | 4 | Simulation Type: | | | | | | | | | | |
| Number of Iterations | - | 1 | Output Variable | | Mean | Lower CL | Upper CL | | Diagnostics | | | | |
| Output Averaging Interval | days | 1 | FWM Outflow C (ppb) | | #N/A | #N/A | #N/A | | H20 Balance Error Mean & Max | | | 0.0% | 0.0% |
| Inflow Conc Scale Factor | - | 1 | GM Outflow C (ppb) | | 104.6 | #N/A | #N/A | | Mass Balance Error Mean & Max | | | 0.0% | 0.0% |
| Rainfall P Conc | ppb | 10 | Load Reduction % | | -4% | #N/A | #N/A | | Iterations & Convergence | | | 1 | 0.0% |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 | Bypass Load (%) | | 30.8% | | | | Warning/Error Messages | | | 3 | |

| Cell Number --> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | LowQByp | FEB_34 | | RES_3 | EMG_3 | EMG_3L | | | | | | |
| Vegetation Type | --> | none | none | | RES_3 | EMG_3 | none | | | | | | |
| Inflow Fraction | - | 1 | | | | | | | | | | | |
| Downstream Cell Number | - | 2 | | | | | | | | | | | |
| Surface Area | km2 | | 60.73 | | | | | | | | | | |
| Mean Width of Flow Path | km | | 7.79 | | | | | | | | | | |
| Number of Tanks in Series | - | | 1.0 | | 1.0 | 3.0 | 1.0 | | | | | | |
| Minimum Depth for Releases | cm | | -30 | | | | | | | | | | |
| Release 1 Series Name | | | Rel_opt34 | | | | | | | | | | |
| Release 2 Series Name | | | Rel_opt2B | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | 304769.5 | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | 1 | | 1 | 4 | 4 | | | | | | |
| Outflow Coefficient - Intercept | - | | 0.259773 | | 0.259773 | 1 | 1 | | | | | | |
| Bypass Depth | cm | | 381.0976 | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 13.36857 | | | | | | | | | | |
| Maximum Outflow | hm3/day | -0.4896911 | 4.896911 | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | 10 | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | 378.5754 | | | | | | | | | | |
| Initial Water Column Depth | cm | | 15 | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | | | | | 3 | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | | | | | 13 | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | | | | | 300 | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | | | | | 10.0 | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | | | | | 40 | | | | | | |
| Z2 = Lower Penalty Depth | cm | | | | | | 100 | | | | | | |
| Z3 = Upper Penalty Depth | cm | | | | | | 200 | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_DFEB_NON**

Model Release:

Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | FEB34_OUT |
| Input Series Name | | TS_FEB34_OUT |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

Splits FEB Outflow to STA34 or STA2B

Fraction t STA2B 0.1

Max Flow STA34 1600

Bypass goes to STA34 Outflow goes to STA2B

Duty Cyc: 1

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 97.4 | #N/A | #N/A |
| GM Outflow C (ppb) | 98.6 | #N/A | #N/A |
| Load Reduction % | 0% | #N/A | #N/A |
| Bypass Load (%) | 90.0% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 4 | |

| Cell Number --> | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | toSTA2B | toSTA34 | | | | | | | | | | |
| Vegetation Type | --> | none | none | | | | | | | | | | |
| Inflow Fraction | - | 0.1 | 0.9 | | | | | | | | | | |
| Downstream Cell Number | - | | | | | | | | | | | | |
| Surface Area | km2 | | | | | | | | | | | | |
| Mean Width of Flow Path | km | | | | | | | | | | | | |
| Number of Tanks in Series | - | | | | | | | | | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | | | | | | | | | | | |
| Outflow Coefficient - Intercept | - | | | | | | | | | | | | |
| Bypass Depth | cm | | | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 0.00001 | | | | | | | | | | |
| Maximum Outflow | hm3/day | 3.917528765 | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | | | | | | | | | | | |
| Initial Water Column Depth | cm | | | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | | | | | | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | | | | | | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | | | | | | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | | | | | | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | | | | | | | | | | | |
| Z2 = Lower Penalty Depth | cm | | | | | | | | | | | | |
| Z3 = Upper Penalty Depth | cm | | | | | | | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_DFEB_NON**

Model Release:

Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | STA2B |
| Input Series Name | | TS_STA2B |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

STA-2/Comp. B

Southern 70% of Cell 2 assumed to be SAV

Area kac = 15.48719

No Expansion

S6 Runoff Diversion to STA34 = 0.00

Duty Cycle 0.95

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 11.5 | #N/A | #N/A |
| GM Outflow C (ppb) | 9.0 | #N/A | #N/A |
| Load Reduction % | 89% | #N/A | #N/A |
| Bypass Load (%) | 1.3% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | 0.0% |
| Mass Balance Error Mean & Max | 0.0% | 0.0% |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 20 | |

| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | 1 | 2N | 2S | 3 | 5N | 5S | 6N | 6S | 4 | 7-Jan | 8 | |
| Vegetation Type | --> | PEW_3 | PEW_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | |
| Inflow Fraction | - | 0.118747 | 0.153145 | | 0.148176 | 0.208506 | | 0.178087 | | | 0.1933397 | | |
| Downstream Cell Number | - | | 3 | | | 6 | 9 | 8 | 9 | | 11 | | |
| Surface Area | km2 | 7.45 | 3.17 | 6.43 | 9.29 | 2.42 | 6.42 | 2.07 | 5.48 | 7.86 | 6.22 | 5.90 | |
| Mean Width of Flow Path | km | 1.58 | 2.00 | 2.00 | 2.00 | 3.51 | 2.70 | 2.99 | 2.30 | 2.50 | 2.00 | 1.50 | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 6.0 | 1.0 | 2.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 52.73 | 29.26 | 29.26 | 35.97 | 42.9768 | 42.9768 | 42.9768 | 42.9768 | 46.0248 | 41.45 | 41.45 | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| Outflow Coefficient - Intercept | - | 0.815 | 1 | 2.098 | 2.852 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Bypass Depth | cm | 121.92 | 121.92 | | 121.92 | 121.92 | | 121.92 | | | 121.92 | | |
| Maximum Inflow | hm3/day | 2.4484555 | 2.485182 | | 2.448455 | 1.444589 | | 1.444589 | | | 1.1752586 | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | 0.017819 | 0.006695 | | | 0.0064 | 0.0133 | 0.0164 | |
| Inflow Seepage Control Elev | cm | | | | | 48 | 48 | | | 60 | 53 | 63 | |
| Inflow Seepage Conc | ppb | | | | | 75 | 75 | | | 75 | 75 | 15 | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | |
| Initial P Storage Per Unit Area | mg/m2 | 1298.5526 | 2557.075 | 534.4401 | 931.7808 | 3432.907 | 1211.299 | 3438.756 | 1220.824 | 357.617 | 2906.5324 | 806.8727 | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | |
| K = Net Settling Rate at Steady State | m/yr | 34.9 | 34.9 | 52.5 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 52.5 | 16.8 | 52.5 | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_DFEB_NON**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | STA34 |
| Input Series Name | | TS_STA34 |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

STA34 (ArcHydro levee centerline areas) with Expansion Cells — duty cycle 0.95

| | | | |
|---|---|---|---|
| Expansion Area = | 0 | 16.31864 | 16.31864 |
| SAV Fraction= | 0.67 | 0.513628 | 0.513628 |

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 11.5 | #N/A | #N/A |
| GM Outflow C (ppb) | 9.8 | #N/A | #N/A |
| Load Reduction % | 89% | #N/A | #N/A |
| Bypass Load (%) | 0.2% | | |

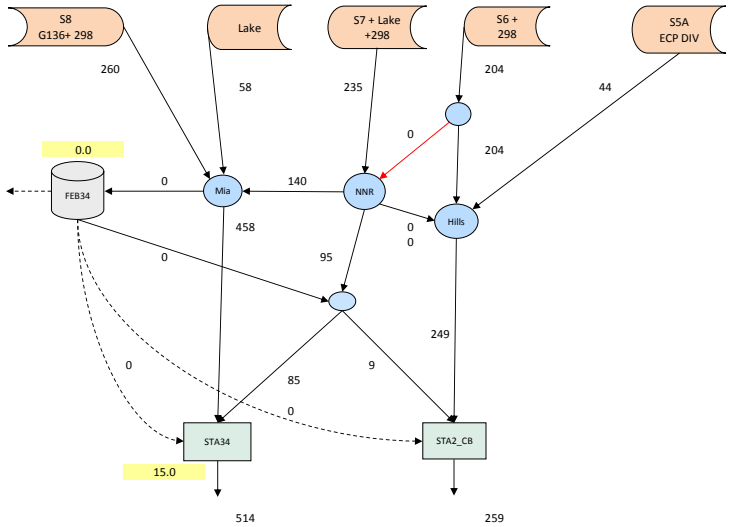
| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 19 | |

| Cell Number --> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | 1A | 1B | 2A | 2B | 3A | 3B | 34X-A | 34X-B | | | | |
| Vegetation Type | --> | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | | | | |
| Inflow Fraction | - | 0.3966436 | | 0.327617 | | 0.27574 | | | | | | | |
| Downstream Cell Number | - | 2 | | 4 | | 6 | | 8 | | | | | |
| Surface Area | km2 | 12.22 | 13.99 | 10.14 | 11.51 | 9.77 | 8.45 | | | | | | |
| Mean Width of Flow Path | km | 3.42 | 4.50 | 2.89 | 4.02 | 4.88 | 4.88 | | | | | | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 40 | 40 | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | |
| Outflow Coefficient - Intercept | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Bypass Depth | cm | 121.92 | | 121.92 | | 121.92 | | | | | | | |
| Maximum Inflow | hm3/day | 5.3229422 | | 4.847942 | | 4.142787 | | | | | | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | 0.000808 | 0.000873 | 7.88E-05 | 0.000935 | 7.88E-05 | 0.001316 | 0.00075 | 0.00075 | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 52 | 12 | 55 | 15 | 55 | 15 | 30 | 30 | | | | |
| Initial P Storage Per Unit Area | mg/m2 | 2701.6157 | 683.3854 | 2700.492 | 690.3819 | 2572.697 | 699.3861 | 1000 | 1000 | | | | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | | | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | | | |
| K = Net Settling Rate at Steady State | m/yr | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | | | | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | | | |

# ALTERNATIVE 4: STORMWATER TREATMENT AREA

Scenario: A1FEB EIS STA Displayed: Flow kac

STA Expansion kac




| | | |
|---|---|---|
| STA Outflow TP ppb | 9.9 | 10.6 |
| STA Expansion kac | 15.0 | |
| STA Total Area kac | 31.3 | 15.5 |
| STA Outflow kacf/yr | 514 | 259 |
| WCA Inflow kacft | 648.1 | 326 |

| | |
|---|---|
| Starting Date for Simulation | 01/01/65 |
| Ending Date for Simulation | 04/30/05 |
| Starting Date for Output | 05/01/65 |
| Run Date | ######### |

Inputs for Scenario A1FEB EIS STA

Diversion Rules

| Diversion | Default | Diverted to | Fraction | Qmax | Description |
|---|---|---|---|---|---|
| C51E Diversion | C51W Canal | EAST | 0 | | |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | divert to hills up to qmax |
| S5A Div (ECART) | S5A Div | HILLS_C | 0 | | low-flow bypass to WPB |
| S5A Div to FEB North | FEBS5A | FEBS5A_N | 0 | | northern STA.FEB |
| FEB S5A Outflow | HILLS_C | STA1DW | 1 | 9999 | diversion to Hills |
| C51W Outflow | EAST | STA1E | 0.613 | | direct to STA1E |
| C51W Outflow | EAST | STA1_DW | 0 | | direct to STA1DW |
| C51W Outflow | EAST | FEB_S5A | 1 | | remainder to East |
| STA1W Distrib | STA1W | STA1E | 0 | | WPB C STA1E |
| S6 Runoff | STA2CB | NNRC | 0 | | S6 divert to NNR |
| NNR Canal | FEB34 | STA34 | 0 | 1200 | NNR LowQ Bypass to STA34 |
| STA56 Distrib | STA5 | STA6 | 0.365 | | Balance STA56 Loads, Hint= |
| L8 to STA1N | North | FEBS5A_N | 0 | | To FEB S5AN (Rest to C51W) |
| L8 to C51W | North | C51W | 1 | 700 | CERP |
| NNR to CB | STA34 | Comp B | 0 | 500 | Original Design for Comp B =1 |
| NNR to CB 2 | STA34 | Comp B | 0 | 500 | Additional NNR Diversion to CB |
| S5A to WS | S5A Div | WS | 0 | 2000 | |
| FEB34 Distrib | STA34 | STA2B | 0.100 | 1600 | |
| Other | | | | | |
| Other | | | | | |

Mass Balance Summary A1FEB EIS project_a1feb eis .xls

| | | Inflows Area kac | Inflows Flow kac-ft | Inflows Load mt | Inflows Conc ppb | Outflows Flow kac-ft | Outflows Load mt | Outflows Conc ppb | HLR cm/d | HLR Max cm/d |
|---|---|---|---|---|---|---|---|---|---|---|
| STA | | | | | | | | | | |
| STA1E | | 5.0 | 107 | 19.6 | 148 | 101 | 1.4 | 11.0 | 1.80 | 13.8 |
| STA1W | | 12.4 | 312 | 67.2 | 174 | 305 | 4.2 | 11.1 | 2.10 | 26.0 |
| STA2B | | 15.5 | 253 | 40.6 | 130 | 259 | 3.4 | 10.6 | 1.36 | 12.4 |
| STA34 | | 31.3 | 533 | 65.4 | 100 | 514 | 6.3 | 9.9 | 1.42 | 12.5 |
| STA5 | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| STA6 | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | #REF! |
| Total STA | | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #VALUE! | |

| | | | | |
|---|---|---|---|---|
| STA Areas | | | | |
| STA1E | R | STA1W+E | 406.0 | 5.5 | 11.1 |
| STA1W | R | STA2+34+B | 773.3 | 9.7 | 10.2 |
| STA2B | R | STA5+6 | #REF! | #REF! | #REF! |
| STA34 | R | | | | |
| STA56 | W2 | | | | |

L = Levee; W = Waterbody; P = Published; R = Draft 2011 Revised; AD = USEPA AD 2010; W2 = Comp. C mitigation area removed
Refer to Sheet "STA_Areas" for Effective Treatment Area calculations

| FEB Calculations | FEB_S5A | FEB_34 | FEB_S6 | FEBS5A_N | Release Mutiplying factor | |
|---|---|---|---|---|---|---|
| DMSTA calibration | none | EMG_3 | RES_3 | EMG_3 | FEB5A_STA1W | 1 |
| Area kac | 0.786 | 0 | 0 | 0 | FEB34_STA34 | 5 |
| HRT days | 30 | 30 | 30 | 30 | FEB34_STA2B | 5 |
| Bypass Depth ft | 58.5 | 4 | 4 | 4 | FEB56_STA5 | 1 |
| LowQ Bypass cfs | 250 | 200 | 50 | 100 | | |
| Max Qin cfs | 2000 | 5460 | 1000 | 2000 | | |
| Max Qout cfs | 450 | 3000 | 9999 | 500 | | |
| Control Depth ft | 5 | 9999 | 1.25 | 1 | | |
| Min Release Depth ft | 5 | 1 | 1.25 | 1 | Optional: | |
| Regulation Schedule | FEB_REG | | | | See FEB_Design Sheet | |
| STA WS Release | Rel_opt | | | | See input series sheet | |
| Farm WS Release | | | | REL_FARM | "" | |
| Frac Irrig Demand | 0.5 | | | 0.25 | A1 Res Seep | 0 |
| Frac C51 Urban WS | 1 | | | | | |
| STA Expansion | STA1WX | STA34X | STA56X | Exist Cell Calib | | |
| Area kac | 5.9 | 15 | 0 | | | |
| Fraction SAV | -0.8 | 0.67 | 0.4 | | 1 or <0= Series, 0-0.99 = Paralle | |
| Enhanced | SAV_3 | SAV_3 | EMG_3 | SAV_3 | | |
| Treat C139 Annex Runoff in STA56 | FALSE | | | | | |
| Base Period for Concs | 3 | 1=2005-2009, 2=1995-2009, 3=2000-2009 | | | | |
| Use Lake P Concs | TRUE | for Lake Releases | | | | |
| C139 Load Reduc | 35% | Max TP ppb | 0 | | C139 calc | 35.23% |
| STA Duty Cycle | 0.95 | New Lake Rel kal | 0 | | | |
| Target Conc ppb | 12.5 | Iterations | 1 | | use iter=1 for testing, 2 for final | |
| Output Interval | 1 | S5A/C51 Cmax | 0 | | | |
| S5A Load Reduc | 0% | S678 Cmax | 0 | | | |
| EBWCD Load Reduc | 0% | C139 Cmax | 0 | | | |
| Treat Urban WS | FALSE | Modify Lake WS to STA6 | | TRUE | | |

| FEBs | Treated Inflow Area kac | Treated Inflow Flow kac-ft | Treated Inflow Load mt | Treated Inflow Conc ppb | Outflows Flow kac-ft | Outflows Load mt | Outflows Conc ppb | Depth cm Mean | Depth cm Min |
|---|---|---|---|---|---|---|---|---|---|
| FEBS5A_N | 0.0 | 0 | 0.0 | #N/A | 0 | 0.0 | #N/A | 0 | 0 |
| FEB_S5A | 0.8 | 161 | 35.3 | 178 | 0 | 0.0 | #N/A | 734 | 117 |
| FEB_34 | 0.0 | 0 | 0.0 | #N/A | 0 | 0.0 | #N/A | 0 | 0 |
| FEB_56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| Total FEB | 0.8 | 161 | 35.3 | 178 | 0 | 0.0 | #N/A | | |

| Input Time Series | Flow kac-ft | Load mt | Conc ppb | Flow cfs | Flow CV - | Flow Max cfs |
|---|---|---|---|---|---|---|
| TS_FEBS5A_N | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_FEBS5A | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1DW | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1W | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA1E | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| TS_STA2B | 248.6 | 40.2 | 131 | 343 | 1.99 | 3626 |
| TS_FEB34 | 0.0 | 0.0 | 0 | 0 | #N/A | 0 |
| TS_STA34 | 458.1 | 56.4 | 100 | 632 | 2.19 | 8167 |
| TS_FEB56 | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! |
| Total | #REF! | #REF! | #REF! | 0 | 0.00 | 0 |

| Watershed Areas | Land kac | Fraction | New STA kac | FEB kac | Runoff Rescale |
|---|---|---|---|---|---|
| Scale_S5A | 107 | 1 | 5.9 | 0.8 | 0.99 |
| Scale_S6 | 105 | 1 | | | 1.00 |
| Scale_S7 | 120 | 1 | 15.0 | 0.0 | 0.88 |
| Scale_S8 | 120 | 0 | | | 1.00 |
| Scale_Annex | 18 | 1 | 0.0 | 0.0 | 0.00 |
| Scale_S5A_DIV | 23 | 1 | 5.9 | | 0.74 |

S5A Runoff Adj. Location for STA1WX 2 1 = S5A/WBWCD, 2 = S5A ECP DIV

End of Design Input Parameters .....

# DMSTA2 - Network Simulation

Model Release: 7/29/2011a
Current Date: 10/26/12
Forecast Type: Base

Network Name: NET_Central
Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_
Stop after Case Num:
Description: Network for EAA Basins

Routing Table — Enter a downstream CASE name or OUTLET number (1-5) in rows 9-13

| Case Name--> | FEB_34 | FEB34_OUT | STA2B | STA34 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Send Bypass to --> | STA34 | STA34 | 1 | 2 | | | | | | |
| Send Release 1 to --> | STA34 | | | | | | | | | |
| Send Release 2 to --> | STA2B | | | | | | | | | |
| Send Outflow to --> | FEB34_OUT | STA2B | 1 | **2** | | | | | | |
| Send Seepage to --> | FEB34_OUT | | | | | | | | | |

Overall Mass Balance

| Outlet Number | Outlet Description | Flow hm3/yr | Load kg/yr | FWC ppb | Geo Mn ppb |
|---|---|---|---|---|---|
| Outlet 1 | STA2B | 326.2 | 4115 | 12.6 | 6.5 |
| Outlet 2 | STA34 | 648.1 | 7566 | 11.7 | 6.1 |
| Outlet 3 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 4 | | 0.0 | 0 | #N/A | #N/A |
| Outlet 5 | | 0.0 | 0 | #N/A | #N/A |
| Total Outlets | | 974.3 | 11682 | 12.0 | |
| Watershed Inputs | | 989.7 | 108049 | 109.2 | 126.7 |
| Storage Increase | | 0.5 | 557 | | |
| Rain - ET | | -6.8 | 6225 | | |
| Net Seepage Losses | | 8.0 | 12 | | |
| Burial | | 0.0 | 102046 | | |
| Mass Balance Check | | 0.0 | -24 | | |
| Input/Outlet Reduction | | 15.3 | 96367 | 97.2 | |
| Reduction % | | 2% | 89% | 89% | |

**Select Network:**

**Select Simulation Type:**

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_STA**

Model Release:

Current Date:

| Input Variable | Units | Value | Case Description: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Case Name | - | FEB_34 | S5A Flow Equalization Basin | | | | Area kac | 0 | Control Z | 9999 | Duty Cyc: | 1 | |
| Input Series Name | | TS_FEB34 | TS Contains Rule for Irrigation Withdrawal | | | | HRT Days | 30 | Release Z | 1 | | | |
| Starting Date for Simulation | - | 01/01/65 | Outflow & Bypass to STA1 Inflow Distr | | | | Byp Depth ft | 4 | Low Q Byp | 200 | | | |
| Ending Date for Simulation | - | 04/30/05 | Network inflow from FEB34_IN | | | | Qin max cfs | 5460 | Calibration | EMG_3 | | | |
| Starting Date for Output | - | 05/01/65 | TS_FEB34 has rainfall, release, reg | | | | Qo Max cfs | 2000 | | | | | |
| Integration Steps Per Day | - | 4 | Simulation Type: | | | | | | | | | | |
| Number of Iterations | - | 1 | Output Variable | | Mean | Lower CL | Upper CL | | Diagnostics | | | | |
| Output Averaging Interval | days | 1 | FWM Outflow C (ppb) | | #N/A | #N/A | #N/A | | H20 Balance Error Mean & Max | | | 0.0% | #N/A |
| Inflow Conc Scale Factor | - | 1 | GM Outflow C (ppb) | | #N/A | #N/A | #N/A | | Mass Balance Error Mean & Max | | | 0.0% | #N/A |
| Rainfall P Conc | ppb | 10 | Load Reduction % | | #N/A | #N/A | #N/A | | Iterations & Convergence | | | 1 | 0.0% |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 | Bypass Load (%) | | #N/A | | | | Warning/Error Messages | | | 5 | |
| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| Cell Label | - | LowQByp | FEB_34 | | RES_3 | EMG_3 | EMG_3L | | | | | | |
| Vegetation Type | --> | none | EMG_3 | | RES_3 | EMG_3 | none | | | | | | |
| Inflow Fraction | - | 1 | | | | | | | | | | | |
| Downstream Cell Number | - | 2 | | | | | | | | | | | |
| Surface Area | km2 | | | | | | | | | | | | |
| Mean Width of Flow Path | km | | | | | | | | | | | | |
| Number of Tanks in Series | - | | 3.0 | | 1.0 | 3.0 | 1.0 | | | | | | |
| Minimum Depth for Releases | cm | | -30 | | | | | | | | | | |
| Release 1 Series Name | | | Rel_opt34 | | | | | | | | | | |
| Release 2 Series Name | | | Rel_opt2B | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | 304769.5 | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | 4 | | 1 | 4 | 4 | | | | | | |
| Outflow Coefficient - Intercept | - | | 1 | | | 1 | 1 | | | | | | |
| Bypass Depth | cm | | 121.9512 | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 13.36857 | | | | | | | | | | |
| Maximum Outflow | hm3/day | -0.4896911 | 4.896911 | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | 10 | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | 1000 | | | | | | | | | | |
| Initial Water Column Depth | cm | | 15 | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | 3 | | | | 3 | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | 22 | | | | 13 | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | 300 | | | | 300 | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | 16.8 | | | | 10.0 | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | 40 | | | | 40 | | | | | | |
| Z2 = Lower Penalty Depth | cm | | 100 | | | | 100 | | | | | | |
| Z3 = Upper Penalty Depth | cm | | 200 | | | | 200 | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_STA**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | FEB34_OUT |
| Input Series Name | | TS_FEB34_OUT |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

Splits FEB Outflow to STA34 or STA2B — Duty Cyc: 1

Fraction t STA2B 0.1

Max Flow STA34 1600

Bypass goes to STA34 Outflow goes to STA2B

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 97.4 | #N/A | #N/A |
| GM Outflow C (ppb) | 95.7 | #N/A | #N/A |
| Load Reduction % | 0% | #N/A | #N/A |
| Bypass Load (%) | 90.0% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | #N/A |
| Mass Balance Error Mean & Max | 0.0% | #N/A |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 4 | |

| Cell Number --> | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | toSTA2B | toSTA34 | | | | | | | | | | |
| Vegetation Type | --> | none | none | | | | | | | | | | |
| Inflow Fraction | - | 0.1 | 0.9 | | | | | | | | | | |
| Downstream Cell Number | - | | | | | | | | | | | | |
| Surface Area | km2 | | | | | | | | | | | | |
| Mean Width of Flow Path | km | | | | | | | | | | | | |
| Number of Tanks in Series | - | | | | | | | | | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | | | | | | | | | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | | | | | | | | | | | | |
| Outflow Coefficient - Intercept | - | | | | | | | | | | | | |
| Bypass Depth | cm | | | | | | | | | | | | |
| Maximum Inflow | hm3/day | | 0.00001 | | | | | | | | | | |
| Maximum Outflow | hm3/day | 3.917528765 | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | | | | | | | | | | | | |
| Initial P Storage Per Unit Area | mg/m2 | | | | | | | | | | | | |
| Initial Water Column Depth | cm | | | | | | | | | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | | | | | | | | | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | | | | | | | | | | | | |
| C2 = Conc at Half-Max Uptake | ppb | | | | | | | | | | | | |
| K = Net Settling Rate at Steady State | m/yr | | | | | | | | | | | | |
| Z1 = Saturated Uptake Depth | cm | | | | | | | | | | | | |
| Z2 = Lower Penalty Depth | cm | | | | | | | | | | | | |
| Z3 = Upper Penalty Depth | cm | | | | | | | | | | | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_STA**

Model Release:

Current Date:

| Input Variable | Units | Value | Case Description: | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Case Name | - | STA2B | STA-2/Comp. B | | | | | | | | | | Duty Cycle | 0.95 |
| Input Series Name | | TS_STA2B | Southern 70% of Cell 2 assumed to be SAV | | | | | | | Area kac = 15.487192 | | | | |
| Starting Date for Simulation | - | 01/01/65 | | | | | | | | No Expansion | | | | |
| Ending Date for Simulation | - | 04/30/05 | | | | | | | | S6 Runoff Diversion to STA34 = | | | 0.00 | |
| Starting Date for Output | - | 05/01/65 | | | | | | | | | | | | |
| Integration Steps Per Day | - | 4 | Simulation Type: | | | | | | | | | | | |
| Number of Iterations | - | 1 | Output Variable | | Mean | Lower CL | Upper CL | | | Diagnostics | | | | |
| Output Averaging Interval | days | 1 | FWM Outflow C (ppb) | | 10.6 | #N/A | #N/A | | | H20 Balance Error Mean & Max | | | 0.0% | 0.0% |
| Inflow Conc Scale Factor | - | 1 | GM Outflow C (ppb) | | 6.3 | #N/A | #N/A | | | Mass Balance Error Mean & Max | | | 0.0% | 0.0% |
| Rainfall P Conc | ppb | 10 | Load Reduction % | | 90% | #N/A | #N/A | | | Iterations & Convergence | | | 1 | 0.0% |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 | Bypass Load (%) | | 1.8% | | | | | Warning/Error Messages | | | 22 | |
| **Cell Number -->** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | |
| Cell Label | - | 1 | 2N | 2S | 3 | 5N | 5S | 6N | 6S | 4 | 7-Jan | 8 | | |
| Vegetation Type | --> | PEW_3 | PEW_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | SAV_3 | EMG_3 | SAV_3 | | |
| Inflow Fraction | - | 0.118747 | 0.153145 | | 0.148176 | 0.208506 | | 0.178087 | | | 0.19334 | | | |
| Downstream Cell Number | - | | 3 | | | 6 | 9 | 8 | 9 | | 11 | | | |
| Surface Area | km2 | 7.45 | 3.17 | 6.43 | 9.29 | 2.42 | 6.42 | 2.07 | 5.48 | 7.86 | 6.22 | 5.90 | | |
| Mean Width of Flow Path | km | 1.58 | 2.00 | 2.00 | 2.00 | 3.51 | 2.70 | 2.99 | 2.30 | 2.50 | 2.00 | 1.50 | | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 6.0 | 1.0 | 2.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 52.73 | 29.26 | 29.26 | 35.97 | 42.9768 | 42.9768 | 42.9768 | 42.9768 | 46.0248 | 41.45 | 41.45 | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | |
| Outflow Coefficient - Intercept | - | 0.815 | 1 | 2.098 | 2.852 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Bypass Depth | cm | 121.92 | 121.92 | | 121.92 | 121.92 | | 121.92 | | | 121.92 | | | |
| Maximum Inflow | hm3/day | 2.4484555 | 2.485182 | | 2.448455 | 1.444589 | | 1.444589 | | | 1.175259 | | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | 0.017819 | 0.006695 | | | 0.0064 | 0.0133 | 0.0164 | | |
| Inflow Seepage Control Elev | cm | | | | | 48 | 48 | | | 60 | 53 | 63 | | |
| Inflow Seepage Conc | ppb | | | | | 75 | 75 | | | 75 | 75 | 15 | | |
| Outflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | | |
| Initial P Storage Per Unit Area | mg/m2 | 1205.1645 | 2402.187 | 480.8857 | 859.2328 | 3310.392 | 1104.963 | 3317.702 | 1112.466 | 328.70814 | 2770.105 | 716.4499 | | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | |
| K = Net Settling Rate at Steady State | m/yr | 34.9 | 34.9 | 52.5 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 52.5 | 16.8 | 52.5 | | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | |

## DMSTA2- Inputs & Outputs

**Project: PROJECT_SFWMD_EC_01MAR2012_NEPA_STA**

Model Release:
Current Date:

| Input Variable | Units | Value |
|---|---|---|
| Design Case Name | - | STA34 |
| Input Series Name | | TS_STA34 |
| Starting Date for Simulation | - | 01/01/65 |
| Ending Date for Simulation | - | 04/30/05 |
| Starting Date for Output | - | 05/01/65 |
| Integration Steps Per Day | - | 4 |
| Number of Iterations | - | 1 |
| Output Averaging Interval | days | 1 |
| Inflow Conc Scale Factor | - | 1 |
| Rainfall P Conc | ppb | 10 |
| Atmospheric P Load (Dry) | mg/m2-yr | 20 |

**Case Description:**

STA34 (ArcHydro levee centerline areas) with Expansion Cells

| | | | |
|---|---|---|---|
| Expansion Area = | 15 | 16.31864 | 31.31864 |
| SAV Fraction= | 0.67 | 0.513628 | 0.588522 |

duty cycle 0.95

Simulation Type:

| Output Variable | Mean | Lower CL | Upper CL |
|---|---|---|---|
| FWM Outflow C (ppb) | 9.9 | #N/A | #N/A |
| GM Outflow C (ppb) | 5.9 | #N/A | #N/A |
| Load Reduction % | 89% | #N/A | #N/A |
| Bypass Load (%) | 1.9% | | |

| Diagnostics | | |
|---|---|---|
| H20 Balance Error Mean & Max | 0.0% | 0.0% |
| Mass Balance Error Mean & Max | 0.0% | 0.0% |
| Iterations & Convergence | 1 | 0.0% |
| Warning/Error Messages | 19 | |

| Cell Number --> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell Label | - | 1A | 1B | 2A | 2B | 3A | 3B | 34X-A | 34X-B | | | | |
| Vegetation Type | --> | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | EMG_3 | SAV_3 | | | | |
| Inflow Fraction | - | 0.206672 | | 0.170705 | | 0.143675 | | 0.478948 | | | | | |
| Downstream Cell Number | - | 2 | | 4 | | 6 | | 8 | | | | | |
| Surface Area | km2 | 12.22 | 13.99 | 10.14 | 11.51 | 9.77 | 8.45 | 20.04 | 40.69 | | | | |
| Mean Width of Flow Path | km | 3.42 | 4.50 | 2.89 | 4.02 | 4.88 | 4.88 | 4.48 | 4.48 | | | | |
| Number of Tanks in Series | - | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| Minimum Depth for Releases | cm | | | | | | | | | | | | |
| Release 1 Series Name | | | | | | | | | | | | | |
| Release 2 Series Name | | | | | | | | | | | | | |
| Outflow Series Name | | | | | | | | | | | | | |
| Depth Series Name | | | | | | | | | | | | | |
| Outflow Control Depth | cm | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 40 | 40 | | | | |
| Outflow Weir Depth | cm | | | | | | | | | | | | |
| Outflow Coefficient - Exponent | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | |
| Outflow Coefficient - Intercept | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Bypass Depth | cm | 121.92 | | 121.92 | | 121.92 | | 121.92 | | | | | |
| Maximum Inflow | hm3/day | 3.276033 | | 2.705543 | | 2.277064 | | 7.59266 | | | | | |
| Maximum Outflow | hm3/day | | | | | | | | | | | | |
| Inflow Seepage Rate | (cm/d) / cm | | | | | | | | | | | | |
| Inflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Inflow Seepage Conc | ppb | | | | | | | | | | | | |
| Outflow Seepage Rate | (cm/d) / cm | 0.000808 | 0.000873 | 7.88E-05 | 0.000935 | 7.88E-05 | 0.001316 | 0.00075 | 0.00075 | | | | |
| Outflow Seepage Control Elev | cm | | | | | | | | | | | | |
| Max Outflow Seepage Conc | ppb | | | | | | | | | | | | |
| Seepage Recycle to Cell Number | - | | | | | | | | | | | | |
| Seepage Recycle Fraction | - | | | | | | | | | | | | |
| Seepage Discharge Fraction | - | | | | | | | | | | | | |
| Initial Water Column Conc | ppb | 52 | 12 | 55 | 15 | 55 | 15 | 30 | 30 | | | | |
| Initial P Storage Per Unit Area | mg/m2 | 1884.141 | 269.6668 | 1885.415 | 272.3087 | 1741.331 | 269.4129 | 2191.239 | 300.122 | | | | |
| Initial Water Column Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| C0 = Conc at 0 g/m2 P Storage | ppb | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | |
| C1 = Conc at 1 g/m2 P storage | ppb | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | | | |
| C2 = Conc at Half-Max Uptake | ppb | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | | | | |
| K = Net Settling Rate at Steady State | m/yr | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | 16.8 | 52.5 | | | | |
| Z1 = Saturated Uptake Depth | cm | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | | |
| Z2 = Lower Penalty Depth | cm | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | |
| Z3 = Upper Penalty Depth | cm | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | | | | |

# Model Documentation Report

## Regional Simulation Model Glades-LECSA
## A-1 Flow Equalization Basin Environmental Impact Statement

**April 17, 2013**

---

## 1.0 Overview

*Identification*

This report documents assumptions and decisions made during the development of the Regional Simulation Model Glades and Lower East Coast Service Area application (also referred to as the Glades-LECSA model or RSMGL) in support of the U.S. Army Corps of Engineers' A-1 Shallow Flow Equalization Basin (FEB) Environmental Impact Statement (EIS). This work was completed by the Hydrologic and Environmental Systems Modeling section at the South Florida Water Management District (SFWMD or District).

*Scope and Objectives*

The intent of the RSMGL modeling was to represent a projection of south Florida system hydrology as it would be in the future (circa 2015-2020) for the A-1 FEB EIS alternatives. The A-1 FEB EIS evaluated the environmental effects of four (4) alternatives: 1.) No Action, 2.) Shallow FEB (the District's Preferred Alternative), 3.) Deep FEB, and 4.) Stormwater Treatment Area (STA). RSMGL-simulated projections are dependent on several assumptions, including anticipated completion of current and planned projects, system operating protocols and projections of future consumptive use and environmental demands.

The RSMGL model domain includes all Water Conservation Areas, Everglades National Park, Big Cypress National Preserve and the Lower East Coast Service Areas south of the C-51 canal in Palm Beach County (see **Figure 1**). Although the entire south Florida regional system is modeled by RSMGL, the primary area of interest for the A-1 FEB EIS focuses on evaluating the effects of the alternatives within WCA-2A and WCA-3A. The main objective of the RSMGL modeling was to simulate the hydrologic impacts of inflows to WCA-2A and WCA-3A for the four A-1 FEB EIS alternatives.

For simulation of the A-1 FEB EIS alternatives, the RSMGL boundary conditions at the northern model boundary are a combination of output from the South Florida Water Management Model (SFWMM or 2x2) and the Dynamic Model for Stormwater Treatment Areas (DMSTA) for each of the four alternatives. In other words, outflows, as simulated by DMSTA, are combined with relevant SFWMM boundary conditions (not simulated by DMSTA) and provided as input to RSMGL.

More information on RSMGL is provided in the December 2011 draft report entitled *Calibration and Validation of the Glades and Lower East Coast Service Area Application of the Regional Simulation Model* (SFWMD, 2011).

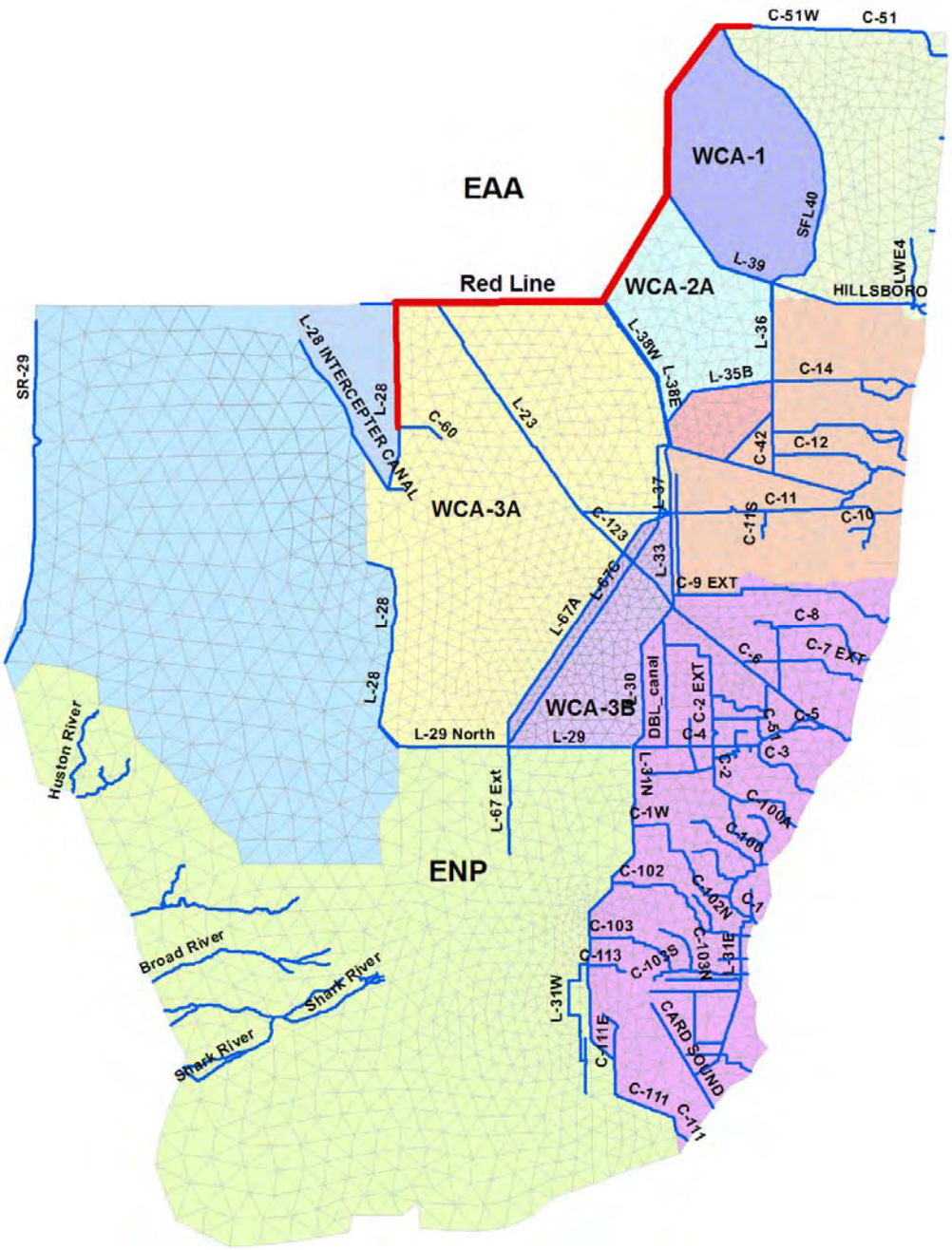



**Figure 1. RSMGL Model Domain**

## *Intended Use of Results*

The simulation of RSMGL is intended to enable estimates of the hydrologic conditions in WCA-2A and WCA-3A to determine potential environmental effects, which can be either positive or negative, that could result from implementation of the alternatives being evaluated by the A-1 FEB EIS. RSMGL is capable of simulating, with an acceptable error tolerance, the stage and other stage dependent variables such as flow, flow vectors, ponding depth and hydroperiods within the model domain.

## 2.0 Basis

*Assumptions, Considerations and Constraints*

For the purposes of the A-1 FEB EIS, the SFWMM Restoration Strategies Baseline 2 (RS_BASE2) scenario provides hydrologic estimates for each of the source basins tributary to WCA-2A and WCA-3A. For each source basin, daily flow time series are provided from the RS_BASE2 model output. This dataset provides the basis for the generation of inputs to the DMSTA model. During this process, some aspects of the SFWMM-estimated hydrology are recalculated or rescaled to more closely approximate observed historical data. DMSTA-simulated outflows corresponding to the four A-1 FEB EIS alternatives were then combined with relevant SFWMM boundary conditions (not simulated by DMSTA) and provided as input to RSMGL.

The key assumptions implemented for the A-1 FEB EIS RSMGL modeling:

- Generally representative of a future (circa 2015-2020) condition including assumed build-out of projects and utilizing future projected consumptive use demands.
- CERP Projects: 1st and 2nd generation projects assumed (Site 1 Impoundment, Broward Water Preserve Area (C-11 and C-9 Impoundments), C-111 Spreader Canal Project).
- WCA-1, WCA-2A and WCA-2B: Current C&SF Regulation Schedule with regulatory releases to tide through Lower East Coast canals.
- WCA-3A and WCA-3B: Everglades Restoration Transition Plan (ERTP) regulation schedule for WCA-3A, as per SFWMM modeled alternative 9E1 (USACE, 2011a; USACE, 2012).
- Water deliveries to Everglades National Park (ENP) are based upon ERTP, with the WCA-3A Regulation Schedule including the lowered Zone A (compared to the Interim Operation Plan (IOP)) and extended Zones D and E1.
- L-29 stage constraint for operation of S-333 assumed to be 7.5 feet National Geodetic Vertical Datum of 1929 (NGVD29).
- G-3273 constraint for operation of S-333 assumed to be 6.8 feet NGVD29, with the 8.5 Square Mile Area (SMA) assumed to be operational
- The one-mile Tamiami Trail Bridge as per the 2008 Tamiami Trail Limited Reevaluation Report is modeled as a one-mile weir, located east of the L-67 extension and west of the S-334 structure.
- Tamiami Trail culverts east of the L-67 extension are simulated where the bridge is not located.
- 5.5 miles remain of the L-67 extension levee.
- S-355A and S-355B are operated but S-356 is not operated.

- Full construction of C-111 project reservoirs consistent with the as-built information from the U.S. Army Corps of Engineers (USACE) plus the addition of contract 8 and 9 features.

- 8.5 SMA project feature as per federally authorized Alternative 6D of the Modified Water Deliveries (MWD)/8.5 SMA Project (USACE, 2000); operations per 2011 Interim Operating Criteria (USACE, 2011b) including S-331 trigger shifted from Angel's well to LPG-2.

- Site 1 Impoundment project modeled as a 1,600-acre above ground reservoir with a maximum depth of 8 feet.

- Broward County Water Preserve Areas (WPAs) comprised of C-11 and C-9 impoundments were modeled as above ground reservoirs with areas of 1,221 and 1,971 acres, respectively, and maximum depths of 4.3 and 4.0 feet, respectively.

## *Model Limitations*

RSMGL is a robust and complex regional scale model and is the best available tool to evaluate the environmental effects of the A-1 FEB EIS alternatives within WCA-2A and WCA-3A. The model has been rigorously calibrated to match historical stage data, while the calibration of flow data was performed by comparing results to the SFWMM. RSMGL does not recognize separate aquifer layers and emulates groundwater flow processes as one hydrologic unit, which may be acceptable only for coarse spatial discretization and flow regimes with hydrostatic pressure distributions. Due to the scale of the model, it is frequently necessary to implement abstractions of system infrastructure and operations that will, in general, mimic the intent and result of the desired project features while not matching the exact mechanism by which these results would be obtained in the real world.

## *Model Boundary Conditions from DMSTA and SFWMM*

As described above, DMSTA-simulated outflows corresponding to the four A-1 FEB EIS alternatives were combined with relevant SFWMM boundary conditions (not simulated by DMSTA) and provided as input to RSMGL along the northern boundary (aka the Redline) of RSMGL. While the DMSTA modeling for the A-1 FEB EIS focused on STA-2 and STA-3/4, RSMGL is a regional model and therefore required inflow boundary conditions corresponding to outflows from STA-1E, STA-1W and STA-5/6. Outflows from STA-3/4 and STA-2 were dependent on the results of the DMSTA modeling and varied for the four alternatives, while outflows from STA-1E, STA-1W and STA-5/6 were equivalent for all alternatives. **Table 1** provides the DMSTA-simulated average annual outflows from the STAs for the four A-1 FEB EIS alternatives used as input to RSMGL.

**Table 1. DMSTA-simulated Average Annual Outflow Volumes Used As Input to RSMGL**

| Alternative | STA-1E (acre-feet) | STA-1W (acre-feet) | STA-2 (acre-feet) | STA-3/4 (acre-feet) | STA-5/6 (acre-feet) |
|---|---|---|---|---|---|
| **1. No Action** | 101,000 | 306,000 | 324,000 | 509,000 | 152,000 |
| **2. Shallow FEB** | 101,000 | 306,000 | 428,000 | 369,000 | 152,000 |
| **3. Deep FEB** | 101,000 | 306,000 | 395,000 | 400,000 | 152,000 |
| **4. STA** | 101,000 | 306,000 | 264,000 | 527,000[1] | 152,000 |

Note: 1. Includes outflows from the A-1 STA.

DMSTA-simulated outflows from STA-1E and STA-1W are applied to RSMGL along the northwest boundary of WCA-1, while DMSTA-simulated STA-2 outflows are applied to RSMGL along the northwest boundary of WCA-2A. DMSTA-simulated STA-3/4 outflows are provided as canal flows into RSMGL at the S-7 and S-8 pump stations.

Flows in the L-5 canal between STA-3/4 and S-8 were constrained to a maximum flow of 1,750 cubic feet per second (cfs), based on recent conveyance capacity analyses performed during the Central Everglades Planning Project (CEPP) (Dan Crawford, USACE, personal communication, 2012). Treated flows from STA-3/4 (and the A-1 STA for Alternative 4) in excess of 1,750 cfs were sent to WCA-2A via S-7. In addition, to the maximum extent possible, the total average annual flow volume into WCA-2A was maintained at approximately 450,000 acre-feet per year for all four A-1 FEB EIS alternatives. This was accomplished by appropriately proportioning the flows to S-7 and S-8.

The pre-processing of the DMSTA-simulated STA outflows and SFWMM-simulated flows (not simulated by DMSTA) for the inflow boundary conditions of RSMGL was accomplished with spreadsheets. **Table 2** provides a summary of the SFWMM flow tags (and any relevant modifications due to DMSTA modeling) applied at the Redline of RSMGL. The SFWMM flow tags applied as RSMGL boundary conditions are broadly divided into the following four categories:

- Use existing RSMGL boundary flows
- Use SFWMM boundary flows unmodified by DMSTA
- Use SFWMM boundary flows modified by DMSTA
- Not currently an RSMGL boundary condition

Examples of the first category of RSMGL boundary conditions (i.e. Use existing RSMGL boundary flows) are S190 in Hendry County and S5A4E and M1Q in Palm Beach County along the C-51 Canal. Examples of the second category of RSMGL boundary conditions (i.e. Use SFWMM boundary flows unmodified by DMSTA) are G204, G205, G206, and S150. Examples of the third category of RSMGL boundary conditions (i.e. Use SFWMM boundary flows modified by DMSTA) are STA2O+BYP2 (STA-2 including Compartment B), S7-WL1351-WLES7 (S-7), S8-WLC354-WLES8 (S-8), and ST6WCA (STA-5/6). The fourth category of boundary conditions (i.e. Not currently an RSMGL boundary condition) is not relevant. For more details on SFWMM flow tags, refer to *Documentation of the South Florida Water Management Model Version 5.5* (SFWMD, 2005).

A summary of average annual flow volumes to WCA-2A and WCA-3A as a result of the post-processing of DMSTA-simulated STA outflows and SFWMM-simulated flows to generate RSMGL boundary flows is summarized in **Table 3**. It should be noted that the difference in flow volumes to WCA-2A and WCA-3A from STA-2 and STA-3/4 between Alternative 1 and Alternatives 2 - 4 is mainly due to runoff no longer occurring form the A-1 project site with Alternatives 2 - 4.

**Table 2. Summary of SFWMM Flow Tags Applied as RSMGL Boundary Conditions**

| Flow Tags to WCA-1 | Flow Tags to WCA-2A | Flow Tags to WCA-3A | Flow Tags to Western Basins[1] | Flow Tags to C-51 Canal and WCA-1 |
|---|---|---|---|---|
| L101OT | STA2O+BYP2 | ST6WCA | GW_EAA_L28INT | C51LGQ |
| S5AWC1 | GW_EAA_WCA2A | RTTWCA | SW_EAA_L28INT | CDRNQ |
| ST1WQ1 | S7-WL1351-WLES7 | S8-WLC354-WLES8 | LKTSEM | GW_PBC |
| ADDSLW | WL1351+WLES7 | GW_EAA_WCA3A | RTTSEM | LGROVQ |
| WSL8S | | G204 | ST6SEM | LKMNGQ |
| GW_EAA_WCA1 | | G205 | S190 | M1Q |
| ST1EO | | G206 | | Q1WDN |
| WL2351* | | S150 | | S5A4E |
| | | ST5OT2 | | STA1E_BCINFLOW3 |
| | | WLC354+WLES8 | | SW_PBC |

**Color Code**

| | |
|---|---|
| | **Use existing RSMGL boundary flows** |
| | **Use SFWMM boundary flows unmodified by DMSTA** |
| | **Use SFWMM boundary flows modified by DMSTA** |
| | **Not currently an RSMGL boundary condition** |

Note: 1. Western Basins generally refers to the basins west of WCA-3A, and includes L-28 Interceptor, Feeder Canal, L28 Gap and East Collier Basins.

**Table 3. Distribution of RSMGL Boundary Flows to WCA-2A and WCA-3A**

| Alt. | To WCA-2A (acre-feet x 1000) | | | | | To WCA-3A (acre-feet x 1000) | | | To WCA-2A and WCA-3A (acre-feet x 1000) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | From STA-2 (via L-6) | From STA-3/4 (plus STA diversion via S-7) | Water Supply (via S-7) | STA-2 Diversion (via S-6) | Sub-Total | From STA-3/4 (plus STA diversion via S-8) | Water Supply (via S-8 and S-150) | Sub-Total | From STA-2 and STA-3/4 (plus STA diversion) | Total |
| **1** | 306.5 | 131.8 | 2.7 | 17.3 | 458.3 | 373.6 | 27.6 | 401.2 | 829 | 860 |
| **2** | 391.2 | 48.5 | 2.7 | 5.4 | 447.8 | 348.3 | 27.6 | 375.9 | 793 | 824 |
| **3** | 389.8 | 47.0 | 2.7 | 4.9 | 444.4 | 349.5 | 27.6 | 377.1 | 791 | 822 |
| **4** | 258.8 | 179.0[1] | 2.7 | 4.9 | 445.4 | 349.9[1] | 27.6 | 377.5 | 793 | 823 |

Note: 1. Includes outflows from the A-1 STA.

## 3.0 Simulation

### *Modeling Tools Used*

Regional Simulation Model Version 2.3.5 (Linux)
SFWMD network model executable location:
/nw/hesm_san/hesm/projects/CentEver/RSM/RSM_REL_2.3.5/hse

### *Model Setup*

SFWMD network model input file locations:

- Alternative 1:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_NA\input\

- Alternative 2:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_SFEB\input\

- Alternative 3:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_DFEB\input\

- Alternative 4:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_STA\input\

## 4.0 Results

### *Identification of Simulation*

SFWMD network model output file locations:

- Alternative 1:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_NA\output

- Alternative 2:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_SFEB\output

- Alternative 3:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_DFEB\output

- Alternative 4:
  \\ad.sfwmd.gov\dfsroot\data\hesm_nas\projects\a1-feb\models\RSM\GL_A1FEB\FWO\FWO_W_A1FEB_EIS\A1_STA\output

The output files from RSMGL are binary files whose formats are based on the NetCDF protocol. Performance Measure (PM) scripts which read the NetCDF file and create Performance Measure Graphics (PMGs) were used to produce project specific plots (e.g. ponding depth hydrographs, ponding depth duration curves) and regional level spatial maps (e.g. average annual ponding depth maps, average annual hydroperiod distribution maps) to enable an evaluation of the hydrologic conditions for each of the A-1 FEB EIS alternatives.

## *Project Specific Results*

The primary objective of this RSMGL modeling effort was to develop estimates of hydrologic conditions within WCA-2A and WCA-3A that are representative of the projects being evaluated by the A-1 FEB EIS in order to evaluate potential environmental effects that could result from implementation of the A-1 FEB EIS alternatives. Ponding depth hydrographs and ponding depth duration curves were prepared for several gage locations within the RSMGL model domain. **Figure 2** shows the spatial locations of the RSMGL gages.

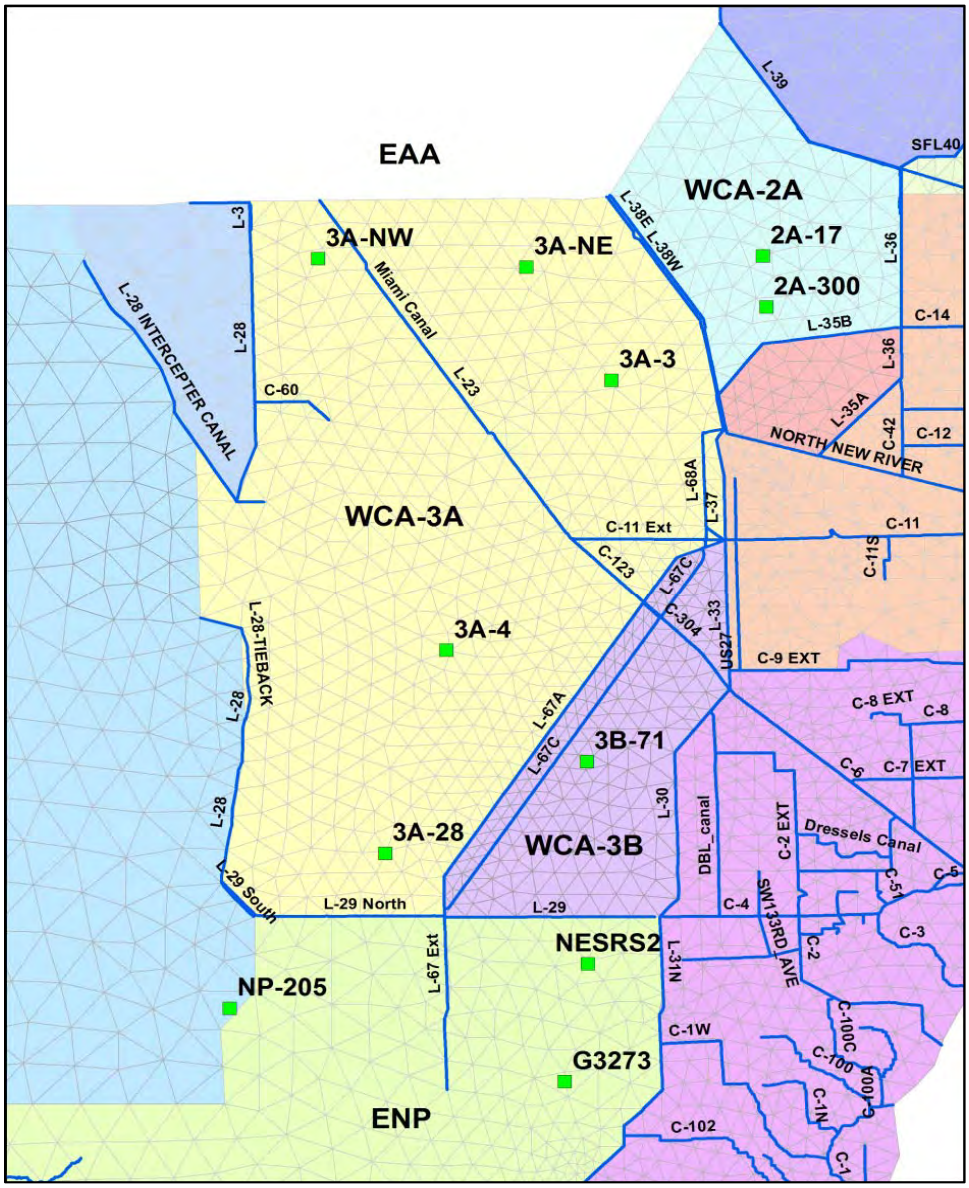



**Figure 2. RSMGL Gage Location Map**

Ponding depth hydrographs and ponding depth duration curves for the four alternatives at gage locations 2A-17, 2A-300, 3A-NW, 3A-NE, 3A-3, 3A-4, 3A-28, 3B-71, ENP_NESRS2, ENP_NP-205 and ENP_G3273 are provided in **Figures 3 - 24**.

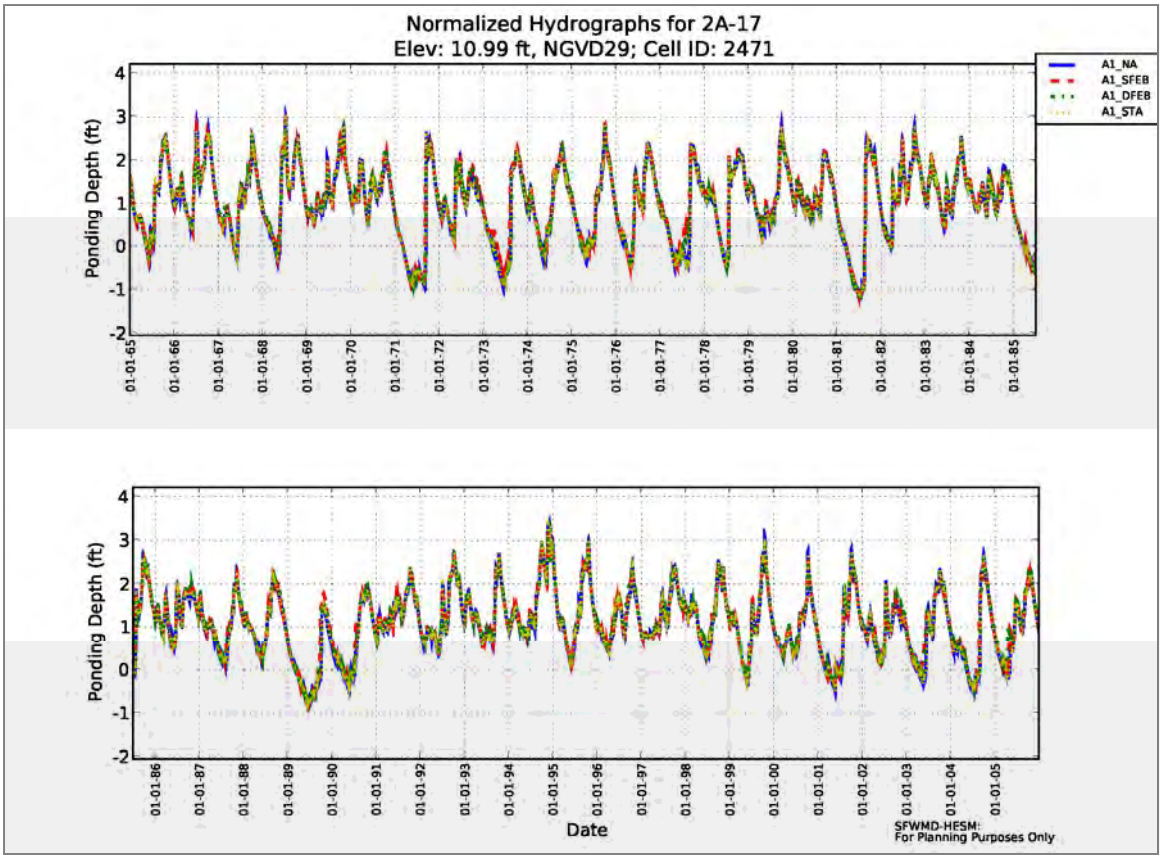



**Figure 3. Ponding Depth Hydrograph for 2A-17 – All Alternatives**

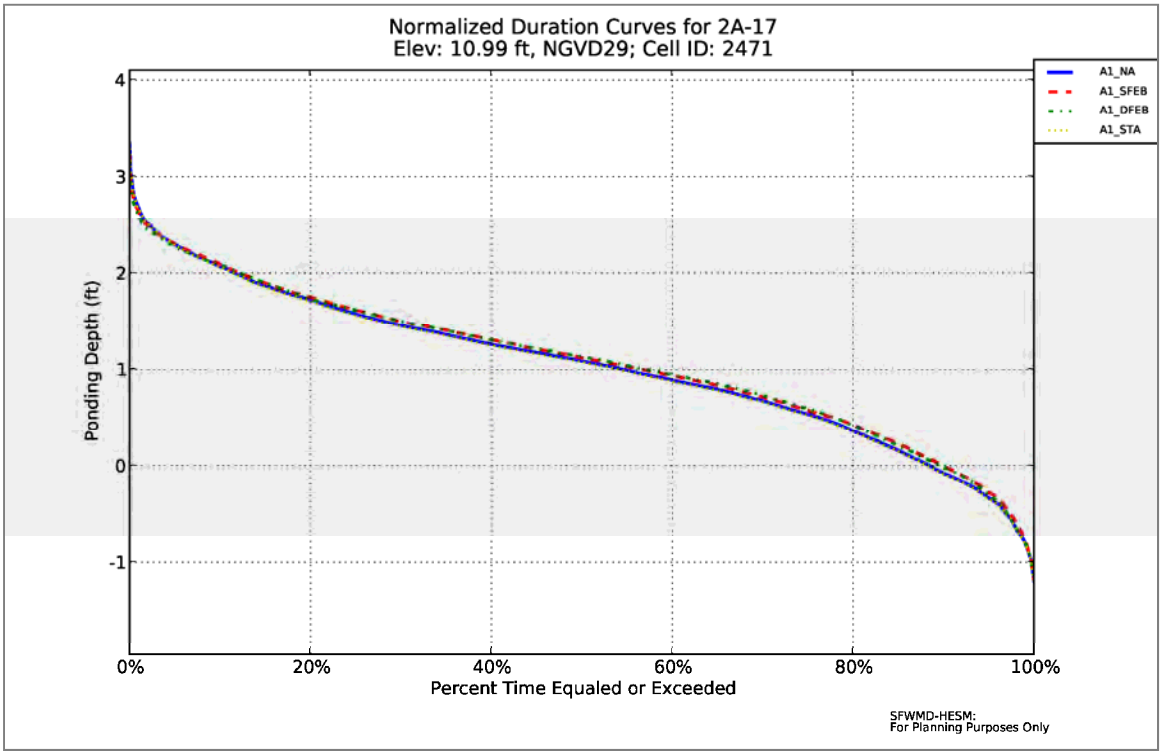



**Figure 4. Ponding Depth Duration Curve for 2A-17 – All Alternatives**

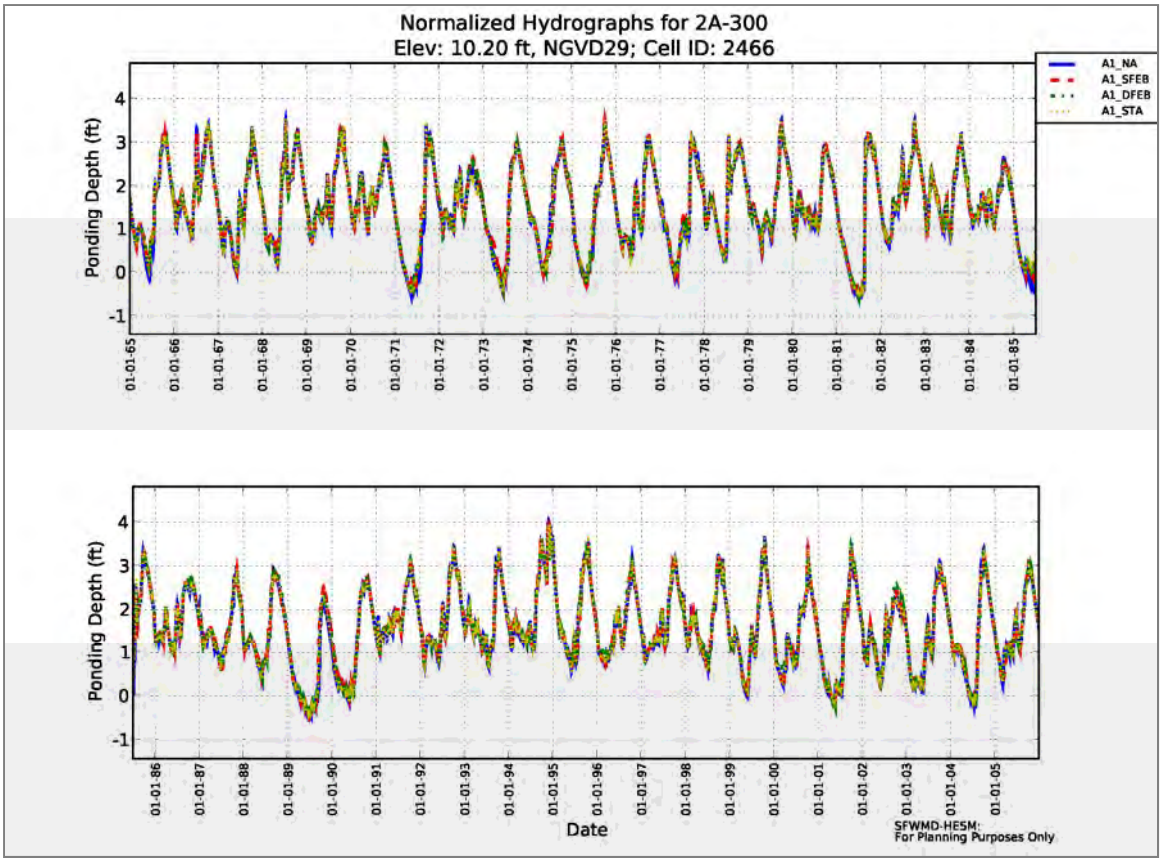



**Figure 5. Ponding Depth Hydrograph for 2A-300 – All Alternatives**

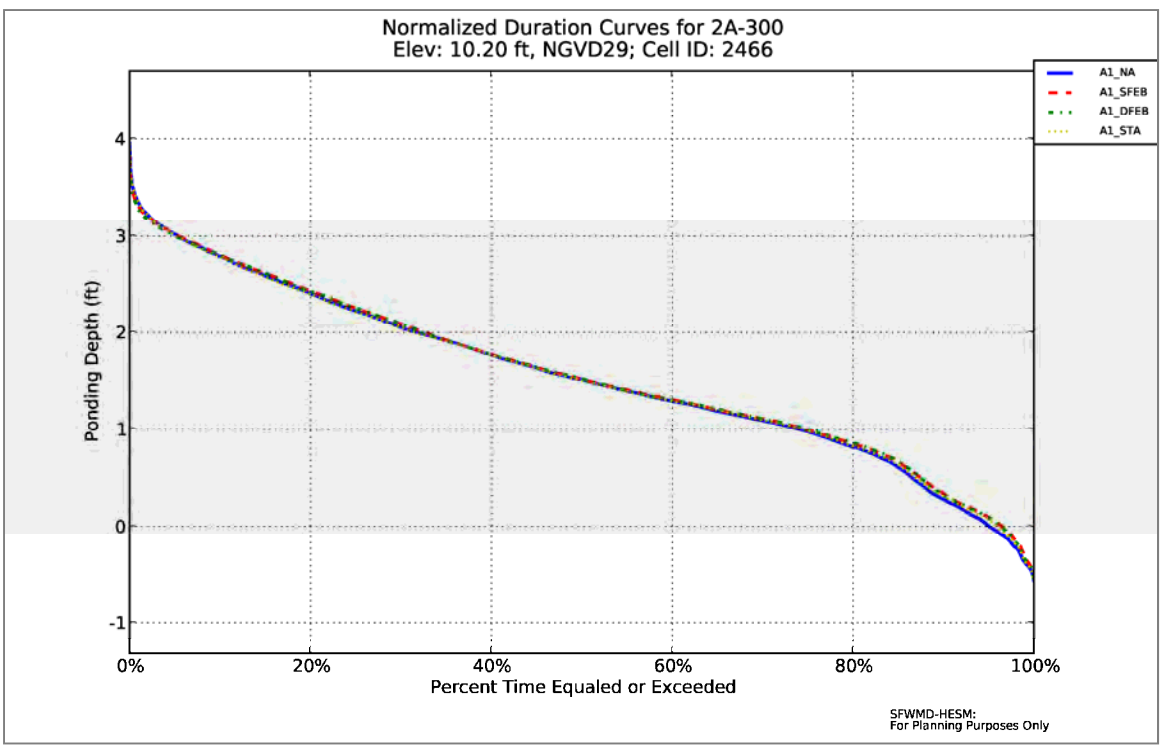



**Figure 6. Ponding Depth Duration Curve for 2A-300 – All Alternatives**

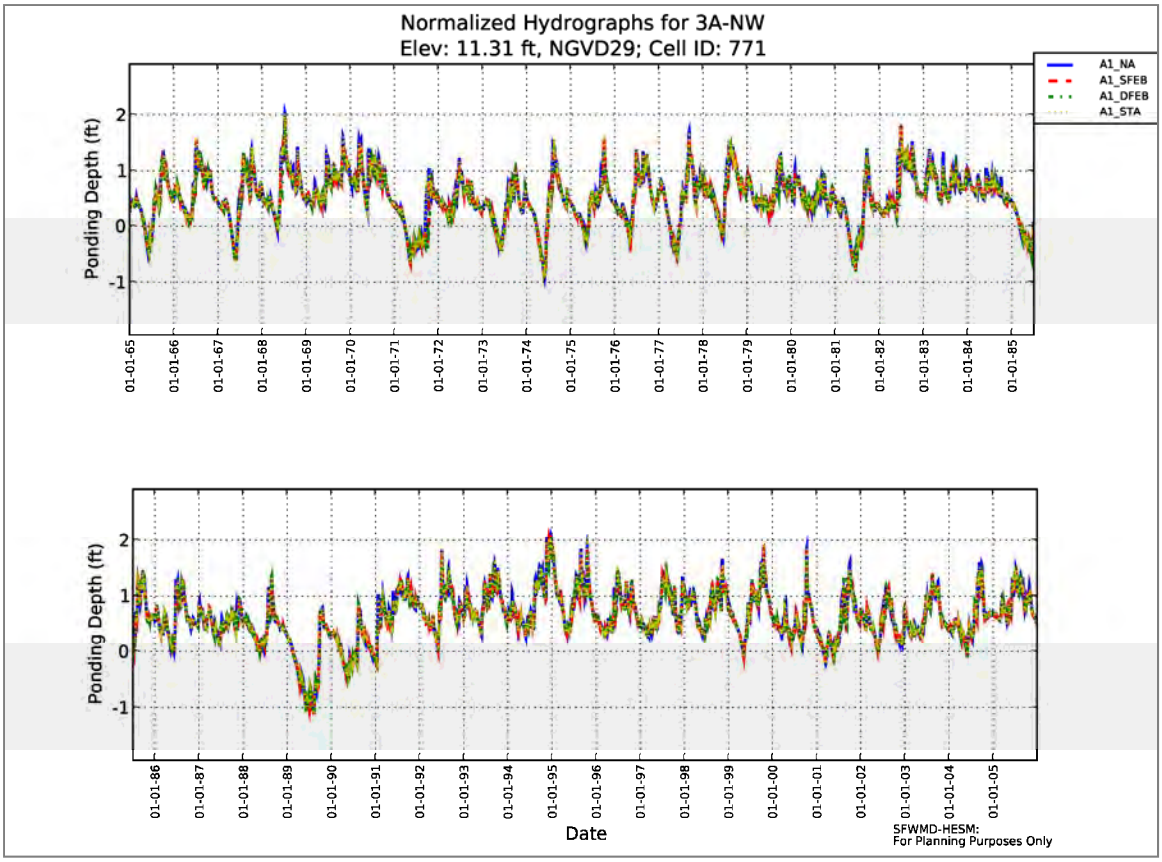



**Figure 7. Ponding Depth Hydrograph for 3A-NW – All Alternatives**

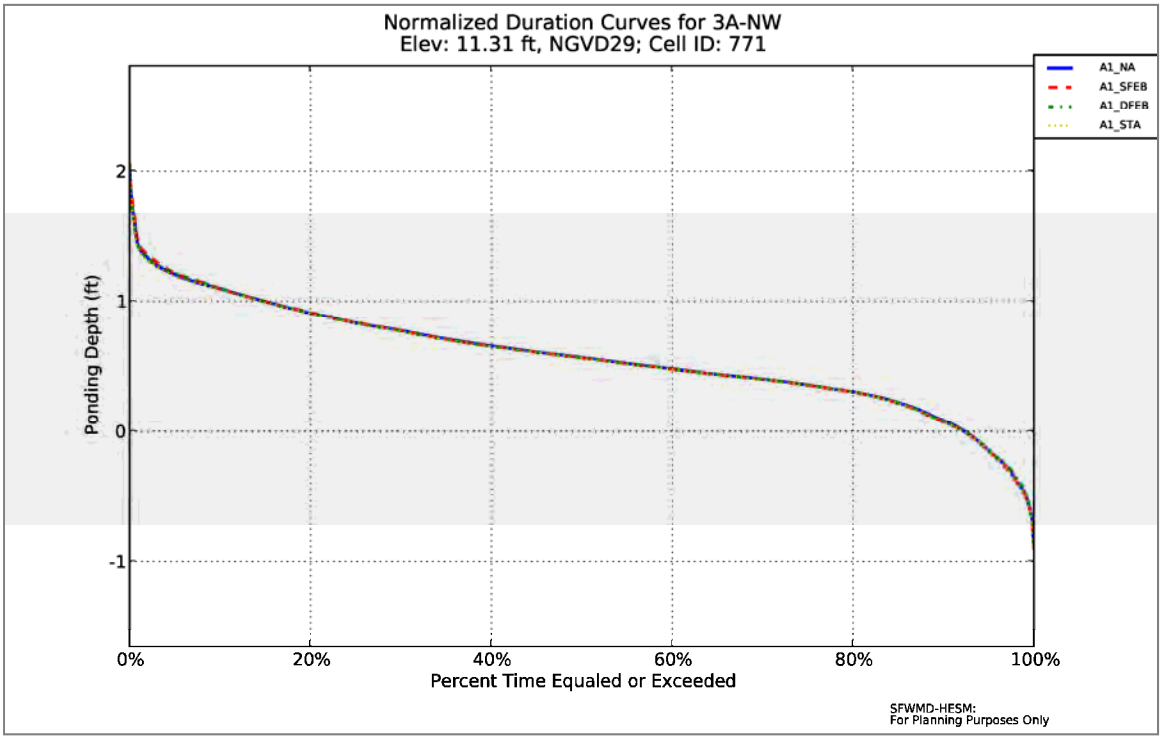



**Figure 8. Ponding Depth Duration Curve for 3A-NW – All Alternatives**

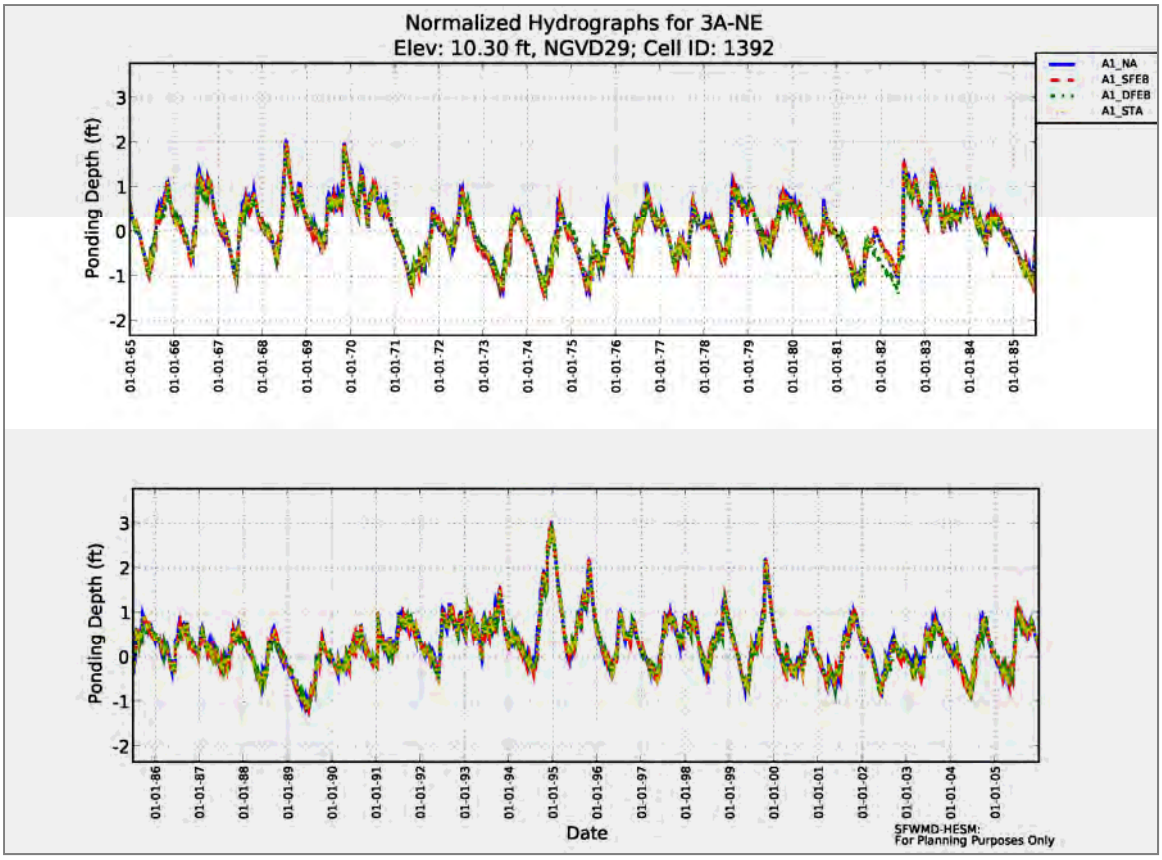



**Figure 9. Ponding Depth Hydrograph for 3A-NE – All Alternatives**

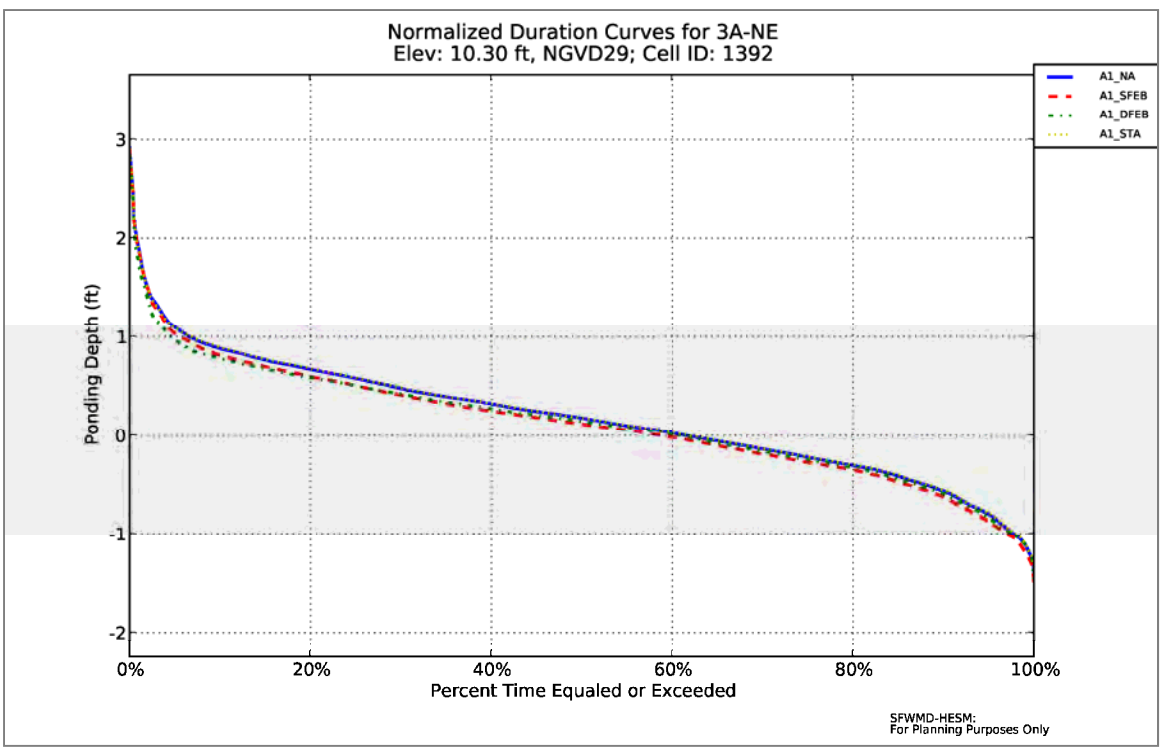



**Figure 10. Ponding Depth Duration Curve for 3A-NE – All Alternatives**

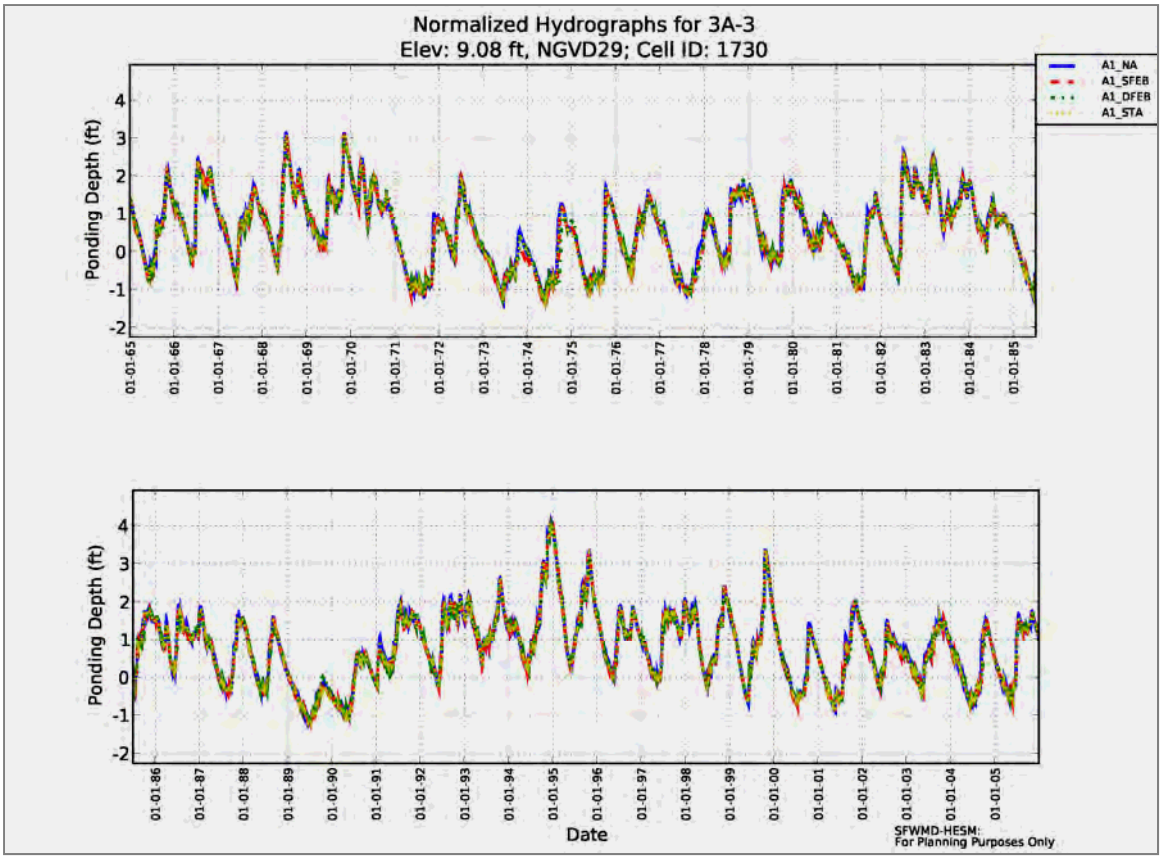



**Figure 11. Ponding Depth Hydrograph for 3A-3 – All Alternatives**

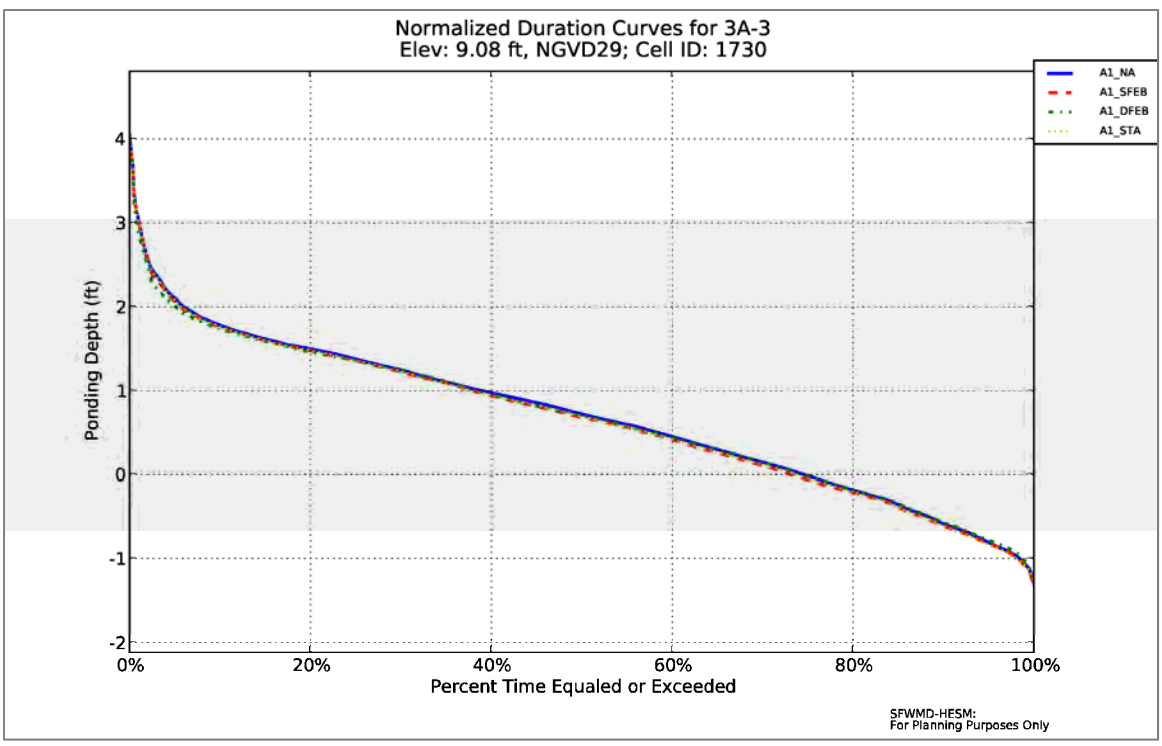



**Figure 12. Ponding Depth Duration Curve for 3A-3 – All Alternatives**

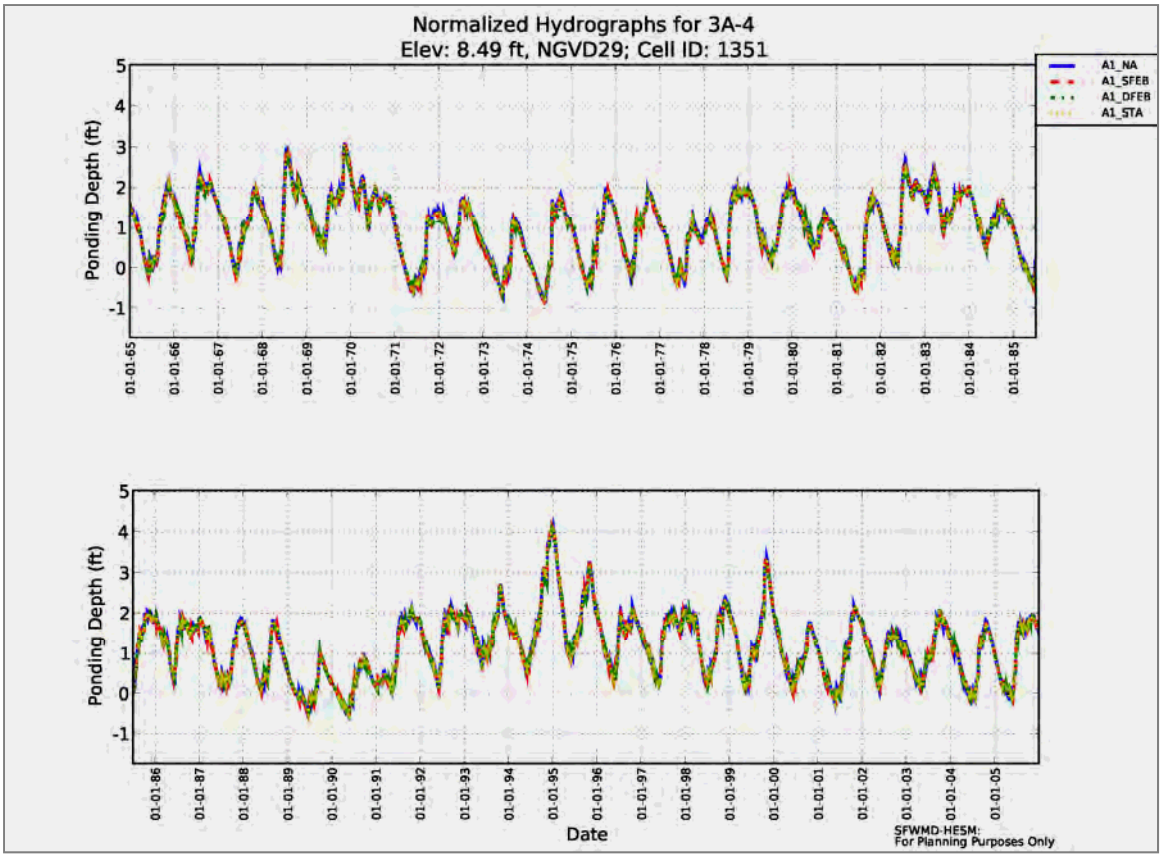



**Figure 13. Ponding Depth Hydrograph for 3A-4 – All Alternatives**

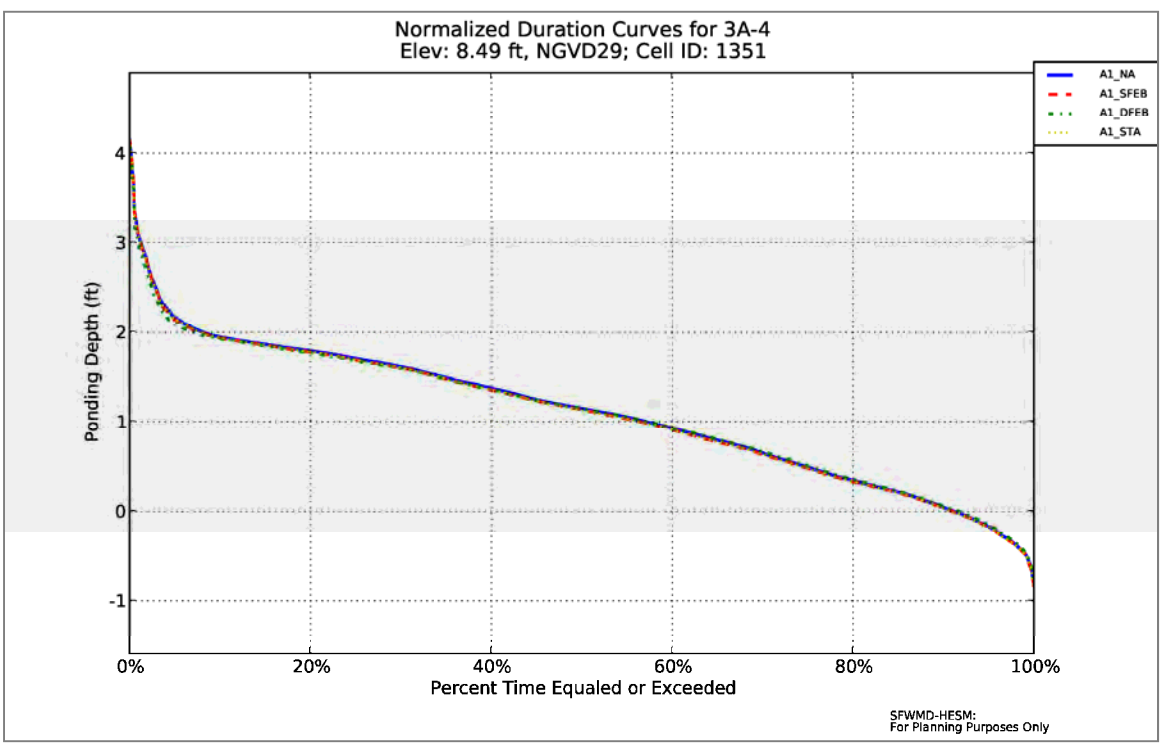



**Figure 14. Ponding Depth Duration Curve for 3A-4 – All Alternatives**

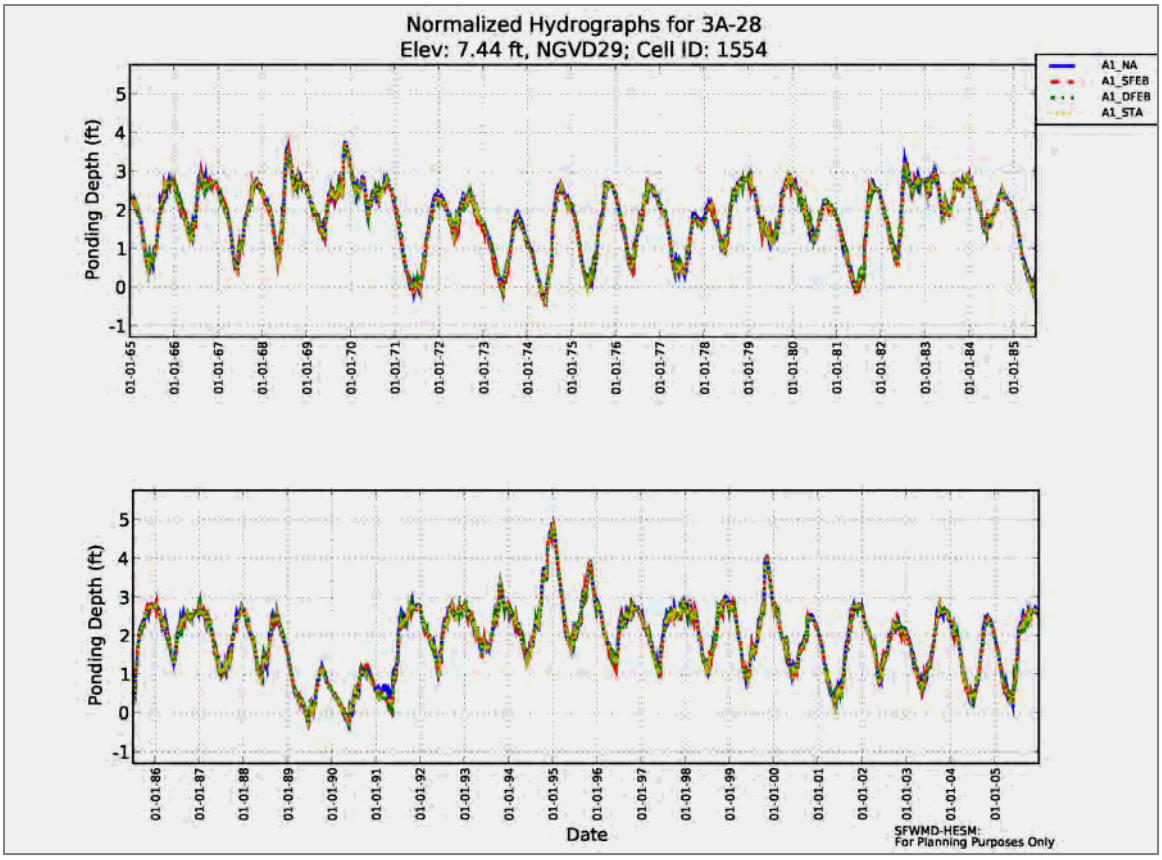



**Figure 15. Ponding Depth Hydrograph for 3A-28 – All Alternatives**

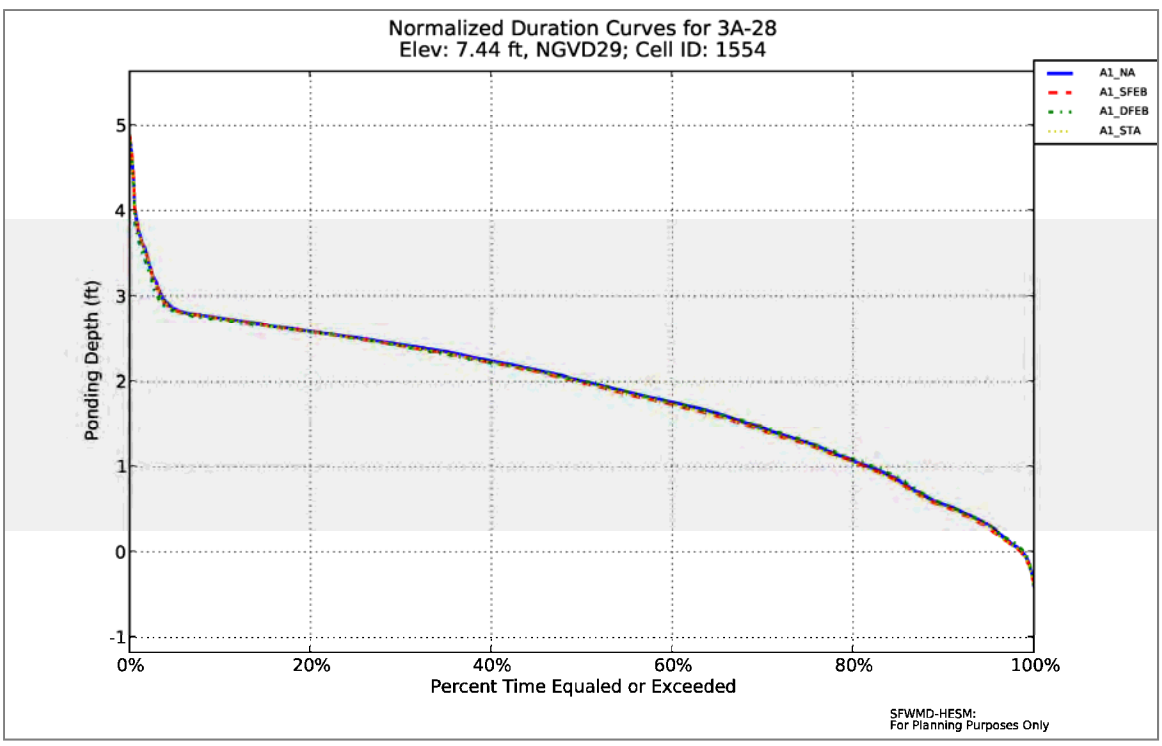



**Figure 16. Ponding Depth Duration Curve for 3A-28 – All Alternatives**

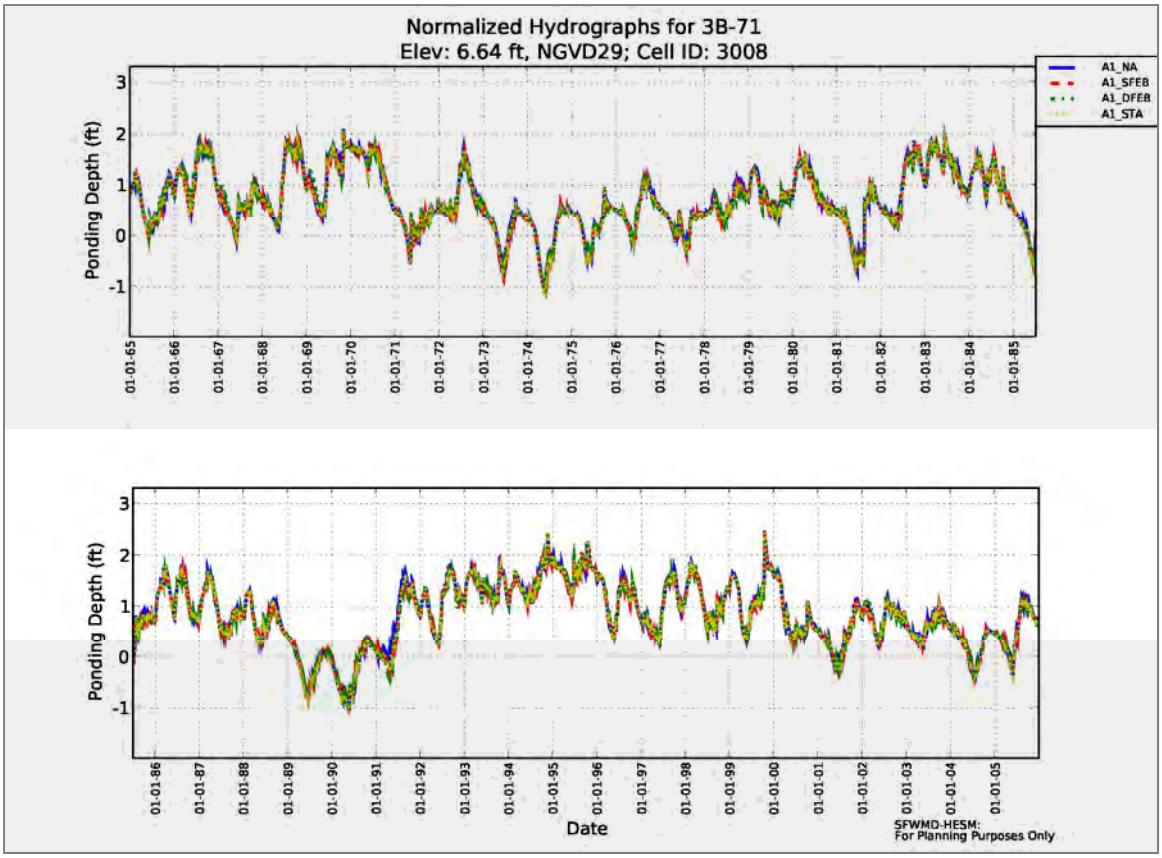



**Figure 17. Ponding Depth Hydrograph for 3B-71 – All Alternatives**

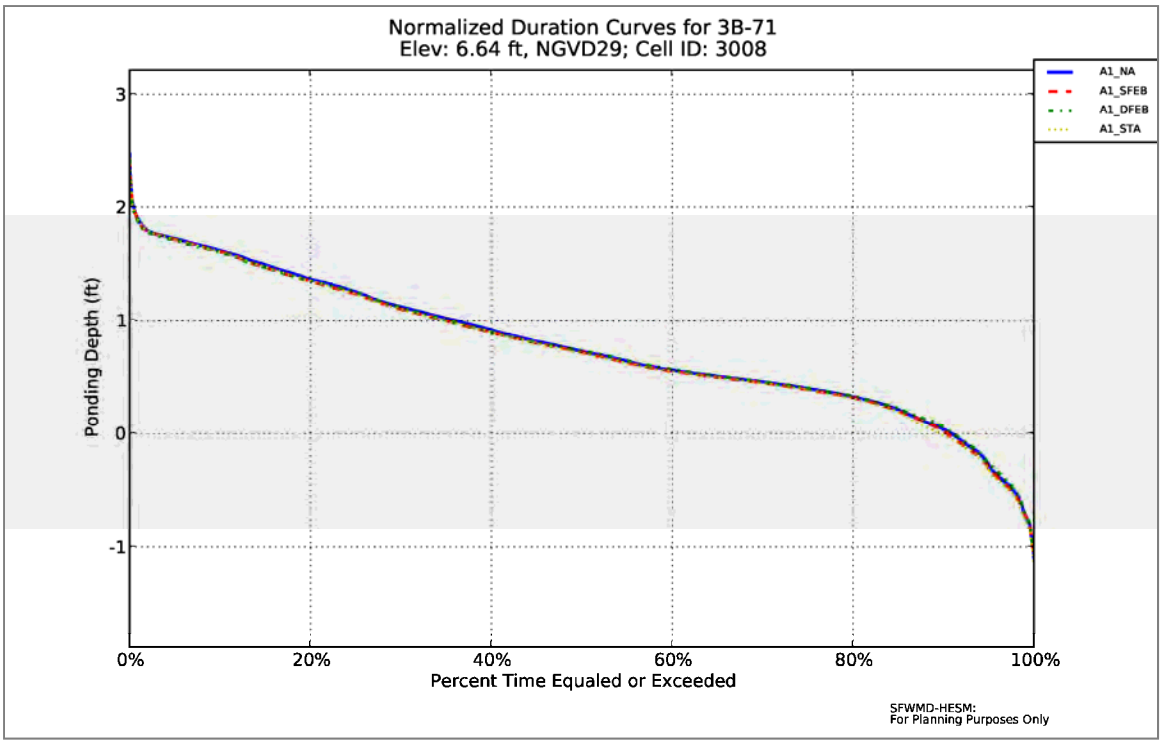



**Figure 18. Ponding Depth Duration Curve for 3B-71 – All Alternatives**

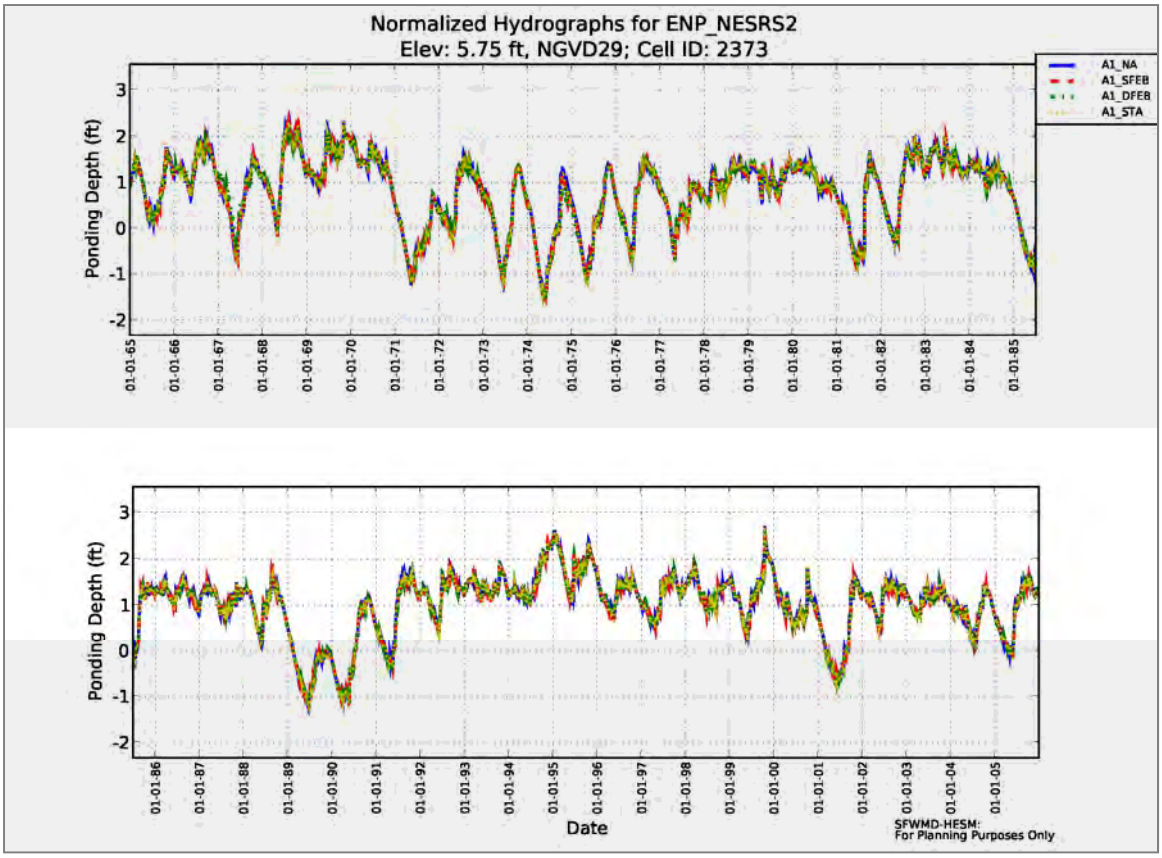



**Figure 19. Ponding Depth Hydrograph for ENP_NESRS2 – All Alternatives**

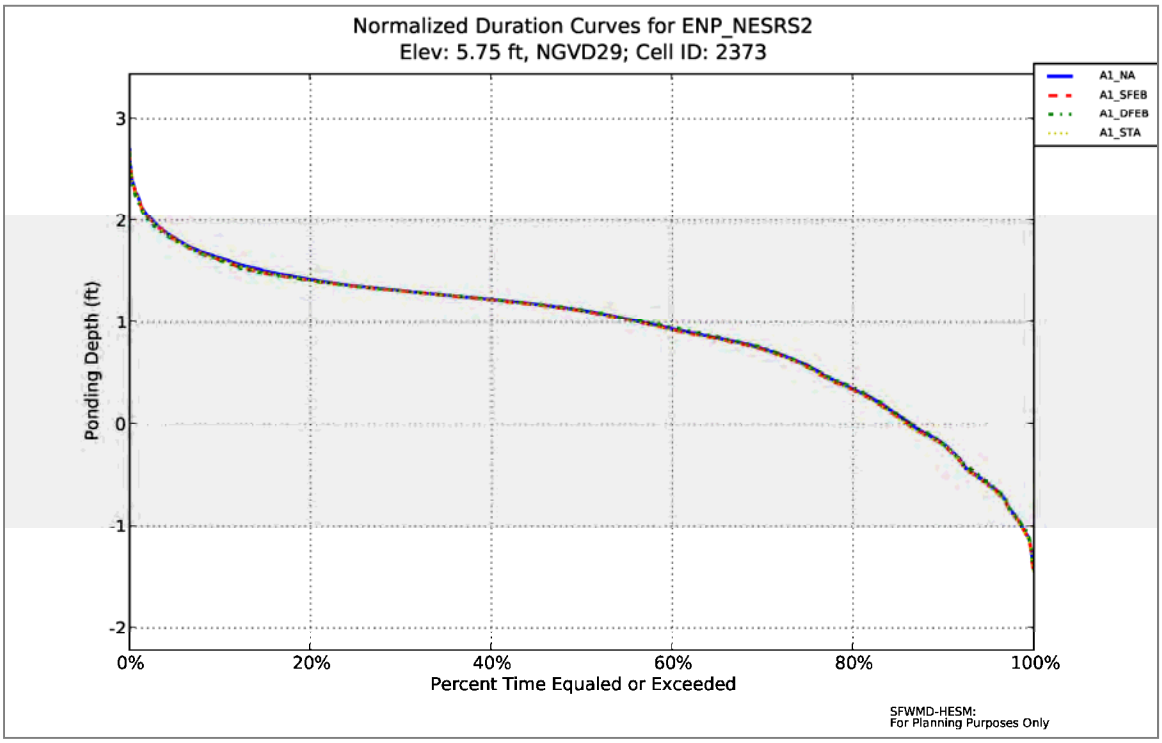



**Figure 20. Ponding Depth Duration Curve for ENP_NESRS2 – All Alternatives**

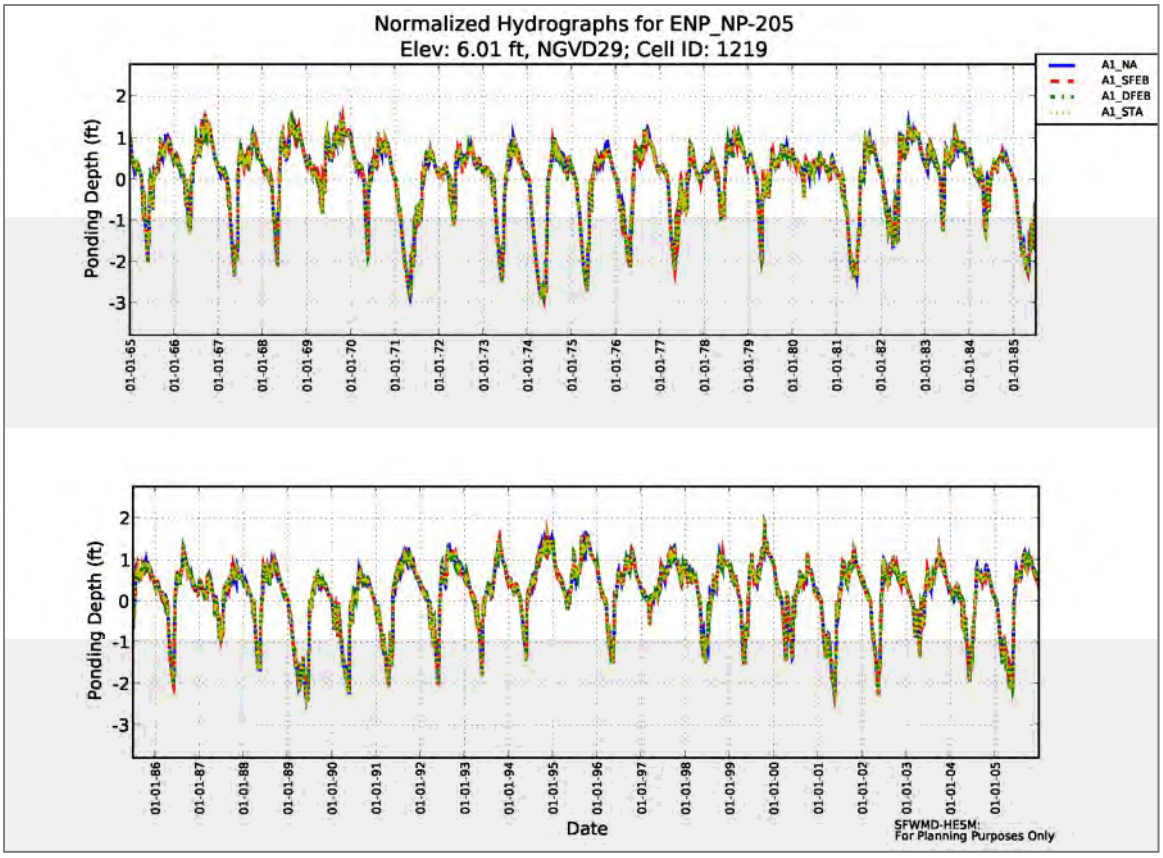



**Figure 21. Ponding Depth Hydrograph for ENP_NP-205 – All Alternatives**

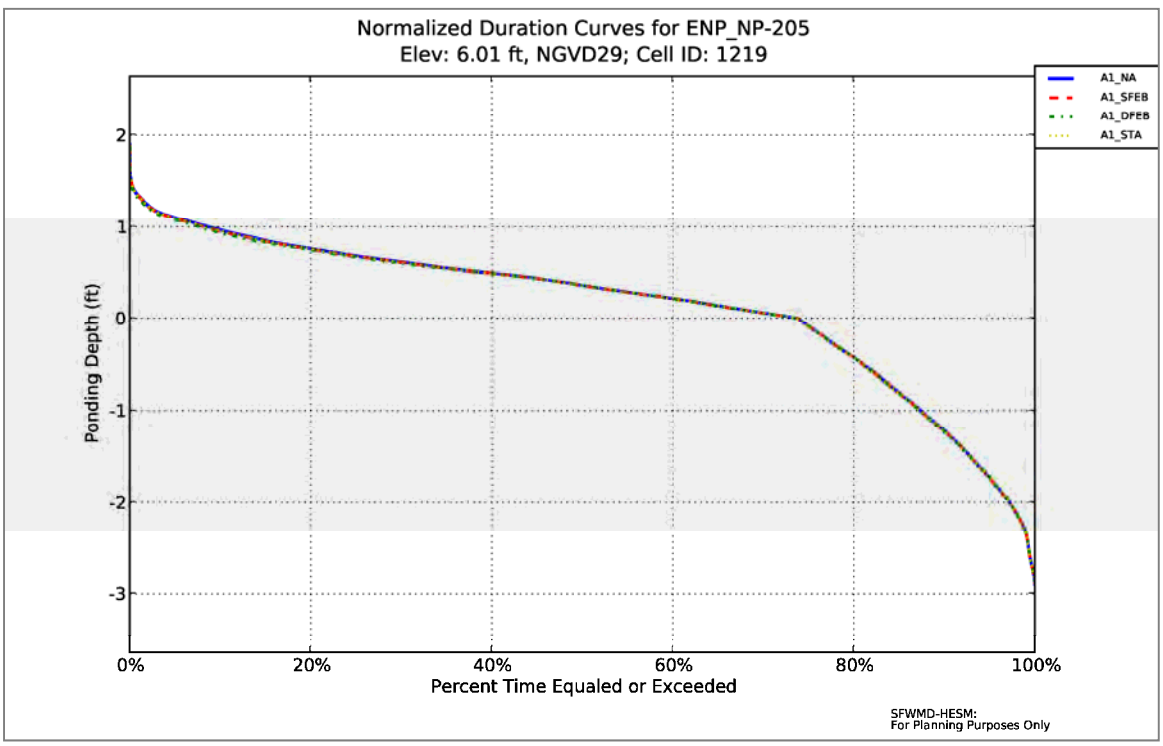



**Figure 22. Ponding Depth Duration Curve for ENP_NP-205 – All Alternatives**

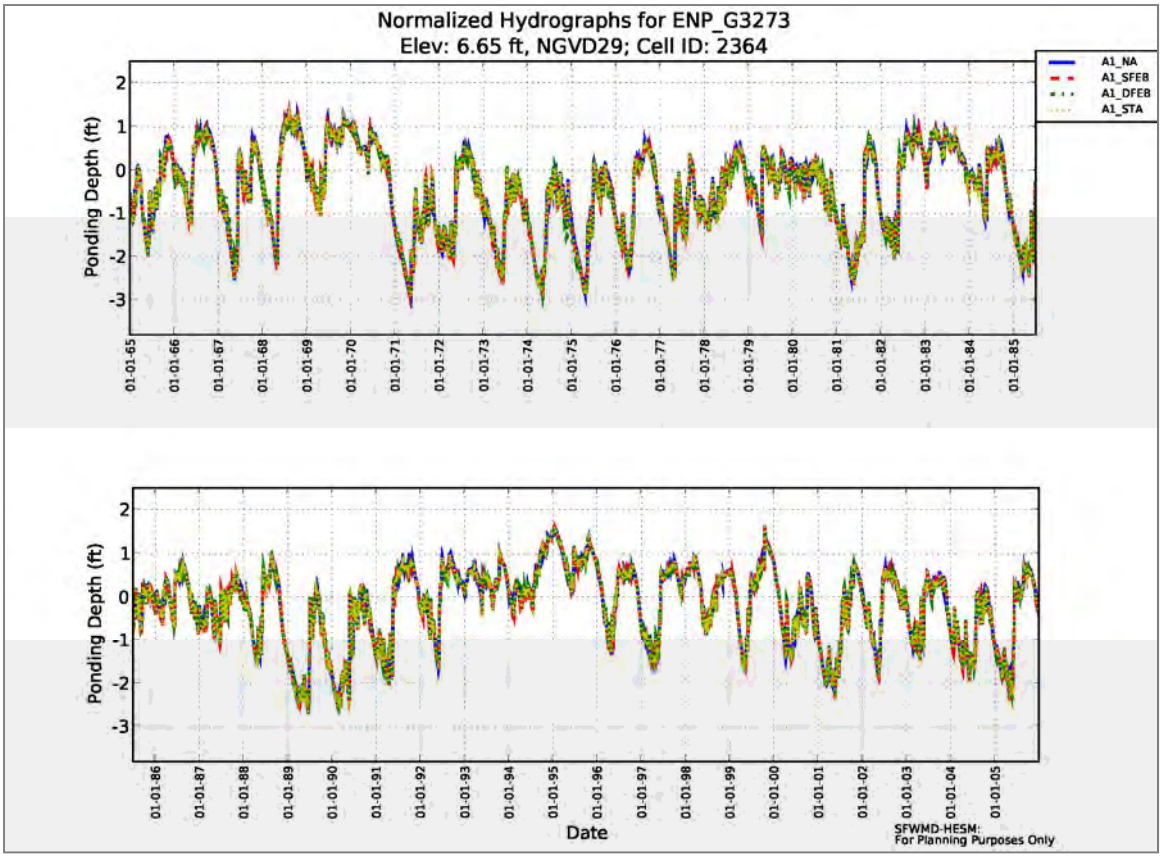



**Figure 23. Ponding Depth Hydrograph for ENP_G3273 – All Alternatives**

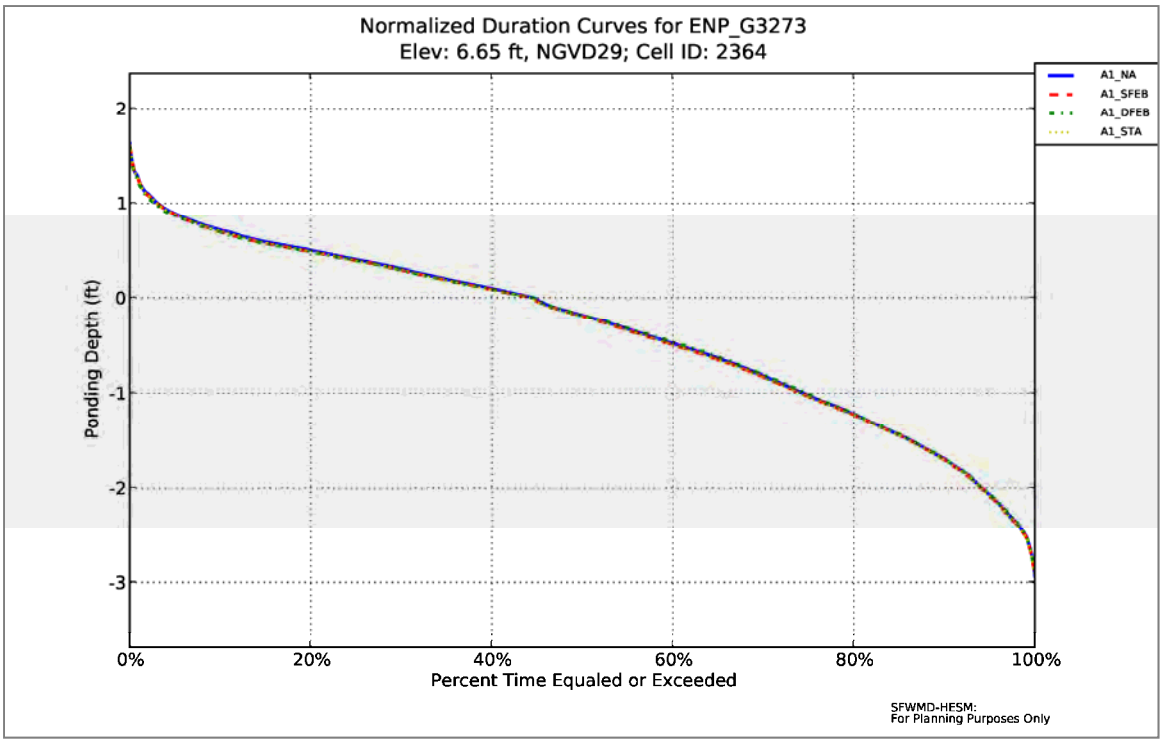



**Figure 24. Ponding Depth Duration Curve for ENP_G3273 – All Alternatives**

## *Regional Level Results*

Average annual ponding depth maps for WCA-2A and WCA-3A for Alternatives 1, 2 and 3 and 4 are provided in **Figures 25, 26, 27 and 28**, respectively. In addition, maps were generated to allow the evaluation of the relative differences in ponding depth between Alternatives 2 - 4 and Alternative 1. For example, Alternative 2 (Shallow FEB) average annual ponding depths were subtracted from Alternative 1 (No Action) average annual ponding depths. No relative differences in ponding depths greater than 0.25 feet were observed, therefore no difference maps are provided in this report. Subsequent detailed analysis revealed isolated ponding depth differences on the order of 0.15 feet or lower, the scale and magnitude of which are considered insignificant at this regional level of modeling.

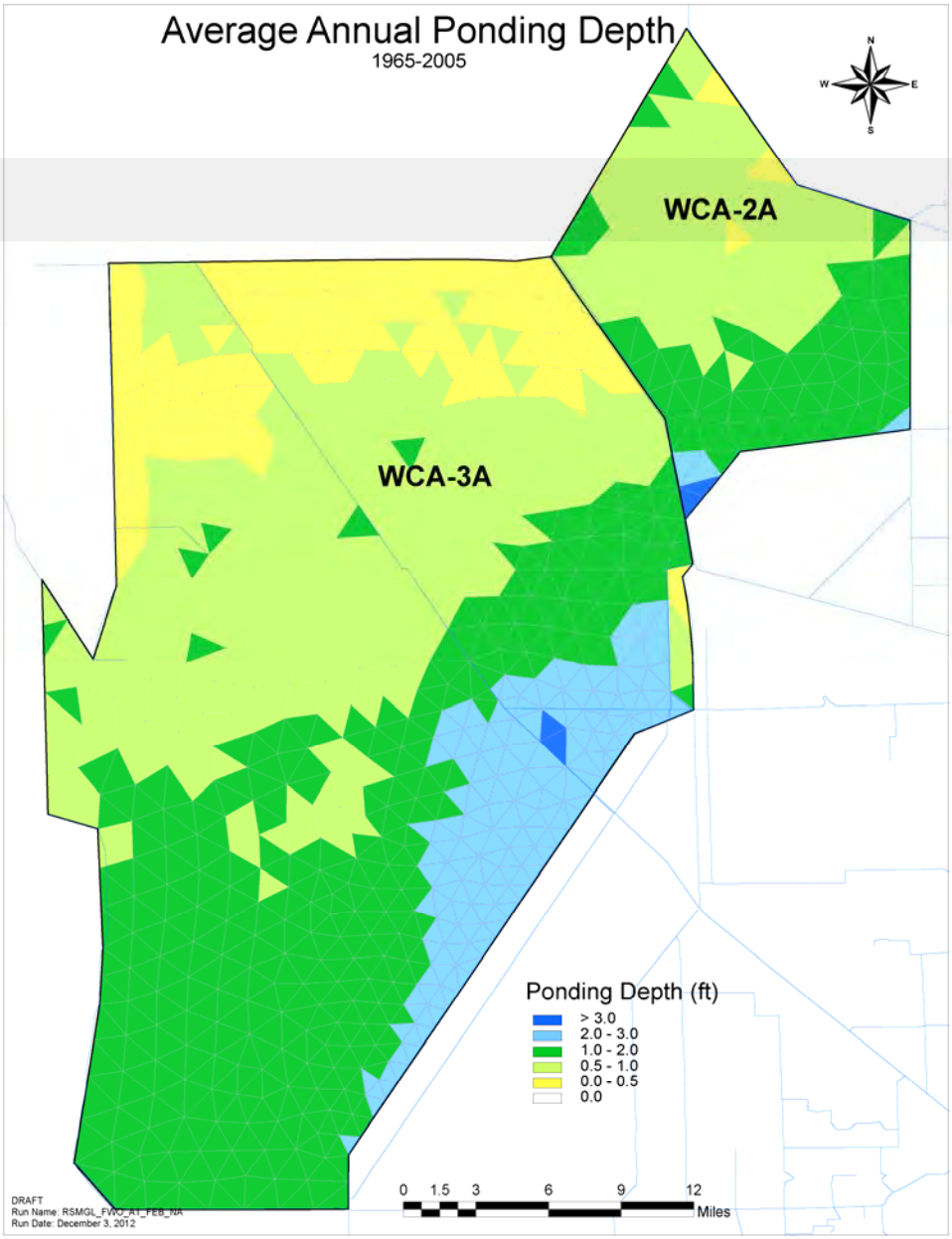



**Figure 25. Average Annual Ponding Depth for WCA-2A and WCA-3A – Alternative 1**

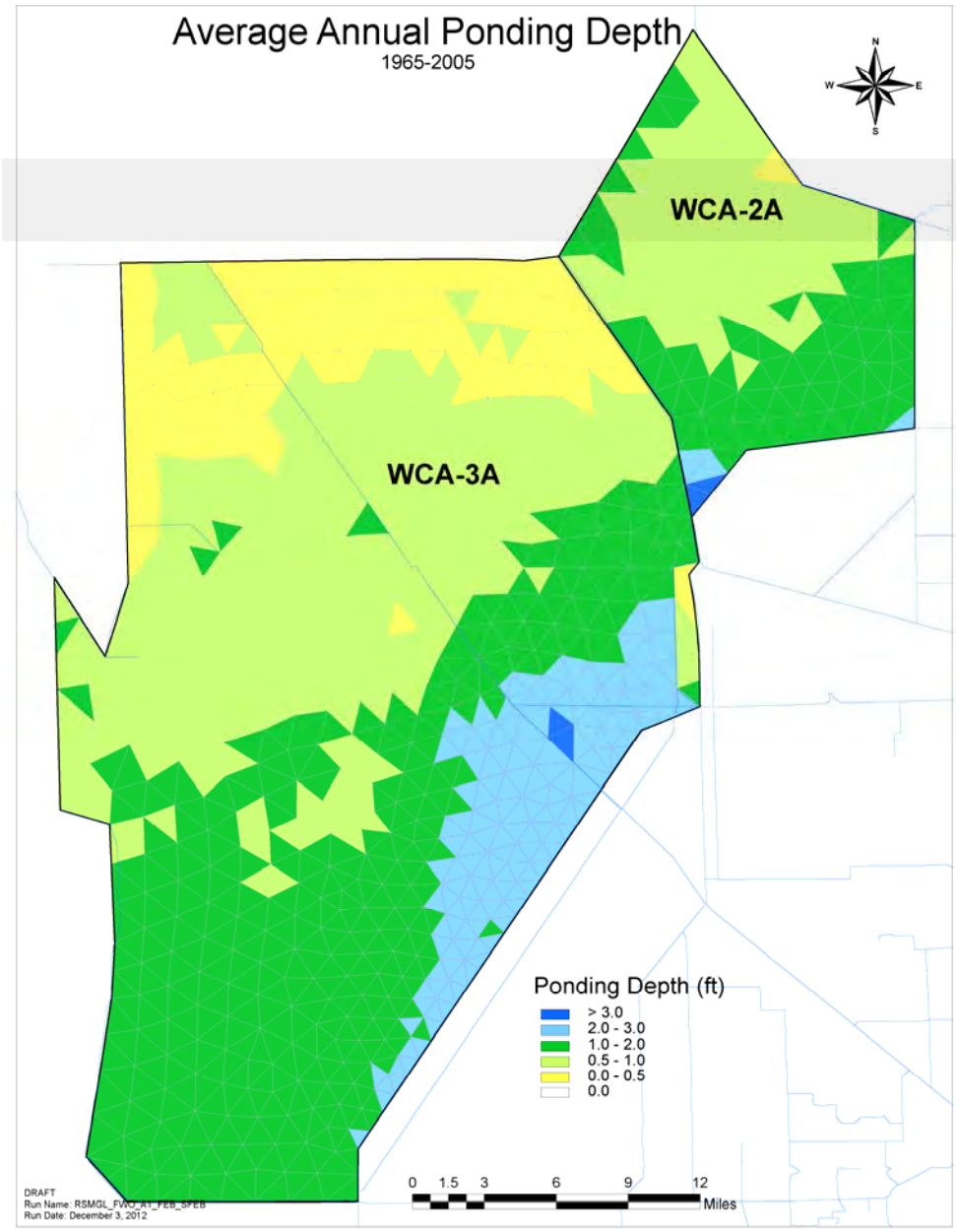



**Figure 26. Average Annual Ponding Depth for WCA-2A and WCA-3A – Alternative 2**

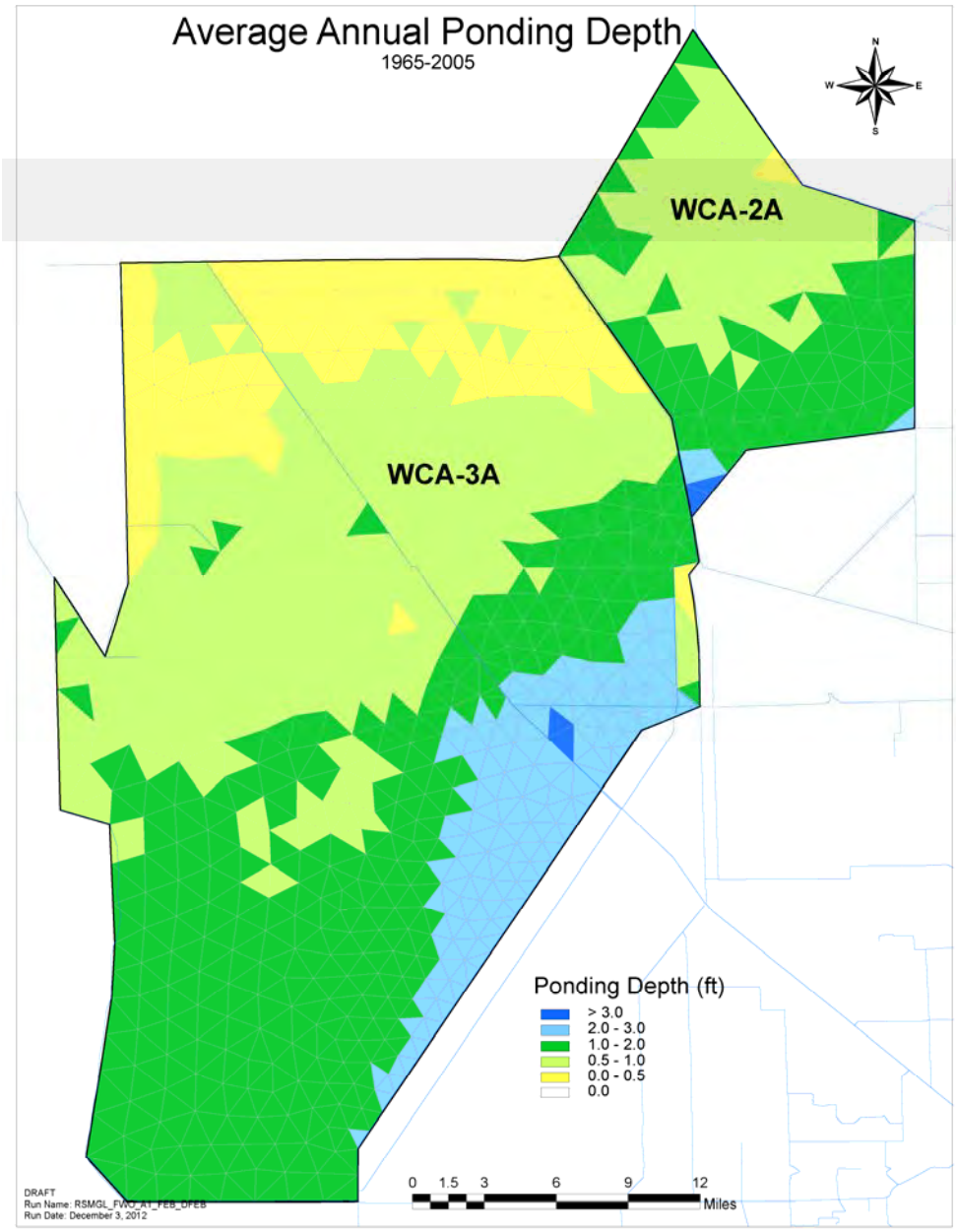



**Figure 27. Average Annual Ponding Depth for WCA-2A and WCA-3A – Alternative 3**

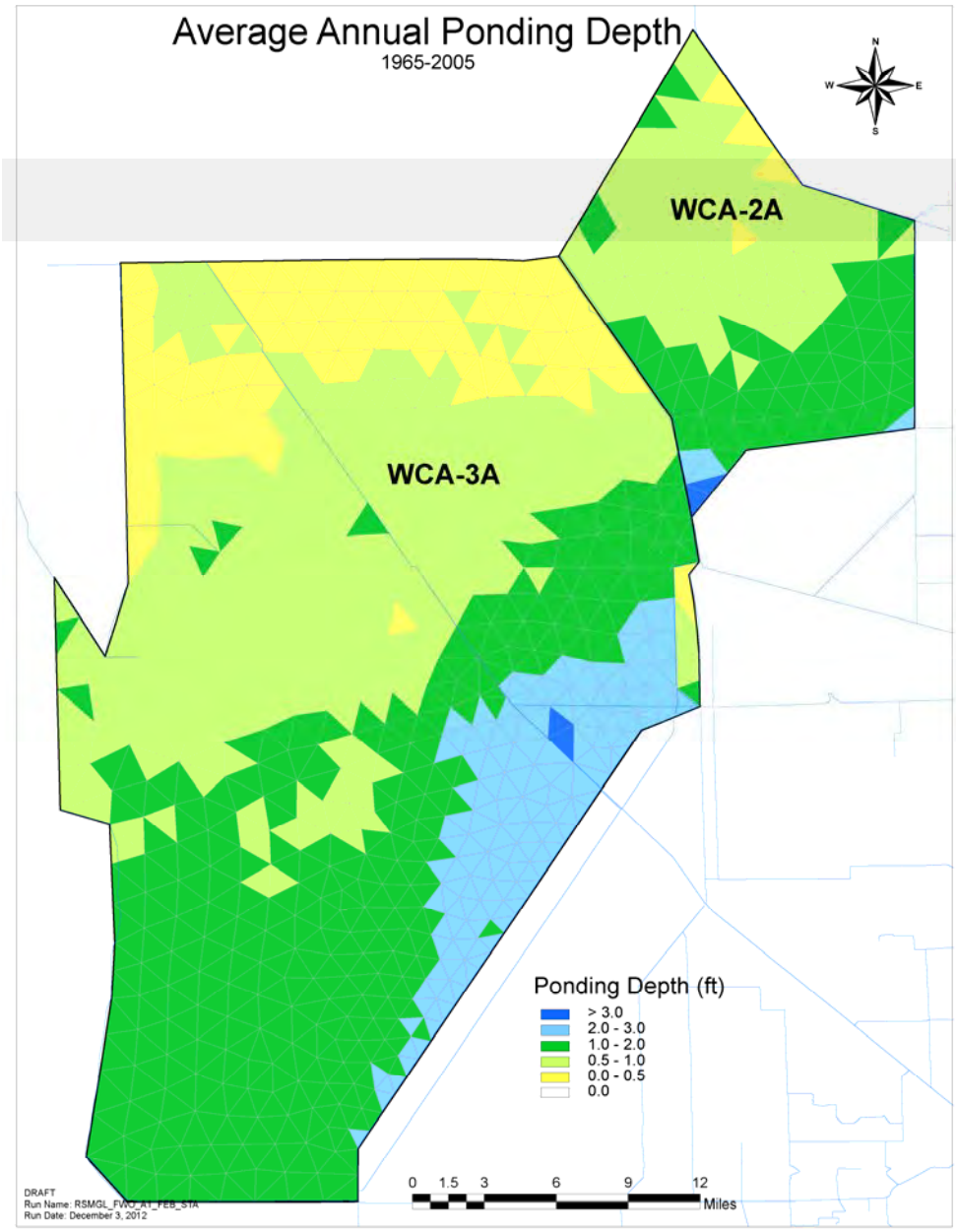



**Figure 28. Average Annual Ponding Depth for WCA-2A and WCA-3A – Alternative 4**

Average annual hydroperiod distribution maps for WCA-2A and WCA-3A for Alternatives 1, 2 and 3 and 4 are provided in **Figures 29, 30, 31 and 32**, respectively. These maps show the simulated average number of days per year of inundation. The lighter colors (white and orange) correspond to shorter hydroperiods (0-120 days) while the darker colors (light blue and dark blue) correspond to longer hydroperiods (300-365 days).

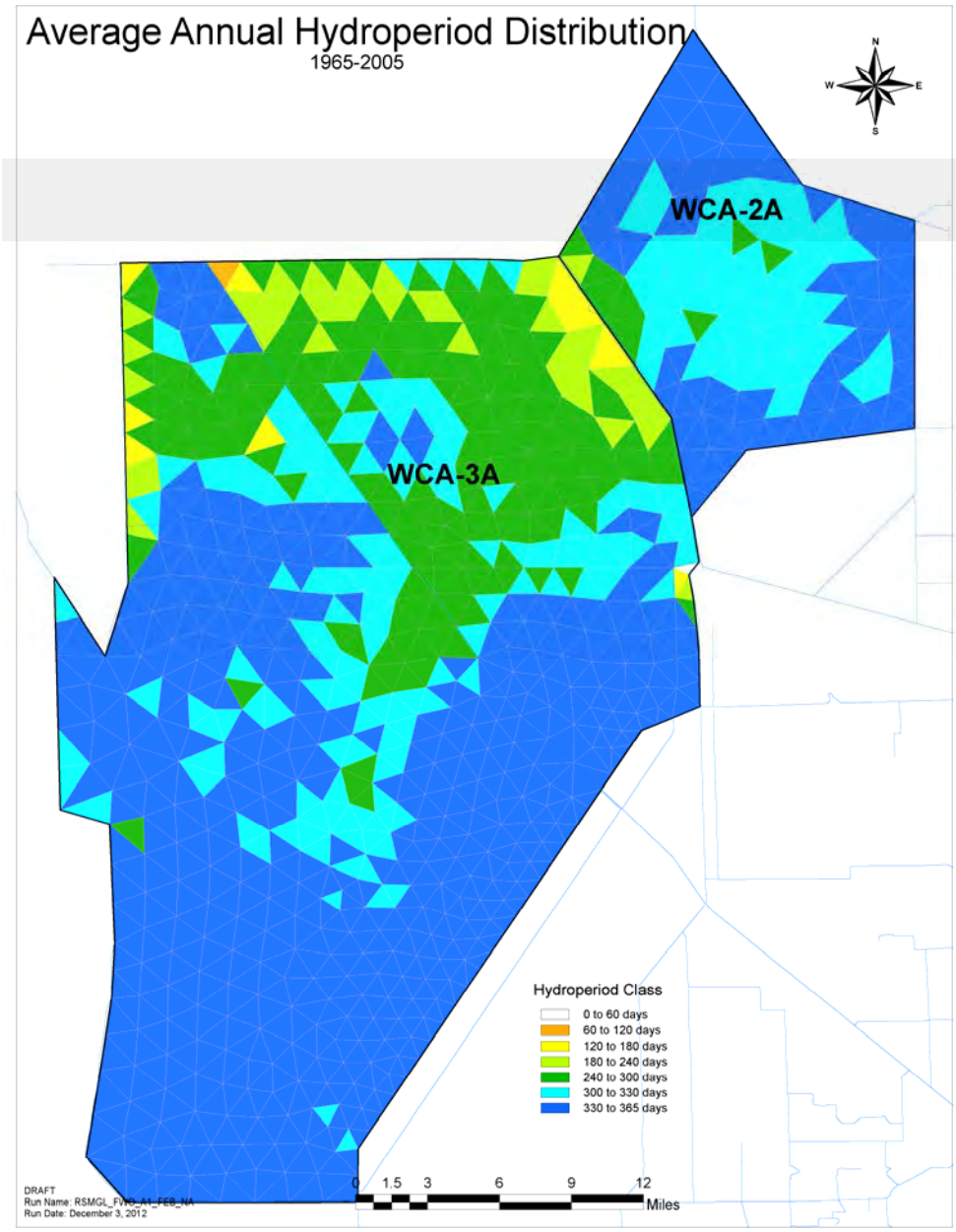



**Figure 29. Average Annual Hydroperiod Distribution for WCA-2A and WCA-3A – Alternative 1**

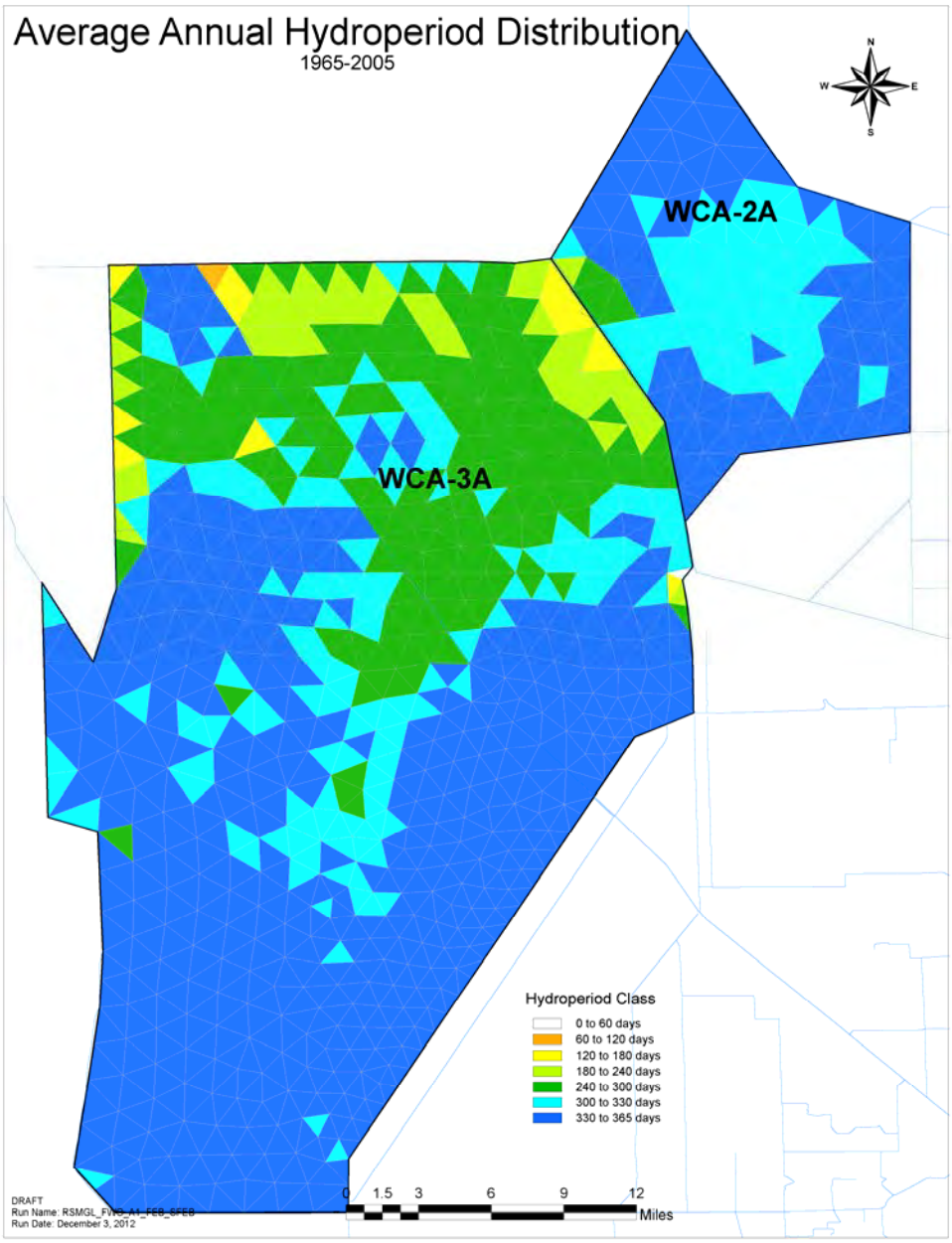



**Figure 30. Average Annual Hydroperiod Distribution for WCA-2A and WCA-3A – Alternative 2**

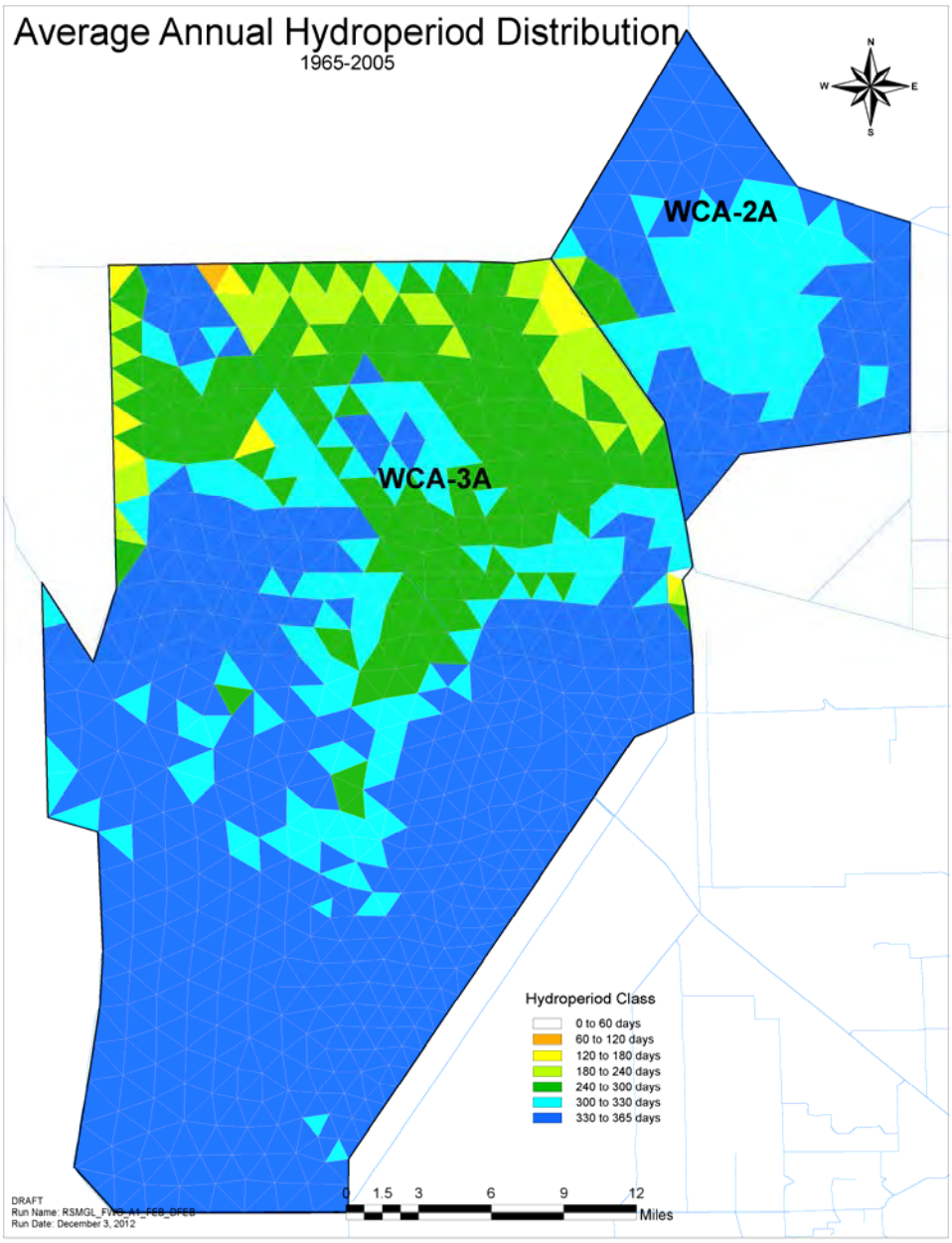



**Figure 31. Average Annual Hydroperiod Distribution for WCA-2A and WCA-3A – Alternative 3**

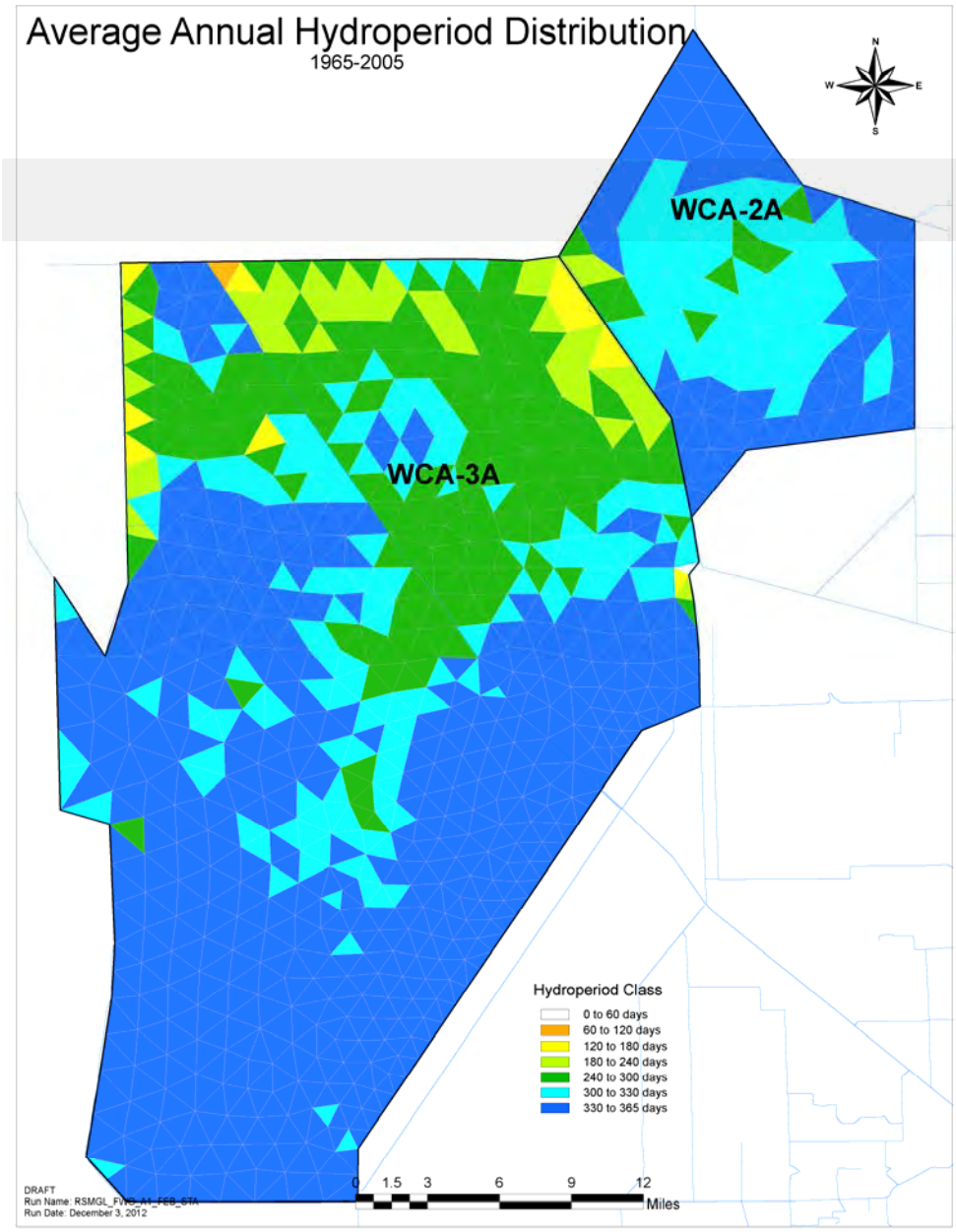



**Figure 32. Average Annual Hydroperiod Distribution for WCA-2A and WCA-3A – Alternative 4**

In order to evaluate the difference in hydroperiod between Alternatives 2, 3 and 4 and Alternative 1, hydroperiod difference maps were prepared and are provided in **Figures 33, 34 and 35**. The hydroperiod difference map duration categories are: less than 14 days shorter or longer; 14-30 days shorter or longer; 30-45 days shorter or longer; and 45-90 days shorter or longer as shown in the legend.

The hydroperiod difference map for Alternative 2 (**Figure 33**) shows some differences in hydroperiod along the Miami Canal in WCA-3A and in a small area within WCA-2A. The yellow colored cells along the Miami Canal have hydroperiod differences that are shorter than Alternative 1 by 14-30 days. For the one light blue colored cell within WCA-2A, the hydroperiod difference is longer than Alternative 1 by 14-30 days. Upon further inspection, the hydroperiod difference in the single WCA-2A cell is 17 days longer than Alternative 1.

The hydroperiod difference map for Alternative 3 (**Figure 34**) shows some differences in hydroperiod within a very small area along the Miami Canal in northern WCA-3A and in some areas within WCA-2A. The yellow colored cells along the Miami Canal have hydroperiod differences that are shorter than Alternative 1 by 14-30 days. For the five light blue colored cells within WCA-2A, the hydroperiod difference is longer than Alternative 1 by 14-30 days. Upon further inspection, the hydroperiod difference in the five WCA-2A cells is 15-18 days longer than Alternative 1.

The hydroperiod difference map for Alternative 4 (**Figure 35**) shows no differences in hydroperiod in both WCA-2A and WCA-3A.

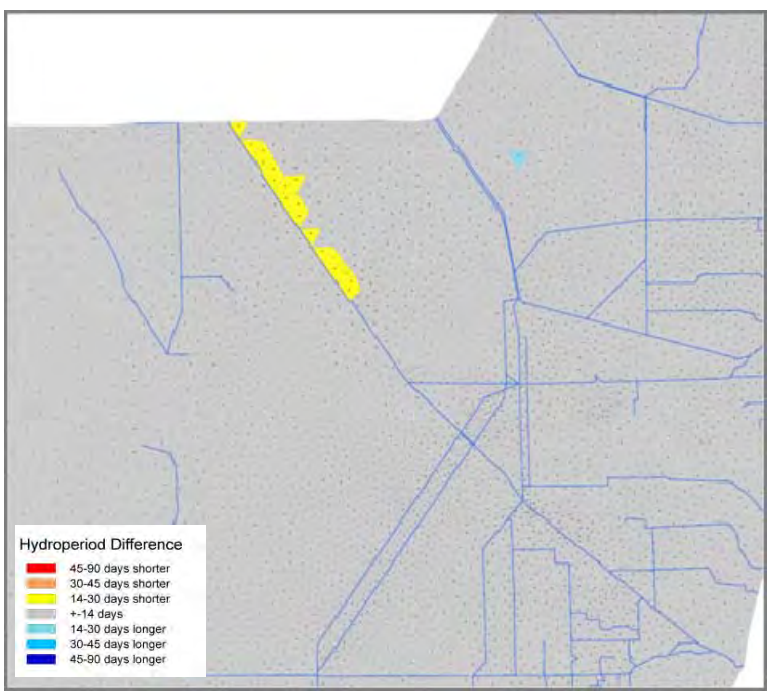



**Figure 33. Hydroperiod Differences for WCA-2A and WCA-3A – Alternative 2**

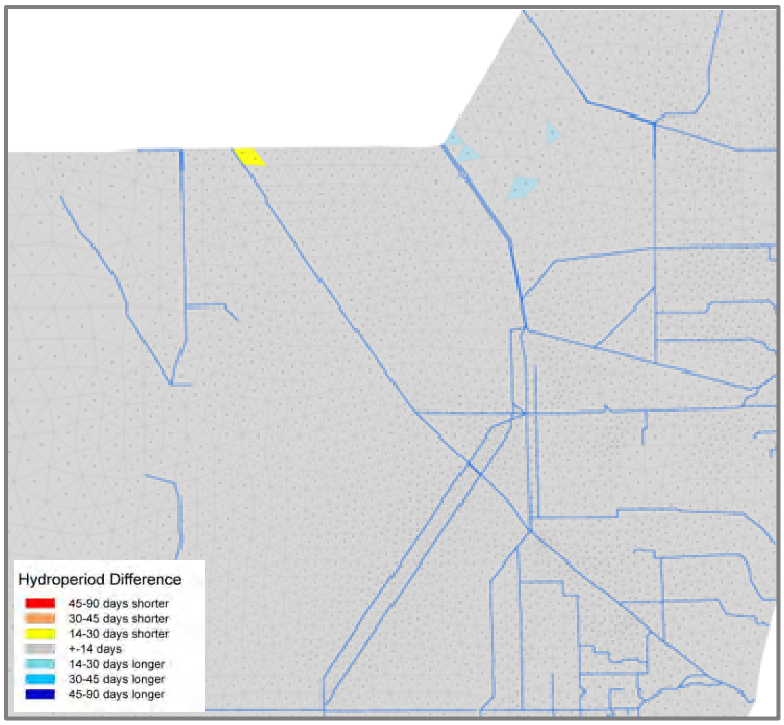



**Figure 34. Hydroperiod Differences for WCA-2A and WCA-3A – Alternative 3**

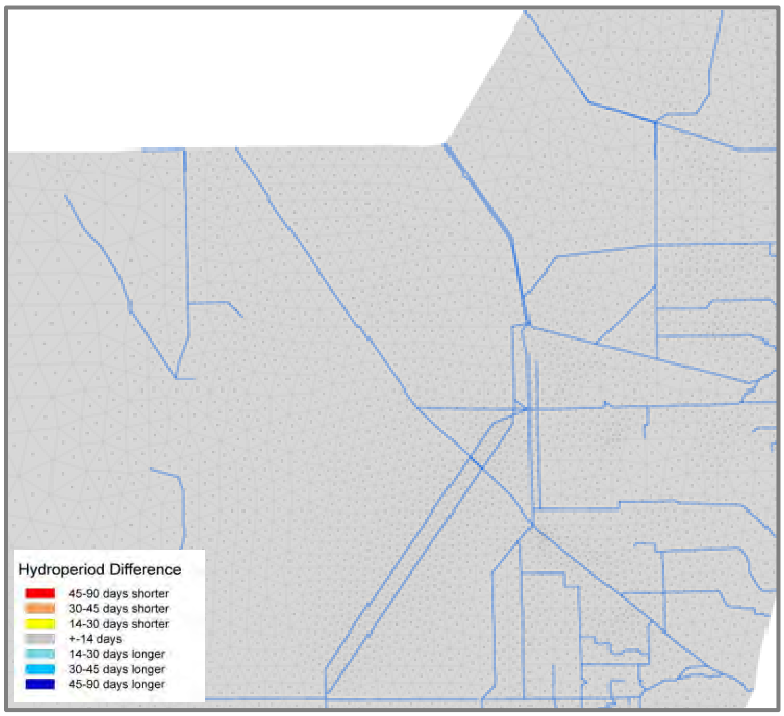



**Figure 35. Hydroperiod Differences for WCA-2A and WCA-3A – Alternative 4**

In addition to the performance measure graphics provided above, water budget summaries for key water budget components were prepared for both WCA-2A and WCA-3A to assist in the evaluation of potential environmental effects of the four A-1 FEB EIS alternatives. A water budget summary showing the average annual inflow volumes to and outflow volumes from WCA-2A for the four alternatives is provided in **Table 4**. While WCA-2A average annual inflow volumes via S-7 and via L-6 vary among alternatives, total WCA-2A inflow volumes remain relatively constant for all four alternatives. WCA-2A outflows via the S-11s, which could be used as a surrogate or indicator of ecological conditions, also remain relatively constant for all four alternatives. A water budget summary showing the average annual inflow volumes to and outflow volumes from WCA-3A for the four alternatives is provided in **Table 5**. All WCA-3A water budget flow volumes remain relatively constant for all four alternatives.

**Table 4. RSMGL-simulated Average Annual Inflow and Outflow Volumes for WCA-2A**

| | Alternative | | | |
|---|---|---|---|---|
| **Water Budget Component** | **1. No Action** | **2. Shallow FEB** | **3. Deep FEB** | **4. STA** |
| ***Inflow (acre-feet)*** | | | | |
| **L-6** | 307,000 | 391,000 | 390,000 | 259,000 |
| **S-7** | 132,000 | 49,000 | 47,000 | 179,000 |
| **Other [1]** | 740,000 | 728,000 | 728,000 | 727,000 |
| **Total Inflow** | 1,179,000 | 1,168,000 | 1,165,000 | 1,165,000 |
| ***Outflow (acre-feet)*** | | | | |
| **S-11s** | 486,000 | 471,000 | 467,000 | 476,000 |
| **Other [2]** | 692,000 | 697,000 | 698,000 | 689,000 |
| **Total Outflow** | 1,178,000 | 1,168,000 | 1,165,000 | 1,165,000 |

Notes:

1. Other inflows to WCA-2A include flows via S-6, S-10s, water supply flows via S-7 and rainfall.
2. Other outflows from WCA-2A include flows via S-143, S-144, S-145, S-38, groundwater, levee seepage and evapotranspiration.

**Table 5. RSMGL-simulated Average Annual Inflow and Outflow Volumes for WCA-3A**

| | Alternative | | | |
|---|---|---|---|---|
| **Water Budget Component** | **1. No Action** | **2. Shallow FEB** | **3. Deep FEB** | **4. STA** |
| ***Inflow (acre-feet)*** | | | | |
| **S-11s** | 486,000 | 471,000 | 467,000 | 476,000 |
| **S-8** | 374,000 | 348,000 | 350,000 | 345,000 |
| **Other [1]** | 2,925,000 | 2,924,000 | 2,926,000 | 2,923,000 |
| **Total Inflow** | 3,785,000 | 3,743,000 | 3,743,000 | 3,744,000 |
| ***Outflow (acre-feet)*** | | | | |
| **S-12s** | 684,000 | 661,000 | 648,000 | 664,000 |
| **S-151** | 356,000 | 348,000 | 354,000 | 348,000 |
| **Other [2]** | 2,747,000 | 2,736,000 | 2,741,000 | 2,736,000 |
| **Total Outflow** | 3,787,000 | 3,745,000 | 3,743,000 | 3,748,000 |

Notes:

1. Other inflows to WCA-3A include flows via S-140, S-142W, S-9, S-9A, G-204, G-205, G-206, S-150, Rotenberger, STA-5/6, groundwater and rainfall.
2. Other outflows from WCA-3A include flows via S-333, S-343A, S-343B, S-344, groundwater, levee seepage and evapotranspiration.

## References

SFWMD. (2005). Documentation of the South Florida Water Management Model Version 5.5. South Florida Water Management District, West Palm Beach, Florida. November 2005. http://www.sfwmd.gov/portal/page/portal/xrepository/sfwmd_repository_pdf/sfwmm_final_121605.pdf

SFWMD. (2011). Calibration and Validation of the Glades and Lower East Coast Service Area Application of the Regional Simulation Model (DRAFT REPORT). South Florida Water Management District, West Palm Beach, Florida. December 2011.

USACE. (2000). 8.5 Square Mile Area General Reevaluation Report and Final Supplemental Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville, Florida. July 2000.

USACE. (2011a). Everglades Restoration Transition Plan Final Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville, Florida. December, 2011. http://www.evergladesplan.org/pm/program_docs/ertp.aspx

USACE. (2011b). Environmental Assessment for the Proposed Interim Operating Criteria for the 8.5 Square Mile Area Project, Miami-Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville, Florida. June 2011.

USACE. (2012). Record of Decision for the Everglades Restoration Transition Plan. U.S. Army Corps of Engineers, Jacksonville, Florida. October 19, 2012. http://www.evergladesplan.org/pm/pm_docs/ertp/final_dec_2011/rod/102612_ertp_signed_rod_101912.pdf

## Attachment A – Table of Assumptions

| **Feature** | **Regional Simulation Model Glades and Lower East Coast Service Area**<br>**A-1 Flow Equalization Basin Environmental Impact Statement Assumptions**<br>41-year Simulation<br>Version 2.3.5 of Regional Simulation Model (Linux) |
|---|---|
| **Meteorological Data** | • Rainfall file used: rain_v3.0_beta_tin_14_05.bin<br>• Reference Evapotranspiration (RET) file used: RET_48_05_MULTIQUAD_v1.0.bin (ARCADIS, 2008) |
| **Topography** | • Same as calibration topographic data set except where reservoirs are introduced (STA1-E, C4 Impoundment and C-111 reservoirs).<br>• United States Geological Survey (USGS) High-Accuracy Elevation Data Collection (HAEDC) for the Water Conservation Areas (1, 2A, 2B, 3A, and 3B), the Big Cypress National Preserve and Everglades National Park. |
| **Tidal Data** | • Tidal data from two primary (Naples and Virginia Key) and five secondary NOAA stations (Flamingo, Everglades, Palm Beach, Delray Beach and Hollywood Beach) were used to generate a historic record to be used as sea level boundary conditions for the entire simulation period. |
| **Land Use and Land Cover** | • Land Use and Land Cover Classification for the Lower East Coast urban areas (east of the Lower East Coast Flood Protection Levee) use 2008-2009 Land Use coverage as prepared by the SFWMD, consumptive use permits as of 2011 were used to update the land use in areas where it did not reflect the permit information.<br>• Land Use and Land Cover Classification for the natural areas (west of the Lower East Coast Flood Protection Levee) is the same as the Calibration Land Use and Land Cover Classification for that area.<br>• Modified at locations where reservoirs are introduced (STA1-E, Site 1 Impoundment, Broward WPAs, C4 Impoundment, Lakebelt Lakes and C-111 Reservoirs). |
| **Water Control Districts (WCDs)** | • Water Control Districts in Palm Beach and Broward Counties and in the Western Basins assumed.<br>• 8.5 SMA seepage canal is modeled as a WCD in ENP area. |
| **Lake Belt Lakes** | • Based on the permitted 2020 Lake Belt Lakes coverage obtained from USACE. |

| **Feature** | **Regional Simulation Model Glades and Lower East Coast Service Area**<br>**A-1 Flow Equalization Basin Environmental Impact Statement Assumptions**<br>41-year Simulation<br>Version 2.3.5 of Regional Simulation Model (Linux) |
|---|---|
| **CERP Projects** | • 1st Generation CERP – Site 1 Impoundment project is modeled as an above ground reservoir of area 1600 acres, with a maximum depth of 8 ft.<br>• 2nd Generation CERP – Broward County Water Preserve Areas (WPAs) comprised of C-11 and C-9 impoundments were modeled as above ground reservoirs with areas 1221 and 1971 acres and maximum depths 4.3 and 4.0 ft. respectively.<br>• 2nd Generation CERP – C-111 Spreader Canal Project includes the Frog Pond Detention Area, which is modeled as an above ground impoundment with the S200 A, B and C pumps as inflow structures. In addition, the Aerojet canal is modeled with the inflow pumps S199 A, B and C. The S199 and S200 pumps are turned off based on the stage at the remote monitoring location EVER4 for the protection of the CSS Critical Habitat Unit 3.<br>• 2nd Generation CERP – Biscayne Bay Coastal Wetlands project features were not modeled since these features along the coast in Miami-Dade County were not considered significant for CEPP.<br>• Areal corrections were applied to the impoundment storages to account for the discrepancies of the areas in the model of the impoundments not matching the design areas. |
| **Water Conservation Area 1 (Arthur R. Marshall Loxahatchee National Wildlife Refuge)** | • Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals<br>• No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow.<br>• Structure S10E connecting LNWR to the northeastern portion of WCA-2A is no longer considered part of the simulated regional System. |
| **Water Conservation Area 2A & 2B** | • Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals.<br>• No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow. |
| **Water Conservation Area 3A & 3B** | • Everglades Restoration Transition Plan (ERTP) regulation schedule for WCA-3A, as per SFWMM modeled alternative 9E1 (USACE, 2011a).<br>• Includes regulatory releases to tide through LEC canals. Documented in Water Control Plan (USACE, June 2002).<br>• No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow. |

| **Feature** | **Regional Simulation Model Glades and Lower East Coast Service Area**<br>**A-1 Flow Equalization Basin Environmental Impact Statement Assumptions**<br>41-year Simulation<br>Version 2.3.5 of Regional Simulation Model (Linux) |
|---|---|
| **Everglades Construction Project Stormwater Treatment Areas** | • STA-1E: 5,132 acres total treatment area.<br>• A uniform bottom elevation equal to the spatial average over the extent of STA-1E is assumed. |
| **Everglades National Park** | • Water deliveries to Everglades National Park are based upon Everglades Restoration Transition Plan (ERTP), with the WCA-3A Regulation Schedule including the lowered Zone A (compared to IOP) and extended Zones D and E1.<br>• L-29 stage constraint for operation of S-333 assumed to be 7.5 ft, NGVD.<br>• G-3273 constraint for operation of S-333 assumed to be 6.8 ft, NGVD.<br>• The one mile Tamiami Trail Bridge as per the 2008 Tamiami Trail Limited Reevaluation Report is modeled as a one mile weir. Located east of the L67 extension and west of the S334 structure.<br>• Tamiami Trail culverts east of the L67 Extension are simulated where the bridge is not located.<br>• 5.5 miles remain of the L-67 Extension Levee.<br>• S-355A & S-355B are operated.<br>• S-356 is not operated.<br>• Full construction of C-111 project reservoirs consistent with the as-built information from USACE plus addition of contract 8 and contract 9 features. A uniform bottom elevation equal to the spatial average over the extent of each reservoir is assumed.<br>• 8.5 SMA project feature as per federally authorized Alternative 6D of the MWD/8.5 SMA Project (USACE, 2000 GRR); operations per 2011 Interim Operating Criteria (USACE, 2011b) including S-331 trigger shifted from Angel's well to LPG-2. Outflow assumed from 8.5 SMA detention cell to the C-111 North Detention Area. |
| **Other Natural Areas** | • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay. |
| **Pumpage and Irrigation** | • Public Water Supply pumpage for the Lower East Coast was updated using 2010 consumptive use permit information as documented in the C-51 Reservoir Feasibility Study; permits under 0.1 MGD were not included.<br>• Residential Self Supported (RSS) pumpage are based on 2010 projections of residential population from the SFWMD Water Supply Bureau.<br>• Industrial pumpage is based on 2010 permits.<br>• Irrigation demands for the six irrigation land-use types are calculated internally by the model.<br>• Seminole Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. Tribal sources of water supply include various bulk sale agreements with municipal service suppliers. |

| **Feature** | **Regional Simulation Model Glades and Lower East Coast Service Area**<br>**A-1 Flow Equalization Basin Environmental Impact Statement Assumptions**<br>41-year Simulation<br>Version 2.3.5 of Regional Simulation Model (Linux) |
|---|---|
| **Canal Operations** | • C&SF system and operating rules in effect in 2010<br>• Includes operations to meet control elevations in the primary coastal canals for the prevention of saltwater intrusion<br>• Includes existing secondary drainage/water supply system<br>• C-4 Flood Mitigation Project<br>• Western C-4, S-380 structure retained open<br>• C-11 Water Quality Treatment Critical Project (S-381 and S-9A)<br>• S-25B and S-26 backflow pumps are not modeled since they are used very rarely during high tide conditions and the model uses a long-term average daily tidal boundary<br>• Northwest Dade Lake Belt area assumes that the conditions caused by currently permitted mining exist and that the effects of any future mining are fully mitigated by industry<br>• ACME Basin A flood control discharges are sent to C-51, west of the S-155A structure, to be pumped into STA-1E. ACME Basin B flood control discharges are sent to STA-1E through the S-319 structure<br>• Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Everglades Restoration Transition Plan (ERTP) regulation schedule for WCA-3A, as per SFWMM modeled alternative 9E1<br>  o Structures S-343A, S-343B, S-344 and S-12A are closed Nov. 1 to July 15<br>  o Structure S-12B is closed Jan. 1 to July 15 |
| **Canal Configuration** | • Canal configuration same as calibration except only 5.5 miles remain of the L-67 Extension Canal and CERP project modifications. |
| **Lower East Coast Service Area Water Shortage Management** | • Lower east coast water restriction zones and trigger cell locations are equivalent to SFWMM ECB implementation. An attempt was made to tie trigger cells with associated groundwater level gages to the extent possible. The Lower East Coast Subregional (LECsR) model is the source of this data.<br>• Periods where the Lower East Coast is under water restriction due to low Lake Okeechobee stages were extracted from the corresponding RSMBN FWO simulation. |

**Note:**
The RSM is a robust and complex regional scale model. Due to the scale of the model, it is frequently necessary to implement abstractions of system infrastructure and operations that will, in general, mimic the intent and result of the desired project features while not matching the exact mechanism by which these results would be obtained in the real world. Additionally, it is sometimes necessary to work within established paradigms and foundations within the model code (e.g. use available input-driven options to represent more complex project operations).