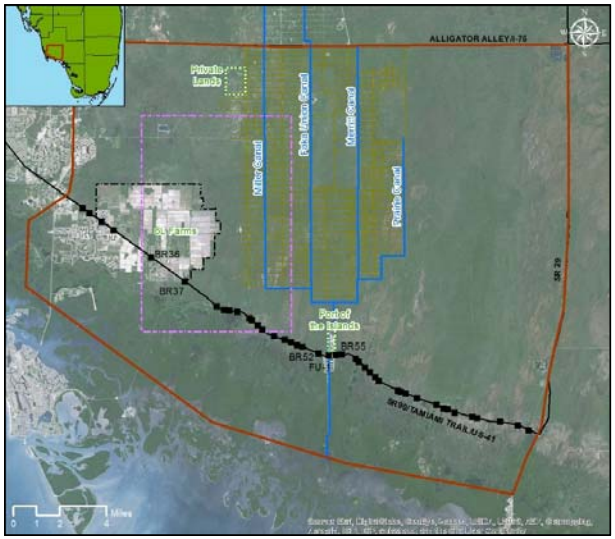
Flood Event Models With Six L’s Farm Discharges

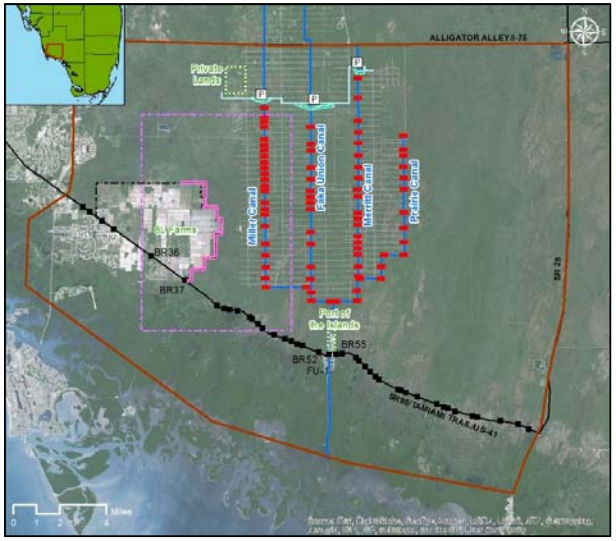
PSRP SWPF

Previous Work (~4 yrs ago)

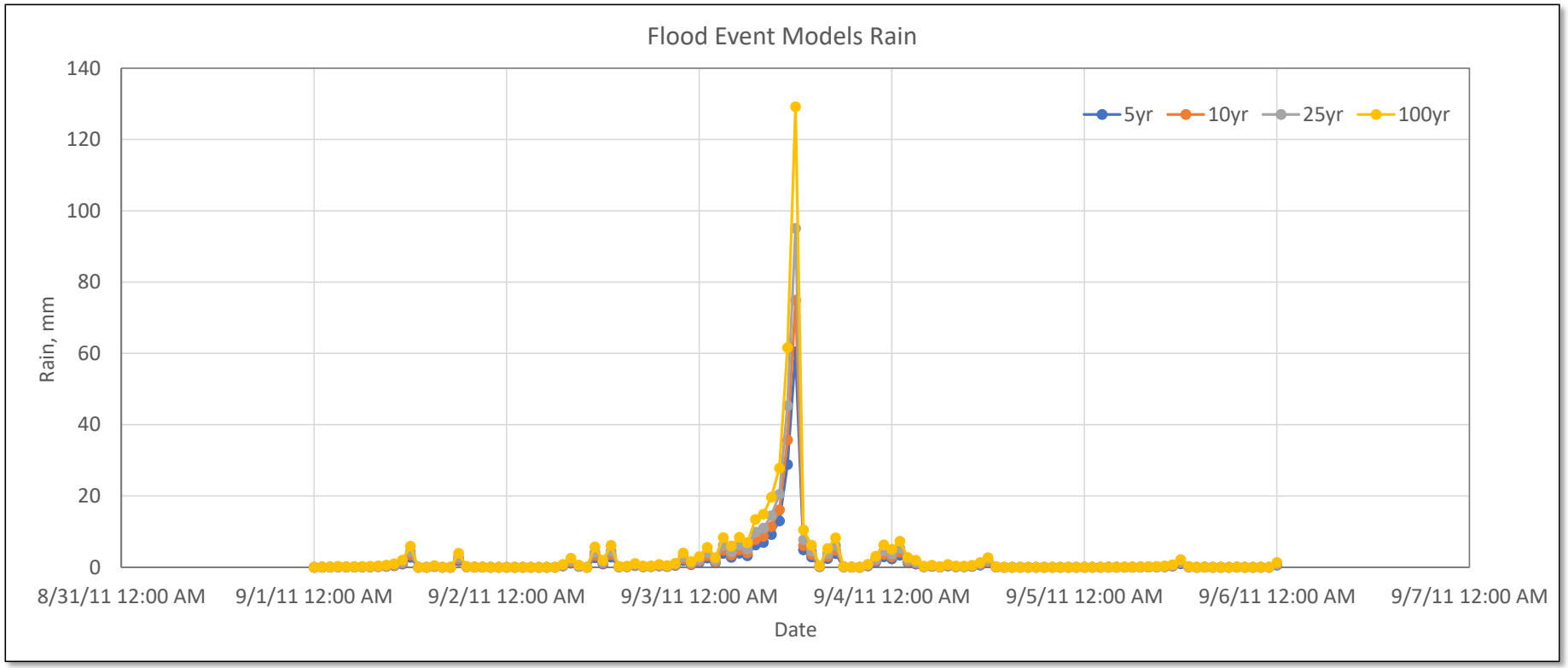
Purpose: Hydraulic Design Criteria Protection Features

- 6 Storm Event models
  - 5, 10, 25, 100, 200, 500yr events
- Protection Features
  - Tie Back levee System
  - Port of Islands Levee
  - Six L's Farm Levee
- 2 Conditions
  - Conditions 1: "Without Project"
  - Conditions 2: "With PSRP Project"
- Tiered level modeling
  - Tier 1: Low resolution, large scale model
  - Tier 2: High resolution, small scale inset models
- No Lipman farm Discharges



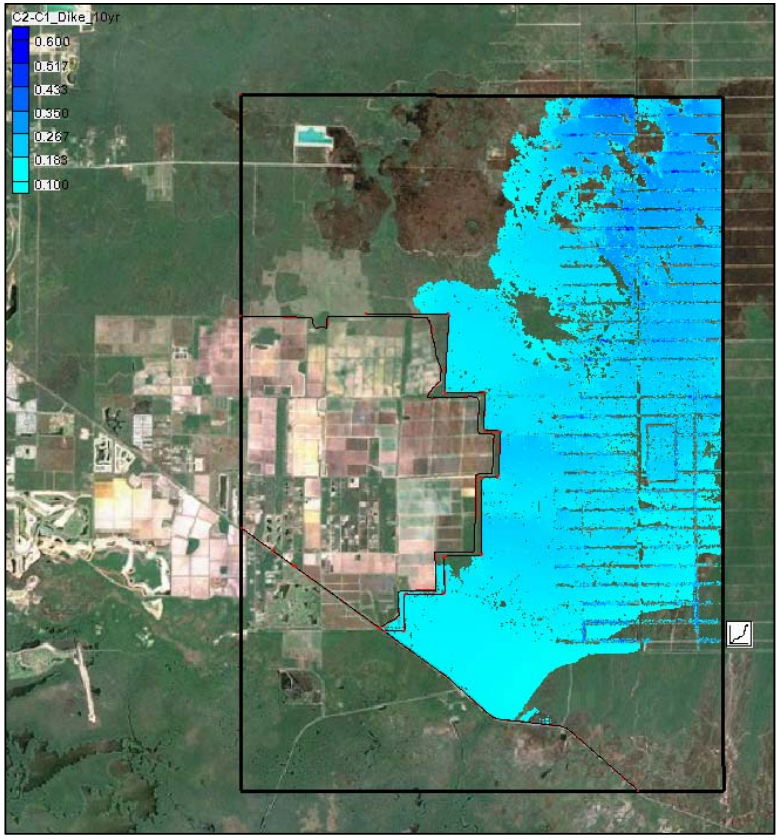


Synthetic Storm events

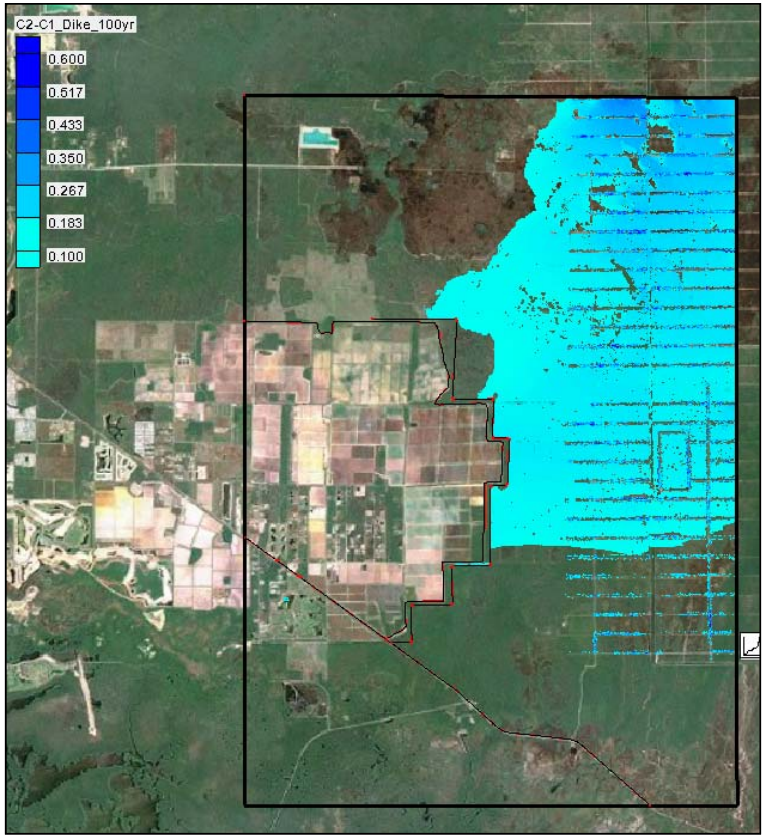


Previous Results

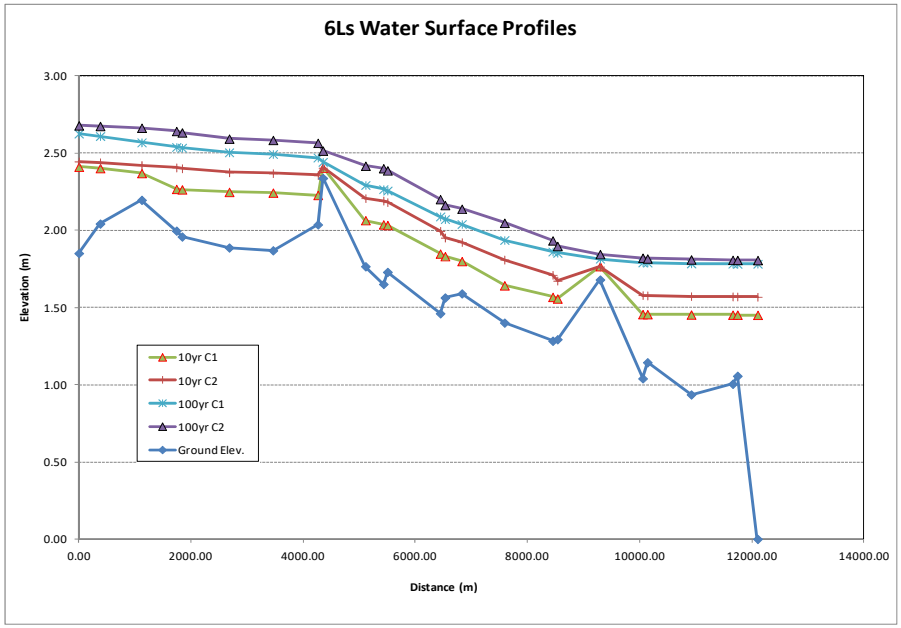
10 yr Return Frequency

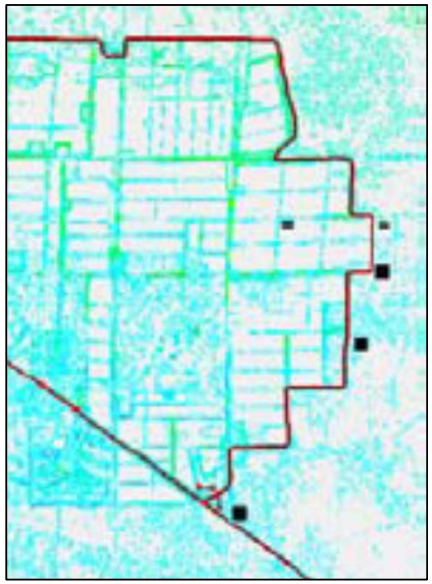


100 yr Return Frequency



Water Surface Profile





Hydraulic Design Criteria per:

- EMs 1110-2-1619
- 1110-2-1913
- ER 1105-2-101

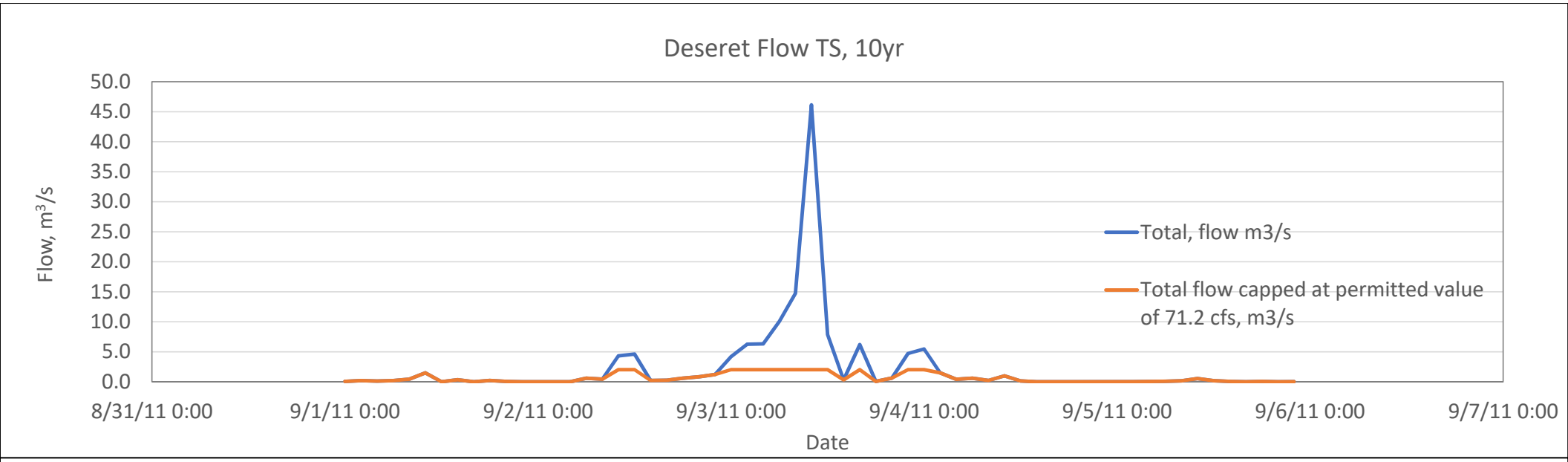
Table 8

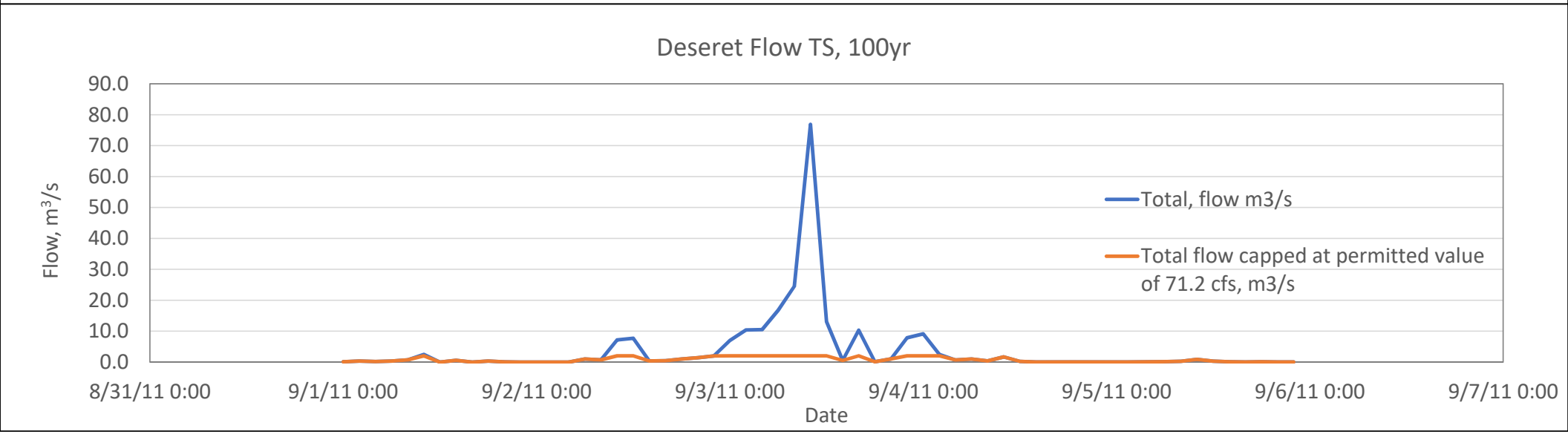
Maximum predicted stage values, at the 95% confidence level, simulated by the Tier two level GSSHA predictive 6Ls model forced with the 5-day 100 year design storm

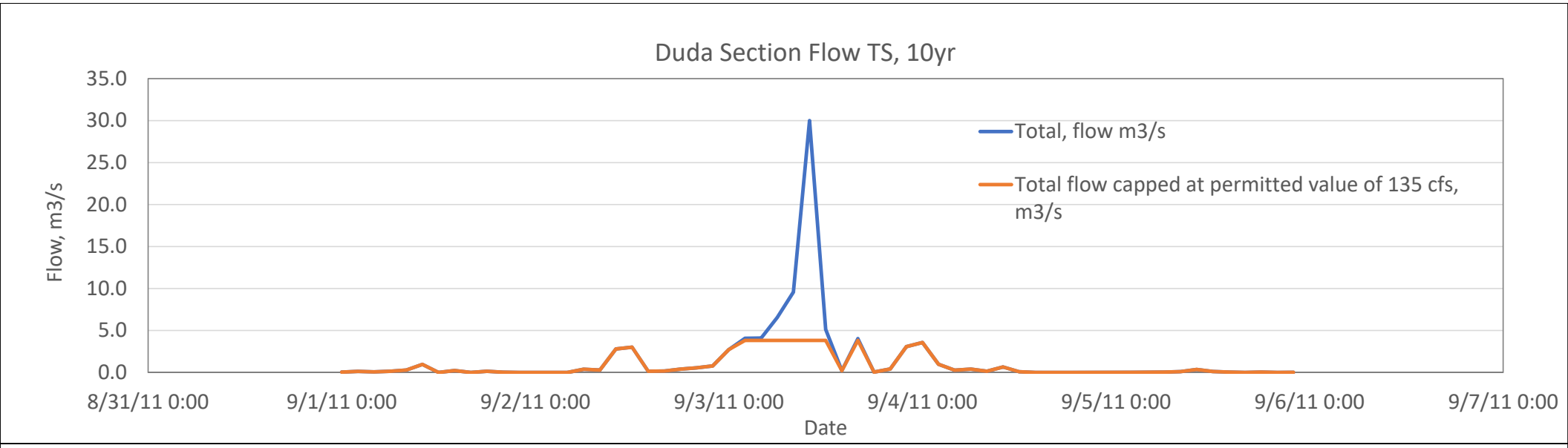
Predictive Tier two GSSHA 6Ls model grid cell location (i,j)	Maximum predicted stage in meters
379, 279	2.438
354, 215	2.028
461, 260	2.183
582, 174	4.002
411, 279	2.30
579, 175	2.47

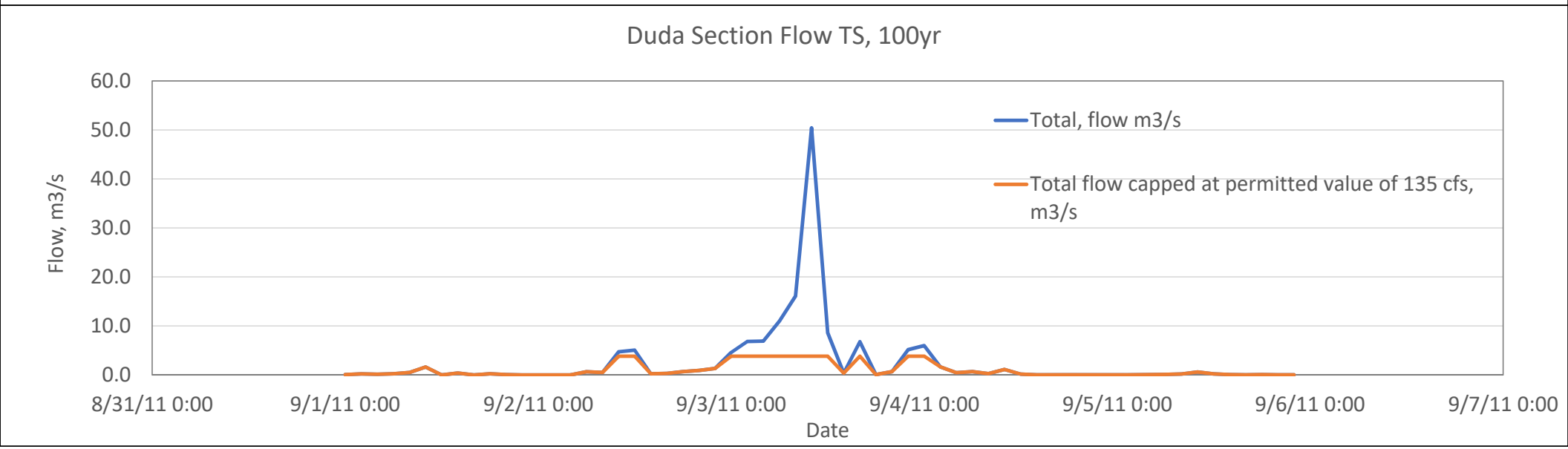
Farm Runoff Time Series

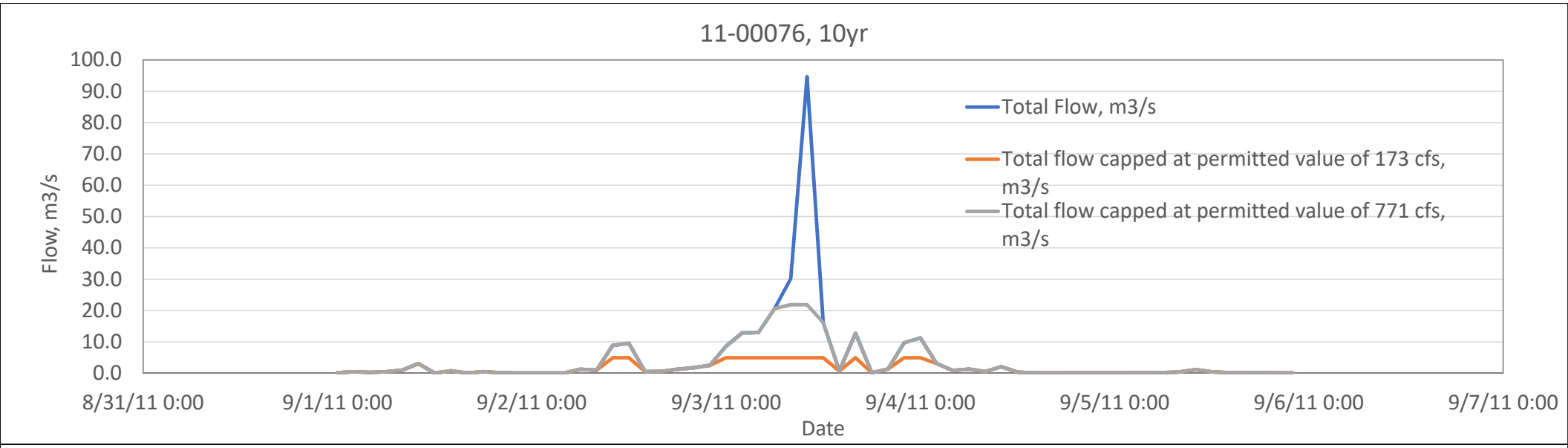
- Permits:
  - Deseret Permit
  - 11-00097-S: Duda Section Lipman Farms
  - 11-00076-S: East Sentel, West Sentel, 41N/S, New Lands

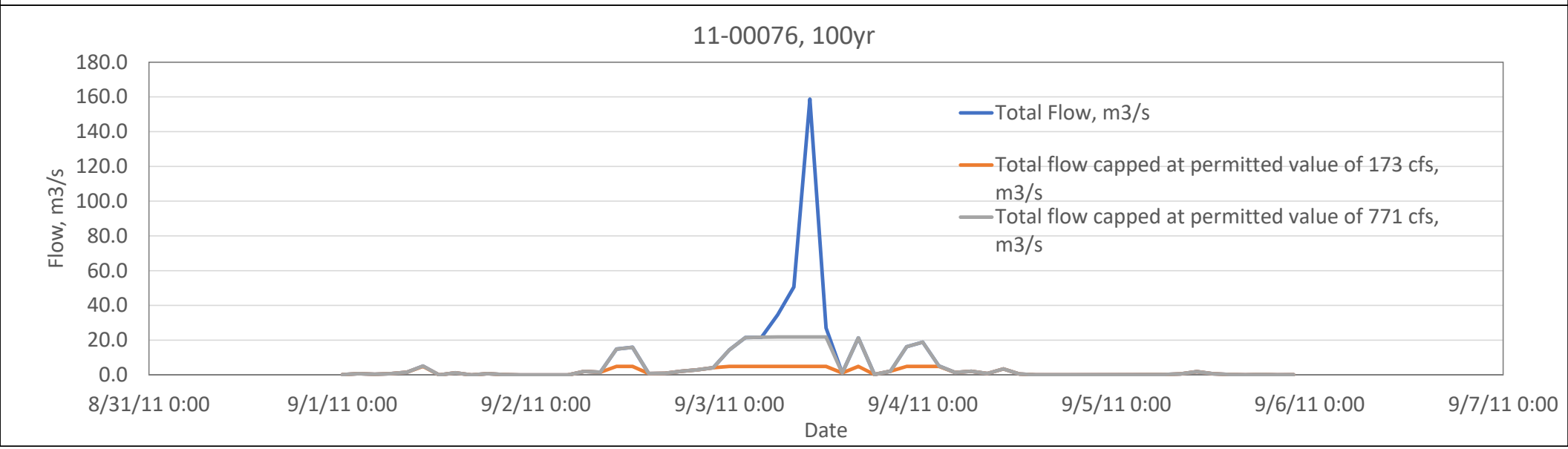

Deseret Flow TS, 10yr
Flow, m3/s
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
8/31/11 0:00
9/1/11 0:00
9/2/11 0:00
9/3/11 0:00
9/4/11 0:00
9/5/11 0:00
9/6/11 0:00
9/7/11 0:00
Date
Total, flow m3/s
Total flow capped at permitted value of 71.2 cfs, m3/s


Deseret Flow TS, 100yr
Flow, m3/s
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
8/31/11 0:00
9/1/11 0:00
9/2/11 0:00
9/3/11 0:00
9/4/11 0:00
9/5/11 0:00
9/6/11 0:00
9/7/11 0:00
Date
Total, flow m3/s
Total flow capped at permitted value of 71.2 cfs, m3/s


Duda Section Flow TS, 10yr
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Flow, m3/s
8/31/11 0:00
9/1/11 0:00
9/2/11 0:00
9/3/11 0:00
9/4/11 0:00
9/5/11 0:00
9/6/11 0:00
9/7/11 0:00
Date
Total, flow m3/s
Total flow capped at permitted value of 135 cfs, m3/s


Duda Section Flow TS, 100yr
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Flow, m3/s
8/31/11 0:00
9/1/11 0:00
9/2/11 0:00
9/3/11 0:00
9/4/11 0:00
9/5/11 0:00
9/6/11 0:00
9/7/11 0:00
Date
Total, flow m3/s
Total flow capped at permitted value of 135 cfs, m3/s


11-00076, 10yr
Flow, m3/s
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
8/31/11 0:00
9/1/11 0:00
9/2/11 0:00
9/3/11 0:00
9/4/11 0:00
9/5/11 0:00
9/6/11 0:00
9/7/11 0:00
Date
Total Flow, m3/s
Total flow capped at permitted value of 173 cfs, m3/s
Total flow capped at permitted value of 771 cfs, m3/s


11-00076, 100yr
Flow, m3/s
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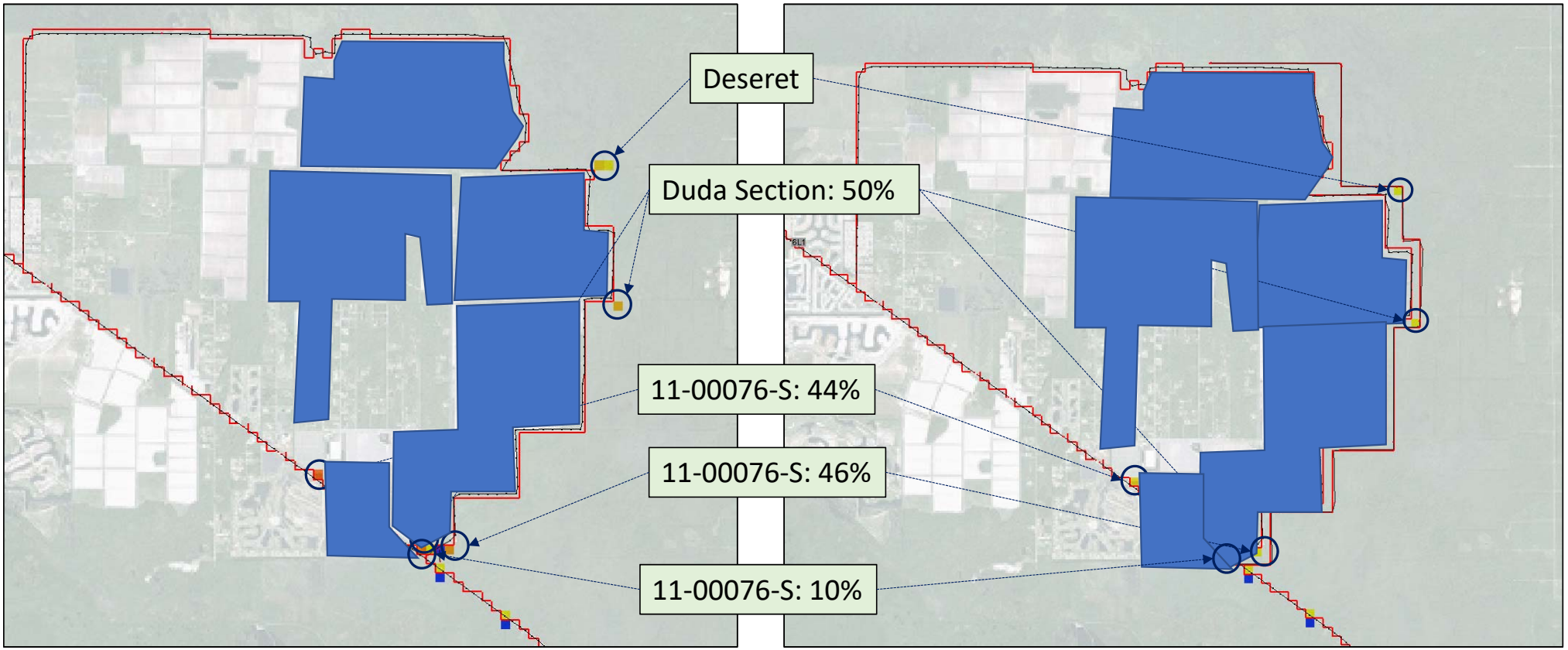
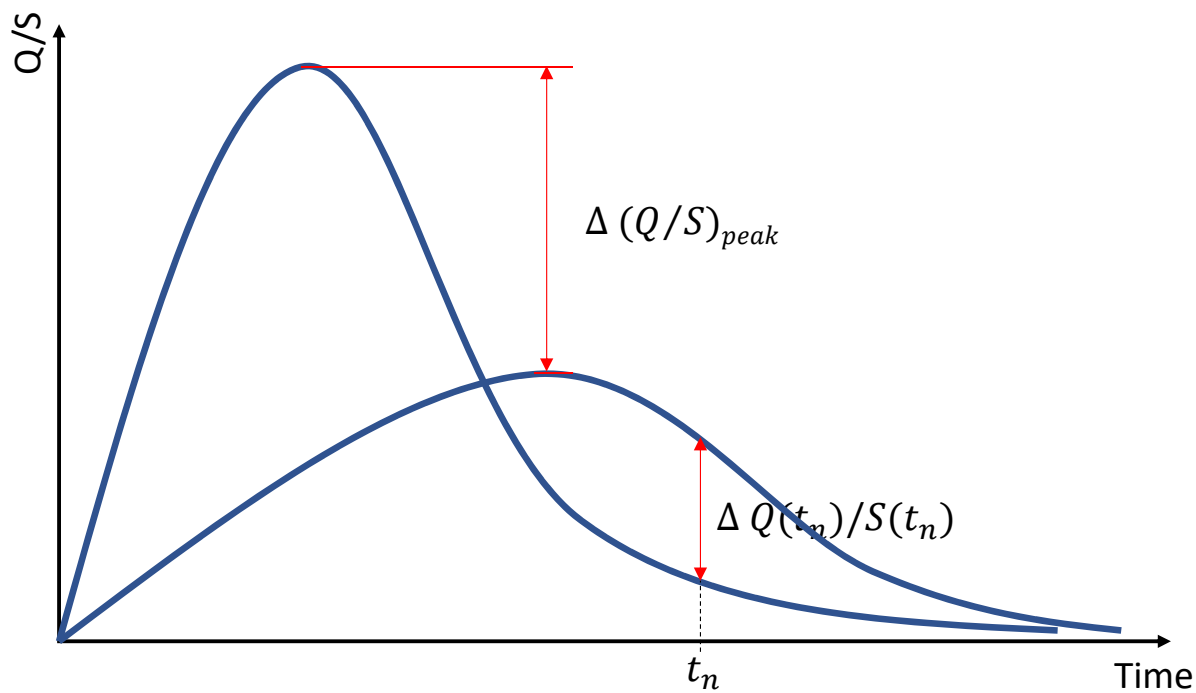
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
8/31/11 0:00
9/1/11 0:00
9/2/11 0:00
9/3/11 0:00
9/4/11 0:00
9/5/11 0:00
9/6/11 0:00
9/7/11 0:00
Date
Total Flow, m3/s
Total flow capped at permitted value of 173 cfs, m3/s
Total flow capped at permitted value of 771 cfs, m3/s

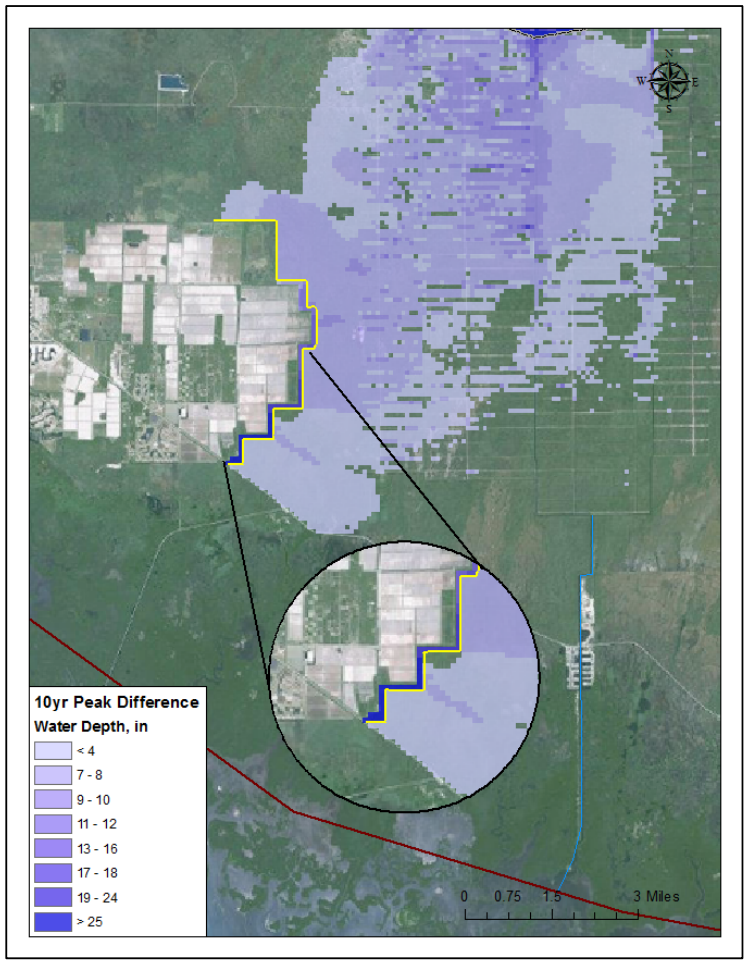
Farm Discharge TS in Model Domain

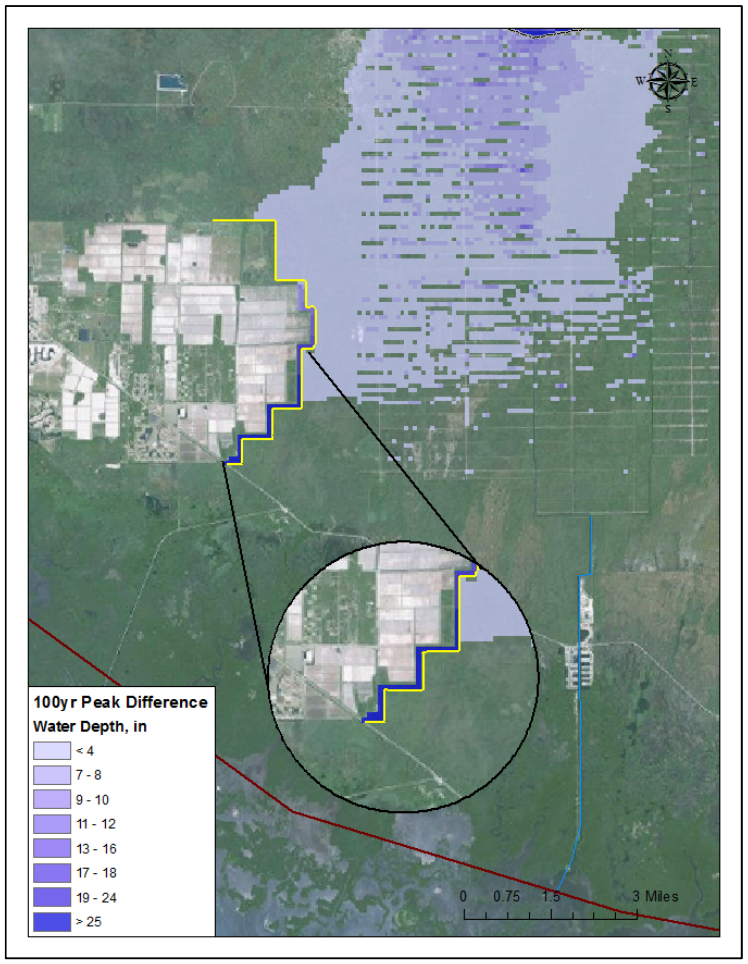


Time Step Difference vs. Peak Difference

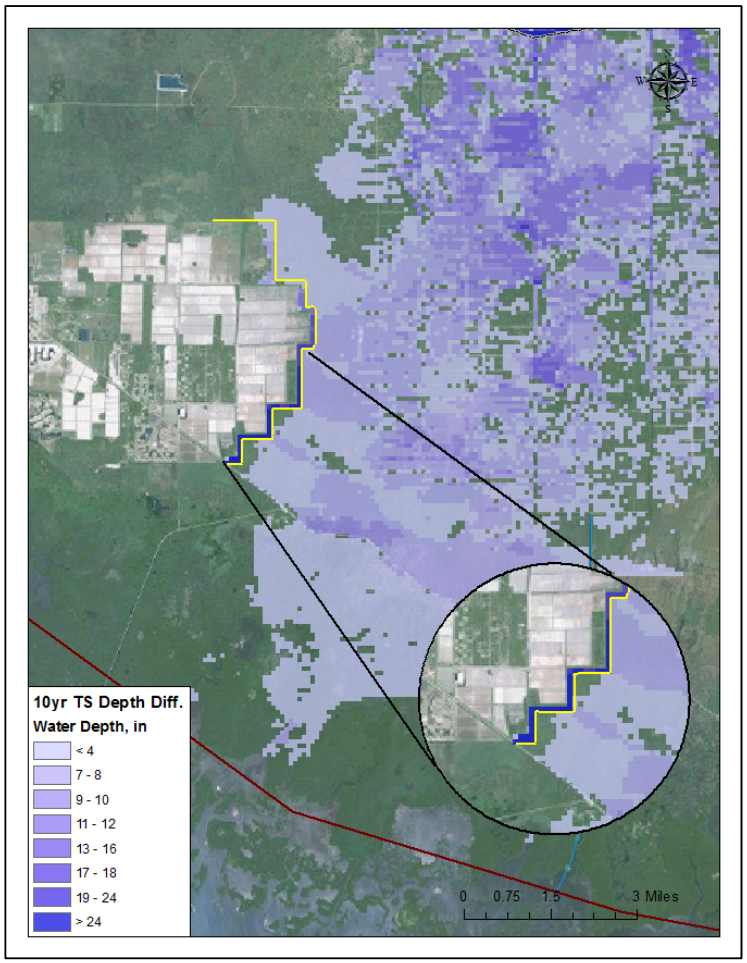


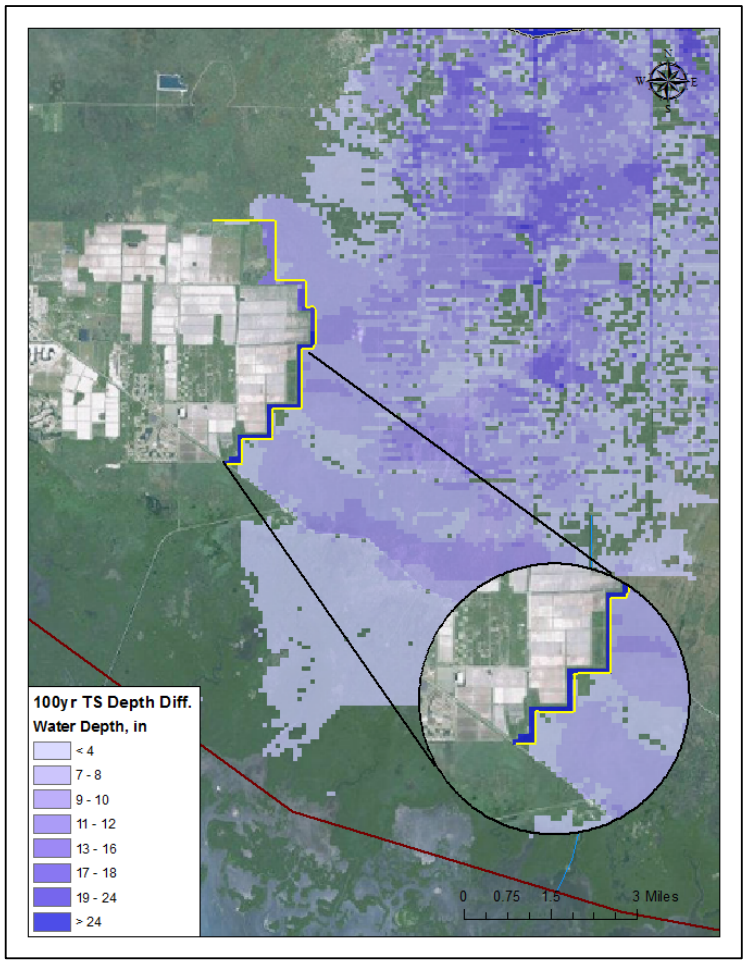
POS peak depth difference: 10yr & 100yr events



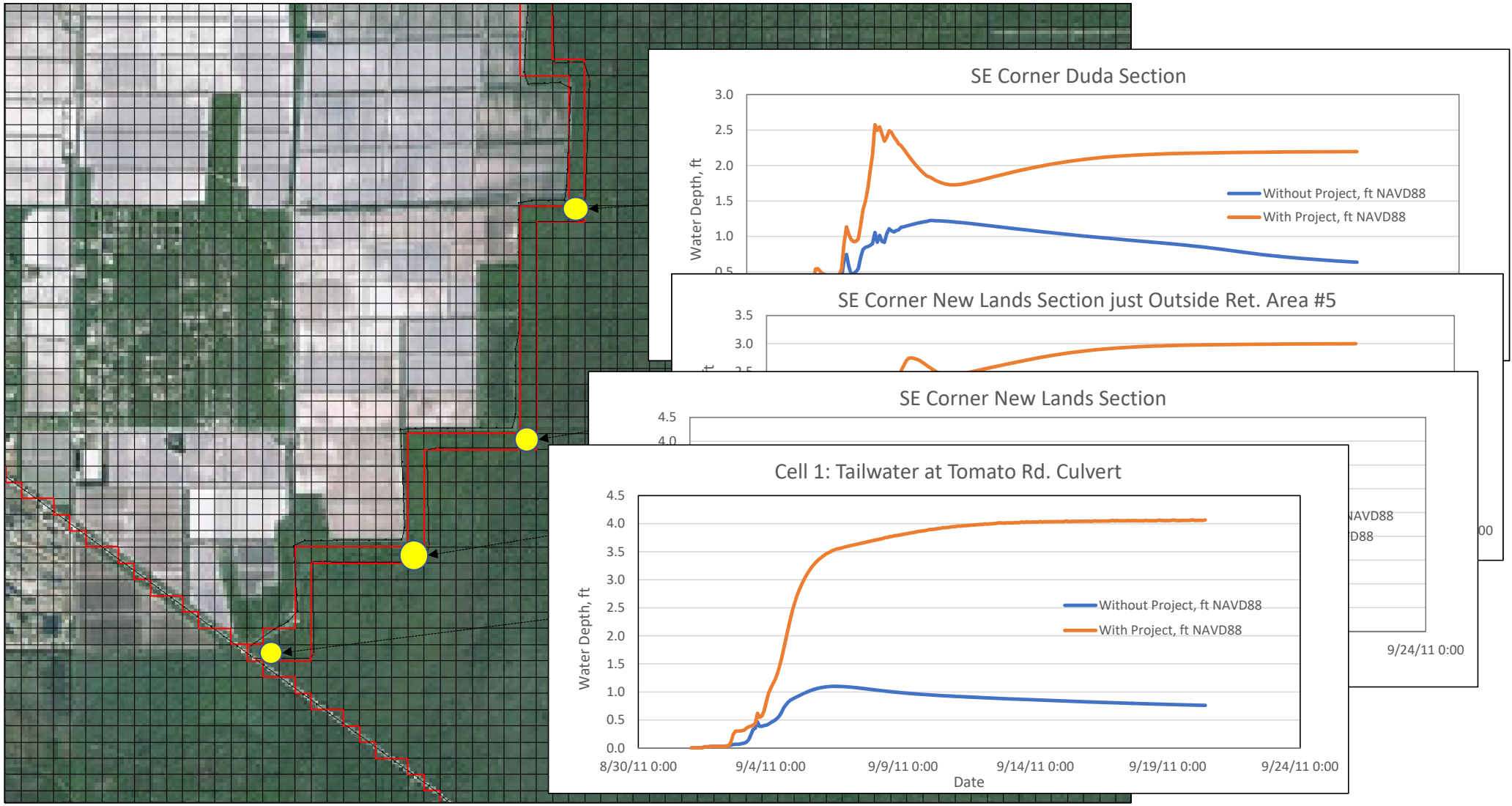


Time Step Max Depth difference: 10yr & 100yr events

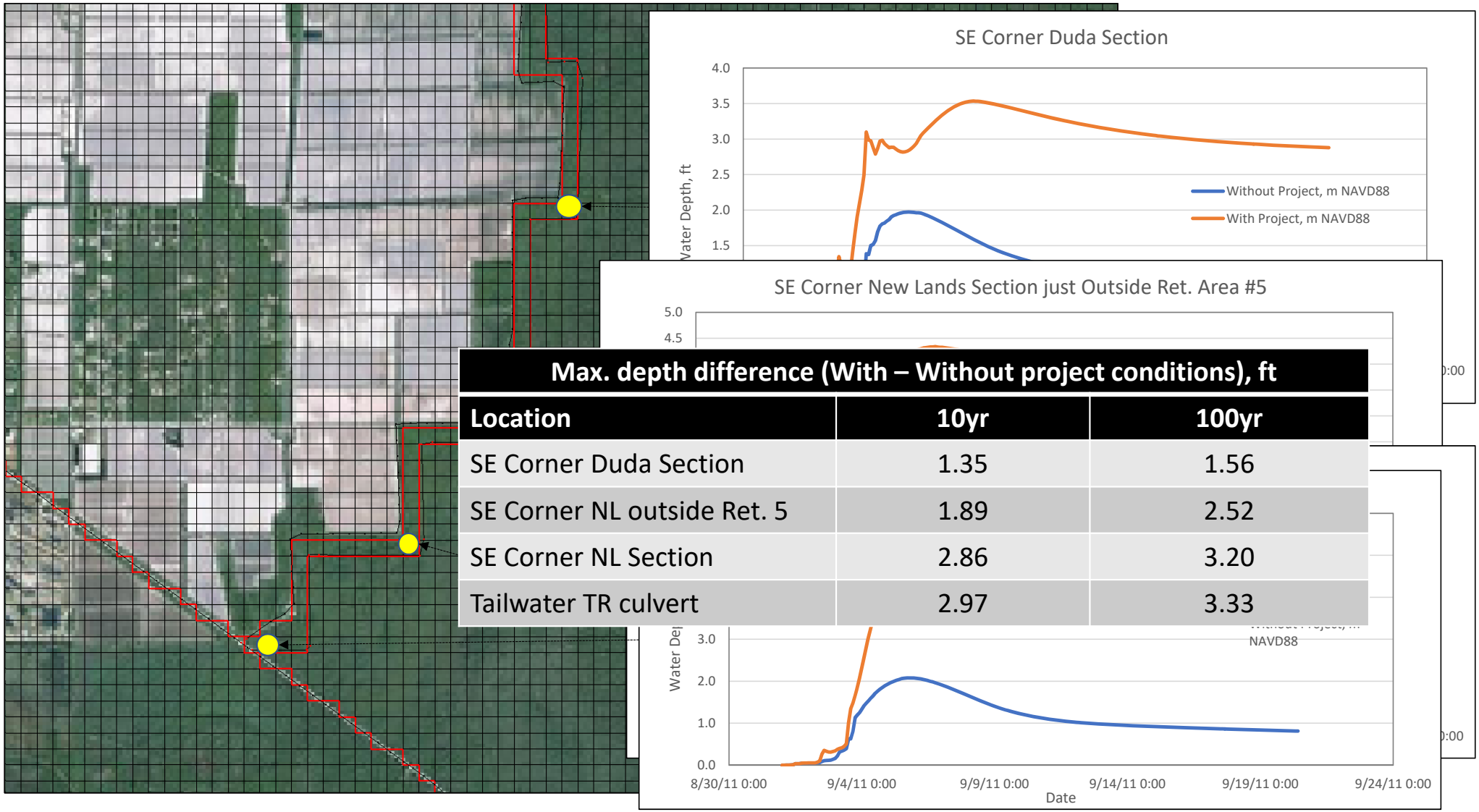




Stage Hydrographs inter-levee cells: 10yr

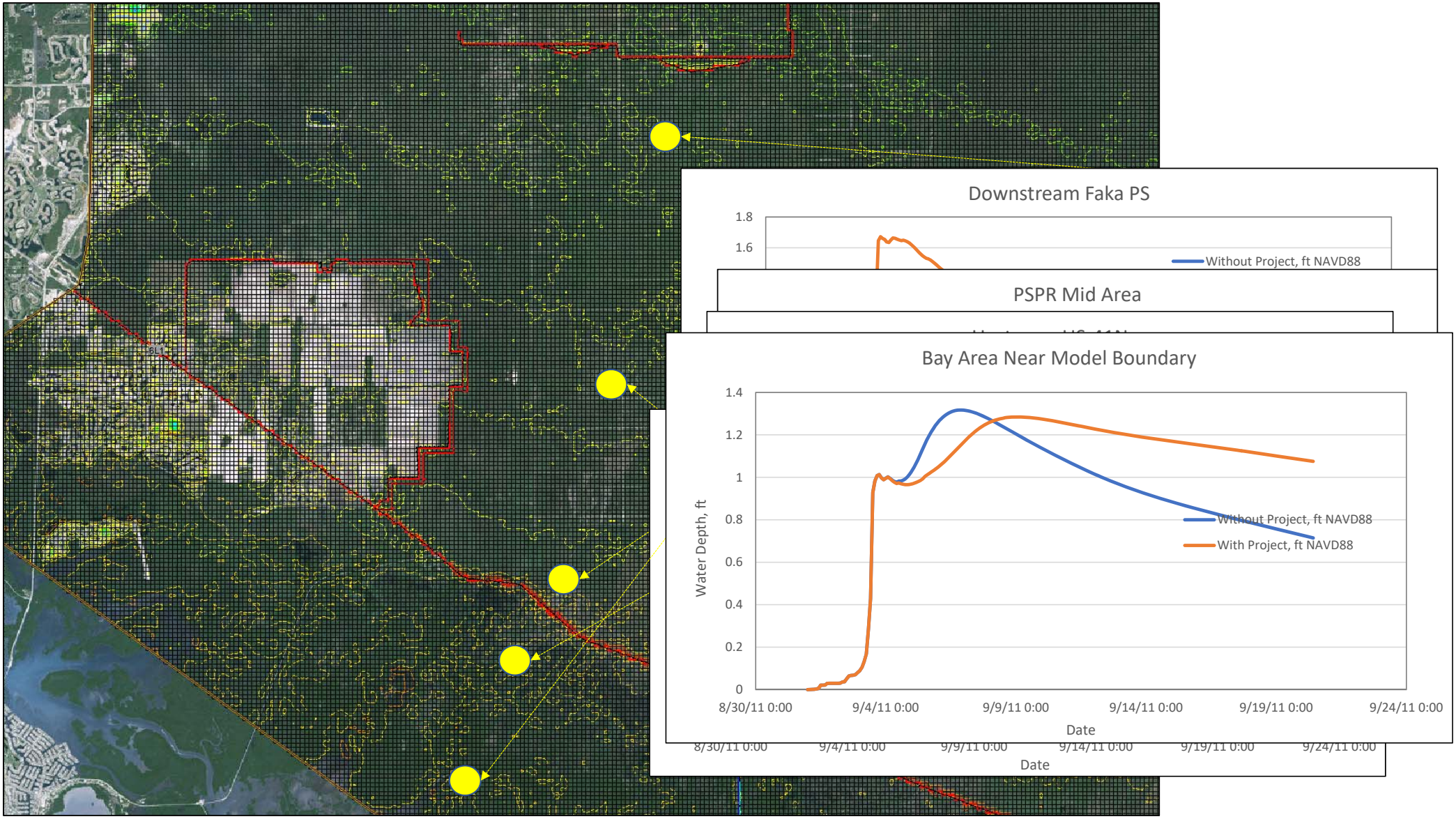
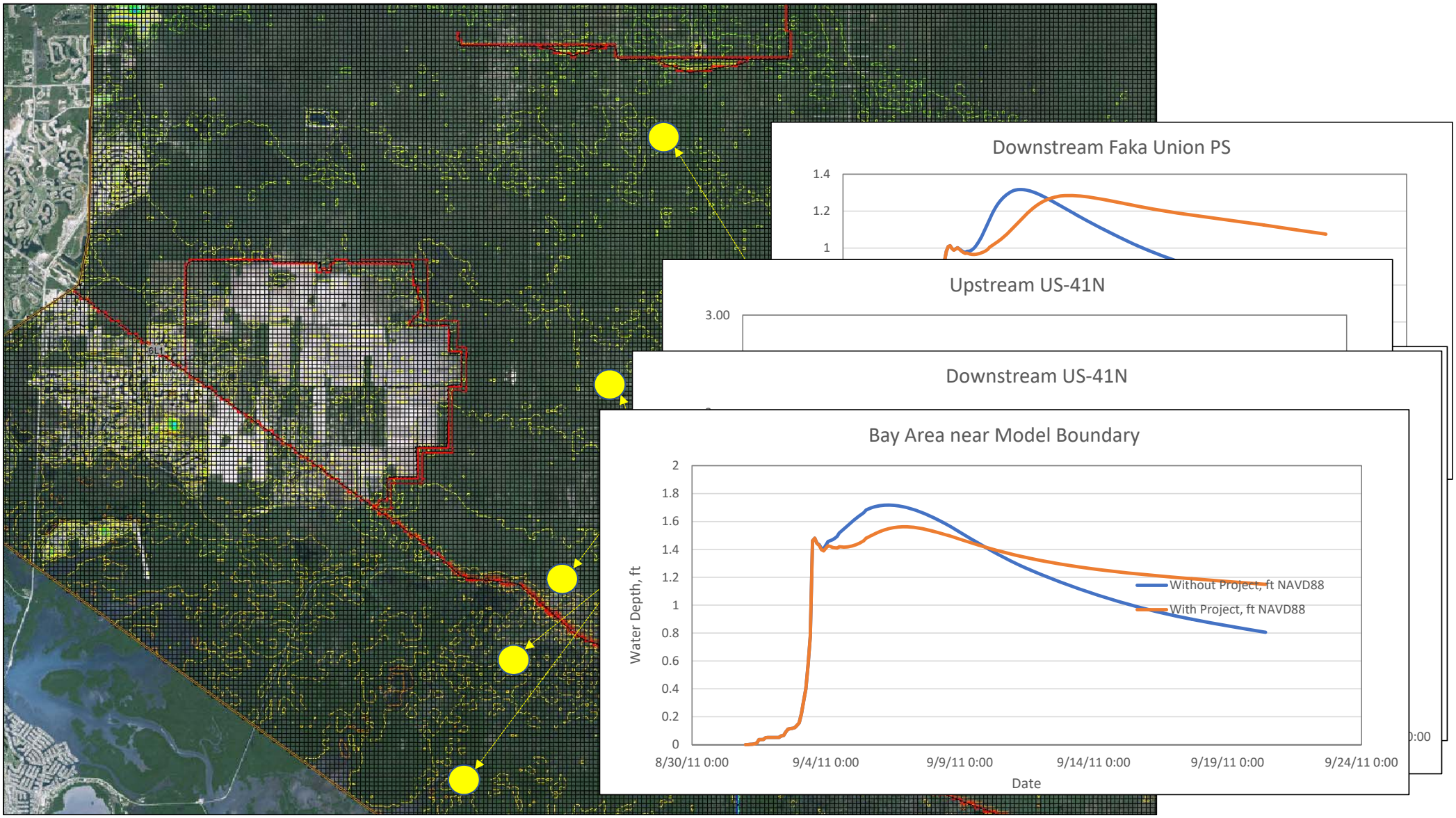


Stage Hydrographs inter-levee cells: 100yr



Max. depth difference (With – Without project conditions), ft		
Location	**10yr**	**100yr**
SE Corner Duda Section	1.35	1.56
SE Corner NL outside Ret. 5	1.89	2.52
SE Corner NL Section	2.86	3.20
Tailwater TR culvert	2.97	3.33

Longitudinal Transect Hydrographs: 10yr



Longitudinal Transect Hydrographs: 100yr