

Dade MODBRANCH Model

&

Pennsuco-Dade-Monroe (PDM)
MODBRANCH Model

September 2005

Bob Evans

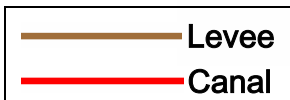
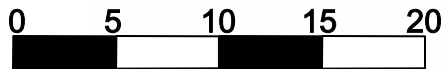
USACE Jacksonville District

Pennsuco-Dade-Monroe
(PDM) MODBRANCH
grid boundaries

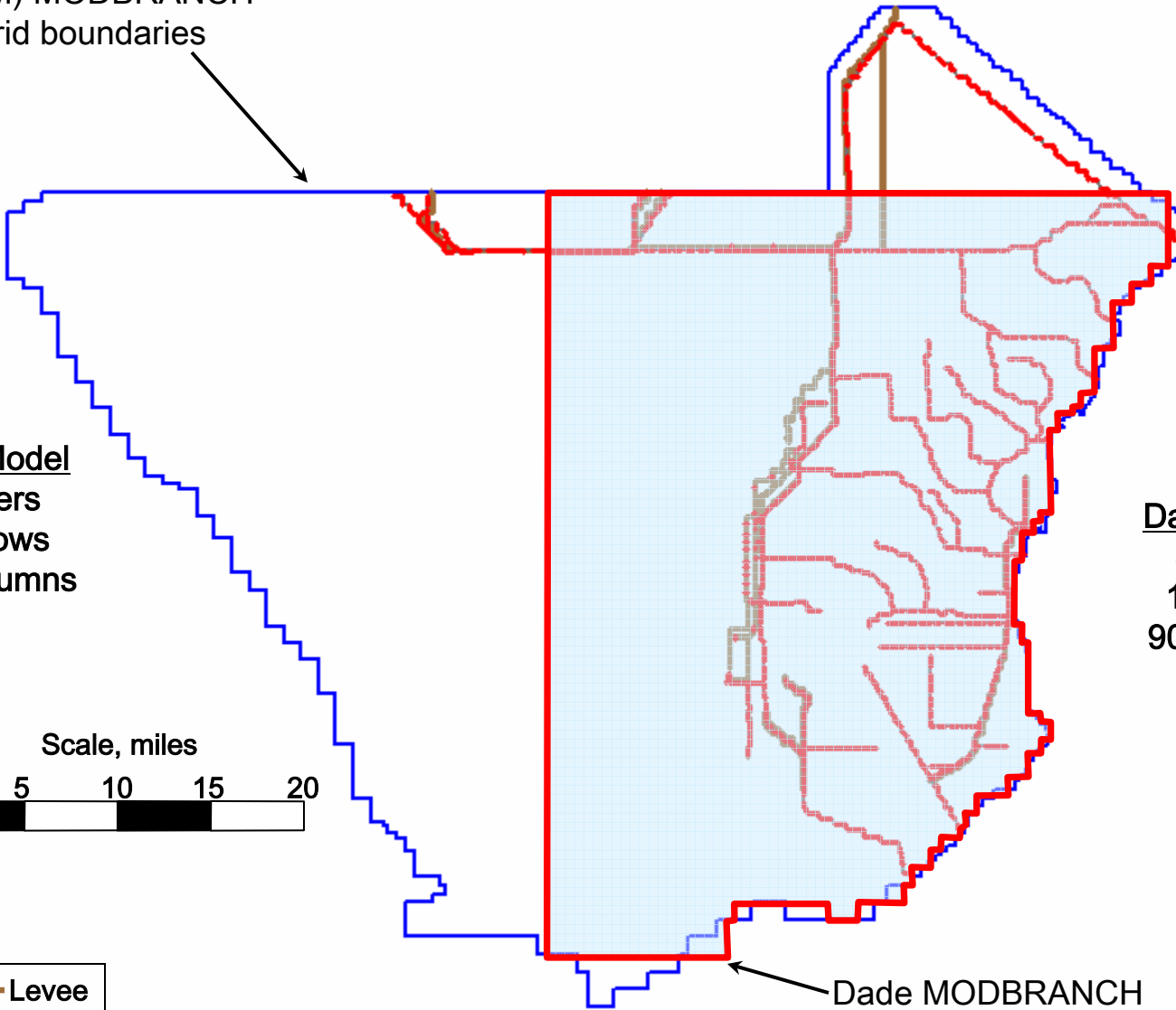
PDM Model
5 layers
239 rows
259 columns

Dade Model
3 layers
103 rows
90 columns

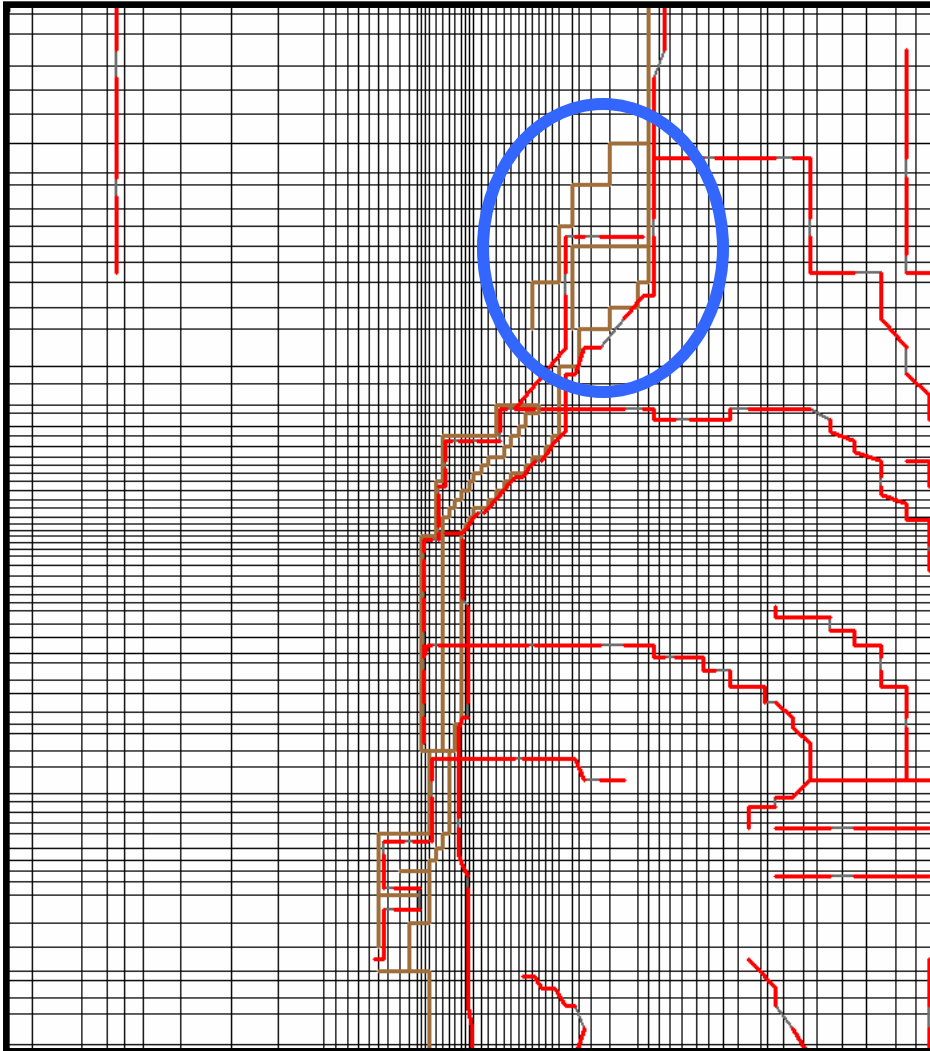
Scale, miles



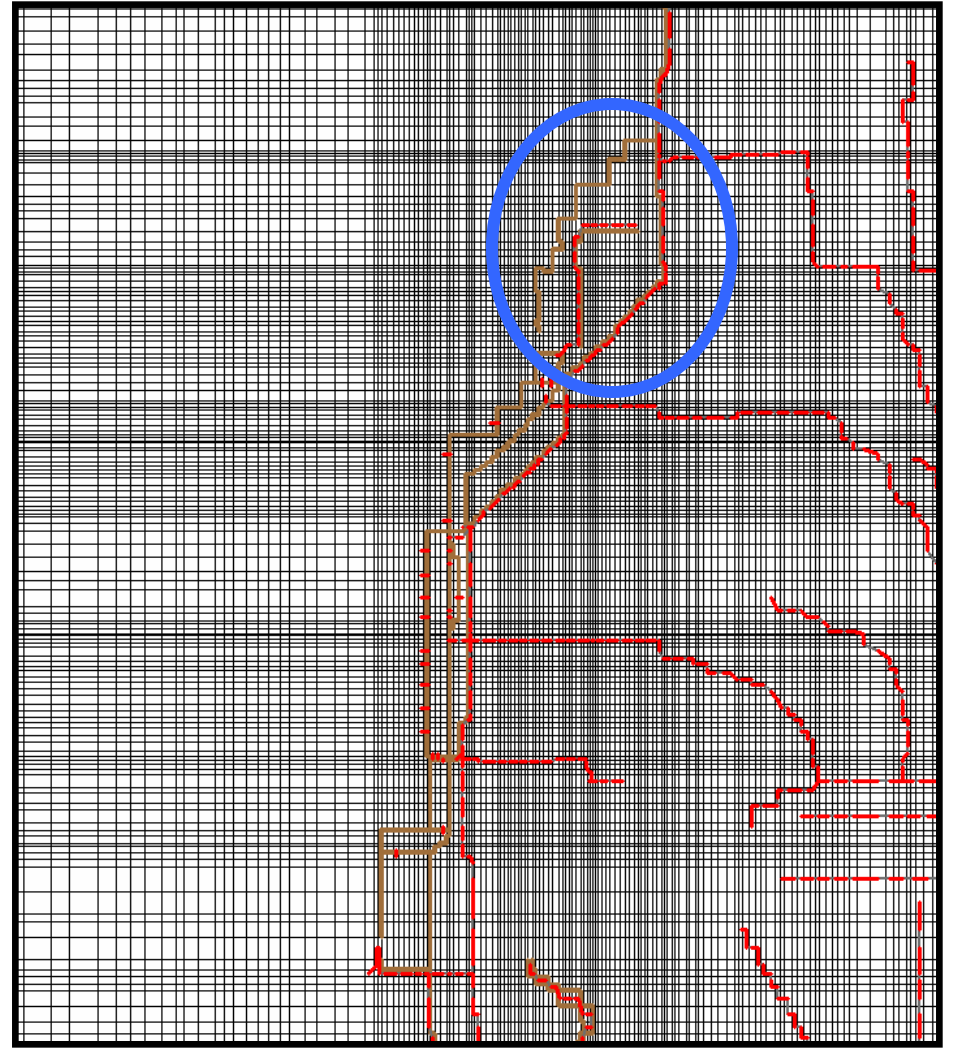
Dade MODBRANCH
grid boundaries



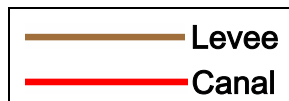
Grid differences between the Dade MODBRANCH model and the PDM MODBRANCH model.



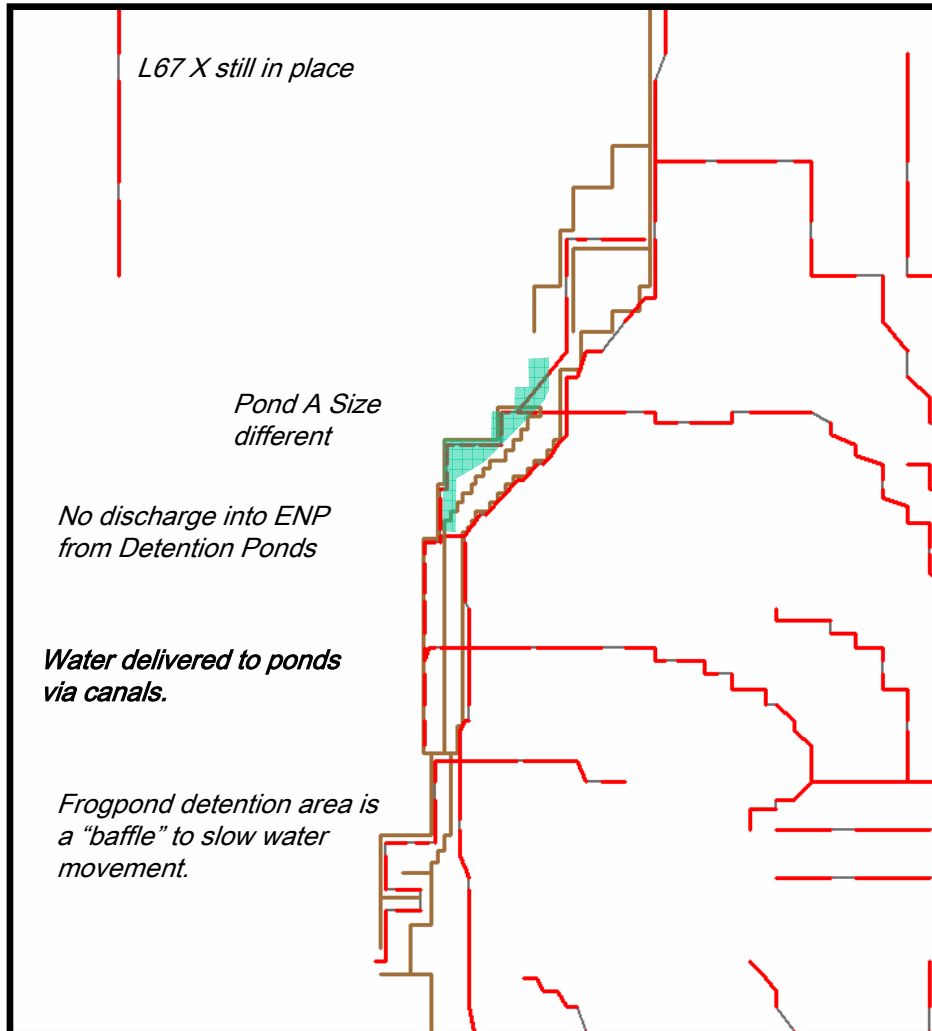
Original Dade Model



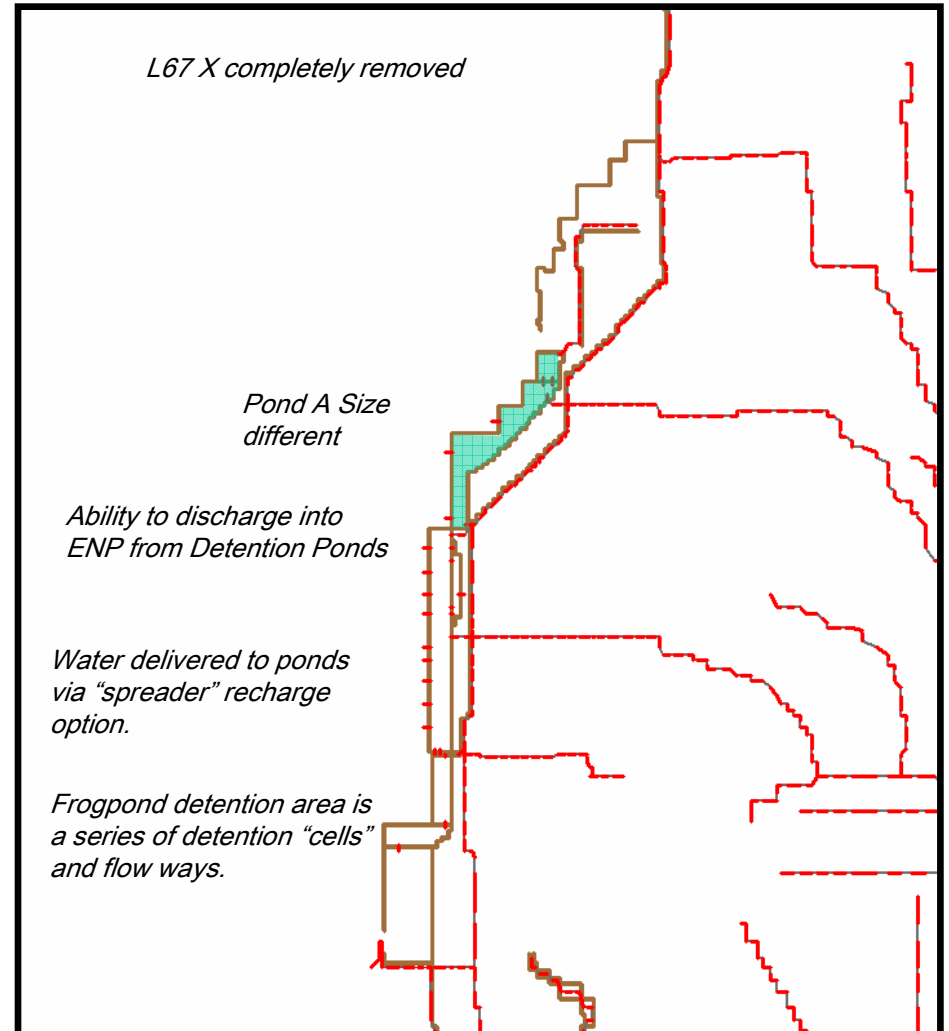
CSOP Plan 6D



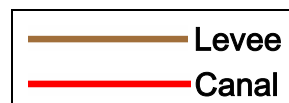
Geometry differences between the 8.5 SMA GRR Plan 6D and the CSOP Plan 6D



GRR 8.5 SMA plan 6D



CSOP Plan 6D



Schematic of the Authorized 8.5SMA Plan 6D

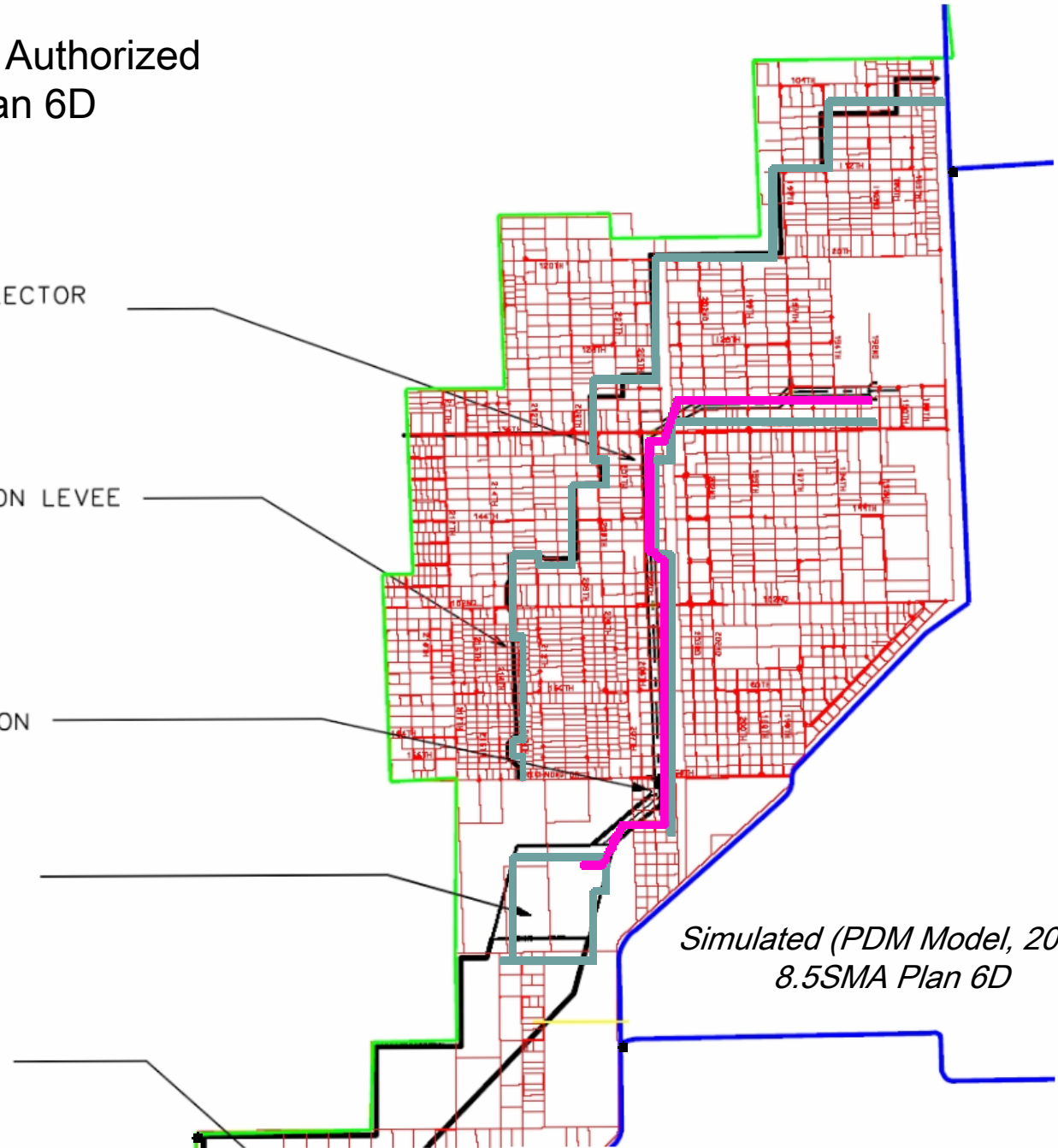
SEEPAGE AND COLLECTOR
CANAL

8.5 SMA PROTECTION LEVEE

S-357 PUMP STATION

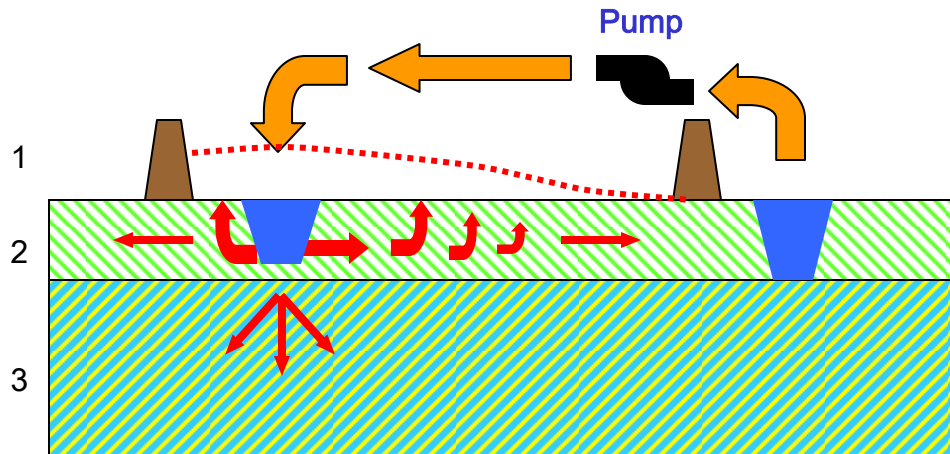
8.5 SMA STORM
WATER TREATMENT
AREA

S-332 A
Detention Area



*Simulated (PDM Model, 2005)
8.5SMA Plan 6D*

Differences between the Dade and the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Discharge into Detention Ponds*)

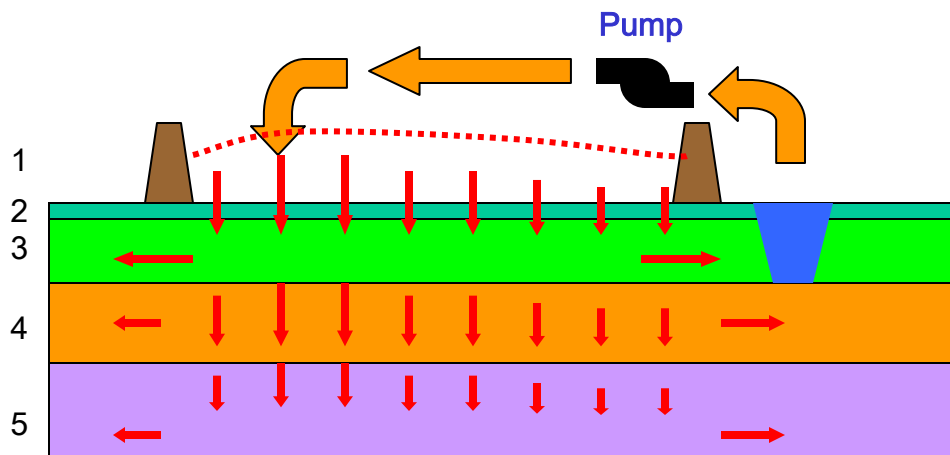


Dade MODBRANCH Model

Water pumped into Detention Pond via a “seepage” canal.

Water must percolate through layer 2 and up to fill the pond.

Stage variation within the pond is determined by the locations of the seepage canal.



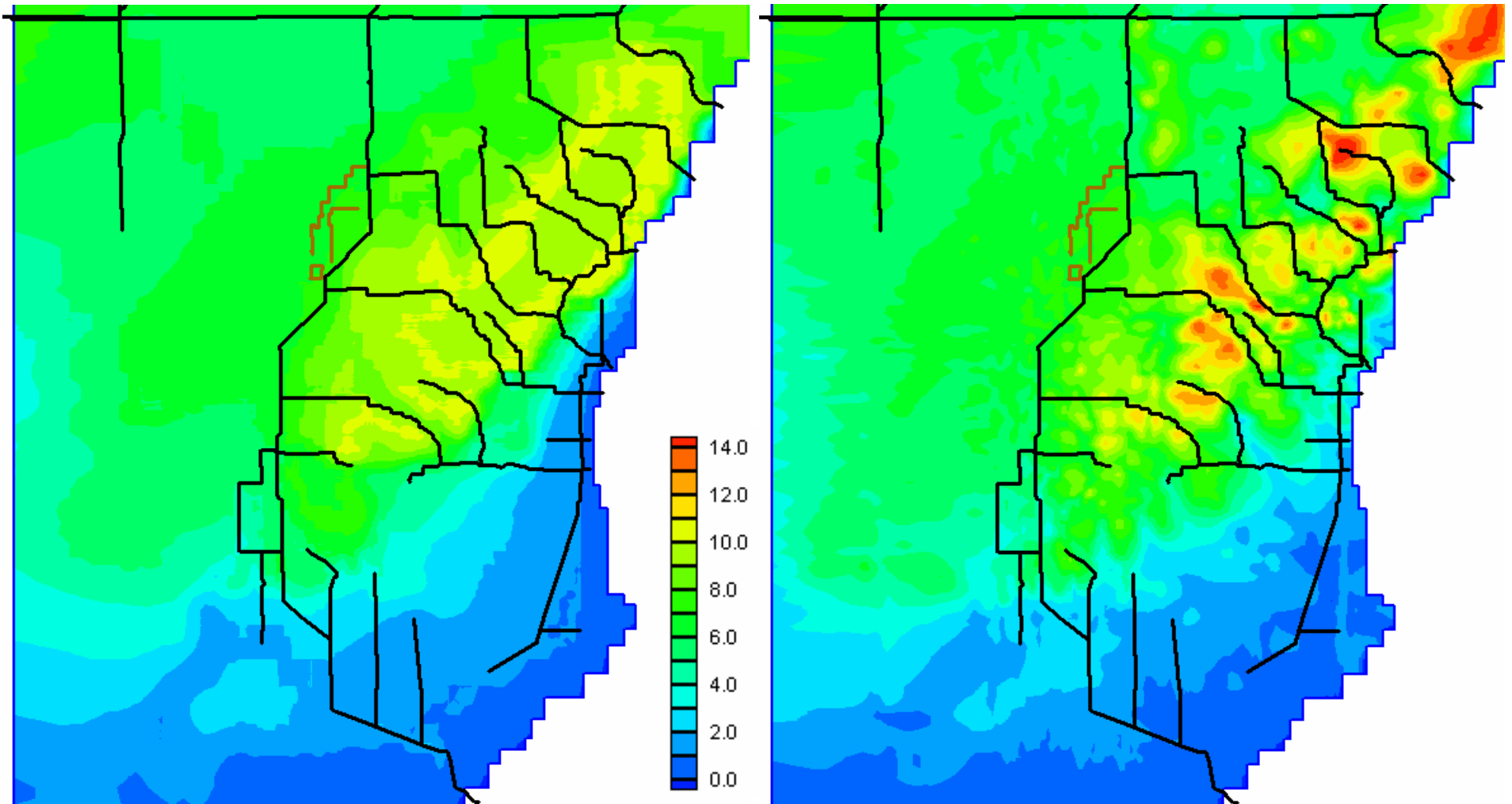
PDM MODBRANCH Model

Water pumped into Detention pond is distributed over a specified area.

Water starts in the uppermost “wet” cell and moves laterally and downward.

Water level in the pond can be more “natural” based on the size and location of the area upon which the water is discharged.

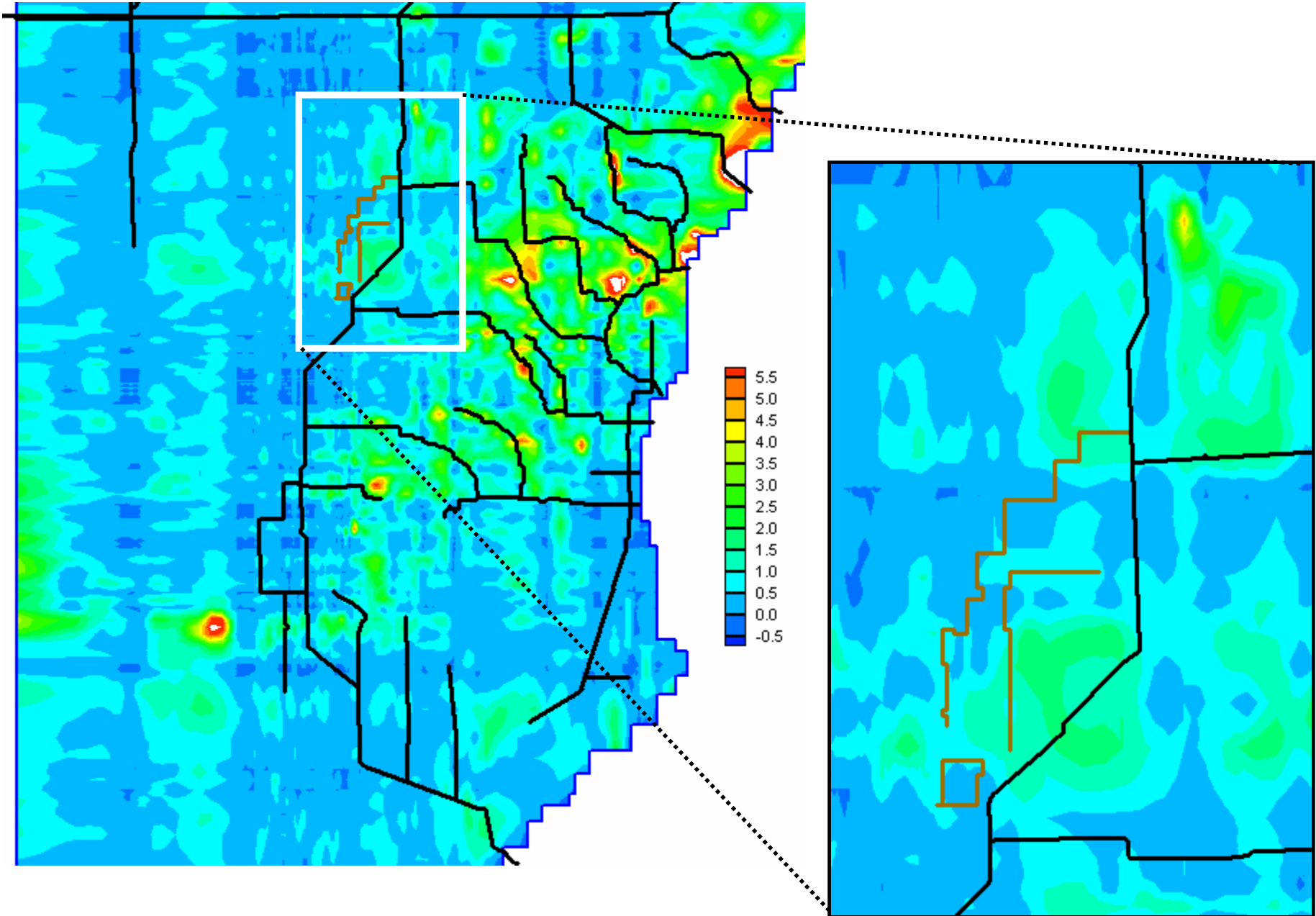
Differences between the Dade and the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models
(*Topography*)



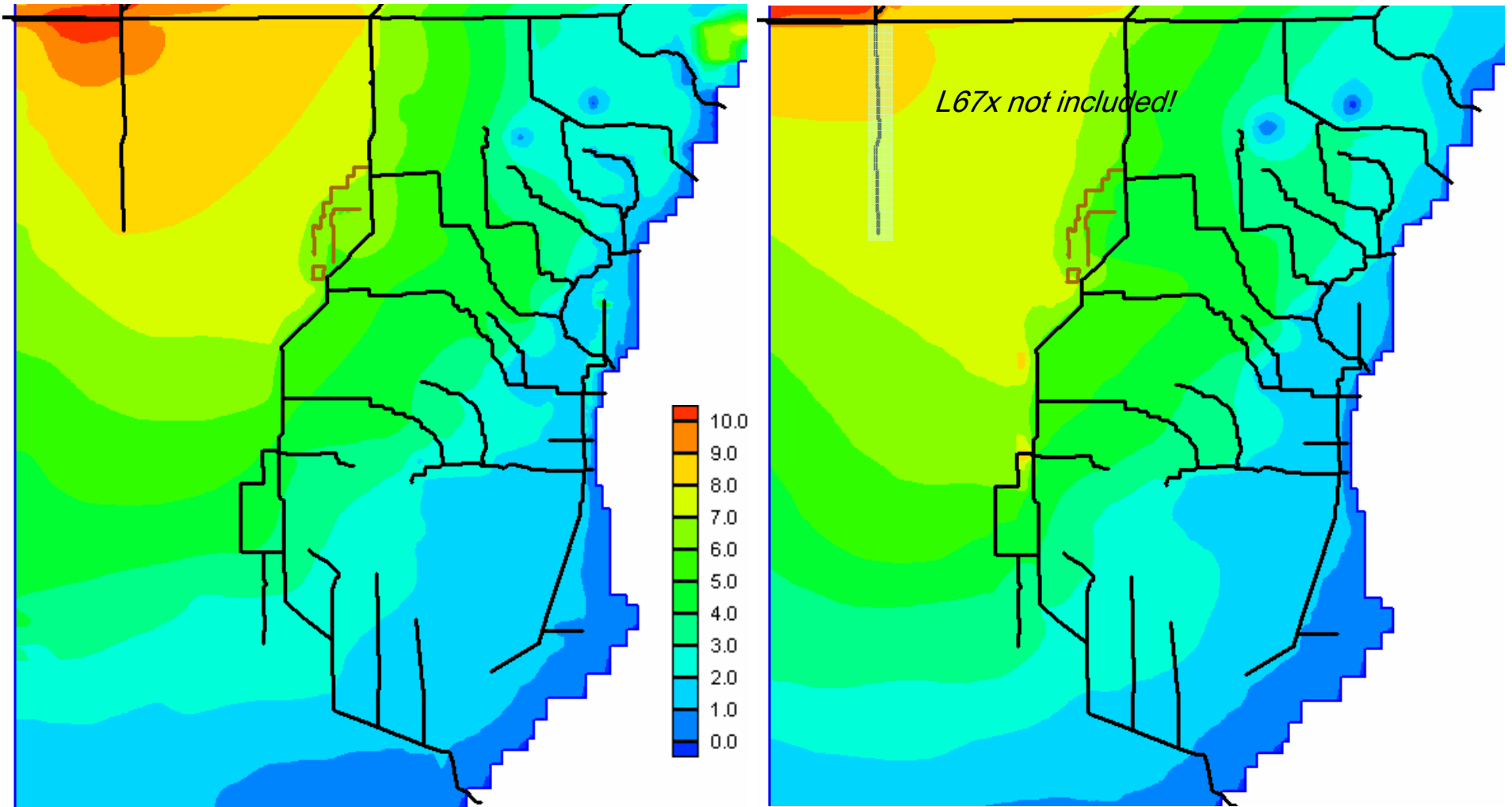
Dade ground elevations

PDM ground elevations averaged within Dade cell

PDM Ground Elevation Range (maximum – minimum) within Dade Model Cells



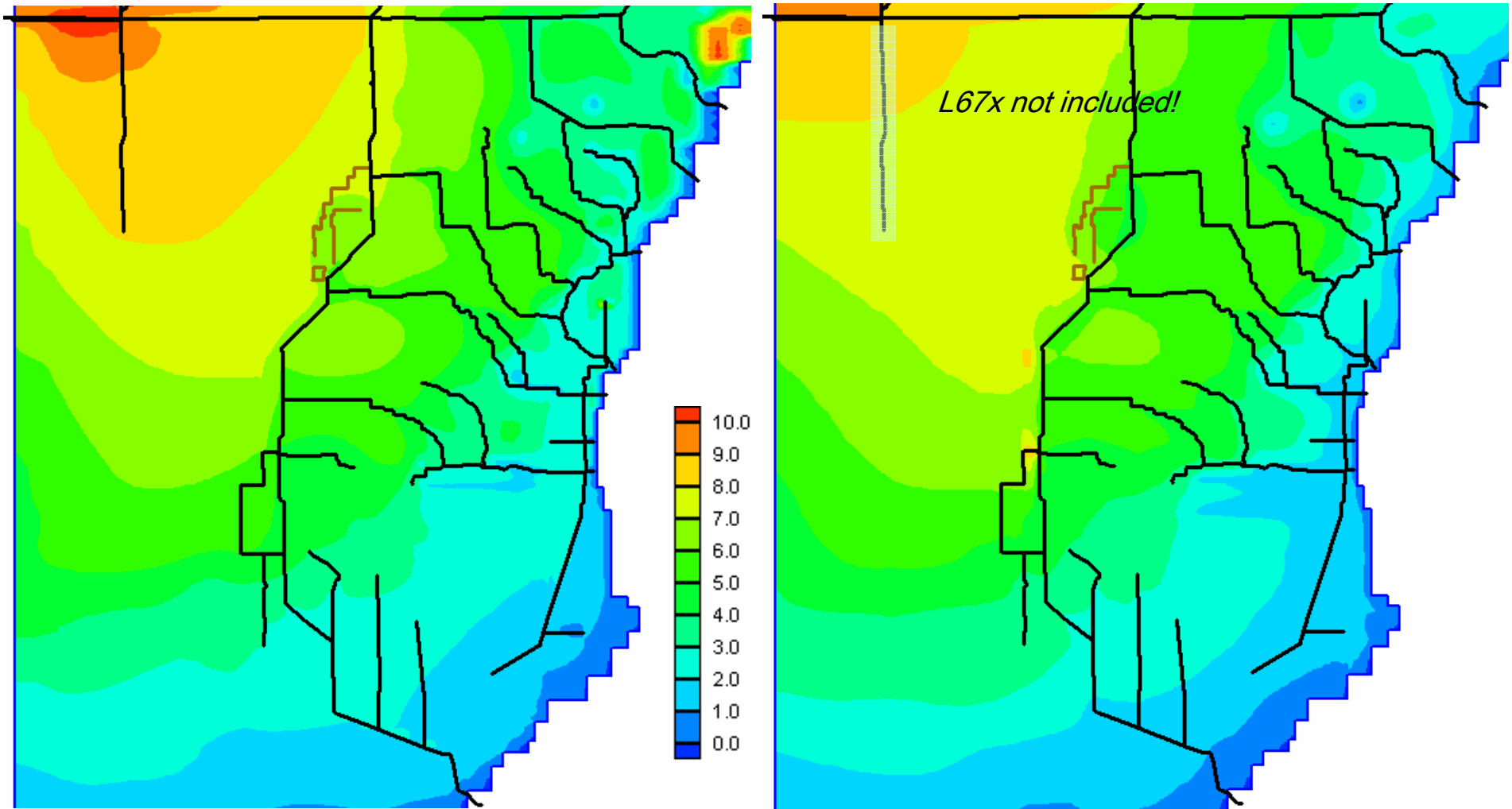
Differences between the Dade and the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models
(Dry Season Average Stage (1 November – 31 May))



Dade Plan 6D

PDM Plan 6D

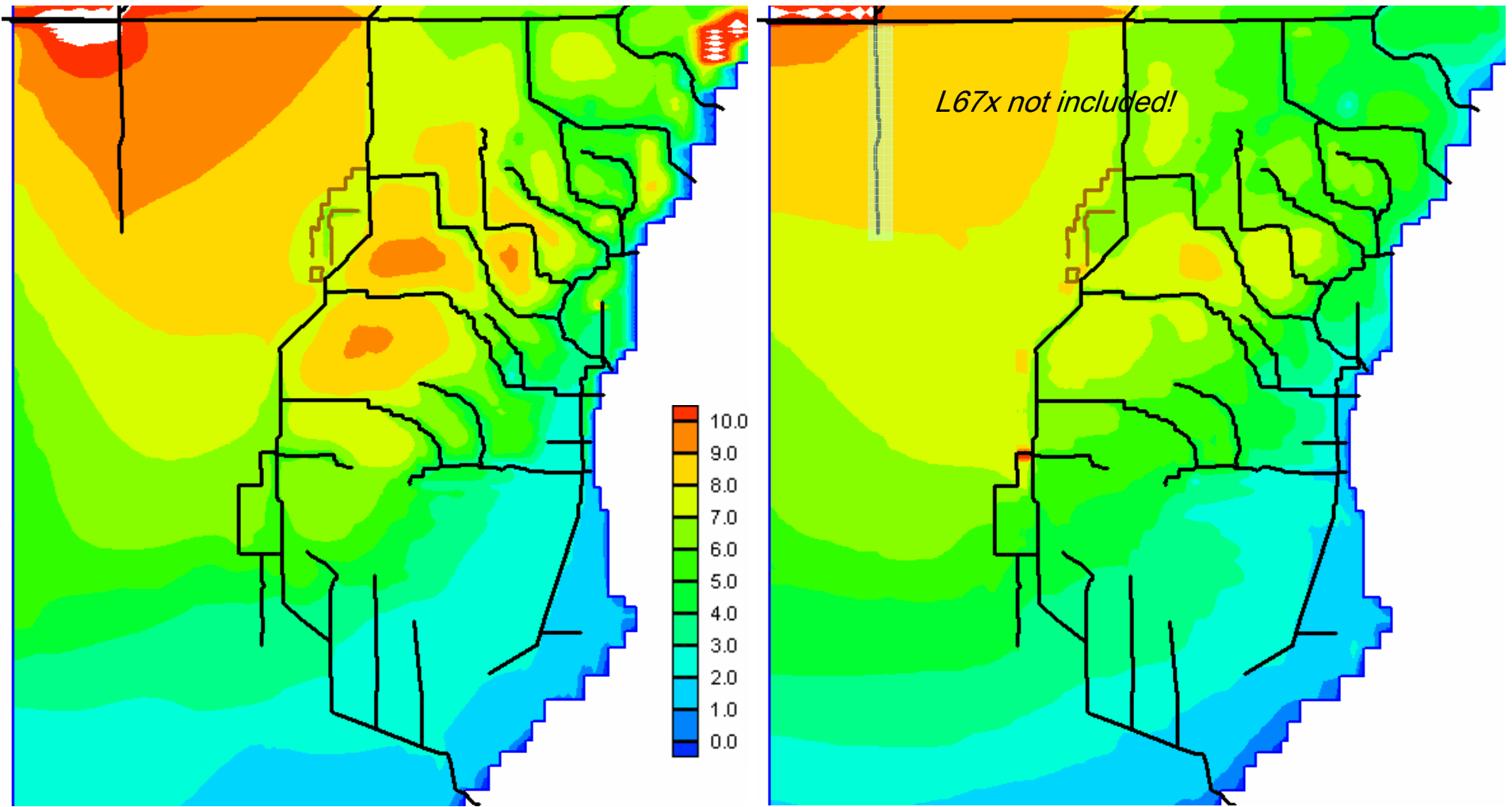
Differences between the Dade and the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models
(Wet Season Average Stage (1 June – 31 October))



Dade Plan 6D

PDM Plan 6D

Differences between the Dade and the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models
(*Peak Stage*)



Dade Plan 6D

PDM Plan 6D

Important Points

- 1 - 8.5SMAp6D originally distributed water into the detention ponds via seepage canals. The new PDM model puts water into the detention ponds via the recharge mechanism (i.e., dumping water into the ponds). This option was not available when the 8.5SMA study was done (2000).
- 2 – The Dade model has a coarser grid. The new PDM model has a finer grid resolution that allows the model canals and levees to be more accurately positioned relative to prototype scales.
- 3 – The topography of the Dade MODBRANCH model is different from the PDM MODBRANCH model. Both were based on the best data available at the time.
- 4 – The geological parameters of the Dade MODBRANCH model are different from the PDM MODBRANCH model.
- 5 – The Dade model used boundary conditions extracted from the SFWMM2x2 v3. The CSOP Planning conditions are simulated using boundary conditions extracted from SFWMM2x2 v5.
- 6 – The Dade model western boundary is much closer to the 8.5SMA than the PDM model western boundary.

Analysis of Water Depth in the 8.5 SMA GRR (2000)

The original study created “Inundation” charts for the various alternatives.

These charts used the Dade MODBRANCH model average weekly stage interpolated to a fine resolution mesh.

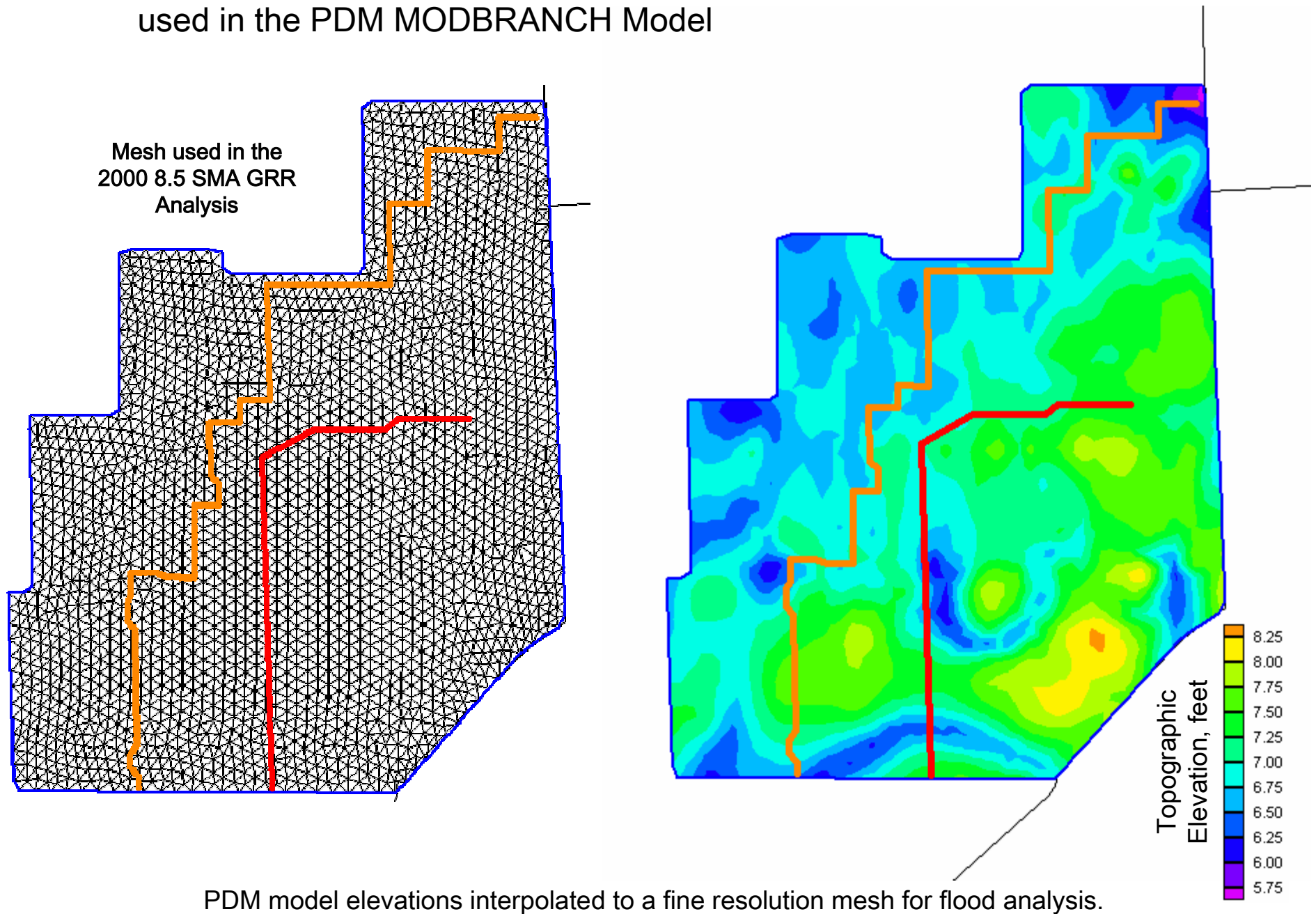
The fine resolution mesh used more recent topographic data (than the 2000 MODBRANCH model) in order to get a better estimate of what areas were likely to flood during high water periods.

The following slides use the same method to create “Inundation” charts based on the PDM MODBRANCH model stages.

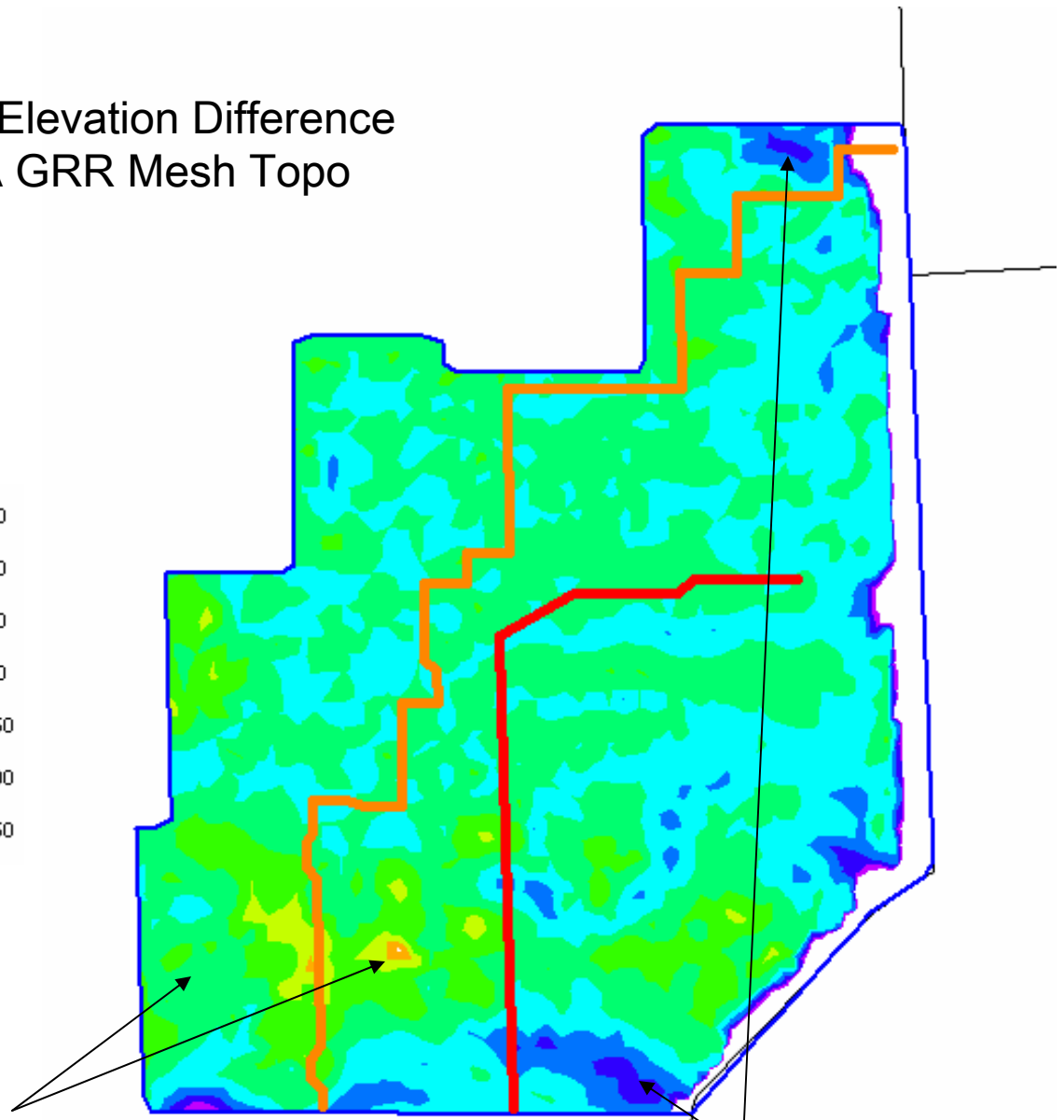
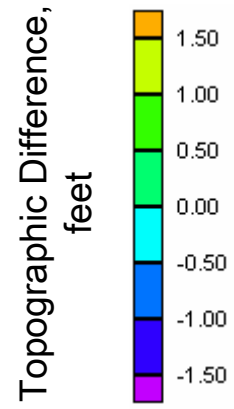
The values are the peak stages in 1995.

The topographic data is extracted from the PDM MODBRANCH model, interpolated to the fine resolution mesh used in the 2000 study.

Topographic Elevation (NGVD29) for the 8.5 SMA used in the PDM MODBRANCH Model



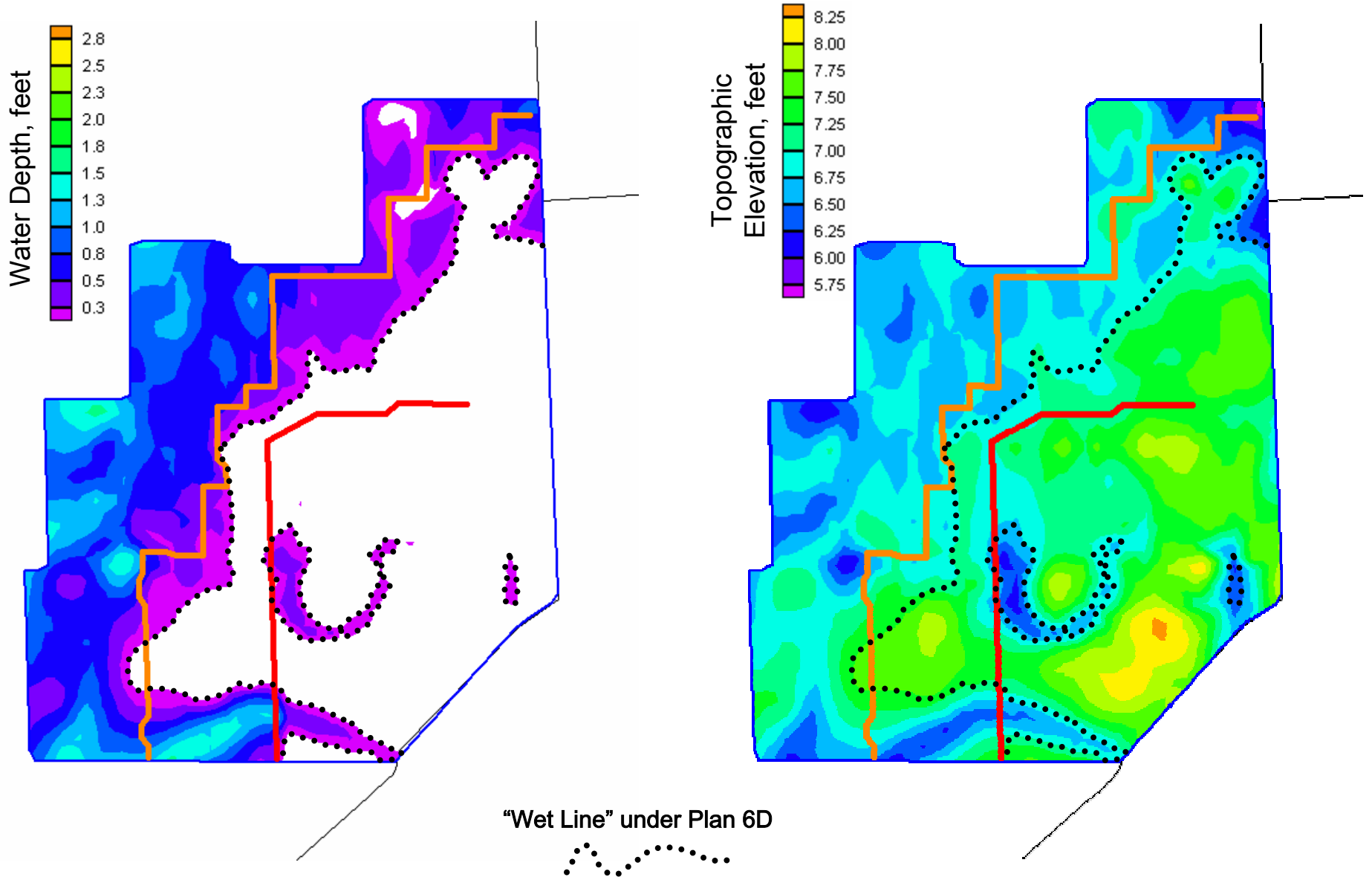
Topographic Elevation Difference PDM Topo – 8.5SMA GRR Mesh Topo



Green/Yellow/Orange areas indicate that topography of the PDM model is > Dade model

Blue/Purple areas indicate that topography of the PDM model is < Dade model

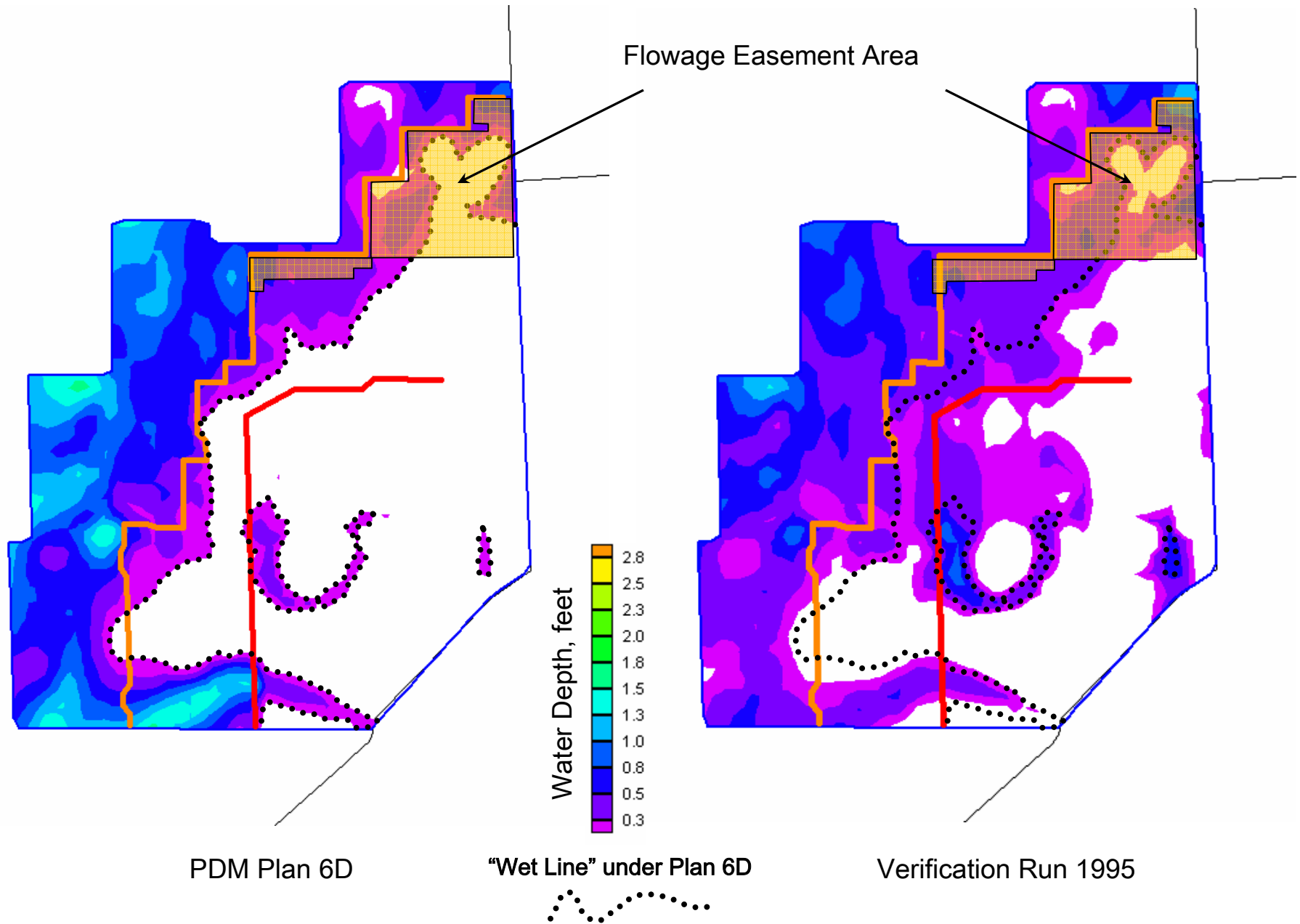
Topographic Elevation and Peak Stage



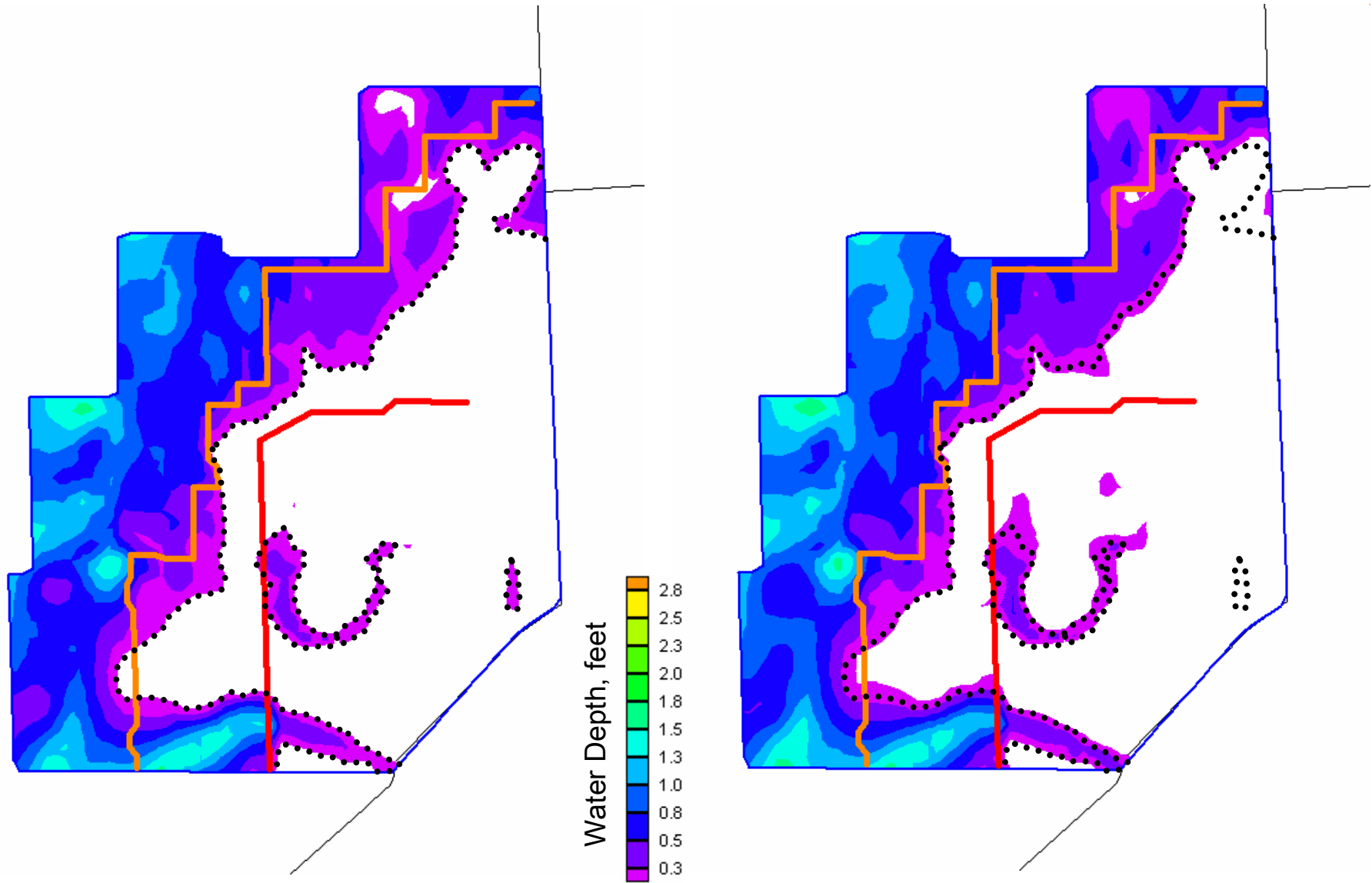
PDM Plan 6D
Peak Stage, 1995

PDM Topographic Elevations

Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



PDM Plan 6D

S356 starts pumping L31N > 5.75 ft (250cfs)
and reaches 500 cfs L31N > 6.5 ft

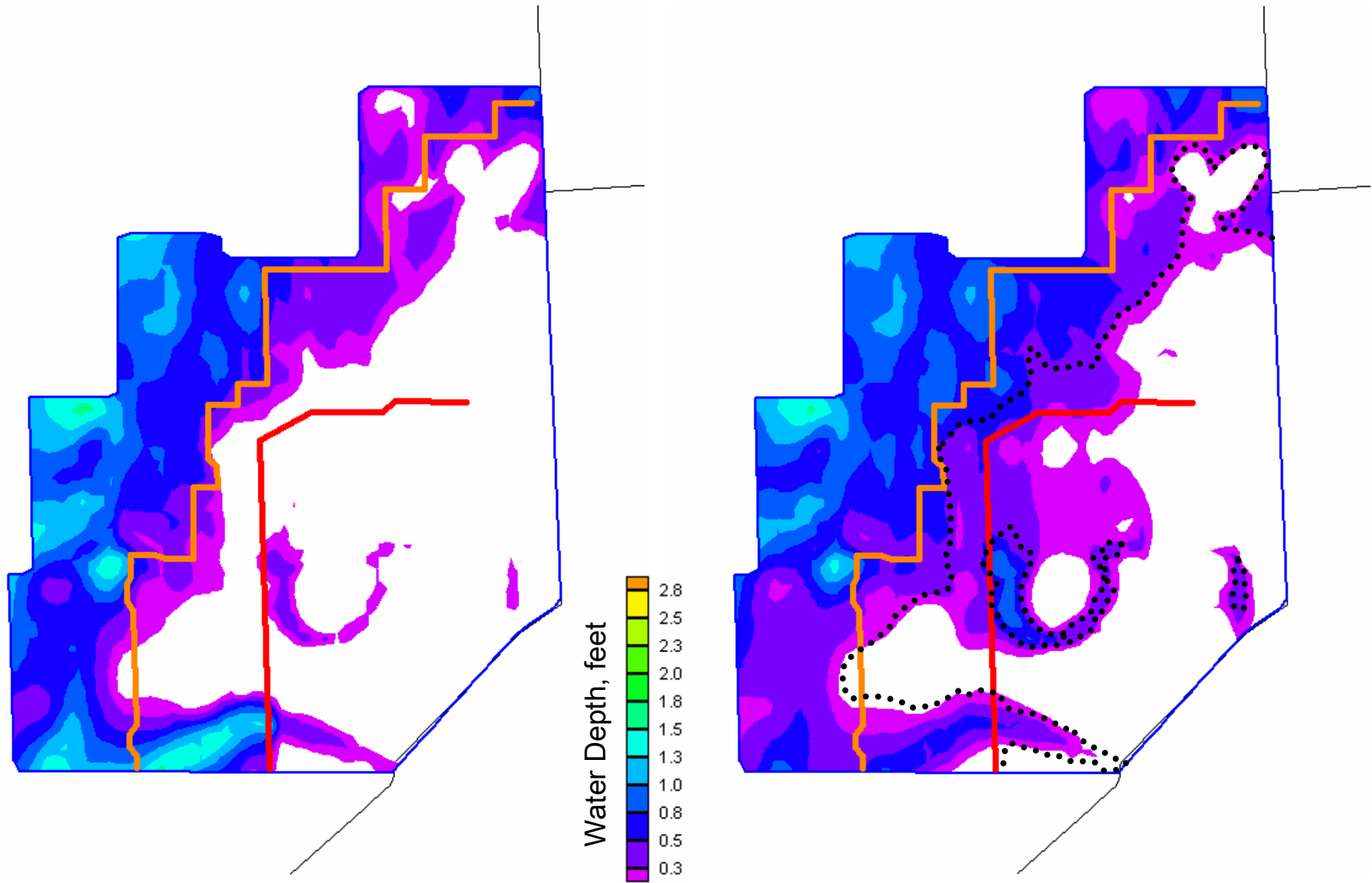
"Wet Line" under Plan 6D



No Action

S356 starts pumping L31N > 5.5 ft (125cfs)
and reaches 500 cfs L31N > 6.0 ft

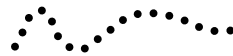
Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



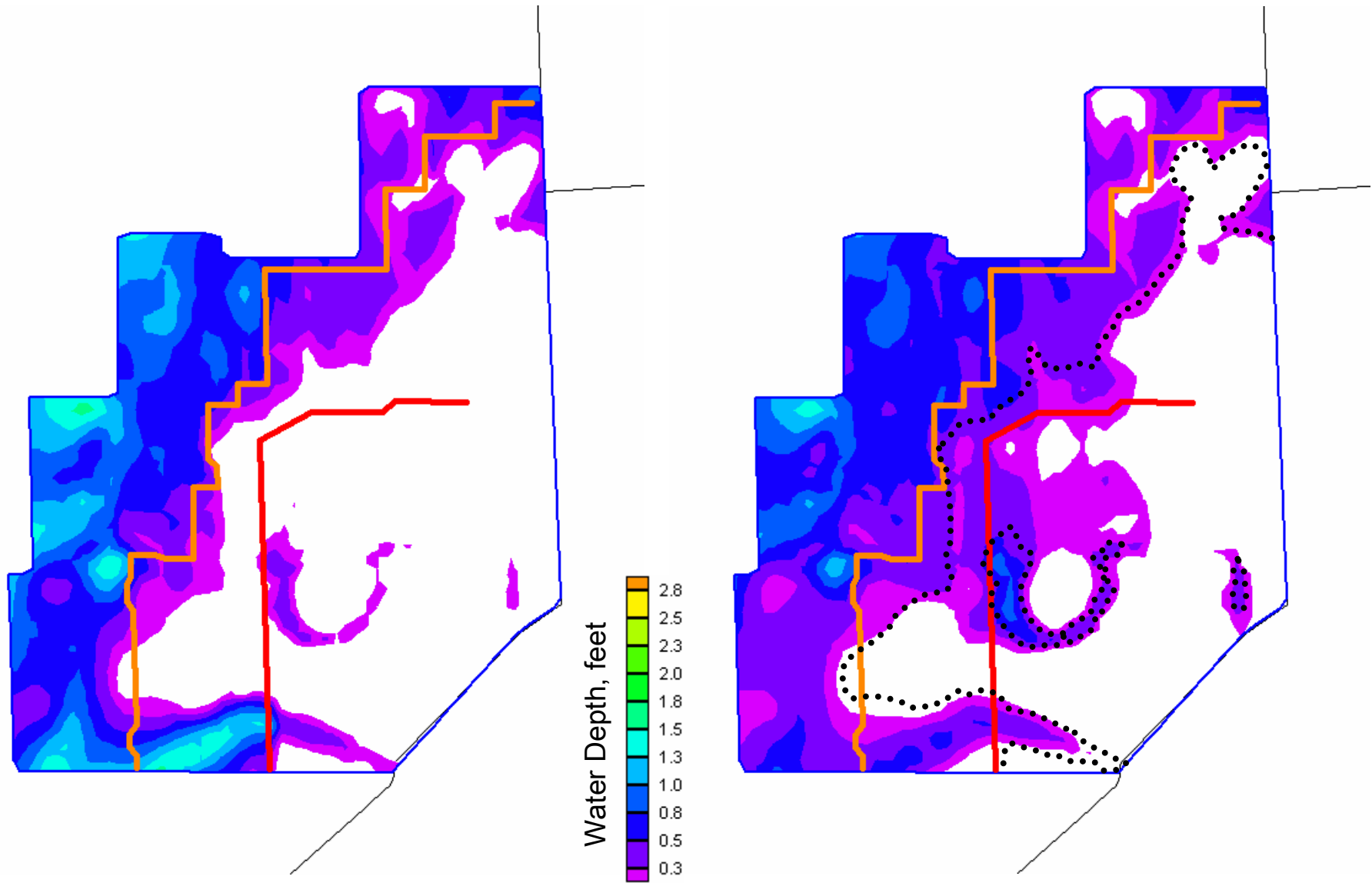
PDM Plan 6D

"Wet Line" under Plan 6D

Base83i



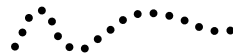
Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



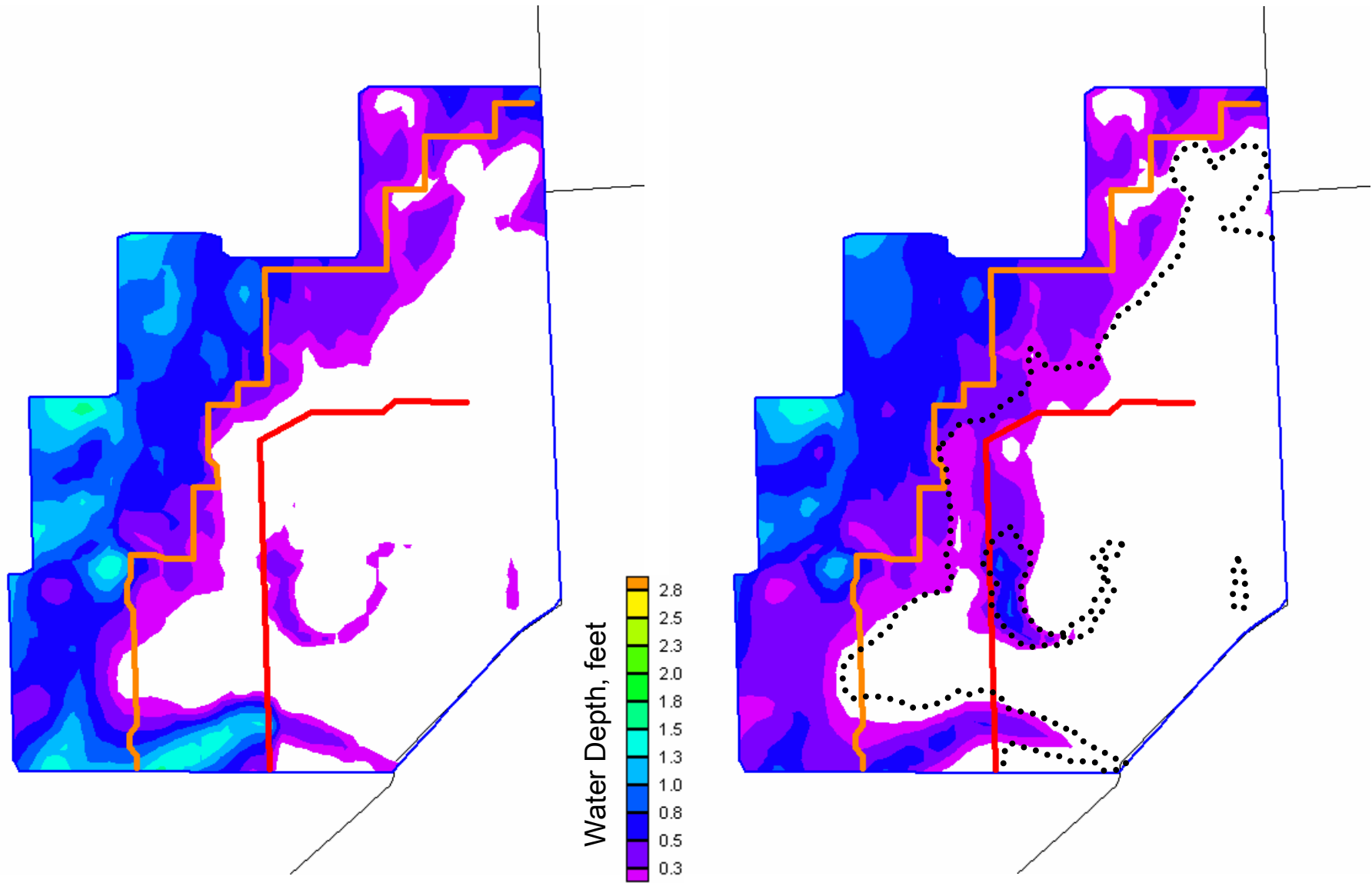
PDM Plan 6D

"Wet Line" under Plan 6D

CSOP Base



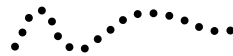
Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



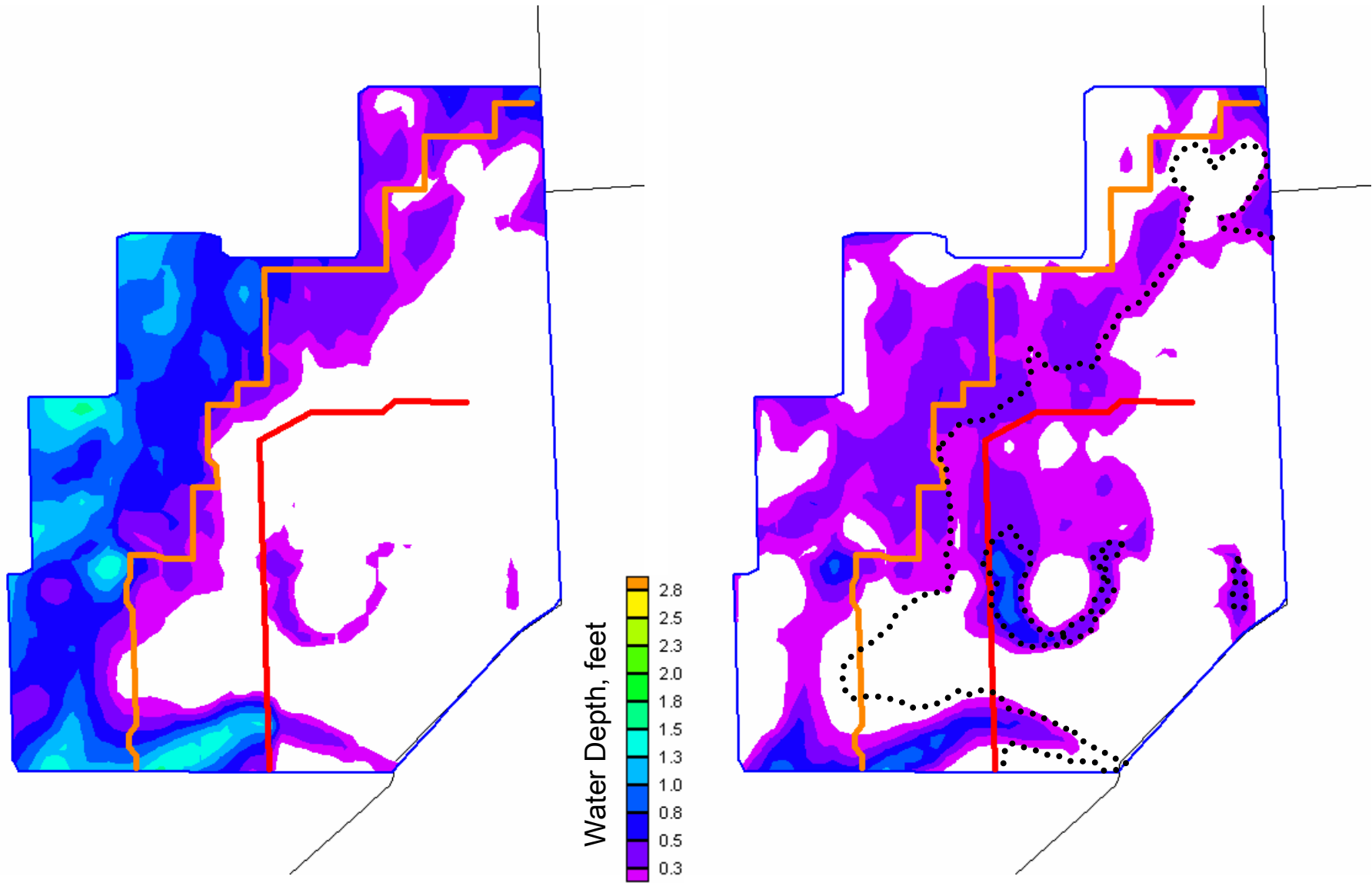
PDM Plan 6D

"Wet Line" under Plan 6D

Alt7R



Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



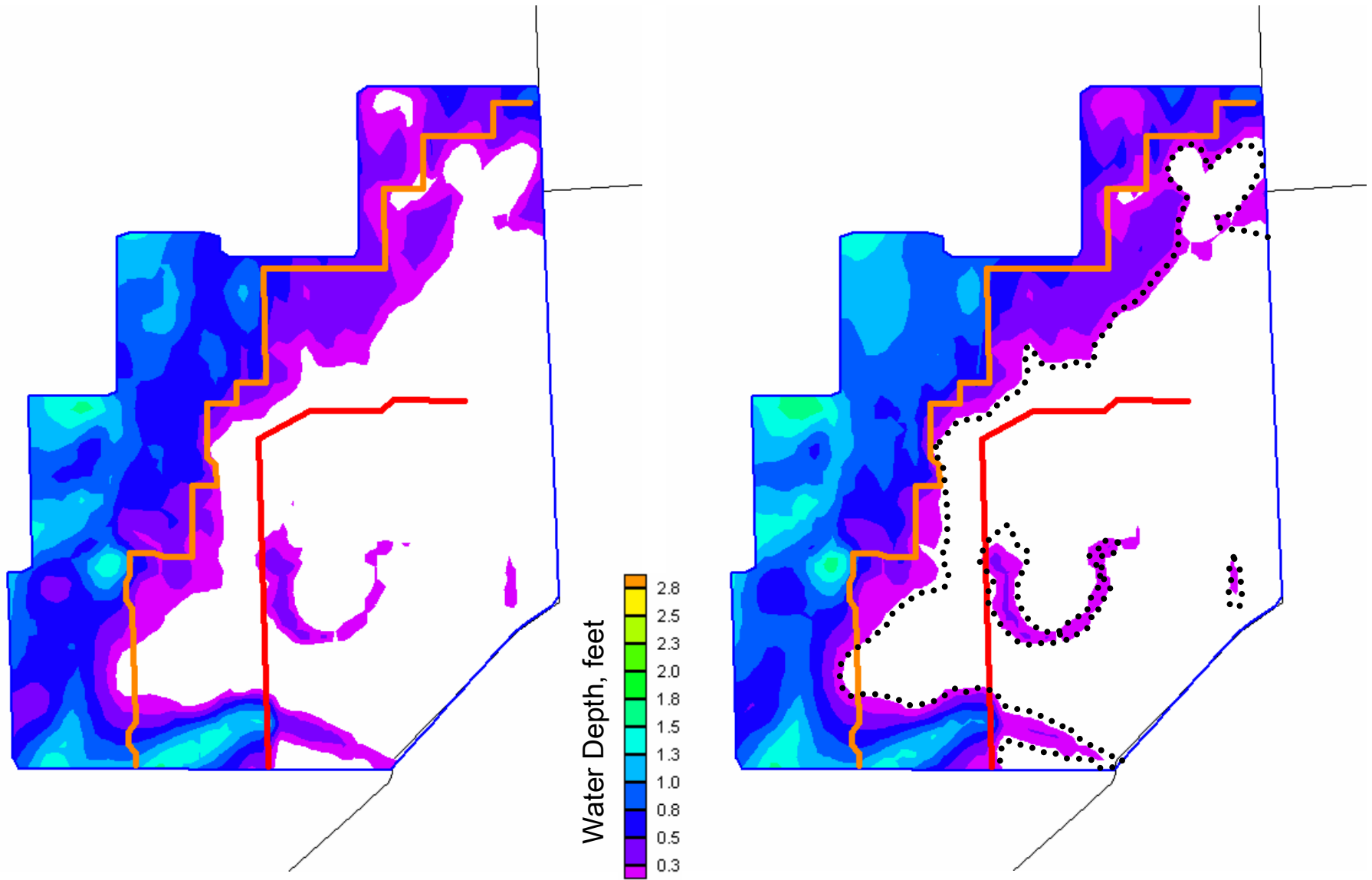
PDM Plan 6D

"Wet Line" under Plan 6D

1994 C111 GRR



Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



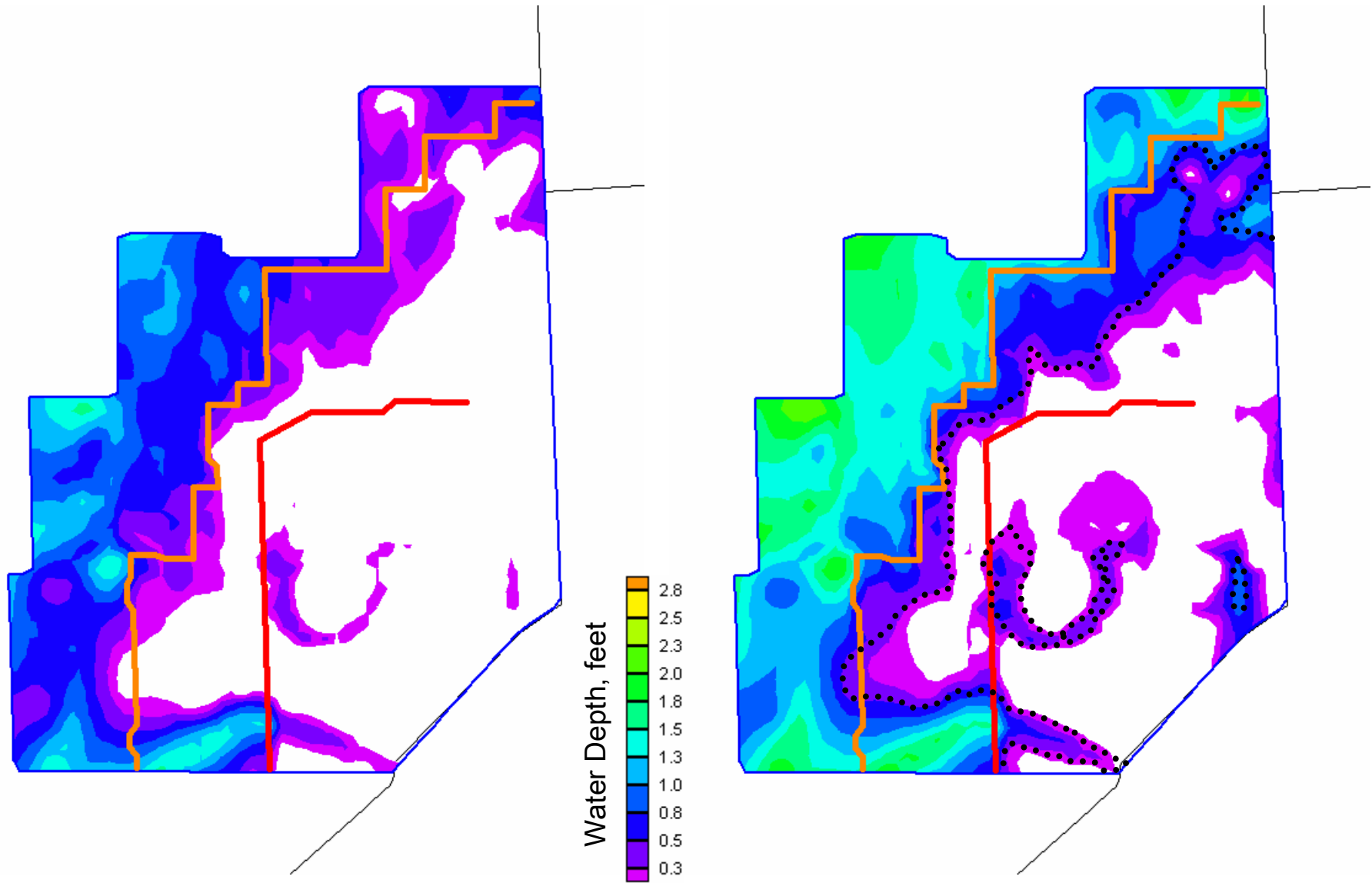
PDM Plan 6D

"Wet Line" under Plan 6D

East Bookend



Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



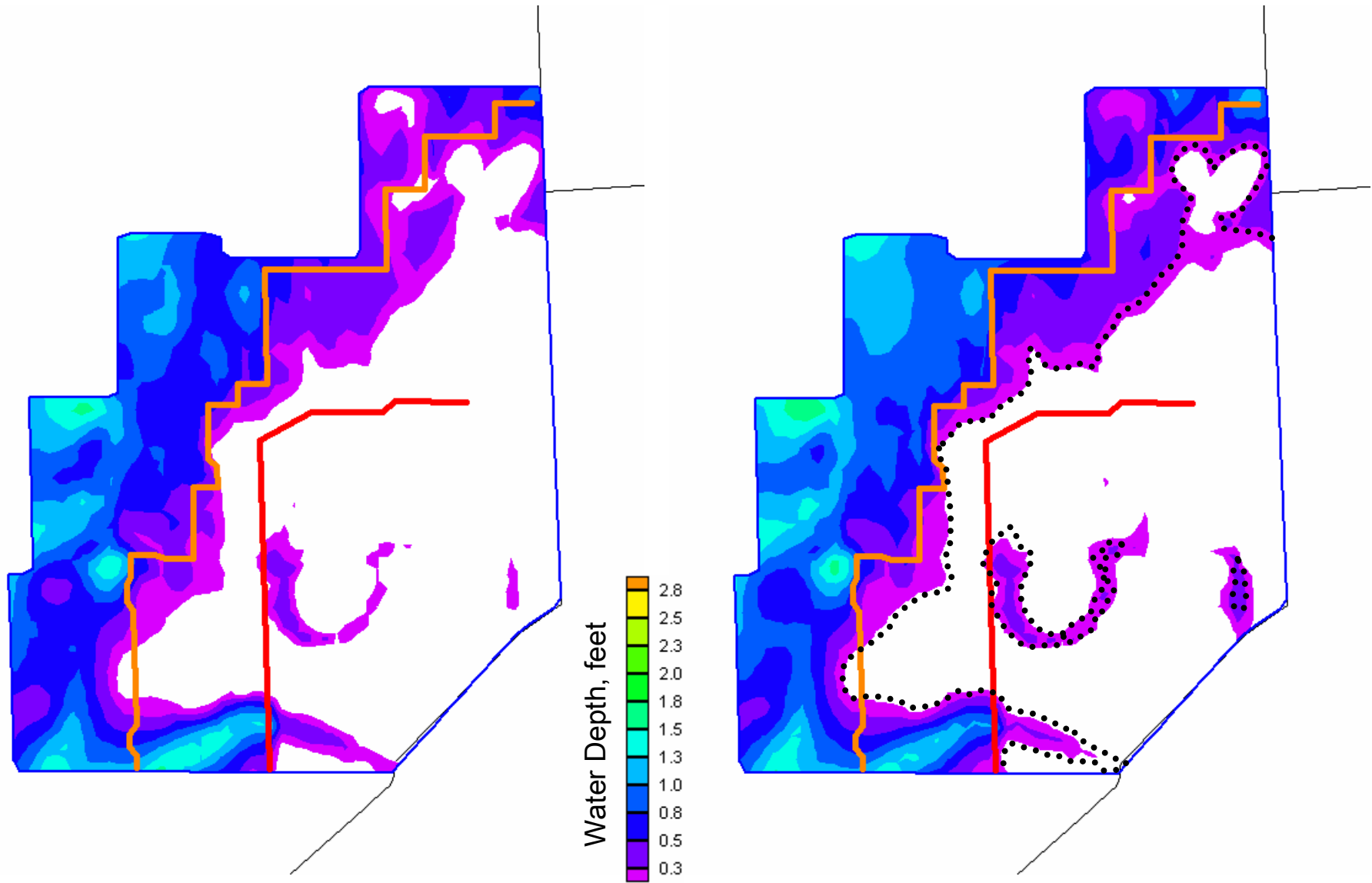
PDM Plan 6D

"Wet Line" under Plan 6D

West Bookend



Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



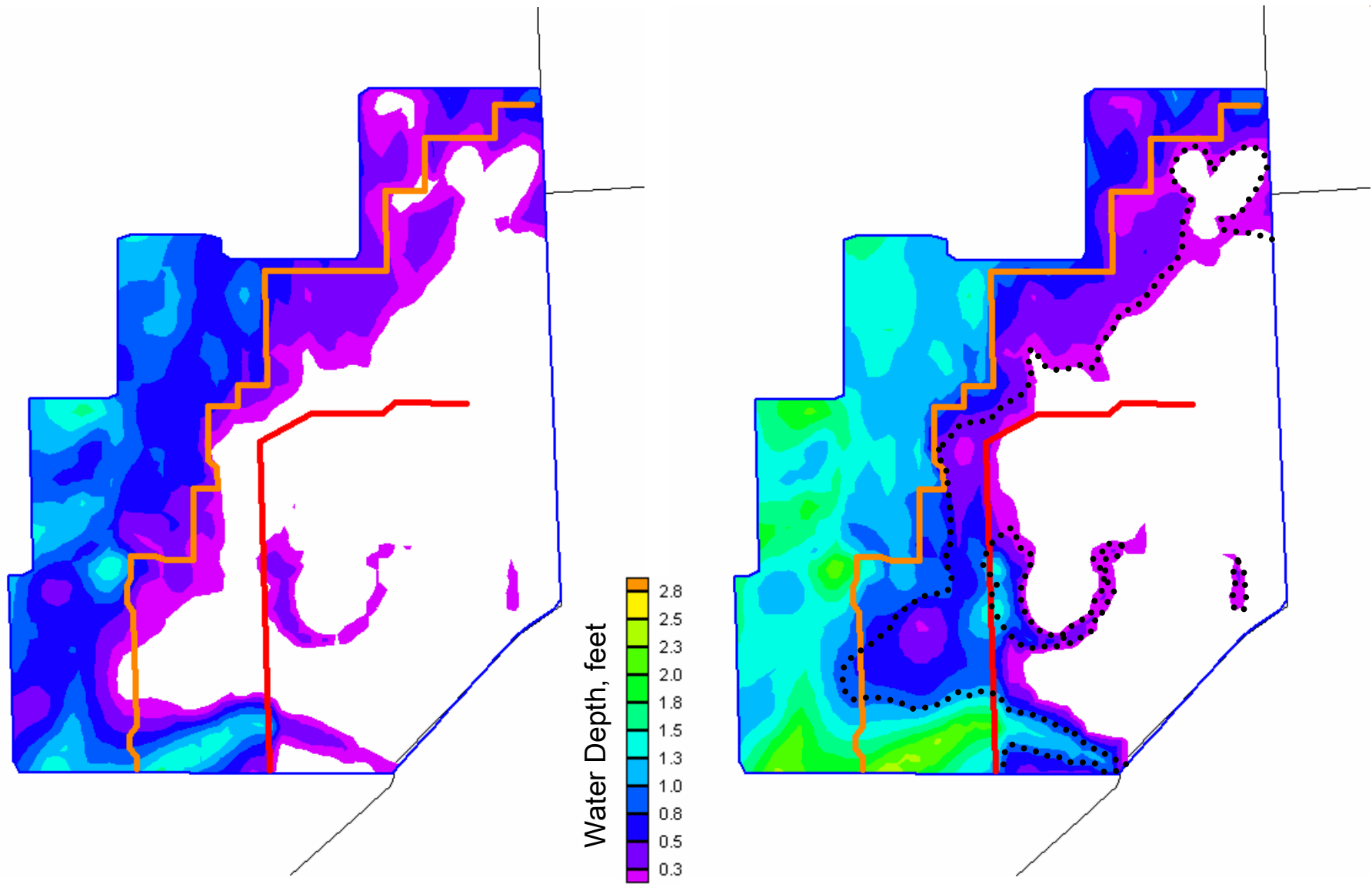
PDM Plan 6D

"Wet Line" under Plan 6D

Alternative 3



Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



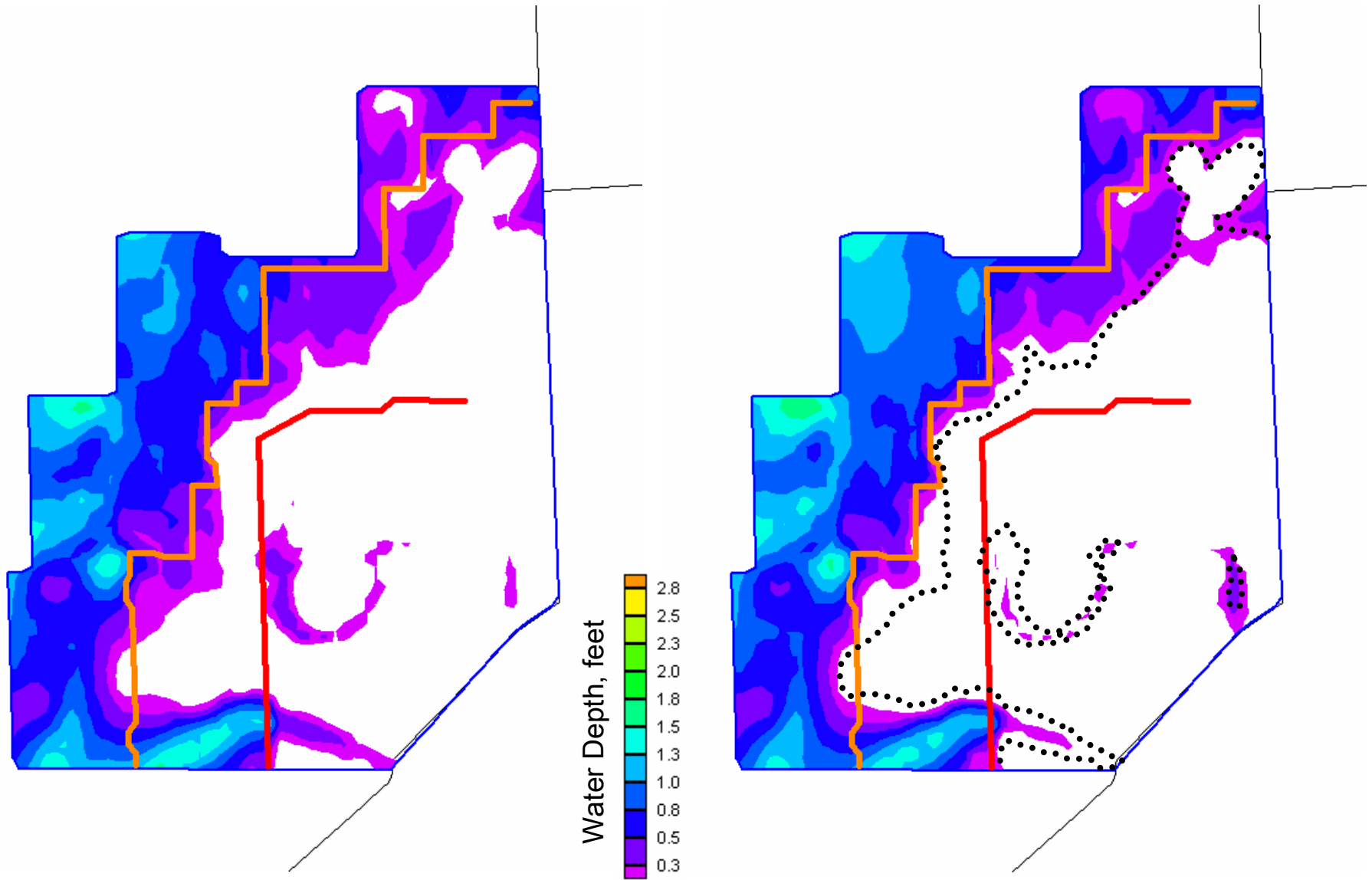
PDM Plan 6D

"Wet Line" under Plan 6D

Alternative 4



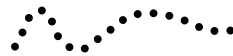
Water Depth for the Pennsuco-Dade-Monroe (PDM) MODBRANCH Models (*Peak Stage 1995*)



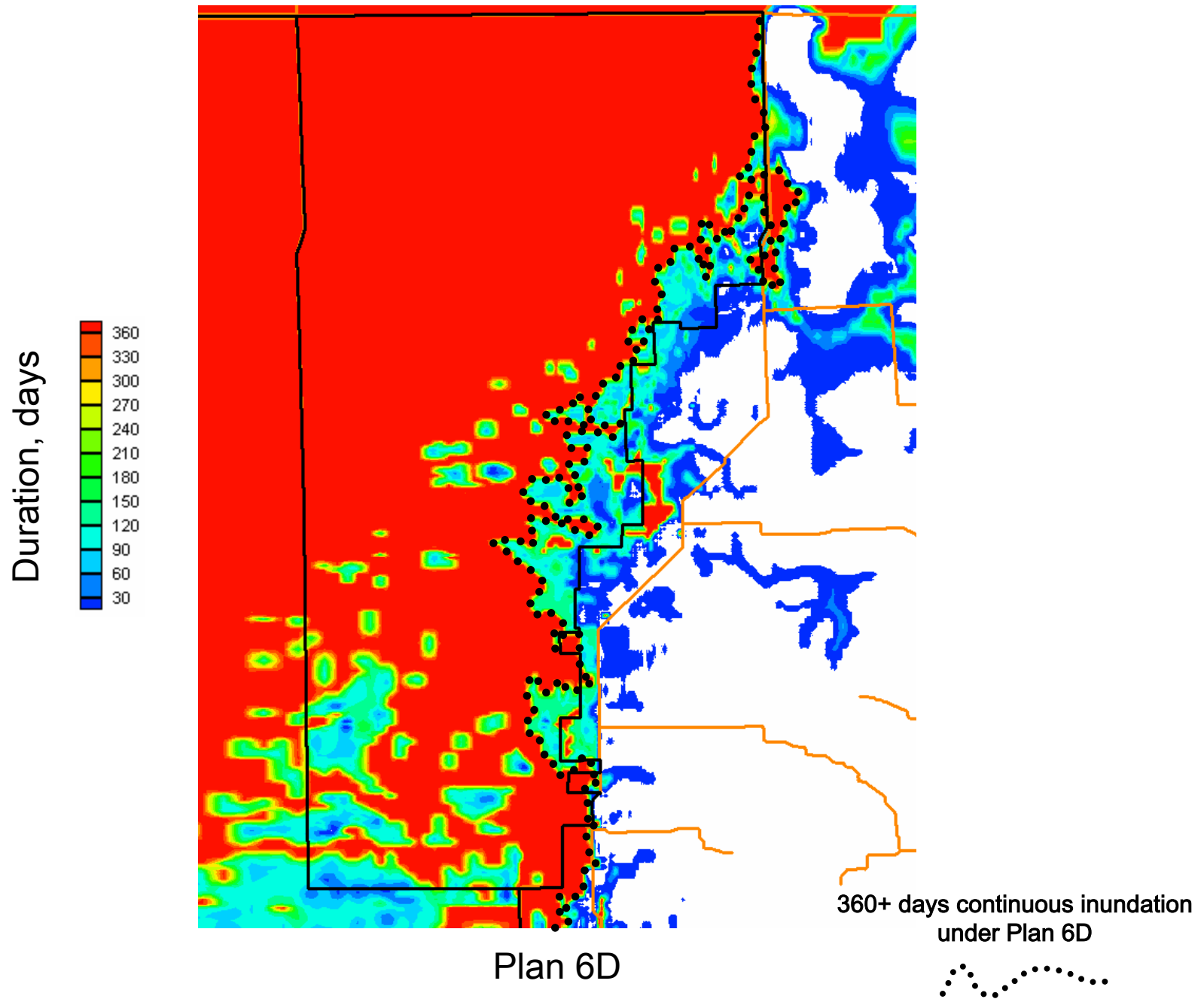
PDM Plan 6D

"Wet Line" under Plan 6D

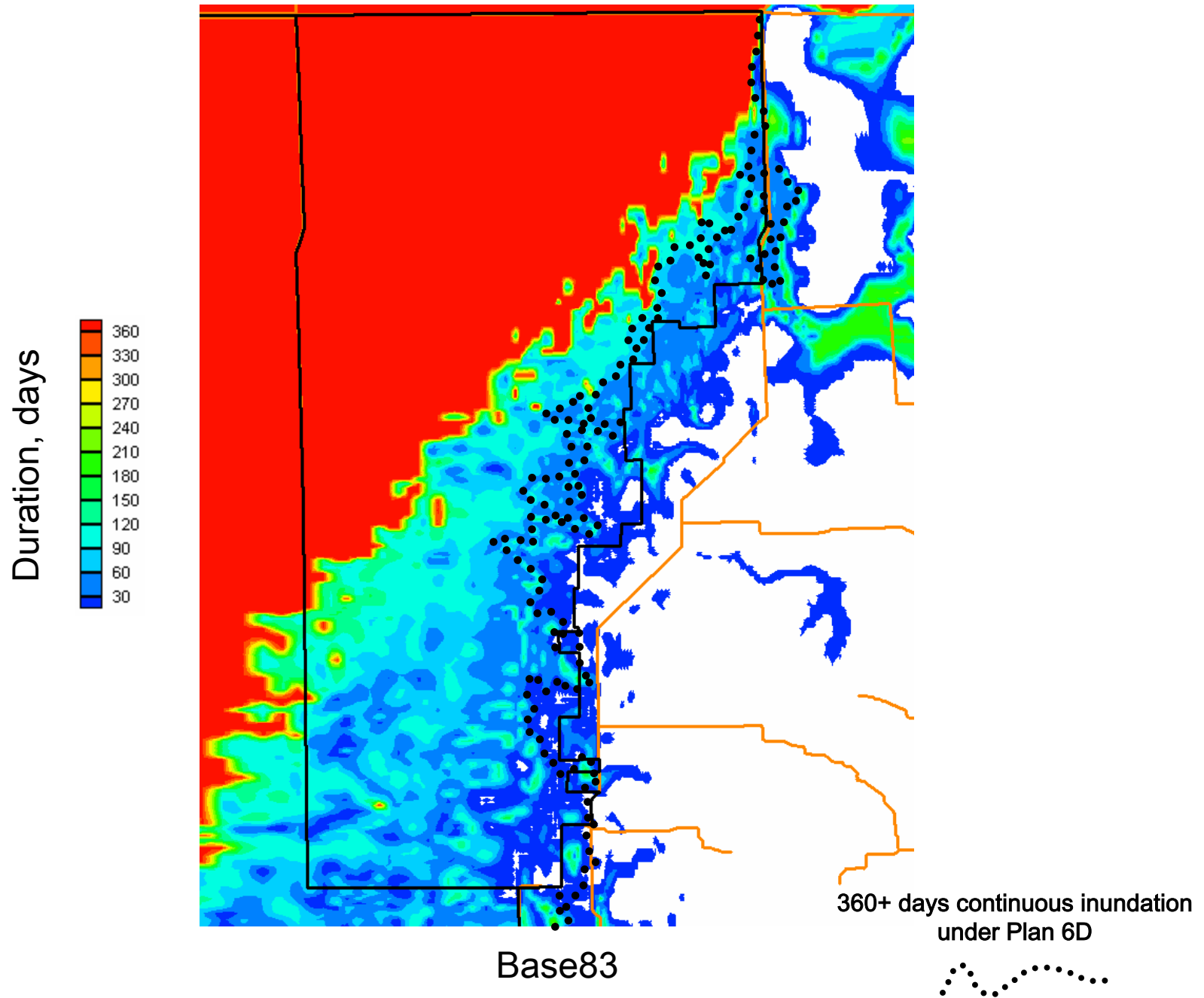
Alternative 5



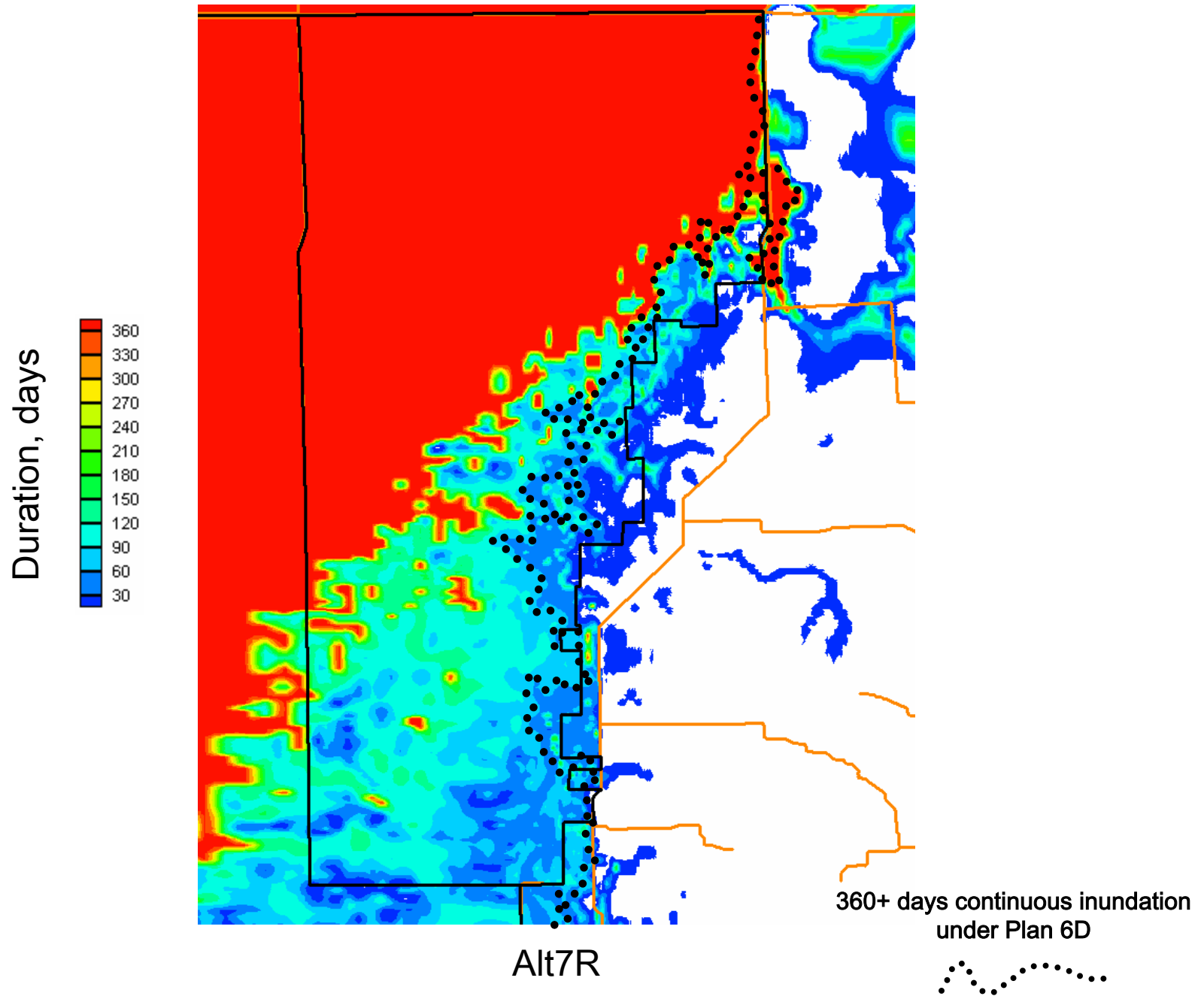
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



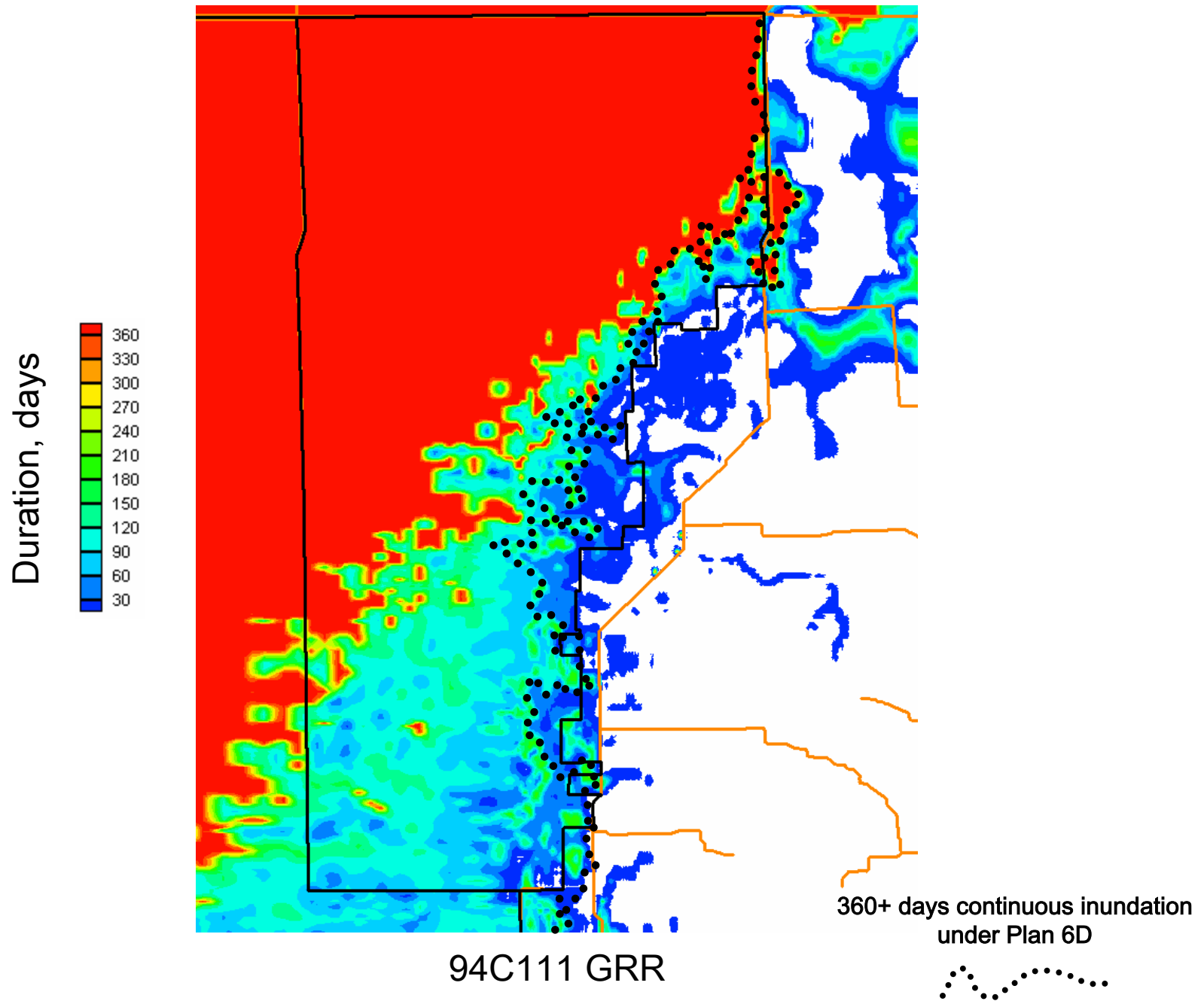
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



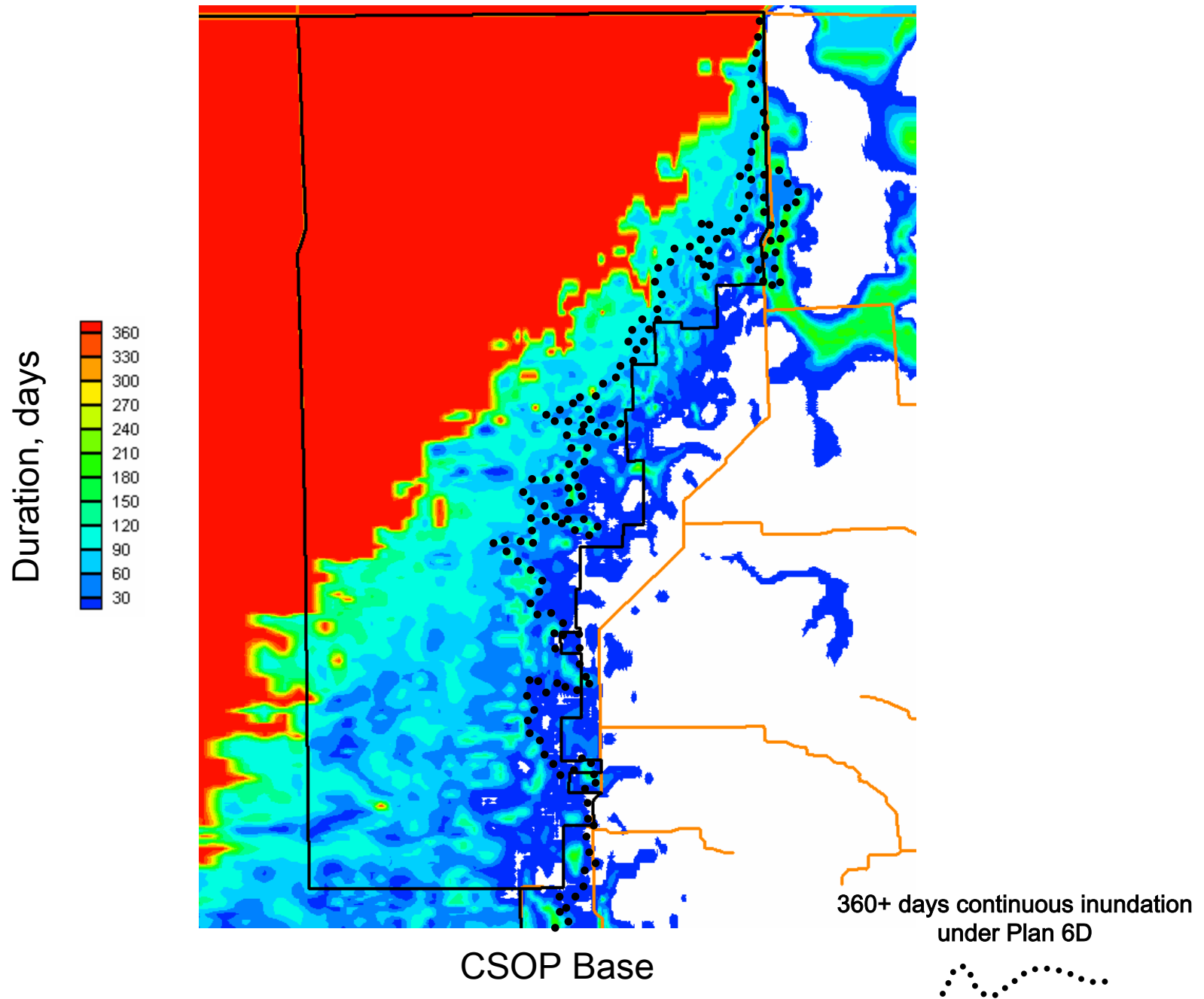
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



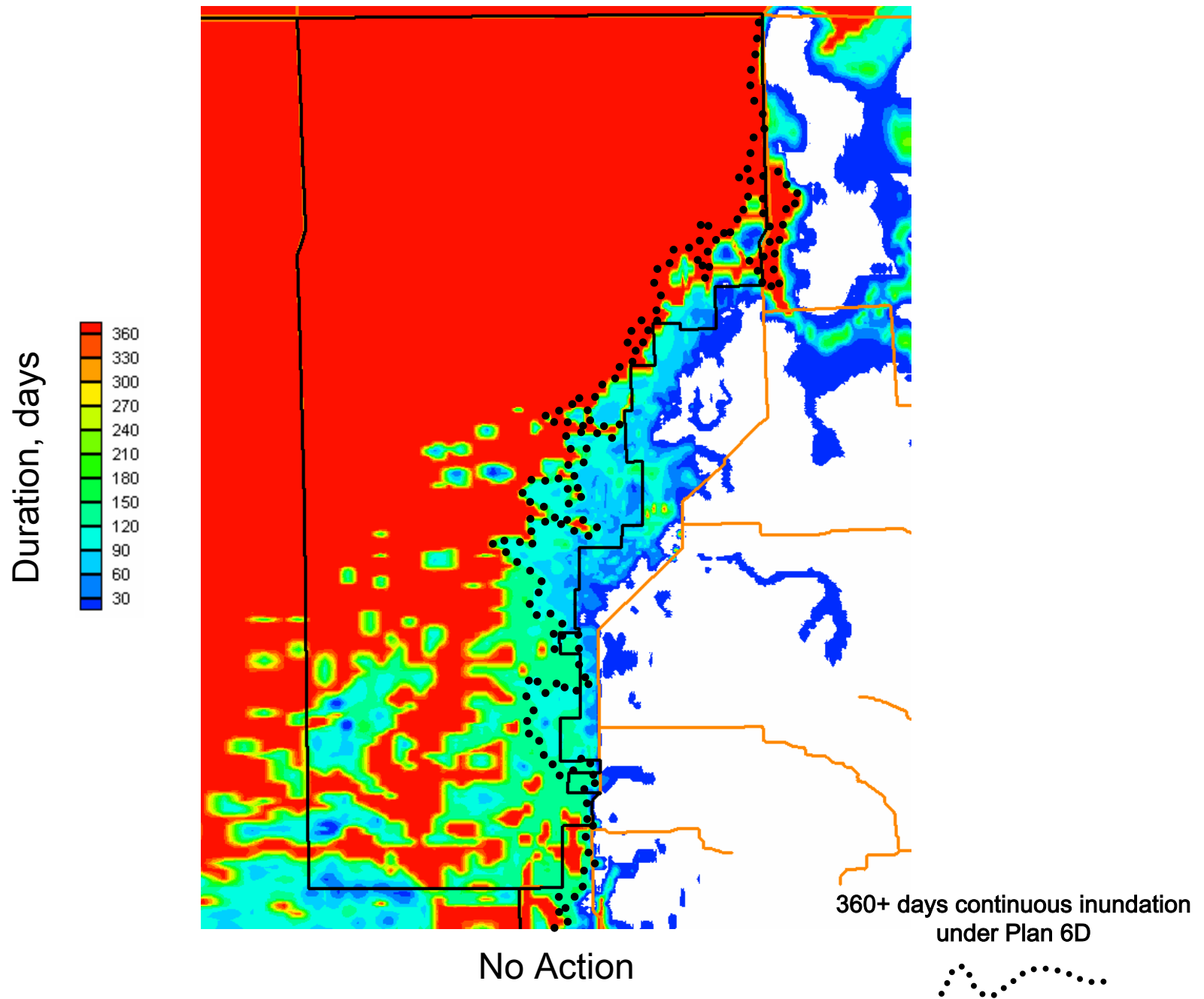
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



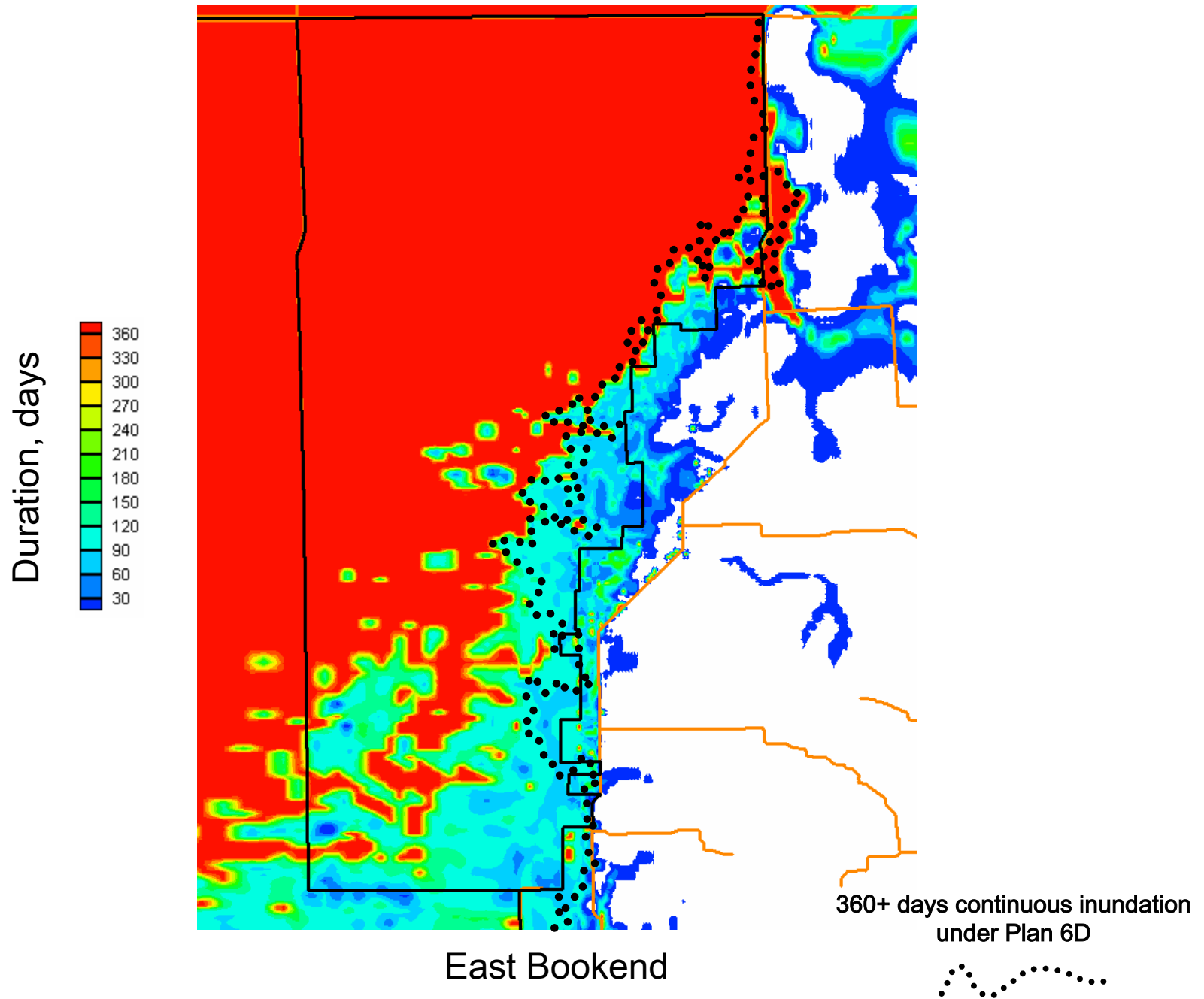
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



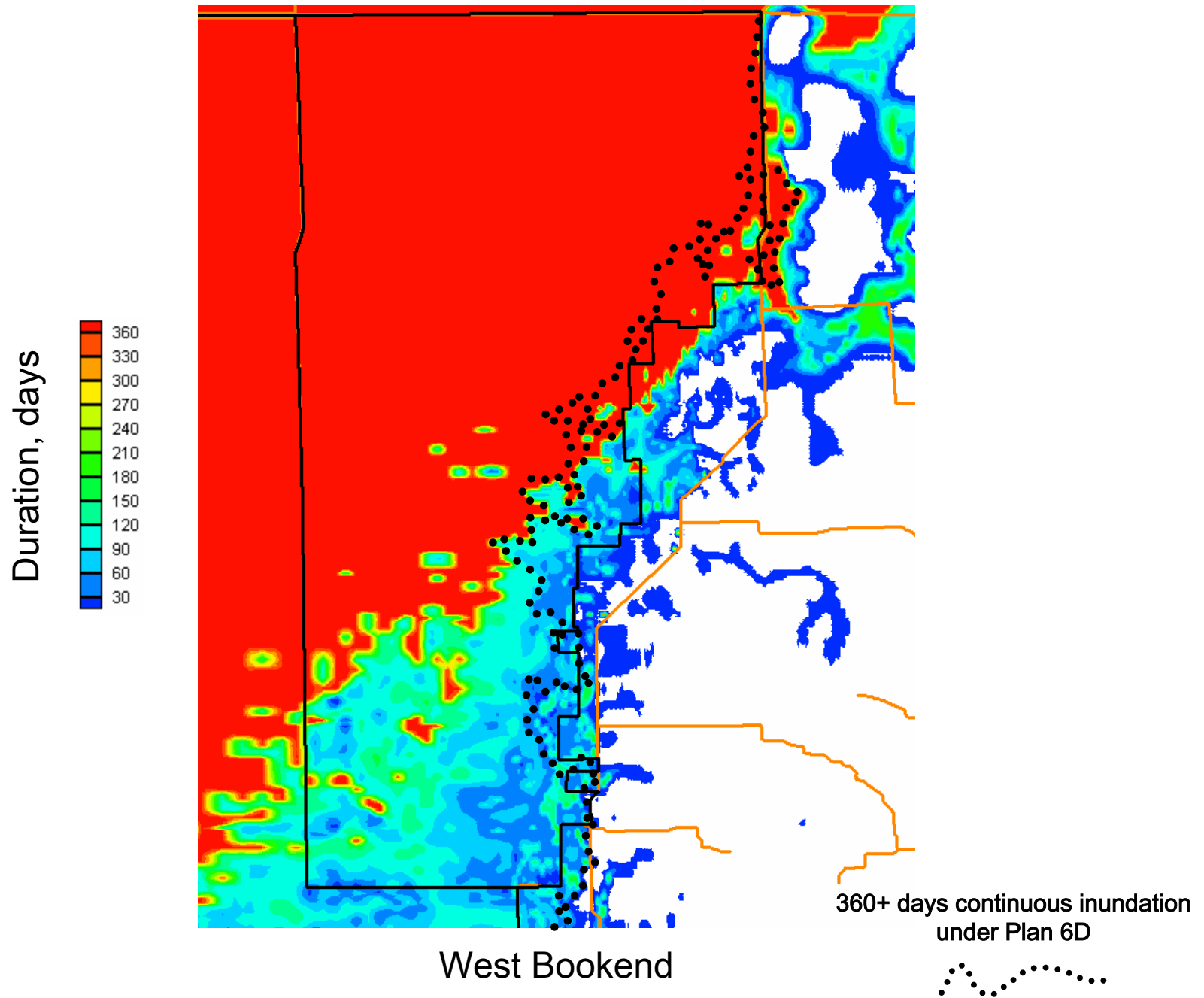
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



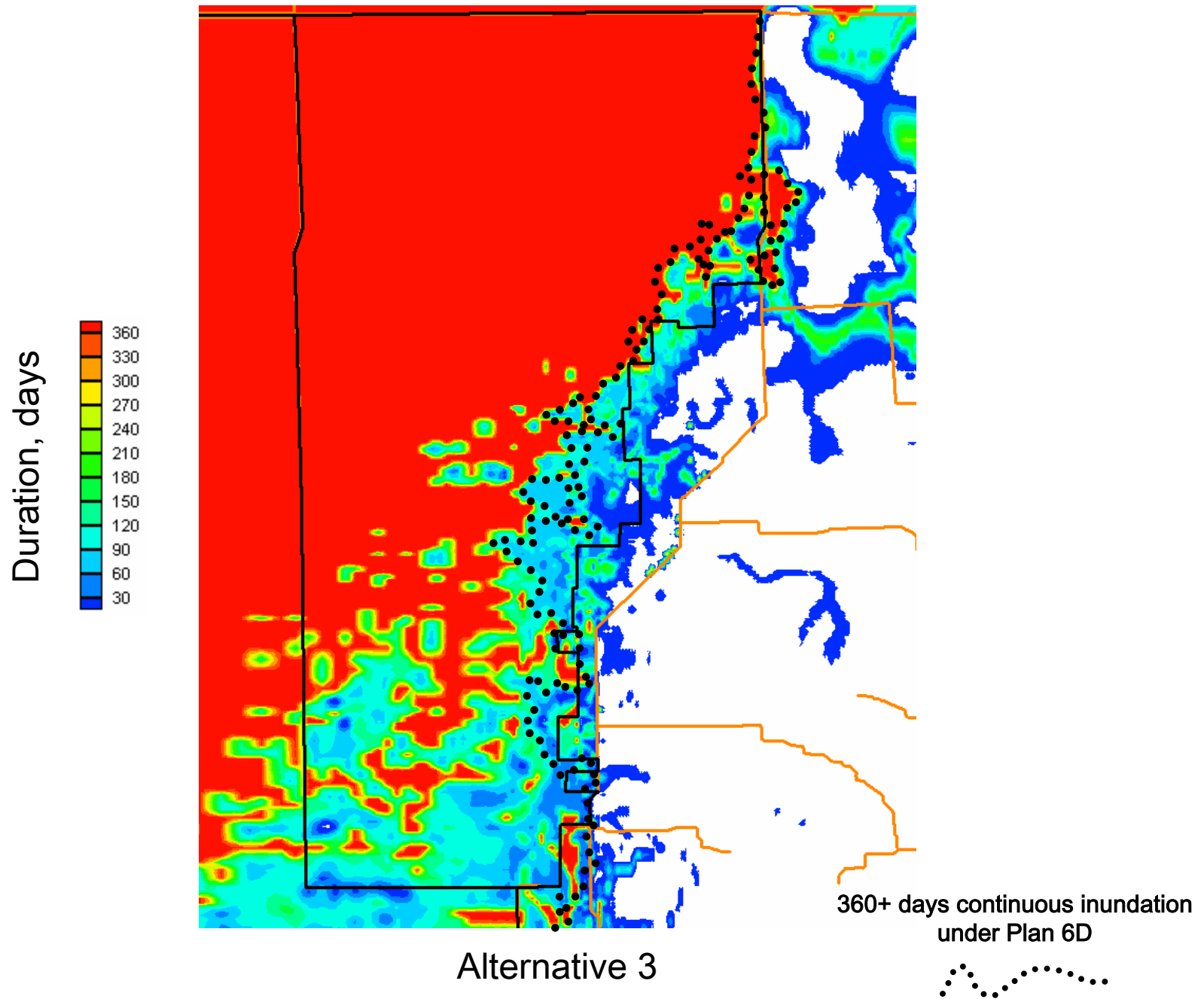
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



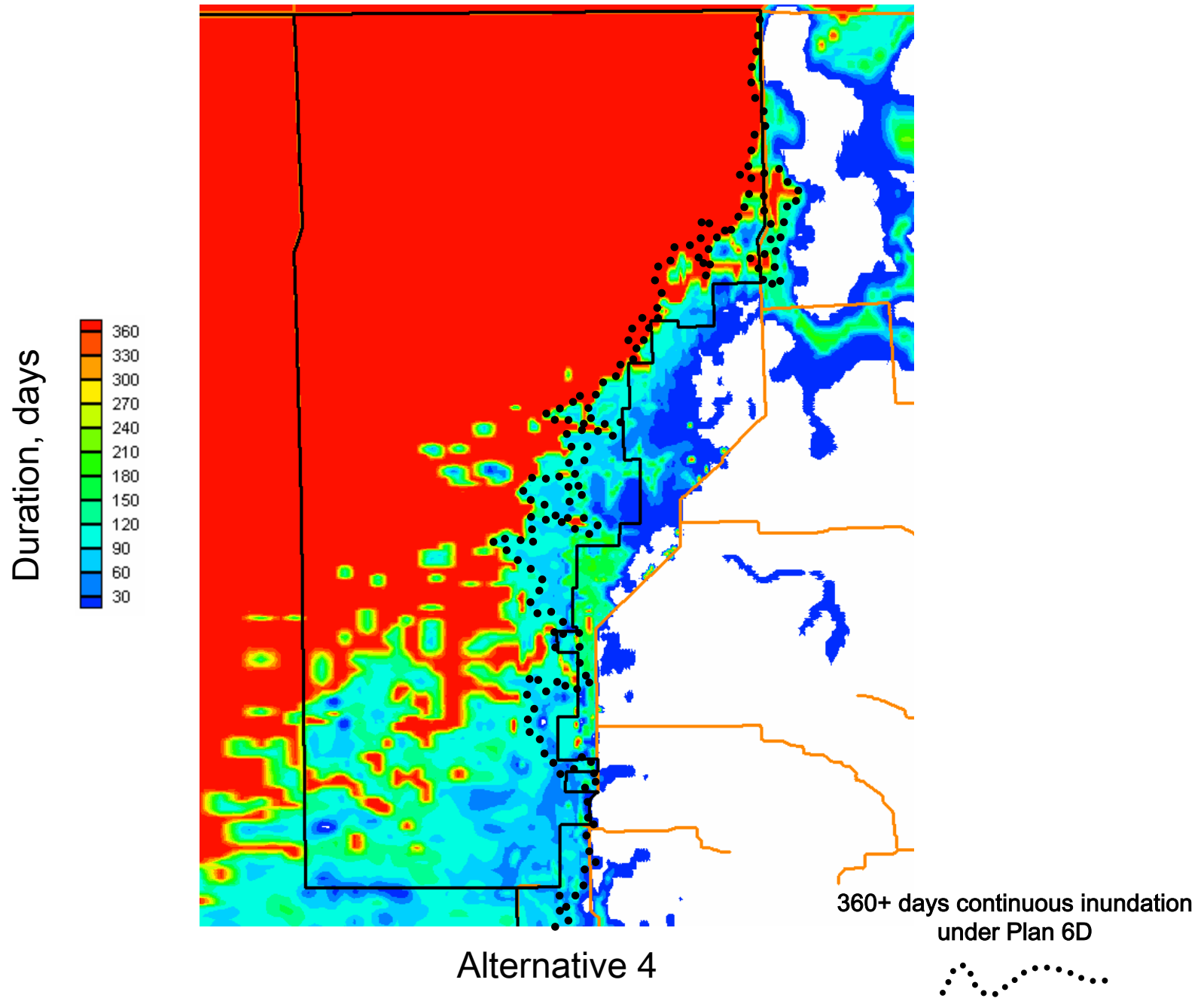
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



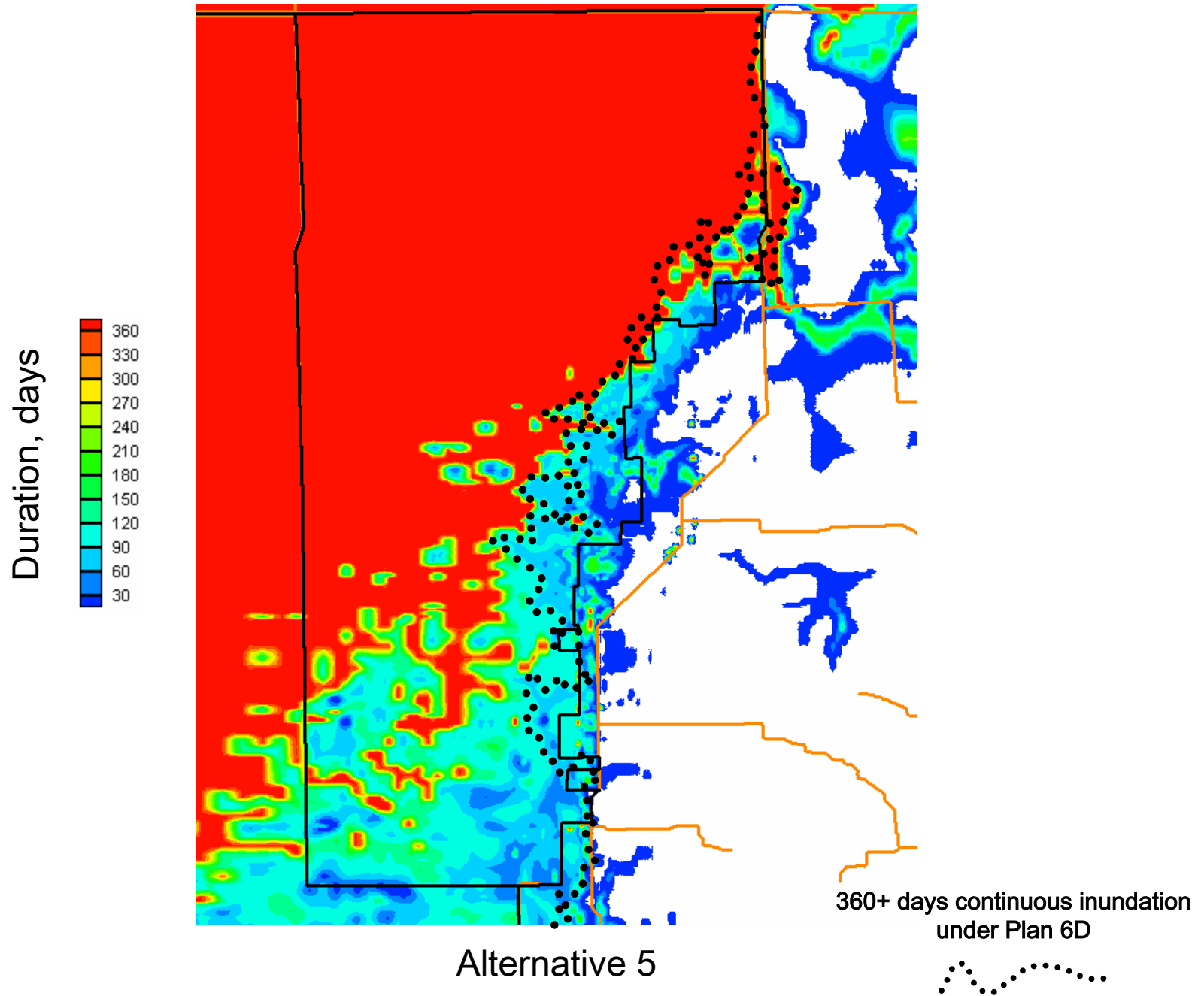
Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



Longest Continuous Wet Period, 1995 PDM MODBRANCH Models



Summary

1 –The authorized Plan 6D was based on:

- (a) the results from over 100 simulations using the Dade MODBRANCH grid;
- (b) efforts to minimize the number of condemnations;
- (c) efforts to avoid disturbing nearby wetlands; and
- (d) best engineering judgment.

2 – The Dade Plan 6D model alignments of the levees and canal are limited by the grid resolution. *The model alignment was not a perfect match to the authorized alignments.*

3 – The authorized Plan 6D alignment is more accurately represented in the Pennsuco Dade Monroe (PDM) MODBRANCH model. (But is still not a perfect match.)

4 – The PDM MODBRANCH model has better topography, geology, and canal/levee alignment. It also has improved distribution algorithms.