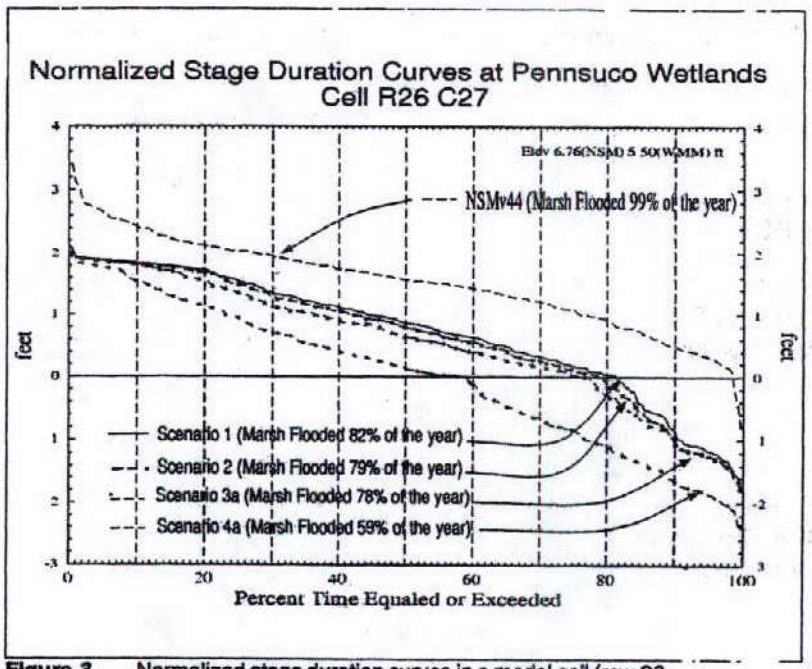


Figure 3 Normalized stage duration curves in a model cell (row 26, col. 27) on Pennsuco Wetlands

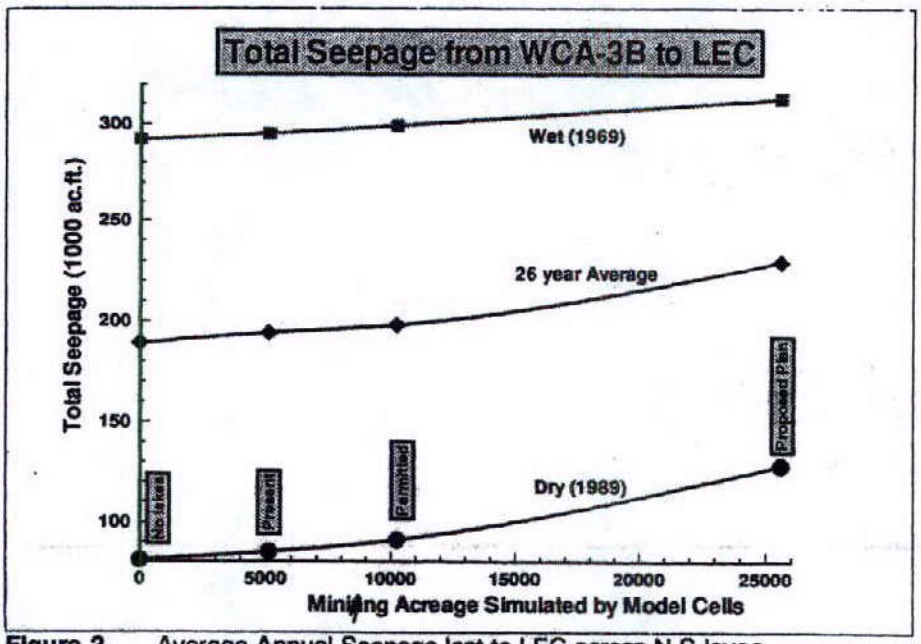
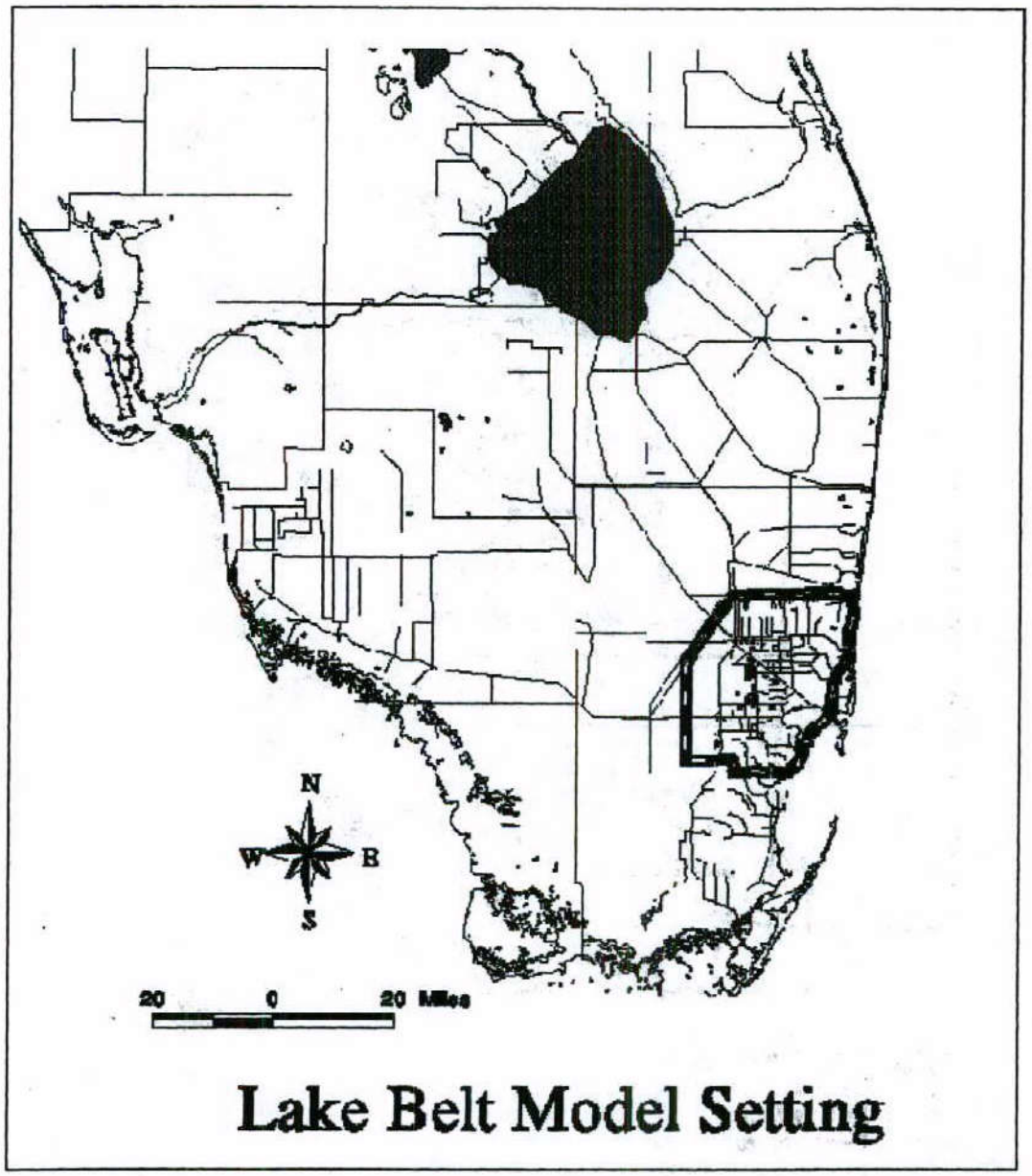


Figure 2 Average Annual Seepage lost to LEC across N-S levee in WCA-3B


N
W
E
S
20
0
20 Miles
Lake Belt Model Setting

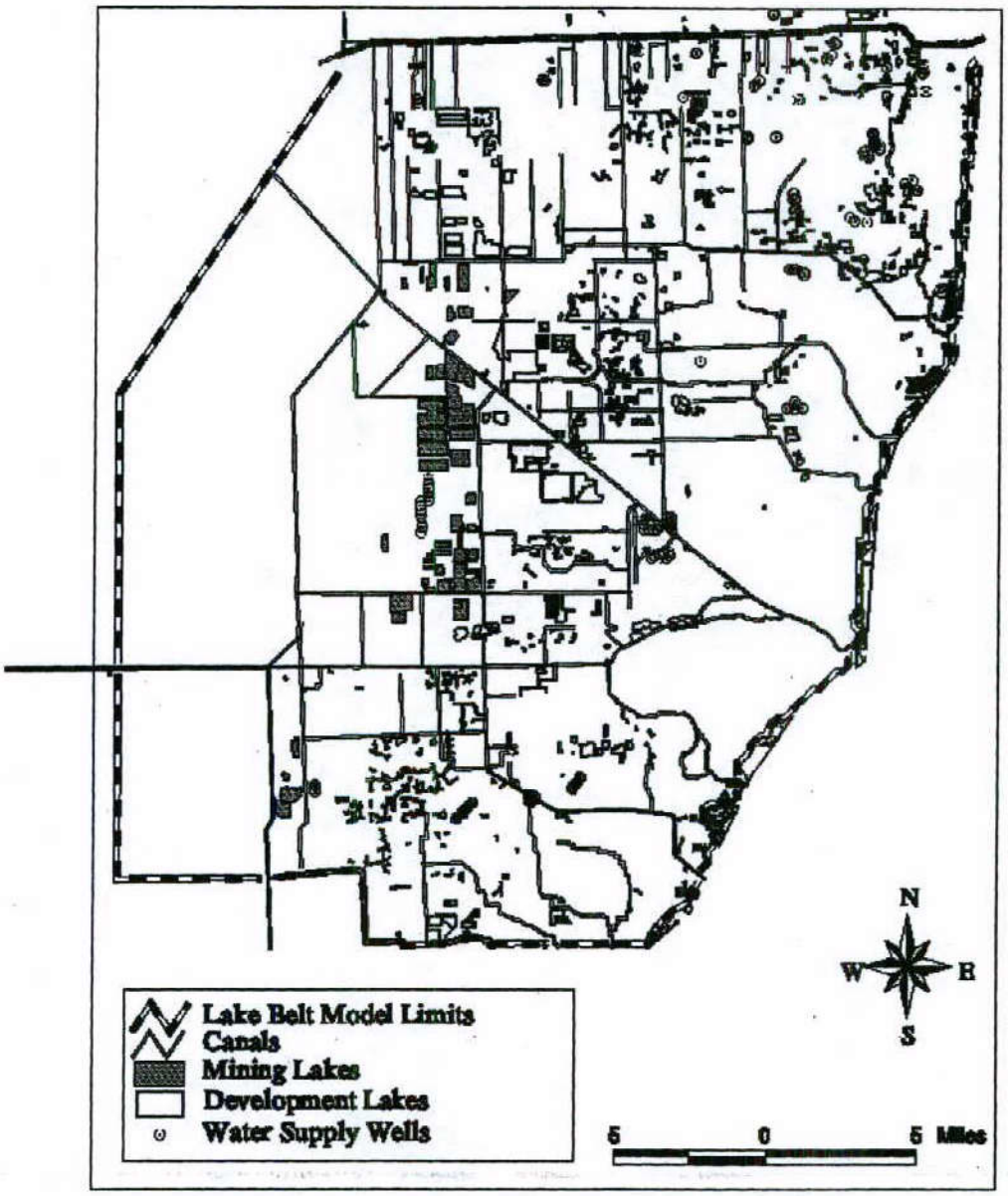


Figure 1. Lake Belt Model Boundaries

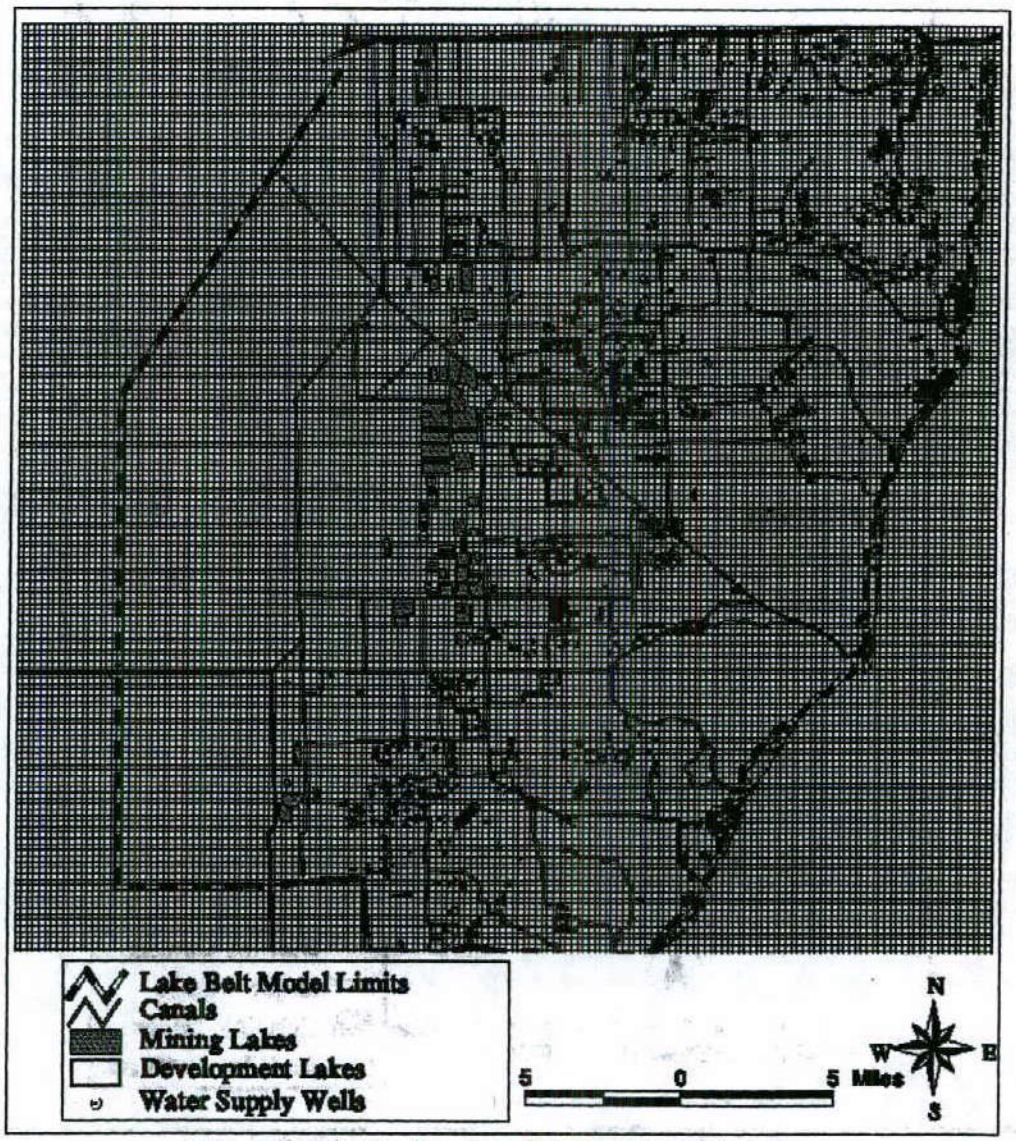


Figure 2. Lake Belt Model Grid

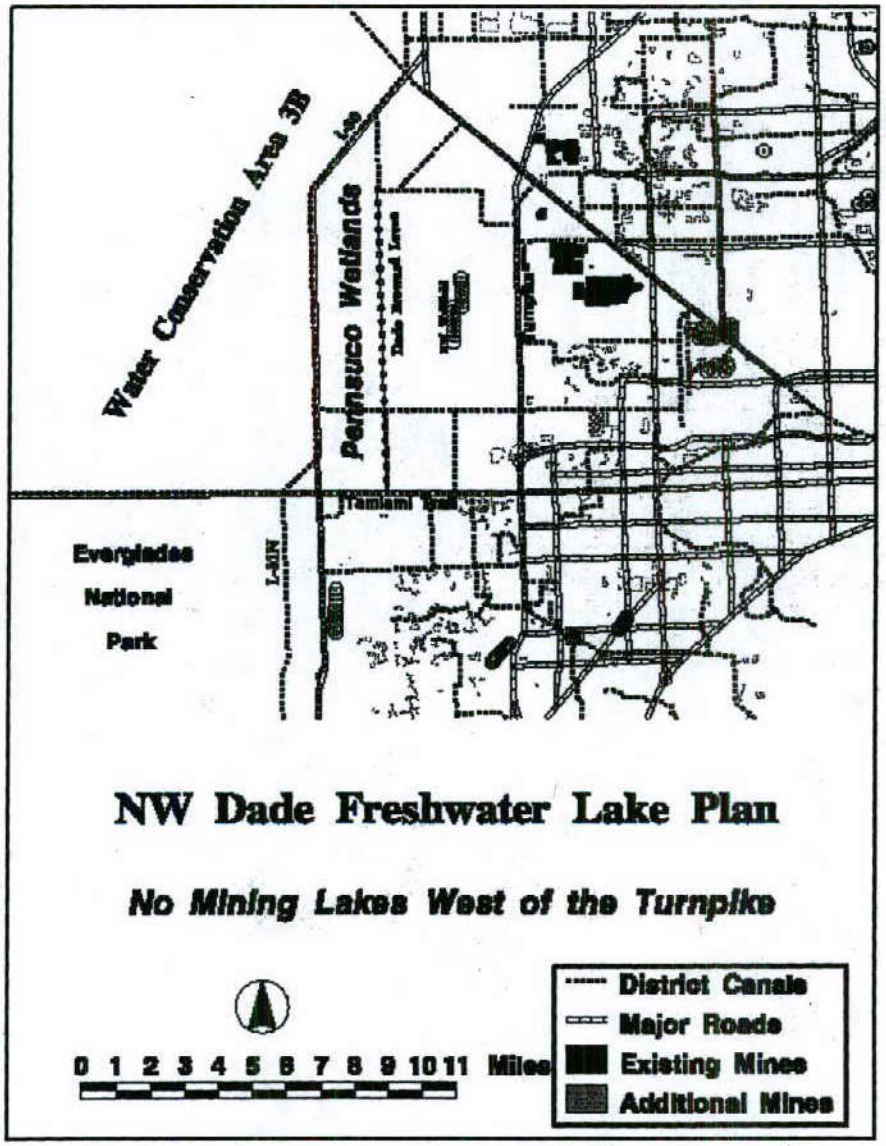


Figure 3. Alternative Mining Configuration 1

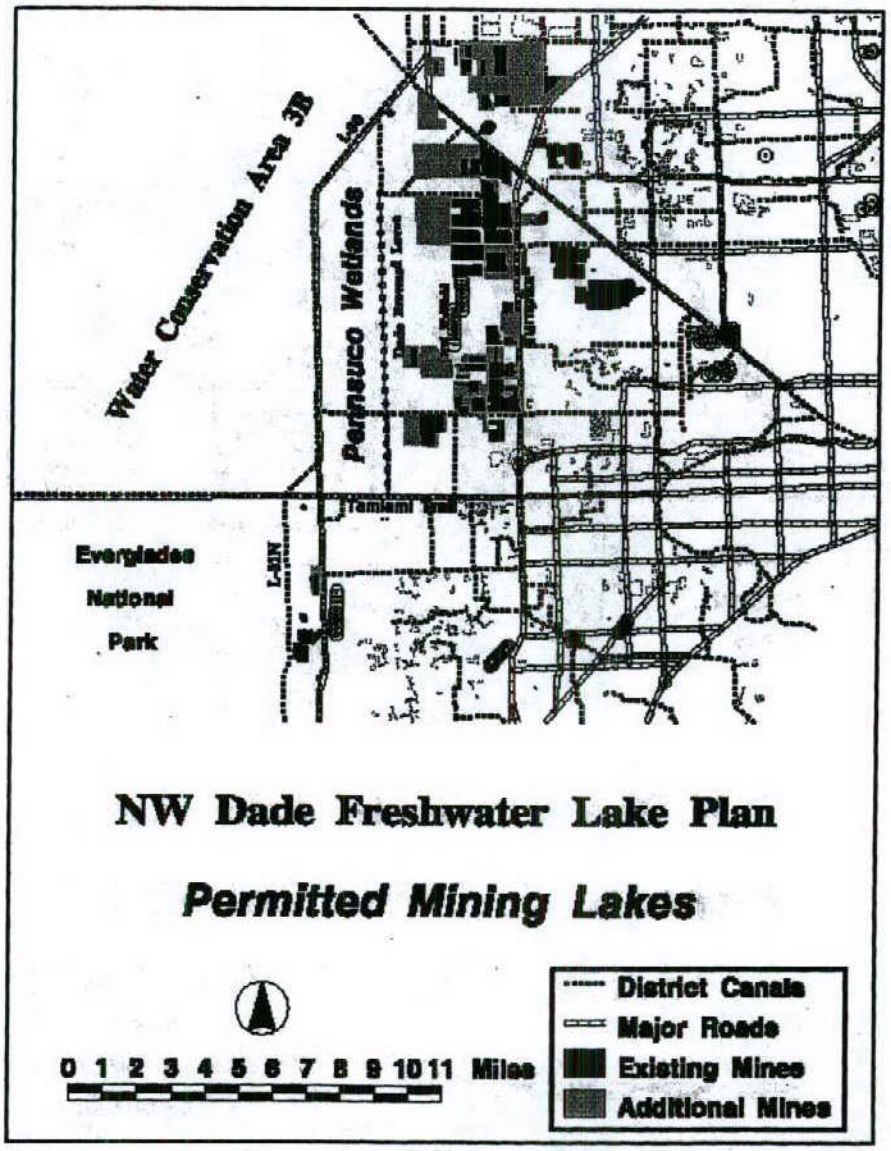


Figure 4. Alternative Mining Configuration 3

Figure 5. Alternative Mining Configuration 4

Figure 6. Alternative Mining Configuration 5

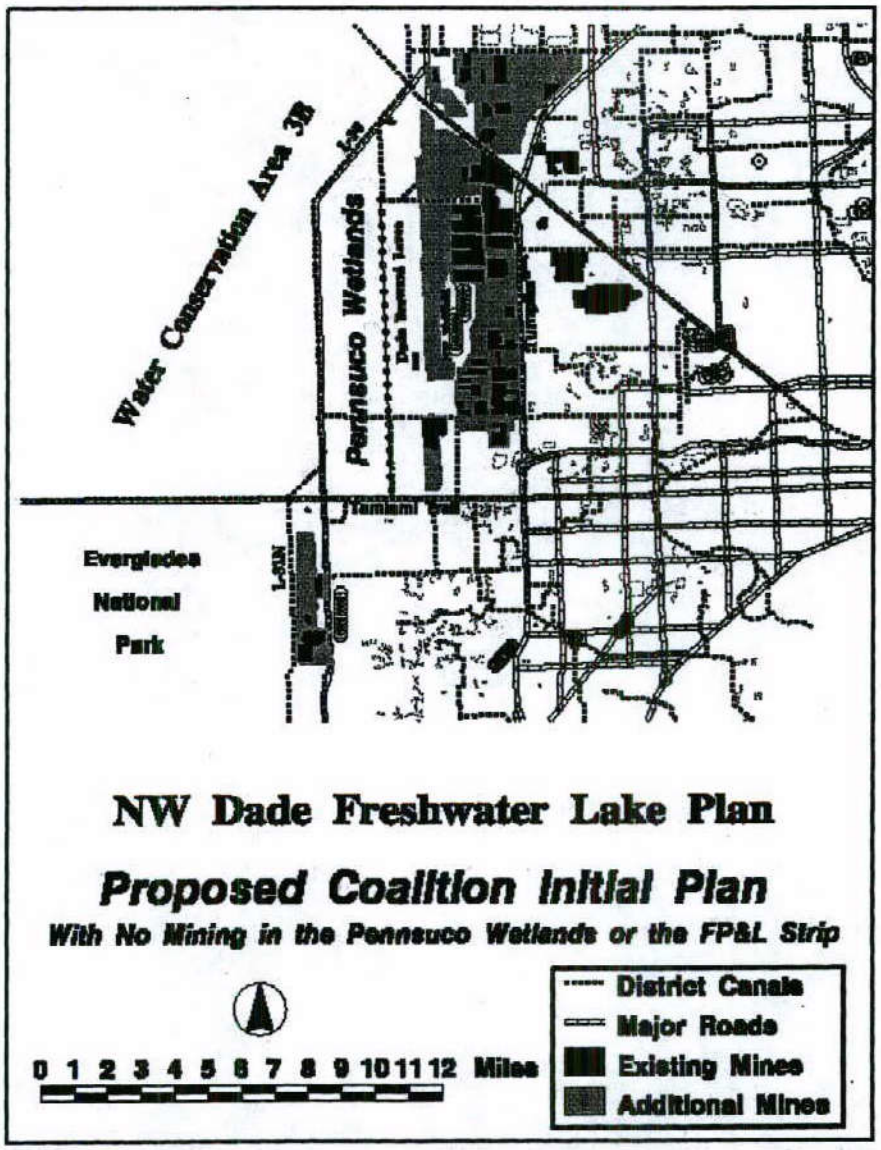


Figure 7. Alternative Mining Configuration 6

Figure 8. Alternative Mining Configuration 7

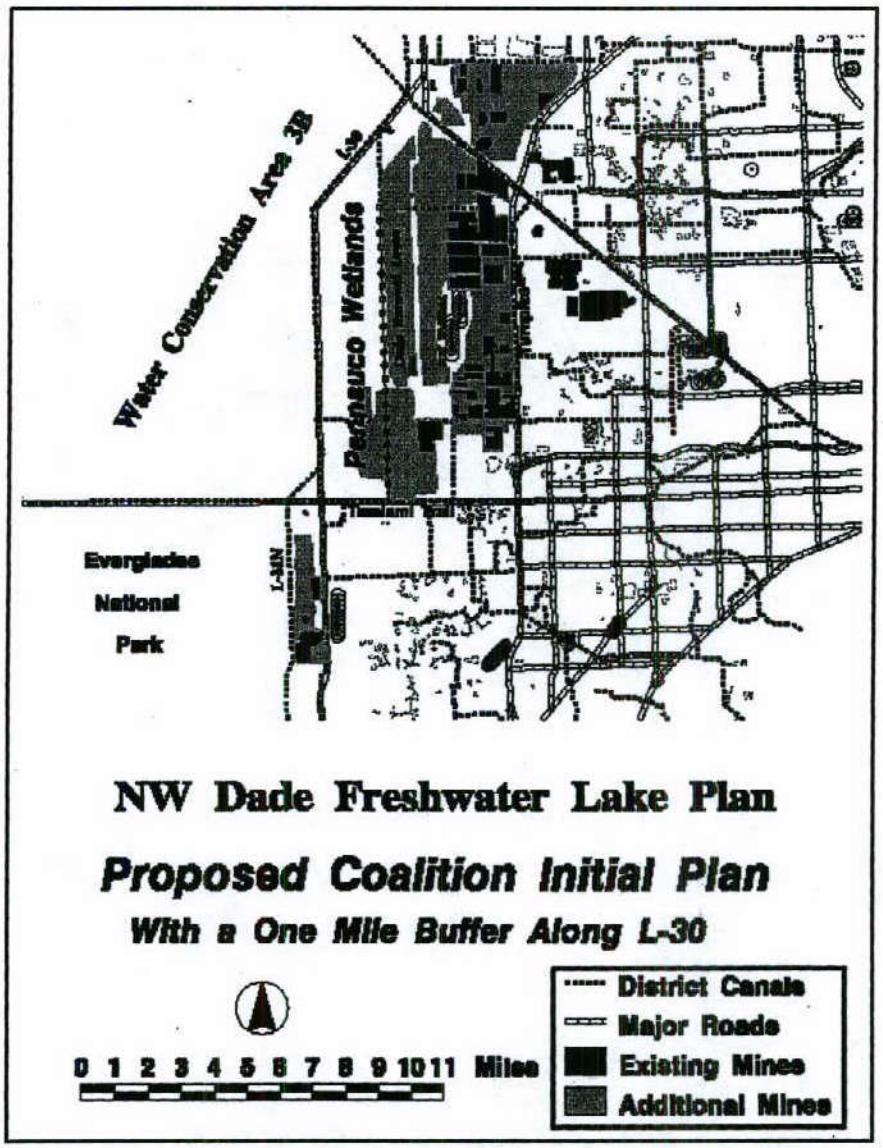


Figure 9. Alternative Mining Configuration 6

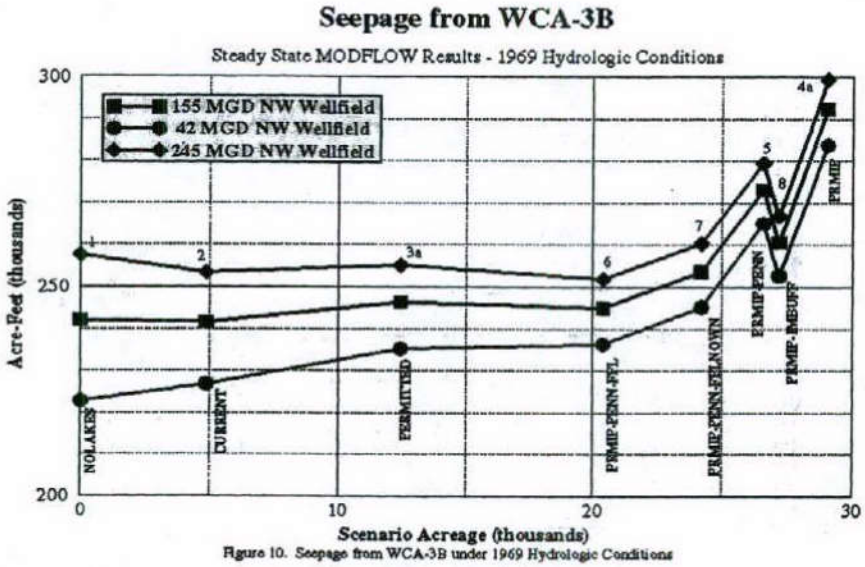


Figure 10. Seepage from WCA-3B under 1969 Hydrologic Conditions

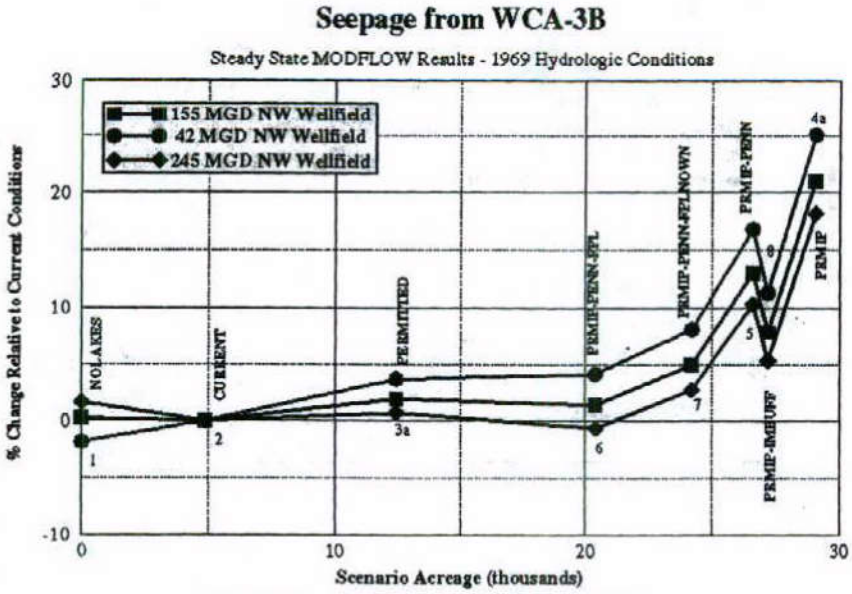


Figure 11. Seepage from WCA-3B under 1969 Hydrologic Conditions

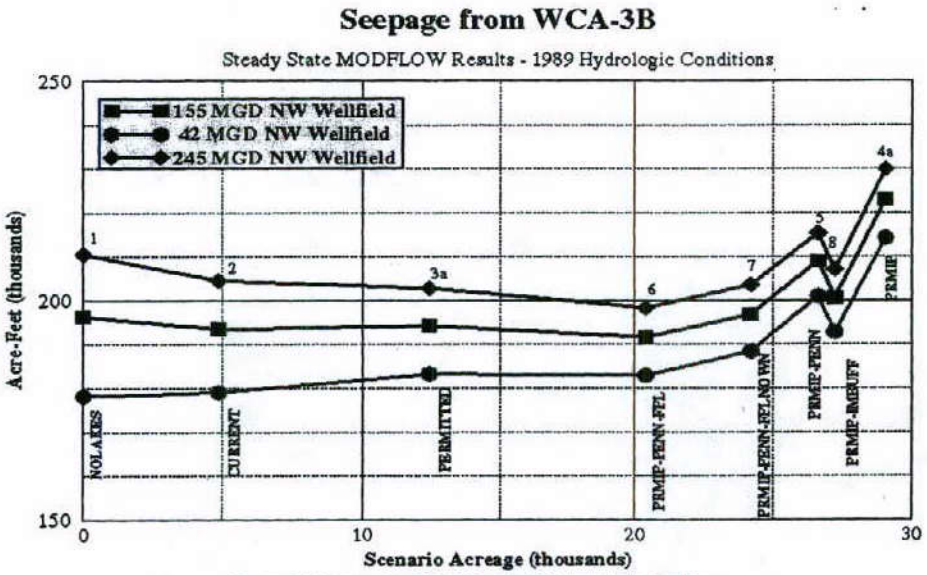


Figure 12. Seepage from WCA-3B under 1989 Hydrologic Conditions

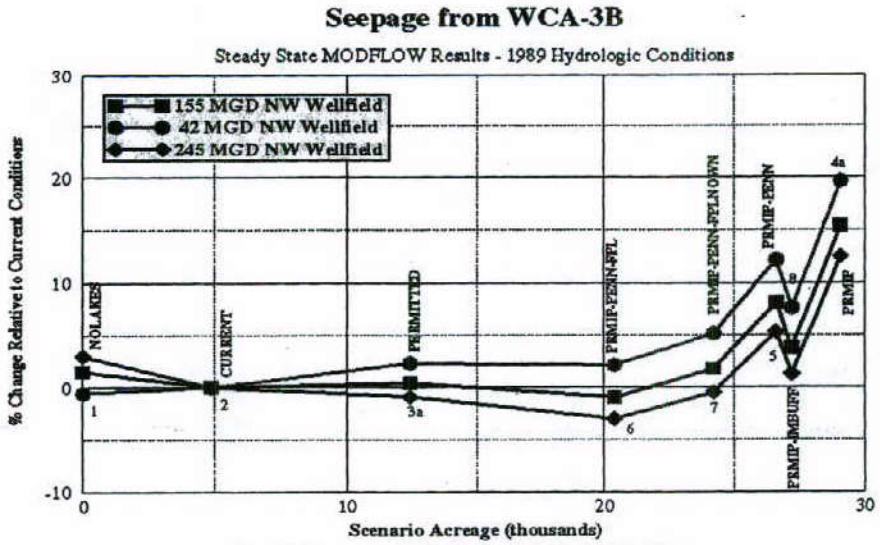


Figure 13. Seepage from WCA-3B under 1989 Hydrologic Conditions

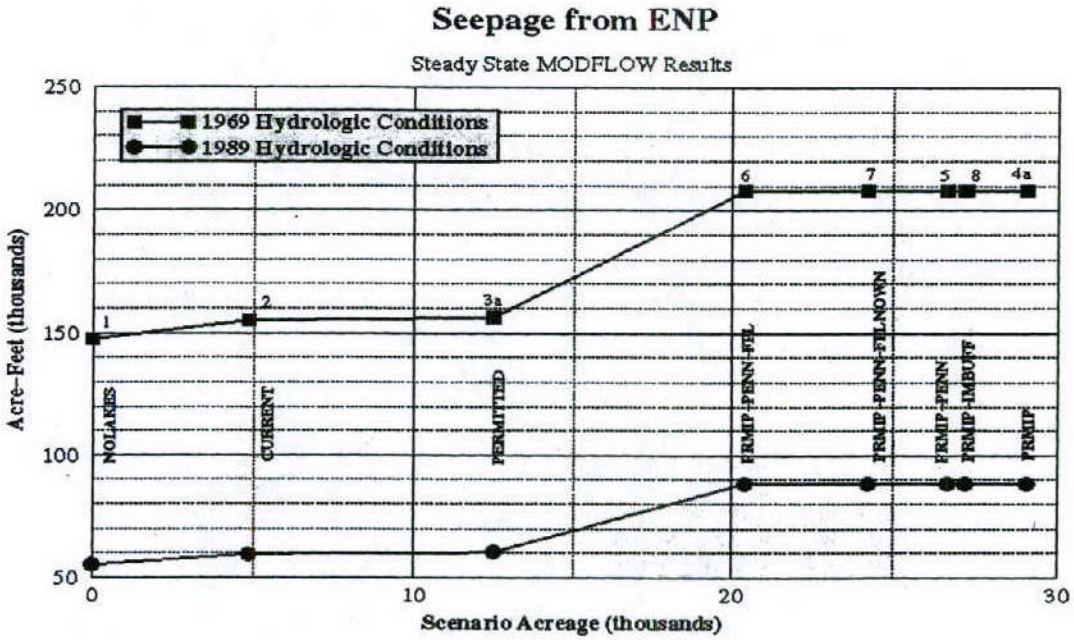


Figure 14. Seepage from the ENP

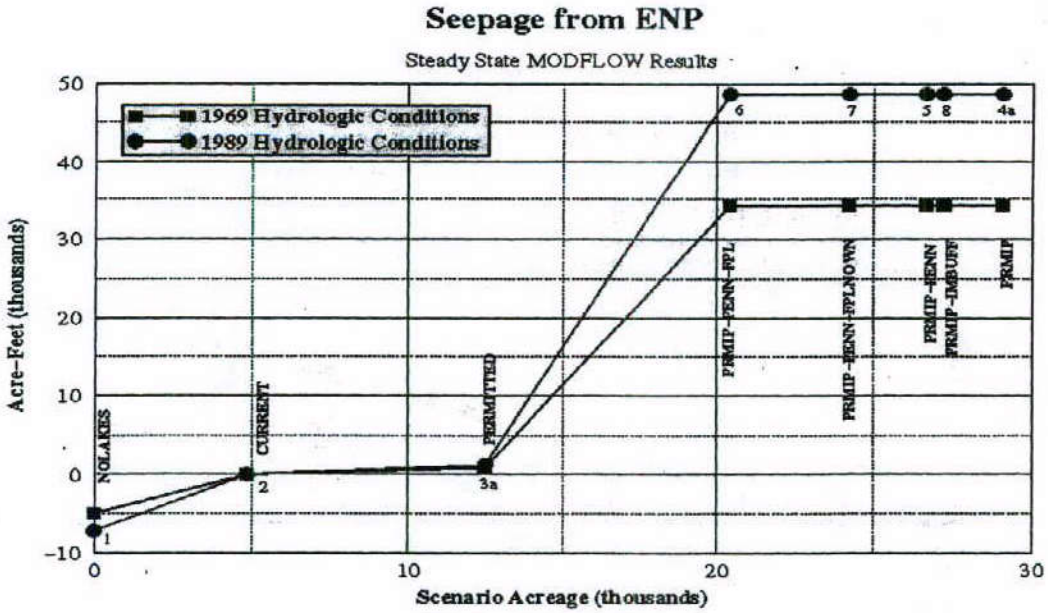


Figure 15. Seepage from the ENP

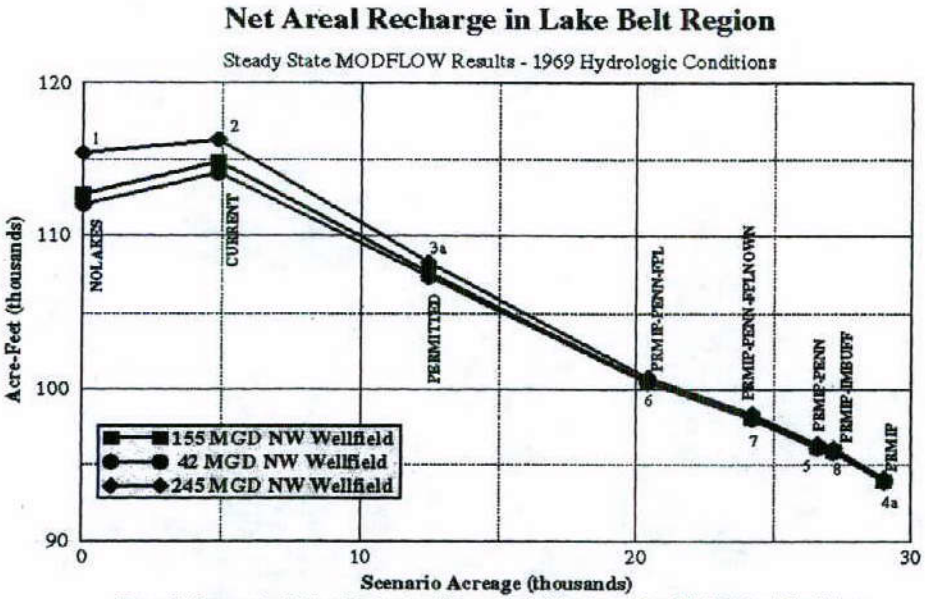


Figure 16. Decrease in Net Areal Recharge with Increasing Mining Area under 1969 Hydrologic Conditions

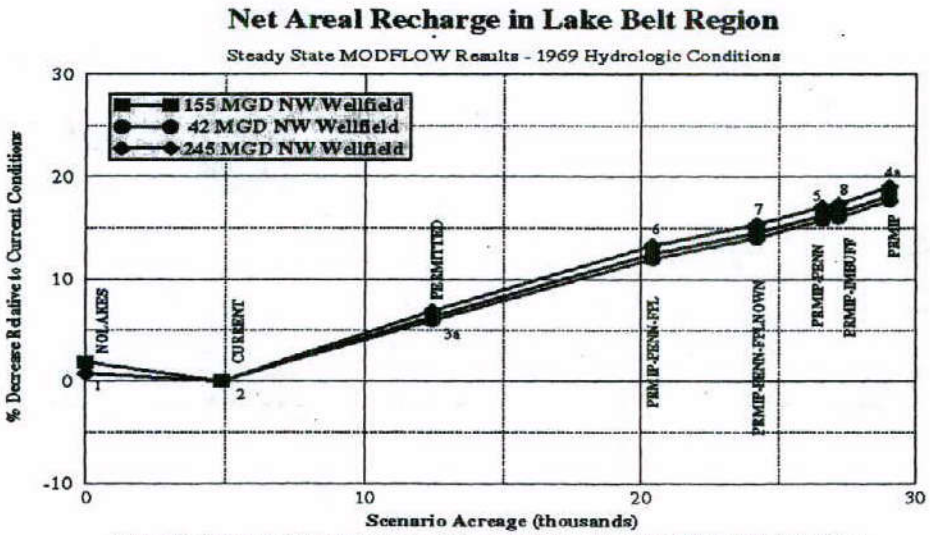


Figure 17. Decrease in Net Areal Recharge with Increasing Mining Area under 1969 Hydrologic Conditions

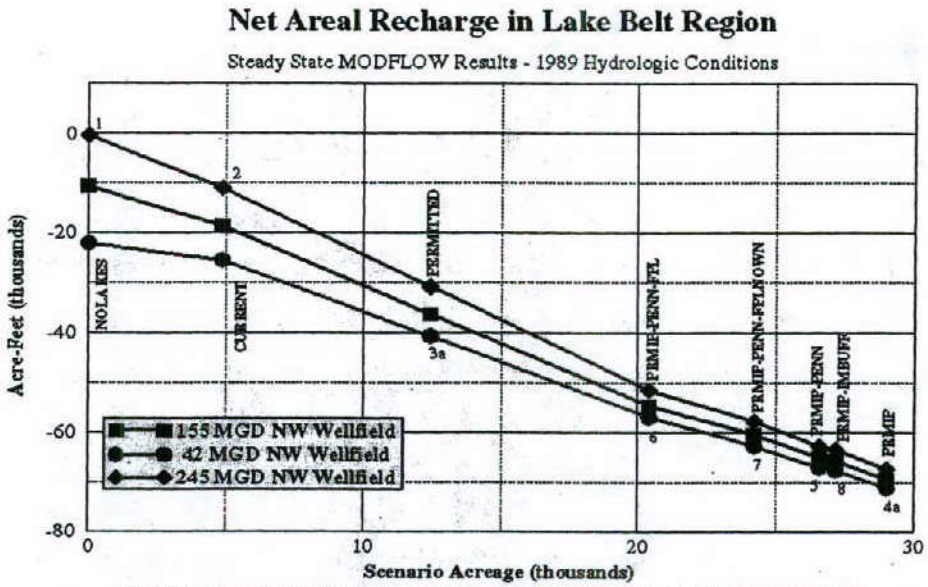


Figure 18. Decrease in Net Areal Recharge with Increasing Mining Area under 1989 Hydrologic Conditions

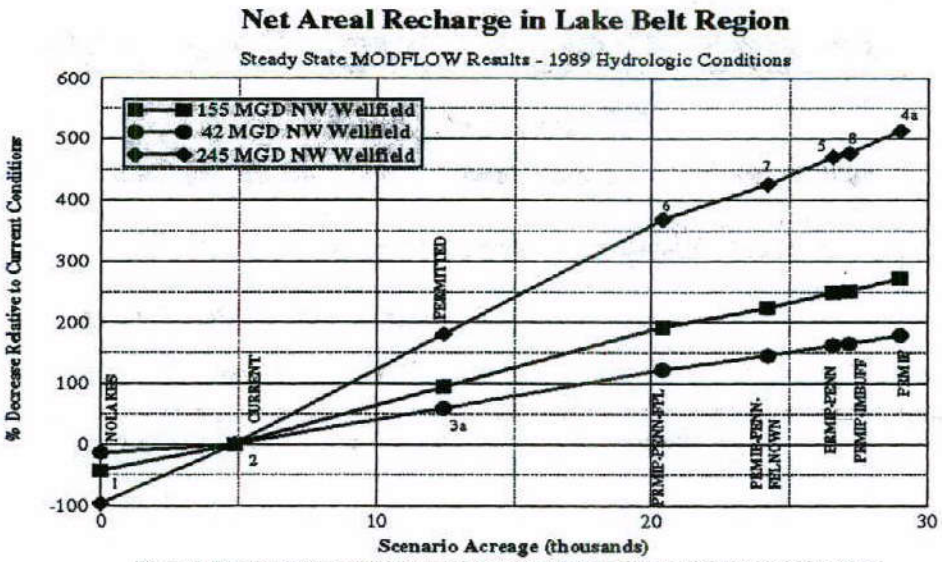


Figure 19. Decrease in Net Areal Recharge with Increasing Mining Area under 1989 Hydrologic Conditions

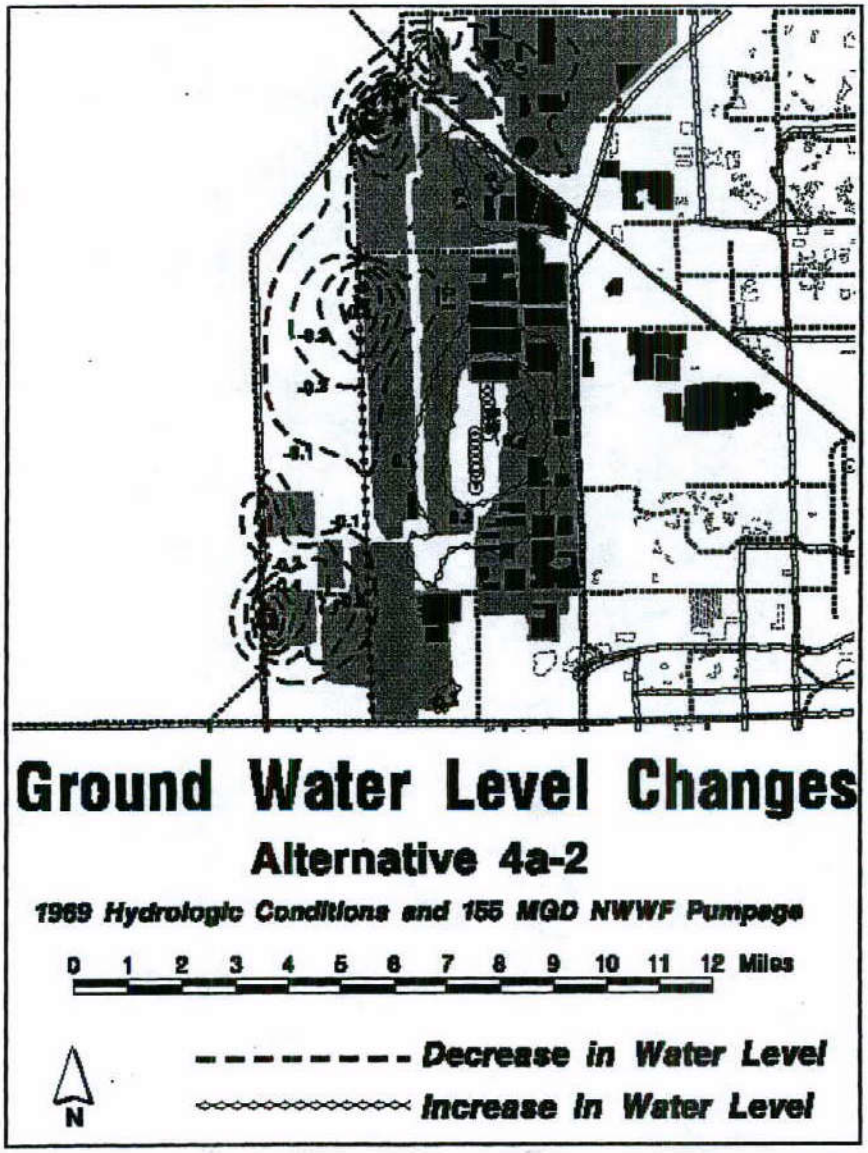


Figure 20. Changes in Ground Water Levels for Mining Alternative 4

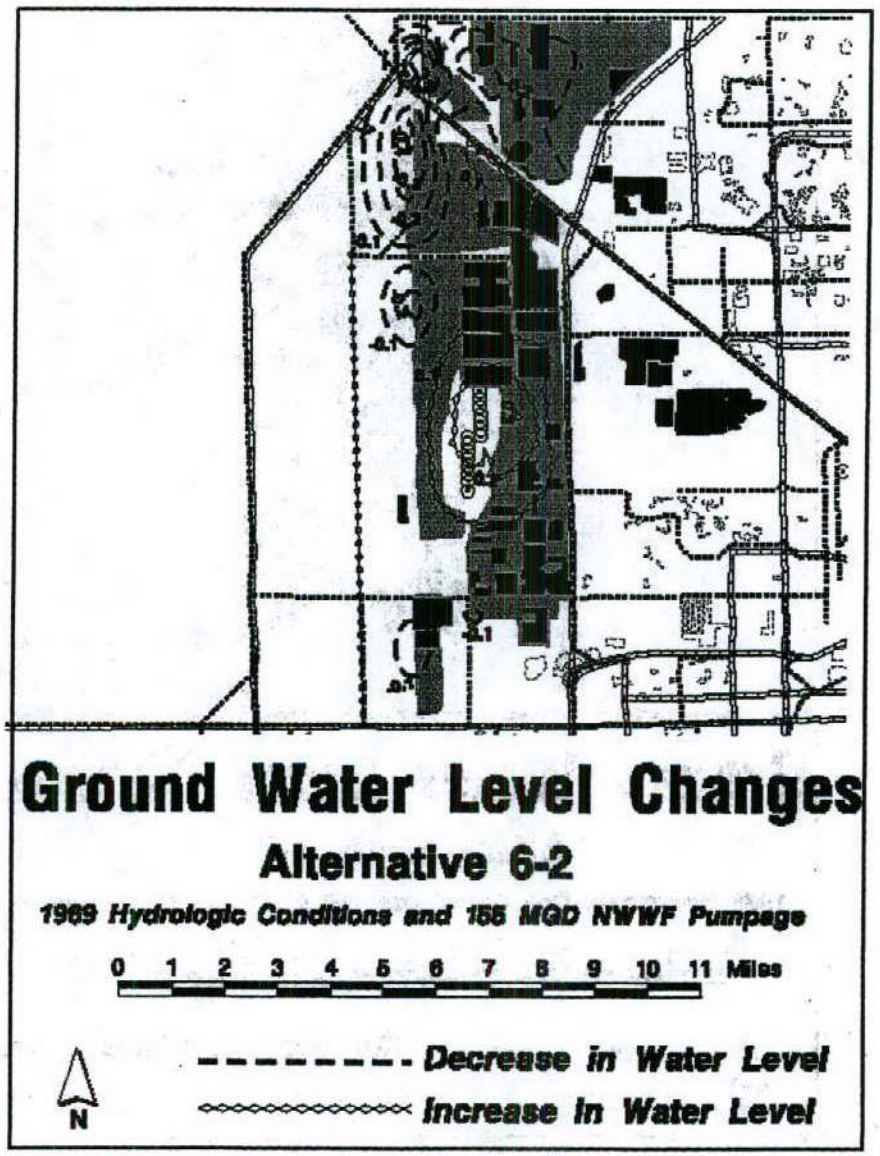


Figure 21. Changes in Ground Water Levels for Mining Alternative 6

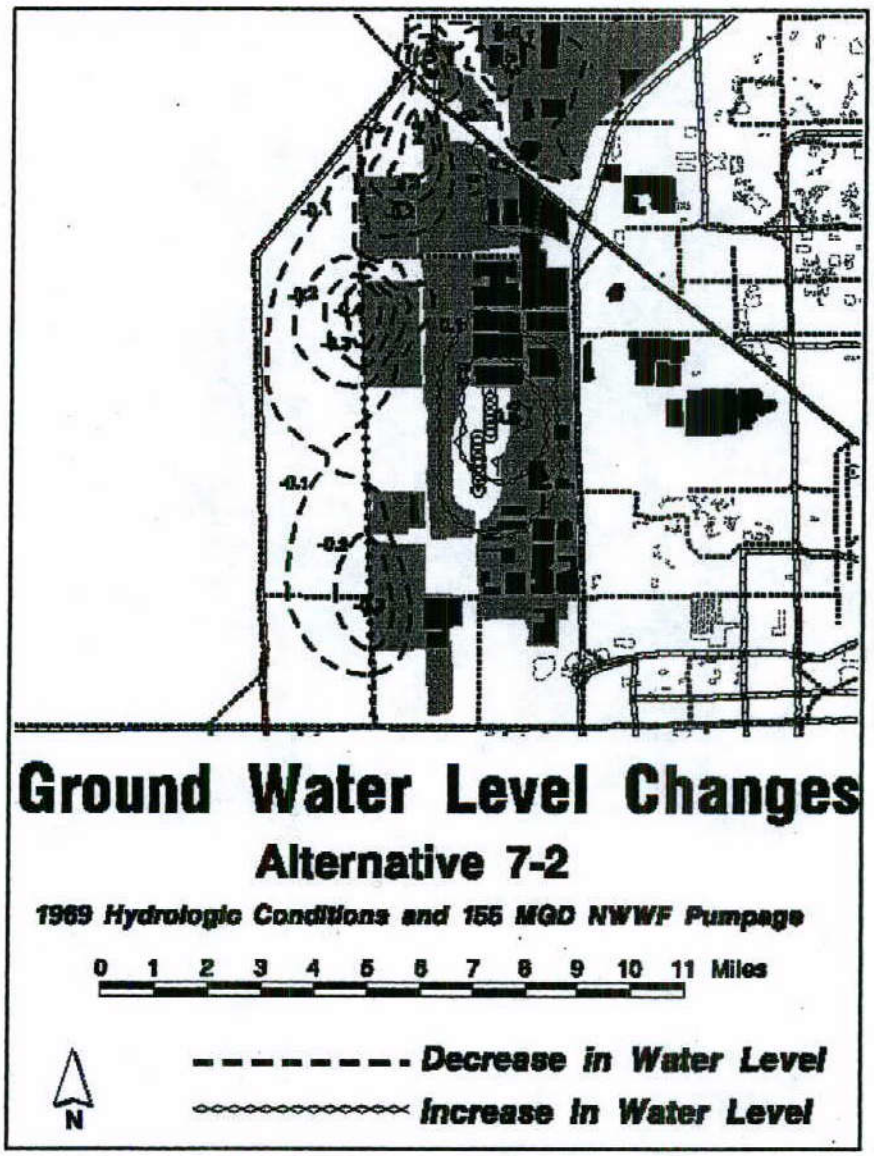


Figure 22. Changes in Ground Water Levels for Mining Alternative 7

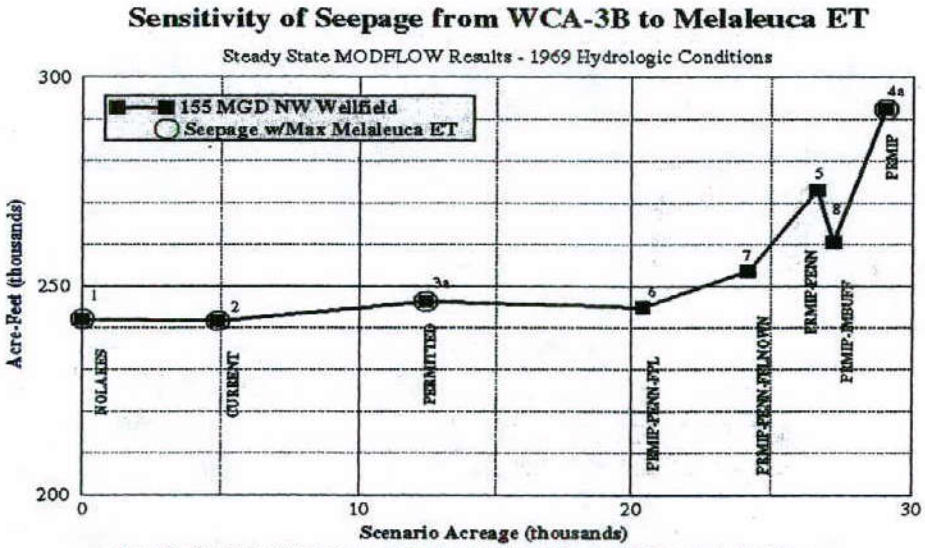


Figure 23. Sensitivity of Seepage from WCA-3B to Melaleuca ET under 1969 Hydrologic Conditions

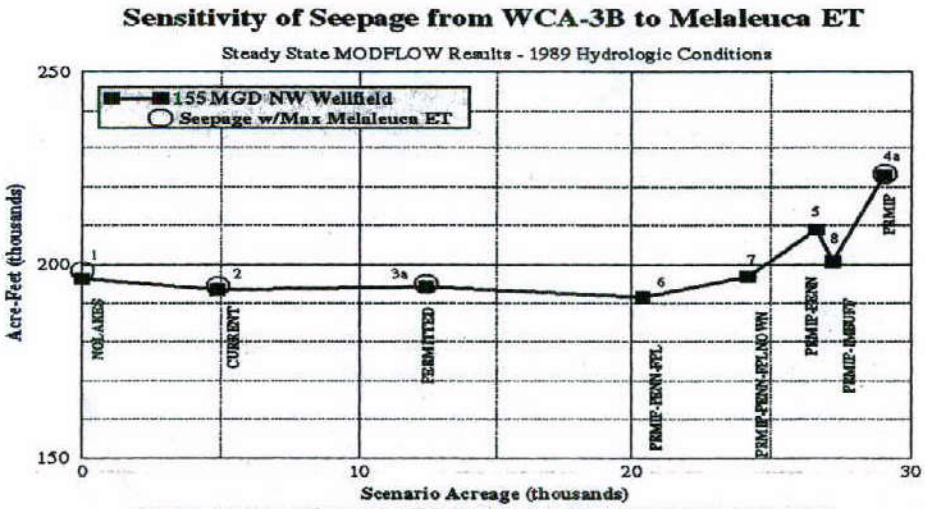


Figure 24. Sensitivity of Seepage from WCA-3B to Melaleuca ET under 1989 Hydrologic Conditions

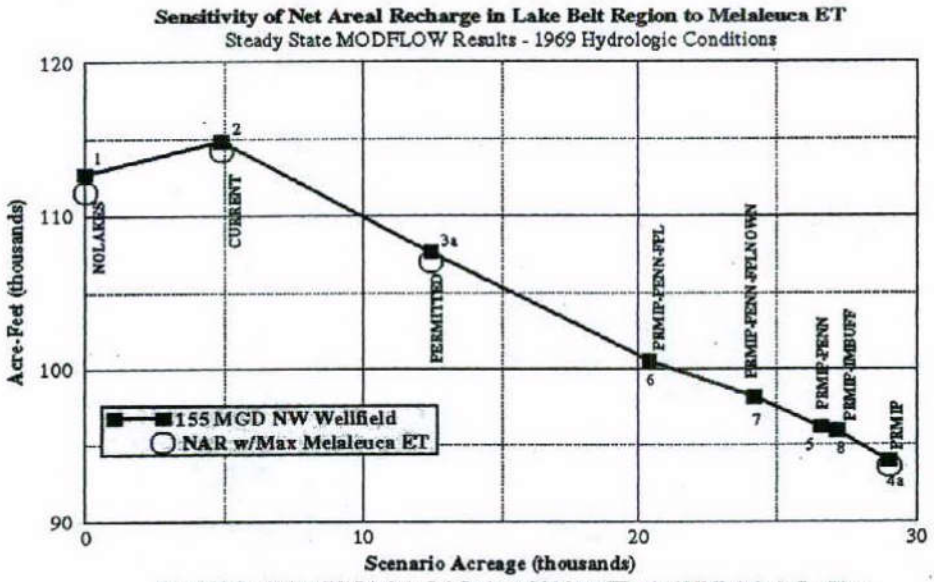


Figure 25. Sensitivity of NAR in Lake Belt Region to Melaleuca ET under 1969 Hydrologic Conditions

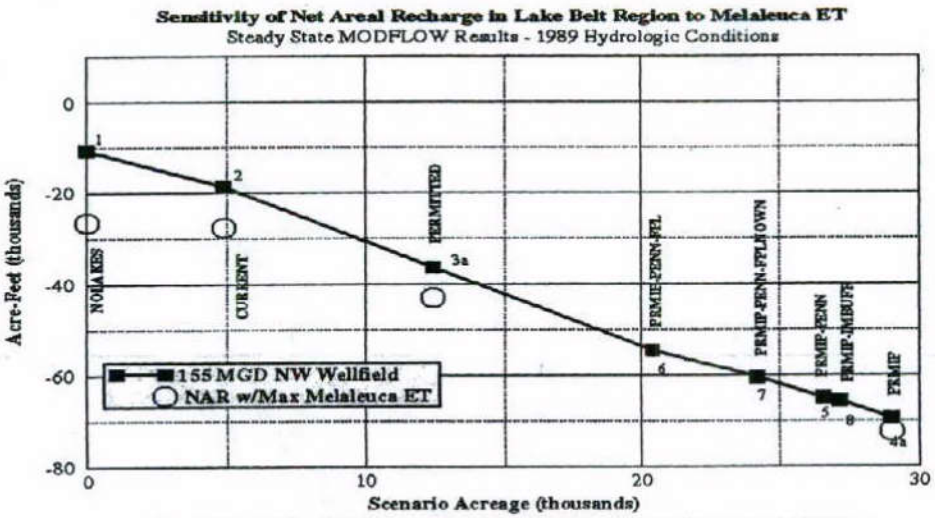


Figure 26. Sensitivity of NAR in Lake Belt Region to Melaleuca ET under 1989 Hydrologic Conditions

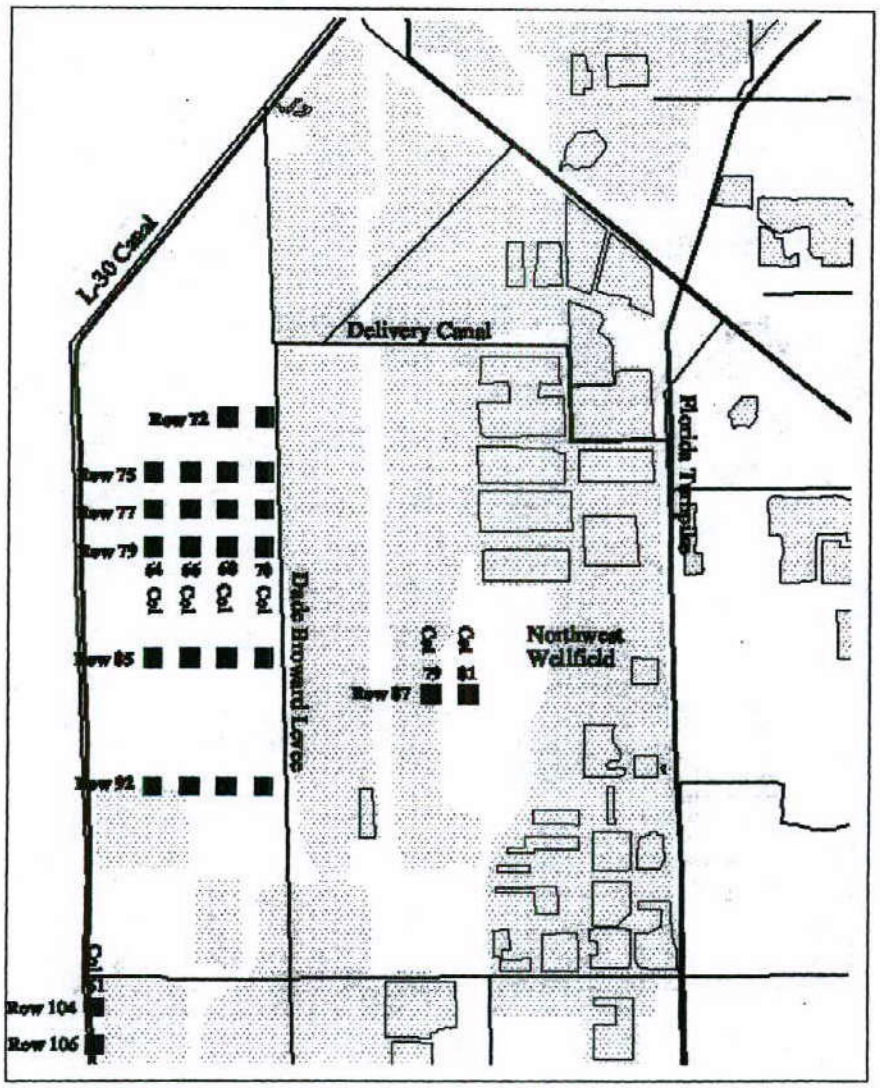


Figure 27. Hydrograph Station Locations for Transient MODFLOW Runs

Figure 28. Water Levels in Pennsuco for 1969

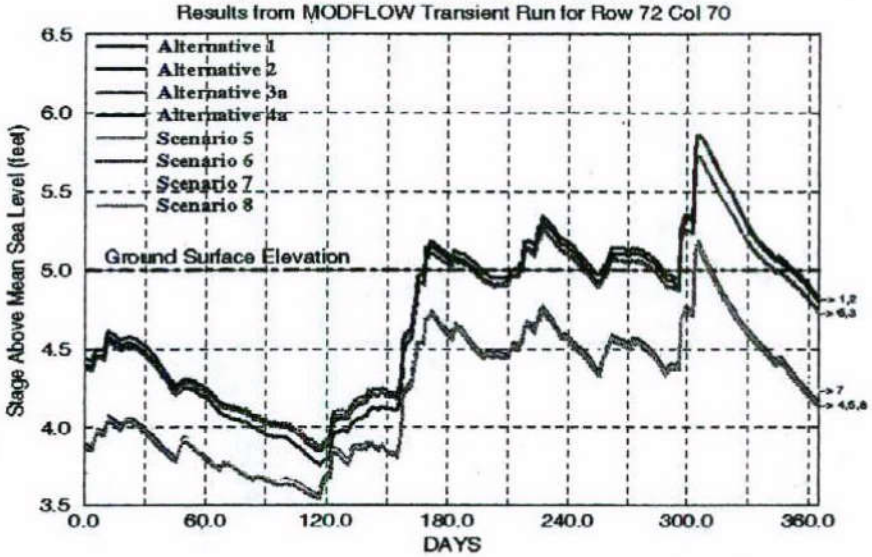


Figure 29. Water Levels in Pennsuco for 1969

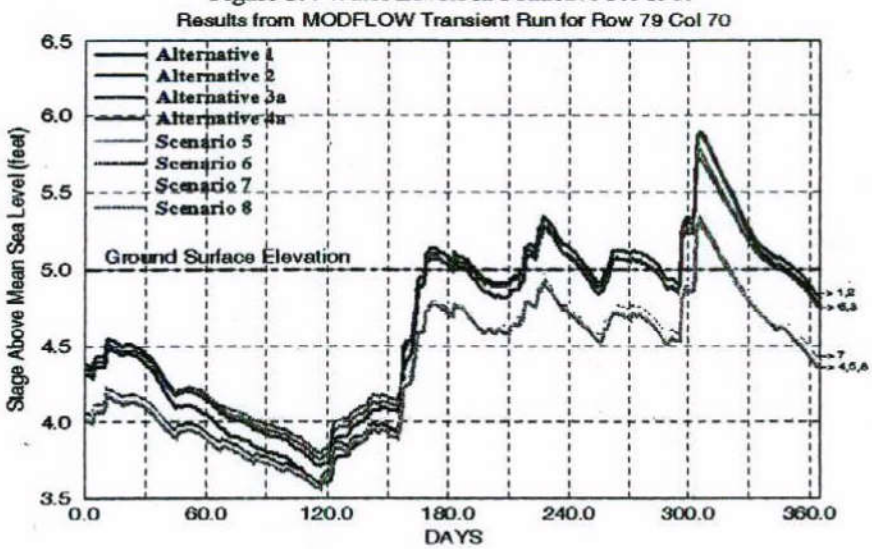


Figure 30. Water Levels in Pennsuco for 1969

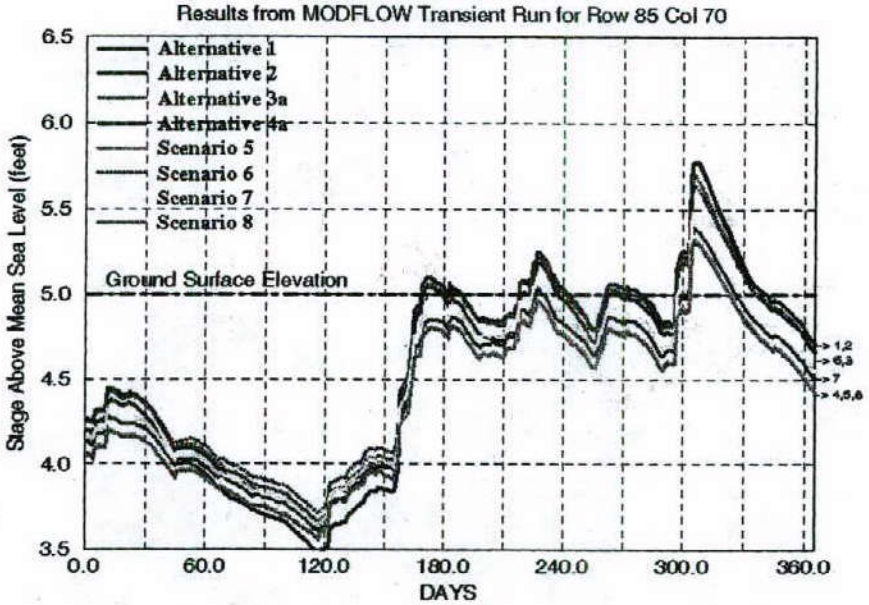


Figure 31. Water Levels in Pennsuco for 1969

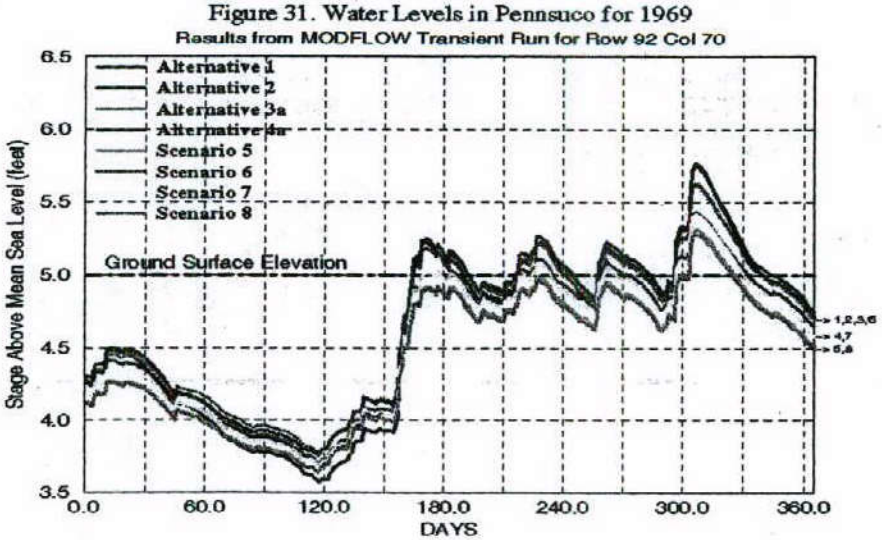


Figure 32. Water Levels in Pennsuco for 1989

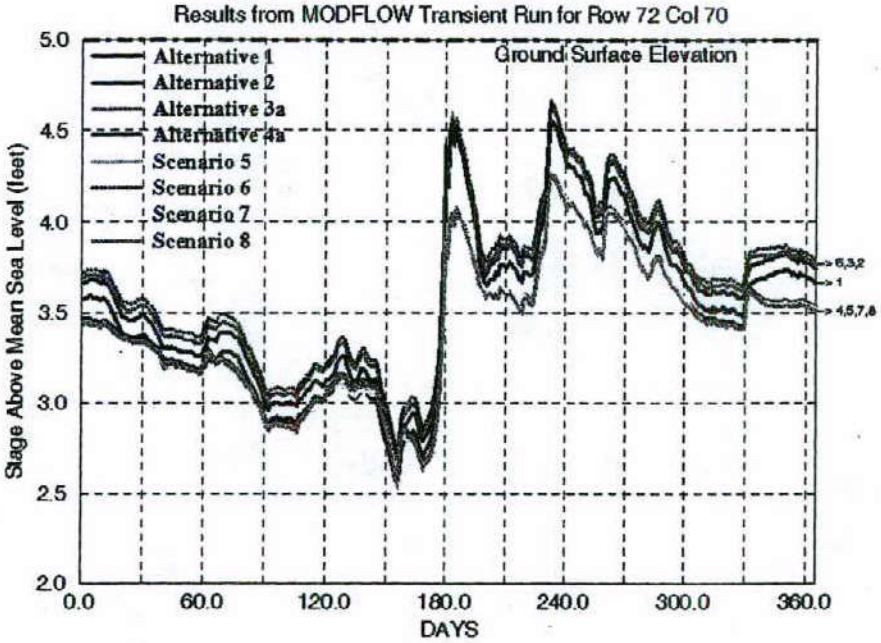


Figure 33. Water Levels in Pennsuco for 1989

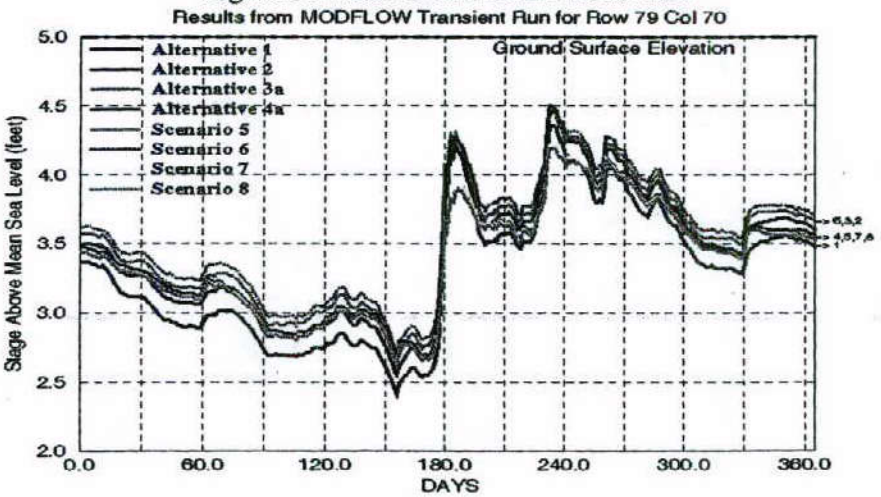


Figure 34. Water Levels in Pennsuco for 1989

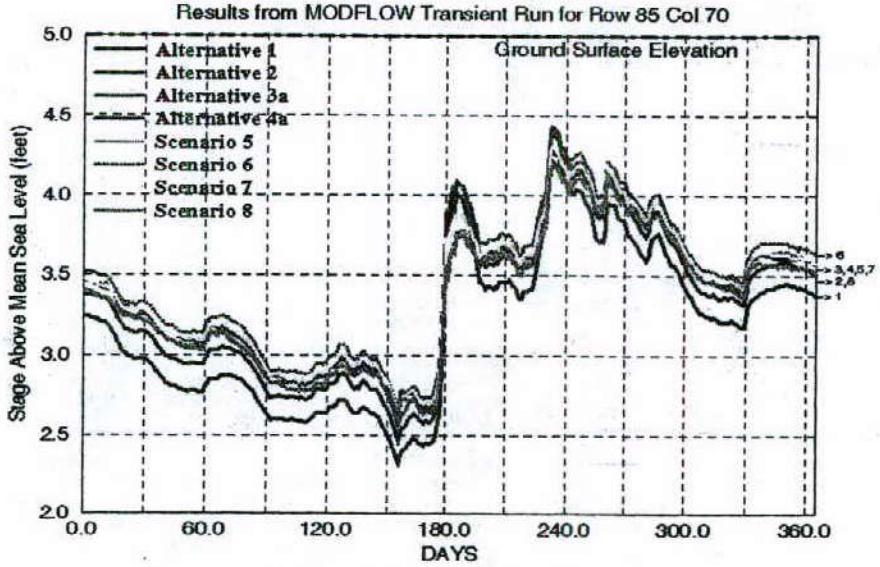


Figure 35. Water Levels in Pennsuco for 1989

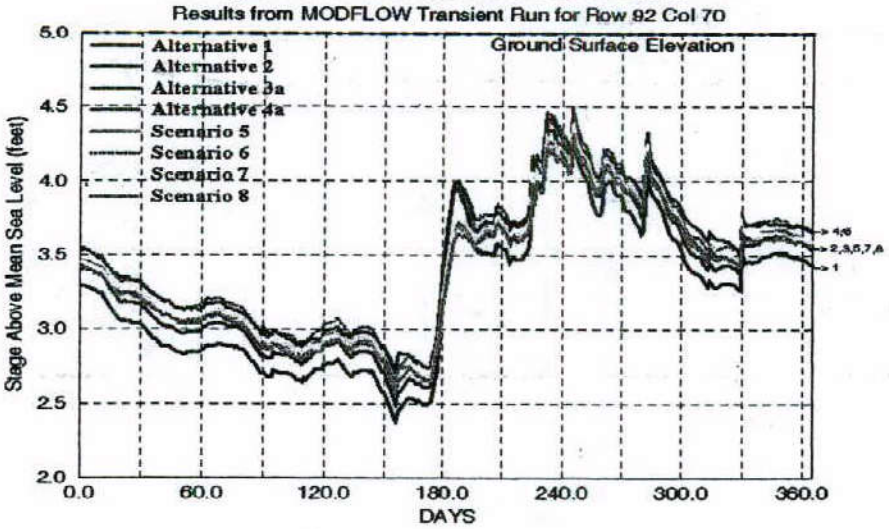


Figure 36. Seepage from WCA–3B for NSM Stages.

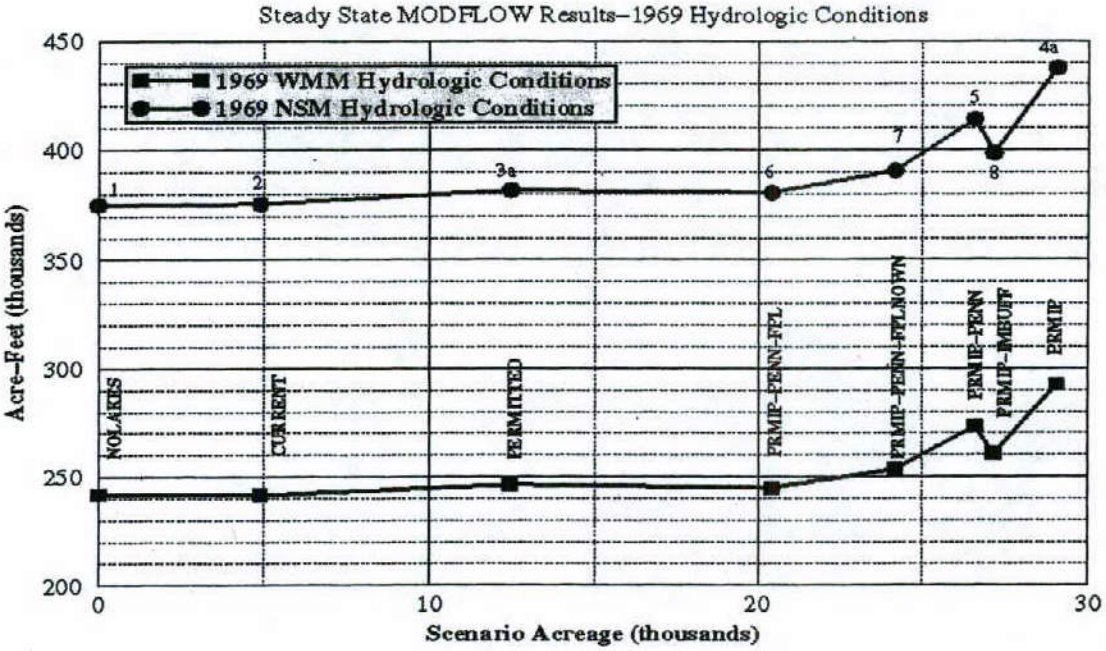
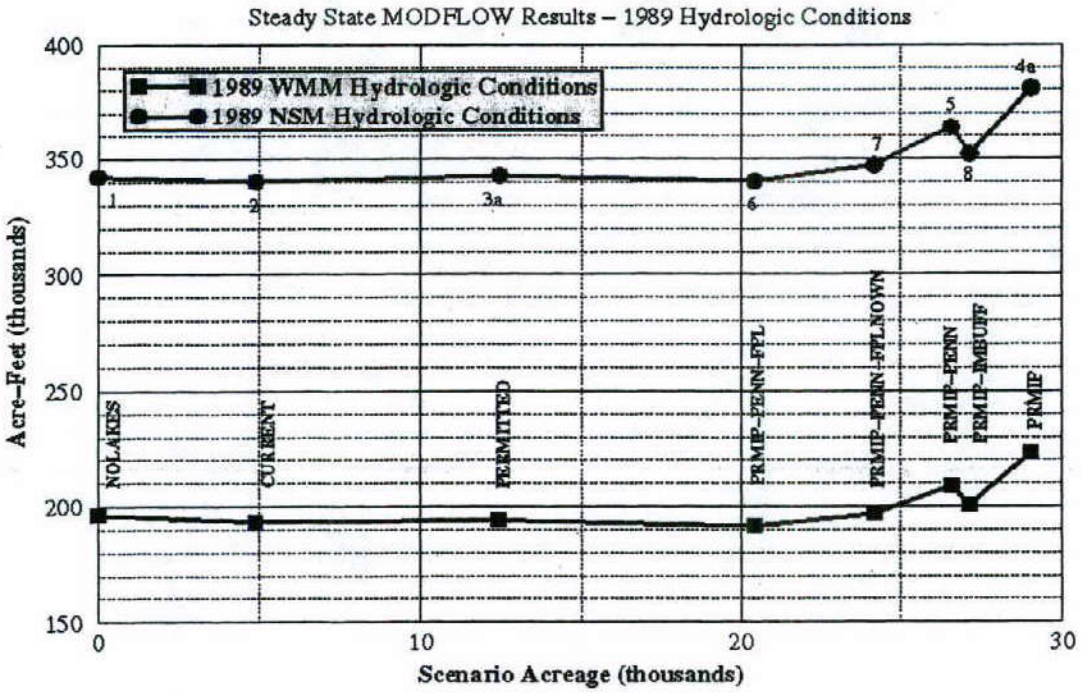


Figure 37. Seepage from WCA–3B for NSM Stages.



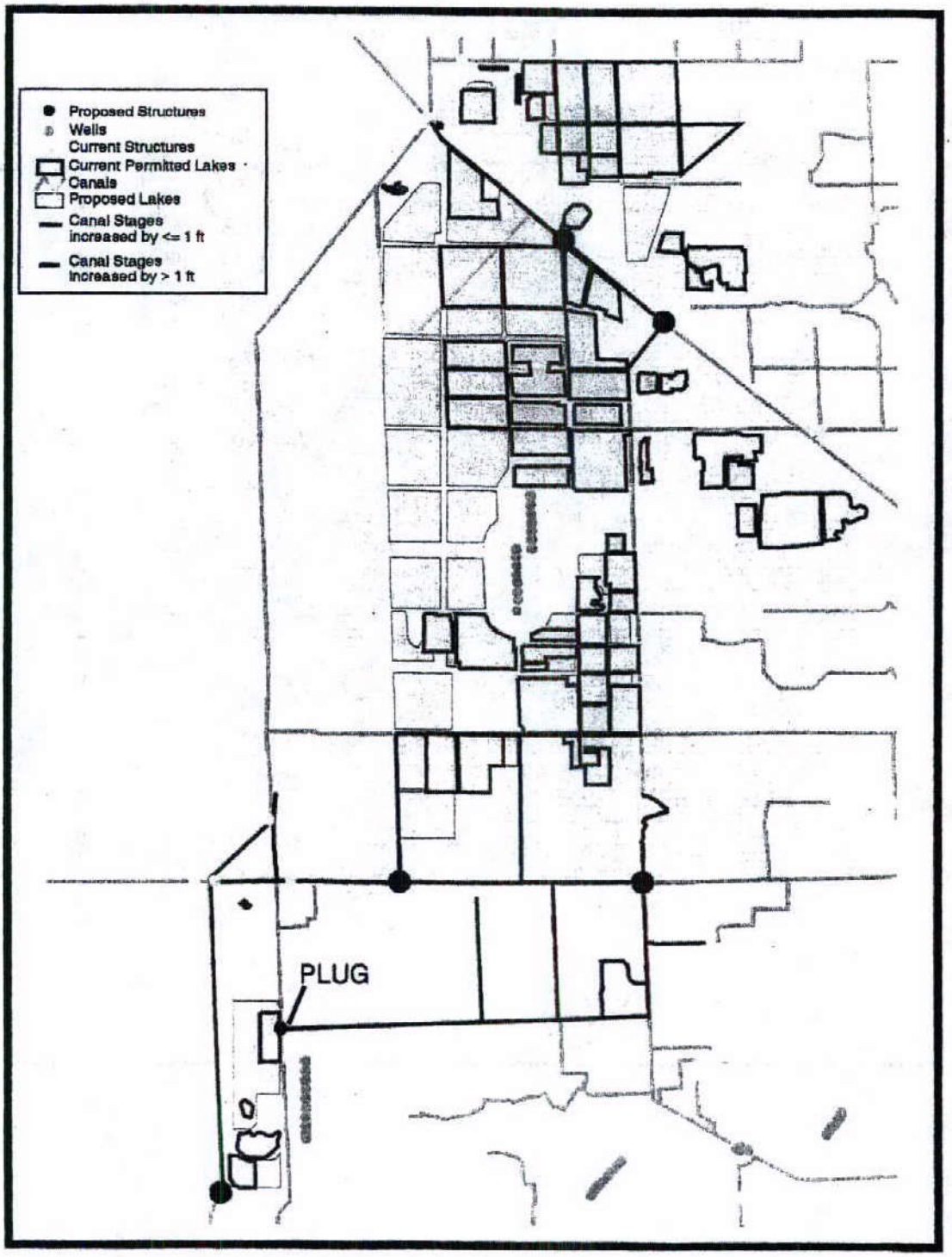


Figure 1. Proposed Mining Plan Along with Structural Improvements

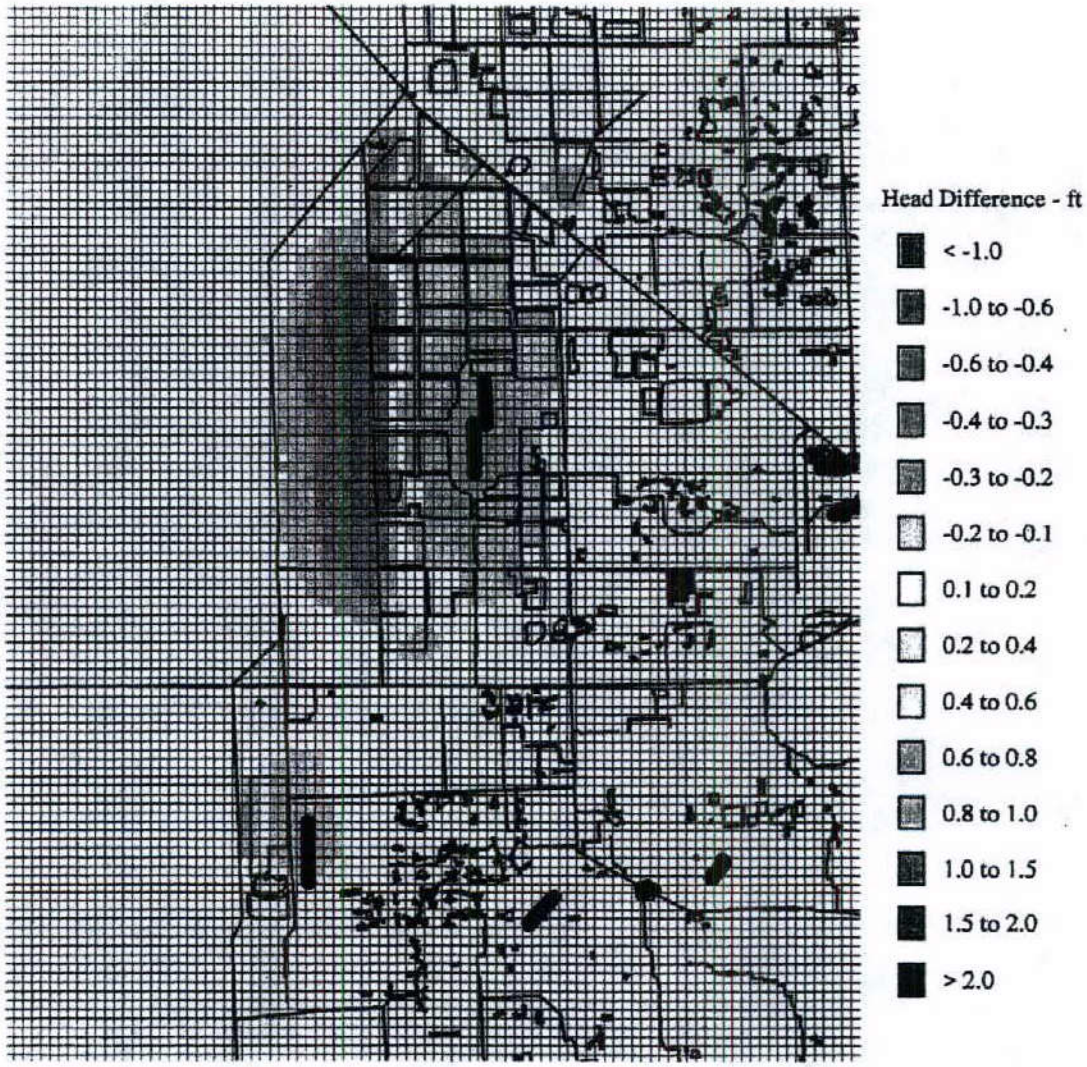


Figure 2 - Lake Belt II MODFLOW Model - 1969 Steady State
Change in Ground Water Levels Between Proposed Configuration without Structures and Permitted Configuration

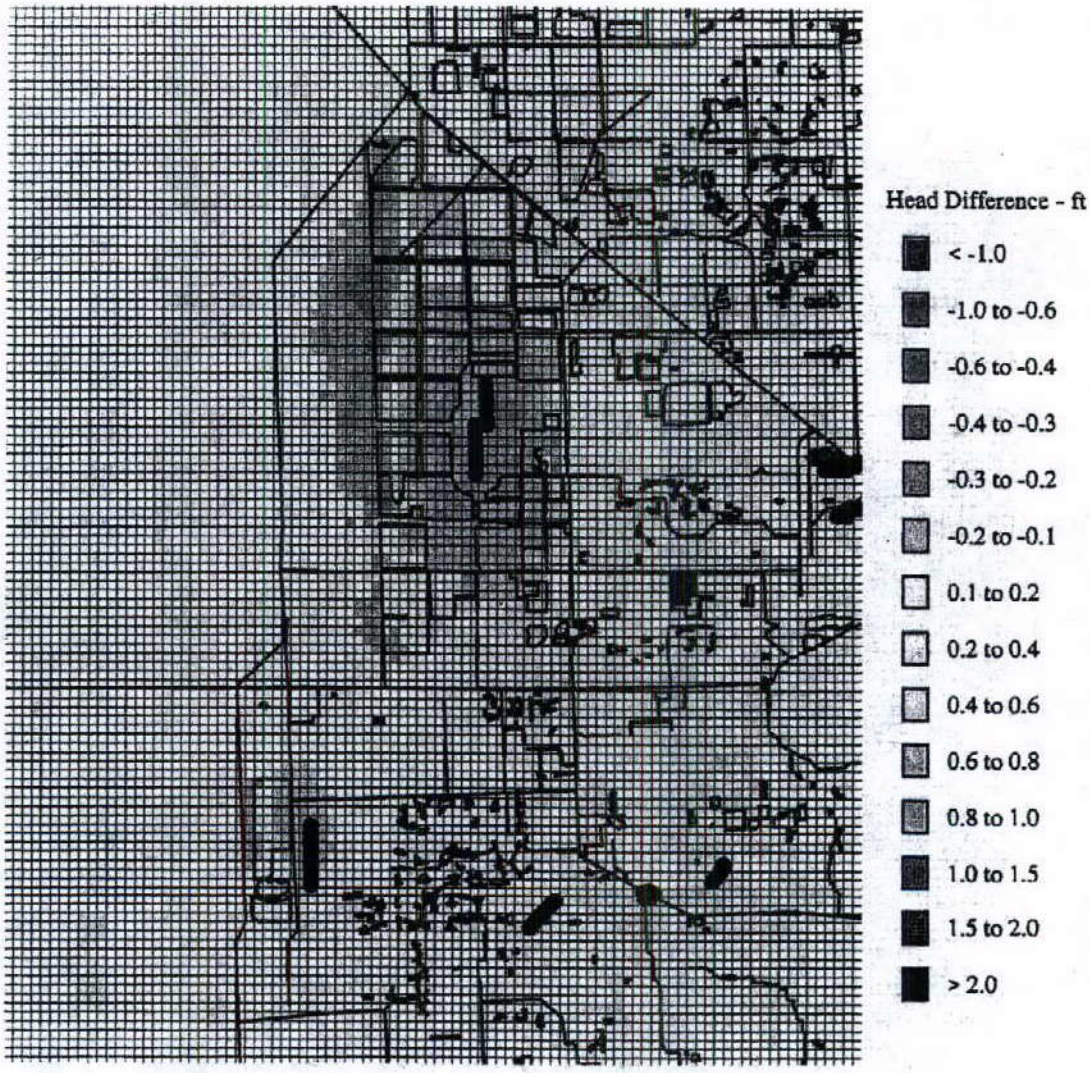


Figure 3 - Lake Belt II MODFLOW Model - 1989 Steady State
Change in Ground Water Levels Between Proposed Configuration without Structures and Permitted Configuration

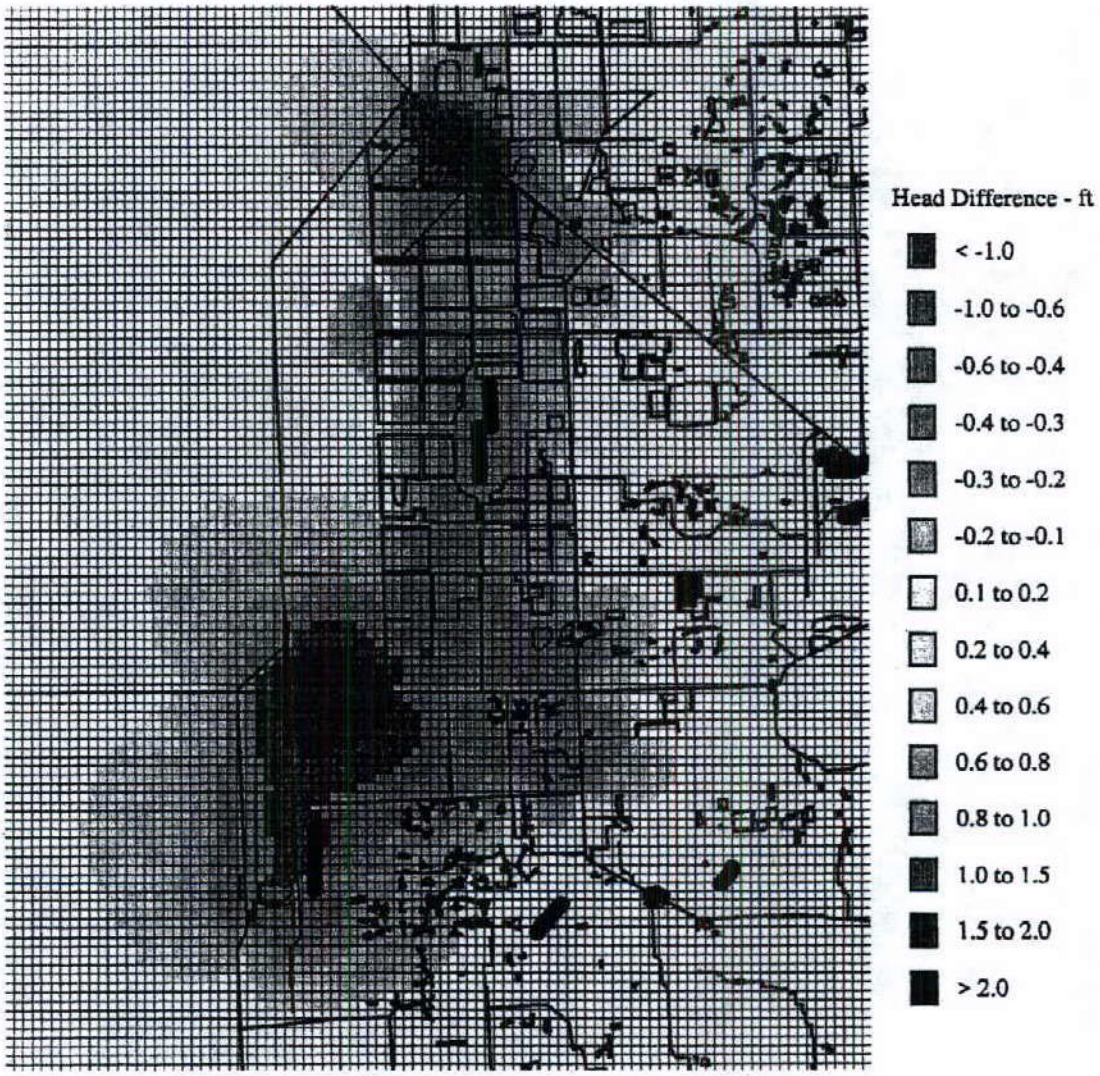


Figure 4 - Lake Belt II MODFLOW Model - 1969 Steady State
Change in Ground Water Levels Between Proposed Configuration with Structures and Permitted Configuration

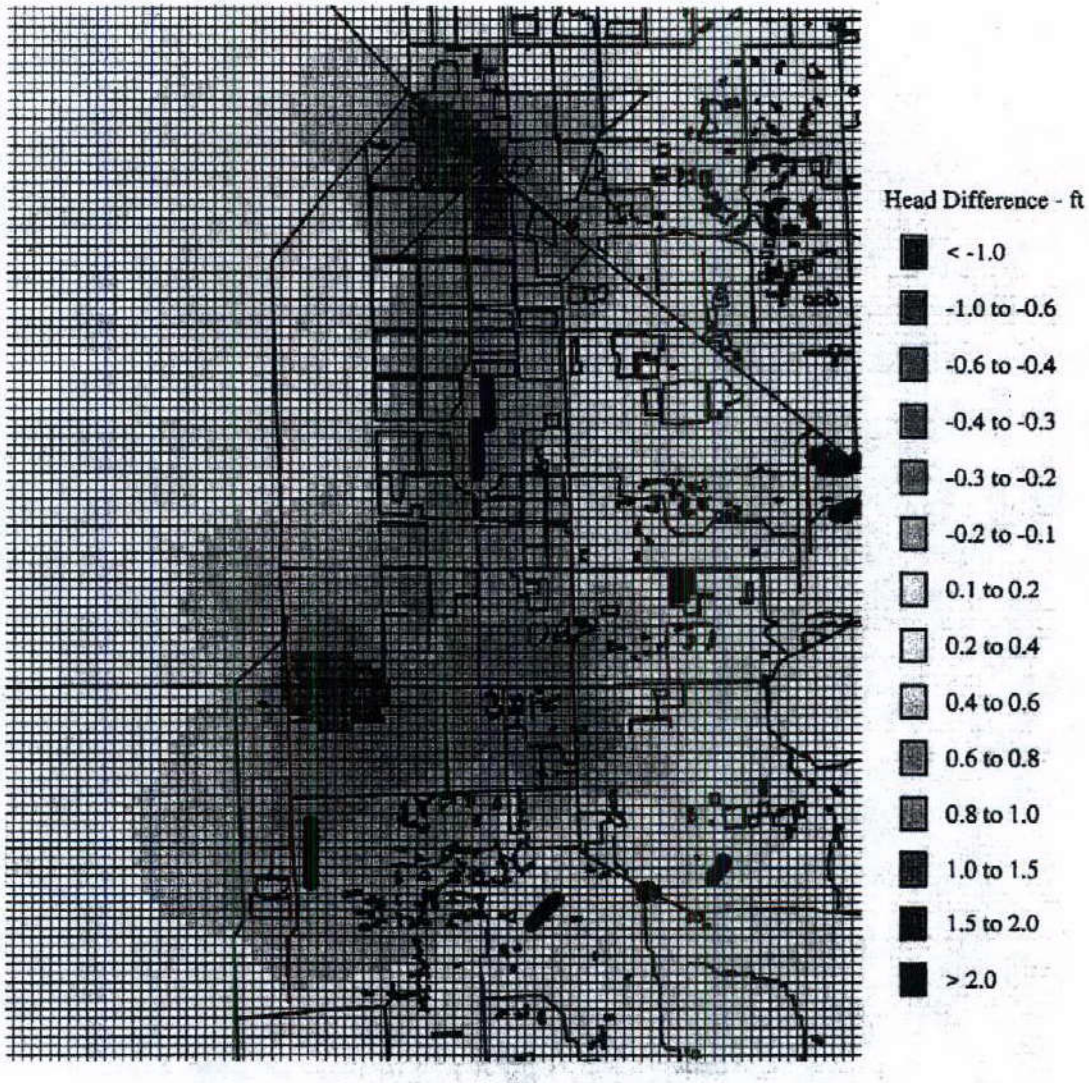


Figure 5 - Lake Belt II MODFLOW Model - 1989 Steady State Change in Ground Water Levels Between Proposed Configuration with Structures and Permitted Configuration

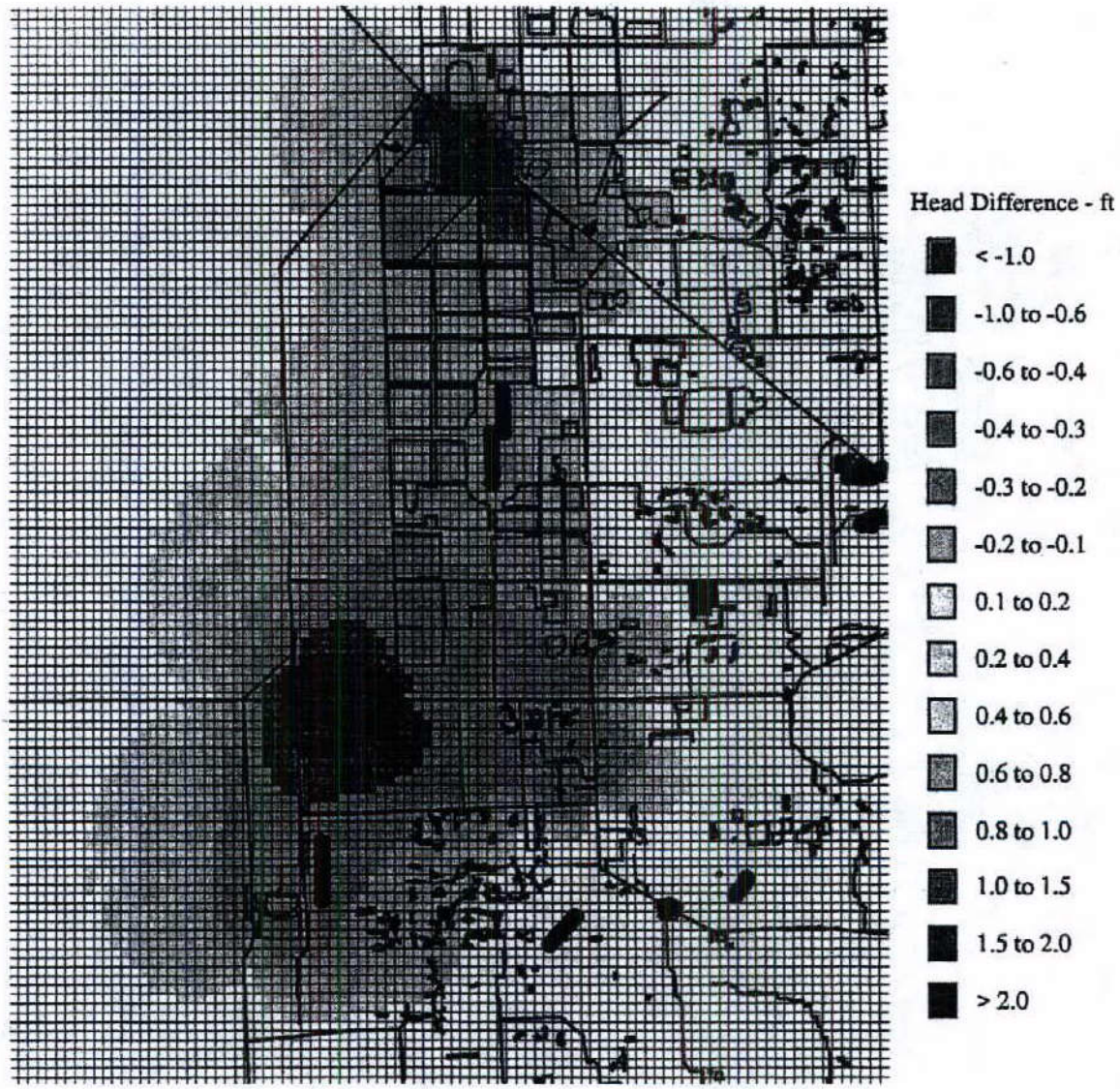


Figure 6 - Lake Belt II MODFLOW Model - 1969 Steady State Change in Ground Water Levels Between Proposed Configuration with Structures and Proposed Configuration without Structures

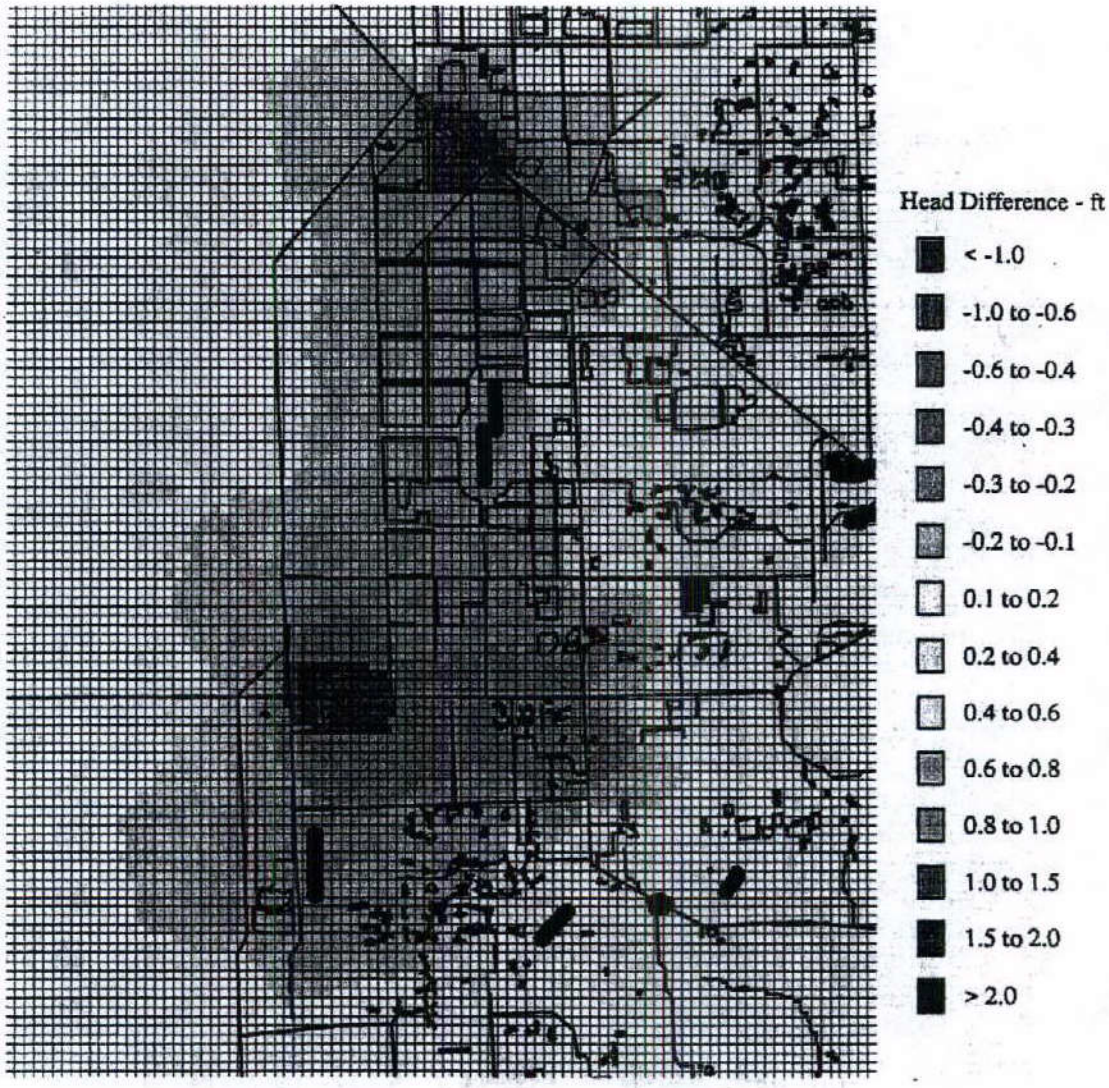


Figure 7 - Lake Belt II MODFLOW Model - 1989 Steady State
Change in Ground Water Levels Between Proposed Configuration with Structures and Proposed Configuration without Structures

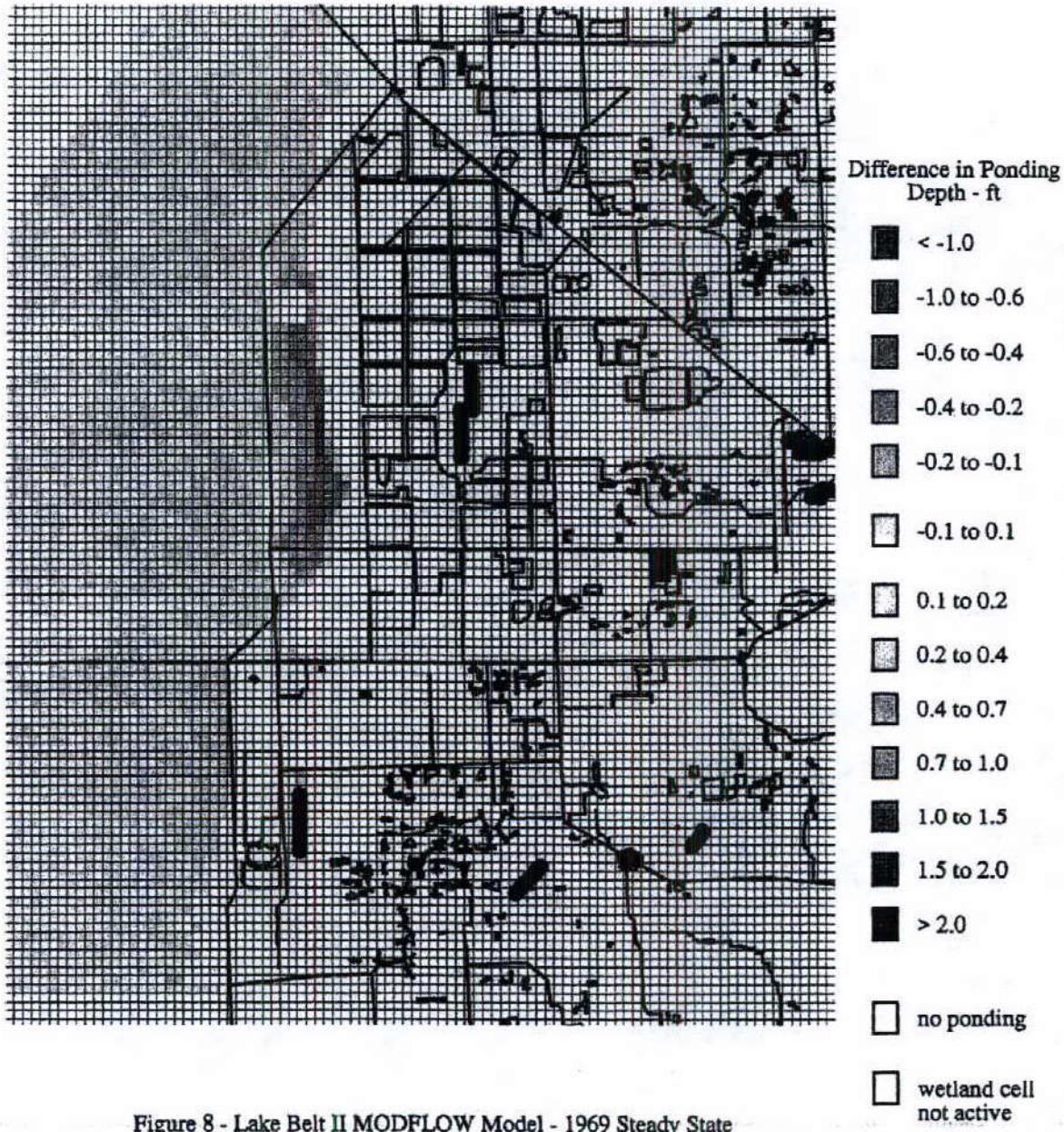


Figure 8 - Lake Belt II MODFLOW Model - 1969 Steady State
Change in Ponding Depths Between Proposed Configuration without Structures and Permitted Configuration

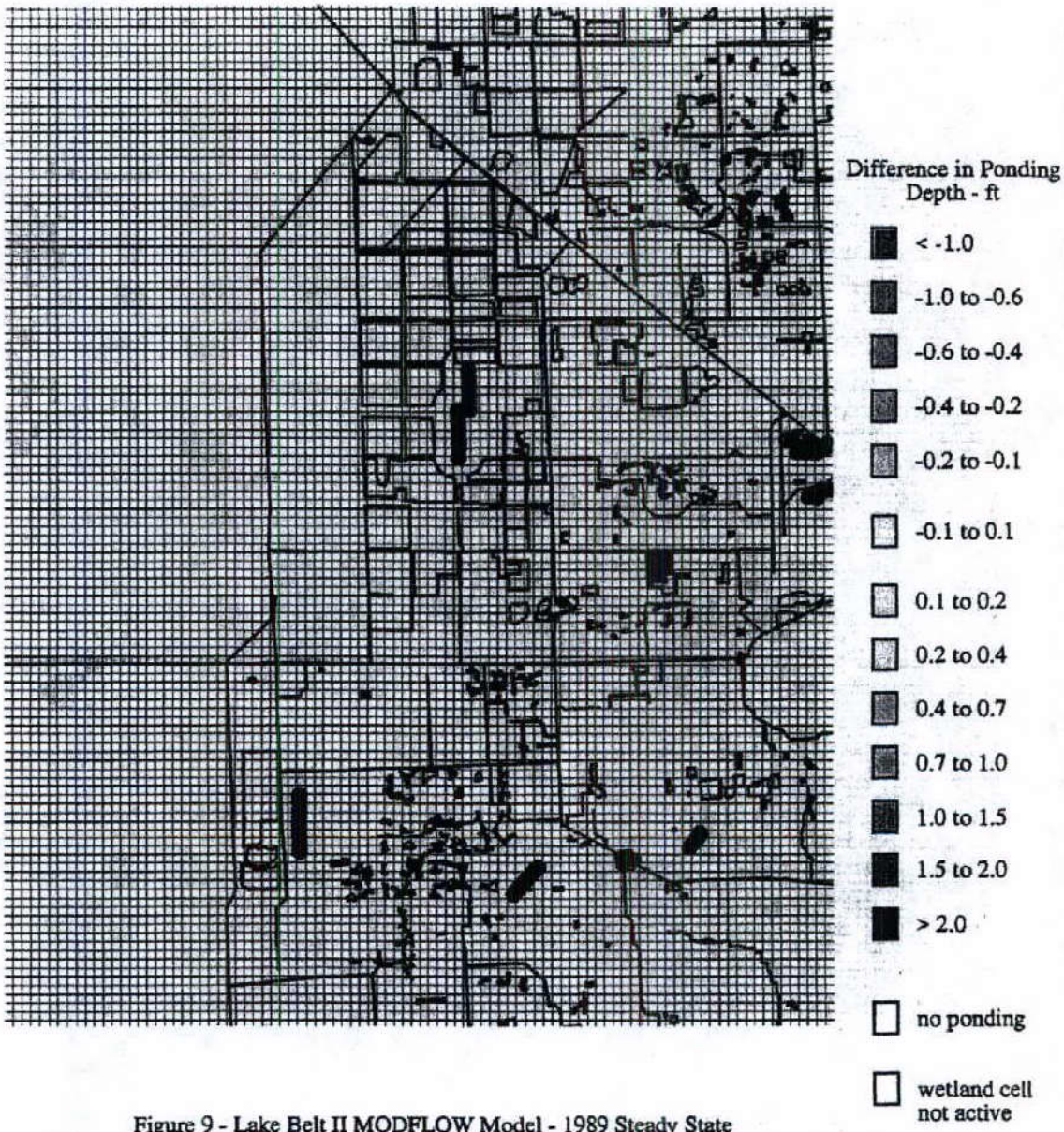


Figure 9 - Lake Belt II MODFLOW Model - 1989 Steady State
Change in Ponding Depths Between Proposed Configuration without Structures and Permitted Configuration

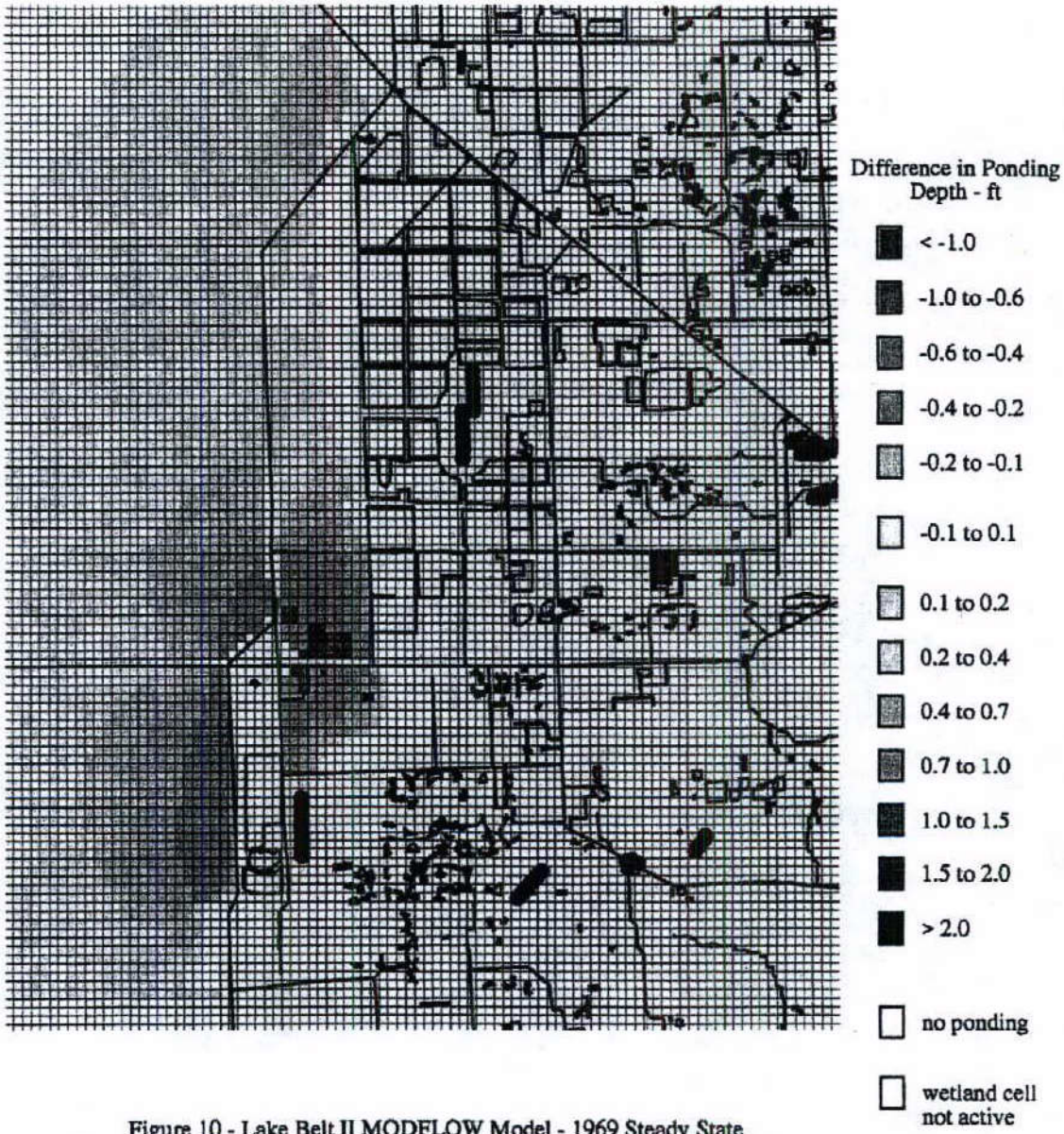


Figure 10 - Lake Belt II MODFLOW Model - 1969 Steady State
Change in Ponding Depths Between Proposed Configuration with Structures and Permitted Configuration

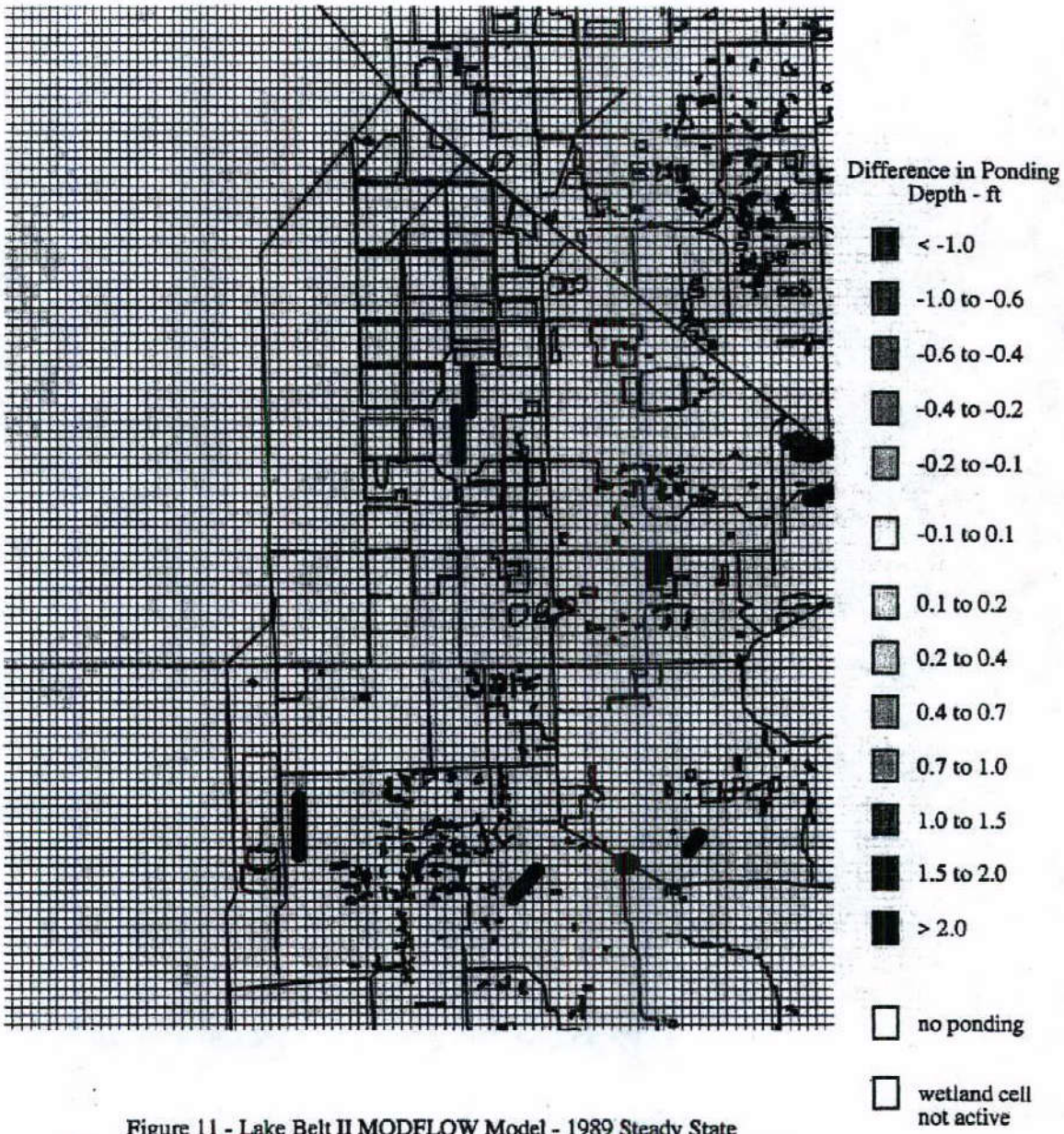


Figure 11 - Lake Belt II MODFLOW Model - 1989 Steady State
Change in Ponding Depths Between Proposed Configuration with Structures and Permitted Configuration

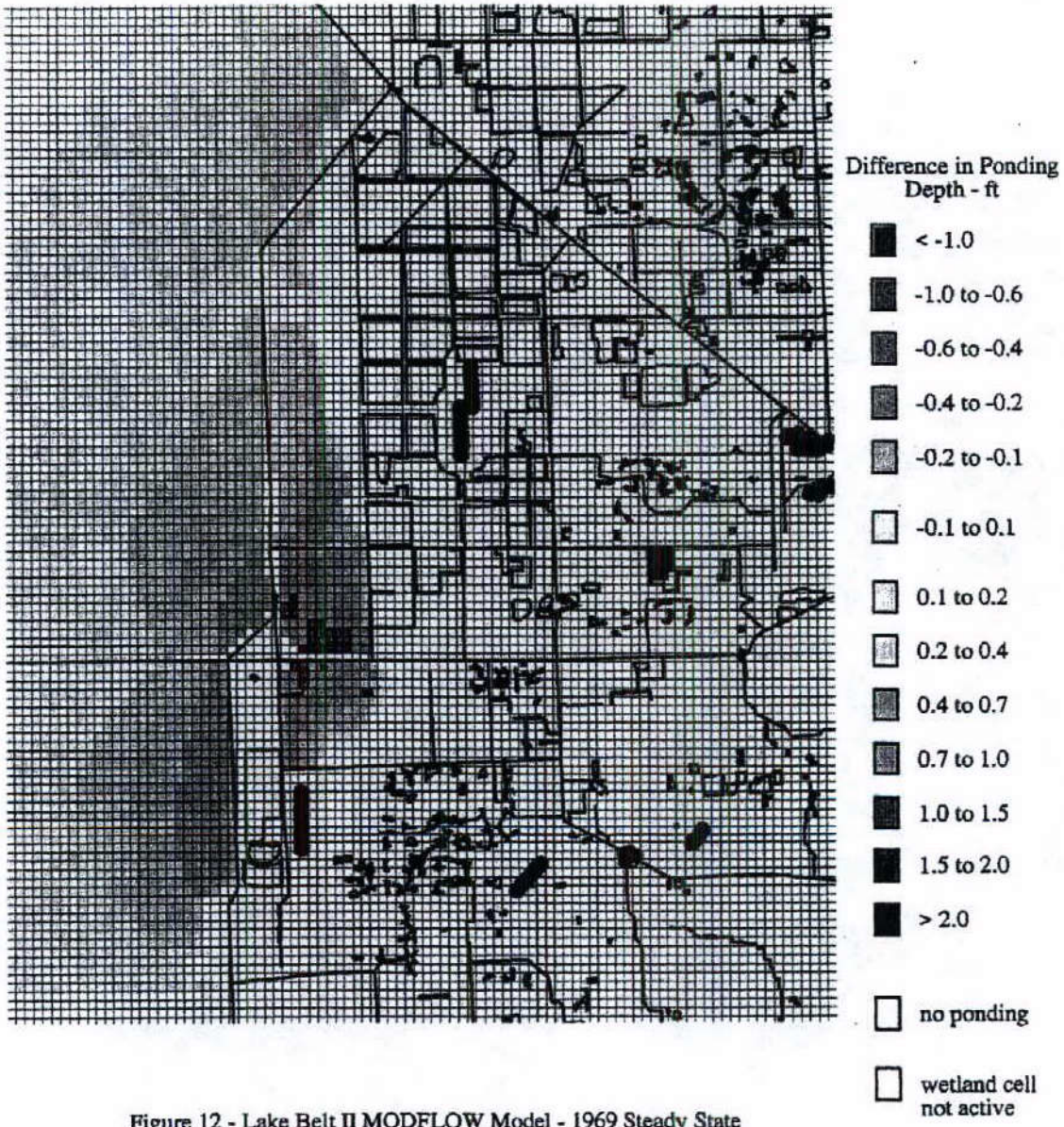


Figure 12 - Lake Belt II MODFLOW Model - 1969 Steady State
Change in Ponding Depths Between Proposed Configuration with Structures
and Proposed Configuration without Structures

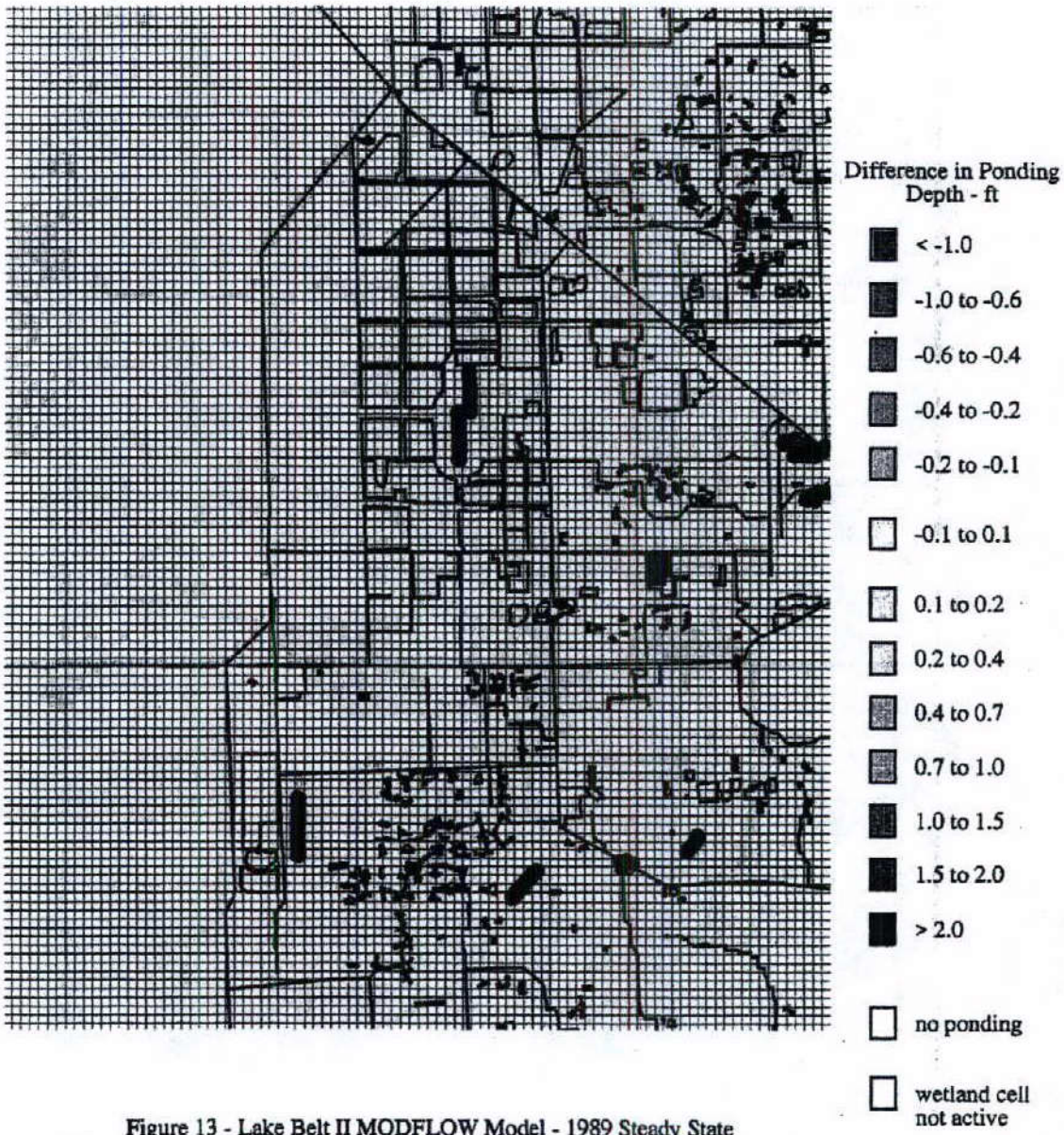


Figure 13 - Lake Belt II MODFLOW Model - 1989 Steady State Change in Ponding Depths Between Proposed Configuration with Structures and Proposed Configuration without Structures

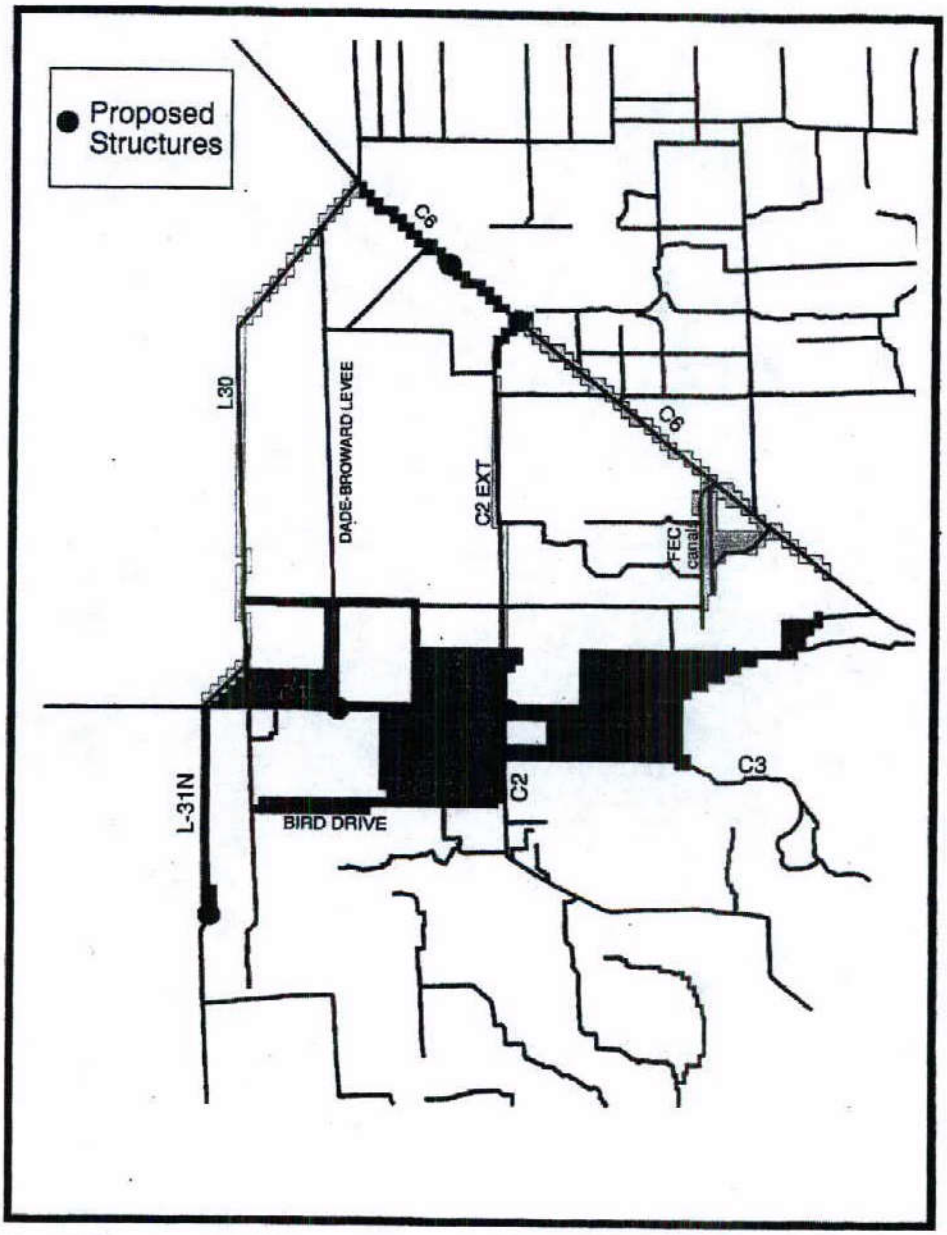


Figure 14. Canal Base Flow Water Budget Areas

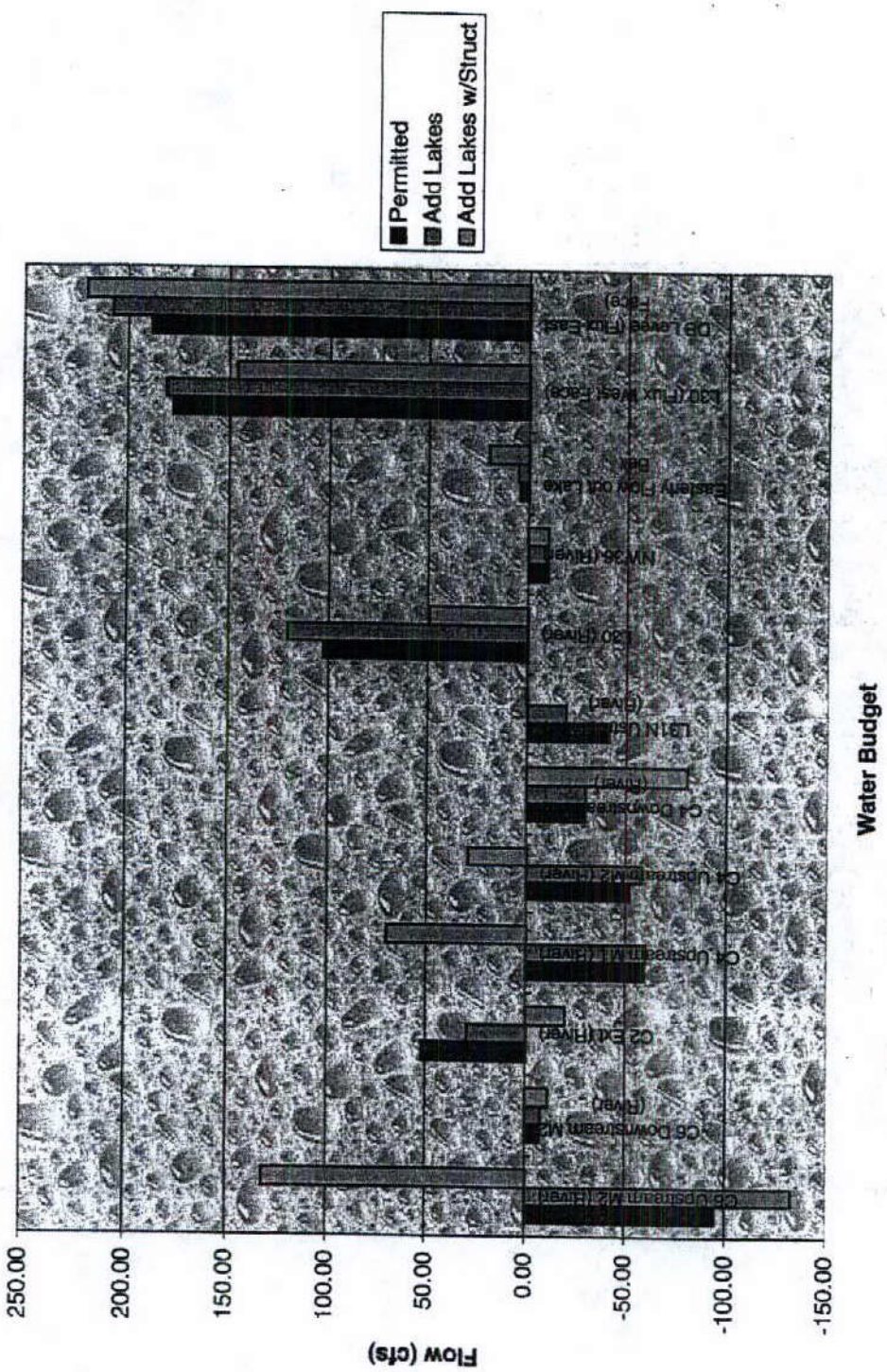


Figure 15: Water Budgets for 1969 (wet conditions)

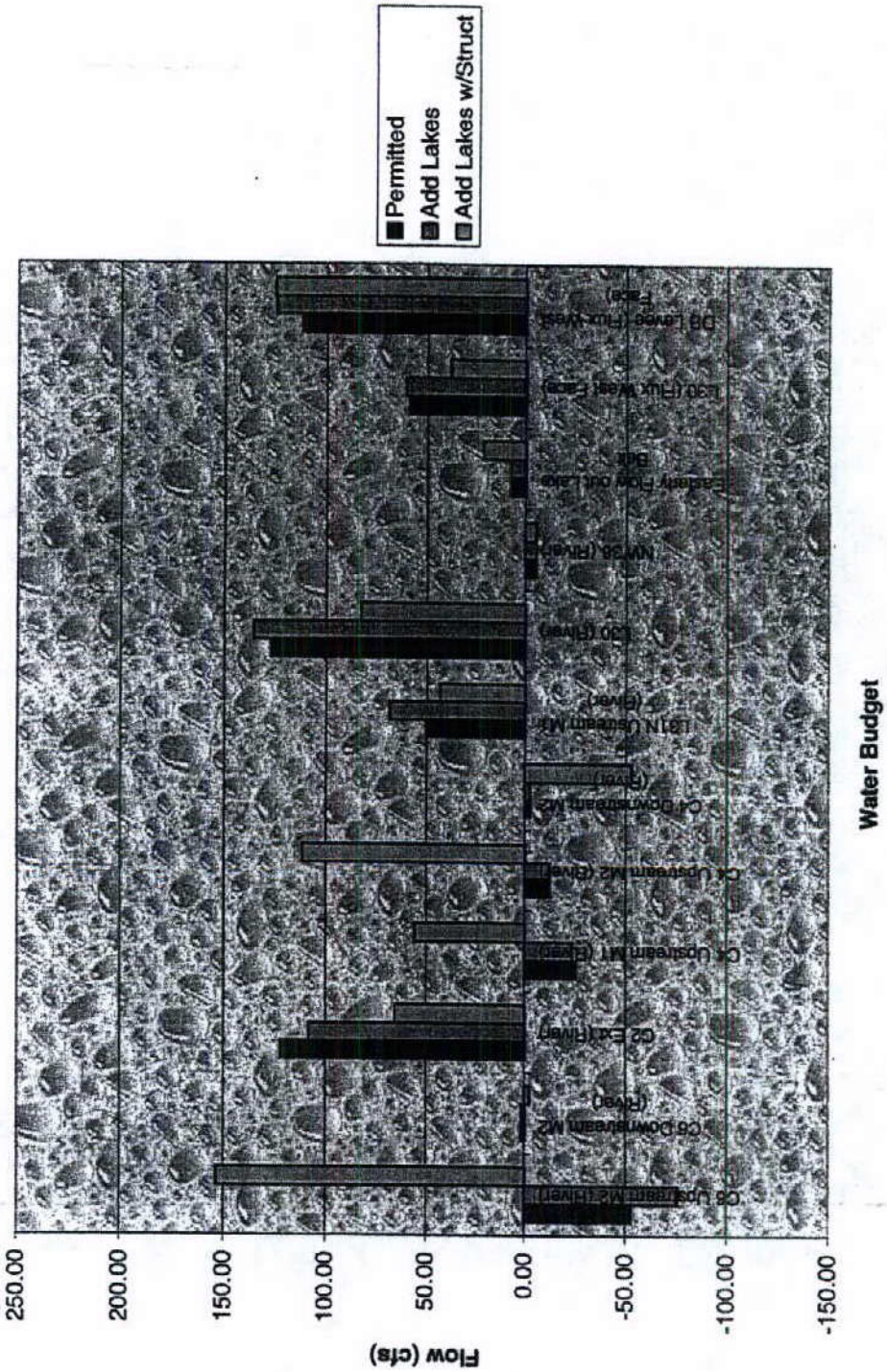


Figure 16: Water Budgets for 1989 (dry conditions)

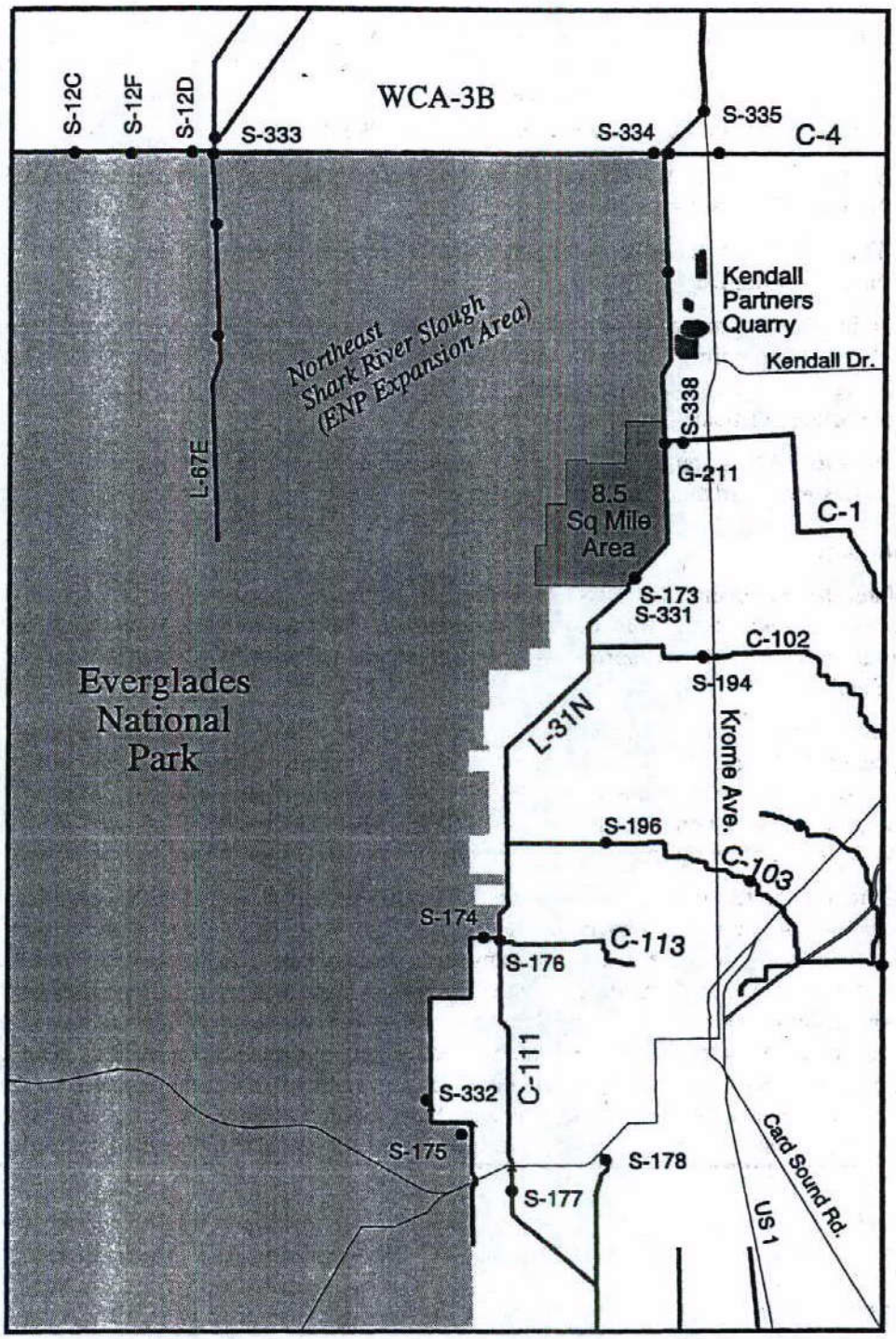


Figure 1. General location sketch of Southwest Dade County

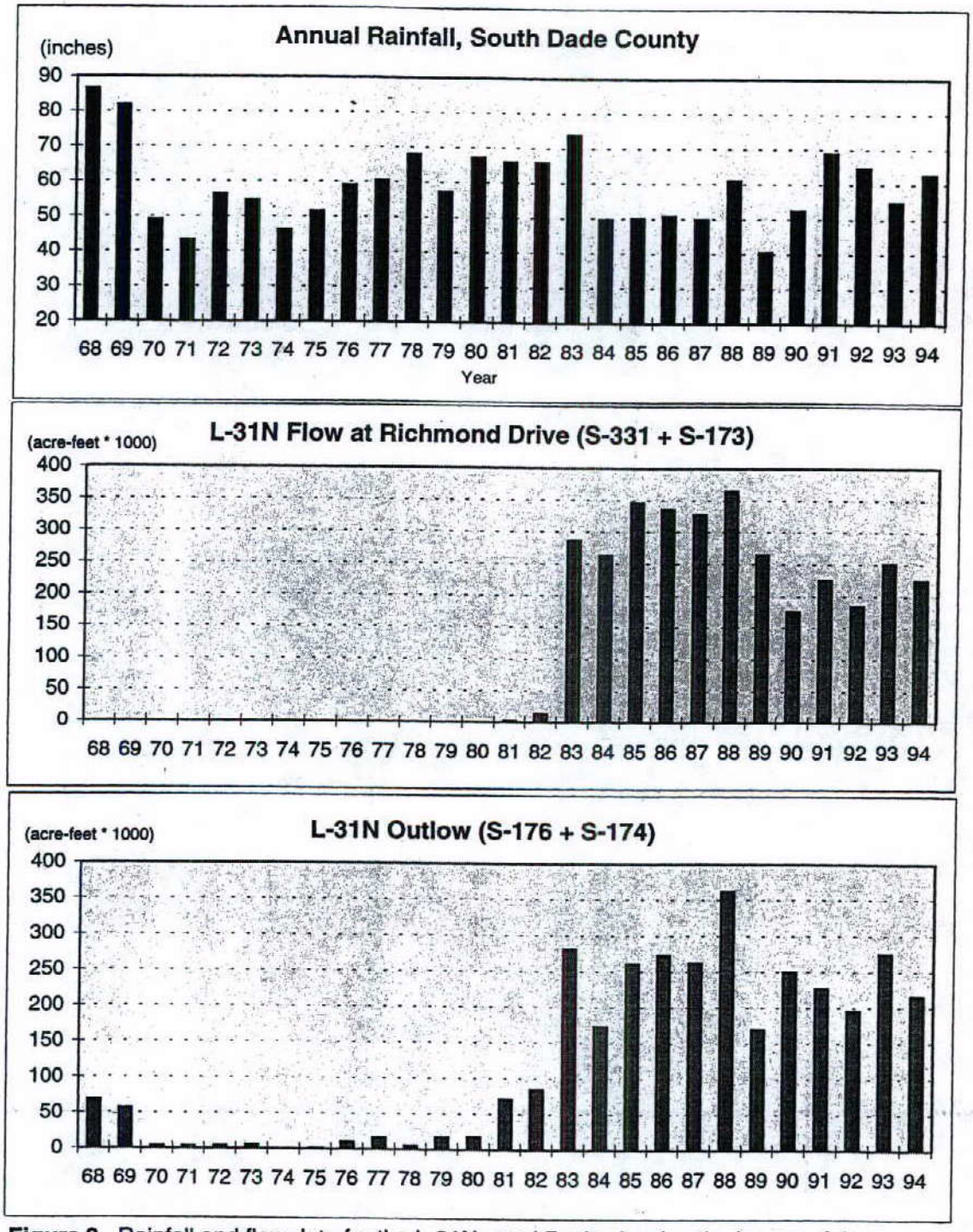


Figure 2. Rainfall and flow data for the L-31N canal Basin showing the impact of the operation of the South Dade Conveyance System on canal flow into C-111. 1968 and 1969 recorded the most rainfall but L-31N flow was not significant compared to years after 1982.

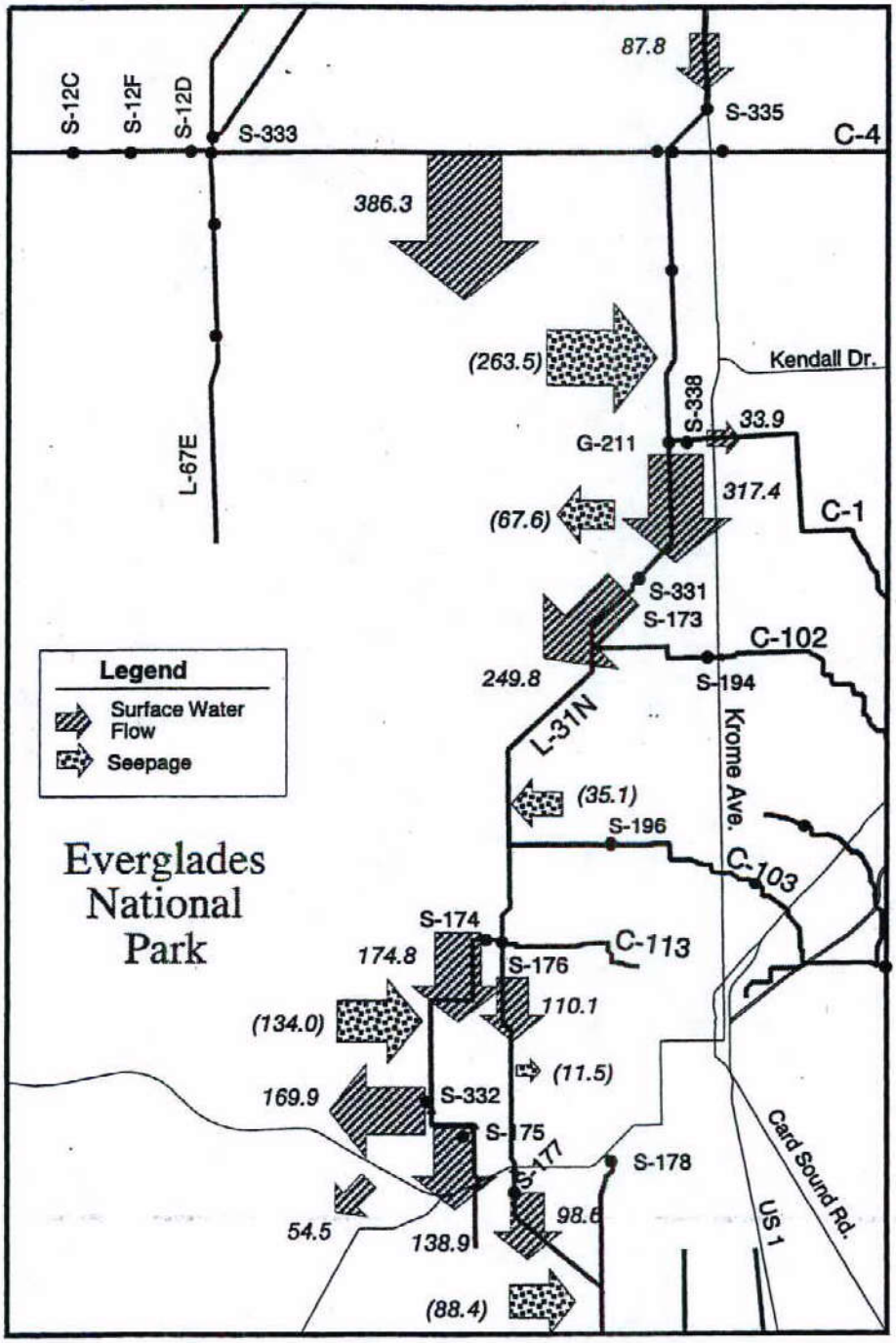


Figure 3. Water flow data in the South Dade canal system. Note the dominance of the seepage flow through G-211 throughout all downstream canals. (SFWMD, 1994)

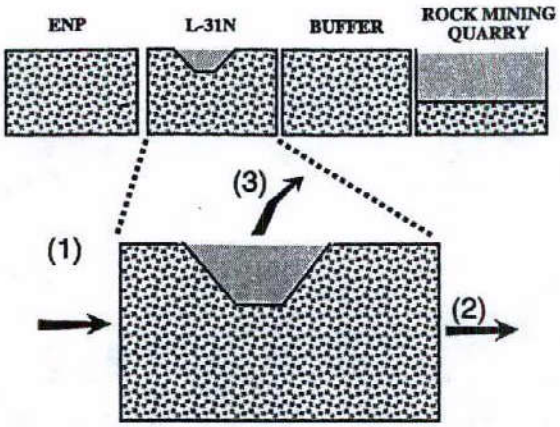


Figure 4. Model cell configuration in the vicinity of the L-32N canal

Flow from Everglades National Park (1) is taken as groundwater flow from the cell west of the canal into the cell containing the canal. Flow to the east (2) is the groundwater flow leaving the cell with the canal and moving to the east. The flow intercepted by the L-31N canal (3) is the amount of water removed from the cell by the L-31N canal which was simulated using the river package in Modflow.

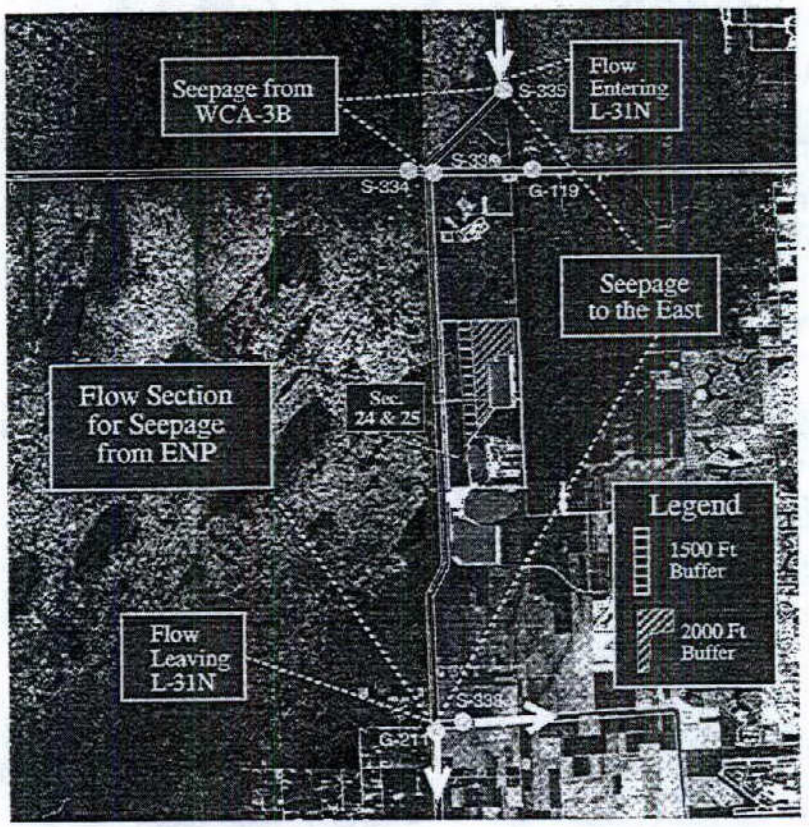
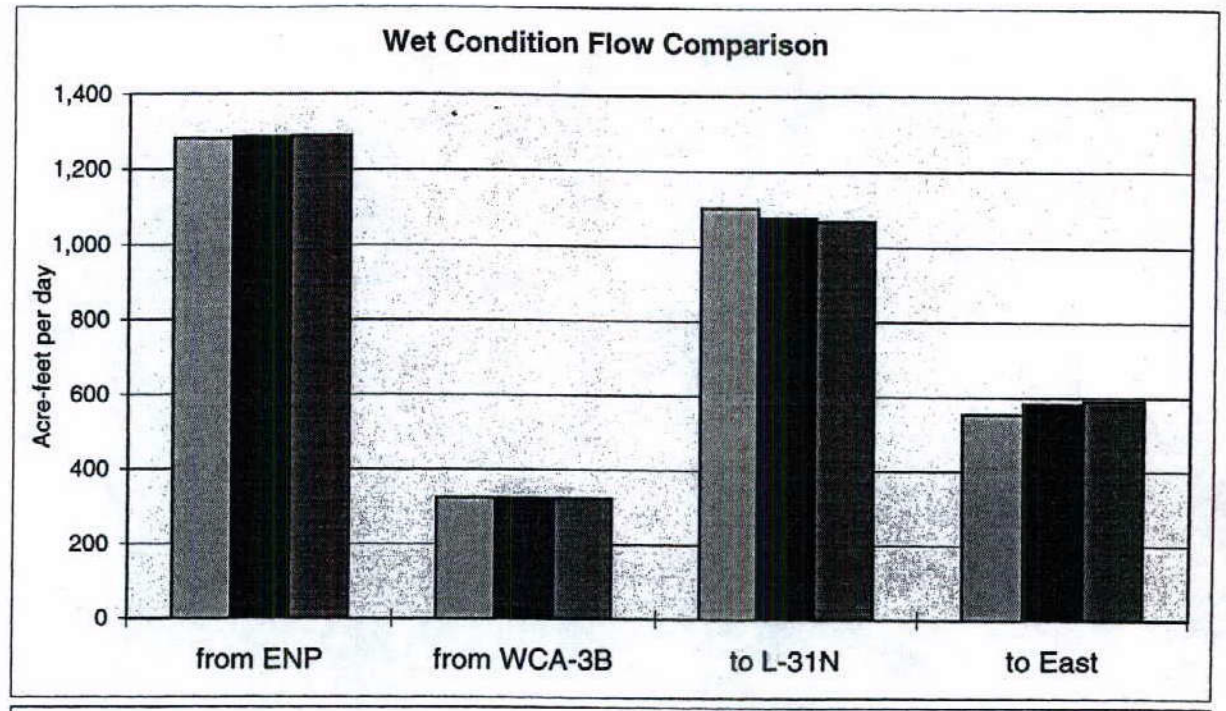


Figure 5. Schematic of model area showing flow section locations used in comparing model results.



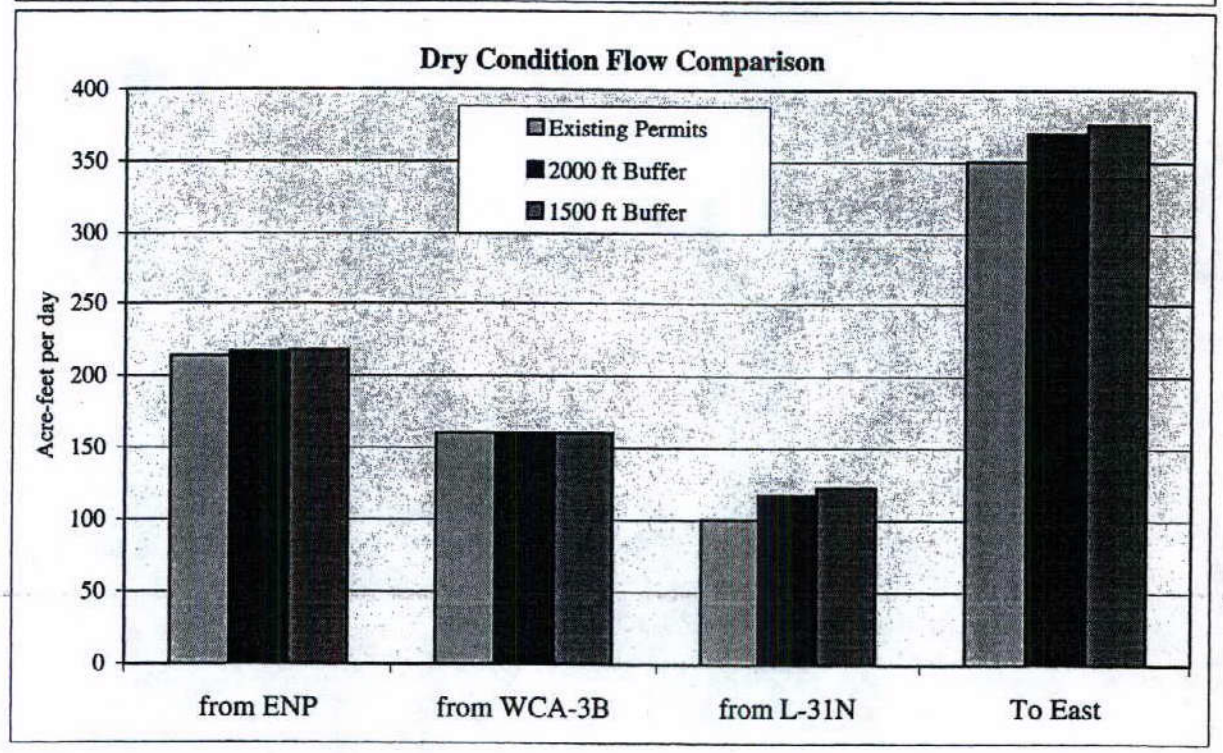
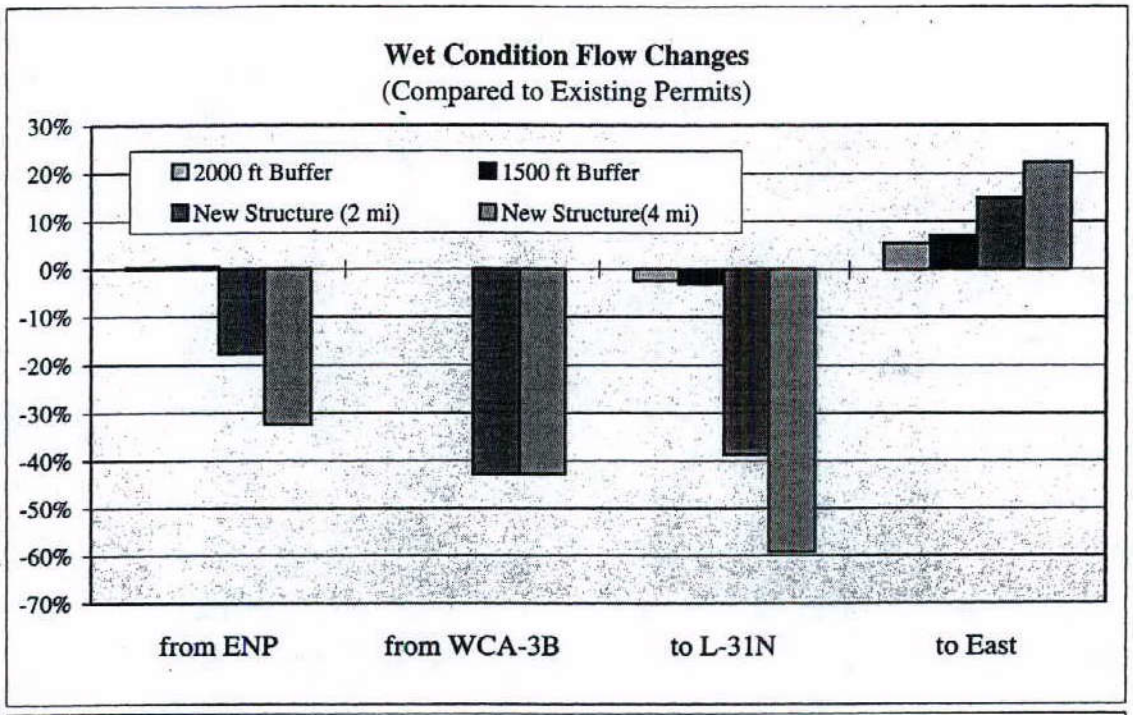


Figure 6. Comparison of key flow quantities under three quarry configurations. The importance of the L-31N Canal is clear under wet and dry conditions.



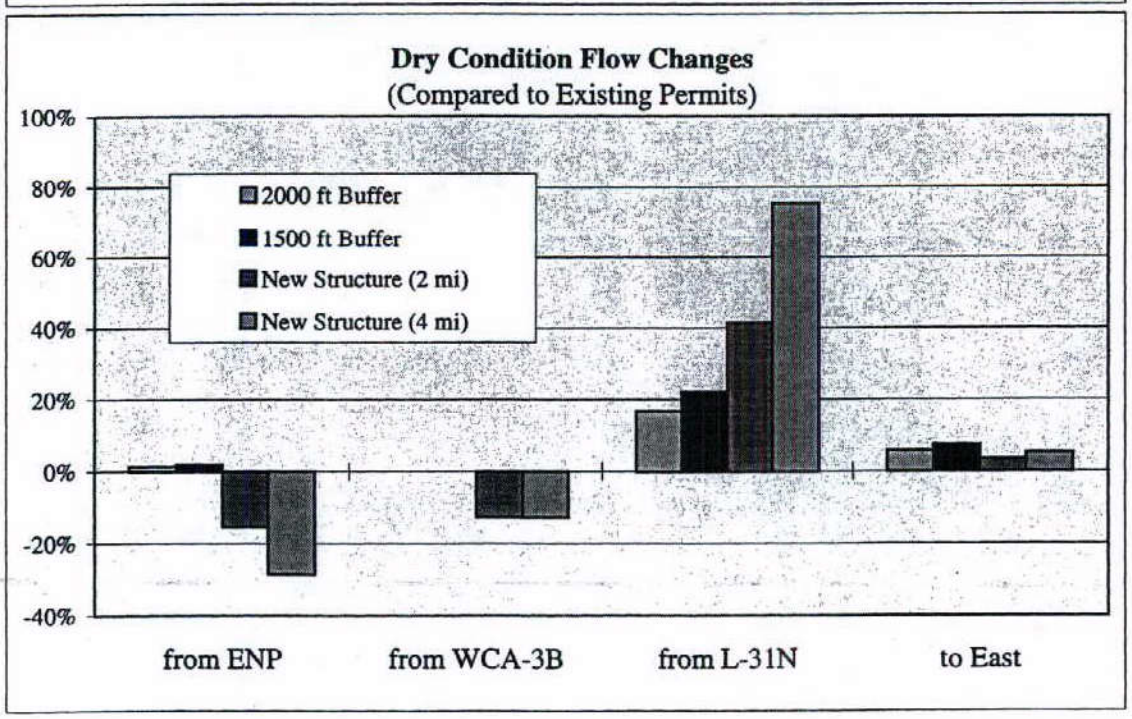


Figure 7. Comparison of key flow quantities with two quarry configurations and two possible structure locations, all compared to existing permitted lakes.

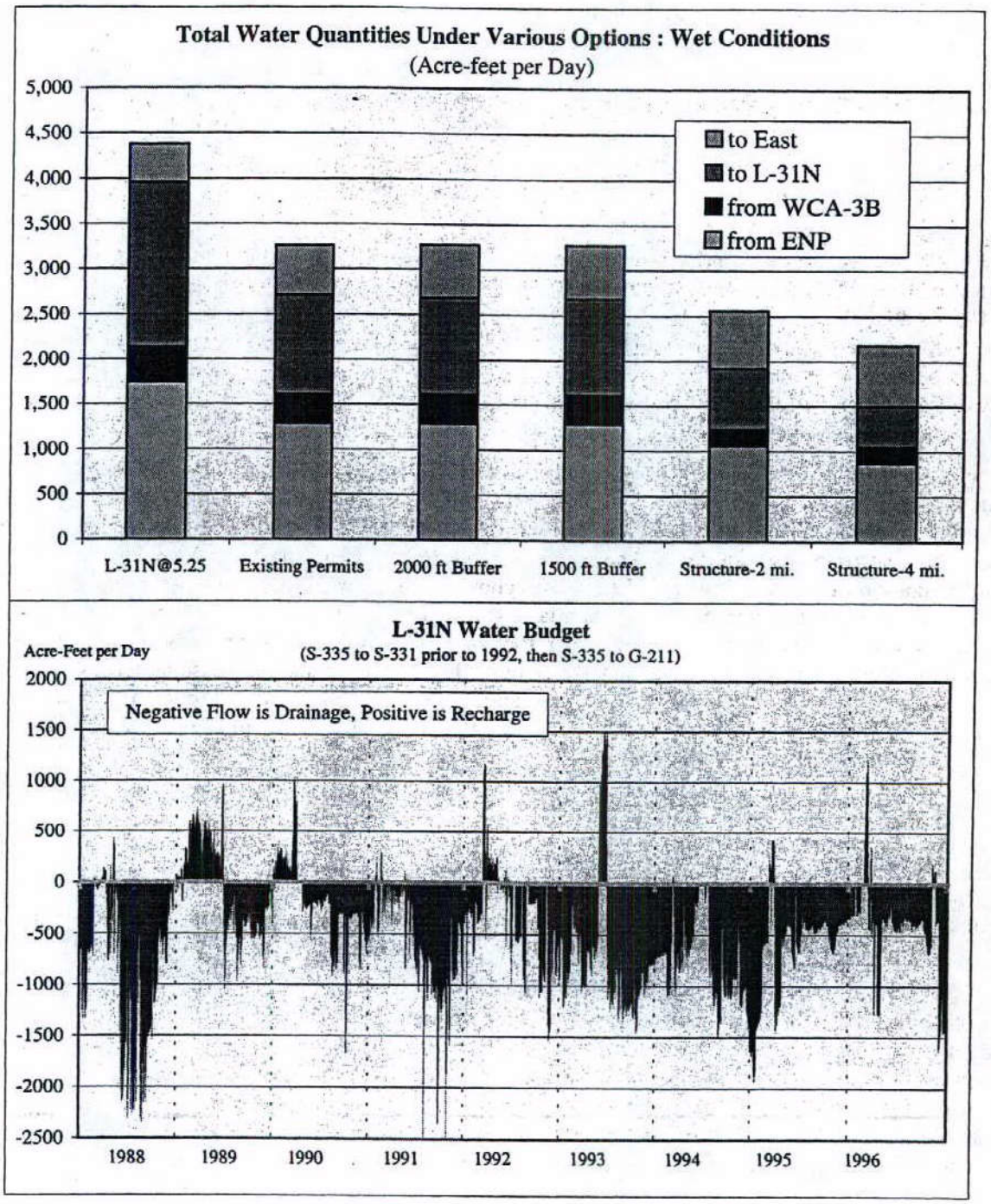
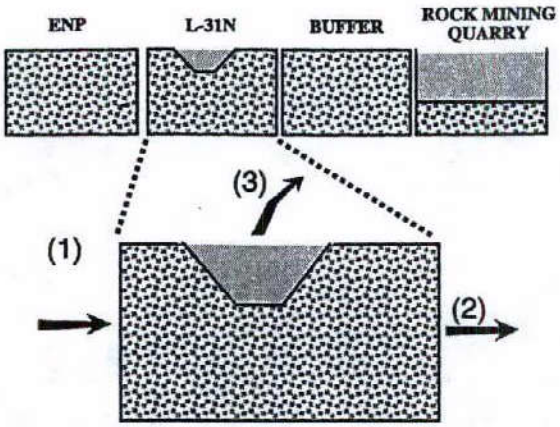


Figure 8. (Upper) The total quantity of flow is shown to be sensitive to canal stage and not sensitive to mining. (Lower) The water budget for the L-31N canal shows the dominance of its use for drainage, even after the installation of G-211.



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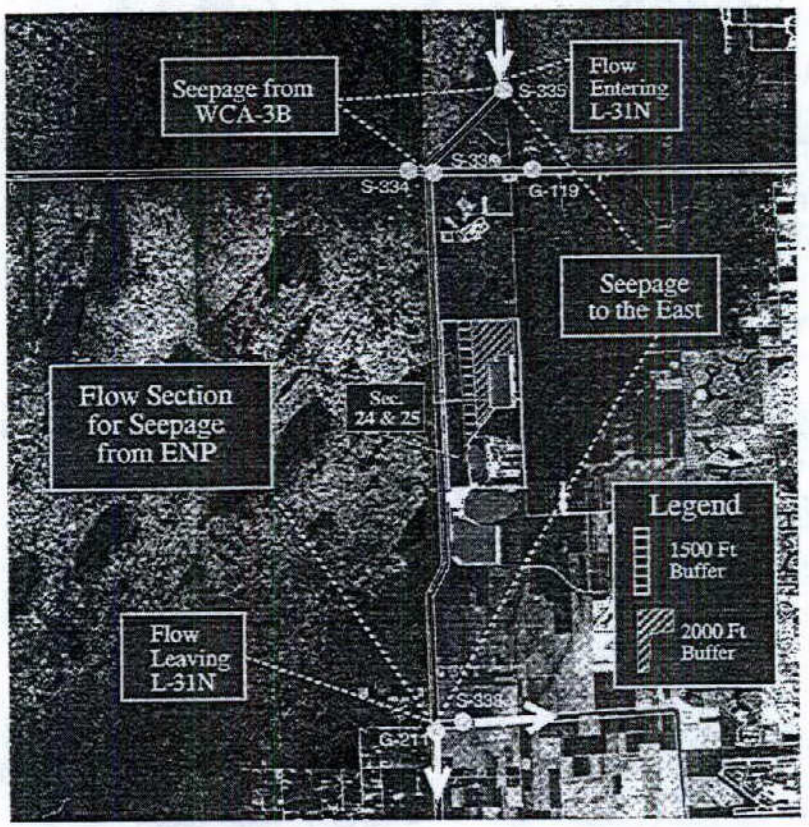

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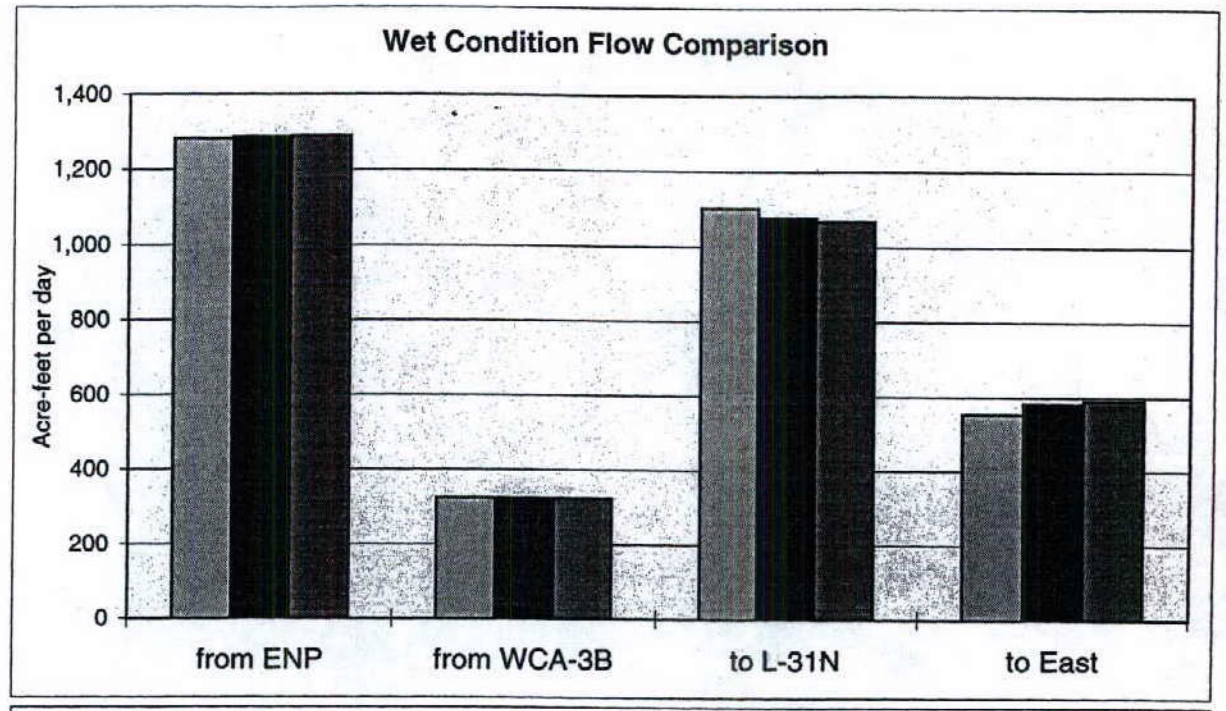

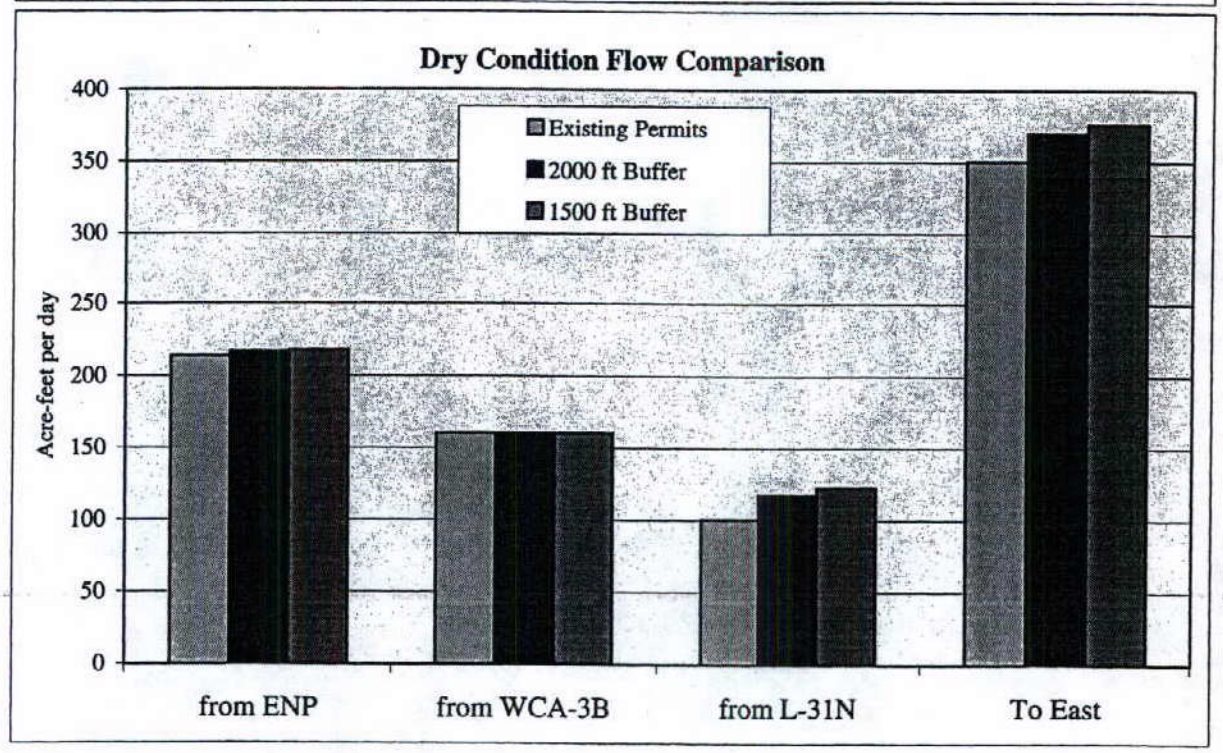

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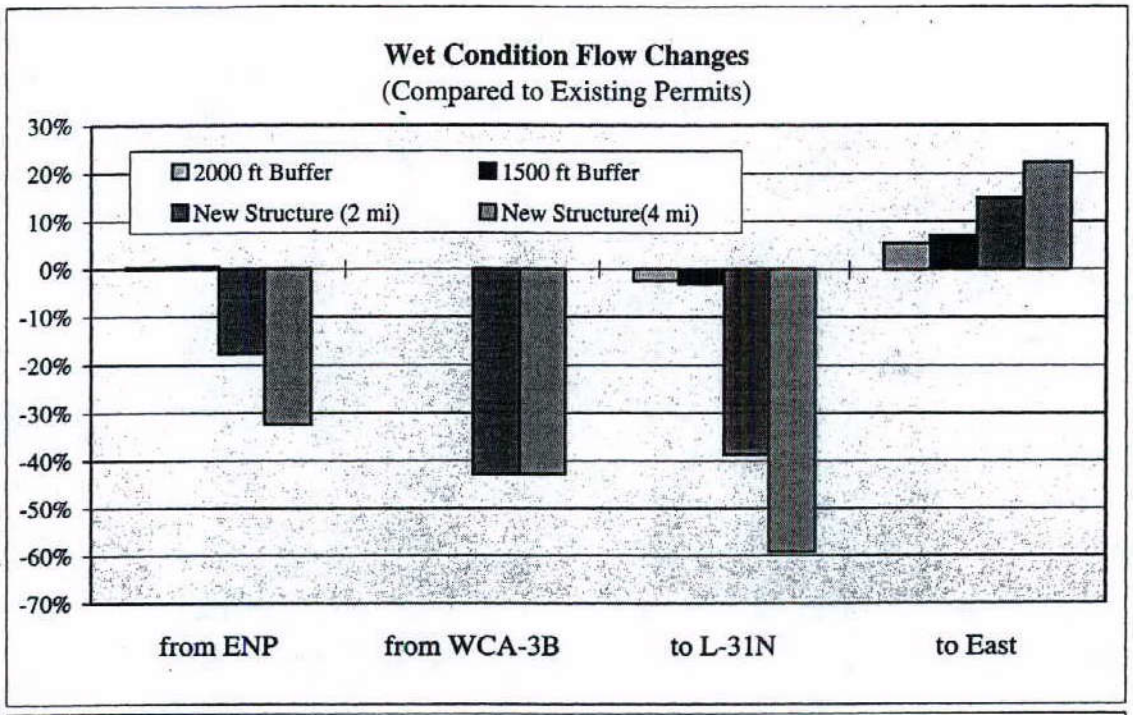

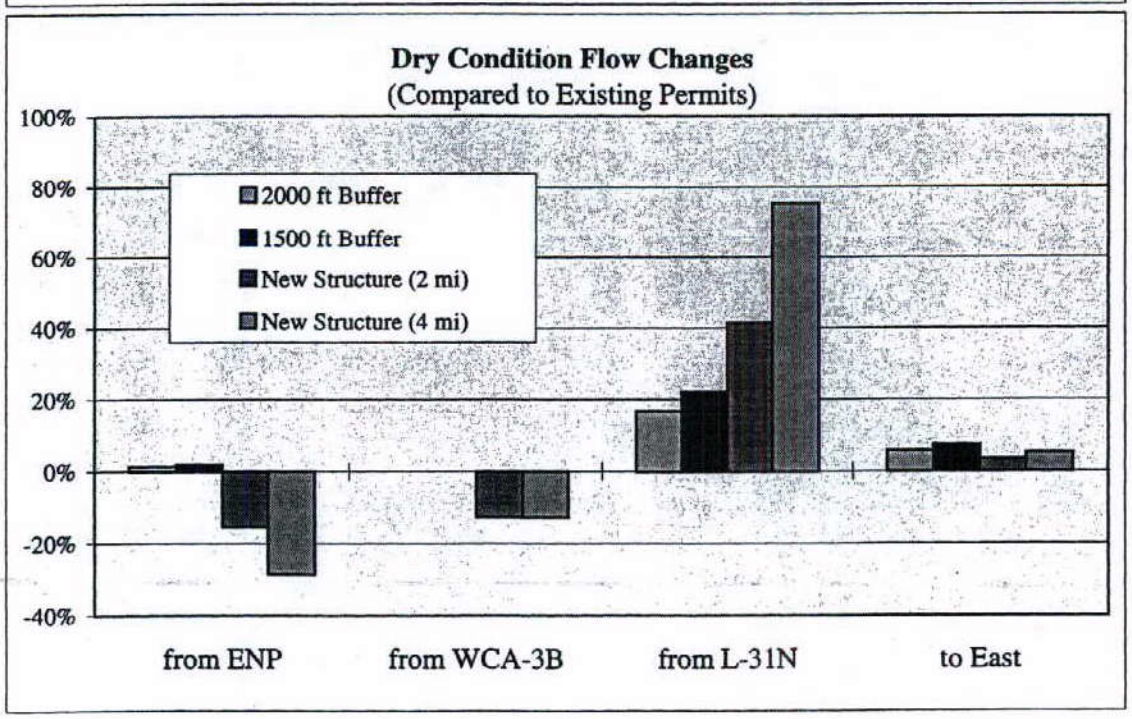

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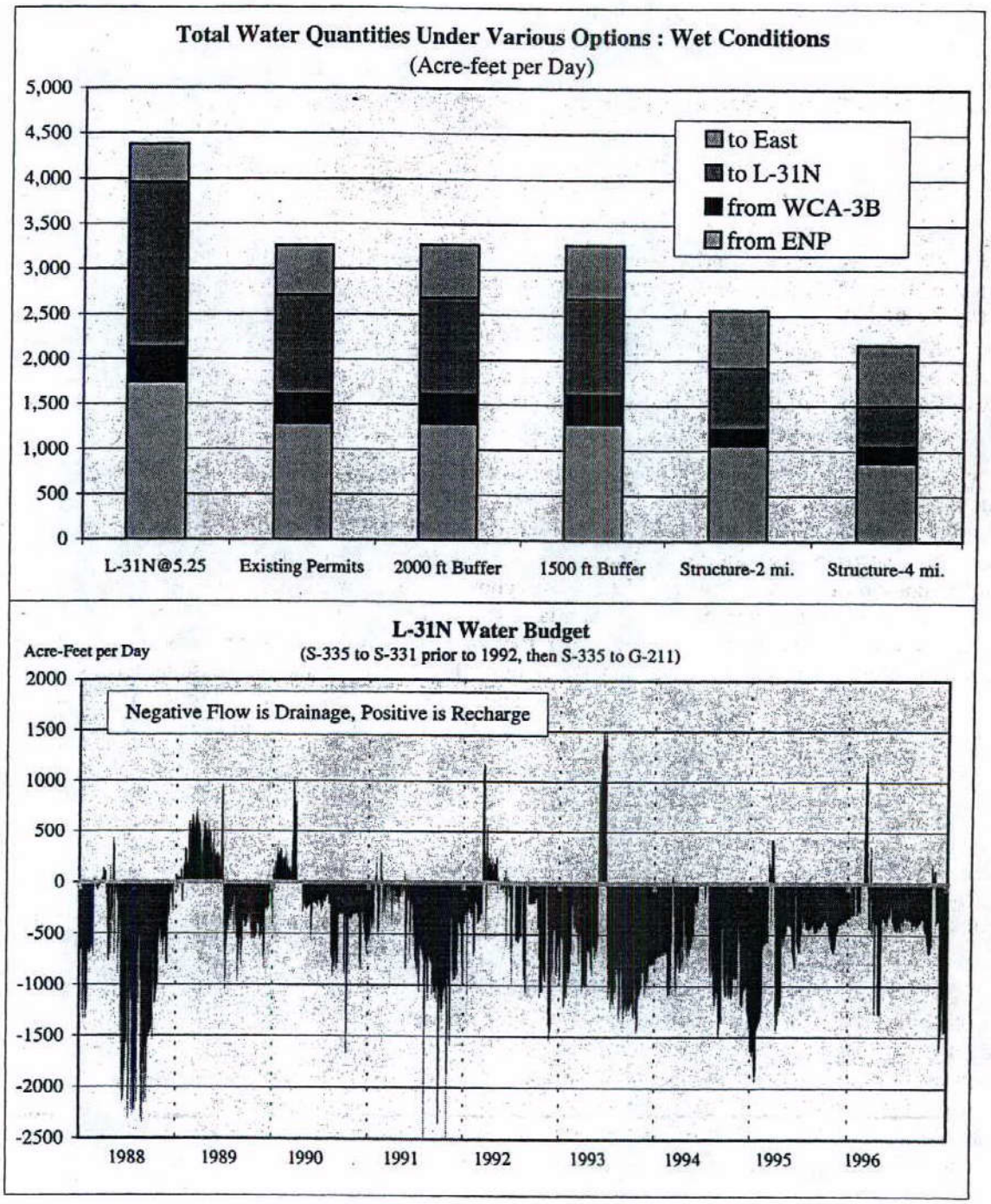

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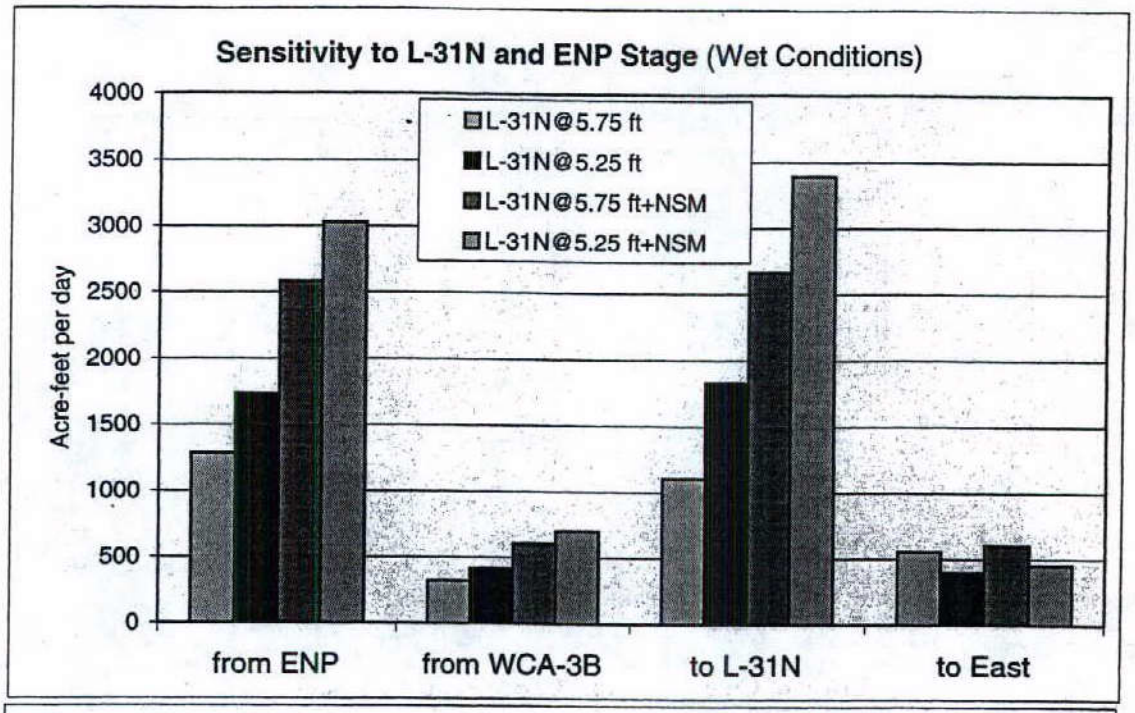


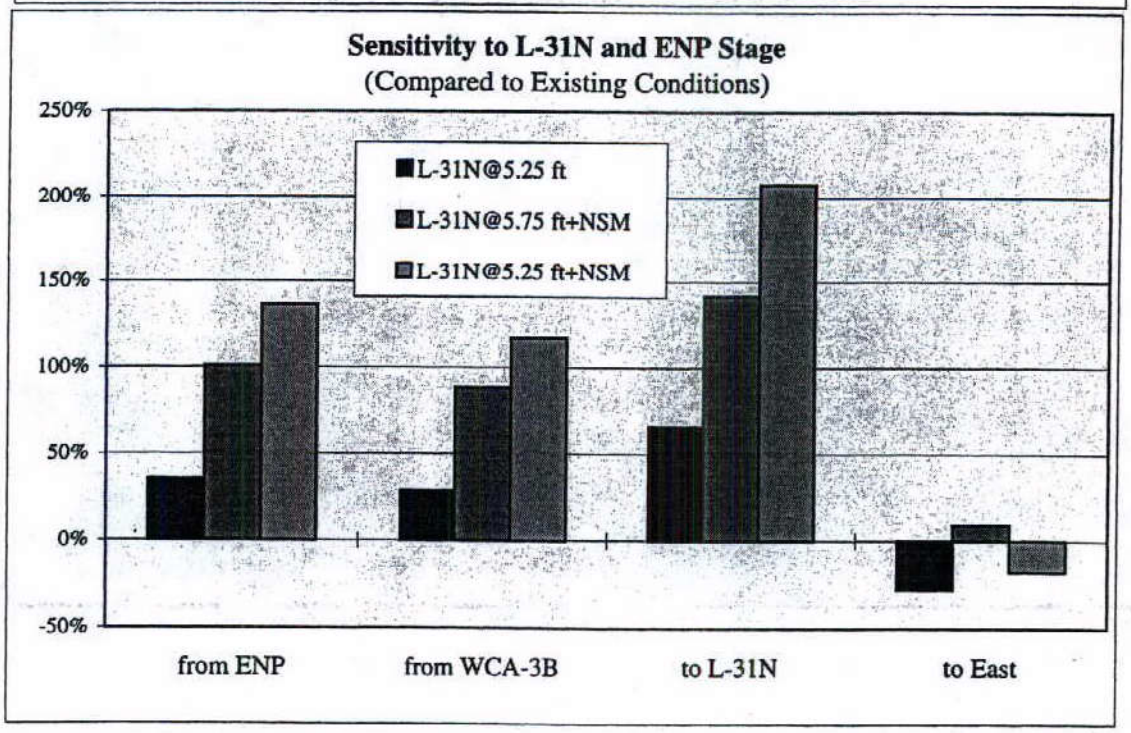
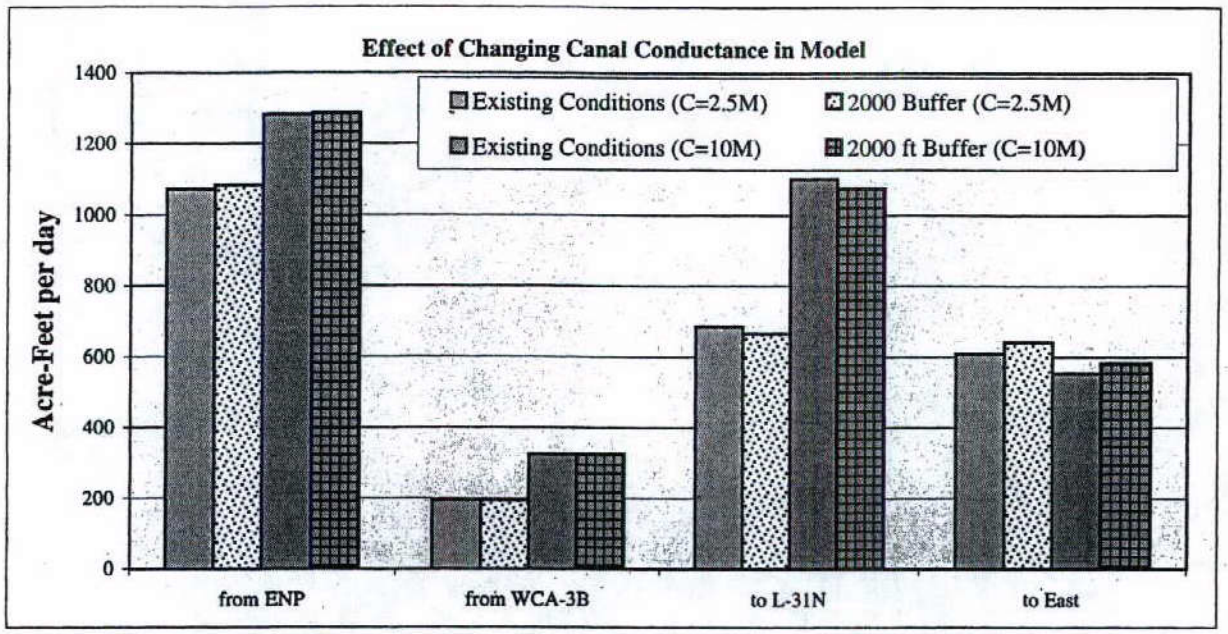


Figure 9. Sensitivity of the various flow quantities to changes in the L-31N stage and the water level in the Everglades National Park. NSM refers to a level in the Park determined by the Natural System Model.



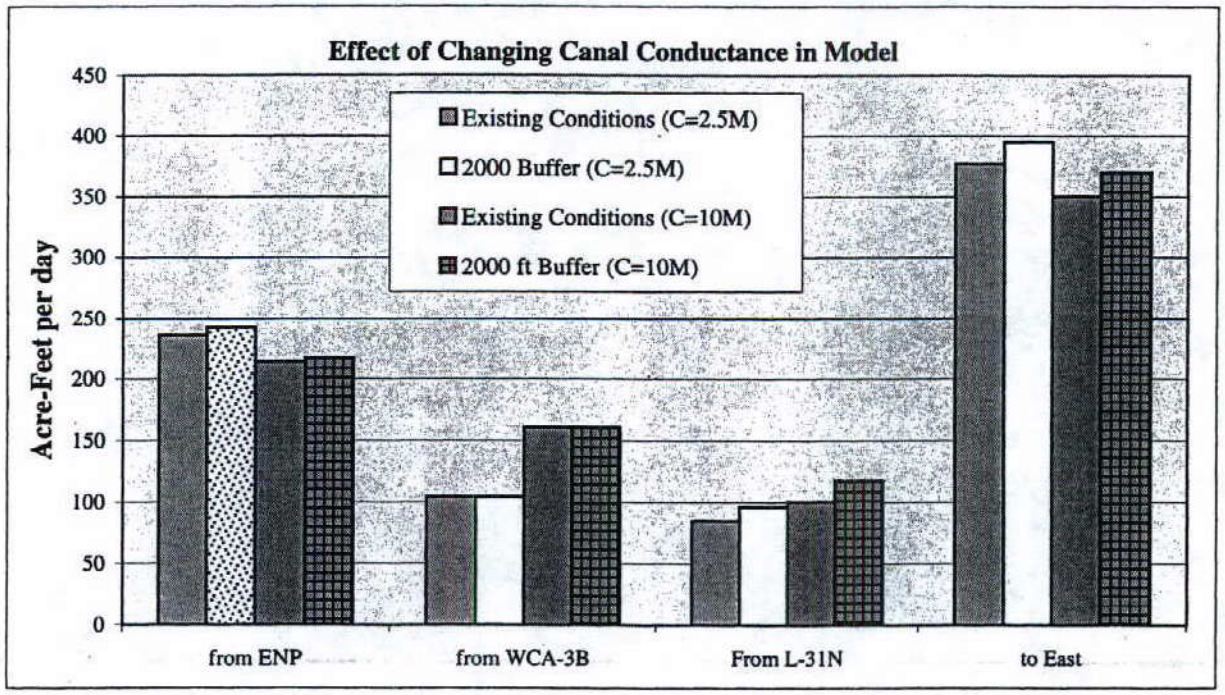
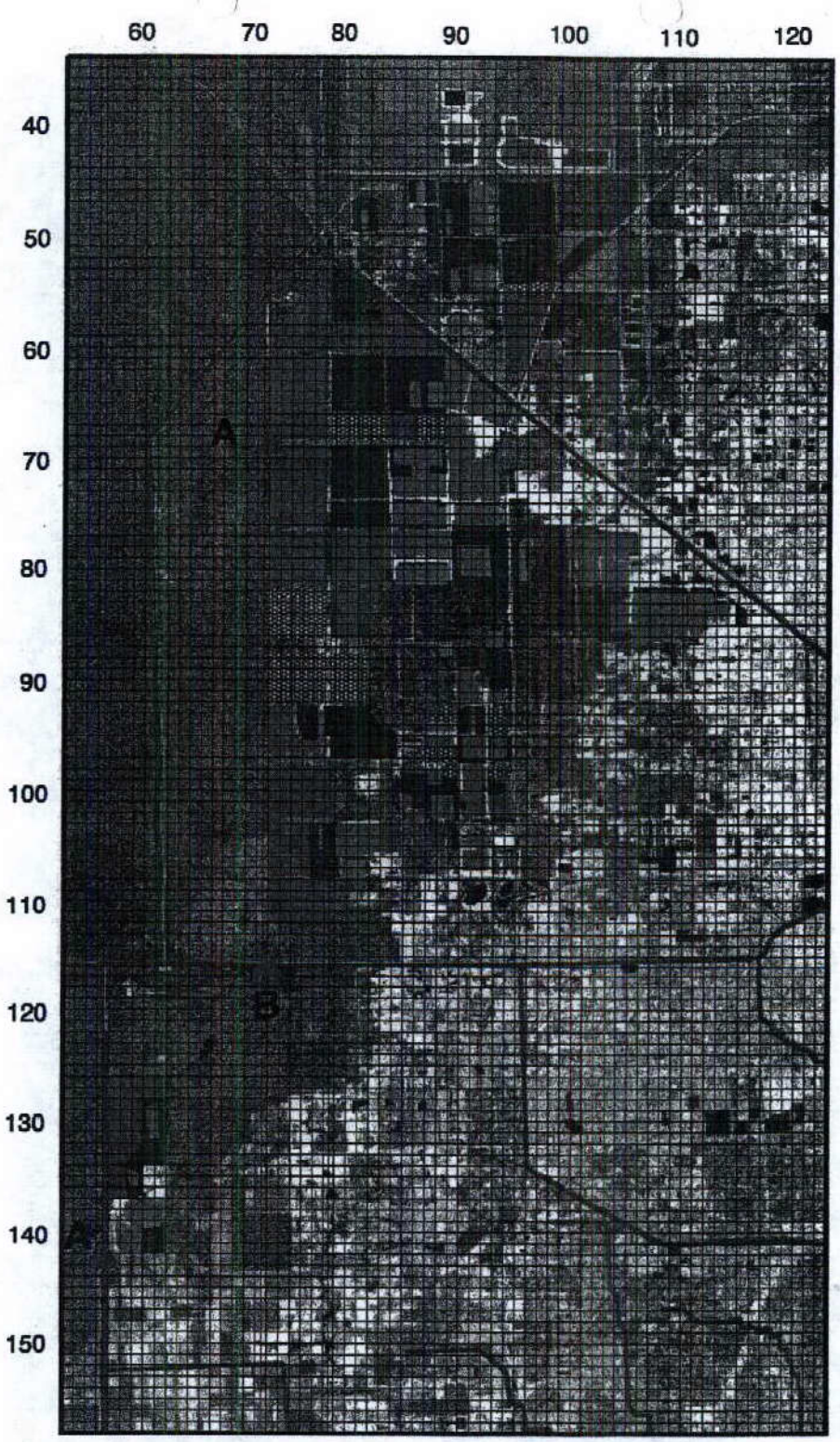


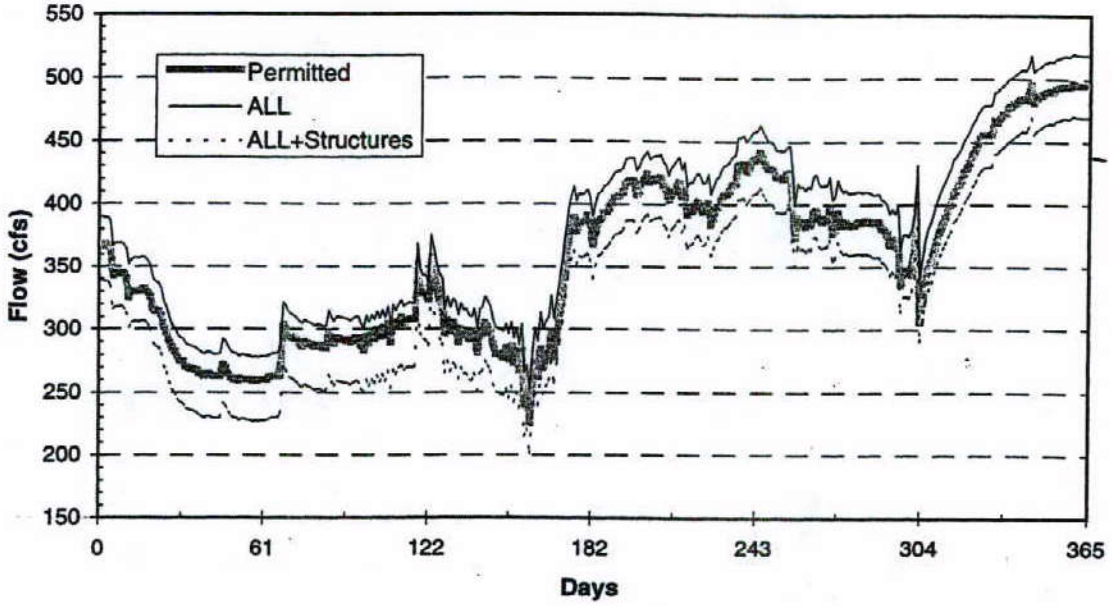
Figure 10. Results of sensitivity analysis with variation in the conductance term for the L-31N canal. The conductance value used for this analysis was taken directly from USGS Report 96-4118. The model was also run using one fourth of that valus for this graph. While Canal flow is directly affected the conductance value does not change the overall conclusions with respect to continued mining in sections 24 and 25.



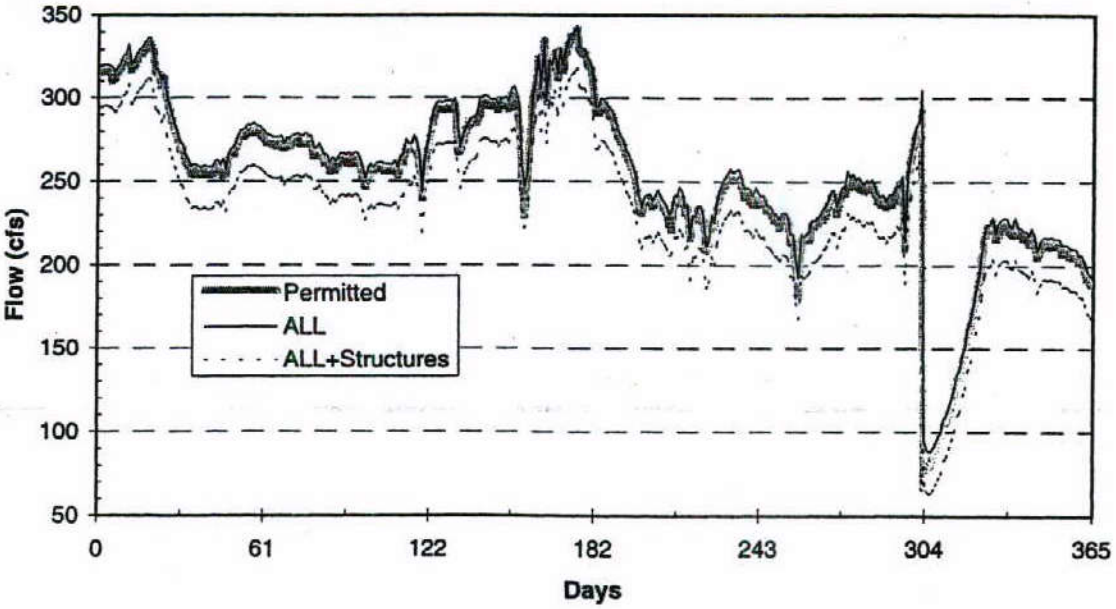
Current Lakes
Permitted
Un-Permitted (owned)
Un-Permitted (not owned)

A. Wellfield Canal & L-31N Structure
B. C-4 Structure

Total Seepage Through L-30 Levee for 1969
(Surface Layer Test-2: 5,000,000 ft/day for Pennsuco Area)



Total Seepage Through L-31N Levee for 1969
(Surface Layer Test-2: 5,000,000 ft/day for Pennsuco Area)



seep69-penn2 : plot

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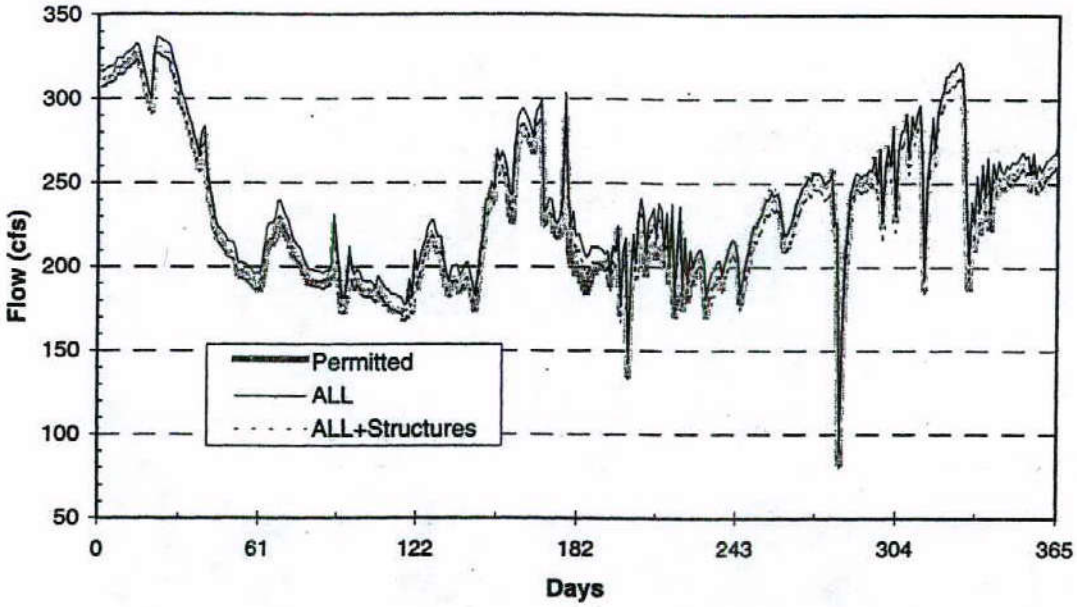
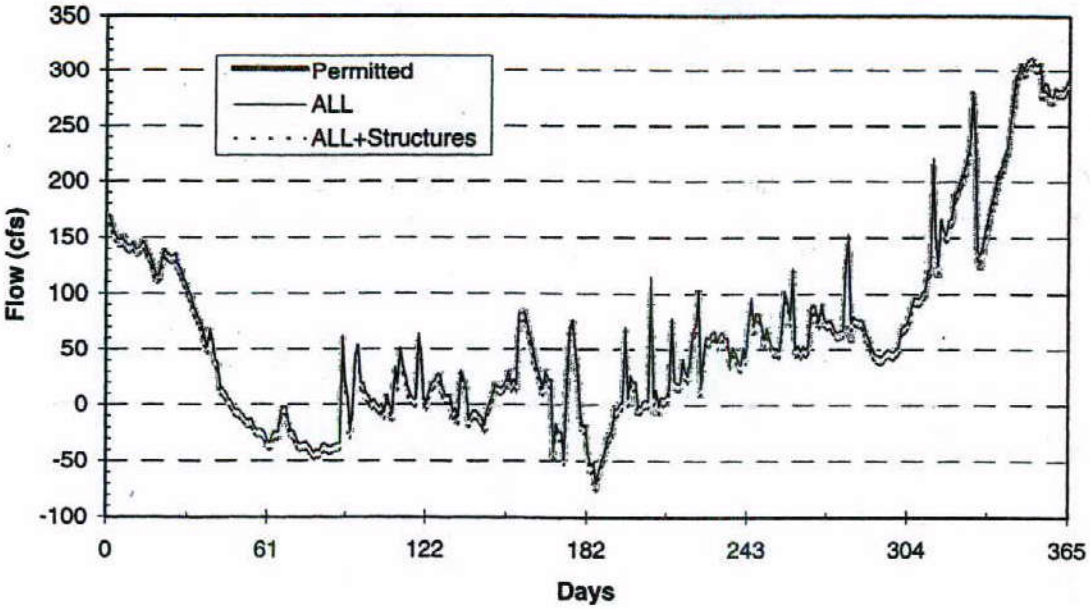
Total Seepage Through L-30 Levee for 1989



Total Seepage Through L-31N Levee for 1989



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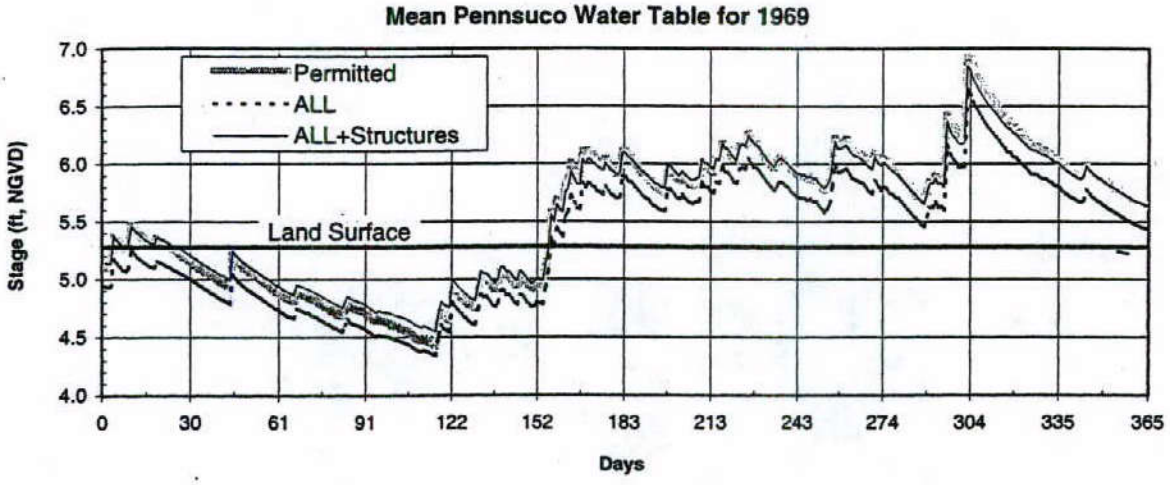
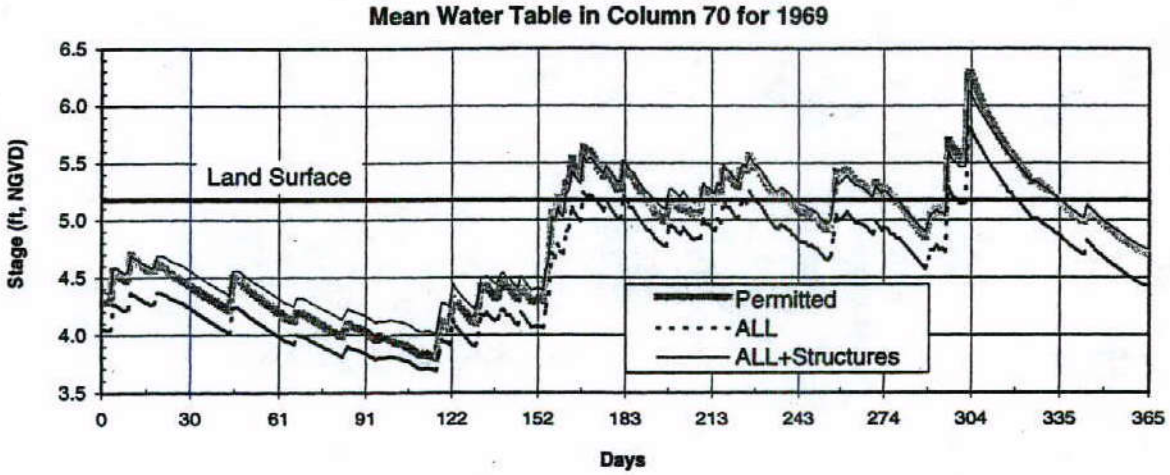
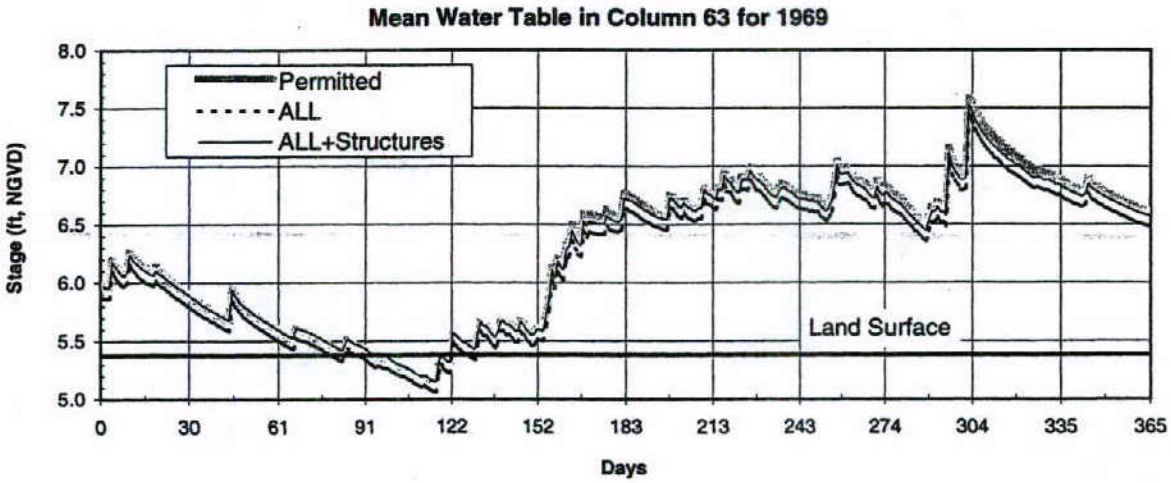
MacVicar, Federico & Lamb, Inc.







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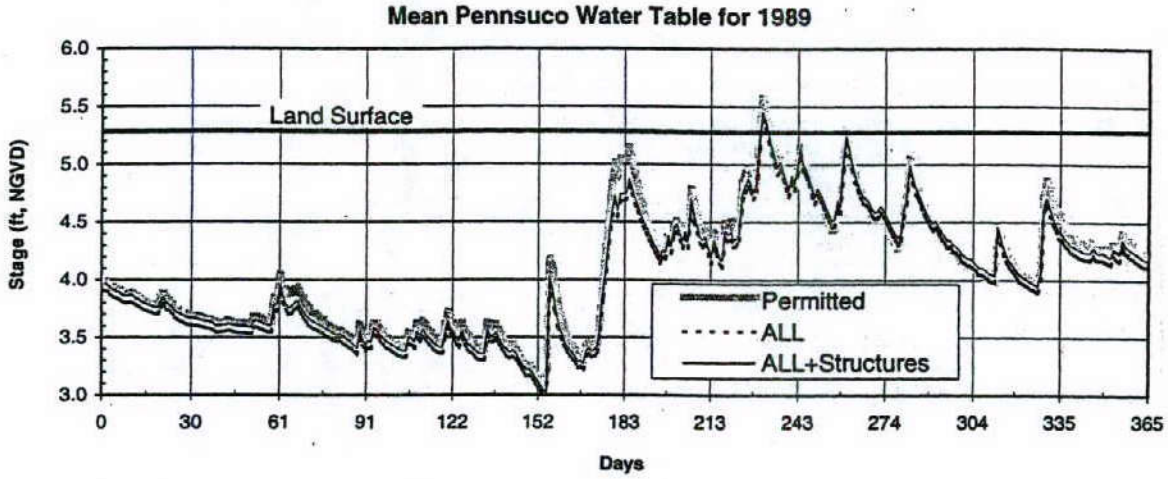

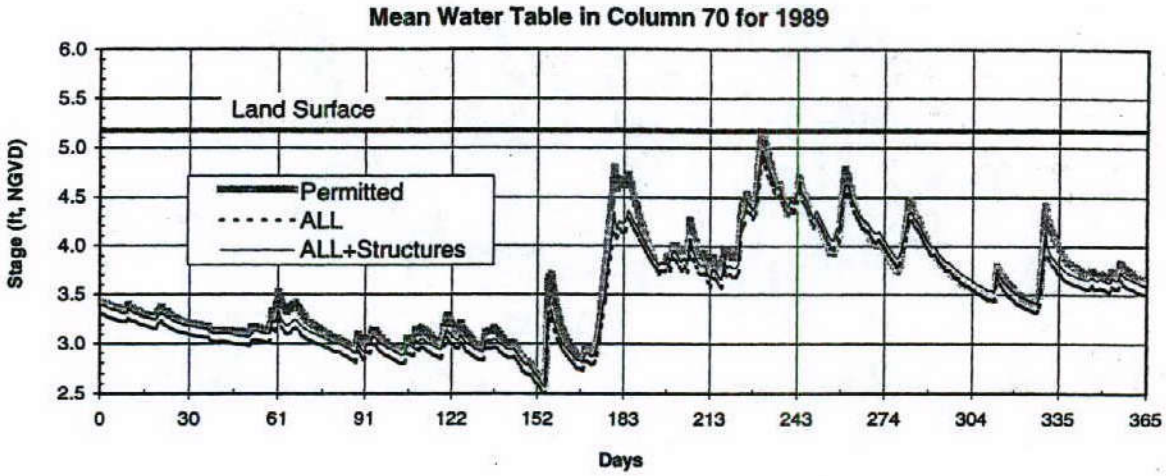

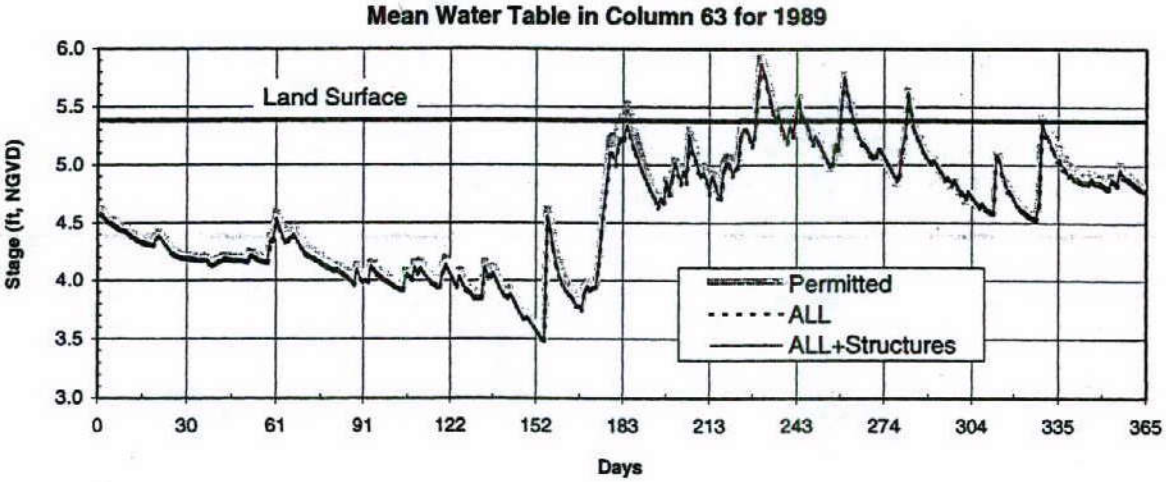

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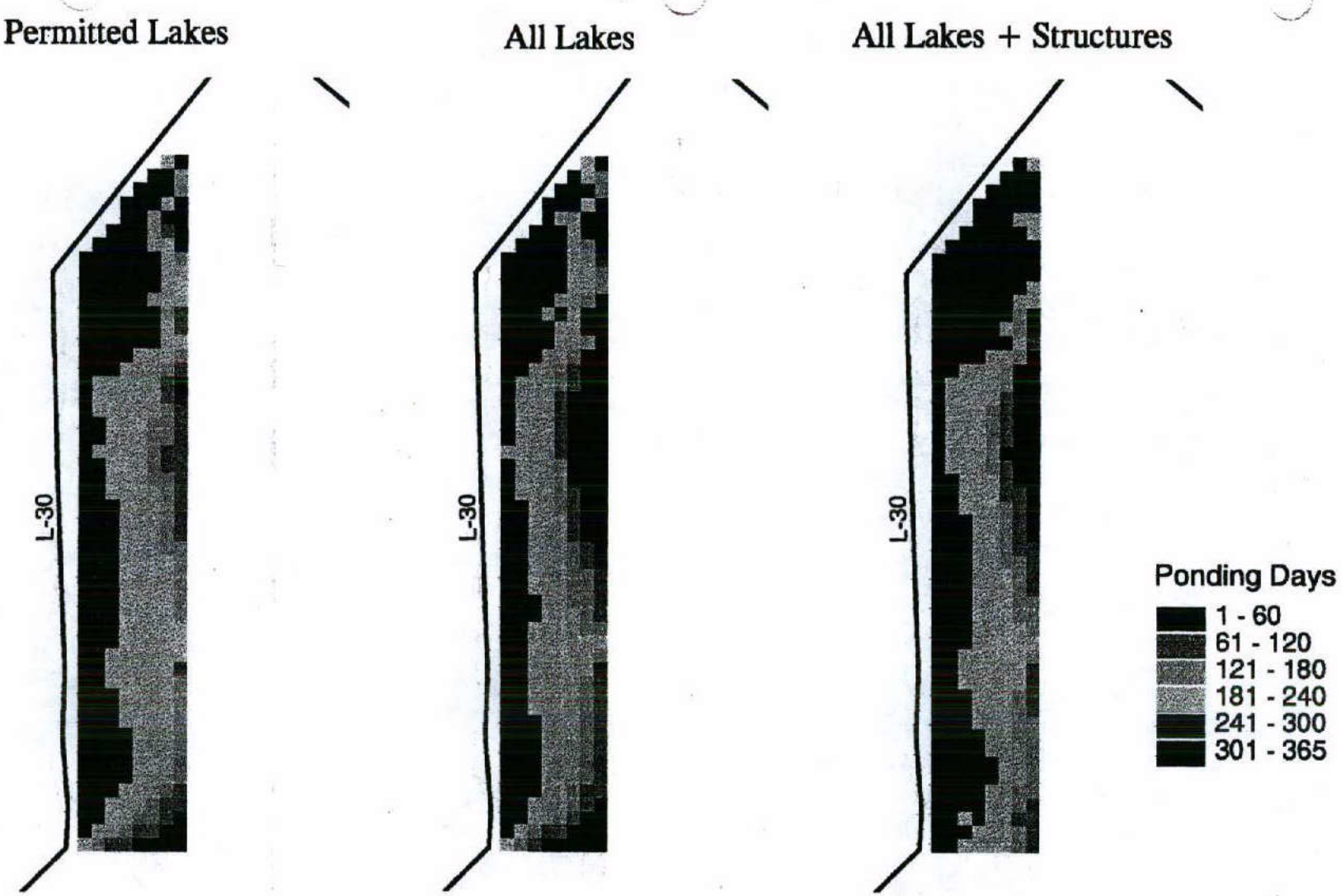

Hydroperiod in the Pennsuco Wetlands - 1969

MacVicar, Federico & Lamb, Inc.

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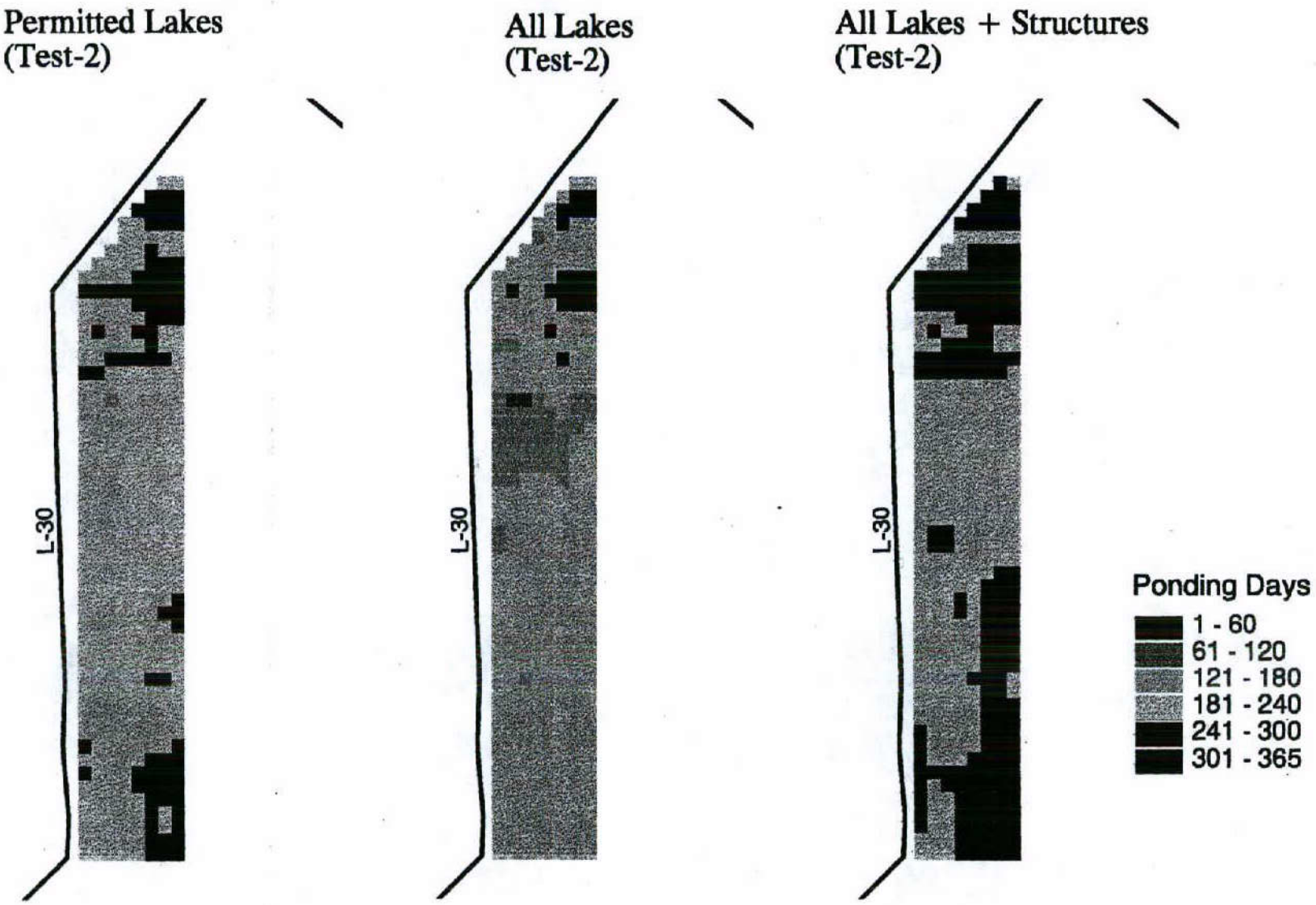

Hydroperiod in the Pennsuco Wetlands - 1969

MacVicar, Federico & Lamb, Inc.

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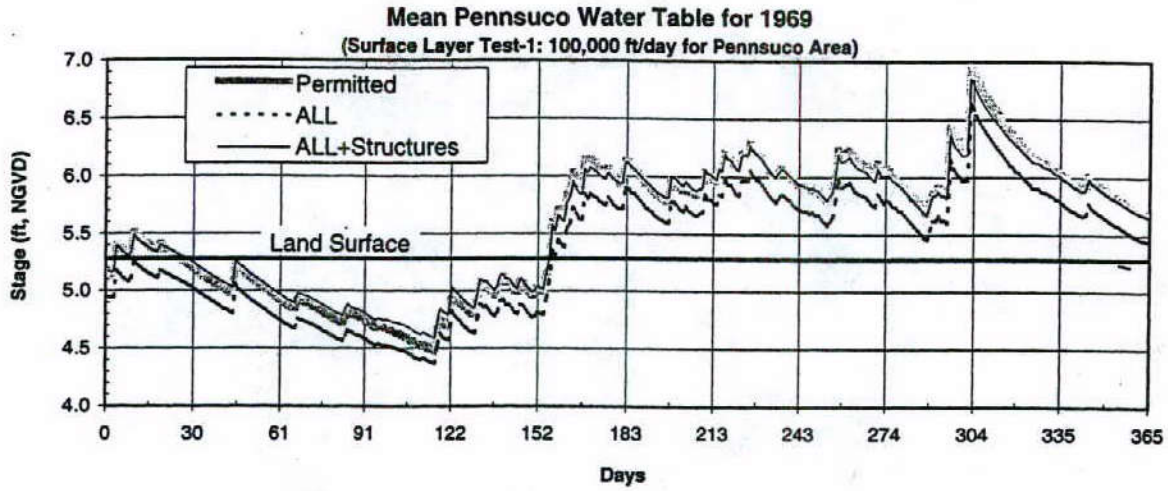

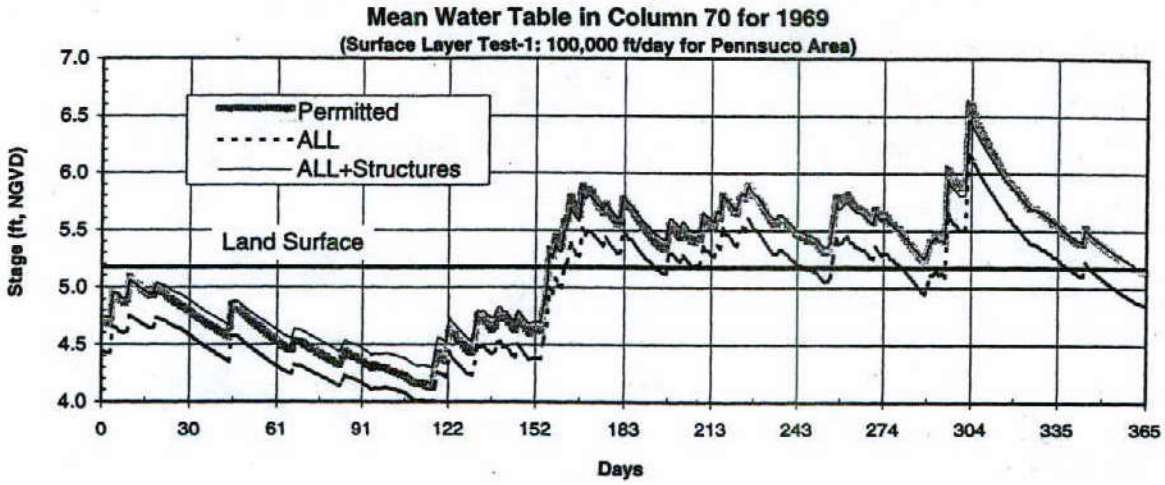

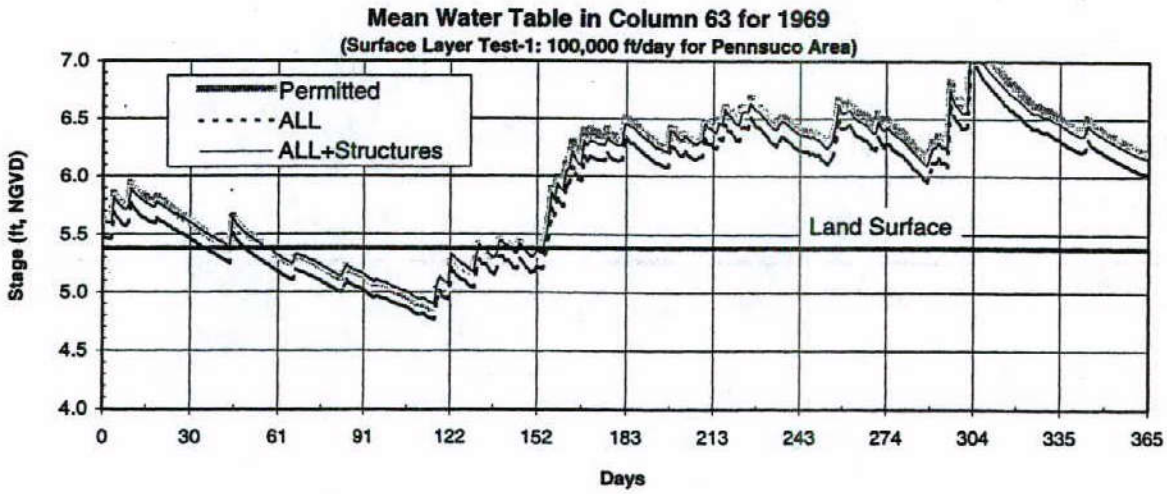

head69-penn1 : plot1 : 2/10/98

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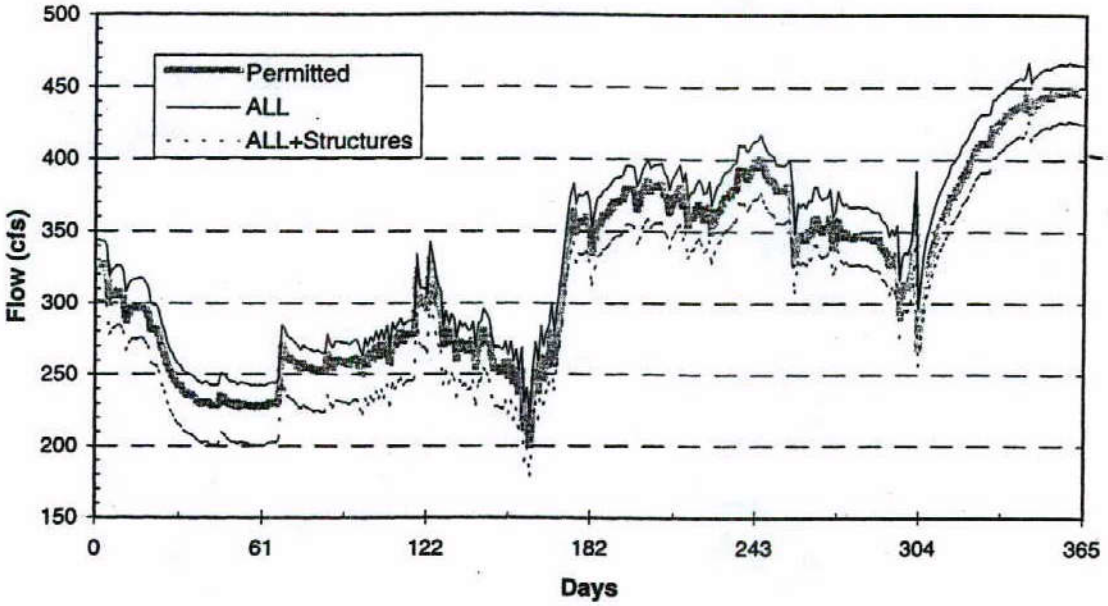
Total Seepage Through L-30 Levee for 1969
(Surface Layer Test-1: 100,000 ft/day for Pennsuco Area)



Total Seepage Through L-31N Levee for 1969
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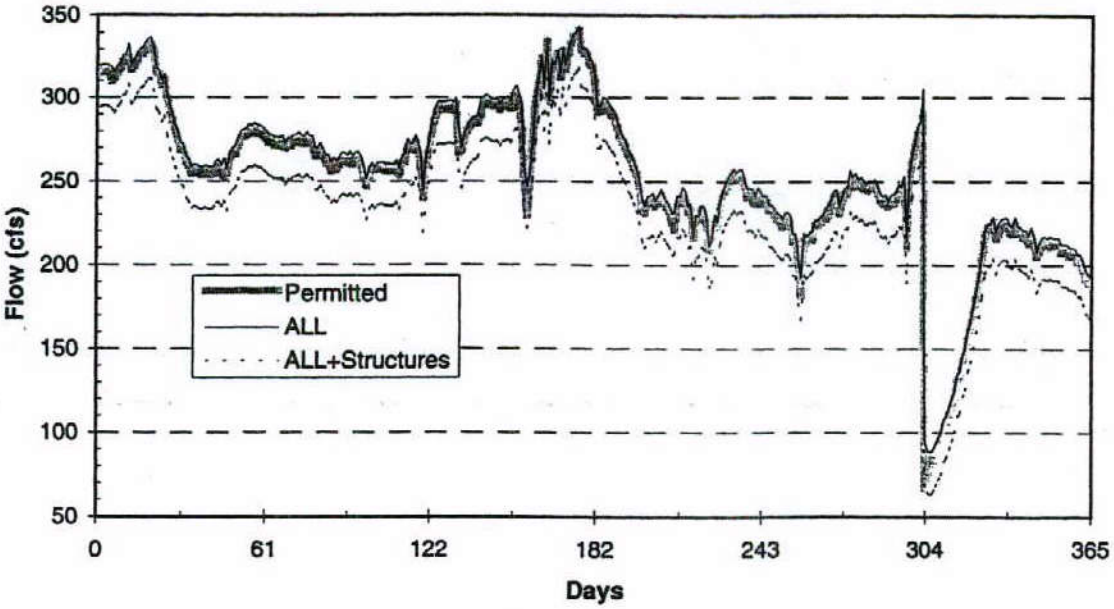

seep69-penn1 : plot

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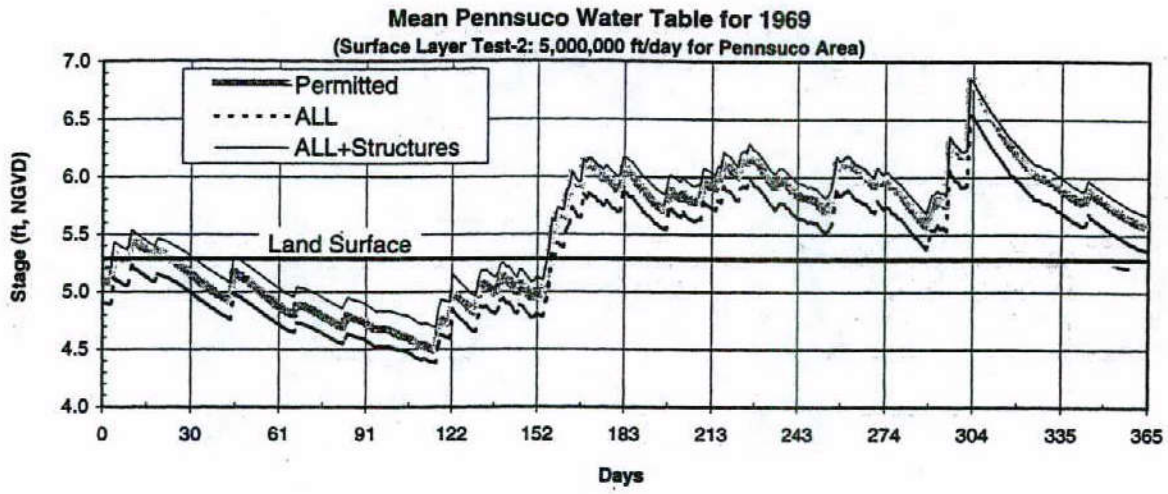

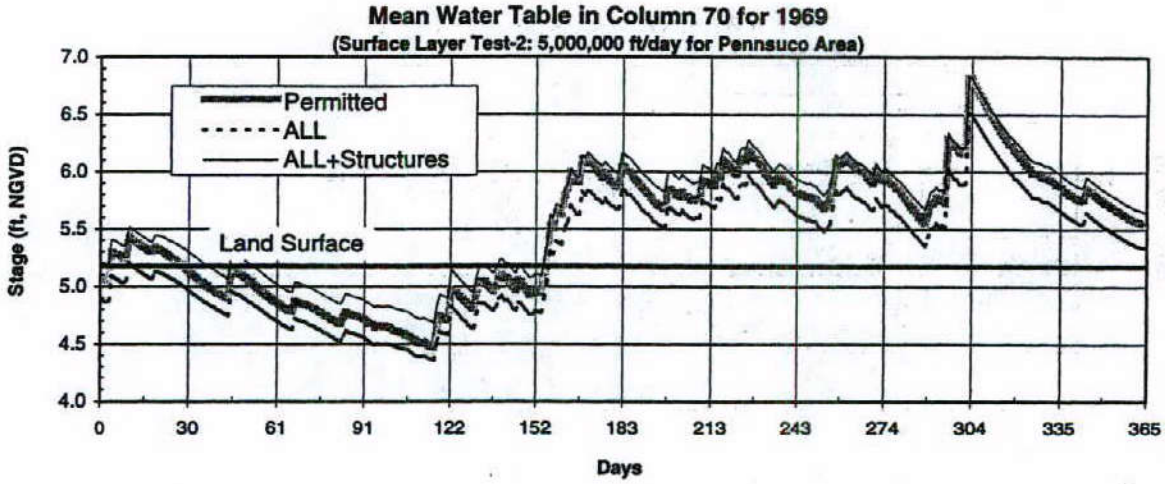

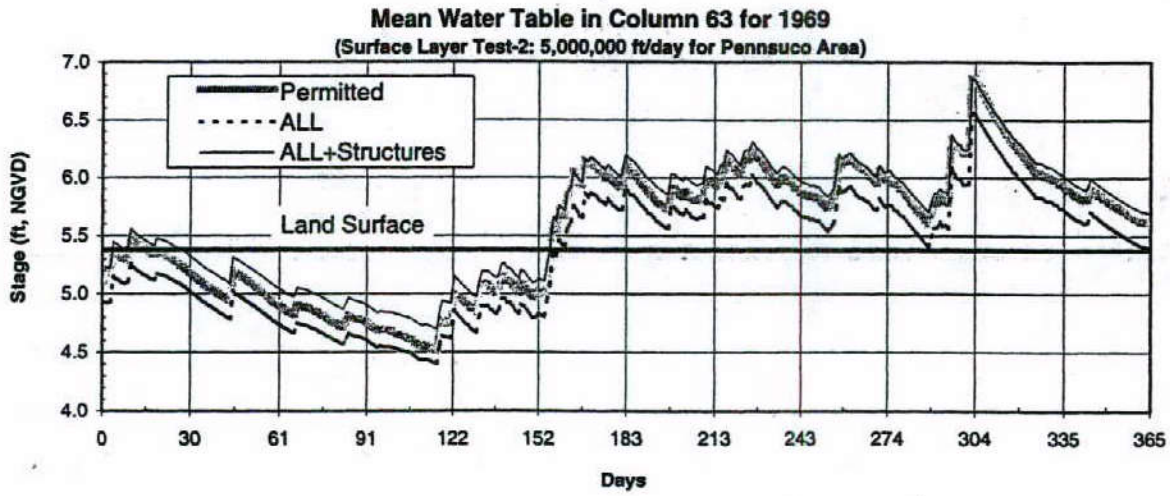

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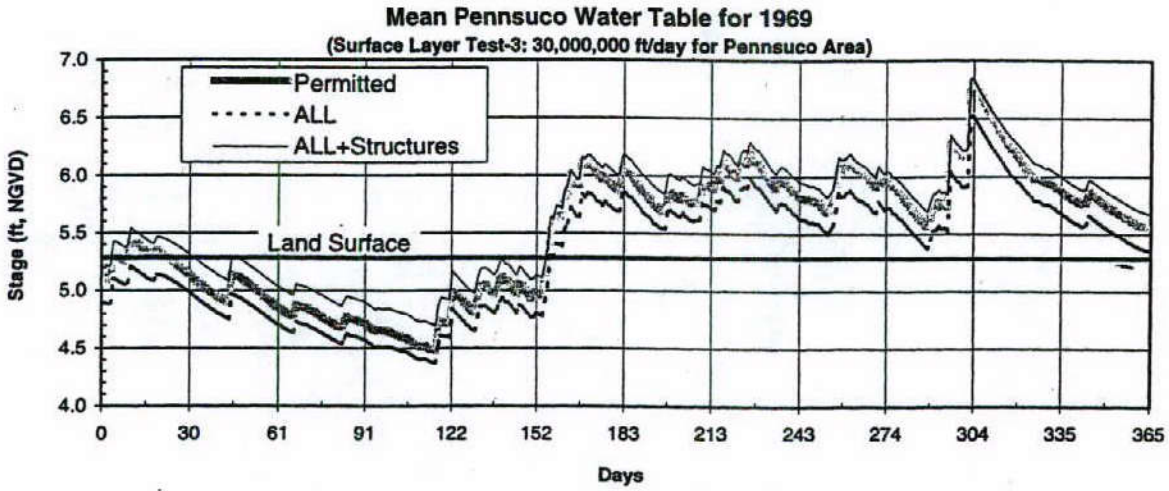

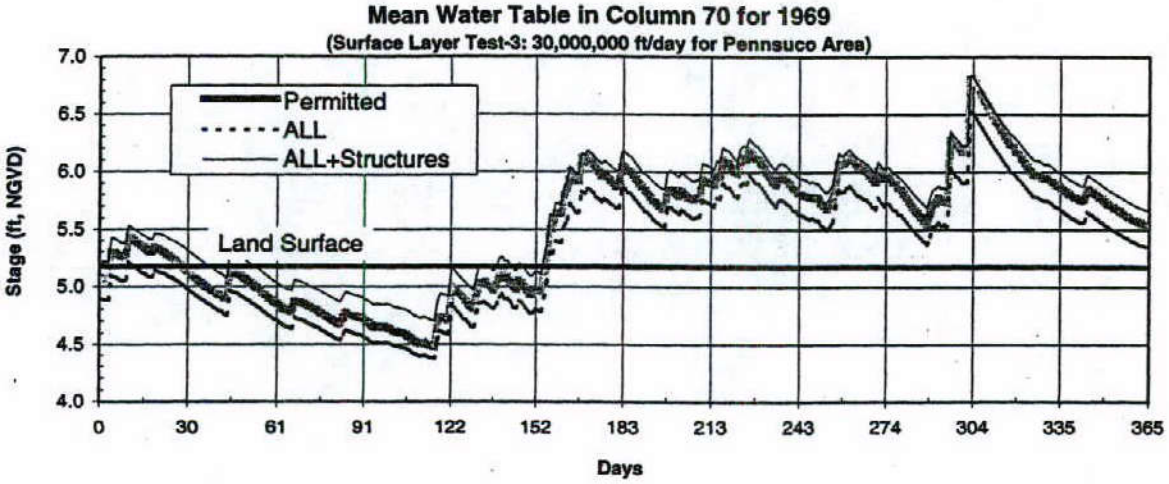

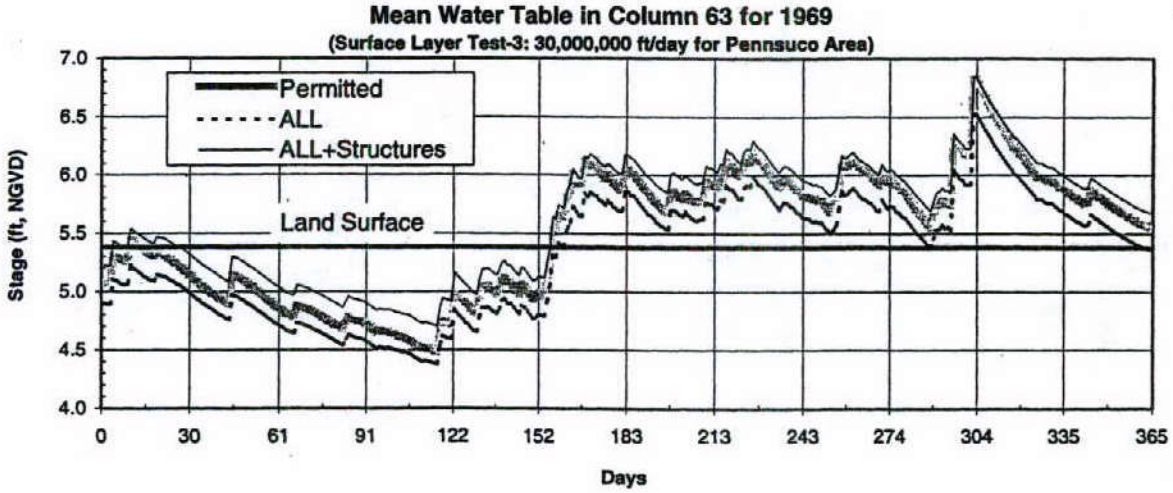

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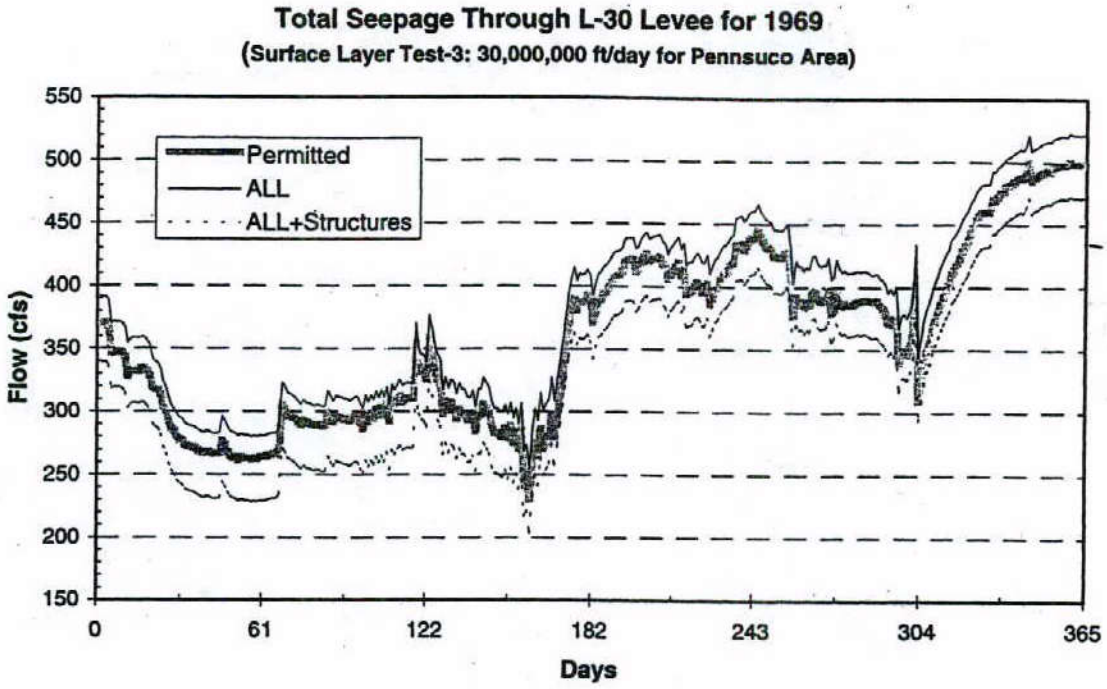
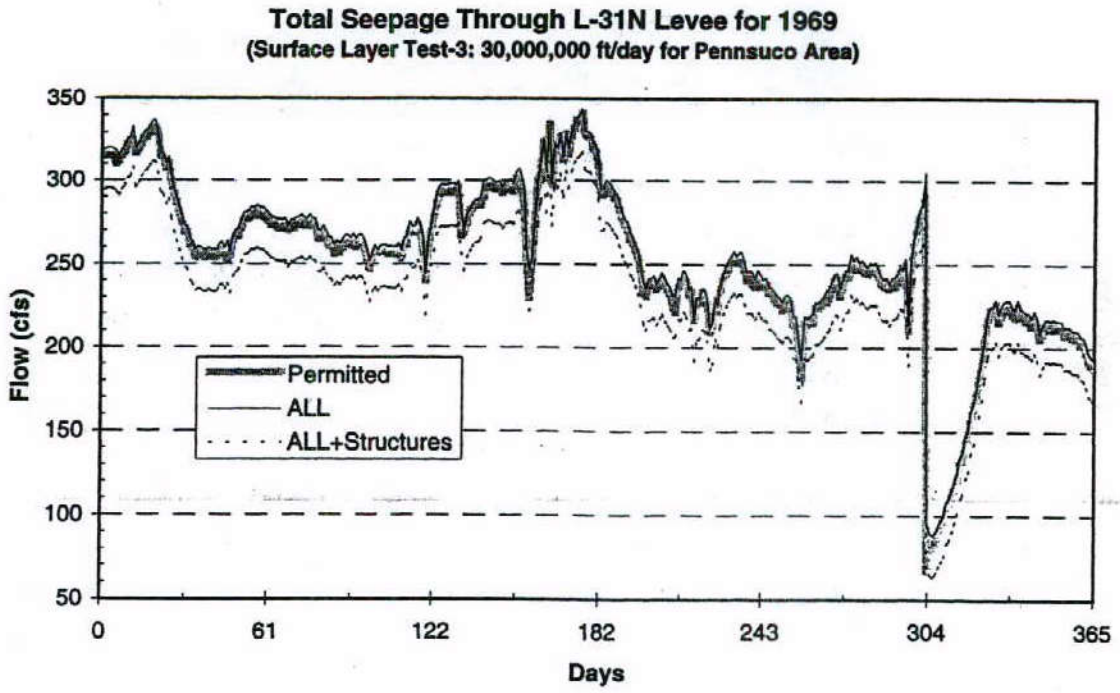
MacVicar, Federico & Lamb, Inc.





seep69-penn3 : plot

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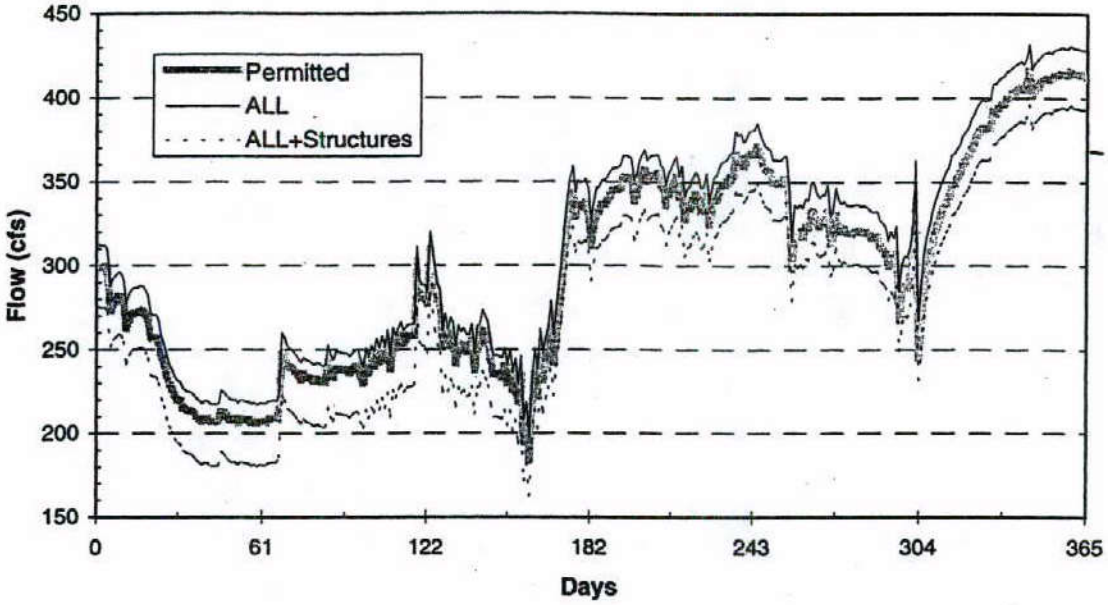
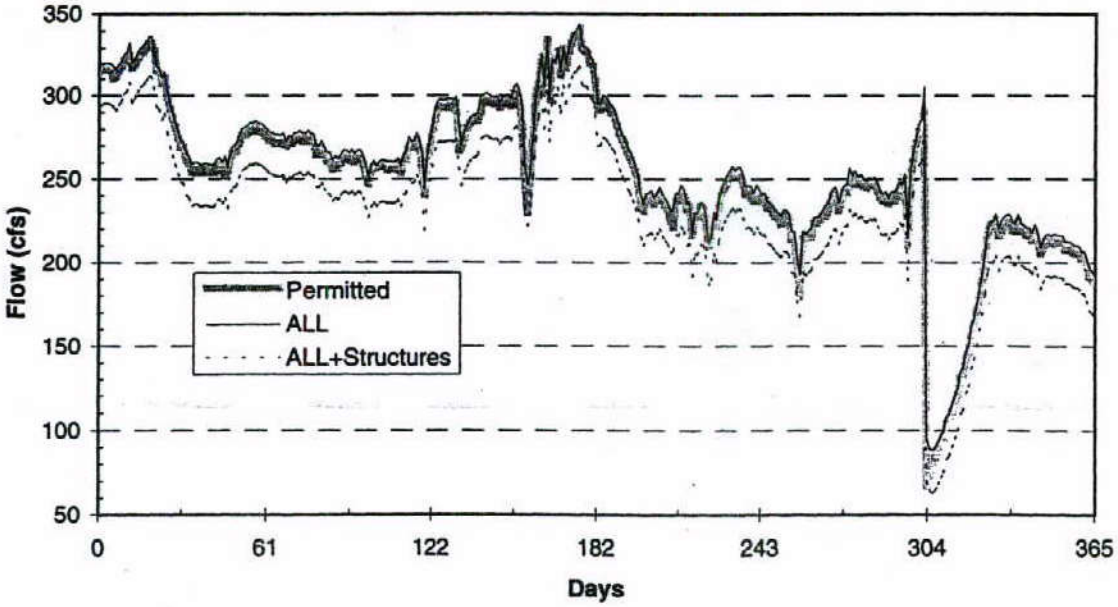
Total Seepage Through L-30 Levee for 1969



Total Seepage Through L-31N Levee for 1969



seep69 : plot2

MacVicar, Federico & Lamb, Inc.