Illinois State Water Survey Division

SURFACE WATER SECTION

SWS Contract Report 447A

APPENDICES FOR:
HYDRAULIC INVESTIGATION FOR THE CONSTRUCTION
OF ARTIFICIAL ISLANDS IN PEORIA LAKE

by

Misganaw Demissie, Ta Wei Soong, and Nani G. Bhowmik

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Prepared for the
Illinois Department of Energy and Natural Resources

Illinois State Water Survey
2204 Griffith Drive
Champaign, Illinois 61820

May 1988

CONTENTS

Appendix A

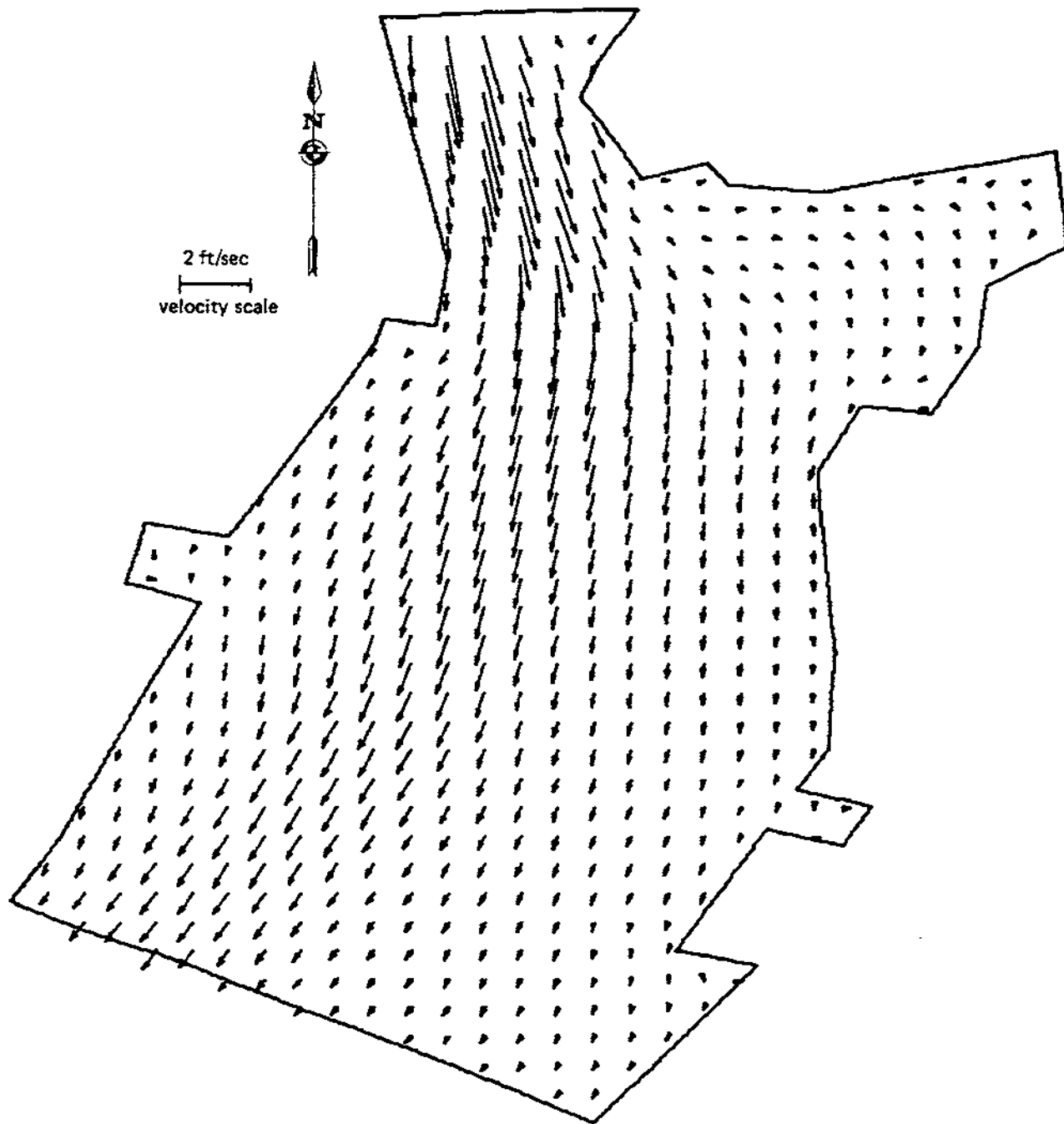Velocity Vector Plots for Different Flows and Island Configurations

Figure A1. Velocity vector field for the no island condition
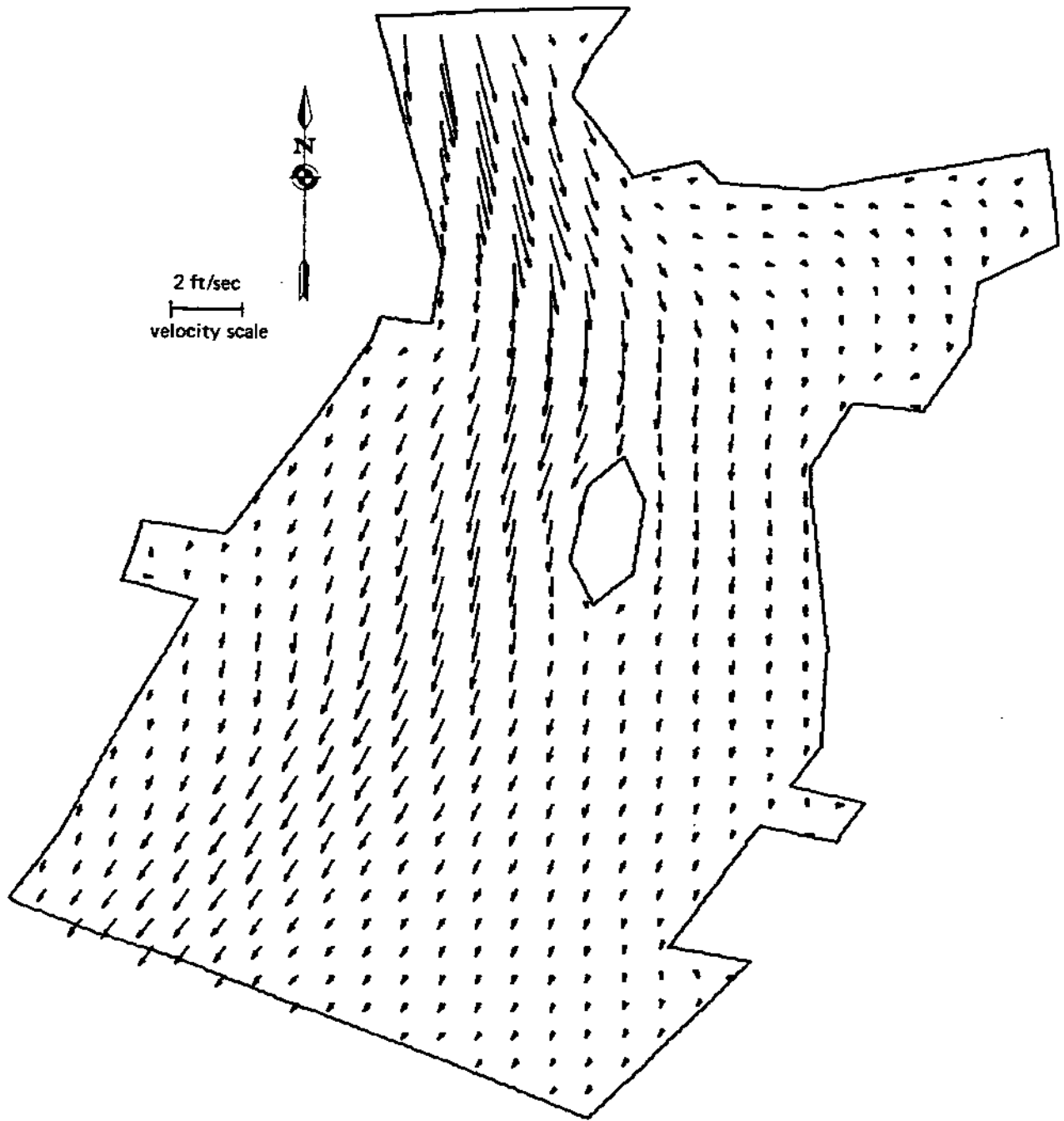in Lower Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

Figure A2. Velocity vector field for the small island condition in
Lower Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

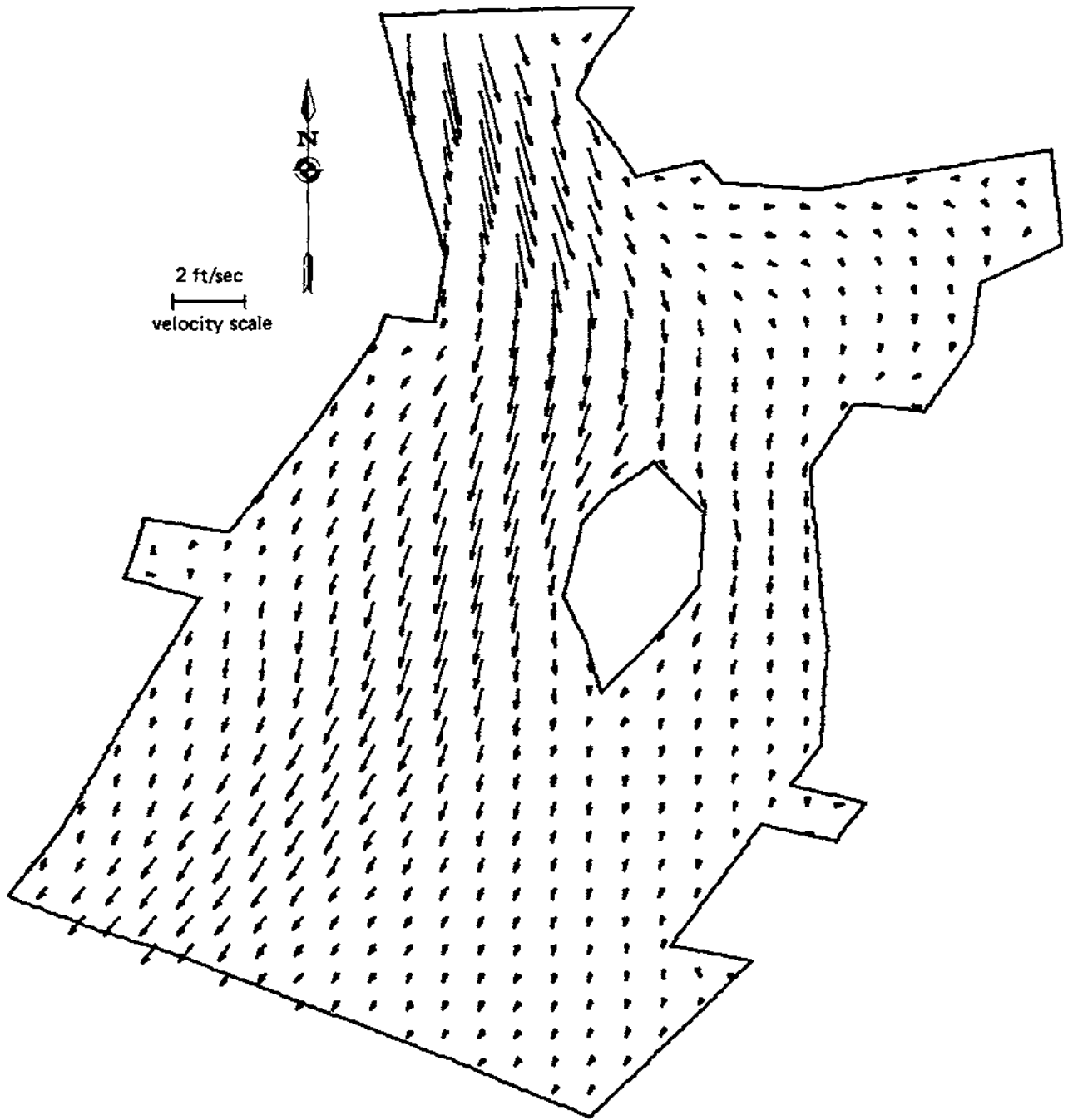Figure A3. Velocity vector field for the large island condition in
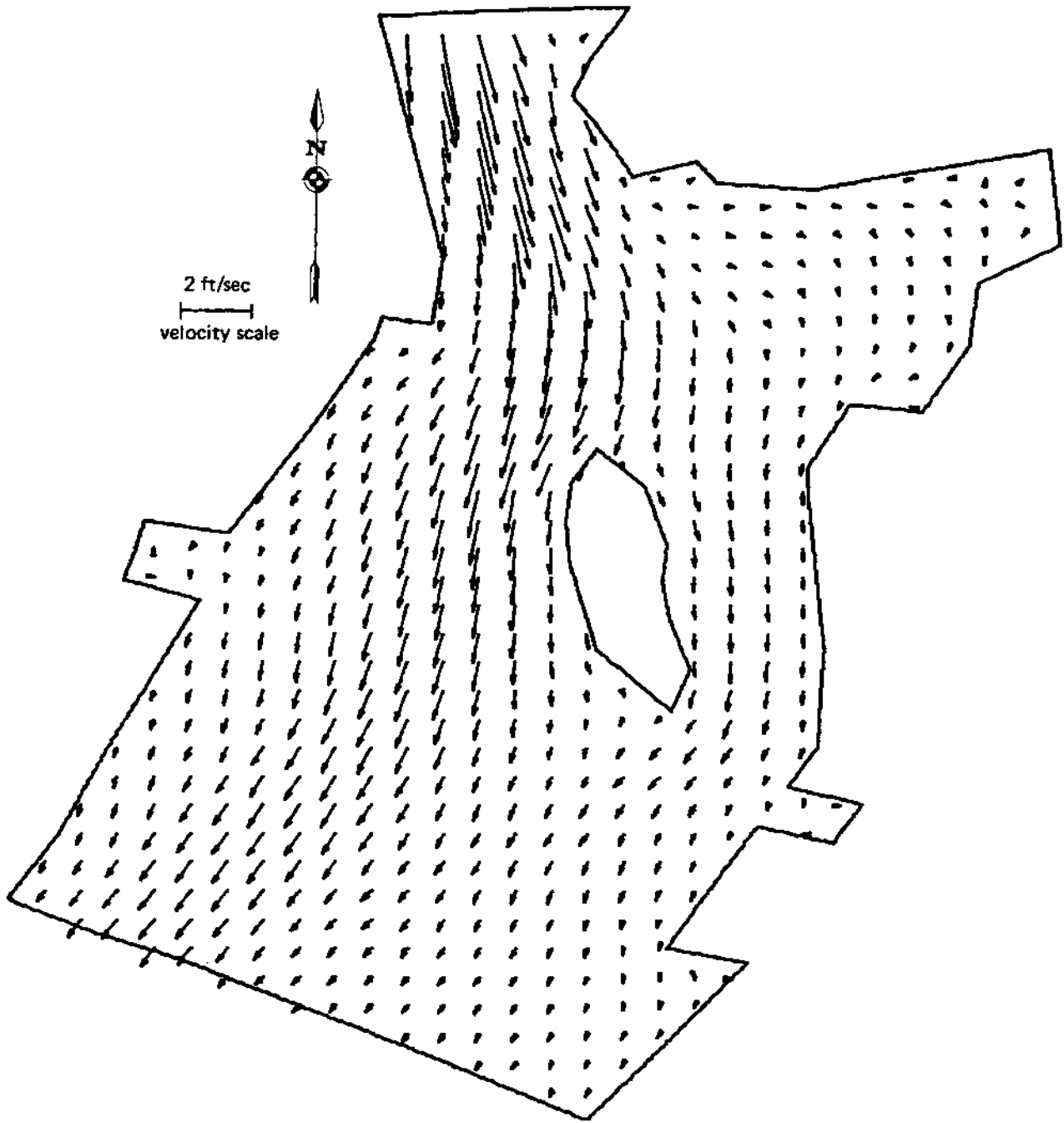Lower Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

Figure A4. Velocity vector field for the rotated island condition in
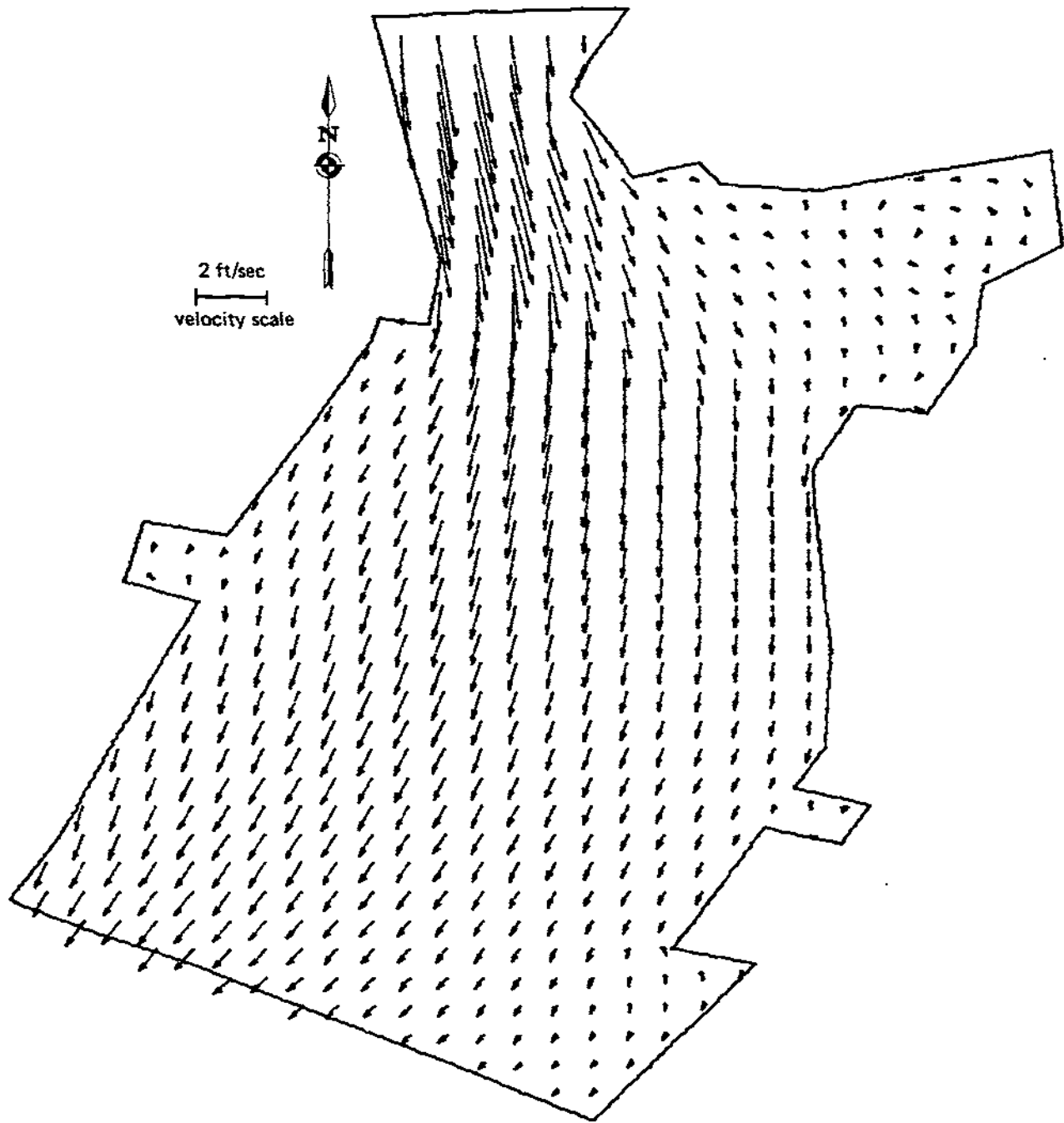Lower Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

Figure A7. Velocity vector field for the no island condition
in Lower Peoria Lake based on TABS-2 simulation for Q – 50,000 cfs
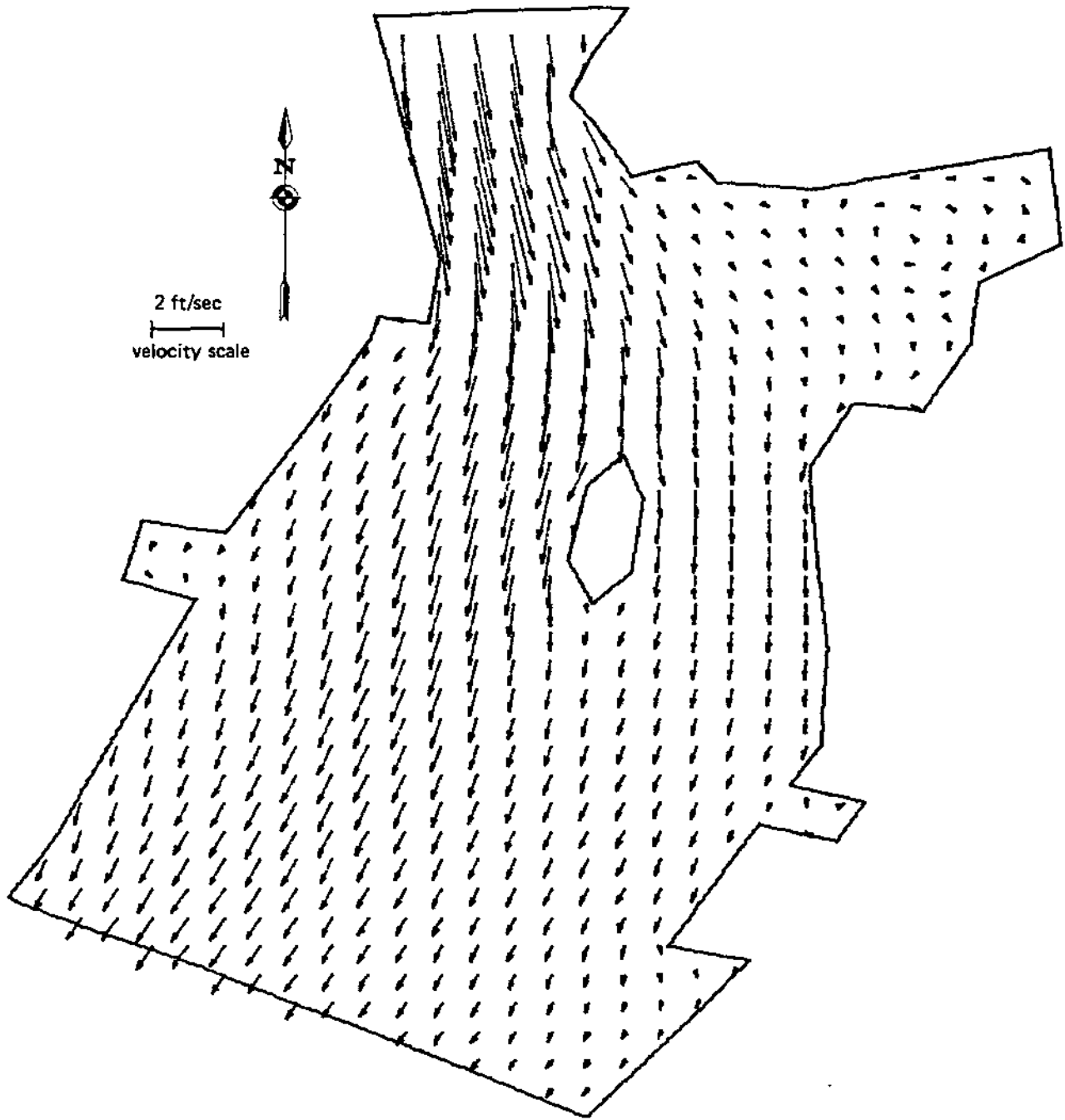(same as Figure 30 in the main text)

Figure A8. Velocity vector field for the small island condition in
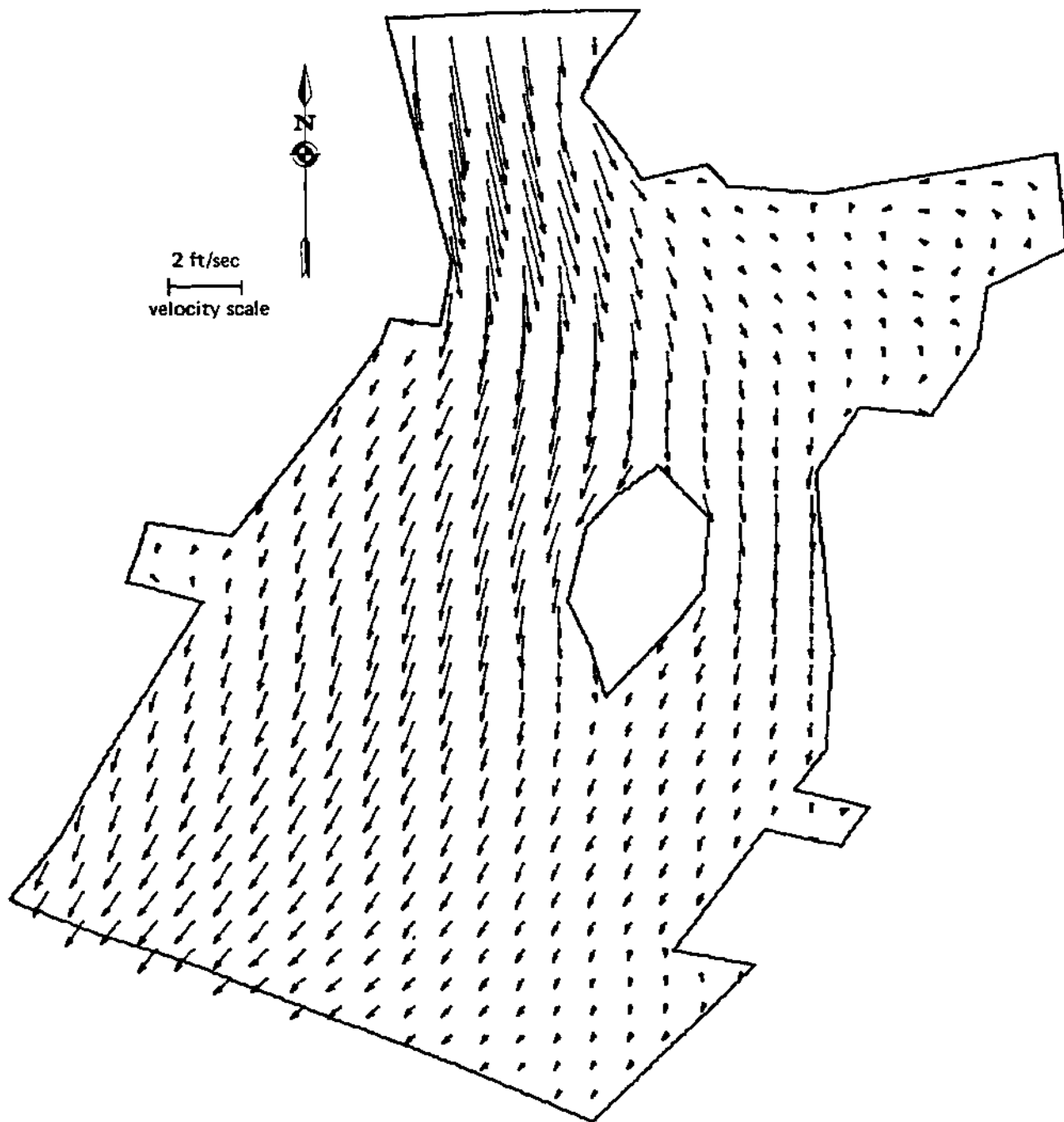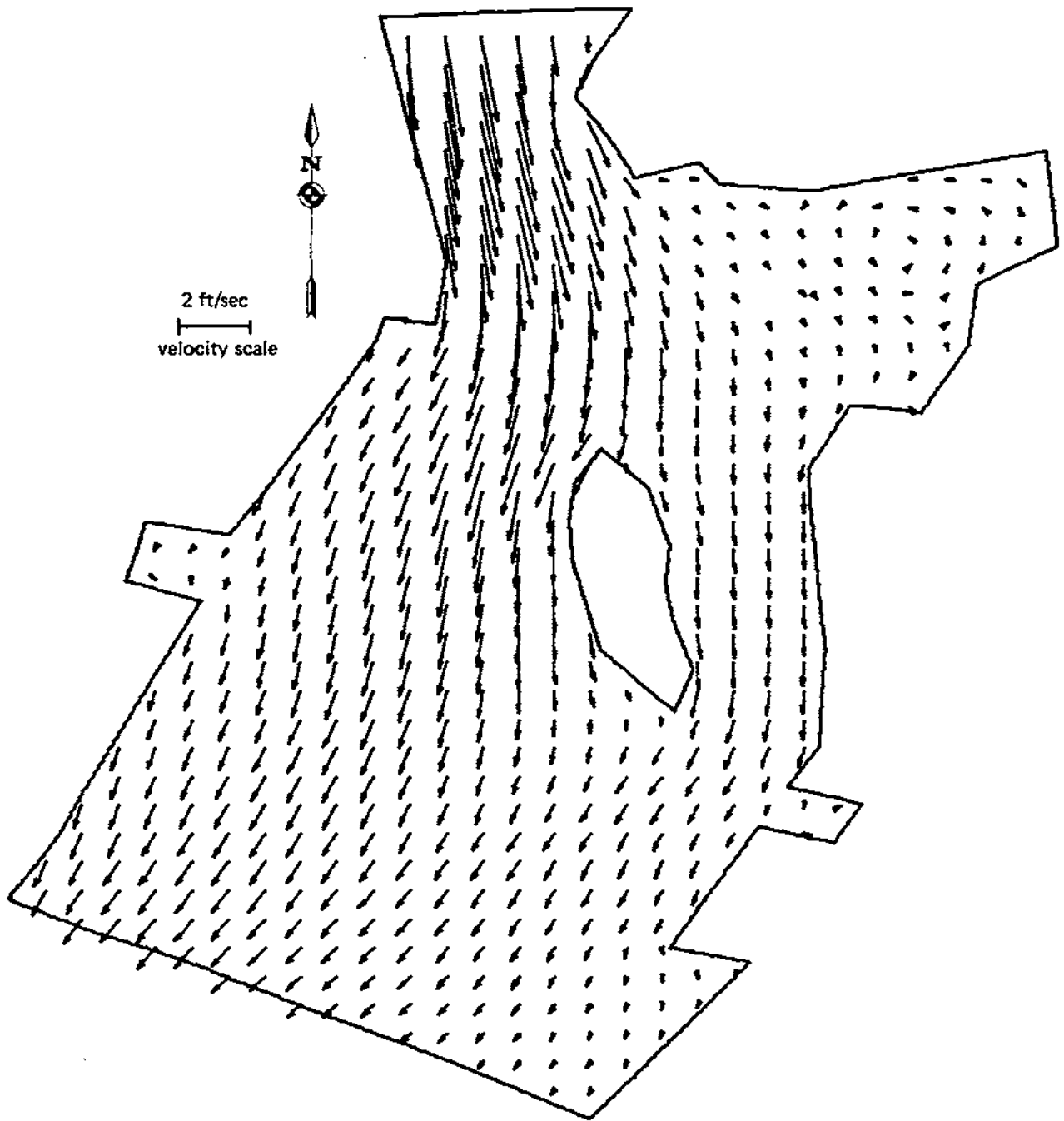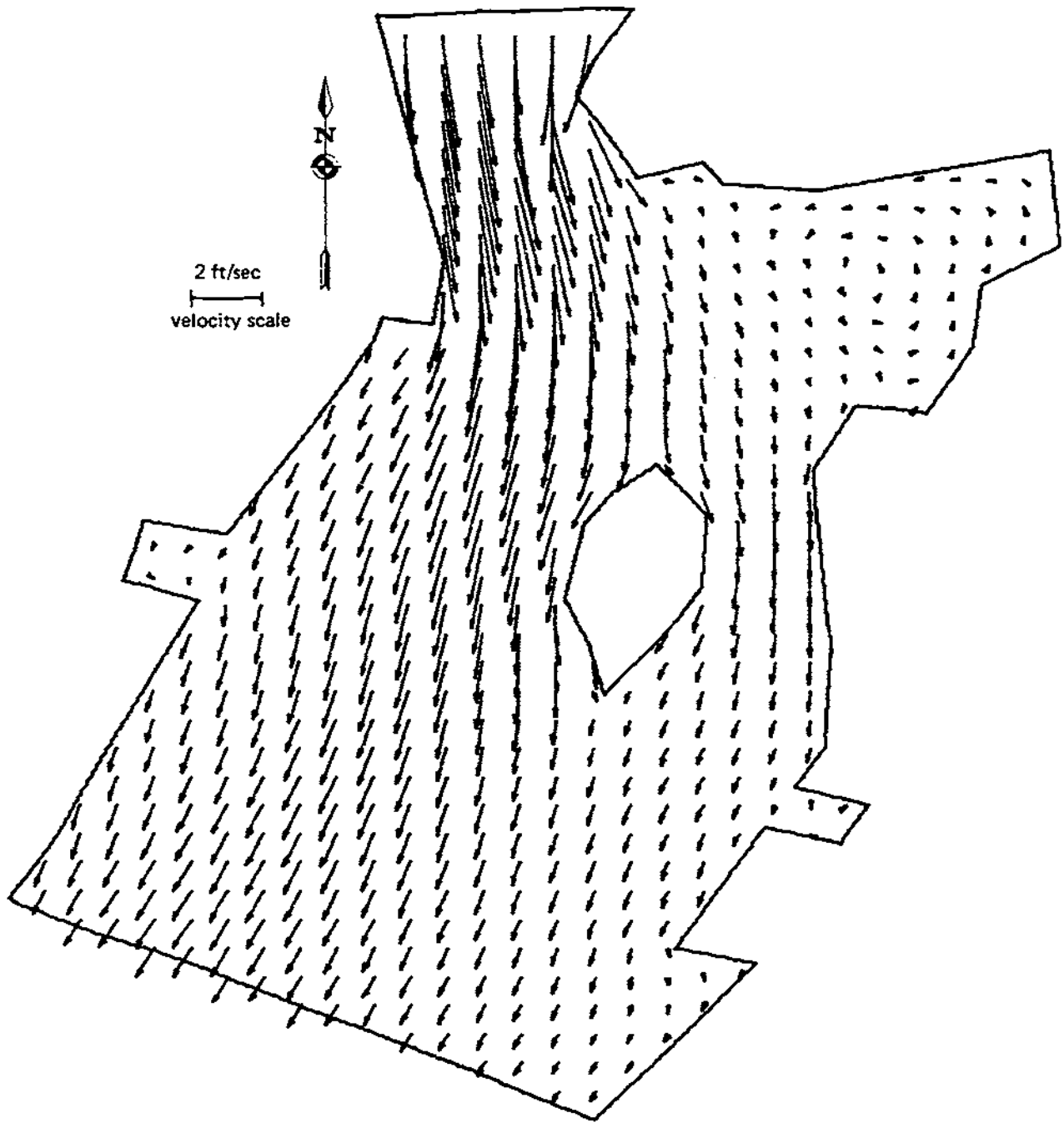Lower Peoria Lake based on TABS-2 simulation for Q = 50,000 cfs

Figure A9. Velocity vector field for the large island condition in
Lower Peoria Lake based on TABS-2 simulation for Q — 50,000 cfs
(same as Figure 31 in the main text)

Figure A10. Velocity vector field for the rotated island condition in
Lower Peoria Lake based on TABS-2 simulation for Q = 50,000 cfs

Figure A15. Velocity vector field for the large island condition in
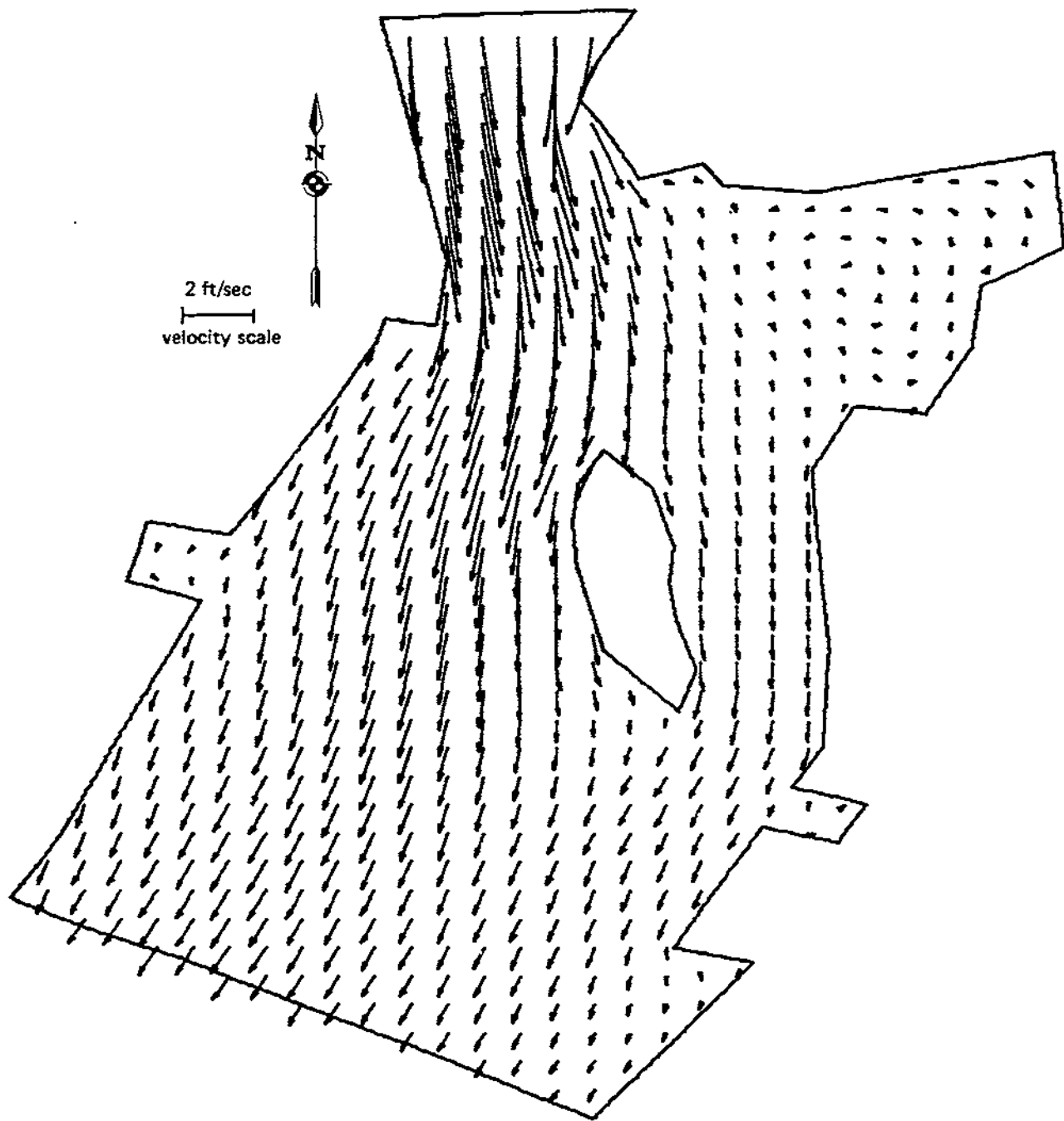Lower Peoria Lake based on TABS-2 simulation for Q — 83,000 cfs

Figure A16. Velocity vector field for the rotated island condition in
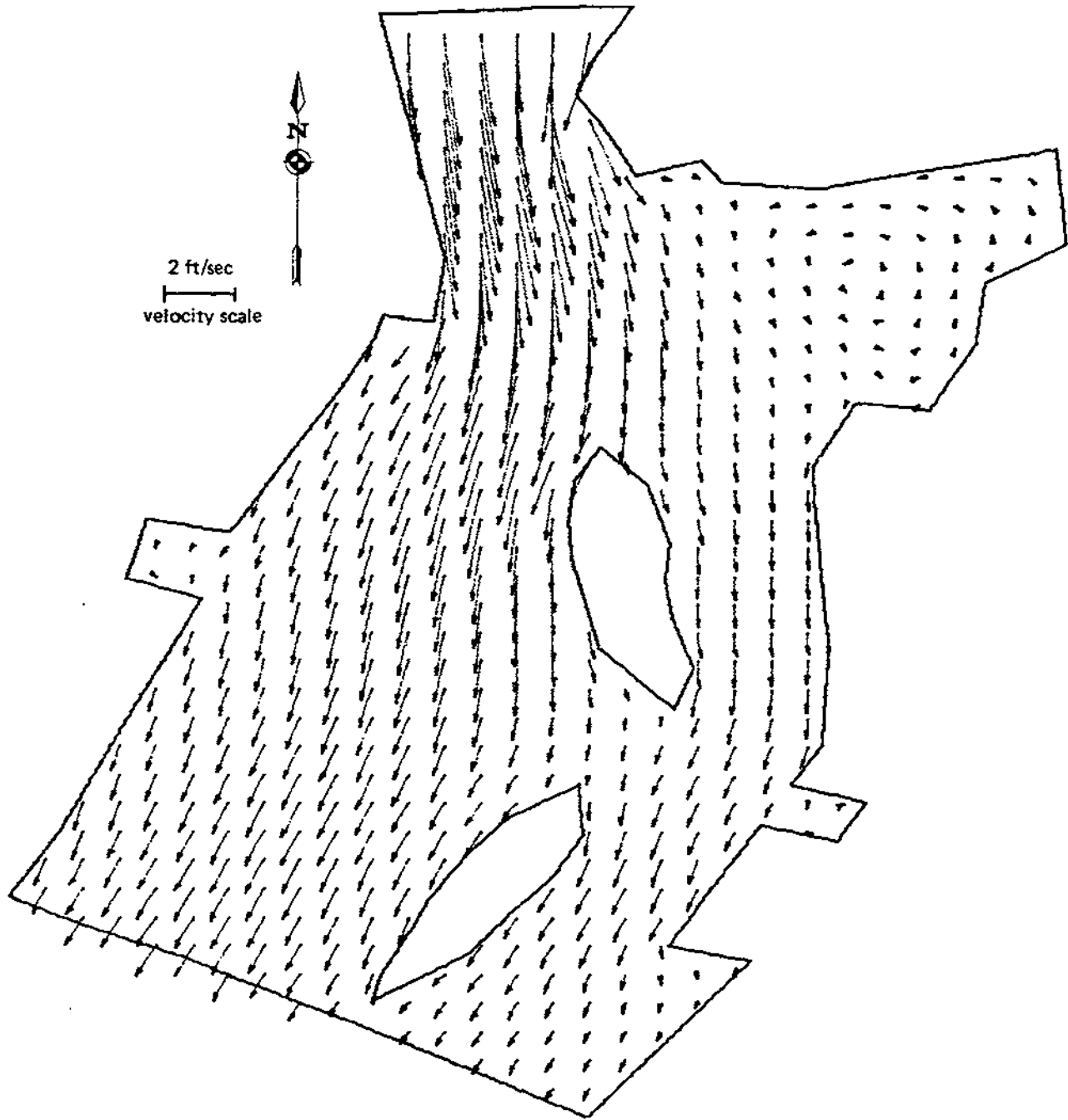Lower Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs

Figure A17. Velocity vector field for the two islands condition in
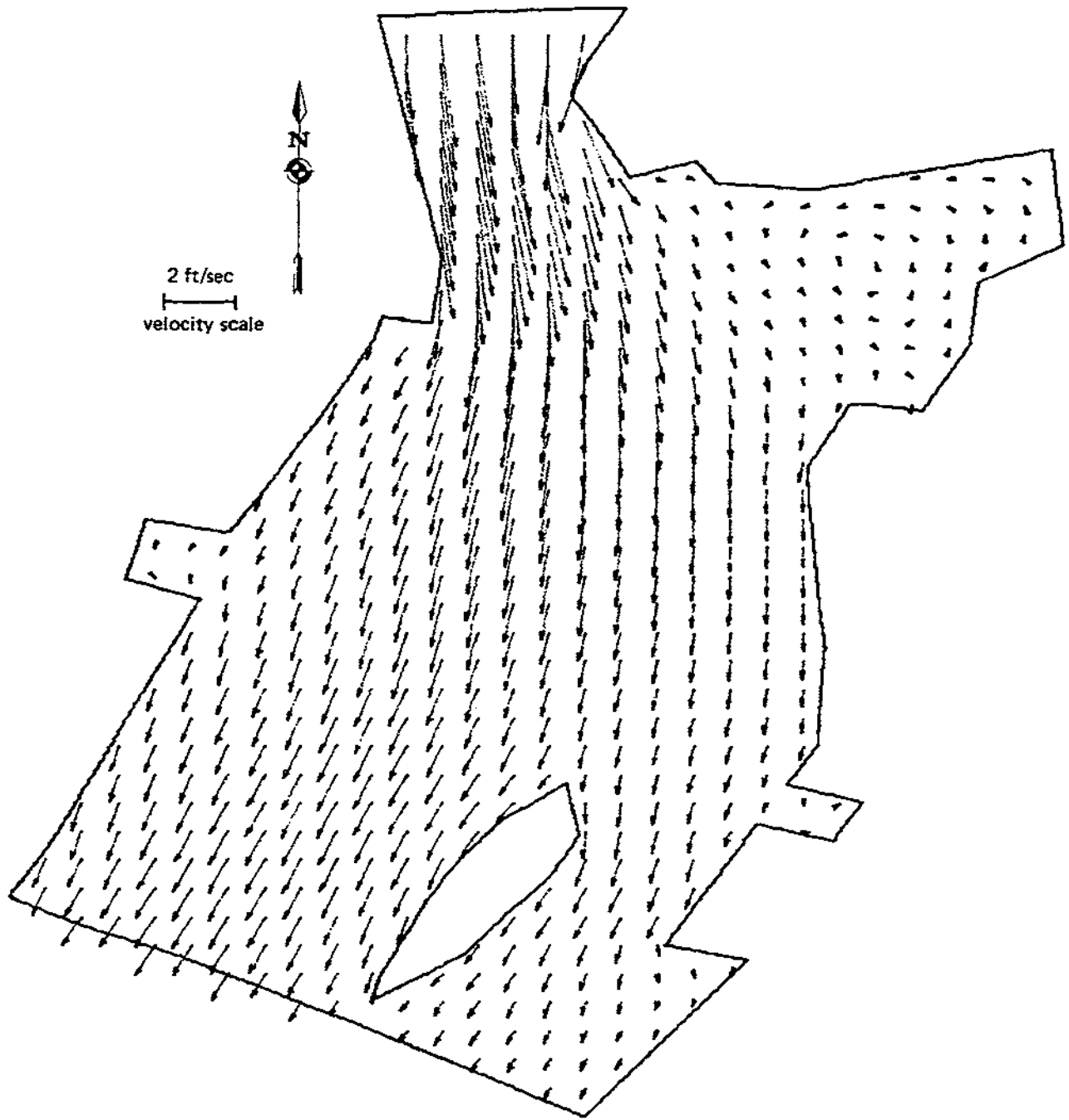Lower Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs

Figure A18. Velocity vector field for the <u>lower island</u> condition in
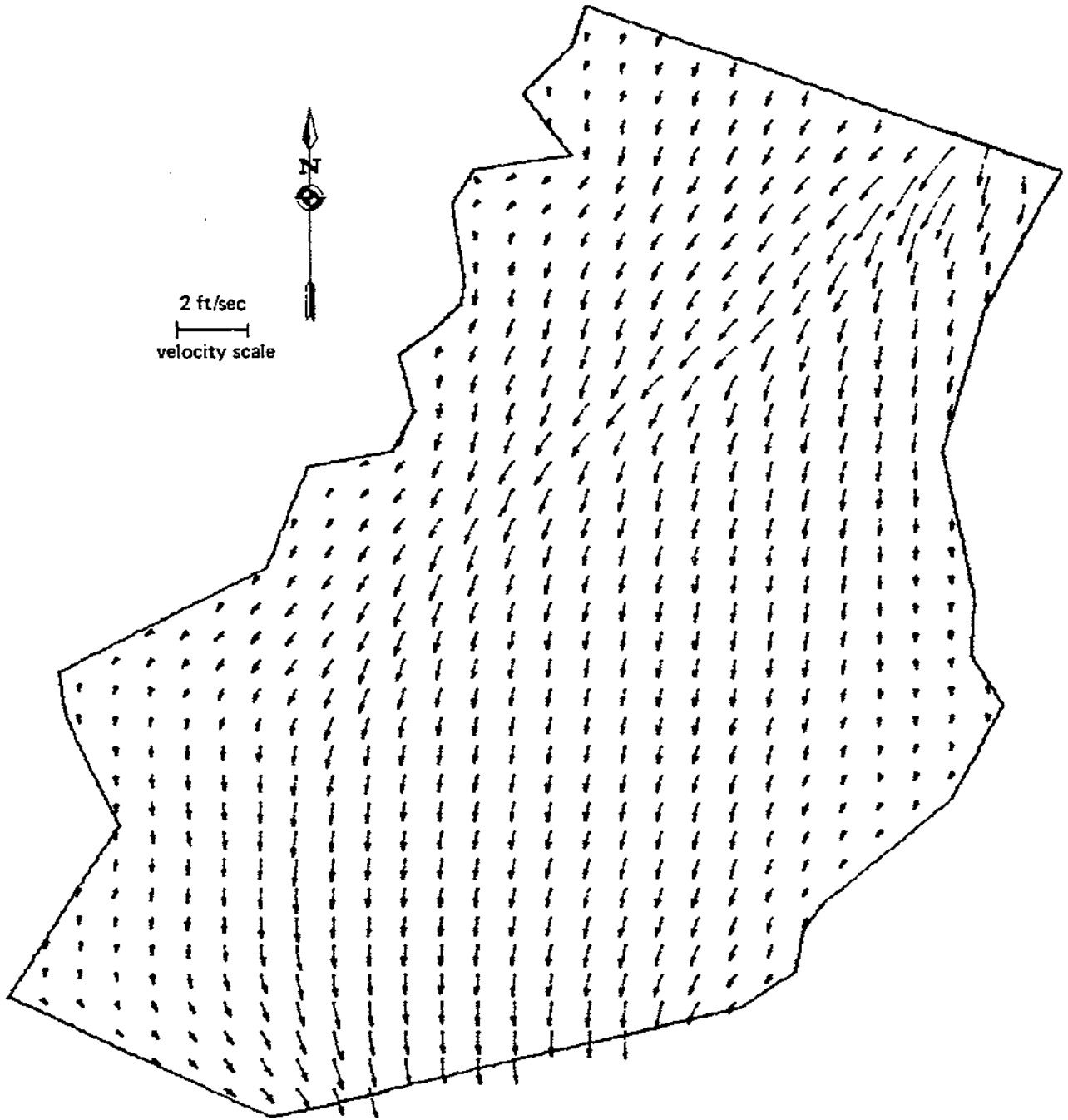Lower Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs

Figure A19. Velocity vector field for the no island condition
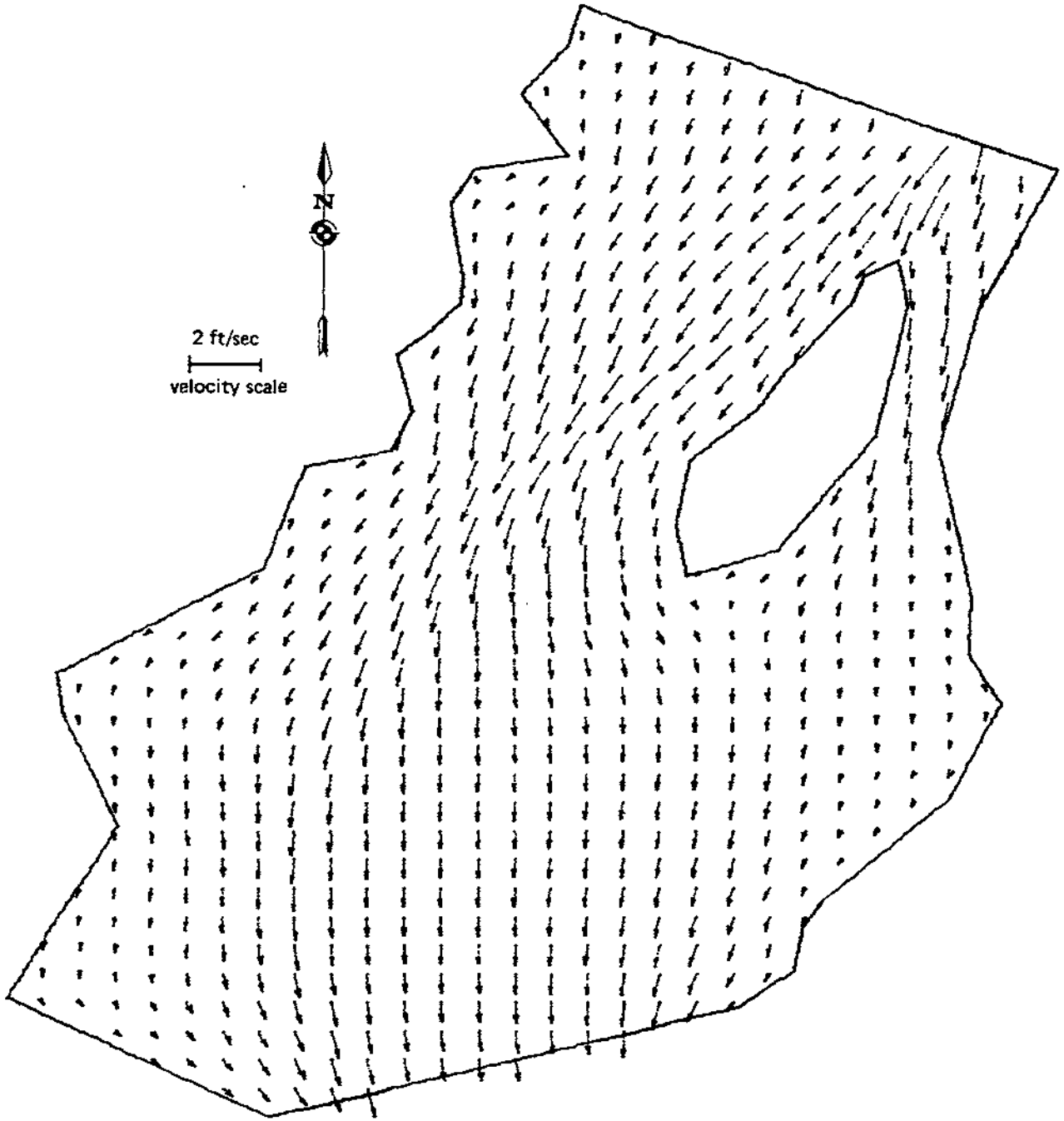in Upper Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

Figure A20. Velocity vector field for the <u>upper island</u> condition in
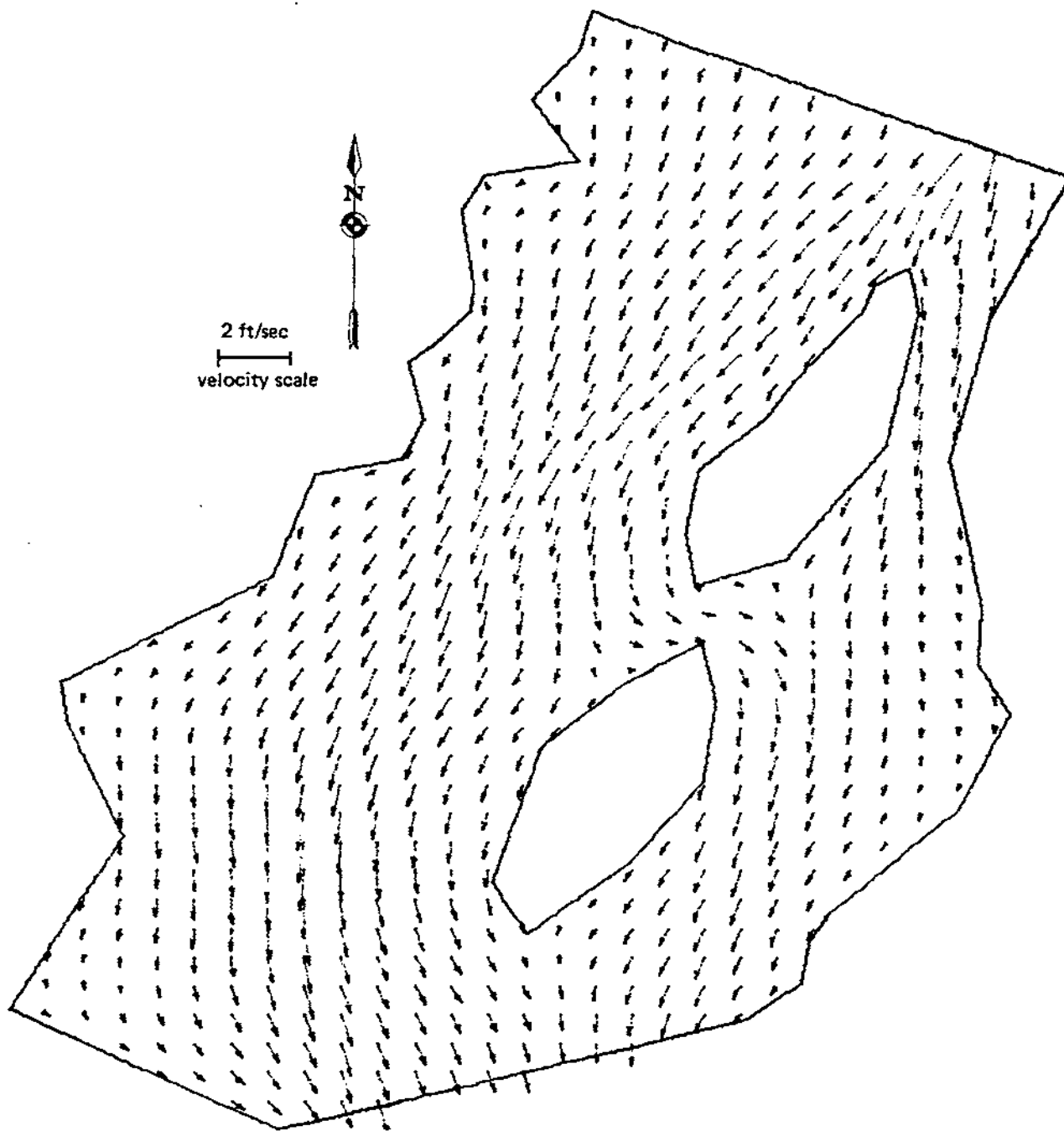Upper Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

Figure A21. Velocity vector field for the two islands condition in Upper Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs
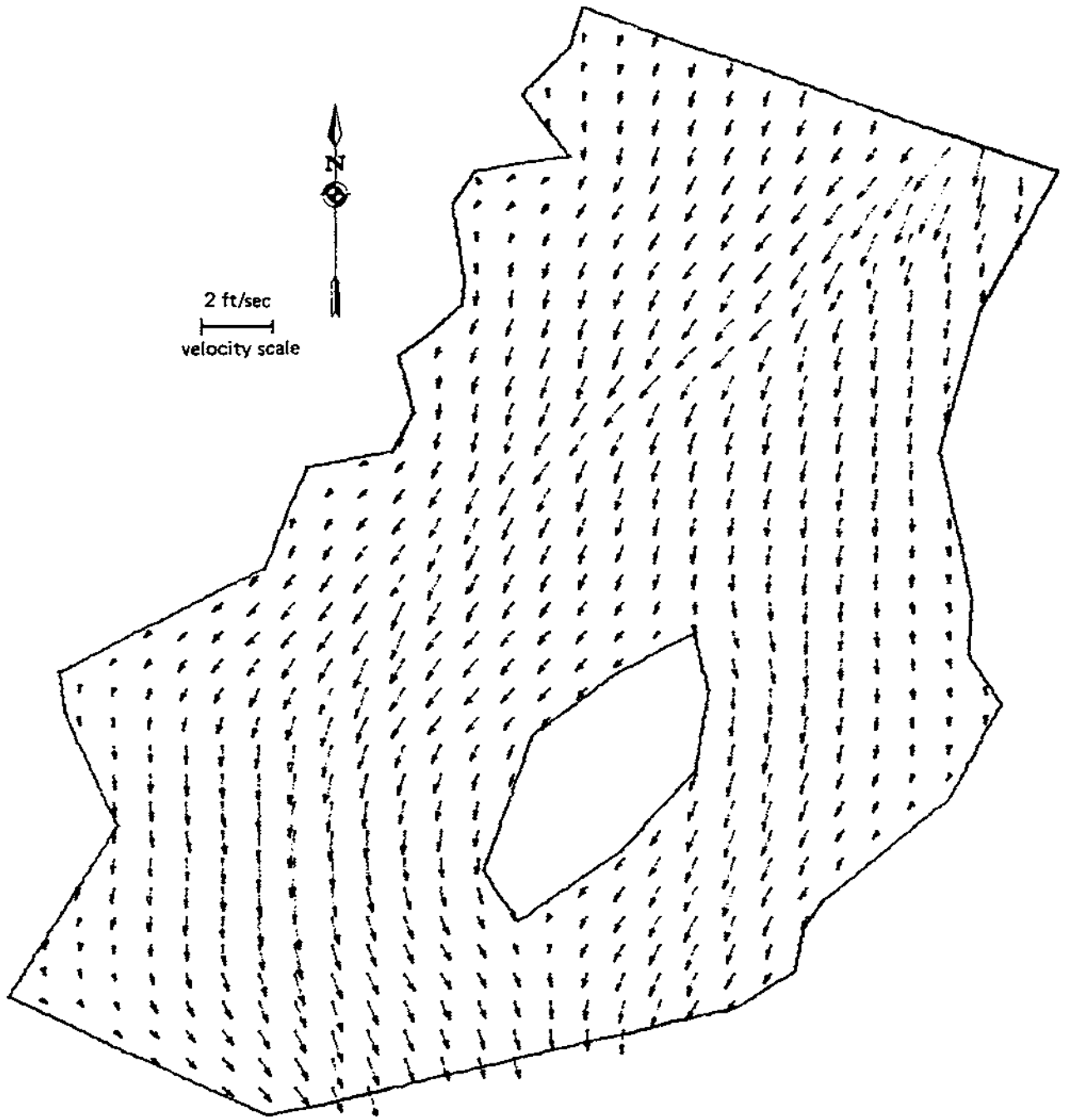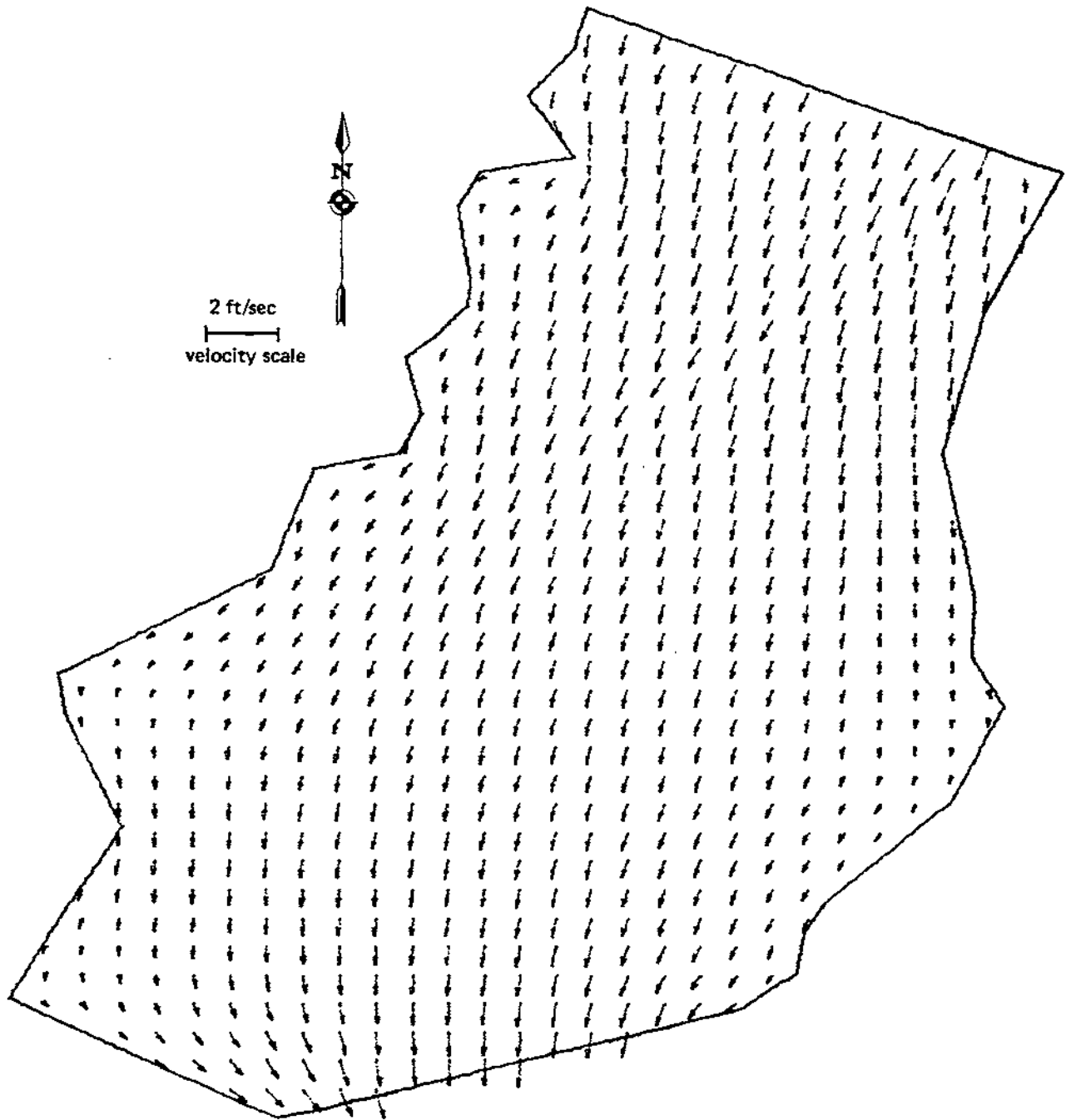
Figure A22. Velocity vector field for the lower island condition in
Upper Peoria Lake based on TABS-2 simulation for Q = 20,000 cfs

Figure A23. Velocity vector field for the no island condition
in Upper Peoria Lake based on TABS-2 simulation for Q = 50,000 cfs
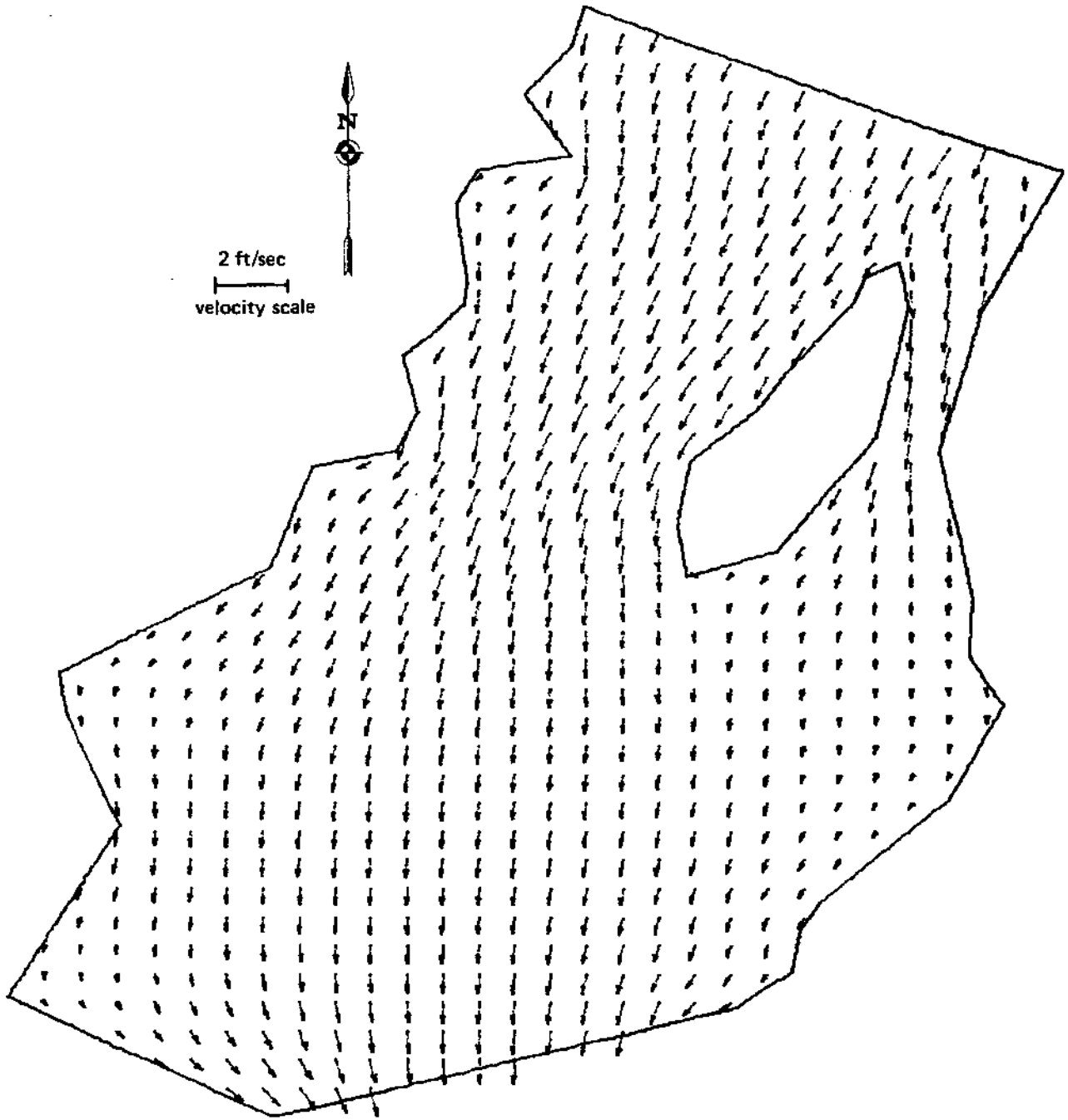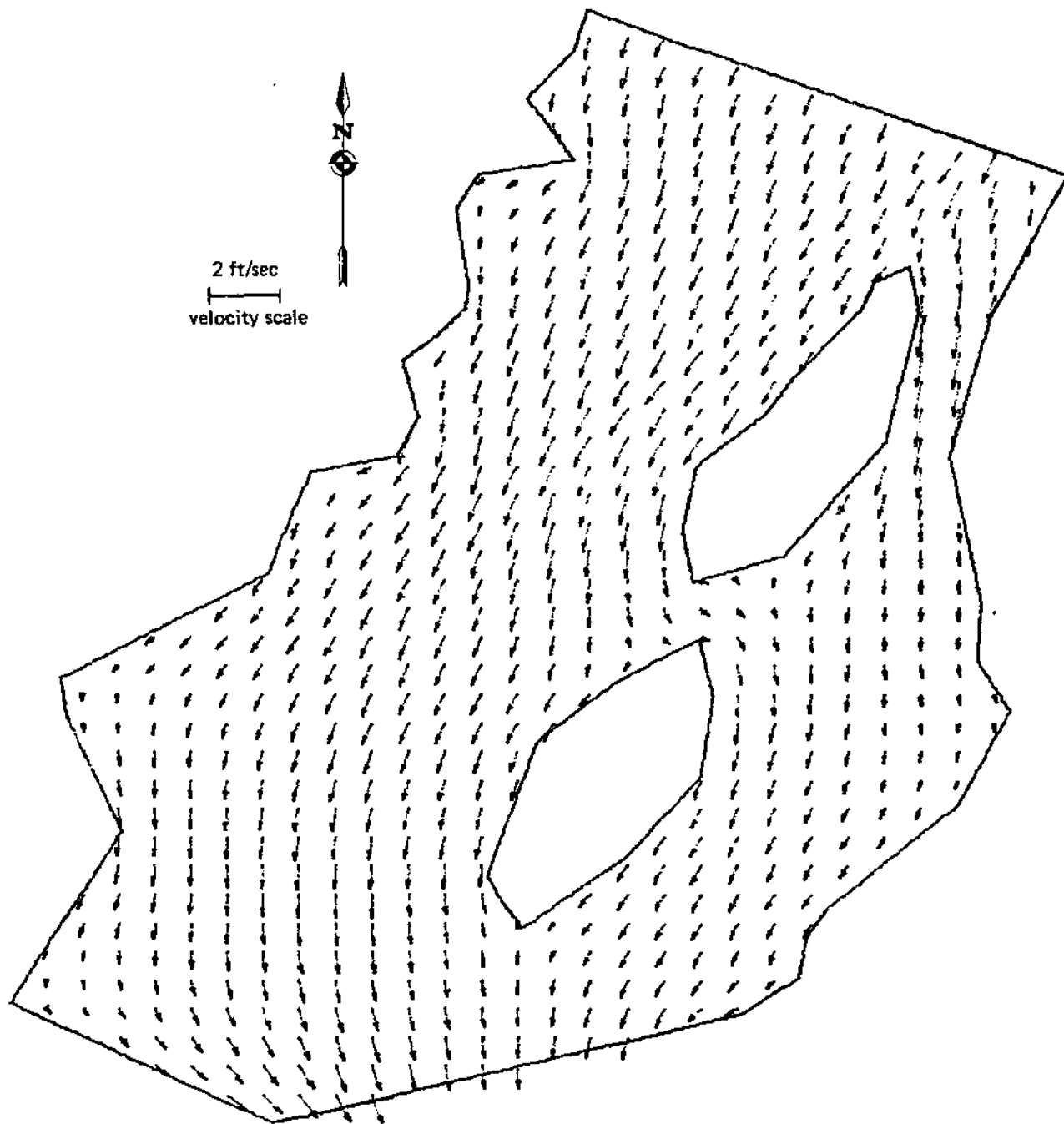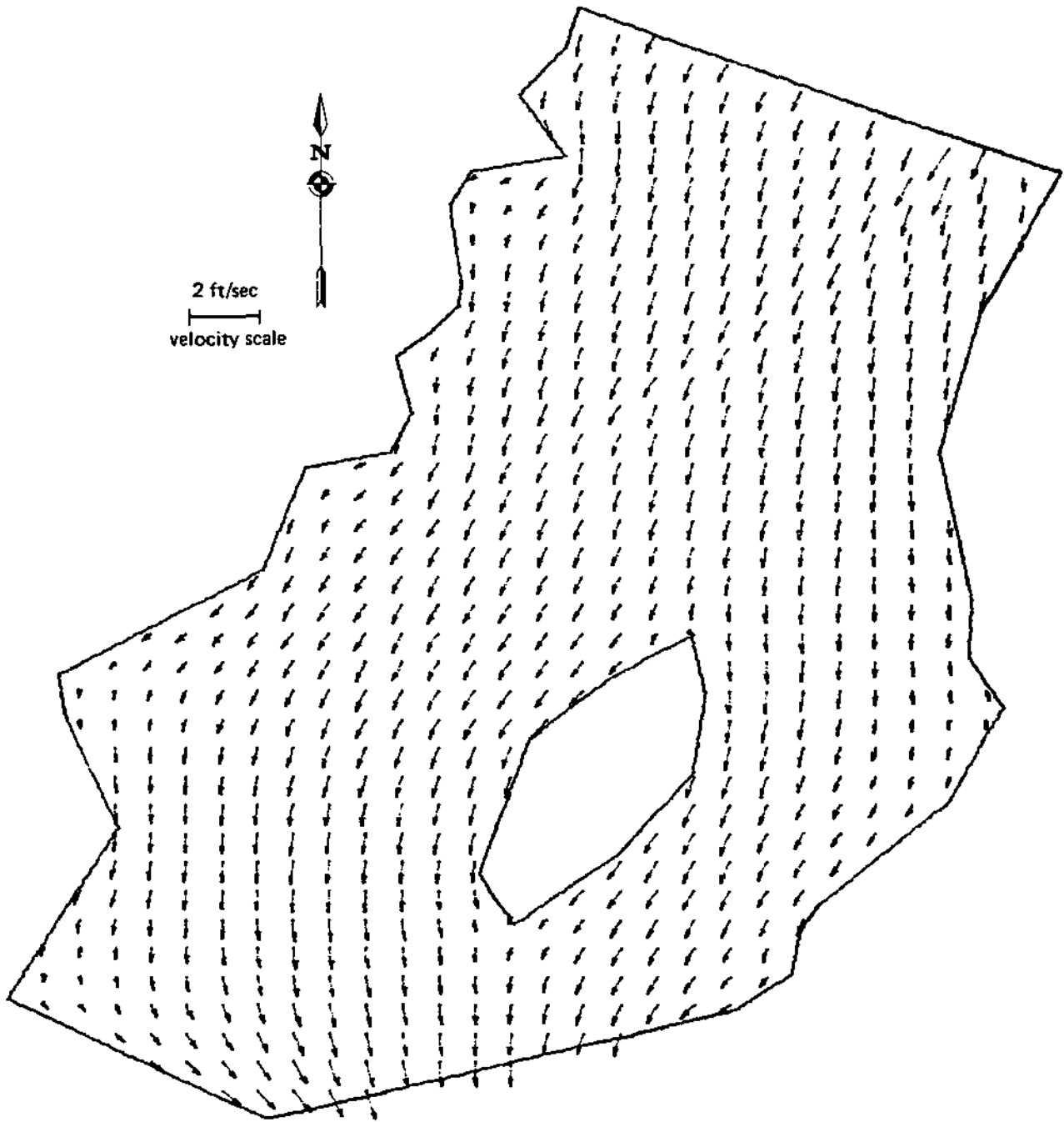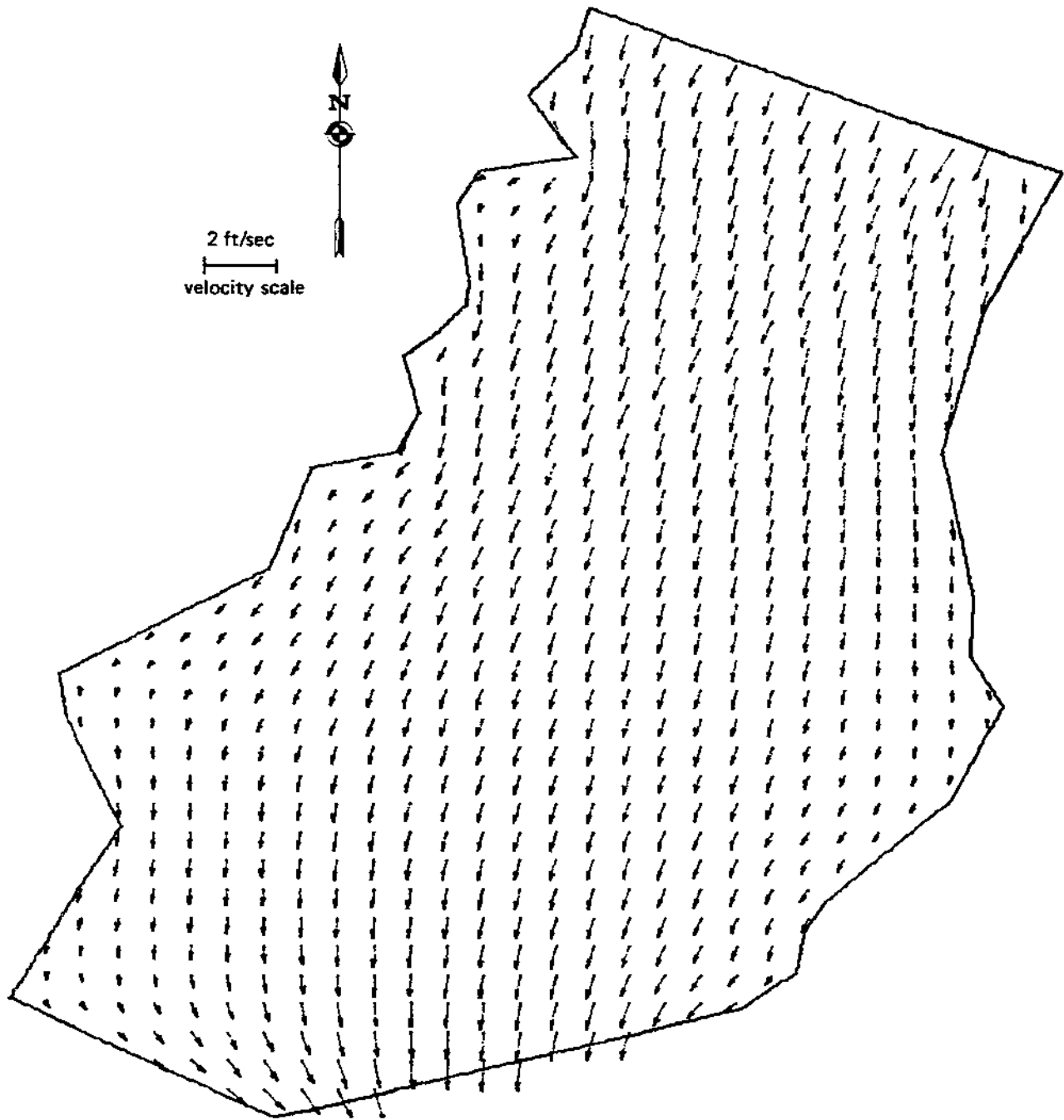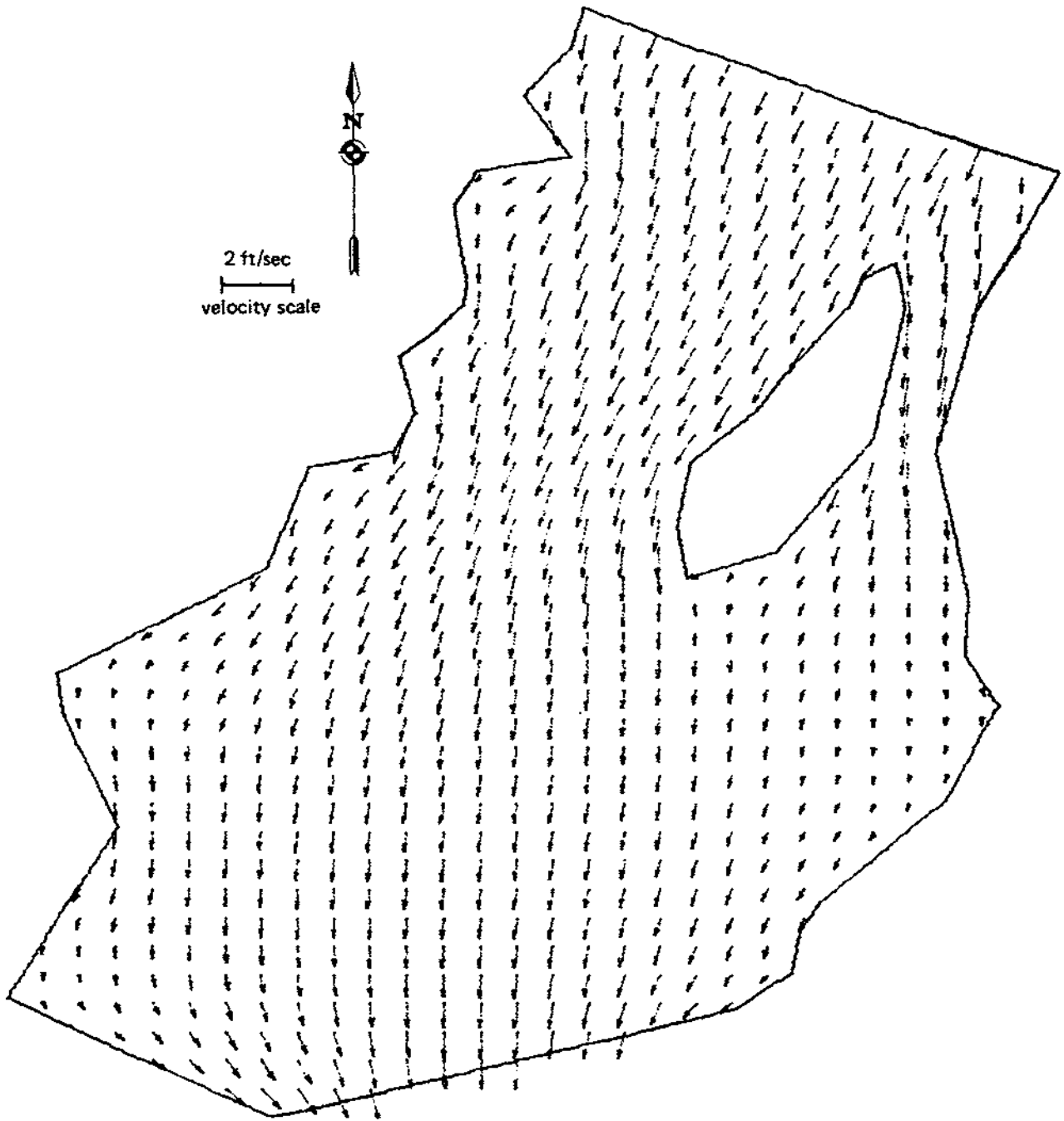(same as Figure 32 in the main text)

Figure A24. Velocity vector field for the upper island condition in
Upper Peoria Lake based on TABS-2 simulation for Q = 50,000 cfs
(same as Figure 33 in the main text)

Figure A25. Velocity vector field for the two islands condition in
Upper Peoria Lake based on TABS-2 simulation for Q = 50,000 cfs

Figure A26. Velocity vector field for the lower island condition in
Upper Peoria Lake based on TABS-2 simulation for Q = 50,000 cfs

Figure A27. Velocity vector field for the no island condition
in Upper Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs

Figure A28. Velocity vector field for the upper island condition in
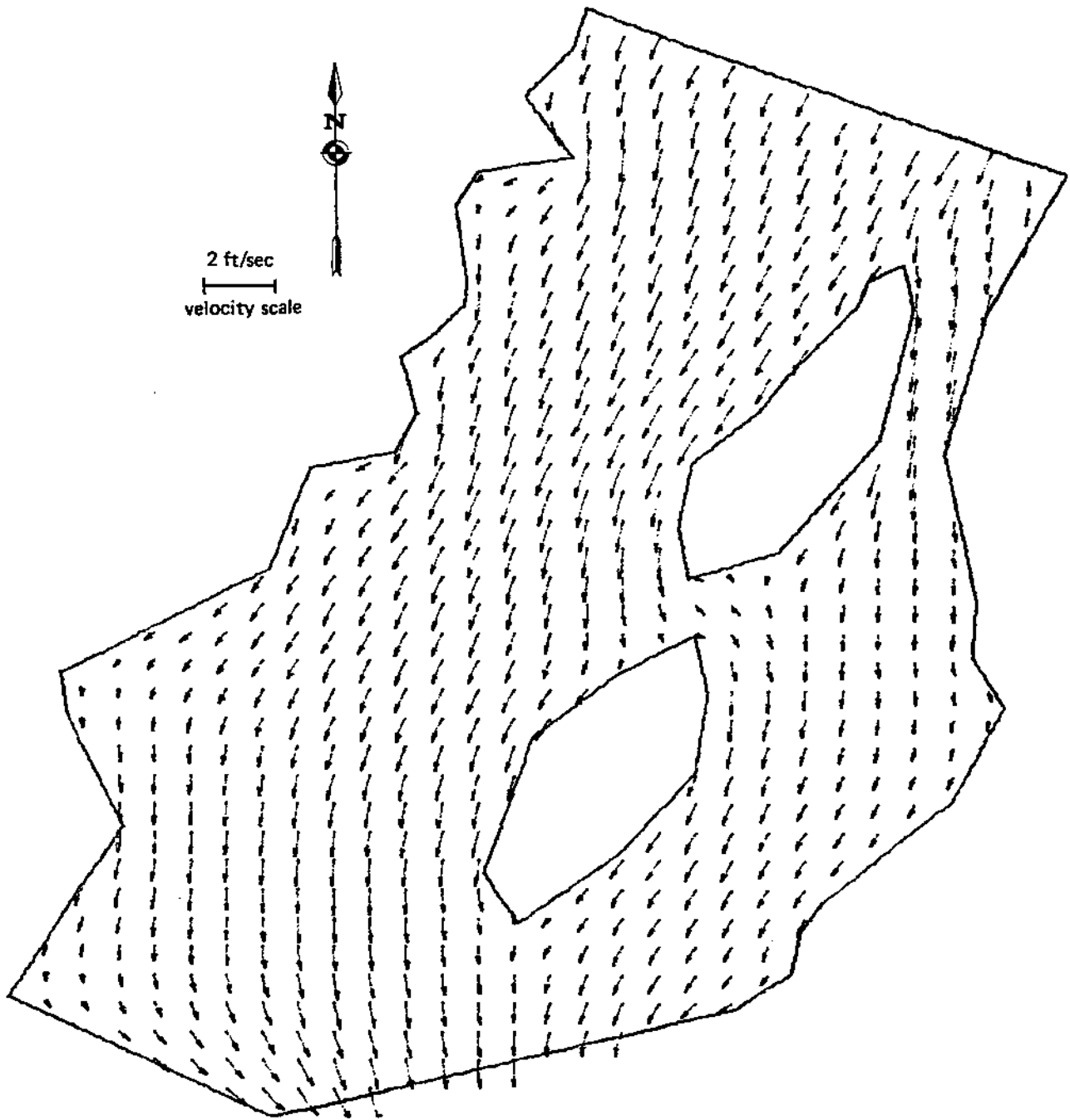Upper Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs

Figure A29. Velocity vector field for the two islands condition in Upper Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs
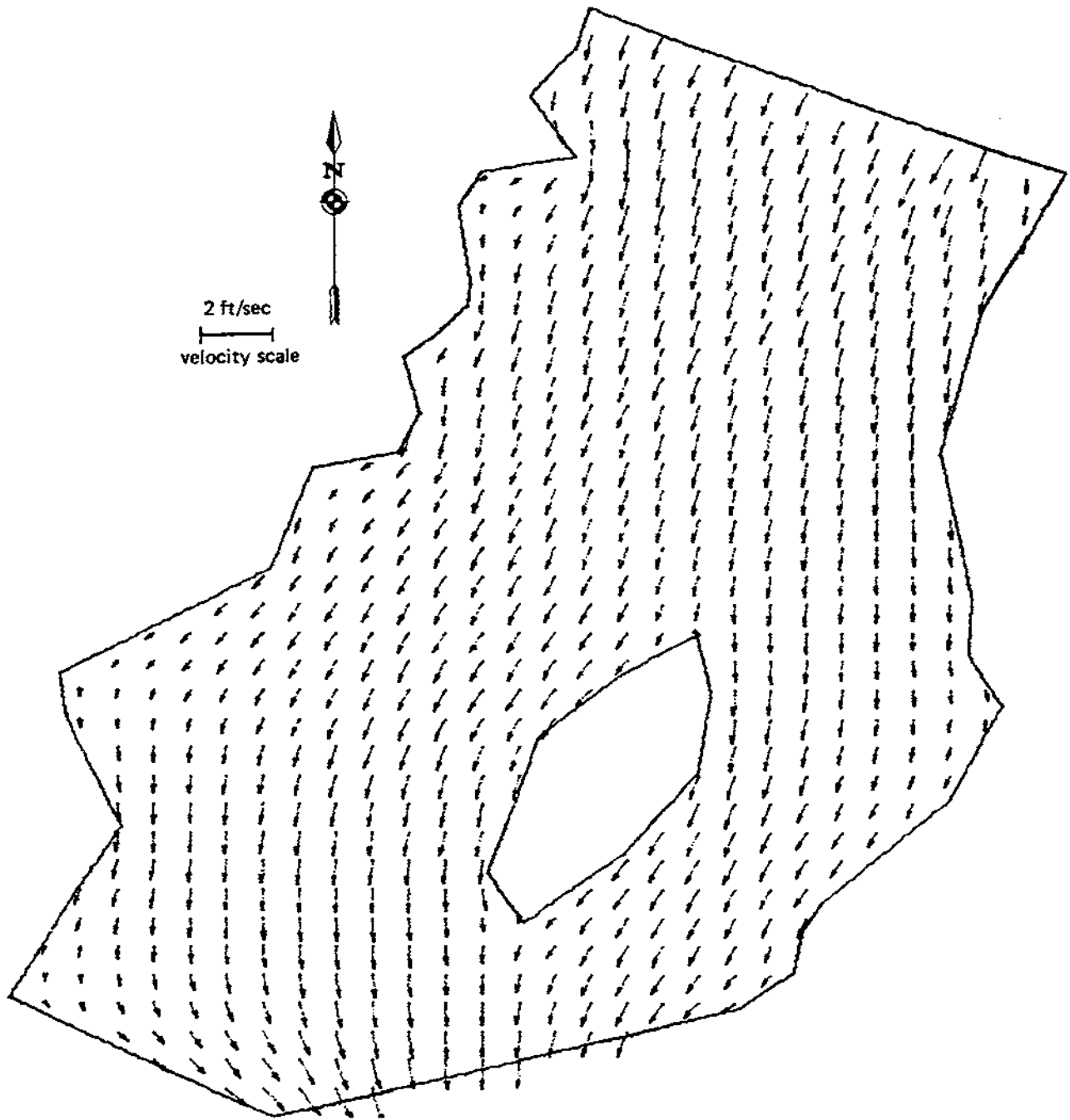
Figure A30. Velocity vector field for the lower island condition in
Upper Peoria Lake based on TABS-2 simulation for Q = 83,000 cfs

Appendix B
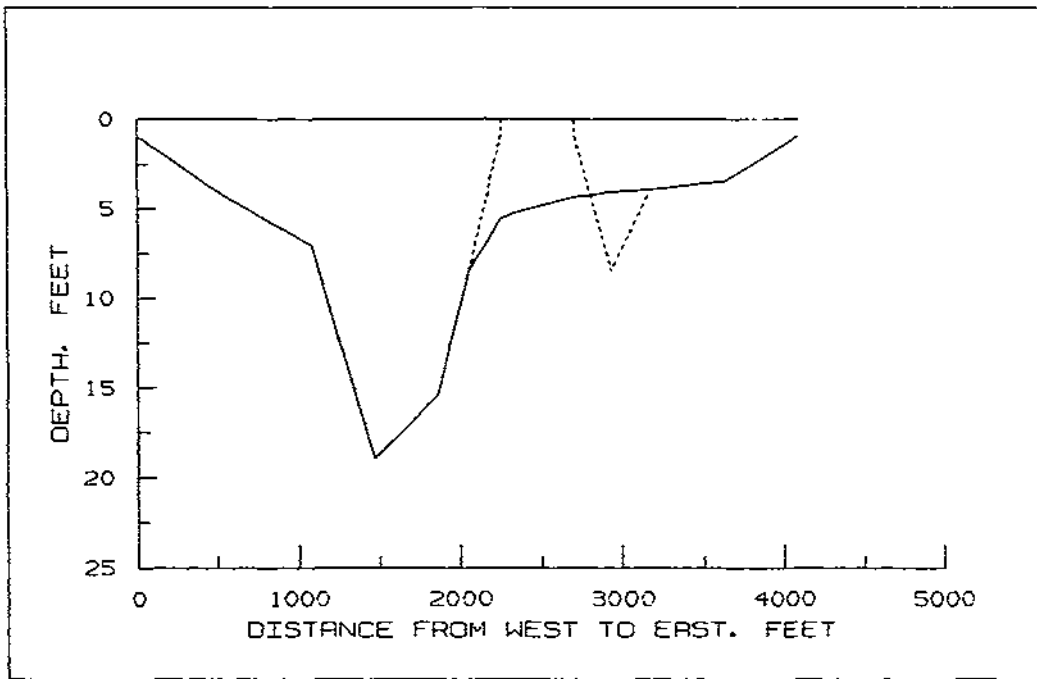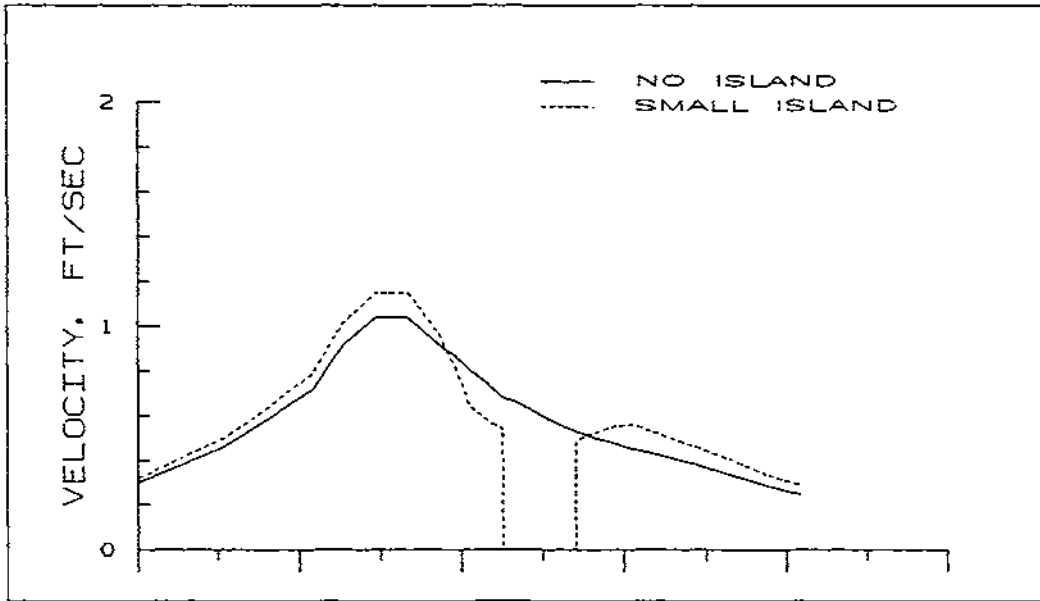

Comparisons of Velocities along Selected Cross Sections

Figure B1. Comparison of velocity distributions at cross section 2
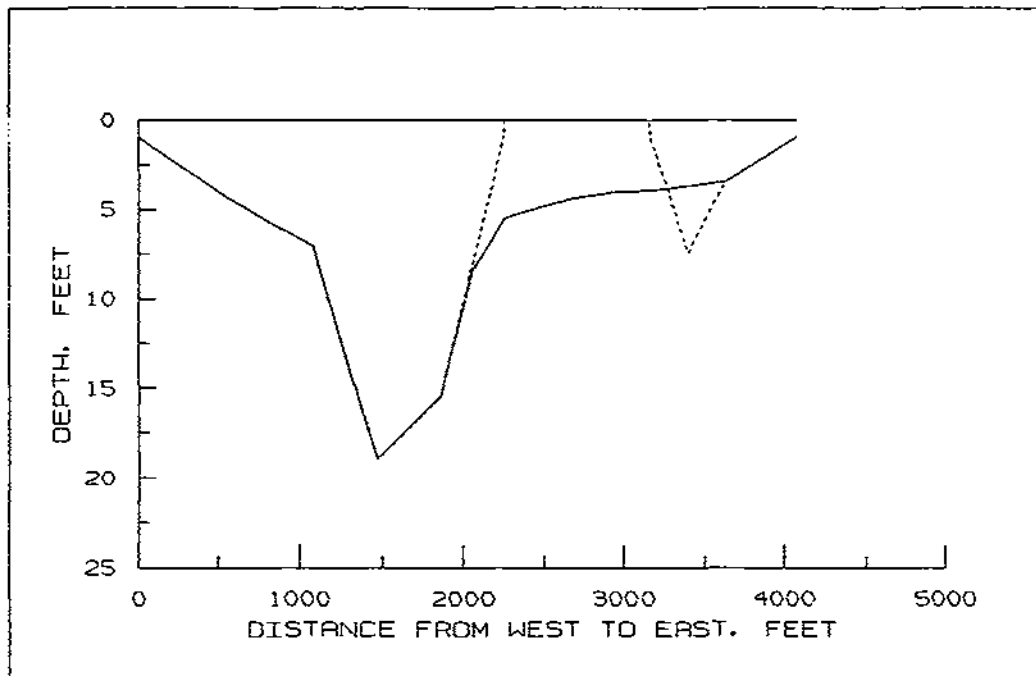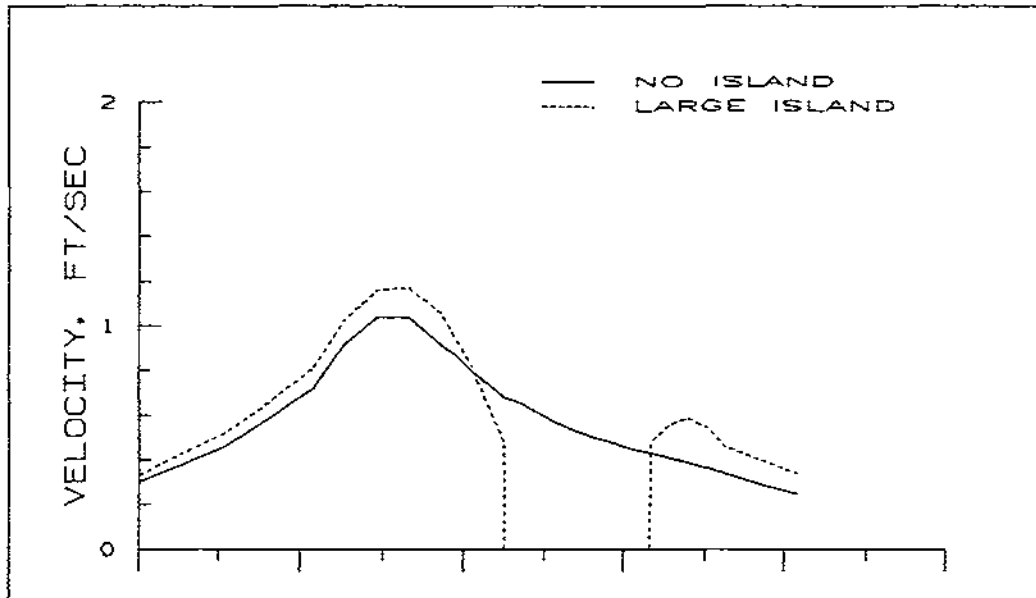in Lower Peoria Lake for the no island and small island conditions
(Q = 20,000 cfs)

Figure B2. Comparison of velocity distributions at cross section 2 in Lower Peoria Lake for the <u>no island</u> and <u>large island</u> conditions (Q = 20,000 cfs) (same as Figure 36 in the main text)
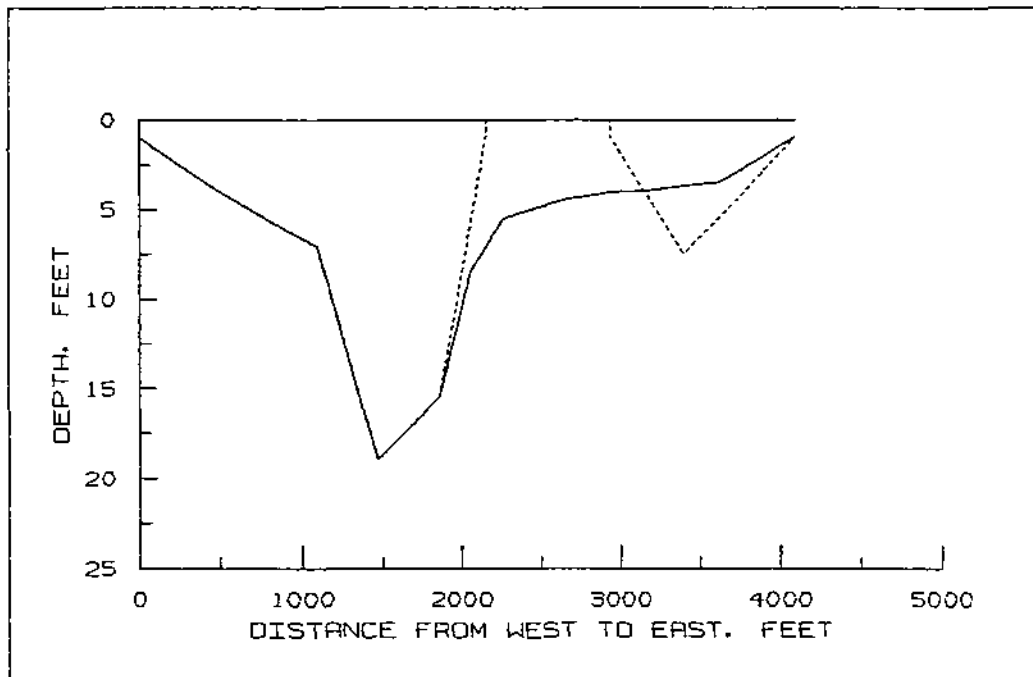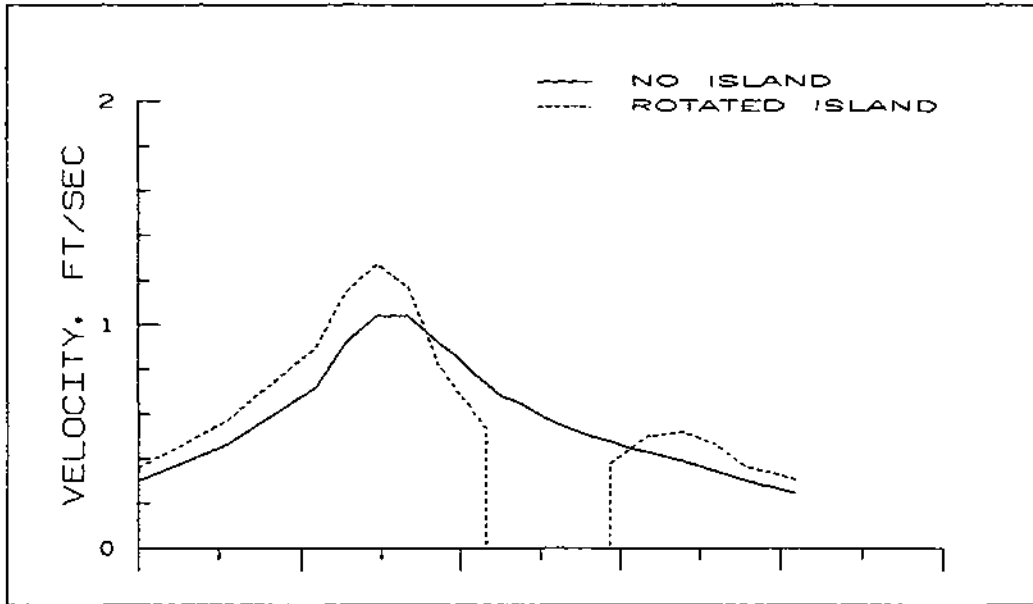
Figure B3. Comparison of velocity distributions at cross section 2 in Lower Peoria Lake for the no island and rotated island conditions (Q = 20,000 cfs)
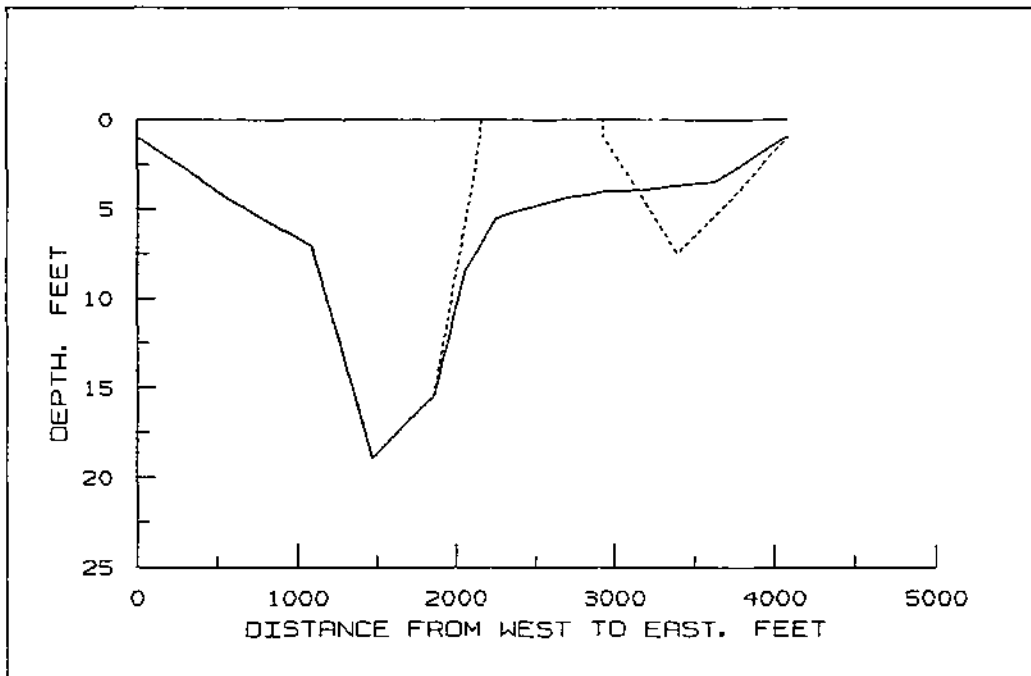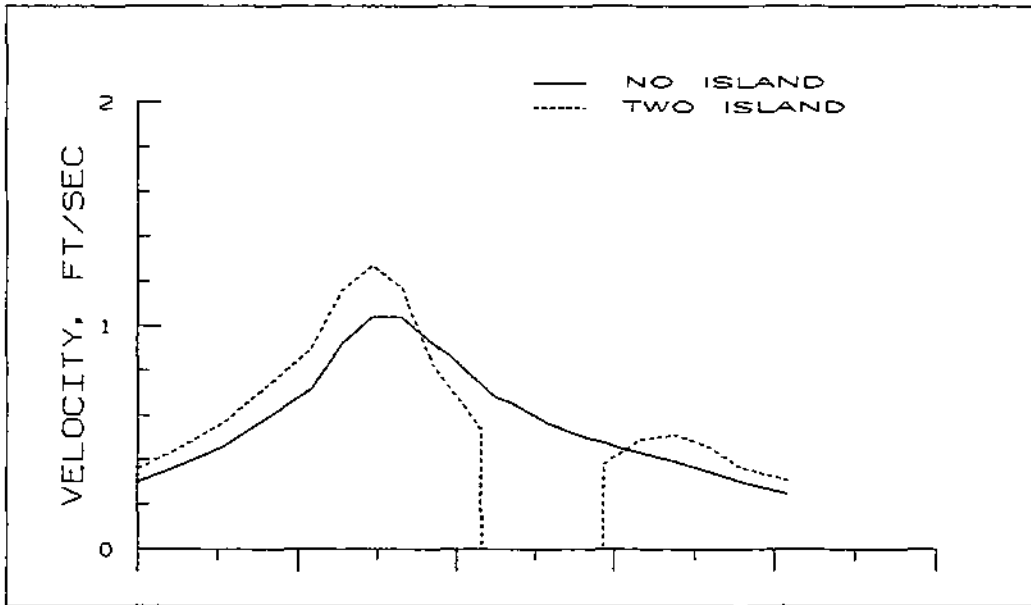
Figure B4. Comparison of velocity distributions at cross section 2 in Lower Peoria Lake for the no island and two islands conditions (Q = 20,000 cfs)
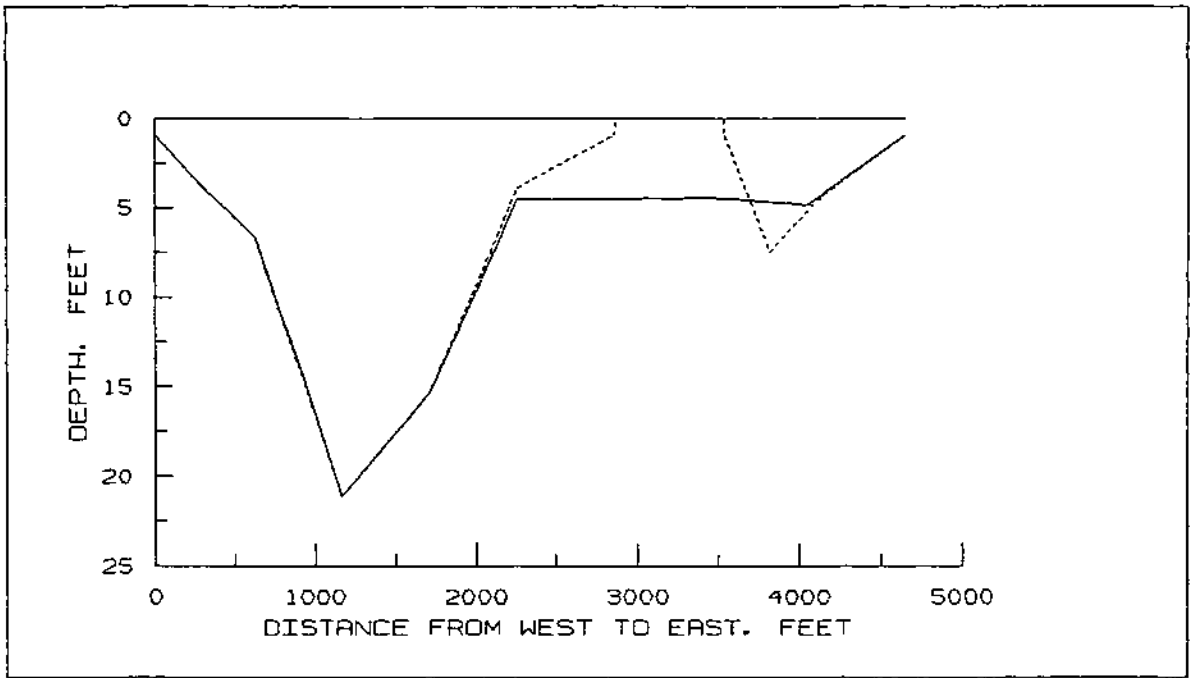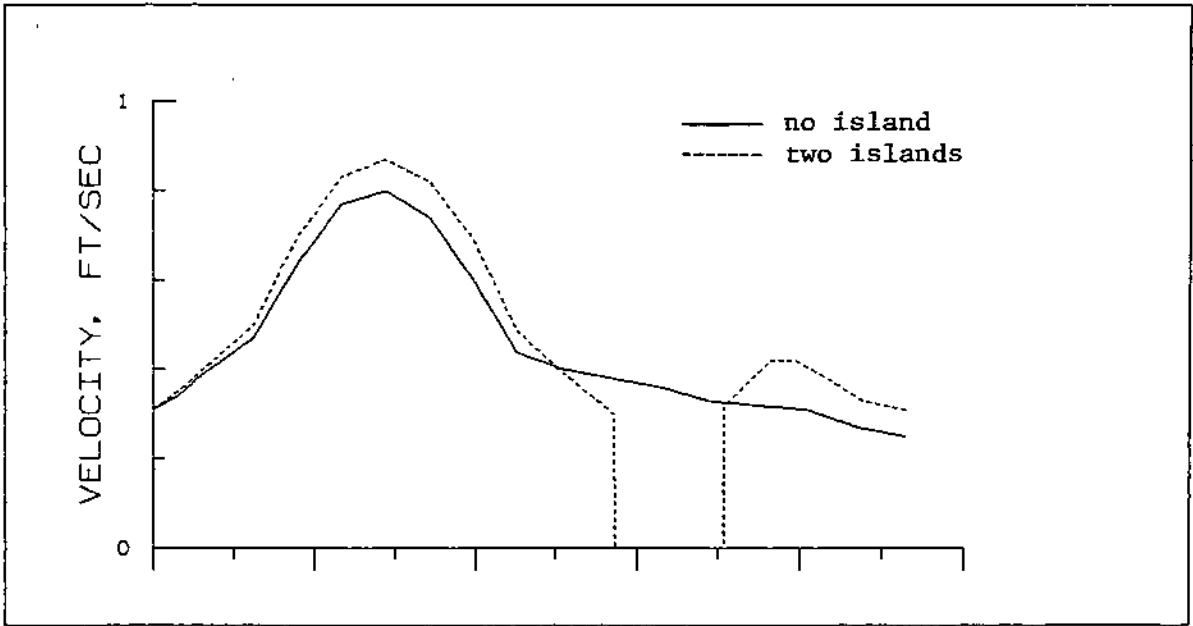
Figure B5. Comparison of velocity distributions at cross section 5 in Lower Peoria Lake for the no island and two islands conditions (Q = 20,000 cfs)
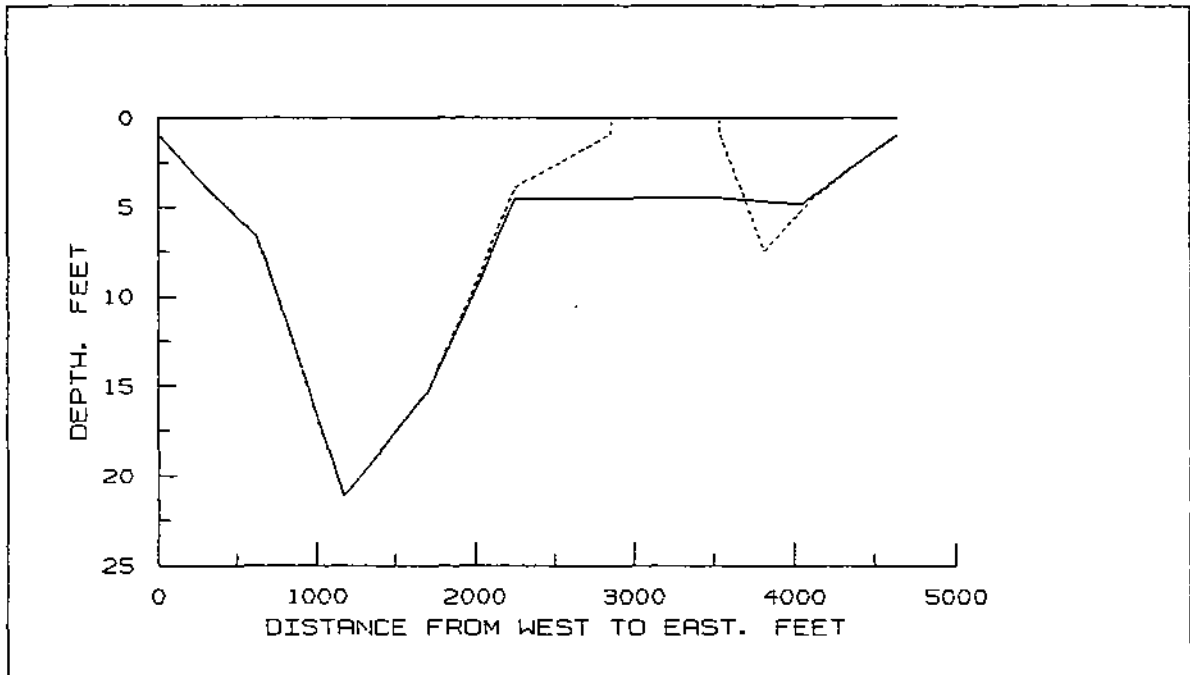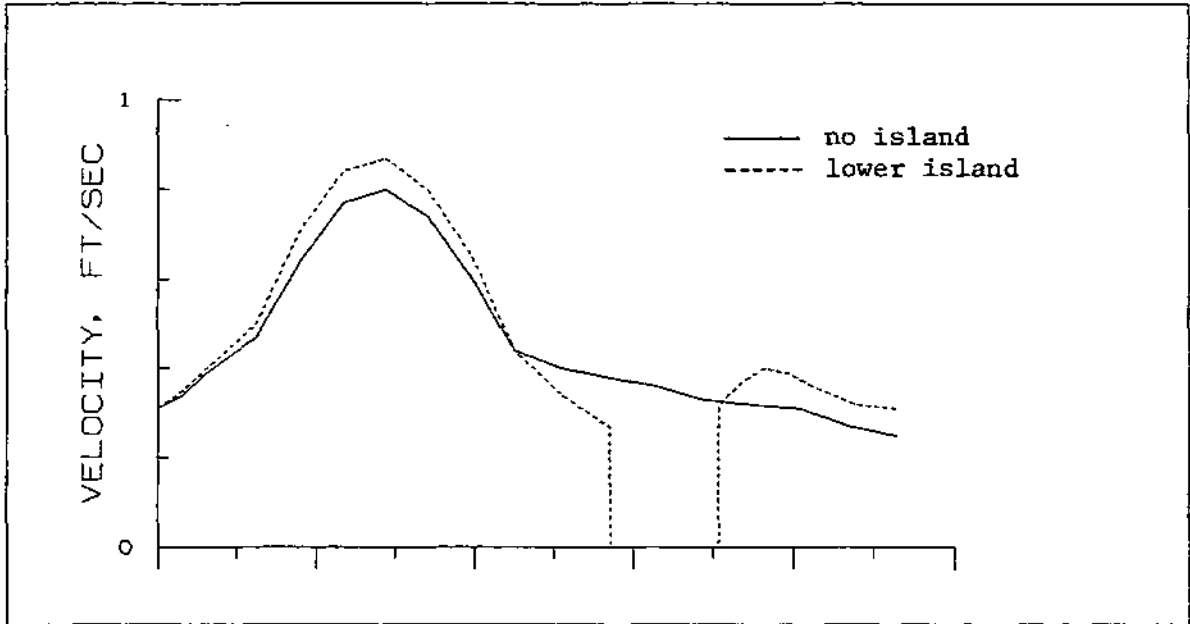
Figure B6. Comparison of velocity distributions at cross section 5 in Lower Peoria Lake for the no island and lower island conditions (Q = 20,000 cfs)
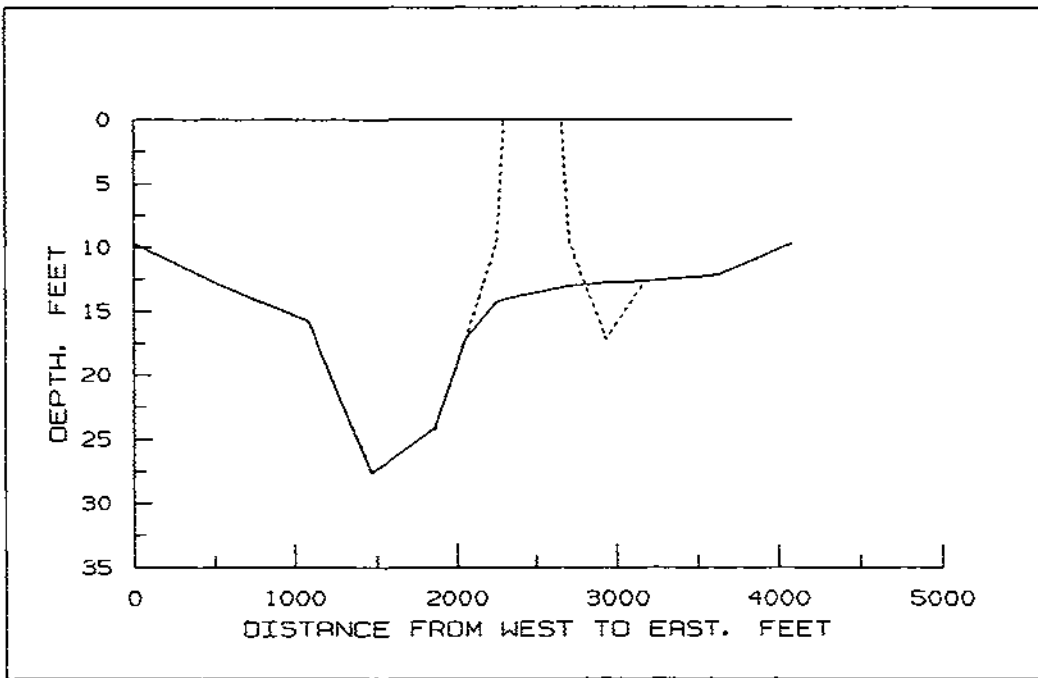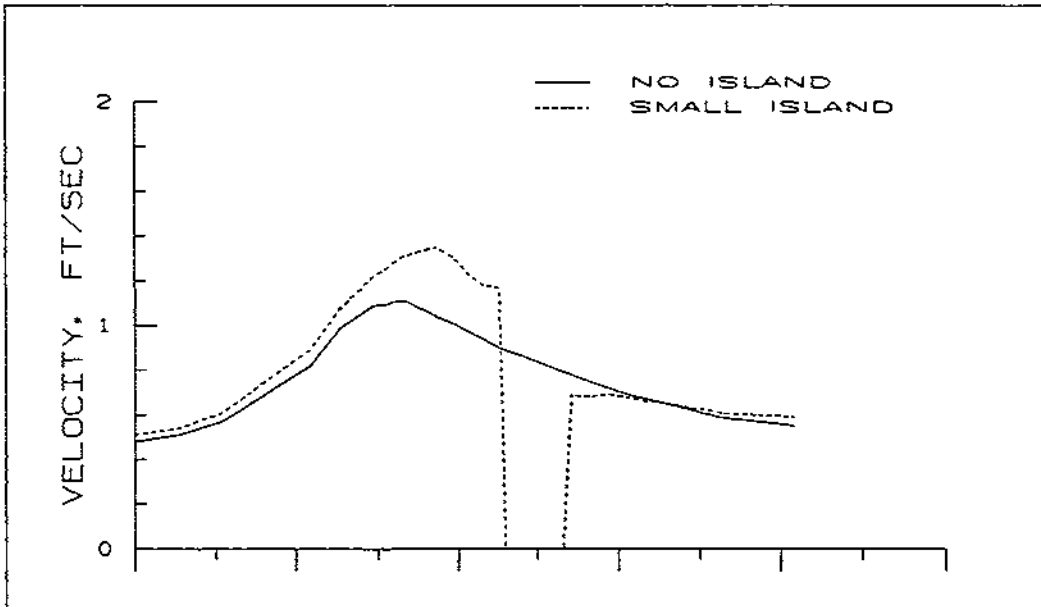
Figure B7. Comparison of velocity distributions at cross section 2
in Lower Peoria Lake for the no island and small island conditions
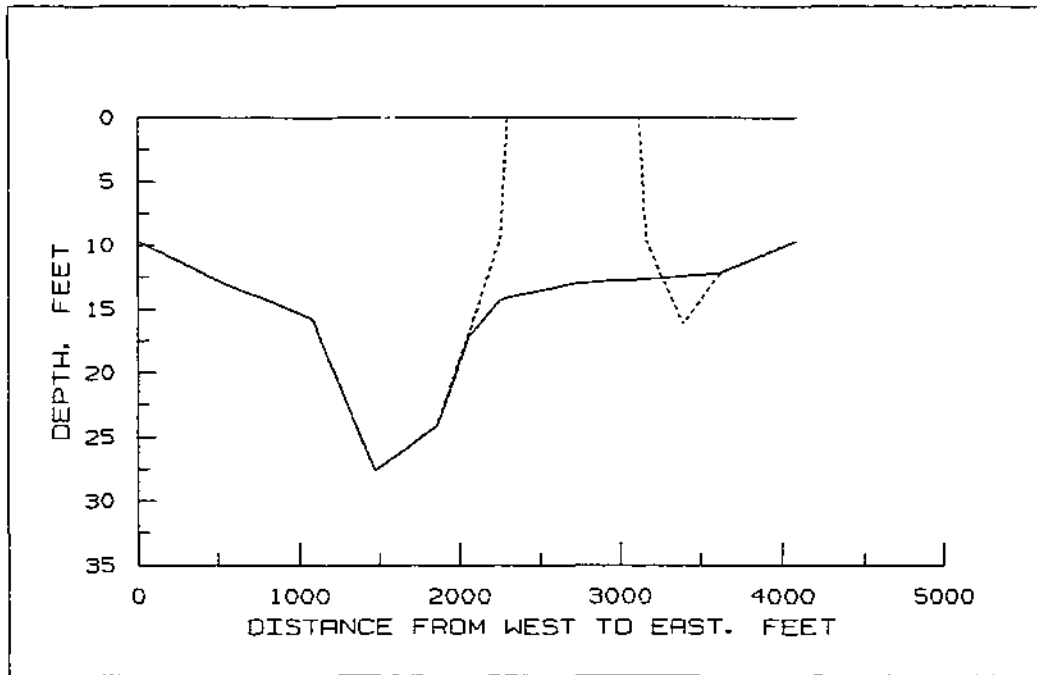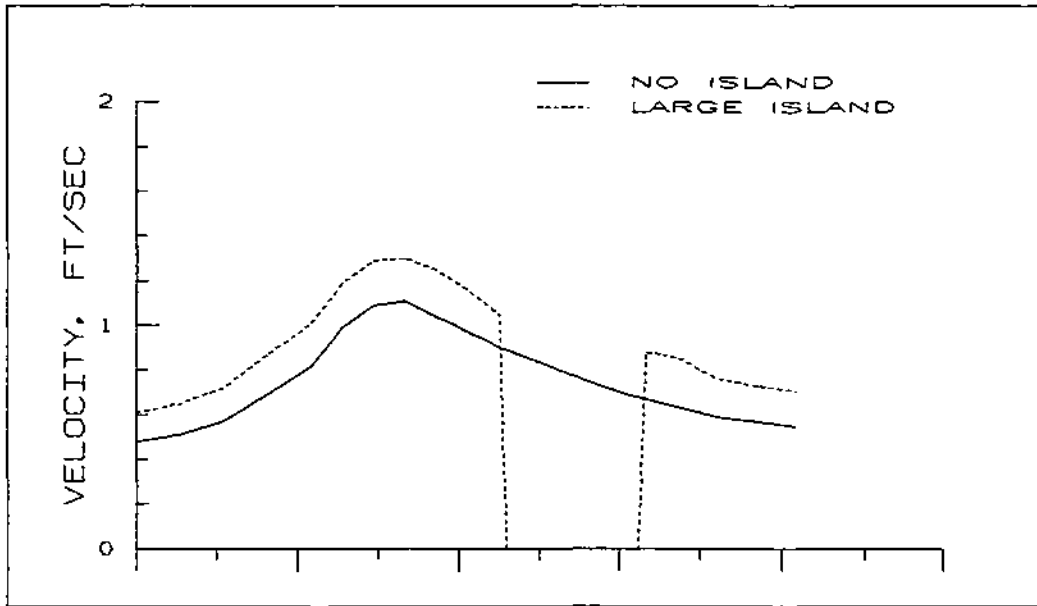(Q = 50,000 cfs)

Figure B8. Comparison of velocity distributions at cross section 2
in Lower Peoria Lake for the no island and large island conditions
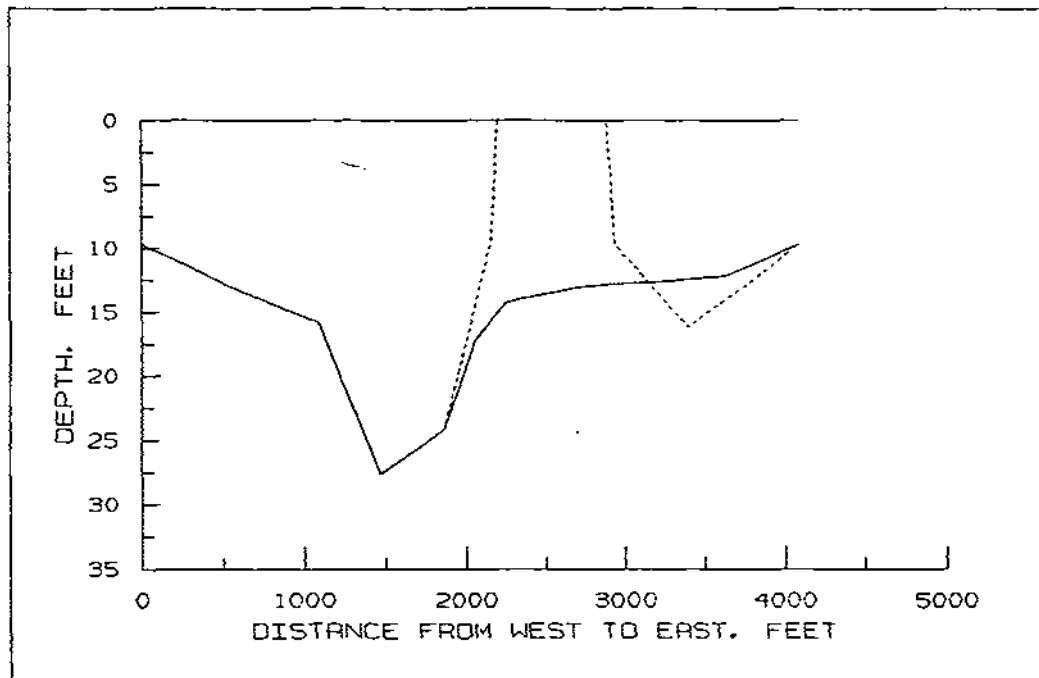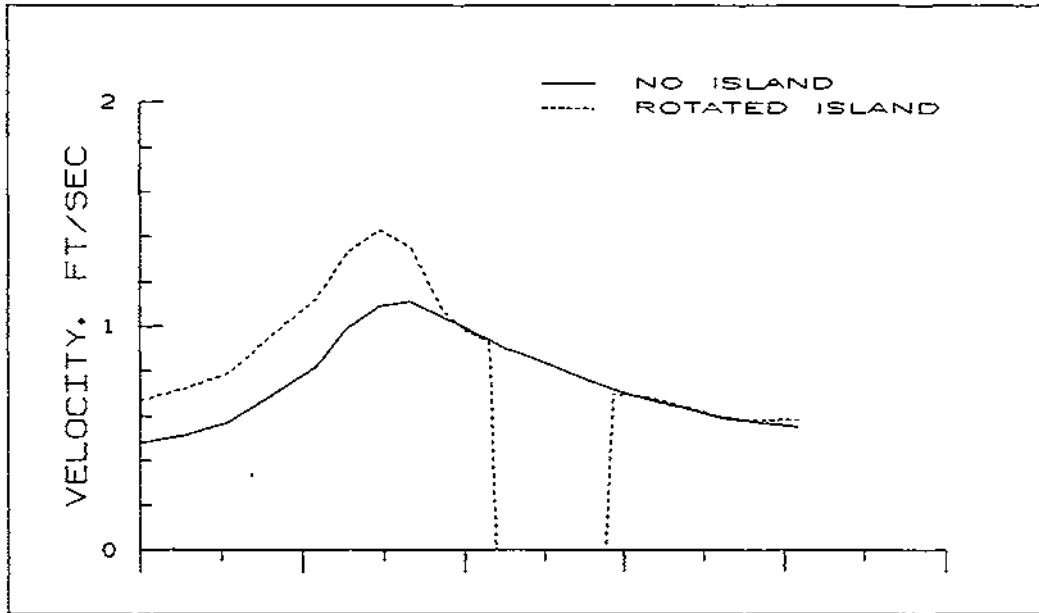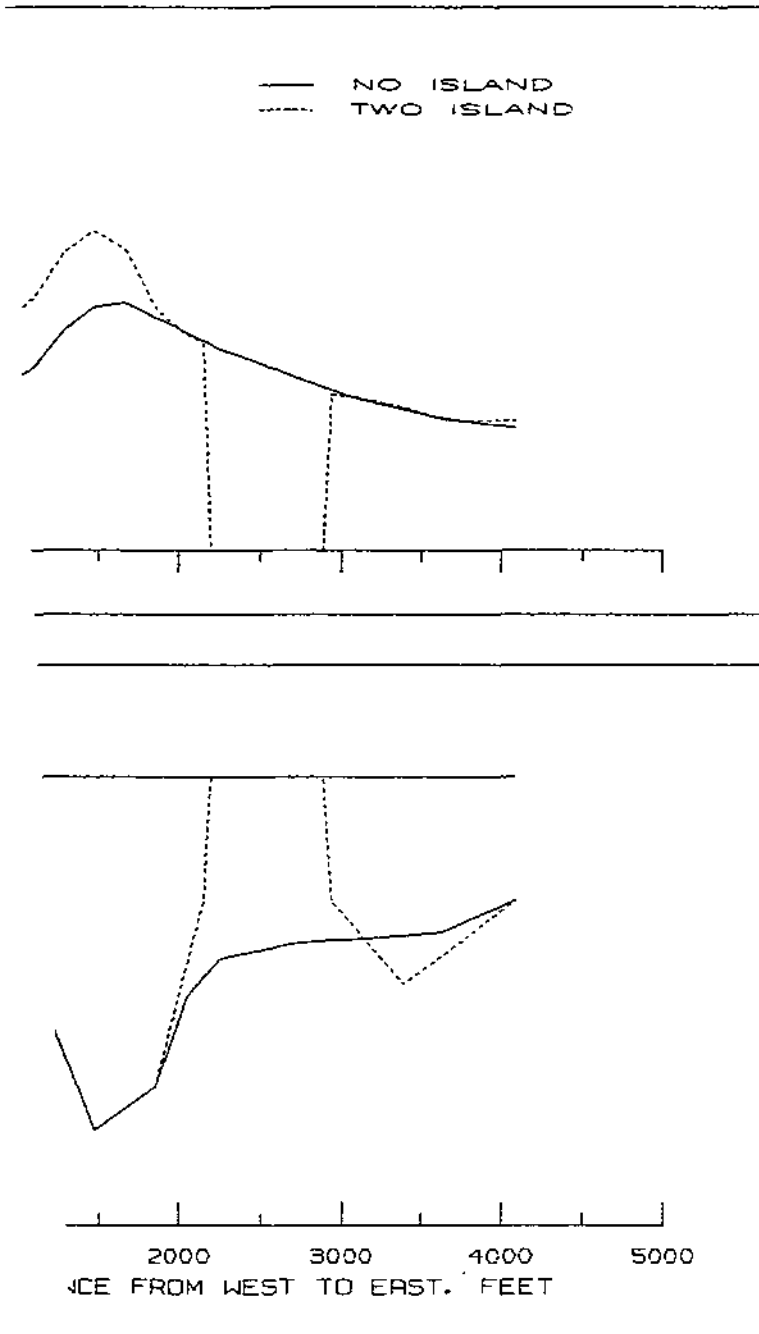(Q - 50,000 cfs)
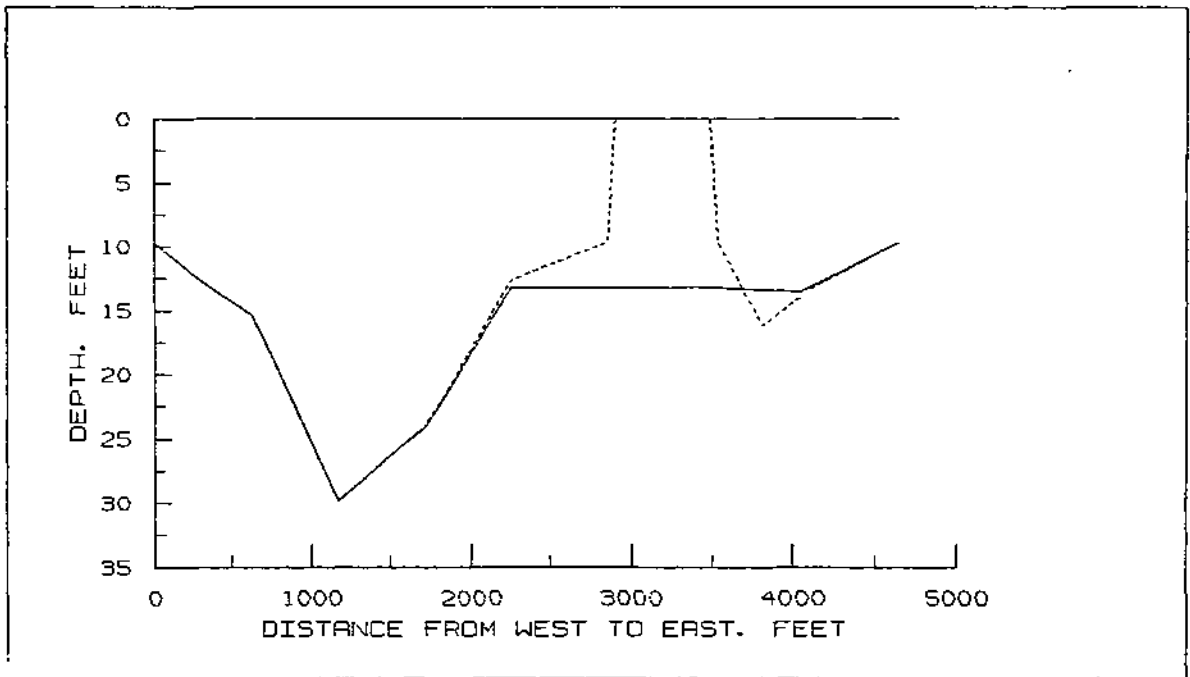(same as Figure 37 in the main text)

41

Figure B9. Comparison of velocity distributions at cross section 2
in Lower Peoria Lake for the no island and rotated island conditions
(Q = 50,000 cfs)

NO ISLAND
TWO ISLAND

2000   3000   4000   5000

JCE FROM WEST TO EAST, FEET

of velocity distributions at cross section 2
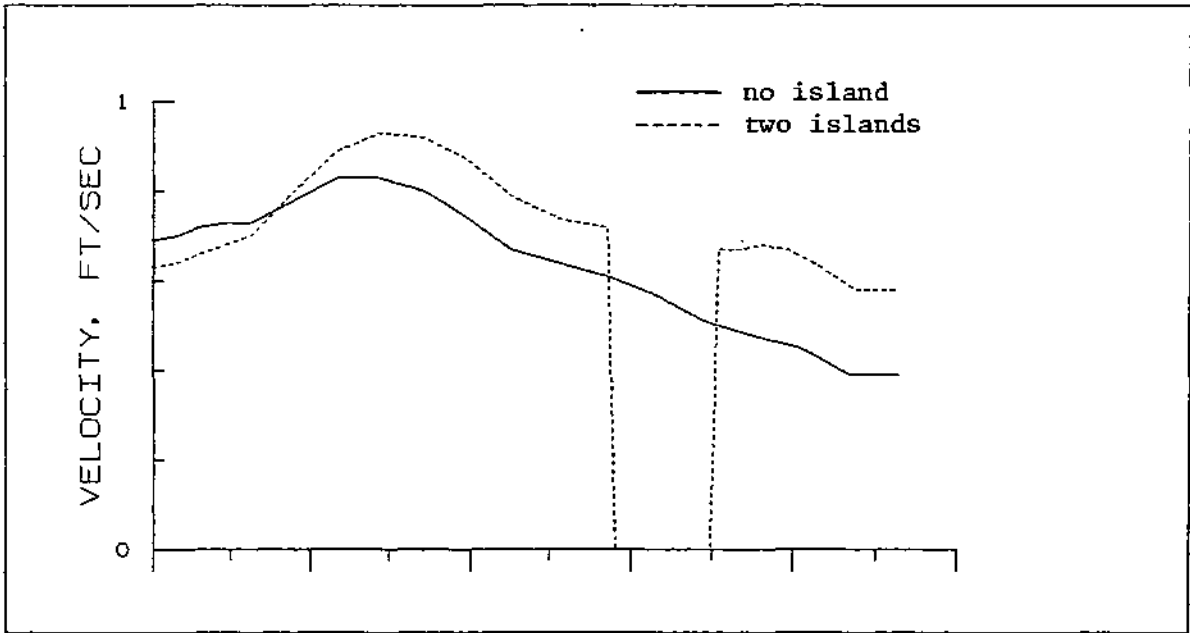or the no island and two islands conditions
    (Q = 50,000 cfs)

43

Figure B11. Comparison of velocity distributions at cross section 5
in Lower Peoria Lake for the no island and two islands conditions
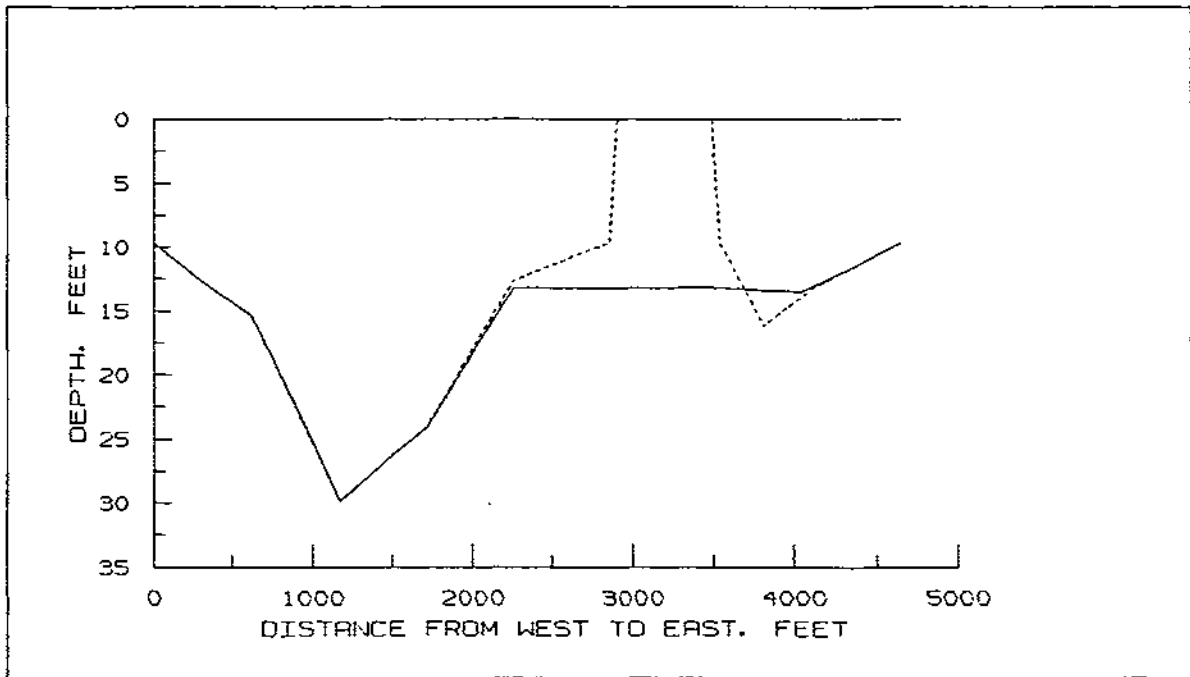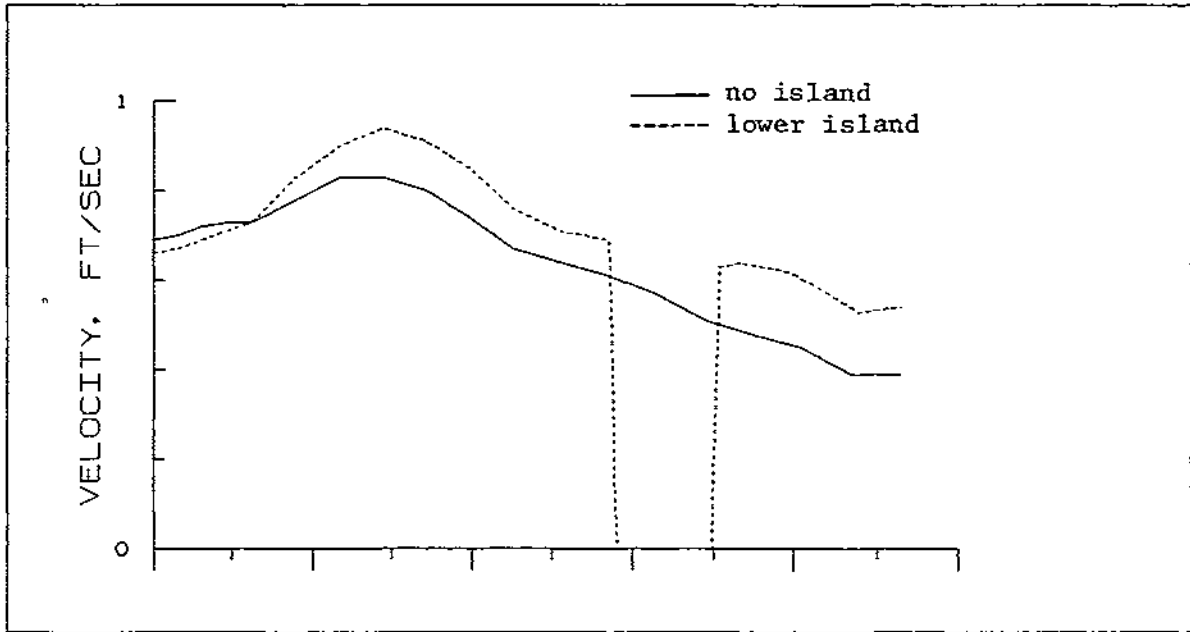(Q = 50,000 cfs)

44

Figure B12. Comparison of velocity distributions at cross section 5
in Lower Peoria Lake for the <u>no island</u> and <u>lower island</u> conditions
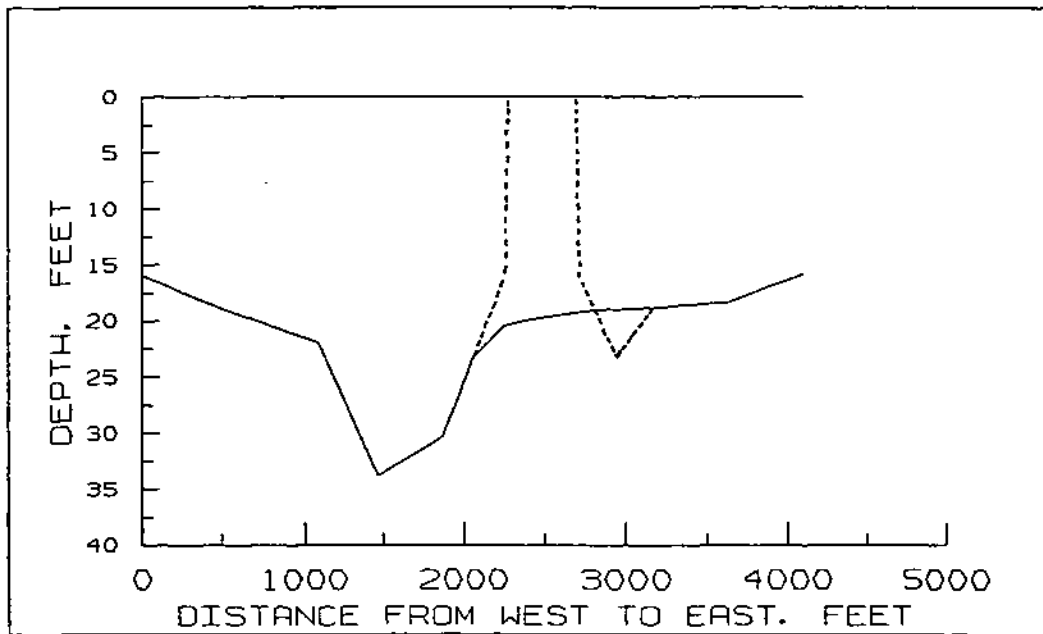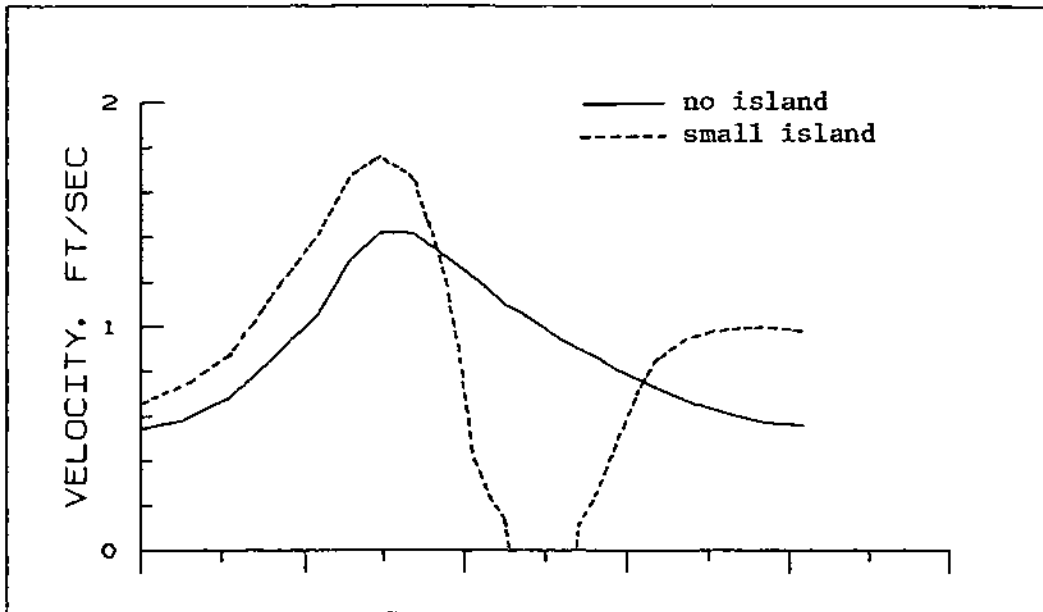(Q - 50,000 cfs)

45

Figure B13. Comparison of velocity distributions at cross section 2 in Lower Peoria Lake for the no island and small island conditions (Q = 83,000 cfs)
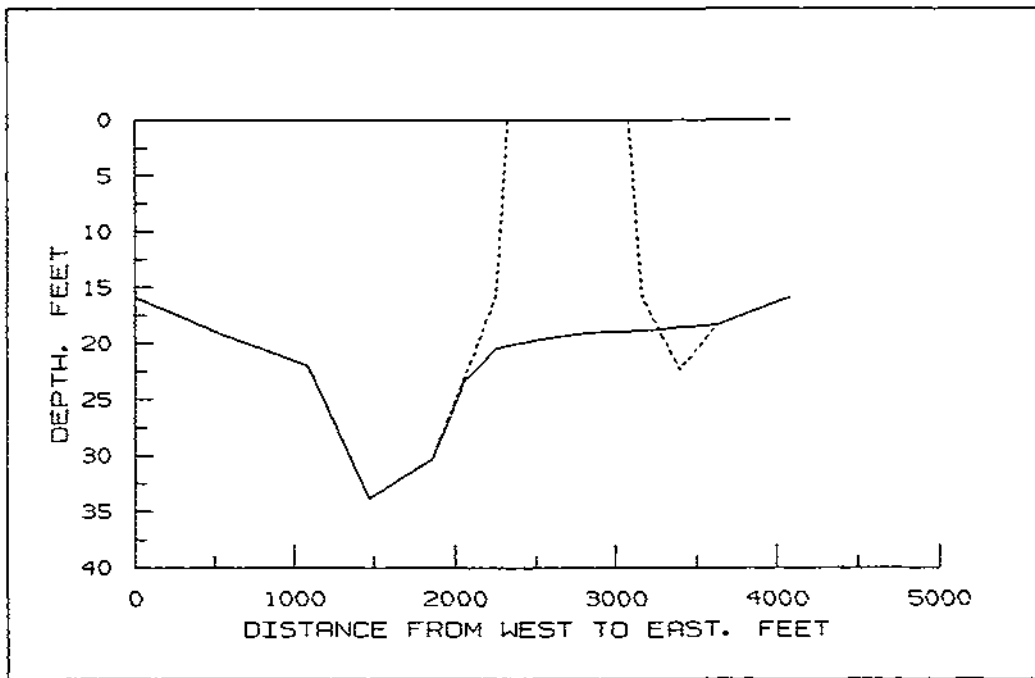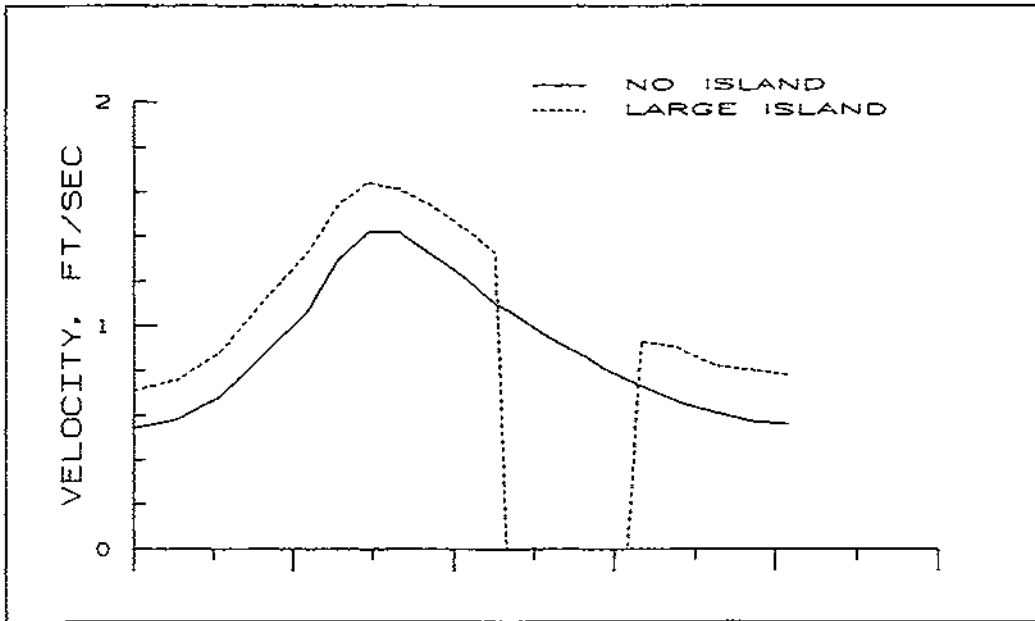
Figure B14. Comparison of velocity distributions at cross section 2
in Lower Peoria Lake for the no island and large island conditions
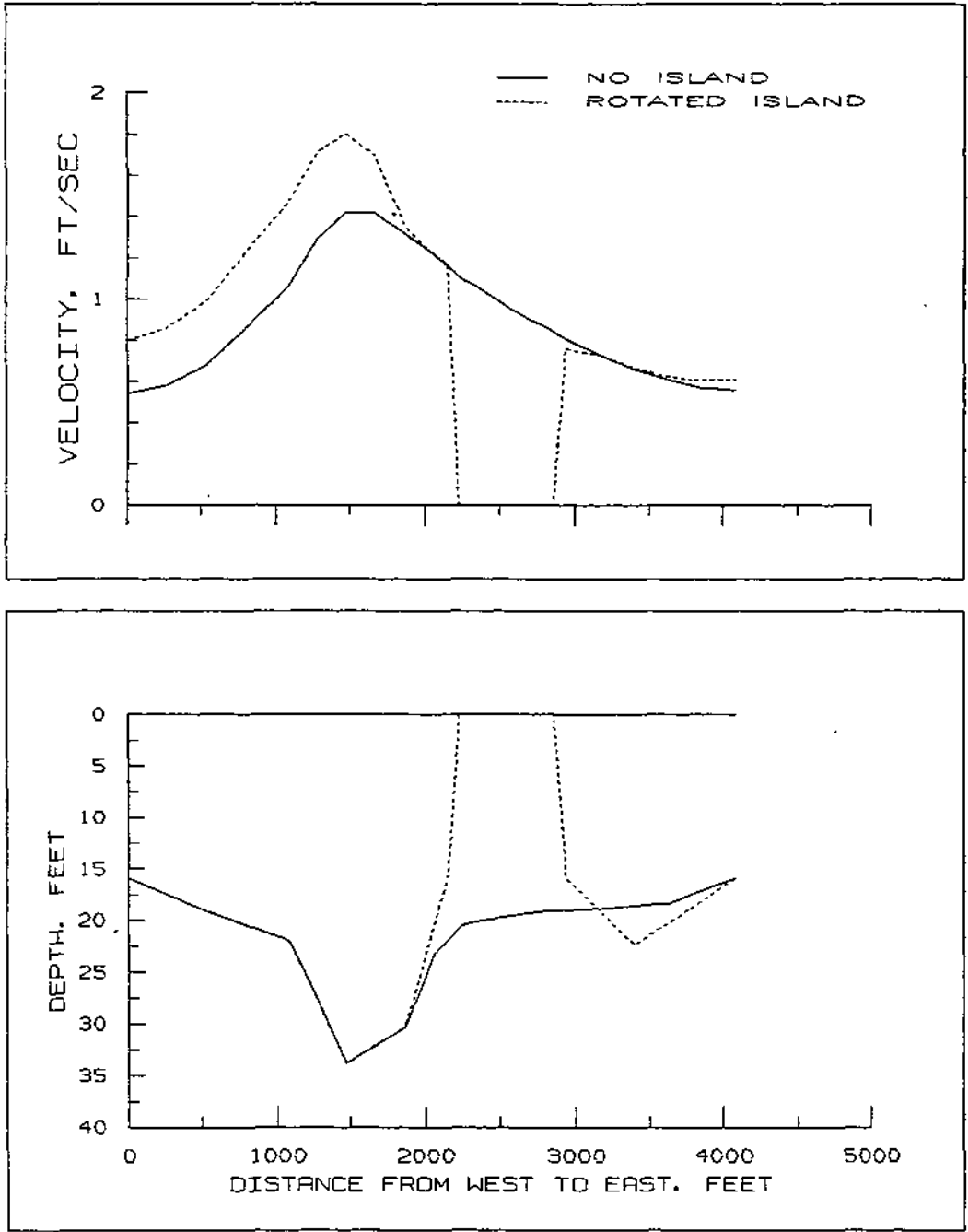(Q = 83,000 cfs)
(same as Figure 38 in the main text)

Figure B15. Comparison of velocity distributions at cross section 2 in Lower Peoria Lake for the no island and rotated island conditions (Q = 83,000 cfs)
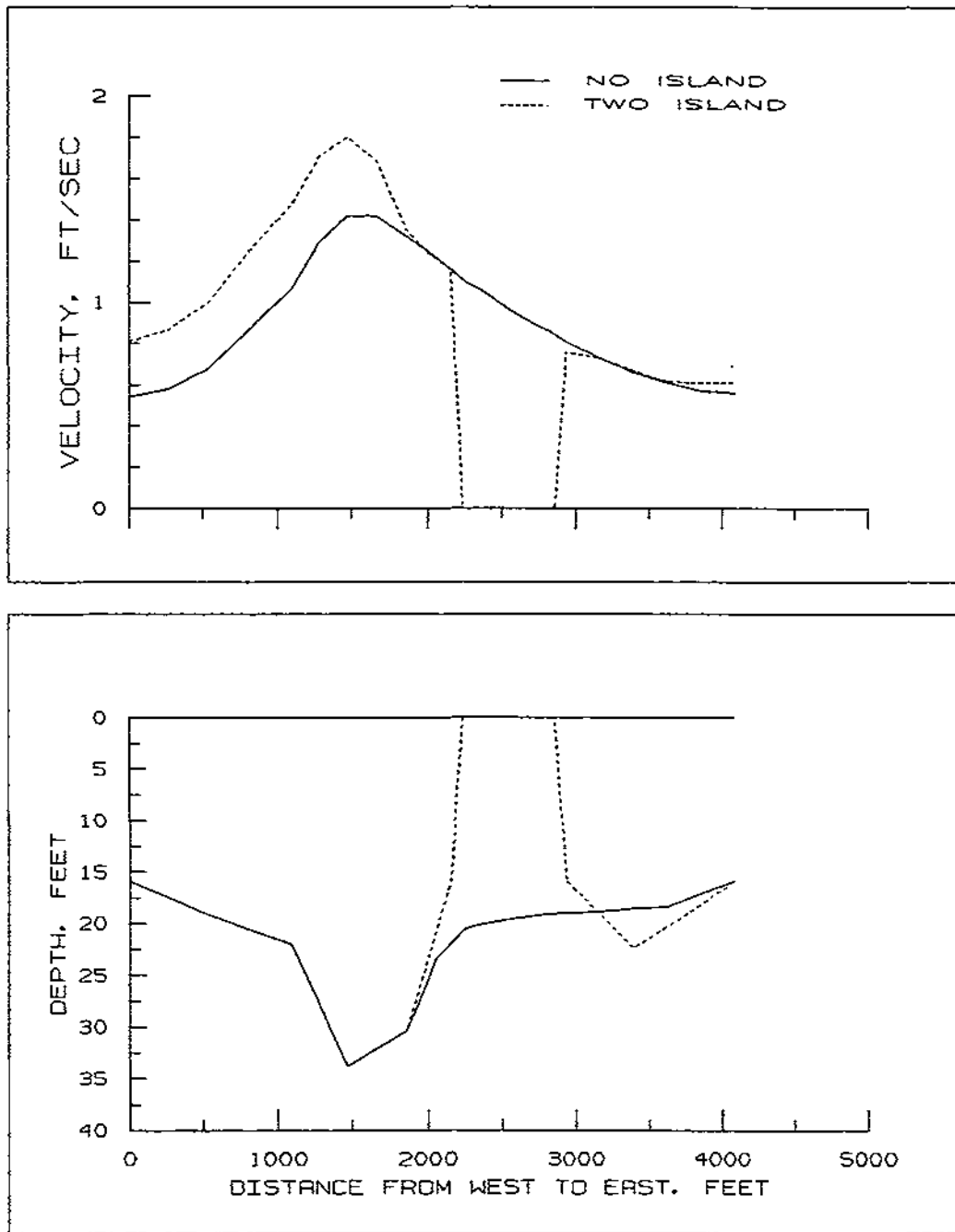
Figure B16. Comparison of velocity distributions at cross section 2 in Lower Peoria Lake for. the no island and two islands conditions (Q = 83,000 cfs)
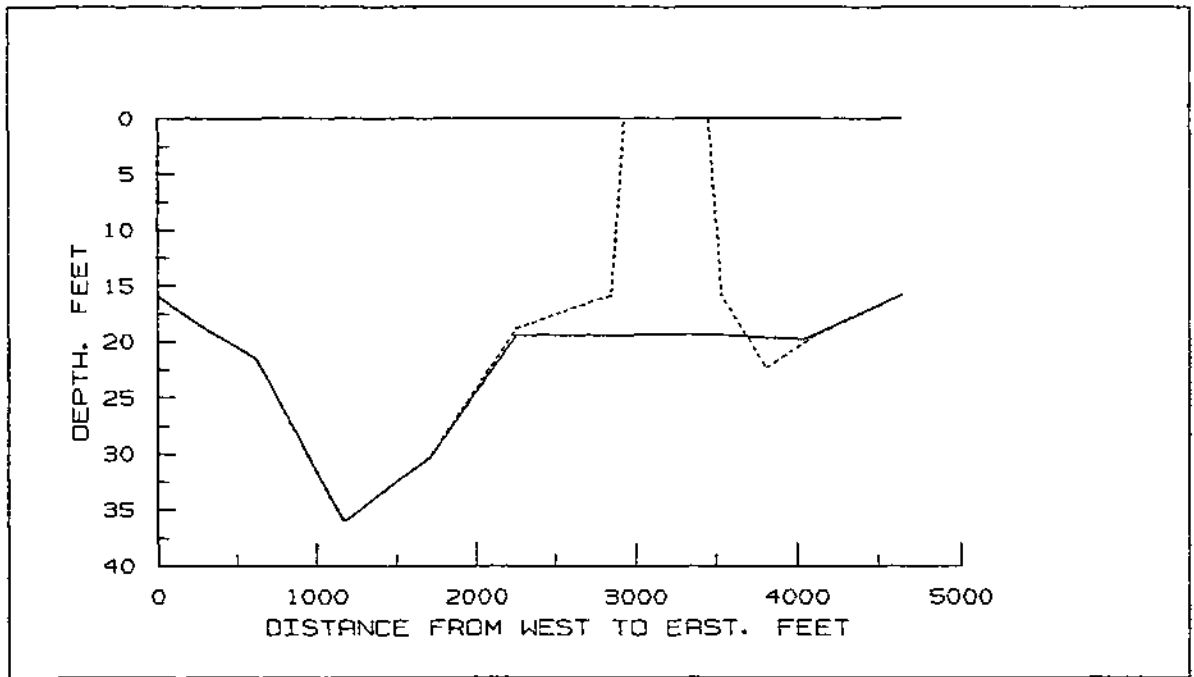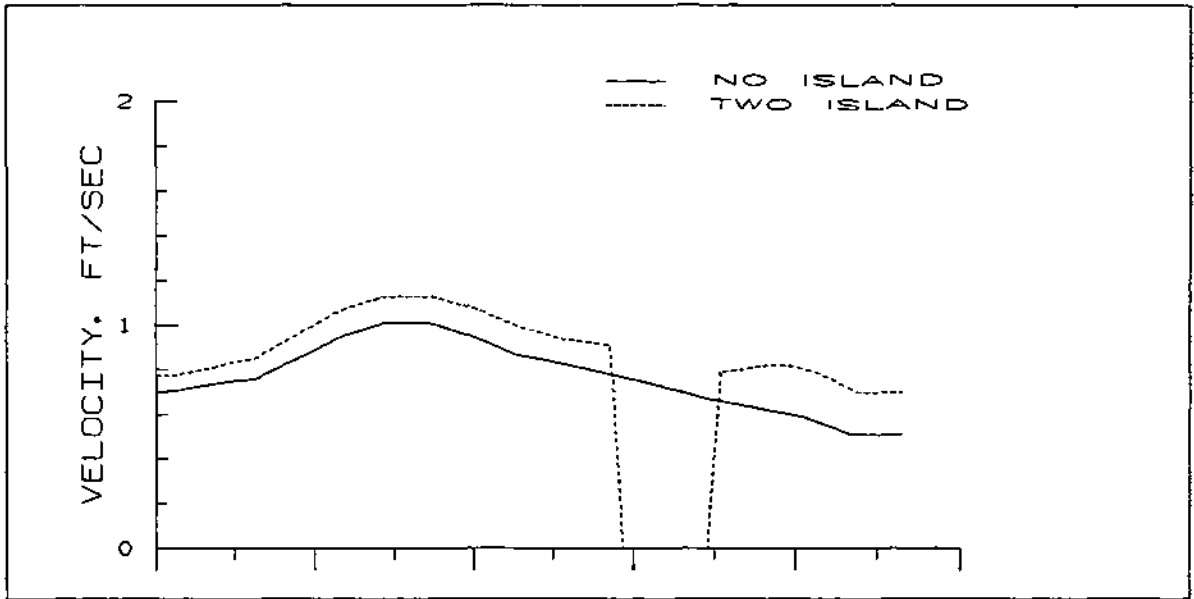
Figure B17. Comparison of velocity distributions at cross section 5 in Lower Peoria Lake for the no island and two islands conditions (Q - 83,000 cfs)
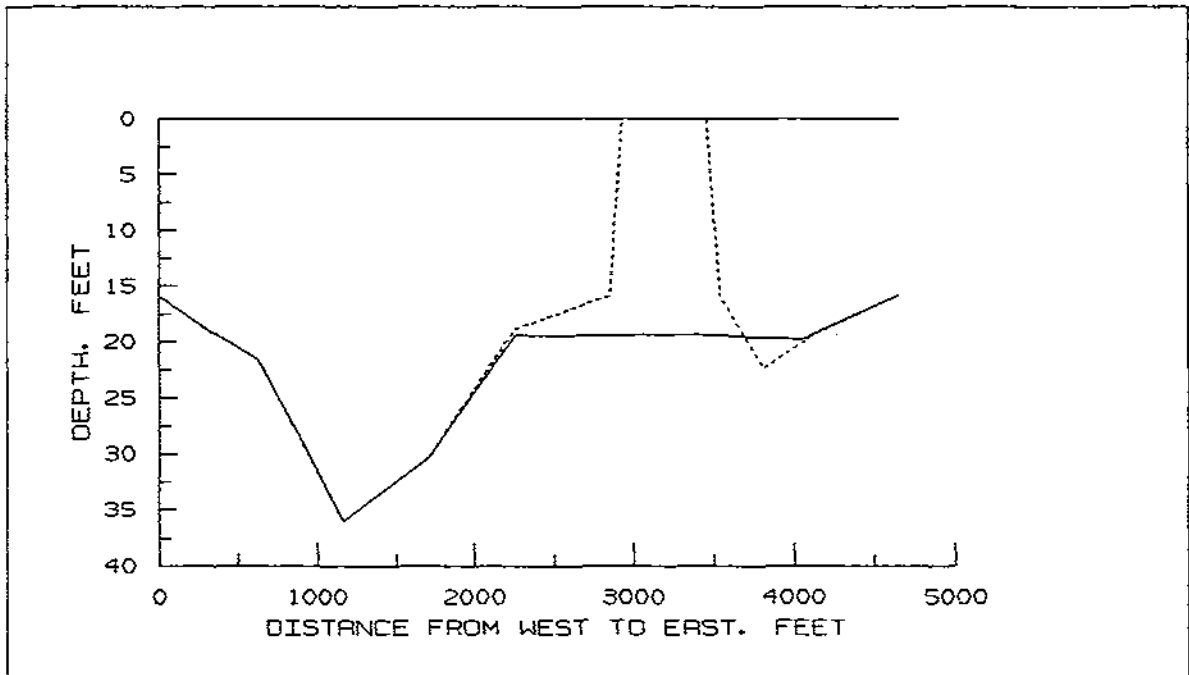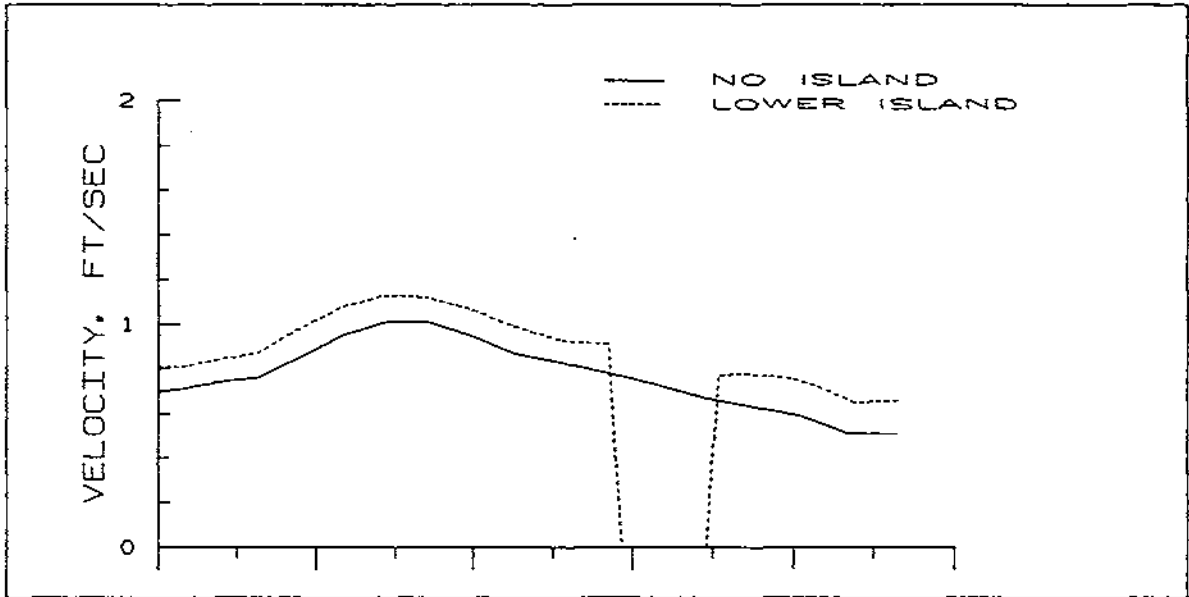
Figure B18. Comparison of velocity distributions at cross section 5 in Lower Peoria Lake for the no island and lower island conditions (Q = 83,000 cfs)
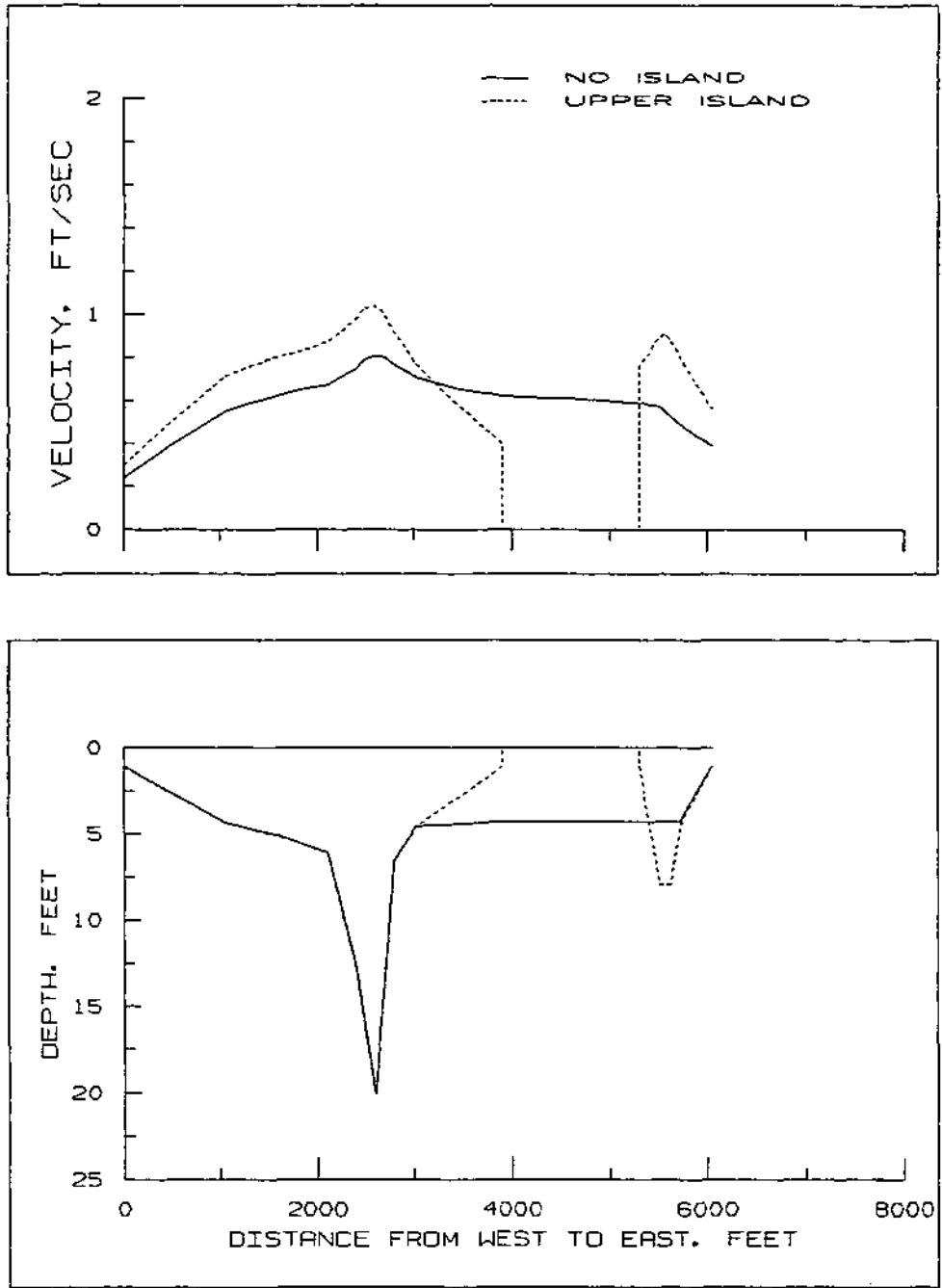
Figure B19. Comparison of velocity distribution at cross section 2 in Upper Peoria Lake for the no island and upper island conditions (Q = 20,000) (same as Figure 39 in the main text)
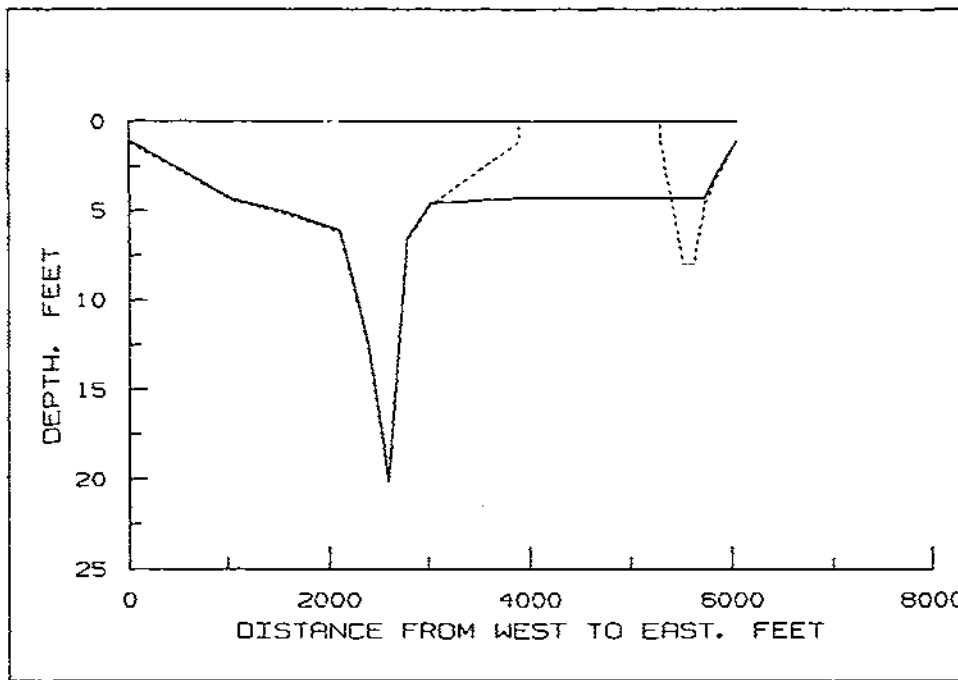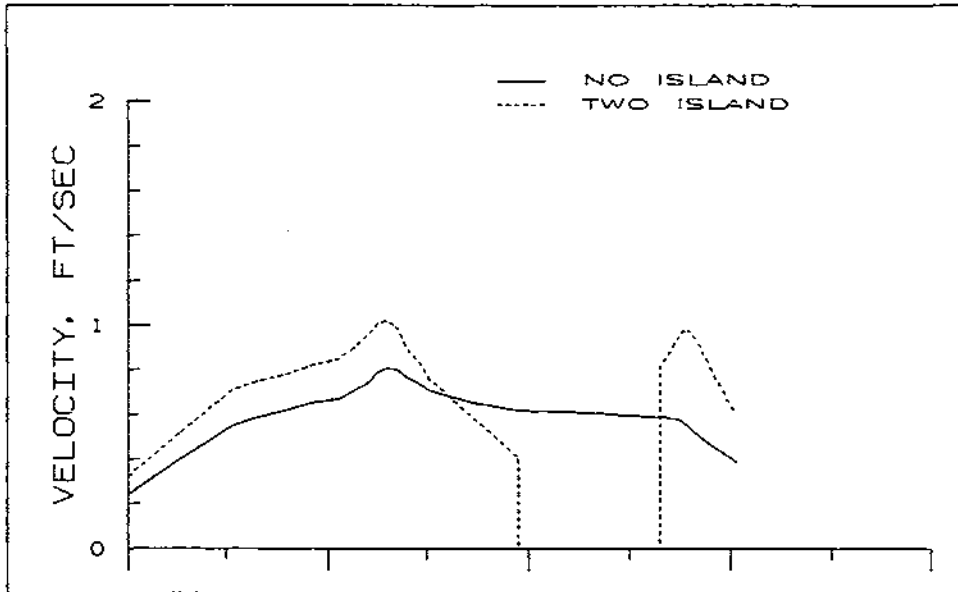
Figure B20. Comparison of velocity distribution at cross section 2
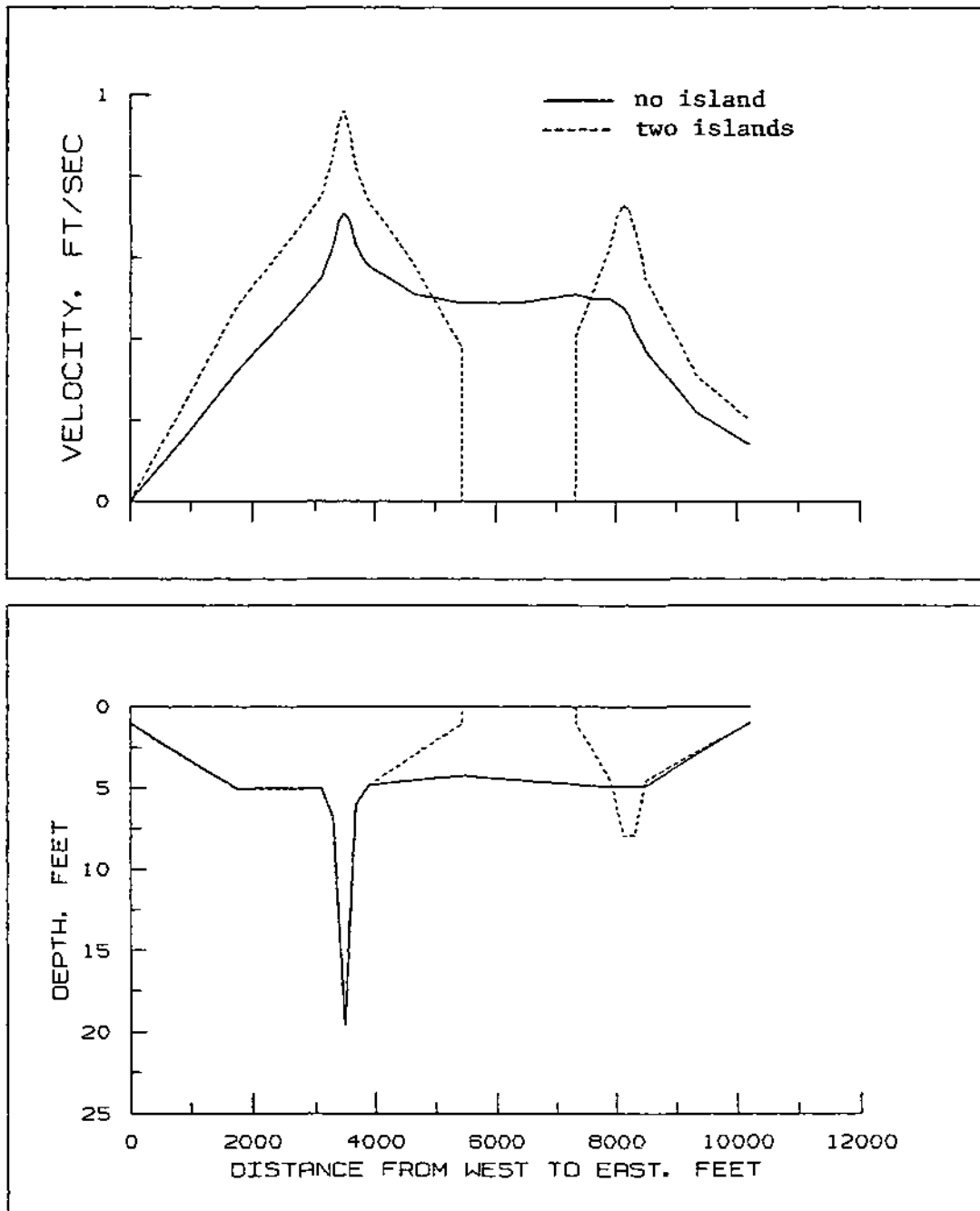in Upper Peoria Lake for the <u>no island</u> and <u>two islands</u> conditions
(Q – 20,000 cfs)

Figure B21. Comparison of velocity distribution at cross section 4
in Upper Peoria Lake for the no island and two islands conditions
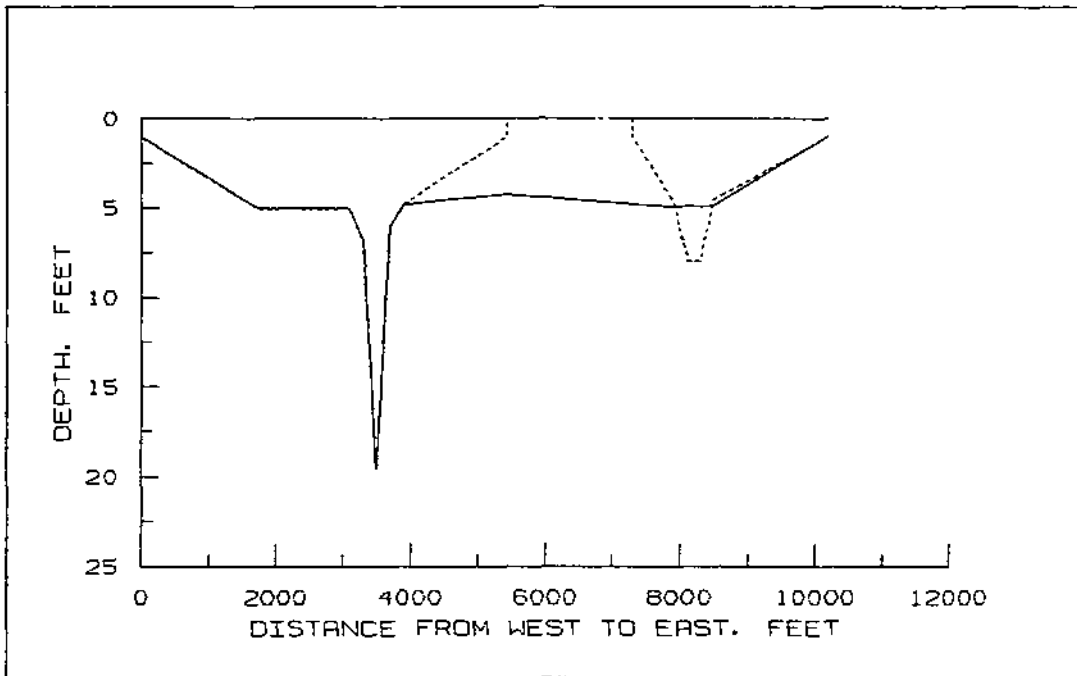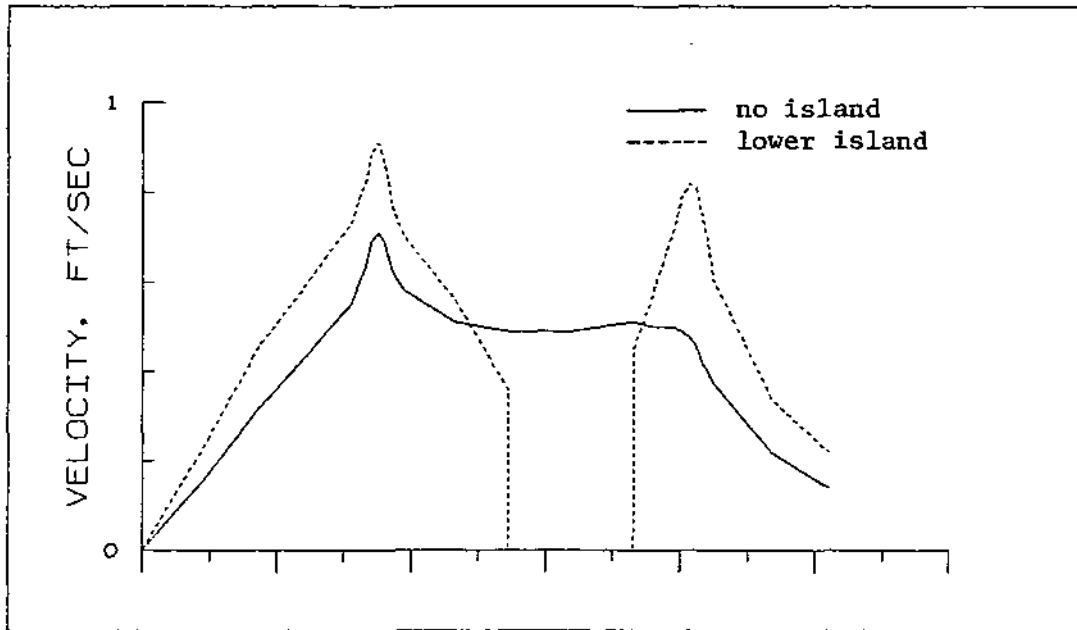(Q = 20,000 cfs)

54

Figure B22. Comparison of velocity distribution at cross section 4 in Upper Peoria Lake for the no island and lower island conditions (Q = 20,000 cfs)
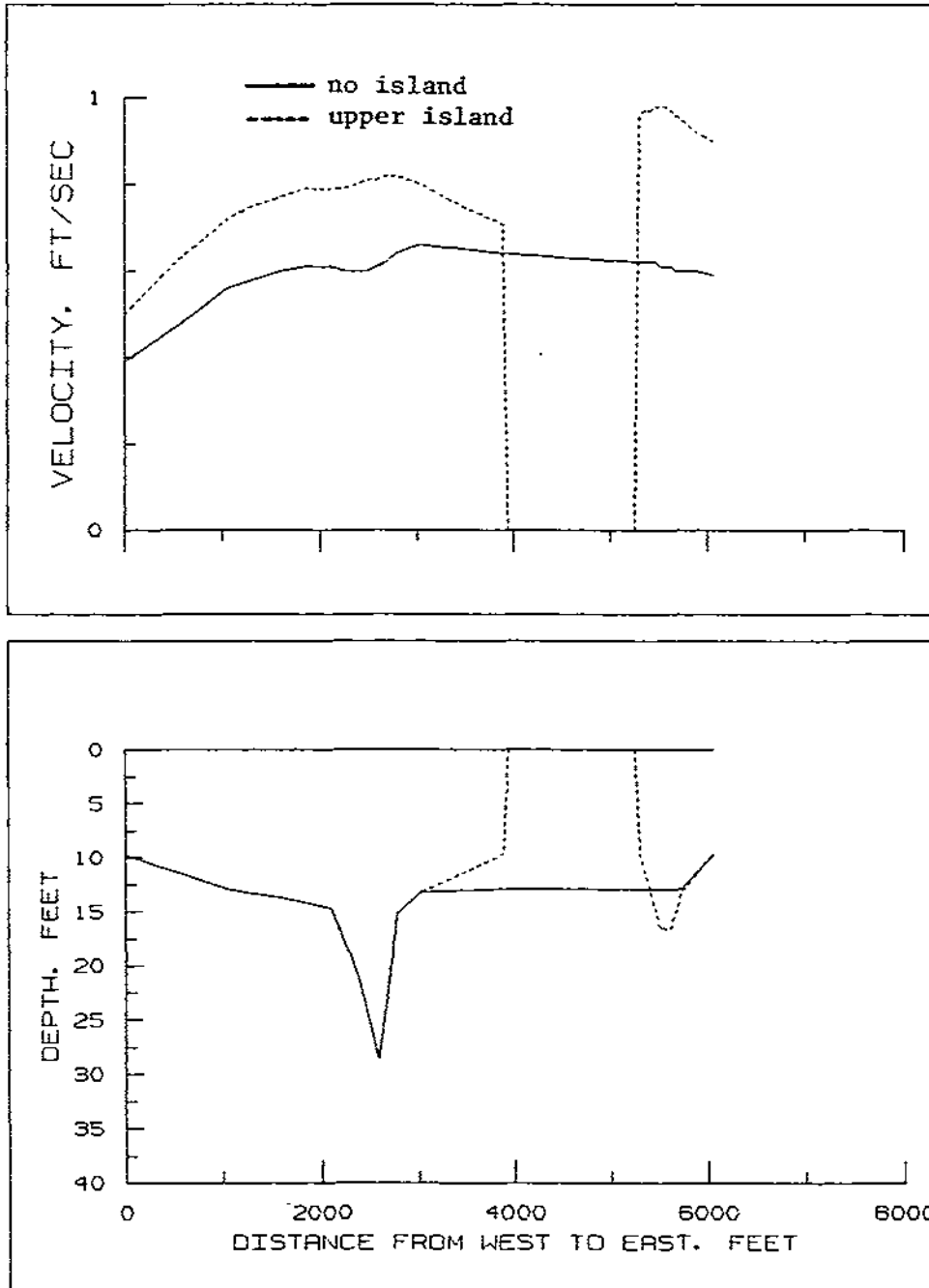
Figure B23. Comparison of velocity distribution at cross section 2
in Upper Peoria Lake for the no island and upper island conditions
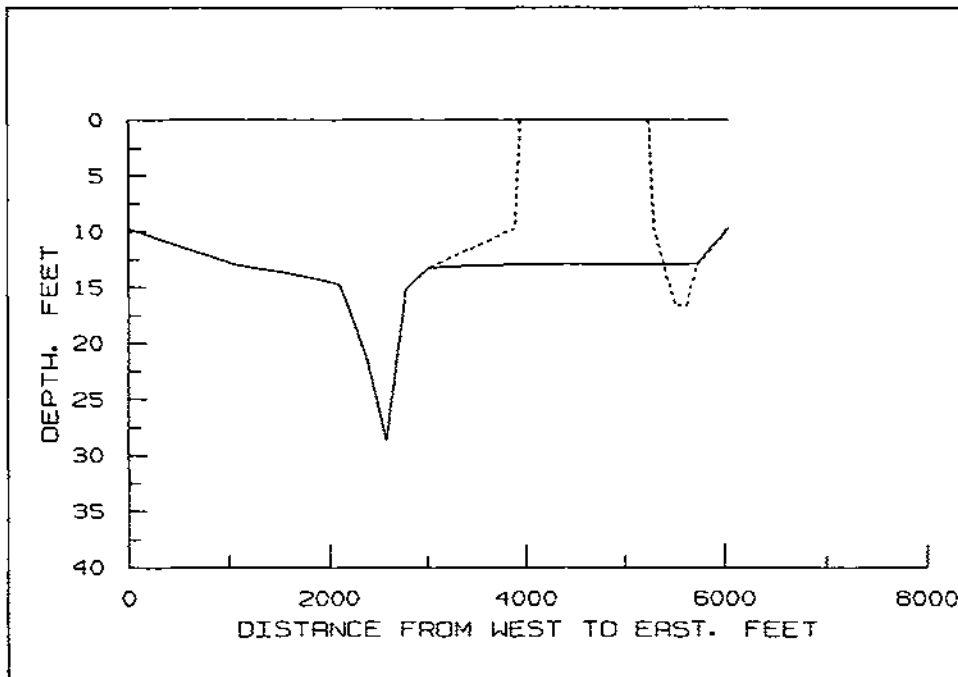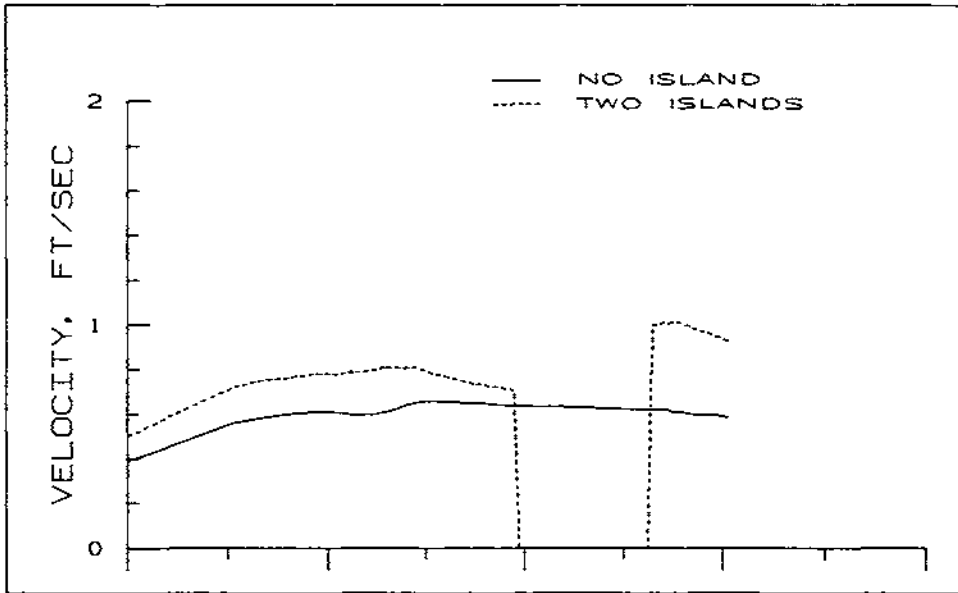(Q = 50,000 cfs)
(same as Figure 40 in the main text)

Figure B24. Comparison of velocity distribution at cross section 2
in Upper Peoria Lake for the no island and two islands conditions
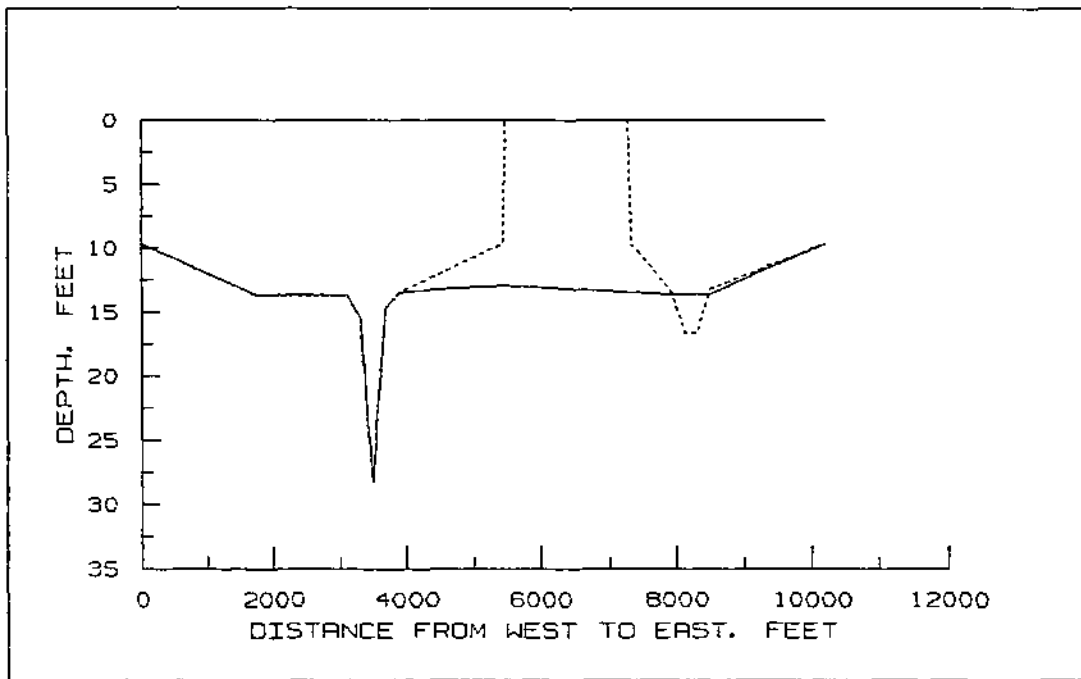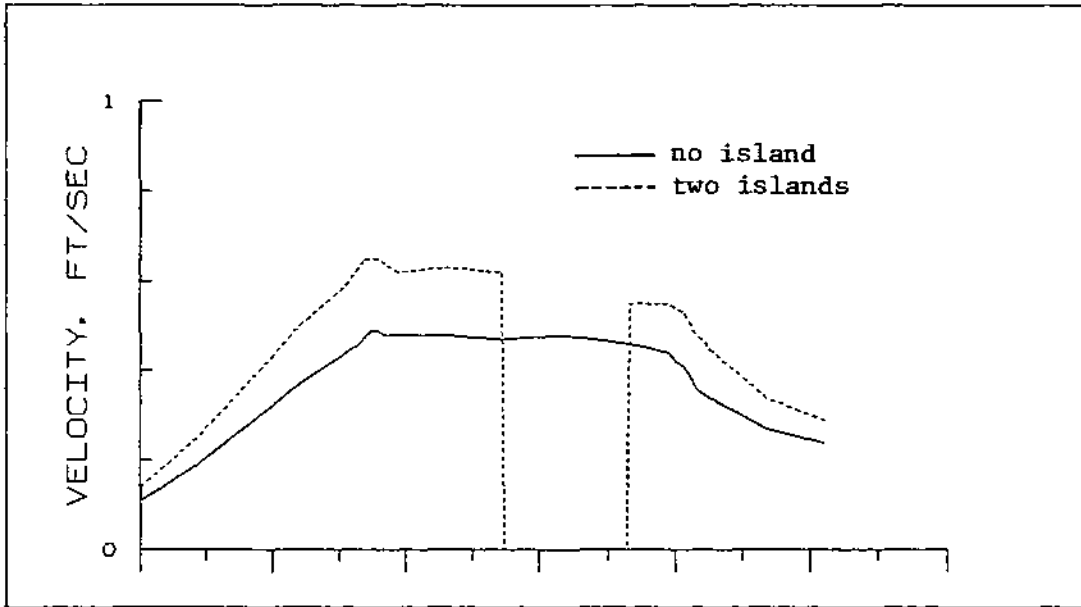(Q = 50,000 cfs)

Figure B25. Comparison of velocity distribution at cross section 4 in Upper Peoria Lake for the no island and two islands conditions (Q = 50,000 cfs)
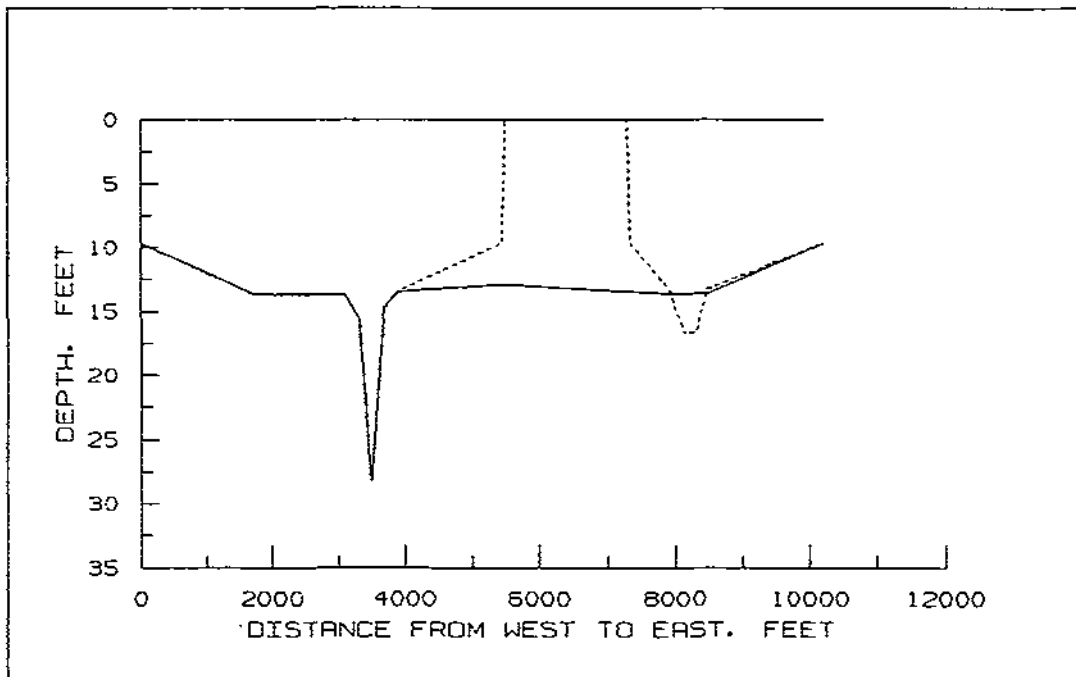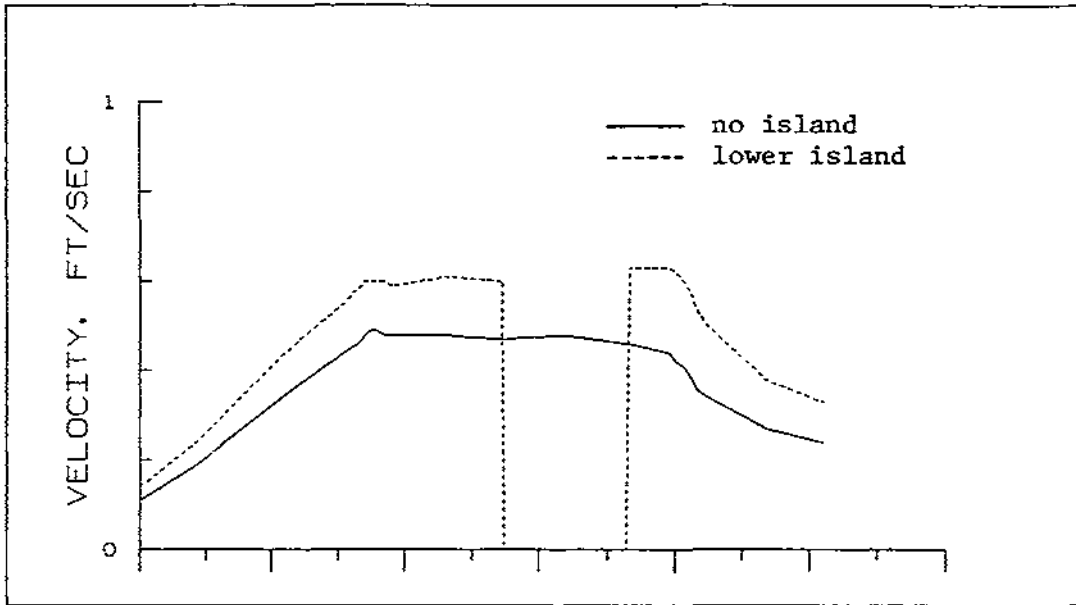
Figure B26. Comparison of velocity distribution at cross section 4
in Upper Peoria Lake for the no island and lower island conditions
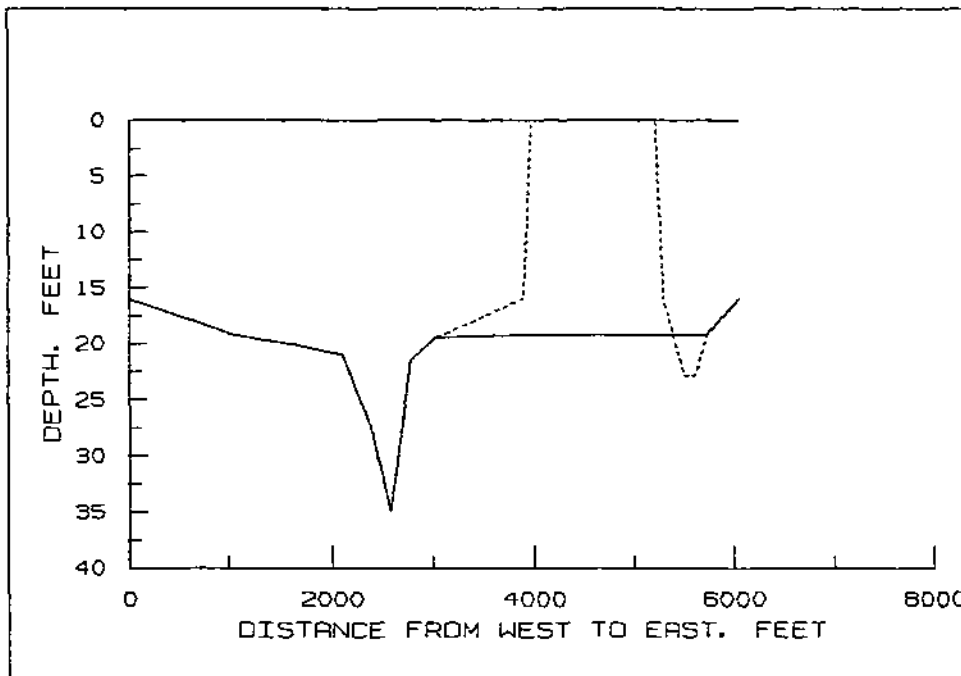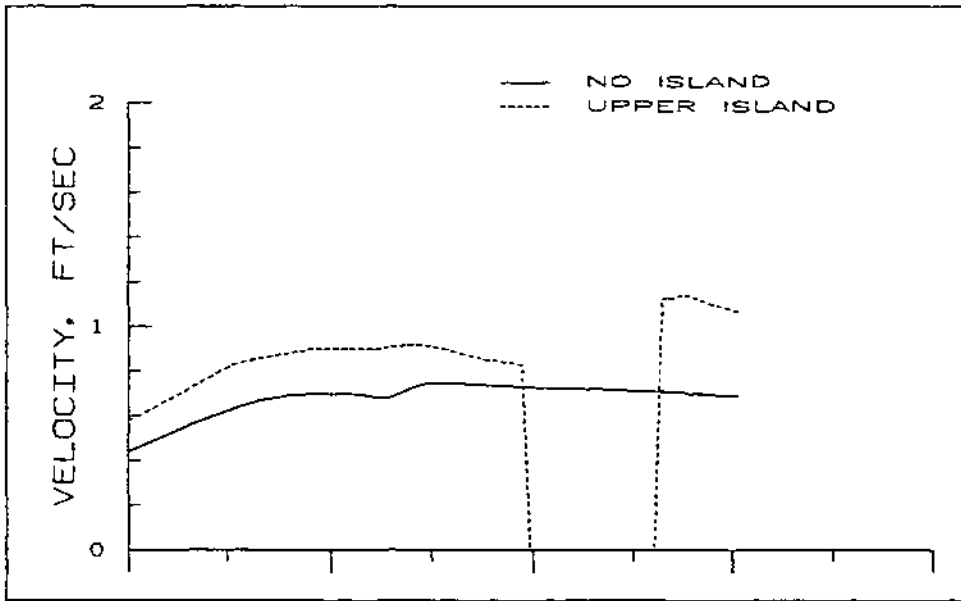(Q = 50,000 cfs)

Figure B27. Comparison of velocity distribution at cross section 2
in Upper Peoria Lake for the no island and upper island conditions
(Q - 83,000 cfs)
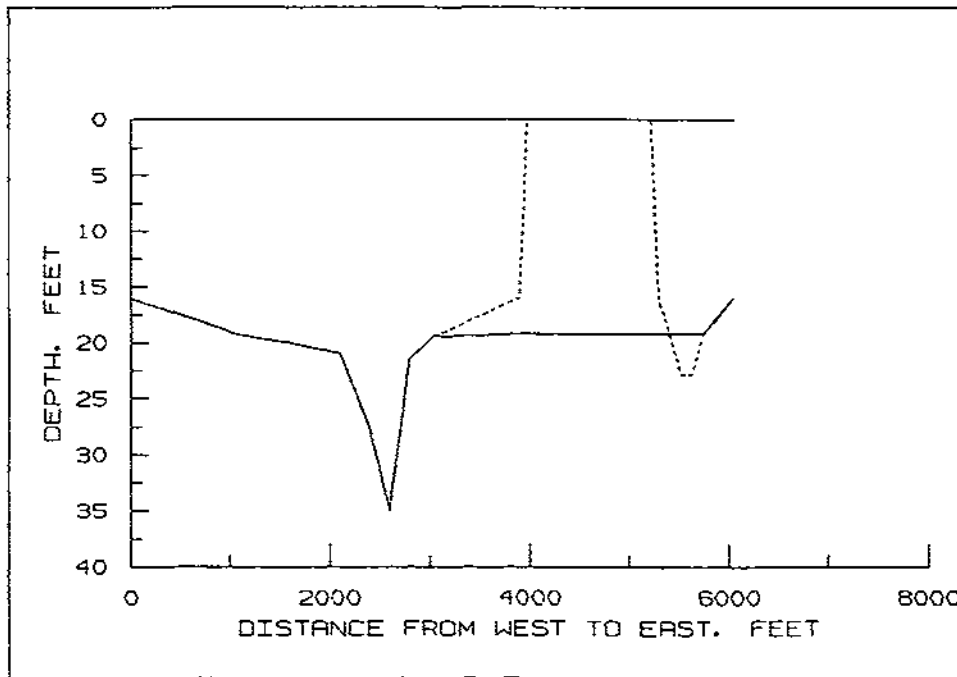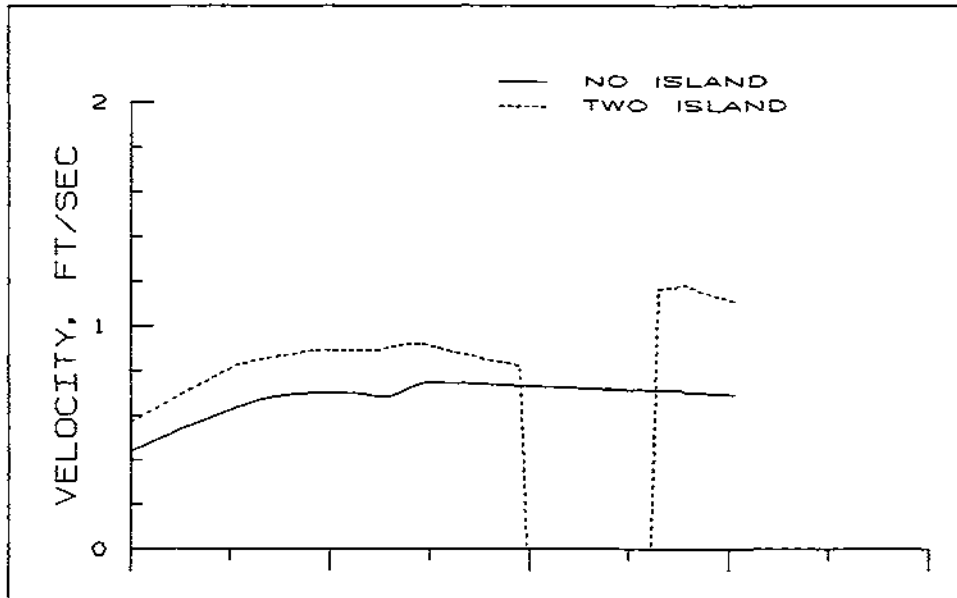(same as Figure 41 in the main text)

60

Figure B28. Comparison of velocity distribution at cross section 2
in Upper Peoria Lake for the no island and two islands conditions
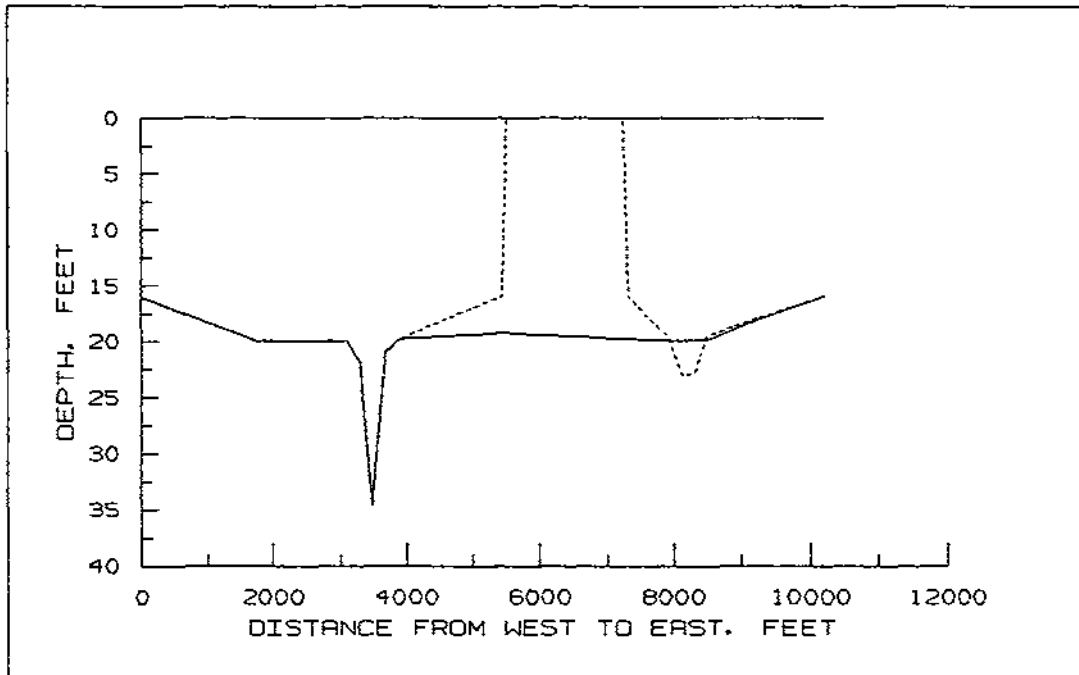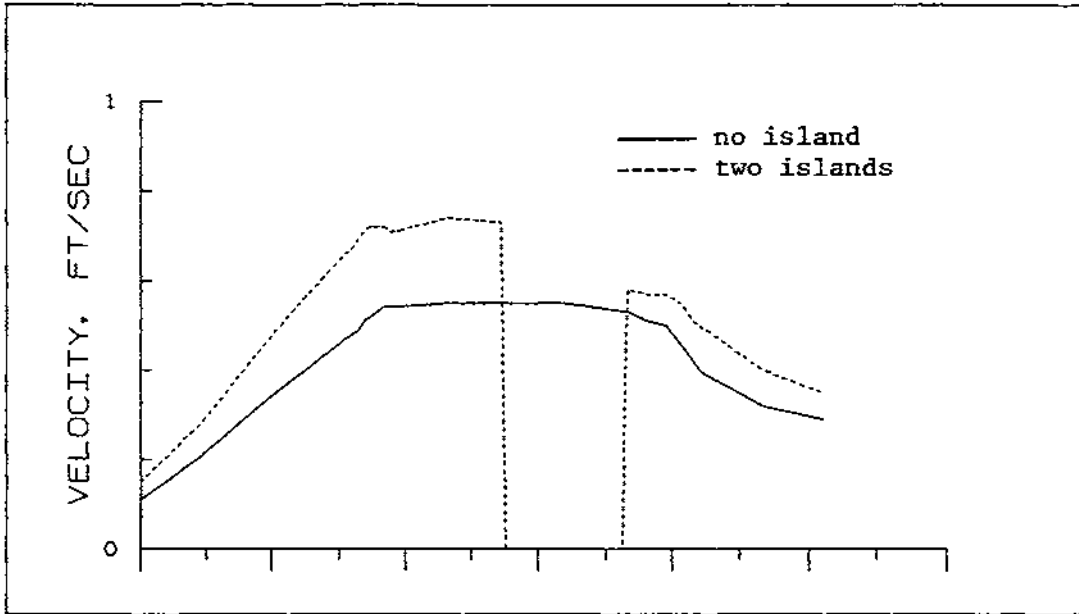(Q = 83,000 cfs)

Figure B29. Comparison of velocity distribution at cross section 4
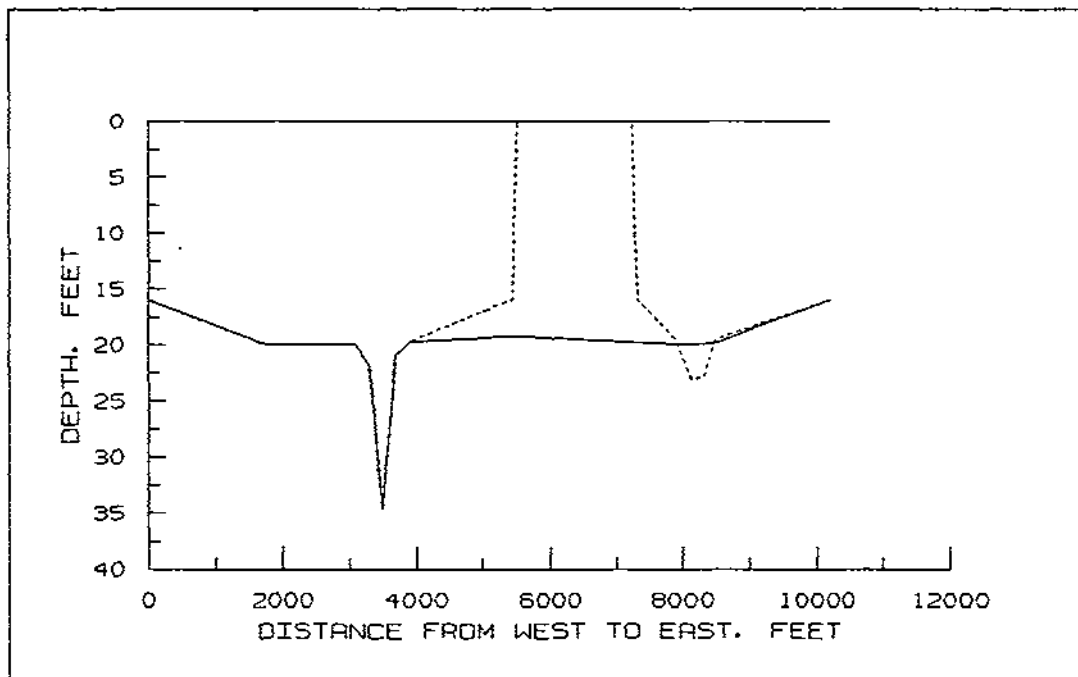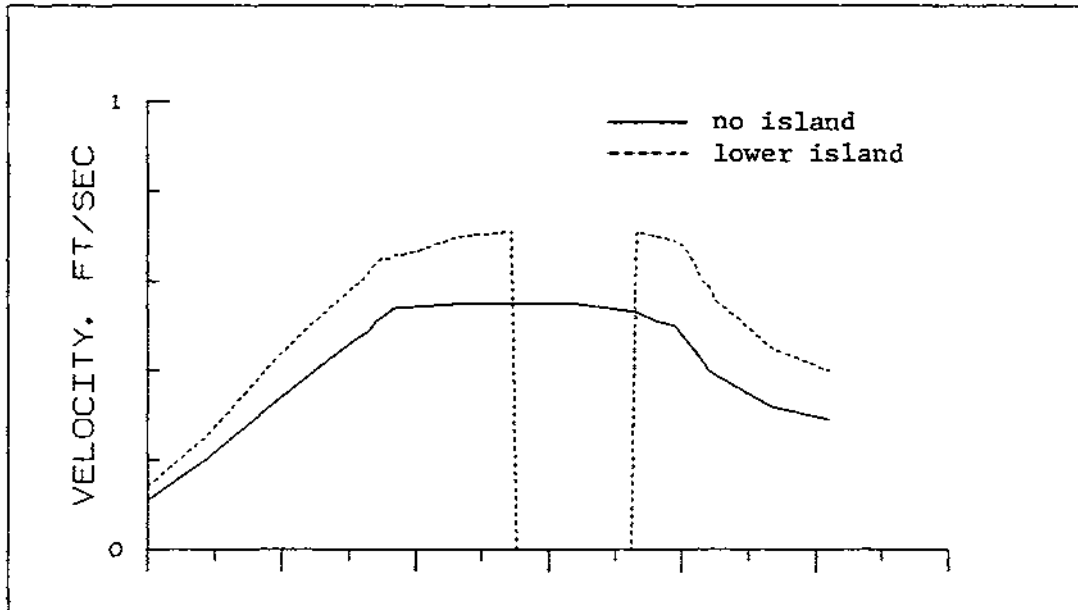in Upper Peoria Lake for the no island and two islands conditions
(Q = 83,000 cfs)

Figure B30. Comparison of velocity distribution at cross section 4 in Upper Peoria Lake for the no island and lower island conditions (Q = 83,000 cfs)

Appendix C

Water Surface Profile Comparisons
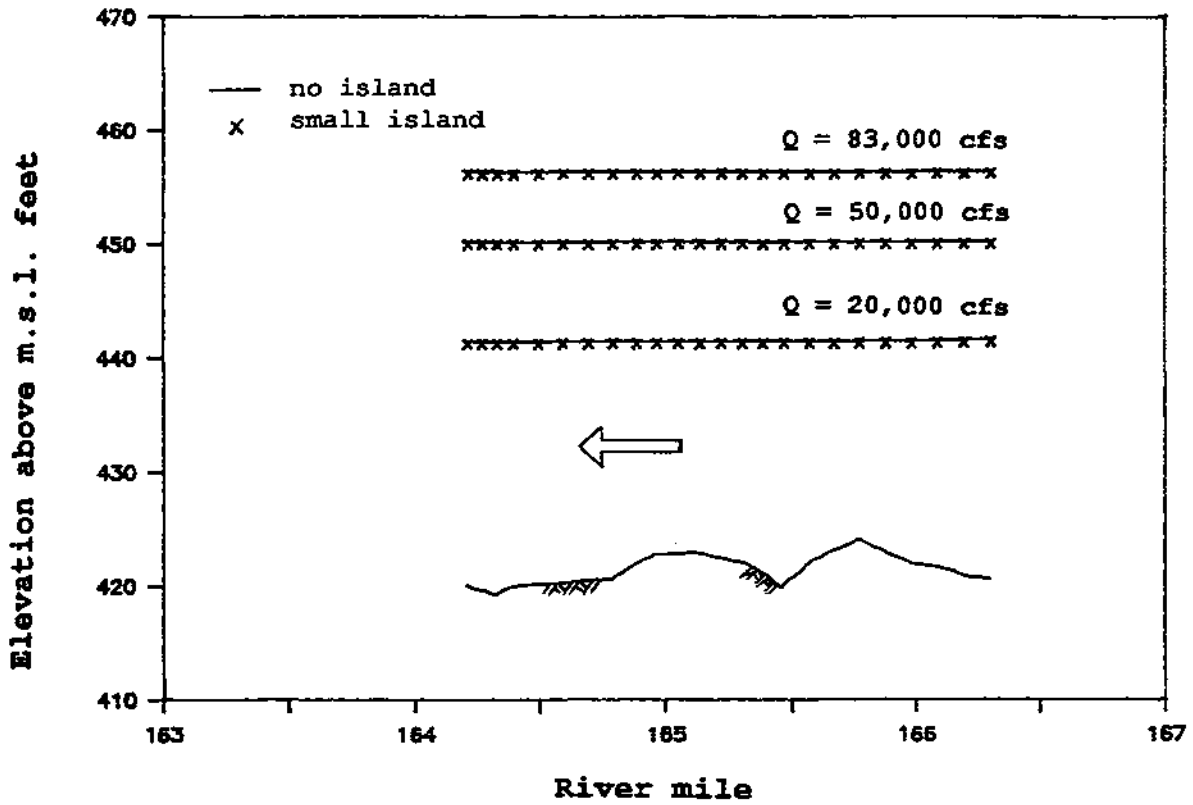between the No Island and Different Assumed Island Conditions

Figure C1. Comparison of water surface elevations for the no island and small island conditions in Lower Peoria Lake based on TABS-2 simulation
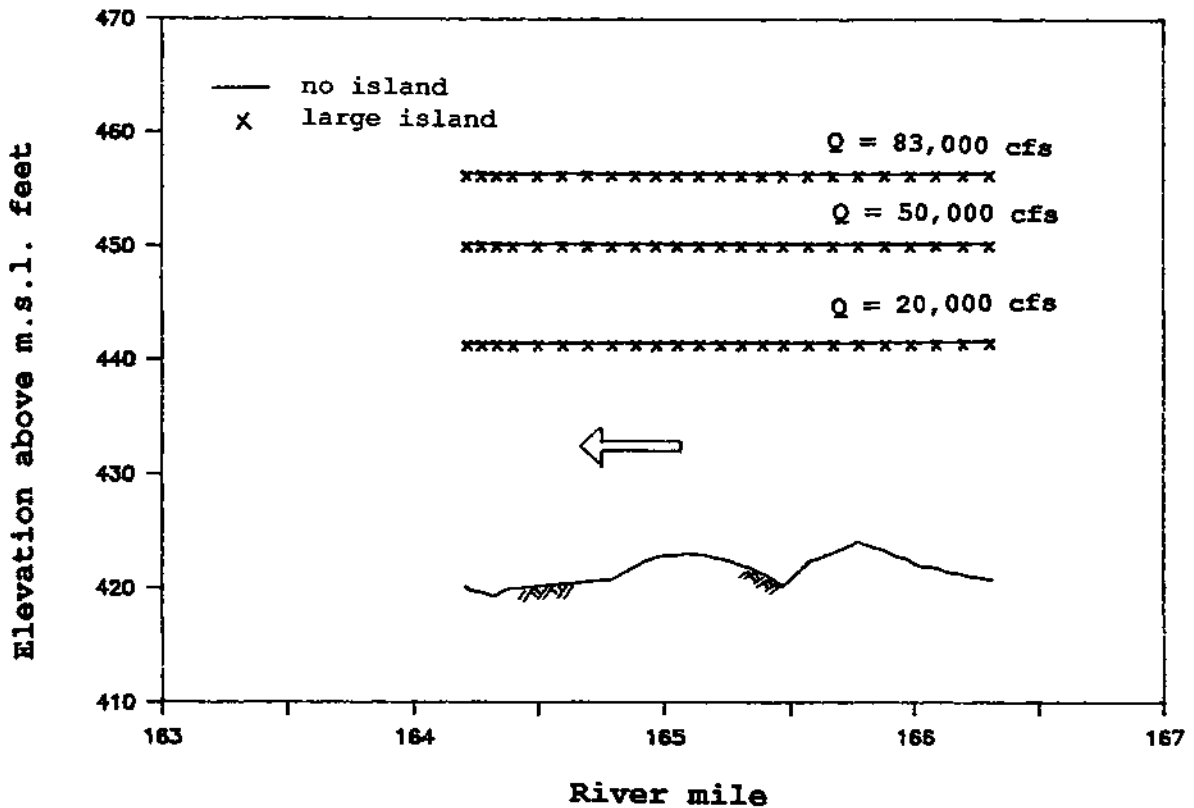

Figure C2. Comparison of water surface elevations for the no island and large island conditions in Lower Peoria Lake based on TABS-2 simulation (same as Figure 44 in the main text)
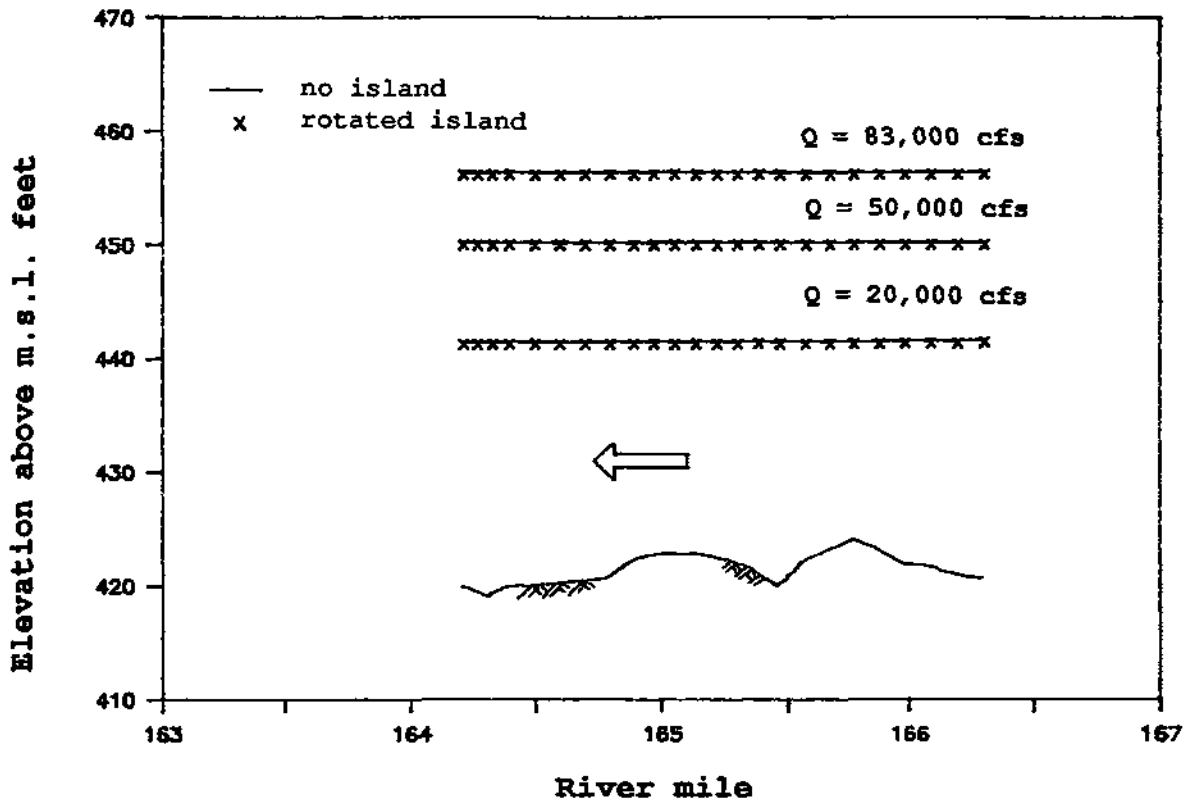
66

Figure C3. Comparison of water surface elevations for the no island and rotated island conditions in Lower Peoria Lake based on TABS-2 simulation
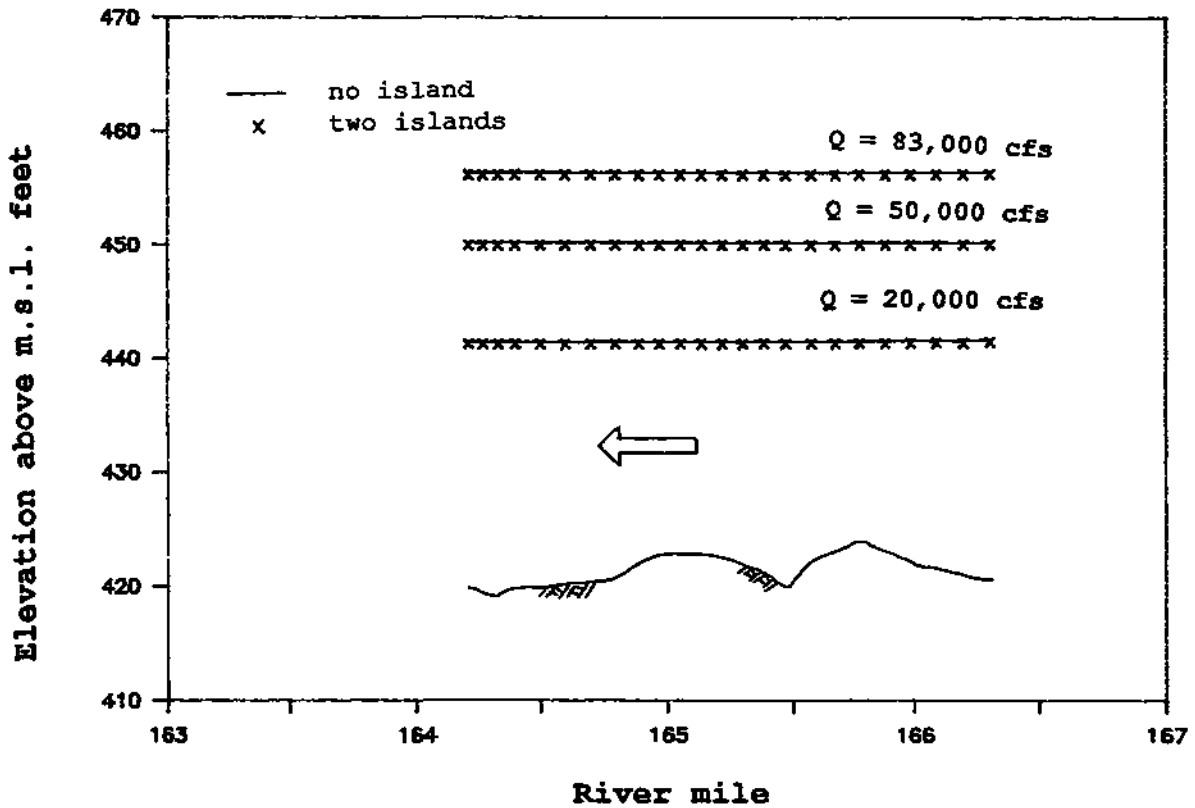

Figure C4. Comparison of water surface elevations for the no island and two islands conditions in Lower Peoria Lake based on TABS-2 simulation
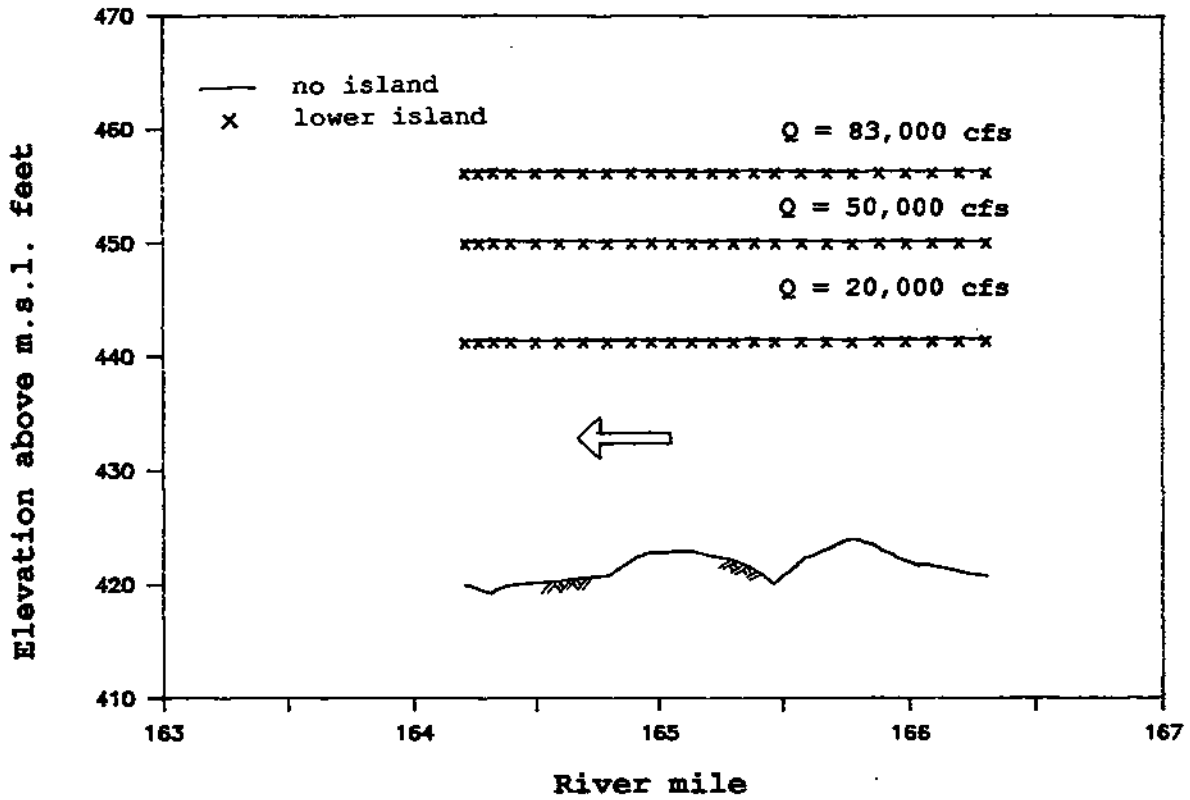
67

Figure C5. Comparison of water surface elevations for the no island and lower island conditions in Lower Peoria Lake based on TABS-2 simulation
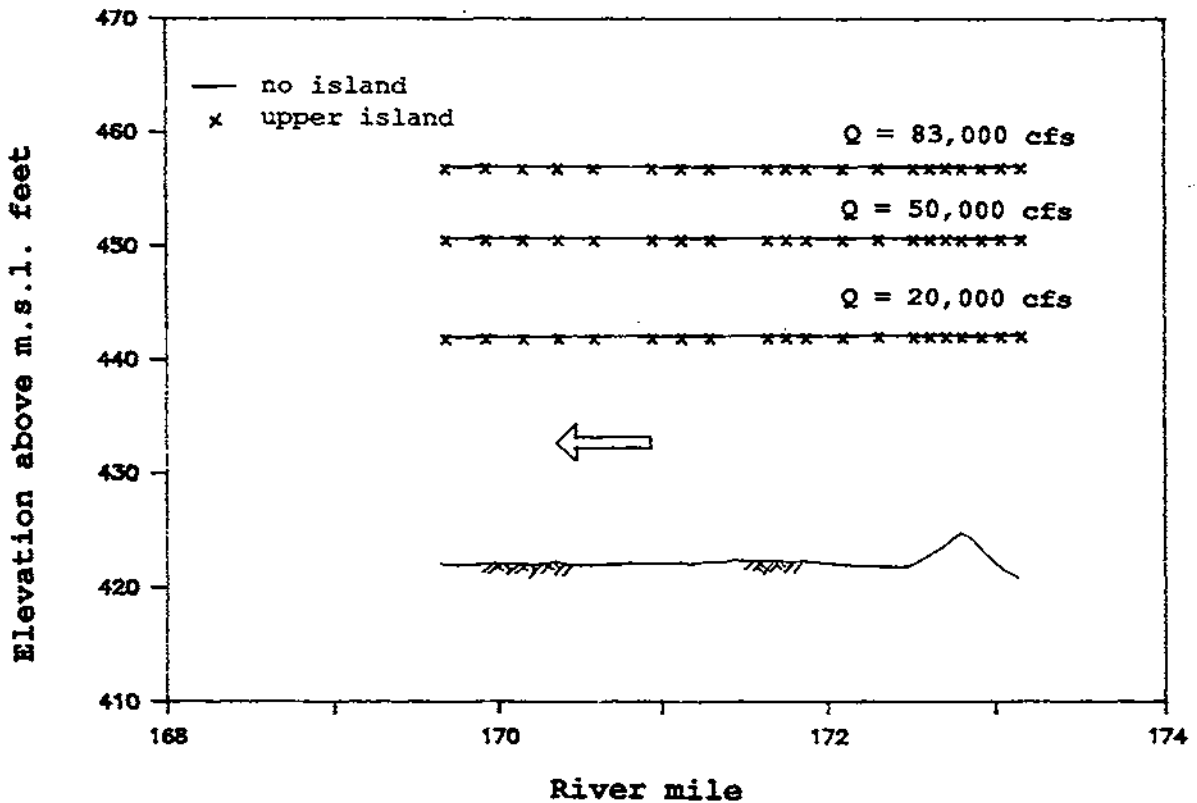

Figure C6. Comparison of water surface elevations for the no island and upper island conditions in Upper Peoria Lake based on TABS-2 simulation (same as Figure 45 in the main text)
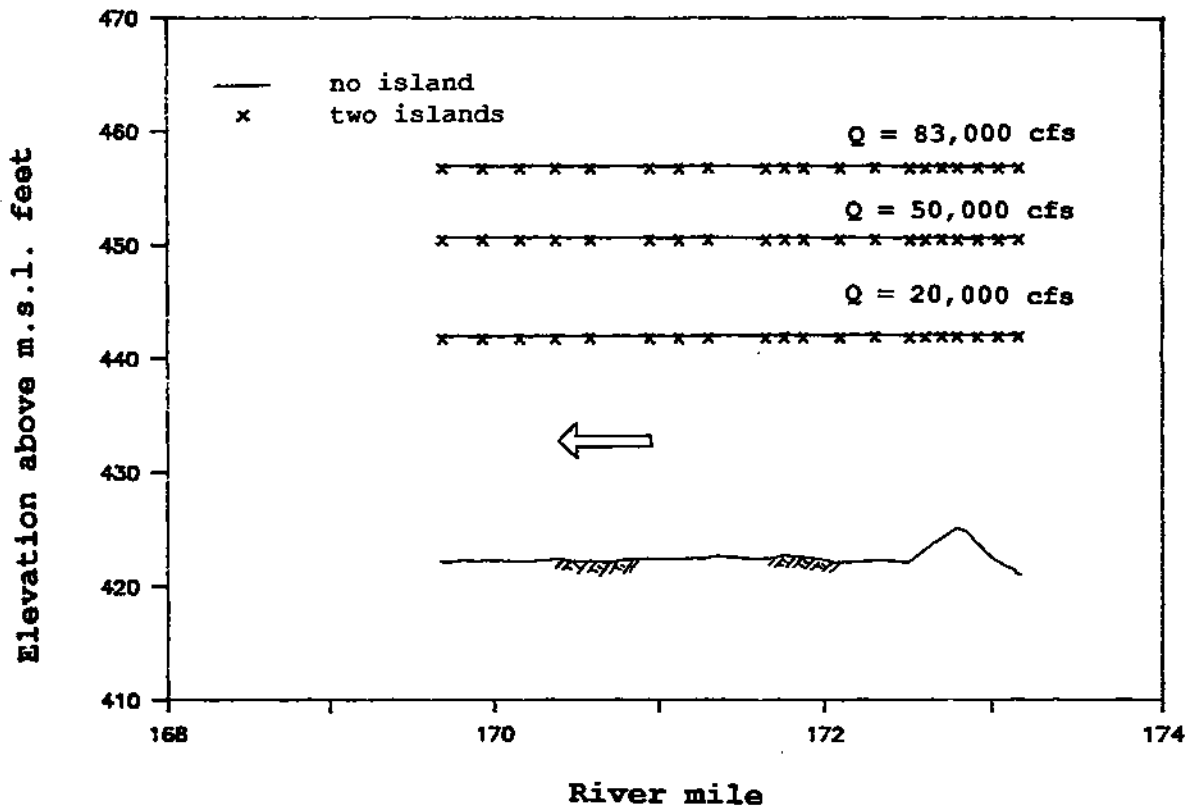
68

Figure C7. Comparison of water surface elevations for the no island and two islands conditions in Upper Peoria Lake based on TABS-2 simulation
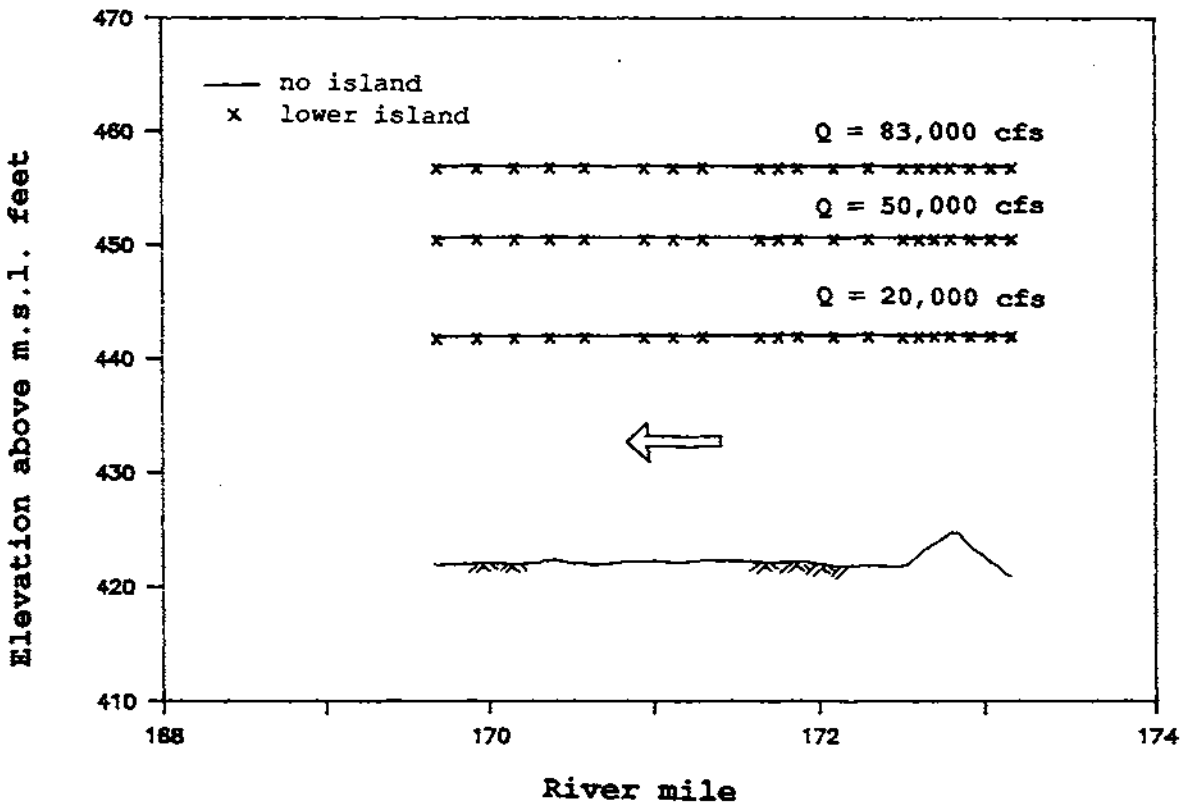

Figure C8. Comparison of water surface elevations for the no island and lower island conditions in Upper Peoria Lake based on TABS-2 simulation