levels. There also is no systematic increase in ground-water ages along the dominant regional trends of the potentiometric surfaces. An exception to this apparent absence of systematic increase in ground-water ages was identified along a geochemical section that terminates near Lake Erie.

Ground water at the downgradient end of the flow paths that terminate at Lake Erie is some of the oldest in the aquifer system (approximately 13,000 years). The very oldest ground water (approximately 38,000-45,000 years) was identified further west, beneath the Maumee River Basin. The $\Delta^{34}S$ values (69.1 per mil, 68.4 per mil) for ground water sampled near Lake Erie and the Maumee River also indicate relatively long residence times in these parts of the aquifer system. Because the very oldest ground water, which is present beneath the Maumee River Basin, is associated with short (typically less than 10 mi) regional ground-water flow paths as compared to the flow paths that terminate at Lake Erie, it is likely that this part of the aquifer system is fairly stagnant. The old ground water near Lake Erie, however, is more likely to be associated with position along regional flow paths rather than with a stagnation point in the aquifer system. Results of the regional ground-water flow model indicate that flow in the aquifer system near Lake Erie at the end of relatively long flow paths may be predominantly vertical and may be associated with discharge from the deep parts of the aquifer system. Ground-water ages from ^{14}C data for selected wells near Lake Erie increase slightly with decreasing depth, a pattern that is consistent with the modeled upward flow of ground water in this area.

No effects of future pumping on the aquifer system were investigated as part of the Midwestern Basins and Arches Regional Aquifer-System Analysis project. Nearly 433 Mgal/d of ground water was reported to have been withdrawn from the aquifer system by users capable of pumping 100,000 gal/d or greater during the 1990 calendar year. Only 15 percent of this water was reported to have been withdrawn from the carbonate-rock aquifer. Of the remaining 85 percent, most of the water was reported to have been withdrawn from outwash deposits that underlie principal streams. Estimates of mean ground-water discharge to streams for long-term steady-state conditions in the aquifer system indicate that more than 13,000 Mgal/d of water discharges from the aquifer system to streams within the study area. Current pumpage, therefore, is only a small percentage of the total amount of water that moves through the aquifer system. No regional-scale cones of depression are present within the aquifer system; the aquifer system is not heavily stressed at the regional scale, and much more of the water in the Midwestern Basins and Arches aquifer system could be used.

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