that connection is spatially heterogeneous—diffuse in some sectors, distinctly focused in others—and potentially susceptible to intrusion under altered hydraulic gradients.

5. Conclusion

Contrary to long-standing assumptions of hydraulic isolation, the Okefenokee Swamp is hydraulically connected to the underlying Upper Floridan Aquifer. Independent lines of evidence—stable isotopic enrichment in groundwater and lagged aquifer responses to swamp-stage fluctuations—demonstrate significant vertical exchange through the intervening Hawthorne Formation. Isotopic mixing models indicate that up to 92% of groundwater beneath the swamp is swamp-derived, and hydraulic response analysis yields a vertical diffusivity of ~291 m^2/d, consistent with monthly-scale signal transmission across a semi-confining layer.

These findings necessitate a revised conceptual model of the Okefenokee as a recharge wetland, not a hydraulically isolated basin. They also reveal that the Hawthorne Group functions as a leaky barrier, allowing appreciable vertical fluxes that alter both swamp water balances and regional aquifer composition. The swamp's role in sustaining Floridan groundwater resources—especially under climate variability and anthropogenic stress—warrants explicit consideration in regional water management and ecological forecasting.

6. References

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