

Groundwater Optimization Handbook: Flow, Contaminant Transport, and Conjunctive Management

Richard C. Peralta



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Existing and impending water shortages argue for improving water quantity and quality management. **Groundwater Optimization Handbook: Flow, Contaminant Transport, and Conjunctive Management** helps you formulate and solve groundwater optimization problems to ensure sustainable supplies of adequate quality and quantity. It shows you how to more effectively use simulation-optimization (S-O) modeling, an economically valuable groundwater management tool that couples simulation models with mathematical optimization techniques.

Written for readers of varying familiarity with groundwater hydrology and mathematical optimization, the handbook approaches complex problems realistically. Its techniques have been applied in many legal settings, with produced strategies providing up to 57% improvement over those developed without S-O modeling. These techniques supply constructible designs, planning and management strategies, and metrics for performance-based contracts.

Learn how to:

- Recognize opportunities for applying S-O models
- Lead client, agency, and consultant personnel through the strategy design and adaptation process
- Formulate common situations as clear deterministic/stochastic and single/multiobjective mathematical optimization problems
- Distinguish between problem nonlinearities resulting from physical system characteristics versus management goals
- Create an S-O model appropriate for your specific needs or select an existing transferrable model
- Develop acceptable feasible solutions and compute optimal solutions
- Quantify tradeoffs between multiple objectives
- Evaluate and adapt a selected optimal strategy, or use it as a metric for comparison

Drawing on the author's numerous real-world designs and more than 30 years of research, consulting, and teaching experience, this practical handbook supplies design procedures, detailed flowcharts, solved problems, lessons learned, and diverse applications. It guides you through the maze of multiple objectives, constraints, and uncertainty to calculate the best strategies for managing flow, contamination, and conjunctive use of groundwater and surface water.

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