

3450 Princeton Pike
Lawrenceville, NJ
08648

(609) 771-3954

fspitz@usgs.gov

Education

M.S., School of Civil and Environmental Engineering
Georgia Institute of Technology, Atlanta, GA

B.S., Department of Geological Sciences
Rutgers University, New Brunswick, NJ

Employment

Research Hydrologist, 2000-present
U.S. Geological Survey
New Jersey Water Science Center

Hydrologist, 1986-1999
U.S. Geological Survey
New Jersey Water Science Center

Project Management

Water Quality

Simulation of estuarine water quality

Co-PI in the development of a 3-D WASP eutrophication model of Barnegat Bay (national estuary program study area). Working with USGS Woods Hole, who are developing a ROMS hydrodynamic model of the bay. Also involved in the development of linkage between the models and the design of a large scale data collection effort to support the modeling. Co-wrote proposal. Funded by NJDEP. *(Current work)*

Simulation of riverine water quality

Project lead in the development of a 1-D WASP eutrophication model of the Salem River (agricultural basin). Developed kinematic wave flow and transport model of the river. Simulated dissolved oxygen, oxygen demands, nutrient species, and algae in the river. Ran nutrient load reduction scenarios with the model to assist with TMDL development. Wrote proposal. Funded by NJDEP. *(Current work)*

Surface Water

Simulation of riverine flow

PI in the development of a 1-D DAFLOW diffusion wave and transport model of the Passaic River and major tributaries (large urban basin) to support water quality model development for a TMDL. Helped develop a mixing algorithm to determine the source of water to a major water supply intake. Co-wrote proposal. Funded through NJ EcoComplex.

Simulation of surface-water/ground-water interaction

Project lead in the development of a 3-D surface water/ground-water model of the Ramapo River (geologically complex interstate basin). Collected field data for the model and applied new software linking MODFLOW and DAFLOW. Provided written testimony for an administrative law case involving proposed water use in the basin. Funded by NJDEP.

Ground Water

Optimization of withdrawals

PI in the application of new MODFLOW-GWM software to determine the optimal distribution, magnitude, and allocation of withdrawals in Water Supply Critical Area 1 (NJ regional area). Used an existing 3-D flow model to develop 14 management models--each with an objective function, decision variables, and constraints. Funded by NJDEP.

Modeling software development

PI in the development of a method/software to resolve an important limitation of the widely used MODPATH particle tracking post-processor for MODFLOW. The method enables more accurate delineation of wellhead protection areas in NJ and has been enhanced by others for use in other ground-water model applications. Funded by NJDEP.

Simulation of ground-water flow

PI/Co-PI in the development of a series of 3-D models of the shallow and deep aquifers in Cape May County (coastal basin) to evaluate the effects of saltwater encroachment on municipal freshwater supply. Ran scenarios with the models to evaluate the sustainability of the water resource. Funded by NJDEP.

Professional Skills

Software Experience

Water quality: WASP, PLOAD, BLTM

Surface water: DAFLOW, DAFLOW-MODFLOW, HEC-RAS

Ground water: MODFLOW, MODPATH, GWM, SHARP, HYSEP/PART

Other: ARCGIS, MICROSOFT EXCEL AND ACCESS, FORTRAN, MINITAB

Continuing Education: 12 one or two week technical training classes (various subjects)

Peer Review: USGS report series, WEF Conference Proceedings, Indiana University SPEA, Ground Water Monitoring & Remediation, USEPA Superfund modeling reports

Awards

USGS: Annual Performance Award (multiple time recipient)

Georgia Institute of Technology: Full Tuition Waiver Award

Professional Memberships

American Society of Civil Engineers

Peer-Reviewed Publications

Journal Articles

Spitz, F.J., Nicholson, R.S., and Pope, D.A., 2001, A nested rediscrretization method to improve pathline resolution by eliminating weak sinks representing wells: *Ground Water*, vol. 39, no. 5, p. 778-785.

Technical Reports

Simulation of flow and eutrophication in the central Salem River Basin, New Jersey: USGS Scientific Investigations Report. (*In progress*)

Spitz, F.J., 2009, Analysis of effects of 2003 and full-allocation withdrawals in Critical Area 1, east-central New Jersey: USGS Open-File Report 2009-1104, 14 p. <http://pubs.usgs.gov/ofr/2009/1104/>

Spitz, F.J. and dePaul, V.T., 2008, Recovery of ground-water levels from 1988 to 2003 and analysis of effects of 2003 and full-allocation withdrawals in Critical Area 2, southern New Jersey: USGS Scientific Investigations Report 2008-5142, 28 p. <http://pubs.usgs.gov/sir/2008/5142/>

Spitz, F.J., Watt, M.K., and dePaul, V.T., 2008, Recovery of ground-water levels from 1998 to 2003 and analysis of potential water-supply-management options in Critical Area 1, east-central New Jersey: USGS Scientific Investigations Report 2007-5193, 40 p. <http://pubs.usgs.gov/sir/2007/5193>

Spitz, F.J., 2007, Simulation of surface-water conditions in the non-tidal Passaic River Basin, New Jersey: USGS Scientific Investigations Report 2007-5052, 67 p. <http://pubs.usgs.gov/sir/2007/5052>

Spitz, F.J. and Nicholson, R.S., 2001, Simulated effects of alternative pumping strategies on ground- water-flow patterns and areas contributing recharge to selected wells near Kenvil, Morris County, New Jersey: USGS Water-Resources Investigations Report 01-4180, 32 p. <http://pubs.usgs.gov/wri/wri01-4180/>

Spitz, F.J., 2001, Method and computer programs to improve pathline resolution near weak sinks representing wells in MODFLOW and MODPATH ground-water-flow simulations: USGS Open- File Report 00-392, 41 p. <http://nj.usgs.gov/publications/OFR/00-392/>

Technical Reports (continued)

Spitz, F.J., 1998, Analysis of ground-water flow and saltwater encroachment in the shallow aquifer system in Cape May County, New Jersey: USGS Water-Supply Paper 2490, 51 p. <http://pubs.er.usgs.gov/usgspubs/wsp/wsp2490>

Spitz, F.J., 1996, Hydrologic feasibility of water-supply development alternatives in Cape May County, New Jersey: USGS Water-Resources Investigations Report 96-4041, 42 p.

Voronin, L.M., **Spitz, F.J.**, and McAuley, S.D., 1996, Evaluation of saltwater intrusion and travel times in the Atlantic City 800-foot sand, Cape May County, New Jersey, 1992, by use of a coupled-model approach and flow-path analysis: USGS Water-Resources Investigations Report 95-4280, 27 p.

Spitz, F.J. and Barringer, T.H., 1992, Simulation of saltwater encroachment in the shallow aquifer system of Cape May County, New Jersey: USGS Water-Resources Investigations Report 91-4191, 87 p.

Lewis, J.C., Hochreiter, J.J., Barton, G.J., Kozinski, J., and **Spitz, F.J.**, 1991, Hydrogeology of, and ground-water quality in, the Potomac-Raritan-Magothy Aquifer System in the Logan Township Region, Gloucester and Salem Counties, New Jersey: USGS Water-Resources Investigations Report 90-4142, 92 p.

Lewis, J.C. and **Spitz, F.J.**, 1987, Hydrogeology, ground-water quality, and the possible effects of a hypothetical radioactive-water spill, Plainsboro Township, New Jersey: USGS Water-Resources Investigations Report 87-4092, 45 p.

Conference Papers, Posters, and Abstracts

dePaul, V.T., and **Spitz, F.J.**, 2014, Modeling of Water Quality in Barnegat Bay-Little Egg Harbor, New Jersey, Abstract, Ninth National Monitoring Conference, National Water Quality Monitoring Council: Cincinnati, OH.

Nicholson, R.S., and others, 2013, Characterizing Physical, Chemical, and Biological Conditions and Processes in the Barnegat Bay-Little Egg Harbor Estuary, New Jersey, Poster Session, 2013 Mid-Atlantic Conference, American Water Resources Association: West Windsor, NJ.

Spitz, F.J., and dePaul, V.T., 2010, Simulation of flow and eutrophication in the central Salem River Basin, New Jersey, Poster Session, 2010 Annual Water Resources Conference, American Water Resources Association: Philadelphia, PA.

Spitz, F.J., 2005, Development of hydraulic inputs for a nutrient TMDL water-quality model of the non-tidal Passaic River Basin, New Jersey, In Proceedings of TMDL 2005, Water Environment Federation: Philadelphia, PA, p. 1297-1308.

Spitz, F.J., Carleton, G.B., and Nicholson, R.S., 2002, Simulation of ground-water/surface-water interaction in a valley-fill aquifer using MODFLOW-DAFLOW, Poster Session, 2002 Annual Meeting and Conference, National Ground Water Association: Las Vegas, NV.

Spitz, F.J. and Nicholson, R.S., 1998, Use of a nested rediscrretization method to improve pathline resolution by eliminating weak sinks representing wells, In Proceedings of MODFLOW'98 at Colorado School of Mines: Golden, CO, vol. 2, p. 905-914.

Spitz, F.J. and Nicholson, R.S., 1998, Use of a nested rediscrretization method to improve pathline resolution by eliminating weak sinks representing wells, Poster Session, MODFLOW'98 at Colorado School of Mines: Golden, CO.

Spitz, F.J. and Barringer, T.H., 1989, A model of coastal groundwater in southern New Jersey, In Proceedings of the Sixth Symposium on Coastal and Ocean Management: American Society of Civil Engineers, Charleston, SC, vol. 4, p. 3651-65.

Barringer, T.H. and **Spitz, F.J.**, 1989, Optimization of Ground-Water Withdrawals in a Coastal Environment; Cape May Peninsula, New Jersey: Abstracts with Programs of the Twenty-Fourth Annual Meeting of the Northeastern Section, Geological Society of America, New Brunswick, NJ, Vol. 21, No. 2.

Lewis, J.C. and **Spitz, F.J.**, 1988, Hydrogeology of a Fractured-Rock Aquifer at a Site in Plainsboro Township, New Jersey: Abstracts of the Conference on Fluid Flow in Fractured Rocks, Georgia State University, Atlanta, GA.