A SNAPSHOT OF ORD RESEARCH ACTIVITY ON REACTIVE NITROGEN

ORD Research on reactive Nitrogen is an on-going component of two multi-year plans (MYPs), Ecology and Water Quality. Monitoring of atmospheric nitrogen is also conducted as part of the Air Quality MYP. Current research projects include the following (this list does represent areas of major thrust, but is not presented as a certified complete list of all N-related research):

National Exposure Research Laboratory

- Improve Estimates of N and P Loading to Small Streams as a Function of Watershed Land Use and Improve Characterization of In Stream Nutrient Cycling Processes
- Exploring for Functional Dependence of Nitrogen Transformations on Measurable Geochemical Properties
- Factors Affecting Organic Nutrient Concentrations and Biological Availability in Coastal Rivers
- Development and Application of Ground-Water Flow and Reactive Transport Models to Simulate Subsurface Nitrogen Fate (PI: Caroline Stevens, Stephen Kraemer)
- Enhanced Surface Water Models for Forecasting Nutrient - Water-Quality Response
- Linked Ground Water, Surface Water, and Water Quality Model for Forecasting Direct Nitrogen Loadings to Estuaries
- Linked Land Drainage, Ground Water, and Surface Water Modeling System for Predicting Nutrient, Sediment and Contaminant Transport and Transformation in a Watershed
- Redox and Nitrogen Speciation in Subsurface Waters, surface waters, and environmental systems

National Health and Environmental Effects Research Laboratory

- Provide a generally applicable, linked GIS-biogeochemical-hydrologic model for predicting landscape scale changes in terrestrial habitats in response to stress
- Trends of acidification status in sensitive waters, (TIME/LTM project)
- Define food web-nutrient response thresholds in Great Lake coastal wetlands. Guidance on setting nutrient criteria protective of food web effects in Great Lakes coastal wetlands
- Report on the conditions and seasonal trends of water quality in the Gulf of Mexico hypoxic zone, 1- Multiple Regression Analysis of the Relationship between Midsummer Hypoxia and Mississsippi River Flow, Nutrient Concentrations and Loads; 2 - Numerical Simulation Modeling of the Northern Gulf of Mexico Hypoxic Zone., Develop a suite of model applications, data products and other tools to assess and predict the relationships between nutrient loads and Gulf hypoxia; forcast the effects of nutrient management actions in the Basin on Gulf hypoxia; and provide defensible options to guide restoration and decision-making.
- Evaluating relative role of and ability to distinguish among nutrient - foodweb pathways and habitat alteration affecting wetland fish communities.

- Empirical and numeric models for SAV model package with user manual for running the seagrass-stress response model which will be available to users in state agencies. Empirical and numeric models for food webs, and their use to assess effects on nutrient enrichment on estuarine ecosystems. (will demonstrate how food web models can be used to identify effects of nutrient enrichment to multiple trophic levels within an estuarine ecosystem, and how food web models could be used to validate nutrient water quality criteria.)
- Propose classification scheme for coastal receiving waters based on SAV and food web sensitivity to nutrients, (The report will provide guidance to the Office of Water concerning development of nutrient criteria in estuaries.)
- Physiochemical habitat of coastal wetlands, including assessment of factors structuring habitat patterns and metrics for summarizing habitat information.
- Improve guidance for nutrient criteria for coastal waters by development of load-response models for estuaries of the Pacific Northwest and Gulf Coasts, and validation of a multiple stressor-response , Final products will include a model package with user manual for running the seagrass-stress response model which will be available to users in state agencies.

National Risk Management Research Laboratory

- Performance of enhanced N removal in sewage treatment
- Using Empirical Flow-Duration Curves to Estimate Watershed Loading of Sediment, Nitrogen and Phosphorus: Application to TMDL Analyses and BMP Effectiveness Evaluation, Environmental Stressors Management, Land Remediation and Pollution Control, Risk Management Research.