

# TERRY BROWN PH.D.

Ecological and spatial data analysis, management, modeling, and visualization.

@ TerryNBrown@gmail.com    218-269-9045    @tbnorth    tbnorth.github.io

## EXPERIENCE

### Temporary consulting

#### Natural Resource Research Institute, UMN

Dec 2019 – present    Duluth, MN, part-time

- Provided guidance on transition to off-site containerized app. environment.
- Developed and assembled hierarchical database of IT assets and their inter-dependencies with web front end.
- Automated deployment of multi-service (GeoServer / PostGIS) interactive web mapping app with 250 data layers for community / natural resource planning.
- Added features to various web applications.
- Developed code for low cost conductivity sensors for environmental monitoring.

### Post Doc. Watersheds and Water Resources Branch

#### US EPA

Dec 2015 – Dec 2019    Duluth, MN, full-time

- Promoted standardizing and integrating legacy data-sets for data mining and increased return on investment in data collection.
- Wrote scope of work and oversaw development of a relational database product to manage large data sets from high frequency sensor systems.
- Applied state of the art 4D web based visualization (CesiumJS) to new and existing EPA data sets.
- Lead development of a cheap "internet of things" style current mapper.
- Modeled movement of contaminants in the Great Lakes using large data sets.

### Research Associate

#### Natural Resource Research Institute, UMN

2001 – Dec 2015    Duluth, MN, full-time

- Developed relational database backed web application for data entry, analysis, QA validation, and download for a multi-site, multi-investigator, multi-discipline project.
- Lead a team developing a DB / web mapping tool to prioritize wetland restoration.
- Lead-PI: \$100k grant to develop pipeline for data from six \$6M EAGLES projects via Webservice / WSDL / SOAP through EPA's CDX network. Developed web app. to edit Ecological Metadata Language (EML - structured hierarchical metadata) and manage uploads of data to CDX.
- Lead-PI: \$100k NOAA/GLOS grant: "An Open Standards Data and Metadata Pipeline for the Natural Resources Research Institute Great Lakes Data". Deployed CKAN server (as used by data.gov) to host NRRI's data assets.
- Applied machine learning techniques to landscape classification.
- Automated application of complex site selection criteria for state wide surveys, generated field sheets / maps, collated data and managed QA process.

## SKILLS & STRENGTHS

- Ecological and spatial data analysis, management, modeling, and visualization.
- Management and processing of heterogeneous environmental data.
- Software life cycle (user needs assessment, iterative development, maintenance / exit).
- Remote collaboration, e.g. open-source projects with globally distributed participants.

Python    DB design    Data curation  
SQL    Django    R    Docker  
JavaScript    git/GitHub    markdown  
LaTeX    JSON    image processing  
spatial analysis / DB    3D visualization  
CesiumJS    Bash    Unix    XML  
HTML    SVG    CSS

- Postgresql / POSTGIS.
- Web map interfaces.
- Various JavaScript libraries (jQuery, React, d3).
- Content management systems.
- Running parallel software on EPA's HPC supercomputer for crunching large data sets.
- Set up proof of concept AOP ontology querying using SPARQL.
- Web-scraping and full text / keyword ranked searching.
- Also previously used: C / C++, Java, FORTRAN, MatLab, ArcGIS, Access.

## EDUCATION

### Ph.D. in Biological systems simulation

#### Lincoln University

1991 – 1995    New Zealand

### B.S.(Hons.) in Microbial Ecology

#### Canterbury University

1988 – 1990    New Zealand

## EXPERIENCE CONT.

### Post Doc. Center for Water and Environment

#### Natural Resource Research Institute, UMN

📅 Jun 1997 – 2001

📍 Duluth, MN, full-time

- Oversaw field data collection and management.
- Developed a detailed simulation of beaver meadow succession.

### Research Scientist

#### Lincoln Environmental

📅 1994 – May 1997

📍 Hamilton, NZ, full-time

- Developed a simulation of nitrate contamination of groundwater.
- Developed processes for intake and management of heterogeneous data flows from sensors and external sources.

## SELECTED PUBLICATIONS

- Host, George E. et al. (Apr. 2019). "Risk-based classification and interactive map of watersheds contributing anthropogenic stress to Laurentian Great Lakes coastal ecosystems". In: *Journal of Great Lakes Research*. DOI: 10.1016/j.jglr.2019.03.008.
- Reavie, Euan D., Meijun Cai, and Terry N. Brown (June 2018). "Historical watershed stressors for the Laurentian Great Lakes". In: *Geoscience Data Journal* 5.1, pp. 4–8. DOI: 10.1002/gdj3.53.
- Brown, T. N. and C. A. Johnston (2017). *Data from: Beavers: boreal ecosystem engineers. On-line data archive to accompany book*. DOI: 10.5061/dryad.b6c45. URL: <http://dx.doi.org/10.5061/dryad.b6c45>.
- Host, G. E. et al. (Oct. 2011). "High-resolution assessment and visualization of environmental stressors in the Lake Superior basin." In: *Aquatic Ecosystem Health and Management, in press* 14.4, pp. 376–385. DOI: 10.1080/14634988.2011.625340.
- Johnston, Carol A. et al. (2009). "Manual of geographic information systems". In: American Society for Photogrammetry and Remote Sensing. Chap. GIS in support of ecological indicator development, p. 18.
- Hollenhorst, T.P. et al. (2007). "Methods for generating multi-scale watershed delineations for indicator development in Great Lake coastal ecosystems". In: *Journal of Great Lakes Research* 33.3.
- Danz, N.P. et al. (2005). "Environmentally Stratified Sampling Design for the Development of Great Lakes Environmental Indicators." In: *Environmental Monitoring and Assessment* 102.1-3, pp. 41–65.
- Johnston, Carol et al. (2005). "Geospatial Tools for Developing Ecological Indicators of Great Lakes Coastal Wetlands". In: *Community to Globe: Landscape Analysis Using Geospatial Tools*. INTECOL Workshop 17.
- Brown, T.N., C.A. Johnston, et al. (2002). "Lateral flow of surface and vadoze zone water into a wetland: field and model perspectives." In: *Integration of Computer Modeling and Field Observations in Geomorphology*. Ed. by John F. Shroder Jr. and Michael P. Bishop. Elsevier. Chap. Lateral flow of surface and vadoze zone water into a wetland: field and model perspectives.
- White, M.A., T.N. Brown, and G.E. Host (2002). "Landscape analysis of risk factors for blister rust (*Cronartium ribicola*) on eastern white pine (*Pinus strobus* L.) in the Mixed Forest Province of Minnesota, U.S.A.". In: *Canadian Journal of Forest Research* 32.9, pp. 1639–1650.
- Brown, T.N. and M.A. White (2001). "Plant Disease Mapping: Machine Learning, Principal Component, Regression Tree, and Electivity Score techniques". In: Conference presentation. Ecological Society of America.
- Brown, T.N., J. Pastor, et al. (2000). "A finite difference type algorithm with pro rata resource allocation." In: *Ecological Modelling* 126.1, pp. 1–8.
- Brown, T.N., D. Kulasiri, and R. Gaunt (1997). "An objective index for the radial distribution of low order lateral tree roots." In: *New Zealand Journal of Forestry Science* 26.3.
- Brown, T.N., D. Kulasiri, and R.E. Gaunt (1997). "A root-morphology based simulation for plant / soil microbial ecosystem modelling." In: *Ecological Modelling* 99, pp. 275–287.
- Brown, T.N. and D. Kulasiri (1996). "Validating models of complex, stochastic, biological systems". In: *Ecological Modelling* 86, pp. 129–134.
- – (1994). "Simulation of *Pinus radiata* root system structure for ecosystem management applications". In: *Simulation* 62.5, pp. 286–294.

## VOLUNTEER

- Coded web app. to gamify migration of 4500 issue reports between platforms for open source Inkscape software.
- Helped organize group packing food at food bank.