Hayduk, Evan, Judy Cushing, Jerilyn Walley, Kirsten Winters. 2012. How ecologists "visualize" research results in publications: VISTAS Project ecology journal survey. 97th ESA Annual Convention. August 2012.

Visual Analytics help ecologists interpret large data sets and model outputs that represent complex ecological phenomena. We posit that visualizing ecosystem states and processes across spatial and temporal scales enhances scientists' understanding of ecological phenomena and helps them intuit testable hypotheses. The VISualization of Terrestrial-Aquatic Systems (VISTAS) Project brings together computer scientists, social scientists, and ecologists to develop and determine which visualizations work for which audiences and for which purposes. To help inform VISTAS' scientists and software developers of visualization use among ecologists, we conducted a literature survey examining six months (July-December 2011) of articles from eight peer-reviewed ecology journals. Survey objectives were to: 1) create a database of visualizations and evaluate their use in print journals, 2) enumerate types of visualizations most often used, 3) identify software programs and visualization centers that help ecologists create visualizations, and 4) analyze the frequency by field of "visualizations of interest [to VISTAS]" in print journals (e.g., hydrology, atmospheric science, general ecology). Results/Conclusions From the survey database, which contains details on the 1,182 reviewed articles and 24,881 visualizations therein, we found that the predominant visualization type (77%) is a 2-dimensional graph usually depicting statistical test results. Other visualization types include maps (11%), photographs (2%), and illustrations (6%). Fewer than 2% of the visualizations surveyed involve a level of sophistication equal to what VISTAS and similar projects are developing, and only 17% of the reviewed visualizations are classified as computer generated representations of natural phenomena. Additionally, we see few citations of software that generated visualizations. We ask if the current types of visualizations used by ecologists in print journals provide adequate explanatory power for presenting research results. Further research is needed to determine the extent to which ecologists use significantly different visualization types in print than in online journals, conference and other presentations, or project web sites. Additionally, further analysis of visualizations of interest, including how particular phenomena or data was visualized in the past, might show how visualization use has evolved over time. This ESA Poster will report visualization types, occurrences, and provenance from our recent survey.
The VISTAS project is supported by the National Science Foundation (NSF/BIO/DBI 1062572). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.