Citation analysis systematically reviews sources cited within a body of literature to discover patterns. Librarians benefit from local citation analysis by determining which information resources are being used at their institution, and informing instructional and collection development activities by doing so. The authors propose that an additional use for this information is through its incorporation into the development of online research guides created by librarians for particular subjects and audiences. Subject guides point to library resources (print and digital) and often highlight publicly accessible internet resources as well. The purpose of the guide is to help scholars navigate the complex web of information available to them. Publishing a research guide with content relevant to undergraduate, and graduate students, faculty, and also serves the public can be challenging. The authors demonstrate the value of a local citation analysis (in this case on Water Resources Program theses and dissertations published from 2004-2009) in the creation of a well-rounded water resources subject guide.

### METHODS

This project reviewed 1794 citations from 18 Water Resources Graduate Program (WRGP) theses, and dissertations (hereafter referred to as “theses”) completed fall 2004 through spring 2009. The citations were categorized by WRGP track and by broad format category: - Journal articles - Books - "Other" - Non governmental sources such as organization and university publications, newspapers & magazines - Governmental sources: U.S. Geological Survey (USGS) analyzed separately.

Developing subject guides is a standard library practice. We hypothesized that having the citation habits of a primary user group on hand to inform the process would add value to the structure and content of a guide. Several research questions were asked to address this hypothesis:

- Are the citation patterns between tracks different enough to warrant multiple guides?
- Should the guide(s) be organized by format or theme based on track (assumes one guide)?
- Which resources from each citation category should be highlighted (journals, books, grey literature, and dissertations (hereafter referred to as “theses”)) completed fall 2004 through spring 2009.
- Is improved subject guide development a practical application of citation analysis?

### CITATION ANALYSIS FINDINGS

We found that different categories of resources were used in varying degrees by students in the three tracks. Not surprisingly, students in all tracks used research articles more frequently than any other category. However, articles were cited a thousand times in Policy & Management (PM) than in Engineering and Science theses. Books, governmental, and organization publications were cited more often in PM theses. The USGS was overall the most cited government agency, but used primarily by Engineering and Science students (Table 1).

### APPLICATION OF FINDINGS TO THE WATER RESOURCES SUBJECT GUIDE

Using local citation data to develop a locally relevant water resources information guide

### CONCLUSION

Structure of the guide

Although there were some distinct differences between the tracks based on categories of resources cited, the authors determined that there was enough overlap to make one subject guide, with content grouped by category (rather than track).

Content on the guide

Resources identified by students multiple times were incorporated into the guide. In some instances resources cited infrequently but deemed useful as a reference source or for future potential were included. Some resources cited frequently were left off the guide, such as advocacy group websites and those with a narrow focus, used only by one student.

We found that a combination of librarian expertise and detailed knowledge of what graduate students are citing make a more complete subject guide. Knowing what was cited drove some decisions about what to include in the guide. Relevant sources from governmental and non-governmental organizations were identified from the theses. However, the guide could not have been built solely on resources cited by these. For example, research databases are an essential tool in the research process at all levels and were included on the guide.

While we do not recommend conducting citation analysis for developing subject guides, we did find it a fruitful way to re-use existing data.

### Table 1: Average number of citations by category and WRGP track

<table>
<thead>
<tr>
<th>Categories</th>
<th>Engineering</th>
<th>Policy &amp; Management</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal articles (n=1054)</td>
<td>66.9</td>
<td>39.6</td>
<td>64.4</td>
</tr>
<tr>
<td>Books (n=262)</td>
<td>14.5</td>
<td>21.4</td>
<td>7.6</td>
</tr>
<tr>
<td>Other – non-governmental (n=207)</td>
<td>11.9</td>
<td>23.2</td>
<td>17.2</td>
</tr>
<tr>
<td>Other – government, not USGS (n=138)</td>
<td>3.6</td>
<td>17.0</td>
<td>6.8</td>
</tr>
<tr>
<td>Other – USGS (n=64)</td>
<td>3.5</td>
<td>0.2</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### An example subject guide for Water Resources

- **Top cited journals**
  - *Ground Water*
  - *Advances in Water Resources*
  - *Hydrological Processes*
  - *Journal of Hydrology*
  - *Water Resources Research*

- **Governmental organizations**
  - U.S. Geological Survey
  - U.S. Army Corps of Engineers
  - U.S. Department of Agriculture

- **Journals**
  - *Journal of Hydrology*
  - *Advances in Water Resources*

- **Books**
  - *Dams*
  - *Advances in Water Resources*

- **Grey literature**
  - *U.S. Geological Survey*