Adding Impacts and Mitigation Measures to OpenEI's RAPID Toolkit

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ABSTRACT

The Open Energy Information platform hosts the Regulatory and Permitting Information Desktop (RAPID) Toolkit to provide renewable energy permitting information on federal and state regulatory processes. One of the RAPID Toolkit's functions is to help streamline the geothermal permitting processes outlined in the National Environmental Policy Act (NEPA). This is particularly important in the geothermal energy sector since each development phase requires separate land analysis to acquire exploration, well field drilling, and power plant construction permits. Using the Environmental Assessment documents included in RAPID's NEPA Database, the RAPID team identified 37 resource categories that a geothermal project may impact. Examples include impacts to geology and minerals, nearby endangered species, or water quality standards.

To provide federal regulators, project developers, consultants, and the public with typical impacts and mitigation measures for geothermal projects, the RAPID team has provided overview webpages of each of these 37 resource categories with a sidebar query to reference related NEPA documents in the NEPA Database.

This project is an expansion of a previous project that analyzed the time to complete NEPA environmental review for various geothermal activities. The NEPA review not only focused on geothermal projects within the Bureau of Land Management and U.S. Forest Service managed lands, but also projects funded by the Department of Energy. Timeline barriers found were: extensive public comments and involvement; content overlap in NEPA documents, and discovery of impacted resources such as endangered species or cultural sites.

Introduction

One of the recent goals from the Department of Energy (DOE) is to modernize public policy by overcoming National Environmental Policy Act (NEPA) timeline barriers. In the geothermal energy sector, every new development action requires an environmental review. This delays permit approval and extends project timelines. The DOE tasked the Strategic Energy Analysis Center (SEAC) at the National Renewable Energy Laboratory (NREL) to research what causes these delays and provide feedback to improve NEPA's effectiveness. The NEPA review not only focused on geothermal projects within Bureau of Land Management (BLM) and U.S. Forest Service (USFS) managed lands, but also projects funded by the DOE. Timeline barriers found were: extensive public comment and involvement; content overlap in NEPA documents, and the discovery of impacted factors such as endangered species or cultural sites. The results not only merited feedback for the DOE, USFS, and BLM, but also for project developers, consultants and contractors (Young, "NEPA Timelines," 893).

The Regulatory and Permitting Information Desktop (RAPID) is an Open Energy Information (OpenEI) platform containing federal and state permitting information. The toolkit aims to promote agency collaboration and uniformity,

inform policy makers, and provide project context. One of the tools on the website is the NEPA Database. It houses geothermal Categorical Exclusions (CX), Casual Use (CU), Environmental Assessments (EA), and Environmental Impact Statement (EIS) documents. Included in each EA and EIS document page is a chart of all impacted project categories found in SEAC's previous research of NEPA documents for geothermal projects such as endangered species or cultural sites. SEAC saw an opportunity to provide impacts and mitigation measures to stakeholders with the data from the NEPA review to further develop the Toolkit's overall effectiveness.

The project this paper outlines is the methodologies to implement the new webpage additions to the RAPID Toolkit. Each page summarizes typical impacts and mitigation measures for each impacted category from existing NEPA documents and includes a query to reference other related NEPA documents. These web page additions enable federal regulators and project managers to take proactive measures if a proposed geothermal project will impact resource categories.

Process

Project goals and objectives are found on the RAPID Toolkit's homepage. To navigate to the "NEPA Database" from the RAPID homepage, choose "Tools" from the menu bar at the top of the page and then click on "NEPA Database." To narrow the search options to the correct dataset, go to the page's left column to find "Filter by Technology" and choose "Geothermal" only. Then, under the "View by Analysis Type", choose "Environmental Assessment" only. All of these EAs have "Proposed Actions", "Conditions of Approval", " Data Completion Notes", and a "Resource Analysis" chart. The "Resource Analysis" chart is a list of all of the resources

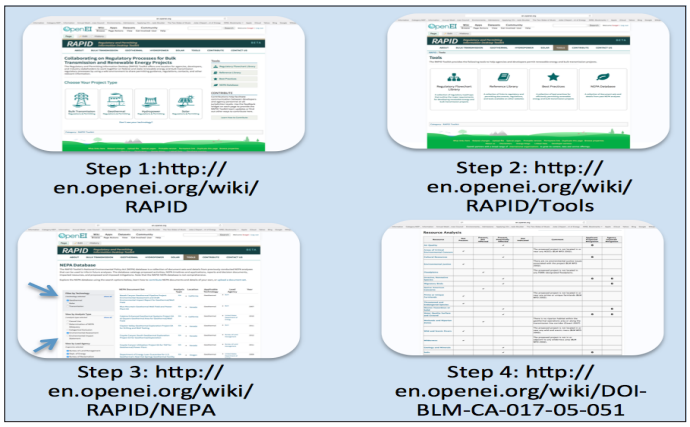
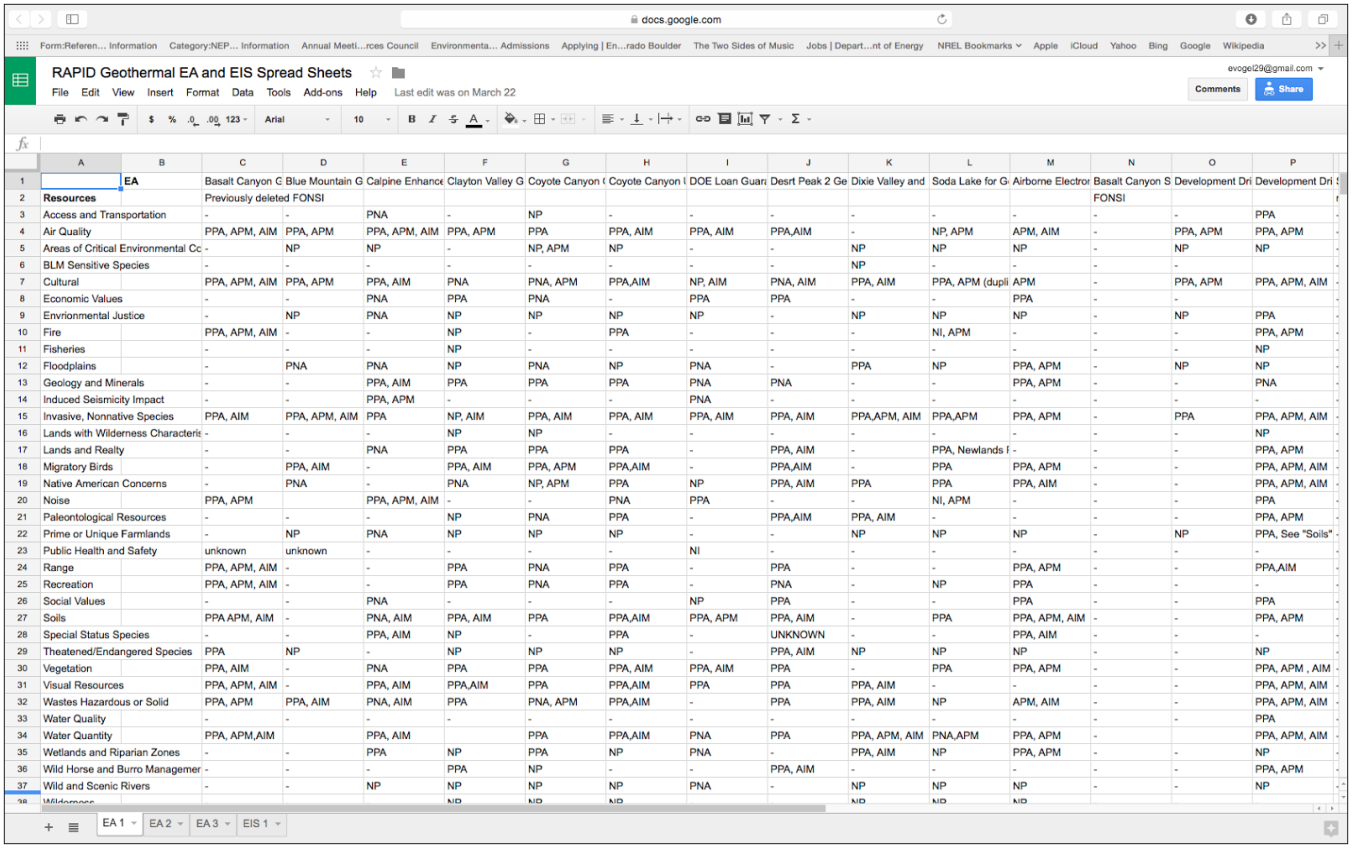


Figure 1. This process explains how to access the NEPA Database from the RAPID "Tools" page. To access the "Tools" page, go to the RAPID homepage and select "Tools" amongst the top banner categories.



RAPID Geothermal EA and EIS Spread Sheets

	EA	Basalt Canyon G	Blue Mountain G	Calpine Enhance	Clayton Valley G	Coyote Canyon (	Coyote Canyon I	DOE Loan Guar	Desrt Peak 2 Ge	Dixie Valley and	Soda Lake for G	Airborne Electror	Basalt Canyon S	Development Dri	Development Dri
2	**Resources**	Previously deleted	FONSI										FONSI		
3	Access and Transportation	-	-	PNA	-	NP	-	-	-	-	-	-	-	-	PPA
4	Air Quality	PPA, APM, AIM	PPA, APM	PPA, APM, AIM	PPA, APM	PPA	PPA, AIM	PPA, AIM	PPA,AIM	-	NP, APM	APM, AIM	-	PPA, APM	PPA, APM
5	Areas of Critical Environmental Cc	-	NP	NP	-	NP, APM	NP	-	-	NP	NP	NP	-	NP	NP
6	BLM Sensitive Species	-	-	-	-	-	-	-	-	NP	-	-	-	-	
7	Cultural	PPA, APM, AIM	PPA, APM	PPA, AIM	PNA	PNA, APM	PPA,AIM	NP, AIM	PNA, AIM	PPA, AIM	PPA, APM (dupli	APM	-	PPA, APM	PPA, APM, AIM
8	Economic Values	-	-	PNA	PPA	PNA	-	PPA	PPA	-	-	PPA	-	-	
9	Envrionmental Justice	-	NP	PNA	NP	NP	NP	NP	-	NP	NP	NP	-	NP	PPA
10	Fire	PPA, APM, AIM	-	-	NP	-	PPA	-	-	-	NI, APM	-	-	-	PPA, APM
11	Fisheries	-	-	-	NP	-	-	-	-	-	-	-	-	-	NP
12	Floodplains	-	PNA	PNA	NP	PNA	NP	PNA	-	PPA	NP	PPA, APM	-	NP	NP
13	Geology and Minerals	-	-	PPA, AIM	PPA	PPA	PPA	PNA	PNA	-	-	PPA, APM	-	-	PNA
14	Induced Seismicity Impact	-	-	PPA, APM	-	-	-	PNA	-	-	-	-	-	-	-
15	Invasive, Nonnative Species	PPA, AIM	PPA, APM, AIM	PPA	NP, AIM	PPA, AIM	PPA, AIM	PPA, AIM	PPA, AIM	PPA,APM, AIM	PPA,APM	PPA, APM	-	PPA	PPA, APM, AIM
16	Lands with Wilderness Characteris	-	-	-	NP	NP	-	-	-	-	-	-	-	-	NP
17	Lands and Realty	-	-	PNA	PPA	PPA	PPA	-	PPA, AIM	-	PPA, Newlands I	-	-	-	PPA, APM
18	Migratory Birds	-	PPA, AIM	-	PPA, AIM	PPA, APM	PPA,AIM	-	PPA,AIM	-	PPA	PPA, APM	-	-	PPA, APM, AIM
19	Native American Concerns	-	PNA	-	PNA	NP, APM	PPA	NP	PPA, AIM	PPA	PPA	PPA, AIM	-	-	PPA, APM, AIM
20	Noise	PPA, APM		PPA, APM, AIM	-	-	PNA	PPA	-	-	NI, APM	-	-	-	PPA
21	Paleontological Resources	-	-	-	NP	PNA	PPA	-	PPA,AIM	PPA, AIM	-	-	-	-	PPA, APM
22	Prime or Unique Farmlands	-	NP	PNA	NP	NP	NP	-	-	NP	NP	NP	-	NP	PPA, See "Soils"
23	Public Health and Safety	unknown	unknown	-	-	-	-	NI	-	-	-	-	-	-	-
24	Range	PPA, APM, AIM	-	-	PPA	PNA	PPA	-	PPA	-	-	PPA, APM	-	-	PPA,AIM
25	Recreation	PPA, APM, AIM	-	-	PPA	PNA	PPA	-	PNA	-	NP	PPA	-	-	-
26	Social Values	-	-	PNA	-	-	-	NP	PPA	-	-	PPA	-	-	PPA
27	Soils	PPA APM, AIM	-	PNA, AIM	PPA, AIM	PPA	PPA,AIM	PPA, APM	PPA, AIM	-	PPA	PPA, APM, AIM	-	-	PPA, APM
28	Special Status Species	-	-	PPA, AIM	NP	-	PPA	-	UNKNOWN	-	-	PPA, AIM	-	-	-
29	Theatened/Endangered Species	PPA	NP	-	NP	NP	NP	-	PPA, AIM	NP	NP	NP	-	-	NP
30	Vegetation	PPA, AIM	-	PNA	PPA	PPA	PPA, AIM	PPA, AIM	PPA	-	PPA	PPA, APM	-	-	PPA, APM , AIM
31	Visual Resources	PPA, APM, AIM	-	PPA, AIM	PPA,AIM	PPA	PPA,AIM	PPA	PPA	PPA, AIM	-	-	-	-	PPA, APM, AIM
32	Wastes Hazardous or Solid	PPA, APM	PPA, AIM	PNA, AIM	PPA	PNA, APM	PPA,AIM	-	PPA	PPA, AIM	NP	APM, AIM	-	-	PPA, APM, AIM
33	Water Quality	-	-	-	-	-	-	-	-	-	-	-	-	-	PPA
34	Water Quantity	PPA, APM,AIM		PPA, AIM		PPA	PPA,AIM	PNA	PPA	PPA, APM, AIM	PNA,APM	PPA, APM	-		PPA, APM, AIM
35	Wetlands and Riparian Zones	-	-	PPA	NP	PPA	NP	PNA	-	PPA, AIM	NP	PPA, APM	-	-	NP
36	Wild Horse and Burro Managemer	-	-	-	PPA	NP	-	-	PPA, AIM	-	-	-	-	-	PPA, APM
37	Wild and Scenic Rivers	-	-	NP	NP	NP	NP	PNA	-	NP	NP	NP	-	-	NP

Figure 2a. Resource Analysis Spreadsheet. This spreadsheet tracked which resource categories were affected in each EA in the NEPA database. NP= Not Present, PNA= Present, Not Affected, PPA=Present, Potentially Affected, APM=Applicant Proposed Mitigation, AIM=Agency Imposed Mitigation, NI=Not Indicated, "dash"= does not apply to that EA, Unknown= Missing resource data.

Resource Analysis

Resource	Not Present	Present, Not Affected	Present, Potentially Affected	Not Indicated	Comment	Applicant Proposed Mitigation	Agency Imposed Mitigation
Air Quality			✔			✔	
Areas of Critical Environmental Concern	✔				The proposed project is not located in or near any ACECs (BLM WFO 2002).		
Cultural Resources			✔			✔	
Environmental Justice	✔				There are no environmental justice issues associated with the project (BLM WFO 2002).		
Floodplains		✔			The proposed project is not located in any FEMA–designated floodplains.		
Invasive, Nonnative Species			✔			✔	✔
Migratory Birds			✔				✔
Native American Concerns		✔					
Prime or Unique Farmlands	✔				The proposed project is not located in or near any prime or unique farmlands (BLM WFO 2002).		
Threatened and Endangered Species	✔						
Wastes Hazardous or Solid			✔				✔
Water Quality Surface and Ground			✔			✔	✔
Wetlands and Riparian Zones		✔			There is no riparian habitat within the geothermal operations area or along the transmission line corridor (Covert 2007)		
Wild and Scenic Rivers	✔				The proposed project is not located in or near any wild and scenic rivers (BLM WFO 2002).		
Wilderness	✔				The proposed project is not in or adjacent to any wilderness area (BLM WFO 2002).		
Geology and Minerals			✔				
Soils			✔			✔	

Figure 2b. Resource Analysis Chart. Click on the check marks in the two columns on the right to access the individual resource category overview pages with impacts and mitigation measures.

affected in that specific project (Figure 1). Altogether, within these 62 EAs, there were 43 affected resource categories identified to research and synthesize into overview pages. This number decreased to 37, as some categories overlapped or did not apply to these EAs.

Excel spreadsheets tracked which resources had "agency imposed" and/or "agency proposed" mitigation. EA titles were on the rows and each of the resource categories were in the columns (Figure 2a). The primary information source for writing the new impacts and mitigation pages came from the "Resource Analysis" chart. Click on the check marks under "agency imposed" and "agency proposed" columns to read impacts and mitigation measures for that specific project. This information was copy and pasted into a Word document to record research (Figure 2b). Additional research for other sections was conducted through literature reviews such as federal government and non-profit websites, journal articles, or peer reviewed papers.

The first resource impacts and mitigation page format included an "Overview" section, a table stating "Common Problems and Solutions" section, and a section including any additional "factors affecting" the resource category. Later, this format changed from a "common problems and solutions" table to an "impacts and mitigation measures" section that was either bulleted or in paragraph form.

In new Word documents, each "Overview" section typically began with relevant legislation explaining what is protected, which federal agency sets standards, and what actions are prohibited or strictly regulated. Each "Impacts and Mitigations" section started with an overview sentence and then synthesized information about how to decrease land, water, or wildlife degradation. The "Factors Affecting" section typically included supplementary information that wasn't policy or construction related. This section was only featured in eight pages. It highlighted subjects such as best land management practices, cultural significance, or additional statutes.

When each draft was completed, either SEAC's legal and regulatory analyst or a law student intern reviewed it. Each revision and edit was tracked in the "markup" version in Microsoft Word. Some revisions and edits took more time than others. The research, draft, revise, and edit routine was repeated 37 times.

When the resource category final drafts were completed, SEAC's OpenEI development team developed a template to input each category's content on its own page and include a sidebar query displaying relevant EA documents. To get to a final product, the resources were uploaded using the "Edit with form" function at the top of each category page.

The text was inserted into the correct text box and saved (Figure 3). From the NEPA Database, these pages can be located by clicking on any of the resource categories found in the "Resource Analysis" charts on any of the geothermal EA pages mentioned before (Figure 4). Reference pages were created for each literature review by going to RAPID's reference library and first searching the database to see if the reference already exists. If it did, it was easy to copy and paste the reference URL. If it wasn't, a series of questions gathered information about it and a short abstract was written about the source. To add in text citations, double brackets "[[ ]]" were placed around the reference's title when the "Edit with form" page was open (Figure 5).

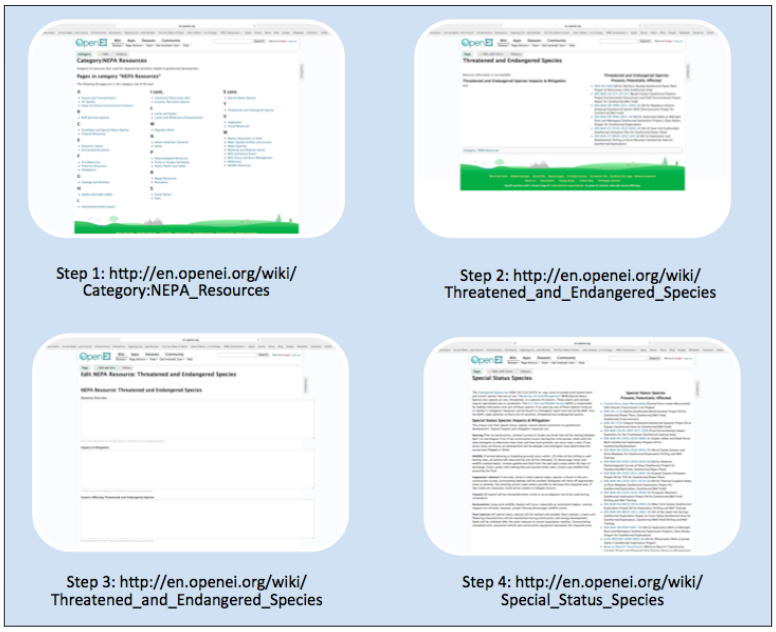


Figure 3. Steps to uploading the impacts and mitigations overview pages.

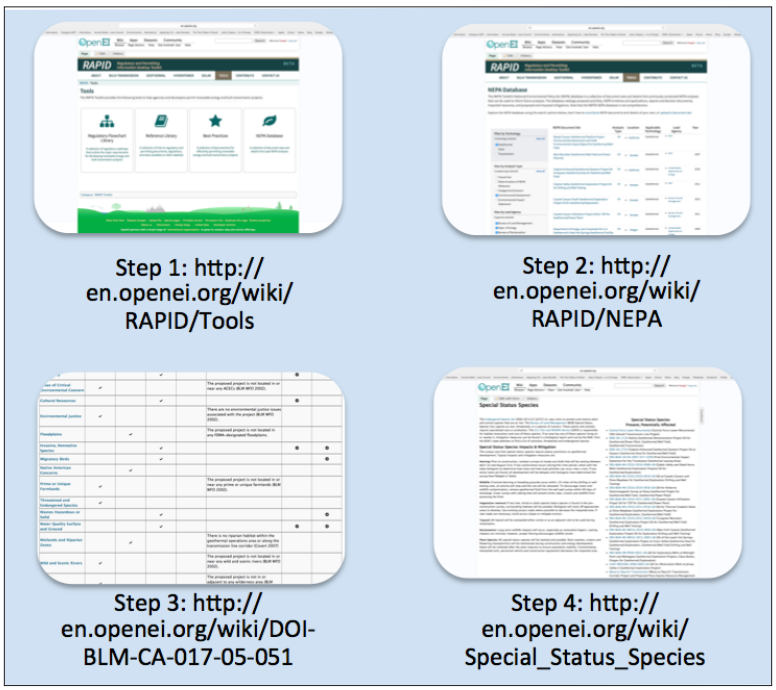


Figure 4. Steps to access the impacts and mitigation overview pages as a user. "Resource Analysis" charts are located on each EA webpage. From this chart, the new impacts and mitigation measures can be accessed by clicking on the check marks in the "Resource Analysis" chart in Step 3. See Figure 2b for more information.

Outcomes and Discussion

Since this was a pilot project for the RAPID Toolkit, content and formatting was open for discussion. Each resource category is not dependent on one another; therefore, standardizing the content was more difficult than intended. At first, drafts included how resource categories affected the geothermal sites, however, through discussions, drafts evolved to explain which actions during geothermal construction and development affect each resource category and how to decrease those impacts. The time allotted for this project was 16 weeks, however, 37 resource pages were completed within approximately nine weeks. This included researching, drafting, revising, editing, template development and uploading content. The only underestimated project element was the website template since it was projected to be ready at the end of March, but was completed mid-April.

Methodologies that contributed to best practices were staying organized and tracking all document changes. During the research phases, keeping strict reference logs simplified the uploading process at the end of the project. This eliminated website backlogging and inaccurate citations. Keeping research documents and drafts separate also aided the writing and compilation project phases, especially when there were several research pages to sort through. This eliminated content overlap and decreased drafting times. During the drafting phases, tracking each edit and revision clarified deleted content, further questions, and recommendations.

Similarities amongst interrelated topics were observed. Often times different projects would state similar mitigation measures identified through previous "best practices" methods or agency standards because processes are dependent on each other. Topics included noise and dust abatement techniques, erosion control methods, water runoff diversion, road leveling and slope cutting, hazardous waste disposal, water use, safety preparedness plans, water quality, fire prevention plans, reclamation efforts, and cultural considerations. However, Special Status Species, Endangered and Threatened Species standards were more difficult to identify without trained professional expertise. There was ambiguity amongst acceptable plant and ani-

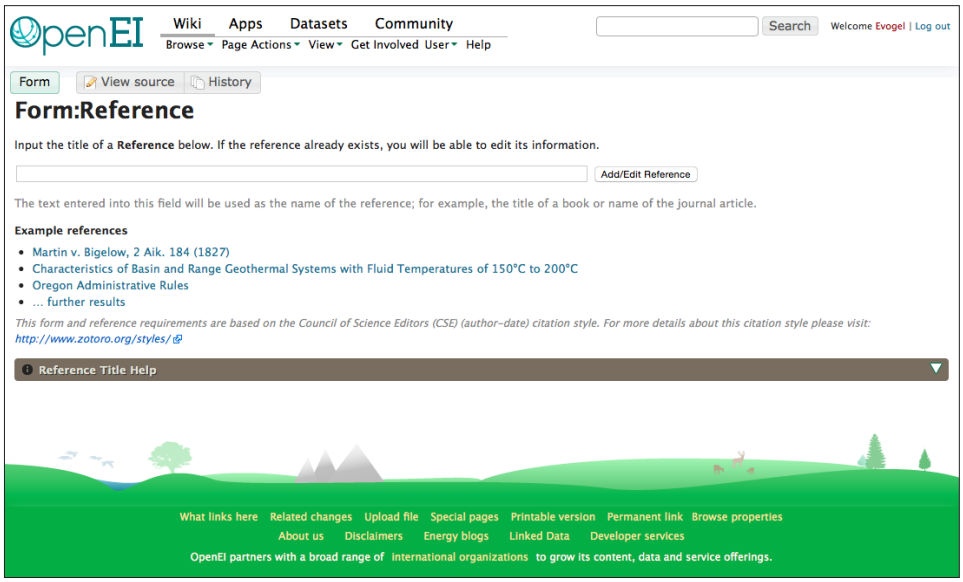


Figure 5. Reference Form. This figure shows the first step in searching for existing references and creating new ones. If the reference exists, the user will be directed to pages that contain the reference. If the reference does not exist, then no results will display. Create a title and click "add reference". A series of questions will display on the page to sort the reference correctly.

mal interactions, development actions, restoration responsibilities, and displacement. There were also gaps in identifying impacts to fisheries since several EA sites did not occur near fisheries. Literature reviews revealed potential long-term impacts to water temperature, however, these impacts were not likely since standards require discharged water to be properly cooled.

The BLM, USFS and the DOE were the three main agencies that funded and/or regulated projects. Some EAs mentioned specific standards set by the regulating agency. The BLM typically stated more explicit, quantitative standards than the USFS and the DOE. This is contingent with the BLM's mission to carry out sustainable yield and mandate multiple-use on public lands.

Four project outcomes include increasing agency transparency to public sources, giving federal regulators and land developers a tool to take proactive steps towards shorter project timelines, providing other RAPID technologies with templates, and providing examples to agency offices that have limited experience or resources. Public sources can now view project bottlenecks and understand why project timelines are often ambiguous and untimely. Longer production cycles and goals to have a reliable resource supply incentivize land developers to shorten the construction phase. The EA document collection in the NEPA database guides inexperienced personnel at BLM or USFS agency offices review initial EAs and provide quality recommendations. These documents exemplify EA formatting, appropriate scope, agency standards, and credible sources. Private and public industry look to these agencies to provide detailed "agency imposed mitigation" recommendations to include area specific land and resource impacts and exploration techniques before submitting the final EA. Geothermal was the first technology that the impacts and mitigation measures were added to in RAPID's NEPA database. This project was completed with no money from the budget, therefore when money becomes available, the RAPID Toolkit will include impacts and mitigation measures for each technology.

Conclusion

Adding 37 resource category impacts and mitigations aids the geothermal energy sector in taking a proactive approach to NEPA's overall processes. While the immediate future does not predict combining CX, CU and EAs to streamline NEPA, giving federal regulators and land developers the tools to be prepared with appropriate mitigation measures can decrease permit approval timelines.

Within the Fiscal Year 17 (FY17), plans to continue developing the RAPID Toolkit include completing the transmission regulatory flowchart library to contain information for all 50 states, Canada and Mexico; and contributing to the hydropower sector. Hydropower sections may include a NEPA Database, best practices, and additions to the regulatory flowchart library. Beyond FY17, wind regulatory information could be added to complete the RAPID Toolkit. Addressing all major renewable energy sectors increases the RAPID Toolkit's effectiveness, as it aims to encourage agency collaboration.

References

Young, Katherine, K. Witherbee, A. Levine, A. Keller, J. Balu, and M. Bennett, 2014. "Geothermal Permitting and NEPA Timelines," Geothermal Resource Council Transactions, v. 38, p. 893-904