Geothermal Resources Council
Results From Website Analysis
January 29th, 2019


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I. Introduction

Clearspace Creative was tasked with auditing the Geothermal Resources Council (GRC) family of sites and proposing an approach to redesigning those sites. To that end, this report will examine what works and what doesn’t in the following areas:

1. **Structure**: how the sites are organized, and in what way content is accessed.
2. **Design**: the visual presentation of site elements.
3. **Security**: maintaining the integrity of the site itself, and the information users have entrusted to it.
4. **Accessibility**: to what degree the sites are usable by differently-abled visitors.
5. **Administration**: how content is managed on the site.
6. **Mobile**: considerations for users viewing the sites on phones, tablets, etc.
7. **Search Engine Optimization (SEO)**: configuring the site to have a better chance of being ranked highly by search engines.

We will then suggest a phased plan for tackling our recommendations. Taken in total, this information can be used to solicit proposals for completing the work.

Ultimately, the questions that should drive any future development of a new GRC site are: *Why should people visit the site?*, and *What should they do while they are visiting?* Those answers are key to how the site should be organized and presented. For the purposes of this document, let’s assume that:

- **People visit the site to easily discover information they want about geothermal energy and activities (meetings, workshops, etc.); and**
- **While they are at the site, we would like them to become members and/or donate to the GRC, and follow one or more social media channels.**

Over the past year (December 1, 2017 to December 1, 2018), geothermal.org's bounce rate—the percentage of users who arrived at a single page and left before interacting with it—hovered steadily around 80%. The bounce rate for geothermal-library.org was lower, around 50%, but it also had a much smaller number of pageviews. (Analytics data does not appear to be available for my.geothermal.org.)

We believe that implementing the recommendations in this report will increase both the number of site visitors and the amount of interaction they have, thus improving the chance to succeed at the goals stated above.
II. Site Structure

Currently, all GRC content is spread over several sites:

- the primary domain, geothermal.org (Figure 1);
- the membership site, my.geothermal.org (Figure 2);
- the document library, geothermal-library.org (Figure 3); and
- a news/blog site hosted at blogspot.com (Figure 4).
Our first recommendation is to merge these sites into one. The following examples showcase issues that this action will help resolve. We’ll then present a new site map that can serve as a starting point for moving forward.

Information Overload

The site map (Figure 5), shows all of the links within and between the GRC sites. It illustrates how overwhelming the amount and distribution of information is. Many users will have to leave whichever site they arrived at to go to a different one. Further, they will sometimes be taken to that different site in a new tab, and sometimes they won’t. All of this together can make it very difficult for a user to find what they need.

![Figure 5. Map of current GRC site family.](image-url)
Link Inconsistency

From the Geothermal Library page at geothermal.org, there are two links that go to geothermal-library.org (FIGXX). The first is the large Geothermal Library button; clicking it opens a new tab with the library home page. Further down the page there is a link to a list of all the articles in the library; this one does not open a new tab.

Figure 6. Inconsistent links to library site.

Along similar lines, the Ask the Librarian link, found at the top of every page on the library site, links back to the library page on the main GRC site, in a new tab. It’s possible, then, that a user could keep clicking links between the two sites and open a frustrating number of tabs.

The easiest resolution to this would be to keep all content on one site. In any case, there should be a consistent standard to how links are handled.

Menu Navigation

All of the sites contain a large amount of information, as shown by the previously-mentioned site map (Figure 5). Most of this image is taken up with a list of all the links in the GRC site’s navigation menu. Some of these links appear in multiple places – in some cases as both primary and secondary navigation items (Figure 7), unnecessarily contributing to the overall sprawl of the content. A better solution would be to make the menu headings intuitive enough so that a visitor will just know where to click.

Figure 7. Yellow Pages link appears twice.
The primary navigation menu should be pared down to just the broadest categories. Then content should be merged and removed as much as possible to reduce/eliminate the need for secondary menu items, and thus simplify the information-finding process for users. A possible starting point for this new structure is illustrated in Figure 8, but of course the final decision should be made by GRC.

Figure 8. Proposed new site hierarchy.

Content Redundancy

Using multiple sites has also allowed content which could be maintained on a single page to appear in several places – and not match when it should. Take, for example, an events listing. The main GRC site itself has several pages that could be categorized as “Events” – Annual Meeting, Workshops, and Calendar (Figure 9). The membership site also has an Events page (Figure 10), with subheadings for both “Events List” and “Conference.”

All of these pages, across both sites, could be merged – especially considering the ones on the membership site appear out of date: no events appear in the event list, and the information in Conference is for one that already occurred (while next year’s conference info is available on the main site’s Annual Meeting page). Even if GRC wants this information on multiple places (e.g. on an Events page, and in a Calendar widget on the members page), it should be maintained in a single location so that staff members don’t need to worry about updating it more than once. (Accomplishing this will be covered in the Site Administration section.)
Figure 9. geothermal.org Calendar page.

Figure 10. my.geothermal.org Events page.
III. Site Design

“Redesign” shouldn’t be taken to mean making a site more flashy or adding a lot of bells and whistles. In the case of GRC, it would actually entail stripping a lot away. As mentioned in the previous section, the site’s navigation should be simplified – this will naturally result in a change to the menu design. The menu can also be realigned to move horizontally, to ensure that it is not growing too large and unwieldy.

There are plenty of other changes that can be made to bring the sites further in line with current web standards. First and foremost, more attention should be paid to the mobile experience; we dedicate an entire section of the report to this, below. Other design updates will naturally stem from improvements to the sites’ accessibility (also given its own section).

Overall, GRC should devise a consistent set of design standards, so that all of the sites’ elements are speaking the same language and conveying a similar feeling. As can be seen from the screenshots of the four different sites in this report’s introduction, that consistency is currently not present. The following examples speak to specific places where these new standards will apply.

Call-to-Action Buttons

Consider the three action buttons currently on the front page of geothermal.org:

They all use different fonts, colors, and shadows. While they don’t necessarily need to look exactly the same, as it stands they don’t seem to have any relationship to each other. Additionally, the “Join” button is not clear as to which community we want the user to join.

There is also no standard for where the buttons appear. But because they carry so much weight – they represent the two primary actions we want visitors to take, plus a vital source of information – they could be moved into header space that is currently being used just for the landscape photograph, and then appear on every page (making it more likely that a visitor will click on one).

“Breadcrumbs”

Breadcrumb links are often found on sites as a way for visitors to return to higher levels of navigation. In most cases they are places above the main heading for a page, and separated with some character (e.g. the greater-than symbol). On the main GRC site, however, this space is occupied by links that go back up to the home page and further down from the page a user is currently on. To avoid confusion, these downward links should either be removed, or changed to bring them into line with current standards.
Site Comparisons

For an example of how this approach looks, let’s examine screenshots from a couple of other sites. Cancer Research Institute (Figure 12) and World Science Festival (Figure 13) are both science-based and content-heavy. But they keep their home pages clear and uncluttered. Primary navigation is kept to five or six items. Both have a prominent call-to-action in the upper-right corner (Donate/Subscribe), as well as a search function (geothermal.org lacks this).

The CRI site also provides an example of the proper way to set up breadcrumbs (Figure 14): starting with the home page, and drilling down to more specific levels of navigation, stopping at the current page.
IV. Security

Being hacked is a nightmare scenario. A website being inaccessible for an extended time period, or users’ sensitive information being compromised can cost untold money and manhours. So it’s imperative to ensure all of your sites are as secure as realistically possible. Luckily, GRC has taken a strong first step by serving all of their sites securely via HTTPS, and keeping PHP up-to-date. But there are further actions that can be taken in the interest of locking everything down.

- **Security headers**: several headers can be added to HTML pages to enforce more secure behavior and prevent certain types of attacks. These include Content Security Policy (CSP), HTTP Strict Transport Security (HSTS), and X-Frame-Options (XFO).
- **Cookies**: an audit of the library site showed that session cookies (which store a user’s data during a particular browsing session) were not set securely.
- **Password policy**: Currently the membership site enforces a minimum password length of 7 characters. For additional security, this policy should also require usage of different character types (uppercase letters, special symbols, digits). Further, if the multiple GRC sites are not merged, this policy should be enacted across all of them.
- **Password security**: Passwords should never be stored in plain text on a server, and should always use a secure encryption hash (e.g. not MD5). (It appears that an old version of the library user database containing plain-text passwords is currently the server.)

Many further security policies (e.g. firewall, brute force attack prevention) can be easily enacted and configured via a content management system (CMS), as recommended in Section VI.

Using an open-source CMS like Wordpress or Drupal can also help keep your site secure. When you implement a widely-used open-source CMS you are implementing the code of tens of thousands of developers who are constantly looking for bugs and security problems. If you use a small, privately developed CMS you risk a lot more security problems, merely because you don’t have nearly as many developers devoted to keeping the software secure.
V. Accessibility

A site’s accessibility is a measure of how well it can be viewed by people with a wide range of abilities – e.g. those who might use screen readers, or are otherwise impaired. The main GRC site is currently fairly accessible, but there are still several areas that can be improved upon. Making these improvements is important because the web should be open to as many people as possible; as an added bonus, they can also help with SEO.

Semantic HTML

Ensuring that descriptive elements and attributes are used where appropriate is extremely beneficial to visitors using assistive technology (e.g., screen readers). For example, instead of just having navigation set up as an `<ul>` inside a `<div>`, it can be wrapped in a `<nav>` tag. The main content area can be broken up with `<section>` tags. All images should have alternate text listed inside the `alt` attribute.

Incidentally, this is another improvement that can be made much simpler by implementing a CMS (see Site Administration section, below). Using templates for pages takes away the need to enter the same code multiple times, and giving media the necessary attributes doesn’t require touching code at all.

Color Contrast

The colors being used across all sites should be revisited – increasing the contrast between foreground and background will improve visibility. The following screenshots all show parts from each site where the contrast is inadequate:

Interactive Focus

Another tenet of an accessible site is usability. We found that some of the sites’ content is mouse-dependent, making it impossible to access for users who might only be using a keyboard. For example, it’s not possible to navigate within the library’s advanced search feature without a mouse (i.e. you can’t tab into or through the form fields).
VI. Site Administration

Administration of the sites seems difficult and unwieldy. While content management systems (CMS) do have their drawbacks – a learning curve for users, additional overhead that can slow down a site – the ability to easily manage a large amount of data/pages usually outweighs them.

There are currently separate systems for managing all four GRC websites:

- manually editing pages for the main site;
- IMIS for the membership site;
- a custom PHP framework for the library; and
- Blogspot’s CMS for the new site.

What, then, is the alternative? Drupal (used by mlsoccer.com, many government sites, and a vast amount of large, corporate sites) is one of the most used CMSes. WordPress is another popular option. The World Science Festival site, referenced in the Site Design section, uses WordPress. Regardless of which solution is ultimately settled on, any one that is well-established will help with problems caused by not having a central system, examples of which follow.

Inconsistent Elements

We saw previously many sections of the sites where contents or elements in one place would not match where they appeared in others (e.g. navigation menu, event listings). A CMS will ensure that elements will appear on all pages they are intended to, with the same content and styling.

Search Function

As mentioned in the Site Design section, geothermal.org lacks search functionality. Using a CMS would provide this out-of-the-box, indexing all content and allowing it to be searched quickly. (Searching PDF content, from the library or other files, would be implementable via a third-party plugin.)

Foreign Language Content

In several parts of geothermal.org, secondary navigation links to the same page in a different language. With a CMS like WordPress, these translations can be kept in the backend, and will be automatically displayed to a user based on the language set in their browser.
VII. Mobile Considerations

As of 2018, around 50% of global web traffic is from mobile devices, so it’s essential that sites allow for their content to be viewed on smaller screens. This is probably GRC’s largest blind spot, and could account for only 30% of geothermal.org’s traffic originating from mobile. For both the primary and library sites, users on mobile devices are delivered the exact same experience as those on desktop computers (Figure 15), resulting in content so small as to be unreadable.

There is a mobile version of the main site located at m.geothermal.org. However, it’s not clear how it is used, as visitors on mobile devices are not automatically redirected there. In any case, having a separate domain is not necessary if you make the site responsive.

A responsive site is coded to change the layout based on a user’s screen size. As it happens, the membership site is responsive, so you can see the type of changes that happen as the display size goes from full width (Figure 2) to that of a phone screen (Figure 16). Similar changes can be seen in the small-screen versions of the Cancer Research Institute (Figure 17) and World Science Festival (Figure 18) sites, which are also responsive.
Making the site(s) more mobile-friendly is a good idea not just to serve users who might end up there on a mobile device, but also to help new users discover the site in the first place: for years Google has given greater weight in their search rankings to sites it deems to have a good mobile experience.
VIII. Search Engine Optimization (SEO)

The algorithms search engines use to determine which sites are ranked highest are extremely opaque – it’s basically impossible to manipulate your site to show up first, and anyone who promises this should be viewed skeptically (especially since attempts to rig the system are more likely to end up in having your site’s rank reduced considerably, if not completely removed from search results.

That said, there are several steps that can be taken to have your site be looked at more favorably by search engines, and therefore have a better chance ranking higher. Many of these steps are encompassed by previous sections of this report: a secure, mobile-friendly, well-structured site is much more likely to be ranked higher by major engines like Google and Bing. Further, content and metadata changes that can have a beneficial effect (discussed below) can be more easily managed with a CMS.

- **sitemap.xml and robots.txt files**: the primary GRC site does have an XML sitemap (which shows search engines how the site is structured), but no text file telling search engines (“robots”) where they should and shouldn’t index pages. The robots.txt file should also contain a pointer to the sitemap.
- **Custom 404 page**: when a user tries to access a page that doesn’t exist, they are served what’s called a 404 error. Currently the main GRC page simply uses what’s included by default with Microsoft’s web server (Figure 19).

![Server Error]

404 - File or directory not found.
The resource you are looking for might have been removed, had its name changed, or is temporarily unavailable.

Figure 19. 404 page served at geothermal.org.

This forces the user to enter another address on their own, or perhaps go to the home page to try and find what they were looking for. A customized 404 page, on the other hand, could present a list of popular links that might anticipate what the user was trying to find, and have a better chance of keeping them on the site. Additionally, by using relevant keywords on the page, it will factor into where search engines rank the site as a whole.

- **Asset caching and minification**: Caching pages, scripts, and images – especially those that aren’t changed frequently – can have a major effect on loading speed, which is an important factor in search ranking. Similar improvements can be found by minifying – that is, removing extraneous line breaks and spaces – from script files.
- **Pay-per-click (PPC) advertising**: Once the site is structured to encourage favorable search engine rankings, then running an ad campaign through a service like Google
AdWords, based on keywords GRC determines are most relevant, can help bring more traffic to the site. This traffic increase, in turn, can help further boost the site’s rank.
IX. Phased Approach

Implementing the recommendations of this report is clearly a large undertaking, and it may be preferable to execute it in steps. Here, then, is one possible way to break it into separate parts:

*Phase I: Devise new design standards and site map.* Determine what colors, fonts, etc. will be used. Also finalize how the new site will be structured – particularly with regards to the current sites being merged – and generate a new site map. A decision should also be made regarding which CMS, if any, will be used.

*Phase II: Begin generating mock-ups for geothermal.org.* Regardless of whether the sites will be merged or not, begin with the content that is currently hosted on the main site (and the news blog, if time allows). Request mock-ups of several of the most important pages (Home, Calendar, Contact, etc.)

*Phase III: Develop main site:* Once approved, implement design of mock-ups in decided-on CMS; if those meet approval, complete migration of old geothermal.org content to new site, and launch.

*Phase IV: Develop membership site.* Repeat phases II and III for member content. This will involve moving all user accounts (and the process for purchasing memberships) to the new CMS, or connecting the existing membership system via a third-party plugin or custom code. The approach taken in this phase may cause the time and cost estimate to increase.

*Phase V: Develop library site.* Repeat phases II and III for library content. A document library will be created within the new CMS, and the current library files will be migrated into it. This library will be accessible only by those given the appropriate member role in Phase IV.
X. Conclusion

With this report we have tried to present a thorough (but not overwhelming) view of where GRC’s web presence has room for improvement. Whether taken on all at once or spread out over multiple years, because of the work that needs to be done in each area we’ve covered (structure, design, accessibility, administration, mobile), our recommendation is for a complete overhaul, including the establishment of a consistent design system and merging of the many disparate sites into one. The investment of time and money to complete this will be substantial, but will also result in a much more user-friendly site that will serve its users better.