Strategic Options of Inventorying & Updating Environmental Guidance & Links

Prepared for:
National Cooperative Highway Research Program
AASHTO Standing Committee on the Environment
As part of NCHRP 25-25/Task 77

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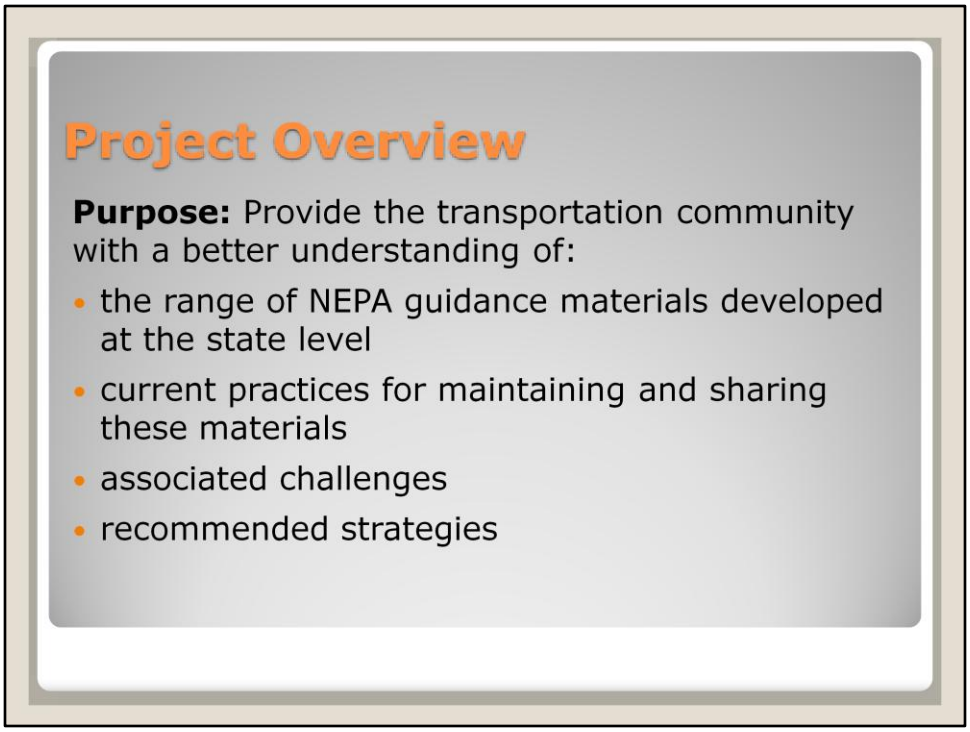
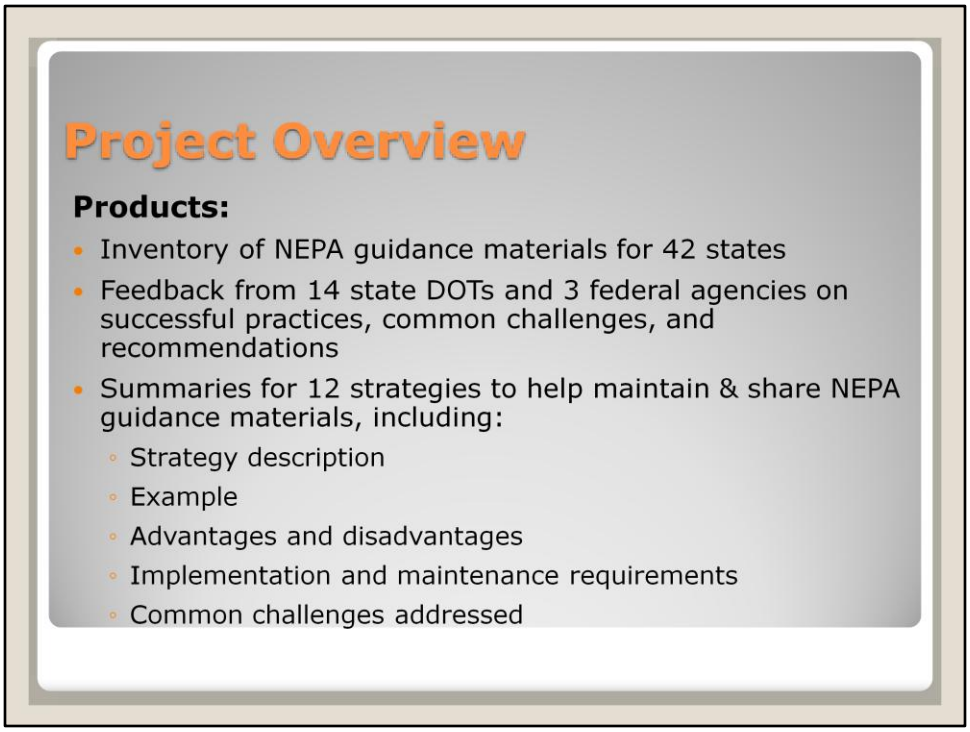
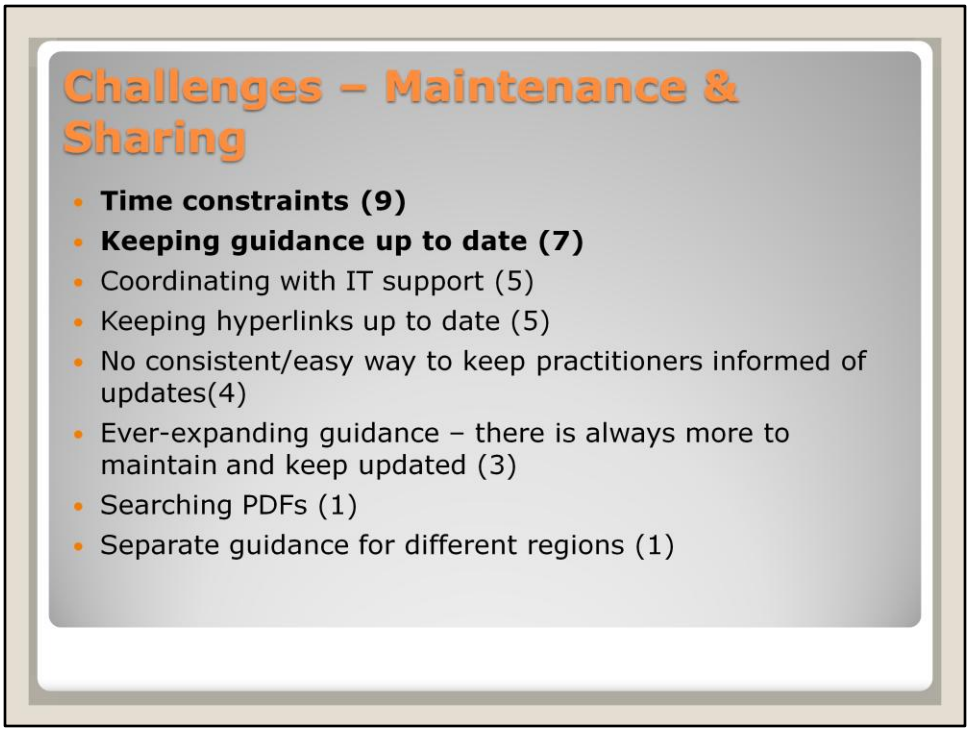


The purpose of National Cooperative Highway Research Program (NCHRP) project 25-25 Task (77) was to provide the transportation community with a better understanding of the range of NEPA guidance materials developed at the state levels, current practices for maintaining and sharing these materials, associated challenges, and recommended strategies.



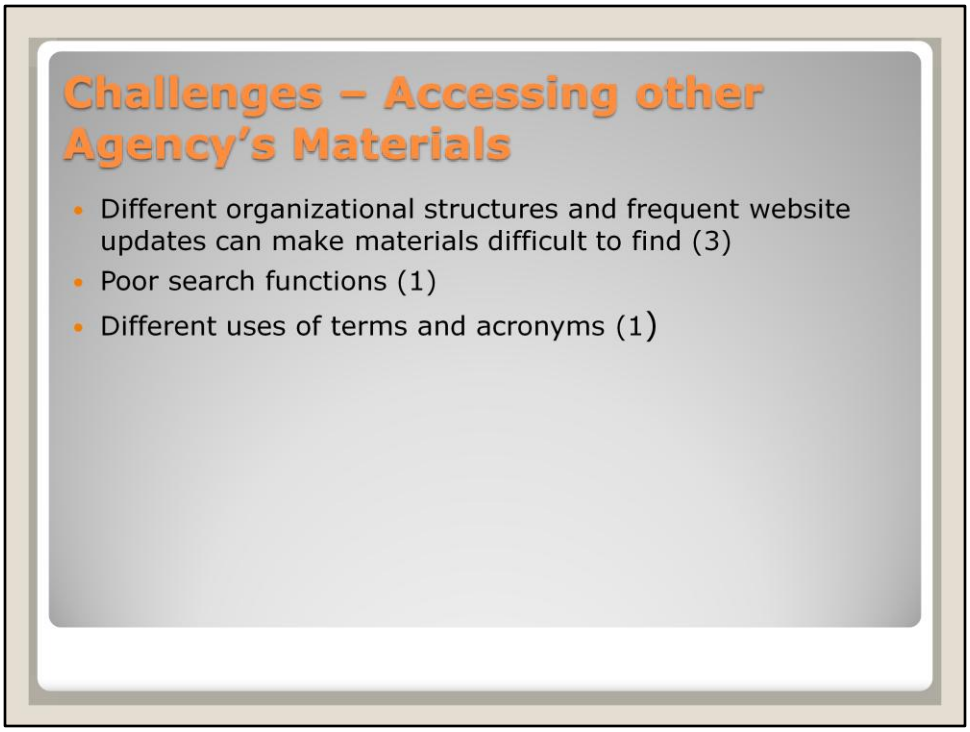
Through web-based research and outreach to state DOTs, the research team developed an inventory summarizing the topics and formats, along with URLs if applicable, of NEPA guidance materials for 42 states. The team conducted telephone interviews with NEPA materials managers and users in 14 DOTs and 3 federal agencies to identify: successful practices for maintaining and sharing NEPA guidance materials, challenges of maintaining and sharing NEPA guidance materials, and recommended strategies.

The research team identified and explored strategies to address the common challenges identified by state DOTs. This resulted in a set of 12 strategies. The strategies range in the level of effort needed to implement and maintain, the expected benefits to materials managers and users, and the challenges they address. Each strategy is described in the final project report along with an example from practice, advantages and disadvantages, the requirements for implementation and maintenance, and common challenges addressed. Summary information is provided in this presentation.



Interviewees cited several common themes related to the challenges of using, maintaining, and updating NEPA guidance materials and websites, as well as some challenges with sharing and accessing materials from other state DOTs and federal agencies websites. Challenge themes that were captured from state DOTs during the interviews are captured on the slide. The themes are ordered by the number of agencies noting the challenge, as indicated by the number included in parenthesis.

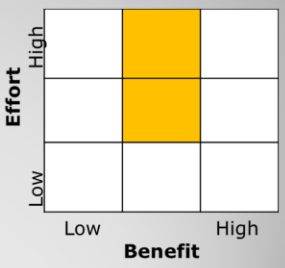
At the root of all challenges is the need for efficiency – those who manage NEPA guidance materials need to be able to make changes quicker and get the word out easily. Those who use NEPA guidance materials need to be able to find what they need more easily and stay aware of updates and changes.



Fewer challenges were expressed regarding accessing NEPA materials from other agencies, compared to the number of challenges expressed related to maintaining and updating an agency's own materials. When accessing NEPA guidance materials from other agencies, interviewees expressed some frustration with locating information or documents as a result of search functions that did not work well or the different organizational structure between DOTs. Another noted that acronyms and terms are frequently used differently, sometimes within agencies as well as in different states, increasing issues with using the search function. Information can also be difficult to find on websites that are updated on a regular basis.

Strategies: Overview

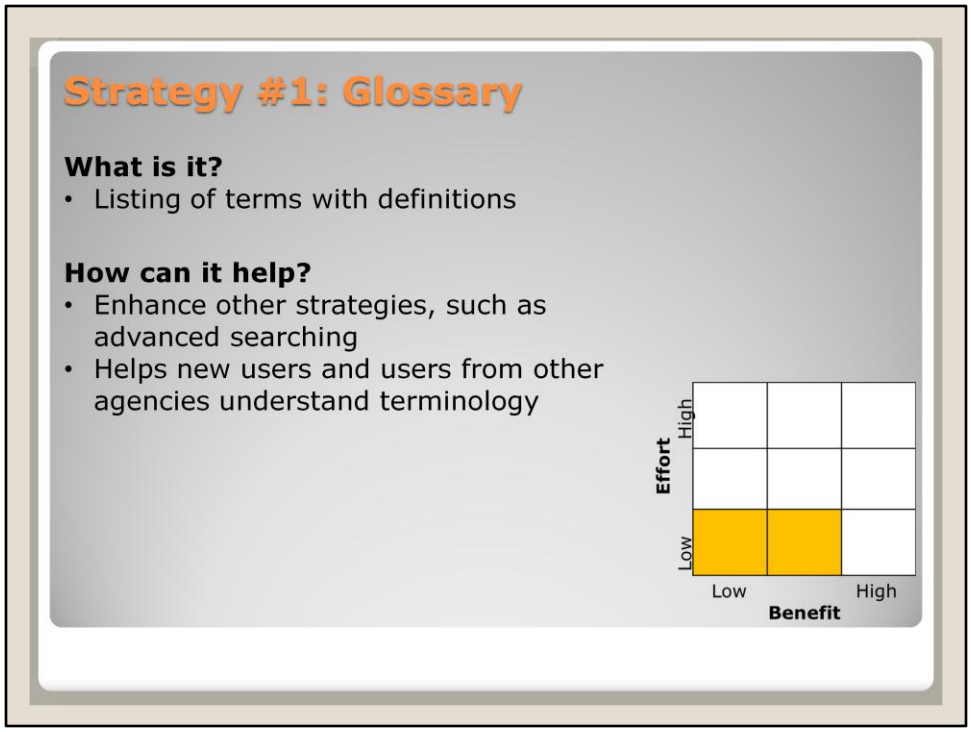
- Highlights for 12 strategies that can be used to address the challenges of sharing and maintaining NEPA guidance materials
- A qualitative depiction of the level of effort required to implement and maintain each strategy, compared to the expected benefit is provided as a guide
- Additional details for each strategy are available in the final project report



Example Effort vs. Benefit Comparison

Highlights of each of the 12 strategies are presented on the remaining slides.

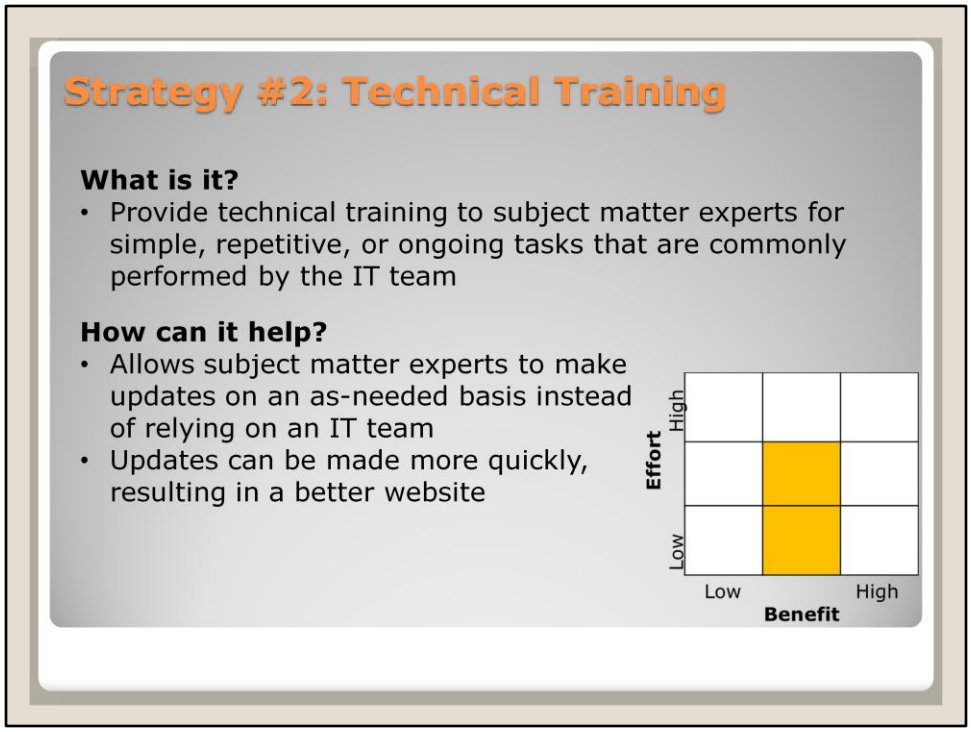
For each strategy, a high-level comparison of the overall expected benefit compared to the level of effort required to implement and maintain the strategy is provided. The final report further breaks down this summary into the effort to implement and maintain the strategy and the ability of the strategy to: (1) increase the efficiency of maintaining and sharing material, and (2) to increase the efficiency of finding material and staying current. In reality, the effort and benefit will vary according to the specific circumstances of each agency and strategy.



A simple approach to address several challenges associated with searching for information, both within an agency and across agencies, is to use a glossary or similar listing of terms with definitions. Glossaries can be incorporated in both web-based and paper-based materials. They require a minimum level of effort to develop and maintain, yet can provide a high return. To aid searching, terms in a glossary could be listed with common synonyms used by other agencies (ex., indirect effects, indirect impacts, secondary effects…). If used with web-based content, hyperlinks within content to the relevant definition in the glossary can be provided.

Developing and maintaining a glossary requires no IT support. The primary purpose is to help users understand agency-specific terminology to increase their ability to find and understand material. Terminology is often agency-specific and best defined at the DOT level.

The specific challenges addressed by this strategy are: educating new users, searching PDFs, search functions, and different terms used by different agencies.

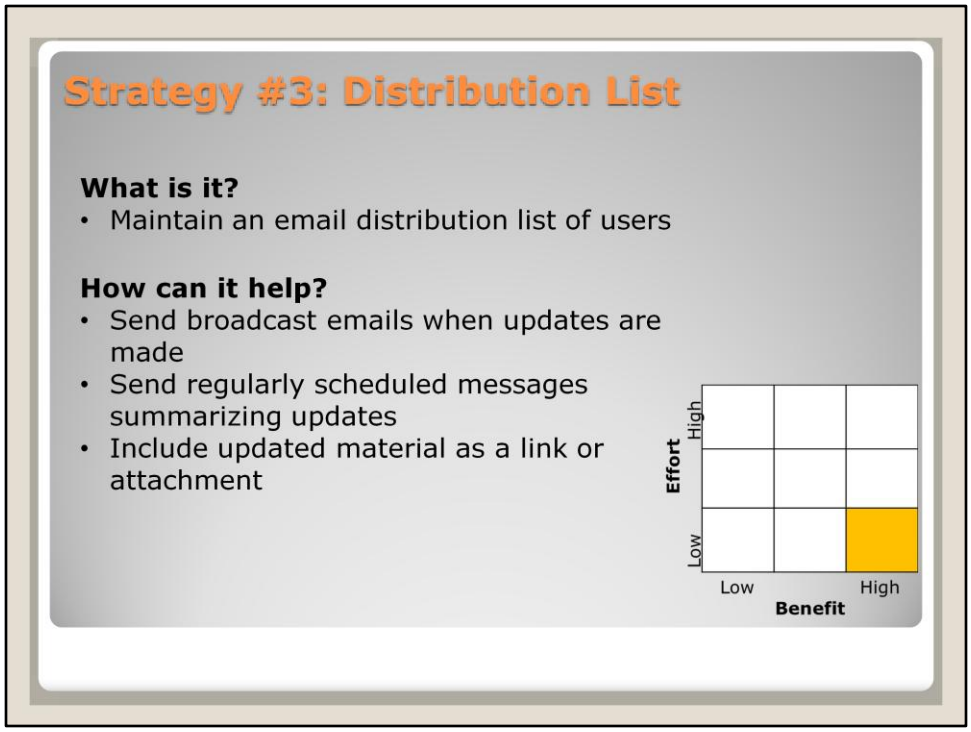


Technical training for subject matter material managers focused on simple, ongoing, or repetitive tasks typically performed by an IT expert could increase the efficiency of updating and maintaining materials.

Several of the strategies focus on IT tasks, but include work that could be accomplished by subject matter experts, not IT staff, given the right training and right existing tools. Modern web content management systems (CMS) provide easy ways for subject matter experts to update add new content, edit existing content, updated RSS feeds, and edit metadata.

It would require some level of effort to develop and initiate the training, but then could become routine. This strategy is best implemented by individual DOTs for their specific processes and software.

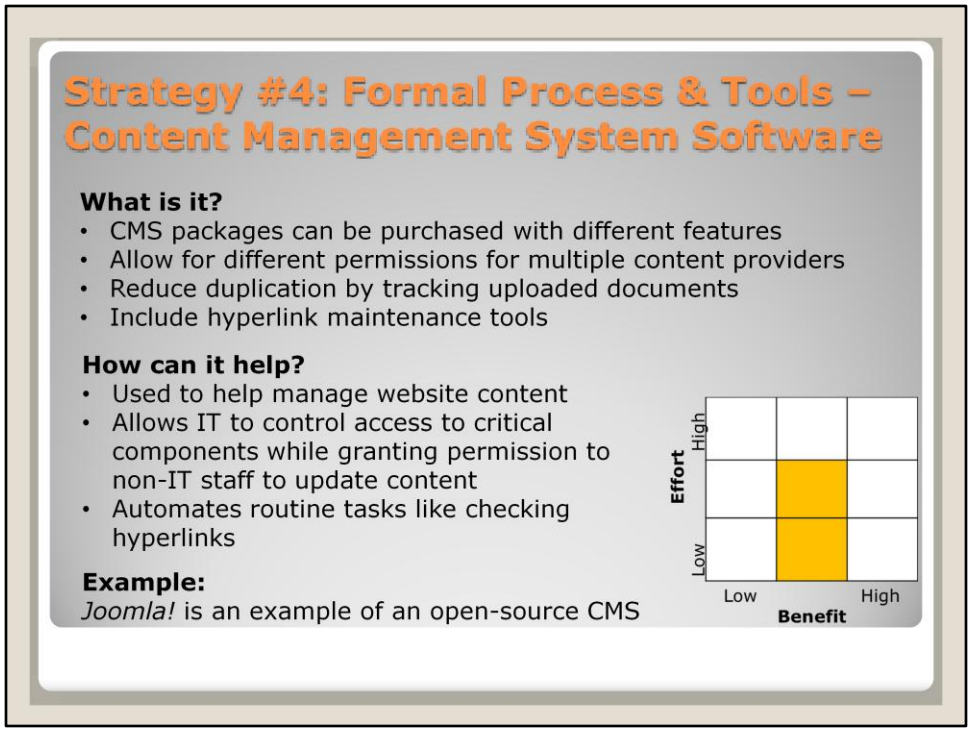
The specific challenges addressed by this strategy are: keeping guidance up to date, lack of resources, educating new users, coordinating with IT support, unfamiliar technology, and making quick updates.



One fairly simple method for informing users of updates to materials is to maintain an email distribution list of users. The distribution list can be used in a variety of ways. An agency could choose to send broadcast emails each time an update is made or send regularly scheduled messages summarizing updates.

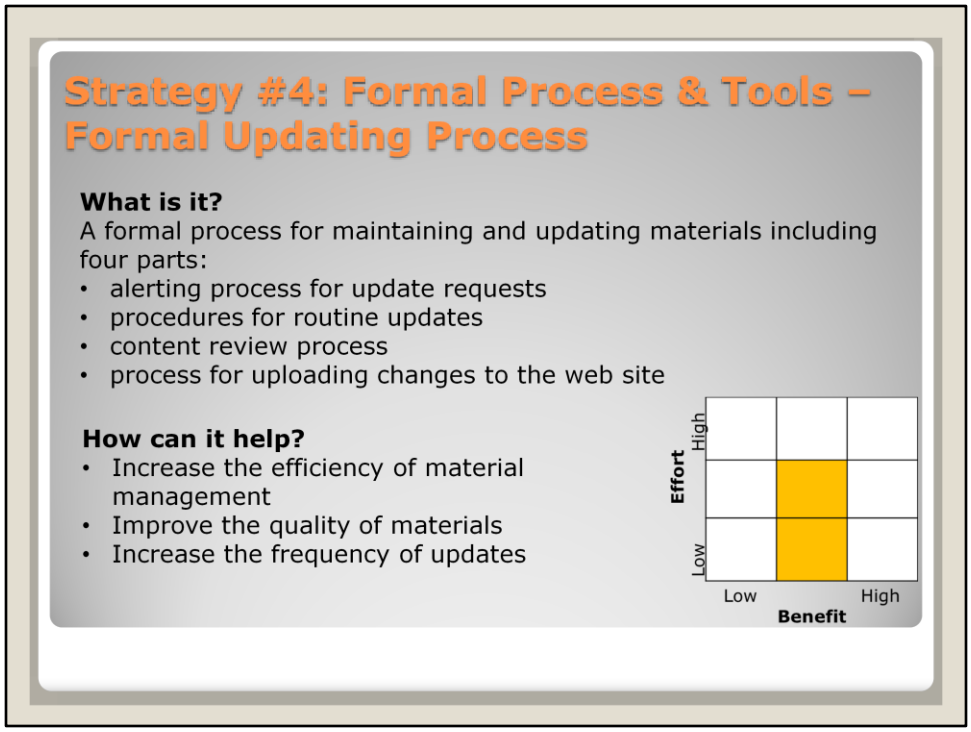
If an agency maintains their material on the Internet, the message could include a link to the updated material. If paper copies are maintained, they could be sent as an attachment.

The specific challenges addressed by this strategy are: informing users of updates and educating new users.



This strategy encompasses a range of processes and tools directed at making it easier for materials managers to keep content current. The levels of effort required to implement and maintain these processes and tools ranges – but are generally low to medium. Once in place, this strategy can increase the efficiency of maintaining and updating content.

There are many ways to maintain content on a web site. Organizations may use more sophisticated content management system software (CMS). This type of software allows for varying permission for multiple content providers, reduces duplication by tracking uploaded documents, and typically has hyperlink maintenance tools. The features and costs vary greatly across CMS software packages; integration into an enterprise-wide document management system, hosting services by the software company versus being installed on the organization's server, and more. Some examples are *Agility CMS, Cascade Server*, and *Joomla!*. A CMS solution allows IT to control access to the critical components needed to keep the web site running while granting permission to non-IT staff to update content with minimal training.



Regardless of the software being used, it is recommended that organizations establish a formal process for maintaining and updating materials that will be effective and efficient. There are four main parts of the process to develop:

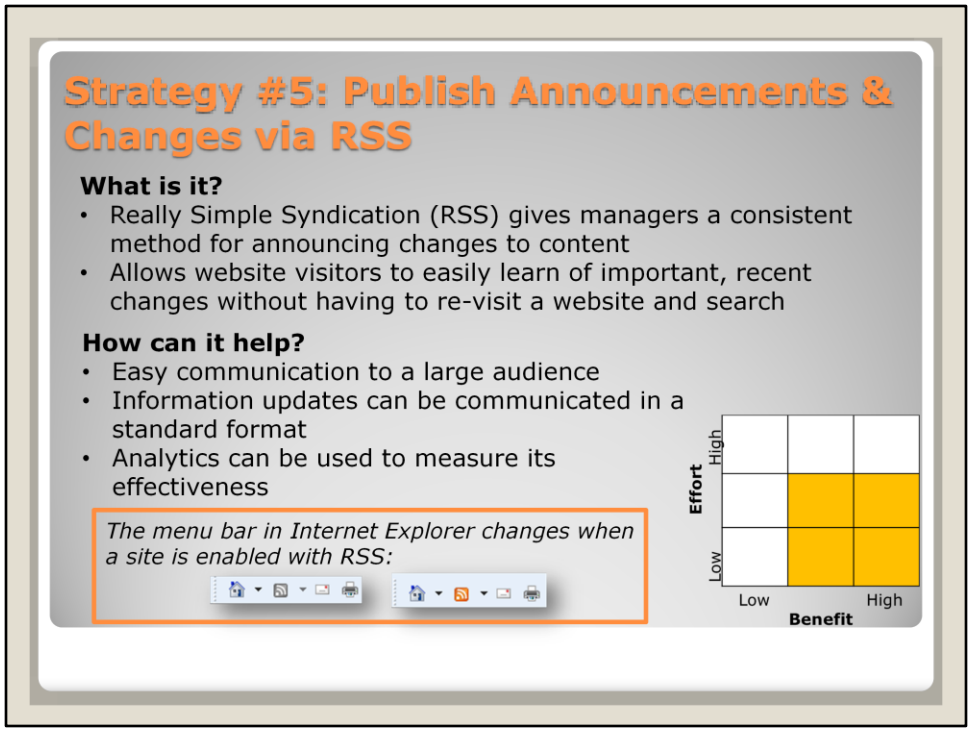
- the alerting process for update requests
- the procedures for routine updates
- the content review process
- the process for uploading changes to the web site

There are some important features or suggestions for each part:
The alerting process:

- Notification of needed updates should incorporate both feedback from organization staff as well as external users of the content.
- Notifications of needed updates from staff and external users should be reviewed, and any that will be implemented should be organized for further action.
- Another way to streamline the alerting (and updating) process is to maintain information on only one web site.

Procedures for routine updates:

- Checking links on a schedule reduces user frustration with broken link and raises their overall opinion of the web site.
- To avoid broken links, when linking to a site outside of the organization, it is often better to post a link to the page where the document is described rather than directly to the full document.
- Most web content software allows for pulling reports of browser traffic to the site and all sub-pages. This data should be reviewed regularly by a team comprised of content providers for the site (as opposed to IT staff). This may alert content



Use of Really Simple Syndication (RSS) feeds can address the challenge of keeping users of NEPA guidance materials updated when changes are made. RSS has become a web standard, giving website managers a consistent method for announcing changes to content and website visitors an easy way to learn of important, recent changes without having to constantly re-visit a website and search for updates.

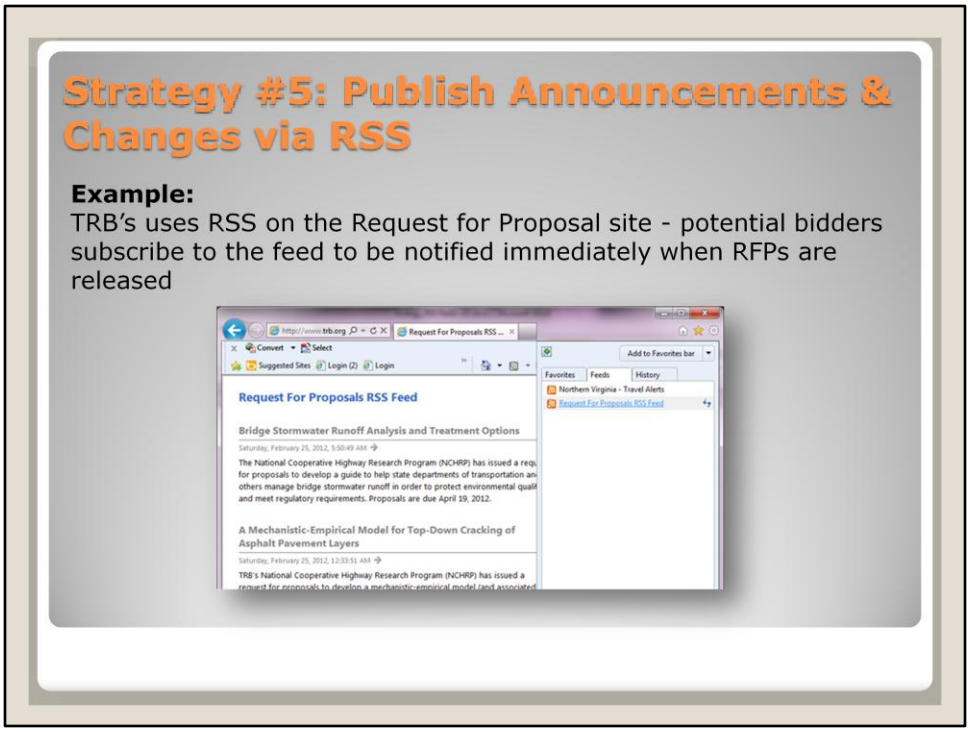
This is how it works:

1. After updating a web page, the author documents the page title, URL, date, and a brief description of the changes and sends them to the web master.
2. The web master updates the RSS file with the information on the new changes. If a sophisticated web content management system is used to build the website, the RSS feed is usually generated automatically.
3. The website visitors can subscribe to the feed.

Because it has become a web standard, RSS feeds also allow other websites and automated tools (like Google Reader) to process and understand changes to a website. It could allow enterprising application developers, a centralized clearinghouse, or aggregation websites to consolidate the feeds from multiple state DOT websites and provide a service of reporting consolidated updates to NEPA and related guidance.

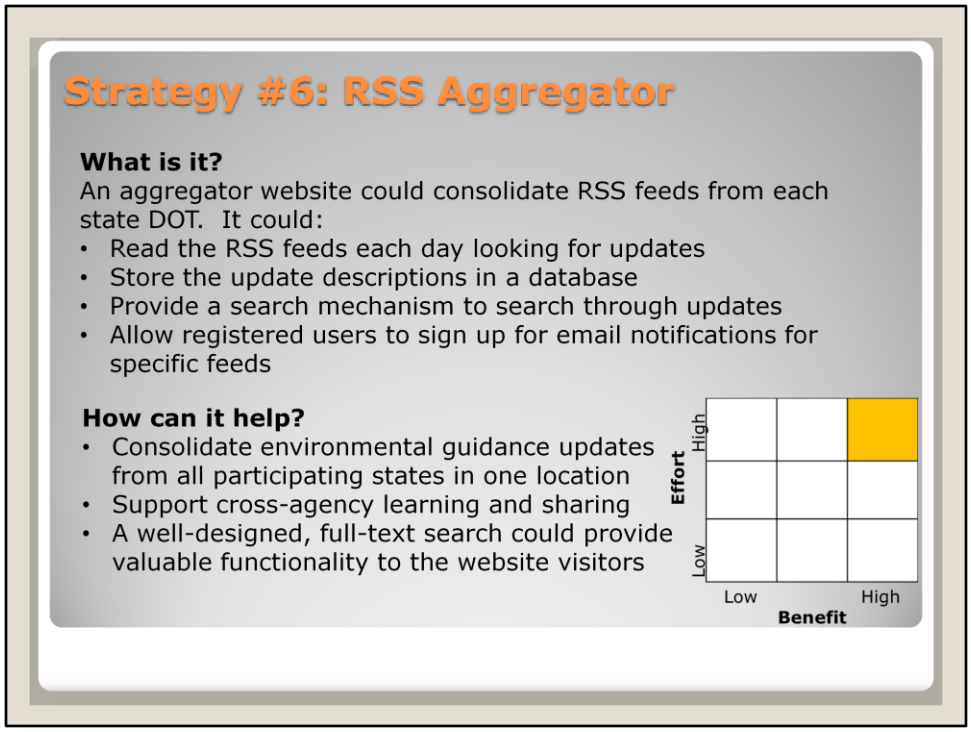
The common challenges associated with updating, maintaining, and sharing NEPA-related guidance addressed by this strategy are:

- Informing users of updates
- Difficulty finding materials online



No examples of using RSS feeds to inform practitioners of updates to NEPA guidance materials were identified through the research. However, there are several examples of how RSS feeds are being used in other ways by transportation agencies.

One example of an RSS feed is TRB's Request for Proposals (RFP) feed. Many potential bidders subscribe to the feed to be notified immediately when RFPs are released without have to constantly visit the TRB website.



If state DOTs agree to develop RSS feeds for their environmental guidance, an aggregator website could be developed to consolidate the feeds from each state DOT and provide a consistent, easy-to-use website to see the update announcements. The consolidated website could:

- Read the RSS feeds each day looking for updates
- Store the update descriptions in a database
- Provide a search mechanism to search through updates
- Allow registered users to sign up for email notifications for specific feeds

This strategy has several advantages:

- An RSS aggregator site would consolidate environment guidance updates from all participating states in one location. For people working in multi-state regions, interested in what other states are doing, or conducting applied research this could be a valuable resource.
- A well-designed, full-text search could provide valuable functionality to the website visitors.

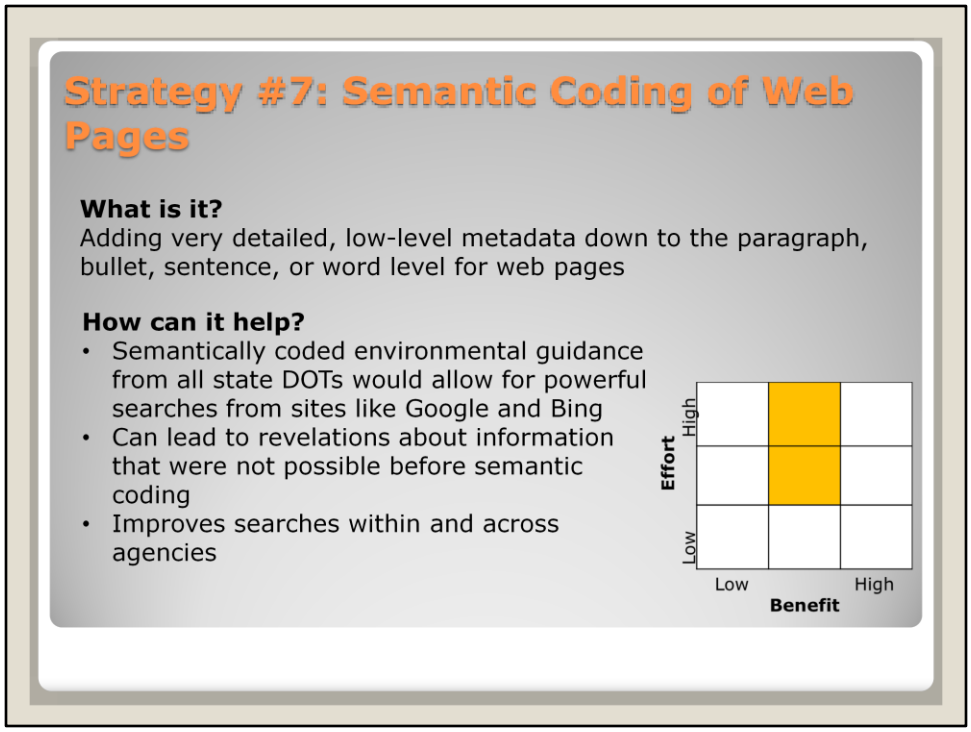
There is one major disadvantage:

- This strategy requires development of a web application, which could be costly. It also would require a website owner to be named/nominated that can maintain the site on behalf of the participating states.

The common challenges associated with updating, maintaining, and sharing NEPA-related guidance addressed by this strategy are:

- Informing users of updates
- Educating new users

A good example of an aggregator site is [Google News](). Google News scans the RSS feeds from all major news outlets (Ex: ABC News, CNN, Reuters) and consolidates the articles across the sources and groups them into news categories (Ex: World, US, Business, Sports). Google does not author any of this content, but just aggregates them from the RSS feeds of the source organizations and provides links to the articles on the source sites.



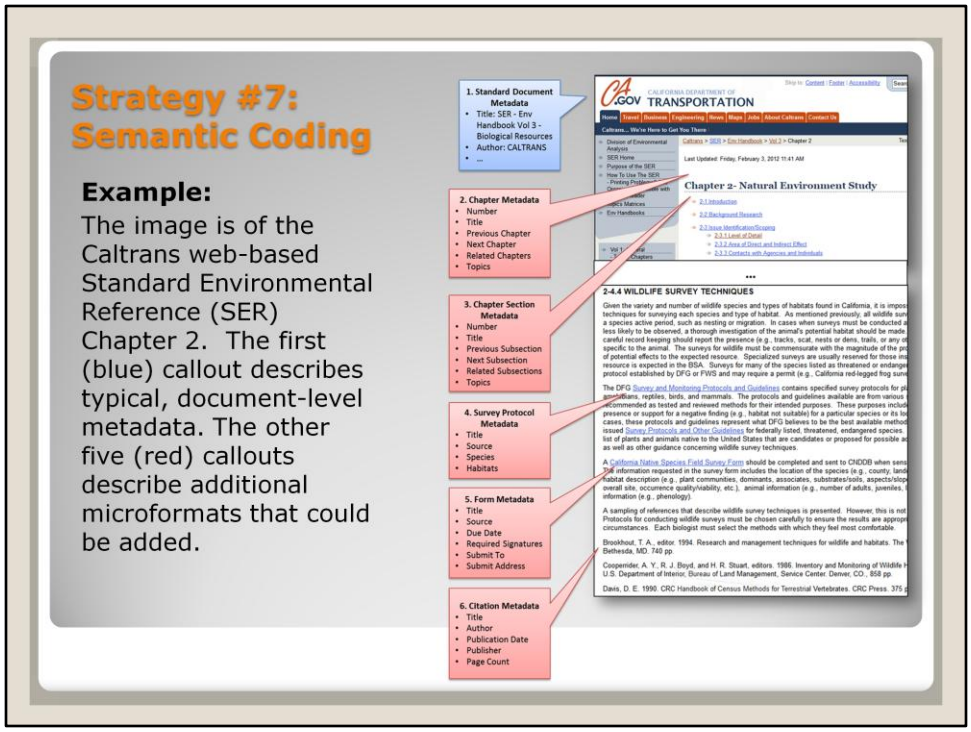
Semantic coding of web pages involves adding very detailed, low-level metadata down to the paragraph, bullet, sentence, or word level. Most of us are familiar with the concept of metadata for web pages and documents (Ex: title, author, description, keywords, source…). However, this metadata just describes the document itself, and does not describe specific information within the document. Semantic coding would apply metadata to information within the webpage. Semantic coding is often referred to as microformats because the coding describes small portions of content.

This strategy has several advantages:

- Semantically coding the web pages will allow systems and search engines to automatically digest the information and understand the context and relationships with other data on the Internet.
- This could lead to extremely powerful web searches significantly reducing the research time required by visitors.
- It could also lead to revelations about the information that were not possible to determine before the web pages were coded.

There are a few disadvantages:

- It is a significant effort to add all of the microformats to the web pages. It also could be a significant effort to update CMSs to allow authors to easily add microformats without updating HTML code.
- Complex microformats, even in industries with established data exchange standards, have not been developed yet. Developing new microformat standards could be a long and frustrating process. The established microformats are just for simple data structures like contact information, calendar events, opinions, relationships, and recipes.



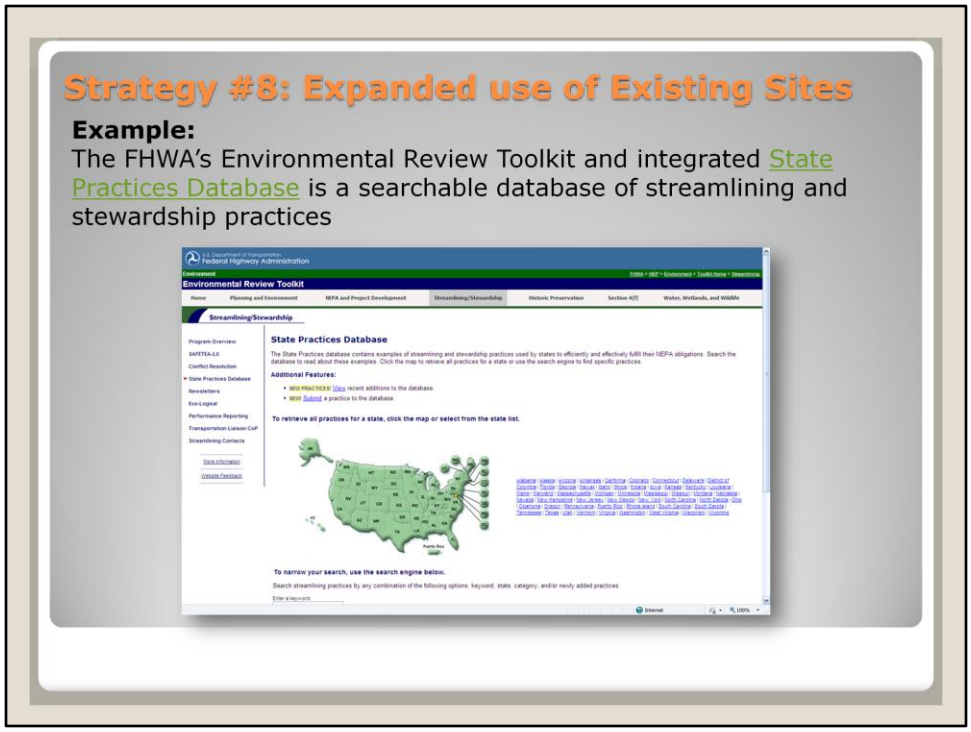
The figure is an example of semantic data that could be added to an environmental guidance web page. The image is of the Caltrans web-based Standard Environmental Reference (SER) Chapter 2. The first (blue) callout describes typical, document-level metadata that could be added to a web page. It should be noted that the actual web page does not include these metadata. The other five (red) callouts describe additional microformats that could be added to further describe the guidance and link it to other SER chapters/sections, research, and regulations

Strategy #8: Expanded Use of Existing Reference Websites

What is it?
Leverage the existing reference sites frequently visited by NEPA practitioners to promote the sharing of NEPA related guidance materials

How can it help?
- Makes use of existing infrastructure instead of reinventing the wheel
- Many practitioners are already aware of and using these sites
- Would help increase sharing of NEPA-related guidance materials and proven practices

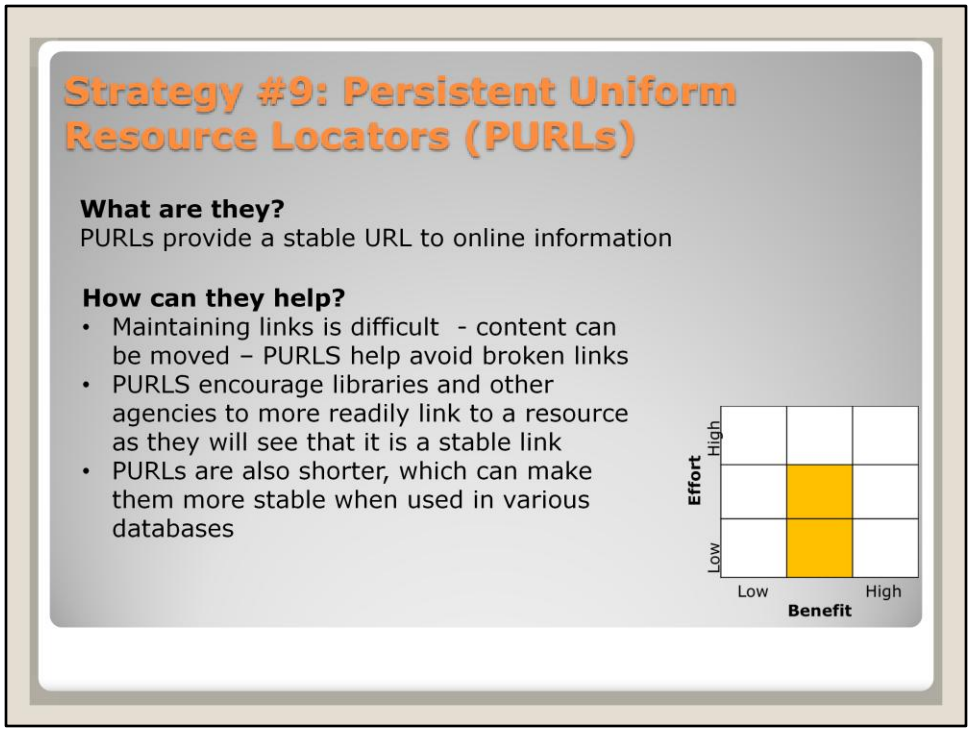
There are several existing reference sites frequently visited by NEPA practitioners in the transportation field. One strategy for promoting the sharing of NEPA related guidance materials is to leverage those existing sites. This strategy relies on the participation of state DOTs to submit material to be posted to existing reference sites and the site managers to post submitted material. Alternatively, these existing reference sites could be considered as a "home" for the RSS Aggregator strategy described separately.



One example of an existing reference website is the FHWA's Environmental Review Toolkit and integrated State Practices Database. This is a searchable database of streamlining and stewardship practices used by states to efficiently and effectively fulfill their NEPA obligations. Material in the database is submitted by DOTs, FHWA Divisions, and others and is posted by FHWA with support from Volpe National Transportation Systems Center (Volpe). The database is publicly accessible and searchable by state, key word, and category.

The benefit of integrating a solution into these existing tools is that those who work in the world of transportation and NEPA are already using them. For example, promoting the FHWA Environmental Review Toolkit site and encouraging contribution to the State Practices Database from states would help increase sharing of NEPA-related guidance materials and proven practices for doing so. In addition, FHWA's monthly newsletter is available on the toolkit site, which could improve awareness of upcoming updates and new materials.

A challenge is that it requires additional effort on the part of state DOTs to prepare and submit information to be posted. In an interview, representatives from FHWA and Volpe indicated that there is desire and capacity on their part to host additional materials in the State Practices database. All state DOTs interviewed were familiar with, and regularly use, the FHWA Environmental Review Toolkit website. However, only about half of the interviewees were aware of the State Practices Database or were only somewhat aware of it, while the other half did know about it and had submitted materials. The majority of interviewees acknowledge they currently access other state DOT or federal websites looking for NEPA-related materials and several interviewees thought it would be helpful to have one location online where links to



Maintaining links is difficult for a number of reasons. Content can be moved during web site reorganization efforts, causing link errors for both internal linking pages as well as on any external web sites that link to content. One way to address these problems is through PURLs, or persistent uniform resource locators. PURLs provide a stable URL to online information.

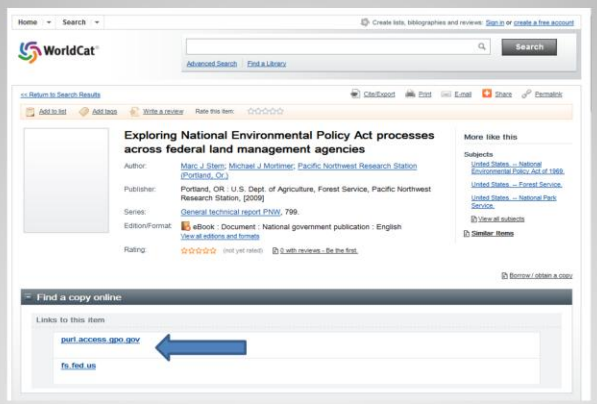
The advantages of using PURLs to provide links to documents are many. They encourage libraries and other agencies to more readily link to a resource as they will see that it is a stable link with an implied commitment to maintain access to the content. PURLs are also shorter, which can make them more stable when used in various databases which may have maximum field length restrictions. If agencies are able to take advantage of the GPO's PURL support program it will eliminate agencies' IT support to create URL resolving solutions within their own domains. State agencies will also benefit from implementing PURLs via OCLC; once the initial scripts are written, content providers can update them easily.

The common challenges associated with updating, maintaining, and sharing NEPA-related guidance addressed by this strategy are:

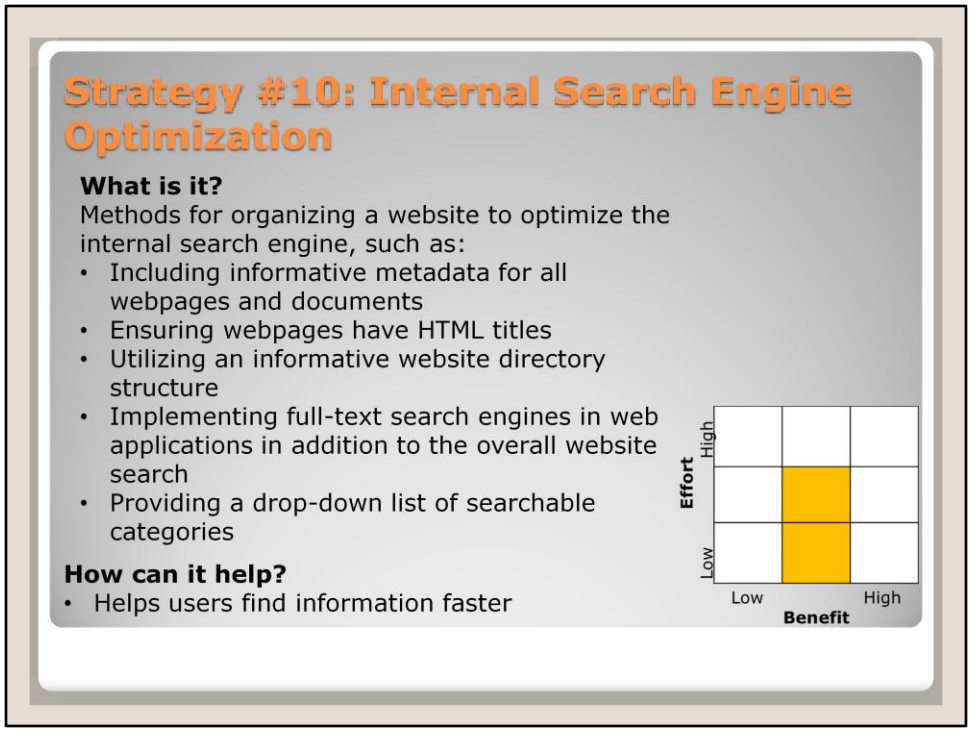
- Keeping guidance up to date, including web sites
- Search functions
- Updating hyperlinks

Strategy #9: Persistent Uniform Resource Locators

Example:
WorldCat, which searches over 10,000 libraries, uses PURLs

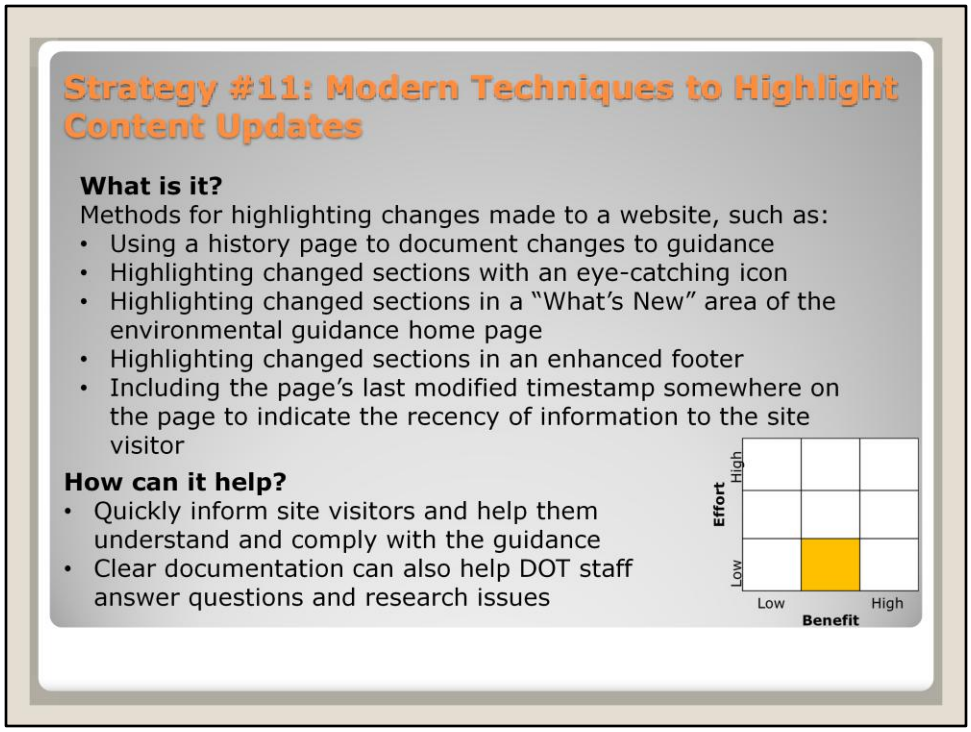


A screen shot of the PURL link used by the WorldCat library site (searches over 10,000 libraries worldwide) is shown.



Most modern websites, including those used by state DOTs to distribute environmental guidance, provide a search option to allow visitors to find webpages and documents via keywords. This functionality is powered by an internal search engine which provides two main functions: 1) crawl (or scan) the website reading every webpage and document to create a word index of all information and 2) provide a mechanism to search across that word index. This strategy addresses best practices in organizing a website to optimize the internal search engine and provide more relevant results.

- **Include informative metadata for all webpages and documents** – Each webpage/document should have standard metadata applied to help describe the content, beyond just the content of the page/document. This includes the standard metadata tags for title, author, description, keywords, and date. Adding synonyms for important keywords can help a large audience find information, even if they use non-standard terms (Ex: a visitor may use "ICE", "secondary impacts" or "indirect and cumulative effects"). States should be careful to include informative metadata, and not just copy the page title into the description and keywords fields.
- **Ensure webpages have HTML titles** – A special HTML code is used to give a webpage a title. Website authors should ensure that this field is completed properly. Search hits in the HTML title are often given more weight than search hits in the webpage body.
- **Utilize an informative website directory structure** – Organizing a website into easily understood directory structures (URLs) can allow search engines to utilize hits in the directory name to help provide context and relevancy for matches.
- Another best practice is to implement **full-text search engines in web applications** in addition to the overall website search.



Visitors who return to a website again and again, such as NEPA practitioners looking for guidance on a particular topic, will often navigate straight to what they need, without looking at a website overall to see what might be new or updated. One strategy to help raise the awareness of those using environmental guidance when there is new or updated material is to use modern website techniques to highlight changes. These techniques include:

- Having a history page to document changes to guidance
- Highlighting changed sections with an eye-catching "New" or "Updated" icon
- Highlighting changed sections in a "What's New" area of the environmental guidance home page
- Highlighting changed sections in an enhanced footer of the website
- Including the page's last modified timestamp somewhere on the page to indicate the recency of information to the site visitor

This strategy has several advantages:

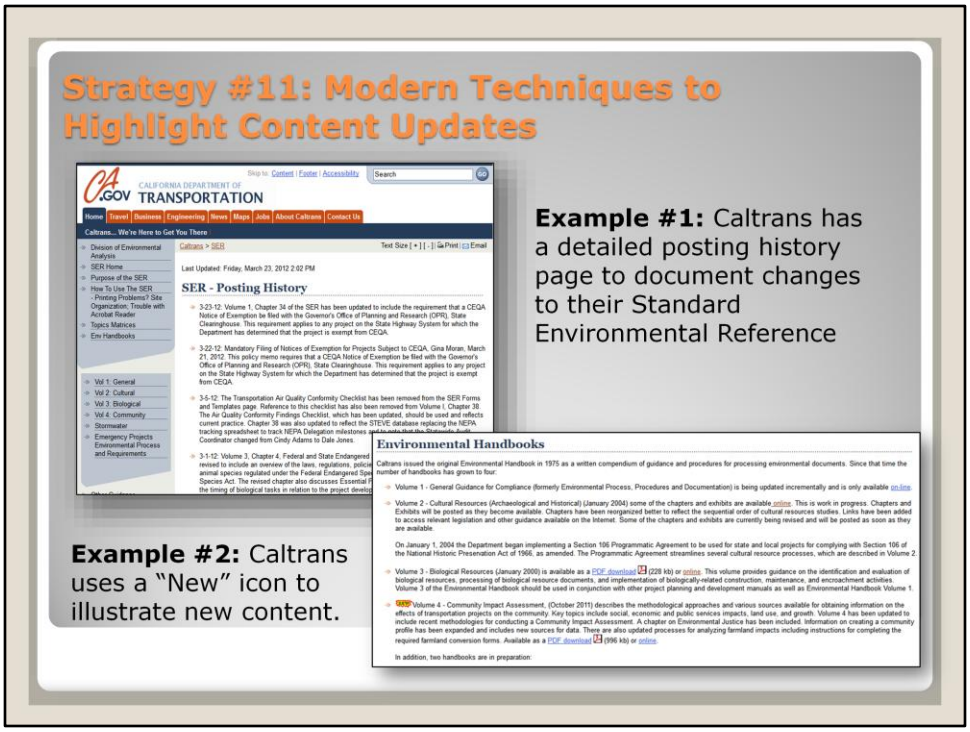
- Highlighting new information quickly informs site visitors and helps them understand and comply with the environmental guidance
- Clear documentation of guidance revisions on the website can also help DOT staff answer questions and research issues

There is one disadvantage:

- Some of the techniques may require coordination with IT support.

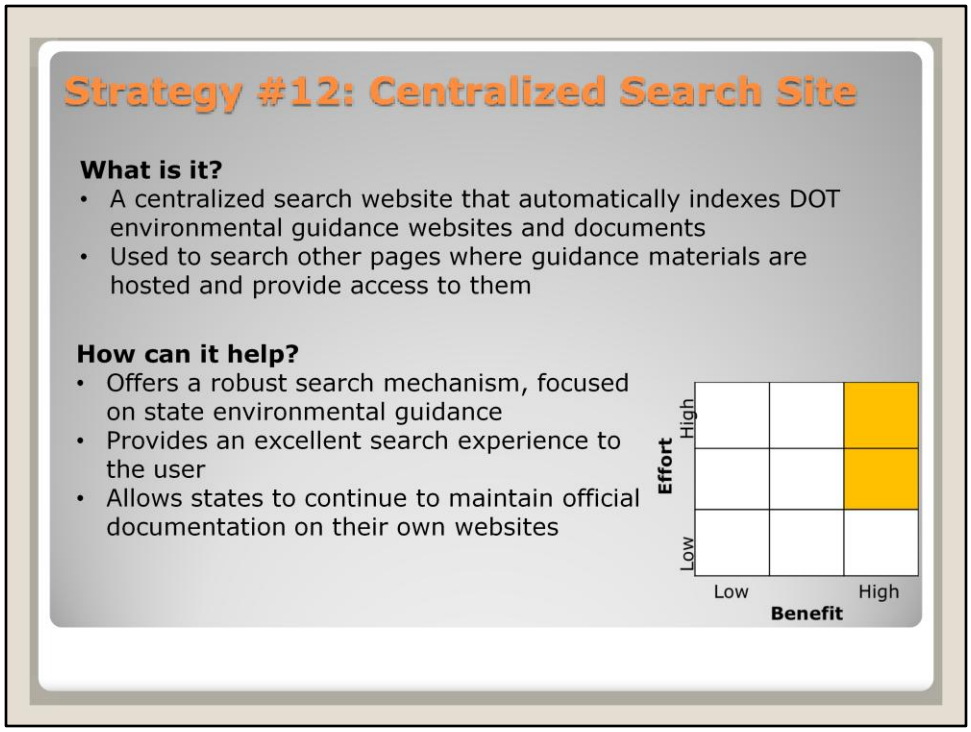
The common challenges associated with updating, maintaining, and sharing NEPA-related guidance addressed by this strategy are:

- Keeping guidance up to date, including websites



Example #1: Caltrans has a detailed posting history page to document changes to their Standard Environmental Reference

Example #2: Caltrans has a few references to updates that use a "New" icon to illustrate new content. However, DOTs should remember to remove the icon after a set period of time (like 90 days).



A centralized search website that automatically indexes (scans every page and records the location of each word like a book index) DOT environmental guidance websites and documents, could be a valuable resource for transportation practitioners. This strategy involves the development of a centralized search website that indexes environmental guidance from a set of official, registered URLs.

Note that this strategy is not a document library – no guidance materials would be hosted on the website, rather it would be used to search other pages where guidance materials are hosted and provide access to them. The search engine would implement modern techniques to provide a powerful search experience.

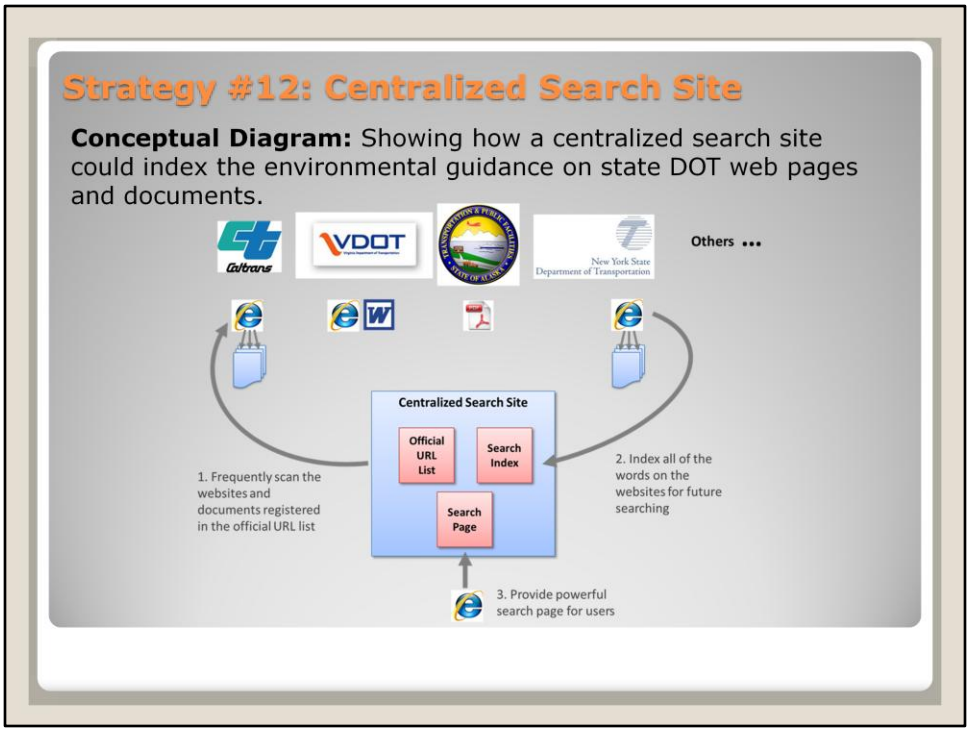
This strategy has several advantages:

- Provides a robust search mechanism to allow users to search within a state's documentation and also across states' websites
- Allows states to continue to maintain official documentation on their own websites
- Supports industry accepted synonyms to allow users to search on industry variations of the same terms (something that Google does not provide)

There are a couple of disadvantages:

- This strategy requires development of a web application, which could be costly
- It also would require a website owner to be named/nominated that can maintain the site on behalf of the participating states

The common challenges associated with updating, maintaining, and sharing NEPA-related guidance addressed by this strategy are:



The figure shows a conceptual diagram of how a centralized search site could index the environmental guidance on state DOT web pages and documents. The application could crawl the entire environmental guidance section of a state's website or target specific files on the website.