WEB
PORTAL
TEAM

Report One

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North Carolina

Department of

Environment and

Natural Resources

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I. Executive Summary

The DENR Web Portal Team reviewed the team charter and identified areas that could be addressed within the available time. The "look and feel" of the site, the need for a search engine and the state initiative to make all Web sites Americans with Disabilities Act (ADA) compliant by the end of 2001 were recognized as priorities.

DENR sites contain a wealth of information, but there is little visual or navigational consistency across the numerous departmental and divisional Web pages. Hundreds of staff members are involved in the development of pages throughout the department's Web sites, but few guidelines have been established for content or presentation. As a result, department and division Web pages are graphically inconsistent and difficult to navigate.

The Web Portal Team suggests that a more consistent approach to Web development would allow DENR and its divisions to take advantage of technologies that could make development and maintenance easier and more cost effective. It would also make implementation of a series of changes, such as applying the federally required ADA guidelines, more efficient.

The team recommends that divisions begin the process of organizing their Web development to make their sites more visitor-friendly, consistent with proposed departmental standards and ADA guidelines. The team also acknowledges that the DENR attractions, such as the N.C. Aquariums, the N.C. Museum of Natural Sciences, and the N.C. Zoological Park, have a different audience and need more latitude in the development of Web site presentation and content. These recommended guidelines are intended to achieve those goals.

In brief, this report makes three recommendations to the IRMB:

- Create a project to address the DENR Web sites' style, consistency and navigational issues, including the selection of a comprehensive search engine and web analysis tools. This project should also include modifying Web pages to make them more accessible to visitors with disabilities in accordance with the state directive.

- Establish a permanent committee or group to oversee Web and e-commerce issues.

- Resolve the apparent duplicate intent of the DENR home site functions and Customer Service Center (CSC) Web functions. Current directions seem to have them moving down parallel paths, which could result in duplicate functions and development efforts

II. Introduction

The DENR Web Portal Team was formed in fall 2000 as an IRMB (Information Resources Management Board) sub-team and charged to set a vision and goals for the department's electronic systems, to enhance internal and external communications, to enhance agency performance and to improve customer service. Given various time constraints, the team set as its primary goal proposal of a plan to develop an integrated, user-friendly Web site that effectively provides useful information and services to DENR customers.

The Web Portal Team was comprised of 15 representatives from staff involved in Web page development across DENR, including management, technical support, communications, and customer service. Environmental and natural resource divisions and DENR attractions were represented. Barbara Satler served as facilitator. The team began work as a process improvement team, but members realized that it would be more effective as a work group. The charter already defined certain directions that it wanted the team to take, so with approval from the sponsor, the team became a work group. This change is consistent with the team's goal and mission. Ed King, DENR's Web integration specialist, served as the team coordinator. A complete list of team members is given in Appendix C.

III. The DENR Web Presence

The DENR Web presence is composed of sites for the department, divisions and some programs. Businesses, local governments, educators and the public can get useful information about regulations, permits, grants, environmental education and other topics. Many divisions have shown a great deal of initiative in setting up Web sites and are to be commended for having a Web presence at all given the limited resources for Web development.

Team members agreed that the site as a whole lacks cohesiveness and consistency. Navigational structure, graphics and content presentation vary greatly among the various DENR divisions. The Team's examination of the DENR Web presence revealed the following characteristics:

- The sites that compose the DENR Web presence are developed independently and reside on many different platforms. Several different tool sets are being used for both development and infrastructure, which makes sharing Web expertise difficult.
- There is little guidance related to Web development and often there appears to be no organizational knowledge that Web sites are being developed.
- Site visitors must understand something about DENR's organizational structure in order to find desired content. This negative effect on site visitors is probably the most notable result of the current situation.
- The lack of standardization makes it difficult to use technologies such as cascading style sheets and data-driven development that would facilitate both site development and maintenance. Most pages on the DENR sites are built in a way that increases required maintenance.
- Processes to keep the content current are also lacking. Sites created and maintained by some divisions are very large and are maintained by many different parts of the division making this issue especially difficult.
- Divisions have expressed a need for dedicated Web staff. Yet, the way DENR develops for the Web prevents it from taking advantage of tools and technologies that would help to reduce maintenance and development tasks. The number of staff developing html for the Web in addition to their designated work assignments probably numbers in the hundreds. Lack of full-time Web staff, coupled with the lack of standardization, increases the number of hours currently spent maintaining DENR's Web presence.

The team's challenge was to develop initial guidelines and standards to begin addressing these issues. The state directive to make all Web sites compliant with the Americans with Disabilities Act (ADA) compliant by the end of 2001 complicates this process. The distributed and diverse nature of the DENR sites makes it very difficult to apply common changes to all the sites.

IV. Delivering a solution

The team charter (http://www.admin.enr.state.nc.us/its/pdf/webcharter.pdf) charged the team to address six areas related to e-commerce and the Web:

1. Provide advice,
2. Develop guidelines,
3. Develop policies and procedures,
4. Develop standards,
5. Identify strategies and opportunities, and
6. Identify and resolve issues.

Because management requested that the team complete some of the charter deliverables by the end of 2000, the team gave highest priority to items that directly affect the site visitor. These items are listed below. Other DENR or state government teams are considering many of the other deliverables such as e-commerce, security issues and one-stop permitting.

High Priority
- user-friendly navigation
- "look and feel" consistency
- portal concept
- access and delivery standards
- site development/oversight
- develop comprehensive search feature
- site management resources and infrastructure

Medium Priority
- site management systems
- Web publishing and E-commerce tools
- Web hardware and software
- Identify issues concerning database connectivity and Web packages
- Identify issues surrounding servers and security

Low Priority
- develop one-stop location for common business processes
- multimedia Web implementation
- E-forms standards
- develop strategy for multi-platform Web technology infrastructure
- identify E-commerce strategies
- identify electronic signature strategies
- identify departmental opportunities for E-commerce
- investigate external Web relations opportunities with other state agencies
- identify E-commerce security issues
- identify electronic workflow processing issues

Team members' business experience and analysis of DENR Web sites indicate that the most frequent visitors are:

- General public,
- small and medium businesses,
- students (K-12),
- DENR employees,
- teachers,
- state/local governments,
- tourists and
- media.

Users want a variety of information, including data, services, forms/applications, entertainment and answers to questions. Some want information about regulations, career opportunities or directions to DENR offices. They also want contact information so they can use the Web site to communicate with DENR. Customers need information in a clear, easy-to-use presentation that is timely, accurate and consistent.

Because of management's desire to create a DENR Web portal, as identified in the charter, the team followed the state portal as a model (http://www.ncgov.com). To complete the work in a timely manner, two subteams were formed to research graphic identify (site "look and feel") and search engine issues. The subteams presented their results to the full team for discussion and consensus.

V. Recommendations

1. The Information Resources Management Board (IRMB) should develop a project to:

Restructure the DENR and division homepages' navigation to make it more user-friendly using a portal and intentions-based approach (V.1, below)

Modify the sites to conform to the state's accessibility directive (V.2),

Select a comprehensive search engine for the site (V.3), and

Select a comprehensive Web analysis tool to analyze site activity at the department and division levels (V.4).

2. The team also recommends that the IRMB establish a permanent team or committee to oversee DENR Web and e-commerce activities.

3. As the team worked, many questions arose. One question that needs resolution in the near future pertains to the Customer Service Center (CSC) Web site within DENR. The CSC site was intended to provide visitors with helpful information about a variety of topics, particularly environmental permits. That is also the goal of the DENR homepage. Once the DENR Web site is redesigned for better navigation and usability, will that negate the need for the CSC site in its current form? Team members felt that the two sites should be combined in some way to avoid duplication of web-related efforts. The ultimate decision should rest with DENR management because

the issue is organizational in nature. It will require further analysis before it can be resolved.

Details of the team's recommendations are given below.

V.1 Restructure the Web pages using an intentions-based approach

A portal/intentions-based approach will make most content available in two or three clicks and will require no knowledge of the DENR organizational structure.   A portal is a gateway for a particular type of site visitor (i.e. business, general public, employee, etc.). An intention is a category of information that is the goal of the visitor (i.e. policies, compliance assistance, etc.). In each case the Web content must be organized into the appropriate categories based on some understanding of the nature of the Web content.

To develop a user-friendly navigational structure for the DENR Web presence the team examined five approaches for organizing Web content:

- intentions-based
- divisional
- search
- core lines of business
- topical.

All of these approaches are actually topical (employ categories by which visitors may access information) except the use of a search engine, which relies on indexing content.

Most content is currently organized along division lines, which requires that visitors understand the organization in order to find content. In addition, site visitors are accessing content from many paths, which do not necessarily go through the DENR or division homepages; the predominant method appears to be through search engines. The state portal also bypasses homepages and goes straight to content.

The team decided to use a combination of portals and intentions. The portal categories and intentions were identified based on team members understanding of the DENR customer base. Team members examined their Web contents and developed the portal categories and intentions below.

Portals	**Intentions (categories)**
Business	Attractions / Tourism
DENR employees	Data and Statistics
Individuals (general public)	Education / Technical Assistance
Local government	Enforcement
	Financial Assistance / Tax Credits
	News / Press Releases
	Permits and Licenses
	Rules, Policies and Regulations

These intentions are recommended as categories for all content available from the DENR homepage.   Divisions may customize intentions if necessary; the team recommends that a process be established to keep intention categories consistent and up-to-date. Since all divisions were not represented on the team, the DENR portals and intentions may be changed during project development. Generally, the content can be reorganized using the following approach.

- Review sites to identify key content. This would be a good time to eliminate obsolete content.
- Organize the content according to the portal and intentions categories. Overlap between categories should be minimized. It should be noted if it appears that additional portals or intentions are needed. The form that the team used to develop intentions is given in Appendix B.
- Review the initial portal and intention groupings and develop sub-intentions to further organize the content for access from the DENR home pages. Divisions and others may develop their own sub-intentions. However, the sub-intentions list should be reviewed to determine whether it can be used.
- Redevelop pages using the portal/intentions-based organization.

This process requires staff time to review and organize content, and to redevelop the pages. The initial reorganization data could be collected by the divisions (and others with sites), or, following the state portal model, could be done by the team or a similar committee and reviewed by the divisions. No hardware costs are anticipated since the reorganization would probably result in less content because of the elimination of obsolete or unnecessary interim pages.   A detailed plan should be developed for the project to provide an estimate of time and resource requirements.

Style Guide

The style guide has two parts**,** a narrative guide and several models that provide a visual representation of the intended style.   These recommendations are intended to provide a basic foundation for fast, attractive and easy to navigate sites. They are also designed for optimum viewing at a resolution of 800 x 600 with no scrolling required on home and second-tier pages. As previously stated, the team also recognizes that DENR "attractions" have additional requirements for their sites. Currently, that list includes:

- Aquariums
- Educational State Forests
- Museum of Natural Sciences
- Parks and Recreation
- Coastal Reserves
- the NC Zoological Park

The guidelines are intended to improve consistency while providing divisions latitude in their Web site presentation. Regardless, all sites must conform to the ADA guidelines as per the state directive.

Page Models

The team produced several pages to be used as models when redeveloping the DENR homepages and division pages. These models provide a visual idea of how the intentions-based approach can be implemented across DENR.   They deviate from the state model by providing both portals and intentions on the same homepage. The team felt that combination would save the visitor time and "clicks" when searching for content.   The top of the page contains a department or division banner, below which is a navigation bar of frequently used links. It will stay on the page throughout the site. The portals and intentions appear below the banner. Each one is "clickable."   The second tier pages provide a further breakdown of the portals and intentions to narrow the visitor's search.   The sub-intentions for the second tier pages cannot be developed until the divisions have categorized their content. The models are given in Appendix   A**.**

Narrative Guide

NOTE: The ADA guidelines supersede the Department of Environment and Natural Resources guidelines.

DENR Style Guide	
DENR and Division Home page and 2nd Tier Intentions pages	
Item	**Parameters**
Screen size	♦ Screens should be designed for 800 X 600 resolution. Home page and second tier should not require scrolling. Images and toolbar are included in maximum size.
Page weight	♦ 50 k maximum to allow shorter downloads.
Image size	♦ 40 k maximum
Top banner	♦ 1 - 4 photos and/or color fill; maximum 85 pixels high
DENR home and Intentions 2nd tier	♦ Name, address and phone in footer (font size 8–10 points) ♦ Logo on top left ♦ Title Tag: Copy reads "NC Department of Environment and Natural Resources"
Division home and Intentions 2nd tier	♦ Name, address and phone in footer (font size 8-10 points) ♦ Division logo on top banner. ♦ DENR logo (or text link to DENR home) on bottom, left. ♦ Title Tag: Copy reads "NC Department of Environment and Natural Resources – Division Name"
NCGov.com link	♦ Navigation line under banner or left side near bottom
Navigation bar (under top banner and/or left column)	♦ Search engine link ♦ FAQ's (Frequently Asked Questions) optional ♦ About Us (Division mission statement, responsibilities, etc.) ♦ Contact Us (Feedback email –suggest title or function instead of personal names ♦ Site map ♦ Staff directory (optional)
Intentions and Sub-Intentions	♦ Bold, font size 10 point for intentions, link to specific page Detailing that category. ♦ Plain, font size 8 point for sub-intentions, link directly to that topic anywhere in site.

Kid's Pages and Attractions	♦ Need to be more attention-getting, so some action graphics are acceptable. ♦ Can use additional (creative) fonts for headings. ♦ Exceptions must use alt.text to comply with ADA guidelines.
ALL PAGES	♦ Center page in browser ♦ Font – Arial/Helvetica/Verdana/San Serif

Style Guide - Content Pages	
Item	**Parameters**
Screen size	♦ 660 pixel width (displayed so screen can print correctly as portrait without adjusting margins). This can also be done using relative width or through other means as long as page prints correctly. ♦ Page length for minimal scrolling (maximum 2 1/2 screens) ♦ Narrow text column width (350 - 450 pixels maximum)
Background	♦ Plain background behind text for readability; white preferred for contrast with text.
Titles and Heading	♦ Bold, font sizes 16 / 14 / 12 ♦ Downstyle capitalization (1st word and proper nouns only)
Text	♦ Black text preferred ♦ Default fonts - Arial, Helvetica, Verdana, san serif, font size 10 / 12 points ♦ Use consistent structure across pages. ♦ Paragraphs - brief, left aligned, blank line to separate ♦ Bulleted or numbered lists ♦ Okay to use PDF.
Color	♦ Web safe color palette ♦ Do not override browser setting on links color defaults.
Graphs and Charts	♦ Summarize or use the "longdesc" (long description) attribute.
Tables	♦ Make line-by-line reading sensible. Summarize.
Images, Animation and Borders	♦ Use alt tags to describe function of each visual.
Cascading style sheets	♦ ADA guidelines recommend use of CSS (cascading style sheets) for layout and style where possible.
Frames	♦ Use is strongly discouraged; are not good for bookmarks. ♦ If included, use <NOFRAMES> tag and meaningful titles.
Plug-ins, scripts and applets	♦ Minimize use of plug-ins; Adobe and Real Player are okay. ♦ Provide alternative content in case active features are inaccessible or unsupported.
Multimedia	♦ Streaming video and audio should have limited use. ♦ Provide captioning and transcripts of audio and transcripts of video per ADA guidelines.
Footer	♦ All pages must have one. ♦ Content to include link to division home page and link to Division contact
Timestamp	♦ All pages carry a "date created" timestamp

V.2 Modify the sites to conform to the state's accessibility directive

The primary goal of the state initiative to have Web sites compliant with the ADA guidelines is to make sites accessible to the greatest number of people. The state initiative started from the Governor's Office and was given to the Lieutenant Governor who was head of the Information Resources Management Commission (IRMC). The Lieutenant Governor, as IRMC Chair, appointed a workgroup chaired by IRMC members and Department of Administration Secretary, Katie Dorsett. The workgroup developed recommendations, including the use of the World Wide Web Consortium, Web Accessibility Initiative (W3C/WAI) guidelines. Those guidelines were incorporated into the Statewide Technical Architecture as Chapter 13 (http://irm.state.nc.us/techarch/chaps/chap13.htm), Accessibility, at the June 2000 meeting of the IRMC. All agencies under the IRMC (all executive department agencies) are required to comply with the architecture. Additionally, the policies as recommended by the workgroup became IRMC policy as of November 2000. All of this was simply a response to the state's existing requirement to provide accessible services under the ADA and NCGS Sec 162A. It is just a way to do it systematically and most cost-effectively (so that the state doesn't have to fix everything immediately), possibly with some sort of legal imperative. Information about the state initiative, the W3C/WAI guidelines, the federal guidelines, and Microsoft's approach to accessibility is available at the following links:

http://www.ncgov.com/projectoffice/guidelines/accessibilityguide.html
http://www.w3.org/TR/WCAG
http://www.access-board.gov/sec508/508standards.htm
http://www.microsoft.com/enable/dev/web/default.htm

 As with other forms of accessibility, there have been legal consequences for some unresponsive companies and organizations. The ICDRI (International Center for Disability Resources on the Internet contains a great deal of general legal information and specific examples of compliance cases.

http://www.icdri.org
http://www.icdri.org/aol_nfb.htm,
http://www.icdri.org/north_carolina_state_university_letter.htm
http://www.cslnet.ctstateu.edu/attygenl/press/2000/health/blind.htm

The state initiative is both North Carolina's effort to "do the right thing" and to eliminate the possibility of similar legal actions by making all state Web sites compliant by the end of 2001. The team believes that the timetable for DENR sites should be somewhat earlier and suggests that it end by September 31, 2001 to allow time for review and any additional, unanticipated conversion efforts.

In order to make Web sites compliant, all segments of DENR, which have sites should review and become familiar with the W3C/WAI guidelines, especially priorities 1 and 2. The divisions and others with Web sites will be invited to participate in a meeting in January (at IRMB discretion). Participants will be allowed to send up to two staff members (one technical, one non-technical) involved in Web development for a

question and answer session with Mark Urban, the head of the state accessibility initiative. The purpose of the session is to allow those responsible for the sites to resolve questions related to the conversion. The session is expected to last half-a-day. The questions and answers will be recorded and the posted to the Web as a reference. Following the meeting attendees should work with their management to develop a conversion plan for their Web content. Plans should be given to the IRMB (or its designate) no later than two weeks after the meeting. Divisions and others with Web sites should then move to execute their conversion plans as quickly as possible.

V.3 Select a comprehensive search engine

The Department of Environment and Natural Resources is a diverse agency, which encompasses aspects of protection and preservation for air, land and water resources, waste management, environmental education and nature attractions. The department's challenge is to manage and present the vast amounts of information inherent to this diversity in a way that best serves our customers. Functional organization, standardization and consistency throughout the DENR Web pages will help to achieve that goal.

However, most organizations with massive amounts of information provide a search service for users who do not readily locate the desired information through page perusal. If site visitors fail to find such a function, the result is an unsatisfied customer.

The team concluded that a key to enhanced customer satisfaction is the ability to search for data and information effectively and easily. A DENR-wide search mechanism, combined with proper data and information organization, will allow users to get to the information they want with minimum effort.

Currently, DENR has many search engines scattered throughout the department and divisions, each serving a specific collection of information. The average visitor would assume that performing a search on a departmental site would include information from across the divisions. In reality, such a search can return incomplete results.

Estimates are that DENR has approximately 60,000 Web accessible files that will need to be searched. An overwhelming majority, estimated at more than 30,000 documents, is found on N.C. Division of Pollution Prevention and Environmental Assistance's web site. The rest are located throughout DENR's divisions and reside on many different servers, some in different parts of the country. Since Web content is not standardized from division to division, a search mechanism must account for variations in software, hardware and authoring methods to make a search worthwhile.

Many search tools are available on the market, but relatively few can meet our needs. The team has investigated the use of Ultraseek by Inktomi Co., the search tool used by the NCGov.com portal. Due to time constraints, other tools that may prove just as effective were not analyzed. Other search alternatives should be evaluated before an engine is selected.

A departmental search function is likely to carry with it a significant expense. Due to the high number of files to be searched, DENR may need to invest in a server that will be at least partially dedicated to this effort. Associated software costs will add to the expense. The pricing for the Inktomi engine is approximately:

Up to   50 thousand files $ 27,000 plus $ 4,000/yr maintenance
Up to 100 thousand files $ 50,000 plus $ 7,500/yr maintenance
Up to 250 thousand files $ 100,000 plus $ 15,000/yr maintenance

A server to house the index is estimated to cost $6,000 - $8,000.   While the prices are retail (actual prices would probably be somewhat lower) and the server could probably perform other functions as well, this gives a clear idea how expensive this feature will be.

It is possible that working with the developers of our state portal could offset software costs. Since NCGov.com already uses and possesses a license for Ultraseek, we might be able to derive some discount for its usage in DENR. However, staff at the state portal were contacted about this issue and indicated that there is currently no enterprise license for the state. Also, depending upon the resources required for the software to function, it is possible that a new server may not be warranted. More research is needed to clarify such issues.

Our goal is to add a search function that is powerful, flexible and easy to use both for our customers and for those charged with its maintenance. It is also important to invest in something that will adapt to changing technologies and not be obsolete in a matter of weeks. Although our specific requirements have helped to narrow the list of possibilities, we need more time to research additional alternatives. Cost, ease of use, performance, and expandability should be the major factors in making final decisions.

V.4 Select a comprehensive Web analysis tool

Analysis of Web activity is an essential component of Web development. There are many software packages available which easily provide a wealth of analysis information at a reasonable price. But, there is no comprehensive analysis product used by the DENR divisions. WebTrends (WebTrends, Inc.) is the de facto tool of choice for divisions analyzing their Web logs. DENR should be able to realize economies of scale by analyzing site activity as a departmental process. WebTrends lists for approximately $ 500/copy. The upgrade to an enterprise license is $1,500. However, there are additional charges based on the number of servers involved ($ 700 each). Given the distributed nature of the DENR Web sites across many servers, a product with this type of pricing structure would not be a cost effective choice. More research is needed to determine whether there is a more reasonable alternative.

This situation is another example of the effect of the distributed environment on cost issues. Another is the number of Web development platforms and tools used and supported by those creating and maintaining Web sites. As a minimum, those tools and platforms should be documented in order to begin to develop an architectural

roadmap. The divisions, and others creating and maintaining Web sites should be canvassed to determine how they develop and support their Web activities, including representative questions such as:

- Server information: number of server, whether hosted by the division or elsewhere, operating system, web server software (OS-Novell, Windows, unix, Linux, MAC OS; http SW-Netscape, IIS, Apache, etc.), primary purpose of server (e.g. static page server, database query server, etc.)

- Software information: what kind of log analyzer software, authoring tools, plug ins are used, etc.

- Web support: number of staff supporting Web activities and their role, process for keeping Web pages current, size of site, etc.

This information should be posted to the Web as a reference and a process should be established to keep it up to date. It would become the basis for a Web technical roadmap, which could be used to define the Web platforms and tools supported by DENR staff.

Appendix A: Page Models

The models in this appendix depict the DENR homepage, a sample second tier sub-intentions page, a divisional homepage (Division of Air Quality), and divisional second tier (Division of Air Quality). All of the models contain some hypothetical information, such as "Contact DENR", that does not yet exist. These links can be added as the services and information are developed. These models allow a certain amount of growth, should additional portals or intentions be needed. When the pages are actually developed, some restructuring may be needed to maintain the appearance of the pages while linking to existing information.
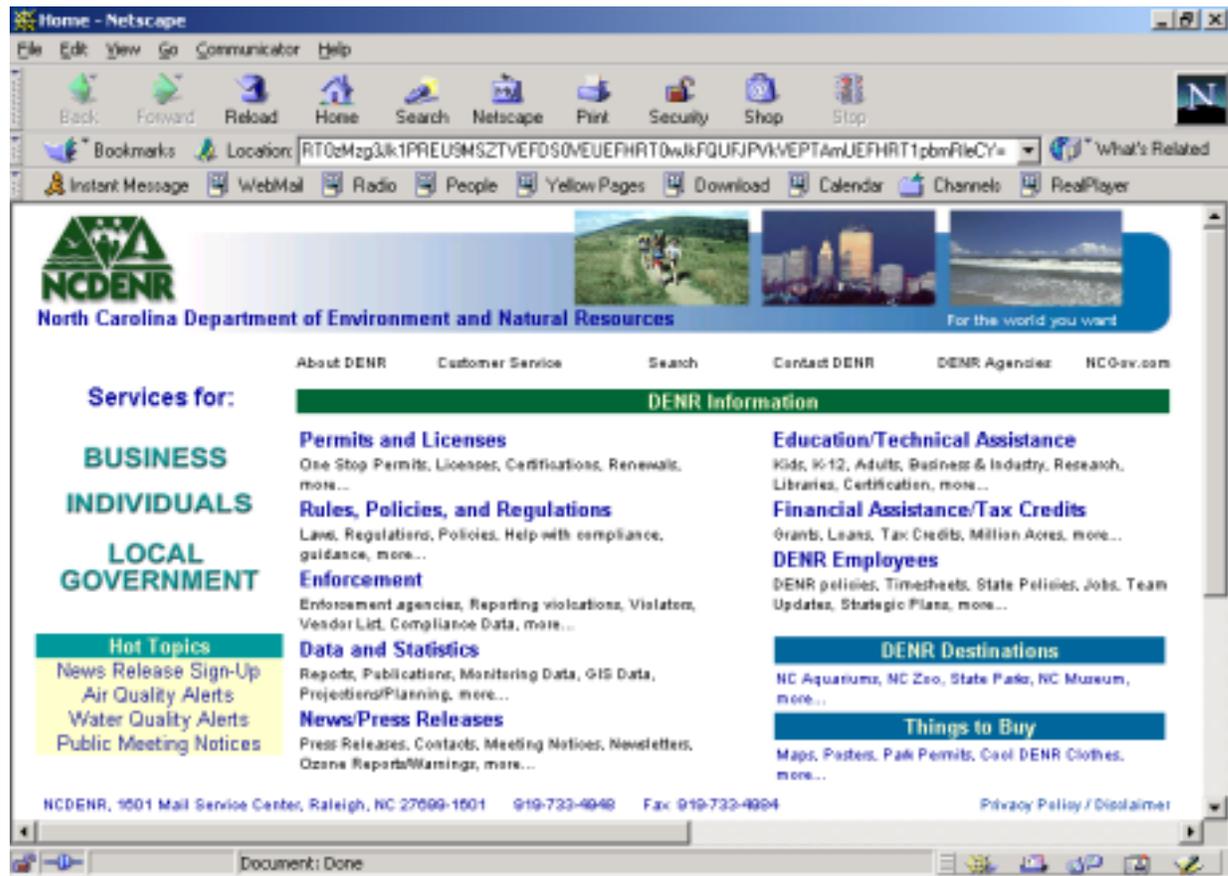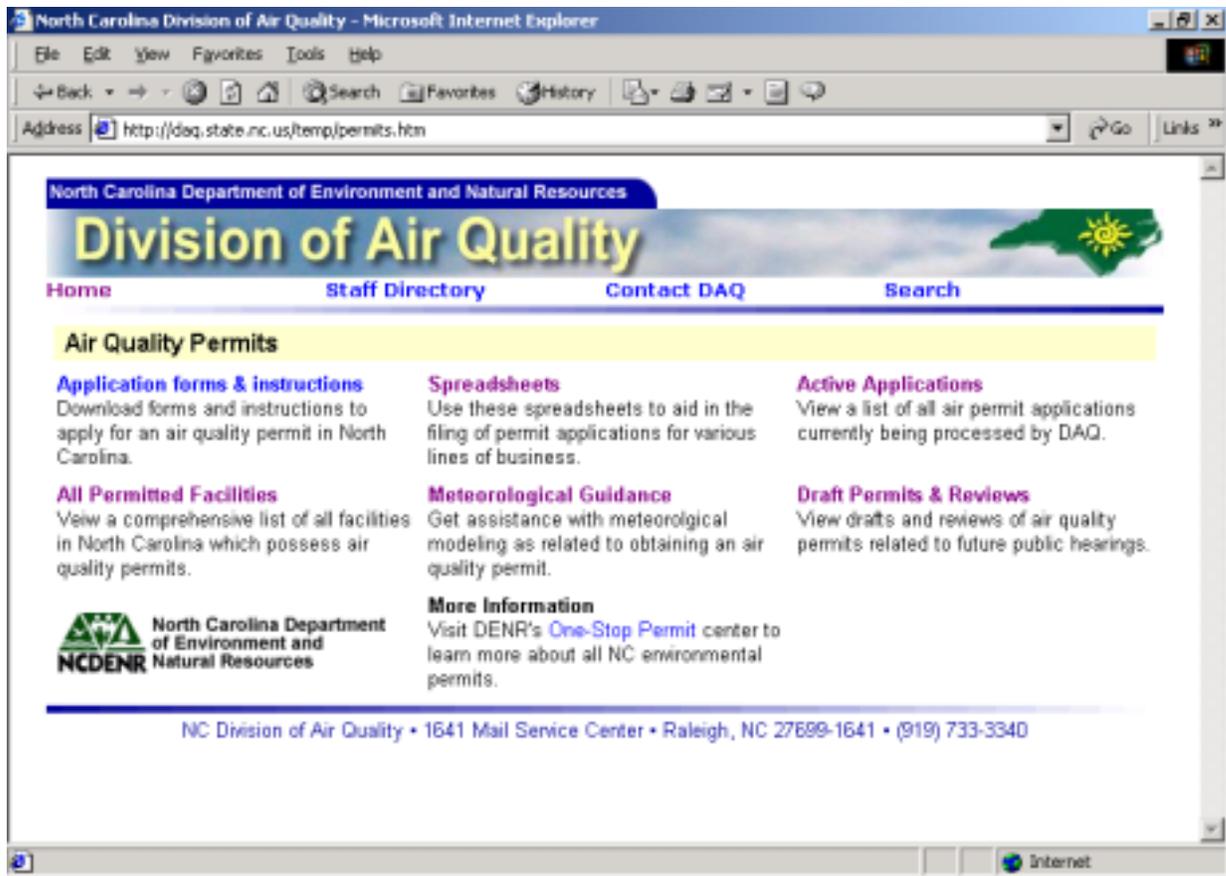
This model is an example of the second-tier page for DENR Employees. Each item under the sub-intention is "clickable." For example, the site visitor could click "Forms" to get the entire list of forms that are available online, or click any of the selections, such as "Timesheets," "Disciplinary Actions," etc. and go directly to them. The sub-intentions, such as "DENR Policies," "Forms," and "Services" will be developed based on an analysis of Web content.

This model is an example of a division page using an intentions-based approach. While the style is somewhat different than the homepage, it should be similar enough to provide a smooth transition for the site visitor.
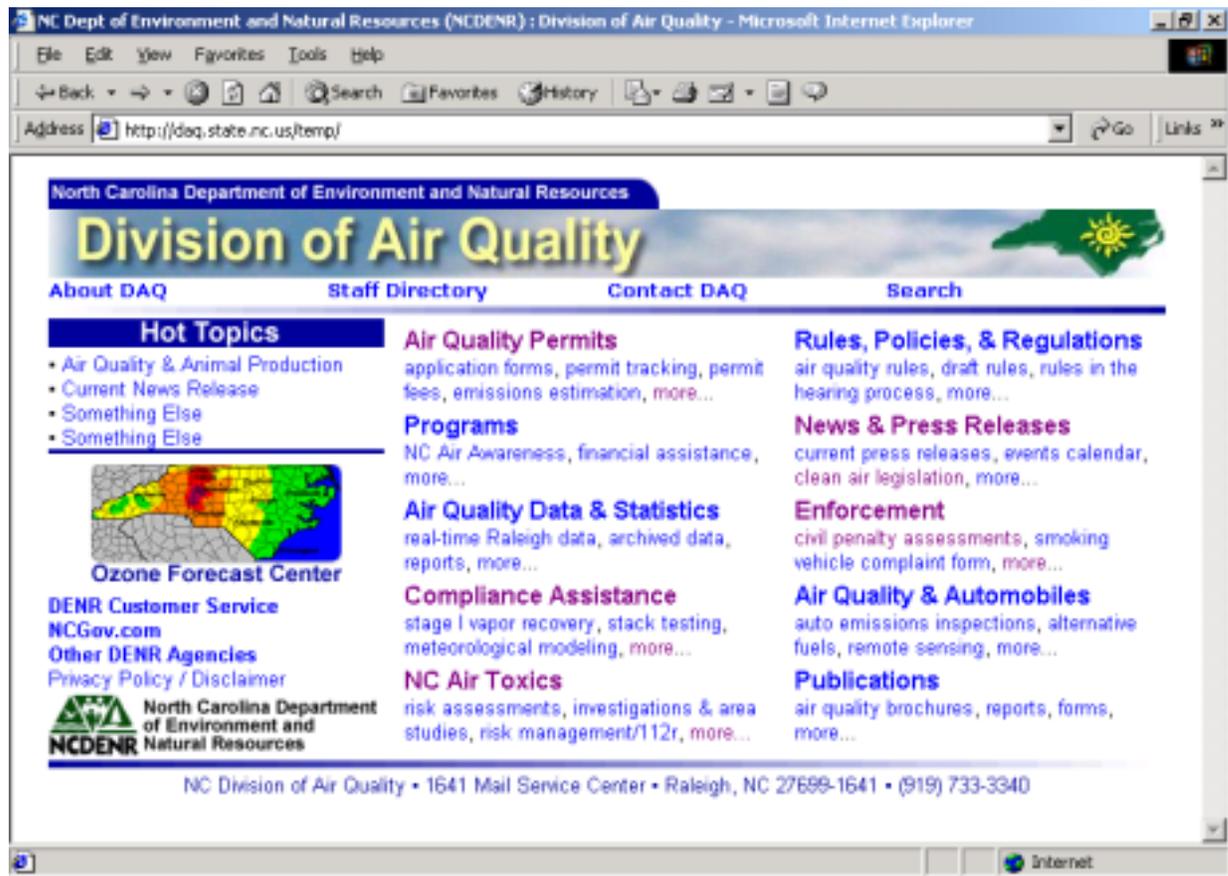
This model is an example of a second-tier division page. In this case, "Air Quality Permits." The approach is a little different in that there are no items under the sub-intentions. The site visitor clicks on the sub-intention, for example "Application forms & instructions" to see a complete list of application forms and instructions for air quality permits.

This is a sample division content page using the new style.

Appendix B: Portal / Intentions Data Collection Form

Division	Portal	Intention	Subintention	Action	Link/URL
Air Quality		Permitting Compliance Assistance Enforcement Data Education Rules/Policies Attractions/Tourism Employees News/Press Releases	Optional	Short, w/out verbs	http://daq.state.nc.us

Appendix C: DENR Web Portal Team Members

Some team members did not participate for the entire length of the project.

Walter Aycock	Division of Air Quality
Chrystal Bartlett	Division of Waste Management
Robin Carter	Division of Forest Resources
Richard Davis	Division of Marine Fisheries
Gary Hunt	Division of Pollution Prevention and Environmental Assistance
Carl Jeeter	Division of Parks and Recreation
Karen Kemp	N.C. Museum of Natural Sciences
Ed King	ITS/Creative Services
Sam Kornegay	ITS
Lew Ledford	Division of Parks and Recreation
Brian Long	Division of Coastal Management
Susan Massengale	Division of Water Quality
Janine Mealey	Division of Environmental Education
Tony Pendola	Customer Service Center
Lou Polletta	Division of Water Quality
Barb Satler	Division of Pollution Prevention and Environmental Assistance / Quality Improvement
Lisa Schell	N.C. Aquariums
Denise Smith	Creative Services
Charlie Theobald	Division of Water Resources