

# CHAPTER 8

---

## Putting the Internet to Work

The Internet can be a bottomless well of information, or it can be a frustratingly chaotic journey through cyberspace. The seemingly haphazard evolution of the Internet poses a challenge to those wanting to effectively use it for locating information, rather than just “surfing” through it. Many attempts have been made to systematically organize, catalog, and reference the location of materials on the Internet. Chapter 6, “Searching the Internet for Earth Science Resources,” illustrated several search engines that attempt to do so. Each method, however, covers a particular service on the Internet: Veronica for Gopher space, Archie for FTP, and so on. There are few comprehensive catalogs of the Internet.

No matter what our job is, we require and thrive on information. There is certainly no lack of information on the Internet. What most of us are faced with is how to get at the information we need while filtering out that which we don’t. A little know-how and the right tools will determine how effective our time will be online. Make sure that you familiarize yourself with the tools before trying to use them. Take a little time to read the documentation or “readme” files that come with the software. It is tempting to jump right into the software and try to use it. But doing this on the Internet may turn out to be a real time waster.

It is incumbent on users to examine why they are using Internet technology to achieve their goals. By examining what you want to accomplish with the Internet, you can create an *Internet methodology*. Methodology means that a defined set of steps is employed to achieve a goal. Developing an Internet methodology entails defining a set of steps, or a strategy, for using the Internet to attain your goals. The methodology you adopt will vary depending on what your goal is. If your goal is communication of information, then electronic mail or Usenet is the appropriate tool. If you’re looking for data to complete a research project, then tools that interact with online databases will be employed. If computer-mediated learning is your goal, then the World Wide Web may be the place to start. If your goal is obtaining information about a subject pertaining to earth science—say, the volcanic history of North America—you might employ several different Internet tools and services and look to specialized sites and databases.

Throughout this book you have learned that the Internet creates several new opportunities to conduct your work. In Chapters 1 and 7, the Internet was described as a framework upon which we can conduct our daily activities. Of late, the World Wide Web has presented the most favorable environment within which to do this. Web documents created with HTML successfully integrate many of the tools that we use in our day-to-day

activities. Advanced browsers permit us to communicate with our colleagues on the floor beneath us or halfway around the world. Hyperlinks embedded in Internet resource pages organize and provide access to earth science information located on different computer servers.

In this chapter we'll put together what we have learned up to this point to provide an integrated approach to using the Internet. This includes:

- defining your task and goals for using the Internet
- defining your methodology for bringing all the Internet resource tools together to find and organize information on the Internet
- showing you how to create simple HTML documents to organize your daily information needs and implement electronic mail through your Web browser
- examining shareware available on the Internet that will help get these tasks accomplished

## Goals and Tasks

Defining your goals and assessing the tasks required to meet them are the first steps toward the execution of any project. Your immediate task will fall into one of several categories depending on the desired outcome. *Closed tasks* have a specific goal or answer and often include subgoals. Suppose you require information about the effects of ozone depletion for a term paper. You identify several subgoals, among which is to find resources explaining how ozone depletion affects the marine ecosystem. In this case, you have a definite goal in mind and will require a much more directed search for information. *Open tasks* are more subject-oriented and less specifically defined. Browsing can satisfy the requirements of either an open or closed task depending on what browsing method you adopt. Once you have established a definitive picture of your desired goals, you proceed to defining your methodology.

### Defining Your Methodology: Asking a Few Questions

Developing your approach to using globally networked information resources is not much different than the way you search for information without the Internet. You employ many of the same techniques that you use when doing conventional library research. You define your topic, suggest key terms related to your topic, and then proceed to pertinent library resources (e.g., card catalogs, printed or electronically accessed CD-ROM databases, etc.). While in the library you probably use any number of different search procedures and resources. A similar approach can be adopted when using the Internet as a digital library. Keep in mind that the way you approach using the Internet today will be entirely different in a year or two. The rapidity with which new Internet software and hardware is introduced forces users to reexamine how they interact with the Net.

From earlier chapters you have learned that the kind of access you have to the Internet determines what Internet services are available and how you interact with them. Dial-up access is often slow, and some services like the World Wide Web can't be efficiently accessed unless you have a SLIP/PPP account. The various Internet services offer access to different kinds of information and interact with that information quite differently from one another. Recall that the Gopher service is a menu-based service that is basically limited to displaying text material on-screen. One must often "burrow" through countless menus before coming to the information desired. On the other hand, HyperText Markup Language and World Wide Web browsers embed context-sensitive linkages to related information and easily access a variety of media. Web browsers provide uniform access to many Internet services too, while Gopher is restricted to a few. New versions of Web browsers, like Netscape Navigator 2.0 and Microsoft Explorer 2.0, have the capability to "plug in" other applications to run programs like Macromedia director files. This capability permits the full use of hypermedia and navigation that you would have if running the presentation software itself, only now with linkages to globally networked resources too. Both the World Wide Web and Gopher permit you to search for information. Yet search engines on the Web often come up with vastly different results due to their database linkages and method of searching. Because of the numerous possibilities for accessing information, you should carefully take these things into consideration prior to starting your Internet excursion.

At the beginning of the book I described the Internet as both a digital library and an environment in which to conduct your daily activities. The digital library metaphor implies an impersonal archive of information. There are any number of earth science information servers awaiting your digital input. The Internet as an environment is a dynamic and ever evolving system, changing as the inputs and outputs of human and technical resources are employed in its development. The dynamism evoked in electronic interest groups and the hyperlinking of resources on the World Wide Web draw us into an interactive world inhabited by people wanting to share information and finding the best ways to do it. This is borne out each day in earth-science-related Usenet groups and through exciting Web sites like those at NASA, introducing us to the space science community and all it has to offer.

First, stop and ask yourself if the Internet is the right place to be or begin with. What is it that you are likely to need from the Internet? Is the information you're looking for likely to be online or offline? This may be a difficult question to answer. If you're looking for information of a historical nature or research publications that predate the last few years, the Internet may not be the best place to go. Traditional sources of information like libraries are still a good place to start when looking for information. Does the library have an online card catalog? If so, then the Internet is an efficient way to proceed. The library catalog may be accessible via the World Wide Web, Gopher, or Telnet. Are you looking for information in a digital format? If so, then the Internet may well be the place to look. Even if the information is not archived on the Internet, you might be directed to the offline source of such data.

The type of information you're looking for will determine the Internet service you'll

use. If you are looking for documents, a good place to start is a document search engine. Which one? I prefer starting with the World Wide Web for a couple of reasons. It's the fastest growing segment of the Internet and is the preferred place to make information available. Web documents embed graphical information, sound and video, making the Web an attractive place to mount information. If the material is relatively new—say, three years old—the Web is the best place to check first. Otherwise, using Veronica to check Gopher space is advised. If you're looking for a particular file, turn to Archie to search through FTP servers. Use a couple of different FTP servers to scan as their databases may not contain the same information.

If you're trying to make contact with someone, then electronic mail is the place to start. Is there someone in particular you are trying to contact for information? If you have their electronic mail address, then you can get right to work. However, turn to a Netfind server if you need to search for it. You can always use the telephone to call the person you need to get an electronic mail address from. This might seem a little silly at first, but using electronic mail for subsequent contacts and conversation will save you much time and expense. If you are seeking out information from specialists in a particular field, try a Usenet newsgroup. Posting a question on a newsgroup will likely put you in contact with a person who can help you find what you're looking for. Posting to a newsgroup is likely to pay off larger benefits as Usenet newsgroups do not require users to subscribe to them, unlike electronic mail discussion lists. You can easily cross-post your message to Usenet newsgroups too. Here's a good example of what can happen. A woman from my local community was given 500 rock and mineral samples to be donated to a school in our sister city in Poland. She was in need of an English-to-Polish scientific dictionary to translate the names before sending them to Poland. I sent a request for information to the sci.geog.geology Usenet group and within a few days had over a dozen suggestions from subscribers to the newsgroup from all over the world.

### **Sitting Down to Work**

Now that you have decided that the Internet is the right place to be to conduct your work, you can get down to the activity of sorting through the various services available to you.

**Write down all the keywords or -phrases that describe the information you are seeking.** Once you write them down, review and refine them. Can they be split into smaller phrases or more specific keywords? A prime determiner of the efficiency and success in using the Internet is how carefully you formulate the central problem and related questions that surround the task at hand. This is particularly important when dealing with the millions of gigabytes worth of information ready to be seized upon in an Internet search. A too broadly defined question will yield an avalanche of articles, books, and other assorted references that could take days to go through. Try breaking your topic or question down into subtopics or smaller questions. If you can do this, then your original topic was too broadly defined. Narrowly defined keywords will yield more manageable search results. However, searches using too narrowly defined keywords may not turn up anything at all

either. Pay attention to case-sensitive items; this will be important with some search engines.

**Search the World Wide Web** with one of the many search engines available (see Chapter 6, “Searching the Internet for Earth Science Resources”) using your keywords. I start with the World Wide Web because it is the fastest growing part of the Internet and most people and organizations are adopting the Web to distribute information. The latest information and data are posted on the World Wide Web or archived at an FTP site. You can still get to FTP archives from the Web with your Web client software. Multifunction browser software makes it easy for you to extract information once it is located. HTML documents can be read on-screen, downloaded and saved or printed off as hard copy. Online forms give you control over requesting particular bits of information from large databases. Use the appropriate Boolean operator to limit or expand your search results.

**Review your results and refine the search.** After you have the first round of potential sources, size up the results and refine the keywords you used in the initial search. If you received too many hits, try limiting the number of returns by setting a specific number of items to return or adding words to the original search term. Adding an additional search term and using the AND Boolean operator is a start toward refining your search.

**Bookmark items that look promising.** Bookmarking is the electronic equivalent of those little sticky tabs used to mark pages in a book. Bookmarks enable you to retrieve information quickly without having to retrace your steps through Web site after Web site. A bookmark file is like a “database” file of references. Most bookmark files are ASCII text files. The entries can be copied and pasted into a bibliography database for fast sorting and retrieval at a later date or into your word processing document bibliography. Some Web browsers allow you to add annotations and descriptions of the bookmarked site.

**Search various subject-oriented guides** like Yahoo! or the Clearing House for Subject-Oriented Guides for pointers to information. Many of the online guides have special categories set up for earth science, astronomy, geography, geology and the like. Most subject-oriented guides lead you through a series of resource pages, each page containing more specific information. Subject-oriented resources like these are good place for nondirected browsing as well as searching. They do not have as extensive resources as other search engines do, however.

**Locate and choose a few electronic mail lists or Usenet newsgroups to join.** These are places for utilizing your earth science Internet community directly. To cast a rather narrow net, choose an electronic mail discussion list. Email listservs must be joined by individuals, and audience size is restricted on the basis of the narrowness of the discussion list subject matter. Usenet newsgroup membership is in a constant state of flux because one can drop in on any number of newsgroups without having to subscribe. The two methods of communication can get the word out and distribute a question to a very large and diverse audience of professional and amateur scientists. They will have pointers to offline

information as well as online. An email response from the earth science Internet community may be able to point you in the right direction quicker than an Internet search service.

**Investigate frequently-asked-question files archived by Usenet groups and email discussion lists.** These often have good pointers to information on many different Internet services. Some provide electronic mail addresses of specialists who have created online resources in their respective earth science fields. Frequently-asked-question files can be archived at or linked from many of the popular subject-oriented guides. Updated frequently-asked-question files are often distributed via Usenet newsgroups and electronic mail listservs. Ask the interest group if there is an FAQ file available for downloading after subscribing to an email listserv or when you first log on to a Usenet newsgroup. Archive the FAQ file on your computer so you can have quick access to it.

**Use WAIS to search WAIS databases.** This step presupposes that you can find a database covering the topic you're interested in looking for. Remember, WAIS does not look at the data you're requesting; it looks through an index of resources. The likelihood of your finding what you're interested in thus is correlated with the thoroughness with which the index was created.

**Use Telnet to connect and search remote libraries for resources with applications like Hytelnet.** This will be a time-consuming process because you will have to browse around different libraries and online resources to find what you're after. Leave this option for last.

Once you've completed the steps above, sit down and review your results. Determine which services/steps provided the best results. Sift through and organize your search results. Have you obtained the information you're looking for in specific enough detail to meet your needs? If not, determine how to revise your search topics to focus in on your information needs. Return to the search engines for the World Wide Web and more narrowly define the search with restrictive Boolean operators. Don't forget online colleagues. They are a great source of information to help you accomplish your goals.

## Citations for Online Resources

The advent of the Internet as a source of published information creates new questions concerning the use of those materials by the rest of the Internet community. What rights do we have in using someone else's documents that have been published on the World Wide Web? Can I download an image that I find and use it on my Web page? What is the proper way to cite Internet information sources that I use in a research report? Unfortunately, there are no clear-cut answers to many of these questions. The Internet is so new and different from other media that these issues will take time to sort out. However, a few caveats concerning intellectual property rights can be observed.

There are a number of style manuals that suggest the proper way to cite materials that

you have used in a piece of creative work like a research paper or book. Likewise, several citation style formats have been suggested for online materials. The Alliance for Computers and Writing has endorsed the MLA-style format of Walker (1995). Walker provides citation styles for most Internet services and protocols.

### **World Wide Web, Gopher and Telnet Sites**

To cite resources on the World Wide Web, give the author's name, title of the work enclosed in quotation marks, the title of the complete work (if applicable) in italics, the full URL, and the date of the visit in parentheses.

Example:

Wells, L., "Geoarchaeological Investigations at Tell Abu Duwari"  
<http://geogweb.berkeley.edu/PersonalPages/lwells/TABD.html> (25 June 1996)

For material from changeable resources like an online journal, the American Psychological Association (APA) and the Modern Language Association (MLA) suggest that the date of publication follow the journal name and the number of paragraphs or pages be included.

Example:

Crampton, J. "Networked Education," *EarthWorks* (1996):13 par.  
<http://www.utexas.edu/depts/grg/eworks/wir/crampton/v1no1.html> (25 June 1996)

### **Electronic Mail, Listservs and Netnews**

To cite electronic mail correspondence or postings to listservs and netnews, give the author's name, subject of the correspondence in quotation marks, address of the listserv or netnews group, and the date of the posting. Addresses may be omitted from personal electronic mail.

Example:

Ritter, M., "Holocene Glaciation," sci.geo.geology (2 Aug. 1995)

### **File Transfer Protocol (FTP) Resources**

Citations for files downloaded from an FTP archive include the full title of the paper in quotation marks, the full Internet address of the paper, and the date of access.

Example:

Ritter, M. "Going Digital: The Geography Department in the Information Age"  
[geodept1.uwsp.edu pub/ritter/papers/](http://geodept1.uwsp.edu/pub/ritter/papers/) (22 July 1996)

## **Citation Information on the Internet**

Several Web sites have excellent information about citing electronic sources:

MLA Citation Guide

URL - <http://www.cas.usf.edu/english/walker/mla.html>

Citing Computer Documents

URL - <http://neal.ctstateu.edu/history/cite.html>

Williams College Library Web

URL - <http://www.williams.edu:803/library/library.www/cite.html>

## **Becoming an Active Participant in the Internet Earth Science Community**

How can you become an active participant in the earth science Internet community? First, GET CONNECTED! Next, learn how to effectively employ the multitude of tools and resources available from the Internet. No, you don't need to become an expert at everything, but there are ways that you can integrate the tools easily into your work and education. Even though the Internet is described as a chaotic environment in which to work, software tools are helping to harness its potential. Many Internet browsers have built-in or "plug-in" functions to simplify downloading files, finding reference information, or browsing the latest network news in your particular area of earth science. Becoming an active participant in the earth science Internet community is a two-way street. The Internet is certainly a good place to get information, but it is also a good place to give back. That is, providing information to the earth science Internet community is a way for you to make a contribution. This could range from offering help to someone over an electronic mail list to creating and sharing information over the World Wide Web. Creating materials for the Internet and especially the World Wide Web has never been easier. Developing materials for the Internet places you in control of how information is organized and how others have access to it. For instance, learning HyperText Markup Language is a simple way to harness many of the resources that you use on the Internet. A thorough review of HTML is beyond the scope of this book. But the discussion below will help you get started. I suggest you check any of the numerous HTML books out on the market today to expand your knowledge of creating documents for the earth science Internet community. Looking at others' work is an enormous help. Most browsers enable you to view the source code of an HTML document. Use these as examples and guides for your own work. Be careful though; not everyone conforms to the rules, and errors in their coding may cause you problems.

## **Harnessing the World Wide Web for Work and Education**

One of the easiest ways to become a creative force in the development of the earth science Internet community is through the creation of World Wide Web documents. A knowledge of HyperText Markup Language is required to create and disseminate materials over the World Wide Web. HTML has evolved over the years into a flexible means of designing digital documents that closely resemble their analog equivalents. Many of the same capabilities for formatting text, placing graphics, and linking information can be done with HTML. But don't be left with the impression that you'll be able to do all the same things your word processor can do. As the demand for more control over document formatting rises, HTML designers will provide the means to do so. The following discussion will give you a general understanding of what HTML is and some simple instructions on how to code Web documents.

### **Creating a Successful Web Page**

A successful Web document or set of documents will greatly benefit from a little prior planning. Try employing the following steps in writing your Web page; modified from Lemay (1995):

- Decide on the purpose of your Web page
- Decide how your audience should use your Web page(s)
- Break up your content into main topics
- Design a navigation scheme
- Storyboard the structure
- Create documents
- Test the page
- Edit the structure and text

Before you actually sit down to program your Web page, stop and consider the purpose and audience for your Web document. If the document you're about to create is a personal Web page, then the structure can be laid out according to your own specialized needs. You program navigation methods that suit your own style and level of Internet expertise. Information linkages will address your daily work or educational requirements. If your document is for a broader audience, then more control over the navigation should be turned over to the user. Documents created for larger audiences must take into account varying levels of Internet expertise. Online help may be needed to provide Internet novices with information to access special features or files from your Web page. For instance, if you include audio or video clips in your page, a reminder to have the user's browser properly configured for the audio or video format needs to be included. Sometimes special HTML codes will need to be used to overcome differences between browsers that people will access your page or document with. Text-based browsers "look and feel" different than graphical browsers. How will the user navigate through your Web document? Will it be like

a conventional book, starting at the first page and moving sequentially page by page? Or will users be encouraged to explore online resources for themselves, using your Web page or document as a launching pad? Whatever your goal, there are a few caveats that should be followed for designing useful Web pages. Once these questions are answered you can decide on how you structure the presentation of information contained in your documents.

Several possible structures can be employed for your Web pages. A *hierarchical structure* is the easiest for most users to follow. Navigation through a hierarchical structure is bidirectional. The user moves up for more general information or down toward more specific information. A *linear structure* is one in which the reader moves from page to page in a sequential pattern. A linear structure is bidirectional as well. Information is accessed by moving back and forth between pages, much the same way one reads a book. A linear structure imposes rigidity and limits on both the freedom that your users have to explore information and the way you can present information. Linear structures are useful for delivering tutorials, when the user must move through a process in a sequential fashion. Linear structure with alternative paths is a variation on the linear structure theme. It permits users to take alternative paths to information; readers start from a main page and branch out to explore information.

Linear and hierarchical structures can be combined for documents that need to be both highly structured and linear. An author using a linear-hierarchical structure must provide context-sensitive clues to positions and paths for the reader. Navigation can be forward and backward and up and down, making it easy for the reader to get lost in a series of documents.

Finally, a *web structure* provides little or no overall structure to a set of information. The only thing that ties each page together is a hyperlink. Readers move from one document to the next following their own chosen path. Each page in a Web structure stands alone. The content of the message you are delivering is basically contained on the page. Contextual links are placed in the body of a page, which links to related information elsewhere on the Internet. The linked information is not critical to understanding the concepts embodied in the originating document. For instance, a discussion of the atmosphere of Jupiter makes reference to the *Viking Explorer* mission, and a link to the *Viking* mission home page is included in the document. It is not crucial that the reader know all about the *Viking* mission to understand the nature of Jupiter's atmosphere.

The disadvantage of a web-structured environment is that it is easy for a user to get lost traversing from one link after another. Unless the path from and back to the originating link is easily discerned, users can become frustrated in retracing their steps. Some Web document authors request their readers to bookmark their starting page for easy navigation back. Placing a "Back to home"-type icon on your document is the best way to help your reader find a way back.

After you have decided on a structure for your document, the next step is to determine

what information goes in it and how each page relates to one another. *Storyboarding* is a good way to help you organize your information for a Web presentation. Storyboarding is a design technique used in filmmaking where the author sketches out the key concepts that are included on each page of the document. One approach is to sketch out key topics and concepts that will appear on each page on separate cards or pieces of paper. The concept boards are then arranged in the order the information is to flow. Storyboarding helps an author decide on how bits of information relate to one another and how the user navigates between them.

Now we're ready to start coding. While there are many tools available that help you create HTML documents, no special software is required to make them. A simple text editor and a list of HTML markup tags are all you need to begin creating your Web documents. It doesn't matter what kind of computer processor you're working with either. The browser that you use on your Macintosh, MS-Windows, OS/2 or UNIX machine will be able to read the HTML. Be forewarned though: earlier versions of some browsers may not be able to decode new tags added to the HTML. Originally, HTML was created to describe the structure of Web documents. That is, HTML was used to describe the various parts or elements of a document, like the document head, body, paragraphs, lists and the like. These elements are defined in terms of tags. HTML markup tags are the "code" used to tell the Web browser how to display information for the user. HTML tags tell the browser where to place an image, how to format a paragraph or an individual piece of text and how to link to information for retrieval and display. Tags are text surrounded by angle bracket (<>) characters (e.g., <EMPHASIS>). Beginning and ending tags are used to define the action on a particular piece of text or graphic. Ending tags use a slash to distinguish them from beginning tags. For example, to code a piece of the text "Earth Science Internet Resources" as a first-order heading, I use the <H1> beginning tag and </H1> ending tag:

```
<H1>Earth Science Internet Resources</H1>
```

HTML tags are not case-sensitive, but they stand out on the coded document better if you capitalize them.

Some elements or tags have *attributes*. An attribute tells the browser what an element is or how to handle it. For instance, all HTML documents are composed of a body element <body>. The body may contain a background image over which the document text is displayed. For instance,

```
<body background="weave.gif">
```

The portion of the body tag background="weave.gif" is the attribute of the body.

Although there are many standard HTML tags, several new ones are proposed from time to time. Tags included in the HTML Level 2 and most Level 3 specifications are implemented in all browsers today. Software vendors like Netscape and Microsoft have

suggested, and use, HTML tags specific to their browsers. It's advisable to stick with the HTML specifications that have been accepted to reach the largest audience for your Web documents. Put a warning on your document specifying whether you have constructed your document to be used with a particular browser or HTML specification. If you do, it is nice to provide a link to a site that can provide a browser for which you have designed your document.

In this chapter I'll use a table of contents page to demonstrate how to create a simple document for the World Wide Web. The table of contents page can serve as either a resource page for online information or as a personal home page. The document will contain a:

- document title
- graphic
- text explanation
- contents listing
- author reference and email address

All Web documents contain a particular set of HTML tags that defines the formatting of the document, the title and content of the document. To begin creating an HTML document, you need to provide some information to tell programs how to decode your document. This first line in your document will be the DOCTYPE tag. The DOCTYPE tag informs a program of markup language used to create your document and what document type definition (DTD) must be used to decode it.

If you are using HTML Level 3 tags, the DOCTYPE tag would take this form:

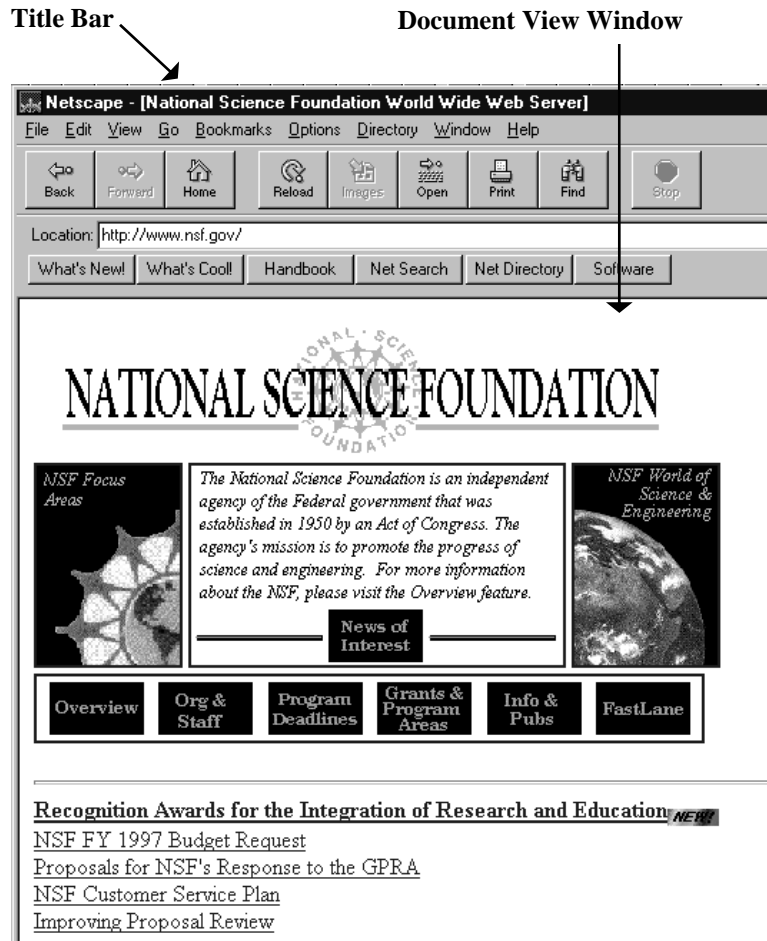
```
<!DOCTYPE HTML PUBLIC "-//IETF/DTD HTML//EN">
```

Following the DOCTYPE tag are the HTML begin and end tags (<HTML> and </HTML>), which enclose the rest of the document and define it as HTML-formatted text. Our initial document now contains:

```
<!DOCTYPE HTML PUBLIC "-//IETF/DTD HTML//EN">
<HTML>
</HTML>
```

Now we can begin adding meat to the document. First, we place beginning and ending HEAD tags between the HTML tags. Title bar information falls between the HEAD tags and is displayed in the title bar of a Windows-style browser (Figure 8.1). The title of my document is "Earth Science Internet Resources Home Page," so the document is coded:

```
<!DOCTYPE HTML PUBLIC "-//IETF/DTD HTML//EN">
<HTML>
```



```
<HEAD>
<TITLE>Earth Science Internet Resources Home Page</TITLE>
</HEAD>
</HTML>
```

The body of the document follows the head and is contained between body tags of the form:

```
<!DOCTYPE HTML PUBLIC "-//IETF/DTD HTML//EN">
<HTML>
```

Figure 8.1 World Wide Web browser

```

<HEAD>
<TITLE>Earth Science Internet Resources Home Page</TITLE>
</HEAD>
<BODY>
----- Body of document here -----

</BODY>

</HTML>

```

Now we're ready to add the content to our evolving Web document. The body of an HTML document contains text formatted as headings, preformatted text, and ordered or unordered lists. Text can be formatted in other structures as described in Appendix 2, "Common HTML Tags." My document will begin with its title and a short piece of introductory text. To draw attention to the title of the page I'll format it as a first-order heading. The latest version of HTML provides for six levels of headings distinguished by font size; first-order headings are the largest, sixth-order headings the smallest. Defining a heading requires both a beginning and ending tag. For my first-order heading

```
<H1>Earth Science Internet Resources Home Page</H1>
```

text can be right or left aligned or centered on a page. The heading is centered by enclosing it with *center* tags:

```
<CENTER><H1>Earth Science Internet Resources Home
Page</H1></CENTER>
```

Let's take a look at the entire HTML source code and what the document looks like. The source code is:

```

<!DOCTYPE HTML PUBLIC "-//IETF/DTD HTML//EN">
<HTML>
<HEAD>
<TITLE>Earth Science Internet Resources Home Page</TITLE>
</HEAD>

<<BODY>>

<CENTER><H1>Earth Science Internet Resources Home
Page</H1></CENTER>

</BODY>
</HTML>

```

Let's add some explanatory text now. I want my user to know what the document is about and how to use it, so I'll add the following text:

Welcome to the  
Earth Science Internet Resources Home Page.

This home page is your gateway to earth science resources on the Internet.

This page is under continual construction, so visit often.

---

Choose a topic below:

1. Astronomy
2. Climatology
3. Education
4. Environmental Science
5. Geographic Information Systems
6. Geography: Physical Geography
7. Geology
8. Government
9. Internet
10. Meteorology
11. Oceanography

---

Created by Michael Ritter.

My document is cast in a hierarchical web structure. Each page in the document contains links that progressively relate to more specific information on a particular topic. Yet each page in the document has links to permit lateral and backward navigation to related information.

I bring the attention of the reader to the title of my Web document by placing it in the center of the screen and emphasizing the document title. I start with a salutation, "Welcome to," as a second-order heading. A second-order heading is displayed in a smaller font size than a first-order heading so as to not detract from the title of the page but still draw the attention of the reader. Next comes the title, defined as a first-order heading, enclosed with `<H1></H1>` tags. Additional emphasis is gained by formatting the title in bold (`<B> </B>`) and italics (`<I></I>`). To give the page a little pizzazz, we'll add an image of the earth from space. This is a NASA image I retrieved via FTP. I enclose the image file name, "earth2.gif," with the `<img src>` tag. This tag tells the browser that an image (img) is to be displayed, and the file (src) will be displayed in the document. The image file will reside in the same directory as the HTML document. If it resides in another directory, I'll have to let the browser know what directory it is in. Be aware that the actual screen layout is

controlled by a user's browser configuration. Your formatting may well look different in other users' Web browsers. For example:

```
<center><H2>Welcome to</H2>



<H2>Earth Science Internet Resources Home Page.</H2>

This home page is your gateway to earth science resources on the Internet.
</H2></center>

<center><H3>This page is under continual construction so visit often.
</H3></center>
<HR>
<H2>Choose a topic below:</H2>
```

Horizontal dividers are placed on a page to separate the document into component parts using the <HR>, "Hard Rule," tag. I've placed a hard rule between the title information and the contents listing.

Earth Science Internet Resources Home Page's table of contents is an alphabetical listing of links to earth science resources. I prompt the reader to gain access to the home page's resources by having them "Choose a topic. . . ." The available choices are arrayed in an indented column. I used the *ordered list* tags, <OL></OL>, to accomplish this.

```
<OL>
<LI><a href="astro.htm">Astronomy</a>
<LI><a href="climate.htm">Climatology</a>
<LI><a href="education.htm">Education</a>
<LI><a href="environ.htm">Environmental Science</a>
<LI><a href="gis.htm">Geographic Information Systems</a>
<LI><a href="physgeo.htm">Geography: Physical Geography</a>
<LI><a href="geology.htm">Geology</a>
<LI><a href="gov.htm">Government</a>
<LI><a href="internet.htm">Internet</a>
<LI><a href="meteor.htm">Meteorology</a>
<LI><a href="ocean.htm">Oceanography</a>
</OL>
```

The <LI> tag before each entry tells the browser that the rest of the line of code is a list item. Seeing an ordered list, the browser will place a number before each line. Enclosing each entry in the contents listing of links are the <A HREF=". . ."></A> tags. The Uniform Resource Locator for the linked information falls between the quotation marks after the

equals sign. Text placed between the end angle bracket on the beginning tag and the ending tag will be highlighted and underlined by your browser to indicate a link. We're just about through now. I'll separate the listing from the rest of the page with a hard rule and "sign" the page with a link to my electronic mail account. A "mailto" reference is used to tell your Web browser to initiate an email session after clicking on the linked text. For example:

```
<HR>
<center>Created by <a href="mailto:mritter@uwsp.edu">Michael
Ritter</a>mritter@uwsp.edu</center>
```

Let's take a look at the full code:

```
<!DOCTYPE HTML PUBLIC "-//IETF/DTD HTML//EN">
<HTML>
<HEAD>
<TITLE>Earth Online</TITLE>
</HEAD>

<body>

<center><H2>Welcome to</H2></center>
<center><H1><I><B>Earth Online</B></I></H1></center>
<center></center>

<center><H2>An Internet Guide for Earth Science<BR></center>

<center><I><B>Earth Online</B></I>is your gateway to earth science resources
on the Internet.</H2></center>

<center><H3>This page is under continual construction so visit often.
</H3></center>

<HR>

<H2>Choose a topic below:</H2>
<OL>
<a href="astro.htm">Astronomy</a><br>
<a href="climate.htm">Climatology</a><br>
<a href="education.htm">Education</a><br>
<a href="environ.htm">Environmental Science</a><br>
<a href="gis.htm">Geographic Information Systems</a><br>
<a href="physgeo.htm">Geography: Physical Geography</a><br>
<a href="geology.htm">Geology</a><br>
<a href="gov.htm">Government</a><br>
<a href="internet.htm">Internet</a><br>
<a href="meteor.htm">Meteorology</a><br>
```

```
<a href="ocean.htm">Oceanography</a><br>
</OL>

<HR>
<B><I> Earth Online </I></B> is maintained by <a href="mailto:mritter@fsmail.
uwsp.edu">Michael Ritter</a>

</body>

</html>
```

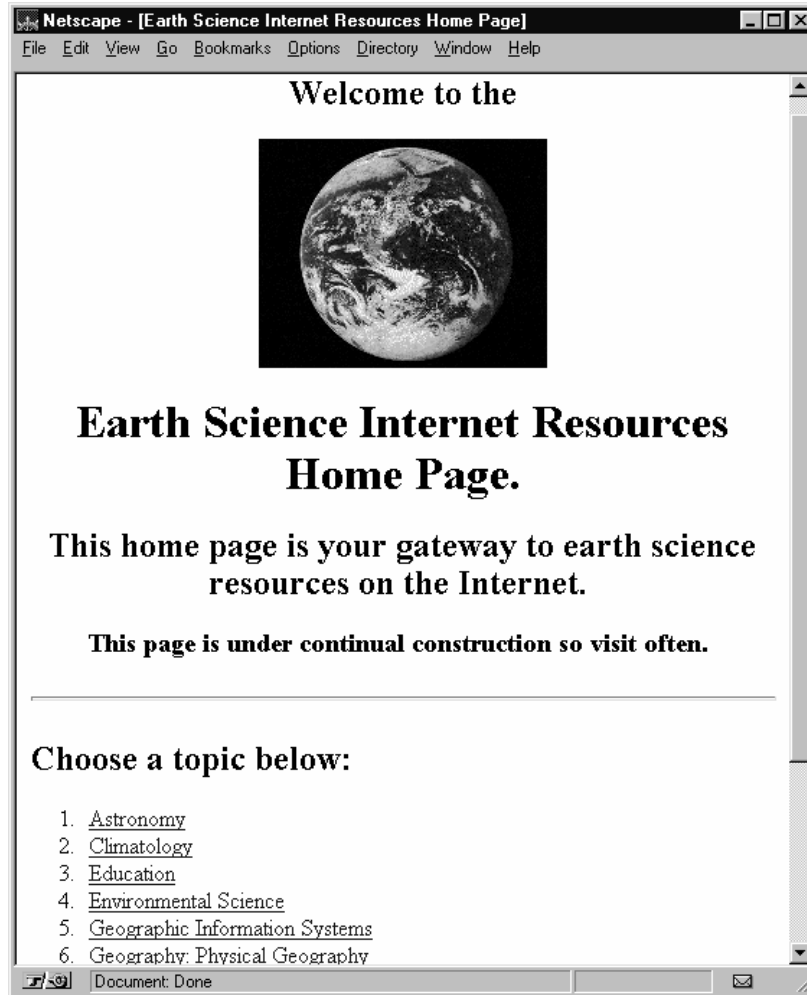
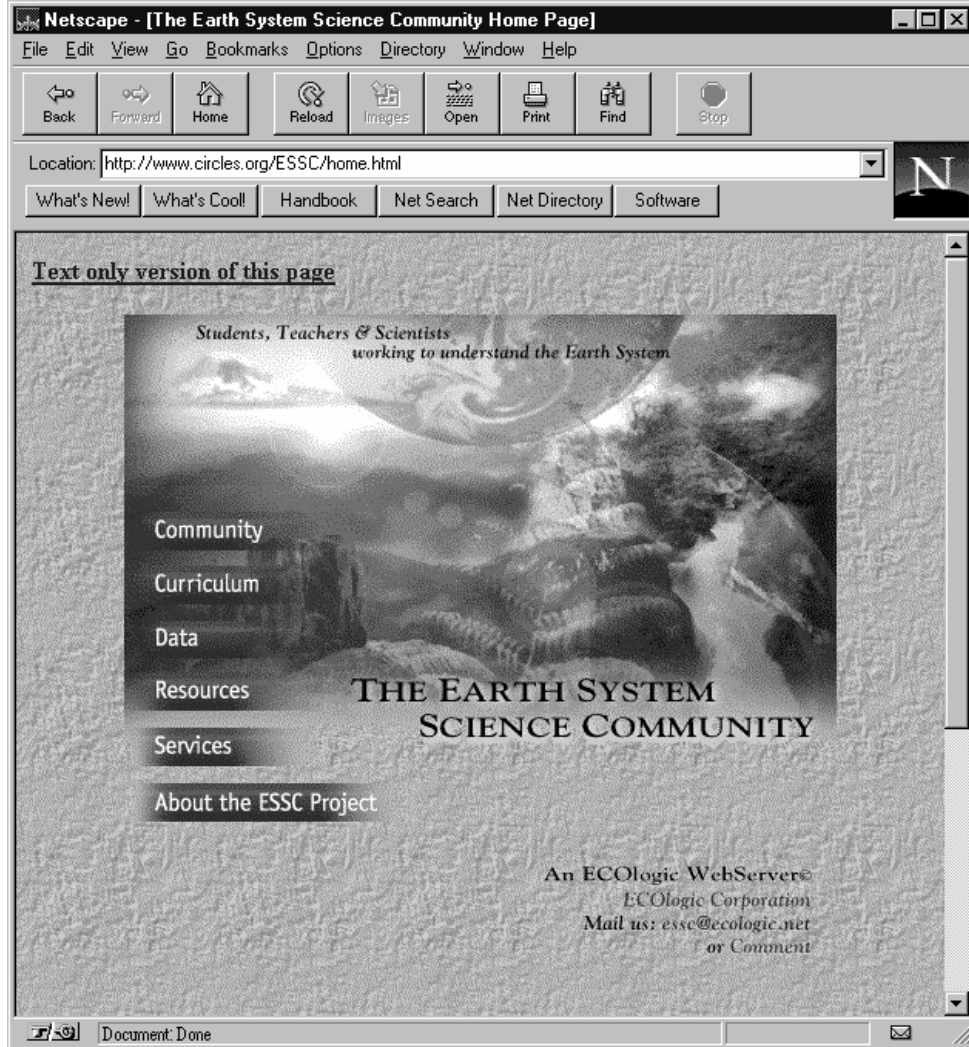


Figure 8.2 Sample home page displayed in Netscape Navigator

Save the file and read it into your browser to check for errors. Then transfer it to your Internet provider's Web server and load it into your browser. Figure 8.2 shows how this file would look with Netscape Navigator.

⊕ **Focus on the Internet: *The Earth System Science Community***

The Earth System Science Community (ESSC) project (**URL - <http://www.circles.org/ESSC/home.html>**) is a good example of how the Internet is bringing together professional



**Figure 8.3 Earth System Science Community home page**

earth scientists, university and secondary educators and high school students to more effectively teach and learn about earth system science. The ESSC is developing an online community and curriculum for high school earth system science. Funded by a grant from NASA in 1994, the ECOlogic Corp. is creating an ESSC curriculum test bed that will include twelve high schools and six universities around the country. The goal of the test bed project is to “enable any teacher, student, or school connected to the Internet to begin investigating the Earth system quickly, easily, and inexpensively” (Figure 8.3).

Earth systems science is a holistic approach to the study of the earth. In order to explain earth dynamics and change, ESS stresses the investigation of the interaction between the various components that make up the earth system. The ESS model is interdisciplinary, using networked scientific computing facilities, and visualization and modeling tools and drawing on a community of like-minded researchers to study the underlying processes of the earth. The ESSC project realizes that science students rarely have access to the tools and techniques for visualizing and analyzing earth system information. The World Wide Web is seen as a way to bring resources distributed on far-flung computing systems together for students to access.

By providing a mechanism to support ongoing collaboration between educators, students and professional earth scientists, the ESSC enables students and teachers to investigate and develop a holistic understanding of the earth system. This is accomplished by helping students to learn process thinking, employ the scientific method through collaborative problem solving, build models and use modern, scientific communication. Finally the ESSC is developing an earth system science curriculum and support system over the Internet.

To meet the objectives of the program, the project has already designed a summer immersion workshop during which ESSC participants develop an understanding of the earth’s dynamic processes. During the first summer workshop in 1995 educators investigated the hydrologic cycle and provided the background necessary to enable students to conduct investigations. Participants developed skills to analyze systems, to tap remotely sensed data and visualization tools and to use HTML to publish their results.

The ESSC program curriculum consists of several team projects and integrates widely distributed information and digital communications networks in support of classroom activities. Projects focusing on investigating and defining the earth as a system are supported by other projects categorized by earth subsystems (e.g., hydrosphere, lithosphere, etc.). Special themes have been identified (El Niño) that cross system boundaries and require a systems approach and that complement the curriculum. Technology is a tool used to do work and to communicate the results of that work. The earth systems science curriculum is dynamic and requires the use of tools that can effectively integrate disparate sources of information into a unified understanding of earth

processes. To utilize the talents of many individuals scattered across the United States, the program uses distributed information technologies like the Internet to collaborate on the creation of the curriculum.

Students work collaboratively in teams, relying on peer education as a means of learning. Team investigations require background research, hypothesis formulation, qualitative and quantitative modeling and scientific communication of results on the World Wide Web. Online access to data relevant to the investigation of earth systems is provided. For example, temperature distribution data to support ESSC investigations is extracted from the GEDEX CD-ROM of World Monthly Surface Station Climatology data sets. ESSC uses resources located on other Web sites to serve participants. ESSC draws on the CoVis project server to provide access to earth energy budget visualizations. The fruits of these investigations are being borne as many interesting student projects are being distributed over the World Wide Web (**URL - <http://www.circles.org/ESSC/resources/samples.html>**).

## What You Have Learned

- Putting the Internet to work in an efficient way requires an Internet methodology.
- Multiple approaches to information discovery must be applied to the fluid medium that is the Internet.
- Linear, linear-hierarchical, and web structures are all methods by which individuals can navigate a Web site.
- Hypertext documents are easy to create for simple hypertext Web pages.

## Apply It!

Earlier in the chapter you were introduced to HTML programming and the way to create a World Wide Web document. Throughout Chapters 1–7 you encountered many different resources that address the climate change problem. Let's put our experience together to organize the online resources we have collected into a Web resource page for climate change. As mentioned earlier, you don't need special software to create the document. Open up the text editor and follow along. Make sure to save your file as a text file with either the htm or html extension, depending on your system.

I want to build a resource page for people to access information about climate change. The first thing to do is sort through the resources I'm interested in and assign them to groups or categories. These groups are:

### **Organizations and resource servers**

- Global Change Master Directory
- Geological Survey
- Goddard Institute for Space Studies

- National Climatic Data Center

#### **Hot lists**

- The Virtual Earth

#### **Online documents and publications**

- Sea Level Change Web Document
- United Nations Environment Program Fact Sheets

#### **Searching**

- Lycos
- Yahoo!

#### **Visualizations and images**

- Greenhouse Effect Visualizations
- Interactive Visualizations (from NCDC)

The document structure will reflect the organization laid out above. The page will consist of unordered lists of sites for each category. Each list item is a hyperlink back to the original source. The document will include a graphic, my electronic mail address, and the creation date at the bottom of the document.

Define the document first as an HTML document and define a title for the browser title bar. Recall that all the text of an HTML document is enclosed in the `<HTML></HTML>` tags and the title is placed within the HEAD element.

```
<HTML>
<HEAD>
<TITLE>Online Climate Change Resources</TITLE>
</HEAD>
-----
-----
</HTML>
```

(The dashed lines between `</HEAD>` and `</HTML>` mean that other text will be located here.) Next we'll add the body of the document. I'll format the document title as a first-order heading centered on the page:

```
<HTML>
<HEAD>
<TITLE>Online Climate Change Resources</TITLE>
</HEAD>
<BODY>
<CENTER>Online Climate Change Resources</CENTER>
-----
```

```
-----
</HTML>
```

Now I'm ready to create my lists and hyperlinks. When I define the link this time I'm going to specify the entire address for a hyperlink. The example given earlier in the chapter didn't specify the absolute URL for the link because the hyperlinked documents resided in the same directory as the originating HTML document. The categories will be formatted as second-order headings, and each list item <LI> will be preceded by a bullet. Let's see what the first set of resources would look like in HTML:

```
<HTML>
<HEAD>
<TITLE>Online Climate Change Resources</TITLE>
</HEAD>
<BODY>
<CENTER><H1>Online Climate Change Resources</H1></CENTER>
<H2>Organizations and resource servers</H2>
<UL>
<LI><a href="http://gcmd.gsfc.nasa.gov/">Global Change Master Directory</a>
<LI><a href="http://www.usgs.gov/">United States Geological Survey</a>
<LI><a href="http://WWW.giss.nasa.gov/">Goddard Institute for Space
    Studies</a>
<LI><a href="http://www.ncdc.noaa.gov/">National Climatic Data Center</a>
</UL>
-----
-----
</HTML>
```

Let's add the rest of the resources now. There are some UNEP facts that I want to go straight to, so I'll embed another unordered list within the "Online Documents and Publications" list:

```
<HTML>
<HEAD>
<TITLE>Online Climate Change Resources</TITLE>
</HEAD>
<BODY>
<CENTER><H1>Online Climate Change Resources</H1></CENTER>

<H2>Organizations and resource servers</H2>
<UL>
<LI><a href="http://gcmd.gsfc.nasa.gov/">Global Change Master Directory</a>
<LI><a href="http://www.usgs.gov/">United States Geological Survey</a>
```

- <LI><a href="http://WWW.giss.nasa.gov/">Goddard Institute for Space Studies</a>
- <LI><a href="http://www.ncdc.noaa.gov/">National Climatic Data Center</a>

## <H2>Hot lists</H2>

- <LI><a href="http://atlas.es.mq.edu.au/users/pingram/v\_earth.html">The Virtual Earth</a>

## <H2>Online documents and publications</H2>

- <LI><a href="http://www.giss.nasa.gov/Research/Intro/gornitz.01.html">Sea Level Change</a> (Gornitz, V. 1996)
- <LI><a href="http://www.unep.ch/iucc/fs-index.html">United Nations Environment Program Fact Sheets</a>
- <LI><a href="http://www.unep.ch/iucc/fs003.html">An introduction to the climate system (UNEP)</a>
- <LI><a href="http://www.unep.ch/iucc/fs001.html">An introduction to the science of man-made climate change.</a>
- <LI><a href="http://www.unep.ch/iucc/fs009.html">Why "climate change" and "global warming" are not the same thing.</a>
- <LI><a href="http://www.unep.ch/iucc/fs104.html">The impact of climate change on water resources</a>
- <LI><a href="http://www.unep.ch/iucc/fs237.html">The debate over allocating responsibility for climate change</a>

## <H2> Searching</H2>

- <LI><a href="http://www.lycos.com">Lycos</a>
- <LI><a href="http://ww.yahoo.com">Yahoo</a>

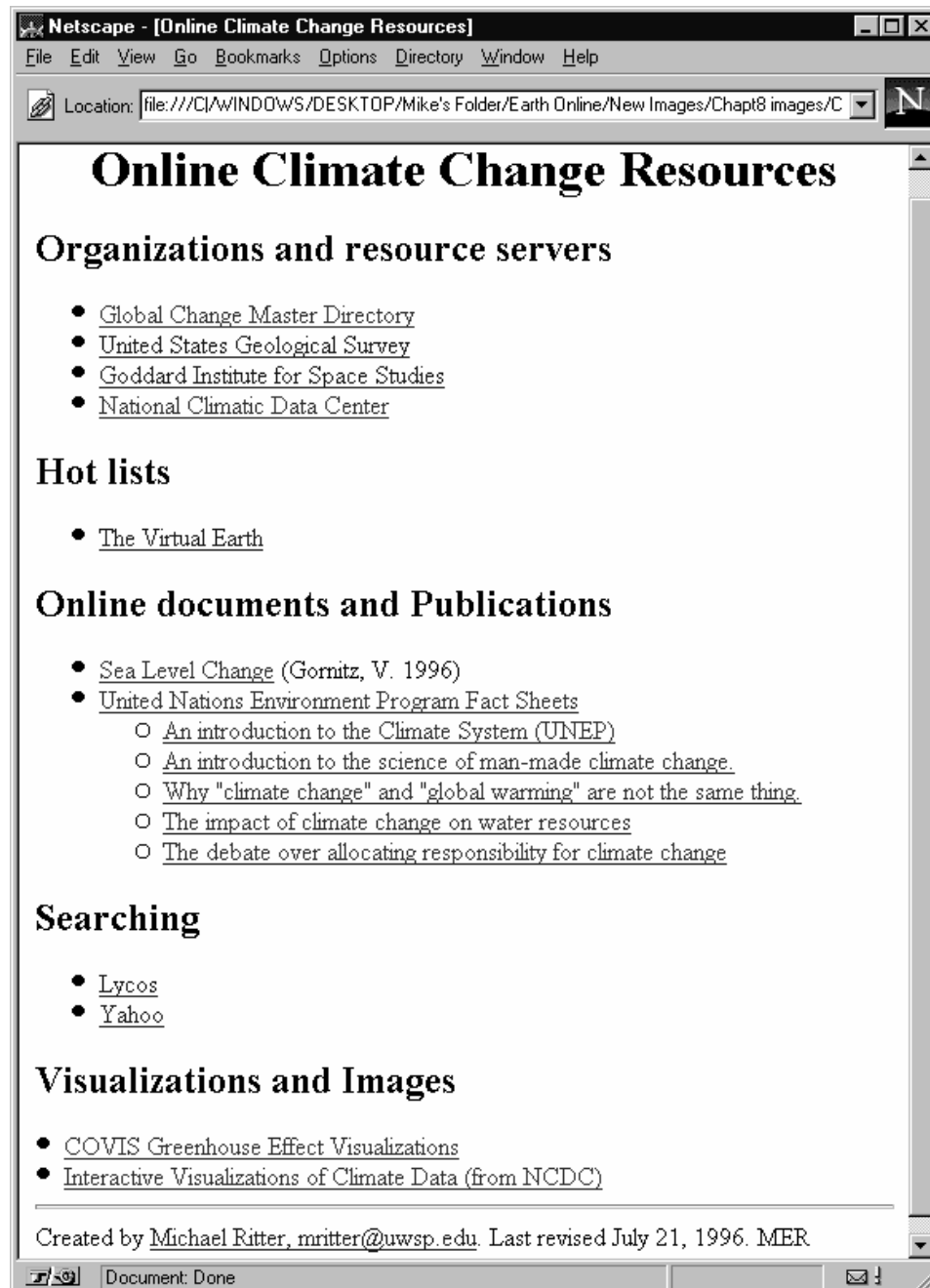
## <H2>Visualizations and Images</H2>

- <LI><a href="http://www.covis.nwu.edu/gev.html"> COVIS Greenhouse Effect Visualizations</a>
- <LI><a href="http://www.ncdc.noaa.gov/homepg/interprod.html">Interactive Visualizations of Climate Data (from NCDC)</a>

<hr>

Created by <a href="mailto:mritter@uwsp.edu">Michael Ritter,  
mritter@uwsp.edu</a>. Last revised July 21, 1996. MER  
</HTML>

At the bottom of the page I put an author reference, my email address using the "mailto" tag and the revision date. Let's take a look at what we have (Figure 8.4). Save the document as "cchange.htm" (use the html extension if you can). Now open the file in Netscape by using the "File" menu and the "Open file in Browser" menu pick.



*Figure 8.4 Personal online climate change resources page*

## Try It Out!

1. Use the World Wide Web to connect to “Introduction to HTML and URLs” at <http://www.utirc.utoronto.ca/HTMLdocs/NewHTML/intro.html>. This Web document is an excellent starting place for those wanting to create their own Web documents.
2. Build a personal home page. Follow the example in the chapter to build your home page. Take a look around at other home pages to get ideas as to how you might create your own. Use the “View Source” option on your World Wide Web browser to see how others created their home pages. Provide hyperlinks to favorite software sites and eliminate the need to use FTP software.
3. **STUDENTS:** Instead of writing a traditional term paper for your class, write a hypermedia version. Term papers constructed in hypermedia let you draw on many more resources than you can with a conventional hard copy version.
4. Create a hypermedia resume. Resumes posted on the World Wide Web attract a potentially larger audience than one can expect to address through conventional dissemination methods. Provide hyperlinks research or other original work in digital form stored at your Web site.
5. **EDUCATORS:** Create a class home page. This is a good way to keep your class up to date and informed. A digital syllabus can draw together science resources scattered across the Internet to support your classroom activities. Convert your lecture notes to hypertext outlines. Hyperlink key terms to digitized images or other supporting graphics.