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RE: Final Report: Usability Testing NRPC Prototype Website

DATE: September 22, 2009

Executive Summary

The Natural Resource Program Center of the National Park Service, U.S. Department of the Interior, asked researchers at Colorado State University to help the Center enhance its Intranet Website by evaluating a prototype of a revised Intranet Website by conducting usability testing.

The objectives of the usability testing was to (1) Identify strengths of the Website design features; (2) Identify Website design features that created problems for users; and (3) Assess participants' perception of the Website.

Methodology. During December 2008, staff from CSU's Center for Research on Communication and Technology conducted usability testing of the NRPC prototype with 12 participants. Six participants from NRPC and six from RMNP completed the usability testing.

Participants were briefed about the project, after which they signed the consent form and completed 18 tasks. As they completed the tasks, they talked aloud. Afterward, they completed a survey, which included open-ended and scaled questions. In addition, we conducted an expert review of the prototype Website based on (1) the emerging bodies of empirical research findings on Website design and (2) our research experience evaluating Website designs and human computer interaction beginning in the 1990s.

Results and Recommendations—Usability Testing

1. The basic organization of the Center's work groups is not intuitive. This creates problems for a novice or users who are unfamiliar with the basic organization of the Center, i.e., they had trouble looking for information.

Recommendation 1: Have the Advisory Group explore this issue.

Recommendation 2: NPS could provide an orientation to the Intranet. A paper document with screen captures or a video using screen capturing software could demonstrate the features and organization of the Website.

2. Content areas (such as geological and wildlife resources) are hard for some users to identify, i.e. participants were not aware of where to look for information.

Recommendation 3: Provide a good search engine and site map for the Website.

Recommendation 4: When possible, use highly descriptive links—i.e., the links tell or give a good idea of the content under that respective link.

Recommendation 5: Provide roll-overs or elaborations for the links so users will have a better idea of what they will find under each link.

3. The Website uses an inconsistent navigation design.

Recommendation 6: Ensure that all of the Tabs across the top navigation bar have appropriate elaborations and all function in the same manner.

4. Participants missed links on the right-hand side; in particular, on the lower right-hand corner of the Web.

Recommendation 7: Place key information high in the left-side navigation and in the upper-left hand corner whenever possible.

5. Returning to the home page presented a problem for users.

Recommendation 8: Provide a link labeled "Home."

6. Participants missed the breadcrumbs.

Recommendation 9: Consider enlarging the text for the breadcrumbs.

7. The font size is hard to read and too small for some participants.

Recommendation 10: Consider using larger fonts.

Recommendation 11: Ensure the font has strong contrast between the background and text. Avoid using the same colored text on a lighter background of the same color.

8. Participants had problems understanding the icons.

Recommendation 12: Consider placing the legend for icons above the tables.

Results and Recommendations--Heuristic Review

The prototype appears clean, neat, and well designed. The color combinations are pleasing and provide a nice color contrast across different sections. Many users will find the three-column format easy to use because it is emerging as one of the standard Website designs.

1. The style is inconsistent.

Recommendation 13: Develop or adopt a style guide.

Recommendation 14: Develop a consistent typographical style guide.

2. The tab design was inconsistent.

Recommendation 15: Be consistent. Ensure each tab has a pull down menu.

3. The contrast of the links' text color within tabs appears weak.

Recommendation 16: Ensure a strong contrast between the text and background to facilitate reading.

4. Small fonts on some links make it difficult for some people to read.

Recommendation 17: Consider using the functional equivalent of 10, 11, or 12 point font size on the screen.

5. Using Serif Fonts may create legibility problems.

Recommendation 18: Use a standard sans-serif font, such as Verdana, Helvetica, or Arial.

6. Some participants could not recognize the meaning of and placement of icons.

Recommendation 19: Place the legend for the icons above the tables.

7. While this is a prototype, the narrative is wordy.

Recommendation 20: Edit to reduce copy length to facilitate reading.

Recommendation 21: Use short paragraphs.

Recommendation 22: Use bullet and number lists, when possible.

Introduction

The Natural Resource Program Center of the National Park Service, U.S. Department of the Interior, asked researchers at Colorado State University to help the Center enhance its Intranet Website by evaluating a prototype of a revised Intranet Website by conducting usability testing (see Figure 1).

The objectives of the usability testing was to (1) Identify strengths of the Website design features; (2) Identify Website design features that created problems for users; and (3) Assess participants' perception of the Website.

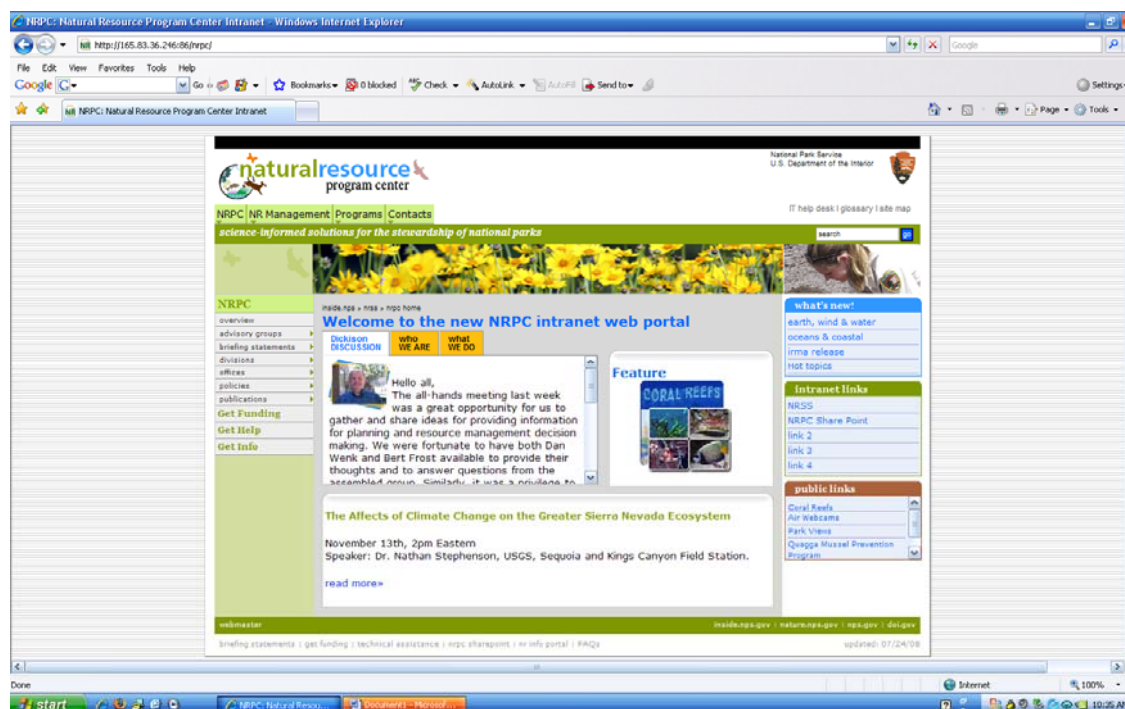


Figure 1. NRPC Prototype Screen Capture Home Page

Methodology

During December 2008, staff from CSU's Center for Research on Communication and Technology conducted usability testing of the NRPC prototype with 12 participants. Six NRPC staff members completed the usability testing at the NRPC offices in Fort Collins and six Rocky Mountain National Park participants completed the usability testing at Park Headquarters in Estes Park.

First, we briefed participants on the research project, asked them to sign the consent form (see Appendix A) and then they completed a protocol analysis—i.e., viewing and interacting

with the prototype Website by completing 18 tasks (see Appendix B). After completing the tasks, they completed a post-usability survey (see Appendix C). Finally, we debriefed them and provided an explanation of the project.

As participants tried to complete the 18 tasks, we asked that they talk aloud telling us what they were doing and why. As they worked, we took notes on their actions, timed them, noted whether they completed the tasks successfully or not, and videotaped their actions.

The post-usability survey (see Appendix C) included open-ended questions probing what participants dislike or liked, what they found difficult to use, any sections of the Website they found irritating, and what recommendations they had to change the Website. See Appendix D for participants' responses to the open-ended questions. The survey also included quantitative questions on information about the Website, technology expertise, and demographics.

In addition to the usability testing, we conducted a heuristic review of the prototype design. We based our approach to conducting heuristic reviews on (1) the emerging bodies of empirical research findings on Website design, interface design, scientific communication and technical communication; (2) our experience conducting research and evaluating Website design beginning in the mid 1990s; and (3) our experience in conducting research and evaluating human computer interactions.

Results

Participants Profile

Six of the participants worked at the NRPC and six worked at Rocky Mountain National Park (RMNP). As a group, they had worked for the Park Service from less than one year to 30 years with an average of 11.27 ± 10.66 years. Of the six participants working for NRPC, they had done so from less than a year to 6 years. Of the six participants working for RMNP, they had done so from 3 to 21 years.

Familiarity with the NRPC varied with 25 percent reporting they were not at all familiar with NRPC to 16% being very familiar with NRPC (see Appendix C, page 29, Question 2). Looking closer, 50% of the Rocky Mountain National Park participants reported being "Not at all" familiar with the NRPC.

Prior to the usability sessions, half of the participants had not searched the current NRPC Intranet. Of those who have used the NRPC intranet ($n=6$), four (66%) worked at the Center and two (33%) worked at RMNP. Half of those who worked at the Center reported having problems using the current Center Intranet Website and both of the RMNP participants reported having problems using the Center Website.

As a group, participants were familiar with personal computers ($M=17.83 \pm 5.22$ years) and the World Wide Web ($M=12.50 \pm 3.78$ years) and they rated their expertise highly (see Table 1). That said, they had less experience and rated themselves lower in using Acrobat Reader and installing software and hardware.

Table 1

Years of Experience and Expertise Level of Personal Computer and World Wide Web (N=12)

Technology Skill	Years of Experience		Level of Expertise (7 = High, 1 = None)	
	Number	S.D.	Level	S.D.
Use personal computer	17.83	±5.21	6.18	±1.09
Use World Wide Web	12.50	±3.78	5.82	±1.17
Use of Acrobat Reader	6.42	±3.85	4.60	±2.17
Downloading PDF files	8.50	±2.40	5.55	±1.29
Install software	10.08	±5.93	4.80	±2.49
Install hardware	10.92	±5.02	4.10	±2.13
Fill out applications online	10.17	±3.66	5.55	±1.57

Average Time Spent Completing Tasks

Of the 18 tasks designed to evaluate the prototype design, success rates of completing the tasks ranged from 8% to 100% with the completion times ranging from 17 seconds to 69 seconds (see Table 2). That said, all 12 participants completed only one task (see Table 2). Participants completed about one-third of the tasks in about 30 seconds or less and about one-fifth of the tasks required about 60 seconds or slightly more.

The easier tasks—those having more than a 75% completion rate, including identifying the major units within NRPC (Task 1), clicking the link to learn more about Education and Outreach (Task 3), clicking on the links to identify the working committees (Task 4), applying for grants (Task 5), understanding mitigation for biology and sounds (Task 6), and understanding what the symbols mean (Task 7).

The more difficult task--i.e., those having less than a 50% completion rates--were locating where within the NPS the NRPC was located (Task 16), finding information about wildlife management (Task 17), linking to NRPC Share Point Website (Task 9), finding out about the Quagga Mussel Prevention Program (Task 18), and returning to the NPS Intranet home page (Task 15) (see Table 2).

For participants, Tasks 16, 17, and 9 required participants to look on the right-hand side of the page, often on the lower-right hand side of the page.

We explored the possible differences between NRPC participants and RMNP participants in successfully completing the tasks. For 16 of the tasks, we found no significant differences between the two groups of participants. However, none of the RMNP staff complete Task 9, which asked them to link to the NRPC Share Point Website. That link is in the lower right-hand corner of the Website. Only one of the RMNP staff successfully completed Task 15, which asked participants to navigate back to the National Park Service Intranet homepage.

Table 2

Average Time and Percent Completing Tasks by NPS Personnel (N=12)

Tasks	Average Time (Seconds)	Percent Completing Task
1. Using the NRPC Website, please identify the major units within NRPC.	29.2	83.3%
2. What are the major activities under the geological resources?	44.4	66.7%
3. Please tell us what links you would click on to learn what services Education and Outreach provides?	41.2	91.7%
4. The Center has several working committees that provide advice to the Center and its Director. Please tell us which link you would click to learn more about these committees.	54.0	83.3%
5. The Center provides grants, monies, and support to projects in the parks. Tell us what links you would click on to seek funding for a project in a Park, assistance with locating information, and learning more about a topic.	17.2	100%
6. Assume you wanted to find out what mitigation activities Parks are undertaking for biology and sounds. Please tell us where you would click to find that information.	57.0	83.3%
7. Now, consider natural resource management. On the natural resource management table (matrix), what do the following symbols mean (NPS arrowhead logo, NR logo)? Please explain.	63.0	81.8%
8. What are the NRPC management functions for our national parks?	61.3	41.7%
9. How would you link to the NRPC Share Point Website?	40.9	36.4%
10. What public links are available from the Intranet?	35.8	58.3%
11. Assume you're having trouble using the Center Intranet Website and you suspect that you've found a problem with the Website. How would you contact the Intranet Webmaster to report the problem? Where would you click?	30.4	58.3%
12. How does the NRPC distinguish between a program and an initiative?	42.2	83.3%
13. Under the Programs tab on the NRPC page, what is the difference between the two symbols—i.e., what do they mean?	23.1	83.3%

Table 2 continued

Average Time and Percent Completing Tasks by NPS Personnel (N=12)

Tasks	Average Time (Seconds)	Percent Completing Task
14. If you wanted to talk to someone at the Natural Resource Program Center, which link would you click on to obtain the needed phone number, e-mail, or address?	25.5	100%
15. Assume you wanted to return to the National Park Service Intranet home page, how would you navigate to reach that page?	34.9	50.0%
16. Assume now, you'd like to know where within the National Park Service that the Natural Resource Program Center is located—i.e., to what office does its staff report to? Tell me how you would navigate to that office.	69.2	8.3%
17. Assume you've been using the NRPC Website for some time, where would you find information on Wildlife Management?	64.7	16.7%
18. Assume you receive a call from a park visitor asking about the Quagga Mussel Prevention Program. Where would you go on the Website to find out more about that mussel program?	30.2	50.0%

Post-Usability Questionnaire

To begin the post-usability questionnaire, participants completed six open-ended questions. The questions focus on obtaining their primary perceptions before asking them about their reactions to specific design features of the Website. Participants then responded to a series of scale questions about specific characteristics of the prototype Website, their prior experiences with the NRPC Website, and their computer expertise.

Respondents Perception of Prototype Website Open-ended Questions

Question 1. What did you like about this Website? Half of the participants noted navigational features such as the tabs, left-hand menu, and drop-down menus. Others thought the prototype was attractive, very user friendly, had an updated look, familiar graphics, a nice place to gain access to the information, and a research clearing house for NRPC information (see Appendix D for all comments).

Question 2. What did you dislike about the Website? About two-thirds of the participants made comments such as “busy, too many frames, cluttered screen, and lots of boxes.” Other individual comments focused on design features—no obvious home button, legend for tables is located on the side of the main screen versus with the table, top banners take up lots of space, Inside NPS NRSS links were small and hard to notice, and could not easily find key words (see Appendix D for all comments.).

Question 3. Which sections were the most difficult to use? Why? No strong commonalities emerged from the responses (see Appendix D for all comments.). Two participants nominated points related to the tasks on Quagga mussel site, which is located in the lower right-hand corner of the screen. Two participants made comments related to the symbols—Park Service symbol as an icon is misleading and didn't think of what information would be accessed when seeing that symbol (no explanation was provided).

Question 4. Were you able to complete the assigned tasks? If not, why do you feel you were unable to complete the tasks? Seven of the 12 participants reported the successfully completed the tasks. Of those who reported they did not (n=5), they attributed their inability to complete the task to the site being a prototype.

Question 5. Were there any aspects of the Website that you found particularly irritating, although they did not cause major problems? Half of the participants reported “nothing.” Two participants reported the lack of a home button (see Appendix D). Other individual comments centered on needing a site map, small letters instead of capitals, red colors on the tabs when pulled up, jarring colors and small frames requiring scrolling.

Question 6. What changes would make the Website easier to use? The one commonality appears to center on the perceptions of the pages being busy or cluttered. Participants made suggestions specifically about less scrolling boxes, eliminating frames, and condensing links (see Appendix D).

Respondents Perception of Prototype Website—Scale Questions on Design Features

For the overall assessment, participants responded to 32 statements about Websites on a standardized scale that we have developed for multiple projects. The scale assesses the Website design, queries participants' desired Website features, and participants' Website usage practices. Participants rated each statement using a 1 to 7 scale where 1= Strongly disagree to 7= Strongly agree. Participants did not rate all items.

When evaluating responses, consider 3.5 as the midpoint (median) for the scale. While most scale items are stated in the positive, a few are stated in the negative (statements 2, 5, 22, 23, and 24). In such cases the low score indicates participants disagreed with the statement.

Overall, only one statement received an average rating above 6 (The pages loaded quickly) (See Table 3). Three statements (i.e., the site's left-hand navigation bar was helpful, words on the screen were legible, and the site was easy to read) were above 5.0 with standard deviations of less than 1, suggesting relatively strong agreement among the participants. Other positive statements regarding the Website, i.e., statements receiving a mean of 4.75 or above, included satisfaction with the experience with the Website, could easily correct errors made on the Website, found information easy to understand, could easily find information needed, and understood the abbreviations used.

While 73% of the statements had mean (average) scores above the midpoint and relatively narrow standard deviation (under ± 1.75), other statements had greater the standard deviations. The greater the standard deviation, the greater the disagreement is among participants. For example, responses to Statement 20, “The site has too much information in PDF files” generated a mean of 3.67 with a standard deviation of ± 2.27 . A closer look at the percentage responses showed that 25% of the respondents score the statement a “4” on the 1 to 7 scale and thus indicating agreement with the statement. Likewise, responses to Statement 24, “The font (typeface) was hard to read” showed that 33% of the participants scored the statement with a “5” or “6” indicating agreement with the statement, but the standard deviation is + 1.81.

Table 3

*Part II Survey Responses: General Web Site Usability (N=12)**

Statements	Mean*	Std. Deviation
1. I was satisfied with my experience using the Web site.	4.91	±1.30
2. I found the links between pages to be very hard to understand.	3.42	±1.24
3. I could easily correct any errors I made while using the Web site.	5.40	±1.17
4. The diagrams and graphics enhanced the information in the text.	4.00	±1.60
5. The text has too much information—it makes it hard to understand the topic.	2.90	±1.52
6. The site's left navigation bar was helpful.	5.00	±0.85
7. The words on the screen were legible (easy to see).	5.50	±0.91
8. I found the site confusing to use.	3.67	±1.44
9. I found the information easy to understand.	4.91	±1.30
10. The site layout was easy to follow.	4.50	±1.51
11. I never felt lost when using the site.	3.75	±1.22
12. I felt overwhelmed when using the site.	3.42	±1.62
13. I made few errors when using the site.	4.58	±1.08
14. The pages loaded quickly.	6.08	±0.90
15. I found the site very easy to use.	4.50	±1.31
16. I found the site was easy to read.	5.25	±0.87
17. I was not at all frustrated when using the site.	4.08	±1.68
18. I found the site to be well-written.	4.44	±1.01
19. The site was not interesting to use.	3.42	±1.08
20. The site has too much information in pdf files	3.67	±2.27
21. I prefer to print and then read Web pages.	2.33	±1.67
22. I found the links to be inconsistent.	3.09	±1.58
23. The font (typeface) was hard to read.	2.58	±1.44
24. The font (typeface) was too small to read.	3.00	±1.81
25. I could easily find the information I needed.	4.83	±1.19
26. The site design is attractive.	4.42	±1.38
27. The colors are pleasing.	4.17	±1.53
28. I prefer reading information online rather than downloading pdf files and then reading the printed file.	4.33	±1.50
29. The Search function was easy to use	4.00	±4.00***
30. A glossary would be helpful.	5.13	±1.25****
31. I would use the IT help link.	5.10	±1.45
32. I understood the abbreviations used.	4.91	±1.22

* Respondents answered using the 1 to 7 scale where 1 = Strongly Disagree to 7 = Strongly Agree.

** N = 1 *** N = 2 **** N = 8

Respondents Perception of Prototype Website—NRPC Characteristics

We developed a scale of statements to assess participants' perceptions of selected features of the NRPC prototype Website (see Table 4). Again, participants rated each statement on a 1 to 7 scale where 1= Strongly disagree to 7 = Strongly agree. Not all participants rated all statements.

The mean (average) score ranged from 6.26 to 4.33, indicating mainly positive responses to the design features of the Website prototype. Standard deviations ranged from ± 1.14 to ± 1.98 (see Table 4).

Statement 15, "The definitions helped me understand," received the highest mean rating ($M = 6.25 \pm 1.55$). Other statements receiving mean ratings above 5.00 were:

- scroll functions were easy to use,
- tables for resources were easy to understand,
- symbols in the tables menu were understandable,
- one could scroll down to the bottom of the table,
- the definition of natural resource management was helpful,
- understood the terms in the left-hand column,
- understood what the symbols meant for the programs, and
- the scroll bar was easy to use.

About 50% of the statements received an average of 5.00 or above 5.0. However, a closer look at their standard deviations suggests some participants did not agree with the statements. Standard deviations of over ± 1.750 for understanding symbols in tables and for programs (Statements 9 and 15) and using the scroll bar (Statements 11 and 16) indicate some participants had problems in these areas. Generally, when the standard deviations are above ± 1.50 , from 9% to 17% of the participants gave the statements a 2 rating on the 1 to 7 point scale.

The biggest issue identified by participants was understanding the NRPC organization. For example, for Statement 1, "NRPC organization was easy to follow." ($M = 4.33, \pm 1.67$), a close look at the percentage responses showed that 42% of the participants rated the statement a 2 or 3 on the 1 to 7 scale. Simply, they disagreed with statement. This suggests that the organization of NRPC was hard for them to follow. Further, examining Statement 2, "Organization makes sense," ($M = 4.75 \pm 1.49$), 17% of the participants gave the statement a rating of 2 on the 1 to 7 scale. The different NRPC units also troubled participants (Statement 3, $M = 4.33 \pm 1.50$).

Table 4

*Part III Survey Responses: Specific Usability (N= 12)**

Statements	Mean*	Std. Deviation
1. NRPC organization was easy to follow.	4.33	±1.67
2. Organization makes sense.	4.75	±1.49
3. Different units make sense to me.	4.33	±1.50
4. Scroll functions were easy to use.	5.18	±1.25
5. Accessing briefing statements are easy.	4.75	±1.26**
6. The abbreviations used are easy to understand.	4.90	±1.20
7. The links providing .pdf files were easy to understand.	4.60	±1.14**
8. Tables for resources (air, water, etc.) were easy to understand.	5.09	±1.30
9. I understand what the symbols in the tables mean.	5.08	±1.83
10. The scroll bars were easy to use.	4.75	±1.91
11. I could scroll down to the bottom of the table.	5.18	±2.23
12. The definition of natural resource management was helpful.	5.29	±1.11***
13. I understood what the terms in the left-hand column meant.	5.00	±1.48
14. The definition of programs helped me understand the difference between programs and initiatives.	6.25	±1.55
15. I understood what the symbols meant for the programs.	5.22	±1.99***
16. The scroll bar was easy to use.	5.00	±1.86
17. I could easily tell what text linked to another screen.	4.33	±1.78
18. I could easily tell what symbols meant.	4.83	±1.80

* Respondents answered using the 1 to 7 scale where 1 = Strongly Disagree to 7 = Strongly Agree.

N = 4 to 5 participants * N = 7 to 9 participants

Discussion and Recommendations of Usability Findings

Based on the foregoing, we identify the leading design issues and provide recommendations for the NRPC staff to consider in redesigning the prototype.

1. The basic organization of the Center

The basic organization of the various work groups or units within the Center content may present problems for users—i.e., the separation by division and offices complicates users' ability to search for information. This particularly creates problems for a novice or users who are unfamiliar with the basic organization of the Center.

This complication is beyond the scope of the usability project, but the organization of the Center does not appear to be intuitive to users.

Recommendation 1: Have the Advisory Group explore this issue.

Recommendation 2: NPS could provide an orientation to the Intranet. A paper document with screen captures or a video using screen capturing software could demonstrate the features of the Website.

2. Content Areas

Users were not aware of where to look for some information. For example only 66% of the participants completed the Task 2 that required them to look for information about geological resources. Also only 16.7% of participants were able to find information on Wildlife Management.

Recommendation 3: Provide a good search engine and site map for the Website.

Recommendation 4: When possible, use highly descriptive links—i.e., they tell or give a good idea of the content under that respective link.

Recommendation 5: Provide roll-overs or elaborations for the links so users will have a better idea of what they will find under each link.

3. Inconsistent design

The lack of consistency on the design created problems for users. Specifically, the lack of a pull-down menu under the program tab created problems for some users. They expected more explanation.

Recommendation 6: Ensure that all of the Tabs across the top navigation bar have elaborations.

4. Links on the right-hand side and lower right-hand corner of the Web

On sites with the left-hand and top navigation bars, some users do not look along the right-hand side and in particular, the lower-right hand corner. We have repeatedly observed this problem on usability research on other Websites.

Do not place mission-critical information on the right-hand and lower-right hand side of the screen layout. Too often participants miss information here.

Recommendation 7: Place key information high in the left-side navigation system or in the upper-left hand corner, whenever possible.

5. Returning to the home page presented a problem for users.

Only 50% of the participants successfully completed Task 15 that asked them to return to the NRPC home page.

Recommendation 8: Provide a link labeled “Home.”

6. Missing the breadcrumbs.

Few participants appeared to use the breadcrumbs above the “Welcome to the new NRPC intranet web portal” headline. Only one participant used the breadcrumbs to identify the organization to which the Center reports.

Recommendation 9: Consider enlarging the text for the breadcrumbs.

7. Font hard to read and too small for some participants.

When asked to respond to the statement, “The font (typeface) was too small to read,” participants rated this statement below the median ($M = 3.00 \pm 1.81$), which suggests about half of the participants may have had trouble reading the text.

When asked to respond to the statement, “The font (typeface) was hard to read,” more than half of the participants agreed. Note the mean and standard deviation-- $M = 2.58 \pm 1.44$.

Therefore, the problem may be associated with the actual size of the text and text legibility—i.e. the contrast between the text and the background.

Recommendation 10: Consider using larger fonts.

Recommendation 11: Ensure the font has strong contrast between the background and text. Avoid using the same colored text on a lighter background of the same color.

8. Understanding the icons

For some participants, they could not quickly identify what the icons meant on the pages with tables—for example, the NRPC on the Natural Resources Management page. Some participants spend time searching for the definitions and could not readily find them. However, once they moved the mouse over the icon, the pop-up provided the needed definition.

Recommendation 12: Consider placing the legend for icons above the tables.

Discussion and Recommendations from Heuristic Review

The prototype appears clean, neat, and well designed. The color combinations are pleasing and provide a nice color contrast across different sections.

Many users will find the three-column format easy to use because it is emerging as one of the standard Website designs. Users come to a Website and begin using them based on their prior experiences with other Websites. No clear studies have documented the learning curve required to learn new designs.

Simply, their first impression influences users and users will spend only so long looking for information.

More effective Websites allow users to find information in less than 30 seconds (Fernades, Dudek, & Brown (2006) Further, research suggest users' first impression of a Website influences whether or not they will use it—regardless of the source or content (Fogg, 2003).

Observations

Below, we provide seven observations based on our review of the prototype Website.

1. The style is inconsistent.

Style encompasses grammar, spelling, typography, and other conventions.

In reviewing the headers and links, we observed a mix of uppercase and lower case, mixed fonts—serif and sans-serif, and font sizes. For example, the style for typographical style of links in the left-hand navigation bar is mixed. Some are capitalized; others are not. The bottom three links “Get Funding, Get Help, and Get Info” use a large and bold-faced serif font using an uppercase/lower case style. The links above these three use a smaller, sans-serif, no capitalization, and regular fonts—i.e., not boldfaced like the “Get Funding, Get Help, Get Info” links.

Recommendation 13. Develop or adopt a style guide.

Adopt a style guide and dictionary to avoid controversies about grammar, spelling, and other conventions. If your agency has a style guide and standard dictionary, follow them.

a. Grammar conventions:

U.S. Government Printing Office Style Manual: U.S.
(2000), 29th Edition
<http://www.gpoaccess.gov/stylemanual/browse.html>

The Chicago Manual of Style, Chicago: The University of Chicago.

Words into Type. Englewood Cliffs NJ: Prentice Hall.

b. Spelling conventions:

The Government Printing Office uses *Webster's Third New International Dictionary* as its guide for the spelling of words not appearing in the Manual.

Other Standard desktop Dictionaries:

Merriam Webster's Collegiate Dictionary. Springfield, MA: Merriam-Webster.

The American Heritage College Dictionary. New York: Houghton Mifflin.

Recommendation 14: Develop a consistent typographical style guide

Consider developing a typographical and layout style guide that provides consistent guidance for font selection, font size, capitalization, layout, and related design features.

2. Inconsistent Tab design

On the Green Tabs across the top of the page, the NRPC, NR Management, Programs, and Contacts do not have a consistent design. The Programs tab does not have a pull down menu like the other tabs.

Recommendation 15: Be consistent. Ensure each tab has a pull down menu.

3. The text of link within tabs contrast appears weak.

The links may be difficult for some users to read—i.e., they may have difficulty with the legibility of the text. Using the same color text on a lighter shade of the same color seldom provides sufficient contrast between the background and the text.

Recommendation 16: Ensure a strong contrast between the text and background to facilitate reading. The text should stand out—i.e., provide a strong contrast against its background.

4. Small fonts on some links may be difficult for some readers.

For example, the fonts in the NPS text and logo in the upper right-hand corner appear to be 6 or 8 point. As users age, they often need bifocals somewhere between 38 and 42 years old. After 42, users often need computer glasses—i.e., they need lenses ground for the focal length of their viewing distance when using computers.

In our usability testing with college students, we have found that upwards of one-fourth report that the fonts are too small on many Websites.

Other places where the fonts maybe too small for some readers:

- IT help desk| glossary| site map
- Inside nps>nrss>nrpc home
- Webmaster text on left and other text on right bottom bar
- Final bottom bar: briefing statements...FAQs.

Recommendation 17: Consider using the functional equivalent of 10, 11 or 12 point font size on the screen.

5. Using Serif Fonts

Serif fonts are those with cross-strokes at the end of each stroke—for example the Times Roman font. Monitors vary widely in their ability to project these serifs and thus create problems for reading extensive amounts of copy online. In some cases the serif fonts create run-on letters—i.e., they lack kerning between the letters—to the point that the words are hard to read.

Recommendation 18: Use a standard sans-serif font, such as Verdana, Helvetica, or Arial.

6. Recognition of and placement of Icons

On the pages with tables, the icons used (such as NPS Arrow, mail, etc.) may not be easily recognized or understood. Further, the icons and their definitions—i.e., the legend, should be placed above the tables.

Recommendation 19: Place the legend for the icons above the tables.

7. While this is a prototype, the narrative is wordy.

Readers do not read Websites word for word as they may do for printed documents. Instead, they often scan looking for key information. Our review of the available copy suggests it could be edited or tightened by 25% or more to reduce its length.

Recommendation 20: Provide edits to reduce copy length to facilitate reading.

Recommendation 21: Use short paragraphs.

Recommendation 22: Use bullet and number lists, when possible.

References Cited

- Fogg, B. J. (2003). *Persuasive technology: Using computers to change what we think and do*. Boston: Morgan Kaufmann
- Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention Web designers: You have 50 milliseconds to make a good first impression. *Behaviour & Information Technology*. 25(2), 115-126.

Appendix A: Consent Form

Usability Assessment Consent Form

COLORADO STATE UNIVERSITY INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

TITLE OF PROJECT:

Developing Research-Based Guidelines for Improving the National Park Service Intranet.

NAME OF PRINCIPAL INVESTIGATORS:

Donald E. Zimmerman

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS: Don Zimmerman 491-5674

SPONSOR OF THE PROJECT: Natural Resource Program Center, National Park Service

PURPOSE OF THE RESEARCH: The purpose of the research is to assess different layout and designs of World Wide Web home pages and sites.

PROCEDURES/METHODS TO BE USED: We would like you to: (1) Find specific information in selected Web sites; and (2) Complete a questionnaire about your reactions to the Web sites, your prior computer use, and selected demographic information. The control numbers on the questionnaires allow us to match participants' responses to the questions before and after using the Web sites.

We will videotape you as you use the Web site and the computer screen, and we will record your comments as you perform the tasks. The videotape is for research, and your name will not be used in the data or any report.

As part of the study, you agree to be videotaped and for the tapes and excerpts from them to be used in the research project designed to assess layout and design of WWW pages. If you sign this consent form agreeing to participate, then you are allowing us to videotape you.

Are you willing for us to use the videotapes for the additional uses listed below? If so, please initial your responses.

1. Other usability research? ☐ Yes ☐ No
2. In classes for training technical communicators? ☐ Yes ☐ No
3. Research presentations demonstrating study results? ☐ Yes ☐ No

The tapes will be retained for three years and then destroyed.

Your participation will take about 90-120 minutes.

RISKS INHERENT IN THE PROCEDURES:

There are no known risks for participating in this research.

It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

BENEFITS: You will benefit by better understanding how to use World Wide Web sites. The information gained from this research project will be used to help improve Web sites.

COMPENSATION: None

CONFIDENTIALITY: Your name will not appear in the data or in any report on the project, and you will not be identified by name. You are assured of confidentiality to the extent legally possible.

LIABILITY: The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

Page 1 of 2 ____ (Initial)

Questions about participants' rights may be directed to Janell Barker at 970-491-1655.

PARTICIPATION: Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing one page.

If you decide to participate in the study, you may withdraw your consent and stop participating at any time.

Participant name (printed)

Participant signature Date

Witness to signature (project staff) Date

Appendix B: Protocol for Usability Testing

The National Park Service Natural Resource Program Center is revising its Website. We need your help in reviewing the design and organization of this new Website for the Center.

On the computer in front of you, you will see a proposed design for the Website. It's not complete—i.e., not all of the links and buttons work, nor does the site contain all of the explanations and information for the final Website. That said, the links, buttons, and functions generally suggest what information would be found under each one.

We're not testing you, but trying to learn what changes may need to be made so that the Website is easier for Center and Park Service staff members to use.

As you work, please talk aloud, telling us what you're thinking and planning to do. We'll be taking notes and video and audio taping you.

First, take two to three minutes to familiarize yourself with the Website. Once you feel comfortable with it, please tell us and we'll have you begin answering our questions.

Do Not Turn the Page until told to do so.

Please read each question below, and then tell us which link or button you would use, or how you would search for information to answer the question. If you feel stuck or don't know where you would go to find the information, please tell us. That's an important point for us to know.

Please write your answers in the space below the question

1. Using the NRPC Website, please identify the major units within NRPC.

2. What are the major activities under geological resources?

3. Assume you wanted to know what services education and outreach provides. Please tell us what links you would click on to learn what services the Education and Outreach provides.

4. The Center has several working committees that provide advice to the Center and its Director. Please tell us which link(s) you would click to learn more about these committees.

5. The Center provides grants, monies, and support to projects in the parks. Tell us what links you would click on to seek funding for a project in a Park.

6. Assume you wanted to find out what mitigation activities National Parks are undertaking for biology. Please tell us where you would click to find that information.

7. Now, consider Natural Resource Management. On the Natural Resource Management table (matrix), what do the following symbols mean: NPS arrowhead logo and the NR logo.? Please explain.

8. What are the NRPC management functions for our national parks?
9. How would you link to the NRPC Share Point Website?
10. What public links are available from the Intranet?
11. Assume you're having trouble using the Center's Intranet Website and you suspect that you've found a problem with the Website. How would you contact the Intranet Webmaster to report the problem? Where would you click?
12. How does the NRPC distinguish between a program and an initiative?
13. Under the Programs tab on the NRPC page, what are definitions of the symbols?
14. If you wanted to talk to someone at the Natural Resource Program Center, which link would you click on to obtain the needed phone number, e-mail, or address?
15. Assume you wanted to return to the National Park Service Intranet home page, how would you navigate to reach that page?

16. Assume you'd like to know where within the National Park Service that the Natural Resource Program Center is located—i.e., to what office does its staff report? Tell me what office the NRPC staff reports to.

17. Assume you've been using the NRPC Website for some time. Where would you find information on Wildlife Management?

18. Assume you receive a call from a park visitor asking about the Quagga Mussel Prevention Program. Where would you go on the Website to find out more about that mussel program?

Appendix C: Usability Post Questionnaire**Part I: Assessment of the Website**

Based on your Web site session today, please answer the following questions in the spaces provided.

1. What do you like about this Web site?

2. What you dislike about the Web site?

3. Which sections were the most difficult to use? Why?

4. Were you able to complete the assigned tasks?

____ Yes ____ No

4a. If no, why do you feel you were unable to complete the tasks?

5. Were there any aspects of the Web site that you found particularly irritating, although they did not cause major problems?

6. What changes would make the Web site easier to use?

Part II. For each of the following items below, please tell us how much you agree or disagree with each statement. Use a 1 to 7 scale where 1 = Strongly Disagree and 7 = Strongly Agree. If the question is not applicable, circle NA. Please circle your responses.

	Strong Disagree				Strongly Agree			
1. I was satisfied with my experience using the Web site.	1	2	3	4	5	6	7	NA
2. I found the links between pages hard to understand.	1	2	3	4	5	6	7	NA
3. I could easily correct any errors I made while using the Web site.	1	2	3	4	5	6	7	NA
4. The diagrams and graphics enhanced the information in the text.	1	2	3	4	5	6	7	NA
5. The text has too much information-- it makes it hard to understand the topic.	1	2	3	4	5	6	7	NA
6. The site's left-hand navigation was helpful.	1	2	3	4	5	6	7	NA
7. The words on the screen were legible (easy to see).	1	2	3	4	5	6	7	NA
8. I found the site confusing to use.	1	2	3	4	5	6	7	NA
9. I found the information easy to understand.	1	2	3	4	5	6	7	NA
10. The site layout was easy to follow.	1	2	3	4	5	6	7	NA
11. I never felt lost when using the site.	1	2	3	4	5	6	7	NA
12. I felt overwhelmed when using the site.	1	2	3	4	5	6	7	NA
13. I made few errors when using the site.	1	2	3	4	5	6	7	NA
14. The pages loaded quickly.	1	2	3	4	5	6	7	NA
15. I found the site very easy to use.	1	2	3	4	5	6	7	NA
16. I found the site easy to read.	1	2	3	4	5	6	7	NA
17. I was not at all frustrated when using the site.	1	2	3	4	5	6	7	NA
18. I found the site to be well-written.	1	2	3	4	5	6	7	NA
19. The site was not interesting to use.	1	2	3	4	5	6	7	NA
20. The site has too much information in .pdf files.	1	2	3	4	5	6	7	NA
21. I prefer to print and then read Web pages.	1	2	3	4	5	6	7	NA
22. I found the links to be inconsistent.	1	2	3	4	5	6	7	NA
23. The font (typeface) was hard to read.	1	2	3	4	5	6	7	NA
24. The font (typeface) was too small to read.	1	2	3	4	5	6	7	NA
25. I could easily find the information I needed.	1	2	3	4	5	6	7	NA
26. The site design is attractive.	1	2	3	4	5	6	7	NA
27. The colors are pleasing.	1	2	3	4	5	6	7	NA
28. I prefer reading information online rather than downloading .pdf files and then reading the printed file.	1	2	3	4	5	6	7	NA
29. Printing pages was easy.	1	2	3	4	5	6	7	NA
30. The search function was easy to use.	1	2	3	4	5	6	7	NA
31. The glossary would be helpful.	1	2	3	4	5	6	7	NA
32. I would use the IT help link.	1	2	3	4	5	6	7	NA
33. I understood the abbreviations used.	1	2	3	4	5	6	7	NA

Part III. The Website that you used is organized around three key sections: (1) an introduction to the Natural Resource Program Center, (2) Natural Resource Management, and (3) NRPC Programs and Initiatives. We'd now like to ask you a few questions about each one of the key sections. For each item listed, please tell us how much you agree or disagree with each statement. Use a 1 to 7 scale where 1 = Strongly Disagree and 7 = Strongly Agree. If the question is not applicable, circle NA. Please circle your responses.

Strong Disagree

Strongly Agree

Introduction to Natural Resource Program Center

1. The organization was easy to follow	1	2	3	4	5	6	7	NA
2. The organization of the Center makes sense to me.	1	2	3	4	5	6	7	NA
3. The different units—divisions, office advisory groups—makes sense to me.	1	2	3	4	5	6	7	NA
4. The scroll functions were easy to use.	1	2	3	4	5	6	7	NA
5. Accessing the briefing statements are easy.	1	2	3	4	5	6	7	NA
6. Submitting new briefing statements would be easy.	1	2	3	4	5	6	7	NA
7. The abbreviations used are easy to understand.	1	2	3	4	5	6	7	NA
8. The links providing .pdf files were easy to understand.	1	2	3	4	5	6	7	NA

Natural Resource Management

9. The table of resources for air, biology, etc. is easy to understand.	1	2	3	4	5	6	7	NA
10. I understood what the symbols in the table mean.	1	2	3	4	5	6	7	NA
11. The scroll bars were easy to use.	1	2	3	4	5	6	7	NA
12. I could scroll to the bottom of the table.	1	2	3	4	5	6	7	NA
13. The definition of natural resource management as helpful.	1	2	3	4	5	6	7	NA
14. I understood what the terms in the left-hand column of the table meant.	1	2	3	4	5	6	7	NA

NRPC Programs & Initiatives

15. The definition of programs helped me understand the difference between programs and initiatives.	1	2	3	4	5	6	7	NA
16. I understood what the symbols meant for the programs.	1	2	3	4	5	6	7	NA
17. The scroll bar was easy to use.	1	2	3	4	5	6	7	NA
18. I could easily tell what text linked to another screen.	1	2	3	4	5	6	7	NA
19. I could easily tell what symbols mean.	1	2	3	4	5	6	7	NA

Part. IV. Using Web sites.

1. Prior today, how frequently have you searched the NPS Natural Resource Program Center Web site for information? Using a 1 to 7 scale where 1 = Not at all to 7 = Very frequently, please circle your response.

Not at all 1 2 3 4 5 6 7 Very frequently

- 1a. Did you have problems using the Website?
 ___ No ___ Yes (GO TO QUESTION 1b)

1b. If so, please tell us what problem(s) you had.

Part V. Computer Experience

1. In Column A, please enter the number of years of experience you have had with each hardware or software product. In Column B, please indicate your expertise using a 1 to 7 scale where 1 = None and 7 = A great deal. Please circle your responses.

	Column A	Column B						
	Years	None					A Great Deal	
a. Using a personal computer	___	1	2	3	4	5	6	7
b. Using the World Wide Web	___	1	2	3	4	5	6	7
c. Personally downloading Adobe's Acrobat Reader software	___	1	2	3	4	5	6	7
d. Downloading .pdf files	___	1	2	3	4	5	6	7
e. Installing software	___	1	2	3	4	5	6	7
f. Installing hardware	___	1	2	3	4	5	6	7
g. Filling out applications/forms online	___	1	2	3	4	5	6	7

Part VI. Background Information

1. How long have you been a NPS employee? _____
 1a. Do you work for the Natural Resource Program Center or Rocky Mountain National Park? (Please check one)

___ Natural Resource Program Center.

1b. How long have you worked for the Center? _____

___ Rocky Mountain National Park

1c. How long have you worked for RMNP? _____

2. How familiar would you say you are with the Natural Resource Program Center and its programs? Using a 1 to 7 scale where 1 = Not at all familiar to 7 = Very familiar, please tell us how familiar you are with the Center. Circle your response.

Not at all familiar 1 2 3 4 5 6 7 Very familiar

Thank you for your responses.

Appendix D: Open-ended Responses on Post-Usability Survey**Question 1. What do you like about this Website?**

Research Clearing house for information
Attractive presentation
Useful logical links
Nice place to gain access to information
Very user friendly
Drop-down menus
What's New and other topics on right column
Pages load quickly
Familiar graphics
Tabs at the top make returning to the main page easy
Tabs and drop-down menus
Updated look
Comparable to Sharepoint site
Left navigation and right information boxes
Straight forward navigation
Good attempt at integrating sites together into a concise directory

Question 2. What did you dislike about the Website?

Could not easily find words
No obvious home button
Lead article in center of page is distracting
Multi screens
Inside NPS NRSS links were small and hard to notice
Small and short tabs
No drop-down menus for programs
Unable to find intranet
Very busy
A lot of boxes give the feeling of a messy page
Distracting when looking for information
No "contact us" link at the bottom of page
Legend on the side instead of on the main screen with corresponding table
Organization was confusing
Repeating items in different locations
Bright green colors
Boxy tabs
Top banners and tabs take up a lot of space
Busy
Too many colors and blocks
Busy interface
Too many frames
Multiple side bars clutter the screen

Question 3. Which sections were the most difficult to use? Why?

Links to NPS went to DOI
 Did not notice any sections
 Links to other website i.e. quagga mussel site
 Finding the table under Resource Management
 tab
 Transfer to NPS intranet
 Park Service symbol was misleading
 Don't think of access type when seeing that
 symbol
 None
 Where NRPC fits into NPS
 Activities list could be multiple areas
 Hard to find if unaware (ex. mussel question)

Question 4. Were you able to complete the assigned tasks? If not, why do you feel you were unable to complete the tasks?

Were you able to complete the assigned tasks?	If no, why do feel you were unable to complete tasks?
No	Hard to find specific words
No	Information was missing; Website incomplete
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	
No	Was not able to complete one question
Yes	
No	Some destinations were not active
Yes	

Question 5. Were there any aspects of the Website that you found particularly irritating, although they did not cause major problems?

Participant's lack of understanding between NRPC and NPS
 Nothing
 No
 No
 Not really
 Red color on the tabs when pulled up
 Colors were jarring
 No back home button
 No
 Lack of a "Home" button
 Lack of a map to the Web site
 Bright green
 White boxes around icons when highlighted
 Using small letters instead of caps
 Not really
 Small frames that require scrolling

Question 6. What changes would make the Website easier to use?

No duplication of pull down and side menus
 Links inside NPS were hard to see
 Information available on the left and top of page
 Add a more obvious icon for the intranet
 Make transferring to NPS intranet specific
 Clean up the page
 Put less on each page
 Have each side bar change with the page
 Offer some of the information as a topic on side bar
 Add home navigation button
 Make features bold in drop-down menus
 Simplify categories and links at top-level
 More space for content
 Less scrolling boxes
 Make sure multiples are in the same directory
 Eliminate frames
 Condense links into top and left side bars