

GEF Web Style Guide

Final Report

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1 Introduction

1.1 Background

The Global Environment Facility (GEF)¹ is a partnership of 178 countries, international institutions, nongovernmental organizations (NGOs), and the private sector. GEF addresses global environmental issues and supports national sustainable development initiatives. Through its partners, GEF awards grants for projects in six focal areas: biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

GEF established the International Waters (IW) focal area to help countries work together to overcome cross-border tensions concerning the use of common water supplies in large water systems. Within this focal area, GEF provides grants to assist countries collectively manage their transboundary surface water basins, groundwater basins, and coastal and marine systems. To date, GEF has supported 183 projects across more than 170 countries, including collaborative efforts in 22 transboundary river basins, eight transboundary lake basins, five transboundary groundwater systems, and 19 large marine ecosystems.² Collectively, the GEF IW focal area has provided \$1.1 billion and leveraged an additional \$4.2 billion in co-financing. Many multilateral environmental agreements concerning international waters and transboundary water systems are also associated with GEF.

In 1994, the GEF and its partner agencies established the International Waters Learning Exchange And Resource Network (IW:LEARN)³ to share experiences and best management practices developed by International Waters projects. IW:LEARN promotes a culture of adaptive learning among GEF IW projects through networking, knowledge sharing, and peer learning among its partner agencies and stakeholders. The goal is to improve the quality of all GEF projects.

The IW:LEARN website maintains a library of project information, including technical reports, project documents, data sets, fact sheets, maps, newsletters, press releases, personnel contacts, and Internet links. This information can be accessed through the IW project database. The website also maintains an archive of all project websites to ensure that no information is lost after a project has been completed.

In addition to information about the IW projects and products, IW:LEARN fosters the

¹ GEF website. Available online at <http://www.gefweb.org>. [Accessed 20 July 2009].

² GEF (2009). *From Ridge to Reef*. Available online for downloading at http://www.gefweb.org/uploadFiles/Publications/GEF_RidgetoReef_CRA_lores.pdf. [Accessed 24 August 2009].

³ IW:LEARN website. Available online at <http://www.iwlearn.net>. [Accessed 20 July 2009].

development and deployment of Web-based content management systems, collaboration tools, and project websites at reasonable costs. These all support user-friendly information sharing and knowledge transfer. IW:LEARN provides IW projects with Internet-based GIS and metadata tools and a website development tool kit using the Plone content management system (CMS). IW:LEARN organizes workshops and online training in the use of these software tools and also provides help in building and hosting project websites.

The scope, magnitude, and diversity of the GEF IW program make it essential to capture and share with the worldwide water resources community, the technical information, water management approaches, and experiences gained by the IW projects. The successful use of the Internet and other information technology tools are key to accomplishing the goals of IW:LEARN and the GEF IW focal area.

1.2 Why have a project website?

The world of information is growing exponentially.⁴ New technology is doubling every two years. The information available in *The New York Times* during an average week exceeds the total information that a person living in the 18th century was likely to see in a lifetime. By 2012 there will be more than 600 million more people using the Internet than in 2008. The ‘digital universe’, which includes all digital information created by digital cameras, Internet transactions, digital phones, and so on worldwide, amounted to 487 exabytes (10^{19}) in 2008. These data will increase 5-fold by 2012.⁵ Interactions between people via emails, text messaging, and social networks will increase by a factor of 8 in the next four years. Managing this incredible volume of information and finding relevant information will be increasingly difficult.

To share the information and expertise gained during your GEF IW project, you will have to compete for users’ attention in this fast-growing universe of information. Today, people seeking information are much more likely to turn to the Internet than to any other information source. You and your project must have a ‘presence’ on the Web to be noticed. More than that, you will have to work hard at communicating your project’s findings and experiences with your target audiences. Traditionally, paper publications from GEF projects would find their way into specialty libraries or be purchased from bookstores of the GEF agencies by a limited number of interested specialists. Today, you have the opportunity to communicate the activities and results of your project, not only with your local and regional partners, but also with potentially tens of thousands of people all over the world who have similar topical interests, as well as the general public. To apply the right information technology tool for the job, however, you have to have some understanding of how these tools operate.

⁴ Fisch, Karl, McLeod, Scott and Brennan, Jeff (2007). Did you know 2.0 (video). Available online at <http://www.youtube.com/watch?v=pMcfrLYDm2U&feature=related>. [Accessed 24 August 2009].

⁵ Gantz, John and Reinsel, David (2009). *As the Economy Contracts, the Digital Universe Expands*. EMC² Corporation. Available online at <http://www.emc.com/collateral/demos/microsites/idc-digital-universe/iview.htm>. [Accessed 24 August, 2009].

1.3 What is the purpose of this guide?

‘A style guide or style manual is a set of standards for design and writing of documents, either for general use or for a specific publication or organization.’⁶ This guide provides GEF IW projects with guidance in the design or redesign of their websites. The construction and maintenance of a well-designed, well-organized, and usable website is a critical part of the GEF program.

While each water project is unique in terms of its topics, culture, and geographic context, the types of information contained on the project website generally will be similar. The use of similar approaches to describe information content and for the navigation of websites will greatly help users searching the family of GEF IW project websites find information of interest. Furthermore, following these guidelines will collectively help brand your website as part of a worldwide resource of authoritative, reliable, and accurate water information about transboundary water resources management.

1.4 Why should I use this guide?

In this guide, you will learn about modern website design and the implementation of best design practices. You will be able use this knowledge to construct or help someone else construct, a website that will support your project objectives and provide consistency between related GEF IW project sites.

Using the GEF International Waters Website Tool Kit,⁷ you should be able to do implement your website quickly and effectively.

1.5 How can this guide help me?

This guide focuses on some of the key design questions and alternatives that you will face in building your website. This information should enable you to make informed decisions on how best to proceed with the construction of your site even though you are not an experienced Web designer.

- Following the recommendations in this guide you will be able to
- Provide guidelines for authors that write or create website content
- Improve users' access to information by standardizing site navigation

⁶ Wikipedia. *Style guide*.. Available online at http://en.wikipedia.org/wiki/Style_guide. [Accessed 3 September 2009]

⁷ *GEF International Waters Project Website Toolkit*. Available online for downloading at <http://www.iwlearn.net/websitetoolkit>. [Accessed 30 August 2009].

- Provide guidance on the use of metadata, controlled vocabularies (keywords), and taxonomies to enhance the findability of information
- Improve the ability of search engines to find your site and site information
- Establish a similar look and feel within the project site and also across project sites in the IW focal area
- Apply some of the social networking tools available to build communities of practice.

This guide covers a broad range of subjects that are important in building modern websites. It is impossible to do justice to each topic as the literature about website design is not only voluminous but also, in some cases, contradictory. The guide is by no means a comprehensive review of the literature of all aspects of Web design. However, the authors believe that it is a useful summary of best practices. These practices, presented as extensive checklists, offer a starting point for creating a new project website. Much of this information is available on the Web for reading and/or downloading. You may want to pursue topics that are rapidly evolving, such as social networking, in greater detail on the Internet.

Most of the items in the checklists are based the collective experience of website designers and users over nearly two decades. Much research has been conducted on what makes a ‘good’ website in terms of its appearance and usability. This research is reflected in the checklists.

Websites are not static. They must be maintained and frequently updated with new information in order to maintain a ‘fresh’ look. User feedback, error corrections, repairs to broken links, and interpretation of analytical data about web usage, are opportunities to improve your website design and structure and to adopt new web technology.

Finally, this guide is intended help both project managers and webmasters. If your project does not have in-house personnel to design and build your website, then you will have to have the work done by a contractor or a partner agency. Another option is to assign a person to learn how to use the IW:LEARN Tool Kit that contains the Plone⁸ content management system (CMS). Regardless of whether you use a contractor, have an experienced webmaster on your staff, or use Plone or another CMS, you will still need to answer many questions and make many decisions about the content and structure of your website in consultation with the person designing and implementing the site. The authors hope that this guide will assist you in developing a website that supports your project’s goals.

1.6 How is this guide organized?

Each section of the guide addresses different elements of website design and implementation. This elements are presented in a somewhat different order from most books on website design.

⁸ Plone website. Available online at <http://plone.org/>. [Accessed 24 August 2009].

The intent in this guide is to first write and prepare the content of the new website, including its metadata; then to create a structure for the content and the navigation aids that will guide the users to the information; and finally to design the web pages. Unfortunately, the starting point in website design is often the reverse with the designers choosing colour palettes and type fonts before understanding the depth and complexity of the content.

1.7 Structure of guideline sections

The first part of each section defines the content of the section and explain why it is important to the overall success of the website. These paragraphs are chiefly addressed to the project manager.

The introductory paragraphs are followed by a more technical description of recommended design practices based on the technical literature. This part should be read by the novice Web designer charged with implementing the project website using Plone or a similar CMS. The various aspects of website design and implementation overlap and support each other. The same or similar points may be made in several different sections. This repetition is intentional as each section of the guide is intended to stand more or less on its own and may be read independently of the other sections.

1.8 Checklists

At the end of each section there is a checklist of ‘Do’s and Don’ts’ along with suggestions for implementing some of these recommendations. Where possible, we have included quantitative recommendations for things such as the number of words in a web page title. These numbers are not hard and fast; they should be tempered by experience and need in each particular situation. The checklist items at the end of each section have also been aggregated into a comprehensive reference list in Appendix 1.

The authors compiled these lists from a variety of published and online sources. These sources are shown in the footnotes on each page. These resources as well as others that were consulted but not cited in the text are provided in the Bibliography section. Where possible, we have provided a link to the given document so that you can immediately acquire the information for bookmarking by your Web browser or for downloading the document from a website.

Each item in the checklist has been given a tag in **bold** type, to make it easy to locate a particular recommendation or practice. The order of checklist items does not imply an item’s importance. However, some items on the checklist are mandatory requirements for GEF IW project websites. Mandatory requirements are shown by an ‘(M)’ after the item’s tag. These **must** be followed in order to support the GEF IW program goals. The intent of these mandatory requirements is to improve information flow between IW projects and the water resources community and also to ensure that critical knowledge, practices, and insights about the management of transboundary watersheds are captured and shared with the global water resources community.

Experienced website administrators or Web design contractors can use the checklists to review your website's design or redesign.

1.9 Appendixes

Appendixes contain the following:

- The Master Checklist, which aggregates all checklist items from the various chapters
- Subject Taxonomy for GEF IW projects
- Document Type Taxonomy for GEF IW projects
- Software program sources.
- Bibliography of all references cited plus others consulted but not cited as footnotes

The bibliography is divided into subject categories. A few references are repeated in more than one category, e.g. *Metadata* and *Standards*.

2 A Short History of the Internet

Before launching into a description of the website design and implementation, it is important to understand the context within which project websites function. It also is important to distinguish between the Internet, a network of networks; software that allows computers to communicate with one another; and the World Wide Web, often defined as system of hypertext documents that are interlinked by the Internet.⁹

2.1 The Internet

At the end of 1969, the first two nodes [the University of California at Los Angeles (UCLA) and the Stanford Research Institute (SRI)] on the Advanced Research Projects Agency Network (ARPANET) of the U.S. Department of Defense were connected, marking the beginning of the modern *internetwork*. The Internet Protocol Suite (TCP/IP), which allowed communication over pre-existing communication networks, was adopted by ARPANET in 1983. In 1986 the U.S. Department of Defence coined the term “Internet” as a shortening of the word, *internetwork*, to describe a global network of interconnected computers that communicate using the Internet Protocol suite. The Internet was opened to commercial use in 1988.

During the 1990s the size of the Internet doubled each year. The number of Internet users increased from 16 millions in 1995 to about 1,600 millions in 2009. Today nearly 24 percent of the world's population uses the Internet¹⁰

2.2 The World Wide Web

In 1989, Tim Berners-Lee created the Hypertext Markup Language (HTML), which allows a set of text instructions to tell a Web browser where to place pictures, text, multimedia, and other features on a Web page. HTML provides a means to create structured documents by denoting structural of text, such as headings, paragraphs, lists, and links. It is written in the form of HTML elements that consisting of pairs of tags¹¹ surrounded by angle brackets before and after the web page content. A Web browser then reads the HTML and renders the web page on a computer monitor. Users view the pages and navigate between them using hyperlinks. For the first few years, people wrote HTML by hand. Anyone with a Web server could publish web pages of text and graphics on the Internet, and anyone with a Web browser could read them.

⁹ ‘Internet’ defined by Wikipedia in *World Wide Web* Available online at http://en.wikipedia.org/wiki/World_wide_web. [Accessed 10 August 2009].

¹⁰ *Internet usage statistics*. Available online at <http://www.internetworldstats.com>. [Accessed 10 August 2009].

¹¹ These are HTML tags not to be confused with informal, user assigned, index terms used in social bookmarking.

At first, HTML was relatively easy to learn, as there were only a few tags. However, the World Wide Web Consortium (W3C)¹² rapidly added new features to HTML in response to requests to improve graphics, typography and security from website designers and browser developers. Cascading Style Sheets (CSS) is one such feature that greatly simplified revising web page layouts on a large website.

In 1995, simple, graphical ("What you see is what you get"(WYSIWYG)) editors appeared, such as Adobe Systems' *PageMill*. This software enabled people who did not want to learn HTML to create Web pages. Increasingly sophisticated website construction programs, such as Microsoft Front Page soon followed. Today, there is a large choice of such programs to aid in website design and construction.

Beginning in the mid-1990s, Web content management systems (CMS) enabled users unfamiliar with HTML to create and manage dynamic Web content, such as documents, images, videos, and other information. Today, there are many systems that allow users to create and apply web page templates; create, edit, review, index, search, and publish content; extend a sites' functionality by adding program modules (plug-ins); manage the workflow of documents; and facilitate collaboration among team members maintaining the site even though they may be located in different geographic locations. Plone is an open source CMS (see Appendix 2 for a comparison of Plone with a number of other CMSs).

2.3 Web 1.0

The first phase of the development of the World Wide Web, now called Web 1.0, was characterized by the one-way flow of information between the client and the user.¹³ This was the result of privacy concerns, widespread computer illiteracy, and slow speeds of network connections to the Internet. The web surfing experience was limited to viewing or downloading content. Interaction with the page you were viewing revolved clicking on hyperlinks, filling in forms, and waiting for a response from a programmed system. Users had personal websites on which to express their opinions. Users had to link to those sites to read them. It was rather a static and passive experience. Web 1.0 tended to be about publishing content.

2.4 Web 2.0

While Web 2.0 is perceived as a second generation of website design and development, the demarcation between Web 1.0 and Web 2.0 is not clear. The term "Web 2.0" was coined by Darcy DiNucci in 1999 in her article, "Fragmented Future," which described the beginnings of a change in website development. She wrote:

¹² World Wide Web Consortium (W3C) website. Available online at <http://www.w3.org/>. [Accessed 10 August 2009].

¹³ Wikipedia (2009). *Web 1.0*. Available online at http://en.wikipedia.org/wiki/Web_1.0. [Accessed 3 September 2009].

"The Web we know now, which loads into a browser window in essentially static screenfuls, is only an embryo of the Web to come. The first glimmerings of Web 2.0 are beginning to appear, and we are just starting to see how that embryo might develop.... The Web will be understood not as screenfuls of text and graphics but as a transport mechanism..."¹⁴

Web 2.0 is a set of principles and practices that may be implemented to varying degrees. However, the shift from Web 1.0 to Web 2.0 was driven mostly by technological refinements to the Web, including widespread access to broadband connections to the Internet (speeds of 1 megabits or greater), improved browsers, and the rise of Adobe Flash platforms. Moreover, Web 2.0 provides the means for incorporating a variety of other services into websites. Examples of some of these capabilities are map making (Google Maps, Microsoft Virtual Earth), social networking (My Space, FaceBook), forums multimedia sharing (Flickr, YouTube), blogging and microblogging (Twitter) and other functions that allow and require user participation and interaction, often on a real-time basis. For example, applications may allow users to comment on and discuss posted material. In some cases, the user community maintains content on a collaborative website, such as Wikipedia. This bottoms-up, decentralized approach to website content is characteristic of Web 2.0. Tim O'Reilly, founder of O'Reilly Media, has written an excellent discourse contrasting the elements of Web 1.0 and 2.0 and what it means for Internet business models.¹⁵

Information that was previous static is now *content rich*, meaning that there are areas of dynamically changing information that respond to user inputs. You can interact with the page and search through the content immediately without refreshing the page in the browser. The newly redesigned IW:LEARN website¹⁶ and Website Toolkit employ Web 2.0 features that allow users to arrange content on the home page to suit their own preferences (e.g. news on top, project map on the left, jobs listings and/or announcements in the centre of the home page). The website employs other Web 2.0 features such as dynamic updates of content gathered from other project websites (e.g. upcoming events, and news) and streaming video. The project database and map¹⁷ allow users to filter project information by region, agency involved, and river basin.

Web 2.0 is not a single technology, but many web technologies structured in a more advantageous and collaborative way. Advances in technology have allowed a new way of thinking that has not occurred on such a large and profound scale. The trend leans towards social and collaborative networking and includes new ways of communicating information such as blogging, microblogging, Really Simple Syndication (RSS) feeds, wikis, social networking and other platforms for collaborative work. Because IW projects require collaborative efforts among

¹⁴ *Web 2.0 defined by Wikipedia*..Available online at http://en.wikipedia.org/wiki/Web_2.0. [Accessed 10 August 2009].

¹⁵ O'Reilly, Tim (2005). *What is Web 2.0: Design patterns and business models for the next generation of software*. Available online at <http://oreilly.com/web2/archive/what-is-web-2.0.html>. [Accessed 23 August 2009].

¹⁶ IW:LEARN website (2009). Available online at <http://www.iwlearn.net/>, accessed 12 August 2009.

¹⁷ IW:LEARN project database (2009). Available online at <http://www.iwlearn.net/iw-projects>. [Accessed 10 August 2009].

GEF IW partners to achieve the maximum potential of the GEF, these forms of Internet communication are particularly relevant to building project websites

Social or collaborative websites and tools make up part the Web 2.0 mystique. For example, if you want to share news or your blog, you can provide an RSS feed to whomever wants to subscribe to it. This enormously powerful tool can be used to keep users up-to-date with news, your latest publications, or even new data sets. RSS is considered a must by most modern websites because of its flexible and concise XML format.

Collaborative tools can also help your own project team members discuss, track and manage project tasks. The Plone CMS, for example, has a collaborative product called "TeamSpace"¹⁸ which enables team members to create and manage content in a collaborative and workflow-based environment.

A fascinating effect of Web 2.0 tools are *mashups* or the combination of resources and technologies from different sources to create new services. For example, *housingmaps.com*¹⁹ combines Google Maps with apartment and housing rentals on Craigslist (www.craigslist.org) to create an interactive housing search tool that allows users to find houses or flats available for rent by price range and geographic location on a map.

People increasingly use the Internet to communicate, often using a combination of mobile devices and computers. Twitter, for example is increasing being used to announce the availability of reports, news, and events, such as earthquakes.²⁰ However, these technologies cannot be used without some understanding of their function and purpose. While it is up to individual website administrators on how best to use the available technologies and techniques, it is up to the project manager to make sure that these investments in website technology fully support the goals of each particular IW project. It is worthwhile for both managers and website developers to learn about and discuss the application of Web 2.0 tools and technologies to their IW projects.

As noted earlier, information technology is changing rapidly. This suggests that project time and effort needs to be allocated to keep current with improvements and new innovations. Web 3.0 is just around the corner although it has yet to be defined.

¹⁸ TeamSpace. Available online at <http://plone.org/products/teamspace>. [Accessed 24 August 2009].

¹⁹ HousingMaps. Available online at <http://www.housingmaps.com/>. [Accessed 23 August 2009].

²⁰ Earthquake information using Twitter. Available online at <http://twitter.com/WheresItShaking>. [Accessed 3 September 2009].

3 Getting Started

People are the key to a website's success. If your website is user-friendly, people will not only come back again and again to satisfy their information needs but also will recommend your site to their friends and colleagues. If there is a golden rule in designing websites, it is ALWAYS to place your users' needs first.

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3.1 Understand your objectives

Before you begin to think about IW project website design and construction, think about the audience, purpose, and functions of your particular website. What are your project's goals and objectives? How will creating a website help you achieve those objectives? For example, of one objective of a transboundary river basin project might be to improve the water-use efficiency of municipal water users in the basin. How will your website help you achieve this objective? The website might link the user to credible sources of information about water use, provide access to a project report about successful actions taken by a municipality within the basin to improve water efficiency, or have charts comparing equipment or methods for allocating water use. It might compare water withdrawals by municipalities on a real-time basis and track trends. Think out of the box.

One common purpose of all IW focal area projects is to provide access to project documents. This is done by placing short descriptions of those documents on the website and enabling the user to find and download the printed report, videos, or other media. While this is both important and useful, try to think of additional ways to serve the water resources community, both locally and globally. For example, your project might be a global leader in the conservation and management of mangroves. Perhaps you could establish an Internet forum on coastal mangrove management or take the lead to establish a social network of mangrove experts on which to share management approaches. This could help your project gain additional expert advice, assist users in your partner agencies, and improve the way you are managing a particular water resource and disseminated and exchange information on management approaches with other parts of the world. Brainstorming about such applications during a meeting of project partners, sponsors, and computer experts can be very useful in establishing a sound foundation for your website design.

3.2 Know your target audience

In addition to knowing your objectives for the website, it is essential to know your audience and their expectations in searching your website. Correctly targeting your information will increase the likelihood of repeat visitors and broaden the reach of your information to a larger number of people.

IW project websites serve four key groups:

1. **Public** — the interested public, including students, who may reside in the area where the project activity takes place
2. **Water managers and scientists** — the water resources community globally, regionally, and locally
3. **GEF projects** — other IW focal area project personnel who want to learn from your project's experience
4. **Program management** — GEF management and partner agencies interested in news and progress being made by the project.

Clearly, each user group has differing interests and abilities to use technical material. Labelling documents for their intended audience might be a useful aid to speeding up user searches. Perhaps your site could have an education page for teachers and students with appropriate content about your project. Similar pages might be designed for mayors and town councils, researchers, and other groups with particular interests and information needs. Decisions with respect to your particular audiences and how you intend to meet their information needs and expectations should be added to the website plan.

3.3 Identify your content

Based on your objectives and your audience, the next step is to inventory the content necessary to support your project's objectives. Building such an inventory will identify gaps in what you already have and what you will need to implement the website. To quote Lynch and Horton: Content development is the hardest, most time-consuming, and most consistently underestimated part of any website development project.²¹

²¹ Lynch, Patrick J. and Horton, Sarah (2008). Web Style Guide, 3rd edn. Yale University Press., p. 15. Available online at <http://www.webstyleguide.com>. [Accessed 4 September 2009].

Building a beautifully designed website that is empty of useful content is like digging a well for water to drink and then just pouring the water down the drain.

3.4 Website development process

Building a website for a large agency or corporation can be a complex task. The website development process can be divided into six general activities.²²

1. Website definition and initial planning
2. Development of information architecture
3. Designing the site
4. Constructing the site
5. Marketing the site
6. Tracking, evaluating, and maintaining the site.

In the last part of the process, tracking information about the use of the site can yield much valuable information about how the site is used by the public. Evaluation of the site based on these data gives the basis for revising web pages and site navigation to improve the user's browsing experience and success at finding needed information. In practice, this linear sequence is supplemented by iterations between one step and another. For example, there may be a number of iterations between the requirements of the site and its design.

3.5 Build your website team

Lynch and Horton provide a list of individual roles on a large web team (FIG. 1).²³ IW project managers will probably not have specialists in each of these categories for website teams. You must make do with the skill you have available. You may end up with only one or two people who will have to fill multiple roles. Gaps in knowledge will need to be filled by self-study and formal or informal training.

The roles of the usability lead and the information architect bear mention as these roles are often combined in the same person. The usability lead is responsible for shaping the overall user

²² Lynch, Patrick J. and Horton, Sarah (2008). Web Style Guide, 3rd edn. Yale University Press., p. 24.

²³ Lynch, Patrick J. and Horton, Sarah (2008). Web Style Guide, 3rd edn. Yale University Press., p. 2.

experience with the site and is the primary advocate for the user during site design and construction. If the website appears to be difficult to use or will not meet user expectations, it is the role of the usability lead to point this out. The information architect organizes and structures

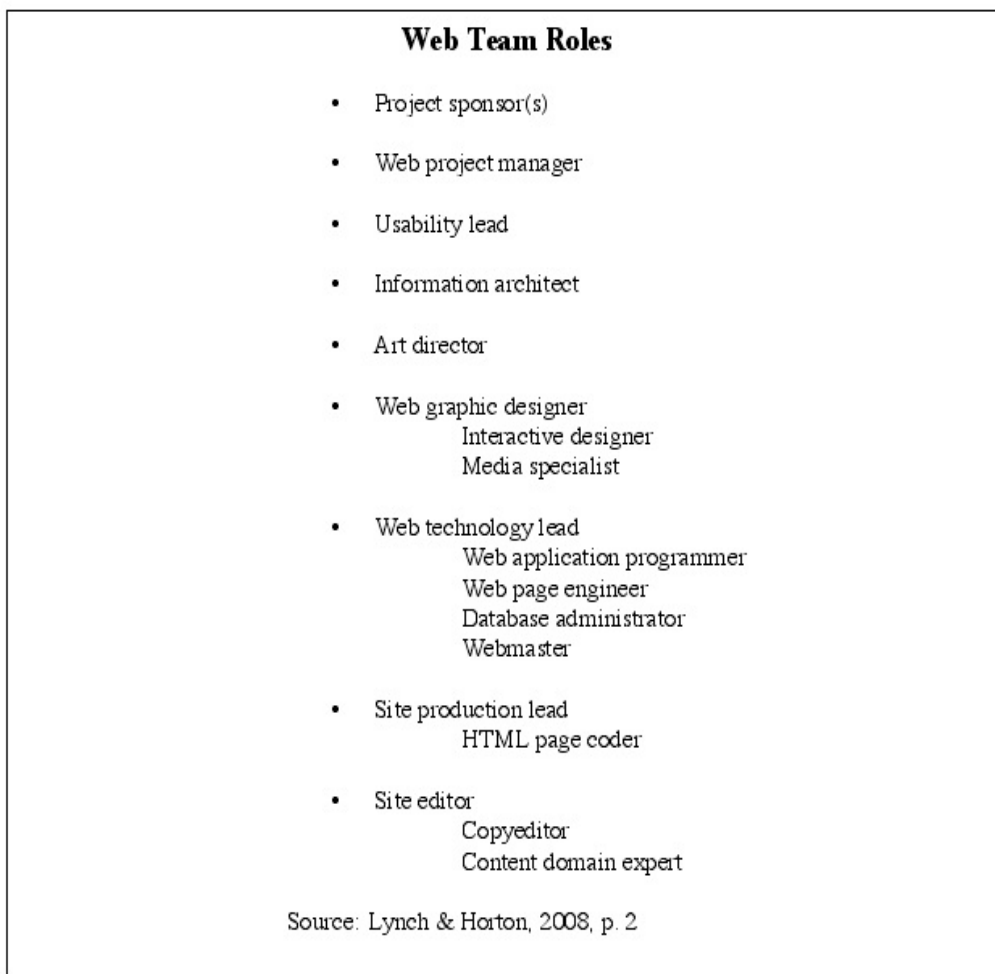


Figure 1. Web team roles.

the categories of information on the site, communicates the structure to the site design team. It is useful to develop small prototype sites that allow the designers of the user interface, navigation tools, and graphics to interact with the site structure. The success of web development process depends upon the successful interaction of these functions, even if only one person will be developing these functions. Always bear in mind that a particular approach or design must benefit users by helping them find information efficiently.

Recent thinking about website design suggests that the distinctions between these specialties are blurred. The goal is a design that entails an integration of the structure of content, the user interface, navigation, and the site's look and feel. Users are not passive consumers of information nor are they an audience to be entertained. Users are actively seeking information

that they perceive to help them do their job better. They deserve our focused attention.

3.6 Decide which tools you will use

Finally, you must pick the right tools for website development. There are many computer applications, web software products, and services you can use to build your website. Your choice should be based on the expertise of staff, time available to develop the website, and your budget. Choices include

- Coding in Hypertext Markup Language (HTML)
- Using a commercial software package, such as Adobe Systems' *Dreamweaver* or Microsoft's *Expression Web*
- Using an open-source website development tool, such as the Plone content management system (CMS)
- Outsourcing website development to a contractor.

The first option requires a programmer with experience in coding HTML. The second requires training a person in the use of the software package. The third option is perhaps the least expensive in that training a noncomputer professional in the use of a CMS is relatively quick and straightforward. The contracting option can require significant expenditure of funds but might be the most cost-effective if your website is likely to be large and/or complex.

3.7 GEF International Waters Website Toolkit

IW:LEARN has produced a Website Toolkit²⁴ that includes a CMS called Plone, an open-source (free) application that is well maintained, widely used, and readily available. Plone has versions for Windows, Macintosh, and Linux operating systems. The toolkit was designed to allow project personnel to create, update, and manage a project website with little or no knowledge of information and computer technology (ICT). The toolkit includes downloadable software for creating a project website, interactive chats and forums, news feeds, intranet/workspaces, photo/video galleries. It also provides a means for collecting and reporting website usage statistics, often referred to Web analytics.

3.8 Build a library

²⁴ *GEF International Waters Website Toolkit*. Available for download at <http://www.iwlearn.net/websitetoolkit>. [Accessed 26 August 2009].

While preparing for your website project, consider getting a few books on website design and bookmarking key design sites. No single book covers all aspects of website design. A good general reference, such as Lynch and Horton (2008),²⁵ covers the basics. Additional texts on Web usability (Thurrow and Musica, 2009),²⁶ website graphic design (Beaird, 2007),²⁷ and writing for the Web²⁸ would be helpful along with a good international English dictionary and style guide, such as the Concise Oxford English Dictionary²⁹ and the Oxford Style Manual.³⁰ You can begin by checking out some of the URLs in the footnotes and references section of this guide. There is lots of information out there.

3.9 Write a plan

Regardless of whether you do the work in house or with the assistance of a contractor, pre-planning the website is absolutely necessary. Project managers must resist all temptations to start assigning colours and visual designs to the website until the initial planning is complete. Without a short, written plan that documents objectives, defines the audience, lists the information content to be placed on the site, and identifies the approach to developing the site, the project is likely to suffer from scope-creep. Scope creep (also called feature creep, focus creep, and similar names) happens when changes occur in the final coding and testing stages of the new website rather than the early design stages. People get inspired by the progress made and enthusiastically decide to add exciting new features and content. The result can be a poorly structured site that is difficult maintain. This is an excellent way to deplete your budget. Get started and good luck!

3.10 Getting started checklist

- **Project website (M).** Each project will have its own operational website within in one year of implementation. Each of these websites must have its own domain name.
- **Users (M).** Define your target audience(s).

²⁵ Lynch, Patrick J. and Horton, Sarah (2008). *Web Style Guide*, 3rd edn. Yale University Press., 338 p. Available online at <http://webstyleguide.com/>. [Accessed 3 September 2009].

²⁶ Thurrow, Shari and Musica, Nick (2009). *When Search Meets Web Usability*. New Riders Publishing. 183 p.

²⁷ Beaird, Jason (2007). *The Principles of Beautiful Web Design*. SitePoint, Pty. Ltd., 168 p. Table of contents and reviews available online at <http://www.sitepoint.com/books/design1/>. [Accessed 3 September 2009]

²⁸ McGovern, Gerry; Norton, Rob; and O'Dowd, Catherine (2002). *The Web Content Style Guide: An Essential Reference for Online Writers, Editors, and Managers*. Prentice Hall, 246 p. Table of contents, excerpts, and reviews available online at http://www.gerrymcgovern.com/web_content_style_guide. [Accessed 3 September 2009].

²⁹ Soanes, Catherine and Stevenson, Angus, editors (2004). *Concise Oxford English Dictionary*, 11th edn. Oxford University Press, 1708 p.

³⁰ Ritter, R.M., editor (2003). *The Oxford Style Manual*. Oxford: Oxford University Press.

- **Content (M).** Identify the types of content you want on the website.
- **Web team (M).** Select those who will work on designing and maintaining the website.
- **Software (M).** The team should decide which tools (software) to use.
- **Build a library.** Begin assembling a library of books and electronic references.
- **Plan (M).** Write a short design plan.

**NOTE to Editor. Figure 1 should be labeled Figure 3.1.
Copyright permission will be needed for publication.**

4 Accessibility

Universal usability means to design something with the user always in mind. This user-centred design philosophy addresses the users' needs, wants, and physical limitations at every stage in the design process. An important component of universal usability is the accessibility of the website to those with various disabilities. Often usability and accessibility are treated together. However, accessibility is sufficiently important to warrant a separate section. Universal accessibility is goal that we probably will never reach but which we should strive to attain as a good social policy. Usability per se is treated in the next chapter.

4.1 What is Accessibility?

An accessible website allows users who are physically disabled to access the website with a minimum of inconvenience. The World Wide Web Consortium (W3C) created the Web Accessibility Initiative (WAI)³¹ in 1999 to address accessibility issues and to promote a set of standards that will educate developers in building websites that can accommodate common disabilities.

4.2 Web Content Accessibility Guidelines (WCAG) 2.0

The W3C recently issued draft Web Content Accessibility Guidelines (WCAG) 2.0,³² which provides a set of 12 guidelines that make Web content more accessible to people with a wide range of disabilities (FIG. 2). The guidelines are organized under four principles.

- **Perceivable information** — Users must be able to perceive the information and user interface.
- **Operable interface** — The user interface and navigation must be operable.
- **Understandable content** — The interface and content must be understandable.
- **Robust content** — The content must be robust so that it can be interpreted by Web user agents that range from web browsers to screen readers and Braille browsers.

³¹ *Web Accessibility Initiative*. Available online at <http://www.w3c.org/WAI/>. [Accessed 31 July 2009].

³² *Web Accessibility Guidelines*. Available online at <http://www.w3.org/WAI/intro/wcag.php>. [Accessed 9 August 2009].

Web Content Accessibility Guidelines (WCAG) 2.0

1. Perceivable

- a. Provide text alternatives for any non text content so that it can be changed into other forms people need.
- b. Provide alternatives for time-based media.
- c. Create content that can be presented in different ways) without losing information or structure.
- d. Make it easier for users to see and hear content including separating foreground from background.

2. Operable

- a. Make all functionality available from a keyboard.
- b. Provide users enough time to read and use content.
- c. Do not design content in a way that is known to cause seizures.
- d. Provide ways to help users navigate, find content, and determine where they are.

3. Understandable

- a. Make text content readable and understandable.
- b. Make Web pages appear and operate in predictable ways.
- c. Help users avoid and correct mistakes.

4. Robust

- a. Maximize compatibility with current and future user agents, including assistive technologies.

Source: World Wide Web Consortium available at <http://www.w3.org/TR/WCAG20/>, [Accessed 20 August 2009].

Figure 2. Twelve guidelines to support Web content accessibility. *Copyright permission will be needed for publication.*

Under each principle there is a set of guidelines. Each set has testable success criteria, three levels of conformance for different disability groups and situations, and suggestions of how to implement the guidelines along with examples.

An objective of the United Nations' Department of Public Information is to comply with the Web Content Accessibility guidelines of the W3C for all UN websites. They have a set of guidelines available for *Making Accessible Websites for the United Nations*.¹

Below are some common ways to make a website accessible.

- **Image alternatives** — Provide text alternatives for graphic content so that it can be changed into other forms people need, such as large print, Braille, speech, symbols or simpler language.
- **Video and Audio alternatives** — Provide alternatives for pre-recorded audio and video by using transcripts, captions, and file descriptions.
- **Readability** — Make it easier for users to see and hear content by separating foreground from background using high-contrast colours between background and text and by resizing text.
- **Keyboard** — All functionality of the content should be able to operate via a keyboard interface without requiring specific timings for individual keystrokes.

4.3 Conformance to WCAG 2.0 guidelines

Each WCAG guideline has a testable Success Criteria for each of three levels of conformance:

1. **Level A** (minimum level) — The Web page satisfies all the Level A Success Criteria
2. **Level AA** — The Web page satisfies all the Level A and Level AA Success Criteria
3. **Level AAA** (highest level) — The Web page satisfies all the Level A, Level AA and Level AAA Success Criteria.

At each level, the website may conform to the guidelines by providing appropriate measures to achieve accessibility. Alternatively, another separate website maybe provided that conforms to the guidelines at each level.

¹ UN, Department of Communications (2009). *Making Accessible Websites for the United Nations*. Available online at <http://www.un.org/webaccessibility/guidelines.shtml>. [Accessed 6 September 2009].

4.4 Evaluating websites for accessibility conformance

The W3C provides a number of ways in which to evaluate accessibility² Methods may involve a combination of automatic, semiautomatic, and manual testing of your website. The testing steps include:

1. Setting a goal for the site's conformance level
2. Selecting a representative sample of Web pages that have
 - Tables, forms, or dynamically generated information
 - Pages with informative images or graphics
 - Pages that use scripts or applications to perform specific functions
3. Testing the entire website with at least one HTML validation tool and two different Web accessibility tools.
4. Manually testing the representative site pages by running them with different Web browsers and different computing platforms. For example viewing the pages browser adjustments such as turning the graphics off and seeing if the appropriate alternative text is present. The guidelines list seven such adjustments to test.
5. Prepare a summary report of test findings.

Testing will reveal coding errors and errors of omission, most of which can easily be repaired.

The resulting website, even if it complies with the AAA level of conformance, will not accommodate all users with disabilities. However, it will be a major improvement and meet the needs of many people who suffer vision or hearing loss and other disabilities.

4.5 Accessibility policy

It is IW:LEARN's policy that its websites shall be clear and simple for everybody to use.³ All GEF IW projects should use Extensible Hypertext Markup Language (XHTML) and Cascading Style Sheets (CSS). All project websites should conform to specifications laid out by the W3C. Use of these standards provides a solid foundation for website accessibility. Similarly, it is the policy of the UN that its websites be accessible.³

² *Methods to evaluate accessibility*. Available online at <http://www.w3.org/WAI/eval/Overview.html>. [Accessed 10 August 2009].

³ *IW:LEARN Accessibility Statement*. Available online at <http://www.iwlearn.net/accessibility-info>. [Accessed 25 August 2009].

GEF IW projects should strive to achieve AAA accessibility as measured against WCAG 2.0 guidelines. Some of the items on the WCAG 2.0 checklist are subjective and can be interpreted in different ways. The IW:LEARN Help Desk can provide you with assistance in interpreting the standards.

4.6 Web Accessibility Checklist

This checklist from The World Wide Web Consortium is also available online.⁴

1. **Font size (M).** Avoid fixed font size that may be specified by style sheets. Specify size in relative terms. Let users choose the display text size with their browser.
2. **Graphs & charts (M).** Summarize or use the 'longdesc' attribute.
3. **Hypertext links (M).** Use text for a link name that makes sense when read out of context. Do not simply say 'Click here' for example. If there is an icon (or other graphic) with the hyperlink words, the hyperlink must be associated with both the text and the icon.
4. **Images & animations (M).** Use the ALT tag to describe the function of each visual.
5. **Multimedia (M).** Provide captioning and transcripts of audio files, and descriptions of videos.
6. **Page organization (M).** Use headings, lists, and consistent structure. Use CSS for layout and style where possible.
7. **Scripts, applets, & add-ons (M).** Always provide alternative content in case active features are inaccessible or unsupported.
8. **Semantic markup (M).** Use semantic markup to provide meaningful structure to the web page.
9. **Site load time (M).** Keep page load times short. This is especially important for the home page. Develop site navigation concepts, and develop strategies that will help search engines find the site.
10. **Home page size (M).** Ideally, it should not require scrolling to view the entire page.

⁴Web accessibility checklist. Available online at <http://www.w3org/WAI/quicktips/Overview.php#tips> [Accessed 10 August 2009].

11. **Tables (M).** Make line-by-line reading sensible. Summarize the tables.
12. **Text contrast (M).** Increase text to background contrast to enhance legibility. Black text on a white background is best most of the time. Visually impaired users can reverse this to white on black.
13. **Text size (M).** Err on the side of text that is slightly too large and line spacing that is adequate.
14. **Validate your work (M).** Use tools, checklist, and guidelines to validate the accessibility of your site

5 Usability

The usability designer's goal is to make the website easy to use, easy to learn, and effective in quickly finding information. The site should be usable by *all* users, not just by a group of purportedly typical users. Website accessibility, a component of universal usability, is discussed above in Chapter 4.

5.1 What is Usability?

Web designers are particularly concerned about the ease with which users can locate and discover content on websites. This characteristic of *usability* also refers to the satisfaction that users experience when they discover unexpected but relevant information and/or locate the particular data that they were actually looking for.

A related concept is the *findability* of information.⁵ This is the quality of information that makes it locatable. For example, we might speak of the how easily a particular piece of information can be found. Our job as website managers and designers is to make sure there are no obstacles that make it difficult for website visitors to find what they are hunting for. The Wichita State Software Usability Research Laboratory has an online newsletter, *Usability News*, which documents the results of their research on human-computer interaction, including website usability testing.⁶ Measuring website usability is not a luxury. It is a necessity.

5.2 Why is usability important?

Most people view the Web as a tool with which to find content. They want to get in and get out of a website quickly. They are impatient and often in a rush. If your users cannot find the information they want on your website, they leave. If they get lost on your website, they leave. If it takes too long for the website to respond to a query or download a document, they leave. They will view their visit to your site as a waste of their time. Worse, they are unlikely to visit your site again, because they could not find the desired content, the content was found only after frustrating trial-and-error searches, or the content found did not meet their expectations or needs. The success of your website, as defined by its ability to provide information to people, rests on its user-friendliness.

⁵ Morville, Peter, 2007. *Ambient Findability*. Sebastapol, CA: O'Reilly Media, Inc., 204 pp.

⁶ Wichita State University Software Usability Research Laboratory, *Usability News*. Available online at <http://www.surl.org/usability> news/ [Accessed 30 August 2009].

5.3 How do users search for information?

People arrive at your website in many ways. They may see your URL in a magazine article or receive it in an email or twitter from a friend. Out of curiosity they may click on a link to your site from another website. Your site may have popped up when surfing or browsing the Web via a commercial search engine such as Google, Cuil, or Bing and clicked on because it looked interesting. Generally speaking, however, unless users already have your website URL, they will use a commercial search engine to find information. User searches may be classified as

- **Direct queries** — using a URL address to go to a specific web page (or website)
- **Keyword searches** — using keywords entered into a commercial search engine
- **Website searches** — using keywords entered into the search box on a particular website
- **Website browsing** — using a website's navigation tools to find information.

This classification of search types reflects two major behaviours: (1) Searching, i.e., querying search engines with keywords and (2) browsing or surfing the Web.

The success Web searches using a commercial search engine depend upon the search engine's detection of keywords or phrases in specific parts of a website's pages. These detections and other factors, such as the number of websites that link to yours, define the ranking of your site on the search engine results page (SERP).

Searches using the website search function look for keywords within all searchable parts of the particular website. Browsing behaviour reflects how users interact with the website user interface and how they read the site's information cues. These two aspects of searching define Web usability.

A recent study by the Project Information Literacy Program centred on young adults (students), doing research on the Web for university research papers. It was discovered that most of the students lacked context for their information searches.⁷ The study's authors identified four types of context needed for successful searching:

1. **Big picture** — the need to place the context of their research question in terms of the field or problem that they are researching
2. **Language context** — the need to be familiar with the vocabulary and jargon of the field of research in order to make meaningful queries

⁷ Head, Alison J. and Michael B. Eisenberg (2009, February). *Finding Context: What Today's College Students Say about Conducting Research in the Digital Age*. (Project Information Literacy Progress Report), Seattle: University of Washington, The Information School, 18 p. Available online at http://projectinfolit.org/pdfs/PIL_ProgressReport_2_2009.pdf. [Accessed 10 August, 2009].

3. **Situational context** — the need to be able to define what information is essential to know in terms of the question or topic being addressed
4. **Information-gathering context** — not being overwhelmed by all the available choices for lack of a strategy for finding what is wanted.

In coping with the first two items, the students usually turned to Wikipedia⁸ to provide an introduction to their research topic and its terminology. For strategies to deal with what information they needed and information gathering, they frequently turned to their local reference librarian for help and coaching. If young adults who were brought up surfing the Web have problems finding information, one may wonder about the information literacy of the rest of us.

This suggests that many users may not be information literate and will need help in providing context for the information on your website and also for understanding the scientific and technical terminology used. A paragraph providing context on the 'About Us' page and a glossary or link(s) to a glossary of terminology used on the project website would be probably be helpful to lay visitors or those from other academic disciplines.

5.4 The Hunt for Information

Some of the young adults that participated in the Information Literacy project spoke of their 'hunt for information'. The metaphor is a good one. Recent books on Web usability mention *the scent of information* that assists the user in finding content⁹ (for example Thurow and Musica, 2009). The scent of information is the combination of graphical and textual clues that help facilitate:

- **Site navigation** — Where can I go?
- **Site orientation** — Where am I?
- **Content assessment** — Should I click on this link?

If the scent of information is strong, people click on a link. If the scent is weak, they do not.

A significant thing to remember about searches is that a user may arrive at a particular page on

⁸ *Wikipedia, The Free Encyclopedia*. Available online at <http://www.wikipedia.org>. [Accessed 25 August 2009].

⁹ See for example: Thurow, S. and Musica, N. (2009). *When search meets Web usability*. Berkeley, CA: New Riders Publishing.

your website from nearly anywhere. Hopefully, when they do arrive, they are at least fairly close to the information they seek. To keep them on your site, however, you need to give visitors some indication that they are close to finding what they want. Such indications are found in the title of the web page, key words in the headings, subheadings, and text, and the URLs of links.

The use of metadata to increase the usability of your website and the findability of information is discussed in the section on Metadata in this guide.

5.5 Browsing behaviour

When a user arrives at your site there are a number of browsing behaviours to watch for as signs of weaknesses in your site navigation.

You will lose users if they get lost or become disoriented. Breadcrumbs near the top of the page help users know where they are in the hierarchy of pages. However, there are other ‘you are here’ cues that help keep the user on track. Users look at the title tag, the URL, the logo, and the tagline in the banner at the top of the page, page heading, the main content at the top of the page, and the navigation menu buttons for cues. While all Web pages in a website should have the same look and feel, it is helpful to have design elements that serve as landmarks as the users browse through the website.

5.5.1 Time on site

The time a user spends on the your website is a good indicator of the kind of an experience the user has. Users who spend a lot of time on your site may be reading and studying content or else they may be searching and not finding the information they seek. For example, above average time on a website coupled with a large number of very brief page views behaviour should be considered bad news. On the other hand, a long time on a website, coupled with active transactions such as frequent downloads of content, suggests that users have found a rich source of useful information.

5.5.2 Pages viewed per visit

The number of pages viewed per visit is a measure of the interest of users in your site. A large number of pages per visit suggests that users are spending time on the website. They stay long enough to look at what you have to offer.

5.5.3 Pogo-sticking behaviour

Users whose browsing behaviour shows rapid jumping back and forth between a category page and content pages suggests that they are not finding the desired content where they expected to find it. It is important to determine the cause of this behaviour. The most likely cause is that the information provided on the category page did not contain enough information to permit the user

to make an informed decision about the probable usefulness of what would be turned up on the linked page. Frustrated users often go rapidly back and forth between the category page and

various content pages vainly searching for useful content. Not all will persist in the hunt. Some website visitors will give up the search after quite a short time.

5.5.4 Bounce rates

Another form of undesirable behaviour is for the user to land on a page of your site and immediately leave. Leaving is called a bounce. The bounce rate is the percentage of users who land on a page and then abandon the site without navigating to another page. Often the landing page is deep within the website. Presumably, the person navigated to your site via a direct link from another website or from a search engine response page. Presumably, that searcher is following the scent of information, but upon arriving at your website, the scent was lost. . Expectations were not met. You need to figure out why this occurred.

You might consider providing visitors with the next steps to follow if they do not find the information they were looking for on the landing page. This might take the form of direct links to more detailed information on the topic mentioned on the landing page. Or you might include multiple 'see-also' links to indicate other pages of possible interest to those who find the landing page worthwhile.

5.5.5 Exit pages

Another tool for finding trouble spots on your website is to see where your users are when leaving your site. Look for points that are unnatural or unusual exit points. Normally, people will leave your site either from the homepage or after downloading, saving, or printing a document. Leaving your site at other points may reflect impatience in download times or unmet expectations.

5.6 Usability testing

Why bother?

Sometimes there is a huge disconnect between the people who make a product and the people who use it. The creator of a Web site may assume too much knowledge on the part of users, leading to confusion. Software designers may not anticipate user behaviour that can unintentionally destroy an entire database.¹

¹ Whitaker, Barbara (2007) Technology's Untanglers: They Make It Really Work. *New York Times*, 8 July. Available online at <http://www.nytimes.com/2007/07/08/business/yourmoney/08starts.html> [Accessed 4 September 2009]

Testing your website's usability should be done throughout the website design process and whenever changes are made to the structure and design of the website. User testing is a controlled and directed observation of user behaviour that can help evaluate the effectiveness of different website designs. During testing, users are given a number of representative tasks and then asked to talk about what is going on in their minds while performing each task. This helps the tester understand the rationale for the users' choices as they navigate the site. Each test is followed by an open-ended interview to discuss the user's experience with the system and to get suggestions for improving the website.

Colleagues in your organization have probably supplied plenty of informal feedback throughout the design process, but that is not quite the same as having them participate in a usability test of the website. In addition to colleagues, select workshop attendees, project partners, or even family members to test your site as long as they did not participate in the website design. Including at least one person under 30 and one person over 60 years old might also be a good idea.² The test group ideally should not be restricted to your target audience(s). Not everyone who visits your website is going to have a professional interest in water resources. You may be surprised to find that your site attracts students, politicians, and ordinary people who happen to live in the geographic region covered by your IW project. One approach is to test each website design (or redesign) for usability with a small sample of users. The Online Journalism Review (OJR) lays out a 5-step process that tests 5 users and takes 5 hours (from planning to finish including data analysis of results)³ This iterative approach to design with frequent user testing is the best way to improve the quality of users' experiences on your website.⁴

5.7 User feedback

Feedback from your website's users can also be beneficial. Structure their feedback on a form for the purpose so that you can interpret their feedback consistently. Another type of feedback can be obtained from the statistical data collected by Web servers on the use of your website (see next subsection).

By analysing the results of testing and feedback, you will be able to tweak your website and add Improvements that would make it easier to use.

² Nielsen, Jakob (2008). Middle-aged users' declining web performance. *Jakob Nielsen's Alertbox*, 31 March. Available online at <http://www.useit.com/alertbox/middle-aged-users.html> [Accessed 5 September 2009]

³ Ruel, Laura and Paul, Nora (2007). OJR's 'five guide' to do-it-yourself website usability testing. Available online at <http://www.ojr.org/ojr/stories/070802ruel/> [Accessed 4 September 2009]

⁴ Neilson, Jakob (2003). Usability 101: Introduction to Usability. *Alertbox*, 25 August. Available online at <http://www.useit.com/alertbox/20030825.html>. [Accessed on 3 August. 2009].

5.8 Web analytics

While much can be learned from user testing, a valuable source of information about users' behaviours on each page of your site is the Web server's log file. Web analytics involves the study of log files to deduce users' search behaviour. Various software programs are available to support analysis of such information. From the Web server log file, you can determine

- **Repeat visitors** — whether the user is a new or repeat visitor
- **Origin of users** — where the user came from before arriving at your website
- **Keywords used** — what keywords were used if the user used a search engine
- **Pages** — number of pages viewed during the site visit
- **Page sequence** — the sequence of web pages visited while on your site
- **User's browser attributes** — type of browser (Explorer, Firefox, Opera, Safari, etc.), operating system, and monitor screen dimensions
- **Last page** — the last page [exit page] the user looked at before leaving your website
- **Time** — Time spent on the site.

Each time users click on a link on a web page, it is considered a hit on that website. Therefore the total number of hits per month is not a very useful metric even though it was frequently cited as a measure of success in the early days of Web browsing. More useful statistics are the number of visitors to your site and the number of website pages each visitor looked at.

After making changes in your website design, the Web server log file statistics should be examined to determine (1) how the changes affected user behaviour and (2) if the changes appeared to improve the website's usability.

5.9 Usability Checklist

- **Access to recent postings.** Make it easy for the user to read the most recent postings on your site. Make it easy to find anything recently featured on the home page in the past 2 to 3 months by linking to the site archives.
- **Browser compatibility (M).** Be sure your website is compatible with the most commonly used web browsers including Internet Explorer (versions 6, 7, and 8), FireFox, Opera, Chrome, and Safari.

- **Graphics.** Label graphs, illustrations, and photographs with captions if their meaning is not clear within the context of the text. Edit the image size, as appropriate, for display on the user's screen. Consider cropping photographs rather than shrinking their size.
- **Links.** Do not use generic instructions, such as 'Click here' as a link name. Specify what there is. Do not use just 'More' when providing a link to additional items. More of; e.g., More news, More pictures, etc. Differentiate these links from the text so users can find them quickly.
- **Page size (M).** Use a flexible layout (fluid design) that can accommodate the common sizes of monitor screens.
- **Page titles.** Give each page in your site a unique title that is rich in keywords.
- **Do not start the title with 'Welcome to....'** Or use the words 'Home page'.
- **Begin with the words that users will associate with the page** — usually the organization name for the title of the home page.
- **Avoid using the same first few words on each web page.** Try to characterise the content of the page in the title.
- **Tags.** Tags on home pages need to be short and to the point. Commercial search engines will use the first 66 characters of the page title on their results page as a clickable link.
- **Title length.** Limit titles to seven or eight words. Longer titles are harder for the eye to scan.
- **Press coverage.** To attract media coverage place a 'Press Room' or 'News Room' link on the home page.
- **Search box.** Make the site's search box visible and easy to find. The input box should be big enough to enter and edit queries (30 characters).
- **Search box label.** Do not label the search area. Place the search button labelled 'Search' or 'Go' to the right of the search box.
- **Advanced search.** Provide a link to 'advanced search' and search tips. You might also offer advanced search on the page of search results.
- **Site search engine.** The search engine for the site should search all content on the website.
- **URLs.** Keep URLs simple and memorable.

- **index.html.** Do not append 'index.html' to the domain name.
- **Register domain names.** Register names with alternative spellings (i.e. frequently misspelled variants of the true name).

6 Metadata

Metadata are the most important tools you have to make your information easy to find on the Web. Metadata range from simple keywords describing a report to descriptions of the attributes of a scientific database to the suite of information that describes a data layer in a Geographic Information System (GIS). Standards have been developed for applying metadata to various kinds of information.

This section of the *Style Guide* describes metadata standards for documents, images, multimedia, datasets, and GIS maps. It points out some of the choices of taxonomies and controlled vocabularies that you will need to make before preparing your website content. It is generally easier and more efficient to incorporate appropriate metadata into the workflow of preparing content for the Web than it is to enter it at a later date.

6.1 What is metadata?

Metadata is usually defined as data about other data.⁵ Metadata describe the physical resource, such as the size and format of an electronic file, its information content, and its structure (title, heading, subheading and text). Within the context of the GEF IW project websites, metadata are chiefly used to help find users find the information they want.

6.2 Why are metadata important?

Metadata are critical in making it easy to find your website and its content on the Web. Metadata can significantly increase the visibility of your website to commercial search engines, such as Google, Cuil, and Bing. Moreover, metadata also raise the ranking of your site on the search engine results page. This application of metadata is called search engine optimization, by which a website's metadata are adjusted to raise the ranking of the site in response to a search that uses a particular keyword.

Metadata also assist users in finding information once on your website through their use in page titles, subheadings, and names of links. Finally, they help your users perform tasks like file downloading by indicating the format and size of the files. The proper application of metadata can markedly increase the number of visitors to your website.

⁵ Wikipedia (2009). *Metadata*. Available at online at <http://en.wikipedia.org/wiki/Metadata>. [Accessed 31 August 2009].

6.3 Dublin Core Metadata Initiative

The Dublin Core Metadata Initiative is an international organization engaged in developing interoperable online metadata standards that support a broad range of purposes.⁶ The standard is widely used to describe digital resources, such as text, images, audio recordings, videos, and datasets.⁷ The Dublin Core is both an international standard (ISO Standard 15836) and an American standard (ANSI Standard Z39.85).

According to the *Using Dublin Core*

1. A metadata record consists of a set of attributes, or elements, necessary to describe the resource in question.⁸ For example, a metadata system common in libraries – the library catalogue – contains a set of metadata records with elements that describe a book or other library item such as author, title, date of creation or publication, subject coverage, and the call number that specifies the location of the item on the shelf.
2. The linkage between a metadata record and the resource it describes may take one of two forms:
 - a. Elements may be contained in a record separate from the item, as in the case of the library's catalogue record.
 - b. Metadata may be embedded in the resource itself.⁹

An important aspect of metadata is that they provide a standardized way of describing information resources within and across organizations and information systems. In the case of GEF International Waters, this standardization needs to be realized across all project websites. To do this, the GEF IW projects must cooperate in the adoption and use of compatible methods and standards.

6.3.1 Dublin Core Metadata Standard

Using Dublin Core defines the Dublin Core as follows:

The Dublin Core metadata is a simple yet effective element set for describing a wide

⁶ Hillman, Diane (2005). *Using Dublin Core*. Available online at <http://www.dublincore.org>. [Accessed 31 August 2009].

⁷ Wikipedia. *Dublin Core* (2009). Available online at http://en.wikipedia.org/wiki/Dublin_Core. [Accessed 31 August 2009].

⁸ *Resource* refers to any information resource, such as a book, newsletter, document, recording, image or map.

⁹ Hillman, Diane (2005). *Using Dublin Core*. Available online at <http://www.dublincore.org/documents/usageguide>. [Accessed 31 August 2009].

range of networked resources. The Dublin Core standard includes two levels: Simple and Qualified. Simple Dublin Core comprises 15 elements; Qualified Dublin Core includes three additional elements...and element refinements...that refine the semantics of the elements in ways that may be useful in resource discovery.¹⁰

Simple Dublin Core Elements. The Simple Dublin Core elements are defined below based on the information provided in *Using Dublin Core*. Numbers are those assigned by Dublin Core. Plone uses 12 of the 15 Dublin Core elements (Lotze and Theune, 2006).¹¹ Where Plone CMS element names differ from the Dublin Core, the names used by Plone are shown in parentheses.

1. **Title** — Title refers to the name given to the resource. The title of a report, document, image, map, dataset, or other resource should be given for this element.
2. **Subject** (Subject and keywords) — In the Dublin Core, the subject element may contain (a) subject classification (taxonomy) codes and names, such as the Library of Congress Classification (LCC) or the Dewey Decimal Classification (DDC) numbers used by libraries, and (b) keywords or phrases selected from a controlled vocabulary that describe the content of the resource. Semicolons are used as separators. Subject categories maybe thought of as major themes or subjects covered by a document. Keywords represent the most significant or important topics included in a document or resource.
3. **Description** (Abstract) — The description field contains an account of the content of the resource. The description may be an abstract, executive summary, table of contents, or textual description of the resource.
4. **Type** (Resource type) — The resource type is the genre the resource, such as text, image, sound, or video. The type of resource should be selected from a controlled vocabulary. Multiple entries, separated by semicolons, may be made to characterize these aspects of the resource type. Note that there are different kinds of resources that can be specified within this element. For example:
 - a. **Functional types** — text document, photograph, video, image, audiofile, etc.
 - b. **Content types** — proposal, project description, news release, technical report, terminal evaluation, event description, etc.
5. **Source** [Plone does not use] — Source refers to a larger resource from which the present resource was derived in whole or in part. Examples are a paper contained in a conference proceeding, the chapter of a book, or a report in a series of reports.

¹⁰ Hillman, Diane (2005). *Using Dublin Core*. Available online at <http://www.dublincore.org/documents/usageguide>. [Accessed 31 August 2009].

¹¹ Lotze, Thomas and Theune, Christian, 2006. *Content management with Plone: Handbook for authors and editors*. Enfold Systems, p. 63

6. **Relation** [Plone does not use] — This element defines the relationship of the resources being described to a related resource. It is considered best practice to use a string or number for formal identification of objects (identifier in Element 14). The relationship qualifiers include: IsPartOf, IsVersionOf, IsFormOf, HasFormat, IsReferencedBy, References, IsBasisFor, and IsBasedOn. Thus, if describing Paper001 in ConfProceeding2005, this element might read 'IsPartOf ConfProceeding 2005. This element can be used to link datasets, GIS coverages, photo albums, and slide presentations to the resources of which they are a part or where they are referenced.
7. **Coverage** [Plone does not use] — The coverage element describes the extent or scope of content of the resource and typically includes a spatial location. This element could contain city, state, country, region, subregion, river basin, and/or other geographic names. However, these names must be standardized and used consistently. Spatial coverage can also be represented by geographic points or latitude/longitude boxes following Dublin Core encoding standards (DCMIPoint and DCMIBox). Coverage can also be temporal as in a date range (DCMIPeriod). An additional item to include in this element might be a thumbnail regional outline map showing the location of the project/program that created the information resource.
8. **Creator** — The creator is the entity (person, organization, or service) primarily responsible for making the content of the resource—in other words, the author(s).¹ An author can be either a person or a corporate author, such as a business, nongovernmental organization, or government agency. People might be followed by organizations, all separated by semicolons. Although personal authors' names are usually inverted in European languages (surname followed by first name), it may be better in an international context to leave a name uninverted. Unfamiliar forms of personal names and the various ways of inverting them is a continuing challenge to book and periodical indexers.
9. **Publisher** — The entity (person, organization, or service) responsible for making the content available. Usually, this is the organization that published the report or document or made it available on the Internet.
10. **Contributor(s)** — The entity (name of the person, organization, or service) responsible for contributing to the content. This could be the contractor(s) who prepared a report or conducted a project for UNEP. Their names are generally found in the preface of UNEP reports.
11. **Rights** (Rights holder) — Rights held in and over the resource, such as the copyright and the entity (person, organization or service) that holds the right. In the interest of international collaboration, you might consider using a Creative Commons license² for your content. With a Creative Commons license you keep the copyright to your work but

¹ Plone provides one line for the entry of each name.

² Creative Commons (2009) *License your work*. Available online at <http://creativecommons.org/choose>. [Accessed 31 August 2009].

allow people to copy and distribute it providing that they give you credit. Licenses include options for commercial use, permitting modifications for incorporation into other works, and placing the content in the public domain.

12. **Date** (Created date) — Date associated with the life cycle of the resource. Creation date, publication date, or release date (for a press release). For IW:LEARN documents, this element will contain the document's publication date (yyyy) or the date that it was placed on the Web site (dd-mm-yyyy). Years should be expressed 4-digits numbers to prevent confusion about which century the particular year belongs to.
13. **Format** — Physical or digital manifestation of the resource. This should include the document size and media type including its computer file type extension. A comprehensive database of computer file extensions with corresponding format-type names and descriptions can be found at File-Extensions.³ The Common File Extensions list of 142 extensions with standardized names serves as a controlled vocabulary for this element.
14. **Identifier** (Resource identification) — The resource identifier is an unambiguous reference to a resource within a given context. This might be the URL. It can also be the ISBN for books or ISSN for series publications like magazines or technical journals.
15. **Language** — The language of the document. For example, 'en' for English; 'fr' for French; and 'es' for Spanish are a few of the standard two- or three-letter language codes defined in ISO 639^{4 5 6}.

In addition Plone has an Available (time frame) element that includes the effective date and expiration date that control the time frame in which the public can view a particular piece of content.

Dublin Core Qualifiers. The Dublin Core uses three qualifiers to make the meaning of an element more specific:

1. **Audience** (the class for whom the resource is intended)
2. **Provenance** (changes in ownership or custody of the resource)

³ File-Extensions (2009). Available online at <http://www.file-extensions.org/filetypes> [Accessed 31 August 2009].

⁴ Code for the representation of languages. From ISO 639, Revised 1989. (1997).. Available online at <http://xml.coverpages.org/iso639a.html> [Accessed 31 August 2009].

⁵ ISO 639 Code Tables (2009). <http://www.sil.org/iso639-3/codes.asp> [Accessed 9 September 2009]

⁶ Language identifiers in the markup context (2006). Available online at <http://xml.coverpages.org/languageIdentifiers.html> [Accessed 9 September 2009]

3. **Rights holder** (manager or holder of the rights to the resource).

6.3.2 Dublin Core Coding

Dublin Core metadata for the UN document, *Making Accessible Websites for the United Nations* may be coded in HTML as shown below.⁷⁷

```
<head>
.....
  <meta name="dc.title" content="Making Accessible Websites for the United
  Nations" />
  <meta name="dc.subject" content="accessibility guidelines, accessible
  websites, people with disabilities" />
  <meta name="dc.description" content="This is the official site on Making
  Accessible Websites for the United Nations. In this site, you will find a
  downloadable template to make your own accessible site, along with the
  guidelines published by the United Nations on accessible websites." />
  <meta name="dc.publisher" content="United Nations" />
  <meta name="dc.format" content="text/html" />
  <meta name="dc.language" content="EN" />
  <meta name="dc.rights" content="United Nations &copy; Copyright 2008" />
  ....
</head>
<body>
....
```

Figure 6.1. Dublin Core metadata HTML coding. *From Making Accessible Websites for the United Nations. Copyright permission needed to reproduce this figure for publication.*

6.3.3 Values for the Dublin Core elements

Most of the values associated with the Dublin Core elements are self-explanatory. The value of the *Title* metadata element is the title of the content, usually the title of the document, video, or image. The value of *Description* might be a short paragraph created by user or an abstract copied from the document.

For elements, such as *Type*, *Format*, and *Language*, the author or editor needs to have a list of approved values, such as a list of language codes, which are an international standard. For others,

⁷⁷ UN, Department of Communications (2009). *Making Accessible Websites for the United Nations*. Available online at <http://www.un.org/webaccessibility/guidelines.shtml>. [Accessed 6 September 2009].

such as resource *Type*, a list will have to be prepared that meets the needs of the host organization. The *Subject* element requires the author or editor to enter a selection of keywords. These element values need controlled vocabularies.

6.4 Vocabulary Control

The search for information on the Web is mediated by commercial search engines. Users enter one or more keywords into the search box, and the search engine finds matches against web pages and content that has been tagged (indexed) by those keywords.

Several problems confound this approach. *Synonymy*, in which two or more words have identical or nearly identical meanings, results in low recall rates. That is, the search engine finds only a portion of the relevant web pages. The other problem is *ambiguity*, where a keyword has more than one meaning. Ambiguity results in low precision (or relevance) because the search engine retrieves all occurrences of the keyword many of which are not relevant to the user's interest.

The ideal search result has both high recall and high precision. In other words, a perfect search retrieves all (high recall) of the most relevant (high precision) information in the database. The use of controlled vocabularies helps reduce ambiguity and, when used with 'use' notes that link to synonyms, improve search results. A controlled vocabulary also defines whether the singular or plural form of a word should be used. Most current search engines will search for both forms of the keyword and take into account common misspellings.

6.4.1 Definitions

Some terms used in the discussion below are defined here.

Controlled vocabulary¹ — A controlled vocabulary is a carefully selected list of words or phrases that are used to index (tag) content for effective retrieval.

Taxonomy² — Taxonomy is the practice of systematic classification for grouping documents into broad categories according to a set of principles or general rules. The Dewey Decimal Classification scheme, used in many libraries worldwide, is an example of a taxonomy.

Thesaurus³ — A thesaurus is a type of controlled vocabulary used for indexing or retrieving information. It contains sets of terms representing concepts and the

¹ Wikipedia (2009). *Controlled vocabulary*. Available online at http://en.wikipedia.org/wiki/Controlled_vocabulary. [Accessed 4 September 2009].

² Wikipedia (2009). *Taxonomy*. Available online at <http://en.wikipedia.org/wiki/Taxonomy>. [Accessed 4 September 2009].

³ Wikipedia (2009). *Thesaurus*. Available online at <http://en.wikipedia.org/wiki/Thesaurus>. [Accessed 4 September 2009].

relationships among them, including hierarchy, equivalence, and associative relationships. It often contains not only the authorized or valid terms to be assigned as metadata but also invalid (“Used for”) synonyms for the term. The structure is usually hierarchical in that an entry often will show both the term itself and also more inclusive (“Broader than”) concepts and more specific (“Narrower than”) concepts. In addition, the entry for a valid term often suggests associated concepts (“Related to” terms) outside the hierarchy that might also be relevant. Valid terms may be used as subject categories or as index terms.

Subject terms — Subject terms are of two kinds: *identifiers* and *descriptors*. *Identifiers* are the names of things, e.g., Indian Ocean, Boeing 747, or the Edwards Aquifer. A list of countries or river basins would be a list of identifiers. Generally speaking, most of the terms in a thesaurus are *descriptors*. They refer to undifferentiated topics such as oceans, airplanes or ground water. Descriptors may be subject headings (in the sense of library catalogue subject heading), subject categories, or index terms.

Index terms⁴ — Index terms, often called *keywords*, is a word or phrase that captures the topical content of a document or other website content. Index terms are assigned to the metadata by an indexer who selects terms from a thesaurus, taxonomy, or other controlled vocabulary. The intent of the indexer is to capture the essence of the document’s subject matter as opposed to merely collecting words actually used in the document.

Keywords⁵ — Originally, *keywords* were those words that actually occurred in a body of text (excluding articles, pronouns, propositions and adverbs of time). In the jargon of the Internet, keywords are really uncontrolled index terms informally assigned by the author or editor.

Tags⁶ — Social tagging is a feature of Web 2.0 where authors or users of a resource may assign tags or index terms by social bookmarking websites. In turn, Web browsers, like Firefox, allow users to review the tags already assigned to a URL and to accept, reject, and add others for their personal use. Tagging is a personal, informal, uncontrolled method of adding keywords to a resource. It also has been successfully used to tag collections of images on photo-sharing sites such as Flickr. Users classify resources in ways that they are more likely to remember because of using their own words.

6.4.2 Sources of index terms

⁴ Wikipedia (2009). *Index term* Available online at http://en.wikipedia.org/wiki/Index_term. [Accessed at 4 September 2009].

⁵ Wikipedia (2009) *Keywords*. Available online at <http://en.wikipedia.org/wiki/Keywords>. [Accessed at 4 September 2009].

⁶ Wikipedia (2009) *Tag (metadata)*. Available online at [http://en.wikipedia.org/wiki/Tag_\(metadata\)](http://en.wikipedia.org/wiki/Tag_(metadata)). [Accessed 4 September 2009].

The simplest approach is for authors to choose keywords for the *Subject* element from the document being indexed. A more formal and systematic approach is for the authors or indexers to select appropriate terms from a thesaurus. This ensures that the form of the word is consistent. A big advantage to using a thesaurus is that once you find the correct term, synonyms for that term are shown on the same page. Using a thesaurus has the further advantage that other appropriate index terms, which may not immediately come to mind, are also shown. Developing a thesaurus for an organization, such as GEF, could be a sizable undertaking. However, thesauri already exist, which can meet the needs of GEF IW projects.

The World Bank Thesaurus. The *World Bank Thesaurus*⁷ is a series of 30 subject-specific mini-thesauri or vocabularies (facet categories) that contain over 85,000 terms (FIG. 3). The following vocabularies appear to be most applicable to GEF IW projects: Freshwater, Coastal, and Marine Environment, Environment and Management, Water Supply and Sanitation, and the Global Environment Facility. When needed terms from other disciplines such as economics, law, health, etc. are readily available.

Typing a word or phrase into the search box on the thesaurus web page brings up a list of terms in alphabetical order. Clicking again on the term of interest brings up a second page showing the hierarchy of terms (the ‘broader than’ and ‘narrower than’ structure), suggestions for related terms (RT), and the facets to which the term belongs (FIG. 4). The structure provides the indexer or editor with additional suggestions for terms to be added to the Dublin Core Subject element.

The *World Bank Thesaurus* is well maintained and adheres to rigorous standards. Parts of the thesaurus have been translated into other languages, but these are not yet available on the website.

⁷ World Bank (2009). *World Bank Thesaurus* Available online at <http://multites.net/mtsql/wb/site/>. [Accessed 4 September 2009].

The screenshot shows the 'The World Bank Thesaurus' interface. At the top, there is a navigation bar with links: Home, Contact Us, About, Countries, Data & Research, Learning, News, Projects & Operations, Publications, and Topics. Below this is a large blue banner with 'The World Bank' logo and the tagline 'IBRD & IDA: Working for a World Free of Poverty'. To the right of the banner is the word 'Thesaurus' and a note 'Powered by MultiTees'.

The search section shows 'Search Criteria: Terms which start with...' with a dropdown menu set to 'Water' and a 'Search' button. Below the search bar is a row of circular buttons for each letter of the alphabet (a-z) and a 'Top terms' button. The search results are listed under the heading 'Search results for Water'.

1. Water
2. Water & sanitation
3. Water & Sanitation Association
4. Water & Sanitation Program
5. Water & trees
6. Water 100% CO2
7. Water absorptive capacity of soil
8. Water abstraction
9. Water access charges
10. Water accidents
11. Water acidification
12. Water acidity
13. Water activity
14. Water adits
15. Water agreements
16. Water alkalinity
17. Water allocation
18. Water allocation policies
19. Water allocation trading
20. Water allocations
21. Water analysis
22. Water appropriation
23. Water appropriation rules
24. Water appropriation sites
25. Water areas

At the bottom of the results list is a 'Next' button. The footer contains a globe icon, the copyright notice '© 2005 The World Bank Group, All Rights Reserved. Legal.', and a link to the website.

Figure 6.2. *World Bank Thesaurus*. By typing 'water' in the search box, all terms in the entire thesaurus that begin with the word *water* are displayed. Alternatively, you can press the 'Facet Categories' button on the right-hand side of the display, and only 'water' terms from a particular faceted vocabulary will show up.

Source: <http://multites.net/mtsql/wb/site/> [Accessed 4 September 2009] *Copyright permission needed to reproduce this figure for publication.*

[Note to Editor: This illustration may not show up on this page. It is also in an separate file called Metadata Fig 6-2 WorldBank.pdf]

The screenshot displays the 'The World Bank Thesaurus' interface. At the top, there is a navigation bar with links: About, Countries, Data & Research, Learning, News, Projects & Operations, Publications, and Topics. The main header features 'The World Bank' logo and the tagline 'IBRD & IDA: Working for a World Free of Poverty', along with the word 'Thesaurus' and 'Powered by MultiTites'.

The search section shows 'Search Criteria: Term record for...' with 'Mangroves' entered in the search box. Below the search box is a row of alphabetically ordered circular buttons (a-z) and a '2' button. To the right are 'Top terms' and 'Facet categories' buttons.

Below the search bar, the text 'Term record for "Mangroves"' is followed by links to 'Google', 'Yahoo', 'Feedback', and 'Hierarchy'. The main content area is titled 'Mangroves' and lists several hierarchical relationships:

- UF:** [Mangrove](#)
- BT:** [Trees](#)
- NT:** [Mangrove varieties](#)
- RT:** [Aquaculture ponds](#), [Coastal processes](#), [Mangrove ecosystems](#), [Mangrove farming](#), [Mangrove forests](#), [Mangrove preservation](#), [Salt evaporation ponds](#), [Tidal areas](#)
- S&O:** DevDict
- VAL:** DevDict
- FAC:** 10.10.00 Silviculture Vocabulary, 12.10.00 Water Resources Management Vocabulary, 12.11.00 Sustainable Land Management Vocabulary

At the bottom, there is a copyright notice: '© 2005 The World Bank Group, All Rights Reserved. [Legal](#)'.

Figure 6.3. Hierarchical structure of the term Mangroves in the World Bank Thesaurus.
 Source: <http://multites.net/mtsql/wb/site/> [Accessed 4 September 2009] *Copyright permission needed to reproduce this figure for publication.*

[Note to Editor: This illustration may not show up on this page. It is also in an separate file called Metadata Fig 6-3 WorldBank.pdf]

UN Bibliographic Information System (UNBIS) Thesaurus.

The fourth edition of *UNBIS Thesaurus*⁸ contains about 7,000 terms and is available in all the official languages of the United Nations: Arabic, Chinese, English, French, Russian, and Spanish. It contains the terminology used in the subject analysis of documents and other materials relevant to United Nations programmes and activities has been incorporated as the subject lexicon of the United Nations Official Document System. The two primary criteria in selecting descriptors have been (1) consistency with the terminology used by the given UN organization itself as reflected in its documents and (2) compatibility with terms included in thesauri produced or used within the UN System, in order to facilitate exchange of information with other organizations.

This thesaurus would be a suitable source of terms for the broad subject terms (categories) used to classify content.

6.4.3 Subject Taxonomy

A subject taxonomy attempts to be broad enough to encompass the scope of the contents of the Web site while at the same time providing enough specificity to guide the user to a group of potentially relevant documents. Additional keywords in the query will narrow the query still further. The Subject Taxonomy shown in Appendix 2 contains 18 major groups of information and 162 subgroups. Portions of this draft taxonomy might be appropriate for a particular GEF IW project. With use, examining the topics most frequently used in query-box searches could further refine the taxonomy. The major subject categories of a website content can be included in the *Subject* element of the Dublin Core, along with the keywords.

6.4.4 Document Type Taxonomy

The Document Type Taxonomy (Appendix C) was developed mostly from the list of document types on the IW:LEARN website, from documents listed on GEF IW project websites, and operational documents of the GEF.

To a certain extent, the Document Type Taxonomy reflects the user groups for various types of documents. The Administrative and Organization categories are for those documents required for program or project management purposes. These are not likely to be of interest to the general public. Scientific, Technical & Reference documents are those of interest to scientists, engineers, students, and others working in the water resources and environmental sciences. The Outreach & Public Education Documents and the Events-Related Documents categories are for documents most likely to be of interest to the general public and the news media.

The taxonomy is complicated by the changing administrative requirements of GEF and its partner agencies that oversee management of the projects. In some cases, project proposals and monitoring and evaluation reports may have several different names for essentially the same

⁸UN Bibliographic Information System (UNBIS) Thesaurus (2009). Available online at <http://lib-thesaurus.un.org>. [Accessed 5 September 2009].

report content. The type of document should be placed in the *Type* element of the Dublin Core. If the *Type* element is not used, document type could be placed in the *Subject* element along with the subject category and the keywords.

6.4.5 Navigation Taxonomy

Users depend on navigation taxonomies (the names of the primary and secondary navigation links) to quickly find a list of resources. These terms are often “themes” that cut across the information resources on the site. On the IW:LEARN Web site, for example, topics in the left-hand column under ‘Navigation’ are such a taxonomy. The success of a navigation taxonomy depends upon how well users understand the terminology. Whatever taxonomies are used on a website, the most important task in guaranteeing the ongoing effectiveness of such a system is maintenance. The controlled vocabulary must be current, and the rules that populate browsable topics must be kept updated to reflect users’ interests and to provide accurate rules for targeted search results.

A periodic review of the keywords used in the commercial search engines that brought visitors to your site can help in refining both the navigation and subject taxonomies.

6.4.6 Geographic identifiers

There are several sources for the standard names of countries and river basins.

- UN Department of Public Information, Geographic Names.¹ This geographic names file has the names of countries and their three-letter geographic code in use by the UN System.
- **GEONet Names Server (GNS).**² GEONet Names Server is maintained by the U.S. National Geospatial –Intelligence Agency (NGA). The server contains information on 4.0 million features with 5.5 million names. Geographic names used on maps in the United States are stored on the U.S. Geological Survey’s Geographic Names Information System (GNIS)³
- **International River Basin Registry.**⁴ The *International River Basin Registry* is part of

¹ UN, Department of Public Information, Cartographic Section (2000). *GeographicNames*. Available for downloading at <http://www.un.org/Depts/Cartographic/english/geoinfo/geoname.pdf>. [Accessed 5 September 2009].

² U.S. National Geospatial-Intelligence Agency (NGA) (2009). *GEONet Names Server (GNS)*. Available at <http://earth-info.nga.mil/gns/html/index.html>. [Accessed 7 September 2009].

³ U.S. Board of Geographic Names (2009). *Geographic Names Information System (GNIS)*. Available online at <http://geonames.usgs.gov/>. [Accessed 5 September 2009].

⁴ Oregon State University, Institute for Water and Watersheds (2002). *International River Basin Registry*. Available online at <http://www.transboundarywaters.orst.edu/database/interriverbasinreg.html>. [Accessed 5 September 2009].

a project on transboundary watersheds by Oregon State University's Institute of Water and Watersheds. It lists the names of 214 international waterways with the names of countries, drainage area of the basin, and percentage of area in each country.

The purpose of these sources of names for GEF IW projects is to make sure that the official name of a geographic location, country, feature, or river is used in the metadata. These subject identifiers should be included in the *Coverage* element of the Dublin Core or location field of other standards. If the *Coverage* element is not used, geographic terms could be included in the *Subject* element along with the keywords.

6.5 Image, audio, and video metadata standards

Image, audio, and video metadata data are imbedded in the electronic file. While you may know what your picture is about and where it was taken, years from now that information will be lost unless it is recorded. The advantage of embedded metadata is that it will travel with the image, audio recording, or video clip. There are two standards that can apply to multimedia content.

6.5.1 Exchangeable image file format (Exif)

The Exchangeable image file format (Exif)¹ is a specification for the image file format of digital cameras. It was created in 1998 by the Japan Electronics Industry Development Association as a means of storing metadata about an image including date and time of exposure, camera settings, a thumbnail picture of the image, and description and copyright information. The latter must be entered manually. You automatically get Exif metadata every time you take a digital picture. The standard also is applicable to JPEG, TIFF, and WAV (Windows Audio Files) files. It is not supported for PGN and GIF files.

Exif contains an extensive set of additional tags for Global Positioning System (GPS) information, such as latitude, longitude, altitude, and azimuth. Only a few cameras now are equipped with GPS units. However, in the future, GPS units will increasingly be incorporated into digital cameras. Mobile phones, such as Apple's iPhone, already have a GPS that will geocode pictures taken with the iPhone camera. If your camera is not equipped with a GPS, you can use a handheld GPS to record time and location where you took a picture. You can later synchronize this data with the image information and write it to the Exif header using geotagging software. Some software programs also allow the use of GoogleEarth to obtain the latitude and longitude of the photograph.²

¹ Wikipedia (2009). Exchangeable image file format (Exif). Available online at <http://en.wikipedia.org/wiki/Exif>. [Accessed 5 September 2009].

² Free Geography Tools: Exploring the world of free tools for GIS, GPS, Google Earth, neogeography, and more (2009). *Archive for the 'geotagging' category*. <http://freegeographytools.com/category/geotagging>. [Accessed 7 September 2009].

6.5.2 International Press Telecommunications Council (IPTC) standard

The International Press Telecommunications Council (IPTC)³ has developed a standard similar to the Dublin Core for images. This IPTC standard can also be used for digital recordings and video clips. The IPTC Core contains information about the creator of the image (name, title, address, phone number, email, and website), a description of the image (headline, description, keywords, IPCT subject code, genre (of picture), location), and copyright and usage information. The metadata are extensively used on websites that sell stock photographs. More abbreviated information is provided for audio recordings (artist, album, track number, genre, and composer) and video (tape or CD/DVD name, scene, shot/take, date shot, and a comments log. Controlled vocabularies are provided by IPTC for subject, genre, and scene.⁴

ExifTool is a freeware, platform independent, program for reading and writing both Exif and IPTC metadata as well as a number of other metadata types.⁵

6.6 Web Page Optimization

Most commercial search engines search for keywords from specific places on the web page, such as title tags, meta-tag descriptions, and page content during a search. Links that meet the search criteria then appear on the search engine's results page. In addition, commercial search engines use link popularity (the number and quality of third party links to your site) in ranking websites. Search engine optimization requires designing a website's text and HTML tags in ways that help Web search engines find your site. In the commercial world, often the goal is to have the company website appear among the top few links on the search engine's results page. Hopefully, this will also happen for your website if you use metadata properly on your website to help users find content.

6.6.1 How can I increase the scent of information?

Some of the information used by the search engine to rank websites is displayed on the search engine's results page. The web page title, for example, will attract users if it contains keywords that users are likely to be interested in. Similarly, the snippet of text describing the site and the name the URL should contain text that will give users confidence that they will be heading in the right direction if they click on your site.

³ Wikipedia (2009). International Press Telecommunications Council (IPTC) standard.. Available at http://en.wikipedia.org/wiki/International_Press_Telecommunications_Council. [Accessed 5 September 2009].

⁴ Controlled vocabularies (n.d.). *When is a Keyword Not a Keyword: Using the IPTC Codes*. Available online at <http://www.controlledvocabulary.com/help/iptc-codes.html>. [Accessed 6 September 2009].

⁵ Exif Tool by Phil Harvey, *Read, Write and Edit Meta Information*. Available online at <http://www.sno.phy.queensu.ca/~phil/exiftool/>, [Accessed 6 September 2009].

During a search Web search engines look at the following items to match words typed into the in the user's search box.

- **Title tags** — The text between the HTML `<title>` tags is the Web page title. The text works best if it is from 7 to 12 words long (40-49 characters). If keywords appear in the title, it will increase user confidence that they have arrived on the right page. All major search engines use keywords in title tags to compute website rankings in a search. Each Web page on your site should have its own, individual title.
- **Meta-tag description (page snippet)** — Search engines search the meta-tag descriptions for each page and take snippet of text from each web page on your site that meets the search criteria. These snippets are generally 155 characters long and are taken from the upper (above the fold) part of the web page. Text formatted as part of graphic images, such as the web page banner, will not be read. Google Search takes snippets from multiple parts of a web page. Keywords should be used in both the meta-tag description and in the on-the-page content. For pages that will be important to informational queries, write longer descriptions (200-250 characters). Write separate meta-tag descriptions for each web page on the site. These descriptions should reinforce the keyword content on the Web page by using the same keywords or other terms and phrases that capture the nature of the content.
- **URL structure** — The URL of a web page can encourage the user to click on the link to your page if it contains important keywords. Keep the URL as short as possible (less than 65 characters) so that it will be easy to read. Unusually long URLs not only are hard to remember but also likely to be miskeyed. If you must have a lengthy URL, consider a TinyURL in references to the given web page.⁶ Avoid complex URLs with code in them.
- **Page content** — Use keywords in the title and subtitles of pages and in the text itself. Text in the ALT tags used to explain pictures and graphical content will also be searched.

⁶ For more information about TinyURLs, see http://en.wikipedia.org/wiki/Tiny_URL. To set up a TinyURL go to <http://tinyURL.com>. [Accessed 27 August 2009].

6.7 Metadata Checklist

- 1 **Page Titles.** Give each page in your site a unique title that is rich in keywords.
 - 2 **Do not start the title with ‘Welcome to....’** Or include the term ‘home page’. Begin with the words that the user will associate with the page.
 - 3 **Use the GEF project name** as part of the title of the home page.
 - 4 **Avoid using the same first few words** on each web page. Try to characterize the content of the page in the title.
 - 5 **Taglines** on home pages need to be short and to the point. Commercial search engines will use the first 66 characters of the page title on their search engine results page as a clickable link. Limit titles to seven or eight words. Longer titles are less scannable.
 - 6 **Controlled Vocabulary.** Use the thesaurus. Use the thesaurus. Use the thesaurus.
 - 7 **Keywords (M).** Assign keywords and meta tags to the content of your website to improve search engine discovery.
-
- 1 **Geographic Names.** Use standard international names and abbreviations.
 - 2 **Language Codes.** Use international standards for language codes.
 - 3 **URLs.** Keep URLs reasonably short.
 - 4 **Document types.** Use the names given in the document type taxonomy.
 - 5 **Subject categories.** Use the names given in the subject category taxonomy.

7 Content

One of the early steps in designing a website is to make an inventory of the content that you want to publish on the Web. Defining and acquiring content is probably the most important (and also the most time-consuming task in building a website. Invariably, gaps will appear in the content needed to support the objectives of both the website and the GIF IW project. For example, you may lack a report documenting lessons learned by the project. Be sure to budget enough time to prepare quality content for your site if it is not readily available. The task of writing, editing, and processing content is often greatly underestimated.

7.1 What is content?

Content includes a great diversity of material that is can be read or viewed online or downloaded from the website for reading or viewing viewed offline. Content may include news articles, technical reports, e-books, directories, hyperlinks, graphics (photographs, illustrations, charts, diagrams, and maps), datasets, and multimedia (audio recordings, slideshows, and videos). It also may include blogs, forum discussions, and microblogs or tweets from Twitter.

7.2 Why is content important?

‘Content is king’ is an oft-repeated truism. You must have interesting, reliable, and fresh content about your project on your website. Otherwise your website will not attract new visitors, nor will old visitors keep coming back. Content is the foundation of a website and your mission, as an IW project, is to share information and experiences in water management with the rest of the world. Everything else—the typography, page design, and navigation tools—all serve to help users easily find the IW project information that they want. If the expected information is not on the project website, they will not find it.

Of course, an attractive, colourful, well-organized website is highly desirable, but without quality content that supports the project's objectives, visitors will leave the site frustrated that they did not find useful information. Worse, they will leave with a negative opinion of your project. People often complain more loudly and more often than they praise. Unhappy website visitors are more likely to tell friends that your website is crummy than happy visitors are to praise it.

7.3 What documents are required for GEF IWprojects?

GEF projects follow a project cycle that consists of the phases that a project must go through in

order to realize its objectives.⁷ The precise formulation of the project cycle varies from one GEF Agency to another, but the basic components are shown in FIG. 7.1. It enables an agency to track actions in developing, implementing, and evaluating projects. The purpose is to improve project management by ensuring that all relevant issues and conditions are taken into account during design and implementation.

Throughout the programming, implementation, and evaluation stages of each project, various reports are produced that should be part of the project library. The actual steps that make up the project cycle of a GEF IW project depend upon whether the project is a Full Size Project (FSP--over \$1 million), a Medium Size Project (MSP—up to a \$1 million), or an Enabling Activity (EA). The following steps are for an FSP.⁸ The Step numbers in parentheses refer to FIG. 7.2 :

1. **Project Identification Form (PIF)** — Preparation of a short (4 pages) project concept paper to make sure that the project is consistent with GEF strategic objectives.
2. **Option to request Project Preparation Grant (PPG)** — For funds to support the development of the project proposal.
3. **CEO Clearance of PIF and PPG** — Letters of Endorsement are provided to go with the PIF (STEP 1).
4. **GEF Council Approval** — GEF Council approves the PIF and the programme framework document that includes the PIF (STEP 2).
5. **Project Document (PD)** — Preparation of this documentation must meet the GEF agency's internal requirements for approving projects. This step may require preparing a number of background documents to support the Project Document.
6. **GEF Council Approval** — GEF Council approves the PD (STEP 3). Criteria include: High likelihood that the project will deliver its outcomes and will generate appropriate global environmental benefits consistent with focal area strategies.
7. **Cost-effective use of GEF funds** monitored by regular review of project budgets
8. **Compliance** with GEF's monitoring & evaluation (M&E) policy
9. **Cost-effective use of the Project preparation grant**
10. **CEO clearance of the PD** — Letter of Endorsement to go with the PD

⁷ GEF project policies are available online at http://www.gefweb.org/interior_right.aspx?id=90 [Accessed 27 August 2009].

⁸ A description of the GEF Project Cycle, available online at http://www.gefcountrysupport.org/report_detail.cfm?projectId=172. [Accessed 27 August 2009].

11. **Implementation, Monitoring and Evaluation of the Project**
12. **Implemented according to the GEF agency rules**
13. **Project Implementation Reports (PIR)** — submitted by GEF agencies
14. **Annual Monitoring Review** — conducted by GEF Secretariat based on PIR
15. **Final Evaluation Report** — Prepared by the GEF agency and submitted to the GEF Evaluation Office.

Comparing GEF IW projects from different GEF agencies and/or different years can be confusion because the terminology describing project documentation varies. For example, a project's *Final Evaluation Report* may also be called a *Final Project Document* or a *Terminal Evaluation*. Ideally, each IW project should use the same terminology for management reports and technical reports when classifying reports and documents for the project library.

From a technical point of view the *Transboundary Diagnostic Analysis* (TDA) contains the most useful information about a project because it addresses the root causes of water-related issues and usually contains a large number of appendixes containing technical assessments prepared by contractors or government agencies.

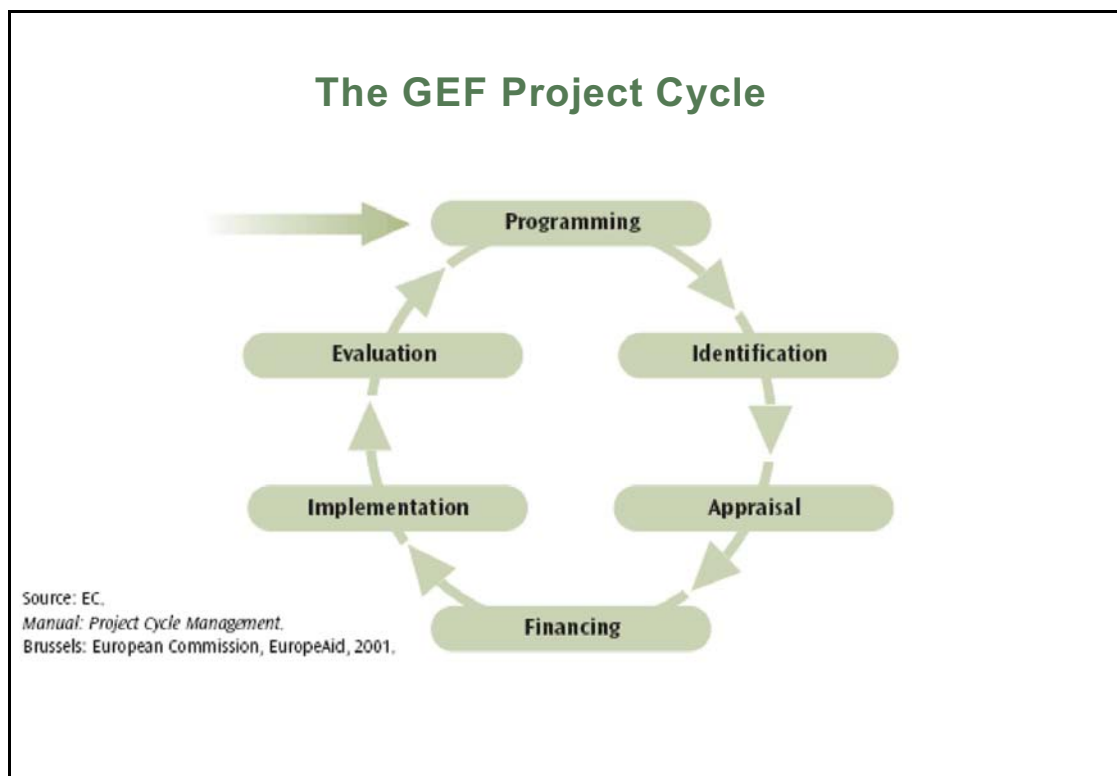


Figure 7.1. GEF Project Cycle
 (Source: http://www.gefcountrysupport.org/report_detail.cfm?projectId=172.
 [Accessed 30 August 2009].)

The GEF Project Cycle

The GEF project approval cycle defines the stages that a project must go through in order to be approved by the GEF and to receive allocation and/ or commitment of funding. There are 4 points in the project cycle where the GEF Secretariat and/ or GEF Council play a role in reviewing and making decisions on providing funding for projects (referred to as Step 1, Step 2, Step 3 and Step 4 in the GEF Project Cycle Paper). These 4 decision points are depicted as gray boxes in the figure. Olive coloured boxes signify stages in the project cycle where the recipient country, together with its partner GEF Agency, takes the lead.

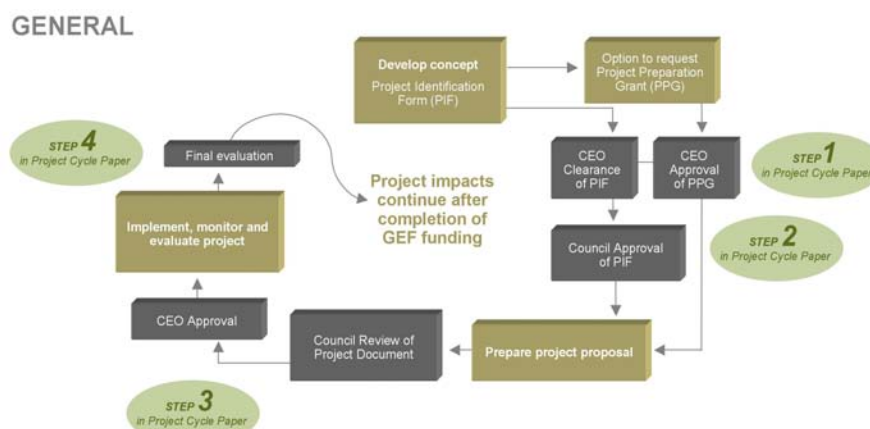


Figure 7.2. GEF project cycle for Full Size Projects (FSP)
 (Source: http://www.gefcountrysupport.org/report_detail.cfm?projectId=172.
 [Accessed 27 August 2009])

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Late in the project a *Strategic Action Programme* (SAP) may be prepared documenting an agreement among participating countries on the actions needed to resolve priority threats to international waters.

In addition to the project cycle documents⁹, the TDA and the SAP, there are many other reports produced by a project over its active life. These include databases, experience notes, GIS coverage, journal articles, maps, internal meeting reports (especially meeting of the project's steering committee and technical review committee), conference presentations, press releases, etc. It is up to the project manager to decide which project outputs should be made available via the Internet. Ideally all information prepared by the project should be made available online. In some cases these documents will have to be acquired from the GEF agency managing the project or from the Global Environment Facility Secretariat. Appendix 2 contains a taxonomy or classification categories for GEF IW project documents.

7.4 Writing Text for the Web

Even though much of an IW project's website content will be reports and documents, other pages will also have to have quite a bit of text. Writing for the Web is different from writing for a journal or a technical publication. The writer must take into account (1) users' behaviours in scanning a monitor screen and (2) the possibility that they may print the web page for reading offline. Research has shown that people do not read web pages word for word as they do book pages: their eyes scan them. Website visitors may read only 20 percent of the words on a web page.¹⁰

⁹Project management reports include: Project Identification Form (PIF), Project Preparation Grant (PPG), Project Appraisal Document (PAD), Project Document (PD), Project Information Document (PID), Project Brief, Annual Work Plan, Annual Status Report, Annual Performance Report, Project Implementation Report (PIR), Annual Monitoring Review (AMR), Mid-term Project Evaluation, Implementation Completion Report (ICR), Project Performance Assessment Report (PPAR), and Final Evaluation Report [or Terminal Evaluation (TE)]. (See also Appendix 2.)

¹⁰ Nielson, Jakob, 2008, *How little do users read?* (article in *Alertbox*, May 6, 2008), Available online at <http://www.useit.com/alertbox/percent-text-read.html> [Accessed 27 August 2009].

Text must be brief, succinct, and structured to facilitate both scanning and printing. For example, project descriptions might include the title, objectives, accomplishments, lessons learned, and references. When using appropriate subheadings, this modular structure of content facilitates scanning because site visitors can anticipate where in the text they might, for example, find *Lessons Learned* when scanning a number of project descriptions.

In composing text for the Web, writers should follow the journalistic principle of putting the most important information first where it will be seen and remembered. This provides a context for the supporting information that follows. In traditional newspaper writing, the basic information required in an article was Who? What? When? Where? Why? and How? [known as the *5 W's (and one H)*].¹¹ A short paragraph containing these elements about your IW project with embedded hyperlinks to more details might be worth considering for the project's home page.

Some general guidelines for website writers are as follows:¹²

- The language used must attract the attention of users and lead them to the information of interest.
- Descriptive and meaningful keywords and concepts embedded in the headings, subheadings, and first few sentences not only helps the user find information but also helps search engines locate your most important information.
- Construct and develop content to meet the needs of your audience(s).
- Use the language of your audience — avoid technical jargon.
- Spell out abbreviations, acronyms, and initialisms the first time they are used and place the spelled out version in parentheses.
- Consider adding a glossary of terms, jargon, and abbreviations to the site.
- Shorter is better: keep text in an online document less than 600-700 words
- If you don't need a word, cut it out.
- Remove adverbs and adjectives they slow the reader down and disguise weak verbs and nouns.

¹¹ *The 5 W's*. Available online at <http://en.wikipedia.org/wiki/FiveWs> [Accessed 29 August 2009].

¹² Adapted from McGovern, Gerry, Rob Norton, and Cathrine O'Dowd (2001). *The Web Content Style Guide: An Essential Reference for Online Writers, Editors and Managers*. Prentice Hall, 246 p. Chapter 1 only. Available online at http://www.gerrymcgovern.com/web_content_style_guide.htm. [Accessed 30 July 2009].

- Be direct. Tell readers what they can expect to read.
- State the key points or conclusions that you want to communicate first.
- Choose short and direct headings that use keywords.
- Use bold language. BUT deliver what you promise.
- Use subheadings to break up the text into 'chunks' of short paragraphs to help users locate where they are in the full text.
- Keep paragraphs short and no more than a few sentences. Reading a computer screen is 25-30 percent slower than reading hardcopy. A paragraph of 45 words is about right for online reading with no more than 50-60 words maximum. Use the word count feature of your word processor to easily find out how many words you have used.
- Keep sentences simple and write in the active voice.
- Capitalize the first letter of bulleted lists.

Although text content meant to be read offline could be much longer and more complex, the suggestions above can apply equally well. George Orwell's famous rules for writers apply here (FIG. 7).

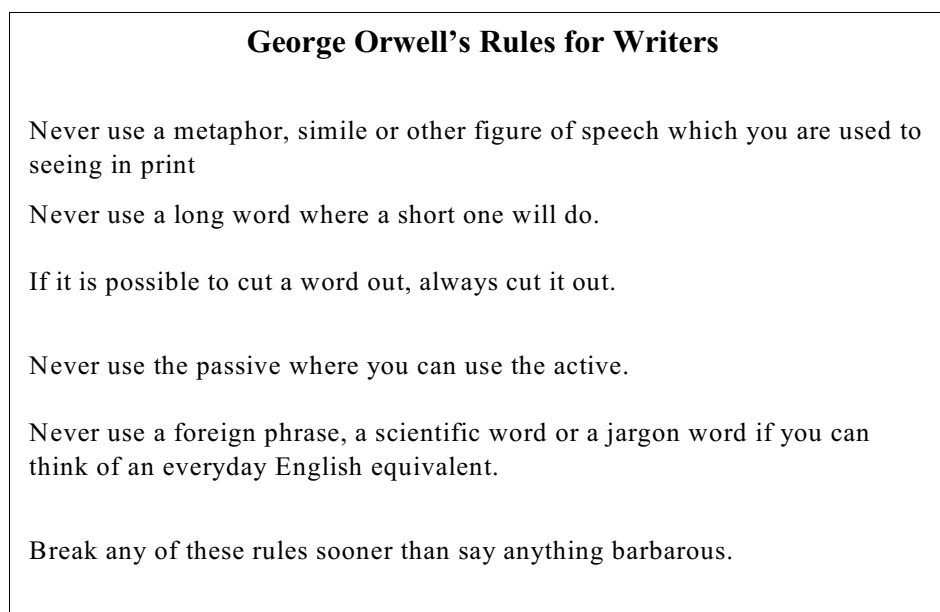


Figure 7.3. George Orwell's Rules for Writers.

(Source: Orwell, George R. (1941). *Politics and the English Language*. Available online at <http://www.netcharles.com/orwell/essays/politics-english-language1.htm> [Accessed

27 August 2009]) *Copyright permission will be needed for publication*

7.5 Editing and Reviewing

Good writing is an acquired skill that comes from practice. It also takes time and patience. One of the skills a good writer possesses is the ability to edit their own work. Colleague reviews from others are also useful. While some writers take offence at another's criticism of their work, a good writer accepts criticism gracefully. Comments or suggested changes in text suggest that the reader hit a speed bump. The writer needs to critically assess the proposed changes to see if they add clarity to the text and if not, to consider a revision that does. McGovern's rules for editing include the following:¹³

- Is the sentence clear?
- Is there a simpler way to say it?
- Is there a shorter way to say it?
- Is the word or sentence necessary?

Consistency in style also is a worthy goal for those who prepare any content for IW project websites. The use of abbreviations and symbols, capitalization, proper names, punctuation, numbers, quotations, lists, tables, maps, and illustrations are all areas that should follow uniform standards for presentation. *The Oxford Style Manual*¹⁴ is an excellent reference that provides guidance in each of these areas. The manual also includes a dictionary for writers and editors for the proper spelling of International English. An English-language dictionary that clearly distinguishes between international and American spelling is the *Concise Oxford English Dictionary*.¹⁵

In writing reports for print publication and for Web content, citations to the sources of information and to online materials is extremely important. The important thing is to adopt a particular format and stick with it. With minor variations, the Harvard Referencing System (also called the author-date system of documentation) is followed by most publishers of scientific and technical material. This is the bibliographic citation system recommended by the *Oxford Style*

¹³ McGovern, Gerry, Rob Norton, and Cathrine O'Dowd (2001). *The Web Content Style Guide: An Essential Reference for Online Writers, Editors and Managers*: Prentice Hall. Chapter 1 available online at http://www.gerrymcgovern.com/web_content_style_guide.htm. [Accessed 30 July 2009].

¹⁴ Ritter, R. M., ed. (2003) *The Oxford Style Manual*. Oxford: Oxford University Press.

¹⁵ Soanes, C. and Stevenson A., eds. (2004) *Concise Oxford English Dictionary*, 11th edn. Oxford: Oxford University Press.

Manual. It is also the system detailed in *The Chicago Manual of Style*¹⁰ as well as the system adopted by the British Standards Institution.¹¹ Examples of bibliographic format for many types of online and print references are available online from the Monash University [Australia]¹², Queen Margaret University [Edinburgh]¹³ as downloadable PDF documents. It uses the international date format (day-month-year) and provides help for publication as well as authors. These references have formats for e-books, e-mail, online newspaper articles, etc. in addition to formats for conventionally published reports and books.

For guidance in English composition, *The Elements of Style* is very good (FIG. 8). The 1st edition is available online.¹⁴ Needless to say any reports or text placed on the Web should be carefully edited and checked for both grammar and spelling.

Strunk's Elementary Principles of Composition

Make the paragraph the unit of composition: one paragraph to each.

As a rule, begin each paragraph with a topic sentence; end it in conformity with the beginning.

Use the active voice.

Put statements in positive form.

Omit needless words.

Avoid a succession of loose sentences.

Express co-ordinate ideas in similar form.

Keep related words together.

In summaries, keep to one tense.

Place the emphatic words of a sentence at the end.

¹⁰ University of Chicago Press staff (2003) *The Chicago Manual of Style*, 15th edn. Chicago: University of Chicago Press.

¹¹ British Standards Institution (1990). BS 5605:1990. *Recommendations for citing and referencing published material*. See <http://www.bsi-global.com/>. [Accessed 1 September 2009]

¹² Monash University Library (2009). Harvard author-date style: Citing and referencing tutorial. Available online at <http://www.lib.monash.edu.au/tutorials/citing/harvard-print.html> [Accessed 10 September 2009]

¹³ Dee, M., Bell, V., and Peacock, S. (2008). Write and Cite: The Queen Margaret University Guide to the Harvard System of Referencing. Available online at http://www.qmu.ac.uk/lb/information/Guides/harvard_ref_guide.pdf [Accessed 28 August 2009]

¹⁴ Strunk, William Jr. and White, E. B. *The Elements of Style*, 4th edn. (Needham Heights, Mass.: Allyn and Bacon). The 1st edition (1918). Available online at <http://www.bartleby.com/141/> [Accessed 30 July 2009].

Figure 7.4. Strunk's Elementary Principles of Composition. (Source: Strunk, William Jr. (1918). *The Elements of Style*, 1st edition. Available online at <http://www.bartleby.com/141/> [Accessed 30 July 2009]) ***Copyright permission will probably be needed for publication***

7.6 Content Formats

The most common content that you will have on your website are documents and reports produced by the project, either as part of the management of the project or as documentation of the scientific and technical outputs. Usually, these documents are produced by word processors directly by the authors. The vast majority of documents are written using Microsoft Word. Less frequently, other word processors are used to produce documents, such as WordPerfect and OpenOffice. Both these word processors can save documents in Rich Text Format (RTF) or as Word documents (DOC). All can save files in Adobe System's Portable Document Format (PDF). Common formats for graphics and multimedia are also described below.

7.6.1 Portable Document Format (PDF)

Adobe Systems created the PDF in 1993 as a file format that could preserve the formatting of documents irrespective of the hardware, software, or operating system that created them. A PDF preserves the text, layout, fonts, images, and vector graphics that make up the document. Originally a proprietary format, PDF (version 1.7) was made an open standard in mid-2008 as ISO/IEC 32000-1:2008.¹⁵ As a result, PDF has become the format of choice for storing and exchanging, letters with signatures, technical reports, forms, and other highly formatted documents.

PDF/A-1 is a format based on PDF version 1.4 that is designed for long-term archiving of electronic documents. The format is defined by ISO 19005-1:2005 that was published in 2005.¹⁶ The goal of this standard is to be able to reproduce the electronic document in years to come without losing any information. The PDF/A-1 file has to be completely self contained. All of the information needed to reproduce the document, such as text, images, and graphics, needs to be imbedded in the file. PDF/A-2, currently (2009) under development, is based on PDF version 1.7 and will be backwards compatible with PDF/A-1.

A number of products have been released that will produce PDF/A compliant documents. Microsoft Office 2007 has a "add-in" (plug-in) that will create PDF/A files from Word, Excel, and PowerPoint documents.^{17 18} Adobe Acrobat 8.0 and later versions will also convert

¹⁵ ISO 32000-1:2008 Document management – Portable document format – Part 1:PDF 1.7 Available online at http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=51502. [Accessed 29 August 2009].

¹⁶ Wikipedia (2009). PDF/A. Available online at <http://en.wikipedia.org/wiki/PDF/A>. [Accessed 1 September 2009].

¹⁷ PDF/A Conference Center, PDF/A – A New Standard for Long-term Archiving. Available online at http://www.pdfa.org/doku.php?id=pdfa:en:pdfa_whitepaper. [Accessed 1 September 2009].

¹⁸ 2007 Microsoft Word Add-in: Microsoft save as PDF. Available online at <http://www.microsoft.com/downloads/details.aspx?FamilyID=f1fc413c-6d89-4f15-991b-63b07ba5f2e5&displaylang=en#QuickInfoContainer>. [Accessed 1 September 2007].

electronic documents to PDF/A.

7.6.2 Graphics and image formats

Images should be used to compliment the content on the web page and to introduce some visual interest to the site.

JPEG Format. The Joint Photographic Experts Group created the JPEG format compression scheme in 1992.¹⁹ The format dedicates 24 bits of memory to each pixel allowing the format to display 16.8 million colours. The format is a very popular for photographic images where image quality and colour fidelity is important. Like interlaced GIF images, progressive JPEG files can be gradually displayed by a Web browser, although it takes longer to load than standard JPEG files.

The amount of compression applied to a JPEG file can be controlled on a sliding scale from 'best' to 'least' quality resulting in an order of magnitude reduction in file size. This 'lossy' file compression, which trades off visual detail for file size by discarding unnecessary data, can create visual artefacts (blocky or fuzzy patterns) in the low quality image. JPEG format is

- Very good with photographic images, paintings, or other image that requires smooth tones and colour
- Supports 16.8 million colours
- Not suitable for line art or text based images.

Graphics Interchange Format (GIF). The Graphics Interchange Format was introduced in 1987.²⁰ It is an eight-bit format that compresses files on the basis of the number of colours in the image. The format supports only 256 colours so that it is not generally used for photographs. However, if the number of colours in an image can be reduced to 8, 16, or 32 colours, the reduction in file size (and thus, download time) can be considerable. GIF images can be solid (blocks the background) or transparent, allowing the background to show through the image.

GIF graphic downloads are usually are non-interlaced, that is the image builds on the Web browsers one row of pixels at a time from the top to the bottom of the image. This process is much faster that downloading an interlaced image where the browser builds a low-resolution version of the image while the full-size image is still downloading. The visual effect is that of an image coming into sharp focus. Interlacing is recommended for large GIF images (200 x 200 pixels) but not for small graphics.

¹⁹Wikipedia (2009). *JPEG* .Available online at <http://en.wikipedia.org/wiki/JPEG>. [Accessed 1 September 2009]

²⁰Wikipedia (2009) *Graphics Interchange Format*.. Available online at <http://en.wikipedia.org/wiki/GIF>. [Accessed 1 September 2009]

The GIF format is quite suitable for images with large blocks of solid colour and sharp edges. GIF format

- Should be used for cartoons, diagrams, or line drawings
- Can display transparency
- Supports animation
- Supports 256 colours.

Portable Network Graphic (PNG). Designed in 1996 as a non-proprietary alternative to the GIF image format, the Portable Network Graphics (PNG) is a multi-purpose image format compatible with most modern web browsers.²¹ The format, like GIF, uses lossless compression, so the resulting full-colour photographic image is much larger than an equivalent JPEG file. However, the format supports a full range of colours, variable transparency, and better interlacing. PNG format

- May be used for photographic images, but requires larger images than JPEG
- Is best used for line art, text, and logos
- Vector graphics.

Complex diagrams or illustrations, such as maps or posters, may best be created as vector graphics with specialized software, such as *Adobe Illustrator*, and then converted to a raster format such as Portable Network Graphics (PNG) for the Web. Such images are easy to modify, can be resized without loss of quality, and can be printed as a high-resolution copy.

Image sizes. Web page graphics image (IMG) tags should include height and width attributes. These tags tell the browser how much space to leave for the graphics. However, if the tag specifies a thumbnail size image and the image is large (1000 x 1000 pixels) then what should have been a one second download may take a minute or more. The best way to approach this problem is to resize all your images to match the size at which they will be displayed. Software, such as Adobe Photoshop, may be often used to resize and optimize images for the Web. Just make sure that you use the JPG, GIF, and PNG file formats mentioned above and take into consideration the pros and cons of each format.

Also use the ALT attribute for an alternative text description of the image or what it represents. If the user loads the website with the graphic loading turned off in the Web browser, the alternative text will appear in place of the image. The goal is to make the whole page comprehensible to a

²¹ Wikipedia (2009). *Portable Network Graphics*. Available online at http://en.wikipedia.org/wiki/Portable_Network_Graphic. [Accessed 1 September 2009].

user that cannot see it. Interface images like icons and buttons do not need alternative text descriptions.

Image dimensions. Logos, icons and thumbnails should be kept small and generally should not exceed 100 x 100 pixels. Certain logos can be wider so apply this guide where suitable. Images for logos and text headings/titles should not exceed 10KB. Ideally, they should be around 4KB.

Photographs can be larger and on average can start from 640x400 pixels and upwards. Photographic images of moderate size, such as 640x400 pixels, should be under a 100KB, and ideally around the 50-70KB mark. Appropriate sizes depend on your site theme, layout, and purpose of the image. Usually it is a good idea to use the smallest size that fulfils the image's purpose on the page. Large images that fill half the of a 1024x768 pixel screen should be used sparingly. If possible keep the image size below 200-300KB. Remember to consider users that do not have fast Internet connection.

Web page banners. Banners can come various shapes. Some banners are related to promoting a related site or an image banner that runs across the width of your design in the header of your Web page. Using them judiciously because users associate them with advertising.

Animation. Animation using GIF images can be eye catching but their use is rarely justified on a website. They may be cute or clever, but they are also distracting. The dominant format for displaying animated vector graphics is Adobe's Small Web Format (SWF). These files can be played with Adobe Flash Player.

7.6.3 Multimedia formats

Videos. In contrast to animations, Videos can be an important form of visual communication with users and can provide them with a sense of environmental ambience that the written word cannot always do. For example, the experience of watching a speech by a high-ranking policy maker and reading the speech are quite different. The video will show body language and inflection of speech that often reveals more information than the text itself. Videos also can enhance appreciation of the seriousness of an issue, such as water scarcity or lack of sanitation, in a way the words cannot.

Digital video consists of a sequence of photographic images shown at about 30 frames (images) per second (fps). Full resolution video and audio utilizes enormous amounts of data storage making it impractical, at least for the moment, to use on websites. It is possible to stream video continuously in real time to the desktop but this requires significant data processing power and bandwidth to work smoothly. To be practical, a video clip is usually is compressed, according to a variety of different algorithms, and the audio track down sampled and reduced from stereophonic to monophonic sound. Finally, the video is shown at 15 fps, giving the image a slightly jerky look. Because a variety of video formats are available, it is good practice to make a

video files available in a number of common formats for downloading by the user. Your users will appreciate your efforts.

Popular formats for Windows-based PC's are Windows Media Viewer (WMV) and Audio Video Interleave (AVI) because the Windows Media Player that is built-in to the Windows operating system supports them. For Macintosh computers, the QuickTime Movie format (MOV) is a good choice because Apple's QuickTime Player supports this format. A Windows version of QuickTime is also available. The various formats' advantages and disadvantages usually involve image quality and file size.

Viewing videos on the web browser. An alternative to downloading videos to be viewed offline is to watch them through the Web browser. The Adobe Flash Video (FLV) format may be used on most browsers by downloading a small, free Adobe Flash Player plug-in.

YouTube alternative. Perhaps the easiest and most user friendly way to view videos, is to upload them to the video sharing service, *YouTube*.²² YouTube takes care the file conversion by accepting many video formats including: WMV, AVI, MOV, and FLV. The advantage of using YouTube is that you do not have to worry about converting the movie format yourself and you do not host the video or worry about bandwidth charges. When you upload your video to YouTube, you will receive a snippet of XML that you will need to paste onto your website. Users may then click and play the video on your website even though the video is stored on YouTube. You also will be asked to provide a video a title, to place it into one of a number of predefined categories, and to assign keywords to the video. This will allow YouTube users to find your video. YouTube limits uploaded videos to 1 GB or 10 minutes in length.

Podcasts (Audio recordings). Audio recordings of speeches and presentations are a useful way of presenting information. In some disciplines, such as ornithology or zoology, records of bird calls or frog calls, can play an important role in training staff to recognize animals in the field. If you use this technology, it would be well to obtain a broadcast quality audio digital recorder. General such recorders are very sensitive to ambient noise, such as air conditioners. Therefore, take care, when interviewing people in an office setting, to make sure you have a quiet place to record. The white noise may not be noticeable until after the recording session is complete. The recording may be upload to a computer for editing and then uploaded to the website as an audio file. The audio may be recorded on a digital voice recorder at 44.1 kiloHertz (kHz), 16-bit stereo sound and stored in Waveform Audio (WAV) format or Audio Interchange File Format (AIFF). Both formats are compatible with Windows PC and Apple computers. Both formats can be downloaded and played on line or exported to a multimedia player for later offline listening.

Podcasts are audio recordings (although occasionally they are videos) that may be downloaded for listening online using a media player or else listening offline on a portable media player, such as an iPod or a MPEG player. The podcaster is the person who created the podcast.

²²YouTube website. Available online at <http://www.youtube.com>. [Accessed 6 Aug. 2009]

When using audio files, make sure that they are fully described for the hearing impaired. If possible have available a transcript of the recording or at least a summary for viewing.

Slideshows. Another form of delivering multimedia content is the slideshow. Most meeting presentations today involve slide presentations of both still images and text images that summarize the points made by the speaker. These are often prepared using Microsoft's PowerPoint or Apple's KeyNote programs. Keynote can save a presentation in PowerPoint format (PPT) for uploading as a downloadable file on your website. Open source software, such as Open Office, will open and play PowerPoint presentations.

One option is to use is for presentations is SlideShare²³. SlideShare is a similar service to YouTube but used to share presentations. Presentation formats include PowerPoint, Keynote, Open Office, and Portable Document Format. Documents can be uploaded from Microsoft Word, Excel Spreadsheets, and Apple's iWorks (Pages and Numbers). After uploading your presentation, SlideShare provides XML code to imbed in your website. You can also imbed YouTube code in your presentation so that the user can view a video clip as part of the presentation.

An audio track of the meeting presentation could be added and synchronized with the images using video editing software, such as Apple's iMovie, to recreate an actual presentation or a training session. SlideShare provides for adding and synchronizing audio tracks. Slideshows stored on SlideShare are limited to 100 MB.

7.6.4 Datasets

Data collected by a project to share and archive is another type of content. The description of datasets can be quite complicated because of the spatial and temporal dimensions of data collection and the need to document data collection methods, analytical methods, accuracy, and quality assurance and quality control procedures. All this is necessary to allow someone else to use your data with confidence.

L.A. Hook and others (2007)²⁴ of the Environmental Sciences Division at Oak Ridge National Laboratory, USA, provide a short introduction to the topic of preparing ecological and ground-based data sets to share and archive. They list seven best practices.

1. **Assign descriptive files names** – Assign names that include location, date, project name and type of data. The file name should be given in the dataset documentation and in the first line of the of the header row in the file.

²³ SlideShare website. Available online at <http://www.slideshare.net/>. [Accessed 5 Aug. 2009].

²⁴ Hook, L.A. and others (2007). *Best Practices for Preparing Environmental Data Sets to Share and Archive*. Available online at <http://daac.ornl.gov/PI/bestprac.html>. [Accessed 6 September 2009].

2. **Use consistent and stable file formats for tabular and image data** – Use simple ASCII text files (TXT) to hold data with three (1) name of file, (2) parameters in each column, and (3) units of each parameter. Then allocate one row for each observation using commas, tabs, or semicolons to separate the values. For image (raster) data use GeoTiff/TIF or binary image files.
3. **Define contents data files** – Provide information on parameter names, units, and formats of the data that are consistent throughout the data set. If you use coded fields for data quality, units, and missing values be sure to document.
4. **Use consistent data organization** – Each row represents a complete record with columns representing the different parameters measured.
5. **Perform basic quality assurance** – Check that data are in the proper columns, the documentation is accurate, there are no outliers or impossible values in the dataset, verify correct transfer of data from field notebooks, etc.
6. **Assign descriptive dataset titles** – Make titles as descriptive as possible.
7. **Provide dataset documentation** – Write documentation for a user 20 years in the future.

The text files are documents that can be stored as PDF and archives. The metadata would be the same as for text document and follow the Dublin Core in many cases. For biological specimen data you might look at the metadata standards used by the Inter-American Biodiversity Network.²⁵ The Darwin Core is developing standards for the exchange of information about the geographic distribution of species.²⁶

²⁵ Interamerican Biodiversity Network (IABIN) web site available at <http://www.iabin.net/>. [Accessed 6 September 2009.]

²⁶ DarwinCore

7.7 Content Checklist

Documents

- 1 **Services.** Emphasize what your site has to offer that is of value to the user. This needs to communicate quickly on the home page.
- 2 **Animation (M).** Do not use animation. It is distracting unless it directly enhances understanding content.
- 3 **Calendar of events (M).** Maintain and frequently update (at least once a month) a calendar of project-related events such as meetings, workshops, and conferences.
- 4 **Contact information (M).** Each page should indicate the contact, email address, mailing address, telephone number, and date last updated.
- 5 **Copyright.** Each page should show the copyright.
- 6 **Examples of Content.** Show users examples of content or category if descriptions are awkward or lengthy. Link directly to the content page from the example.
- 7 **Graphics.** Use graphics to illustrate real content, not to decorate the web page. Provide a few pictures of people working on your project.
- 8 **Links list.** Do not refer to a list of links on a page as *links*. Name the categories to which the links go such as “water newsletters.”
- 9 **Logos (M).** Place the logo and name of your organization on the upper left-hand side of the home page to brand the site. Include the logos of partner organizations in the footer of the home page.
- 10 **Multilingual content (M).** Content in other languages than English should be included. However, it is important to provide a short description of the document in English with the link.
- 11 **If a document is available in multiple languages,** include those versions on the website.
- 12 **Translating the home page into several languages** (if you have the language capability) and allowing visitors to select their preferred language is highly desirable and user-friendly even when the rest of the site is in another language.
- 13 **Newsletter (M).** Regularly post an electronic newsletter that is addressed to the project stakeholders and partners about events, progress, and issues. This should be done at least every 3 months. Include recent past issues of newsletters on the website.

- 14 **Press releases.** Summaries of news stories should be written specifically for the media.
- 15 Provide the maximum amount of information in the fewest words.
- 16 Show the date prominently on the full story.
- 17 Include news from partner organizations.
- 18 **PDF files (M).** Do not use PDF files for online reading.
- 19 Give visitors adequate warning if a PDF file (or any other file) will automatically download when the link to it is clicked on.
- 20 **Optimize the PDF file** to reduce its size.
- 21 **Describe the content** of the document, title, author, publication date, and file size.
- 22 **Convert the content** of a PDF document to a text file – if it must be read online
- 23 **Project news (M).** Publish project-related news frequently (at least once a month) and share it via RSS.
- 24 **Privacy policy.** If you collect any information from visitors, include a link to your organization’s privacy policy.
- 25 **Project staff (M).** Include on the About Us or Contact Us page an up-to-date list of key project staff and their contact details.
- 26 **Tag line.** Provide a short, succinct tag line to go with your logo. Explicitly state what your organization does. This information should also be on the “About Us” page. Place the tagline in the content area of the home page.
- 27 **Tasks.** Emphasize on the home page the highest priority tasks that the user can accomplish: register on the site, subscribe to a newsletter, download files, provide feedback, ask questions, etc. Offer direct links to these tasks.
- 28 **Text.** Text should be copy-edited and free from typographical and grammatical errors. Do not rely on your word processing software’s spell checking and grammar checking tools for this. When in doubt, consult a publication style manual such as *The Oxford Style Manual* or *The Chicago Manual of Style*.
- 29 **Tools.** Do not provide functionality on your home page (e.g., bookmarking your site or setting your site as the user’s start page). The user’s browser should do that.

Graphics

- 30 Content. Use graphics to illustrate real content, not to decorate the web page.
- 31 Graphics files size. Keep the size of graphic files small- less than 20 KB for graphics and less than 10 KB for navigation if possible.
- 32 Colour palettes. Reduce the number of colours in the colour palette to reduce file size.
- 33 Graphic file format. Use the appropriate file format as needed for images (JPEG) or solid colour graphics (GIF). Using the wrong format could create an unduly large file.
- 34 Graphic resolution. Use only the resolution that you need (under 96 dpi) for screen viewing. Graphics should fit on the screen.
- 35 Photograph and image downloads. Provide a description and indicate the format and size of any photo or graphic that the user can download.
- 36 Thumbnail images. Provide thumbnail images of photographs, maps, charts, etc.
- 37 Optional downloads. Provide the option of downloading a large-format (high-resolution) image of a complete picture shown at low resolution on the web page.

Multimedia formats

- 38 Multimedia files. Do not use multimedia files that download automatically.
- 39 Multimedia file type. Provide a description of content. Specify the format and size of the file to be downloaded.
- 40 Multimedia format. If the file requires a special plug-in or reader such as Adobe Reader, so indicate. Also provide a link to the site where the application can be downloaded.

8 Information Architecture

Now that you have an inventory of the content of your website, you need to consider how to group it into categories (taxonomies) and then organize the content into hierarchies of information.

8.1 What is information architecture?

Information architecture is the practice of structuring information or data for effective and efficient storage and retrieval. Although information architecture is most commonly applied to Web development, the term also applies to other disciplines such as technical writing. Information architecture is considered an important element of user experience design. Conceptual descriptions of website content help define the navigation strategies, the user interface, and the labels used to find information.

8.2 Why is information architecture important?

Defining the information architecture of a website is critical to making decisions about the navigation and design of the site. It brings order to the arrangement and/or grouping of information content and defines how the user will navigate from one type of information to another. Without a clear and understandable content structure, your website's users can rapidly get lost in a sea of information, unable to find needed data or documents that actually are there.

8.3 Content structure

Most websites have a hierarchical structure. They progress from broad, general categories on the home page to more specific information to a particular chunk of information such as a report, an image, a brochure, or a video. In developing a website's structure, designer must define categories of information and rank the bits and pieces of information in order of relevance to one of the major categories. Information architecture becomes especially important for large, complex websites.

8.4 Taxonomies and Controlled Vocabularies

Taxonomy is the practice and science of the classification of things or concepts into categories. A taxonomic scheme is a particular classification. It may be as simple as an alphabetical list (e.g., types of documents), or it may be have a hierarchical tree structure (e.g., a classification of water resources issues). In any hierarchy, there is a parent-child relationship between categories progressing from the more general to the specific. Given the power of CMS to organize

information, you can use several taxonomies to organize content. For example, a project video on protection of sea turtles might be part of a library of video clips (media type), public education and awareness (content type), and endangered species (topical classification).

In creating taxonomies, one carefully selects a descriptive term for each category. The most important criterion is to be always able to refer to the same category (or concept) by the same term each time it is used. This includes details such as the choice of the singular or plural forms of category names. One of the most important tasks for the information architect is to produce a consistent set of terms for describing the categories, navigation links, labels, and the interactive features that are to be used throughout the site. This set of terms is called a *controlled vocabulary*.

Thus, this part of information architecture becomes a collaboration between the architect, website designer, and the content editor. More will be said about controlled vocabularies in the section on Metadata.

Choosing a theme for classifying information may be helpful. Lynch and Horton (2008) list five common themes:

- **Category** — organized by similarity or relatedness. For example items in a grocery store (vegetables, meat, beverages, etc.) or books in a library.
- **Time** — organized by time line or history.
- **Location** — organized by spatial or geographic location. For example, all the GEF IW projects in Southeast Asia.
- **Alphabetic** — organized on the basis of the initial letters of names, such as in a directory of personnel.
- **Continuum** — organized by a variable measured or scored over a range, such as measurement of water pollution at a specific beach or the rating of project performance.

8.5 Site structure

Site structure can be thought of a set of layers of information. How quickly can you get to the information you want?

When users visit your website, they quickly build mental models of the way in which you have organized information. This mental model depends on their level of sophistication or experience in searching for information on the Web, educational background, experience with similar websites, and their familiarity with the terminology used by the website's dominant technical

discipline. Along with the scent of information which you provide, these mental models help users decide where to go on your website. In other words, the user tries to predict where the different kinds of information is located on your site so as to find it quickly.

Generally, a site will have (1) a flat structure with many submenu pages linked to the home page and long menus on the home page (2) a hierarchical structure requiring the user to drill down through many submenu pages to reach the desired content, or (3) a web-like structure where the user can freely link to other pages and other sites but may get hopeless lost in the process. A good rule-of-thumb is that all content should be no more than three clicks away from the home page. If users have to waste a lot of time clicking a mouse to get deep into your website where the “good stuff” is, they may well get frustrated and leave.

8.6 Site diagram

As a tool for your Web design team, develop a site diagram that portrays the structure of the site and how each page is linked to each other. You might consider using Jesse James Garrett’s “visual vocabulary” to diagram the site structure, interactive relationships, and user decision points.²⁷

The art of site design lies in achieving the right balance between menus and content pages that will not only provide quick access to information but also reflect how that information is organized. User testing of proposed designs and user feedback for operation sites will help fine-tune site structure. The clearer and more concrete the site structure is, the easier it will be for the user to navigate through the site without feeling lost. To this end, there are navigation tools, such as site maps and site indexes that will help the users find their way.

8.7 Information architecture checklist

- **Categories.** Avoid using both too many top-level categories.
- **Content.** Keep content within a few clicks of the home page.
- **Content organization (M).** Use understandable and consistent categories for site content. Avoid mixing different schemes for organizing content. For each project website, include the following mandatory major sections:
 - **About us (M).** About the project: its entire name, its purpose, objectives, history, and the full legal names of sponsoring organizations. Public relations contact information should be provided for journalists.

²⁷ Garrett, Jesse James, 2002. A visual vocabulary for describing information architecture and interaction design (6 March 2002). Available online at <http://www.jjg.net/ia/visvocab/> [Accessed 27 August 2009]

- **Events (M).** Include a calendar or events list of project-related happenings.
- **News (M).** Press releases and news stories about the project, partner activities, and articles of interest to the project user community from other sources (project staff and partners, other GEF IW projects addressing similar issues).
- **Library (M).** Project library or “document centre” that holds all project reports, publications, meeting reports, images (photo galleries), videos, maps, and datasets.
- **Editing.** Use a professional copy editor to edit and revise content.
- **Language.** Use the language of the visitor. Avoid jargon, slang, and acronyms or abbreviations that users from other academic or scientific disciplines are not likely to know.
- **Organizational information.** Group information about the organization on the “About Us” page. Mission, goals and objectives, contact data, and other organizational information should be included. Be sure to give the full legal name of the organization here, especially if it is usually known by a shortened version.
- **Redundant content.** Avoid redundant content: it wastes space and clutters the site.
- **Writing style (M).** Keep writing simple and avoid jargon. Important information (such as conclusions) should come first, where it is more easily seen and remembered. Secondary information (such as how the project was carried out) should follow. The least important information should come last.

9 Navigation

The user interface of a website combines all of the characteristics of user interaction, graphics, interface metaphors, images, concepts, and page layout that contribute to the look and feel of a site. Without good navigation, website visitors get lost and will have to work hard to find your content, if they find it at all. On the other hand, good site navigation provides a clear path to the designed information with lots of signposts along the way to reassure the users that they are on the right path.

9.1 What is navigation?

Site navigation is the integration of the user interface, the information architecture, metadata, and website design which allows users to find information on the site. It includes primary and secondary menu bars, navigation links, buttons, icons, images, the site search box, and other tools, such as a site map and site index.

9.2 Why is navigation important?

Creating good navigation is one of the most important tasks that a website designer can accomplish. If your users do not know how to find your content, then the most resourceful or beautiful website will be ineffective. Keep your navigation consistent, understandable and visible.

9.3 Design for your user

Think like a user. Imagine yourself wanting to find information. What makes sense to you? What would help you find information more easily and quickly? Try to anticipate how a user who has never seen your website will view the information.

Get some users (friends and colleagues of varying ages and computer savvy) who are not familiar with your trial website to test your user interface and give you feedback. See section 5.9 on Usability Testing for specific suggestions.

9.4 User interface

The user interface of a website answers the questions: where have I been, where am I now, and where can I go to find certain information. It orients users to their various positions within the site. When visitors arrive at a website, they have some expectations, based on their experiences

with other websites, as to how your website will work. For example, they expect the home page to tell them the purpose of your website and what kinds of information are on the content pages. Furthermore, your home page will identify a number of paths that visitors may take to find that information by using menu bars, hyperlinks and other aids to searching.

As users browse through your site, they develop a mental map or understanding of how it is organized. Rather quickly, they will start predicting how your website works and where information is located. Ideally, their experience is consistent and understandable. They know where they have been, where to go next, and when they have arrived at the right place. They also will want to know how to get back to where they came from: the home page. If they feel lost and confused, users will quickly become frustrated and angry. They will leave your site.

9.5 Placement of navigation aids

Keep in mind people's reading habits. For English- and most European-language websites, text is read left to right and from top to bottom. Therefore it makes sense for secondary navigation to be placed on the left side in a 2 or 3-column page layout. Eye-tracking studies have shown that the eye tends to concentrate on the upper left-hand part of the page. The eye reads the first few words of the top heading, and then scans down the left-hand margin of the text column for other important words in the subheading and page links (“F” pattern).

Similarly, most users expect specific types of information to be located in certain places. These expectations should be given great weight in the design of web pages unless there is an overriding technical reason not to do so. Lynch and Horton (2008)²⁸ have identified the following locations for Web content based upon user expectations:

- **Home link** — upper left corner of page
- **Banner** — top of page that includes a logo of the principal agencies sponsoring the project. This includes the GEF logo and the project’s hosts’ logo. Logos of other partner organizations should go in the footer.
- **Search box** — upper right corner of page or middle of left column between navigation menus
- **Internal navigation menu** — across top part of page under the banner and/or down the left-hand side of the page. Be consistent in the order and labelling of links. Make sure they are visible.
- **External links** — near top of right-hand column below the navigation bar.

²⁸ Lynch, Patrick and Horton, Sarah (2008). *Web style guide: basic design principles for creating web sites*, 3rd ed. New Haven, Connecticut: Yale University Press, pages 153-58.

- **Help information** — near upper right hand corner of page.
- **Advertising** — or text banners that look like advertising announcing for meetings, workshops, and other events.
- **About Us** — this menu link is usually in the upper left corner of the home page. The About Us page will have more detail than the contact information in the footer of each page on the website. Feedback forms are usually found on this page.
- **Contact information** — e-mail address, physical address, telephone number of the implementing agency as well logos of partner agencies are usually in the footer of each web page together with links to privacy and disclosure policies, copyright notice.

9.6 Types of Navigation

On content-rich websites, the structure of the site will most likely be hierarchical. It has a home page with topics and subtopics in several tiers of pages under it. The users will drill their way down in the site through these layers. There may be certain pages of content, however, where global navigation links may be used that take the user directly to a page wherever it is located. Examples are the home page (from a point deep in the site), the about us page, sitemap, contact us, and the major website content categories. These links are usually found on each page. Local navigation links, often located in the upper part of the left-hand column, help the user move about a single web page. They work well with lists of Frequently Asked Questions (FAQs), A-Z indexes where all the information is on the same page, and specific topical content that link within the same document. A ‘top of page’ often found at the bottom of a long web page is a local navigation link

9.7 Orientation aids

9.7.1 Breadcrumb bars

A breadcrumb bar on each web page helps users keep track of where they are within a particular website. Breadcrumbs are links that provide a trail back to the home page. Usually breadcrumb bars are near the top of each page below the banner or other header information. There are three types of web breadcrumbs:²⁹

²⁹ Instone, Keith (2003). Three breadcrumbs overview. Available online as downloadable PDF file at <http://instone.org/breadcrumbs> [Accessed 5 September 2009]. The document shows examples of each breadcrumb type.

1. Path breadcrumbs show the path that the user has taken to arrive at a page.
2. Location breadcrumbs show where the page is located in the website hierarchy.
3. Attribute breadcrumbs give information that categorizes the current page.

9.7.2 Landmarks

Some designers use landmarks to assist in path finding. For example, landmarks can be colourful photos of images relevant to the topic on the page. Thus, should the user unexpectedly link back to the page the image would immediately identify the page as one already visited. It is extremely important that landmark images be static and always in the same location on each page. Image slide shows are useless as landmarks and should be obviously separate.

9.7.3 Colour

The background colour of breadcrumb bars, menu bars, or other design elements might be used to signify that the user is in a particular topical neighbourhood. For example, the wetlands section of an IW project site might have green navigation bars, and the water section might have blue bars.

Make sure you provide clear, consistent paths to the major components of the project website. Do not confuse site visitors by having too many choices on the home page or on major content pages. On large sites, consider creating a unique identity for each major topic. Provide landmarks to keep the user oriented. Most importantly, every web page on the site must have a link back to the home page.

IW:LEARN website has vertical- navigation situated in the left column and clearly visible. In fact it is clearly labelled "Navigation" (though this is not required and you can clearly see the levels of content. In addition, each layout uses colour effectively to help illustrate the hierarchy of the content.

9.8 Links and labelling

Links and labels should be obvious and direct. Label your links with common terminology that is understood in the IW network of projects. Use consistent naming conventions and keep them meaningful and in context but short, descriptive, and intuitive. Colour can be applied to your links but be consistent with conventions. Consistently using blue text words and underlining hyperlinks (purple after the link has been opened) will help users know which keywords are links and which ones are not. If you use icons in conjunction with a link name, make sure both the icon and the name can be clicked to bring up the new page. Remember that some people cannot distinguish between major colours.

Avoid using the words 'click here' as a link. Instead, if you wish the user to go to the 2009

workshop pages, use the text [2009 workshop](#). In some cases, links can have the HTML attribute TITLE added. In this case the title attribute clearly and accurately describes the target of the link.

9.9 Discovery and filenames

One of the most useful things you can do to improve your website is to adopt a user-friendly Uniform Resource Locator (URL) for your website address. The URL should clearly identify the content type and be easy to read and remember.

9.9.1 URLs

User-friendly URLs — are short, lowercase, descriptive, conventional and in plain language. For example: instead of <www.example.com/research_documents/monitoring_and_evaluation/>, use <www.example.com/docs/monitoring_eval/>

Lower case URLs — are easier to type, to explain, and to remember. In context, you might even be able to correctly guess it.

Descriptive URLs — say what they are. For example /docs/ always refers to documents, and /contactus/ always refers to “contact us”. Follow other website naming conventions the chances are that if you see it being used frequently, you can be sure that most Web users will be familiar with it too; i.e., /faq/.

Tiny URLs — TinyURL is a free web service that provides short aliases for redirection of long URLs.³⁰ These URLs do not expire and will not break up in email postings.

Define plain language — Keep away from technical jargon or strange abbreviations that your audience will be unaware of. Always assume the lowest common denominator when naming your folders and files. Be certain that your web users will know what a URL like 'www.example.com/docs/mne/ops/' means. Perhaps 'www.example.com/docs/monitoring/performance/' would be more comprehensible.

Is there a tool to help make my entire site URLs user-friendly? — The Plone CMS does the hard work for you by converting URLs into lowercase and replacing blanks with hyphens. If you name your particular Web page as "John Doe Biography" under your "About us" section the following will happen: /about/John Doe Biography.html will be converted to /about/john-doe-biography/.

9.10 Sitemaps

Another important feature to help users find their way around your website is to have a *sitemap*. Typically the site map is a page with a list of links in a structured format, much like a detailed

³⁰ For more information, see <http://tinyurl.com/> [Accessed 5 September 2009]

table of contents of a book. Each entry will take the user to the indicated page or section.^{31 32}

A similar sitemap coded in XML will improve the Search Engine Optimization of the website by enabling automated web crawlers to find all your recently modified pages (see section on Search Engine Optimization)

9.11 Site A-Z index

An A-Z index takes its name from the organization of the index. It is a list of titles, subjects, topics, place names, and other material organized alphabetically. It is very similar to a back-of-the-book index. It may have subheadings as well as 'see' and 'see also' cross references.

Some websites maintain separate indexes for subjects, people, geographic places, organizations, and chronological lists. Each entry may have a number in parentheses next to it indicating the number of occurrences on the website of the term. Clicking on the link brings up a page of entries containing that subject, person's name, place name, etc. Clicking on each entry brings up the document, image, video, or other content.^{33 34 35 36}

9.12 Navigation Checklist



³¹ European Environmental Agency site map available at <http://www.eea.europa.eu/sitemap>. [Accessed 29 August 2009]

³² World Bank site map available at <http://web.worldbank.org/WBSITE/EXTERNAL/0,,contentMDK:20130468~pagePK:50016803~piPK:50016805~theSitePK:13,00.html>. [Accessed 29 August 2009]

³³ Montague Institute site index available at <http://www.montague.com/Public/indexes.htm>. [Accessed 29 August 2009]

³⁴ European Environmental Agency site index (glossary) available at <http://glossary.eea.europa.eu/>. [Accessed 29 August 2009]

³⁵ World Bank site index available at <http://web.worldbank.org/WBSITE/EXTERNAL/0,,contentMDK:20130466~pagePK:50016803~piPK:50016805~theSitePK:13,00.html>. [Assessed 29 August 2009].

³⁶ Global Environment Facility site index available at <http://www.gefweb.org/interior.aspx?id=286> [Assessed 29 August 2009].





10 Design & Layout

At this point in the Web design process, you should have an inventory of your content, the organization of the content on the site, a site diagram showing the interrelationships (links) among the various web pages, and a set of navigation tools to be applied (e.g. breadcrumb bars, content menus, and landmarks) for different areas of the site. Now comes the design and layout of the website. This is, perhaps, the most subjective part of website design. There is considerable diversity of opinion about what represents ‘good’ website design. Bad design tends to be obvious, however. Observing what not to do in designing a site can sometimes be just as helpful as knowing what you ought to do.³⁷

10.1 What is the design and layout of a website?

Web page design and layout creates a visual logic for the content contained on the page. It involves deciding where to place graphic and textual elements, placement of navigation aids, the use of pleasing colour palettes, the choice of typefaces (fonts) and sizes, the distribution of white space to improve the legibility of the text, and a variety of other design and layout decisions.

10.2 Why is the design and layout important?

The design of a web page is analogous to the presentation of fine food on your plate at an expensive restaurant. Effective design engages the user and makes the experience enjoyable. Good design stimulates confidence in the information content and in the organization that is providing it. How your site is laid out enables your website to be a useful resource or not. It affects usability of the website and also helps maintain the consistency of the GEF IW brand across all IW projects.

10.3 Good website design

Good design can be viewed, justifiably, from the point of view of usability that focuses on the functionality of the site. It can also be looked at from the point of view of aesthetics. There is no reason why a website cannot be both usable and beautiful. You should strive for both qualities. Good design is about an awareness of the spatial relationship between design elements on the web page. It is about proportion, balance, colour, symmetry, and cohesiveness as the user navigates from the home page to other pages on the site. Don’t be afraid to surf the Web for sites that you like and that have designs appropriate to your content. Determine why you like a particular site and adopt some of that site’s design features.

³⁷ For examples of very badly designed websites, see Web Pages That Suck (2009). *Web design techniques and principles*. Available online at <http://www.webpagesthatsuck.com/> [Accessed 31 August 2009]

10.4 Web page design elements

The principal design elements of the web page are the logo and banner at the top of the page; the navigation aids under the banner and on the left-hand side of the page; the content column of the page; the right-hand column that usually contains news, information about events and other secondary content; and the footer at the bottom of the page. The content of these elements have been described about in the discussion of Content and Navigation. The user expects to find these elements in specific parts of the web page based on their searching experience on the Web 9 (FIG. 9) Because of this, you should give serious consideration to meeting the user's expectations as to where to find certain information.

10.4.1 Grids

One simple approach to laying out a web page is to use grids and the *rule of thirds*. The rule of thirds is a simplified version of the golden ratio.³⁸ Take a piece of paper that represents your web page and divide it vertically into three equal columns and horizontally into three equal rows. Subdivide the vertical columns in half and the top row into thirds. This provides a simple grid on which to test different layouts of the page.

10.4.2 Balance

Balance is the visual effect that elements have upon one another. Design elements have visual weight that draws the eye. Elements may symmetrically balance each other as when content in a wide centre column is balanced by navigation menus and news content in the narrower left and right columns. Other forms of symmetry include bilateral symmetry (along two axes of symmetry) and radial symmetry (elements spaced equally around a point). Asymmetrical balance is usually more visually interesting because it uses objects of different sizes, shapes, and colours to create a balanced composition.

10.4.3 Unity

Unity is the visual characteristic of a composition that describes how the individual components interact with one another and work as a unit. A group of objects may work as a unit by locating them close to one another or by repeating the object in a pattern. Headings and text are unified by locating the heading close to the text.

³⁸If a line is bisected into two parts, a and b , and $(a+b/a)$ has the same ratio as (a/b) , then the two lines have the golden ratio which is approximately 1.62. This ratio has been used at least since the Renaissance by artists and sculptors to achieve pleasing compositions. Discussion at http://en.wikipedia.org/wiki/Golden_ratio. [Accessed 29 August 2009]

Insert Fig. 10.1

From separate file

Figure 10.1. The location of page elements based on user expectations. (Source: Lynch and Horton (2008), p. 92. Available online at <http://webstyleguide.com> [Accessed 10 September 2009])

10.4.4 Other design considerations

Other aspects of visual design include the emphasis or dominance of an object by making it a focal point on a web page or isolating the object, such as a meeting announcement, from other elements. High contrast between an object and its background will also make it stand out. By using unusual proportions where one object is much larger or smaller than it should be given its context will also give visual emphasis.

10.5 Colour

Colour choices can make or break a website. Colour establishes mood whether it energizes and excites you or provides a sense of peace. Colour also has deep-seated meanings in some cultures. Depending upon your target audience this is an aspect of colour that you may wish to research.^{3 4}

Colours have temperature. They may be *warm* (red to yellow) or *cool* (green to purple). They have values. Colours may be dark (shades of pure colour with black added) or light (tints of pure colour with white added). Finally, colours have intensity or saturation. Intense, vivid colours stand out while dull or desaturated colours (colours with black and white added) reduce tension and give compositions a dreamy appearance.

If you are picking colour palettes for use on your website you should know something about colour theory. Any one who has picked colours for text or to fill in a graphic object has seen the colour wheel. Primary colours (red, yellow, and blue) create secondary colours (orange, green, and purple) by mixing adjacent primary colours. Adjacent primary and secondary colours mix to produce six tertiary colours (vermilion, marigold, chartreuse, aquamarine, violet, and magenta).

10.5.1 Colour schemes

In picking palettes of colours for your website you are constrained by the way colours interact. There are six classic colour schemes:

1. **Monochromatic** — A single pure colour and any number of tints and shades (including black and white)
2. **Analogous** — Colours that are adjacent to each other on the colour wheel (two colours)

³Do Good Design (2009). *Colour psychology, web design, and your brand*. Available online at <http://www.dogood-design.com/colour-psychology-web-design-and-your-brand/> [Accessed 29 August 2009]

⁴Don Pedro (2009). Don Pedro's how to choose website colours. Available online at http://www.donpedrowebdesign.com/choose_color.html [Accessed 5 September 2009]

3. **Complementary** — Colours that are opposite each other on the colour wheel such as green and red or yellow and violet (two colours) If the colours are not directly opposite each other they will be discordant colours and clash with one another.
4. **Split complementary** — Colours that are either side of the opposite colour of the colour wheel (three colours)
5. **Triadic** — Three colours that are equally spaced around the colour wheel.
6. **Tetradic** — Two complementary colour sets combined (four colours)

From these schemes you create a colour palette for use on your web page with each colour represented by its hexadecimal colour code. Several websites have HTML colour codes along with suggestions for using colour in web design.^{5 6 7} Colour swatches are available for downloading into most of the popular graphics software packages for Windows, Linux, and Macintosh at the Visibone website.⁸ For further detail on using colour, the Lynda.com website has a free video-based tutorial on the basic principles of colour relationships as they relate to digital design and/or composition. The full course takes about 5 hours to view.⁹

Given this background, the easiest way to develop a colour palette is to use one of the colour scheme generators on the Web.¹⁰ You probably will want to have at least six basic colours to use and their shades and tints. Often your choice of colours may be based on the colours in your organizational logo or the iconic image that you use on your home page. Your palette should reflect the colours in such images.

⁵ December Communications (2009). Hex Hub (Named Hexadecimal Color Codes for HTML). Available online at <http://www.december.com/html/spec/color.html> [Accessed 5 September 2009]

⁶ Visibone Webmaster's Color Lab (2009). The 216-color webmaster's palette. Available online at <http://www.visibone.com/colorlab> [Accessed 1 September 2009]

⁷ W3 Schools (2009). HTML Colors. Available online at http://www.w3schools.com/html/html_colors.asp [Accessed 1 September 2009] The site includes cross-browser color names.

⁸ Visibone (2009). Web-safe swatch collections. Available online for downloading at <http://www.visibone.com/swatches/> [Accessed 5 September 2009]. These colour swatch collections can be downloaded for use with most of the popular graphics software packages.

⁹ Heavin, Bruce (2004). Working with color. Available online at <http://www.lynda.com/home/DisplayCourse.aspx?lpk2=83>. [Accessed 5 September 2009]

¹⁰ Single function has a review of 15 colour scheme generators available at <http://singlefunction.com/15-hand-picked-color-palette-and-color-scheme-generators/>. [Accessed 29 August 2009]

10.6 Texture

Jason Beaird notes that ‘Not every web site has to be beautiful, but every site can be’.¹¹ He suggests that many website designers using CSS do not make full use of the control they have over how a web site looks. Texture is the appearance or feel of the surface of an object. By using texture, the designer can give a feeling of depth and smoothness or roughness.

Shapes, such as custom corners and borders can give rectangles and boxes a modern look.¹² Perspective, light and shadow, and background patterns can add visual richness to your site. Drop shadows, for example can give menus and photographs a three-dimensional look.¹³ Background colour gradients can also be used as a design element to give your design a level of depth and dimension to an otherwise flat surface.

The art of designing and laying out a website is a discipline of its own. This very modest introduction only scratches the surface to what is possible. Reading a good design book, seeking out examples of designs that you and your colleagues find attractive and appropriate for your content, and paying attention to the design details will give you the tools to make a great website. As a starting point, use the theme and CSS templates that come with the IW:LEARN Web Toolkit.

10.7 Typography

10.7.1 What is typography?

Typography is the art of arranging type on a page and includes selecting typefaces or *fonts*, type size (measured in points), line length, and the vertical distance between lines of text (*leading*).

10.7.2 Why is typography important?

The choice of font, type size, line length and adjustments of the distance between groups of letters (*tracking*) and between pairs of letters (*Kerning*) dramatically affect the legibility and readability of text whether on printed pages or on computer screens. *Legibility* incorporates both the perception of the text words, white space around the text, and how easily one can comprehend the content. *Readability* refers to how easily the text can be understood. Readability chiefly involves grammar, word choice, and sentence structure. Appropriate choices of fonts for the headings and body text, type size, line length (column width), the contrast between text

¹¹Beaird, Jason (2007). The principles of beautiful web design. Collingwood, Australia, SitePoint.

¹²Madsen, Søren (2003). CSS design: creating custom corners and borders. *A List Apart*. Available online at <http://www.alistapart.com/articles/customcorners/>. [Accessed 29 August 2009].

¹³Villarreal, Sergio (2004). CSS drop shadows II: fuzzy shadows. *A List Apart*. Available online at <http://www.alistapart.com/articles/cssdrop2/>. [Accessed 29 August 2009]

colour and background colour, and white space surrounding the text all work to improve legibility.

10.7.3 Font choices

For site visitors to see the fonts used on your website, they must have the same fonts installed on their computers. Because different operating systems come with different collections of fonts there are only a few fonts that can be described as ‘web safe.’ If you choose to use a specific display type, check to see if it is available on the computers that commonly access your site. If a font cannot be read on a particular computer, the browser will default to a common (but ugly) font so that the text can be displayed. In other words, if a font is not common font to most operating systems, either do not use it or else display the font in an image file. Remember, however, that search engines cannot read the text within an image file.

You need not restrict your website to the fonts that came bundled with your word processor or other software. One advantage of PDF files for documents is that the original document fonts will be incorporated. Fonthaus¹⁴ offers more than 15,000 name-brand typefaces that can be purchased for downloading; many are inexpensive. Most are available in Windows, Postscript, and OpenType formats. There are a number of other websites that offer downloadable TrueType fonts for free or for a nominal cost. Many of these are artistic fonts that are excellent for headlines or special effects but not for reading paragraphs of text.

10.7.4 Serif and sans-serif fonts

Serif fonts. Serif fonts, such as Times New Roman, Garamond, Century Schoolbook, or Georgia have small details at ends of the letters (serifs). A traditional font such as Times Roman is considered to be a highly legible typeface on paper but its adaptation for computer screens, Times New Roman, is only about average in legibility. Serif fonts tend to work well at on paper and at high screen resolutions because the letters' end points lead the reader on to the next letter. These typefaces are especially appropriate for lengthy text documents that are likely to be printed out by the user. Times New Roman is good for packing a lot of text into a small space.

Sans-serif fonts. Sans-serif fonts such as Arial, Tahoma, Verdana, and Helvetica look more modern because they lack serifs. They are open and look pleasing on computer screens. Sans-serif fonts are more legible at lower resolutions than serif fonts. They are a commonly used for body text on Web pages. Many designers recommend Verdana as the most effective type for body text although Tahoma may be slightly more legible.¹⁵

¹⁴ Fonthaus (2009). Fonthaus website. Available at <http://www.fonthaus.com>. [Accessed 7 September 2009].

¹⁵ Atwood, Jeff (2005). Comparing font legibility. *Coding horror: programming and human factors*, 18 November. Available online at <http://www.codinghorror.com/blog/archives/000449.html> [Accessed 28 August 2009]

Even if you use these common fonts, there is a chance that the user will not have the font that you specify to be used. HTML `` tag permits you instruct the Web browser to use replacement fonts in case the desired font is not available on the user's system. The list includes a generic serif (Serif) and sans-serif (Sans) font.

10.7.4 Type size

The size of type for website viewing should be under the control of the user. Older readers and the visually impaired almost certainly will have trouble reading fine print. The best approach to text size is to use cascading style sheets (CSS) where the size of the body text defaults to the text size defined by the user's browser. Text for different levels of headings, captions, and links are expressed in relative units, such as percent) of the default values.

10.7.5 Capitalization

Capitalizing text is one of the most frequent forms of adding emphasis to text. When all the letters in a word are capitalized the word has to be read letter by letter. Worse, too many words in all capital letters appear as a monotonous block of text and are the online equivalent of yelling or shouting.

Initial capital letters in a phrase lead to bumpy reading. The tops of words are more important to legibility than the bottom halves and initial capitalization decreases legibility because we tend to recognize words by their shape. Thus, full capitalization and initial capitalization make reading more difficult. On the other hand, it is essential to use capital letters where they are expected. Not seeing a capital letter at the beginning of each sentence, in the names of people, months, or places, etc. is jarring to the reader and slows down comprehension. Titles, headings and subheadings of more than two or three words are best represented by capitalizing the initial word and using lowercase type for the rest of the phrase. For blocks of text, however, do follow the standard practices of capitalization and punctuation.

10.7.6 Headings and subheadings

A solid body of text on a web page is hard to scan for content structure. Headings and subheadings help break up the text and provide clues for finding the desired information. Usually three levels of headings and subheadings are sufficient to structure most text. The headings and subheadings are usually of a different size from the body text and often are in bold for emphasis. Users generally will understand that larger and/or bold text is something important.

10.7.7 Bold text

Specific words or keywords, titles, and headings may be placed in **boldface** or *bold italics* for emphasis. Do this sparingly, however entire paragraphs in bold type lose effectiveness and, like words with all capital letters appear to be the online equivalent of shouting.

10.7.8 Italics

Italics should be used for the names of journals and books or to emphasize a word or phrase. Occasional foreign-language words and phrases are also put in italics.

10.7.8 Coloured text and backgrounds

Coloured text can be used as a design element or for emphasis, but be careful not to deceive the reader into thinking that the coloured words are hyperlinks. By convention, most users will assume that coloured words within the body text, especially words printed in blue, are hyperlinks. Do NOT use the default blue and violet colours for hyperlinks when assigning colours to other text.

Most importantly, when using blocks of coloured text make sure that the contrast between the text and the page background is great enough to be easily read. For example, reading pale blue text against a white background can be very tiring. Use a minimum number of colours and text sizes and be consistent throughout your website. Also remember that some users will be unable to distinguish colours.

Similarly, using coloured backgrounds is an easy way to change the look of your web page without adding graphics. Different colours can unify blocks of similar text and add to the visual interest of the page. Jakob Nielsen, the noted Web usability expert, does not use any graphics on his website and depends on coloured backgrounds for visual interest.¹⁶

10.7.9 Underlining

In the days before personal computers, typewriters only had a single font and words were underlined to indicate they should be in italics for printing. Today, underlined words in text are assumed to be hyperlinks. Don't add to users' confusion.

10.7.10 Hyperlinks and URLs

At some point you will need to reference another web document (or another website). When creating such hyperlinks, be sure to describe what is at the other end of the link. Do not make users who click on a link wonder: Why am I looking at this page?

¹⁶ Jacob Nielsen's website available at <http://www.useit.com/about/nographics.html>. Accessed 4 August 2009].

It is also desirable to have links open in a new tab on the browser. This is particularly true if the link is to another website. You do not want users to leave your website and feel that you abandoned them in a wasteland. By opening the new site in a new tab instead of a new window, the user can easily return to your site.

Finally, hyperlinked words (or phrases) and URLs should be in blue text and also underlined. This is the universal way of indicating a link and notifies users who cannot distinguish colours that the underlined words are a hyperlink.

10.7.11 Alignment

Blocks of text may be set in four ways:

1. Left-justified text lined up evenly along the left-hand side of the page and a ragged-right margin
2. Right-justified text lined up on the right-hand margin with ragged-left margin
3. Justified with even margins on both sides (letters and words are spaced so that each line ends at the right margin)
4. Centred text with both ragged left and right margins.

Left-justified text is easiest to read on web pages because it is predictable, and the margin is easy to find. Similarly, subheadings should be left justified to be in harmony with the text. However, short titles above or below images or in clearly defined text boxes can be centred without losing legibility.

10.7.12 Paragraph indentation

Paragraphs are separated by a blank line. When beginning a new paragraph, the new sentence may be either indented or flush left. It is common to have the first paragraph following a heading, subheading, or line space set flush left and subsequent paragraphs indented.¹⁷

Indentation is also a way of setting off numbered or bulleted lists, lengthy quotations, or example text within a paragraph.

10.7.13 White space

In addition to separating paragraphs, white space also helps to emphasize text. A blank line before and after a heading helps to set it off from the body text without needing to increase type size. Just make sure that the heading is closer to the content it represents than to the preceding content. Generous margins (white space) also make text more readable.

¹⁷ Ritter, R. M. editor (2003). *The Oxford Style Manual*. Oxford: Oxford University Press, p. 18.

10.7.14 Line length

Paragraphs that are too wide or too long are hard to read on computer screens. Generally speaking, paragraphs on web pages should be limited to a few sentences of 35 words or less and no more than 40 to 60 words. In reading, the amount of text that can be viewed at one time is limited by the eye's span of acute focus, usually eight to ten centimeters. Otherwise the user must move their head and/or eye to track the line. In print media the ideal line length is between 45 to 75 characters per line. On the screen, a line of 50 characters (six to nine words) is a good goal. To some extent, the line length will be determined by whether you use a fixed-width layout or a flexible layout. The actual line length will be determined by the browser and the user's preference for type size.

10.7.15 Graphic text

When constructing banners with text on them, organizational logos, or buttons where the organization's identity is tied to a specific logo and font (e.g., Coca-Cola Company), the creation of a graphic text is necessary. Make sure that you use the ALT tag to include alternative text to the graphic text. This will allow users to read the text of the graphic before it loads. It is especially important for the visually impaired who cannot see the graphic font/logo but can have the ALT tag text read to them by a speech synthesizer.

10.7.16 Cascading style sheets

Much of the typography discussed here can be controlled by both the website designer and the user through the use of cascading style sheets (CSS). CSSs link the structural form of the content with its visual appearance on the screen. In other words, the flexibility of CSS allows the same text to be displayed on the screen, printed on paper, or displayed on a handheld device. Each form of display has different requirements. In using CSS, the website developer specifies how each HTML tag will look. Finally, the appearance of all the content on a website can be modified simply by updating the CSS. From the point of view of accessibility, the user can override the author's CSS so that the text is presented as white letters on a black background to provide maximum contrast. The look and feel of a Plone website can be customized using CSS files.

10.9 Design and Layout Checklist

5. **Colour** — Keep the design simple and consistent and contrast the colours where appropriate to make elements stand out where needed.
6. **Colour schemes** — Each page should use the same theme and colour schemes. In some cases you may be able to customize a page with a colour scheme but it should not detract from the main theme.

7. **Frames** — A Frame controlling the standard body text area may be able to incorporate a different colour to emphasize a section like "About us"
8. **Theme** — Create a theme to compliment the message you want to convey
9. **Fonts** — Choose fonts with care. They can make your web pages either annoying or pleasing to read.
10. **Look around** — Examine various websites to see what styles that you like and what might suit your project's type of content. Also note what turns you off and avoid making the same mistakes.

11. Social Networking and Web 2.0

For years, people have used the concept of ‘social networking’ to refer to complex sets of relationships between members of social groups at all scales. These relationships are critical in determining how problems are solved, how organizations are run, and the degree to which individuals achieve their goals. Your success in life is often determined by who you know at a particular place and time in your life. Indeed, one of the great benefits of professional associations is the face-to-face ‘networking’ that goes on at technical meetings where scientific information is exchanged, personal knowledge-bases are updated, and collaborative research planned between groups with similar interest. The degree to which this member benefit permeates a professional organization is illustrated by the tag line of the American Water Resources Association: *Community, Conversation, Connections*.¹⁸ Many characteristics of the networking that takes place within professional associations are now available from social networking services on the Web in the form of user communities, dialogues between users, and networks of connections or ‘friends’.

In addition to social networking websites, a variety of Web 2.0 tools facilitate communications between groups and individuals. This field of software development is moving rapidly with new innovations announced almost daily. By keeping abreast of new developments in the area of social networking, you will be able decide how best to connect your project website with social networking websites and which Web 2.0 tools to use to support your project objectives. One means of following Web 2.0 developments is to subscribe to The ReadWriteWeb blog.¹⁹ This daily blog covers all aspects of Web technology with an emphasis on products and trends.

11.1 What are social networking services?

Social networking services, such as Facebook, MySpace, and LinkedIn are websites that provide users with their own web page on which they create a profile of their background and interests, provide a picture of themselves, and designate other users as ‘friends’. The services also provide an opportunity to seek out new friends based on similar interest profiles or to join or create new special interest groups. Once accepted in a particular group, users may view a list of members of the group and invite them to be friends. Members of the group can post descriptions of events (meetings, field trips, social gatherings), videos and pictures, comments on topical group discussions, and can chat online with other members. In an active group with a passion for their topic, there is a strong sense of adventure and excitement – a sense of a community of practice.

¹⁸ American Water Resources Association website. Available online at <http://www.awra.org>. [Accessed 8 September 2009].

¹⁹ ReadWriteWeb blog. Available online at <http://www.readriteweb.com/> [Accessed 8 September 2009]

Additional tools such as social bookmarking, blogging, microblogging (Twitter), discussion groups, and real simple syndication (RSS) provide additional means of communicating with your community in the context of social networks.

11.2 Why is social networking important?

Social networking services increasing the ease with which people of like interests can find and communicate with one another and exchange information. Conventional means of communication such as email, electronic mailing lists²⁰ Google Groups,²¹ and Yahoo Groups²² are generally static and limited to communications with individuals, in the case of e-mail, groups of subscribers, or members of groups. Although discussion groups support exchanges between members and the sharing of information resources, they require either a predefined list of users that share interests or, in open groups, the discovery of the group by interested users. Social networking services are much more dynamic in that they easily can establish a network of people with similar interests that are not necessarily known to one another before hand..

The success of the GEF IW initiative requires that knowledge of best management practices be exchanged between IW projects in all parts of the world and with the global water resources community. There is no way in advance that one can identify all the potential users of information or the people from academia, governments, non governmental agencies, and the general public that might benefit from and contribute information and insights to a knowledge base. Social networking services provide a structure for providing a global web of users, in and outside of the GEF projects, that can form communities of practice.²³

11.3 Communities of practice

Communities of practice share knowledge, experiences, and valuable organisational insights that can reduce redundant work, avoid past mistakes, reduce training time and adapt to changing environments. Cutting across political, geographic, and organizational boundaries, people connect to share their expertise and learn from other members of the community. Benefits include:

- Improving problem solving
- Developing new capabilities
- Improving productivity

²⁰Wikipedia (2009). *Electronic mailing lists*. Available online at http://en.wikipedia.org/wiki/Email_list [Accessed 9 September 2009]

²¹ Google Groups website. Available online at <http://groups.google.com/> [Accessed 9 September 2009]

²² Yahoo Groups website. Available online at <http://groups.yahoo.com/> [Accessed 9 September 2009]

²³ Wikipedia (2009). *Communities of practice*. Available online at http://en.wikipedia.org/wiki/Communities_of_practice [Accessed 9 September 2009]

- Standardizing best practices

- Avoiding making mistakes
- Creating new knowledge.

People are the best conduits of information. Workers spend a third of their time looking for information and they are five times more likely to turn to a co-worker rather than they are to consult an explicit source of information, such as a book, manual, or database. Thus, by networking, they time may save and improve productivity. In a community of practice, members can openly discuss and brainstorm about problems and solutions that can lead to new capabilities and new knowledge.

11.4 Social networking services

A social network may be a private community, where participation is by invitation only, or a public community open to all web users. Small private networks, such as members of a project or organization, tend to have strong ties between members and to share the same values, knowledge-base, and opportunities. In some cases, however, a closed network may be less useful to its membership than a larger network that has weaker ties between members but whose membership comes from much more geographically and technically diverse group. These more open networks are more likely to introduce new ideas and approaches to their members because they have access to a broader range of knowledge and experiences. They also may attract members of other communities of practice that can bridge more than one network that are not directly linked.

Social networking is based on the trust that comes out of knowing another person. If I trust you, then I am likely to trust your friends. Most social networking services require new users to create a profile of their interests and background. The new user is then asked to provide the email addresses (or access to their entire address book) of others he or she would like to invite to be their friends. The service then invites these people to join the network citing the name of the person extending the invitation. The recipients of the invitation must confirm that they indeed want to be friends of the new user before they are linked. Then things get interesting.

The service looks at the list of friends of the new friend and suggests to the new user that he or she may wish to become friends these people based on his or her common friendship with the new friend. In this manner, your person network of friends can rapidly grow to hundreds of people. Alternatively, the users of the service can seek out new friends who are already using the network on the basis of shared interests as described on the user profiles or locate people they already know that already using the service. Social networks have privacy controls that allow the user to choose who can view their profile and contact them.

Many social networks have additional features, such as the ability to create groups that share common interests or affiliations (company or organization name), produce phone books listing

friends, maintain calendars of events, upload videos, share photographs and documents, post blogs, hold discussions, and communicate using instant messaging.

11.5 Social networking websites

There are more than 200 social networking services are in operation. Thirty-seven have more than 10 million users.⁷ However, there is a tendency for users to be members of more than one service. For example, in 2007, LinkedIn, which has 40 million members in 200 hundred countries, shared 42 percent its users with Facebook and 32 percent with Myspace.⁸ This is because the social networking services have virtual walls between them. Users of one system cannot send messages or share photographs with another. Thus, users have to be members of several social networking services as well as photo sharing sites, blogging sites, and instant-messaging services to interact with one another if not on the same service.

A recent trend has been toward more interoperability between social networks led by technologies such as OpenID⁹ ¹⁰ and OpenSocial.¹¹ OpenID, for example, lets users with a registered identify log very quickly to any service using OpenID.

There are a large number of social networking websites.¹² Several types of social networking websites are described next.

11.5.1 Facebook

Facebook¹³ is a global social networking service with about 250 million members. While aimed at individuals, Facebook allows the user to set up a business or organizational page as well as a personal profile page.

Facebook has a number of features.

- **Friend Network** – List of people that agreed to become your friends.

⁷Wikipedia (2009). *List of social network services*. Available online at http://en.wikipedia.org/wiki/List_of_social_networking_websites [Accessed 9 September 2009]

⁸ Patriquin, Alex (2007). *Connecting the social graph: Membership overlap at OpenSocial and Facebook*. Available online at <http://blog.compete.com/2007/11/12/connecting-the-social-graph-member-overlap-at-opensocial-and-facebook/> [Accessed 9 September 2009]

⁹ Wikipedia (2009). *OpenID*. Available online at <http://en.wikipedia.org/wiki/OpenId> [Accessed 9 September 2009]

¹⁰ OpenID Foundation website. Available online at <http://openid.net> [Accessed 9 September 2009]

¹¹ Wikipedia (2009). *OpenSocial*. Available online at <http://en.wikipedia.org/wiki/OpenSocial> [Accessed 9 September 2009]

¹² Wikipedia (2009). *List of Social Networking Websites*. Available online at http://en.wikipedia.org/wiki/List_of_social_networking_websites [Accessed 9 September 2009]

¹³ Facebook website. Available online at <http://www.facebook.com/> [Accessed 9 September 2009]

- **Wall** – A wall is a space on every user's profile page where friends can post messages and attachments for the user to see. The user's wall is visible to anyone who can read the user's profile.
- **Status** – Status allows the user to indicate where they are and what they are doing at a moment of posting. If you reference a friend, group or event in the status report and place an @ in front of their name(s), you will be able send them a post to their wall linking them back to your post.
- **Events** – Users can maintain calendars of events, meetings, birthdays, etc. on their page.
- **News Feed** – The news feed provide information about profile changes, changes in status, upcoming events, and birthdays of the user's friends. The user can control who see the various pieces of information.
- **Photos** – Users can upload albums and photos. Facebook allows users to upload at least 60 photo per album. Privacy settings can be set for individual albums, limiting the groups of users that can see an album.
- **Notes** – *Facebook Notes* is a blogging feature that allows users to tag and embed images in their blogs and to import blogs from other blogging services.
- **Tagging** –Users can tag or label people (other Facebook users) in a photo, video, or note. Tagging sends a notification to each friend in the photo, video, or note that they have been tagged and provides them with a link to the content tagged.
- **Chat** -- Chat is an instant messaging which allows users to communicate with friends and is similar in functionality to desktop-based instant messengers.
- **Marketplace** – Marketplace allows users to post free classified ads on Facebook. Marketplace has been compared to Craigslist except that the listing can be only viewed by members of a particular group.
- **Groups** – Users may establish special interest groups. Each group has its own events calendar, blog, and photo album.
- **Phone book** – Users can create a phone book that includes all the people on their friends list
- **Twitter** – This feature allows Facebook pages to automatically publish updates to the user's Twitter account

11.5.4 LinkedIn

LinkedIn¹⁴ focuses on developing business networks. It has about 43 million members in 200 countries covering 170 industries.¹⁵ The user profile is basically a resume of the member's education and professional experience. The purpose of the service is to build business networks of people that the members know and trust in business or professional relationships. The people in the member's list of trusted contacts are called 'connections'. A member can invite anyone to be a connection whether or not they are a LinkedIn member. The 'gated-access approach' of network development, where connections require either a pre-existing relationship or the intervention of another person on the user's contact list, is intended to build trust among the users of the service.

LinkedIn has similar features to Facebook but has a professional or business orientation:

- **Contact network** – The network consists of the member's direct connections (those who agreed to be a connection), the connections of each of their connections (termed second-degree connections) and the connections of second-degree connections (termed third-degree connections).
- **Job list** -- Employers can list jobs and search for potential candidates based on information on user profiles.
- **Job seekers** – Users can review the user profile of hiring managers and discover which of their existing contacts might be able to introduce them.
- **Answers** – This feature allows users to ask questions of the community. The questions are potentially more business-oriented and the identity of the people asking and answering questions is known.
- **Groups** – Groups allows users to establish new business relationships by joining alumni, industrial, professional, and other relevant groups. LinkedIn groups can be created for by any member of LinkedIn for specific interests.
- **Polls** – Polls allow surveys to be made of specific contact networks.
- **Applications platform** – LinkedIn recently enabled an "applications platform" that allows other online services to be embedded within a member's profile page. Among the initial applications were Amazon Reading List on which members can display books they are reading and an application that allows members to publish their most recent blog posting on their member profile pages.

¹⁴LinkedIn website. Available online at <http://www.linkedin.com/> [Accessed 9 September 2009]

¹⁵ Wikipedia (2009). *LinkedIn*. Available online at <http://www.wikipedia.org/wiki/LinkedIn> [Accessed 9 September 2009]

- **RSS feeds** -- ‘News’ aggregated from a number of RSS feeds of interest may be displayed to the membership of a group.

11.5.5 Ning

Ning¹⁶ is a platform that allows its members to create their own social networks around specific interests.¹⁷ The Soil and Water Conservation Society (SWCS), for example, has a network of about 1,000 people on Ning. The network has pages for photos, videos, events, groups, blogs and chats. The events page lists 31 events, mostly technical meetings, with links to information about them. Within the SWCS network, 41 groups have been established on such subjects as wetlands, hydrologic and water quality monitoring, biofuels, and conservation and photography. Within each group there are three to four discussion topics. Blogs tend to concern announcements of new reports and news. Within a such a network, groups are easily formed or deleted as needed by a network administrator.

As with other social networking services, each member of Ning fills out a profile of interests and provides a list of friends. A new member then applies to join one or more existing networks and one or more groups with in the networks that they belong to. In each case, they must be accepted by the network or group administrator. Once a member of any network or group, the user can ask other members of the group to be friends and expand their friends list.

11.6 Social network applications

Social networks play a variety of roles in society ranging from finding jobs to getting answers to questions. The social networking services all support the establishment of formal and ad hoc communities, communications through chat, postings, and discussion groups. Some are used for learning through the presentation and sharing of teaching materials, discussion of assignments, and demonstrations of problem solving. Others use networks to disseminate peer to peer knowledge.

Within the context of GEF IW projects and IW:LEARN, social networking websites offer some interesting opportunities for establishing communities of practice that extend well beyond these organizations. In particular, project staff using a social networking website group could exchange information with both the GEF project community and a much broader community of people interested in water resources.

Some possible applications include

¹⁶Ning website. Available online at <http://www.ning.com/> [Accessed 9 September 2009]

¹⁷ Wikipedia (2009). *Ning*. Available online at <http://en.wikipedia.org/wiki/Ning> [Accessed 9 September 2009]

- Establishment of networks of local, regional, or global discipline specialists to share knowledge of on going activities that might lead to formal or informal collaboration
- Creation of groups to discuss and apply lessons learned and best management practices, highlighting, at least initially, the results of GEF IW projects but bringing into the discussions similar experiences from around the world.
- Establishment of groups focused on problem solving of particular issues, such as managing a wetland or reducing the water quality impact of tourism, or how to avoid management mistakes made in the past.
- Creation of groups to conduct training programs or tutorials using shared documents, slide presentations and videos on technical topics of all kinds.

A common mistake in initiating discussion forums is to set up groups for a number of topics, post a series of provocative questions, and then sit back expecting a flood of insightful comments to pour forth. It is much better, at least initially, to select one good topic and to nurture discussion. As the discussion group grows in membership, new threads can break off and form their own groups. In this way the discussion group grows organically in response to the interests of the group.

To successfully use social networking, you will need to attract a sufficiently large community to sustain an ongoing dialogue. A handful of people, busy with their own day to day work, will find it difficult to maintain a long period of discussion. You will also need skilled leaders who can facilitate, guide, and periodically summarize the discussion and energize the group. The discussion leader should be charged with periodically producing a report that records the findings of the discussion for publication.

You also need to provide incentives for people to join and contribute to the discussion. In part, this is done by choosing topics that have broad interest, that provide a real learning experience for many participants, and that will increase the quality and quantity of their contributions to their work places and their projects. It also comes from providing a 'safe' environment for members to express their opinions and feelings without being personally attacked or unduly criticised by other group members. It is the role of the discussion leader to set the tone and encourage participation.

11.7 Really Simple Syndication (RSS)

11.7.1 What is RSS?

Real Simple Syndication (RSS)¹⁸ is a format for delivering regularly changing web content to your or to someone else's website. Many news-related sites, weblogs, and other online publishers syndicate their content as an RSS Feed to whoever wants it.

11.7.2 Why is RSS important?

RSS allows you to automatically send notification of newly added information or changes to your website to others who subscribe to your RSS feeds. For example, you might create a RSS feed of all project press releases, project news, and project documents on your project website. IW:Learn could then subscribe to your RSS feed and automatically update its website with links to your news. Conversely, you could update your website with information and news from other websites or aggregations of websites automatically. For example, you might subscribe to an RSS feed of news about GEF, local news about water and the environment, and new scientific reports on technical topics relevant to your project. This ability to automatically freshen up the content of your website is one way of encouraging visitors frequently check for site for new information.

11.7.3 RSS feeds

RSS is a group XML file formats used to publish headlines and descriptions of frequently changing information, such as blog entries, news, and web content that is published once and viewed by many different subscribers. An RSS document is called an item and a group of items with a similar theme are called a 'web feed' or 'channel'. The feed may have the full text or a summary of a document and includes metadata on the publication, its date of publication, and its authorship. Software known as 'RSS readers' and 'news aggregators' collects information from news feeds of interest in a central location where the content can be read.¹⁹

The user subscribes to a RSS feed by entering the feed's URI into a RSS reader or by clicking an RSS icon on a website that initiates the subscription process. The RSS reader checks the user's subscribed feeds regularly for new work, downloads any updates that it finds, and provides a user interface to monitor and read the feeds.

The number of sites offering RSS feeds is growing rapidly. More than 550,000 websites are equipped with some form of RSS.²⁰ More than two thirds of the RSS feeds use the RSS 2.0 format, although other formats (RSS 0.9, RSS 1.0, and Atom) are also in use.

11.7.4 How to create an RSS 2.0 feed

¹⁸ RSS is sometimes called Rich Site Summary.

¹⁹ NotePage, Inc. (2009). *RSS specifications*. Available online at <http://www.rss-specifications.com/> [Accessed 10 September 2009]

²⁰ Wikipedia (2009). *Real Simple Syndication (RSS)*. Available online at <http://en.wikipedia.org/wiki/RSS> [Accessed 10 September 2009]

RSS feeds can be established directly in XML using a text editor or by using RSS feed creation software. Step-by-step instructions for hand coding are given on the RSS Specifications website.²¹ Your XML should be validated using the W3C Markup Validation Service.²²

Once your feed is created, you need to submit your RSS feed's URL to a number of feed directories. News aggregators use these directories, among other tools, to find active RSS feeds. This may be done manually or by using commercial software, such as RSS Planter.²³ There are many RSS feed and Blog directories.²⁴ The cost of the submission software generally includes access to the latest list of directories for one year.

Plone keeps tracking of changes made to folders in the CMS. You can decide for each folder whether or not you want to offer a RSS feed announcing the folder's current items and smart folders. Plone can also syndicate search results. The feed is the continually updated list of items in the search list.²⁵

11.7.5 Reading and aggregating RSS feeds

RSS readers allow the user to aggregate feeds and display content. There are many free RSS readers available. For example, the web browser FireFox has an add-on called Simple RSS Reader (SRR).²⁶ With a browser with a built in news reader, it is a simple matter to go to websites with RSS feeds of interest and subscribe to them by clicking on the RSS icon.²⁷ On stand alone RSS readers, you must manually enter the URL of the RSS feed into your newsreader. Then your news reader will display any new content posted by the RSS feed.

11.7.6 Promoting your RSS feed

RSS feeds are becoming a very popular way to deliver content to users. However, you need to market the availability of your feeds by making sure they are listed in RSS directories. These directories are indexed by commercial search engines and are another way of making your

²¹ NotePage (2009). *Making RSS feeds*. Available online at <http://www.make-rss-feeds.html> [Accessed 12 September 2009]

²² World Wide Web Consortium (2009). *Markup validation service*. Available online at <http://validator.w3.org/> [Accessed 13 September 2009]

²³ RSS Planter website. Available online at <http://www.rssplanter.com> [Accessed 13 September 2009]

²⁴ NotePage (2009). *RSS Specifications, RSS directories*. Available online at <http://www.rss-specifications.com/rss-directory.htm> [Accessed 13 September 2009]

²⁵ Lotze, Thomas and Theune, Christian (2006). *Content management with plone: Handbook for authors and editors*. Gocept gmbh & co. kg, p. 146-147.

²⁶ Mozilla Corporation (2009). Simple RSS Reader (SRR) add-on. Available online at <https://addons.mozilla.org/en-US/firefox/addon/5459> [Accessed 13 September 2009]

²⁷ NotePage, Inc. (2009) *RSS specifications: RSS graphics*. Available online at <http://www.rss-specifications.com/rss-directory.htm> [Accessed 13 September 2009]

website more visible on the Web.²⁸ Search engine optimization techniques are similar to those used for web pages: add keywords to the RSS channel title; channel description; and the item titles (the titles or headlines should be 50-75 characters including spaces). Plone takes the channel title from the folder title and other information from the folder properties and item properties including the title, description, creator, author copyright and publication date.²⁹

Finally, there are commercial services that can fine tune the content that you collect from other sources to your website, such as NewsIsFree.³⁰ These commercial sites provide an annual subscription for users that, depending upon the level of service, provide customized web pages with an aggregation of hourly updates your selection of RSS feeds. Conversely, the service will search hourly all RSS feeds in its directory for specific content. The volume of information, thus obtained can be overwhelming.

11.8 Blogs

11.8.1 What are blogs?

A blog is personal (or professional) journal on the Web. A blog provides commentary or news on a particular subject and a response from readers who make comments on each post. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. They are a tool to inform, educate, and connect people about a particular topic of interest and to gather responses or reactions. Because there is little or no cost to setting up and maintaining a blog, except for the time of the blogger, many individuals and organizations have established blogs as part of their website content and communications strategy.

11.8.2 Why are blogs important?

The blogosphere is vast. Blogs allow millions of people to publish their ideas and many more to respond with comments. Blogs are a form of two-way communication between a publisher and interested readers. Get enough people participating in a blog and you can have an online discussion with the blogger insert his or her own comments. Blogs enable users to become active participants instead of passive readers.

11.8.3 How to set up a Blog

²⁸ FeedForAll (2009). *RSS feed tips to help search engine optimization*. Available online at <http://www.feedforall.com/feed-tips-seo.htm> [Accessed 13 September 2009]

²⁹ Lotze, Thomas and Theune, Christian (2006). *Content management with plone: Handbook for authors and editors*. Gocept gmbh & co. kg, p. 147.

³⁰ NewsIsFree website. Available online at <http://www.newsisfree.com/> [Accessed 13 September 2009]

The first step is to think of a title for your blog that differentiates it from the millions of blogs already on the Web. Then get a domain name for the blog or incorporate it into your website, such as www.example.com/water-resources-blog. Incorporating a major keyword in the URL of your blog will help search engines find and index it.

The next step is to pick your content management system that provides you the tools to manage your blog. The top two platforms for hosting blogs are Blogger³¹ (a Google tool), and WordPress.³² Blogger is free, but can be fairly limiting. WordPress offers a hosted version with limited features and a fully featured version that requires you to have a server to host your blog. Plone has a blog platform called Quills that provides for blogs with multiple authors and for authors having multiple blogs on a website.³³

11.8.4 Blog content

Like Web pages, content is all important. Some suggestions for developing blog content include

- **Solve problems** – Propose a solution to a problem and asked for comments and analysis
- **Ask questions** – Ask questions about how to approach a particular issue
- **Look for trends** – Identify trends in topics such as integrated water resources management or watershed (catchment) management
- **Latest news** – Comment on the news in a particular subject area, but in the context of GEF IW, stay away from politics
- **Take a poll** – Gather opinions on the best way to approach a problem or rank in order of importance, the most important factors to consider in managing a resource
- **Networking and partnerships** – Interact with people outside your blog using a social networking website.

Once you start blogging and develop a following, be consistent in the frequency with which you blog. Be sure to pace yourself in terms of the time you have to devote to blogging. Don't blog daily for several weeks and then go for a month without a post.

11.8.5 Promoting your blog

³¹ *Blogger* website. Available online at <http://www.blogger.com/> [Accessed 13 September 2009]

³² *WordPress* website. Available online at <http://wordpress.org/> [Accessed 13 September 2009]

³³ *Quills* available online at <http://plone.org/products/quills> [Accessed 13 September 2009]

RSS is the most common way of promoting your blog online. Blogging platforms usually have an RSS feed built in to the software. Many social bookmarking plug-ins also can help promote your blog. You can also submit your blog to blog directories where they are readily indexed by search engines.³⁴

³⁴ Baker, Loren (2007). *20 essential blog directories to submit your blog to*. Available online at <http://www.searchenginejournal.com/20-essential-blog-directories-to-submit-your-blog-to/5998/> [Accessed 13 September 2009]

Finding useful information in the blogosphere is problematic. Specialized blog search engines include Bloglines,³⁵ BlogScope,³⁶ and Technorati.³⁷ Technorati is among the most popular blog search engines and provides current information on the most popular searches and on tags used to categorize blog postings.

11.9 Twitter (Microblogs)

11.9.1 What is Twitter?

Twitter is a free social networking and micro-blogging service.³⁸ Users of the service are able to send and read messages known as tweets. Tweets are text-based strings of up to 140 characters displayed on the author's profile page and delivered to the author's subscribers who are known as followers.³⁹

11.9.2 Why is Twitter Important?

Twitter is remarkably simple. As a social network, it modelled after 'followers' in the same way that blogs depend upon readers and subscribers. Followers view your tweets mixed in with the tweets of others that they follow, in reverse chronological order. In other words, the most recent tweet is first in the list of tweets on the follower's Twitter page. At one end of spectrum, the system allows one person to publish to literally millions of followers in real time. At the other end, you as a microblogger can follow your followers and see their tweets. This opens up the possibility of a many short exchanges between members of a small working group or committee.

Because the system is accessible from mobile phones, there is significant potential for applications that require short, real time communications.

11.9.3 Twitter Applications

Twitter applications are rapidly evolving. An analysis of the content of several thousand tweets showed that 41 percent were characterized as 'senseless babble' and 38 percent as 'conversational.'⁴⁰ Yet Twitter is also being used in very innovative ways.

³⁵ Bloglines website. Available online at <http://www.bloglines.com/> [Accessed 13 September 2009]

³⁶ Blogscope website. Available online at <http://www.blogscope.net/about/> [Accessed 13 September 2009]

³⁷ Technorati website. Available online at <http://technorati.com/> [Accessed 13 September 2009]

³⁸ Twitter website. Available online at <http://twitter.com> [Accessed 13 September 2009]

³⁹ Wikipedia (2009). *Twitter*. <http://en.wikipedia.org/wiki/Twitter> [Accessed 13 September 2009]

⁴⁰ Kelly, Ryan, editor (2009). *Twitter study reveals interesting results about usage*. San Antonio, TX: Pear Analytics. PDF file. Available online at

Earthquake reporting. The US Geological Survey's *World Earthquake* reports earthquakes throughout the world in near real time (928 followers)⁴¹

Charity:Water fund-raising. The nonprofit organization, Charity:water is using Twitter to raise funds for water philanthropy (928,000 followers)⁴²

Education. The Massachusetts Historical Society (MHS) in the United States commemorated the 200th anniversary of the travels of John Quincy Adams (sixth president of the U.S.) on his trip to St. Petersburg as ambassador to Russia in 1809. Each day, MHS posts one of Adams's short, one-line diary entries (e.g., the entry for September 1, 1809 was posted on September 1, 2009). The entries record the position of the ship, the weather, and what he was reading. The ship's positions are plotted separately on a Google Map. Electronic copies of Adams's reading material are posted on the MHS website so that followers can read along with him. The tweets are introducing a new generation of people to one facet of American history and are stimulating donations to the society—both unanticipated results of what was an experiment in the use of a Web 2.0 tool (15,200 followers)⁴³

Medical Alerts. The U.S. Center for Disease Control (CDC) is using Twitter to provide medical personnel and the general public with information about public health emergencies. In late 2009, CDC was tracking the spread of H1N1 flu cases. (884,200 followers).⁴⁴

Other applications include announcing the release of reports, news items, and alerts of various sorts. For example, if one were making flood forecasts in a river basin, the forecasts could be announced via a tweet with a link to the actual forecast on your website.

Twitter allows tweets to be limited to a specific group of people. One can direct a tweet to a specific user of Twitter by placing an @ symbol in front of their username. Firefox has an add-on for its browser called TwitterFox⁴⁵ that allows a tweet to be typed into the address bar and posted directly to your Twitter page or addressed to a specific person. This user interface makes it extremely easy to tweet a message or to send the current URL of your browser to your followers.

<http://www.pearanalytics.com/wp-content/uploads/2009/08/Twitter-Study-August-2009.pdf>
[Accessed 14 September 2009]

⁴¹ U.S. Geological Survey. *World earthquakes*. Available online at <http://twitter.com/earthquake>
[Accessed 13 September 2009]

⁴² Charity:water. *Charitywater*. Available online at <http://twitter.com/charitywater> [Accessed 13 September 2009]

⁴³ Massachusetts Historical Society. *John Quincy Adams*. Available online at http://twitter.com/JQAdams_MHS and also <http://www.masshist.org/adams/jqa.php> [Accessed 13 September 2009]

⁴⁴ US Center for Disease Control. CDC Emergency. Available online at <http://twitter.com/CDCemergency/> [Accessed 15 September 2009]

⁴⁵ TwitterBar available online at <https://addons.mozilla.org/en-US/firefox/addon/4664> [Accessed 13 September 2009]

These kinds of short, spontaneous communications of small bits of information are very useful in the context of a collaborative working group.

11.9.4 Finding Information on Twitter

Twitter added a search bar and a sidebar of ‘trending topics’ in the Spring of 2009. The topics are the most common phrases currently appearing in messages. Every tweet is now indexed and made discoverable using a search box. Analysis of tweets is a booming business. One of many such websites is *twitoaster* that archives threads your Twitter conversations. The site also provides a number of analytical tools that show you how many replies are generated by your tweets.⁴⁶

11.10 Wikis

11.10.1 What are wikis?

A wiki is a website that uses wiki software. It facilitates the creation and editing of interlinked Web pages using a simplified text editor within a Web browser. A wiki is essentially a database for creating, browsing, and searching through information. In the context of social networking, a wiki website permits the collaboration of the community of users to develop information for a specific purpose such as an encyclopedia.⁴⁷

11.10.2 Why are wikis important?

Wiki technology enables wiki pages to be easily created and updated. Generally, there is no review before modifications of wiki pages are accepted. This is both a strength and a weakness of the system. It encourages maximum participation by potential contributors because of the ease of use. At the same time, it opens up the system to abuse by people who are not knowledgeable of a subject and either intentionally or unintentionally provide inaccurate information to the site. Despite its problems, wikis enable a sufficiently large community of users to quickly establish a knowledge base and through self-monitoring and editing by the community, provide a reasonably reliable source of information.

11.10.3 Applications of Wikis

⁴⁶ Twitoaster website. Available online at www.twitoaster.com [Accessed 15 September 2009]

⁴⁷ Wikipedia (2009). *Wikis*. Available online at <http://en.wikipedia.org/wiki/Wikis> [Accessed 13 September 2009]

A list of wikis applications reveals a wide variety of topical applications.⁴⁸ Wikipedia is by far the largest wiki with some 12 million articles. Others deal with self-directed learning (Wikiversity), general instruction (wikihow), and a free library of educational textbooks (wikibooks). In the context of the GEF IW projects, UNDP's Waterwiki.net is of interest.⁴⁹

‘Water wiki aims at being a knowledge map and on-line collaboration platform for Water Sector Professionals and Practitioners worldwide, to find - and share! - experience and knowledge about water-related work in the international (UN) context.’

Akovopedia⁵⁰ is covers water and sanitation issues. ‘The goal of Akvopedia is to improve water and sanitation projects through knowledge exchange on smart and affordable technical solutions and effective approaches.’

The use of wikis in GEF IW projects could take the form of collaborative documents describing river basin resources, water problems, and existing or planned management activities. By requiring users to register, inputs and contributions from national, regional, and local governments could be integrated to provide a comprehensive overview of what is happening in a particular geographic area. The credibility of such documents would rest on the citations to published documents or other published sources.

On a global scale, wiki could be used to develop best management practices based on the experience of GEF IW projects, UN agencies, and governmental projects. Consideration would have to be given to the relationship of these efforts and those of Waterwiki.net.

11.11 Social bookmarking

A final tool in this chapter on social networking is referred to as social bookmarking.⁵¹ Users save bookmarks for web pages they want to keep and also share with others by placing those bookmarks on their personal web page at a social bookmarking site. The bookmarks (URLs) are tagged by the user who assigns tags based on his own vocabulary. Collectively, these tags become an informal *folksonomy* (or social tagging).

A social bookmark link generator (or a tag generator), such as Socialmarker⁵² is third-party software that generates a code to be added to Web pages and/or Blogs to facilitate bookmarking web content on bookmarking websites. Socialmarker permits the user to submit bookmarks to 49

⁴⁸ Wikipedia (2009). *List of wikis*. Available online at http://en.wikipedia.org/wiki/List_of_wikis [Accessed 13 September 2009]

⁴⁹ Waterwiki.net. Available online at <http://waterwiki.net/> [Accessed 13 September 2009]

⁵⁰ Akvopedia. Available online at http://www.akvo.org/wiki/index.php/Main_Page [Accessed 13 September 2009]

⁵¹ Wikipedia (2009). *Social bookmarking*. Available online at http://en.wikipedia.org/wiki/Social_bookmarking [Accessed 13 September 2009]

⁵² Socialmarker website. Available online at http://en.wikipedia.org/wiki/Social_bookmarking [Accessed 13 September 2009]

social bookmarking sites at one time. Since Social bookmarking generate back links, it has been used as at tool to promote websites and blogs. Some of the more popular bookmarking services include Google, Del.icio.us, Digg, and Stumble Upon.

11.12 Social networking checklist

- **Develop a plan** – Establish a small working group to discuss how your project might best utilize social networking to achieve the objectives of your project locally, regionally, and globally. Develop a short plan with action items, responsibilities, and deadlines.
- **Set up a network** – Consider establishing a special interest group for your GEF IW project on one of the social networking websites, such as LinkedIn. Grow the network with participation by project staff, partners, and representatives of interested organizations.
- **Social networking groups** – on the social networking website, establish a group for your project. Create one or two discussion groups to look at issues that can be discussed publically. In choosing issues to discuss, consider the possible applications of social networking websites listed in section 11.
- **RSS feeds** – Use an RSS feed as a means of getting project news to IW:LEARN and to your social networking website. Feed your CMS blog to your social networking site. Feed your social networking blog to your project website. Offer RSS feeds to your project news, press releases, meetings and other events, new reports, and other new content of the website. Subscribe your social networking website to the project RSS feeds.
- **RSS directories** – Submit your RSS feeds to as many RSS directories as possible to be indexed by search engines and to attract visitors to your website.
- **Establish a blog** – Establish one or more blogs on your project website and on your social networking websites. Use it to keep people informed about progress your project. Consider the list of potential blog content in Section 11 and apply to your project website. Feed the blog and comments to your social networking website and to your project website.
- **Blog directories** – Submit your blogs that are on your project website and on your social networking site to as many blog directories as you can.
- **RSS aggregate feed** – Select one or more aggregated RSS feeds from news sources for display on your project website. Consider having a feed for (1) GEF project news from around the world; (2) Local environmental and water resources news within the geographic sphere of interest of your project; and (3) technical information on subjects of interest to the project from sources worldwide.
- **Social bookmarking** – Include bookmarking icons for four to five social bookmarking sites to display on your website. Encourage visitors to submit your

page URLs that they find useful to these social bookmarking sites. Set up a page of bookmarks for the project on one of these services. Use RSS to feed bookmark information to your websites.

- **Twitter** – Open one or more Twitter accounts for use by your project and, perhaps by some project committees or working groups. Use tweets to pass interesting or relevant URLs to project staff. Can you issue tweets on environmental or water resource conditions in your project area?
- **Wiki** – Consider using wiki pages to develop a collaborative description of the environmental and water resources of your project areas or to develop a profile of environmental issues of interest to your project. Use the results to blog and discuss problems with your social network.

12 Website Maintenance and Updating

In the long term, website maintenance and updating is almost as important as good website design. The World Wide Web is a dynamic environment and things are constantly changing. As one example, the link to a website that contained content of great interest to your project may have worked perfectly last week, but this week users report that it is broken. Perhaps the website was redesigned or taken down. The point is that you have to frequently check your website to make sure that it is operating the way that it is supposed to.

12.1 What are website maintenance and updating?

Like any complex system, a website must be maintained and updated. Maintenance tasks involve updating the computer operating system, installing new versions of the CMS, upgrading software used to develop content, checking the integrity of internal and external hyperlinks, analysing the server web logs for information on visits to the site, improving search engine optimisation, and adding fresh content frequently.

12.2 Why are website maintenance and updating important?

Certainly, website maintenance is important if you wish to keep your site running smoothly. It is also important because of user expectations. As mentioned a number of times in this style guide, users are an impatient group of people in a hurry. They expect that when they click on a link, they will be taken to a Web page with relevant information on it. When a link does not work the first time, they will make an effort to see that the URL is correct and properly entered into their browser's address bar. When a second attempt fails, they are apt to get a bit annoyed and wonder whether the site is properly managed and maintained. When the third try fails, they get angry and give up. They leave. There are other sites, in competition with yours, that work.

In addition to working properly, users expect your website to contain current information. To discover a web page that has not been updated in the past five years raises serious questions about the value and credibility of the site. The page should have been updated or removed from the site. Users also expect change: new information, recent news, and fresh results from your project. If you want users to keep coming back to your site, you must frequently add new material. Today, your site may be an award winner, but unless you allocate sufficient time and effort to maintain it, tomorrow it will rapidly fall into disrepair.

12.3 Website Maintenance

Physical maintenance of your website includes a number of tasks, some of which will be determined by the CMS or other programs used to develop the site. Several websites provide examples of guidance for this important activity.^{53 54} The maintenance process is sufficiently complex for even a small website to warrant preparation of a website maintenance plan that should be rigorously followed, and monitored. The plan should include a description of responsibilities for and frequency of updating content, scanning for outdated content, checking the integrity of links, making backup copies of the site, and other maintenance activities.

12.3.1 Offsite Backups

One of the most basic maintenance tasks is to backup your website. Back it up frequently. Do not depend upon the website host to do it. They may not back up their servers often enough. Find out what their backup policy is. A production web server should not be used for backups.

Be sure to make use of the IW:LEARN archival service for your project website..If additional backups are required, these should be done on other storage media.

12.3.2 Local Backups

Always have a current copy of the website on your own computer. For added security, store another copy in a secure location offsite. An external disk drive of sufficient size to hold the site's files can serve this purpose. Thus, if your web server crashes, and it's been a month since the server was backed up by the host, you can quickly restore your site to its most recent version.

Index pages should be backed up in each file directory in case of accidental overwrites during uploading of updated information.

12.3.3 BackUp Plan

Establish a written backup plan for your website that will assure that copies of the site will survive fire, flood, civil disturbance or other disasters. This should be part of the overall web maintenance plan.

Specify tasks, locations of backup storage, responsibilities for making copies, and frequency of backups. Place backup dates on the [project's calendar and methodically adhere to the schedule.

⁵³ ToTheWeb (2009). *Learning Center: Website Maintenance Tips*. Available online at http://totheweb.com/learning_center/website-maintenance-tips.html [Accessed 15 September 2009]

⁵⁴ Meiert, Jens (2008). *10 measures for continuous website maintenance*. Available online at <http://meiert.com/en/blog/20080624/continuous-website-maintenance/> [Accessed 15 September 2009]

12.4 Content

The chances are that if you are using a content management system (CMS), authors and editors may be uploading and updating their content to the website. If so, it will be your role as web administrator to monitor the updating process and make sure that all is working well. Frequently browsing your website and randomly looking at a content item is one approach to maintaining some sort of quality control. Make sure that videos play, PDFs download, and slideshows can be viewed.

12.4.1 Proofread content

All content that is posted to the website should be proofread by the author and by an editor. It also should be looked at by someone who is not familiar with the content. It is a fact of life that there will always be some typographical errors. Your job is to oversee a website maintenance process that will minimize them. From time to time, randomly select an article or two, print them out, and read them carefully for typographical errors. Hard copy is much easier to proofread than text on a computer monitor. Embarrassing typographical errors may be missed for months or even years. Misspellings introduced by computer spell checkers in automatic correction mode are a particular problem. Do you really want your hilarious errors e-mailed around the world as a joke that people send to all their friends? All such errors affect the credibility of your website. Be vigilant.

12.4.2 Updating content

When updating content, there is always the possibility of a software or hardware malfunction. Before revising a web page, download the current page from the live site to your local computer to ensure that you have saved the latest version of the page in case something goes wrong with the update. Don't forget to save graphics and image files related to the page. Then make the changes and upload them to the web server. Immediately after uploading updated or new content, check the pages with several web browsers to make sure they loaded properly.

12.4.3 Automatically updated content

Frequently read those parts of your website that are automatically updated with new information, (e.g., news feeds) to make sure that they are working properly. Periodically ensure that the RSS feeds that you are posting are appropriate. Perhaps the RSS feed(s) need to be tweaked to better reflect the interests of your user audience. Even though the updating is done automatically, the updating process can still malfunction.

12.4.4 Look for outdated content

Always be on the lookout for outdated content. If a policy of placing the date of the last update of a web page is followed, then the task of finding outdated material is somewhat easier. However,

the fact that new content was added to a web page does not guarantee that outdated material was removed. Print out some of the older content and see if it still seems current. If you have doubts, contact the author and ask for an update. An obvious example is the meeting announcement that speaks in glowing terms of an ‘upcoming event’ that occurred a year ago. The event entry provides a description of the meeting, a registration form, and perhaps an agenda. A logical question to ask ewehn seeing the agenda is “I wonder what happened at the meeting or workshop. This is an ideal place to link a copy of the meeting report, paper presentations, training materials and other documents that came out of the event.. Try to provide documents on the website that follows up events. Using the events calendar to find these documents would provide an innovative means of accessing them.

Be sure to delete or archive old content. You do not want search engines indexing and pointing to obsolete information.

12.4.5 Other things to keep updated and current

There are many other items on your website that potentially may get out of date or become obsolete. Spend some time making an inventory of such items and their location on the site.. They may include

- Logos of major participants in your project
- Contact details of key project staff
- Calendars of events
- Project documents and reports that may have changed or been updated
- New news feeds from other projects, social networking websites and partner agencies
- Job vacancies, especially announcement that have expired or that have been filled

12.4.6 Maintain the style of the site

During the design and layout phase of website implementation, you decided on the “look and feel” of your website. As you update content and add new web pages to the site, make sure that you maintain the style of the site. Do not introduce new colour palettes or different typography unless it is part of a redesign effort. If you use CCS to define the fonts and layout styles of web pages, maintaining the sites style should not be a problem.

12.4.7 Web page footer updates

Many website designers recommend that the web page footer area at the bottom of the page provide a variety of information about the organization responsible for the website and contact information. They also recommend that the date be display of the last time a web page was updated. Some websites automatically show the current date giving the illusion that someone updates all the web pages on the site daily. It is much more credible, if different pages have different dates reflecting a realistic updating schedule. Also valuable is a link to the list of content on the page that was added or updated.. As an aid to website management, especially on a site where a number of different people are responsible for updating content, consider dating each page when it is updated. This way you, as site administrator can immediately see what has and has not been done.

12.5 File maintenance

A large website has a complex file structure containing many folder hierarchies and individual files. Over months or years, the structure can become cluttered with obsolete and unused files and folders. Overtime, one is uncertain what they are and there is a reluctance to remove them without knowing their function. Thus, one aspect of website maintenance is good housekeeping practices.

12.5.1 Maintain file names

If an old file is replaced with a newer one, keep the file name the same. This will alleviate the need to revised any links that point to the file and search engines will not have to update their indexes. This also will help avoid '404 page not found' errors.

Also keep improving file names to better reflect the file's content. Rename files that are not readily understandable. This will make it easier to maintain the website as it grows It will also improve search engine optimization and assist users find information on your website.

12.5.2 Delete unused files and folders

Keep up with housekeeping chores on your files and folders by deleting unused files. These superseded files may be archived offline, but they must be removed from the site as soon as possible. Search engines will continue to index this material as long it is on the site. Site maps will help identify any duplicate files.

12.6 Software upgrades

The growth of the Internet presents many challenges ranging from increasing spam mail to the grow of malware and attacks on website security. More than ever, it is important to keep your

software up-to-date and current with the latest security patches and antivirus updates. Be sure that you have your software set to notify use when updates are available and promptly install them.

If you use Plone or another CMS, you should consult the CMS website regularly for website updates regularly for software upgrades. The updates can add features fix software bugs and provide security enhancements to your current implementation. Keep your website development software current.

12.7 Browsers

Different web browsers can interpret the same HTML differently. Every time you make a change to a web page, view that page in Internet Explorer, Netscape, Opera and Firefox for Windows computers and in Firefox, Safari, Opera and Netscape for Apple computers. Also check the rendering of your website after upgrades of these browsers or the introduction of a new browser to make sure that your website is still compatible and web pages appear the way they should..

12.8 Links

Links are the key to navigating between web pages and websites. They require routine maintenance and repair. Link rot occurs on the best of sites.

12.8.1 Link Checks

The more people involved in maintaining content, the more opportunities arise for alterations in website structure to lead to dead links, broken links, or 404 error pages that indicate a particular web page is not available. The situation is worse with external links where you have no control over what other people are doing on their websites.

12.8.2 Link Checking Services

Several tools are available to help you review the integrity of hyperlinks. The W3C has an online link checker in which you enter the URL of your website, and the program validates the links and provides a report.⁵⁵ IW:LEARN's Plone CMS can perform such checks by using an add-on

⁵⁵ World Wide Web Consortium, (2009). *Link Checker*. Available online at <http://validator.w3.org/checklink> [Accessed 15 September 2009]

framework called *Wicked*.⁵⁶ Another Plone feature called *Kupu*,⁵⁷ a text editor, can be used as a link checker by enabling a feature called 'Link using UID.'

The integrity of links should be checked weekly.

12.8.3 Migrating your website and old links

If you have an existing website and want to move your site to a new CMS, you may need to permanently redirect old links that have been bookmarked by users or cached into search engine results. One way to do this is to set up an HTTP 301 status code⁵⁸ for permanently redirection of a URL.⁵⁹ This method should be used

- When you change your domain name
- When you change a URL
- When external links pointing to your site or pages are old or invalid.

12.8.4 Error page text

Consider adding user-friendly text to both the HTTP 301 page and the HTTP 404 page. Expresses concern that the wanted web page cannot be found. Provide a friendly message suggesting that the potential visitor should check the URL spelling. Provide the valid URL for your website's home page along with a means of reporting the problem to the webmaster. This shows that you are concerned about quality of the user's experience on your website.

12.8.5 Using the 'nofollow' HTML attribute for links

There may be occasions when you would like to provide a link to another website without necessarily vouching for its content or subject matter. Because the suspect website can backlink to your website, the reputation of that site will affect your ranking in search engine results pages. By adding the rel='nofollow' HTML attribute to the link, you can prevent this cross linking from occurring. The syntax of the HTML statement is

```
<a href="http://www.dodgywebsite.com/" rel="nofollow">External info</a>
```

⁵⁶ *Wicked* available online at <http://plone.org/products/wicked> [Accessed 15 September 2009]

⁵⁷ *Kupu* available online at <http://plone.org/products/kupu> [Accessed 15 September 2009]

⁵⁸ Wikipedia (2009). *HTTP 301*. Available online at http://en.wikipedia.org/wiki/HTTP_301 [Accessed 15 September 2009]

⁵⁹ Humbad, Shaiklesh N. (2009) *Permanent redirect with http 301*. <http://www.somacn.com/p145.php> [Accessed 15 September 2009]

12.9 Website performance improvement

Reducing the size of images and graphics used on your web pages can greatly improve your users' browsing experience and can also reduce the load on your Web server. Many of these points were made earlier in section 10 on Design and Layout. They bear repeating here. They should be checked as part of your website maintenance program as your site and checking as your website is revised, redesigned, and updated.

12.9.1 Image sizes

Use the smallest file you can to provide reasonable resolution at the scale at which the image is displayed.. Don't squeeze a large image file in to a small space. The large image will take longer to download and will not improve the quality of the image viewed on the page. Consider using a low resolution image on the page with the option of downloading a higher resolution image if more detail is desired.

12.9.2 Website loading times

Periodically test how long it takes for your web pages to load, especially if you have upgraded the CMS to a new version or made major revisions in the content of the page. Make sure that load times are still reasonable. Keep the site footprint small. Single web pages should be smaller than 150KB. Ensure that users are only downloading the required files, images, and scripts to render the page. Bear in mind that many people still do not have access to high-speed broadband service.

Use the Firefox Web browser add-on, called Firebug Web Developer tool,⁶⁰ to check your website footprint and to minimize script downloads. Don't include unnecessary JavaScript code on every page. Be selective.

12.9.3 Problem detection

Check Web analytics for your website. In addition to information useful for improving website usability and improving search engine optimization, web logs and user statistics provide useful information about website problems. Broken links and hacking attempts may show up on these reports. In addition, if your website is increasing in popularity, the site analytics will provide information about the number of visitors, file usage, and trends over time. You may need to

⁶⁰ Firebug available online at <http://getfirebug.com/> [Accessed 15 September 2009]

increase bandwidth and storage limits on your host's server and upgrade the level of your service. This is best done well in advance of a growth in demand for services.

12.9.4 Other suggestions to improve performance

Other actions also may help improve the users' experience with your website:

- Use the proper file type (GIF, JPG, PNG) for each image type.
- Use table-less layouts to reduce HTML markup.
- Separate CSS style sheets from the body of the HTML markup.
- Reduce video file sizes by trying different compression programs
- Use a third-party website, like YouTube, to reduce the storage and bandwidth burdens on the host site.
- Insert CSS or JavaScript in the header of your HTML.

Quality assurance of websites explicitly includes validation of HTML⁶¹, XML⁶², and CSS⁶³ coding. The more people who work on the site, the more often tests should be carried out to validate the coding and accessibility requirements. Use W3C's validation tools. As a matter of course, all deficiencies should be corrected as quickly as possible.

12.10 Search Engine Optimization (SEO)

Search engine optimization (SEO) was discussed in the Metadata chapter in anticipation of creating content. SEO is an art. It requires attention not only when the website is implemented but also when new content is written and added to the site. SEO is an ongoing activity that is an important part of website maintenance.

There's no single way to improve search engine results. However, there are a few ways to give your website a better chance of being ranked high in search engine results. These methods also increase the scent of information for the user.

⁶¹World Wide Web Consortium, *Markup validation service*. Available online at <http://validator.w3.org/> [Accessed 15 September 2009]

⁶²World Wide Web Consortium, *Validator for XML REC (20010502) version, as amended*. Available online at <http://www.w3.org/2001/03/webdata/xsv> [Accessed 15 September 2009]

⁶³World Wide Web Consortium, *CSS Validator*. Available online at <http://jigsaw.w3.org/css-validator/> [Accessed 15 September 2009]

The Pear Analytics website⁶⁴ offers a quick online assessment of your website at no cost. The analysis includes a printable report. At the very least, this can give you some idea of which aspects of your site might benefit from some changes.

12.10.1 Improving findability

Mention has already been made of the need to include significant keywords on each Web page to reflect the subject of the content. The following actions will help improve search engine results and your web pages' ranking with commercial search engines

- Create accurate titles of each web page that reflects its content and subject matter.
- Use descriptive and understandable file names in URLs for the Web pages on your site.
- Put keywords within the metadata tags of the HTML on each page
- Create meaningful and accurate headings and subheading for the text on a page that reflect content. Use the <H1>, <H2>, <H3> tags on the page to designate content structure but use them sparingly and only where appropriate.
- Place meaningful keywords in the body of text that reflect content
- Add ALT tags containing keywords to images and graphics.
- Use the correct HTML mark-up tags for content. If you have an address listed, enclose the address by using the <address> tag and format, using CSS to suit your site's theme.
- Avoid ambiguous words and phrases with dual meanings and synonyms that could cause misclassification by a search engine. Use a controlled vocabulary of index terms for the assignment of keywords
- Create a sitemap.xml file based on the Google sitemap standard⁶⁵ for search engines to index and provide an HTML version for the user.
- Promote your site on social media sites like Facebook when there is something significant to announce
- Blog about new content, events, workshops, and activities

⁶⁴Pear Analytics (2009). *Website analyzer*. Available online at <http://analyzers.pearanalytics.com/> [Accessed 16 September 2009].

⁶⁵Sitemaps.org available online at <http://www.sitemaps.org> [Accessed 15 September 2009]

- Don't forget to promote the website offline at meetings, workshops, and other events
- Don't forget to pay your domain name bill
- Provide a 404 'Page not found' web page with a useful message, but be careful not to let this page get indexed by search engines.

12.10.2 Limiting access by Web robots

One way to prevent '404' pages and other content from being indexed by search engines is to invoke the Robot Exclusion Standard⁶⁶, also known as the robots.txt protocol. This voluntary convention prevents cooperating web crawlers from accessing all or part of a website, that otherwise is publicly viewable. A robots.txt file placed on the website will tell specified robots to ignore certain files or directories, such as '404 Page not found', in their search.

12.10.3 Promoting your website

Marking part of your website out of bounds with robots.txt does not guarantee privacy, however. All pages on your site are publicly available, and their content can readily be viewed by anyone with a web browser. If a folder needs to be secure, then it should be protected by a password.

In the previous chapter, it was pointed out that by registering blogs and RSS feeds in multiple directories and tagging them with appropriate metadata, search engines will index these feeds and point to your site. If your feeds report on new or altered content, then this method makes sure that your new content is promptly indexed. Finally, by making sure that your site appears on social bookmarking sites and on social networking websites, you may be able to generate 'buzz' about your site and attract increased numbers of visitors. Each of these actions contributes to your site's ranking on a search engine results page.

12.10.4 South China Sea Project: a case study in search engine optimization

In 2002, the GEF initiated a seven country project entitled 'Reversing environmental degradation trends in the South China Sea and Gulf of Thailand.'⁶⁷ The project's goal was to foster regional collaboration among 400 regional and national institutions and organizations and to enhance the capacity of participating governments to integrate environmental considerations into national planning. The project has created a repository of more than 1,700 project documents and publications, online computer modeling tools, a collection of regionally specific training

⁶⁶ The Web Robot Page (2009). *A standard for robot exclusion*. Available online at <http://www.robotstxt.org/orig.html> [Accessed 15 September 2009]

⁶⁷ South China Sea project website. Available online at <http://www.unepscs.org/> [Accessed 15 September 2009]

materials and public awareness resources. As the project progressed it became clear to managers that the South China Sea (SCS) project website was an important tool to improve the flow of information and project news between partners and demonstration field sites and to share experiences learned during project implementation.⁶⁸

Lack of visibility. The problem the South China Sea project faced was how to improve awareness of the project and its considerable information resources. Review of the website analytics showed that visitors came to the website (1) directly using the site's URL, (2) using referral links from other websites, and (3) from search engine results. In general, the SCS managers found that awareness of the project on the websites of GEF implementing agencies needed much improvement. Internet traffic is high at those websites, which meant there was a good opportunity to guide visitors to the SCS website. The IW:LEARN website was well positioned, but the website itself was not visible from the implementing agencies websites nor from GEF itself. The limited metadata on the site that was associated with International Waters projects precluded the IW:LEARN site's ranking well in the results of technical, topic specific searches, such as 'mangroves and Thailand' or 'seagrass and China.'

Raising Awareness. To improve the ranking of the SCS website, the project installed software in 2007 on their CMS to permit the use of user friendly URLs for Web pages. The project made the following improvements:

- Significant keywords were added to the URLs of each web page
- Structure was redesigned in a hierarchical structure and links improved between sections of the site were established to encourage search engine indexing
- Meaningful keywords were used in the navigation menus, key sections of the site.
- All content was renamed using rich keyword content in the filenames
- Higher densities of important keywords were also added to web pages
- RSS feed was redeveloped to include the site's blog, new items on the home page, and project newsletter. The RSS feed ensured that new information was promptly indexed by search engines after it was posted.
- Efforts were also made to increase the engagement of users once they arrived at the website. A 'Highlights' section was established on the home page to hold visitors attention and a multimedia library of videos and photographs was added. To provide a more interactive experience, the project used the Google Earth platform to display a project layer showing the extent of coastal habitats and the

⁶⁸ Paterson, Christopher (2008). Connecting GEF projects with a global audience: outreach initiatives of the South China Sea project. *International Waters Experience Notes, 2008-001*. Available online at <http://www.iwlearn.net/publications/experience-note/> [Accessed 15 September 2009]

location of demonstration sites against a satellite image map of the region. Information bubbles for the location of demonstration sites provided access to key project information resources.

Results. Unexpectedly, Google Earth included the SCS application in the *Google Earth Showcase* in February 2008. This attracted 27,000 visitors during the week after Google announced the selection of the SCS site. Significantly, search engine ranking of the site went from about 100th place to among the top 10 of more than 8 million pages indexed for ‘South China Sea’. The effective use of Google Earth, the linking of the project with the global geographical search engine, and the content rich SCS website combined to increase traffic to the site. Visitors during the same April to June period increased from 53,600 in 2007 to 260,100 in 2008, a five fold increase. This is a clear indication of the benefits of thoughtful and systematic search engine optimization.

12.11 Usability testing

Usability testing was stressed in the website design phase. But usability testing is also part of website maintenance. Whenever the structure of your website is altered or you introduce new technology or new design elements, you should retest the site and seek input and feedback from users.

Web analytics needs to be carefully monitored, especially when the metadata or the structure of the website is altered. Even small changes, such as colour schemes or the placement of web page elements, may have unpredictable effects on the number of visitors, time on site, and browsing behaviour. Search engine optimization is an art that requires repeated iterations of change, measurement, and change to determine the effects of different schemes of metadata use and Web design.

12.12 Website maintenance checklist

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Appendix A

Website Checklist

The following checklist provides guidance to planning and implementing a GEF IW Project website. Nearly all the items in the list would improve the design of any website. The list has been assembled from a large body of literature, much of it available on the Internet, as well as books dealing with various aspects of Web design. These sources are listed in the References section.

The individual sections given in this master checklist also appear at the end of each chapter with the same name.

The items are grouped by the topics discussed in each chapter of the guidelines. Each group also appears at the end of the chapter about the given subject. A few checklist items are repeated in different sections. Each item has been labelled in **boldface type** to help you search for relevant guidelines.

Items with an (M) after the boldface label are mandatory for GEF IW projects. The rest are recommended practices.

Getting Started

Accessibility



Usability



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Metadata

- Do not start the title with ‘Welcome to...’ or use the words ‘Home page.’
- Begin the page title with keywords that the user will associate with the page, usually the organization name for the title of the home page.
- Use the GEF project name as part of the title of the home page.
- Avoid using the same first few words on each web page. Try to characterize the content of the page in the title.
- Limit titles to seven or eight words. Longer titles are less scannable.

Content

Documents



- If a document is available in multiple languages, include those versions on the website.
- If you have the language capability, translating the home page into several languages and allowing visitors to select their preferred language is highly desirable and user-friendly even when the rest of the site is in another language.

- Show the date prominently on the full story.
- Include news from partner organizations.
- Give visitors adequate warning if a PDF file will download when the link to it is clicked on.
- Be sure to optimize the PFD file to reduce its size.
- Describe the content of the document, title, author, publication date, and file size.
- If the content of a PDF document must be read online, convert it to a text file.

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Graphics

Multimedia formats

Information Architecture









Navigation





Design and Layout





Typography



Graphics

Multimedia

Datasets



Social Networking

- Discussion groups take a considerable amount of personal time and effort to maintain.
- Spam, pornography, blatant sales pitches, and significantly off-topic messages should be deleted BEFORE being posted.
- Messages should be monitored for viruses, spyware, and inappropriate content before being uploaded to the website.

Website Maintenance



- Specify the purpose of the link, the kind of feedback sought, and who will read it.

- Be sure to require the user's email address so that you can reply.

- If a question cannot be answered immediately, send the user an email saying that you have received the question and when to expect an answer.



- If you want the user to subscribe to your newsletter, provide a link to a sample newsletter. Be sure to tell potential readers the frequency of publication.
- If you collect email addresses, say so and provide a link to your privacy policy.



Appendix B

Taxonomy of Subjects for GEF International Waters Projects

A Environment and Natural Resources

A1 Geology

A21 Rocks and minerals

A22 Sedimentation

A23 Erosion and weathering

A2 Geography and Geomorphology

A3 Natural Hazards and Extreme Events

[Disaster preparedness and response is classified as V6]

A31 Earthquakes

A32 Tsunamis

A33 Volcanic eruptions

A34 Landslides and mudslides

A35 Floods

A36 Droughts

B Climate

B1 Meteorology and Weather

B2 Climate Change

C Water Resources

C1 Hydrology

C2 Surface water

C21 Rivers and streams

C22 Basins and catchment areas [watersheds]

C23 Lakes

C3 Groundwater

C4 Transboundary waters

C5 Water quality

[Polluted or contaminated freshwater is classified as M3]

[Ocean water quality is classified as Seawater quality: F7]

C6 Water resources management

C7 Hydraulic structures

D Terrestrial Landforms and Landscapes

D1 Deserts

D2 Forests

D3 Mountains

D31 Volcanoes

D4 Wetlands

D41 Tidal Marshes and Salt Marshes

D5 Coastal landforms

D51 Beaches

D52 Deltas

D53 Lagoons

D6 Islands

E Oceans and Seas

E1 Marine Protected Areas

E2 Territorial waters

E3 Nearshore environment

E4 Marine landforms

[Coral reefs and atolls are classified under Marine ecosystems: F41]

E41 Seamounts

E42 Trenches

F Habitats and Ecosystems

F1 Terrestrial habitats and ecosystems

F2 Freshwater habitats and ecosystems

F3 Coastal habitats and ecosystems

F4 Marine habitats and ecosystems

[Marine Protected Areas are classified under Oceans and Seas: E1]

F41 Coral reefs and atolls

F42 Fisheries

F5 Ecological dynamics

F6 Habitat modification

F7 Biodiversity

F8 Habitat and ecosystem management

F81 Endangered species conservation

G Plants

[Agricultural crops are classified under Agriculture: J13]

G1 Trees

G2 Shrubs

G3 Grasses (including seagrasses)

G4 Mangroves

H Animals

H1 Microorganisms

H2 Macroinvertebrates

H3 Mollusks

H4 Crustaceans

H5 Reptiles

H6 Amphibians

H7 Fish

H8 Birds

H9 Mammals

H91 Marine mammals

J Land Use

J1 Agriculture

J11 Soils

J12 Forestry

J13 Crops

J14 Animal production

J15 Aquaculture

J2 Urban and suburban environments

J21 Buildings

J22 Coastal development

J23 Rural development

J3 Ports and Harbors

J4 Airports

J5 Land degradation

J51 Deforestation

J52 Desertification

J7 Recreation and tourism

J71 Sport fishing

J72 Boating

[Cruise ships are classified under Transportation: K13]

K Industrial and Military Activities

K1 Transportation

K11 Shipping

K12 Pipelines

K13 Cruise ships and passenger vessels

K14 Roads

K15 Rail transport

K16 Air transport

K2 Petroleum Industry

K21 Oil drilling

K22 Drilling platforms

K3 Mining

K31 Deep-sea mining

K4 Manufacturing

K5 Military activities

M Environmental Pollution

M1 Water pollution [freshwater]

M13	Industrial pollution
M32	Nonpoint source pollution
M33	Ground water pollution
M34	Surface water pollution

M2Coastal pollution

M3Marine pollution

M31	Sewage discharges (from ships)
M32	Garbage scows
M33	Oil spills
M34	Solid wastes
[Solid wastes on land are classified under Waste management: N2]	
M37	Land-based pollution

M4Air pollution

M5Pollutants

M51	Nutrients
M52	Metals and metallic compounds
M53	Hazardous and radioactive substances
M54	Solid wastes and litter
M55	Persistent organic pollutants
M56	Pharmaceuticals
M57	Pesticides and fertilizers

M6Pollutant transport

M61	Atmospheric deposition
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M7Thermal pollution

M8Noise pollution

M9Light pollution

N Waste Management

N1 Water treatment

N2 Solid waste management

N3 Hazardous wastes

N4 Wastewater treatment

P Energy

Q Data Collection and Analysis

Q1 Data collection

- Q11 Surveys and mapping
- Q12 Remote sensing and aerial imagery
- Q13 Laboratory analyses
- Q14 Bathymetry
- Q15 Animal studies
- Q16 Human behaviour and opinion studies
- Q17 Environmental monitoring
- Q18 Literature reviews

Q2 Data analysis and interpretation

- Q21 Mathematical and statistical analysis
- Q22 Modelling
- Q23 Economic analysis
- Q24 Environmental impact assessment

Q3 Program and project evaluation

Q4 Information technology and management

- Q41 Databases

Q5 Geographic information systems (GIS)

Q6 Information resources

Q7 Environmental problems overviews

Q8 Case studies

R Law

R1 Intergovernmental agreements and conventions

R2 Law of the Sea

R3 Water law

R4 National, state, and local legislation

R5 Regulations and regulatory compliance

S Governance

S1 Planning and decision-making

S2 Policy

S21 Environmental policy

S3 Public participation

S4 International organizations and programmes

T Economics

T1 Environmental economics

T2 Socioeconomic impacts

T3 Funding and finance

T31 Public-private partnerships (PPPs)

U Human Aspects of Environmental Management

U1 Environmental management and protection

[Environmental policy is classified under Governance: S21]

U11 Pollution prevention and control

U12 Site cleanup

U13 Land reclamation

U14 Natural resources conservation

U2 Health and Sanitation

U3 Population and population characteristics

U4 Sustainable development

U5 Human behavior and attitudes

U6 Disaster preparedness and response

U7 Education, training and capacity building

[Socioeconomic impacts is classified under Economics: T2]

Appendix C

Taxonomy of Document Types for GEF International Waters Projects

Administrative Documents

Project preparation materials

Any documents used to prepare the project proposal including miscellaneous surveys and reports, some of whom may be prepared by contractors.⁶⁹

Project Concept Paper

A preliminary description of the project intended to gather support. May include any or all of the following:

Project Identification Form (PIF) – A short, 4-page project concept document that initiates the GEF project cycle and Endorsement Letter.

Program Framework Document (PFD) – Document describing the objective and scope of the program and list of PIFs that will be funded under the PFD.

Project Preparation Grants (PPG) – A proposal for a grant to cover the preparation costs of a Project Document (PD). The PPG may be submitted to GEF at the same time as the PIF but will not be approved unless the PIF is approved.

Project Document (PD)⁷⁰

A Project Document is prepared for each project proposed for GEF financing and describes the operation and setting forth the GEF's appraisal and assessment of the feasibility of, and justification for, the project. Program Document is accompanied by an Endorsement Letter. []

Project Brief – A brief description of the project and financing.

⁶⁹Depending on the content some of these materials may be better classified as *Technical Reports*.

⁷⁰The term *Project Document* is often loosely used to include a variety of project documents including Project Briefs, Project Information Documents, Grant Applications, Proposed Work Plans, etc.

Project Document for Work Plan (WP) – Usually a Project Brief and a proposed Work Plan

Project Appraisal Document (PAD)

PADs are form-based documents that present concise presentation of the information needed to approve a project for financing. When project application processing and the Project Appraisal Document are complete, the project is sent for approval under cover of a Memorandum & Recommendation, usually no more than one page in length. that contains only the information necessary to transmit the Project Appraisal Document.

Project Appraisal Data Sheet

Information sheet to accompany the Project Appraisal Document (PAD)

Project Implementation Plan (PIP)

A description of how the project will be implemented and executed.

Project Implementation Review (PIR)

A review of the Project Implementation Plan (PIP)

Project Executive Summary

Monitoring & Evaluation Documents (M & E)

Annual Status Report

Status reports may be submitted quarterly, semi-annually, or annually and describe accomplishments of the project during the reporting period.

Annual Work Plan

Annual work plans describe the project work to be accomplished in the next year.

Annual Performance Reports (APR)

Performance reports based on the status reports and work plans.

Policy Steering Committee Meetings

Agendas, minutes, background documents etc. for particular meetings

Technical Steering Committee Meetings

Agendas, minutes, background documents for particular meetings

Project Financial Management Assessment

Assessment of the management of the project funds and expenditures.

Project Procurement Assessment⁷¹

Project Review Sheets

Project Information Document (PID)

The PID presents a brief summary of the main elements of the project, with updates as new information becomes available. The PID is updated before each formal project appraisal and also revised after the appraisal, if necessary.

Mid-term Evaluation

At the project level, the mid-term evaluation assesses progress, identifies challenges, and facilitates changes to improve achievement of project objectives.

Implementation Completion Report (ICR)

Implementation Completion Reports review the results and assesses a project and provides relevant information concerning their management.

Project Performance Assessment Report (PPAR)

PPARs are based on the review of the Implementation Completion Report (ICR)—a self-evaluation by the project. To prepare PPARs, staff examine project files and other documents, interview project staff, and in most cases visit the project country or countries for onsite discussions.

Final Project Report⁷²

Terminal Evaluation (TE)⁷³

The Terminal Evaluation is an assessment of project outcomes and impacts, conducted for all projects. Findings can be used for improving the design of subsequent projects; positive findings or practices can be shared or replicated in other projects.

⁷¹ Also called Project Procurement Capacity Assessment

⁷² Also called a Final Project Document or a Final Project Summary

⁷³ Also called a Final Evaluation

Legal Conventions and Agreements

Strategic Action Programme (SAP)

A SAP is an agreement among participating countries on actions needed to resolve priority threats to international waters, including actions for the national benefit of each country, actions addressing transboundary issues and institutional mechanisms at regional and national level for implementation of those actions.

Scientific, Technical & Reference Documents

Transboundary Diagnostic Analysis (TDA)

Transboundary Diagnostic Analyses are science-based analyses of transboundary water-related concerns and opportunities that exist in multi-country surface water, ground water, and coastal/marine water systems. They are used to identify priorities for joint action, root causes and scope for the concerns or opportunities, and serve as the basis for reforms and investments included in the action programmes.

Technical reports

Technical reports – Reports, working papers, technical contractor reports published for the project

Journal articles – Reports published in peer-reviewed journals

Technical meeting presentations – Both text of papers and PowerPoint presentations (including poster presentations) as well as printed conference proceedings

Books – Including eBooks and microforms

Lessons Learned and Experience Notes

Case studies and examples of best management practices and lessons learned prepared by projects for these series of reports.

Reference manuals

Includes 'How-to' instructions

Glossaries

Bibliographies or References Cited

Includes lists of hyperlinks to other Web sites with technical content

Geographic Information System (GIS) Maps and Datasets

Statistical data, surveys, and datasets

Graphic Images

Charts, diagrams, technical drawings, maps

Photographs

Video recordings

Sound recordings – MP3, audio CDs, audiotapes, Podcasts, etc.

Outreach and Public Education Documents

Brochures

E-Bulletins and newsletters

Mailing lists

Press releases and news reports

Policy briefs

Press conference statements and recordings

Project fact sheets

Website FAQ files

Newspaper & magazine articles

Educational graphic images

Drawings, cartoons, posters, photographs, charts, or diagrams

Educational videos

Educational sound recordings

MP3, audio CDs, audiotapes, Podcasts, etc.

Event-Related Documents

Calendars and Meeting announcements

Proceedings of conferences, workshops, seminars, etc.

Multiple presentations collected and published as books, CDs, or DVDs. Individual scientific papers presented at meetings should be classified as *Technical Meeting Presentations* under **Technical Reports**

Nontechnical Presentations (e.g., Plenary speeches)

Scientific papers should be categorized as *Technical Meeting Presentations* under **Technical Reports**

Committee reports

Training courses

Field trip guides

Photographs, videos, and sound recordings of the event

Publicity photos are categorized with **Press releases**

GEF International Waters Conferences

Agendas and proceedings (papers presented, speeches, PowerPoint presentations, slide presentations, handouts, videos, and sound recordings of presentations, etc.)

Organization Documents

Official Policy Statements

Policy briefs and press conferences are classified under Outreach and Educational Documents: *Press releases, news reports and publicity*

Organization charts & related documents

Office & personnel directories

Job announcements

Human resources documents

Online Services

Website Toolkit (Plone)

Forums & blogs

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