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USES, VALUES, STAKEHOLDERS, AND OPINIONS ASSOCIATED WITH MARINE PROTECTED AREAS: A CONTENT ANALYSIS OF NEWS MEDIA, 1995-2001

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ABSTRACT

The concept of marine protected areas is currently under scrutiny by members of the U.S. Congress, coastal natural resource management agencies, special interest stakeholder groups, and the public. As a surrogate for public opinion polls, a media content analysis was performed for news stories related to marine protected areas. The analysis examined more than 25,000 on-line newspaper, news wire, and radio and television broadcast news stories from 1995 to 2001 for expressions of four broad categories of uses and values associated with marine protected areas, expressions of favorable and unfavorable attitudes associated with marine protected areas, and the stakeholder groups involved in the discussion. Ecological uses and values were expressed more often than social, recreational, and commercial uses and values. Favorable attitudes were expressed more frequently than unfavorable attitudes. Over the period of analysis, 1995 to 2001, a gradual upward trend was found in frequencies of expressions of ecological, social, recreational, and commercial uses and values. A gradual upward trend was found for relative frequency of favorable attitudes and a gradual downward trend for unfavorable attitudes. For the five broad stakeholder groups, marine protected areas were mentioned most frequently in connection to government, followed by nongovernmental groups, the public, industry, and academia. This paper describes the study methods and findings of the analysis, and offers management implications and considerations for future research.

BACKGROUND

On May 26, 2000, President Clinton signed Executive Order No. 13158 on Marine Protected Areas. Marine protected areas, as defined in section two of the executive order, include "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." (Executive Order No. 13158 2000) The purpose of the executive order is to "help protect the significant natural and cultural resources within the marine environment for the benefit of present and future generations by strengthening and expanding the Nation's system of marine protected areas (MPAs)." (Executive Order No. 13158 2000)

Efforts under way pursuant to several sections of the executive order include the creation of a MPA Advisory Committee, an inventory of current MPA sites, a national MPA Web site, and a National MPA Center in Washington, DC. The National MPA Center was established by the National Oceanic and Atmospheric Administration (NOAA) to coordinate, in cooperation with the Department of the Interior (DOI) and other partners, the implementation of the executive order "to develop a framework for a national system of MPAs, and to provide Federal, State, territorial, tribal, and local governments with the information, technologies, and strategies to support the system." (Executive Order No. 13158 2000) Within the responsibilities of the National MPA Center, two regional institutes have been

established—the MPA Science Institute, in Santa Cruz, California, and the MPA Training and Technical Assistance Institute, housed at the NOAA Coastal Services Center in Charleston, South Carolina.

Staff at the NOAA Coastal Services Center conducted a content analysis of news media stories related to marine protected areas as a component of a larger assessment of needs. The intent of the analysis was to examine the public discourse to identify overall attitudes, uses and values, and stakeholder groups commonly associated with marine protected areas.

Content Analysis

Content analysis is the systematic quantitative analysis of communication content (Bengston 2000; Holsti 1969; Krippendorf 1980). Content analysis is used to determine the presence of specific terms or concepts in a text or set of texts and to infer meaning from such content in a given context. Analysis of manifest content, where the meaning is obvious, involves quantifying only the clearly recognizable terms or phrases present in the text. Analysis of latent content, where meanings are less apparent or indirect, involves further examination of the context in which terms are used and the relationships formed between more than one term to create new meanings (e.g., not + effective = ineffective). The media analysis described here used both methods, analyzing manifest content via simple word counts and assessing latent content by examining combinations of terms.

Content analysis can be conducted in two ways—either by hand or with the aid of a computer. Hand content analysis requires one or more individuals to read texts and code the terms that are of interest. Coding of terms involves categorizing terms according to the concepts of interest that they represent. Hand content analysis is appropriate for small volumes of text, such as interviews, courtroom transcripts, and speeches, and has been widely used to review public comments on natural resource management plan documents. Hand content analysis is subject to reliability disadvantages such as individual "coder" bias and coding inconsistency across groups of individual coders—that is, different individuals may interpret terms and meanings differently, and thus coding inconsistencies can occur. In contrast, computer-assisted content analysis allows analysis of large volumes of text, is less susceptible to coder bias once instructions have been written, and can reliably replicate the coding of texts with no variation.

The increasing availability of mass media text in digital format (e.g., on-line) in recent years has made computer-assisted content analysis of mass media possible, offering a number of distinct advantages over traditional methods for assessing public opinion (e.g., polling, surveys). Computer-assisted content analysis enables timely acquisition and analysis of digital textual data. Unlike traditional polls and surveys, computer-aided content analysis provides an unobtrusive means of data collection. In addition, analyses can be easily updated to modify the content or geographic scope, to search for additional concepts within the text, to include new data sources as they come on-line, or to query the same sources numerous times. Finally, computer content analyses can be extended back in time to follow opinion time trends related to natural resource policy changes or replicated in the future to facilitate periodic monitoring of opinions.

The News Media

Bengston and Fan (1999a) state that discussion and debate of natural resource management issues and public policy occur in several forums in society—the courts, legislatures, meetings and hearings, and protests and confrontations. The media presents information from all of these forums and provides an additional forum through direct reporting and interactions with the audience (e.g., via letters to the editor) (Bengston, Fan, and Celarier 1999). George Gallup, founder of the Gallup Poll in the 1930s, suggested that the media has replaced the town meeting of yesterday by "presenting information and argument on both sides" (quoted in Bengston, Fan, and Celarier 1999) of issues as they are debated in the public eye. Ansolabehere, Behr, and Iyengar (1993) discuss how the media both reports and influences the opinions of the public. Several studies have shown that the news media is the most important source for people for information about the environment (Detjen 1995; Ostman and Parker 1987; Rogers, Dearing, and Bregman 1993; Shindler, Steel, and List 1996; K. M. Wilson 1995). Other studies have shown the influence of the news media on public opinion (Ader 1995; Anderson 1997; Gamson and Modigliani 1989) and the political agenda (Fan 1988; Fan, Brosius, and Kepplinger 1994; Protess et al. 1987). Computer-assisted content analysis has been used numerous times for natural resource planning, public opinion assessment, and policy analysis (Allen, Bengston, and Fan 2000; Bengston and Fan 1999b; Pierskalla and Anderson 2000;

Schroeder 1996) and has been shown to be an effective and reliable substitute for public opinion polls and attitude surveys (Fan 1994b; Fan and Tims 1989; Lindenmann 1983). It follows that content analysis of media related to MPAs would serve as an effective indirect method for assessing public opinions associated with MPAs.

METHODS

The objectives of content analysis are to identify, categorize, and quantify terms, phrases, and expressions in the text that represent the concepts of interest for a given investigation. For the analysis discussed here, the concepts of interest included uses, values, stakeholders, and favorable and unfavorable expressions associated with MPAs. The analysis involved several steps including selecting news sources, downloading text, filtering out extraneous paragraphs, coding text, and testing validity. The steps are described below.

Capturing the Media Text

The first step was to define the scope of the analysis. The analysis was designed to assess concepts associated with MPAs from news media stories available on-line. The dates from which news stories were selected and the target terminology used to "capture" the stories for download determined the extent of the news media to be analyzed. The time period selected was January 1, 1995 to June 30, 2001.

The next step was to select the media sources and media types. The news stories included in the analysis comprised stories from 111 news sources, including national, regional, and local newspapers (e.g., *Anchorage Daily News*, *Los Angeles Times*, *Miami Herald*, *USA Today*, *Christian Science Monitor*), news wire services (e.g., Associated Press, United Press International), and radio (e.g., National Public Radio) and television news (e.g., CNN News) broadcast transcripts. The unit of analysis was paragraphs. Only U.S.-based English language news sources with full text (i.e., only complete stories, not excerpts) were selected, and only sources that had had continuous coverage for the selected time period—January 1, 1995, to June 30, 2001—were used. The amount of text downloaded for each paragraph included the 100 words surrounding any of the designated search terms (i.e., 50 words on either side of each designated search term in any paragraph). Capturing more than 50 words on either side of a target term does not enhance the ability to extract meaning from the text relative to the target term (Fan 2001, personal communication). A customized interface for searching and downloading textual data from the commercial databases LEXIS-NEXIS and DIALOG was used to retrieve the text for the analysis.

Given the numerous management authorities and types of managed areas associated with marine and coastal resource management, a comprehensive "search string" (i.e., a set of key words, names, or phrases) was created that reflected different coastal and marine areas and the breadth of responsible management agencies and management units listed in the executive order. One potential limitation of this method of selecting news stories was that protected areas that have not traditionally been referred to using terms associated with marine protected areas (e.g., state parks, waterfowl production areas), but which fit within the definition put forth in the executive order, might not be selected unless the appropriate descriptor terms were present in the text (e.g., "coastal" + "state park"). To address this limitation in part, the comprehensive search string had to include the names of all management units listed within the National MPA Center's MPA Inventory of marine protected areas (Table 1) as well as descriptive terms about coastal and marine managed areas that might not be listed by name. Prior to the initial use of the InfoTrend software, staff at the NOAA Coastal Services Center met to brainstorm possible target terms and phrases useful in capturing the desired news media stories. Staff identified terms related to "marine" (e.g., salt water, marine, seashore, estuary, beach), "protected" (e.g., protection, restricted, management, wilderness, preservation, restoration, conservation), "area" (e.g., zone, area, reserve, preserve, sanctuary, park, refuge), and combinations of these terms (e.g., marine reserve, national seashore, critical habitat, fishery management zone). Many of these terms were used in combination with terms listed in the executive order—federal (e.g., National Marine Sanctuaries, National Seashores, National Wildlife Refuges), federal-state partnership (e.g., National Estuarine Research Reserves), state and territorial, tribal, and local marine protected areas—to create the search string used to capture text from the media sources.

The comprehensive set of terms used to query the online media databases comprised a Boolean search string, which allows the combination of many search terms by using operator terms such as "AND" or "OR." Prior to the full download of stories, several small trials were undertaken to assure that the stories captured included stories related to the broad array of MPAs. The process is iterative and allows testing and

Table 1. Current National MPA Center Inventory of Marine Protected Areas

Agency/ Program	Number of Sites
Federal	
NOAA/National Marine Sanctuaries	14
NOAA/National Marine Fisheries Service	27
Department of Interior/National Park Service	39
Department of Interior/Fish and Wildlife Service	162
Federal-State Partnerships	
National Estuarine Research Reserve System	25
State	
Maine	22
Massachusetts	19
Territorial	Not yet inventoried
Tribal	Not yet inventoried
Local	Not yet inventoried

(Source: www.mpa.gov [January, 2002])

refining of the search string until it consistently captures stories representative of the breadth of MPAs targeted for the analysis. Following this testing phase, a full download of stories was completed overnight yielding 59,730 stories. The search term yielded stories that contained specific national management units listed by name (e.g., Florida Keys National Marine Sanctuary), as well as those MPAs that have more generic descriptions and management units that occurred in close proximity to a coastal or marine or estuarine descriptor word (Table 2).

Filtering the Text

Once the download of text was complete, the next step was to "filter" the text to remove extraneous paragraphs using the patented media analysis software application InfoTrend (Fan 1990; 1994a). The InfoTrend software uses a sophisticated command language called FILTSCOR, which enables the analyst to create "dictionaries" containing terms and phrases that represent concepts of interest for the analysis. A dictionary of irrelevant terms and phrases was created to enable the InfoTrend software to filter out paragraphs containing irrelevant information—that is, paragraphs that were captured in the download of stories, but that contained MPA terms in a false context, such as the "U.S. Marine Reserves," or those that contained only incidental mention of the MPA terms, such as numerous news stories about a young boy, "Jessie," who sustained a shark bite in Gulf Islands National Seashore.

Numerous iterations were performed on random selections of 100 stories during the creation of the irrelevant word filter dictionary. The iterative process can continue ad infinitum, but one reaches a point, where as the law of diminishing returns (Spillman and Lang 1924) suggests, additional effort (e.g.,

Table 2. Boolean Search String Used for Downloading News Stories from Commercial Databases

Boolean Search String
(((ESTUAR! OR COAST! OR REEF OR OCEAN! OR SEA OR AQUATIC) W/5 (STEWARDSHIP OR MANAGEMENT OR MANAGED OR MANAGE)) OR (NATIONAL PRE/1 (SING(MARINE) OR SEASHORE OR LAKESHORE OR ESTUAR!)) OR ((AQUATIC OR SING(MARINE) OR COASTAL OR REEF) PRE/1 (CONSERVATION OR SANCTUAR! OR PRESERV! OR RESERVE OR PROTECTED OR PARK OR REFUGE OR MANAGEMENT OR MANAGED)) OR (((NATIONAL WILDLIFE REFUGE) OR (NATIONAL PARK) OR (NATIONAL MONUMENT)) W/P SING(MARINE) OR COAST!)))

trials) does not yield significantly better results. Once the analyst was satisfied with the ability of the software to reliably filter out recurring extraneous terms, the entire database of nearly 60,000 stories was filtered. After this process, approximately 26,000 stories remained, containing 45,523 paragraphs related to MPAs.

The Coding Scheme

The next step involved development of a coding scheme—the process by which the content of the text is coded. The coding scheme is "the heart of any content analysis" (Bengston and Xu 1995). Development of the coding scheme includes the creation of dictionaries and "idea transition rules" (Bengston, Fan, and Celarier 1999) for the analysis. As mentioned above, dictionaries are lists of terms and phrases that represent the concepts of interest for an analysis. Idea transition rules are computer commands that specify how terms from the different dictionaries are combined to reflect additional concepts of interest for the analysis. For example, a "fishing" term might be combined with a "commercial" term to create a "commercial fishing" term.

The irrelevant term dictionary described above contained terms and phrases that the analysts wished to exclude from the analysis. The remainder of the dictionaries contained terms and phrases that the analysts wished to use to extract the meaning of the text for the analysis. Terms that comprised the various dictionaries served as representatives for each particular concept of interest. With content analysis, one can begin with a defined set of ideas or concepts that one might hope to uncover more information about, or one may rely solely on the text itself to bring forth the dominant concepts. As mentioned earlier, staff at the NOAA Coastal Services Center convened a group to list terms and ideas pertaining to marine protected areas—including terms pertaining to "marine," "protected," and "area" independently. The list that was generated was large and provided a good reference for the analysts as they created the dictionaries. However, in the end, the analysts relied less upon the predetermined list and more upon the content of the text itself, as the concepts were limited to the ideas expressed in the text.

The creation and refinement of the concept dictionaries and idea transition rules that comprise the coding scheme involved numerous trials to determine if the coding scheme would code the concepts of interest in the text in a consistent and reliable fashion. The InfoTrend software allows the analyst to view the application of the coding scheme to the paragraphs of text in real time on the computer screen. This reduces the time necessary for refinement of the coding scheme by allowing the analyst to change and reapply the coding scheme to paragraphs until the software coding satisfactorily reflects the desired coding scheme without waiting for printouts and poring over printed text and computer code.

Validity Analysis

The final step before the InfoTrend software rules were applied to the entire database was a validity analysis. After the dictionaries and idea transition rules were refined, a random sample of 100 stories (207 paragraphs) was coded by hand by the analyst and by the InfoTrend software. The intent of the validity analysis was to determine if the InfoTrend–based coding scheme would provide valid and reliable results that reflect how a human coder would code the paragraphs. As the software codes the concepts of interest in the text, it creates scores for each paragraph for each of the concepts of interest for the analysis. The resultant coding values from the software and the human coder were compared. A rule of thumb for computer content analysis is to achieve an 80 percent accuracy rate for computer-based coding (Bengston, Fan, and Celarier 1999). In this validity analysis, the software coded the paragraphs accurately (i.e., hand coding scores and software coding scores were in agreement) 89.9 percent of the time.

Scoring the Text

Once the validity analysis was completed, the coding scheme dictionaries and idea transition rules were used to analyze all 45,523 paragraphs in the filtered database. The InfoTrend software compared terms in the dictionaries with terms in the text, coded each occurrence according to the associated concept dictionaries and idea transition rules, and generated values for each paragraph. Depending on the concepts one wishes to analyze, the software will either code terms independently (i.e., manifest content) or combine terms according to the idea transition rules to extract more complex meaning (i.e., latent content) from the text. Table 3 shows four example paragraphs in their original form and the resultant coding by the InfoTrend software. Each term found in the text that corresponds to a term in an idea dictionary is tagged within the text (i.e., numbered and underlined). Each tagged term is coded according to its respective concept dictionary (e.g., social, ecological). Based on the InfoTrend

Table 3. Example Text from News Sources and Resultant Coding by InfoTrend Software

Text from *The Los Angeles Times*, January 21, 2001 **(Source: Trautwein 2001)**

[Paragraph 2] "...I strongly support protection of our oceanic resources and fisheries by placing at least 40% to 50% of the Channel Islands National Marine Sanctuary into a marine reserve system."

[Paragraph 10] "...fish and game and the Channel Islands Marine Sanctuary advisory council should embrace the scientists' recommendations to prevent extinction while ensuring that fisheries are available for commercial and recreational harvests for many generations to come."

Text coded by InfoTrend software

!2 i strongly{1} support} protection of our oceanic resources and{2} fisheries } by placing at least 40 % to 50 % of the channel islands national marine sanctuary into a marine reserve system .

ORIG TEXT EQ>>> 9 {1=ProMMA} 41 {2=Ecological} 97

*** FOUND: ProMMA=1 Ecological=1

!10{1} fish } and game and the channel islands marine sanctuary advisory council should embrace the{2} scien}tists ' recommendations to prevent extinction while ensuring that{3} fisheries } are available for{4} commercial } and{5} recreational }{6} harvest}s for many{7} generation}s to come .

ORIG TEXT EQ>>> 0 {1=Ecological} 77 {2=SciRschEduc} 61 {3=Ecological} 24 {4=Commercial} 13 {5=Recreational} 12 {6=ComFisheries} 15 {7=CultValues} 17

ComFisheries E 30 Recreational RecFisheries R 3

DONE RULE 3>>> 0 {1=Ecological} 77 {2=SciRschEduc} 61 {3=Ecological} 24 {4=Commercial} 13 {[RecFisheries]} 12 {6=ComFisheries} 15 {7=CultValues} 17

RecFisheries E 30 Commercial ComFisheries R 6

DONE RULE 6>>> 0 {1=Ecological} 77 {2=SciRschEduc} 61 {3=Ecological} 24 {[ComFisheries]} 13 {[RecFisheries]} 12 {6=ComFisheries} 15 {7=CultValues} 17

*** FOUND: CultValues=1 ComFisheries=2 RecFisheries=1 SciRschEduc=1 Ecological=2

Text from *The Palm Beach Post*, February 24, 1997 **(Source: King 1997)**

[Paragraph 5] "...but after a delay much longer than anyone expected, the blueprint for protecting the Florida Keys National Marine Sanctuary is far weaker than what supporters once envisioned."

[Paragraph 7] "...much of the sanctuary's efforts will go to teaching people how to protect the coral, and conducting research that may lead to tighter rules and eventual solutions."

Text coded by InfoTrend software

!5 but after a delay much longer than anyone expected , the blueprint for protecting the florida keys national marine sanctuary is far weaker than what{1} support}ers once envisioned .

ORIG TEXT EQ>>> 123 {1=ProMMA} 24

*** FOUND: ProMMA=1

!7 much of the sanctuary ' s efforts will go to{1} teach}ing{2} people} how{3} to protect} the{4} coral} , and conducting{5} research} that may lead to tighter rules and eventual solutions .

ORIG TEXT EQ>>> 34 {1=SciRschEduc} 8 {2=Social} 9 {3=Conservation} 12 {4=Ecological} 18 {5=SciRschEduc} 53

*** FOUND: Conservation=1 Social=1 SciRschEduc=2 Ecological=1

software rules established by the analyst, the terms representing each concept of interest for the analysis are tallied to provide a score for each paragraph. However, not all tagged terms are reported in the paragraph values; only values for concepts that will be used in the analysis are reported. The values reported at the end of the selections (i.e., "`*** FOUND:`") reflect the frequencies of occurrence for each concept of interest in the paragraph. For example, for paragraph two from the first selection in Table 3 (Trautwein 2001), the paragraph score included one favorable term (i.e., "`ProMMA=1`") and one ecological term (i.e., "`Ecological=1`"). The paragraph scores are used for the analysis. The InfoTrend software required more than eight hours to code the database of text using the coding scheme dictionaries and idea transition rules. The resultant output was a delimited text file that can be viewed in spreadsheet, database, or statistical software packages.

DISCUSSION OF FINDINGS

The analysis of paragraphs yielded results for each of the seven chief concepts of interest—favorable and unfavorable; commercial, social, recreational, and ecological uses and values; and stakeholders. Additional tabulation of specific terms was conducted during the dictionary and idea transition rule development phase. The results for each concept category are presented below along with basic frequency counts for a number of MPA-related terms.

Frequency of MPA-Related Terms

Independent searches for specific terms from a large sample (44,001 paragraphs) of the database were conducted during the dictionary and idea transition rule development phase to tabulate the frequency of occurrence of a variety of terms used widely by coastal natural resource managers (Table 4). This exercise aided analysts in determining whether including specific individual terms related to MPAs in the InfoTrend software concept dictionaries and idea transition rules would yield high or low numbers of paragraphs. Additionally, this exercise provided insight about the frequency of occurrence of several important terms. A majority of paragraphs contained U.S. Department of Interior terms. National Park Service terms (e.g., National Park, National Seashore, National Lakeshore) occurred in 22,700 paragraphs. The term "national wildlife refuge" occurred in 3,343 paragraphs. The term "sanctuary" or "sanctuaries" occurred in 4,858 paragraphs, whereas the term "National Oceanic and Atmospheric Administration" or "NOAA" occurred in only 398 paragraphs. The term "marine protected area" or "MPA" occurred in only 260 paragraphs. The term with the lowest frequency of occurrence among the terms the analysts searched for was "marine managed area," which occurred in only 4 of 44,001 paragraphs.

Table 4. Frequency Count of Terms from a Sample of MPA-Related News Story Paragraphs

Term or Phrase	Number of Paragraphs[1]	Percent of Sample (%n)[2]
Department of Interior		
National Park Service: National Park or National Seashore or National Lakeshore or National Monument	22,700	51.6
U.S. Fish and Wildlife Service: National Wildlife Refuge	3,343	7.6
Department of Commerce		
National Oceanic and Atmospheric Administration or NOAA:	398	0.9
National Marine Fisheries Service or NMFS	268	0.6
Sanctuary or sanctuaries	4,858	11.0
Marine reserve(s)	1,616	3.7
Marine protected area(s) or MPA(s)	260	0.6
Marine managed area(s)	4	0.01

[1] News media story paragraphs from January 1, 1995, through June 30, 2001.

[2] n=44,001

Favorable and Unfavorable Expressions

For the favorable and unfavorable concept analysis, favorable expressions occurred overall more frequently than unfavorable expressions. A gradual upward trend was found for favorable expressions and a gradual downward trend was found for unfavorable expressions. However, only a small percentage (i.e., less than 14.0 percent maximum) of the overall 45,523 paragraphs contained favorable or unfavorable expressions toward MPAs (Figure 1). Favorable and unfavorable expressions are typically relatively small in media content. The fact that on average 3.9 and 8.1 percent of paragraphs contained unfavorable and favorable expressions per quarter, respectively, over 26 quarters suggests that these expressions do not pervade the majority of media coverage related to MPAs.

Use and Value Expressions

The analysis of use and value expressions contained four main concepts—ecological, social, recreational, and commercial. Overall, ecological expressions had the highest frequency of occurrence, occurring in nearly 50 percent of all MPA-related paragraphs (Figure 2). Social, recreational, and commercial uses and values followed ecological uses and values in order. The average frequency by quarter from 1995 to mid-2001 for the four use and value expressions maintained the same rank order—ecological (47.4 percent), social (33.8 percent), recreational (29.0 percent), and commercial (19.3 percent).

Ecological Values

The high frequency for expressions of ecological uses and values follows logically with the overarching subject matter of the content analysis—marine protected areas. A gradual upward trend was found for ecological uses and values despite a gradual decline reported by G. R. Wilson (1995) of environmental coverage in media in the 1990s. The increased coverage could be attributed to increased emphasis on ecological matters in coastal areas as they experience population growth at rates higher than the national average (Bartlett, Mageean, and O'Connor 2000).

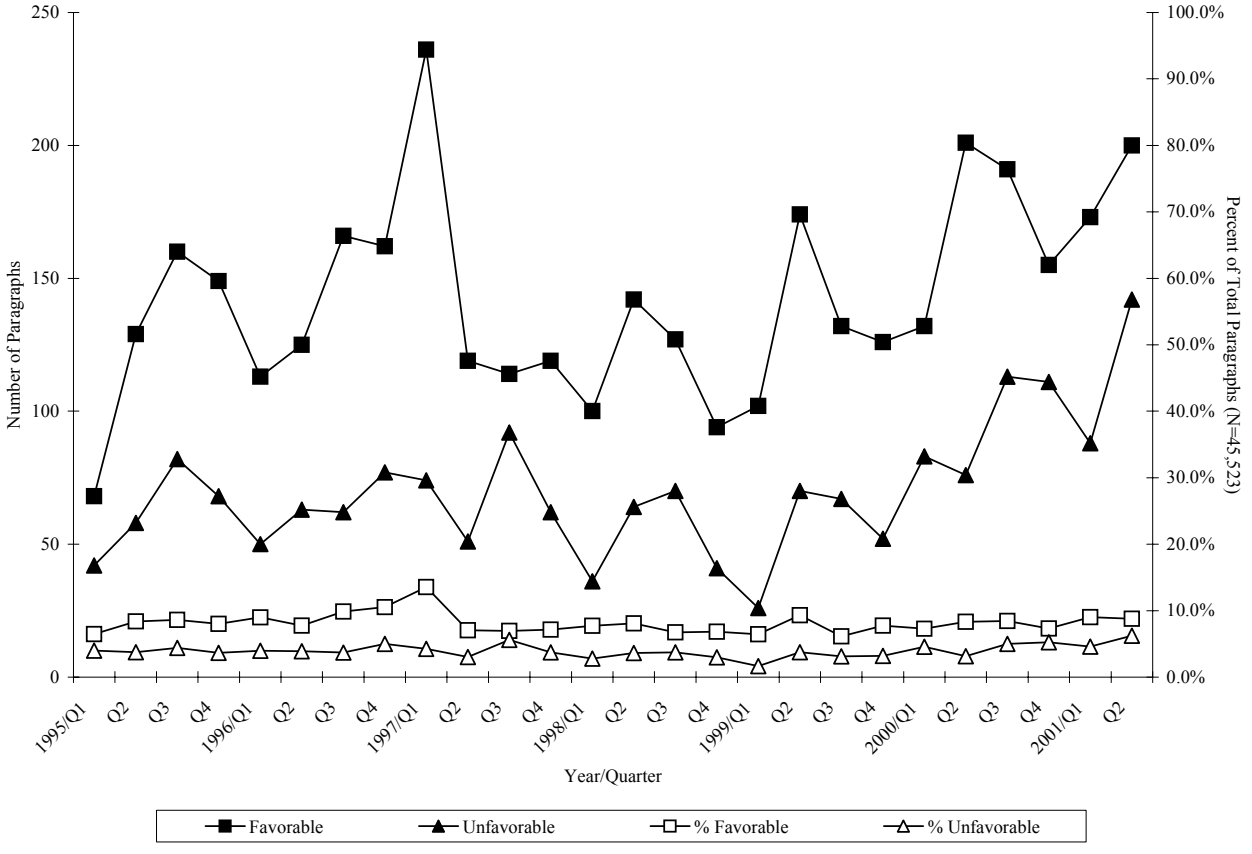

Figure 1. Frequency of Coverage (Number of Paragraphs) and Relative Coverage (Percent of Total Paragraphs) for Favorable and Unfavorable Expressions Associated with MPAs

Social Values

The social concept comprised expressions of cultural, historical, aesthetic, and societal values and uses. The high frequency for social uses and values reflects the broad set of values that MPAs provide for the public. Coastal areas are destinations for leisure travelers, preferred settings for residential development, and places of historical and cultural significance, as well as places that provide recreational and commercial opportunities. The gradual upward trend in relative coverage of social use and value expressions likely reflects the increase in people along the nation's coastal areas and an increased level of interest among the public about nature and wildlands (Ewert 1990).

Recreational Values

The high relative coverage of recreational uses and values follows the increased emphasis on coastal areas by society. Recreation and leisure, including tourism, comprise the world's largest industry and user group (Miller 1990; Jenner and Smith 1992; Goodhead and Johnson 1996). Studies have shown a trend toward increased demand for outdoor recreation and increased participation in outdoor recreation (Ewert 1990; Cordell and Super 2000; Orams 1999). However, public access to coastal waters has been affected by increased privatization of the coast and by sheer numbers of recreationists (Fish 1997). The recreational opportunities provided by MPAs, as public resources, are extensive.

Commercial Values

The commercial use and value concept had the smallest relative frequency among the four use and value concepts, but maintained an average frequency over the study period of more than 19 percent. The commercial use and value concept comprised dictionaries representing commercial fishing, shipping, and energy industries. A gradual upward trend was found for coverage of commercial use and value expressions over the study period. As more interest turns toward ocean exploration in this country, there is increased potential for coverage of commercial maritime issues in the news media.

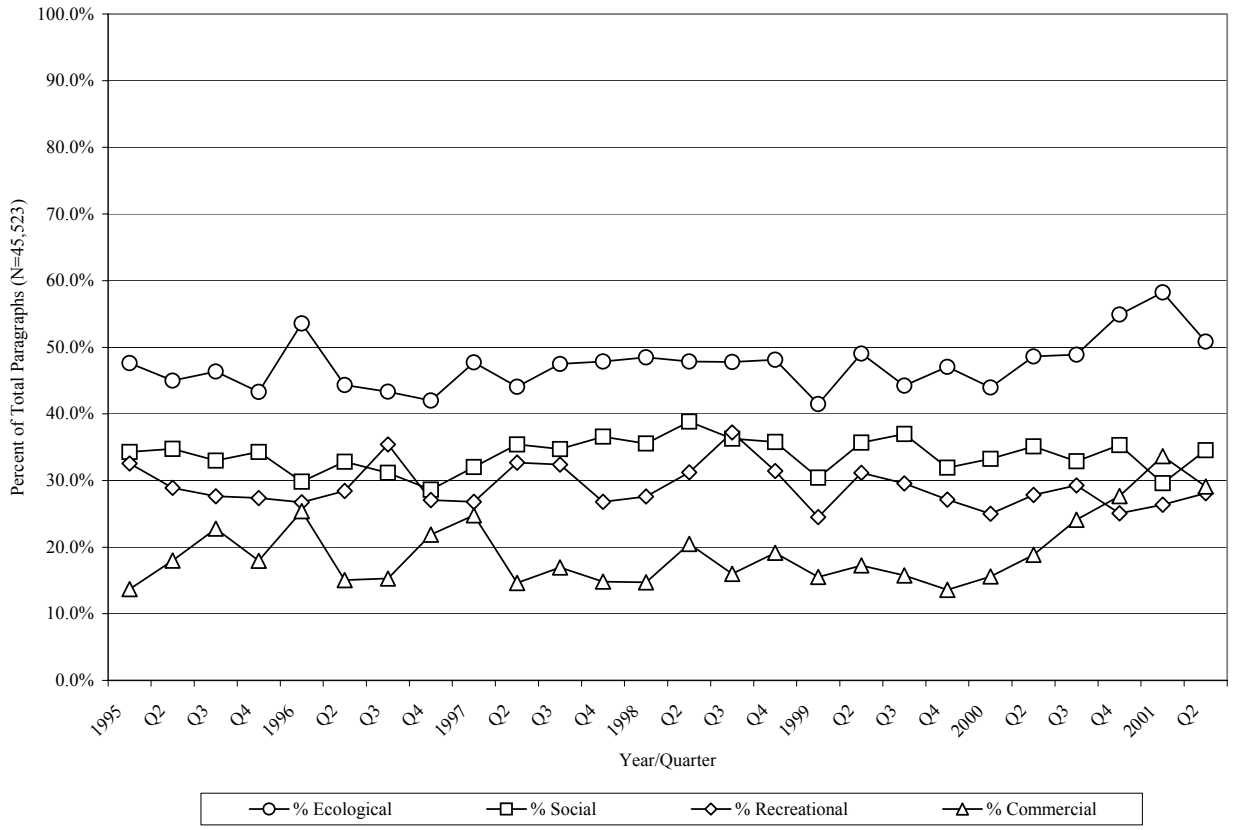

Figure 2. Relative Coverage (Percent of Total Paragraphs) for Ecological, Social, Recreational, and Commercial Use and Value Expressions Associated with MPAs

Recreational and Commercial Fishing

A secondary analysis comparing commercial and recreational fishing uses and values associated with MPAs was conducted. These two well-organized and vocal user groups have been involved in the discussion about MPAs since well before the executive order was signed. The comparison of relative frequency of coverage was conducted from the perspectives of both uses and values and relative stakeholder coverage. The relative coverage for the stakeholder uses and values perspective shows that frequency of coverage of commercial fishing uses and values far exceeds coverage for recreational fishing uses and values, yet for all but two quarters the frequency of coverage remains below 10 percent of total paragraphs (Figure 3). The comparison of coverage of commercial and recreational fishing stakeholder groups remains below 2 percent of total paragraphs for all 26 quarters (Figure 3). Although these two groups and fishing-related use and value concepts are well represented in specialized discussion forums, neither receives extensive coverage in the news media, especially from a stakeholder group perspective. Both commercial and recreational fishing use and value concepts demonstrated an increase in coverage beginning in the first quarter of 2000 and continuing with an upward trend through the end of the study period. The analysis could be repeated in the future to assess any change in these recent trends over time.

Stakeholders

Stakeholder expressions existed for all 18 stakeholder groups— academia, agriculture, commercial fishers, elected officials, energy industry, general public, local governments, military, nongovernmental organizations, other commercial interests, other federal agencies, other recreational interests, recreational fishers, state agencies, tribal governments, U.S. Department of Commerce, U.S. Department of Interior, and U.S. Environmental Protection Agency. Stakeholders were categorized by

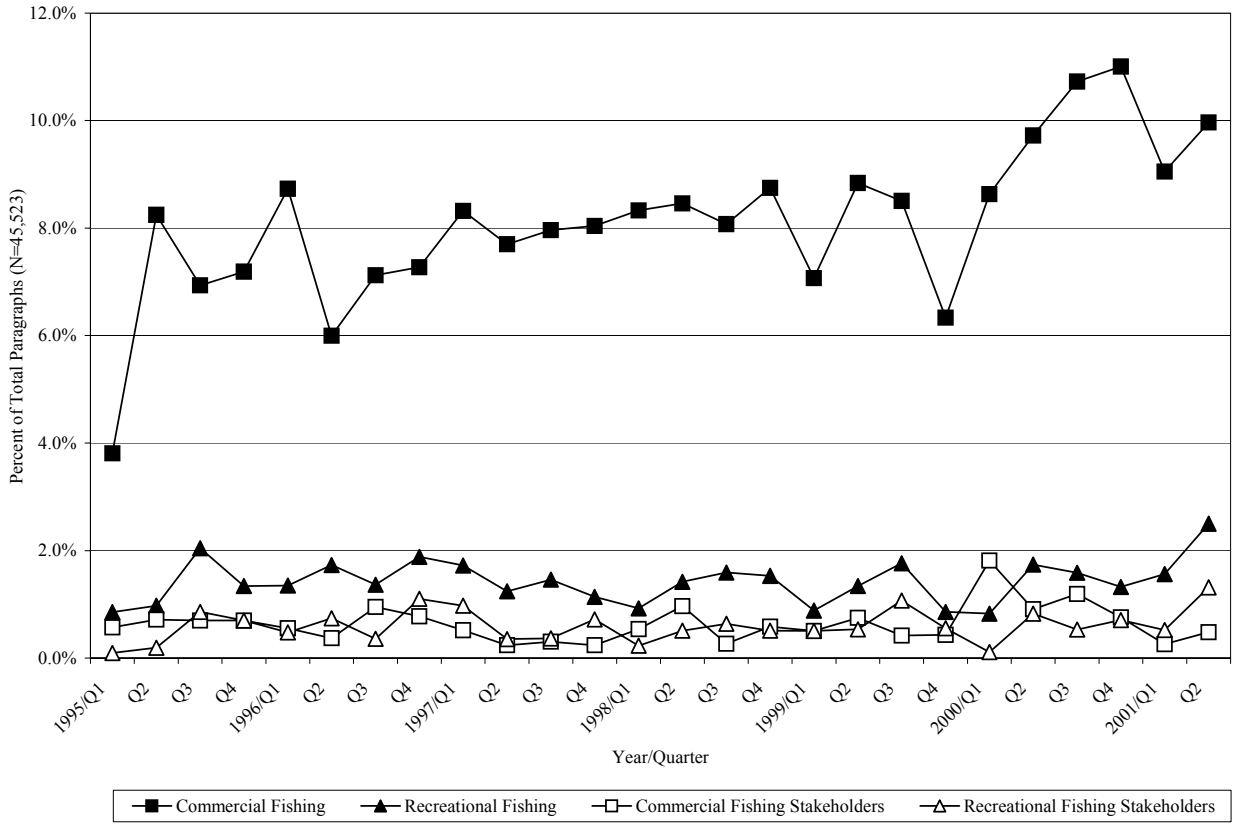

Figure 3. Relative Coverage (Percent of Total Paragraphs) for Commercial and Recreational Fishing Use and Value Expressions Associated with MPAs and Commercial and Recreational Fishing Stakeholders

sector—government, nongovernmental organization, industry, academia, and the public (Figure 4). Figure 4 illustrates that the majority of paragraphs associated with MPAs contained references to government. Figure 4 contains composite measures of coverage for stakeholder groups bundled by sector (e.g., "government" included federal, state, local, and tribal governments, elected officials, and the military).

Figure 5 depicts frequency of coverage of the major governmental entities involved in MPA management—U.S. Department of Interior, U.S. Department of Commerce/NOAA, state agencies, tribal governments, and local governments. Average frequency per quarter for the five major government entities were, in order, U.S. Department of Interior (60.7 percent), U.S. Department of Commerce/NOAA (11.7 percent), local governments (11.2 percent), state agencies (7.5 percent), and tribal governments (1.9 percent). The differences in media coverage can be attributed in part to the higher number of U.S. Department of Interior MPA-related management units compared to U.S. Department of Commerce, and state, tribal, and local government management units referred to as MPAs in the media (see Table 1, page 5).

IMPLICATIONS FOR MANAGEMENT

The results of the content analysis shed light on the state of public knowledge and opinion regarding marine protected areas as well as the uses and values associated with them in the public discourse. The results also identify gaps in the knowledge that can be addressed by ongoing and future MPA management efforts. Where practicable, information uncovered in the content analysis will be incorporated into the MPA needs assessment under way at the NOAA Coastal Services Center, a project designed to aid in planning for the national MPA initiative.

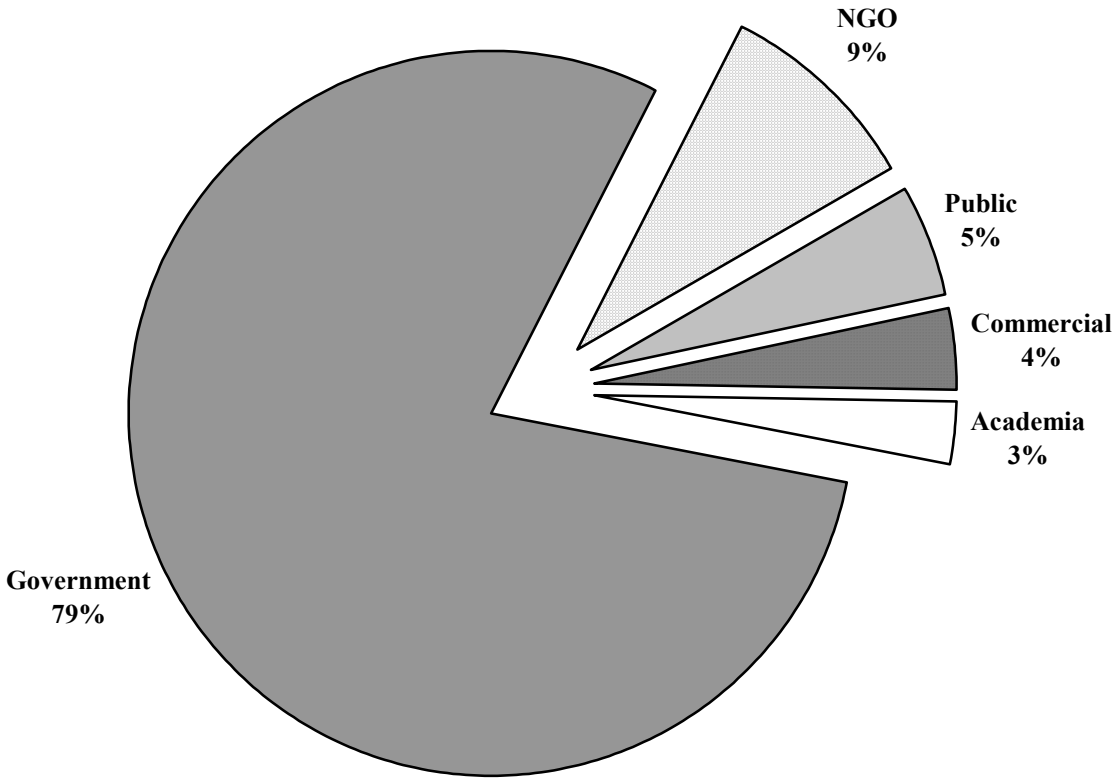

Figure 4. Relative Coverage of Stakeholder Groups by Sector
(Note: Totals reflect composite measures of media coverage for stakeholder groups bundled by sector. For example, "government" included federal, state, local, and tribal governments, elected officials, and the military.)

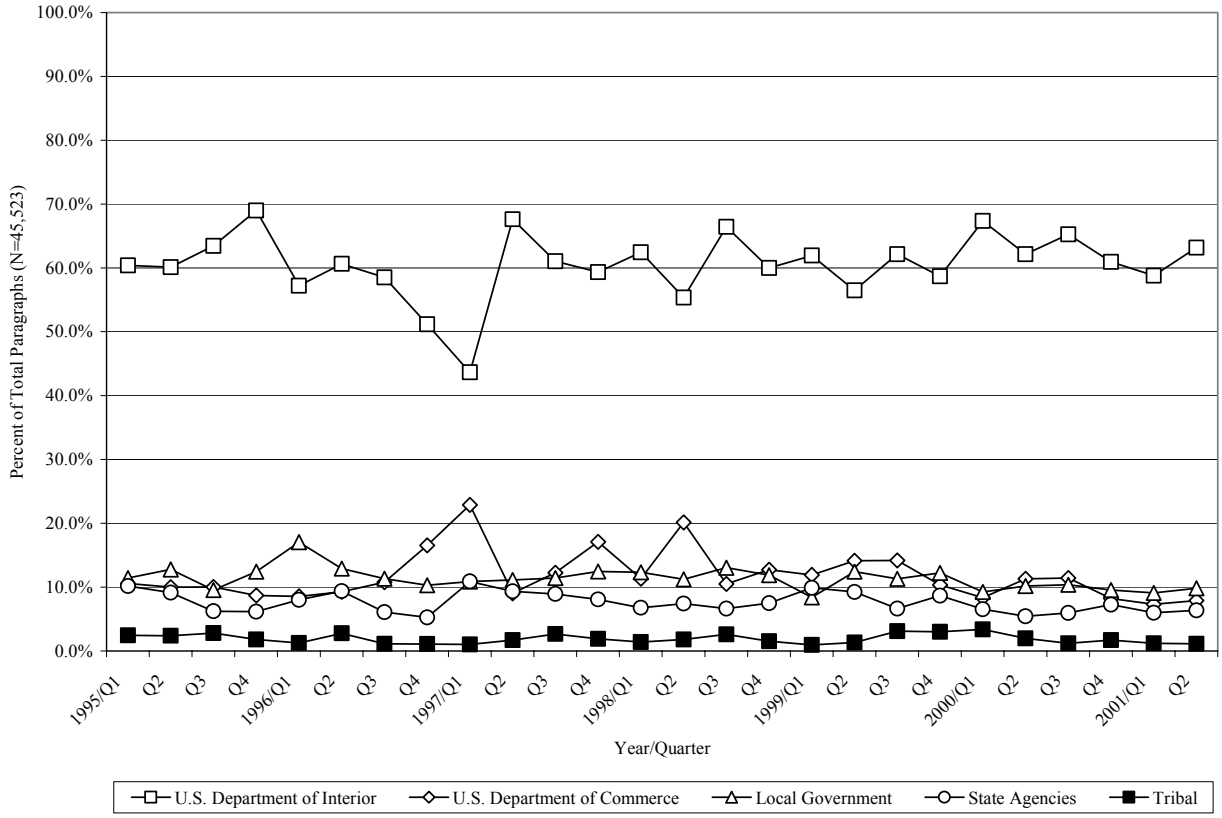

Figure 5. Relative Coverage (Percent of Total Paragraphs) for Five Major Governmental Groups Responsible for MPA Management

Key Concepts and Implied Needs

Perhaps the most elucidating finding of the content analysis is that although "marine protected area" is a common term within marine and coastal management and academic communities, the term is not widely used in the public discourse. Less than one percent of MPA-related news story paragraphs from January 1, 1995, to June 30, 2001, contained the term "marine protected area" or "MPA." In addition, while the term "marine reserve" was mentioned more frequently than the term marine protected area, the content did not suggest that these areas were "no-take" areas, although the term marine reserve has become nearly synonymous with no-take areas within the academic community. The varied use of terms within the media indicates that one cannot assume that "marine protected area" or "marine reserve" are commonly understood and consistently defined. Furthermore, this finding indicates a need for broad outreach to foster public understanding of the terminology and issues surrounding marine protected areas. Clear definitions and common use of terminology are essential if the public is to effectively engage in the public policy process related to marine protected areas.

Similar to the analysis of use of terms, findings about favorable and unfavorable expressions in media coverage related to marine protected areas were more remarkable for what was not there than for what was. Less than 14 percent of MPA-related news story paragraphs contained favorable or unfavorable expressions related to MPAs. This should be expected since media coverage strives to be unbiased about issues—"presenting information and argument on both sides" (quoted in Bengston, Fan, and Celarier 1999) of issues as they are debated in the public eye. However, this should also serve as an important reminder for individuals engaged in current marine protected area processes who might assume extensive public sentiment—whether positive or negative—about these areas based on vocal local debate. The content analysis found that neither positive nor negative sentiments are predominant in the MPA-related public discourse in the news media across the

country, but that overall favorable expressions appear more frequently than unfavorable and that the frequency of favorable expressions has increased since 1995.

A final way in which the content analysis provides insight into both the public's interests and resource management needs is by illustrating the variety of values and uses associated with MPAs discussed in the media. All of the chief use and value expressions included in the analysis—ecological, social, recreational, and commercial—received substantial media coverage. Approximately one-fifth of all paragraphs included commercial concepts; recreational and social concepts each occurred in approximately one-third of the paragraphs; and ecological concepts were in nearly half of all paragraphs. The analysis demonstrated that the public interest in marine areas is based on a diverse set of individual uses and values, including direct water-dependent commerce, ecological services provided by marine ecosystems, and cultural and aesthetic values associated with marine protected areas. For marine and coastal resource managers, this suggests that the areas they manage provide a wide range of benefit opportunities, support a host of different uses, and represent a number of different values for many different types of stakeholder groups.

The diversity of uses and values discussed in the media serves as an important reminder that while certain uses or stakeholder groups may be very prominent in individual marine protected area efforts, the public overall is concerned about a broad range of values and uses. For example, while commercial and recreational fishing interests have been very vocal participants in MPA processes, less than 15 percent of paragraphs related to MPAs in the mass media mention fishing of any kind. Thus the fishing community is just one of the many stakeholder groups involved in the discussion of marine protected areas in the media. Hence, the implied need is for management efforts that strive to preserve and sustain the range of benefits, uses, and values associated with MPAs and that are inclusive of all stakeholders.

Areas for Further Analysis

While the units included in the analysis all fit within the broad definition of marine protected areas put forth in Executive Order No. 13158, they are by no means a homogeneous group of management areas biophysically, socioculturally, or politically. Differences in existing and past management priorities, multiple uses, memorandums of agreement, enabling legislation, and agency missions might account for numerous variations in the level of coverage and focus of media content. For example, the high percentage of coverage of U.S. Department of Interior units might reflect a bias in the media content toward activities that occur in DOI units (e.g., National Parks) over activities occurring in areas managed by the U.S. Department of Commerce or state, local, and tribal governments for conservation or preservation purposes. The variations in level of coverage suggest that an essential area for future analysis should be exploring media coverage of different types of managed areas to determine if attitudes and issues vary across units and/or management entities.

Additional analyses might include further exploration of the relationships between concepts present in the text, tracking trends in uses, values, and stakeholders as they develop over time, or comparing expressions of favorable and unfavorable attitudes, uses, and values across stakeholder groups. For example, with which management authority do favorable and unfavorable expressions occur? Or which use and value concepts are most frequently associated with which management authorities or other stakeholder groups? Variations in concept expression frequency could be compared to policy changes to track coverage of specific stakeholders and concepts in the media. Variations in coverage over time could also be compared to seasonal fluctuations in topical coverage (e.g., more emphasis on beach recreation in summer months). An analysis comparing the frequency of coverage in different regions of the country might uncover different perspectives on the local or regional level. Finally, content analysis of industry trade publications, government reports, and environmental organization documents could be useful for identifying attitudes of specific individual stakeholder groups toward marine protected areas.

Overall, the findings illustrate both the state of public understanding of the specific concept of marine protected areas and the public's concerns surrounding and interests in marine and coastal protected area management. While the term "marine protected area" may not yet be commonplace in the mass media, there is no doubt that marine and coastal areas are valued for a myriad of environmental, social, commercial, and recreational benefits. Marine and coastal resource managers are challenged not only with responding to the need for outreach and education on the concept of marine protected areas, but also with striving to work with multiple stakeholder groups and pursuing management regimes that sustain the numerous benefits the public derive from marine and coastal ecosystems.

REFERENCES

Ader, C. R. 1995. "A Longitudinal Study of Agenda Setting for the Issue of Environmental Pollution." *Journalism and Mass Communication Quarterly*. Volume 72. Pages 300 to 311.

Allen, S. D., D. N. Bengston, and D. P. Fan. 2000. "Exploring the National Benefits of Alaska's Tongass National Forest." *In* D. N. Bengston (Editor), *Applications of Computer-Aided Text Analysis in Natural Resources*. U.S. Department of Agriculture, Forest Service, North Central Research Station. St. Paul, MN. General Technical Report NC-211. Pages 19 to 25.

Anderson, A. 1997. *Media, Culture, and the Environment*. Rutgers University Press. New Brunswick, NJ.

Ansolabehere, S., R. Behr, and S. Iyengar. 1993. *The Media Game: American Politics in the Television Age*. Macmillan. New York.

Bartlett, J. G., D. M. Mageean, and R. J. O'Connor. 2000. "Residential Expansion as a Continental Threat to U.S. Coastal Ecosystems." *Population and Environment*. Volume 21. Pages 429 to 468.

Bengston, D. N. 2000. "Foreword." *In* D. N. Bengston (Editor), *Applications of Computer-Aided Text Analysis in Natural Resources*. U.S. Department of Agriculture, Forest Service, North Central Research Station. St. Paul, MN. General Technical Report NC-211. Pages I to III.

Bengston, D. N., and D. P. Fan. 1999a. "An Innovative Method for Evaluating Strategic Goals in a Public Agency: Conservation Leadership in the U.S. Forest Service." *Evaluation Review*. Volume 23, Number 1. Pages 77 to 100.

Bengston, D. N., and D. P. Fan. 1999b. "Roads on the U.S. National Forest: An Analysis of Public Attitudes, Beliefs, and Values Expressed in the News Media." *Environment and Behavior*. Volume 31. Pages 514 to 539.

Bengston, D. N., D. P. Fan, and D. N. Celarier. 1999. "A New Approach to Monitoring the Social Environment for Natural Resource Management and Policy: The Case of US National Forest Benefits and Values." *Journal of Environmental Management*. Volume 56. Pages 181 to 193.

Bengston, D. N., and Z. Xu. 1995. *Changing National Forest Values: A Content Analysis*. U.S. Department of Agriculture, Forest Service, North Central Research Station. St. Paul, MN. Research Paper NC-323.

Cordell, H. K., and G. Super. 2000. "Trends in Americans' Outdoor Recreation." *In* W. C. Gartner and D. W. Lime (Editors), *Trends in Outdoor Recreation, Leisure and Tourism*. CABI Publishing. New York.

Detjen, J. 1995. "The Media's Role in Science Education." *BioScience*. Supplement. Page S-58ff.

Ewert, A. 1990. "Wildland Resource Values: A Struggle for Balance." *Society and Natural Resources*. Volume 3. Pages 385 to 393.

Executive Order No. 13158. Title 3 Code of Federal Regulations. 2000. Pages 273 to 276.

Fan, D. P. 1988. *Predictions of Public Opinion from the Mass Media: Computer Content Analysis and Mathematical Modeling*. Greenwood. New York.

Fan, D. P. 1990. "Information Processing Expert System for Text Analysis and Predicting Public Opinion Based on Information Available to the Public." U.S. Patent 4,930,077.

Fan, D. P. 1994a. "Information Processing Analysis System for Sorting and Scoring Text." U.S. Patent 5,371,673.

Fan, D. P. 1994b. "Predicting Public Opinion from Press Coverage." *The Public Perspective*. Volume 5, Number 5. Pages 21 to 23.

Fan, D. P., H.-B. Brosius, and H. M. Kepplinger. 1994. "Predictions of the Public Agenda from Television Coverage." *Journal of Broadcasting and Electronic Media*. Volume 38. Pages 163 to 177.

Fan, D. P., and A. R. Tims. 1989. "The Impact of the News Media on Public Opinion: American Presidential Election, 1987-1988." *International Journal of Public Opinion Research*. Volume 1, Number 2. Pages 151 to 163.

Fish, T. E. 1997. "Recreation within the National Estuarine Research Reserve System: Benefits-based Management as a Tool for Managers." *In* B. Sullivan (Editor), *Proceedings of the 1996*

National Estuarine Research Reserve System Conference. Georgia Department of Natural Resources, Sapelo Island National Estuarine Research Reserve. Sapelo Island, GA. Pages 34 to 38.

Gamson, W. A., and A. Modigliani. 1989. "Media Discourse and Public Opinion on Nuclear Power: A Constructivist Approach." *American Journal of Sociology*. Volume 95. Pages 1 to 37.

Goodhead, T., and D. Johnson. 1996. *Coastal Recreation Management: The Sustainable Development of Maritime Leisure*. E and FN Spon. London.

Holsti, O. R. 1969. *Content Analysis for the Social Sciences and Humanities*. Addison-Wesley Publishing Company. Reading, MA.

Jenner, P., and C. Smith. 1992. *The Tourism Industry and the Environment*. Economist Intelligence Unit. London. Special Report No. 2453.

King, R. P. 1997, February 24. "The Florida Keys: Are We 'Loving It To Death'." *The Palm Beach Post*. Page A1.

Krippendorf, K. 1980. *Content Analysis: An Introduction to Its Methodology*. Sage Publications. Beverly Hills, CA.

Lindenmann, W. K. 1983. "Content Analysis." *Public Relations Journal*. Volume 39(July). Pages 24 to 26.

Miller, M. L. 1990. "Tourism in the Coastal Zone: Portents, Problems, and Possibilities." *In* M. L. Miller and J. Auyong (Editors), *Proceedings of the 1990 Congress on Coastal and Marine Tourism. Volume 1*. National Coastal Resources Research and Development Institute. Newport, OR. NCRI-T-91-010. Pages 1 to 8.

Orams, M. 1999. Marine Tourism: Development, Impacts and Management. Routledge. New York.

Ostman, R. E., and J. L. Parker. 1987. "A Public's Environmental Information Sources and Evaluations of Mass Media." *Journal of Environmental Education*. Volume 18, Number 2. Pages 9 to 17.

Pierskalla, C. D., and D. H. Anderson. 2000. "Turning Qualitative Text into Interval-Level Data: A Computer Content Analysis Approach." *In* D. N. Bengston (Editor), *Applications of Computer-Aided Text Analysis in Natural Resources*. U.S. Department of Agriculture, Forest Service, North Central Research Station. St. Paul, MN. General Technical Report NC-211. Pages 15 to 18.

Protess, D. L., F. L. Cook, T. R. Curtin, M. T. Gordon, D. R. Leff, M. E. McCombs, and P. Miller. 1987. "The Impact of Investigative Reporting on Public Opinion and Policymaking: Targeting Toxic Waste." *Public Opinion Quarterly*. Volume 51. Pages 166 to 185.

Rogers, E. M., J. W. Dearing, and D. Bregman. 1993. "The Anatomy of Agenda-Setting Research." *Journal of Communications*. Volume 43, Number 2. Pages 68 to 84.

Schroeder, H. W. 1996. *Voices from Michigan's Black River: Obtaining Information on "Special Places" for Natural Resource Planning*. U.S. Department of Agriculture, Forest Service, North Central Research Station. St. Paul, MN. General Technical Report NC-184.

Shindler, B., B. Steel, and P. List. 1996. "Public Judgements of Adaptive Management: A Response from Forest Communities." *Journal of Forestry*. Volume 94. Pages 4 to 12.

Spillman, W. J., and E. Lang. 1924. *The Law of Diminishing Returns*. World Book Company. Yonkers-on-Hudson, NY.

Trautwein, B. 2001. "Ventura County Perspective; Channel Islands Marine Reserve Would Help Fishermen and Fish." January 21. *The Los Angeles Times*. Page B15.

Wilson, G. R. 1995. *Public Attitudes and Press Coverage of the Environment, 1968-1996*. Master's thesis. The University of Alabama. Available: <http://web.utk.edu/~gwilson1/thesis.html> (28 June 2002).

Wilson, K. M. 1995. "Mass Media as Sources of Global Warming Knowledge." *Mass Comm Review*. Volume 22. Pages 75 to 89.