



Examining the role of Web site information in facilitating different citizen–government relationships: A case study of state Chronic Wasting Disease Web sites

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Abstract

This paper develops a framework to assess the text-based public information provided on program level government agency Web sites. The framework informs the larger e-government question of how, or whether, state administrative agencies are using Web sites in a transformative capacity—to change relationships between citizens and government. It focuses on assessing the degree to which text information provided on government Web sites could facilitate various relationships between government agencies and citizens. The framework incorporates four views of government information obligations stemming from different assumptions about citizen–government relationships in a democracy: the private citizen view, the attentive citizen view, the deliberative citizen view, and the citizen–publisher view. Each view suggests inclusion of different types of information on government agency web sites. The framework is employed to assess state Web sites containing information about chronic wasting disease, a disease effecting deer and elk in numerous U.S. states and Canada.

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1. Introduction

Many have hoped that the Web might transform the relationship between citizens and government in governance: making services more convenient and effective, facilitating communication between citizens and government, and (most importantly for this paper) increasing the amount of information government agencies distribute about their programs, activities, and decisions. For example, Bimber proposes that increased governmental use of technology will lead in part to a period of “information abundance” facilitating citizen and civil society involvement in governance (Bimber, 2003). Kim et al. (2005) suggest that ICT use can “systematize the transparency of governance” by “providing relevant and timely information in large quantities”.

Recent e-government performance or evaluation studies have begun to evaluate the extent to which this envisioned transformation is actually occurring (e.g., Moon, 2002; Clayton & Gregory, 2003; Musso, Weare & Hale, 2000). For the most part, however, these studies focus on Web site applications—either for transactional services or for supporting public input to policy making, for example, through public comment systems (Shulman, 2005). This paper contributes to this endeavor, but makes a unique addition to the literature by focusing on the role of Web-based text information in supporting different citizen–government relationships. The focus on text information is appropriate because current e-government studies tend to undervalue Web site textual information; further, they provide only rudimentary tools for assessing or measuring the value of text information to supporting different citizen–government relationships.

The goal of this paper is threefold. First it calls attention to the important role of government Web site text information in facilitating different citizen–government relationships. Second, drawing on a number of democratic theories and existing e-government frameworks, the paper suggests a new “government information valuation” (GIV) framework that assesses text information on government agency Web sites in light of what types of citizen–government relationships it could facilitate. Third, the paper demonstrates the utility of the GIV framework by applying it to a case study of state wildlife agency Web sites containing information for the general public about chronic wasting disease (CWD), a fatal disease effecting deer and elk. In our analysis, we compare the information provided on the Web sites to the information suggested by the GIV framework.

CWD information, which serves as our case study, should be understood as a “public information campaign,” or a government directed and sponsored effort to communicate to the mass public in order to achieve a policy goal (Weiss & Tschirhart, 1994). Public information is defined as information disseminated for no cost by the government for a general public audience. Motivations for the CWD information campaign include an administrative responsibility to inform the public about health risks, a desire to stop the disease, and a need to persuade key stakeholders to enact behaviors necessary for management policies to succeed.

CWD information is an interesting case study because relatively few statutory or administrative guidelines exist to determine state agency CWD information dissemination decisions. While numerous federal administrative rules and laws guide federal agency

information production, these arguably do not apply to state agencies. Further, few state-level information rules or laws address CWD information, or set direct constraints on its production or distribution.¹ CWD information is also interesting because of its controversial nature; CWD has attracted a good deal of attention among landowners and hunters in infected states, and some stakeholder groups have challenged the truth claims contained in states' information.

While this case study focuses on CWD, the article makes broader contributions to the e-government and government information literatures. The results inform the question of how, or whether, state administrative agencies are using Web sites in a transformative capacity—to change relationships between citizens and government. In doing so, it focuses specifically on textual information on government Web sites. Further, the article develops a framework that can be employed by other researchers to consider the adequacy of information provided about any number of government policies. The framework is not specific to CWD.

Section one continues by summarizing assumptions about government's public information obligations suggested by democratic theories. It then reviews existing approaches for evaluating government Web sites. Section two describes CWD policy controversies and existing government guidelines for CWD information. The third section summarizes the methodologies employed to collect data from state CWD Web sites in Colorado, Utah, Wisconsin, and Wyoming. The findings are presented in section four, which highlights variation in the types of documents, topics of documents, and level of detail provided on each Web site as well as differences in press coverage in the four states. Section five, the discussion section, assesses the information provided on the Web sites in light of different information obligations and assumptions about citizen–government relationships. It goes on to present the GIV framework, and outlines types of information that agencies ought to produce based on varying assumptions about citizen–government relationships. The article concludes by summarizing its contribution to the e-government research that seeks to measure or evaluate to what extent government Web sites support transformation of the relationship between citizens and government.

¹ From 2002 to 2006, the U.S. Office of Management and Budget put forth numerous new rules that may influence the production of federal agency information, particularly information related to science based policy (new rules include Information Quality Act Implementation Guidelines, Peer Review Guidelines, and Proposed Risk Assessment Bulletin). Currently, these rules do not apply to state agencies; however, a Congressional Research Service Report suggests that state legislation to create similar rules at the state level may be proposed in the near future. See Copeland, C.W., & Simpson, M. (2004). *The Information Quality Act: OMB's Guidance and initial implementation*. Congressional Research Service Report RL32532. Washington, DC: Library of Congress. See also the OMB Watch analysis of model state data quality legislation (<http://www.ombwatch.org/article/articleview/1393/1/1>; accessed May 2006). Passage of similar state level laws would likely have a large impact on CWD information production by state wildlife agencies. A search of our four states' current statutes and constitutions on key information/publication terms found no information quality laws or information or publication regulations related to CWD. Of course, agencies creating information that displeases governors or state legislatures run the risk of budget cuts, audits, public rebuke, or other forms of censure. Further, while state agencies collaborate with, and accept grant money from the USDA to support data collection, Wisconsin CWD staff reported that accepting funds entailed only minor reporting requirements, and that submitted reports were not subject to the OMB requirements outlined above.

1.1. *Government's information obligations*

In the United States, government public information, or information disseminated at no cost by government agencies to the general public, is seen as foundational to democratic society. Government commitments to using information to promote openness and transparency are expressed in numerous laws including freedom of information and public records laws, and also through requirements that government place copies of official publications in depository libraries. In many views of democratic theory, the delegation of governance power by citizens/stakeholders to government agencies requires that agencies in turn supply information to the public (Walters, 2005). Further, citizens require information about policies and services in order to take advantage of taxpayer funded programs (Leonard, 2003).

Historically, expectations about what information government should publish have varied as part of larger debates about the role of government in the publishing industry, government paternalistic responsibilities, and the proper nature of citizen participation in government (Leonard, 2003; Walters, 2005). Some have criticized agencies for the costs of public information, while others have charged that agencies deter citizen oversight by not disseminating enough information (Sprehe, 1987).

Democratic theory does not provide a single answer to the question of what public information agencies should produce. Different theories of democracy assume different relationships between citizens and government in governance, and these assumptions suggest different government information obligations. Variation in assumptions about desirable citizen–government relationships in policy making complicates government Web site information assessment and measurement. Different starting assumptions may lead to different expectations for information. This variation in assumptions about the relationship between citizens and government is reflected in the results of an analysis of the range of national electronic government goal statements—some implementations emphasize transactional services and others emphasize citizen–government communications and collaboration (Chadwick & May, 2003).

Several models have explicated the relationship between citizens and government in policy making (e.g., Roberts, 1997; Decker & Chase, 2001; Vigoda, 2002). While these models do not primarily focus on public information, they do outline a range of assumptions about citizen–government relationships in policy making; each of which suggest different public information obligations. Here we elaborate on these models by exploring these suggestions about different information obligations under different visions of citizen–government relationships. We refer to our continuum of government information obligations as the GIV framework.

At one end of the continuum of the GIV, government information obligations would be minimized to providing information needed by individual citizens to make private decisions or take private actions (e.g., warnings related to health considerations). The emphasis would be on swift and effective provision of information – based on agency scientific expertise – to citizens. Here, government's role in society is limited, and most decisions are relegated to individuals acting in a private capacity but facilitated by the information provided by government. We refer to this as the “private citizen” view of information obligations.

In another view, the government is obligated to provide information that facilitates citizen assessment of agency policies and performance. Further, the government is obligated to collect information about citizen opinion to inform policy making. Here, information flow is two way and information facilitates better governance by permitting oversight and informing policy decisions. In this view, citizens are acting as a counterbalance to more activist government agencies, overseeing policy implementations, holding agencies accountable, and providing feedback to expert agency decision makers to use in expert decision making. We call this the “attentive citizen” view of information obligations.

More deliberative models of democratic governance call for agencies to provide citizens with information so that they can formulate, articulate, and defend views in public forums. In this view, citizens actively participate in policy-making processes through one of a range of citizen participation mechanisms, assisting in the setting of the stakes of the debate and perhaps also in actual policy setting. The primary role of government information here is to provide a range of facts and interpretations to support informed debate on a policy. We refer to this as the “deliberative citizen” view of information obligations.

In a similar but even more participatory vision described by Chadwick and May, information flows become multidirectional and horizontal. Information branches out from citizens and government to encompass many civil society organizations. In this view, government information is no longer necessarily the focus of debate; rather, it should support and reflect debate among the multiplicity of participants and their information claims (Chadwick and May, 2003). We refer to this as the “citizen–publisher” view of information obligations.

Variants in level of detail may exist within each of these models. One variation involves the kinds of supporting evidence provided. Web sites may provide just core information (such as the outcomes of policy deliberation or data analysis), the evidence used to develop and/or justify the core information, or competing evidence and interpretations of data or the policy. Differences in levels of detail may imply degrees of willingness to transfer knowledge about an agency and its decision-making processes to citizens (Welch & Fulla, 2005). Inclusion of a range of arguments, evidence, and interpretation may imply that agencies see their role as facilitating a broader debate about policy issues rather than justifying a policy decision (Covello, McCallum & Pavlova, 1987; Jasanoff, 1994; National Research Council, 1996; Wynne, 1996).²

A second variation involves whether the information published by an agency is driven primarily by agency experts or by citizen/stakeholders. In traditional expert decision-making views (private and attentive citizen), agencies decide what public information is necessary; but in more participatory views (e.g., task forces or consensus conferences), stakeholders

² Democratic theorists disagree about citizens’ ability to participate in policy making. Some views hold citizens as incapable of understanding complex information, or argue that individual decision making is inefficient, and that decision making should be ceded to government experts or other groups. Other theorists argue that government has an obligation to educate the citizenry so it can independently analyze evidence in order to oversee government.

may, to varying degrees, drive information development and dissemination (National Research Council, 1996; Chase, Schusler & Decker, 2000).³

1.2. *Government Web site evaluation*

Most e-government Web site evaluation studies include only limited assessment or measurement of textual information content. One reason for this oversight may be a field-level bias toward transactional services. In their study of e-government framing, Chadwick and May found that most national policy documents describing goals for e-government emphasize efficiency benefits and transactional aspects of e-government rather than governance benefits and interaction/communication aspects (Chadwick and May, 2003). Textual public information is likely more central to the latter. Subsequent evaluations of e-government likely mirror the efficiency-transaction bias and therefore provide only limited consideration of the role of text information in supporting citizen–government relationships. This section summarizes existing text information assessment approaches and explains their limitations for investigating how Web site information supports various forms of citizen–government relationships.⁴

The simplest presentation of text information appears in e-government stage models: text information is presented as the first stage of a progression of ideal stages of e-government (Layne & Lee, 2001; Norris & Moon, 2005). The linear nature of the models suggests that movement to higher stages of e-government has little to do with text information but rather with implementation of transactional services. All text information is lumped together into one category, sometimes disparagingly referred to as “brochureware”.

A common measure of text in the e-government literature is the presence/absence measures. For example, the CyPRG Web site evaluation framework measures the presence or absence of a broad category of information titled “reports, research, laws, and regulations” (La Porte, Demchak & de Jong, 2002). West’s e-government surveys note presence or absence of “publications” (West, 2005). Both the presence/absence measures and the stage models tend to place all types of information into one category, overlooking variations in information that might be important to supporting different citizen–government relationships. Further, the valuation criteria here suggest that the presence of documents makes Web sites better—regardless of their content. The major limitation of these approaches is that they cannot assess the importance of a given document, type of document, or document topic to various citizen–government relationships in policy making; rather, all documents are equal—and the more documents are better.

Other studies count the number of documents of specific genres (Lee, 2004) or specific subjects (Musso, Weare & Hale, 2000). These studies recognize that certain document

³ This dichotomy is simplified. The broader information production and dissemination world of agencies is more complex and nuanced involving an array of information dissemination and withholding strategies employing a variety of media.

⁴ In the development of our framework and assessment of the four Web sites, we bracket off those elements of text information for which good measurement and valuation methodologies already exist (e.g., reading level, usability). We recognize that these are very important aspects of text information—but inclusion of evaluation criteria for these aspects is beyond the scope of the paper.

types and subjects are more valuable than others because they facilitate desirable citizen or stakeholder actions, such as government oversight. However, it is not clear which document types or subject matter are important to what types of citizen–government interaction, and it may be that document types or subjects vary in importance across different policy issues.

Another approach is to measure users' perceptions of the quality of text information. Studies have measured perceptions of expert assessors (Eschenfelder, Beachboard, McClure & Wyman, 1997) or actual government Web site users (Barnes & Vidgen, 2004; Clayton & Gregory, 2003; Cullen & Houghton, 2000). The valuation criteria typically consist of very broad, predefined information qualities (e.g., "perceived ability of information to satisfy audience needs"). While these studies provide important user-based data, they are limited in that they do not test citizens' perceptions of information quality related to a particular policy issue; further, they do not tell us anything about citizens' satisfaction with information in terms of whether or not it facilitates some desired relationship with government.

Many of the limitations inherent in these approaches stem from agency-level measurements of information. Agency-level measures preclude consideration of the relevance and importance of a specific topic because the information assessed is not related to a particular policy debate. To provide an alternative approach, the GIV framework centers analysis within a particular policy debate (in this case, CWD). By doing so, it incorporates the context of that debate, including the relative importance of different document genres and topics within that debate, and also uncertainties associated with specific truth claims. Other limitations of current approaches stem from a limited valuation scale for information. In most presence/absence or document counting studies, information is valued on a quantity scale. The GIV valuation framework, however, evaluates information in terms of a theoretical framework that specifies what different information types, topics, and levels of detail might support different types of citizen–government interaction. Data on the quantity of information provided is supplemented by data on document types, document topics, and the details the document include.

2. Chronic wasting disease background

To empirically ground the GIV framework, we analyzed the content of four state wildlife agency Web sites providing public information about chronic wasting disease (CWD). CWD is a fatal and transmissible neurological disease of deer and elk (cervids) belonging to the family of diseases that includes bovine spongiform encephalopathy (mad cow) in cattle, scrapie in sheep, and new variant Creutzfeldt-Jacob (nvCJD) in humans.

There is no known treatment or vaccine for CWD; further, there is no approved live test for the disease. Where the disease is found on a ranch, states typically completely depopulate it, leading to a significant loss of capital for the rancher. When a diseased animal is found in the wild, states typically seek to aggressively cull nearby herds. Culling is often dependent on hunters' activity in the area, although agencies will sometimes employ sharpshooters.

Although there is no evidence that CWD can be transmitted to humans under natural conditions, the U.S. Center for Disease Control and Prevention advises not eating food

derived from an animal with CWD because there is no evidence that it could never be transmitted to humans. Prion scientists recommend precautions to minimize human exposure to CWD (Bosque, 2005), and new research showing prions in the muscle tissue of diseased animals has raised new concerns about hunter and meat handler exposure (Angers et al., 2006).

For some time, CWD was only a concern in the west; but in recent years the disease has moved into the denser herds of Wisconsin, Illinois, New York, West Virginia and other states.⁵ Many fear the disease will quickly spread due to the dense population and social behaviors of cervid species in the Midwestern and Eastern United States. Currently, CWD is thought to be transmissible through contact among live animals and exposure to the excrement or carcasses of diseased animals (U.S. Department of Agriculture, 2002a).

The spread of CWD within cervid herds is problematic for both economic and social reasons. Fear of the disease could decrease hunting and swell cervid herds promoting spread of other diseases, agricultural damage, and increased car–animal collisions. Cervid ranchers have experienced significant economic losses from reductions in sales and destruction of herds. States also fear loss of hunting license revenues and tourism dollars (Bishop, 2004; Seidl & Koontz, 2004).

But damage from CWD is not limited to economics. Many fear that CWD will destroy valued cultural practices and recreational opportunities (Bishop, 2004). CWD may contribute to the already declining interest in hunting as a historic cultural practice. Further, many oppose the banning of feed piles – employed both for hunting and wildlife viewing – although agencies have long argued that the piles contribute to spread of many diseases (State of Wisconsin Conservation Department, 1943).

CWD management includes numerous information goals. The missions of state wildlife agencies typically require informing or educating the public about issues like the dangers of handling and consumption of diseased meat. Further, CWD management requires persuasion of the public to enact desirable behaviors, including stopping baiting and feeding, installation of better cervid ranch fencing, continued hunting to reduce herd sizes in order to slow disease spread, and also submission of deer carcasses to facilitate disease surveillance (tracking of where the disease is located).

CWD information faces numerous challenges. Because it comes from a wildlife agency, some stakeholders may doubt its credibility *prima facie* (Covello et al., 1987; Nye, Zelikow & King, 1997). Agencies and hunters have long standing conflicting beliefs about the real and optimum size of cervid herds, and agency cervid estimates are notoriously contentious (State of Wisconsin Conservation Department, 1943). This historical animosity may taint CWD information. For example, hunter surveys show that a significant minority of hunters in some states believe that agency CWD information is less than “somewhat believable” (Needham, Vaske & Manfredro, 2004, 2005; Vaske, Timmons, Beaman & Petchenik, 2004). Further, the

⁵ See www.cwd-info.org for a current map of disease locations.

persuasive intent of some of the information (i.e., to keep hunters hunting) may raise concerns among some stakeholders.⁶

CWD information is controversial in its own right due to underlying scientific uncertainty about the disease. While scientific consensus points to prions (misshapen protein molecules) as the source of CWD, some scientists disagree about the hypothesized infectious agent and transmission methods (Bastian, Dash & Garry, 2004). While this skepticism is often dismissed as “fringe science”, most scientists acknowledge significant gaps in knowledge. For example, even among parties that agree about the epidemiology and means of disease transmission, knowledge gaps about cervid populations, the validity of various animal sampling strategies, and likely animal contact lead to disagreements about the meaning of surveillance information and disease spread models (Joly, 2005; Clark, Nusser & Huang, 2005; Heberlein, 2004). Yet these models underlie disease control policy making. Finally, the effectiveness of various management strategies will not be known for many years, making it difficult to evaluate policy choices. Some hunters, landowners, and rancher groups point to these uncertainties as a reason not to support agency policies.

The tests used to detect diseased animals have also generated uncertainty due to confusion related to conflicting test results, disease distribution probabilities, and the relationship between the tests and food safety. Two tests are commonly used: the immunohistochemistry assay (IHC)—a slow, expensive “gold standard” test based on human slide reading, and the enzyme-linked immunosorbent assay (ELISA) test—a high throughput chemical screening test developed to err on the side of false positives. States typically perform ELISA on all test results and then follow-up with the IHC test on any sample that tests positive under ELISA. Confusion regarding the discrepancies between the test results has, in some cases, created anxiety about their reliability. Further, in some states, discrepancies between test results from state labs and private labs have created doubts about official government results. Further, the probabilistic nature of the information may make it difficult for the public to interpret (Burkell, 2004). To add to the confusion, the USDA has emphasized that that neither test is a food safety test, and that no test can be used to determine whether an animal is CWD free due to the long disease’s incubation period that may lead to false negatives in early infection (U.S. Department of Agriculture, 2002a). The inability of the tests to guarantee food safety has likely confused many hunters whose motivation to participate in testing may have been to ensure the safety of their meat rather than to aid in data collection for disease surveillance.

Within this environment of historic mistrust and scientific uncertainty, few guidelines exist to direct state agency decisions about what CWD information to disseminate. Federal action has focused on data rather than synthesized public information. A federal/state working group met between 2002 and 2004 and released very general public information recommendations

⁶ The legitimate government interest in persuading its citizens to modify their behaviors or beliefs, the illegitimate creation of “propaganda”, and the fuzzy line between them is well explored in texts such as Yudof, M. (1983). *When government speaks: Politics, law, and government expression in America*. Berkeley, CA: University of California Press; and Tussman, J. (1977). *Government and the mind*. New York: Oxford University Press.

that focused on human health risks (U.S. Department of Agriculture, 2002b,c, 2004a,b). The reports did not include any model language, and they did not include recommendations for dealing with information uncertainty. The recommendations suggested that states

- provide a usable synopsis of the best scientific information about human health risks associated with CWD so that hunters can make an informed choice about hunting;
- provide information about the availability and logistics of animal testing;
- provide precautionary information about handling animals and meat;
- do not claim that CWD testing ensures food safety; and
- develop customized materials for stakeholder groups (such as meat processors and landowners).

While the report recommended development of a disease management plan in each state, this recommendation was listed as a disease management goal, not a communications goal.

3. Study design and methodology

We analyzed the CWD information provided on state wildlife agency Web sites in Colorado, Utah, Wisconsin, and Wyoming. In selecting states for inclusion in the study, we initially reviewed the wildlife agency Web sites of all states with CWD infections in wild cervid herds during June of 2004.⁷ From those states, we chose a subset of four state wildlife agency Web sites to examine more closely. In order to maximize the variance in amounts and types of information available, we chose two state wildlife agency Web sites with the largest numbers of HTML and PDF files (Colorado and Wisconsin) and two states with the smallest number of HTML and PDF files (Utah and Wyoming). The sampling strategy also allowed comparison between states in which the disease had been present for some time (mid-1980s in Colorado and Wyoming) and states in which the disease was relatively new (2002 in Utah and Wisconsin).

We conducted a full audit of the information available on the wildlife agency CWD Web sites from Colorado, Utah, Wisconsin, and Wyoming in June 2004.^{8,9} We defined the CWD

⁷ States reporting CWD in wild herds during June 2004 included Colorado, Nebraska, New Mexico, South Dakota, Utah, Wisconsin, and Wyoming.

⁸ CWD information production is largely seasonal with new information produced for each fall hunting season during the summer and during the hunting seasons. By collecting data in June 2004, we therefore captured the information created for the public up through the winter 2004 hunting season.

⁹ We first identified those states that had active CWD infections in wild cervid populations. We then searched the Web sites of state wildlife, agricultural, and natural resource agencies to identify which agencies published the most information about management of CWD in wild cervids. We found that state wildlife or natural resources agencies maintained the most comprehensive CWD Web site in each state, and we therefore refer to their Web site as the state CWD Web site. In some cases, state agricultural agencies managed CWD in captive cervid herds. In these cases, we also reviewed current policies on those sites, but we did not include the agriculture agency's materials in our data collection unless the materials contained direct links from the state wildlife agency CWD Web site.

Table 1
Number of documents by type

Types of documents	CO	UT	WI	WY
Navigation page	1	1	1	
Rules/Law/Policy, Orders	1		6	
Plans/Management actions	4		1	2
Letter or Memo	2		2	
Report	5		7	
Fact sheet/FAQ/Brochure/Newsletter	3		15	7
Testimony or public hearing/meeting	1		2	
Other information type	4			
Press release	56	11	114	15
Research articles	23			
Maps of CWD	5	2	13	5
Datasets	1	1	1	1
Bibliography	1		2	
Test results application	1	1	2	1
Forms	2			
Questionnaire/Survey			1	

Web site as all documents listed under a CWD file structure within the agency Web site. We also included documents on other state agency Web sites (within the same state) that contained direct links from the CWD Web site.¹⁰ Documents included text-based objects, video, audio, images, and data tables.¹¹ We identified the number, types, and subject matter of each document. Each document was classified into a genre or “type” based on the document type categories defined under the Government Information Locator Service (GILS) metadata scheme (e.g., FAQ, press release, official report).¹² Each document was assigned only one document type; therefore, when confronted with documents that included multiple elements (e.g., a Web page containing both FAQ information and the summary of a regulation), we chose a dominant document type (see Table 1). Each document was also assigned a CWD subject heading from a code sheet developed through a pilot analysis of Wisconsin’s CWD documents. Each document could be coded for multiple subjects, and most documents were assigned at least two subjects¹³ (see Table 2).

¹⁰ We only included linked content if the link directed users to a particular document (as opposed to a portal site or homepage). State CWD Web sites were typically small, with only 3 or 4 levels of content and 4–7 main subcategories of information. We explored each subcategory, each level of content, and any associated links.

¹¹ Drawing from the Society for American Archivists definitions, we defined document broadly as information in digital form that has been compiled and formatted for a specific purpose or representation.

¹² We based our document type scheme on the state of Utah GILS Resource Type controlled vocabulary and the Australia Government Locator Service controlled vocabulary for “Document Types.” The typology was pretested with the documents from the Wisconsin DNR Web site. The first author and a trained research assistant read each document and assigned a document type.

¹³ We used a coding rule that if at least 75 percent of the document referred to one subject, then we only coded it as that one subject. But if more than 25 percent of the document addressed a second subject, then we double or triple coded the document as needed. The first author and a trained research assistant also assigned each document subject headings.

Table 2
Number of documents by topic

Topics included in agency documents	Number of documents containing topic			
	CO	UT	WI	WY
1. Human health risks related to the disease	7	1	7	3
2. Descriptions of management actions and procedures for controlling the disease	24	1	19	5
3. Management program reviews or critiques	2		2	
4. Disease demographics including how many deer have it, where diseased deer are located	8	1	2	8
5. Disease surveillance methods (how to collect data on how extensive the disease is)	3	1	4	4
6. How the disease works, what causes it, how it spreads, possible treatments	16	1	4	3
7. Public opinion related to policies			3	
8. Descriptions of agency services or agency endorsed services, for example, testing	4	1	2	
9. Descriptions of scientific research in which the state is participating	2		2	1
10. Limitation of CWD tests on test results page	1	1		

In addition to analyzing the documents, we also examined tabular and map data on each Web site and noted the number of CWD samples collected by each state, the geographical scale at which the CWD sample data were presented and the confidence intervals produced for estimating the likelihood of diseased animals in a given geographical area. We also collected and reviewed state policies relevant to CWD.

We also conducted a content analysis of CWD newspaper coverage from January 2002 through August 2004 in order to better understand the nature of the CWD controversy across the states.¹⁴ Analysis included at least two newspapers from each state: the state capital newspaper, a newspaper in another major city within or nearby the CWD infected areas, and (if available) a small town newspaper from within the CWD infected area.^{15,16}

¹⁴ We chose January 2002 because Wisconsin discovered CWD in wild cervids at the end of January 2002.

¹⁵ Colorado newspapers included the Denver Post, the Colorado Springs Gazette, the Rocky Mountain News and the Craig Daily Press. Utah newspapers included the Salt Lake Tribune, the Deseret News, and the St. George Spectrum. Wisconsin newspapers included the Wisconsin State Journal and the Milwaukee Journal Sentinel. Wyoming newspapers included the Wyoming Tribune Eagle, the Caspar Star Tribune, and the Lusk Herald.

¹⁶ We used on-line newspaper archives or the ProQuest database to search the archives of each newspaper for the terms “CWD” or “chronic wasting disease.” Searches of some Colorado and Wisconsin newspapers produced several hundred articles per paper during the two-and-a-half year period of the sample. In these instances, given resource constraints, random subsets of some newspapers’ articles were analyzed. In Colorado, we analyzed the complete set of 243 Rocky Mountain News articles, 23 Colorado Spring Gazette articles, and 36 Craig Daily Press articles. We analyzed a random sample of 50 of The Denver Post’s 138 articles. In Wisconsin, we analyzed the complete set of the Wisconsin State Journal’s 565 articles, and a random sample of 50 of the Milwaukee Journal Sentinel’s 672 articles. We analyzed all articles from Wyoming and Utah papers.

4. Findings

This section briefly describes the sample CWD Web sites in terms of document types contained and topics addressed. It then briefly describes differences in state press coverage of CWD. As noted in the sampling section, we controlled for differences in Web site size/numbers of documents by selecting states with high and low numbers of documents. This section therefore focuses on the differences in types of documents, subject matter, and level of detail found within key documents.

As [Table 1](#) shows, document types common across the four sites included press releases, maps of disease locations, CWD testing datasets, and CWD test results applications. All states contained FAQ information, although Utah's was embedded in its main navigational page so it does not appear as a distinct document in [Table 1](#).

Not all states provided the same information types. For example, Colorado, Wisconsin, and Wyoming included CWD management plans, but Utah only briefly described management actions on its homepage. Colorado and Wisconsin provided several additional document types that Wyoming and Utah did not offer, including official rules and orders, letters to stakeholder groups (landfill managers, meat processors, taxidermists, and landowners), agency disease management reports, testimony from public hearings, and bibliographies of scientific articles. Colorado was the only state to provide full text access to scientific articles related to CWD. Wisconsin was the only state to publish an electronic copy of a questionnaire distributed at public meetings and the transcripts of a public meeting (Colorado published the transcript of legislative testimony by agency experts).

The subject matter addressed by the Web sites showed some commonalities but some important differences. As outlined in [Table 2](#), subjects common across the four states included human health risks related to the disease, descriptions of management actions, disease demographics, surveillance methods, and information about CWD. But not all Web sites addressed all subjects. Only Colorado and Wisconsin included external reviews of their management plans. Further, only Wisconsin documents included public opinion of disease management strategies and actions.

Also of interest to our question of what types of information government agencies ought to provide are distinctions in levels of detail provided about key topics across the state Web sites. We saw a good deal of variation here. For example, not all states included information on the limitations or reliability of CWD tests. We found limitations statements on the Utah and Colorado Web sites—the Colorado test results page warns that “. . .no testing process can assure 100% accuracy for CWD diagnosis. Consequently, ‘Not Detected’ test results do not exclude the possibility of an individual deer or elk being infected with CWD.” According to interviews with agency staff, Wisconsin provided a similar warning on its test results display page (which this research could not access). But according to a conversation with a Wyoming agency source, their test results display page did not contain a warning and we could not find one on the Web site.

In another example of variation in detail provided, while all four states provided tabular and graphical data about the number and location of diseased animals, the data differed in terms the number of cervids sampled, the range of the surveillance, the scale at which testing

results were reported, and the confidence interval with which each state could claim a given area was disease free. These differences are arguably important to hunters deciding whether or not they want to hunt in a given area or whether or not to have their animal tested. Agency claims that a given area did not contain the disease were based on confidence intervals generated from the sampling data. The confidence intervals estimated the likelihood that the sampling would show at least one positive animal if 1 percent or more of the animal population was diseased. Colorado, Wisconsin, and Wyoming provided statewide information (i.e., collecting samples from every geographical analysis unit) at least one year during the study period, while Utah only conducted targeted surveillance sampling (i.e., only collecting samples from certain geographical analysis units).¹⁷

The press coverage of CWD varied drastically across the states. Coverage in Wisconsin was heaviest with one paper featuring 672 CWD items during the study period. In 2002, Wisconsin papers routinely featured over thirty CWD items per month—with peaks of over fifty items per month. Colorado had the second highest press coverage with the top coverage paper carrying 243 CWD items during the study period. In Wyoming, the top coverage paper included ninety-six items during the study period. In comparison to other states, news coverage of CWD in Utah was light with only twenty-seven total articles during the study period in the top coverage paper.

5. Analysis and discussion

We organize our analysis in terms of four views of government information obligations and their relationship to citizen–government relationships outlined earlier. We do not suggest that provision of information defined under the types will *cause* certain types of citizen government relationships; rather, we argue that certain information facilitates certain relationships better (Chadwick and May, 2003).

In the first view, the “private citizen view,” government should produce information that aids citizens in making decisions regarding private choices. In the second view, the “attentive citizen view,” government should produce information that aids citizens and interest group oversight of the decisions made by agencies. In the third view, the “deliberative citizen view,” government information should aid citizens in participating in deliberative processes, including debating and evaluating the merit of policy alternatives. In the fourth view, the “citizen publisher view,” government information supports multilateral debate and discursive information production among a number of civil society organizations. Within each view, some variation may occur in types of information provided. Web sites may provide just *core* information such as the outcomes of policy deliberation or data analysis, the evidence used to

¹⁷ The confidence intervals varied based on the number of samples taken, and areas that had generated more samples reported higher confidence intervals. This variation in can be partially explained by differences in herd sizes and environments across the states. Because Wisconsin has denser wild cervid herds and more hunters, it has the ability to take more samples than other states. States experiencing low herd numbers due to droughts and drier habitats may be harder pressed to obtain sufficient sample numbers.

develop or justify the core information, or competing evidence and interpretations of data or data interpretations.

5.1. *Private citizen assessment*

In terms of the private citizen view of government information, our data suggest that each state is providing some core information, including most of the information recommendations set forth by the federal/state CWD working group. But data do show differences; for example, because it could not sample as many deer, Utah provided less information about the location of diseased animals compared to other states. Findings correlate with hunter surveys which show greater percentage of deer hunters in Utah stated they did not have enough information about where CWD was found in the state (Needham et al., 2004, 2005; Vaske et al., 2004). But hunters may not be the only stakeholder group needing more core information—not all states provided customized information for meat processors and landfill owners on Web sites. States also differed in terms of how much evidence they provided to support their core information. For example, Colorado, Wisconsin, and Wyoming included descriptions of how data was collected; Colorado and Utah included fuller warnings about test results limitations.

5.2. *Attentive citizen assessment*

The attentive citizen view of government information requires agencies to produce information to facilitate citizen and interest group oversight of government decisions. We found that not all the state Web sites included this type of information. This may stem from the lack of attention to oversight information in the federal/state working group information recommendations. As described earlier, the report's communications recommendations focused largely on human health concerns; as an example, the working group recommendation to develop a disease management plan was not listed under public communications recommendations—suggesting that the group did not consider public knowledge of management plans an important communications goal.

Some have argued that collection and dissemination of performance information informs the public of agency successes and failures and increases public accountability (Lee, 2004). Neither federal agencies nor the federal/state task force suggested any performance measures. Wyoming's CWD site was the only site to include this information—listing policy goals as part of its Management Plan.¹⁸ Colorado had CWD management performance measures in its agency strategic plan, but these measures were not referenced on the CWD Web site. It would have been difficult for citizens to find these measures for oversight purposes.

Looking over the data from Tables 1 and 2, one can argue that Utah's Web site would least support citizen oversight, and Colorado and Wisconsin's Web sites would best facilitate oversight. On one hand, all of the states published annual summaries of

¹⁸ Wyoming's 2003 Management Plan lists 13 goals. We did not find any content from Wyoming reporting its success in meeting its goals.

surveillance activities—which can be thought of as progress reports. On the other hand, despite 2004 federal/state working group recommendations that states develop a disease management plan, not all states had done so. For example, we were unable to easily find a comprehensive source of core information about disease management strategies in Utah.¹⁹ The lack of access to a comprehensive management plan detailing decisions and actions (whether because no such plan exists or because it was not made available) arguably limits Utah citizens' ability to review and critique the agency's actions. Our finding corresponds with hunter survey data showing that 62 percent of Utah deer hunters disagree that they have "enough information" about what the state agency is doing about CWD (Needham et al., 2004, 2005; Vaske et al., 2004).

Colorado and Wisconsin Web sites included additional information types and subjects that might facilitate citizen oversight including rules and orders related to CWD management and the results of an external critique of management plans. Further, Colorado and Wisconsin may have better facilitated citizen oversight of science-based decisions by providing evidentiary information such as expert legislative testimony and references for scientific research used in policy creation. By providing these references, the agency arguably facilitated citizens' ability to obtain, read, and formulate their own conclusions about these studies. Our analysis corresponds with survey data showing that more hunters in Wisconsin and Colorado agree that they have enough information on what the agency is doing about CWD (Needham et al., 2004, 2005; Vaske et al., 2004).

5.3. *Deliberative citizen assessment*

Under the deliberative citizen view of government information, agencies should provide information that facilitates citizen participation in deliberative processes. In this view, the goal of government information should not be to reduce conflict about a policy, but rather to increase citizen understanding of its complexities and facilitate public debate (National Research Council, 1989, 1996). Agencies should avoid persuasive messages, acknowledge both sides of a debate, give conflicting claims a fair and balanced review, describe the risks and benefits of alternative actions, describe all uncertainties, disclose data gaps and disagreements, and describe who is responsible for decision making (National Research Council, 1989; Covello et al., 1987).

In this view, government information should encourage citizen participation; but, approaches for citizen participation vary in terms of locus of debate and decision making. Some approaches merely collect citizen opinions as input for the agency expert debate and decision-making. Other approaches seek to foster deliberation by citizens either among themselves or with policy experts through various public participation models, and still other approaches advocate agency facilitation of stakeholder decision making (Decker and Chase, 2001). Citizen participation tools include (from low to high participation in decision making)

¹⁹ Limited information was found in the monthly agency magazine, the state deer management plan, and the state code, none of which contain direct links from the CWD Web site.

surveys and focus groups that measure public opinion, citizen panels to evaluate policy options presented by agency experts, and citizen task forces that work with agency experts to develop recommendations based on known data (National Research Council, 1996). We refer to information approaches that support citizen input into agency decision making as the “deliberative citizen approach” and approaches that incorporate more citizen decision making and citizen direction of information production and dissemination as the “citizen–publisher” approach.

5.4. *Citizen–publisher assessment*

Under the citizen–publisher view of government information, agencies provide information to support multilateral policy debate and participatory decision making. On one hand, debate may be fostered within the constrained context of a government supported participatory body such as a citizen task force (Chase et al., 2000); or, information may be aimed at encouraging broader public debate and consensus making (Chadwick and May, 2003). Regardless of the scope of the debate, in this view, citizens take a more active role in the production and dissemination of information. The information dissemination role of agencies here includes providing information to support debate, but it might also extend assistance in disseminating information produced by citizen task forces or civil society organizations—for example by providing links to stakeholders’ Web sites or by providing an electronic forum where different stakeholder can provide information (e.g., through browsable e-public comment systems).

To assess the degree to which the Web sites supported the deliberative citizen view or citizen–publisher view, we first examined to what extent the Web site would support citizen input for policy making. As noted in Table 1, none of the sites contained online surveys that actively solicited public input. But each of the states was involved in the mail-based surveys of hunters (Needham et al., 2004, 2005; Vaske et al., 2004). Only Wisconsin had published the results of the mail-based surveys, arguably providing citizens with a better understanding of the breadth of hunter opinion. All the sites typically provided information to contact an agency customer service center or the site Webmaster, but they did not identify specific CWD decision makers or provide direct contact information for them. Wisconsin provided transcripts of some public meetings, which might also provide citizens with an understanding of the breadth of public opinion.

Colorado’s governor did name a stakeholder taskforce to provide policy recommendations; however, the Colorado Web site contains no information about the taskforce’s deliberations, information used in deliberations, or the ultimate recommendations.²⁰

We also examined whether the categorization and labeling of information on the Website highlighted areas of debate or uncertainty so as to encourage increased public under-

²⁰ Newspaper reports describe the taskforce as deliberating evidence and providing recommendations to the Governor. Browsing the Colorado Governor’s Website list of commissions and panels suggest that no Web site was ever established for the panel and none of the panel’s recommendations are published on the CWD Web site.

standing of the complexities of policy choices. No Web site grouped or labeled chunks of content in terms of policy choices, different interpretations, areas of controversy, or uncertainties. We also examined categorization and labeling of individual documents to see if their organization highlighted areas of uncertainty or debate. We found only one Web site document that did so—Wisconsin's environmental impact statement labeled sections discussing possible policy effects and policy alternatives.

We also looked at individual document contents to see to what extent they might address areas of uncertainty or debate regardless of their organizational structures. In general, all the states described areas of uncertainty about human health implications and disease spread. Wyoming and Utah provided less information about uncertainties associated with management strategy outcomes. Further, none of the states provided much information describing uncertainties associated with carcass disposal or prion longevity. Arguably, this lack of information would limit citizen learning about the complexities of policy choices in these areas.

Additionally, some Colorado and Wisconsin documents addressed areas of debate. Both states published external evaluations of their CWD management programs that suggested some alternative goals for management. Colorado and Wisconsin CWD management plans briefly described some alternative policies or competing truth claims; however, they did not provide references to obtain more information on these positions. The Wisconsin environmental impact study considered the costs and benefits of different policy choices. None of the sites contained links to organizations which promoted alternatives to the agency CWD policy.

None of the Web sites in our sample contained content that would explicitly support multilateral debate and decision making. One can characterize the information provided by agencies as explaining and supporting policy decisions rather than displaying a range of options to facilitate multilateral debate.

5.5. Agency information valuation framework

In this section, we return to the paper's goal of creating a valuation framework for government information (GIV). We lay out general information requirements for each information approach defined by the GIV. We recognize that the categories we present are overly simplistic. In reality, the between categories are fuzzy, and in most cases a hybrid information approach may be desirable.

In the private citizen view, government information educates citizens so that they can make informed decisions about their own actions. This approach may require conversations with citizens about information needs and information preferences related to personal decision making.

The attentive citizen view would include the above described information but would have the additional aim of facilitating greater citizen oversight. In this view, agency experts make decisions, but the agency provides sufficient information such that interested citizens could oversee the policy-making process and could raise concerns ([National Research](#)

Council, 1996). We suggest several possible levels of information provision in the attentive citizen approach.

- (a) Agencies provide information fully describing actions taken to manage the problem, and agencies provide performance criteria so that citizens can hold officials accountable for agency performance.
- (b) Agencies provide all information necessary to justify policy decisions including evidence and assumptions used in decision making.

The deliberative view of government information assumes that citizens actively deliberate policy options and participate in policy making by providing input to agency decision making via opinion polls, citizen panels, or other mechanisms. The role of government information is to educate citizens so they can provide input to agency decision makers. This would include all of the information described for the attentive citizen approach and additional information types described below:

- (c) Agencies provide information on the nature of the problem, the current solution, and evaluation tools used to make policy decisions (predictive models, cost-benefit analyses, impact statements), so that interested citizens can decide if the decision makers have the problem and the management approach right.
- (d) Agencies summarize or provide references to any data discounted in decision making, and explain the reasons for discounting the information.
- (e) Agencies briefly describe alternative policy choices or problem conceptions and explain why they were not adopted so that citizens are aware of the range of the policy debate.

These suggestions are similar to the U.S. Office of Management and Budget's Information Quality Act guidelines for "influential" information that require agencies to provide sufficient information such that interested parties could conduct an independent reanalysis and come up with similar conclusions (*Office of Management and Budget, 2002*).²¹

To accomplish this, agencies could use information architecture (choices about how to group information, category labels, and descriptive titles) to highlight areas of debate or uncertainty, both within the Web site and within individual documents. Web sites could also provide references, or links, to more information on different viewpoints. In this view, agencies would also create mechanisms to collect public input and then make the summaries of public input available on the Web site.

In the even more participatory citizen–publisher view, the role of government information is to facilitate policy debate and decision making through multilateral information flows between participants in a citizen task force or among wider civil society organizations (*Chadwick and May, 2003*). Within the context of a citizen task force, information provided

²¹ Note that neither the Information Quality Act, nor the OMB implementation guidelines apply to state agency information. See note 1.

Table 3
Government information valuation framework

Information approach	Purpose of information	Types of information required	Information creators:	Relationship between citizens and government
Private citizen	Information facilitates personal decision making	Information that will facilitate citizen personal decision making related to the policy issue of interest	Agency experts	Government minimizes its intrusion into the lives of citizens. Most decisions left to individuals
Attentive citizen	Information facilitates citizen oversight of agencies and of agency decisions	All of the above, and description and justification of agency policies or decisions, including: evidence and assumptions used in decision making, cost benefit or impact analysis of chosen policy, and performance measures	Agency experts	Government provides information in order to facilitate citizen oversight of government activities
Deliberative citizen	Information facilitates citizen debate of policy issues and input into agency policy making	All of the above, and descriptions of policy alternatives; assessment methodologies, models, or frameworks used by agency to evaluate different alternatives; costs and benefit analysis and impact studies of alternative actions; contradictory data and uncertainties in scientific results; information discounted during policy making, and the reasons for discounting	Agency experts with citizen input	Citizens provide input into policy making through techniques ranging from citizen opinion polls to citizen panels
Citizen publisher	Information facilitates citizen debate and decision making	All of the above, and information requested by, or created by, citizens or civil society groups participating in policy making	Citizen decision makers	Citizens participate in policy deliberation and decision making, as part of a citizen task force or as part of wider debates and consensus building between civil society organizations

to or created by the citizen decision makers would also be available to the public at large in order to foster a wider public debate about the policy decisions (Chase et al., 2000). To support wider civil society debate, the Web site might seek to post or link to material from different stakeholder groups or provide a forum for online discussion. More aggressively, a Web site might give authorial voice to opponents allowing them to post their own materials within an agency maintained neutral space in which policy debates can take place.

Table 3 summarizes each view, the information required under each view, whether information production and dissemination is primarily agency or citizen-driven, and the assumptions about citizen–government relationships underlying each view.

6. Conclusions

Recent e-government research investigates the extent to which government Web sites could change of the relationship between citizens and government in governance. In analyzing Web sites, however, most studies have focused on their transactional elements. The degree to which text information might support different citizen–government relationships is not considered, or if it is considered, its measurement/assessment is very limited.

Empirical examination of how electronic government might change the relationship between citizens and government requires fuller consideration of the role of text information. Without more attention to text information, we cannot begin to ascertain whether Bimber's vision of 'information abundance' actually reflects the reality on government agency Web sites (Bimber, 2003). This research raises several questions that require further inquiry: Under what circumstances are Web sites providing information that facilitates increased citizen and civil society participation in governance? Are these types of information too costly to produce and maintain? (Eschenfelder, 2004). Do agencies really seek to use Web sites to change their relationship with citizens, or do they see them as tools to reinforce their positions of information power in a policy debate? (Fountain, 2001).

Investigation of the degree to which text information could support various citizen–government relationships is in a relatively immature stage. We argued in this paper that many current approaches are hobbled by their agency level of analysis, which precludes consideration of the importance of particular document genres or topics. Existing approaches are also limited by lack of a theoretical framework for placing value on information. Without such a framework, one must rely primarily on quantity (i.e., number of documents) to assess value.

The GIV framework presented in this paper represents a first step toward overcoming these problems. It provides a tool to consider the value of Web site text information in supporting various citizen–government relationships. But the GIV has several limitations. For example, from a broader information systems evaluation perspective, the framework offers only one perspective on what should be valued about government Web site textual information. We measure the value of the text criteria against a set of characteristics based on various visions of citizen–government relationships. But other value criteria are possible and could offer different insights. For example, the GIV does not consider the usability of the information.

Furthermore, it does not assess the adequacy of information in light of real-life information challenges or demands made by stakeholders, which may vary considerably over different policy areas. Finally, the GIV does not explicitly directly address issues of information quality, either as defined by federal regulations such as OMB's Information Quality Act implementation rules (Office of Management and Budget, 2002) or through information science research (Stvilia, Twidale, Smith & Gasser, 2005). We argue, however, that the GIV better facilitates investigation of certain quality dimensions, such as 'information complexity' and 'informativeness' or 'utility' due to its policy level focus and its inclusion of document genres and topics.

The GIV does not represent the only framework to measure or assess Web-based government text information. Rather, we hope that future research might develop a range of valuation criteria for Web site text information that place value on different criteria (i.e., citizen–government relationships facilitated, cost of producing and maintaining information, comparison to actual stakeholder information demands or challenges). Further, the GIV does not provide the information that existing Web site usability and customer experience assessment tools can provide. We imagine that the GIV would be used in a modular approach as a complement to existing tools.

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