Public Preferences on the Integration of Natural Resources Information in Land Use Planning & Zoning:

A Survey of Local and Regional Planning Officials

Report # 2007-04

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Public Preferences on the Integration of Natural Resources Information in Land Use Planning & Zoning: A Survey of Local and Regional Planning Officials

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Executive Summary

Michigan's most valuable asset is its wealth of natural resources. Land use trends over the last half-century and those projected for the first half of the twenty-first century have raised serious concerns about the impact of land use on Michigan's natural resources. In spite of a relatively stable state population, the population distribution has become increasingly dispersed. This dispersion manifests itself, and its socio-economic and environmental impacts, in low-density development patterns in the outer ring suburbs, in rural communities along major transportation routes, and along major water bodies including the Great Lakes. In recognition of these concerns, the Michigan Land Use Leadership Council (2003) highlighted the need for local governments to make land use decisions in a long-term, landscape-level context.

In Michigan, land use planning may take place at the regional, county, township and/or municipal level, while zoning may take place at the county, township and/or municipal level. If local officials are to evaluate the long-term impacts of land use decisions on the environment, they need the local capacity to access and understand the various types of natural resource information available. With over 1,800 local units of government with distinct needs and abilities, it is unknown what types of natural resource information are readily or rarely used, how natural resource information is incorporated into land use decisions, how satisfied local governments are with natural resource information, how important natural resource information is, and what needs or services could improve the integration of natural resource information in land use planning and zoning decisions.

To assess these questions, a survey was mailed to all townships (1,242), counties (83), and regional planning commissions (14) in Michigan concerning the integration of natural resource information in local land use planning and zoning. Of the 1,339 local governments that were contacted, 940 (70%) returned a usable survey, of which 865 were from townships (70% of the townships), 60 were from counties (72% of the counties), and 13 were from regional planning commissions (93% of the regional planning commissions). Approximately 72% of all townships and 76% of county governments in Michigan have adopted a basic land use plan or Master Plan, while zoning ordinances have been adopted in 76% of townships and 37% of counties.

Fifteen different types of natural resource information were defined in the survey including: agricultural, wetland vegetation, upland vegetation, invasive plant species, wildlife species, invasive animal species, endangered and threatened species, geology, surface water, ground water, soils, land cover/land use, topographic, comprehensive green space map, and other natural resource information. The most common types of natural resource information used by local governments include surface water, land cover/land use, soils and wetland vegetation information. Excluding the "other" category, invasive animal, invasive plant, wildlife, and endangered and threatened species information are used least often by local governments in land use planning and zoning activities.

Local governments were asked how important 15 different types of natural resource information were for future planning and zoning decisions. The following types of information were identified as "very important" in respective order: 1) surface water, 2) ground water, 3) land cover/land use, 4) wetland, 5) soils, and 6) agricultural information. When forced to choose the top three most important types of natural resource information for future land use planning and zoning, and when an importance index is applied, results change slightly to: 1) surface water, 2) ground water, and 3) agricultural information. The index provides a more accurate interpretation of information importance. Invasive plant, invasive animal, endangered and threatened species, and wildlife information were identified as both least important and least understood by local governments.

One-third of local governments "always" used natural resource information when creating or updating a Master Plan and zoning ordinance, while only one-quarter of local governments "always" used natural resource information when conducting site development reviews. The low number of local governments that consistently incorporate natural resource information into Master Plans, zoning ordinances and site development reviews reflects a shortcoming that should be addressed in Michigan. A related survey question indicates there is a "great need" among local governments to know where to access natural resource information and to fund the acquisition of natural resource information. Regional planning commissions expressed the greatest need for knowing where to access information, followed by townships and counties.

Survey results show the types of natural resource information that local governments use and the types of information that are important for decision making are very similar. Such findings are not surprising since surface water, ground water, land cover/land use, soils, agriculture and wetland information have immediate social, economic and regulatory influences on human activities (e.g. community character, clean drinking water, recreation, development, etc.). What are notable however, are the types of natural resource information that are not commonly used and not currently important to local governments. The use and integration of invasive plant, invasive animal, wildlife and rare species information is critical to the future of Michigan's biological diversity and ecological integrity. An educational program that focuses on the more obscure but equally significant types of natural resource information would benefit the future viability of Michigan's natural resources.

This preliminary report identifies the types of natural resource information that are commonly used and most important to local governments, along with the types of natural resource information that are rarely used, not accessible and/or not well understood. Insights into how natural resource information should be delivered, how information is incorporated and what level of development pressure exists, are also reported. A future report will include additional spatial analysis of the survey results and the reflections of 30 local government officials that will be interviewed about the current and potential role of natural resource information in land use planning and zoning activities. Interviews will be conducted in the Upper Peninsula, Northern Lower Peninsula and Southern Lower Peninsula with 21 township officials, 6 county officials and 3 regional planning commissions.

Natural resource issues are biologically complex and are inherently affected by human beliefs and decisions. An important strategy to minimize the negative impacts of development patterns

on the environment is to provide local government decision makers with natural resource information that is comprehensive, user-friendly, accurate and current, while keeping in mind end users may have differing information needs and requirements. Communication and cooperation among local, state and federal government is required if Michigan's natural resources are going to be effectively conserved. Admittedly, information sharing among multiple levels is not easy, but improvements can and are being made to make natural resource information more accessible. The results of this study will help natural resource agencies and organizations address the information needs of township, county and regional governments in Michigan.

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1.0 Introduction

In 1908, in response to rapid population growth from successful industrialization and natural resource exploitation, Michigan passed legislation identifying itself as a "home rule" state (MSPO, 1995). The principle of "home rule" assumes that local governments are better suited to create regulations and make decisions that affect residents at the local level. Twenty U.S. states have some form of home rule legislation at the town or township level (NATT, 1988). Mostly east of the Mississippi River, they include Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island in the New England region; New York, New Jersey and Pennsylvania in the Mid-Atlantic region; and Michigan, Ohio, Indiana, Illinois, Wisconsin, Minnesota, North Dakota, South Dakota, Kansas, Nebraska and Missouri in the Midwest. Variation does exist among regions. In New England, county governments are limited or nonexistent in the roles they perform. There, towns are the primary player in local self governance. In the Midwest, townships and counties actively share government responsibilities.

The roles and responsibilities of land use planning and zoning in Michigan are numerous, complex and at times, overlapping. Local governments are given authority to administer their affairs through the state constitution and statutory laws. In 1921, Michigan adopted the City and Village Zoning Act which set the standard for state zoning (MTA, 2003). Zoning allows local governments to identify what types of land uses and development densities are allowed in certain districts or zones. Typical zoning regulations were adopted to protect the public's health, safety and general welfare. In 1943, the County Zoning Act and Township Zoning Act were adopted and established the regulatory authority for modern zoning in Michigan. Due to confusion about zoning laws and differences among municipalities, townships and counties, the three separate jurisdictional zoning acts were integrated into one Michigan Zoning Enabling Act in 2006.

Soon after early zoning regulations were instituted, it became clear municipalities needed to anticipate land use conflicts, identify opportunities and develop solutions in communities undergoing rapid development. In 1931, Michigan established the Municipal Planning Act to allow planning in villages and cities. Following municipal planning, the Regional Planning Act and County Planning Act of 1945 enabled the creation of regional and county planning commissions. Regional planning commissions bring county and township governments together to identify, administer and provide information, programs and planning at a more economical and effective scale. The Township Planning Act of 1959 allowed the adoption of a "basic plan" and the creation of township planning commissions (MSPO, 1995). Since 1959, amendments have been passed to improve coordination, notification, content and natural resource protection in the planning acts above, although, it is anticipated that a unified planning enabling act will be passed in the near future to improve planning in Michigan.

Township and county governments in Michigan are not legally obligated to develop land use plans or to implement zoning. However, if a township has not adopted zoning but the county has, the township is subject to county zoning. If at any time the township adopts its own zoning ordinance, it is no longer subject to county zoning. Similarly, a local government may develop a basic land use plan or Master Plan to guide future development. If a township does not adopt a Master Plan and their county has, the township is subject to county planning. If at a later time the township adopts a Master Plan, it must submit a copy to the county or regional planning

commission (MTA, 2003). Once approved, the township is no longer subject to county planning. Sometimes neither county nor township planning or zoning is implemented. This tends to occur in rural areas with low population densities. Interestingly, adoption of a zoning ordinance does not require adoption of a Master Plan, although, many local governments adopt both for more complete and comprehensive self governance.

Local land use decision making is a difficult balancing act between public versus private interests and frequently competing social, economic and environmental objectives. In 1992, the Michigan Environmental Science Board identified the lack of land use planning in consideration of resources and ecosystem integrity as one of the greatest risks to the state's environment (MDNR, 1992). Human health and welfare, and ultimately human existence, is dependent on environmental quality. Land use - more than any other type of human activity - directly affects water quality, natural habitats, biodiversity, public health, ecological services, socio-economic conditions and community character (MUCC, 1993).

Recent surveys in Michigan have shown that adults are concerned about land use sprawl and the state's current development patterns (IPPSR, 2003). Due to public concern and the impact development can have on Michigan's natural resource based industries, a Land Transformation Model (LTM) was developed at Michigan State University to analyze the implications of current and future land use trends. LTM projections between 1980 and 1995 in 17 Michigan counties with updated land cover information indicate the built areas (those areas of residential, commercial, and industrial use, and roads) increased by 25%, while population grew by only 3% (PSC, 2001). This 8:1 ratio indicates Michigan's rate of land conversion to urban-like conditions is greatly out-pacing the rate of population growth. If current development trends continue between 1980 and 2040, LTM projections indicate the built areas of Michigan will increase by 178%. During the same time period agriculture, wetlands, forest and other vegetation are expected to decrease by 17%, 10%, 8% and 24% respectively. While this simulation model reflects an estimate of expected outcomes, the numbers are nevertheless a serious concern to those that rely on Michigan's land-based industries and the economic output of goods and services provided by the agriculture, recreation, tourism, mining and forestry sectors. The landscape fragmentation associated with a significant increase in the built environment will make resource production and resource conservation much more difficult.

As a result, one state agency has recently identified the threats and conservation needs to protect wildlife species and their habitats at the landscape and species level. In 2005, this resulted in the compilation of a Wildlife Action Plan by the Michigan Department of Natural Resources. This plan identifies fourteen statewide priority threats against wildlife species and their habitats (Eagle et al., 2005). Seven of the fourteen priority threats (e.g. fragmentation, riparian modifications, non-consumptive recreation, altered sediment loads, altered hydrologic regimes, altered fire regime, and social attitudes) specifically identify local land use planning roles as a conservation action need. These roles include incorporating, improving, initiating, and implementing programs and ordinances that protect and enhance natural environments. In order for local governments to implement such ordinances, they must have accurate natural resource information to justify their decisions. If Michigan's Wildlife Action Plan is to be successful, the Department of Natural Resources and other land management agencies and organizations must make natural resource information readily accessible to land use planning officials. An informed

citizenry will achieve a better future through coordinated and comprehensive land use planning, access to information, and creative use of new technologies.

To ascertain these information needs, this survey project was implemented to assist local land use decision makers, natural resource organizations and agencies, and related partners in the cooperative conservation of Michigan's unique and critical natural resources. This preliminary report compiles the results of a survey sent to all townships, counties and regional planning commissions in Michigan concerning their use, satisfaction, importance and need for natural resource information for local land use planning and zoning. A future report will include the results of the final phase of the project, 30 total face-to-face interviews with township, county and regional planning officials across the state.

The following project objectives are addressed with the survey:

- Identify the types of natural resource information being used by local governments in land use planning and zoning.
- Identify how often natural resource information is being incorporated into local land use planning and zoning activities.
- Identify how important different types of natural resource information are to future land use planning and zoning efforts.
- Identify how local governments would like to obtain natural resources information.
- Identify the information and service needs of local governments with respect to incorporating natural resource information into land use planning and zoning.

2.0 Methods

A 20-question survey (Appendix A) was mailed to the Clerk in all of Michigan's 1,242 townships and 83 counties, and to the Planner or Director in the 14 regional planning commissions. Names and addresses were retrieved from the Michigan Townships Association, Michigan Association of Counties and Michigan Association of Regions. The survey design and implementation followed Dillman's (2000) Tailored Design Method. Survey recipients were contacted up to five times when necessary through the first questionnaire, a reminder postcard, two replacement questionnaires, and a short non-response survey. The Tailored Design Method is based on the principles of social exchange theory which emphasize the survey's usefulness and the importance of a response from each person in the sample. Multiple contacts that differ in technique (e.g. cover letter, postcard, short survey) are essential to maximize response rates.

Surveys were mailed with a cover letter, and a self-addressed business reply return envelope was provided. The first questionnaire was mailed to 1,339 local governments in August 2005. A reminder postcard was sent two weeks after the first questionnaire. The second replacement questionnaire was mailed one month after the first questionnaire. The third replacement questionnaire was mailed one month after the second questionnaire. In an attempt to measure non-respondents, a shortened six-question survey was mailed one month after the third questionnaire. Local governments that returned the questionnaire did not receive replacement questionnaires. Survey results were analyzed using SPSS software.

3.0 Results

Of the 1,339 total questionnaires mailed, 994 (74%) were returned. Fifty-four (4%) returned questionnaires had no usable information. The remaining 940 questionnaires (70%) had at least one land use related question that was answered and used in the analysis. Of the 940 usable surveys, 865 were from townships (70% of the townships), 60 were from counties (72% of the counties), and 13 were from regional planning commissions (93% of the regional planning commissions). Two surveys were returned with the identification number torn off, but otherwise had usable information. Of the 345 questionnaires that were not returned after three contact attempts, 55 (16%) did respond to the short non-response survey. The most common reason for not filling the questionnaire out was the local government did not participate in zoning and/or planning activities. Survey results were calculated using absolute and relative frequencies, cross tabulations, and an index of importance. Detailed results are included in Appendix B.

Analysis begins by looking at local government planning structure and whether a basic land use plan and zoning ordinance have been adopted at the township and county level. Approximately 72% of all townships and 76% of county governments in Michigan have adopted a basic land use plan (Table B1). Zoning ordinances have been adopted in 76% of townships but in only 37% of counties (Table B2). The low number of counties adopting a zoning ordinance is likely due to the fact that in more urban and populous counties, local townships or municipalities are more likely to adopt their own zoning ordinances, which makes county zoning exempt.

According to a survey conducted in 2003 by the Institute for Public Policy and Social Research (IPPSR 2004), 68% of townships and 73% of counties had adopted a basic land use plan, while 71% of townships and 29% of counties had adopted a zoning ordinance. Although the overall response rate for the IPPSR survey was 93% and the overall response rate for this natural resource survey was 70%, a comparison of the results reveals similar responses (Table B3).

Natural resources were defined in the survey as: soils, surface and ground water, forests, minerals, air, fisheries, wildlife (common, rare, invasive), plants (common, rare, invasive), wetlands, grasslands, dunes, and other landscape features. The most common types of natural resource information used by all local governments, including regional planning commissions, are surface water (70%), land cover/land use (69%), soils (64%) and wetland vegetation information (62%) (Table 1). Regional planning commissions used this information most often, followed by counties and townships. Excluding the “Other Natural Resource Information” category, invasive animal (12%) and invasive plant (14%) species information are least often used by local governments, although, counties and townships are more likely to use this information than regional planning commissions.

Table 3.1 Have you used the following types of natural resource information in your land use plans, zoning ordinances or land use decisions/recommendations?

Types of Natural Resource Information	Yes		No		Total # of Respondents
	N	%	N	%	
Agricultural	451	59%	307	41%	758
Wetland Vegetation	472	62%	282	38%	754
Upland Vegetation	305	41%	435	59%	740
Invasive Plant Species	107	14%	633	86%	740
Wildlife Species	124	17%	620	83%	744
Invasive Animal Species	**88**	**12%**	651	88%	739
Endangered & Threatened Species	133	18%	604	82%	737
Geology	327	44%	411	56%	738
Surface Water	**529**	**70%**	225	30%	754
Ground Water	355	47%	391	53%	746
Soils	483	64%	266	36%	749
Land cover/land use	523	69%	233	31%	756
Topographic	399	53%	347	47%	746
Comprehensive Green Space Map	225	31%	504	69%	729
Other Natural Resource Information	68	14%	425	86%	493

Approximately 75% of all natural resource information used by local governments has been distributed in hard copy format, while land cover/land use information had the highest percentage of electronic distribution (36%) (Table B4). When asked in what format the information would be most preferred today, only 60% of local governments continued to prefer the hard copy format (Table B5). Townships specifically preferred hard copy information (63%), while counties (76%) and regional planning commissions (92%) preferred electronic information (Table B6). The decrease in the distribution of hard copy information from what has been used in the past to what is preferred currently, indicates local governments are making investments in computers and technology (e.g. GIS), although, a significant percentage of townships still lack the resources, capability or interest in electronically distributed natural resource information.

Local governments were asked how satisfied they were with the natural resource information they have used. After combining "very satisfied" with "moderately satisfied," and "moderately dissatisfied" with "very dissatisfied," respondents were most satisfied with surface water (66%) and land cover/land use (63%) information and least satisfied with ground water (10%) and wetland vegetation (8%) information (Table B7). When the "information was not available or available but not used" responses were removed from the analysis, surface water and land cover/land use information remained the most satisfactory, while the information respondents were least satisfied with shifted to invasive animal, invasive plant, and endangered and threatened species information (Table B8). It is notable however, that over 75% of the respondents indicated invasive animal, invasive plant, endangered and threatened species, and wildlife information was not available or not used. This may explain the lack of satisfaction with these types of information.

Natural resource information is used always, or 100% of the time, by 31% of local governments when creating or updating a Master Plan and zoning ordinance, and by 27% of local governments when conducting site development reviews (Table B9). Regional planning commissions (77%) are more likely to use natural resource information when creating or updating a Master Plan than counties (60%) or townships (53%), while regional planning commissions (54%) and townships (53%) use natural resource information equally when it comes to creating or updating a zoning ordinance. Townships (50%) and counties (49%) used natural resource information equally when conducting site plan reviews. Natural resource information is least likely to be used in transportation and utility planning.

When asked how important the 15 different types of natural resource information are for future planning and zoning decisions or recommendations, local governments overwhelmingly indicated surface water (72%), ground water (67%), land cover/land use (60%), wetland vegetation (58%), soils (56%) and agricultural (52%) information were "very important" (Table B10). Invasive plant (20%), invasive animal (19%), endangered and threatened species (16%) and wildlife (15%) information were identified most frequently as "not important" although, an almost equal percentage of local governments indicated they "don't know" enough about invasive plant (19%), invasive animal (18%), endangered and threatened species (16%), and wildlife information (16%).

When forced to choose the top three most important types of natural resource information from among the 15 types provided, answers changed slightly. That is, local governments indicated the "most important" type of natural resource information is agricultural, the "second most important" is surface water, and the "third most important" is soils (Table B11). To identify the overall importance of the 15 types of natural resource information, an importance index was created. The number of respondents identifying a type of information as "most important" was multiplied by three, the number of respondents identifying a type of information as "second most important" was multiplied by two, and the number of respondents identifying a type of information as "third most important" was multiplied by one. The results were then summed and divided by the highest possible score. The highest possible score a single type of information could receive is 2019, or the total # of respondents under the most important column multiplied by 3 (673 * 3 = 2019). This created an index between 0 and 1, with 0 being least important and 1 being most important. An example is provided for Agricultural information: (179*3) + (45*2) + (46*1) / 2016 = .333. The importance index scores were then ranked. Results indicate surface water information is most important, followed by ground water and agricultural information (Table 2). The index provides an improved measurement of importance versus frequency data alone. For example soils information drops from third most important in the frequency data to sixth most important with the importance index. Endangered and threatened species information and invasive species information were ranked as least important in both scenarios.

Table 3.2 Ranking the Importance of Natural Resource Information Using an Index Score

Future Most Important Information	Most Important	Second Most Important	Third Most Important	Importance Index	Rank
	N	N	N		
Agricultural	**179**	**45**	**46**	**.333**	**3**
Wetland Vegetation	76	75	53	.213	5
Upland Vegetation	9	16	20	.039	10.5
Invasive Plant Species	10	9	16	.032	14
Wildlife Species	12	16	20	.044	9
Invasive Animal Species	6	16	21	.035	13
Endangered & Threatened Species	3	5	7	.013	15
Geology	9	15	22	.039	10.5
Surface Water	**107**	**167**	**84**	**.366**	**1**
Ground Water	**115**	**125**	**80**	**.334**	**2**
Soils	29	56	93	.145	6
Land cover/land use	83	63	86	.228	4
Topographic	10	22	38	.055	7
Comprehensive Green Space Map	10	20	39	.054	8
Other Natural Resource Information	15	10	10	.037	12
Total # of Respondents	**673**	**660**	**635**		

There is a "great need" among local governments to know where to access natural resource information (59%) and to fund the acquisition of natural resource information (47%) (Table 3). Regional planning commissions (75%) expressed the greatest need for knowing where to access information, followed by townships (60%) and counties (44%) (Table B12). Regional planning commissions also expressed a great need for funding to acquire information (67%), followed by counties (58%) and townships (46%) (Table B13). Consultation with biologists on the environmental impacts of proposed land uses and the creation of ordinances to protect natural resources were in least demand by local governments, although, 50% of the regional planning commission respondents identified both services as a "great need."

While approximately 30% of local governments identified or anticipate the amount of residential and commercial development in their area as "greatly increasing" in the past five or next five years, just over 50% of respondents indicate a "somewhat increasing" level of development in the last five and next five years (Table B14). This moderate increase may be viewed as positive given Michigan's struggling economy. Less than 5% of respondents identified residential and commercial development as either "somewhat" or "greatly decreasing."

Table 3.3 With respect to incorporating natural resource information into land use planning and zoning, how much of a need do you have for the following information or services?

Information or Services	Great Need (1)		Somewhat Need (2)		No Need (3)		Total # of Respondents
	N	%	N	%	N	%	
Knowing where to access information	**471**	**59%**	**273**	**35%**	**51**	**6%**	**795**
Computer hardware or software information	242	32%	371	48%	155	20%	768
Funding to acquire information	**363**	**47%**	**306**	**40%**	**103**	**13%**	**772**
Interpretation of information	261	34%	407	52%	107	14%	775
Application of information	257	33%	410	53%	105	14%	772
Creation of ordinances to protect natural resources	236	31%	405	52%	133	17%	774
Consultation with biologists on environmental impacts of proposed land uses	173	23%	411	53%	186	24%	770
Other needs	24	13%	30	16%	135	71%	189

The demographic analysis of respondents follows. Just over half of the respondents were male (53%) versus female (47%) (Table B15). Because the survey was sent to the Clerk in all of Michigan's townships and counties, most of the respondents were Clerks (48%), followed by Supervisors (16%) (Table B16). The majority of respondents were elected (68%) and their position required making land use planning or zoning decisions/recommendations (68%) (Tables B17 and B18). The average number of years respondents have been in their current position is 10 (mean), although, the value that appears most frequently (mode) is one year (Table B19). The mode, in this case one year of service, indicates a high turn over rate in the land use planning environment. The mean age of respondents was 55.5 years old. The oldest respondent was 87 and the youngest was 22 years old (Table B20). Highest attained education level among respondents ranged from 20% who had a high school diploma, to 29% who had some college education, to 21% who had a Bachelor's Degree, to 14% who had a graduate or professional degree (Table B21). Only 11% of respondents were a Certified Planner or have planning credentials (Table B22) and most of these were county officials in the Southern Lower Peninsula (Table B23).

The second phase of this project involves interviewing 30 local government officials across the state. A stratified sample was selected from those survey respondents that indicated they were willing to participate in an interview to further explore the current and potential role of natural resource information in land use planning and zoning activities (Survey question #14). Of the 820 respondents that answered the question, 35% (283) answered yes to an interview (Table B24). Stratified, representative interviews were conducted with 21 township officials, 6 county officials and 3 regional planning commission staff. Ten of the interviews were in the Upper Peninsula, 10 in the Northern Lower Peninsula, and 10 in the Southern Lower Peninsula. Results and analysis of the interviews will be summarized in a future final report.

The last question on the survey provided space for comments from the respondent. Most of the returned non-usable surveys indicated they did not have any planning or zoning responsibilities and the county conducted planning on their behalf. Additional comments, along with the answers to the "other" categories in previous questions, will be summarized in a final report.

4.0 Discussion

One challenge in conducting this survey was finding a source of names and addresses for planning and zoning officials at the county and township level. Michigan does not have a central organization that gathers comprehensive planning and zoning contact information. The Michigan Association of Planning (MAP) tracks paying members only, and not necessarily by position, so for those local governments that are not members, their information is unknown. The Michigan Association of Townships tracks the Supervisor, Clerk, Treasurer and Trustee positions. The Michigan Association of Counties tracks the Clerk, Drain Commissioner, Prosecuting Attorney, Registrar of Deeds, Sheriff, Treasurer and County Commissioners. E-mail addresses were not available from any organization. Clerks are often members on a Board of Trustees, where final decisions are made concerning land use decisions, although Clerks are not usually members of a Planning Commission. Since the role of a Planner or Planning Commission is to make recommendations to the Board of Trustees on land use issues, and Zoning Boards are being dissolved under the new 2006 Michigan Zoning Enabling Act, it is the Planner or Planning Commission members that are most likely to use and interpret natural resource information. Ideally, township and county Planners or Planning Commission members would have received a survey such as this. Due to the inability to efficiently contact Planners or Planning Commission members, we chose to replicate part of the methodology the Institute for Public Policy and Social Research undertook in their 2003 survey, *To Plan or Not to Plan: Current Activity within Michigan's Local Governments* (IPPSR, 2004). That is, we sent the survey to the Clerk.

The most common types of natural resource information used by local governments were: 1) surface water, 2) land cover/land use, 3) soils, and 4) wetland vegetation information. This may not be surprising since social, economic and regulatory factors heavily influence the use of information. The social and economic value of water front property has always driven development towards those areas with favorable access to open water. Surface water, ground water and wetland activities are regulated under the federal Clean Water Act (CWA). In Michigan, administration of the CWA has been assumed by the state Department of Environmental Quality (DEQ). Both the Michigan Department of Natural Resources and Michigan State University provide land cover/land use information to the public. Some regional planning commissions and counties also provide more up-to-date land cover information within their jurisdiction. Soils information is provided by the federal Natural Resource Conservation Service. At a minimum, if local officials issue building permits they must know where wetlands and floodplains are located, along with the water holding capacity and drainage characteristics of soils where human structures and septic systems will be constructed. The state and federal agencies responsible for surface water, land cover/land use, soils and wetland information have field offices scattered across the state and robust websites (e.g. Michigan Center for Geographic Information Spatial Data Library, NRCS Web Soil Survey, National Wetland Inventory Web Page, etc.) which have provided local governments with a basic level of accessibility to the frequently required or requested information.

Information on invasive animal, invasive plant, wildlife, and endangered and threatened species information is rarely used by local government officials. A significant percentage of survey respondents indicate the information is either not available or not used (~ 75% in Table B7), or they don't know how important the information is (~ 17% in Table B10). The use of these types of information is critical to the future of Michigan's biological diversity and ecological integrity. These issues could be addressed in an educational program for local government officials. A program that focuses on the potential role local governments can have on invasive species, wildlife and rare species is needed and would benefit the future of Michigan's natural resources. Programs that focus on education, training, detection, monitoring and control through land use planning could be delivered in cooperation with the U.S. Department of Agriculture, U.S. Department of Interior, Michigan State University Extension, Michigan Department of Natural Resources, Michigan Department of Environmental Quality, Michigan Association of Planning, Michigan Association of Regions, Michigan Association of Counties, Michigan Townships Association, Michigan Municipal League and/or with other natural resource conservation partners (e.g. land conservancies, watershed councils, etc.).

When local governments were asked to rank their three most important types of information overall, index scores showed surface water, ground water and agricultural information were the top priority. This is likely due to the fact that information on surface water, ground water and agricultural information is more familiar, perceived as more critical to human health and welfare, and regulated by statutes at multiple levels. Ten percent of respondents indicated they were most dissatisfied (moderately or very dissatisfied) with ground water information. Possible reasons for dissatisfaction may be due to the general lack of ground water information statewide, lack of public awareness of ground water related contaminants and issues, and the overall quality of existing ground water information. Interviews during phase two of this project will elucidate additional reasons for local government dissatisfaction with natural resource information.

Local governments indicate they most need to know where to access natural resource information. This is not surprising since natural resource information tends to be scattered among several agencies and organizations. Subsequent to knowing where to access information, funding, interpretation, application, preservation ordinances, computer requirements, and consultation with biologists were the information and services most requested, respectively. The regional planning commissions in Michigan expressed the strongest need in knowing where to access and how to fund the acquisition of natural resource information. Because the regional commissions service relatively large geographic areas, efficiency would be maximized by developing educational programs and services for them. However, not all the counties or townships are active members of their regional planning commission so overall effectiveness is uncertain. Counties should be an additional focus of educational and service programs, with open invitations to associated townships. Identifying the primary natural resource information providers and providing grant opportunities for local governments to specifically acquire natural resource information when updating their land use plans or zoning ordinances would improve natural resource conservation measures in Michigan. This may include funding the technologies needed to acquire certain types of natural resources information (e.g. computer hardware or software, GIS, etc.).

Agencies and organizations that gather natural resource information should create one location to advertise and access their information. This may include links to individual websites, but the overriding goal should be to consolidate where natural resource information is accessed from. The Michigan Center for Geographic Information spatial data library website (http://www.mcgi.state.mi.us/mgdl/) already provides digital access to various types of natural resource information. Most local government officials, especially at the township level, have a limited term in office and a relatively high turn over rate. It is unrealistic to expect local officials, or the general public, to know and to contact all the respective natural resource organizations independently for information. Information gathering would be most efficient if there was one central natural resource data website. On the other hand, natural resource information providers must be prepared to distribute their information in both hard copy and electronic/digital format. Townships specifically prefer hard copy information, while counties and regional planning commissions greatly prefer electronic information. This is likely related to county government and regional planning commissions generally having additional resources available, in terms of personnel, finances, and computer hardware/technology.

Of the 940 survey respondents, 283 (35%) agreed to participate in an interview to further explore the current and potential role of natural resource information in planning and zoning activities. Many more local governments are willing to discuss natural resource issues than can be reasonably contacted in the scope of this project. Similar results were observed in recent workshops (September 2006) presented by the Michigan Association of Planning, in partnership with the DEQ and Michigan Association of Regions that focused on local government's role in environmental protection. Information was presented on water-related natural resource issues such as wetlands, environmental areas, soil erosion and sedimentation, inland lakes and streams, natural rivers, floodplains, high risk erosion areas, and sand dunes. Of the five workshops conducted, 246 individuals registered to attend (personal communication with Kelly McIntyre, MAP). This level of interest and participation is a positive step towards improved coordination, cooperation and conservation of Michigan's natural resources. Additional workshops should also focus on other natural resource gaps such as endangered and threatened species, invasive species, wildlife, farmland preservation, comprehensive green space planning, groundwater contamination, and high quality natural communities.

5.0 Conclusions

Reducing the rate of habitat degradation and consequent loss of biodiversity are difficult to achieve without access to good natural resource information. A 2002 survey of Michigan local land use decision makers found that across the state there is a perceived need for better information and planning tools (Suvedi et al., 2002). Local governments at the county and township levels are primary among those making land use and resource protection decisions. Local initiatives that focus on the protection of natural features are not widespread, either nationally or in Michigan (Thomas, 2003). Comprehensive land use planning that protects critical wildlife habitat, travel corridors, and ecological processes is an essential component of a successful conservation strategy. The power to protect the environment is a shared responsibility among the public and private sector.

The Michigan Land Use Leadership Council (2003) recently acknowledged the negative impact state land use trends have had on biodiversity. In order to better protect the state's natural

environment, partnerships between and among federal, state and local governments, natural resource organizations, and the private sector are needed to identify and protect critical habitats while allowing productive uses of the land. Specific recommendations identified for the continued health of Michigan's land resource-based industries include: improved data collection, analysis and access to information, and outreach to the general public and local policymakers concerning the social, economic and environmental value of natural resources. A high quality environment will attract visitors, enhance economic growth and maintain biological processes, all of which improve quality of life.

Michigan has several regulations that can guide or assist local governments with the integration of natural resource information in land use planning. For example, under the Michigan Natural Resources and Environmental Protection Act, local governments may regulate wetlands of less than two acres if they adopt a local ordinance (Michigan Compiled Laws 324.30309). If such an ordinance is adopted, local governments can then evaluate and decide if the wetland being impacted is "essential to the preservation of the natural resources of the local unit of government" (ELI, 2003). Proving wetland importance may require additional information such as the location of endangered and threatened species, locally rare or unique ecosystems, waterfowl, or migratory birds, etc. The ordinance provides local governments an opportunity to protect critical resources. Coordination and cooperation among natural resource organizations will be needed to provide such data and technical expertise to local governments.

The following recommendations are provided based on experience gained during this research project and a 70% response rate on a survey sent to all of Michigan's townships, counties and regional planning commissions concerning the integration of natural resource information in land use planning:

- A central organization should track and provide contact information for all planning and zoning staff at the township and county level in Michigan (e.g. Michigan Association of Planning, Michigan Association of Counties, and/or Michigan Townships Association).
- Educational programs that focus on how natural resource information can be integrated into the land use planning and zoning process and the role local governments can have on the conservation of natural resources is needed (e.g. training, interpretation education, detection, monitoring and/or control).
- Educational programs that focus on the value and importance of lesser known types of natural resource information such as invasive species, wildlife and rare species are needed to protect the future of Michigan's biological diversity and ecological integrity.
- Identify and create one central website where natural resource information can be accessed. Information should be available in both electronic and hard copy format.
- Up-to-date natural resource information should be accessible to all levels of local government across the state (e.g. land cover, soils, ground water, etc.).
- Provide grant opportunities for local governments to specifically acquire and integrate natural resource information. This may include funding the technologies needed to acquire certain types of natural resources information (e.g. computer hardware or software, GIS, etc.).

Phase II of this project will include 30 in-depth interviews with local government officials to further explore the current and potential role of natural resource information in land use planning. A future report will summarize the results of the interviews, along with additional geographic analysis of the survey data. For example, this may include the spatial relationship of local governments to their desired information needs and land cover patterns. Also, detailed geographical analysis can further assist information providers in prioritizing information needs and targeting local governments for information delivery.

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Appendix A: Original Survey

Integration of Natural Resource Information in Land Use Planning

This questionnaire is designed to assist local governments and planning officials in meeting their information and decision-making needs. Results of the survey will assist natural resource agencies, organizations and universities in providing improved data products and services to local governments and regional planning councils. This survey should be filled out by a planner, or individual that actively gathers land use planning and zoning information at the township, county or regional level. For some local governments, this may be a consultant. We ask, if the person receiving this survey is not involved with gathering planning or zoning information, that they please forward the survey to the appropriate individual.

Your views and experience are very important to us. Your response will help determine what type of natural resource information is needed and how information should be delivered to local governments. Please keep in mind that we are interested in everyone's response, from highly populated to sparsely populated townships, counties and regions across the state.

Your response will remain confidential and will never be associated with your name.

Please complete this questionnaire at your earliest convenience. Place the survey in the envelope provided and drop it in any mailbox. Return postage has been provided. The questionnaire should take about 15 minutes to complete. If you choose not to complete the questionnaire, **please return it** with a note on the last question, Question 20. Then simply place the survey in the return envelope and drop it in a mailbox.

If you have any questions regarding this survey, please contact Jennifer A. Olson, Project Manager, by e-mail: olsonje6@msu.edu or by phone: (517) 373-9405.

THANK YOU FOR YOUR ASSISTANCE!

For the purpose of this survey, **natural resources are defined as**: soils, surface and ground water, forests, minerals, air, fisheries, wildlife (common, rare, invasive), plants (common, rare, invasive), wetlands, grasslands, dunes, and other landscape features.

The Township, County, Region and You

1. How would you describe your current **appointment** in relation to the township, county or region receiving this questionnaire? *(Please check only one.)*

   ☐ Elected official

   ☐ Appointed official

   ☐ Hired staff

   ☐ Volunteer staff

   ☐ Consulting firm (please identify): _____

   ☐ Other appointment (please identify): _____

2. Please specify your current **position** below. *(Please check only one.)*

   ☐ Township/County Supervisor

   ☐ Township/County Manager

   ☐ Township/County Clerk

   ☐ Township/County Zoning Administrator

   ☐ Township/County Zoning Board member

   ☐ Township/County Planning Commission member

   ☐ Township/County Planner

   ☐ Planning Consultant (Private Firm)

   ☐ Regional Council/Commission Planner

   ☐ Regional Council/Commission Director

   ☐ Other position (please identify): _____

3. Does your position require making land use planning or zoning decisions/recommendations, such as the placement of utilities, subdivisions, roads, zoning, etc. for the township/county/region? *(Please check one.)*

   ☐ Yes ☐ No

4. Has your township/county adopted a Comprehensive Development Plan, Master Plan, or other similar land use plan? *(Please check one.)*

   ☐ Yes ☐ No ☐ Not Sure

5. Has your township/county adopted a Zoning Ordinance? *(Please check one.)*

   ☐ Yes ☐ No ☐ Not Sure

Integration of Natural Resource Information

6. This question has two parts. Part 1: Have you **used** the following types of natural resource information in your land use plans, zoning ordinances or land use decisions/recommendations? Part 2: If Yes, in what **format** was the information provided? *(Please check up to two responses for each statement.)*

	Part 1			Part 2	
	Types of Natural Resource Information	**No, did not use**	**Yes, used**	**Information provided in electronic format**	**Information provided in hard copy format**
a.	**Agricultural** (crops, livestock, size, location, etc.)	☐	☐ ⇨	☐	☐
b.	**Wetland vegetation** (marsh, floodplain, shrub swamp, etc.)	☐	☐ ⇨	☐	☐
c.	**Upland vegetation** (forests, prairies, savannas, etc.)	☐	☐ ⇨	☐	☐
d.	**Invasive plant species** (purple loosestrife, Eurasian milfoil, garlic mustard, spotted knapweed, etc.)	☐	☐ ⇨	☐	☐
e.	**Wildlife species** (game and non-game species, nuisance species, health risk species, etc.)	☐	☐ ⇨	☐	☐
f.	**Invasive animal species** (emerald ash borer, zebra mussels, round goby, sea lamprey, etc.)	☐	☐ ⇨	☐	☐
g.	**Endangered & threatened species** (animals and plants legally protected by state or federal legislation)	☐	☐ ⇨	☐	☐
h.	**Geology** (surface and subsurface minerals, oil, gas, bedrock, surface landforms, etc.)	☐	☐ ⇨	☐	☐
i.	**Surface water** (lakes, rivers, streams, drainages, etc.)	☐	☐ ⇨	☐	☐
j.	**Ground water** (aquifers, location, depth, springs, etc.)	☐	☐ ⇨	☐	☐
k.	**Soils** (maps, texture, depth, productivity, erodibility, permeability, etc.)	☐	☐ ⇨	☐	☐
l.	**Land cover/use** (maps, aerial photography, satellite imagery, etc.)	☐	☐ ⇨	☐	☐
m.	**Topographic** (surface contours, steep slopes, etc.)	☐	☐ ⇨	☐	☐
n.	**Comprehensive green space map** (land identified for the long term viability of natural ecosystems)	☐	☐ ⇨	☐	☐
o.	**Other** natural resource information (please identify and rate):	☐	☐ ⇨	☐	☐

7. How **satisfied** were you with the natural resource information that was used in your land use plans, zoning ordinances and land use decisions/recommendations? *(Please check only <u>one</u> response for each statement.)*

	Types of Natural Resource Information	Very Satisfied	Moderately Satisfied	Moderately Dissatisfied	Very Dissatisfied	N/A*
a.	**Agricultural** (crops, livestock, size, location, etc.)	☐	☐	☐	☐	☐
b.	**Wetland vegetation** (marsh, floodplain, shrub swamp, etc.)	☐	☐	☐	☐	☐
c.	**Upland vegetation** (forests, prairies, savannas, etc.)	☐	☐	☐	☐	☐
d.	**Invasive plant species** (purple loosestrife, Eurasian milfoil, garlic mustard, spotted knapweed, etc.)	☐	☐	☐	☐	☐
e.	**Wildlife species** (game and non-game species, nuisance species, health risk species, etc.)	☐	☐	☐	☐	☐
f.	**Invasive animal species** (emerald ash borer, zebra mussels, round goby, sea lamprey, etc.)	☐	☐	☐	☐	☐
g.	**Endangered & threatened species** (animals and plants legally protected by state or federal legislation)	☐	☐	☐	☐	☐
h.	**Geology** (surface and subsurface minerals, oil, gas, bedrock, surface landforms, etc.)	☐	☐	☐	☐	☐
i.	**Surface water** (lakes, rivers, streams, drainages, etc.)	☐	☐	☐	☐	☐
j.	**Ground water** (aquifers, location, depth, springs, etc.)	☐	☐	☐	☐	☐
k.	**Soils** (maps, texture, depth, productivity, erodibility, permeability, etc.)	☐	☐	☐	☐	☐
l.	**Land cover/use** (maps, aerial photography, satellite imagery, etc.)	☐	☐	☐	☐	☐
m.	**Topographic** (surface contours, steep slopes, etc.)	☐	☐	☐	☐	☐
n.	**Comprehensive green space map** (land identified for the long term viability of natural ecosystems)	☐	☐	☐	☐	☐
o.	**Other** natural resource information (please identify and rate):	☐	☐	☐	☐	☐

* Information was not available, or available but not used.

8. How **often** do you use natural resource information in the following land use planning and zoning activities? *(Please check only <u>one</u> response for each statement.)*

	Planning and Zoning Activities	Always (100%)	Frequently (~75%)	Sometimes (~50%)	Rarely (~25%)	Never (0%)	N/A*
a.	**Master Plan** creation or update	☐	☐	☐	☐	☐	☐
b.	**Site Development** reviews	☐	☐	☐	☐	☐	☐
c.	**Planned Unit Developments** (PUDs)	☐	☐	☐	☐	☐	☐
d.	**Land Division** reviews	☐	☐	☐	☐	☐	☐
e.	**Zoning Ordinance** creation or update (map or text)	☐	☐	☐	☐	☐	☐
f.	**Preservation Ordinance** creation or update (wetland, open space, woodland ordinance)	☐	☐	☐	☐	☐	☐
g.	**Land Acquisition** planning	☐	☐	☐	☐	☐	☐
h.	**Park and Recreation** planning	☐	☐	☐	☐	☐	☐
i.	**Transportation** planning	☐	☐	☐	☐	☐	☐
j.	**Utility** planning	☐	☐	☐	☐	☐	☐
k.	**Capital Improvements** planning	☐	☐	☐	☐	☐	☐
l.	**Other activities** (please identify and rate):	☐	☐	☐	☐	☐	☐

* Not Applicable, activity not conducted by township/county/region.

9. How would you describe the **amount** of residential and commercial development occurring in your township/county/region over the past, and anticipated future, five-year time period? *(Please check only <u>one</u> response for each statement.)*

	Time Period	Greatly Increasing	Somewhat Increasing	Unchanged	Somewhat Decreasing	Greatly Decreasing	Don't Know
a.	**<u>Past</u> five years**	☐	☐	☐	☐	☐	☐
b.	**<u>Next</u> five years**	☐	☐	☐	☐	☐	☐

10. Assume the following information is freely available and of high quality. Please indicate how **important** each type of natural resource information is for future land use plans, zoning ordinances and land use decisions/recommendations? *(Please check only one response for each statement.)*

	Types of Natural Resource Information	Very Important	Somewhat Important	Not Important	Don't Know
a.	**Agricultural** (crops, livestock, size, location, etc.)	☐	☐	☐	☐
b.	**Wetland vegetation** (marsh, floodplain, shrub swamp, etc.)	☐	☐	☐	☐
c.	**Upland vegetation** (forests, prairies, savannas, etc.)	☐	☐	☐	☐
d.	**Invasive plant species** (purple loosestrife, Eurasian milfoil, garlic mustard, spotted knapweed, etc.)	☐	☐	☐	☐
e.	**Wildlife species** (game and non-game species, nuisance species, health risk species, etc.)	☐	☐	☐	☐
f.	**Invasive animal species** (emerald ash borer, zebra mussels, round goby, sea lamprey, etc.)	☐	☐	☐	☐
g.	**Endangered & threatened species** (animals and plants legally protected by state or federal legislation)	☐	☐	☐	☐
h.	**Geology** (surface and subsurface minerals, oil, gas, bedrock, surface landforms, etc.)	☐	☐	☐	☐
i.	**Surface water** (lakes, rivers, streams, drainages, etc.)	☐	☐	☐	☐
j.	**Ground water** (aquifers, location, depth, springs, etc.)	☐	☐	☐	☐
k.	**Soils** (maps, texture, depth, productivity, erodibility, permeability, etc.)	☐	☐	☐	☐
l.	**Land cover/use** (maps, aerial photography, satellite imagery, etc.)	☐	☐	☐	☐
m.	**Topographic** (surface contours, steep slopes, etc.)	☐	☐	☐	☐
n.	**Comprehensive green space map** (land identified for the long term viability of natural ecosystems)	☐	☐	☐	☐
o.	**Other** natural resource information (please identify and rate):	☐	☐	☐	☐

11. Of the above natural resource information categories, please rank the **three most important** types of natural resource information that you would be interested in for future planning and zoning efforts.
(Please write one type of information after each rank.)

Most important _____

Second most important _____

Third most important _____

12. If you were to request natural resource information about your township/county/region, in what **format** would the information be most preferred? *(Please check one.)*

☐ **Hard copy format** – paper copies of maps, tables, reports, publications, etc.

☐ **Electronic format** – GIS data layers, web based data, digital info, models, etc.

13. With respect to incorporating natural resource information into land use planning and zoning, **how much of a need** do you have for the following information or services?
(Please check only one response for each statement.)

	Information / Services	Great Need	Somewhat Need	No Need
a.	**Knowing** where to access information	☐	☐	☐
b.	**Computer** hardware or software information (GIS recommendations, minimum requirements, etc.)	☐	☐	☐
c.	**Funding** to acquire information	☐	☐	☐
d.	**Interpretation** of information	☐	☐	☐
e.	**Application** of information	☐	☐	☐
f.	**Creation** of ordinances to protect natural resources	☐	☐	☐
g.	**Consultation** with biologists on environmental impact of proposed land uses	☐	☐	☐
h.	**Other** needs (please identify and rate)**:**	☐	☐	☐

14. Would you be willing to participate in an **interview** (telephone or in-person) to further explore the current and potential role of natural resource information, and data products, in your township/county/regional land use planning and zoning activities? *(Please check one.)*

☐ Yes ☐ No

Background Information

15. How many years have you been in your current position? *(Please write in number of years.)*

_____ Years

16. Are you: ☐ Male ☐ Female

17. In what year were you born? _____ *(Please write in year.)*

18. What is the highest level of formal education that you have completed? *(Please check only one.)*

☐ Less than high school

☐ High school diploma or equivalent

☐ Some college

☐ Associate's degree

☐ Technical / vocational degree

☐ Bachelor's or 4 year degree

☐ Graduate or professional degree (Master's, Doctorate, etc.)

19. Are you a Certified Planner or do you have other specific planning credentials? *(Please check one.)*

☐ Yes, please identify credentials:_____

☐ No

20. Please use the space below for any additional comments you wish to make regarding the use of natural resource information in land use planning and zoning.

Thank you very much for your participation!

Appendix B: Detailed Results of Survey Questions

Table B1. Has your township/county adopted a Comprehensive Development Plan, Master Plan, or other similar land use plan?

			Local government has adopted a Master Plan			
			Yes	No	Not Sure	Total
Level of Government	County	Count	44	9	5	58
		Percent	76%	15%	9%	100%
	Township	Count	607	208	30	845
		Percent	72%	25%	3%	100%
		Total # of Respondents	651	217	35	903

Table B2. Has your township/county adopted a Zoning Ordinance?

			Local government has adopted a Zoning Ordinance			
			Yes	No	Not Sure	Total
Level of Government	County	Count	22	37	0	59
		Percent	37%	63%	0%	100%
	Township	Count	649	202	6	857
		Percent	76%	23%	1%	100%
		Total # of Respondents	671	239	6	916

Table B3. Comparison of IPPSR survey results with this natural resource survey.

Have Land Use Plan & Zoning	County	County %	Township	Township %
IPPSR survey	N (# Respondents)		N (# Respondents)	
Yes - Master Plan	61 (83)	73%	756 (1120)	68%
Yes - Zoning Ordinance	24 (83)	29%	797 (1122)	71%
Natural resource survey	N (# Respondents)		N (# Respondents)	
Yes - Master Plan	44 (58)	76%	607 (845)	72%
Yes - Zoning Ordinance	22 (59)	37%	649 (857)	76%

Table B4. If you have used the following types of natural resources information, in what format was the information provided?

Types of Natural Resource Information	Electronic		Hard Copy		Total # of Respondents
	N	%	N	%	
Agricultural	92	21%	340	79%	432
Wetland Vegetation	108	24%	340	76%	448
Upland Vegetation	83	28%	214	72%	297
Invasive Plant Species	28	28%	72	72%	100
Wildlife Species	25	22%	90	78%	115
Invasive Animal Species	17	21%	66	79%	83
Endangered & Threatened Species	29	22%	101	78%	130
Geology	73	23%	246	74%	319
Surface Water	141	28%	361	72%	502
Ground Water	88	26%	249	74%	337
Soils	111	24%	358	76%	469
Land cover/land use	**183**	**36%**	320	64%	503
Topographic	120	31%	262	69%	382
Comprehensive Green Space Map	49	24%	158	76%	207
Other Natural Resource Information	19	31%	42	69%	61

Table B5. If you were to request natural resource information about your township/county/region, in what format would the information be <u>most preferred</u>?

Format	Frequency	Percent
Hard copy	476	60%
Electronic	314	40%
Total	790	100%
No response	150	
Total	940	

Table B6. Preferred format of natural resource information by level of government.

Level of Government	Format information preferred to be in				Total # of Respondents
	Hard copy format		Electronic format		
Regional Planning Commission	1	8%	11	92%	12
County	10	24%	32	76%	42
Township	464	63%	270	37%	734
Total	475		313		788

Table B7. How satisfied were you with the natural resource information that was used in your land use plans, zoning ordinances and land use decisions/recommendations?

Types of Natural Resource Information	Very Satisfied		Moderately Satisfied		Moderately Dissatisfied		Very Dissatisfied		Information Not Available **or** Not Used		Total # of Respondents
	N	%	N	%	N	%	N	%	N	%	
Agricultural	126	17%	277	38%	34	5%	10	1%	285	39%	732
Wetland Vegetation	140	19%	276	38%	**43**	**6%**	**11**	**2%**	257	35%	727
Upland Vegetation	96	14%	194	28%	25	3%	7	1%	377	54%	699
Invasive Plant Species	28	4%	87	13%	29	4%	11	2%	533	77%	688
Wildlife Species	36	5%	95	14%	28	4%	9	1%	523	76%	691
Invasive Animal Species	33	5%	67	10%	28	4%	11	1%	549	80%	688
Endangered & Threatened Species	32	5%	89	13%	35	5%	11	1%	524	76%	691
Geology	106	15%	213	30%	35	5%	9	1%	351	49%	714
Surface Water	**176**	**24%**	**306**	**42%**	30	4%	8	1%	206	29%	726
Ground Water	110	15%	206	29%	**46**	**7%**	**19**	**3%**	331	46%	712
Soils	163	22%	277	38%	42	6%	8	1%	242	33%	732
Land cover/land use	**192**	**26%**	**268**	**37%**	42	6%	7	1%	219	30%	728
Topographic	140	20%	224	31%	39	5%	8	1%	303	43%	714
Comprehensive Green Space Map	68	10%	137	20%	31	4%	8	1%	452	65%	696
Other Natural Resource Information	25	5%	39	8%	5	1%	6	1%	432	85%	507

Table B8. How satisfied were you with the natural resource information that was used in your land use plans, zoning ordinances and land use decisions/recommendations (without "Information Not Available or Not Used" responses)?

Types of Natural Resource Information	Very Satisfied (1)		Moderately Satisfied (2)		Moderately Dissatisfied (3)		Very Dissatisfied (4)		Total # of Respondents
	N	%	N	%	N	%	N	%	
Agricultural	126	28%	277	62%	34	8%	10	2%	447
Wetland Vegetation	140	30%	276	59%	43	9%	11	2%	470
Upland Vegetation	96	30%	194	60%	25	8%	7	2%	322
Invasive Plant Species	28	18%	87	56%	29	19%	11	7%	155
Wildlife Species	36	21%	95	57%	28	17%	9	5%	168
Invasive Animal Species	33	24%	67	48%	**28**	**20%**	**11**	**8%**	139
Endangered & Threatened Species	32	19%	89	53%	**35**	**21%**	**11**	**7%**	167
Geology	106	29%	213	59%	35	10%	9	2%	363
Surface Water	**176**	**34%**	**306**	**59%**	30	6%	8	1%	520
Ground Water	110	29%	206	54%	46	12%	19	5%	381
Soils	163	33%	277	57%	42	9%	8	1%	490
Land cover/land use	**192**	**38%**	**268**	**53%**	42	8%	7	1%	509
Topographic	140	34%	224	55%	39	9%	8	2%	411
Comprehensive Green Space Map	68	28%	137	56%	31	13%	8	3%	244
Other Natural Resource Information	25	33%	39	52%	5	7%	6	8%	75

Table B9. How often do you use natural resource information in the following land use planning and zoning activities?

Planning Activity	Always (100%)		Frequently (~75%)		Sometimes (~50%)		Rarely (~25%)		Never (0%)		Activity Not Conducted		Total # of Respondents
	N	%	N	%	N	%	N	%	N	%	N	%	
Master Plan creation or update	**232**	**31%**	**172**	**23%**	110	15%	60	8%	33	4%	145	19%	752
Site Development reviews	**198**	**27%**	**171**	**23%**	135	18%	53	7%	36	5%	151	20%	744
Planned Unit Developments (PUD's)	167	23%	119	16%	70	10%	54	7%	54	7%	276	37%	740
Land Division reviews	136	18%	128	17%	140	19%	86	11%	71	10%	185	25%	746
Zoning Ordinance creation or update	**231**	**31%**	**162**	**21%**	119	16%	54	7%	34	5%	154	20%	754
Preservation Ordinance creation or update	155	21%	105	14%	80	11%	49	7%	53	7%	299	40%	741
Land Acquisition planning	85	11%	81	11%	78	11%	57	8%	64	9%	372	50%	737
Park and Recreation planning	136	18%	122	16%	81	11%	57	8%	58	8%	290	39%	744
Transportation planning	**58**	**8%**	**65**	**9%**	71	9%	72	10%	71	9%	405	55%	742
Utility planning	**69**	**9%**	**70**	**10%**	72	10%	65	9%	69	9%	395	53%	740
Capital Improvements planning	71	9%	87	12%	110	15%	60	8%	63	9%	344	47%	735
Other activities	12	3%	11	3%	8	2%	11	3%	32	8%	324	81%	398

Table B10. Assume the following information is freely available and of high quality. Please indicate how important each type of natural resource information is for future land use plans, zoning ordinances and land use decisions/recommendations?

Future Importance	Very Important		Somewhat Important		Not Important		Don't Know		Total # of Respondents
	N	%	N	%	N	%	N	%	
Agricultural	415	52%	256	32%	66	9%	58	7%	795
Wetland Vegetation	453	58%	232	29%	37	5%	64	8%	786
Upland Vegetation	290	37%	287	37%	107	14%	97	12%	781
Invasive Plant Species	183	23%	291	38%	**159**	**20%**	**146**	**19%**	779
Wildlife Species	206	26%	339	43%	116	15%	123	16%	784
Invasive Animal Species	239	30%	256	33%	**147**	**19%**	**138**	**18%**	780
Endangered & Threatened Species	217	28%	309	40%	125	16%	127	16%	778
Geology	291	37%	313	40%	82	11%	96	12%	782
Surface Water	**568**	**72%**	155	20%	11	1%	54	7%	788
Ground Water	**528**	**67%**	183	23%	24	3%	58	7%	793
Soils	442	56%	257	33%	21	3%	66	8%	786
Land cover/land use	471	60%	236	30%	20	2%	61	8%	788
Topographic	368	47%	278	35%	61	8%	76	10%	783
Comprehensive Green Space Map	295	38%	302	39%	64	8%	118	15%	779
Other Natural Resource Information	61	16%	79	20%	22	6%	221	58%	383

Table B11. Of the above natural resource information categories, please rank the three most important types of natural resource information that you would be interested in for future planning and zoning efforts.

Future Most Important Information	Most Important		Second Most Important		Third Most Important	
	N	%	N	%	N	%
Agricultural	**179**	**27%**	45	7%	46	7%
Wetland Vegetation	76	11%	75	12%	53	8%
Upland Vegetation	9	1%	16	2%	20	3%
Invasive Plant Species	10	2%	9	1%	16	3%
Wildlife Species	12	2%	16	2%	20	3%
Invasive Animal Species	6	1%	16	2%	21	3%
Endangered & Threatened Species	3	.5%	5	1%	7	1%
Geology	9	1%	15	2%	22	4%
Surface Water	107	16%	**167**	**25%**	84	13%
Ground Water	115	17%	125	19%	80	13%
Soils	29	5%	56	9%	**93**	**15%**
Land cover/land use	83	12%	63	10%	86	14%
Topographic	10	1.5%	22	3%	38	6%
Comprehensive Green Space Map	10	2%	20	3%	39	6%
Other Natural Resource Information	15	2%	10	2%	10	2%
Total # of Respondents	**673**		**660**		**635**	

Table B12. Level of government needing to know where to access natural resource information.

			Need for knowing where to access natural resource information			Total
			Great Need	Somewhat Need	No Need	
Level of Government	Regional Planning Commission	Count	9	3	0	12
		Percent	75%	25%	0%	100%
	County	Count	20	20	5	45
		Percent	44%	45%	11%	100%
	Township	Count	440	250	46	736
		Percent	60%	34%	6%	100%
		Total # of Respondents	469	273	51	793

Table B13. Level of government need for funding to acquire natural resource information.

			Need for funding to acquire natural resource information			Total
			Great Need	Somewhat Need	No Need	
Level of Government	Regional Planning Commission	Count	8	4	0	12
		Percent	67%	33%	0%	100%
	County	Count	26	15	4	45
		Percent	58%	33%	9%	100%
	Township	Count	329	285	99	713
		Percent	46%	40%	14%	100%
		Total # of Respondents	363	304	103	770

Table B14. How would you describe the amount of residential and commercial development occurring in your township/county/region over the past, and anticipated future, five-year time period?

Development	Greatly Increasing		Somewhat Increasing		Unchanged		Somewhat Decreasing		Greatly Decreasing		Don't Know		Total # of Respondents
	N	%	N	%	N	%	N	%	N	%	N	%	
Past five years	267	31%	458	54%	79	9%	23	3%	10	1%	13	2%	850
Next five years	271	32%	443	52%	64	8%	22	2%	5	1%	41	5%	846

Table B15. Are you male or female?

Gender	Frequency	Percent
Male	457	53%
Female	411	47%
Total	868	100%
No response	72	
Total	940	

Table B16. Please specify your current position.

Current Position	Frequency	Percent
Township or County Supervisor	147	16%
Township or County Manager	5	.5%
Township or County Clerk	431	48%
Township or County Zoning Administrator	106	12%
Township or County Zoning Board member	14	2%
Township or County Planning Commission member	89	10%
Township or County Planner	45	5%
Private Planning Consultant	9	1%
Regional Commission Planner	9	1%
Regional Commission Director	3	.5%
Other position	37	4%
Total	895	100%
No response	45	
Total	940	

Table B17. How would you describe your current appointment in relation to the township, county or region receiving this questionnaire?

Current Appointment	Frequency	Percent
Elected official	609	68%
Appointed official	160	18%
Hired staff	102	11%
Volunteer staff	2	.5%
Consulting firm	13	2%
Other appointment	2	.5%
Total	888	100%
No response	52	
Total	940	

Table B18. Does your position require making land use planning or zoning decisions/recommendations, such as the placement of utilities, subdivisions, roads, zoning, etc. for the township/county/region?

Land Use Decisions	Frequency	Percent
Yes	598	68%
No	285	32%
Total	883	100%
No response	57	
Total	940	

Table B19. How many years have you been in your current position?

Years in Current Position	
Mean	10.0
Median	8.0
Mode	1.0
Minimum	.5
Maximum	57.0
Missing	73
Number of Respondents	867

Table B20. In what year were you born?

Year Born	
Mean	1950.5
Median	1950
Mode	1947(a)
Minimum	1919
Maximum	1984
Missing	115
Number of Respondents	825

(a) Multiple modes exist. The smallest value is shown.

Table B21. What is the highest level of formal education that you have completed?

Education	Frequency	Percent
Less than high school	5	1%
High school diploma or equivalent	169	20%
Some college	249	29%
Associate's degree	95	11%
Technical / vocational degree	38	4%
Bachelor's or 4-year degree	185	21%
Graduate or professional degree	122	14%
Total	863	100%
No response	77	
Total	940	

Table B22. Are you a Certified Planner or do you have other specific planning credentials?

Planning Credentials	Frequency	Percent
Yes	93	11%
No	763	89%
Total respondents	856	100%
No response	84	
Total	940	

Table B23. Planning credentials by level of government and location in state.

		Planning credentials				Total # of Respondents
		Yes	%	No	%	
Level of Government	Regional Planning Commission	2	15%	11	85%	13
	County	**10**	**21%**	38	79%	48
	Township	80	10%	713	90%	793
Total # of Respondents		92	11	762	89	854
Location in State	Western Upper Peninsula	3	7%	42	93%	45
	Eastern Upper Peninsula	4	8%	48	92%	52
	Northern Lower Peninsula	23	9%	236	91%	259
	Southern Lower Peninsula	**62**	**12%**	436	88%	498
Total # of Respondents		92	11	762	89	854

Table B24. Would you be willing to participate in an interview (telephone or in-person) to further explore the <u>current</u> and <u>potential</u> role of natural resource information, and data products, in your township/county/regional land use planning and zoning activities?

Interview	Frequency	Percent
Yes	283	35%
No	537	65%
Total	820	100%
No response	120	
Total	940	

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