Integration of Natural Resources Data in Local Land Use Planning: A Preliminary Report

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Abstract

Michigan's most valuable asset is it's 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 future of Michigan's natural resources, including those species in greatest need of conservation. In Michigan, local governments at the county and township levels are primary land planning decision makers. The perceptions and use of natural resource information by these entities is unknown. A survey was sent to all townships (1,242), all counties (83) and all regional planning commissions (14) in Michigan to measure the use of, satisfaction with, importance of, and need for natural resource information in local land use planning. Of the 1,339 distributed surveys, 937 (70%) usable surveys were returned. The most frequently used natural resource information was surface water (70%), land cover/land use (69%), soils (64%) and wetland vegetation (62%). Local governments were the least satisfied with invasive plant, invasive animal, endangered and threatened species, and wildlife information. When asked to rank the relative importance of natural resource information, these same categories were ranked lowest, with wildlife ranking somewhat higher. A significant number of respondents indicated they did not know how important invasive species, rare species and wildlife information would be in future land use activities. Of the local governments that expressed a need for services, 94% expressed the greatest need for knowing where to access natural resource information.

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Introduction

The roles and responsibilities of land use planning in Michigan are numerous, complex and at times, overlapping. 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" is based on the theory that local governments are better suited to create regulations and make decisions which affect residents at the local level. Local governments are given authority to govern 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.

Soon after zoning regulations were instituted, it became clear that land use planning would be needed to anticipate problems, 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). Amendments have been incorporated in all these Acts to improve coordination, notification, content and natural resource protection at the local level.

Today, twenty U.S. states have some form of home rule legislation at the town or township level (NATT 1988). 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.

State law enables local governments with the power to plan and zone. These laws allow, but do not require local governments to perform planning and zoning functions. For example, in Michigan, if a county adopts a zoning regulation and a township within the county does not have a zoning ordinance, the township is subject to county zoning. If the township adopts its own zoning ordinance, it is no longer subject to county zoning control.

Similarly, a local government may develop a master plan to guide future development. If a county adopts a master plan and a township within the county does not have a master plan, the township is subject to county planning provisions. If the township adopts a master plan, it must submit a copy to the county planning commission for approval. If there is no county planning

commission, the plan must be sent to the regional planning commission (MTA 2003). Once approved, the township is no longer subject to county planning. Interestingly, adoption of a zoning ordinance does not require adoption of a master plan, although, many local governments at the township level do adopt both for more comprehensive planning and zoning.

It is not surprising with the multitude of governmental bodies and complex laws, that planning in Michigan is conducted in a piece meal and disconnected manner. Local government officials make decisions based on competing social, economic and environmental objectives. The process of making decisions is fraught with controversies about public versus private interests. Economic objectives often drive the decisions at significant cost to the environment and society. 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). Local governments can easily obtain socio-economic data. These data are freely accessible from the U.S. Census Bureau, and internal and external government offices (e.g. township, county or state departments). However, environmental data are not as readily available or as consolidated. In some cases, specific technological requirements are needed to access and manipulate environmental data. It is also common for multiple agencies, organizations and governments to maintain and disseminate this information.

To project what Michigan's landscape might look like in the future if present land use trends continue, a Land Transformation Model was developed at Michigan State University (PSC 2001). The model simulates future change in land use and land cover based on historical and recent land use/cover data. From 1980 to 2040, the built areas of Michigan, which include residential, commercial and industrial areas, roads, etc., are expected to increase by 178 percent if current development trends continue. Agriculture, wetlands, forest and other vegetation are expected to decrease by 17%, 10%, 8% and 24% respectively. Contrary to the increase in the built environment, Michigan's population from 1980 to 1995 only grew at 1/8th the rate of development during the same time period (PSC 2001). This indicates that land conversion to urban-like environments is greatly out-pacing Michigan's rate of population growth. Given this model is an estimate of expected outcomes, the numbers are nevertheless a concern to those economic sectors that rely on Michigan's land-based industries of agriculture, recreation, tourism, mining, forestry and wildlife.

From 1995 to 2003, surveys of Michigan adults showed a consistent concern about sprawl (IPPSR 2003). Although concerned, adults did not feel very well informed on land use issues. Residents felt the state (42%) should have the most land use responsibility, followed by local (24%), county (17%), federal (9%), metro (6%) and private entities (4%) (IPPSR 2001). Unfortunately, Michigan has not adopted state land use goals to guide regional, county or township decision making as in other states. The Michigan Land Use Leadership Council identified the need for the state to provide the leadership, cooperation and technical information to improve land use decision making at all levels (MLULC 2003). An informed community can achieve a better future through coordinated and comprehensive land use planning, access to information, and creative use of new technologies.

The Michigan Department of Natural Resources recently created a Wildlife Action Plan (WAP). This plan identified fourteen priority conservation action needs and threats against wildlife

species and their habitats at the statewide, regional and species level (Eagle et al. 2005). Of the fourteen priority threats, seven (e.g. fragmentation, riparian modifications, non-consumptive recreation, altered sediment loads, altered hydrologic regimes, altered fire regime, and social attitudes) have specific local planning roles identified as conservation action needs. These roles include incorporating, improving, initiating, and implementing programs and ordinances that protect and enhance natural environments. However, in order for local governments to implement such ordinances, they must have accurate natural resource information to justify their decisions. If Michigan's WAP is to be successful, the Michigan Department of Natural Resources, and other land management agencies and organizations, must provide useful and accessible natural resource information to local and regional planning officials.

Since human existence is dependent on environmental health, the maintenance of natural habitats, biodiversity and ecological services are critical for human health and welfare. Land use, more than any other type of human activity, has direct impacts on water quality, sensitive environments, public health, public service delivery, economic development and community character (MUCC 1993). As habitat loss continues and the number of special concern (261), threatened (249), endangered (93) and extirpated (56) species in Michigan remains high, we must explore the relationship between natural resource information and local land use planning. Once this relationship is better understood, more effective tools can be created to improve the integration of natural resource information in the planning and decision making process.

This preliminary report evaluates the survey results from township, county and regional planning commissions in Michigan. The second phase of the project will involve interviews and additional analysis of survey results.

Methods

A 20-question survey (see Appendix A) was mailed to the Clerk in all of Michigan's townships (1,242) and counties (83), and to the Planner or Director in the fourteen regional planning commissions. The names and addresses of clerks were received from the Michigan Townships Association and Michigan Association of Counties. The fourteen individual regional planning commission websites were visited to retrieve the names and addresses of the Planner or Director. The survey design and implementation followed the Tailored Design Method outlined by Dillman (2000). Up to a five-contact sequence was utilized which included 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 (i.e. letter, postcard, short survey) are essential for maximizing response rates.

All outgoing questionnaires and postcards were affixed with first-class stamps. Self-addressed business reply return envelopes or postcards were provided. The questionnaires were mailed with a detailed cover letter explaining the purpose of the research project and why a response was important. The first questionnaire was mailed in August 2005. A thank you 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 final shortened version of the questionnaire was mailed in November 2005, one month after the third questionnaire. Respondents that returned their questionnaire did not receive replacement questionnaires. A survey ID number was placed on the last page of the questionnaire to eliminate unnecessary mailings and to identify those local governments that indicated they were willing to participate in an interview (Question #14 in survey). A team of volunteers helped prepare and mail questionnaires and postcards. The survey was approved by the University Committee on Research Involving Human Subjects at Michigan State University (see Appendix B).

For the analysis purposes, the state was divided into four regions based on Albert's regional landscape ecosystems (Albert 1995). These four regions, or sections, are based on the prevailing climate, bedrock geology, physiography and vegetation patterns. Realizing ecological boundaries do not match political boundaries the four sections were adjusted to encompass the majority of the county in question (see Appendix C). Survey response data was analyzed using SPSS software. For phase I of this project the analysis included absolute and relative frequencies, means and cross tabulations. Additional analysis of survey data will be included in phase II of this project, including correlations, Chi-Square and multiple regression analysis. Phase II will also include analysis of 30 follow-up interviews from representative local governments across Michigan (3 regional planning commissions, 6 counties and 21 townships).

Results

Of the 1,339 total questionnaires mailed, 993 (74%) were returned. Fifty-six (4%) returned questionnaires did not have any usable information. The remaining 937 questionnaires (70%) had at least one question answered and were included for analysis. Of the 402 respondents that did not provide any information in the first three questionnaires, 55 (14%) did respond to the short non-response survey. The following survey results include absolute and relative frequencies, and when appropriate, the mean for questions that dealt with planning structure and natural resource use. Of the 937 usable surveys, planning commissions returned 13 (93% of planning commissions), counties returned 59 (71% of counties), and townships returned 935 (69% of townships). Two surveys were returned without an identification number but otherwise had usable information. Analysis of demographic and miscellaneous survey questions are provided in Appendix D.

Analysis begins with local government planning structure, whether a basic land use plan and zoning ordinance have been adopted at the township and county level (Tables 1-2). Approximately 75% of county governments have adopted a land use plan, but only a third of counties have adopted a zoning ordinance (Table 3). This is because in more urban and populous counties, townships and municipalities are likely to adopt their own land use plan. On average, approximately 70% of all townships in Michigan have adopted both a land use plan and zoning ordinance (Table 3).

Table 1: Has your township/county adopted a **Comprehensive Development Plan**, Master Plan, or other similar land use plan?

Comprehensive Development Plan	Frequency	Percent
Yes	656	71.8
No	223	24.4
Not Sure	35	3.8
Total	914	100.0
No response	23	
Total	937	

Table 2: Has your township/county adopted a **Zoning Ordinance**?

Zoning Ordinance	Frequency	Percent
Yes	673	72.7
No	247	26.7
Not Sure	6	.6
Total	926	100.0
No response	11	
Total	937	

According to a survey conducted in 2003 by the Institute for Public Policy and Social Research (IPPSR), sixty-one Michigan counties (73%) had adopted a master plan and twenty-four counties (29%) had adopted a zoning ordinance (IPPSR 2004). Although the overall response rate from the IPPSR survey was 93% and the overall response rate from this natural resource survey was 70%, a comparison of the responses reveals similar percentages (Table 3).

Table 3: Comparison of IPPSR survey results with natural resource survey results.

Have Land Use Plan & Zoning	County	County %	Township	Township %
IPPSR survey	N (# Respondents)		N (# Respondents)	
Yes - Master Plan	61 (83)	73%	756 (1120)	67.5%
Yes - Zoning Ordinance	24 (83)	29%	797 (1122)	71%
Natural resource survey	N (# Respondents)		N (# Respondents)	
Yes - Master Plan	43 (57)	75%	606 (843)	72%
Yes - Zoning Ordinance	21 (58)	36%	647 (854)	76%

The types of natural resource information that are most often used by regional, county and township governments are surface water (70%), land cover/land use (69%), soils (64%) and wetland vegetation information (62%) (Table 4). Excluding the "Other Natural Resource Information" category, only invasive animal (12%) and invasive plant (14%) species information are used less often than wildlife (17%) or endangered and threatened species (18%) information.

Table 4: 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	450	59%	307	41%	757
Wetland Vegetation	471	62%	282	38%	753
Upland Vegetation	304	41%	435	59%	739
Invasive Plant Species	107	14%	632	86%	739
Wildlife Species	124	17%	619	83%	743
Invasive Animal Species	88	12%	650	88%	738
Endangered & Threatened Species	133	18%	603	82%	736
Geology	326	44%	411	56%	737
Surface Water	**528**	**70%**	225	30%	753
Ground Water	354	47%	391	53%	745
Soils	482	64%	266	36%	748
Land cover / Land use	522	69%	233	31%	755
Topographic	398	53%	347	47%	745
Comprehensive Green Space Map	225	31%	503	69%	728
Other Natural Resource Information	68	14%	425	86%	493

For the purposes of this report, additional analysis was conducted on questions dealing with wildlife, and endangered and threatened species. Cross tabulations were calculated based on the use of wildlife and rare species information and level of government (township, county or regional planning commission) (Table 5). Counties use more wildlife information than the other levels of government and regional planning commissions use more endangered and threatened species information, although the vast majority of governments do not use either information at all.

Table 5. Use of wildlife and endangered and threatened species information by level of government.

Level of Government	Yes	% Yes	No	% No	Total # of Respondents
Wildlife species information					
Regional Planning Commission	3	23%	10	77%	13 (2%)
County	**9**	**25%**	27	75%	36 (5%)
Township	112	16%	581	84%	693 (93%)
Total # of Respondents	124	17%	618	83%	742
Endangered and threatened species information					
Regional Planning Commission	**5**	**38%**	8	62%	13 (2%)
County	12	33%	24	67%	36 (5%)
Township	116	17%	570	83%	686 (93%)
Total # of Respondents	133	18%	602	82%	735

Cross tabulations were also calculated on the location of the local government and their use of wildlife and rare species information (Table 6). Local governments in the Eastern Upper Peninsula were the most likely to use wildlife and rare species information, followed closely by governments in the Northern Lower and Western Upper Peninsula.

Table 6. Location of local governments and use of wildlife and endangered and threatened species information.

Location in State	Yes	% Yes	No	% No	Total # of Respondents
Wildlife species information					
Western Upper Peninsula	9	21%	33	79%	42
Eastern Upper Peninsula	**9**	**23%**	30	77%	39
Northern Lower Peninsula	44	21%	167	79%	211
Southern Lower Peninsula	62	14%	388	86%	450
Total # of Respondents	124	17%	618	83%	742
Endangered and threatened species information					
Western Upper Peninsula	9	21%	33	79%	42
Eastern Upper Peninsula	**10**	**26%**	28	74%	38
Northern Lower Peninsula	47	22%	164	78%	211
Southern Lower Peninsula	67	15%	377	85%	444
Total # of Respondents	133	18%	602	82%	735

Local governments that use wildlife and endangered and threatened species information and have a land use plan and/or zoning ordinance were analyzed (Table 7). Eight-five percent of the local governments that have used wildlife and rare species information have adopted a land use plan and zoning ordinance. Conversely, of the local governments that have adopted a land use plan or zoning ordinance, less than 20% have used wildlife and rare species information.

Table 7. Use of wildlife or endangered and threatened species information in a Master Plan or Zoning Ordinance.

Use of Natural Resource Information		Adoption of Land Use Plan				Adoption of Zoning Ordinance			
		Yes	No	Not Sure	Total # of Respondents	Yes	No	Not Sure	Total # of Respondents
Local government has used **wildlife species information**	No	478	123	17	618	500	113	4	617
	Yes	105	16	3	124	105	19	0	124
Total # of Respondents		583	139	20	742	605	132	4	741
Local government has used **endangered and threatened species information**	No	464	121	18	603	489	109	4	602
	Yes	112	18	2	132	109	23	0	132
Total # of Respondents		576	139	20	735	598	132	4	734

Approximately 74% of all the natural resource information that is distributed is in a hard copy format (Table 8). Land cover / land use information had the highest percentage of electronic distribution (36%). Although, when asked in what format the information would be most preferred, only 60% of local governments indicate they prefer the hard copy format (Table 9). This may mean local governments are making investments in computers and technology (e.g. GIS) and/or information providers are unable or unwilling to meet desired format needs. Not surprisingly, regional planning commissions and counties, those entities which tend to have more personnel and financial resources, prefer electronic information, while just over 60% of townships prefer hard copy information (Table 10).

Table 8: 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	91	21%	340	79%	431
Wetland Vegetation	107	24%	340	76%	447
Upland Vegetation	82	28%	214	72%	296
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	72	23%	246	74%	318
Surface Water	140	28%	361	72%	501
Ground Water	87	26%	249	74%	336
Soils	110	24%	358	76%	468
Land cover / Land use	**182**	**36%**	320	64%	502
Topographic	119	31%	262	69%	381
Comprehensive Green Space Map	49	24%	157	76%	207
Other Natural Resource Information	19	31%	42	69%	61

Table 9: 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	475	60.2
Electronic	314	39.8
Total	789	100.0
No response	148	
Total	937	

Table 10. Preferred format by level of government.

Level of Government	Format information preferred to be in		Total
	Hard copy format	Electronic format	
Regional Planning Commission	1 (8%)	11 (92%)	12
County	10 (24%)	32 (76%)	42
Township	463 (63%)	270 (37%)	733
Total	474	313	787

Local governments were asked how satisfied they were with the natural resource information they used. Respondents were most satisfied overall (very and moderately satisfied combined) with surface water (66%), land cover/land use (63%), and soils (60%) information (Table 11a). However, when the "information not available or not used" respondents are eliminated from calculations, overall satisfaction with agricultural and upland vegetation information increases and matches the soils information (Table 11b). Interestingly, respondents are least satisfied (very dissatisfied) with invasive animal, invasive plant and endangered and threatened species information. When analyzing the overall mean response, land cover/land use (1.73), surface water (1.75), and soils (1.79) information receive the most satisfied response, while invasive plant (2.15), endangered and threatened species (2.15), and invasive animal species information (2.12) receive the least satisfied response, albeit still closest to "moderately satisfied" (2.0). Of the levels of government surveyed, townships appear more satisfied (very and moderately satisfied combined) than counties or regional planning commissions (Table 12).

Table 11a: 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	125	17%	277	38%	34	5%	10	1%	285	39%	731
Wetland Vegetation	139	19%	276	38%	43	6%	11	2%	257	35%	726
Upland Vegetation	95	14%	194	28%	25	3%	7	1%	377	54%	698
Invasive Plant Species	28	4%	87	13%	29	4%	11	2%	532	77%	687
Wildlife Species	36	5%	95	14%	28	4%	9	1%	522	76%	690
Invasive Animal Species	33	5%	67	10%	28	4%	11	1%	548	80%	687
Endangered & Threatened Species	32	5%	89	13%	35	5%	11	1%	523	76%	690
Geology	105	15%	213	30%	35	5%	9	1%	351	49%	713
Surface Water	**175**	**24%**	**306**	**42%**	30	4%	8	1%	206	29%	725
Ground Water	109	15%	206	29%	46	7%	19	3%	331	46%	711
Soils	162	22%	277	38%	42	6%	8	1%	242	33%	731
Land cover / Land use	191	26%	268	37%	42	6%	7	1%	219	30%	727
Topographic	139	20%	224	31%	39	5%	8	1%	303	43%	713
Comprehensive Green Space Map	68	10%	137	20%	31	4%	8	1%	451	65%	695
Other Natural Resource Information	25	5%	39	8%	5	1%	6	1%	431	85%	506

Table 11b: 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	Mean
	N	%	N	%	N	%	N	%		
Agricultural	125	28%	277	62%	34	8%	10	2%	446	1.84
Wetland Vegetation	139	30%	276	59%	43	9%	11	2%	469	1.84
Upland Vegetation	95	30%	194	60%	25	8%	7	2%	321	1.83
Invasive Plant Species	28	18%	87	56%	29	19%	11	7%	155	2.15
Wildlife Species	36	21%	95	57%	28	17%	9	5%	168	2.06
Invasive Animal Species	33	24%	67	48%	28	20%	11	8%	139	2.12
Endangered & Threatened Species	32	19%	89	53%	35	21%	11	7%	167	2.15
Geology	105	29%	213	59%	35	10%	9	2%	362	1.86
Surface Water	175	34%	306	59%	30	6%	8	1%	519	1.75
Ground Water	109	29%	206	54%	46	12%	19	5%	380	1.93
Soils	162	33%	277	57%	42	9%	8	1%	489	1.79
Land cover / Land use	191	38%	268	53%	42	8%	7	1%	508	**1.73**
Topographic	139	34%	224	55%	39	9%	8	2%	410	1.80
Comprehensive Green Space Map	68	28%	137	56%	31	13%	8	3%	244	1.91
Other Natural Resource Information	25	33%	39	52%	5	7%	6	8%	75	1.89

Table 12. Satisfaction with wildlife species and endangered and threatened species information and level of government.

Level of Government	Very satisfied	Moderately satisfied	Moderately dissatisfied	Very dissatisfied	Total # of Respondents
Wildlife species information					
Regional Planning Commission	0	3 (75%)	1 (25%)	0	4 (2%)
County	3 (30%)	4 (40%)	3 (30%)	0	10 (6%)
Township	**33 (21%)**	**88 (57%)**	24 (16%)	9 (6%)	154 (92%)
Total # of Respondents	36 (21%)	95 (57%)	28 (17%)	9 (5%)	168
Endangered and threatened species information					
Regional Planning Commission	0	3 (60%)	2 (40%)	0	5 (3%)
County	3 (23%)	6 (46%)	3 (23%)	1 (8%)	13 (8%)
Township	**29 (19%)**	**80 (54%)**	30 (20%)	10 (7%)	149 (89%)
Total # of Respondents	32 (19%)	89 (53%)	35 (21%)	11 (7%)	167

Planning and zoning activities that use natural resource information at least 75% of the time include Master Plan creation or update, zoning ordinance creation or update, and site development reviews (Table 13a). When the "activity not conducted" responses are eliminated from analysis, Planned Unit Development activities are included with Master Plan, zoning ordinance and site development reviews, with at least 60% of local governments indicating that natural resource information is used in these activities at least 75% of the time (Table 13b). Transportation and utility planning use the least amount of natural resource information, although the average mean is still closest to "sometimes" or approximately use the information 50% of the time (3.0).

Table 13a: 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%**	**171**	**23%**	110	15%	60	8%	33	4%	145	19%	751
Site Development reviews	198	27%	170	23%	135	18%	53	7%	36	5%	151	20%	743
Planned Unit Developments (PUD's)	166	23%	119	16%	70	10%	54	7%	54	7%	276	37%	739
Land Division reviews	136	18%	127	17%	140	19%	86	11%	71	10%	185	25%	745
Zoning Ordinance creation or update	230	31%	162	21%	119	16%	54	7%	34	5%	154	20%	753
Preservation Ordinance creation or update	155	21%	105	14%	80	11%	49	7%	53	7%	298	40%	740
Land Acquisition planning	84	11%	81	11%	78	11%	57	8%	64	9%	372	50%	736
Park and Recreation planning	135	18%	122	16%	81	11%	57	8%	58	8%	290	39%	743
Transportation planning	57	8%	65	9%	71	9%	72	10%	71	9%	405	55%	741
Utility planning	68	9%	70	10%	72	10%	65	9%	69	9%	395	53%	739
Capital Improvements planning	70	9%	87	12%	110	15%	60	8%	63	9%	344	47%	734
Other activities	12	3%	11	3%	8	2%	11	3%	32	8%	324	81%	398

Table 13b: How **often** do you use natural resource information in the following land use planning and zoning activities (without "Activity Not Conducted" responses)?

Planning Activity	Always (1)		Frequently (2)		Sometimes (3)		Rarely (4)		Never (5)		Total # of Respondents	Mean
	N	%	N	%	N	%	N	%	N	%		
Master Plan creation or update	**232**	**38%**	**171**	**28%**	**110**	**18%**	**60**	**10%**	**33**	**6%**	**606**	**2.16**
Site Development reviews	198	33%	170	29%	135	23%	53	9%	36	6%	592	2.26
Planned Unit Developments (PUD's)	166	36%	119	25%	70	15%	54	12%	54	12%	463	2.38
Land Division reviews	136	24%	127	23%	140	25%	86	15%	71	13%	560	2.69
Zoning Ordinance creation or update	230	38%	162	27%	119	20%	54	9%	34	6%	599	2.17
Preservation Ordinance creation or update	155	35%	105	24%	80	18%	49	11%	53	12%	442	2.41
Land Acquisition planning	84	23%	81	22%	78	21%	57	16%	64	18%	364	2.82
Park and Recreation planning	135	30%	122	27%	81	18%	57	12%	58	13%	453	2.52
Transportation planning	57	17%	65	19%	71	21%	72	22%	71	21%	336	3.10
Utility planning	68	20%	70	20%	72	21%	65	19%	69	20%	344	2.99
Capital Improvements planning	70	18%	87	22%	110	28%	60	16%	63	16%	390	2.89
Other activities	12	16%	11	15%	8	11%	11	15%	32	43%	74	3.54

When local governments were asked how important the different types of natural resource information were, the overall response rate (very and somewhat important combined) indicated surface water, ground water, land use/ land cover, and soils information were most important (Table 14a). Following a common theme in previous questions, information identified as least important included invasive plant, invasive animal, endangered and threatened, and wildlife species information. Although, it is interesting to note that the highest percentage of "don't know" respondents also identified the same least important pieces of information. With so few local governments using these unique pieces of information, a measurable uncertainty is expressed among respondents. Another example is the overall mean response. When the "don't know" respondents are eliminated from calculations, the overall mean response for invasive plant, invasive animal, endangered and threatened species and wildlife information remains closest to 2.0 or "somewhat important" (Table 14b).

Table 14a: Assume the following information is <u>freely available</u> and of <u>high quality</u>. Please indicate how **important** each type of natural resource information is for <u>future</u> 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	414	52%	256	32%	66	9%	58	7%	794
Wetland Vegetation	452	58%	232	29%	37	5%	64	8%	785
Upland Vegetation	289	37%	287	37%	107	14%	97	12%	780
Invasive Plant Species	182	23%	291	38%	159	20%	146	19%	778
Wildlife Species	205	26%	339	43%	116	15%	123	16%	783
Invasive Animal Species	238	30%	256	33%	147	19%	138	18%	779
Endangered & Threatened Species	216	28%	309	40%	125	16%	127	16%	777
Geology	290	37%	313	40%	82	11%	96	12%	781
Surface Water	**567**	**72%**	**155**	**20%**	11	1%	54	7%	787
Ground Water	527	67%	183	23%	24	3%	58	7%	792
Soils	441	56%	257	33%	21	3%	66	8%	785
Land cover / Land use	470	60%	236	30%	20	2%	61	8%	787
Topographic	367	47%	278	35%	61	8%	76	10%	782
Comprehensive Green Space Map	294	38%	302	39%	64	8%	118	15%	778
Other Natural Resource Information	61	16%	79	20%	22	6%	221	58%	383

Table 14b. Assume the following information is <u>freely available</u> and of <u>high quality</u>. Please indicate how **important** each type of natural resource information is for <u>future</u> land use plans, zoning ordinances and land use decisions/recommendations (without "Don't Know" responses)?

Future Importance	Very Important		Somewhat Important		Not Important		Total # of Respondents	Mean
	N	%	N	%	N	%		
Agricultural	414	56%	256	35%	66	9%	736	1.53
Wetland Vegetation	452	63%	232	32%	37	5%	721	1.42
Upland Vegetation	289	42%	287	42%	107	16%	683	1.73
Invasive Plant Species	182	29%	291	46%	159	25%	632	1.96
Wildlife Species	205	31%	339	51%	116	18%	660	1.87
Invasive Animal Species	238	37%	256	40%	147	23%	641	1.86
Endangered & Threatened Species	216	33%	309	48%	125	19%	650	1.86
Geology	290	42%	313	46%	82	12%	685	1.70
Surface Water	**567**	**77%**	**155**	**21%**	**11**	**2%**	**733**	**1.24**
Ground Water	527	72%	183	25%	24	3%	734	1.31
Soils	441	61%	257	36%	21	3%	719	1.42
Land cover / Land use	470	65%	236	32%	20	3%	726	1.38
Topographic	367	52%	278	39%	61	9%	706	1.57
Comprehensive Green Space Map	294	44%	302	46%	64	10%	660	1.65
Other Natural Resource Information	61	38%	79	49%	22	13%	162	1.76

Overall, regional planning commissions rank wildlife and endangered and threatened species information as most important, followed by counties, then townships (Table 15). Following the pattern of use, local governments in the Eastern Upper Peninsula identified wildlife and rare species information as the most important (very and somewhat combined) and the Southern Lower Peninsula governments, least important (Table 16).

Table 15. Importance of wildlife and endangered and threatened species information for future planning and the level of government.

Level of Government	Very Important	Somewhat Important	Not Important	Total # of Respondents
Wildlife species information				
Regional Planning Commission	**5 (42%)**	**6 (50%)**	1 (8%)	12 (2%)
County	16 (38%)	22 (52%)	4 (10%)	42 (6%)
Township	184 (31%)	309 (51%)	111 (18%)	604 (92%)
Total # of Respondents	205 (31%)	337 (51%)	116 (18%)	658
Endangered and threatened species information				
Regional Planning Commission	**6 (50%)**	**6 (50%)**	0	12 (2%)
County	17 (44%)	18 (46%)	4 (10%)	39 (6%)
Township	192 (32%)	284 (48%)	121 (20%)	597 (92%)
Total # of Respondents	215 (33%)	308 (48%)	125 (19%)	648

Table 16. Location of local governments that ranked wildlife and endangered and threatened species information as important for future planning.

Location in State	Very Important	Somewhat Important	Not Important	Total # of Respondents
Wildlife species information				
Western Upper Peninsula	14 (37%)	18 (47%)	6 (16%)	38
Eastern Upper Peninsula	**15 (42%)**	**18 (50%)**	3 (8%)	36
Northern Lower Peninsula	82 (41%)	91 (46%)	26 (13%)	199
Southern Lower Peninsula	94 (24%)	210 (55%)	81 (21%)	385
Total # of Respondents	205 (31%)	337 (51%)	116 (18%)	658
Endangered and threatened species information				
Western Upper Peninsula	12 (32%)	19 (50%)	7 (18%)	38
Eastern Upper Peninsula	**12 (35%)**	**18 (53%)**	4 (12%)	34
Northern Lower Peninsula	74 (39%)	89 (46%)	29 (15%)	192
Southern Lower Peninsula	117 (31%)	182 (47%)	85 (22%)	384
Total # of Respondents	215 (33%)	308 (48%)	125 (19%)	648

Three well known and well defined types of natural resource information were ranked as first, second and third most important for future planning and zoning efforts. Responses indicate agricultural, surface water and soils information were chosen respectively (Table 17). Endangered and threatened species information was least important in all three categories.

Table 17: 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 <u>future</u> 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%	**166**	**25%**	84	13%
Ground Water	115	17%	125	19%	79	12%
Soils	29	5%	56	9%	**93**	**15%**
Land cover / Land use	82	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	**672**		**659**		**634**	

An index was created to identify overall, how important the different types of natural resource information were to local governments (Table 18). 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 2016 (total # of respondents under the most important column, 672 * 3 = 2016). This created an index between 0 and 1. An example is provided: Agricultural information (179*3) + (45*2) + (46*1) / 2016 = .334. The index was then ranked by score. Surface water information is most important overall, followed with a tie between agricultural and ground water information.

Table 18. Top three types of natural resource information with index.

Future Most Important Information	Most Important	Second Most Important	Third Most Important	Index	Rank
	N	N	N		
Agricultural	**179**	**45**	**46**	**.334**	**2**
Wetland Vegetation	76	75	53	.214	4
Upland Vegetation	9	16	20	.039	9
Invasive Plant Species	10	9	16	.032	12
Wildlife Species	12	16	20	.044	8
Invasive Animal Species	6	16	21	.035	11
Endangered & Threatened Species	3	5	7	.013	13
Geology	9	15	22	.039	9
Surface Water	**107**	**166**	**84**	**.366**	**1**
Ground Water	**115**	**125**	**79**	**.334**	**2**
Soils	29	56	93	.145	5
Land cover / Land use	82	63	86	.227	3
Topographic	10	22	38	.056	6
Comprehensive Green Space Map	10	20	39	.054	7
Other Natural Resource Information	15	10	10	.037	10
Total # of Respondents	**672**	**659**	**634**		

Of the local governments that did rank wildlife and endangered and threatened species in the top three most important categories, townships identified the information as overall more important than counties or regional planning commissions (Table 19). These townships were overwhelmingly located in the Southern Lower Peninsula (Table 20).

Table 19. Level of government indicating wildlife species or endangered and threatened species information were the top 3 in importance for future planning.

Level of Government	Most Important		Second Most Important		Third Most Important		Total # of Respondents	Total # of Respondents to Question
	Wildlife species	Endangered & threatened species	Wildlife species	Endangered & threatened species	Wildlife species	Endangered & threatened species		
Regional Planning Commission	0	0	0	0	1 (100%)	0	1(3%)	34
County	0	0	0	0	1 (100%)	0	1 (1%)	110
Township	**12 (20%)**	**3 (5%)**	**16 (26%)**	**5 (8%)**	**18 (30%)**	**7 (11%)**	**61 (3%)**	**1,815**
Total # of Respondents	12 (19%)	3 (5%)	16 (25%)	5 (8%)	20 (32%)	7 (11%)	63 (3%)	1,959

Table 20. Location of local governments indicating wildlife species or endangered and threatened species information were the top 3 in importance for future planning.

Location in State	Most Important		Second Most Important		Third Most Important		Total # of Respondents
	Wildlife species	Endangered & threatened species	Wildlife species	Endangered & threatened species	Wildlife species	Endangered & threatened species	
Western Upper Peninsula	3 (43%)	0	0	1 (14%)	2 (29%)	1 (14%)	7
Eastern Upper Peninsula	1 (25%)	1 (25%)	0	0	2 (50%)	0	4
Northern Lower Peninsula	4 (19%)	1 (5%)	6 (28%)	1 (5%)	8 (38%)	1 (5%)	21
Southern Lower Peninsula	**4 (13%)**	**1 (3%)**	**10 (32%)**	**3 (10%)**	**8 (26%)**	**5 (16%)**	**31**
Total # of Respondents	12 (19%)	3 (5%)	16 (25%)	5 (8%)	20 (32%)	7 (11%)	63

Respondents indicated they needed to know most of all where to access natural resource information (mean 1.47), then funding to acquire the information (mean 1.66) (Table 21). Consultation with biologists on the environmental impacts of proposed land uses was in least demand (mean 2.02), although overall response was still closest to "somewhat need" (mean 2.0).

Table 21: 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	Mean
	N	%	N	%	N	%		
Knowing where to access information	**470**	**59%**	**273**	**35%**	**51**	**6%**	**794**	**1.47**
Computer hardware or software information	241	32%	371	48%	155	20%	767	1.89
Funding to acquire information	**363**	**47%**	**305**	**40%**	**103**	**13%**	**771**	**1.66**
Interpretation of information	261	34%	406	52%	107	14%	774	1.80
Application of information	256	33%	410	53%	105	14%	771	1.80
Creation of ordinances to protect natural resources	235	31%	405	52%	133	17%	773	1.87
Consultation with biologists on environmental impacts of proposed land uses	172	23%	411	53%	186	24%	769	2.02
Other needs	24	13%	30	16%	135	71%	189	2.59

The majority of local governments describe the level of past and anticipated future residential and commercial development as somewhat increasing. When combining the somewhat increasing and greatly increasing respondents, more than 80% of local governments are expecting increased development in the next five years (Table 22).

Table 22: 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%	457	54%	79	9%	23	3%	10	1%	13	2%	849
Next five years	270	32%	443	52%	64	8%	22	2%	5	1%	41	5%	845

The final analysis looks at respondents with planning credentials. Not surprisingly, since the survey was sent to the clerk, the majority of respondents do not have planning credentials (Table 23). Respondents that do have planning credentials are mainly located in county governments and in the Southern Lower Peninsula (Table 24).

Table 23: Are you a Certified Planner or do you have other specific **planning credentials**?

Planning Credentials	Frequency	Percent
Yes	93	10.9
No	762	89.1
Total	855	100.0
No response	82	
Total	937	

Table 24. 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%)	712 (90%)	792
Total # of Respondents		92 (11%)	761 (89%)	853
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%)**	435 (88%)	497
Total # of Respondents		92 (11%)	761 (89%)	853

Approximately half of the respondents were male (53%) and female (47%), and two-thirds were elected (68.5%) officials (see Appendix D). The mean average number of years respondents have been in their current position is ten, although, the value that appears most frequently (mode) is one year. The mean age was 55.5 and approximately one-third (29%) of the respondents have had some college education. The last question on the survey provided space for comments from the respondent. Most of the returned, non-usable township surveys indicated they did not have planning or zoning responsibilities but the county conducted planning on their behalf. Additional comments, along with the answers to the "other" categories in previous questions, will be summarized in the final report.

Discussion

One challenge in conducting this survey was finding a source of names and addresses for local planning and zoning officials at the county and township level. Michigan does not have an organization that gathers land use contact information for the benefit of society. The Michigan Association of Planning tracks paying members, although not consistently by position, and for those local governments that do not have a membership, 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. An additional challenge with this project was knowing which of the 1,242 townships plan and/or zone. The status can change at any time. Given these difficulties, we chose to replicate part of the methodology the Institute for Public Policy and Social Research undertook in 2003. That is, conduct a statewide survey of local governments and send the survey to the clerk (IPPSR 2004).

Knowing the clerk would be receiving the survey, instructions were provided that informed the recipient the survey should be filled out by an individual that actively gathers land use planning and zoning information. The survey response rate of this project was high (70%) and the responses that were provided were valuable and informative. Based on the survey results, almost half of the respondents were clerks (48%) and two-thirds (68%) of the respondents indicated their position requires making land use planning or zoning decisions/recommendations (see Appendix D). Clerks are often active members on a Board of Trustees, where final decisions are made about land use decisions, but clerks are not usually members of a Planning Commission. Since Planning Commissions are designed to make recommendations to the Board of Trustees on land use issues, it is the Commission members that are most likely to use and interpret natural resource information. Ideally, township and county Planning Commission or Zoning Board members should have received this survey.

The most common types of natural resource information used by local governments are: 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 each category. The economic value of water front property has always driven development towards those areas with favorable access to open water. Due to unregulated development in wetlands, pollution of public waterways, contamination of ground water supplies and declining wildlife habitat, the Clean Water Act was passed in the 1970's to restore and maintain the chemical, physical, and

biological integrity of the nation's waters (ELI 2003). Surface water, ground water and wetland activities are now regulated under the Clean Water Act. In Michigan, this responsibility has been assumed by the Department of Environmental Quality. As a result, most information dealing with water or wetlands is provided by the MDEQ. Prime agricultural lands were identified long ago by willing and interested settlers using soils information from the United States Department of Agriculture. Soils information continues to be a critical component in site development decisions today. Understanding the patterns and use of our landscape is critical to land use planners at all levels. Both the Michigan Department of Natural Resources and Michigan State University provide land cover / land use information to the public. Some regional planning commissions are also able to provide more up-to-date land cover/use analysis. Several state and federal programs focus on the most commonly used pieces of natural resource information. These programs have been in existence for a long time compared to programs that offer access to some of the other information. It will be informative to learn during the second phase of this project, why local governments are not using some of the other information like invasive animal, invasive plant, wildlife, and endangered and threatened species information. Based on survey results, these types of information were used the least.

The relatively small number of local governments that do use wildlife (124) and endangered and threatened species (133) information are located primarily in the Northern Lower Peninsula and Upper Peninsula. Large parcels of public and private land are located in northern Michigan with relatively low densities of development. These parcels provide significant areas of suitable habitat for wildlife and rare species which increases the likelihood that community discussions will occur concerning the impact of land use activities on wildlife and rare species. These same factors likely affected the response on the importance of rare species and wildlife information. Northern Michigan respondents identified this information as more important than Southern Michigan respondents. However, when asked to rank their top three types of natural resource information relative to all possibilities, Southern Lower Peninsula governments identified wildlife and rare species information more frequently than northern governments. The lack of high quality habitat and pressure from development may be influencing southern Michigan respondents. The few local governments that have sought out rare species information have primarily been from southern Michigan (personal communication with MNFI).

Regional planning commissions expressed more interest in wildlife and rare species information than county or township governments. This may reflect the availability of time, technical and financial resources, and personnel required to pursue these more incomplete pieces of information. At least half of the natural resource information should be provided to local governments in hard copy format since the majority of respondents were not interested in electronic information (only 40%). Follow-up interviews will provide a better evaluation of the capabilities and reasons for the differences among the local governments.

Given that most local governments have not used wildlife or endangered species information, they did not express high satisfaction for either piece of information. Even though townships were least likely to use the wildlife or rare species information relative to counties or regional planning commissions, townships ranked the information in the top three more frequently and their satisfaction with the information the highest. This may be because the scale and detail provided at the township level is most effective. Species identification is often masked when

distributing rare species information. This may lead to more dissatisfied responses when moving to larger scales. In order to refute or confirm current hypotheses, it will be necessary to ask interviewees why certain types of information receive higher satisfaction responses than others – and vice versa.

When local governments were asked what types of natural resource information were important, they indicated surface water, ground water, land cover / land use and soils information were most important. However, when asked to rank their top three most important types of information overall, index scores showed surface water was first, and agricultural and ground water information tied for second. Ground water information received a relatively high dissatisfaction ranking by local governments. An evaluation of why ground water information was unsatisfactory will be conducted in phase II of the project. A possible recommendation may be to improve available ground water information.

Respondents indicated 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 services most requested respectively. Even though consultation with biologists was in least demand, 75% of the local governments that did respond indicated they had at least somewhat of a need (including those that have a great need) for this service. Results of the survey indicate outreach and training materials should focus on where to access natural resource information. Agencies and organizations that gather natural resource information should create one location to distribute their information. This may include links to the individual agencies or organizations, but the overriding goal would be to consolidate where natural resource information is accessed. The interview phase of this project will probe needs and training further.

Of the 937 respondents, 282 (34%) 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. The second and final phase of this project will involve conducting 30 representative, stratified interviews in the four ecoregions of the state. The following objectives will be addressed in the interviews:
- Are natural resources being addressed in local land use planning and zoning activities? If so, at what level are natural resources being addressed?
- Where are local governments obtaining natural resources information?
- What are the challenges and barriers to the integration of natural resource information in planning efforts?
- What information or tools (e.g. decision support systems) would facilitate greater consideration of natural resource data in local government land use planning?
- What educational efforts are needed to support these products?
- If rare species and/or natural resource information has been acquired by a local government, how have those data been incorporated into land use planning efforts? Are users aware of the data's limitations and how are those limitations addressed?

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). Yet, comprehensive land use planning which protects critical wildlife habitat, travel corridors, and ecological processes is an essential component of a successful conservation strategy.

Without informed decision-making, natural resources cannot be effectively protected, even when one desires to do so. Michigan has several policies and sources of data that can be used by local governments to improve the integration of natural resource information into land use planning. 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 must approve permits unless the wetland 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. This policy provides local governments an opportunity to protect critical resources. State leadership will be needed to provide the data and technical expertise to local governments in order to capitalize on local government capabilities to protect critical resources.

Local government officials in Michigan want to know where to access natural resource information. One recommendation may be to create a website or other portal for natural resource information, even if that application has links to other websites. If natural resource information is going to meet the needs of local land use planners, a discussion is needed regarding what, when, how and why natural resource information is and isn't being used and what, when and how is information desired. This project begins that discussion.

Even though wildlife and rare species information are not used frequently, nor ranked by many as very important, the vast majority of local governments rank the information as somewhat important. This may indicate planning officials are unaware of what information is available and how the information should be interpreted and applied to planning situations. Phase II of the project will probe these hypotheses for further explanations.

Acknowledgements

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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 <u>one</u>.)*

   ☐ 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 <u>one</u>.)*

   ☐ 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. <u>Part 1</u>: Have you **used** the following types of natural resource information in your land use plans, zoning ordinances or land use decisions/recommendations? <u>Part 2</u>: If Yes, in what **format** was the information provided? *(Please check up to <u>two</u> 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 __one__ 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 one 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 one response for each statement.)*

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

10. Assume the following information is <u>freely available</u> and of <u>high quality</u>. Please indicate how **important** each type of natural resource information is for <u>future</u> 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 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 <u>future</u> 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 <u>most preferred</u>? *(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 <u>one</u> 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 <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? *(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 <u>only</u> 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: Approval from Michigan State University – University Committee on Research Involving Human Subjects (UCRIHS)

July 12, 2005

To: Gerhardus SCHULTINK
        310 Natural Resources

Re: **IRB # 05-362**   Category: EXPEDITED 2-7
        Approval Date: July 11, 2005
        Expiration Date: July 10, 2006

Title: INTEGRATION OF NATURAL RESOURCE INFORMATION IN LAND USE PLANNING

The University Committee on Research Involving Human Subjects (UCRIHS) has completed their review of your project. I am pleased to advise you that **your project has been approved**.

The committee has found that your research project is appropriate in design, protects the rights and welfare of human subjects, and meets the requirements of MSU's Federal Wide Assurance and the Federal Guidelines (45 CFR 46 and 21 CFR Part 50). The protection of human subjects in research is a partnership between the IRB and the investigators. We look forward to working with you as we both fulfill our responsibilities.

Renewals: UCRIHS approval is valid until the expiration date listed above. If you are continuing your project, you must submit an *Application for Renewal* application at least one month before expiration. If the project is completed, please submit an *Application for Permanent Closure*.

Revisions: UCRIHS must review any changes in the project, prior to initiation of the change. Please submit an *Application for Revision* to have your changes reviewed. If changes are made at the time of renewal, please include an *Application for Revision* with the renewal application.

Problems: If issues should arise during the conduct of the research, such as unanticipated problems, adverse events, or any problem that may increase the risk to the human subjects, notify UCRIHS promptly. Forms are available to report these issues.

Please use the IRB number listed above on any forms submitted which relate to this project, or on any correspondence with UCRIHS.

Good luck in your research. If we can be of further assistance, please contact us at 517-355-2180 or via email at UCRIHS@msu.edu. Thank you for your cooperation.

Sincerely,

[signature]

Peter Vasilenko, Ph.D.
UCRIHS Chair

c: Jennifer Olson
        2519 Wilson Ave
        Lansing, MI 48906

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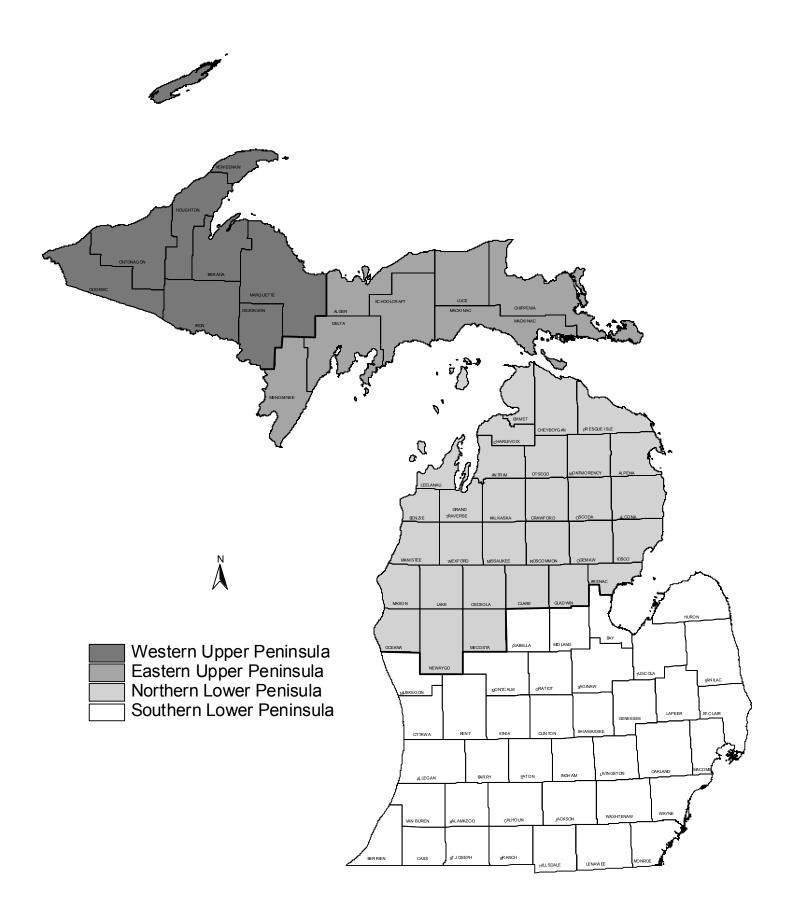48824

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*MSU is an affirmative-action,
equal-opportunity institution.*

Appendix C: Regions used in analysis based on Albert's regional landscape ecosystem

Western Upper Peninsula
Eastern Upper Peninsula
Northern Lower Penisula
Southern Lower Peninsula

Appendix D: Analysis of Survey Questions not included in Results Section

Table D-1: How would you describe your current **appointment** in relation to the township, county or region receiving this questionnaire?

Current Appointment	Frequency	Percent
Elected official	608	68.5
Appointed official	160	18.0
Hired staff	102	11.5
Volunteer staff	2	.2
Consulting firm	13	1.5
Other appointment	2	.2
Total	887	100.0
No response	50	
Total	937	

Table D-2: Please specify your current **position**.

Current Position	Frequency	Percent
Township or County Supervisor	146	16.3
Township or County Manager	5	.6
Township or County Clerk	431	48.2
Township or County Zoning Administrator	106	11.9
Township or County Zoning Board member	14	1.6
Township or County Planning Commission member	89	10.0
Township or County Planner	45	5.0
Private Planning Consultant	9	1.0
Regional Commission Planner	9	1.0
Regional Commission Director	3	.3
Other position	37	4.1
Total	894	100.0
No response	43	
Total	937	

Table D-3: 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	70
Number of Respondents	867

Table D-4: 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	597	67.7
No	285	32.3
Total	882	100.0
No response	55	
Total	937	

Table D-5: 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?

Interview	Frequency	Percent
Yes	282	34.4
No	537	65.6
Total	819	100.0
No response	118	
Total	937	

Table D-6: Are you male or female?

Gender	Frequency	Percent
Male	457	52.6
Female	411	47.4
Total	868	100.0
No response	69	
Total	937	

Table D-7: In what **year** were you born?

Year Born	
Mean	1950.5
Median	1950
Mode	1947(a)
Minimum	1919
Maximum	1984
Missing	112
Number of Respondents	825

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

Table D-8: What is the highest level of formal **education** that you have completed?

Education	Frequency	Percent
Less than high school	5	.6
High school diploma or equivalent	169	19.6
Some college	248	28.7
Associate's degree	95	11.0
Technical / vocational degree	38	4.4
Bachelor's or 4-year degree	186	21.6
Graduate or professional degree	122	14.1
Total	863	100.0
No response	74	
Total	937	