

State/Local Capability Assessment: Existing Hazard Mitigation Tools and Measures

This section of the plan expands upon many of the hazard mitigation strategies listed within each hazard subsection, with a greater emphasis on those strategies that can be implemented or promoted in some manner by staff and/or funding at the level. This description includes some strengths and weaknesses of hazard mitigation strategies, which is useful to explain the types of considerations that may make certain strategies more or less feasible at the state government level, or for promotion by state government.

Land Use / Development Measures

The relationship between wise land use planning and the reduction of a community's exposure and vulnerability to hazards is clear. Experience has shown that those communities that carefully plan the location, type, and structural requirements of development to avoid (to the extent possible) hazardous areas and vulnerable structures suffer far less disaster-related damage and impacts than do communities that don't carefully plan for development. The benefits of wise land use and development planning, from a disaster recovery standpoint, include:

- Less disruption to a community's economic, social, and physical structure.
- Less impact on the community's tax base.
- Less impact on the provision of essential services.
- Less financial impact in terms of local participation in disaster program cost-sharing and the rebuilding of damaged community facilities.

In addition, communities that are more vulnerable to disaster damage may be less likely to be looked upon favorably by potential business enterprises as a safe, secure place in which to do business. Clearly, wise land use planning and development practices have very practical ramifications from that standpoint of attracting and retaining business and industry in the community.

Prevention is the Key

Preventing land use or development related problems in the first place (**preventive mitigation**) is much more prudent and desirable than attempting to go back and correct problems (**corrective mitigation**) at a later time. The old adage "an ounce of prevention is worth a pound of cure" is certainly true when it comes to land use planning and community development. Buildings, homes, businesses, and public infrastructure that are in harm's way or vulnerable by design or construction are doomed to eventual failure. It might not occur overnight, but experience has shown that eventually it will occur. The unfortunate part is that the community is left with the job of picking up the pieces in the aftermath of an emergency or disaster.

Hazard Mitigation is Primarily a Local Function

Fortunately, local governments have many tools available to guide the type, location and structural requirements of development. For that reason, and since development occurs primarily at the local level, hazard mitigation is inherently a local government function. State government has an important role to play, in that laws and processes governing the use of land and development of property originate at the state level. In addition, state agencies administer a wide variety of programs that affect – either directly or indirectly – the development and use of land. Therefore, successful implementation of a program to reduce vulnerability to hazards must, out of necessity, be a joint cooperative effort between the State and local governments. State government provides the means (i.e., enabling laws and local governing authority) for regulating land development, and local governments put that means to use and actually make land use / development decisions.

For land use / development decision-making to be effective in limiting or eliminating hazard risk and vulnerability, local and state actions must be carefully coordinated. The State must ensure, through appropriate legislation and rules/regulations, that local governments have the necessary means to effectively guide and manage land use change

and development. In addition, the State must ensure that its development related actions do not contribute to increasing hazard risk and vulnerability.

Local governments, in turn, must make good land use decisions and exercise prudent stewardship of the land development process within their communities. Adequate guidance, oversight, and enforcement at the local level are critically important to successfully mitigating hazard risk and vulnerability. Successful implementation of this process will help ensure that the State of Michigan's land use / development pattern lends itself to a reduction, to the extent possible, of risk and vulnerability to natural, technological and human-related hazards.

Existing Measures and Their Effectiveness at Mitigating Hazards

Local governments in Michigan can utilize the following measures to effectively guide land use and development:

- Comprehensive planning;
- Zoning ordinances;
- Building codes;
- Subdivision regulations;
- Special area, use and design regulations; and
- Capital improvements planning.

These measures can be used to reduce risk and vulnerability to many types of hazards. However, political, social and economic pressure at the local level often leads to approval of land uses and developments that may not be appropriate for a particular site or area. In some instances, code enforcement may be a problem. In others, adequate funding may not be available to support planning or regulatory activities, or there may be a lack of community support for such activities. The end result is that local communities may not be able to effectively utilize the measures they have at their disposal.

The one commonality that these land use / development guidance measures have is that they are coordinated, at least to some degree, by a planning commission. In Michigan, local and regional planning commissions are authorized to develop, review and implement long-range, comprehensive development plans. Although local planning commissions in Michigan are primarily advisory bodies as opposed to regulatory ones, they can wield power and influence in land use and development decisions. Similarly, regional planning commissions have authority to review and comment on local federally funded development projects, which also places them in a position to offer insight on possible mitigation opportunities within or affecting local jurisdictions.

These measures provide local governments with the tools necessary to effectively guide and regulate land use and development. The primary mitigation opportunities lie not in the structure of the measures, but in the coordination and application of the measures at the local level.

Some planning commissions have been successful in effectively coordinating land use / development measures to reduce community risk and vulnerability to hazards. However, community decision makers do not always follow the recommendations of their planning commission. Often, local economic considerations take precedence over the need for mitigation. This may be compounded, at least in part, by differences or bias in risk perception. For example, certain hazards (or perhaps hazards in general) may not be viewed as a threat worth addressing, other issues may be ranked higher than hazard risk reduction, or the community may not be aware of the potential impacts of a hazard. Also, time horizons vary a great deal. For example, a homeowner has a lengthy time horizon because they usually want to protect their investment for as long as possible. The bank holding the mortgage has a 30-year time horizon (the period for which the loan proceeds are at risk), although some lending institutions are remarkably short sighted when it comes to lending money for risky developments. The developer who proposes a project has a time horizon of only a few years, long enough to build a structure and then sell it. A political leader is often operating under a time horizon that may expire before the next disaster, and thus may choose to let the next generation of decision makers deal with the issue.

Planning commissioners may also fall under this last category. They may not be overly concerned with development issues that will crop up after their term expires. Another obstacle may be a general lack of knowledge in the planning

community (both professional practitioner and commissioner) about the relationship between sound land use planning and development decisions and the community's risk and vulnerability to hazards. Many planners don't know a great deal about hazard mitigation and emergency management because they never received training in these disciplines and they are not part of their day-to-day work activities.

The general hazard mitigation goal of promoting safe, sustainable development that results in economically, socially and physically viable communities is virtually identical to the overall mission of the urban planning profession. However, more often than not, hazard vulnerability reduction is not considered much when decisions are made about land uses and land development because the concept is not formally institutionalized in the decision making process. Institutionalizing hazard mitigation principles into land use planning and development decision making is the key to limiting community risk and vulnerability to hazards. That institutionalization must occur at the policy making level (the "tools of the trade") – incorporating hazard mitigation into the comprehensive plan, zoning ordinance, capital improvements plan and other mechanisms for guiding land development – and at the implementation level where the actual land use / development decisions are made by the planning commission and local governing body.

Following is a description of the major provisions of the aforementioned basic land use / development measures as they relate to the implementation of hazard mitigation objectives:

Comprehensive Planning

The purpose of a comprehensive plan is to establish an orderly, convenient, efficient and enjoyable environment in a community, and to improve the quality of life for all its citizens. A comprehensive plan provides for future development or improvement of the land use pattern and public service program of the community. In Michigan, planning commissions are required to prepare and adopt a comprehensive plan if the community is enforcing a zoning ordinance. (The zoning ordinance must be based on an adopted comprehensive plan to be legally defensible and enforceable.) This is probably the most significant responsibility of the planning commission. Once adopted (by the planning commission and/or the community's legislative body), the comprehensive plan serves as the foundation document for the preparation and subsequent implementation of other land use / development measures such as the zoning ordinance, public works capital improvements plan, subdivision regulations, and special area, use or design regulations. All of these other measures can be used to implement hazard mitigation measures, so the importance of the comprehensive plan in relation to mitigation cannot be understated.

In terms of content, comprehensive plans typically address such subjects as land use, transportation, utilities, schools, public facilities, parks, economic development, and other subjects that relate to the physical development of the community. Although there are no absolute required elements for comprehensive plans in Michigan, 2006 PA 110 (Michigan Zoning Enabling Act*) does provide some guidance with regard to the types of zoning districts that may be established. Section 201 (1) of the Act states: "A local unit of government may provide by zoning ordinance for the regulation of land development and the establishment of one or more districts within its zoning jurisdiction which regulate the use of land and structures to meet the needs of the state's citizens for food, fiber, energy, and other natural resources, places of residence, recreation, industry, trade, service, and other uses of land, to ensure that use of the land is situated in appropriate locations and relationships, to limit the inappropriate overcrowding of land and congestion of population, transportation systems, and other public facilities, to facilitate adequate and efficient provision for transportation systems, sewage disposal, water, energy, education, recreation, and other public service and facility requirements, and to promote public health, safety, and welfare."

Section 201 (3) of the Zoning Enabling Act provides for the establishment of zoning districts to address special land use problems or achieve specific land management objectives. It states: "A local unit of government may provide under the zoning ordinance for the regulation of land development and the establishment of districts which apply only to land areas and activities involved in a special program to achieve specific land management objectives and avert or solve specific land use problems, including the regulation of land development and the establishment of districts in areas subject to damage from flooding or beach erosion." This allows for such activities as floodplain management under the National Flood Insurance Program (NFIP) and coastal zone management under the Michigan Natural Resources and Environmental Protection Act (1994 PA 451, as amended). Although the Act specifically mentioned flooding and beach erosion hazards as examples, this provision is certainly flexible enough to address other known hazard areas in a community as long as the regulatory measure is legally defensible and consistently applied.

The Michigan Zoning Enabling Act, and especially Section 201 (3), appears to provide sufficient flexibility and regulatory framework to allow communities to effectively use comprehensive planning and zoning to reduce their natural hazard risk and vulnerability.

***Background Notes:** On July 1, 2006, Michigan's three zoning enabling acts (one each for cities and villages, townships, and counties) were officially repealed and combined into one new statute, the Michigan Zoning Enabling Act (2006 PA 110). The new Zoning Enabling Act has many improvements over the former enabling legislation. It is roughly one-third the length of the previous acts, the language is clearer, and the notification process is easier and more consistent. Enactment of the Zoning Enabling Act was the culmination of years of work by many stakeholder groups, including the Michigan Association of Planning, Michigan Townships Association, Michigan Municipal League, Michigan Association of Counties, Michigan Homebuilders Association, Michigan Realtors Association, Michigan Department of Environmental Quality, and the Michigan Department of Energy, Labor and Economic Growth. Unification and modernization of the three zoning enabling acts was also one of the recommendations of the final report of the Michigan Land Use Leadership Council in August of 2003. (Note: Only counties, cities, villages, and townships that have a zoning ordinance are affected by the new Zoning Enabling Act.)

On February 29, 2008, 2006 PA 110 was amended by 2008 PA 12 to make several needed "corrective amendments" to various administrative mechanisms and processes contained in the original act. Act 33 of 2008, the Michigan Planning Enabling Act, unified and amended Michigan's three planning enabling acts (one each for cities and villages, townships, and counties) into a single, coordinated planning act. This new act was widely supported by various professional and advocacy organizations, with the anticipation that it would do for planning what the Michigan Zoning Enabling Act (described above) had done for zoning. The enactment of a new coordinated planning act was also one of the recommendations contained in the final report of the Michigan Land Use Leadership Council in August 2003. The new act was designed to strengthen the ability of local communities to effectively use comprehensive planning along with zoning and other regulatory tools.

Zoning Ordinances

A zoning ordinance is probably the most effective measure a community has for guiding and regulating development and the land use pattern, and it can be very effective in mitigating hazard risk and vulnerability. The zoning ordinance provides a mechanism for implementing the policy decisions articulated in the comprehensive plan concerning the desired locations of various land uses and public facilities. The zoning ordinance is based on the comprehensive plan and therefore is developed and adopted after the comprehensive plan has been formally adopted by the community. One major difference between the two mechanisms is the timeframe upon which they are based. Generally, the comprehensive plan is designed to guide development for the next 20 years or more, whereas the zoning ordinance will typically be adopted on the basis of a 7-10 year land use development need projection.

A zoning ordinance typically addresses 3 primary areas: 1) the use of land and structures and the height and bulk of structures; 2) the density of population and intensity of land and structural use; and 3) the provision for space around structures (i.e., requirements for side yards, rear yards, open space, building setback lines, etc.)

Some zoning ordinances may specifically address potential hazards to life and property, although there is no requirement to do this. The ordinance itself consists of a map or maps delineating the zoning districts in the community where various land uses will be allowed, and an accompanying set of administrative procedures, standards and methods for enforcing the zoning regulations. Zoning districts typically include various types of industrial, commercial, residential, agricultural, and public facility uses. Specific zoning districts are tailored to the particular needs of the community. For example, communities that have a significant amount of lakefront properties may have a special zoning district for residential development around lakes.

Although there are a variety of standard zoning districts, there are no formal legal requirements regarding the type of districts that must be included in an ordinance. As indicated in the "Comprehensive Planning" section above, the new Michigan Zoning Enabling Act is suggestive but not prescriptive in its provisions for zoning districts. Section 201 (1) of the Act suggests a variety of land uses that may be addressed by formal zoning districts but it does not mandate a standardized list of zoning districts that must be applied in each Michigan community that has a zoning ordinance. Section 201 (1) is sufficiently flexible to allow each community to develop a zoning ordinance to meet its individual circumstances. Obviously, any zoning ordinance must allow sufficient uses to be legally defensible if challenged in court. Essentially, it is left up to each planning commission to determine the type of zoning districts that are appropriate for the community, based on its unique characteristics. Section 201 (3) of the Act also provides communities with the option to establish zoning districts and regulate land uses to address specific land use or land management problems. As indicated in the "Comprehensive Planning" section above, the Michigan Zoning Enabling Act provides sufficient flexibility and regulatory framework to allow communities to use comprehensive planning and zoning to effectively reduce their natural hazard risk and vulnerability.

Building Codes

Building codes are designed to ensure that a building or other structure will be constructed in such a manner as to be safe for occupancy and use. These codes also regulate health and sanitation requirements for water, ventilation, plumbing, electricity, mechanical equipment, heating and air conditioning. They also contain minimum construction standards for natural hazard resistance.

Pursuant to 1972 PA 230, adopted November 5, 1974 and amended by 1999 PA 245, all communities in Michigan are subject to the State Construction Code, which establishes general minimum construction standards for buildings and structures in all Michigan municipalities. The State Construction Code is a compilation of the International Residential Code, the International Building Code, the International Mechanical Code, the International Plumbing Code published by the International Code Council, the National Electrical Code published by the National Fire Prevention Association, and the Michigan Uniform Energy Code with amendments, additions, or deletions as the Michigan Department of Energy, Labor and Economic Growth determines appropriate. The Code became effective statewide on July 31, 2001. The State Construction Code provides for statewide uniformity of application and implementation of rules governing the construction, use, and occupancy of buildings and structures. (Prior to the 1999 PA 245 amendment, communities had the option of adopting the State Construction Code – which was the National Building Officials and Code Administrators [BOCA] Code with State amendments – or they could adopt any other nationally recognized building code such as the Uniform Building Code [UBC] or the Council of American Building Officials [CABO] Code for one and two family dwellings. Approximately 40% of Michigan communities adopted the State Construction Code and 50% followed the National BOCA Code. The remaining 10% adopted the UBC.)

Provisions of the State Construction Code and other building codes are enforced through authorized local building inspection agencies and state inspectors. In Michigan, there are 2,600 registered local inspectors and 80 state inspectors. In communities where comprehensive planning is not done, the building code is often the only land use regulatory measure available.

Building codes, used in concert with other available land use / development guidance measures, can be effective in reducing or eliminating damage caused by many types of hazards such as high winds, fire and flooding. For example, proper adherence to wind load requirements for roof systems can substantially reduce damage to structures from straight-line and tornadic winds. By securing the “envelope” of a structure, water-related damage from rainfall can also be greatly reduced. Many times, that makes the difference between a home that suffers minimal or no damage and one that suffers major damage or is a total loss.

For residential structures within the floodplain, the new State Construction Code requires that the structure have the lowest floor one foot above the base flood elevation (the depth of peak elevation of flooding, including wave height, which has a 1% or greater chance of being equaled or exceeded in any given year – commonly known as the “100-year flood.”) This is called the “design flood elevation.” Basements (defined as being below grade on all sides) must be at or above the base flood elevation. Though not as stringent as Michigan’s previous State Construction Code (which required that the lowest portion of all horizontal structural members supporting floors – such as floor joists – be located at or above the 100-year flood elevation, effectively providing a one-foot “freeboard”), the new Code still provides protection against significant flood damage in many cases.

The Code also requires that utilities and mechanical equipment be elevated above the 100-year flood elevation or protected so as to prevent water from entering or accumulating within the components during the occurrence of a 100-year flood.

For non-residential structures, the level of flood protection required by the State Construction Code is dependent on the classification of the building use. Category III and IV buildings (critical facilities) such as hospitals, emergency response facilities, power generation stations and other public utilities, must have the lowest floor elevated or dry flood proofed one foot above the 500-year flood elevation. Buildings that do not fall within Category III or IV must have the lowest floor elevated or flood proofed one foot above the 100-year flood elevation. (A listing of Category III and IV buildings may be found in the publication “American Society of Civil Engineers Flood Resistant Design and Construction – SEI/ASCE 24-98.”) Non-residential buildings using the watertight flood-proofing option must be designed and certified by a registered architect or professional engineer.

By enforcing the flood resistant construction provisions of the State Construction Code, inspectors can help ensure that new construction within flood prone areas will be built in such a manner as to minimize future flood losses.

The State of Michigan has taken a number of steps to increase the effectiveness of Building Code enforcement by targeting both state and local building code Inspectors. 1986 PA 54, the Building Officials Registration Act, requires all building inspectors to be registered with the State and continue training throughout their careers. Training sessions conducted by the Bureau of Construction Codes, Department of Energy, Labor and Economic Growth, are required for all building code Inspectors every three years in order to be registered with the State. Michigan Department of Environmental Quality personnel also participate in these training sessions to provide information relating to floodplain management, the NFIP, and the MDEQ permit requirements. The training sessions make the inspectors aware of the Code requirements related to flooding and are an important phase of flood hazard mitigation. Because of the continual turnover in the number of building officials, there is a need to foster an ongoing education program. The local building officials are an essential component of the effort to ensure that future development is not flood prone.

Following the training sessions, evaluations are given in order to set high standards for the quality of building inspectors in Michigan. The Bureau of Construction Codes also evaluates the performance of a community's building inspection and enforcement effort. These performance evaluations are usually done when a community requests an audit, or a complaint is filed by a private citizen.

At the national level, the Insurance Services Office (ISO) has undertaken a major initiative designed to foster better building code enforcement. Under the ISO's Building Code Effectiveness Grading Schedule – part of the insurance industry's continuing efforts to reduce natural hazard damage – local building departments will be “graded” on their code enforcement efforts. A community's grade will be determined by the resources devoted to code enforcement activities. Communities that have good codes and code enforcement programs in place will receive a higher grade than those communities that don't, and property owners in the higher-graded communities will be rewarded with homeowners' insurance premium credits. The ISO plans to inspect every building department in the country.

The ISO developed the Grading Schedule after determining that much of the construction failure resulting from natural disasters was due, in large part, from the construction not being built to comply with codes. The insurance industry's experience has shown that communities with effective codes and code enforcement have a more favorable (lower) insurance loss experience because they have less disaster-related damage to structures. The Building Code Effectiveness Grading Schedule is modeled after a similar and long-standing ISO fire-grading program, which assesses local fire departments and water supplies. From a practical standpoint, implementation of this initiative in Michigan will mean better local codes and code enforcement, which should in turn reduce disaster-related structural damage and disaster costs.

Subdivision Regulations

Subdivision regulations are the legally established standards of design and construction for dividing a land parcel into smaller ones for the purpose of selling or leasing the property. The Land Division Act (1967 PA 288, as amended by 1996 PA 591, 1997 PA 87, and 2004 PA 524) governs the subdivision of land in Michigan. The Act requires that the land being subdivided be suitable for building sites and public improvements, that there be adequate drainage and proper ingress and egress to lots, and that reviews be conducted at the local, county and state levels to ensure that the land being subdivided is suitable for development. The Act also requires conformance with all local planning codes. From a hazard mitigation standpoint, that point is important because it gives the local planning commission the authority to approve subdivision development in accordance with the local comprehensive plan and regulatory standards.

In terms of process, the subdivision of land has three major phases. The first involves a preliminary review of the engineering aspects of the project – roads, drainage, utilities, and other necessary services, by local and county reviewing agencies. The second phase involves a review of the proposal by the Michigan Department of Environmental Quality, the Michigan Department of Transportation, and the Michigan Department of Energy, Labor and Economic Growth to ensure compliance with state standards regarding location and engineering. At the end of this phase, the developer can obtain tentative approval from the local governing body of the jurisdiction in which the project is located. The final phase involves preparation of the final plat or map of the subdivision. Local and state

reviewing agencies again review the final design to ensure compliance with local and state standards. Once approved, the plat is registered with the county register of deeds.

Subdivision regulations can be an effective tool in reducing risk and vulnerability to certain hazards, such as flooding and wildfires, if mitigation factors are incorporated into the subdivision process through mechanisms such as local planning codes. For example, a community may allow a subdivision to be placed in a heavily wooded area susceptible to wildfire if proper engineering measures are taken regarding lot size and ingress and egress, thereby providing a basic level of protection to developed home sites and the residents occupying those home sites.

From a flood hazards viewpoint, proposed subdivisions are reviewed by the County Drain Commissioner for proper drainage, and for floodplain impacts by the Michigan Department of Environmental Quality / Land and Water Management Division. (Refer to the Riverine Flooding chapter of the Michigan Hazard Analysis section in the MHMP for specific MDEQ provisions that directly address flood mitigation.)

Like any regulation, the Land Division Act can be effective if it is enforced and coordinated with other land use / development mechanisms in an effort to reduce overall community risk and vulnerability to hazards.

The subdivision rules relating to flooding are implemented through a review process and use of restrictive deed covenants. However, the restrictive deed covenants that are filed under the Act are only effective if the local building official is aware of and enforces the restrictions. Continuing education for the local building officials is essential for effective implementation of the Act.

The rules currently allow the construction of basements below the 100-year flood elevation, but these basements must be flood proofed, or it must be demonstrated by an engineering analysis that the basement will not be adversely impacted by hydrostatic pressures exerted by floodwaters. The developer must also obtain a letter of map revision (LOMR) from FEMA, certifying that the property has been filled above the 100-year flood elevation and the soil has been properly compacted. The LOMR officially removes the property from the 100-year floodplain.

The design standards for a flood proofed basement are fairly involved. Unless the building official is aware of the restrictive deed covenants and the design standards, and is enforcing these requirements, there is considerable potential for flood damage to basements even in subdivisions platted under the current act. Thus, as noted earlier, continuing education is essential.

It should be noted that Michigan's subdivision regulations are under continual attack by home builders and developers as being too restrictive. If the regulations are reduced in the future, the potential for future flood damages will be increased considerably.

Special Area, Use and Design Regulations

Examples of special area, use and design regulations include:

- Local floodplain management ordinances;
- Coastal zone management regulations;
- Watershed management regulations;
- Special infrastructure design standards and regulations;
- Drainage regulations;
- Housing regulations;
- Wetland protection regulations;
- Natural rivers protection regulations;
- Farmland and open space protection regulations;
- Endangered species / habitat regulations; and
- Historic preservation regulations (among many others).

These regulations (most of which are administered by a state or federal agency in cooperation with local officials) are designed to regulate a certain aspect of the natural or built environment to ensure protection of the public health, safety

and welfare, or some significant or unique natural feature. Not surprisingly, most of the regulations have goals that are remarkably similar to those of hazard mitigation. They provide valuable mechanisms for achieving mitigation objectives. These regulations are discussed in greater detail in the following sections of this plan.

To be effective, the provisions of these special regulations must be fully integrated into the comprehensive planning process at the local level. Major provisions of pertinent regulations must be included or addressed in the comprehensive plan and primary implementing mechanisms such as the zoning ordinance, capital improvements plan, etc. In addition, state agencies administering the regulations must coordinate development-related actions so that one agency's work does not conflict with those of another agency.

Two programs administered by the State of Michigan provide good examples of special area / use measures that, while originally designed to accomplish something else, also contribute to a reduction in a community's risk and vulnerability to hazards (flooding and wildfires in these two instances):

Natural Rivers Program

This program, administered by the Michigan Department of Environmental Quality, seeks to establish a system of outstanding rivers in Michigan and to preserve, protect and enhance their wildlife, fisheries, scenic, historical, recreational and other values. Through the natural rivers designation process, a natural river district is established and a zoning ordinance is adopted. Within the natural river district, permits are required for building construction, land alteration, platting of lots, cutting of vegetation, and bridge construction. Not all of the zoning ordinances on the natural rivers have the same requirements, although they all have building setback requirements and vegetative strip requirements.

Although not specifically designed to reduce flood losses, the program nonetheless has flood hazard mitigation benefits by requiring building to be constructed away from the river and out of the floodplain. The program is very effective when administered as intended. Like any regulatory program, if the administrator and the variance board are aware of the requirements of the program and their duties, it is very effective.

Farmland and Open Space Preservation Program

This program, administered by the Michigan Department of Agriculture and Rural Development, has the primary goal of preserving unique and beneficial open space. It does this by transferring development rights and acquiring easements. There are two categories of land eligible. The first category makes up historic, riverfront, and shoreland areas. The second category includes land that conserves natural or scenic resources, enhances recreational opportunities, promotes the conservation of soils, wetlands and beaches, or preserves historic sites and idle farmland.

The largest component of the program provides landowners with an opportunity to get a break on their property taxes for designating parcels of land that will remain undeveloped. Thus, this mechanism could be used to reduce risk and vulnerability to wildfires by preventing development in heavily forested areas. It could also reduce vulnerability to flooding by preventing development along rivers and in floodplains. However, the program does have a drawback in that the agreements are not in perpetuity and may be relinquished under certain circumstances. The land can be removed from the program under certain circumstances, with the payment of a penalty. Over the short-term, the program is very effective at slowing the development of the special open spaces. It does not, however, necessarily eliminate future development on the parcels and therefore should not be considered an effective long-term mitigation tool. However, there is also a Purchase of Development Rights program, which does purchase development rights in perpetuity. In addition, there have been significant donations of development rights to the State and to local conservation programs.

Capital Improvements Planning

A Capital Improvements Plan (CIP) is the mechanism through which a community identifies, prioritizes, and establishes financing methods for needed public improvements such as new or improved public buildings, roads, bridges, treatment plants, water and sewer infrastructure, etc. Under Michigan law, planning commissions are required to annually prepare and adopt a CIP and recommend it to the legislative body for their use in considering public works projects. Generally, public improvements included in the CIP are those that require a substantial expenditure of public funds. (Each jurisdiction must decide what constitutes a substantial expenditure.) The CIP can be an effective implementing mechanism for the community's comprehensive plan and zoning ordinance because it dictates the nature

and timing of public facility expenditures. Normally, the CIP is established for a six-year period. The first year of the CIP becomes the year's capital budget and is the basis for making appropriations for capital improvements. As a result, the annually approved items are the highest priority public improvements to be built in planned areas.

For the CIP to be an effective mechanism for implementing the comprehensive plan and zoning ordinance, public improvements must be targeted for those areas of the community where growth or certain types of land uses are desirable. Public improvements should not be put in those areas where growth or development is not desired. In that sense, the CIP should mirror the comprehensive plan and zoning ordinance; otherwise, the three mechanisms may work against each other (i.e., public expenditures in a non-desirable area may spur unwanted development). On the other hand, if desirable private development occurs or is proposed, the CIP may have to be adjusted somewhat to coordinate public investment with the desired private development. Each year, the planning commission must extend the CIP one more year through the established local planning process. As part of that process, the commission will reevaluate project proposals in light of any developmental changes that might necessitate revision in public improvement priorities. Each year, then, becomes the beginning of a new CIP.

From a hazard mitigation perspective, the CIP, if coordinated with the community's comprehensive plan and zoning ordinance, can be an effective mechanism for creating a desirable, less vulnerable land use and development pattern. Planning commissions, because they create and adopt each of the three mechanisms, are instrumental in ensuring that public investment is done in such a way that it helps reduce or eliminate the community's risk and vulnerability to hazards.

Other Considerations: Local Mitigation Policies, Programs, and Capabilities

Local jurisdictions vary widely in the number and experience of staff that are, or can be, devoted to hazard mitigation activities. All counties are represented by Emergency Management Coordinators who handle emergency response activities, exercises, response planning, and related duties, and these persons are involved in hazard mitigation planning activities, hazard mitigation project grant applications, monitoring the implementation of local hazard mitigation activities, and promoting the hazard mitigation concept within their communities (and sometimes beyond).

Unfortunately, some jurisdictions seem to have a frequent turnover of emergency management staff. While this has been one of the reasons why the development of a local hazard mitigation plan is helpful (information acquired by one person can be easily passed on to his or her replacement in the form of a printed document), nevertheless it can remain a significant problem for some jurisdictions when new emergency management staff enters and needs to take the time to become familiarized with existing conditions, information, relevant agency contacts, policies, forms, procedures, equipment, existing resources, interagency agreements, mutual assistance arrangements, and so on. Some communities may not be fully aware of the great number of things that a good emergency management coordinator needs to keep track of or be able to accomplish, with very short notice. Some communities have provided only minimal staff time and resource commitment to their emergency management programs. In some cases, a quarter time position is all that has been arranged, and serious consideration should be given to the expansion of emergency management staffing and staff hours.

In some areas of the State, local sentiments reveal a mistrust of higher levels of government. In some cases, there is suspicion that the acceptance of federal funding will come "with strings attached" that will cause the loss of some aspect of local authority to State or Federal officials or agencies. Emergency management coordinators tend to be aware of various local needs that can be supplemented with State and Federal assistance, but sometimes must accept the decisions of local officials who may be reluctant to admit any vulnerabilities or community preparedness weaknesses. If fundamental preparedness issues are sometimes difficult for local emergency managers to explain and "sell" to their community decision-makers, then preventive actions such as hazard mitigation planning and projects can be perceived as even harder to successfully explain and promote under such circumstances. This trend is evidently not a broadly generalizable condition, since Keweenaw County, the smallest in population and one of the smaller counties in land area, contained some of the most enthusiastic proponents of hazard mitigation planning and one of the swiftest mobilizations of support for the process. At the other end of the state, many jurisdictions in the Metropolitan Detroit area were also very enthusiastic and efficient in their planning activities. Similarly, areas of differing degrees of urbanization and population density, and with different types of land uses and economies throughout the state have shown a good responsiveness to hazard mitigation planning initiatives and their requests for project grant funds. Variation in the extent and effectiveness of support for hazard mitigation activities appears to me more related to the

circumstances of local agencies and officials than it is to general attributes such as regional location, population size and density, wealth or economic specializations.

Most local programs have in some way utilized available State and Federal grant funds, or at least submitted applications at some point requesting the use of such funds. Attachment C provides detailed listings of the history of funding that has been directed toward hazard mitigation activities. The following table has been newly updated to summarize the hazard mitigation funds that have contributed to activities in specific jurisdictions (counties) throughout the state.

**MITIGATION PROJECT FUNDING MADE AVAILABLE IN MICHIGAN SINCE 1994,
BY COUNTY (AS OF MAY 2013)**

COUNTY	PROJECT TOTAL	FEDERAL SHARE
Alcona	\$ 297,992	\$ 180,000
Allegan	\$ 413,235	\$ 308,607
Alpena	\$ 566,540	\$ 367,088
Antrim	\$ 447,511	\$ 286,258
Arenac	\$ 215,840	\$ 127,875
Baraga	\$ 78,702	\$ 56,255
Barry	\$ 332,795	\$ 248,413
Bay	\$ 3,083,644	\$ 2,467,959
Cass	\$ 87,520	\$ 60,540
Charlevoix	\$ 432,579	\$ 301,456
Cheboygan	\$ 17,876	\$ 13,407
Chippewa	\$ 566,652	\$ 424,989
Crawford	\$ 1,967	\$ 1,475
Delta	\$ 12,575	\$ 9,432
Dickinson	\$ 84,701	\$ 63,297
Eaton	\$ 320,086	\$ 225,000
Emmet	\$ 142,955	\$ 56,436
Genesee	\$ 4,956,999	\$ 3,719,810
Gogebic	\$ 609,918	\$ 330,089
Grand Traverse	\$ 76,989	\$ 57,742
Gratiot	\$ 405,181	\$ 277,352
Houghton	\$ 651,742	\$ 478,846
Huron	\$ 587,630	\$ 376,500
Ingham	\$ 1,950,331	\$ 1,439,293
Ionia	\$ 399,372	\$ 298,243
Iosco	\$ 154,696	\$ 67,511
Iron	\$ 209,825	\$ 148,742
Isabella	\$ 58,744	\$ 44,059
Jackson	\$ 107,637	\$ 76,797
Kalamazoo	\$ 84,318	\$ 63,239
Kent	\$ 8,877,038	\$ 6,455,211
Keweenaw	\$ 150,652	\$ 112,500
Lake	\$ 27,940	\$ 20,000
Lapeer	\$ 5,421	\$ 4,066
Leelanau	\$ 21,975	\$ 13,875
Lenawee	\$ 147,448	\$ 110,586
Livingston	\$ 590,470	\$ 442,852
Mackinac	\$ 273,754	\$ 183,750
Macomb	\$ 2,374,738	\$ 1,376,530
Marquette	\$ 2,130,426	\$ 1,313,288

Mason	\$ 27,940	\$ 20,000
Mecosta	\$ 109,965	\$ 109,965
Midland	\$ 84,056	\$ 58,637
Monroe	\$ 1,642,496	\$ 1,318,570
Muskegon	\$ 343,898	\$ 257,923
Newaygo	\$ 18,638	\$ 12,000
Oakland	\$ 3,826,141	\$ 2,544,356
Ogemaw	\$ 202,325	\$ 150,000
Ontonagon	\$ 64,811	\$ 48,379
Osceola	\$ 27,940	\$ 20,000
Otsego	\$ 2,106	\$ 1,575
Ottawa	\$ 4,303,289	\$ 3,083,578
Saginaw	\$ 4,060,032	\$ 2,664,727
Sanilac	\$ 615,471	\$ 375,316
St. Clair	\$ 356,259	\$ 267,195
St. Joseph	\$ 327,175	\$ 245,381
Tuscola	\$ 4,010,683	\$ 2,592,157
Van Buren	\$ 480,292	\$ 316,635
Washtenaw	\$ 536,155	\$ 402,116
Wayne	\$ 4,931,743	\$ 3,633,023
Wexford	\$ 846,431	\$ 634,823
Statewide (other)	\$ 1,246,019	\$ 827,041
TOTAL in Michigan	\$ 60,020,279	\$ 42,192,768

- The totals in this table represent 269 separate project grants. Two-hundred-fifty-six (256) of the projects are complete and the totals included in the table are based actual project costs. For the thirteen (13) grants that were awarded but not yet complete as of May 2013, projected totals were used based on grant application budgets.
- This table includes totals from two multi-county projects that benefitted a total of seven counties. The completed project totals for those two projects were evenly distributed to the counties they benefitted.
- There were a total of twelve projects that yielded benefits that were statewide or regional in nature. Those twelve projects are totaled under the category of “Statewide (other)”.
- The project grant totals represented in this table are from grants awarded to the State of Michigan from the Federal Emergency Management Agency (FEMA). The grants were awarded four of FEMA’s five separate grant programs that are collectively known as Hazard Mitigation Assistance (HMA). The four grant programs represented in this table are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) program, the Pre-Disaster Mitigation (PDM) program, and the Repetitive Flood Claims (RFC) program. All grants, other than totaled in the “Statewide (other)” category, were passed through from the State of Michigan to local units of government.

As can be seen from this table, and from the information in Attachment C, the use of hazard mitigation funds to support specific projects has been widespread throughout the state, and has been quite balanced so as not to unduly favor any particular regions or jurisdictions. Some areas may have received lighter funding due to cases (described previously) in which local authorities have been reluctant to authorize the application for and acceptance of State and Federal dollars. For every case in which that may have happened, some comparable case can readily be found in which an adjacent county that was economically, demographically, and geographically similar has been more active in applying for, and receiving, funds for hazard mitigation projects. In other cases, such an interpretation may be misleading, in that such projects are meant to address specific vulnerabilities that other communities may not have. Therefore, a lack of funding may only indicate that a community has a lesser need to make use of such funds, or that the types of projects preferred by the community are of a nature that has difficulty matching with the types of projects that are currently eligible under State and Federal funding sources. (For example, if a community has a problem with aging dams, there are no clear means to obtain funding for dam maintenance projects from available programs.)

Another issue that arises in many communities is the lack of a clear means by which to assemble the local match requirements for most federal sources of funding. For most communities, a cash match is out of the question, and even with the acceptability of “soft matches,” there remain problems with assembling (and documenting) all of the qualifying services that could add up to the match value for a project of substantial expense. Since the State of Michigan has not been providing any matching funds for the non-federal share, it tends to fall upon local grant applicants to determine what sources of matching funds are possible, and then to shoulder the substantial administrative burden of documenting match items, which can be very difficult for a complicated or expensive project.

Climate Change Considerations

In 2010 MSP/EMHSD planning staff participated in multiple activities to assess the effects that climate change might have on Michigan’s hazards. These activities included a set of meetings and communications coordinated by the Michigan Department of Community Health, and attendance at the MSU Climate Change Symposium in East Lansing, on April 26 and 27. The MDCH meetings were the start of a year-long multi-agency planning effort to identify and assess the potential impacts of climate change upon public health. Participants identified numerous areas of overlap between Climate Change topics and the types of hazards that are assessed in this plan. For example, climate change can eventually exacerbate the severity of thunderstorms, severe winds, extreme temperatures, flooding, drought, erosion, wildfires, and invasive species. Climate change issues also tie in with the problems of infrastructure failures and public health emergencies. Consideration was given to the addition of a new section in this plan, to address climate change issues, but it was decided that the topic was best covered by referring to climate change in the appropriate sections that deal with the specific hazards that may be exacerbated. This content has been substantially expanded in the 2014 update of this plan, as information about climate change effects is gathered from various sources and its nature becomes clearer. From an emergency management and emergency planning perspective, the climate change issue seems to be easiest to handle in terms of the specific hazards (already described in this plan) through which its effects are known. Certain indicators of climate change are already present. For example, in Michigan’s daily record temperatures, heat records outnumbered cold records by 3 to 1 during the 1990s, and by 6 to 1 during the 2000s. Long-term planning and mitigation is being undertaken by other agencies that deal specifically with long-term environmental and ecological issues, and the MSP/EMHSD has continued to coordinate with them agencies about the climate change issue, becoming an active member of the Michigan Climate Coalition as part of its coordination and outreach on the subject.

Michigan Land Use Policy: Governor’s Land Use Leadership Council of 2003

In February 2003, Governor Granholm, supported by bipartisan leadership from the Michigan Legislature, created the 26-member Michigan Land Use Leadership Council (MLULC) to develop recommendations for charting the course of Michigan’s future land use policy. Specifically, the MLULC was given the responsibility to find ways to minimize the negative impacts of current and projected land use patterns on Michigan’s environment and economy. The MLULC represented a broad spectrum of stakeholders (representing governmental, private sector, and private-nonprofit entities) concerned and knowledgeable about Michigan’s land use policy, laws, regulations, and trends.

For a six-month period in 2003, the MLULC studied dozens of complex and often controversial land use and land development issues. The MLULC held six public hearings during that six-month period and a total of 398 individuals provided oral testimony. In addition, 1,330 written or e-mail comments were received for consideration by the MLULC. One of those written responses was developed by the Michigan Hazard Mitigation Coordinating Council (MHMCC), which submitted a three-page letter urging the MLULC to consider a consolidation of the State’s three separate planning and zoning enabling laws into a single, coordinated enabling law that also addresses hazard vulnerability reduction as a required planning element in all land use (comprehensive) plans and land use change decisions. The MHMCC letter even offered specific language that could be incorporated into the new statute. The ultimate goal of the MHMCC effort was to institutionalize hazard vulnerability reduction into the land use and land development structures at the state, regional, and local levels of government.

In August 2003, the MLULC issued its final report which contained more than 160 recommendations for Michigan land use policy reforms. Although the MLULC report does not specifically mention the MHMCC’s recommendations per se, this was not totally unexpected since the Council’s recommendations were not sent to the MLULC until late in its comment period. However, the MLULC final report clearly espouses the creation of *sustainable* communities in Michigan, which fits hand-in-glove with the basic hazard mitigation goal of creating sustainable, disaster resistant communities. To that end, the MLULC final report advocates several general land use measures that also support the basic hazard mitigation principles of sustainability and disaster resistance.

Policies that Aid in Reducing Flood Vulnerability

In Chapter 5, the MLULC report discusses the need to “explain the role and value of wetland, natural river, and sand dune protection and other state environment land use programs in protecting and enhancing natural environments.” This recommendation, while aimed primarily at environmental protection, has the additional benefit of mitigating flooding and Great Lakes shoreline erosion – two of Michigan’s top natural hazards. Chapter 5 also advocates the creation of “Agricultural Production Areas” under Michigan’s PA 116 farmland preservation program to minimize the encroachment of development on valuable agricultural lands. This measure would also have the added benefit of mitigating potential flooding, since many farms border rivers and drains that frequently flood. Agricultural land is a much more desirable land use bordering rivers and drains (because of its ability to serve as a “sponge” to absorb floodwaters) than would be residential housing or commercial development (which could be damaged by flood waters). In addition, Chapter 5 advocates the expansion of the State’s Conservation Reserve Enhancement Program (CREP), which pays farmers to establish and maintain buffer strips along watercourses. The CREP also supports hazard mitigation by keeping areas adjoining watercourses open and free of development, thereby reducing potential flood losses.

Chapter 5 also recommends measures to prioritize Great Lakes shoreline protection measures, preserve critical headwaters areas through land or land rights acquisition, revise and streamline the Land Division Act, encourage greater participation in several land conservation programs, and create a clearinghouse for various land protection grant programs. All of these recommended measures have the added benefit of potentially aiding in the mitigation of flooding and other natural hazards.

Improving Land Use Planning and Land Development Policies

Chapter 6 of the MLULC final report recommends measures that address land use planning and land development in Michigan. Again, several of these measures have the added benefit of supporting basic hazard mitigation principles. For example, Chapter 6 advocates an expansion of land use education for local planning and zoning officials, local elected officials, and possibly even teachers through intermediate school districts. If this land use education also included elements pertaining to hazard mitigation and its relationship to land use planning and land development, it would be consistent with and fully support similar objectives found in the Michigan Hazard Mitigation Plan. Chapter 6 also advocates the inclusion of storm water retention in improved road corridors (which can help reduce flooding of adjacent properties), and studying the negative impacts of impervious surfaces on both urban and rural watersheds. The latter objective is consistent with two objectives in the Michigan Hazard Mitigation Plan that seek to institute enhanced watershed planning and decision making, and to study land character and its influence on storm water runoff.

Perhaps most importantly, Chapter 6 of the MLULC final report discusses the need to modernize Michigan’s antiquated planning and zoning enabling laws. Again, this is consistent with and supports several objectives in the Michigan Hazard Mitigation Plan and was the primary subject of the Council’s 2003 letter to the MLULC. Fortunately, the effort was successful and resulted in the enactment of the Michigan Zoning Enabling Act, 2006 PA 110, which took effect on July 1, 2006. (Note: 2006 PA 110 was subsequently amended on February 29, 2008, by 2008 PA 12 to make several needed “corrective amendments” to various administrative mechanisms and processes contained in the original act. In addition, at the time of this writing, a bill to unify and amend Michigan’s three planning enabling acts into a single, coordinated planning act had been presented to Governor Granholm for her signature.)

Chapter 6 also discusses the desirability of enhanced governmental cooperation at the regional level for land use planning and decision making – specifically recommending the preparation of regional emergency preparedness plans. If that recommendation is adopted, there is a real opportunity for the Council to advocate for the inclusion of hazard mitigation as an essential element of that larger emergency preparedness plan. In addition, Chapter 6 recommends that special assessment districts or adequate public facilities ordinances be authorized to allow for provision of, among other things, adequate storm drain infrastructure in new developments. This provision, if instituted statewide, could greatly reduce future flooding risks.

Reducing the Vulnerability of Infrastructure

Chapter 7 of the report addresses a variety of infrastructure issues. One recommendation in particular – the desirability of burying electrical and telecommunications lines – has hazard mitigation implications in that buried lines are much

less vulnerable to damage caused by natural forces such as wind, lightning, ice and snow, and severe storms. This recommendation is also consistent with and supports a similar objective in the Michigan Hazard Mitigation Plan.

These examples highlight the many commonalities that the MLULC report and the Michigan Hazard Mitigation Plan share. The MSP/EMHSD and the MCCERCC will work with the Governor's office and other involved agencies and organizations (as time, resources, and circumstances allow) in implementing those elements of the MLULC report that address hazard mitigation and will ultimately aid in reducing Michigan's risk and vulnerability to natural, technological and human-related hazards.

Implementation of MLULC Report Recommendations

To date, progress on the 160 MLULC final report recommendations has been slow but steady. At the time of this writing, over 30 recommendations had either been fully or partially addressed and another 30 were in progress of being implemented. One of the early successes in this effort was the consolidation of the State's three antiquated zoning enabling laws into a single, comprehensive law known as the Michigan Zoning Enabling Act (2006 PA 110, effective July 1, 2006). The new Zoning Enabling Act provides a more modern framework and process for using zoning as an effective regulatory tool to guide land use and development. This had been one of the more important objectives contained in the 2005 edition of the Michigan Hazard Mitigation Plan. The Michigan Zoning Enabling Act is a major step forward in the effort to further institutionalize natural hazard risk and vulnerability reduction into land use and land development decision making processes. (Note: A companion effort to unify and modernize Michigan's three planning enabling laws had been presented to Governor Granholm on March 6, 2008 for signature into law. At the time of this writing, no action had been taken by the Governor on the bill.)

Existing Hazard-Specific Mitigation Measures

Mitigation is occurring in many facets of Michigan state government, local government, and private industry. Mitigation can be found in many laws, programs and initiatives already being implemented on a daily basis – although it may not specifically be called hazard mitigation. Even though hazard mitigation may not be the expressed purpose of the law, program or initiative, the efforts often eliminate or reduce hazard risk and vulnerability. Each hazard section of the Michigan Hazard Analysis (MSP/EMHSD Publication 103) provides an overview of the laws, programs and initiatives in effect in Michigan and elsewhere that have (or could have) a mitigating impact on the hazards facing Michigan communities. (For brevity purposes, those laws, programs and initiatives will not be repeated here. Refer to the Michigan Hazard Analysis for a complete listing.)

Following are synopses of the overall effectiveness of existing laws, programs, policies and initiatives for the hazards deemed most problematic in Michigan. Where applicable, suggestions have been made for ways to make the measure more beneficial in reducing long-term hazard risk and vulnerability. Those suggestions have then been translated into specific objectives and action items for short-term and/or long-term implementation by the Michigan Citizen-Community Emergency Response Coordinating Council (MCCERCC), working in partnership with other appropriate entities. Refer to the Mitigation Opportunities, Recommendations, and Implementation section.

Riverine Flooding

Measures taken to reduce the State's risk and vulnerability to flooding have been primarily non-structural with a focus on discouraging floodplain occupation and improving building code enforcement. In addition, an emphasis on the regulation and management of land adjacent to a river is seen in many of the laws and programs administered by the State. A culmination of efforts has resulted in a generally positive trend towards riverine flood mitigation. In evaluating the effectiveness of the measures being initiated at the state level, a discussion of the local governing process has to be included. Because so much of the success of state level programs and initiatives relies on the cooperation of and coordination with local government, an evaluation of state government effectiveness cannot be void of local government actions.

Floodplain Regulatory Authority

The Floodplain Regulatory Authority found in Part 31, Water Resources Protection of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, is the primary state regulation that deals with construction within floodplains, and is effective at maintaining the flow carrying capacity of a watercourse for those projects that are permitted. The "harmful increase" phrase used in the rules is flexible enough to allow reasonable development within the riverine floodplain without increasing flood damages.

The Act is also effective at prohibiting the construction of new residential structures within the floodway. However, there are areas of concern related to the Act:

Small Watersheds. The Act only deals with watercourses that have a drainage area greater than two square miles. There are many flooding problems on smaller watercourses that do not fall under the authority of the Act, which must be administered at the local level. Some communities are very effective at regulating the floodplains of the smaller watersheds, but to many communities floodplain regulation does not rate high on the priority list of things to do.

Inland Lake Floodplains. The Act does require a permit for filling or construction within the floodplain of inland lakes. The local building code would also require elevating structures in lake floodplains. However, if the floodplain of the lake is not identified by a floodplain map, the local building official may not be aware of the flooding potential and may not require adequate elevation.

Education Regarding Permit Requirements. There is still a need to continually make building officials and property owners aware of the need for a permit from the MDEQ under Part 31. A common response from a property owner is, "I did not know I needed a permit for building in the floodplain." It is difficult to determine the amount of construction that is occurring in the floodplain without benefit of a MDEQ permit, although it is happening on a regular basis. The more informed local building officials are regarding the requirements, the greater the compliance. There is a continuing need to educate both the public and local officials on state permitting requirements.

Structures Occupying Floodways. The Act is quite specific about prohibiting the residential occupation of the floodway. However, there are many existing structures within floodways of Michigan rivers. These structures are "grandfathered in," using the current interpretation of Part 31. A structure in the floodway can be remodeled, as long as the size of the structure is not increased. Thus, the occupation can remain in the floodway indefinitely. From a flood hazard point of view, this policy should be reviewed. An Attorney General's opinion may be needed on the floodway occupation issue for clarification of this policy.

Education of Building Officials. For buildings constructed in a filled portion of a floodplain, Part 31 has specific requirements to ensure that the building will not be damaged by floodwaters. However, the effectiveness of these requirements is dependent upon the awareness of the local building officials. Again, the education of building officials is essential to the reduction of future flood losses.

Flood Storage. "Critical" flood storage has been evaluated in only a few areas of the state. A critical flood storage area is determined based on an engineering analysis of the impact that the elimination of floodplain storage would have on downstream flood stages. The loss of flood storage in a "critical" area would result in increased flood discharges and stages in the downstream areas. To help combat this problem, in 2000 the MDEQ implemented a requirement for compensating cut for all floodplain fills statewide, except for projects involving less than 300 cubic yards of floodplain fill.

At both the state and national level, very little has been done to determine the long-term effects of the elimination of floodplain storage areas. There is a need to continue to identify critical storage areas within the state.

Floodplains Not Mapped. Part 31 applies to all riverine floodplains having a watershed greater than two square miles. However, not all of the floodplains in the state have been mapped under the NFIP. This causes considerable confusion among local officials and property owners. There is a common misconception that "if a floodplain is not identified on a map published by FEMA, then there are no state floodplain permits required." There is a continuing need to educate both the public and local officials on state permitting requirements.

In addition to unmapped communities, the accuracy and delineation of many mapped floodplains is subject to continuing debate. The existing federal floodplain mapping program is inadequate in its current state and form. For that reason, FEMA is undertaking a nationwide map modernization initiative to map all communities in the nation and produce updated digitized flood maps. The MDEQ has implemented a statewide floodplain mapping business plan to complement and supplement the federal map modernization program.

Stormwater Management. There is currently no state law that regulates stormwater runoff quantity. Any regulation that exists is done at the local/county level. As a result, there is a wide variety of requirements across the state. There is a growing awareness of the need for stormwater management on a “watershed” basis, although a statewide approach will not likely occur in the near future. The MDEQ has prepared a stormwater management best management practices guidebook to assist local governments in their stormwater management efforts.

Building Codes

See Existing Mitigation Tools and Measures, Effectiveness of Land Use / Development Measures – Building Codes.

Subdivision Regulations

See Existing Mitigation Tools and Measures, Effectiveness of Land Use / Development Measures – Subdivision Regulations.

Inland Lakes and Streams, Part 301 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended

The Act is reasonably effective for what it was enacted to do – that is, regulate construction, excavation, and commercial marina operations on the State’s inland waters, and to protect the “public trust.”

From a flood hazard perspective, the Act discourages lengthy stream enclosures and extensive filling below the ordinary high water mark, which helps to maintain the flow carrying capacity of a watercourse. Since the Act applies to all watercourses that have a defined bed and bank, there are no drainage area limitations. This provides the MDEQ some input to watercourse alterations, even if the drainage area is less than two square miles.

Dam Safety Program, Part 315 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended

The Dam Safety Act provides review and inspection requirements for dams, along with emergency action plans for “high” and “significant” hazard dams. The Act provides the necessary means for adequately regulating dam safety, provided adequate staffing levels are maintained. The Act will not prevent dam failures. However, it will help to reduce the chance of and potential impacts of a dam failure.

There are no laws that regulate development downstream of a dam. Existing floodplain, subdivision, and NFIP requirements provide no consideration for a dam failure. However, the flood elevations that can result from a dam failure are significantly higher than would be shown in an existing flood insurance study or a typical floodplain determination. Development can take place downstream of a dam, which could be destroyed in the event of a dam failure. In fact, a dam that was initially classified as a low hazard dam could be reclassified as a high hazard dam as development occurs downstream.

In some states, development is regulated downstream of dams, as consideration is given to the possibility of failure of the dam. Currently, Michigan does not have any requirements relating to development in the hydraulic “shadow” of a dam.

Floodplain Service Program

The Floodplain Service Program is provided by the MDEQ to the public without the assessment of a fee. The service is very effective in that it provides floodplain information and permitting requirements before plans are finalized and building begins. As a result, informed decisions can be made which can result in lower future flood damages.

Because the program is not funded by fees, and there are no statutory timeframes imposed, the service is unfortunately not a high priority item. The primary focus of the staff is on processing the permits. Whatever staff time is left over is used to provide services. As a result, during the peak permitting season, it is possible that some service requests will not receive a prompt response. In addition, if this service were widely publicized, staff would likely be overwhelmed with requests. Possible (though unlikely) remedies could include fees (which would likely discourage service requests and defeat the purpose of the service), or additional staff (which is unlikely given continuous budget constraints).

National Flood Insurance Program

The NFIP has provided a needed stimulus for state and local officials to focus on floodplain management. The benefits and drawbacks of the NFIP have been discussed for years, and it is not the intent of this plan to reiterate those discussions.

Community Assistance. As the coordinator for the NFIP in Michigan, MDEQ contracts with FEMA to work with communities to ensure that they understand their duties under the NFIP. Community contacts are done by telephone and by visiting the community. These contacts provide local officials with a “refresher” on the NFIP, in addition to MDEQ permit requirements. These contacts are a very effective means of keeping officials up-to-date. However, due to the number of communities in the NFIP, some communities may be contacted only once every five years or so. Due to the turnover of local officials, more frequent contacts would be extremely beneficial.

Community Participation. Within Michigan there are 1,775 communities, of which 867 (about 49%) were participating in the NFIP as of November 17, 2010. This marks a sizable increase from the 41% that were participating when the previous edition of this plan was written three years ago. There are estimated to be more than 720 communities in Michigan that have flood problems. Because of the existing state laws and the building codes, every community in Michigan meets the minimum standards to participate in the NFIP. The only actions necessary to join the NFIP would be the passing of a resolution indicating an interest in joining the NFIP, adopting an ordinance indicating the State Construction Code is enforced in the community, and completing an application. The MDEQ, in cooperation with the Michigan Attorney General’s Office has developed a sample ordinance that may be used by communities when joining the NFIP. A continued effort is needed to make the communities in Michigan aware of the NFIP and floodplain management.

Flood Insurance Purchases. Nationally, it has been estimated that only about 10 to 12% of the eligible properties within the flood hazard areas of participating communities have flood insurance. (It is believed that a similar percentage of participation – approximately 15% – is occurring in Michigan.) There is currently a national advertising campaign to make homeowners aware that flood damages are not covered by their homeowners’ policy. In recent years there has been an increased awareness on the part of lenders regarding the flood insurance purchase requirements.

Combining the low participation rate on flood prone properties with the fact that property owners in non-participating communities cannot purchase flood insurance, it can be inferred that Michigan’s 24,083 active NFIP policies represent a very small portion of the total number of structures that are considered to be flood prone within Michigan. It is estimated that there are about 200,000 structures in Michigan that are within the 100-year floodplain. This means that only about 12% of Michigan’s flood-prone properties are insured against the peril of flooding.

While not a Michigan problem alone, there is still a need to increase the awareness of the public of flooding problems and the availability of flood insurance.

Repetitive Losses. Nationally, it is estimated that about 10% of the properties account for about 40% of all NFIP claims. These properties which continually receive flood damage and are reimbursed for their insured losses are referred to as repetitive loss properties, and are a primary concern for the NFIP. The NFIP Reform Act of 1994 is a first step at addressing repetitive loss properties through mitigation.

The NFIP Reform Act established the Flood Mitigation Assistance Program (FMAP). At full funding, \$20 million is made available annually to states and local governments to mitigate future flood losses. The fund is used primarily on repetitive loss structures.

Since 1978, more than \$45 million in claims have been paid due to flooding in Michigan. Although that figure is not as high as some areas of the country, Michigan does have its share of repetitive loss properties. (See the Riverine Flooding Section in the Hazard Analysis portion of this plan for more detailed information on repetitive loss properties and flood insurance claims in Michigan.)

Repetitive Loss Reduction Project. Reducing claims of repetitive flood loss properties under the NFIP is a major goal of both FEMA and the State of Michigan. To that end, in 2001 the MSP/EMHSD and the MHMCC (now MCCERCC) embarked on a \$3 million statewide repetitive flood loss reduction project using HMGP funding from Federal Disaster 1346-DR-MI. The goal of this project is to acquire / remove or elevate as many as possible of Michigan’s repetitive flood loss structures (which totaled 456 at the program start), with particular emphasis being placed on those communities that show a strong willingness and commitment toward repetitive flood loss reduction.



Although it started as a statewide campaign, it quickly became evident that staff and funding limitations necessitated a change in the initial focus of the project. Instead of initiating mitigation work on small numbers of structures in multiple jurisdictions across the entire state, it was determined that it would be more efficient and effective to target individual communities that not only had a high level of risk but also a high level of homeowner and government interest in reducing or eliminating that risk. Early on, a decision was made by the MSP/EMHSD and MHMCC to target structures in “community clusters” to provide opportunities for greater efficiency and economy of scale and activity. After reviewing the repetitive flood loss properties list for Michigan and talking to various state and local officials, it became evident that Monroe County was an

excellent place to start with the project. Further analysis revealed that the Village of Estral Beach and Erie Township in Monroe County both had large numbers of structures at risk, and homeowners that were willing and able to undertake mitigation measures to reduce their risk to both riverine and Great Lakes flooding. The Village of Estral Beach was selected as the initial pilot community for this project, and Erie Township was selected at the second pilot community.

In August 2002, the State of Michigan contracted with the engineering / urban planning consulting firm Camp, Dresser & McKee (CDM) to execute and manage this project on behalf of the MSP/EMHSD and the MHMCC. CDM was tasked with contacting all property owners within the Village of Estral Beach and Erie Township that met the repetitive flood loss reduction project criteria, to determine a level of interest in elevating their structure or having their structure acquired. This was accomplished by CDM and the local elected officials by holding a public meeting on November 7, 2002 to describe the scope of the project and the eligibility criteria. Staff from the MSP/EMHSD was also present at the meeting to answer any questions related to programmatic issues. A total of 39 home elevation projects were identified in Estral Beach and 23 were identified in Erie Township. (The situation in Estral Beach is particularly favorable to additional flood mitigation because currently a combination of earthen dike and concrete floodwall, built by the U.S. Army Corps of Engineers many years ago, provides flood protection for the community. However, this flood barrier has been compromised in several locations throughout the years and is only high enough to mitigate the 10-year flood event in some areas of the village.)

After the initial public meetings, interested property owners contacted CDM, which in turn developed an estimate of the cost of the project and conducted a preliminary benefit / cost analysis to ensure the project is cost-effective. The Estral Beach portion of the project involves elevating the 39 flood prone homes a minimum of one-foot above the 100-year flood elevation. Those homes that are subject to wave run up from Lake Erie will be elevated in accordance with recommendations of the MDEQ. Those houses will be elevated between two and 12 feet.

Unfortunately, the contract with CDM expired in late 2004 and could not be renewed within the specified timeframe due to restrictions within the State’s procurement process, and its worsening financial situation. As a result, the MSP/EMHSD – out of necessity – took on the responsibility of overseeing and guiding this project through the construction phase to eventual completion, using in-house planning and grant management staff. The MSP/EMHSD assembled a project team and promptly developed an action plan for completing the project. The action plan was developed after conferring with CDM and the Village of Estral Beach on numerous occasions regarding the specifics of what needed to be done to complete the construction phase and then close out the project. Although this transition to in-house management was clearly not part of the original implementation plan for the project, it was nonetheless required based on the situational circumstances in place at the time the CDM contract expired. The MSP/EMHSD has assumed responsibility for project administration and monitoring, grant management, and project closeout.

The MSP/EMHSD staff continues to work with village officials and involved homeowners to complete ongoing home elevations. The project has been extended to August 2011 (from its original August 2010 completion deadline) to accommodate a several-month delay that occurred when the initial federal environmental reviews expired and had to be re-approved, and because of damage that occurred when a tornado struck the village in June 2010 (described in the tornado section of the hazard analysis in this plan). Ironically, one of the homes being elevated was damaged beyond repair by the tornado but the home is being reconstructed and elevated. As of December 2010, a total of 11 structures have been approved for funding for elevation under this grant. All 11 elevation projects have started and two have been completed at the time of this writing.

The elevation / acquisition of the 23 identified flood prone properties in Erie Township will be implemented in a future project as time, resources and circumstances allow. The involved local communities in Erie Township include Grand Beach, La Salle, Luna Pier, Monroe, Rockwood and Detroit Beach.

The Estral Beach project has proven to be a highly successful model for other community-wide home elevation initiatives. It will be replicated in Erie Township and other areas of the state as additional funding for home elevations becomes available.

Natural Rivers Program, Part 305 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended

Even though the Natural Rivers Program is not intended to reduce flood hazards, it does result in structures being constructed away from the river, and out of the floodplain. The program is very effective when administered as intended. Like any regulatory program, if the administrator and the variance board are aware of the requirements of the program, it is very effective.

Farmland and Open Space Preservation, Parts 361 and 362 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended

The Farmland and Open Space Preservation Program is effective at reducing flood hazards only as long as the property is enrolled. Since the program is voluntary, land can be removed from the program at any time with the payment of a penalty. The program is very effective over a short period of time at preventing development in sensitive areas (such as floodplains); however, from a long-term perspective, the program cannot be considered to be an effective flood hazard mitigation tool unless the property is part of a permanent conservation easement purchased by or donated to the State of Michigan in perpetuity.

Manufactured Housing Commission Act, 1987 PA 96, as amended

The Michigan Manufactured Housing Commission Act and its implementing Administrative Rules provide regulation on the placement of manufactured homes and establishes construction criteria. Manufactured homes are prohibited from being placed within a floodway, as determined by the Department of Environmental Quality. In addition, manufactured homes sited within a floodplain must install an approved anchoring system to prevent the home from being moved from the site by floodwaters, and be elevated above the 100-year elevation. These provisions are highly effective when properly carried out and enforced.

Condominium Act, 1979 PA 59, as amended

Similar to the Manufactured Housing Commission Act (1987 PA 96, as amended) and the Land Division Act (1967 PA 288, as amended), the Condominium Act also requires identification of floodplain limits and places certain restrictions on structures in floodplain areas. Administrative Rule 559.402 states: "The floodplain areas shall be clearly labeled...A common element or a condominium unit, other than a campsite or a marina unit, shall not be constructed where it may be reasonably anticipated that the structures will be damaged by flooding..."

In practice, flood prone condominium projects are identified during the permit application review by the MDEQ. To avoid damage by flooding, the elevation of the lowest floor is stipulated in the state floodplain permit issued under authority of the state Floodplain Regulatory Authority found in Part 31 of 1994 PA 451, as amended. These provisions are highly effective when properly carried out and enforced.

Seller Disclosure Act, 1993 PA 92, as amended

This law requires the seller of any 1-4 family residential property to disclose (on a form prescribed by the Act) known defects including whether the property has flooded or is flood prone. It is hoped that this change in regulation regarding the sale of residential structures will reduce the number of dissatisfied home buyers. The law, however, only applies to existing 1-4 family structures, not vacant land, and it is only as good as the knowledge (and honesty) of the seller.

Michigan Agricultural Programs and Flood Hazard Mitigation

The Michigan Department of Agriculture and Rural Development has several programs designed to reduce the negative impacts of weather related disasters on agriculture and the environment. These programs help maintain adequate drainage, preserve farmland and open space, and develop practices to prevent erosion to reduce the water impacts of flooding. Instituting sound practices on farms – from better design and siting decisions to better

management of manure, fertilizer and pesticides – all help to reduce the negative environmental impacts that accompany flooding and other natural disasters.

Michigan Agriculture Environmental Assurance Program. This program helps prevent agriculture related pollution by ensuring that participating producers are using effective stewardship practices that comply with state and federal environmental laws and standards. The proactive, comprehensive program provides education, on-farm technical assistance, environmental risk assessments, and site / farm specific actions plans. This program does not mitigate flood damage, but does help mitigate the negative environmental impacts associated with flooding.

Conservation Reserve Enhancement Program. This program implements environmentally sound practices on agricultural lands which enhance wildlife habitat, reduce soil erosion on high-risk farmland, increase soil productivity, and improve surface and groundwater quality in and downstream of agricultural areas. Specifically, agricultural land along targeted waterways is taken out of production and improved to prevent erosion and run-off, in exchange for rental payments. This program can be effective in reducing soil erosion and sedimentation in waterways, which in turn helps to reduce the potential for flooding.

Pre-Disaster Mitigation Program

Since its inception in 2002, the Pre-Disaster Mitigation Program (PDMP) has been successfully utilized in Michigan to fund flood mitigation activities. The most prominent example is a flood prone properties acquisition project in Robinson Township (Ottawa County) that was initiated in 2005 using two PDMP project grants:

Flood Acquisition / Removal Project in Ottawa County. Robinson Township is a small rural community in west-central Ottawa County consisting of 5,588 residents. The northern boundary of the Township is defined by the Grand River. From 1994 to 2005, two subdivisions in Robinson Township – Van Lopik Avenue and Limberlost Lane, which collectively have 40 structures and 20 vacant parcels – experienced 12 different flooding events. The majority of these flooding events were caused when ice dams forced the Grand River to back up. The flood stage for the Grand River in Robinson Township is 13.3 feet. The flooding events since 1994 have ranged from 13.3 feet to 18.3 feet, the highest recorded flood being in January 2005. The January 2005 flooding event forced the residents of Van Lopik Avenue and Limberlost Lane to relocate from their homes. Due to the extent of the flooding, the loss of utilities and the damage incurred, some of the residents were not able to inhabit their houses for up to six months, and still others were not allowed to return at all.

Seeing the hardships the flooding caused for the residents of Van Lopik Avenue and Limberlost Lane, officials of Robinson Township, the Ottawa County Emergency Management Office, and the Ottawa County Planning and Grants Office inquired with the MSP/EMHSD about the availability of grants to assist in the elevation or acquisition of these structures. Fortunately for Robinson Township, luck and timing was on their side. In November 2004, a few months before the flooding event, FEMA had announced the open application period for the Pre-Disaster Mitigation Program (PDMP). The PDMP is a nationally competitive grant program intended to provide funding for mitigation measures identified in local hazard mitigation plans. For Robinson Township, securing a competitive grant for this project looked like an uphill battle. First, there was the looming application deadline which was only a few weeks away. The second and perhaps most daunting challenge was the fact that a FEMA-approved local hazard mitigation plan was required in order for the project to be eligible for PDMP funding – and Robinson Township didn't have such a plan.

Understanding the time-sensitive challenges faced by Robinson Township, the MSP/EMHSD offered to provide significant technical assistance to the township and Ottawa County in developing the PDMP project application and a hazard mitigation plan. The first major issue that had to be tackled was how to actually develop the grant application. Because the estimated project cost exceeded the funding cap of the grant, it was decided early on that the project had to be broken up into two separate but related segments – each with its own application. That was the easy part. With assistance provided by MSP/EMHSD, the township was able to successfully develop its two applications within the federal government's "eGrants" online grant management system.

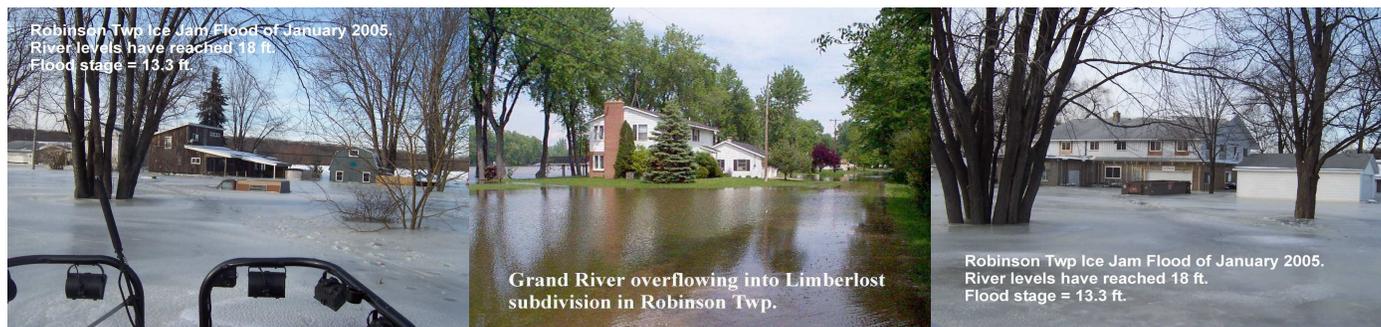
The more difficult issue was how to develop a high-quality hazard mitigation plan that met both the immediate grant application needs as well as the longer-term hazard mitigation needs of the township. One option was to include Robinson Township in the Ottawa County plan. However, that plan was still many months away from being completed. Therefore, it would be necessary to develop a separate plan for Robinson Township in order to meet the looming grant application deadline. (The township would later merge its hazard mitigation plan into the larger Ottawa County coordinated planning activities.)

Developing a high-quality plan in such a short timeframe would require significant technical assistance from the MSP/EMHSD. For the long-term benefit of the Robinson Township residents affected by the flooding, the MSP/EMHSD agreed to put many of its other work priorities temporarily on hold in order to assist the township with its plan development. By working long hours and getting considerable cooperation and assistance from the township (staff and citizens) and Ottawa County, the MSP/EMHSD was successful in developing the Robinson Township hazard mitigation plan within the required timeframe. This was truly a remarkable accomplishment, since it often takes a year or more to complete a plan from start to finish in the best of circumstances. Fortunately, the combination of MSP/EMHSD staff planning knowledge and tenacity, the ready availability of needed data, the existence of an earlier hazard mitigation plan for Ottawa County, an engaged and informed citizenry, and cooperative local officials all came together to make the Robinson Township planning effort a timely success.

In March 2005, the Robinson Township grant applications along with nine other grant applications from other Michigan jurisdictions were submitted to FEMA for funding consideration. In October 2005, the grants were officially awarded to the Township to acquire 60 flood-prone properties.

In all, 18 of the 60 parcels were acquired with the PDMP grants. Separately from the grants, six other parcels were acquired by the Michigan Department of Transportation (MDOT) for a future transportation project. Another six property owners elevated their homes with no financial assistance. In all, 30 of the 60 properties were mitigated in one way or another. Twenty-one homes remain un-elevated in the floodplain and eight of the remaining parcels are vacant. Although not all of the 60 flood prone parcels were acquired, the combination of the planning effort and the good percentage of parcels that were mitigated using grant funding and other means made this project a tremendous success. (Because the parcel acquisitions were strictly voluntary—as is the case in almost all flood prone property acquisitions—it is not uncommon for some property owners to not participate.)

Robinson Township – Then



Robinson Township is at risk from flooding of the Grand River at all times of the year. The January 2005 flood was particularly severe and was the result of ice dams on the river. Damage to homes and personal property was significant, and many homes could not be occupied due to lingering public health and safety threats.

Robinson Township – Now



Some of the flood prone properties that have been acquired, cleared, and restored as open space along the Grand River in Robinson Township using FY 05 PDMP funding.

Shoreline Flooding and Erosion

Much of Michigan's character is defined by the Great Lakes. The beaches provide numerous recreational opportunities, and are also considered prime real estate. Unfortunately, the hazards inherent in coastal areas are not always apparent. In addition, development activities along the shoreline significantly alter the natural ebb and flow of coastal dynamics. The continuing and increasing development of the coastal areas, and the resulting conflicts that arise between users, has resulted in passage of various laws designed to establish regulations to mitigate conflict and environmental degradation.

Great Lakes Shoreland Management Program

Under the Great Lakes Shorelands Administrative Rules, local governments may assume permitting responsibility in erosion, flooding, and environmental areas. In communities designated as flood risk areas, ordinances adopted for participation in the NFIP generally meet the requirements under Part 323 prior to the 1992 amendments and allowed the community to assume permitting authority under Part 323. However, most communities have not taken on the additional enforcement responsibility in high-risk erosion and environmental areas. Therefore, in these communities, a state permit is required for most construction proposed in designated areas. In the high-risk erosion area program, an intergovernmental agreement with the Michigan Department of Energy, Labor and Economic Growth directs building inspectors to withhold building permits in high-risk erosion areas until the state permit is issued. Development proposed in environmental areas is also typically reviewed by the MDEQ in conjunction with wetland regulations.

Local building departments are generally cooperative in enforcing coastal regulations. Efforts are made to keep communication lines open between local enforcing agents to minimize misunderstanding. Thorough knowledge of all regulations prior to start of construction has proven to be the best approach to compliance.

Political Pressures: Anti-Land Use Regulation

Shoreland flooding and erosion mitigation occurs through the MDEQ as mandated by Part 323 of the Natural Resources and Environmental Protection Act. The State relies heavily on local government to inform property owners of the regulations and the need for state permits. Strong communication between state and local officials is a priority to MDEQ staff. The value of lakefront property and the increase in tax revenue is attractive to local governments, resulting in strong political pressure to reduce or eliminate regulation of shorelands. In some instances, zoning ordinances are circumvented through the use of variances, resulting in flood- or erosion-prone structures being constructed.

The current political climate in the Michigan Legislature has a tendency toward a reduction in government regulation of land use. It is not anticipated that additional regulations will be enacted in the near future.

Tornadoes

Tornadoes are nature's most destructive and unpredictable storms, and so it is difficult to economically build structures on a widespread basis, using today's construction methods and materials, that can totally withstand the direct wind forces of a strong tornado. However, effective mitigation includes the reduction of damages and lost lives, not just the complete prevention of harm. Although tornadoes themselves cannot be prevented, it is possible to reduce the loss of life and property damages that result from these hazardous events.

Current data indicate that approximately 85% of reported tornadoes in the United States have wind speeds of 112 miles per hour or less. Most homes or commercial buildings built to conform to the State Construction Code will stand up well to the direct wind forces of these weaker tornadoes. Damage from flying debris may still cause considerable damage to the outside walls and roof of a structure, but code compliance is still an effective start for resisting harm from tornadic winds.

Tornadic winds try to lift off the roof and blow out the walls of buildings. If the structure is built to code, the pressures to lift the roof off are transferred down to the wall frame and foundation, thus reducing the likelihood of failure. In addition, construction techniques of securely fastening roof sheathing to its support frame, tightly fastening rafters to the top of the walls, securely bolting wall base plates to the foundation, and cross bracing gable ends, can all be used to significantly reduce the extent of structural tornado damage. While some damages may still occur, these construction techniques reduce the likelihood of the type of catastrophic damage that results from failure of one or more of the main structural components of the building.

Some damages from flying debris can be prevented or reduced through the use of properly installed protective shutters over windows. (Residents should close such shutters soon after hearing that severe weather warnings are issued because there may not be the time or opportunity to do so as weather conditions worsen.) The use of reinforced masonry construction, although expensive, can also provide additional structural resistance to tornado-related damages. As the building industry continues to make strides in developing wind-resistant siding and roofing materials, and to employ the wind-resistant construction techniques described above, these damages may become less prevalent in the future.

Continued public education, along with early detection, tracking and warning, are also critical to reducing tornado-related deaths and injuries. The promotion of “safe space” concepts within homes, schools, commercial and governmental structures must continue to be stressed by local emergency management officials and other decision makers. The development of tornado “safe rooms” (interior reinforced concrete “closets”) should be encouraged in any residential, commercial and governmental structures that do not already offer good protection against tornadoes and severe winds. Residents of mobile home parks are particularly vulnerable and should receive particular encouragement in the development of shelters and safe rooms, and the anchoring of the homes to a secure foundation. Anchoring increases the wind resistance of mobile homes and in this way prevents the extra damages and structural weaknesses that result from wind-induced tipping of the units.

Over the past several decades the number of deaths and injuries caused by tornadoes has dropped significantly in the United States. The widespread use of warning sirens, enhanced radar systems, and weather spotters, coupled with constant public education campaigns by government officials and the media, have dramatically improved public safety during tornado events. However, tornado-related deaths and injuries still occur that are both needless and preventable. Some of the reasons for this include building construction that doesn’t meet current codes, people ignoring or not receiving weather warning information, people trying to “outrun” tornadoes in their cars, mobile homes that are not properly anchored, and people failing to secure loose items that turn into flying debris under the forces of severe winds. In addition, tornado “exposure” has increased as previously undeveloped areas are settled, so that what used to be sparsely populated farmland or open space is now more likely to contain homes and businesses that are vulnerable to damages and loss of life. All of these circumstances highlight the need for continued and improved public education, storm tracking and early warning, and the use and enforcement of modern construction techniques and requirements.

Winter Storms

Fortunately, winter storms are one of nature’s most predictable weather phenomena. As a result, citizens and communities generally have several hours to several days notice before a severe winter storm hits, thus allowing time to adequately prepare for the event. The physical elements of the event itself generally result in little damage on their own – the exception being death or severe injury caused by prolonged exposure to severe cold temperatures. However, the consequences of the accumulated effects of wind, ice, extreme cold and massive amounts of snow – loss of power and essential services, isolation, collapsed roofs due to snow and ice buildup, blocked roads, downed power lines and debris, traffic accidents, etc. – can cause tremendous (and often deadly) problems for individuals, families, businesses, critical facilities and local governments.

In some ways, snowstorms are the northern states’ hurricanes. Generally large in size, they can result in massive debris removal operations (snow, downed trees), loss of power due to downed lines and other damaged electrical infrastructure, loss or reduction in essential services, isolation, and temporary economic disruption. However, damage to buildings is usually minimal if they are properly constructed and maintained. In terms of physical destruction, damage to trees and electrical infrastructure are generally the two primary concerns. Existing measures aimed at mitigating these types of damages are very effective where implemented. However, the problem is that implementation is not widespread and consistent. Few cities in Michigan have active, ongoing urban forestry programs designed to minimize storm related damage to trees. Those that do are often hampered by lack of funding.

Electrical infrastructure mitigation goes hand-in-hand with urban forestry, since most storm related damage to electrical infrastructure is caused by downed trees and limbs. Major electrical service providers in Michigan have ongoing system reliability improvement programs (which include forestry activities), and most new electrical infrastructure is placed underground. However, the vast majority of the existing infrastructure is above ground and

therefore highly vulnerable to storm related damage. Over time, lines and equipment are upgraded with newer, stronger materials. However, severe storms still cause considerable damage to the electrical infrastructure every year. This results in power outages (often prolonged and widespread) that severely tax the capabilities of the utility companies to respond, and citizens and communities to cope with the consequences of the situation.

In terms of winter storm response, sheltering people from the elements, clearing roadways, and maintaining critical public safety services (i.e., police, fire, EMS) are the primary concerns of local officials. Michigan communities are generally well prepared to meet these challenges on their own, sometimes supplemented by mutual aid and state assistance. Fortunately, few people die or are severely injured as a direct result of winter storms in Michigan. In those cases where it does occur, it is usually the result of auto accidents, prolonged exposure to cold temperatures, or overexertion (i.e., heart attack) from snow shoveling. Keeping people inside and off the roads during winter storms would greatly minimize the numbers of deaths and injuries. Continued public information programs in that regard should help. In addition, most communities have active programs to check on the condition of elderly and homebound individuals, both of which are extremely vulnerable during severe winter storms.

Wildfires

The Michigan Department of Natural Resources / Forest Management Division (MDNR/FMD) is committed to a multi-jurisdictional, coordinated wildfire mitigation effort. The MDNR/FMD is actively working to reduce the State's vulnerability to wildfires by:

- Participating in multi-state and interagency mitigation efforts.
- Aiding local communities in developing zoning and subdivision control ordinances that adequately address wildfire mitigation.
- Regulating the time and amount of permits that are given for prescribed burns.
- Conducting research on wildfire prevention, containment and suppression activities.
- Developing fire hazard assessments to aid community and property owners in determining their risk and vulnerability to wildfires.

Lack of Local Government Wildfire Mitigation Initiatives

Despite the ongoing initiatives of the MDNR/FMFMD, wildfire prevention and mitigation must be stressed at the local level if a meaningful reduction in risk and vulnerability is to occur. With fewer than 100 state fire prevention officers and funding often in jeopardy, fire prevention efforts need to be redirected more toward local community initiatives. There is ample room for improvement in mitigating forest fire risk and vulnerability at the local level. One main issue is the lack of emphasis on forest fire risk and vulnerability reduction in local zoning ordinances and comprehensive plans.

Most local zoning ordinances lack provisions for wildfire risk and vulnerability reduction. In addition, comprehensive plans are often not prepared far enough in advance in rural areas to adequately direct development and institute mitigation measures in high-risk fire hazard areas. Communities are not adequately utilizing land use systems that recognize special fire problems and requirements related to vegetation, topography, weather, transportation and access, water supply, and density of development.

Local fire agencies only sporadically review proposed lot splits, subdivisions, severances and other developments for fire protection needs. In general, communities are not requiring large developments to calculate the future fire vulnerability of the development. These calculations are also not required for most variances and special use permits. Builders seeking building permits for additions to homes do not have to retrofit the existing structure to meet wildfire safety and mitigation measures. These measures would include such things as replacing an existing roof covering with a fire-resistant or non-combustible covering, installing smoke detectors and other fire safety controls, or maintaining a "firewise" landscape by providing adequate vehicular access, signing streets, roads and buildings, and providing adequate emergency water supplies.

Regulation of Outdoor Burning

The Michigan Solid Waste Management Act (1990 PA 264), which prohibits the burning of leaves and grass clippings in municipalities over 7,500 in population (unless a local ordinance allows such burning), has resulted in some

reduction in accidental fires caused by the burning of vegetation and yard wastes. This is a significant step. However, there are clearly more steps that can be taken to reduce the number of wildfires, as well as minimize the spread of those that do occur.

Severe Winds (Non-Tornadic)

Severe winds occur with regularity in Michigan, and they often cause considerable damage to buildings, trees, and the electrical infrastructure. Existing measures designed to minimize or eliminate the effects of severe winds, such as enforcement of building codes, strengthening electrical transmission lines and equipment, and urban forestry programs, are effective where implemented in a concerted and consistent manner. As mentioned in the Tornadoes Section, the problem isn't in the mitigation techniques themselves. Rather, the problem is in getting the techniques implemented.

Street trees not properly pruned and maintained will incur damage in severe winds. Electrical transmission lines and equipment that is old, inadequate, or vulnerable to damage from trees and tree limbs is much more likely to fail in a storm. Above-ground electrical lines are more vulnerable to wind damage than are below-ground lines. (Unfortunately, the vast majority of the electrical infrastructure is above ground.) Building roofs that are properly and securely anchored to the wall structure are not as likely to be damaged by the uplifting force of winds. The examples are numerous.

Implementation is the key to all of these measures. Over time, these techniques have proven to be sound and cost-effective. However, unless the measures are implemented on a widespread and consistent basis, their effectiveness is greatly reduced.

Hail and Lightning (Thunderstorm Hazards)

As indicated in the Michigan Hazard Analysis (MSP/EMHSD Publication 103), lightning prevention or protection, in an absolute sense, is impossible. However, the consequences of lightning strikes can be diminished (in terms of deaths / injuries and property damage) through the implementation of such measures as:

- Enhanced early warning of lightning conditions by the National Weather Service;
- Enhanced public education of thunderstorm and lightning hazards through Severe Weather Awareness Week and other appropriate avenues;
- Lightning protection for all critical structures using the systematic lightning hazard mitigation approach advocated by the National Lightning Safety Institute (NLSI);
- Widespread use of local lightning detection systems at such locations as golf courses, pools, sports fields and stadiums, and other outdoor venues; and
- Enhanced emergency planning for all large outdoor gatherings (e.g., sporting events, concerts, campgrounds, fairs, festivals, etc.) that includes provisions for early detection, monitoring, and warning of approaching thunderstorms that could produce lightning.

Local emergency managers are central to all of these efforts and are the key players in the implementation of a community-wide lightning protection program. The MSP/EMHSD actively encourages local communities to address lightning risks as part of their overall emergency planning and hazard mitigation initiatives. Although lightning deaths, injuries and property damage can never be totally prevented, these negative impacts can at least be reduced through a combination of public education, human vigilance, technology, proper building safety provisions, and simple common sense.

These measures have been successfully implemented, in whole or in part, in many Michigan communities. Despite these efforts, Michigan still ranks near the top in the United States in terms of lightning deaths and injuries. Undoubtedly, Michigan's status as an outdoor recreation state contributes heavily to its high numbers of lightning deaths and injuries. The MSP/EMHSD will continue to promote lightning safety and mitigation measures in its ongoing coordination activities with local emergency management programs.

Earthquake

Because Michigan is not located in an area subject to major earthquake activity, local emergency management programs and the MSP/EMHSD generally do not devote much time or effort to this hazard. Even if a major earthquake were to occur in the New Madrid Seismic Zone, the impacts to structures in Michigan would be minimal at

best and mostly cosmetic in nature in well designed and constructed buildings. The greatest impact on the state would probably come from damage (that occurs outside of Michigan) to natural gas and petroleum pipelines that originate in the Gulf of Mexico region of the United States and enter Michigan along its southern border. Such infrastructure failures could cause temporary, but severe fuel shortages – especially during the winter heating months. During the hot summer months, a temporary cutoff of natural gas and petroleum supplies could cause a widespread reduction in the availability of air conditioning, which could adversely impact at-risk groups such as young children, the elderly, and persons in poor health.

Emergency Planning and Earthquake Monitoring

The best measure to address these potential contingencies is good emergency planning that includes provisions for the establishment and maintenance of heating and cooling centers and temporary shelters for the most seriously affected individuals. In general, most local communities in Michigan have adequate provisions in place in their emergency plans to address the conditions that would likely occur in the state in the event of a major earthquake in the New Madrid Seismic Zone. The MSP/EMHSD actively promotes these sheltering concepts in its planning guidance, training and exercising programs, and ongoing coordination activities with local emergency management programs – especially those in southern Lower Michigan.

The Michigan Department of Environmental Quality / Office of Geological Survey (MDEQ/OGS), as the State’s primary investigator of geological phenomenon, regularly monitors activities related to a potential earthquake in the New Madrid Seismic Zone. Any findings which could affect earthquake emergency planning are forwarded to the MSP/EMHSD for appropriate action.

Extreme Temperatures

Extreme temperatures are common in Michigan due to its Upper Midwest geographic location and proximity to the Great Lakes. Periods of extreme heat and extreme cold occur virtually every year and each phenomenon creates its own set of dangerous conditions that tend to most seriously impact the most vulnerable segments of the population – young children, the elderly, and persons in poor health. Nothing can be done to eliminate or reduce extreme temperatures; however, there are measures that can be taken to reduce the impacts of these conditions on Michigan’s citizens and communities. Such measures include:

- Identification of at-risk persons, with emphasis on homebound individuals that have limited mobility and contact with the “outside world”;
- Establishment of temperature / humidity trigger points that activate emergency provisions for the most at-risk groups in the community, including visits to homebound individuals;
- Good emergency planning that includes provisions for the establishment and maintenance of heating and cooling centers and temporary shelters for the most seriously affected individuals (these plans are particularly critical in urban areas and urban centers, as these areas are more likely to have larger numbers of at-risk individuals); and
- Community planning and engineering standards that require that appropriate mitigative measures be taken to prevent deep ground freeze damage to public infrastructure such as water distribution lines and sewer lines.

In general, most local communities in Michigan have adequate provisions in place in their emergency plans to address the impacts to individuals caused by extreme temperatures. The MSP/EMHSD actively promotes these sheltering concepts in its planning guidance, training and exercising programs, and ongoing coordination activities with local emergency management programs – particularly those that deal with large urban centers.

Public Infrastructure Impacts

In addition, the Michigan Department of Environmental Quality (MDEQ) regulates the design, construction and maintenance of community water distribution and wastewater collection / treatment systems in the state. The MDEQ, through its oversight and permitting processes, helps ensure that the newer elements of public water distribution and wastewater systems are able to function adequately during most periods of extreme cold temperatures. However, as was evidenced in the 1994 deep freeze disaster in Northern Michigan (1028-DR-MI), older infrastructure may not hold up as well during prolonged periods of deep ground freeze. As a result, temporary infrastructure failures due to

extreme cold temperatures still occur with regularity throughout Michigan. As these older segments of the infrastructure are replaced over time, this problem is likely to decrease.

Land Subsidence

The primary historical cause of subsidence in Michigan is underground mining, although a substantial number of events have been occurring in urban areas, as a result of water main failures or construction mishaps. Although many areas of the state are potentially vulnerable to mine subsidence hazards, it is safe to say that it is generally not considered a top hazard in most communities (the exception being some sections of the Upper Peninsula). Part of that may be due to lack of specific data on the exact whereabouts of abandoned mines, and part may be due to the fact that subsidence generally has a limited impact area (typically a single site). However, the amount of recent damages in urban areas, as described above, now seems to significantly outweigh damages caused by collapsing mines (and to cause more injuries, as well). Increased funding for urban infrastructure and maintenance would be one way to address this increasing problem.

Mine Subsidence Efforts

The Michigan Department of Environmental Quality / Office of Geological Survey (MDEQ/OGS) monitors and regulates mining activity in Michigan. Working with local officials and the U. S. Department of the Interior, the MDEQ/OGS mitigates mine subsidence problems through special projects aimed at properly sealing mine shafts and otherwise ensuring the structural integrity of underground coal mined areas. Unfortunately, there is very limited state funding for mine subsidence mitigation. Therefore, most of the funding for such projects comes from the federal government. The primary federal funding source is the Abandoned Mine Lands (AML) Reclamation Fund in the Surface Mining Control and Reclamation Act (SMCRA), P.L. 95-87, administered by the U.S. Department of Interior's Office of Surface Mining Reclamation and Enforcement (OSMRE). AML funds are derived through a tax on coal production targeted at reclaiming land and water resources adversely affected by pre-1977 coal mining. These funds can also be used for mine subsidence mitigation measures and salt sealing, which Michigan has done on numerous occasions.

Since 1981, the MDEQ/OGS has directed the expenditure of over \$1 million in AML funds on corrective measures at 12 different abandoned coal mines. In addition, more than \$800,000 has been expended on mine inventories and other special studies. Unfortunately, there is not enough funding to accomplish all of the mitigation and reclamation work that needs to be done. As recipient and administrator of Michigan's share of AML Fund monies, the MDEQ/OGS is responsible for prioritizing and selecting mitigation and reclamation projects for funding requests. Normally, priority is given to those emergency projects that involve mine lands that present an immediate danger to the public health, safety or general welfare. Typically, such emergencies include landslides near homes and across roads, subsidence occurring under houses and public buildings, mine and coal waste fires, and open mineshafts discovered near populated areas.

Despite those efforts, incidents of mine subsidence still occur with some regularity in areas with abandoned mines. Fortunately, the impact area tends to be small and steps can usually be taken to prevent further collapse and major damage to structures.

Infrastructure-Caused Subsidence

Subsidence caused by leaking underground water and sewer lines is increasingly common in developed urban and suburban areas. This type of subsidence is difficult to detect and usually becomes known only when the collapse occurs. In most cases, whole sections of street and portions of adjacent private property are affected. Once the location of the leak is pinpointed, corrective measures can be put in place to prevent further subsidence incidents from occurring. These situations are typically handled by local public works agencies with engineering oversight provided by the MDEQ/OGS. There are no specific state programs designed to target this type of subsidence problem.

State Hazard Mitigation Goals and Objectives

The State of Michigan's four hazard mitigation goals are:

GOAL 1: Promote Life Safety

Minimize disaster-related injuries and loss of life through public education, hazard analysis, and early warning.

GOAL 2: Reduce Property Damage

Incorporate hazard mitigation considerations into land use planning/management, land development processes, and disaster-resistant structures.

GOAL 3: Build Alliances

Forge partnerships with other public safety agencies and organizations to enhance and improve the safety and well-being of all Michigan communities.

GOAL 4: Provide Leadership

Provide leadership, direction, coordination, guidance, and advocacy for hazard mitigation in Michigan.

Under each goal is a set of hazard mitigation objectives. A full list of these objectives appears, with explanatory descriptions, in a list on the following pages of this plan.

The hazard mitigation goals and objectives listed in this plan were developed by the MHMCC and MCCERCC and the MSP/EMHSD staff after extensive hazards research, consultations with stakeholders, and years of experience in dealing with a wide variety of disasters and emergencies. The goals and objectives, which are necessarily statewide or regional in nature, were developed based on a number of practical and philosophical factors which include but are not limited to the following:

- The desire to minimize hazard-related deaths and injuries to the extent possible.
- The desire to minimize hazard-related property and environmental damage to the extent possible.
- The desire to minimize the number of disasters that occur in Michigan, and their associated response and recovery costs, to the extent possible.
- The desire to minimize hazard-related negative social and economic impacts to the extent possible.
- The desire to enhance and maximize coordination between local, state and federal agencies and applicable nongovernmental organizations in identifying mitigation problems, opportunities and solutions, and in coordinating resources to implement the identified solutions.
- The desire to make hazard mitigation a part of the daily business practices of all Michigan governmental agencies and nongovernmental organizations, to the extent possible.
- The desire to keep hazard mitigation “on the front burner” of current issues, concerns and priorities by institutionalizing it in the comprehensive planning and land development processes at the local and state levels.
- The desire to make hazard mitigation an important part of the daily lives of all Michigan citizens by increasing their awareness of their hazard risk / vulnerability, their willingness to undertake appropriate individual home / business mitigation measures, and their support of community-and statewide hazard mitigation activities.

Development of Statewide Goals

With these and other relevant factors in mind, the MHMCC and the MSP/EMHSD set about in late 1998 and 1999 to develop a core set of hazard mitigation goals and objectives that reflect these practical and philosophical values. Numerous work sessions were held during that period to develop and ultimately refine the plan goals and objectives. This work was carried out primarily through the MHMCC operating committee structure. Advice and assistance from numerous supporting agencies and organizations was solicited during the development of the goals and objectives – primarily through direct contact with the individual MHMCC members. The MHMCC members used this input to assist them in formulating the plan goals and objectives.

Preparer's Note: The goals and the majority of the objectives contained in this plan were developed BEFORE the passage of the federal Disaster Mitigation Act of 2000 and the development of the more detailed risk assessments for critical state owned and operated facilities that are a central part of this plan. The DMA 2000 places significant emphasis on the development of goals and objectives that directly correlate to the risk assessment. That has been enhance in the 2014 plan update by including additional objectives (under goal 2) to address non-flood hazards. However, since many specific hazard mitigation actions must be implemented at a local level, this state plan emphasizes higher-level coordination and funding administration issues that cannot be covered in local plans. Several of the objectives in this plan, for example, are oriented toward integrating hazard mitigation more fully into local comprehensive planning—future-oriented activities which do not relate directly to the results of the risk assessment. Similarly, to increase public knowledge of and support for mitigation measures is not intrinsically hazard-specific, although the results of the risk assessment provide an extensive source of information to distribute through numerous networks, venues, and forms of media, to build public awareness of all types of hazards. These are just two examples of the many plan objectives that are indirectly shaped by the results of the risk assessment, even if not intrinsically hazard-specific. More information appears in the detail of the objectives' descriptions.

After much research, analysis and deliberation, the MHMCC and MSP/EMHSD developed a set of goals and objectives that attempt not only to reduce future hazard-related damage and negative impacts (preventive mitigation), but also to correct existing problems related to land use planning, engineering and construction, land development, and land management (corrective mitigation) that may contribute to an increase in the number or severity of hazards and their resultant damage and impacts. On August 25, 1999, the MHMCC formally adopted the following statewide hazard mitigation goals:

MICHIGAN'S STATEWIDE HAZARD MITIGATION GOALS

1. **Promote Life Safety:** Minimize disaster-related injuries and loss of life through public education, hazard analysis, and early warning.
2. **Reduce Property Damage:** Incorporate hazard mitigation considerations into land use planning / management, land development processes, and disaster resistant structures.
3. **Build Alliances:** Forge partnerships with other public safety agencies and organizations to enhance and improve the safety and well being of all Michigan communities.
4. **Provide Leadership:** Provide leadership, direction, coordination, guidance, and advocacy for hazard mitigation in Michigan.

Development of Objectives

In order to reach these four statewide goals, a number of specific objectives have been identified related to each goal. Those objectives, and an accompanying action plan for each, can be found in the "Mitigation Opportunities, Recommendations, and Implementation" section. (Note: It should be recognized that this list of objectives is fluid and dynamic – constantly changing and evolving as necessary to meet the current problems, concerns, and issues facing the State of Michigan, local governments, and private industry.)

Review of Goals and Objectives for 2014 Plan Revision

For the 2014 MHMP revision, the goals and objectives were thoroughly reviewed by the MCCERCC, MSP/EMHSD, Silver Jackets, and relevant stakeholders (i.e., state and federal agency subject matter experts and nongovernmental organizations). As a result of that process, the four goals were left unchanged but numerous changes were made to the objectives. Many objectives were reprioritized, amended as required, and "retired" (removed) if adequately addressed or determined to be non-feasible given current and projected political and/or fiscal realities. These determinations were based on current and anticipated conditions in Michigan with regard to hazard risks and vulnerabilities, state and local governmental budgeting, and the priorities of the new gubernatorial administration regarding governmental structure and functions. In addition, several objectives related to non-flood hazards were added to the active list in order to expand activities in those areas. In accordance with the requirements of the Emergency Management Accreditation Program (EMAP) accreditation process (in which the State of Michigan is participating at the time of this planning process), objectives address technological and human-related hazards (including homeland security), in addition to those natural hazard objectives required by FEMA as part of the federal DMA 2000 plan approval process.

Selection and Prioritization of 2014 MHMP Objectives

The objectives presented in this updated 2014 edition of the Michigan Hazard Mitigation Plan were selected and prioritized according to the following criteria:

- For objectives that were listed in the 2011 edition of the MHMP, was each objective able to be partially or fully completed? An assessment was made as to whether sufficient progress had been made to enable the objective to be removed from, or assigned a lower priority in, the updated list for 2014.

- Are resources currently available, or likely to be available soon, to allow the objective to be accomplished as written? Objectives that require more resources than are likely to be available were revised, de-prioritized, or removed from the updated 2014 list.
- Is the objective still relevant in the current and projected environment? If some objectives appeared to have become mismatched with (or more relevant for) the current and anticipated trajectory of programs, administrative organization, funding, political support, or other aspects of the current operating environment, they were assigned a new priority, re-worded, added to, or dropped from the updated 2014 list.
- Is the objective appropriate for the agencies available to implement it? Objectives that seemed better-matched for agencies other than those in Michigan’s state government (and its MCCERCC partners) were reconsidered for inclusion, or had their priority changed, in light of the currently operating agencies, and their associated responsibilities and programs.
- Have activities been implemented that were not reflected in the 2011 list? Some new objectives have been added to the 2014 plan in order to better reflect activities that are actually taking place in Michigan.

The following subsections add additional detail to these selection and prioritization considerations, including implementation and funding capability, cost-effectiveness, and other aspects of feasibility. Additional information can also be found in the notes that accompany the full list of objectives, in the next section of this plan.

Implementation of Objectives

The MSP/EMHSD and the MCCERCC Hazard Mitigation Committee are jointly responsible for initiating and monitoring the implementation of the mitigation objectives listed in this plan. Council members and MSP/EMHSD staff involved with each objective report (when appropriate) on implementation status at MCCERCC Hazard Mitigation Committee meetings and/or regular MCCERCC meetings. Specific implementation actions taken are highlighted in the “Comments” portion of the “Mitigation Opportunities, Recommendations, and Implementation” section of this plan on a continuous basis as part of the overall revision process. In addition, some implementation actions may be highlighted and discussed in the MCCERCC’s “Michigan Community Emergency Response and Citizen Corps Coordination Plan” and/or MSP/EMHSD Publication 106a – “Hazard Mitigation Best Practices: Michigan Success Stories,” both of which are widely distributed to state agencies, the Governor’s office and Michigan Legislature, and posted for public viewing and downloading on the MSP/EMHSD web site. When significant accomplishments are made on a specific project or it has been completed, the MSP/EMHSD and MCCERCC may (at the discretion of the MCCERCC Chair) issue a media release that highlights those accomplishments and the overall benefits derived from the project (a mitigation “success story”).

Hazard Mitigation Opportunities, Recommendations, and Implementation

Overview and General Guiding Principles

The mitigation opportunities and recommendations listed (in the form of objectives) in the goals tables that follow are just that – opportunities and recommendations. Listing an objective does not necessarily mean that it definitely will be implemented. It merely means that the objective could, and probably should, be implemented because the basic principles behind the activity (or activities) associated with the objective are sound and will result in a reduction or elimination of damage, impact and suffering caused by natural, technological or human-related hazards. It is hoped that this plan will eventually help make mitigation an ongoing reality in Michigan’s local communities, state agencies, and the private sector. The opportunities and recommendations contained in the goals tables that follow are designed to make a real difference in the lives of Michigan’s citizens by reducing or eliminating the dangers and costs associated with disasters.

Political, social and fiscal realities must be understood and taken into consideration when implementing hazard mitigation activities. Even the best ideas and opportunities, if not crafted within the parameters of existing system constraints, are more often than not doomed to failure from the start. Some of the recommendations listed in the following tables may be categorized as “pie-in-the-sky,” meaning that the idea or activity – even those that are highly meritorious – is not likely to be implemented in the foreseeable future because it may have one or more significant constraints working against it. Nonetheless, those recommendations have been included in the plan because the principles behind the recommendation are strong and they at least warrant future consideration.

In developing mitigation recommendations and implementation strategies for the hazards addressed in this plan, the following general guiding principles have been followed to the extent possible:

- Non-structural measures have been emphasized over structural measures.
- Voluntary measures have been emphasized over mandatory measures.
- Education-based compliance and cooperation has been emphasized over legislated mandates.
- The least expensive alternative has, in general, been emphasized over more expensive alternatives.

Furthermore, the following additional principles will govern the development and implementation of flood hazard mitigation recommendations:

- NFIP-participating communities will have priority over non-participating communities.
- Communities / sites suffering repetitive losses will have greater emphasis.
- Flood mitigation projects will, to the extent possible, be implemented in the following order of priority:
 1. Acquisition and relocation or elevation of flood prone structures.
 2. Drainage projects (culverts, channels, retention / detention ponds, etc.).
 3. Wet and dry flood proofing of structures.
 4. Structural measures (floodwalls, dikes, jetties, etc.).

Funding Sources for Implementation of Mitigation Projects

For each mitigation opportunity or recommendation listed in the following tables, potential funding sources have been identified. For the most part, those sources include the federal Emergency Management Performance Grant (EMPG), and state, local and private funding, and the Hazard Mitigation Assistance program—an umbrella grant program that includes the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMAP), the Pre-Disaster Mitigation Program (PDMP). The Repetitive Flood Claims Program (RFCP) and the Severe Repetitive Loss Program (SRLP) are now considered to be a part of FMAP. A few items still refer to the Homeland Security Grant Program (HSGP), where still considered relevant. Those are the primary funding mechanisms currently used to implement desired mitigation projects in Michigan (and most other states). It should be noted that Michigan does not have a state mitigation fund, although establishment of such a fund used to be a recommended measure under Goal 4 of the Mitigation Opportunities, Recommendations and Implementation Section that follows. (Instead, this has shifted into a new effort to allow MCCERCC to make use of private sector donations—see Objective 4.5 and the description in the next paragraph, below.) It should be further noted that Michigan has had a state disaster contingency fund on the books since 1976, but it has never been funded to its legally established base amount. Philosophically, the Michigan Legislature and Michigan’s Governors over the years have been opposed to allocating funds to contingency accounts. Instead, the Michigan Legislature has preferred to allocate state disaster relief funds on an as-needed, case-by-case basis. That basic philosophy continues today and is unlikely to change in the foreseeable future. Any state funding identified in the tables would come from one-time appropriations by the Michigan Legislature or from existing budgets of involved state agencies.

Sources of pre-disaster funding include the federal grants available under PDMP and FMAP. There is still a need for Michigan to compile specific information from local plans in order to better solicit specific hazard mitigation projects within the sometimes-tight timeframes under which applications must be submitted. The main source of post-disaster hazard mitigation funding is the HMGP. However, in Michigan’s most recent disaster (#4121, April-May 2013), it has found that the amount of money actually available for hazard mitigation is substantially less than had originally been foreseen, partly due to differences between Preliminary Damage Assessment information and the final figures allocated to the state. There have been numerous cases over the past decade in which Michigan has attempted to gain federal disaster declarations, but in which these attempts have resulted in disappointment. Surrounding states in the region now seem to have gained access to much more funding in recent years, resulting from their successful declaration requests. Some of the successful Michigan requests have been relatively modest in the amount of funds made available, and in some cases, the limited amount of post-disaster funds has meant that they only served a limited portion of the state, rather than a representative selection of communities, statewide. (The fairest distribution in such cases has often been to favor the area specifically covered by the disaster declaration.)

A desirable future work activity for the MCCERCC Hazard Mitigation Committee could involve the identification of specific protocols for creating public/private partnerships and accessing private-sector funding for hazard mitigation purposes. It is unlikely that large amounts of private sector funding will be identified for general hazard mitigation use, but such funding would likely be targeted to specific projects, even if they may turn out to be one-time-only projects and circumstances. Nonetheless, private sector funding can, in many instances, be obtained and is a valuable supplemental funding source for project implementation in the right circumstances. The MCCERCC Hazard Mitigation Committee intends to develop protocols for approaching private sector entities for funding support as a desirable program activity for the future.

It is often possible to successfully fund hazard mitigation projects using other sources of federal funding targeted primarily for other purposes. This typically involves “multi-objective” projects that include, either purposely or coincidentally, hazard mitigation elements. For example, a riverfront parkland acquisition project also includes the added benefit of preventing unwanted development in the floodplain, thereby effectively mitigating potential flooding problems. These types of projects are possible and desirable, but they often are more difficult to implement because more individuals and agencies are involved and the benefit of mitigating hazards is generally not the primary objective. However, under the right circumstances, they can work to the benefit of all involved parties.

Recognizing that fact, this plan includes guidance within Attachment C of this plan, which can provide a “roadmap” to the many governmental and private sector funding programs and mechanisms currently in place that can be used to assist in implementing hazard mitigation projects and initiatives of a multi-objective nature. It points the way to more detailed information sources available to anyone via the Internet, such as the Catalog of Federal Domestic Assistance (CFDA), federal and state agency web sites that describe funding programs, and private philanthropic organization web sites. This information can be used either to help implement projects at the local level, or to identify potential funding sources for mitigation projects of regional or statewide application.

Project Funding Criteria

Pursuant to Executive Order 2007-18, the MCCERCC is responsible for reviewing, prioritizing and selecting all projects for funding under the HMGP, FMAP and PDMP. This responsibility has been extended to also include the RFCP and SRLP (as well as any other new federal grant programs that are established). The MSP/EMHSD and MCCERCC have established specific review criteria and a multi-step review process for carrying out that responsibility.

The review process in each case begins with the MCCERCC Hazard Mitigation Committee, which is responsible along with the MSP/EMHSD staff for screening of solicited applications and potential applicants. For each of the grant programs, the MCCERCC Hazard Mitigation Committee reviews the applications received (project and planning) to ensure applicant, work and cost eligibility and to categorize the project type. The MCCERCC Hazard Mitigation Committee then convenes a State Selection Panel that consists of committee members, selected MSP/EMHSD staff, and state agency representatives with expertise in the particular type of disaster that occurred. The size of the State Selection Panel is left to the discretion of the Hazard Mitigation Committee chair, but typically consists of 7-10 individuals. The State Selection Panel reviews and evaluates each eligible application received (project and planning) and then prioritizes the applications using a 1-5 point numerical scoring system based on the following criteria:

- The project demonstrates sound hazard mitigation techniques.
- The project is listed in the applicable local hazard mitigation plan.
- The project supports the Michigan Hazard Mitigation Plan.
- The project meets the required eligibility criteria.
- The project is suitable for funding under the HMGP / FMAP / PDMP / RFCP / SRLP rather than other funding programs.
- The project is consistent with the MCCERCC approved strategy for the federally-declared disaster (if applicable).
- The project completely or substantially solves the problem.
- The project provides a permanent or long-term solution.
- The project is likely to be cost-effective based on physical damages prevented.
- The project will not create negative environmental effects.

- The project is consistent with other projects, initiatives, and state agency priorities.
- Communities with the highest risk.
- Communities with the greatest number of repetitive loss properties.
- Communities with the greatest number of NFIP insured structures.
- Communities with the most intense development pressures.
- Communities with the largest increases in population and/or physical development.
- Communities that have the ability to successfully implement hazard mitigation projects within the required timeframes.
- Communities that have expressed interest in hazard mitigation activities.

The numerical scores for each project are added together and then divided by the number of voting members of the State Selection Panel, thereby establishing an average score for the project. The projects are then ranked according to their numerical score. (See Attachment C for a sample project scoring matrix and a further explanation of the prioritization criteria used.)

Generally, the scored projects are then funded according to their ranking, up to the established federal funding limit, after receiving full Council concurrence. However, in some cases the Council may establish special priority for certain types of projects and those projects would then receive the highest funding consideration for that disaster. For example, the Council may determine that acquisition or elevation of flood prone structures is the highest priority for a federally declared disaster and those types of projects would receive consideration over other types of projects for HMGP funding. Any special funding priorities established would be set forth in the mitigation strategy developed jointly with FEMA for that disaster.

For the nationally-competitive PDMP and RFCP, project applications are reviewed and prioritized for funding consideration by the Council upon recommendation of the MSP/EMHSD mitigation staff. All PDMP and RFCP applications are submitted directly by applicants to FEMA via the federal E-Grants system. A prioritized project application listing is submitted by the MSP/EMHSD to FEMA for federal review by national review committees established by FEMA. Once the project applications enter that review process, there is no guarantee that the State's highest priority applications will actually be selected for funding under the PDMP or RFCP. In some cases, lower priority projects may be selected because the national review committee felt that the higher priority projects were not eligible due to technical problems with the project or a lower benefit / cost ratio. It is also possible that NO projects will be selected for the State of Michigan due to the competitive nature of the programs.

For the SRLP, the eligible properties for the competitive phase of the grant program are pre-identified by FEMA. Michigan currently has eight properties that have been pre-identified as being eligible for funding consideration under the SLRP. In the event that project applications received exceed available funding possibilities, the projects will be prioritized and selected for funding consideration on the basis of the highest benefit-cost ratio as determined by the applicant and the MSP/EMHSD staff. Other prioritization and selection criteria may be instituted by the MCCERCC Hazard Mitigation Committee based on current or anticipated local conditions or other relevant factors.

Assurances:

The State of Michigan will comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c) and will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

At the time of application for FEMA mitigation grant funds, applicants sign FEMA Form 20-16 certifying that they will comply with applicable standard assurances as follows: (FEMA Form 20-16A) Assurances for Non-Construction Programs, (FEMA Form 20-16B) Assurances for Construction Programs, (FEMA Form 20-16C) Certifications Regarding Lobbying; Debarment, Suspension, and other Responsibility Matters; and Drug-Free Workplace Requirements, and (FEMA SF-LLL) Disclosure of Lobbying Activities.

At the time of grant award for FEMA mitigation grant funds, recipients sign a grant agreement officially certifying that they will administer the grant in accordance with Federal regulations including (but not limited to) Titles 2, 31, and 44 of the Code of Federal Regulations, OMB Circulars, and applicable State laws and statutes.

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