

January 12, 2004

**Michigan's  
Multi-Hazard Flood Map Modernization  
Phase II-Implementation Phase  
Business Plan**

Administered by the Geological and Land Management Division

Michigan Department of Environmental Quality

## *Michigan's History in Floodplain Management and Effective Legislation*

The State of Michigan's floodplain management program, administered by the Michigan Department of Environmental Quality (MDEQ), has over the years been recognized throughout the country as a first rate and effective program. Its floodplain management controls and regulations date back to the development of the initial floodplain regulation in 1968. The program has advanced to the point that it exceeds the federal criteria contained in the National Flood Insurance Program. The regulation is specifically entitled the State Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. It stipulates that State permits must be obtained for the occupation, filling, or grading of lands in a floodplain, streambed, or channel of a stream.

## *Current Regulatory Permitting Process*

Since the early 1980s, the state has operated a consolidated permit application review process for land/water interface projects regulated by several statutes. This single consolidated review covers all regulated activities within the floodplains, inland lakes and streams, wetlands, and the Great Lakes. Of the 6,500 applications processed annually, approximately 18% (about 1,200) are for projects regulated by the state's floodplain management regulations. The established consolidated permitting process provides the state's main tool for focusing on and realizing compliance with state and federal flood management regulations.

## *Current Staff and IT Resources*

The consolidated permit review process has proven to be effective in assuring that all applicable land/water regulations are identified and applied to projects through a single final determination by the agency. The success of the floodplain permit program is primarily due to developing a field staff of seven floodplain engineers and 13 additional staff in Lansing having a multitude of specialized knowledge, training, and abilities. This complement of staff will provide many of the staff resources needed to implement and achieve the multi-hazard flood map modernization goals.

The necessary supporting Information Technology (IT) capabilities exist to meet staff's needs in engineering modeling and hydrologic and hydraulic analysis. Staff have been trained in ArcView and use it routinely for their daily work. Staff have also been trained in the use of the HEC GeoRAS and HEC GeoHMS extensions for ArcView. The MDEQ recently used HEC GeoRAS to develop the HEC-RAS models and map the resulting floodplains for two rivers. The MDEQ also has the ability to store the digital files and present maps on the Internet.

## *Vision and Goals*

The multi-hazard flood map modernization goals include the reduction in the loss of life and property, minimize the suffering and disruption caused by disaster, and better

prepare the nation to address the consequences of flooding and other hazards. The Federal Emergency Management Agency's (FEMA's) flood hazard maps are essential tools for flood hazard mitigation in Michigan as they are throughout the United States. About 54 percent of the existing flood hazard maps published by FEMA in Michigan are more than 15 years old. About 1,000 communities in Michigan do not have flood hazard maps. Often the older maps reflect outdated flood hazard information that limits their utility for insurance and floodplain management purposes.

MDEQ's overall proposed primary goals (contingent upon available funds) for supporting the map modernization program objectives are the following:

- Reduce the average age of the flood maps to 6 years.
- Produce digital flood hazard maps with up-to-date flood hazard data for the 15 percent highest priority areas in the state.
- Develop flood hazard maps for 50 percent of the unmapped, floodprone communities in the state.

Actual year-to-year goals will be more specific and will be based upon adjusted priorities for the year and upon available funds.

#### *Project Selection Criteria, Method, and Prioritization*

The MDEQ will use its August 2002 document entitled "Map Modernization Plan for Michigan" (attachment 1) as an initial guide to the selection of projects for map modernization efforts. The criteria detailed in the August 2002 plan will be adjusted/modified as appropriate to comply with any guidance and program criteria developed by FEMA throughout the multi-year modernization program.

Beyond any direction from FEMA, major factors influencing the project selection and prioritization process will be the level of interest, participation, and support by the subject communities and other potential agency partnerships.

#### *MDEQ Role in FEMA's Multi-Hazard Flood Modernization Initiative*

The MDEQ proposes to have the maximum level of participation in this program. It will perform and/or manage some or all of the mapping activities for the state. The MDEQ's specific activities will depend upon the funding available from FEMA. The State will provide up to a 25 percent match to federal funds available from FEMA as required. The nature and scope of specific activities will be detailed in partnership agreements and will be based upon the evaluation and prioritization of statewide mapping needs and the level of interest and cooperation from impacted communities. Specific elements the MDEQ will be involved with include:

- The MDEQ will be the lead agency in the state's efforts to support and participate in FEMA's map modernization program and will maintain the discretion to determine which tasks, e.g. conducting flood studies itself or reviewing flood studies by others, it will conduct.
- The MDEQ will, with regard to floodplain studies, generally review the hydrology and hydraulics (H&H) work performed by others rather than actually conduct the studies.
- The MDEQ has developed an approved list of engineering firms, and the MDEQ will use this list to subcontract for assistance in conducting and/or assisting in the collection of field data, modeling, conducting studies, and reviewing studies.
- The MDEQ will oversee/manage CTP projects and other agreements between FEMA and local agencies, communities, or consultants.
- The MDEQ will provide technical assistance and staff resources to the program.

### *Proposed Map Modernization Activities*

Mapping activities that the MDEQ and its partners will perform outreach and community coordination, digital base map collection/ coordination, digital base map development, field surveys, hydrologic and hydraulic analyses, floodplain mapping, and Digital Flood Insurance Rate Map (DFIRM) production. Following are specific activities defining the state strategy for providing, developing, and/or managing the state's capability and capacity for the program:

#### 1. Digital Base Map Data Sharing

- Floodplain delineations will be stored as ArcView© layers that will be accessible by the public over the Internet from Michigan's Center For Geographic Information (CGI). The DFIRM layers prepared by outside contractors will be projected to a geographic coordinate system that is compatible with the other base map layers provided by the CGI. Additional base map layers will also be available, including land use, soils, transportation networks, digital orthography, digital topographic maps, and hydrography. Layers can be downloaded from the web page or will be provided on CD by request. This activity will be implemented in year one and continue annually.
- It will support the program objective of being a geo-spatial system, providing easy access by the user community to flood hazard data and other data to support risk management.

## 2. DFIRM Maintenance

- The MDEQ will maintain and update only the base map layers. Revised floodplain layers will be prepared by FEMA contractors and then sent to the MDEQ. This activity will be implemented in year one and continue annually.
- It will support the program objective of being able to provide information maintenance over a long term that would not require large amounts of federal funding.

## 3. Hydrologic and Hydraulic Review

- The MDEQ will review all hydrology and hydraulic (H&H) studies prepared for original Flood Insurance Studies (FIS) and FIS revisions. This review will follow standard accepted engineering practices and comply with the technical requirements found in Guidelines and Specifications for Flood Hazard Mapping Partners. Staff shall also participate with FEMA and their contractors in the scoping meetings and the presentation of the study results to the community. This shall be the final, technical review and replaces the one currently assigned to FEMA's Mapping Coordination Contractor. Studies initiated and prepared by the MDEQ shall be reviewed by FEMA's designated contractor. This activity will be implemented in year one and continue annually. Up to two additional staff may be needed after year one, depending on the amount of H&H review initiated under map modernization.
- This activity represents a program objective of using a process that will ensure that the data is reliable and meets FEMA and other national and state standards.

## 4. Assessment of Community Mapping Needs

The MDEQ will perform a detailed community-by-community assessment of mapping needs for every community in Michigan. With over 900 communities in Michigan not participating in the NFIP, there is a need to expand the assessment beyond NFIP communities. The MDEQ will enter the results into the Michigan Mapping Needs Update Support System (MNUSS) database.

The detailed assessment of the 1,776 communities in Michigan will be done over a four-year period. The assessment will include:

- Community contacts
- Site visits
- Review of state floodplain permitting activities
- In-office review of maps
- Review of CLOMR & LOMR activity
- Floodplain approximation using soils information and GIS technology
- Floodplain approximation using existing data

In addition to community contacts, a web link will be established on the MDEQ website to solicit input from stakeholders.

The community assessment will be conducted by county, using the August 2002 Mapping Modernization Plan Supplement to establish an initial priority. The first year will focus on the top 14 counties, plus all unmapped participating NFIP communities. As a part of the year one assessment, recommendations will be made for the unmapped NFIP communities to convert to the regular phase on the NFIP without a map, develop an approximate FIRM, or define detailed study needs.

Years two, three, and four will each include 23 counties – about 460 communities.

It is anticipated that year one will involve about 400 communities and will require approximately \$75,000 of effort. The remaining years' efforts will involve about 460 communities each and will also require about \$75,000 of effort. In addition to the hours required for the assessment, about \$45,000 (for technical support from the Department of Information Technology) will be required in year one to develop the GIS information needed for the soils assessment to approximate flood-prone areas.

In addition to the MNUSS data base being populated, a GIS layer will be created which identifies potential flood-prone areas based on soil types. The GIS information will be made available to the communities which currently do not have floodplain maps.

An initial cursory assessment was done in preparation of the August 2002 plan. However, to adequately define the needs, a more in-depth assessment is needed. As with the ongoing Community Assistance Program (CAP) program, a selected number of communities will be assessed each year. The progress and costs of the assessment will be reviewed quarterly. The level of effort that the State will be able to put toward this task is proportional to the level of funding provided under Map Mod. If full funding is not provided, the assessment will be done first concentrating on the unmapped communities and then using the county priority list.

If no funding is received under Map Mod, some unmapped communities may be assessed, but they will be done when other funded and State regulatory requirements have been met; the proposed statewide assessment will not be possible.

## 5. Information Technology Systems Data Storage and Access

- The CGI, housed in Michigan's Department of Information Technology, will be the primary repository of the digital data. The State shall develop a website to distribute the data to the public. Maps will be accessible through an Internet Map Server© interface. The website will be developed during year one, and data/maps will be added as they become available. DFIRMS will be made available in Adobe© Portable Document Format (PDF) for users who want to print the maps.

- This system satisfies the program objective of easy access to information by the user community through a system that meets national and state standards and has appropriate security.

## 6. Letters of Map Change Review

- The MDEQ will assume the responsibility of the FEMA Flood Map Production Coordination Contractor with regard to evaluating requests for Conditional Letters of Map Revision (CLOMRs) and Letters of Map Revision (LOMRs). In year one, this activity will be limited to the first decile counties that FEMA identified as a priority for the first year of the map modernization program. The MDEQ will process these conditional and final map revision requests in accordance with the applicable provisions of the NFIP regulations. Based on the results of the MDEQ review, FEMA will issue a determination regarding the request. For proposed projects, FEMA will issue CLOMRs in accordance with the applicable NFIP regulations. For existing or “as-built” projects, FEMA will issue LOMRs or will physically revise and reissue the affected map panels following Physical Map Revision processes in accordance with the NFIP regulations, as appropriate. This activity will require full funding in the amount of the fees the letter of map change applicants currently pay to FEMA.
- The activity may be extended to other priority counties in years two through five, depending upon FEMA’s evaluation of the MDEQ’s ability to perform this service at the end of year one.

## 7. Outreach

- General outreach will be provided by map modernization informational update articles in the existing agency quarterly “Flood News for Michigan Floodplain Managers” newsletter. This newsletter is a committed activity under the CAP-SSSE grant agreement plan with FEMA. It has a distribution to all communities within the state and many other interested agencies, contractors, and consultants.
- The MDEQ will, as appropriate, use and disseminate to its established floodplain management mailing lists and informational brochures provided by FEMA regarding the map modernization program. Program information produced by the State and available from FEMA will also be linked to or placed on the State’s existing floodplain management web page.
- Public informational meetings will be scheduled and held in the participating community’s locale as deemed appropriate and as statutorily required. Meeting advertisement will be provided as statutorily required and by inclusion into the MDEQ monthly calendar.

- These outreach elements will represent the objective of expanding, informing, educating, and making available to the user community available information that can assist them in making sound decisions to eliminate/minimize their vulnerability to natural and manmade hazards.

*Relationship to Michigan Hazard Mitigation Coordinating Council*

Michigan's floodplain management program's interest in the implementation of the FEMA multi-hazard flood map modernization program is consistent with the governor's Executive Order 1998-5 dated July 29, 1998. This order created the Michigan Hazard Mitigation Coordinating Council (MHMCC). It is charged with four primary responsibilities:

- Assist in the development, maintenance, and implementation of a state hazard mitigation plan;
- Assist in the development, maintenance, and implementation of guidance and informational materials to support hazard mitigation efforts of local and state government and private entities;
- Solicit, review, and identify hazard mitigation projects for funding under Sections 553 and 554 of the National Flood Insurance Reform Act, PL 103-325; and
- Foster and promote, where appropriate, hazard mitigation principles and practices within local and state government, and with the general public.

With multi-hazard emphasis being part of the floodplain map modernization program, it is very logical that the State's participation effort to produce up-to-date digital flood hazard maps be directly coordinated with other agency efforts, such as the MHMCC, to permanently eliminate or reduce the long-term risk to human life and property from natural and technological hazards. Our efforts, data, and new map products will be mutually shared with the emergency management, preparedness, response, and recovery programs supported by the MHMCC and administered by the Emergency Management Division of the Michigan State Police (MSP). MSP will be one logical partner in which the mutual sharing of data will benefit both programs through the communication of flood risk and other hazard information.

The membership of the council is composed of seven state agencies (Michigan State Police, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, Michigan Department of Agriculture, Michigan Department of Consumer and Industry Services, Michigan Department of Transportation, and Michigan Department of Management and Budget), two private industry representatives, and one local emergency management representative. The director of the MDEQ (or their designee) serves on the council and has direct involvement in council actions. Thus, the MDEQ's floodplain management program is recognized as a key program

component to the overall charge of the council to take actions to eliminate or reduce long-term risk to human life and property from natural and technological hazards. The proposed action by the State's floodplain management program to actively participate in FEMA's multi-hazard flood map modernization program represents a valuable and wise choice, which will result in a very useful program product in direct support of the Governor's MHMCC.

#### *Project Plan Management, Projects, Scheduling, Tracking, Evaluation, Reporting, and Accounting*

Since all effort by the State to initiate any tasks associated with this map modernization program is dependant upon available federal funds, the scheduling of any associated activity will not commence until the State is officially notified of fund allocations. At that time, the State will commence with its plan for community needs assessments and prioritization of projects from the 2002 plan. Coordination with subject communities and applicable partners will begin with applicable planning/scoping meetings. Those meetings will describe the product to be produced, identify local and state resources available to produce the product, identify partner roles, and chart a schedule for project progression and completion.

The method of tracking specific projects will be described and detailed in phase II for each specific project plan. The descriptions will address staffing resources, role responsibilities, timelines, deliverables, reporting, quality assurance, performance measures, fund allocations, costs, and payments. Developed tracking systems will be compliant with state financial and contracting requirements and FEMA guidance and map modernization program requirements as dictated throughout its term.

#### *Projected Staffing Needs, Budget Projections, and Alternatives*

The State's efforts to successfully initiate, implement, and complete its map modernization goals is obviously dependent upon staffing and the availability of funds to support staff efforts on the initiative. Following is an estimated yearly FTE and costs projection that our proposed map modernization efforts would represent above and beyond current staff levels, assignments, responsibilities, and budget resources. The budget represents the total amount of federal funds required to perform the level of work. Estimated costs are based on year one projections, not adjusted for inflation in years 2 through 5.

## Year 1

<b>Personnel</b>	<b>Role</b>	<b>FTE</b>	<b>Costs</b>
Eng. Mgr 15	Oversight	0.1	10,800
Eng. Mgr 14	Direct Superv.	0.5	50,700
Eng 13	H&H Study/review	0.5	47,300
Eng 11	H&H Study/review	1.0	75,000
Eng 11	Assessment	1.0	75,000
Eng 11	LOMR reviews	0.25	18,750
Clerical	Support	0.25	11,300
DIT	GIS		<u>45,000</u>
		<u>3.60</u>	<u>\$333,850</u>
Travel			5,000
Equipment/Supplies (approx. 1,250 per FTE)			4,500
Other (Assessments - approx. 4,400 per FTE)			15,840
Indirect (19.56%)			<u>65,300</u>
<b>Total</b>			<b>\$424,490</b>

## Years 2-4

<b>Personnel</b>	<b>Role</b>	<b>FTE</b>	<b>Costs</b>
Eng. Mgr 15	Oversight	0.1	10,800
Eng. Mgr 14	Direct Superv.	0.5	50,700
Eng 13	H&H Study/review	0.5	47,300
Eng 11	H&H Study/review	1.0	75,000
Eng 11	H&H Study/review	1.0	75,000
Eng 11	Assessment	1.0	75,000
Eng 11	LOMR Review	0.25	18,750
Clerical	Support	0.25	11,300
DIT	GIS		<u>5,000</u>
		<u>4.60</u>	<u>\$368,850</u>
Travel			5,000
Equipment/Supplies (approx. 1,250 per FTE)			5,750
Other (Assessments) (approx. 4,400 per FTE)			20,240
Indirect (19.56%)			<u>72,150</u>
<b>Total</b>			<b>\$471,990</b>

## Year 5

<b>Personnel</b>	<b>Role</b>	<b>FTE</b>	<b>Costs</b>
Eng. Mgr 15	Oversight	0.1	10,800
Eng. Mgr 14	Direct Superv.	0.5	50,700
Eng 13	H&H Study/review	0.5	47,300
Eng 11	H&H Study/review	1.0	75,000
Eng 11	H&H Study/review	1.0	75,000
Eng 11	LOMR Review	0.25	18,750
Clerical	Support	0.25	11,300
DIT	GIS		<u>5,000</u>
		<u>3.60</u>	<u>\$293,850</u>
Travel			5,000
Equipment/Supplies (approx. 1,250 per FTE)			4,500
Other (Assessments) (approx. 4,400 per FTE)			15,840
Indirect (19.56%)			<u>57,480</u>
<b>Total</b>			<b>\$376,670</b>

## IV. Alternatives

**Full funding.** It is estimated that \$2,220,000 from the FEMA will be needed over the five-year period to provide the resources to facilitate the following Michigan Map Modernization goals:

1. Assessing the mapping needs of 1,776 communities in Michigan.
2. Reducing the average age of the flood maps to six years.
3. Produce up-to-date digital flood hazard maps for the 15 percent highest priority areas.
4. Develop flood hazard maps for 50 percent of the unmapped floodprone communities.
5. Review the hydrology and hydraulics of all the studies prepared by FEMA contractors.
6. Perform a minimum number of in-house hydrologic and hydraulic studies for the purpose of updating or producing floodplain maps.
7. Coordination on a state level with the Michigan Hazard Mitigation Coordinating Council.
8. Participate in various scoping, informational, and final meetings.

9. Review LOMR activity.
10. Oversee/mange CTP projects and other agreements between FEMA, local agencies, communities, or consultants.
11. Update base map layers.
12. Store DFIRMS in a centralized location for easy access of all users.

**Medium Funding.** With two-thirds of the full funding from the FEMA (\$1,500,000) over the five-year period, the following goals are proposed:

1. Assess the mapping needs of 1,184 communities in Michigan.
2. Reduce the average age of the flood maps to 12 years.
3. Produce up-to-date digital flood hazard maps for the 15 percent highest priority areas.
4. Develop flood hazard maps for 25 percent of the unmapped floodprone communities.
5. Review the hydrology and hydraulics of all the studies prepared by FEMA contractors.
6. Coordination on a state level with the Michigan Hazard Mitigation Coordinating Council.
7. Participate in various scoping, informational, and final meetings.
8. Review LOMR activity.
9. Oversee/mange CTP projects and other agreements between FEMA, local agencies, communities, or consultants.
10. Update base map layers.
11. Store DFIRMS in centralized location for easy access of all users.

**Low Funding.** With one-third of the full funding from the FEMA (\$725,000) over the five-year period, the following goals are proposed:

1. Assessing the mapping needs of 592 communities in Michigan.

2. Review the hydrology and hydraulics of all the studies prepared by FEMA contractors.
3. Coordination on a state level with the Michigan Hazard Mitigation Coordinating Council.
4. Participate in various scoping, informational, and final meetings.
5. Review LOMR activity.
6. Oversee/manage CTP projects and other agreements between FEMA, local agencies, communities, or consultants.
7. Update base map layers.
8. Store DFIRMS in centralized location for easy access of all users.

**State Funding Only.** With no funding from the FEMA and only state funding over the five-year period, there will be no change to the current mapping activities at the state level.

**How will FEMA dollars cover shortfalls?** FEMA dollars will provide the resources required to facilitate Michigan's efforts to accomplish its stated goals.

**State match.** State match will be provided through in-kind services tied to the existing statewide floodplain management program. The program includes engineers who: Review applications to alter floodplains; review new subdivisions to ensure they are not flood prone; review alternations to dams; review alterations to bridges and culverts; and provide flood discharge estimates for construction in floodplain areas. In addition, match will be provided through municipal and county governments and other local agencies.

This plan is the work product from efforts of the following MDEQ, GLMD staff:  
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