

# **Flood Map Modernization**

## **Business Plan For Oregon**

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### **Executive Summary**

Oregon's state agencies and local governments rely on flood hazard data and maps produced by the Federal Emergency Management Agency (FEMA) for floodplain management. The FEMA flood hazard maps establish floodplain boundaries and flood depths for regulatory purposes and provide information that helps state agencies, local governments, and citizens to mitigate for potential flood losses. Of the two hundred fifty seven (257) Oregon cities and counties that participate in the National Flood Insurance Program (NFIP), over seventy percent of these NFIP communities have FEMA maps that are outdated. Some of the more significant problems associated with using outdated flood maps are:

- Flood depths and impact areas shown on old maps are potentially inaccurate, particularly where Oregon has experienced population increases and resulting changes in development patterns;
- During major flood events in 1996 & 1997, some Oregon communities experienced flooding in areas not delineated on FEMA maps as floodplain;
- Older FEMA maps were prepared using manual cartographic techniques, which make the maps difficult for state and local customers to use and expensive to maintain;
- Difficulties with the use of older maps can result in inconsistencies determining if properties are within or outside of floodplains, resulting in a lack of credibility with the public and challenges for providing good customer service
- The base data used to develop the flood hazard maps, where still accessible, are not in an easy-to-use format by today's mapping standards and in some cases are inadequate or inaccurate.

Although the majority of Oregon's flood maps are considerably out-of-date, six populous counties will have up-to-date, digital flood hazard maps in 2004. Four additional counties are scheduled by FEMA for map updates in 2005. DLCD wants to see the number of NFIP communities with similarly updated maps increased. The long-term goal must be to digitize (and update as necessary) all FEMA flood hazard maps for Oregon.

FEMA has embarked on a nationwide program called the Map Modernization initiative to address mapping problems like those described above. As part of the national initiative, FEMA provided state floodplain programs with the opportunity to develop business plans describing potential state involvement in the Map Modernization initiative. The Department of Land Conservation and Development (DLCD), as the state's lead agency for administration of the NFIP in Oregon, has developed this business plan to identify how Oregon could participate in and further the objectives of FEMA's Map Modernization initiative.

Oregon's business plan describes potential state contributions to the FEMA mapping initiative and identifies the essentials of a funding and staffing package that is necessary for implementation of the business plan. The business plan will serve as a basis for any

future state requests for FEMA map modernization funds. DLCD envisions completing the flood map updating and conversion to digital flood maps within 5 years. This goal is, of course, dependent on the future availability of federal funding and other federal support for state participation. Full implementation of this business plan will result in more accurate flood maps and a method of delivery and maintenance that facilitates effective floodplain management across the state.

DLCD proposes to lead the state effort to implement the Map Modernization initiative. This will be accomplished through partnerships with FEMA, other federal agencies as appropriate, key state agencies, and local communities. These partnerships will be used to leverage contributions (e.g. data, labor, etc.) and to produce better maps at a lower cost.

The state will manage the map modernization process to facilitate various floodplain management needs and uses for flood hazard data and maps, while constantly seeking out efficiencies in the development, use and maintenance of flood hazard data. The state will have an increased role in the distribution and maintenance of flood hazard data and maps. Local government participation in map modernization would be strongly encouraged and supported to the maximum extent possible by the state. The goal would be to work together across agencies and levels of government to share resources and knowledge related to mapping and map use. This would allow the state to maximize resources at the state level and better ensure that funding for mapping work is distributed across Oregon to assist the maximum number of NFIP communities.

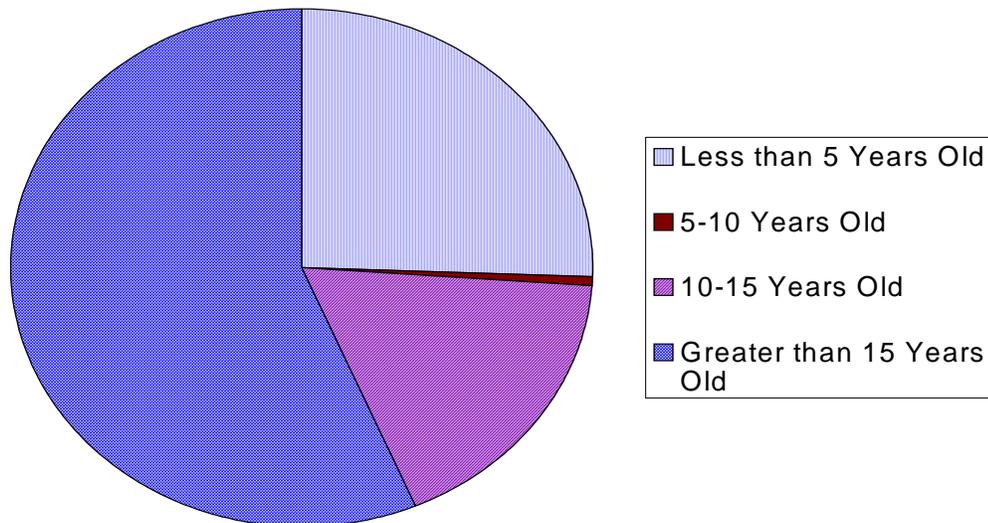
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### 1. Problem Statement

Flood hazard maps produced by the Federal Emergency Management Agency (FEMA) are one of the essential tools for flood hazard mitigation in Oregon and in the United States in general. Oregon's local governments and state agencies rely on FEMA flood hazard maps to regulate floodplain development and otherwise mitigate for flood losses. The private sector also uses FEMA maps for development and insurance purposes. As shown in Figure 1, the majority of flood hazard maps produced for Oregon's communities are more than 15 years old. Many of these maps were originally produced in the 1970s or early 1980s. Since then, Oregon's population has increased significantly, particularly in the flood-prone Willamette Valley and in some coastal communities. Flooding levels and impact areas are potentially altered by these population increases and changes in development patterns.



**Figure 1 - Age of Oregon's Flood Hazard Maps**

**Data Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002**

Additionally, the state suffered significant flood losses in 1996 and 1997 when 27 of the state's 36 counties were declared federal disaster areas. Among the lessons learned during the 1996 and 1997 floods was that flooding in Oregon communities was not always limited to areas shown on FEMA flood hazard maps. In many cases, flooding occurred in areas not mapped as having significant flood hazards. This demonstrates the problem of older FEMA maps sometimes reflecting outdated flood hazard information, thereby limiting map utility for floodplain management purposes.

Even where the flood hazard information represented on FEMA's flood hazard maps remains accurate, FEMA's traditional map format generates numerous challenges for Oregon communities charged with regulating floodplain development and state agencies

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working to mitigate flood hazards. We provide some examples here of these challenges for illustrative purposes.

- Most of the FEMA maps were prepared using road network information that is now outdated.
- The original maps were prepared using manual cartographic techniques, which make the maps difficult for state and local customers to use and expensive to maintain.
- Changes in political boundaries, such as annexations by cities, are not readily addressed on older maps.
- City and county maps were not produced in a seamless method making it difficult to use the maps for locations near jurisdiction boundaries.
- The base data used to develop the flood hazard maps, where still accessible, is not in an easy-to-use format by today's mapping standards.
- Local floodplain administrators must document by hand onto the paper maps all the site-by-site administrative changes made routinely by FEMA.
- The submission and acceptance process for updating flood maps can appear slow and complicated to potential participants.

The state of Oregon also has a relatively high number of stream miles subject to mapping for flood hazards. The Association of State Floodplain Managers (ASFPM) reports that Oregon has 107,039 total stream miles to address. ASFPM lists only nine states with more stream miles subject to flood hazard mapping, and only one of those states (Alaska) is located within Region X. This highlights the extent of flood hazards across Oregon and the potential scope of updates needed to modernize existing flood hazard maps.

FEMA has embarked on a nationwide program called the Map Modernization initiative to address the mapping problems described above. The objectives for the Map Modernization initiative are listed here and discussed in more details later in this document.

Objective I – Establish and maintain a premier data collection and delivery system.

Objective II – Achieve effective program management

Objective III – Build and maintain mutually beneficial partnerships

Objective IV - Expand and better inform the user community

## **2. Purpose and Scope of Business Plan**

The purpose of this business plan is to present a proposal to FEMA for how the State of Oregon could participate in and further the Map Modernization initiative. The business plan describes potential state contributions to the mapping process and identifies the essentials of a proposed funding and staffing package that is necessary for implementation of the business plan. The state contributions and work proposed in this

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plan are dependent on federal funding and leveraging of partnerships to reduce mapping costs and increase efficiencies.

Oregon's business plan proposes that the Oregon Department of Land Conservation and Development (DLCD) act as the lead agency for the state but work cooperatively with multiple mapping partners to carry out map modernization activities. A funding and staffing package that would allow for state participation is outlined within this business plan. The plan also specifies where FEMA Region X would need to carry out mapping activities directly, by contract, or through local partners. Oregon is not proposing to become a "full" mapping state due to limitations in state capacity that could not be readily overcome even with the proposed funding and staffing package.

This business plan addresses a 5-year period (Federal fiscal years 2005 through 2009). The timeframe for implementation of this business plan would, of course, lengthen if the funding and staffing package proposed herein cannot be achieved. The implementation timeframe would also be extended if FEMA Region X were not sufficiently funded to support state and local government mapping efforts.

### **3. State of Oregon Vision for Supporting Multi-Hazard Flood Map Modernization**

Given the importance of flood hazard mapping to Oregon communities and the state of Oregon and the need for flood hazard maps that are accurate, easy to use, and readily available to all users, DLCD is very encouraged by FEMA's Map Modernization initiative. This business plan reflects the importance of the Map Modernization initiative to Oregon and the current vision for realizing FEMA's map modernization objectives in a reasonable, predictable and cost-effective manner.

DLCD proposes to establish the framework for evaluating and prioritizing the flood map modernization needs of all thirty-six Oregon counties consistently through this business plan. DLCD would lead the state effort to implement the Map Modernization initiative through partnerships with FEMA, other federal agencies as appropriate, key state agencies, and local communities. Partnerships would be used to leverage contributions (e.g. data, labor, etc.) and to produce better maps at a lower cost. These partnerships would also facilitate local community participation in the mapping process at a level that we have not seen in the past. The state will strive to manage the map modernization process to facilitate various floodplain management needs and uses for flood hazard data and maps, while constantly seeking out efficiencies in the development, use and maintenance of flood hazard data. The goal would be to work together across agencies and levels of government to share resources and knowledge related to mapping and map use. This would allow the state to maximize resources at the state level and better ensure that funding for mapping work is distributed across Oregon to assist the maximum number of NFIP communities.

#### **3.1. Overarching State Vision for Map Modernization**

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- Work toward a seamless floodplain layer for the entire state supported by a geospatial database.
- Increase effectiveness and efficiency of the floodplain mapping process.
- Ensure public access, particularly for local governments and state agencies, to the best available data in order to support floodplain management.
- Develop and maintain capacity at the state-level to provide high quality customer service to local mapping partners and FEMA.
- Empower Oregon's NFIP communities to participate in the Map Modernization initiative.
- Produce all maps for Oregon's NFIP communities in Digital Flood Insurance Rate Map (DFIRM) format (with paper option).

## **4. Potential Mapping Partners**

DLCD believes that there is a unique opportunity for having a number of state, local, and federal partners involved in the Map Modernization initiative in Oregon. Key agencies that DLCD anticipates would be key mapping partners are listed below. Additional partners may be identified as map modernization activities move forward:

### **4.1. State Agencies**

Department of Administrative Services (DAS), Geospatial Enterprise Office (GEO)  
Oregon Office of Emergency Management (OEM)  
Department of Forestry (ODF)  
Department of Geology and Mineral Industries (DOGAMI)  
Division of State Lands (DSL)  
Department of Transportation (ODOT)  
Water Resources Department (WRD)  
Other members of the Interagency Hazard Mitigation Team (Appendix B for listing)

### **4.2. Regional and Local**

Oregon Natural Hazards Workgroup – University of Oregon  
Metro Regional Government  
Regional Councils of Governments (Western Oregon)  
County Planning, Building, Public Works, other appropriate departments  
City Planning, Building, Public Works, other appropriate departments

### **4.3. Federal Agencies**

U.S. Army Corps of Engineers  
U.S. Bureau of Land Management  
U.S. Forest Service  
U.S. Geological Survey  
Natural Resource Conservation Service  
Office of Ocean & Coastal Resource Management\*\*

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Coastal Services Center\*\*

\*\* For coastal zone mapping only

## 5. Existing Resources (See also Section 8, Appendices A & B)

### 5.1. State Agency Programs

The Statewide Land Use Planning Program provides an overarching framework for state-local partnerships. State land use regulations also require local land use programs to incorporate natural hazard inventories, policies, and implementing regulations (e.g. floodplain zoning ordinances.). (See also the more detailed discussion of land use authorities, including statewide planning Goal 7 found in Appendix B.)

DLCD's Floodplain/Natural Hazards Program provides assistance to Oregon communities in various ways. One, key program goal is to ensure that Oregon communities remain eligible to participate in the NFIP. Another key goal is to work with FEMA and other parties to provide technical assistance and improved flood hazard information in various forms to Oregon's local governments to facilitate effective floodplain management.

DLCD also administers the Oregon Ocean Coastal Management Program (OCMP), the state's federally-approved coastal zone management program. The OCMP provides planning and technical assistance to local governments within Oregon's coastal zone. The OCMP efforts include a focus on natural hazards management, including but not limited to coastal erosion and flooding.

Oregon's Geospatial Enterprise Office (GEO) assists state agencies with the coordinated development, application, and use of Geographic Information Systems (GIS) technologies and is responsible for the operation of the Oregon Geospatial Data Clearinghouse (OGDC). OGDC provides Oregon agencies with the infrastructure and support staff to distribute and maintain geospatial data for the public consumption. Fundamental to OGDC is the development, distribution and maintenance of statewide base map layers. OGDC has procedures in place and is currently implementing programs that address the creation, maintenance, and distribution of base map layers FEMA requires for the DFIRM product.

Other State Agency Programs: Each of the other, above-listed agencies has certain expertise with natural hazards management, hazards mapping, or specific geospatial data/data applications. DLCD will coordinate with these agencies with the goal of maximizing cooperative and mutually beneficial partnerships with respect to map modernization. As one example, DOGAMI has expertise that would be key for v-zone and landslide modeling and mapping efforts. DOGAMI also would be a source for hazards data that is not currently available in a digital format. As another

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example, DSL has expertise regarding the state's waterways and likely can assist with questions or data regarding those waterways.

### 5.2. Flood Maps

The status of flood maps in Oregon is as follows.

By October 2004, FEMA's Cooperating Technical Partners and National Service Provider (NSP) will complete DFIRMs for the following communities (shown shaded in Figure 2):

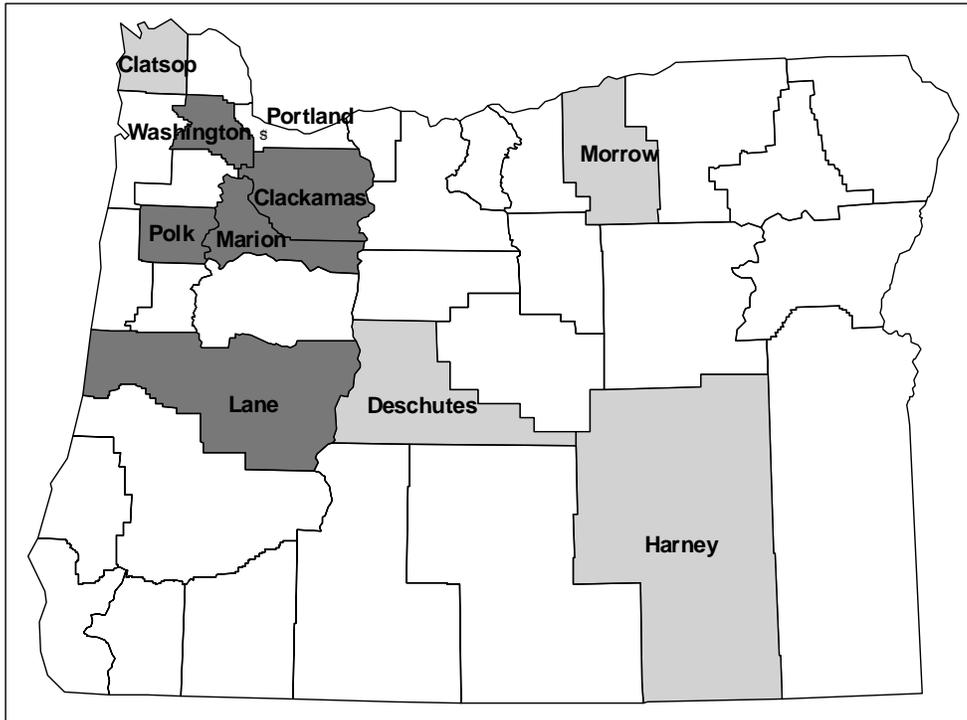
- Clackamas County – limited restudy
- Washington County - restudy
- Lane County – straight conversion
- Marion County – straight conversion
- Polk County - straight conversion
- City of Portland – straight conversion

Work planned for 2005 is as follows (shown shaded in Figure 2):

- Morrow County – limited restudy
- Harney County – New topography/conversion
- Deschutes County – straight conversion
- Clatsop County – limited restudy Seaside, otherwise straight conversion

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**Figure 2 – DFIRM Production By County**

The current, total numbers of FIRM panels by county, either digital or hard copy, are shown in Table 1. Many Oregon communities still only have hard copy maps. (See also Appendix A for more information about existing maps.)

<b>County</b>	<b>Number of FIRM Panels</b>
Baker	38
Benton	45
Clackamas	100
Clatsop	36
Columbia	48
Coos	66
Crook	21
Curry	41
Deschutes	24
Douglas	67
Gilliam	33
Grant	33
Harney	39
Hood River	14
Jackson	203
Jefferson	44

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Josephine	83
Klamath	113
Lake	45
Lane	168
Lincoln	41
Linn	90
Malheur	69
Marion	85
Morrow	80
Multnomah	107
Polk	50
Sherman	27
Tillamook	38
Umatilla	54
Union	93
Wallowa	29
Wasco	47
Washington	182
Wheeler	30
Yamhill	123
<b>Total</b>	<b>2470</b>

*Table 1 - FIRM Panels By County*

Like other coastal states, Oregon's coastal floodplain studies are based on outdated floodplain mapping conducted in 1976-1978. Updates to coastal floodplain mapping have been delayed until new methodology is developed and adopted by FEMA. When the new coastal mapping methodology is available for use, DLCDC will need to reassess priorities and begin to schedule re-mapping in coastal communities. It is likely that some and perhaps all coastal communities will become high priority areas for remapping. FEMA currently anticipates that an updated coastal methodology will be available late in 2004.

### **6. Support of FEMA Map Modernization Objectives**

Oregon's business plan proposal has been developed to support FEMA's objectives for the Map Modernization initiative. The following tasks would support FEMA's objectives and would be accomplished as "CAP-MAP" and/or floodplain mapping project activities as described later in this document.

#### **6.1. Objective I – Establish and maintain a premier data collection and delivery system.**

Oregon strongly believes that to establish and maintain a premier data collection and delivery system the following must be accomplished:

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- New flood maps be developed digitally in a county-wide, seamless format to set specifications
- Flood maps be made accessible to the public via the Internet, thus reducing the need for hard copy flood maps
- Flood maps be available for printing on demand via the Internet for areas needed by any potential user
- Mechanisms be in place to keep floodplain and base map data up-to-date

The state of Oregon, under the leadership of DLCD, proposes the following tasks to address Objective I. These tasks are not listed in sequential order and are likely to be carried out concurrently:

1. Participate in the development and management of data standards for Oregon projects, working with FEMA to promote appropriate product specifications and quality in a way that minimizes the complexity of the standards and assures data and systems are compatible
2. Provide technical assistance to educate and enable local governments and others to create and use digital flood data
3. Develop an inventory of existing digital DFIRM base map data
4. Prioritize the development of digital base map data and make the data available to users
5. Secure necessary permissions from communities or base map sources to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge
6. Identify strategies to motivate local communities and other mapping partners to actively participate in data sharing, development and maintenance
7. Make digital flood map data available to users and stakeholders in the public domain environment of the Oregon Geospatial Data Clearinghouse
8. Lead the community-by-community assessment of flood mapping needs for NFIP communities within the state.
9. Work with FEMA to adopt specific technical standards or processes appropriate for local conditions for flood mapping purposes. Flood-related hazards unique to Oregon and other coastal Pacific Northwest states include coastal erosion, winter storm surges, tsunamis and landslides.
10. Influence the DFIRM development and adoption process to maximize efficiencies, local control, and transparency

### **6.2. Objective II – Achieve effective program management.**

DLCD's intent for program management is not to replace or usurp other state or local programs for natural hazards mapping and management. The intent, instead, is to provide additional capacity at the state-level to coordinate map modernization efforts with such state and local programs while being able to maintain a specific focus on mapping for floodplain management purposes.

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Under the leadership of DLCD, the state proposes to establish the Oregon Map Modernization Coordinating Workgroup. The workgroup would assist DLCD in developing and continually improving program management. The workgroup would help DLCD in efforts to motivate partners to share responsibilities and to work cooperatively to reduce Oregon's vulnerability to flood and other related hazards. The workgroup would consist of appropriate state and local partners and other interested parties. (See also Section 7.2.11.)

The workgroup would specifically assist DLCD with tasks that address Objective II such as:

- Establish Map Modernization performance goals and measures.
- Ensure the completion of the Oregon Map Modernization program by 2009.
- Increase state legislative and local elected officials support for the Map Modernization initiative.
- Reduce the state's cost by developing partners that will develop, contribute, or accept ownership of the data.
- Broaden the management scope from a single hazard focus to a multi-hazard focus whenever possible.

The floodplain mapping organization (see Section 10) proposes in this business plan would provide DLCD with the ability to lead and manage the "CAP-MAP" and other map modernization activities. While DLCD must continue to rely on FEMA for floodplain studies and mapping, the proposed organization should provide sufficient state resources to coordinate activities with communities, perform outreach, conduct mapping needs assessments and participate with FEMA in project-specific scoping and outreach.

GEO provides an important element of the proposed program management by ensuring that base map layers are available and up-to-date. GEO also oversees the operation of the state clearinghouse to distribute geospatial information to users. In addition, GEO is knowledgeable of mapping activities occurring throughout the state and will provide DLCD and FEMA with the assurance that the best available data is being incorporated into flood studies in the most cost effective manner. GEO would also provide guidance to DLCD on data steward responsibilities and other similar functions.

### **6.3. Objective III – Build and maintain mutually beneficial partnerships.**

Developing and maintaining effective partnerships and leveraging resources will be fundamental to the success of Oregon's proposal for participation in the Map Modernization initiative. The state intends to encourage greater and broader community participation in the development and maintenance of the data needed to meet mandates of the NFIP.

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Oregon will foster collaborative approaches to data gathering and distribution to encourage direct management of the data collection, analysis, product delivery and data maintenance at the regional and local level. DLCDC, taking the lead for the State, would address Objective III as follows:

1. Develop strategies for motivating partnerships and partner assumption of responsibilities for mapping activities
2. Enter into an overarching Cooperating Technical Partners (CTP) agreement (FEMA Region X and DLCDC)
3. Promote increased partner involvement through mentoring and assistance that ensures flood-mapping data is reliable, usable, and widely accessible.
4. Increase the number of local governments that will undertake mapping efforts through CTP agreements with FEMA or independently using their own resources.
5. Reflect the importance of partnerships in how the state sets mapping priorities, while allowing for the continued addition of partners and partners' contributions to flood mapping efforts.
6. Identify possible incentives to strengthen partnerships, links, and commonalities to other state and regional programs that could contribute data to the flood mapping process.
7. Address coordination with other flood hazard mitigation efforts, including mitigation planning under the Disaster Mitigation Act of 2000, Oregon Showcase State initiatives, USGS National Map, etc.

### **6.4. Objective IV - Expand and better inform the user community.**

Oregon's outreach program would be aimed at helping to ensure the success of the Map Modernization initiative overall as well as the success of individual community mapping projects. The outreach program would be developed to foster better public and stakeholder understanding of the importance of flood hazard mapping and map modernization. Ideas for outreach are discussed in more detail later in this plan. The primary goals of Oregon's outreach program would be to:

- Communicate the benefits of map modernization to Oregon communities, state agencies, and elected officials
- Maximize stakeholder involvement in and contributions to the map modernization process
- Enhance map accuracy and lower mapping costs by facilitating data sharing
- Minimize formal appeals and protests to map changes
- Ensure the use of best available data and updated flood maps for local and state floodplain management and hazard mitigation efforts

Outreach initiatives led by DLCDC could include:

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1. Identify users and target audiences for specific outreach activities, e.g. local governments, realtors, etc.
2. Implement innovative solutions/mechanisms for the presentation of flood mapping data that are meaningful for various users.
3. Develop/present state/local education efforts for citizens regarding flood hazards, floodplain management, and the importance of map modernization efforts.
4. Develop/present methods to receive, share, and respond to flood mapping product user evaluations/feedback.

## **7. State Participation in Map Modernization**

The state's proposal for involvement in "CAP-MAP" Phase II Activities and FEMA Flood Mapping project activities is described below. "CAP MAP" activities are those that are not linked to specific mapping projects but instead provide overall support to the Map Modernization initiative. Floodplain mapping activities are those activities that occur as part of specific DFIRM conversion or restudy mapping projects. For more information about "CAP-MAP" and mapping project activities, see Sections 7.2 and 7.3 respectively.

The extent to which DLCDC can lead state participation in CAP-MAP and mapping project activities and the timeframe for reaching FEMA's objectives for the Map Modernization initiative are dependent on several key factors. These factors are: adequate federal funding (FEMA Region X and to states), pulling together a stable funding/staffing package at the state-level, and successful creation of intergovernmental partnerships to accomplish map modernization work.

DLCDC expresses in this business plan its intent for supporting FEMA's Map Modernization program. The uncertainty of federal funding for map modernization work and budgetary constraints at the state level make it difficult for DLCDC to be confident about the proposed level of state participation. (See discussion at Section 10.) Nonetheless, we believe that the state's business plan outlines an approach meeting FEMA's overarching objectives for the Map Modernization initiative while providing solid support for mapping efforts in Region X. This business plan proposal leverages existing state programs and infrastructure into the approach for state participation in mapping activities. The approach laid out in this business plan would be a cost effective and efficient approach for both the state and FEMA. In addition, the approach described herein will result in engagement of and quality customer service to Oregon's local governments and other flood map users.

### **7.1. FEMA Cooperating Technical Partners (CTP) Program**

DLCDC, as the lead state agency for map modernization activities, proposes to pursue a CTP agreement with FEMA Region X. The DLCDC-FEMA CTP agreement would establish the overall basis for cooperation and coordination between the state of Oregon and FEMA. This CTP agreement would support the state efforts described in this plan and memorialize DLCDC's commitment to the Map Modernization initiative.

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One of DLCD's "CTP" goals would be to work toward expanding the number of local CTP's within the state to:

- facilitate more efficient floodplain management;
- pool resources and extend the productivity of limited public funds; and
- move ownership of flood map maintenance and distribution to local communities

Oregon communities that are currently CTPs or considering the CTP program include:

- Clean Water Services, Washington County
- Clackamas County Service District #1
- Harney County
- City of Eugene
- City Stanfield
- City of Sutherlin

With a combined DLCD and GEO focused effort, we will identify other likely CTP candidates and encourage them to become participants. DLCD would work with FEMA to direct local CTP candidates to FEMA CTP training.

### 7.2. "CAP MAP" and Related Activities

"CAP MAP" activities would not be linked to specific mapping projects but instead would provide overall support to the Map Modernization initiative. In other words, "CAP-MAP" activities are programmatic activities. Some "CAP-MAP" activities would be conducted prior to specific mapping projects while others would be more or less continuous throughout the implementation period. "CAP-MAP" activities would be supportive of individual mapping projects.

"CAP-MAP" activities are listed in Table 2 along with an indication of the state's interest in leading or otherwise participating in these activities. Each activity is then discussed in turn within this subsection of the business plan.

<b>Activity – Program Administration &amp; Management 25% State Match Required</b>	<b>Initial State Interest*</b> (Y=yes, N=No)
Annual State Business Plan Updates	Y (state lead)
Inventory of Digital Base Map Layers	Y (state lead)
Community Mapping Needs Assessment	Y (state partner)
Outreach (Regarding NFIP/Mapping)	Y (state partner)
Hydrologic and Hydraulic Reviews	N
Information Technology Systems (Maintain/Disseminate Maps)	Y (state lead)

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DFIRM Maintenance (Floodplain/Base Layers, LOMCs)	Y (state lead)
Technical Standards/Process Agreements	Y (state partner)
Other Map Modernization Activities	? (To be determined on as needed basis)

*\*Subject to the availability of federal funds*

**Table 2 – “CAP-MAP” & Related Activities**

## **7.2.1. Annual State Business Plan Updates**

As the community mapping needs assessment process becomes more robust, flood-mapping priorities will change. DLCD will provide FEMA Region X with an updated list of recommended mapping priorities for Oregon on an annual basis. These recommendations will rank potential projects and suggest whether straight FIRM to DFIRM conversions, conversions incorporating better topographic information, or hydrologic/hydraulic restudies are required. DLCD will also enter this updated information into the FEMA MNUSS database on an annual basis.

DLCD will also update this business plan on an annual basis to address developing information about new data sources, state in-kind contributions, and newly emerging or strengthened partnerships with local, state, or federal agencies.

## **7.2.2. Inventory of Digital Base Map Layers for NFIP Communities**

DLCD and DAS-GEO will lead the effort to provide an inventory of base map data meeting FEMA specifications for NFIP communities. The digital base map inventory will be useful during the mapping needs assessment and scoping. DLCD will supplement the information found in the August 2002 *Flood Map Modernization Plan for Oregon* (Appendix A) with additional information obtained from communities through a survey, phone conversations and site visits where necessary. The data layers inventoried will include county and municipal boundaries, publicly owned lands, transportation features, hydrography, benchmarks and geodetic control, topography, and digital orthophotography. In order to determine if the data meets FEMA specifications, the survey will gather information on the scale, attributes, time of last update, aerial coverage, accuracy, coordinate system, and metadata availability for each of the data layers. The communities identified in this plan as mapping priorities will be given a high priority in the survey process. Please see Appendix E for a copy of the survey that will be used to aid in development of the inventory.

## **7.2.3. Community Mapping Needs Assessment**

The purpose of mapping needs assessment is to evaluate whether flood hazard and other data on a community’s existing FIRM maps are adequate for floodplain management purposes and to establish flood-mapping priorities. The flood mapping priorities shown in this business plan (Section 11) are based on

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information contained in the August 2002 *Flood Map Modernization Plan for Oregon* (Appendix A). No further assessment work has been completed to date because DLCD does not currently have the staffing or funding necessary to expand upon the 2002 analysis. (The information collected and assessed previously is described on page 13 of the 2002 plan.)

DLCD views mapping needs assessment as a process that will have to be front-loaded into the implementation period but continually enhanced over the 5-year period as necessary. The assessment process will entail: gathering information from NFIP communities, evaluating that information and analyzing it based on a set of mapping criteria, and providing recommendations to FEMA Region X about mapping priorities for Oregon.

DLCD will develop a systematic approach to assess and document mapping needs information. A tiered assessment process is proposed. Tier 1 will be a general assessment of all Oregon NFIP communities accomplished through surveying. Tier 2 will focus in on those communities that are red-flagged in Tier 1 and will involve more detailed discussions with local floodplain administrators. Tier 3 will include communities investigated in Tier 2 but requiring additional review and documentation of data gaps or other issues done in conjunction with local floodplain administrators.

DLCD will determine key local contacts for providing assessment information from each NFIP community. DLCD will also formulate and use a standard list of questions for discussion with these local contacts. At a minimum, DLCD would investigate:

- Accuracy/adequacy of flood hazard data (for specific flooding sources/areas)
- Accuracy/adequacy of base map information
- Number of stream/shoreline miles mapped and requiring updates/not requiring updates
- Identified changes in local flooding conditions
- Comparison of any recent flood hazard events to the flood hazard information shown on FIRMs
- Significant changes in land use patterns within the watersheds or community
- Potential for future changes in land use patterns
- Noted problems with base flood elevations and 100 year event boundaries shown on FIRMs
- New/altered bridges/culverts, including performance during flood events
- Other factors potentially affecting stream morphology and hydraulics (e.g. flood control projects, stream bank stabilization, etc.)
- Development occurring within Approximate A zones (i.e., areas without established base flood elevations)

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- Changes in jurisdiction boundaries (e.g. annexation of lands into city limits, responsibilities within urban growth boundaries, changes in urban growth boundaries)
- Extent of digital capabilities that are available at the local level

DLCD will analyze the information obtained through the first stage of the needs assessment to develop recommendations on mapping priorities. DLCDC, in cooperation with FEMA, will then develop and employ a list of criteria for prioritizing mapping needs that will be used to rank potential mapping projects.

Like other coastal states, Oregon's coastal floodplain studies are based on outdated floodplain mapping conducted in 1976-1978. Updates to coastal floodplain mapping have been delayed until new methodology is developed and adopted by FEMA. When the new coastal mapping methodology is available for use, DLCDC will need to reassess priorities and begin to schedule re-mapping in coastal communities. It is likely that some and perhaps all coastal communities will become high priority areas for remapping. FEMA currently anticipates that an updated coastal methodology will be available late in 2004.

### **7.2.4. Outreach Program**

DLCD views implementation of an outreach strategy that integrates community outreach into all phases of the FEMA mapping process as critical to the ultimate success of mapping projects. DLCDC in partnership with FEMA, FEMA contractors and other mapping partners must educate community members, local and state officials, and other interested parties about:

- floodplain management in general, including hazard mitigation and floodplain insurance
- the importance of floodplain mapping to communities and the state
- regulatory uses of floodplain maps
- reasons for updating floodplain maps, including the benefits of using digital maps and
- the FEMA mapping process
- the Oregon map modernization program

Outreach must encourage information exchange along a "two-way" street. Therefore, Oregon's outreach strategy also will provide for DLCDC, FEMA, and other mapping partners to obtain information and understand the floodplain hazards and floodplain mapping issues from the standpoint of community members and officials. In this context, community members would include local residents, businesses, insurance agents, representatives of lending institutions, realtors, surveyors/engineers serving the area, special interest groups, local educators, local government staff working outside the planning department, and elected officials. Elected officials would include mayors, city planning

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commission members, city council members, county board members, state legislators, and congressional offices serving the community. Input from community members and officials will be necessary for program success.

DLCD will take the lead for the state on outreach efforts. The state NFIP coordinator and DLCD Map Modernization staff (see Section 9) would lead the outreach efforts. Outreach would be conducted in partnership with GEO, FEMA Region X and other mapping partners. DLCD anticipates that the Oregon Natural Hazards Workgroup (ONHW) in particular would be a key partner in outreach activities. ONHW defines as one of its key functions the coordination of community outreach, workshops, public education and information dissemination with respect to natural hazards. (For more information on ONHW, see <http://darkwing.uoregon.edu/~onhw/>)

Potential outreach activities include:

- Participating in and/or conducting meetings, trainings, or workshops designed to encourage community participation in map modernization and the CTP program.
- Assisting FEMA Region X with the distribution of map modernization materials, such as map modernization publications, mapping guidelines and specifications, mapping procedure manuals, CTP information/draft agreements, etc.
- Responding to community, public, or other requests for technical assistance regarding floodplain mapping.
- Empowering local communities to get involved in the mapping process by:
  - Addressing issues regarding integration of local and state data.
  - Communicating why local governments should provide data for mapping.
  - Providing GIS technical assistance to those communities without GIS resources or specialists.
  - Providing other resources to ensure that local governments can respond to state or FEMA requests for data and involvement in the mapping process.

A key assumption with respect to outreach is that FEMA will produce and make available federal publications that address the Map Modernization initiative. DLCD may need to tailor FEMA products for use in Oregon but is not anticipating a need to produce publications from scratch.

This business plan also recognizes the critical importance of local information technology shops to the success of map modernization. Part of the NFIP community inventory (see Section 7.2.2.) seeks to document local capacities in this regard, and this inventory will inform the local shops support that the state hopes to provide support.

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### 7.2.5. Information Technology Systems (maintain and disseminate flood maps)

The state of Oregon proposes to take the lead on the maintenance and dissemination of flood hazard data and maps. Key goals for the proposed information technology systems are as follows:

- Develop a statewide floodplain coverage supported by a geospatial database that is maintained at the state-level via partnerships among DLCD, DAS-GEO/OGDC, and others.
- Allow the state to distribute flood maps, through web-based printing and from in-house at DLCD's Floodplain/Natural Hazards program.
- Continually incorporate improved base layer data into the geospatial database.
- Routinely incorporate Letters of Map Change (LOMCs) into the system instead of waiting for a new mapping project.
- Work with FEMA and NFIP communities to address digital map use for regulatory purposes.
- Flag changes in base flood elevations and 100-year floodplain boundaries suggested by new, upgraded data.

DLCD is confident that the state of Oregon can reach these goals, if adequate federal funding is provided, due largely to the existence of the GEO and an established state clearinghouse for GIS information. A statewide GIS coordinator located within the Oregon Department of Administrative Services manages the GEO. The DAS coordinator coordinates the GIS activities of all state agencies, local governments, and academic institutions in Oregon.

The GEO works with and staffs the Oregon Geographic Information Council, created by Executive Order and composed of representatives from twenty-two (22) state agencies, four (4) local governments, and two (2) federal agencies. The Council discusses and approves resources and standards for development of shared information and tools that prevent duplication of data and save millions of tax dollars every year.

The Council developed the *Oregon Strategic Plan for Geographic Information Management*, adopted in June 2001. The *Strategic Plan* calls for the establishment of a Framework Implementation Team (FIT) and the design of an inclusive data standards development process. The Framework Implementation Team has been established and is composed of representatives from all levels of government, utilities, academia, and the private sector. The Team has identified and prioritized fourteen (14) primary Framework data themes, containing over one hundred (100) individual data elements. There are Framework Working Groups working concurrently on thirteen (13) of these themes, with over three hundred (300) people in the various groups. Oregon Department of

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Administrative Services, through its GEO, serves as the state of Oregon's coordinating agency for all geospatial activities in state and local governments. The GEO could support DLCDD with map modernization activities in several different ways. They have a staff of GIS specialists and are responsible for the ongoing State Framework data development that includes the base map layers required for a DFIRM.

One of the key components of GEO is the Oregon Geospatial Data Clearinghouse, an Internet library of location/map information that receives approximately 300,000 visitors and 200,000 data downloads each month. The Clearinghouse includes many functions designed to support the Oregon GIS Community:

- Communication mechanisms that help to develop and build a sense of community among the users of GIS technology and geospatial data
- Metadata repository to ensure that all Framework data sets shared by multiple agencies are properly documented according to accepted standards
- Geospatial data access and distribution to ensure the easiest possible access to Framework data needed for decision-making
- Geospatial data archive, coordinated through the Oregon University System library system
- Internet mapping services to enable all users to view and manipulate data holdings without specialized GIS software or knowledge
- Data integration, coordinated through identified data stewards for each Framework dataset

The Oregon Geospatial Data Clearinghouse contains the base map layers required by FEMA and has the infrastructure that is needed for storage and distribution of DFIRMs.

### **7.2.6. DFIRM Maintenance**

The state of Oregon proposes to maintain DFIRMs and the associated geospatial database. The state role in maintenance would be a continual, evolving process. The state's intent is to manage the maintenance process such that FEMA's involvement is minimized over time. However, notification to FEMA would always be provided to address any updates that indicate problems with established base flood elevations. The state would also work with NFIP communities to develop local capacity for DFIRM maintenance.

The DAS GIS Coordinator identifies funding mechanisms that pass state and federal funds through local governments and state agencies to develop standardized data and to establish ongoing maintenance agreements that ensure a steady stream of updated data. Collaboration among the entire enterprise of government in Oregon makes this possible. The appropriate data steward(s) is identified as part of the collaborative process of data development. Many

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agencies at all levels of government and the private sector may be Framework data contributors, adhering to agreed upon standards in exchange for financial and other incentives.

### 7.2.7. Base Layers

Oregon’s Geographic Data Framework is comprised of 13 data themes as shown in the table below and includes the key base map layers required by FEMA. The Oregon Geographic Data Framework will help data producers locate their information in its correct position and provide a means of integrating this information with other geospatial data. Benefits from the development of a statewide geographic data Framework include reduced expenditures for data, increased ease of obtaining and using data collected by others, accelerated development of critical applications, increased number of customers for data products linked to the Framework, and improved recognition of programs. All existing, statewide data layers at OGDC conform to state of Oregon projection standards.

<b>Data Theme</b>	<b>Data Steward</b>	<b>Required by FEMA</b>
Hydrography	OWRD	●
Transportation	ODOT	●
Geodetic Control	BLM	●
Land Cover/Use	OSU	
Bioscience	OWEB	
Elevation	ODF	
Geoscience	DOGAMI	
Orthoimagery	OGDC	●
Ownership	DOR	
Political Boundaries	OGDC	●
Hazards	OSU	
Utilities	OGDC	
Climate	OSU	

**Table 3 – Oregon Geographic Data Framework Layers**

Table 4 lists the additional base map layers required by FEMA that are not currently part of the Oregon Geographic Framework. As shown in the table below, the required data is attainable and will be installed on the OGDC system as necessary.

<b>Data Layer</b>	<b>Status</b>
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Bench Marks/ Control Points	Control points being developed for statewide tax lot layer, additional data will be acquired from governmental agencies as needed
Public Land Survey	Data will be acquired from Bureau of Land Management's Geographic Coordinate Data Base as needed
US Geol. Survey 7½ Quadrangles	Some data is available and on file at OGDC, other data will be required as needed

**Table 4 – Status of Additional Layers Required by FEMA**

One of the most important tasks in developing a geographic data Framework for Oregon is to develop data standards for the various data themes that are most commonly needed and shared by users. When data standards are clearly defined, useful data can and will be developed and shared by multiple data producers and users across the state.

Ongoing maintenance of these data sets to ensure their continued availability for all agencies and organizations is critical to prevent the loss of the initial investment. GEO provides the leadership to provide for continuous maintenance and is currently recruiting and training data stewards. The data steward is most often an identified state or federal agency that has agreed to modify internal business processes to produce an integrated Framework data set by incorporating contributions from data producers into a centralized data model. Constant integration by the data steward of updated Framework data from local, state, and federal data contributors is an essential component of the Framework process.

The state understands that there may be additional data conversion efforts required for FEMA or other mapping participants to be able to use geographic data framework layers developed and maintained in OGDC. The state will work with data providers and FEMA to address any issues associated with different data projections, datums, units of measurement, or data conversions.

### **7.2.8. Floodplain Layer**

DLCD would be the state's designated data steward for the floodplain layer. GEO would help establish DLCD as the data steward. Data stewards receive or collect data from various, often widely distributed sources, such as local and regional governments, universities, state agencies, and federal agencies. They ensure that the data from these various data providers have been created in adherence with existing and applicable state and federal data content standards. They perform quality control procedures on the data to ensure that the data is accurate, complete, and consistent and that all appropriate metadata documentation accompanies each data submission. The data steward develops and maintains a close working relationship with the various data providers. This relationship is formalized with at least a memorandum of understanding, and in

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some cases requires an interagency agreement or contract when payment is involved. Data stewards use available and authoritative Framework data as a reference or base map for integrating the various data submissions. This integration follows agreed upon procedures that make the resulting statewide data set useful for all government agencies, including the original data providers.

GEO will work with DLCD to assist them in becoming a data steward for floodplain data and maps. To the extent necessary, GEO will work with DLCD staff to redirect resources and modify internal business processes to accommodate the data stewardship role. GEO has the technical expertise to assist DLCD with incorporating the appropriate technology in to the agency to accomplish the stewardship tasks, including data integration of standardized data provided by local governments, re-projection of that data to match all other Framework data sets, etc. GEO will further assist DLCD in drafting and implementing agreements with all data providers to ensure a continuous flow of data to the data steward and to ensure that properly formatted metadata accompanies each submittal of data from each data provider. GEO will provide DLCD access to all necessary Framework data from the Clearinghouse to form the base for integration of the locally provided floodplain data and updates. GEO will also provide technical assistance to DLCD staff as needed to assist with issues and problems as they arise related to data integration and the stewardship role. The Clearinghouse is available to serve as the repository of the statewide floodplain data and will make that data accessible to all government agencies and the public.

### **7.2.9. Letters of Map Change (LOMCs)**

A critical part of DFIRM maintenance is incorporating LOMC revisions to floodplain maps and records with the aim to eliminate the current problem that communities and DLCD have in tracking LOMCs. DLCD's vision is to incorporate approved LOMCs onto the DFIRM as soon as possible after the change is approved. We intend to revise the DFIRM such that the excluded area is visible digitally. If FEMA requires linking the LOMC records to the map, even if the LOMC is visibly excluded from the floodplain, we will provide the link so the LOMC data can be brought onto the screen by clicking on the excluded area. Our approach installs all the information on the digital map needed to determine if a property requires flood insurance and eliminates the need to refer to the hard copy LOMCs.

The LOMC process needs to be enhanced by FEMA to facilitate incorporating changes onto the DFIRM map and records. Additional information such as the coordinates of the center of the property, the parcel boundaries and elevation of the property is needed in order to update DFIRMs and to eliminate the need to refer to hard copy LOMCs. DLCD will work with FEMA to test the approach for incorporating LOMC revisions on DFIRM maps and records.

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The state is currently working on a project to digitize tax lot data across the state. This tax lot data would facilitate work to incorporate LOMCs into DFIRMs.

### **7.2.10. Technical Standard/Process Agreements**

DLCD and its mapping partners will likely run into situations where full adherence to FEMA guidelines and specifications for base layer data or certain steps in FEMA's standard mapping process would neither be cost effective nor otherwise justified based on local flood risks. In such cases, DLCD would work with FEMA Region X, affected communities, and other mapping partners to develop agreements on appropriate standards and process steps. The state expects any such agreements to be carried forward to specific mapping projects.

DLCD will also strive to work with FEMA and other mapping partners to develop agreements on how to address local conditions and unique hazards. This could include coastal erosion, winter storm surges, tsunamis, and landslides.

### **7.2.11. Other Map Modernization Activities**

As discussed in Section 6.2, DLCD proposes to establish a Map Modernization Coordinating Workgroup to provide a high-level structure to ensure effective program management. The primary activities of the workgroup would include:

- Develop a 5-year plan, updated annually, for bringing all Oregon NFIP Community maps into the digital format
- Assist DLCD with performance goals and measures for map modernization
- Set priorities for mapping projects based on the results of the community mapping needs assessment
- Identify roles and responsibilities for all entities contributing to map modernization
- Monitor and track progress of mapping projects and partner contributions to mapping projects
- Evaluate overall DLCD/program performance and recommend improvements
- Propose training for local governments about the FEMA mapping process emphasizing the benefits of local government contributions, ownership of data, and approval of final maps within a timely manner
- Encourage communication across governmental agencies related to floodplain management issues

## **7.3. Floodplain Mapping Activities**

Floodplain mapping activities are those activities that occur as part of specific DFIRM conversion or restudy mapping projects. (A straight DFIRM conversion is where the existing FEMA floodplain boundaries and base flood elevations are not re-examined or altered but the paper map is converted to digital format. A restudy

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involves gathering updated hydraulic and hydrologic information to assess the accuracy of floodplain boundaries and base flood elevations, with necessary map changes made and reflected in the digital map.) These activities would occur after or concurrent with the “CAP-MAP” activities discussed previously.

At this time, DLCD does not envision the state of Oregon being able to acquire sufficient technical engineering staff to perform all flood mapping studies or to administer all flood mapping contracts at the state level. State budgetary and organizational constraints preclude DLCD from recommending that the state of Oregon become a “full” mapping state. DLCD views the funding and staffing package that would be required for Oregon to be a full mapping partner as highly unrealistic. Instead, DLCD is proposing that floodplain-mapping activities specific to individual mapping projects will generally need to be conducted by FEMA, a FEMA study contractor, or a local CTP.

The DOGAMI has expressed interest in possibly conducting or overseeing certain flood mapping projects, particularly for coastal areas. The possibilities for DOGAMI involvement need to be discussed further by DLCD, DOGAMI, and FEMA. DOGAMI should be given the opportunity to actively participate in specific mapping projects, acting as a direct “contractor” to FEMA, where there is potential to draw upon that Department’s expertise and realize efficiencies in the mapping process. Alternatively, DLCD could work with FEMA and DOGAMI to further address a DOGAMI roll in specific mapping projects in an annual update to this business plan.

Notwithstanding the above, DLCD can foresee having limited ability to participate in specific mapping projects as follows.

### **7.3.1. Project Scoping**

DLCD could develop the capacity to participate in the scoping process for individual mapping projects as a full partner along with FEMA and FEMA Study Contractors. DLCD also welcomes GEO participation in the scoping because of their knowledge of existing base map data availability throughout the state and their capability to help determine the most cost effective approach to acquiring suitable topography data. And DLCD will encourage other state agencies to be involved with project scoping, specifically to determine if any state agency has data, technical expertise, or staff time to participate in mapping.

The state’s proposed level of participation in scoping is as follows:

- Participate in FEMA’s initial contact with the community once a decision to move forward with a mapping project has been made
- Be a member of the project management team; work with FEMA and the community to identify other members for the management team (This could include other state agencies that want to participate in specific projects.)
- Encourage community participation as a CTP where appropriate

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- Contact/meet with the community to discuss and plan for community outreach, including how to incorporate public input into the project
- Participate as needed in the community's more detailed data needs assessment, specifically identifying data that can be transferred without change, data that must be updated, available data, data gaps, and how to merge state/local data
- Work with the community and FEMA on assignment of project tasks, including determination of capabilities of various partners to perform tasks and the need for contracts/other agreements to accomplish tasks
- Ensure that technical standards/process agreements are carried forward into mapping projects to ensure that state and local knowledge is utilized to the maximum extent

### 7.3.2. Project Outreach

DLCD also anticipates that the general outreach activities proposed under the CAP-MAP section could blend with and support outreach conducted as part of specific mapping projects. DLCD may also be able to participate in project-specific outreach as follows:

- Work with FEMA and local mapping partners to identify community audiences and determine outreach needs/methods appropriate for those audiences
- Provide input to FEMA and local mapping partners regarding proposed outreach strategies and schedules
- Participate in outreach meetings conducted by FEMA and local mapping partners when feasible (dependent on staffing/workload/travel budget constraints)

## 8. State Contributions To Map Modernization

The state of Oregon has significant, in-kind contributions that it can provide relative to the Map Modernization initiative, particularly with respect to FEMA's objective to "establish and maintain a premier data collection and delivery system." In-kind contributions would include data, other technical resources, and staff time of state employees in various agencies. DLCD has not attempted as part of business plan development to determine exact fiscal values for state in-kind contributions. This decision was partially based on time constraints set by FEMA for development of the business plan. But more importantly, DLCD believes that determination of in-kind contributions is a process that should be conducted openly and cooperatively with FEMA Region X and other state agencies. One source of guidance on in-kind contributions is "Estimating the Value of Partner Contributions to Flood Mapping Projects: A "Blue Book" by FEMA, October 2002. DLCD and FEMA will also need to assess local and regional pricing factors. Also, DLCD expects to identify additional in-kind contributions as coordination efforts with other state agencies continue.

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As described previously, the DAS GEO developed and operates the Oregon Geospatial Data Clearinghouse (OGDC) that serves as the state's geospatial data repository and delivery system. OGDC is well established as the source for geospatial data in the state of Oregon. The OGDC was designed to readily incorporate various agency applications, such as storing and distributing NFIP floodplain mapping information. GEO also leads Oregon's State Framework Program. The Framework Program produces various statewide base map layers, including the layers required for DFIRMs. Oregon can contribute base map layers that meet or exceed FEMA base map specifications.

Maintenance of the base map layers and of floodplain maps is another important in-kind contribution of GEO. GEO is providing the leadership to establish procedures that will ensure base map layers and floodplain maps are kept up-to-date. GEO aims to develop agreements with state agencies, such as ODOT for transportation data, the Department of Water Resources for hydrology and DLCD for floodplain maps, that outline data stewards responsibilities for the agencies' respective datasets. In addition to negotiating the data steward agreements, GEO provides agencies the training in GIS procedures and tools necessary to become data stewards.

Lastly, GEO participation in mapping need assessments, scoping and outreach activities will reduce the time and effort required of FEMA Study Contractors to determine the availability and suitability of data needed for flood studies. GEO has comprehensive knowledge of ongoing state, local and federal government mapping and data acquisition activities throughout Oregon and has the authority and opportunities to develop cost sharing agreements across a wide range of partners. GEO knowledge of existing data and planned data acquisitions will be especially helpful in developing cost effective approaches for new topography data.

Numerous other state agencies (See Section 5.1) have certain expertise with natural hazards management, hazards mapping, or specific geospatial data/data applications. DLCD will coordinate with these agencies with the goal of maximizing cooperative and mutually beneficial partnerships with respect to map modernization. The Department anticipates that additional, in-kind contributions will result from these partnerships with other state agencies. DLCD will keep FEMA Region X informed of these developing partnerships and involve FEMA in discussions with other state agencies as necessary.

### **9. State Resource/Staffing Needs, Justification for Future Funding Requests**

DLCD supports the need for flood hazard maps that are accurate, easy to use, and readily available to all users. However, the Department does not currently have an organization dedicated or available to support the FEMA Map Modernization Program. At present, DLCD receives annual FEMA funding under the Community Assistance Program-State Support Services Element (CAP-SSSE) program. The CAP-SSSE funding supports DLCD's work as Oregon's NFIP coordinating agency but is not sufficient to also support the needed Map Modernization work. The CAP-SSSE funding has historically covered salary costs of the NFIP coordinator, basic technical assistance and outreach efforts, and the occasional small, special project. If the NFIP coordinator were to focus on Map

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Modernization, then fundamental tasks such as community assistance visits and contacts, publication of newsletters, training sessions for NFIP participants, local ordinance review and assistance, and other important NFIP tasks could not be accomplished by DLCD.

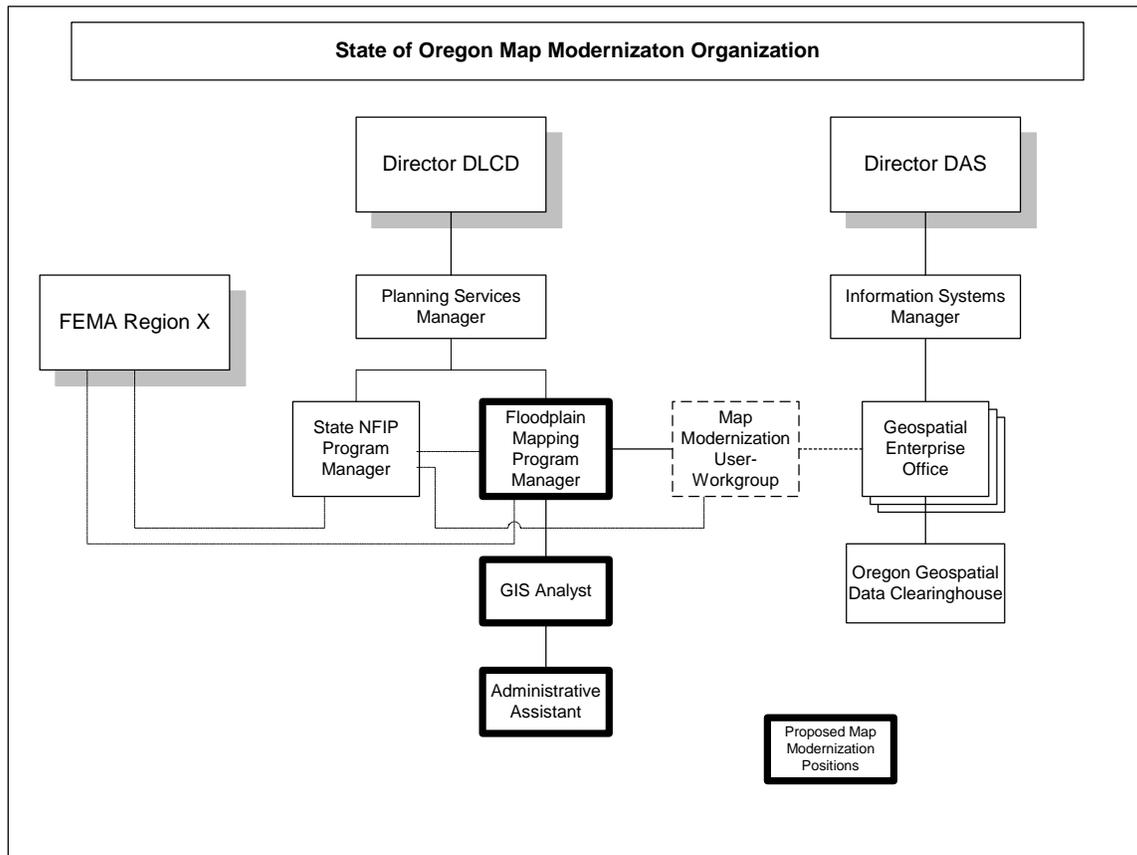
DLCD is proposing a minimal organization to:

- conduct “CAP-MAP” activities,
- ensure limited participation in mapping projects (i.e., scoping, outreach),
- maintain floodplain data and maps

The following organizational chart shows DLCD’s anticipated staffing needs for supporting the Map Modernization initiative. Again, these are minimum estimates. The Department may need to adjust resource and staffing estimates as it becomes more familiar with map modernization work or should the state involvement in specific mapping projects increase (See also Section 7.3).

The organization chart shows the proposed location of the new Map Modernization positions within the Department and how the new positions would relate to the existing NFIP coordinator position. (A DLCD organization chart is found as Appendix D.) The map modernization positions would be placed in the same division as the NFIP coordinator allowing for close coordination between CAP-SSSE funded work and map modernization activities. The proposed organization would allow DLCD to closely link efforts such as community needs assessment, public outreach, and local ordinance review and assistance.

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**Figure 3 – State of Oregon Map Modernization Organization**

**Staffing:** Staff costs for the proposed map modernization organization are estimated as follows [state salary range/class title], all being 1 Full Time Equivalent (FTE):

- Flood. Map. Program Manager [31 I/IS 7]: 7,527/month salary & OPE = 90,324/year
- GIS Analyst [28 I/IS 5]: 6,675/month salary & OPE = 80,100/year
- Administrative Assistant [17/AS 1]: 3,965/month salary & OPE = 47,580/year

The above FTE costs are based upon the specific state job classifications potentially appropriate for the needed Map Modernization FTE. Final decisions on appropriate classifications will be made dependent on the work tasks ultimately assigned. Salary rates listed here are based on DLCDC's labor contract for the 03-05 biennium; salary rates could change in the future. OPE (Other Payroll Expense) costs, which apply to permanent or limited duration positions, are estimated here using the statewide OPE average of 42% of salary.

**Travel:** Travel costs for the floodplain mapping program manager and GIS analyst are also estimated below. DLCDC assumes that map modernization staff will need to visit local communities prior to and during mapping projects. Outreach efforts would also involve travel around the state. Travel costs are estimated based on current rates and

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experience from past years under the CAP-SSSE program. Vehicle, per diem and lodging allowances could, of course, increase within the implementation period.

Training: A modest training budget has been included in the table below. This is to cover training that will be needed by DLCD map modernization staff. DLCD may need to ultimately increase the training budget to cover local training costs. DLCD would need to determine through community needs assessment and other efforts just how much training NFIP communities need to participate effectively in map modernization activities.

Hardware/Software: DLCD currently does not have the GIS software and hardware required to work with floodplain maps and has no surplus computer capability. Therefore, the map modernization staff will need to be supplied with GIS software and GIS workstations. A laptop computer and projector are needed in order to conduct outreach activities.

Indirect: The proposed budget also accounts for various indirect costs associated with the proposed map modernization organization.

Tables 5 and 6 summarize the minimum needs and estimated costs of the proposed state organization for supporting the Map Modernization initiative. Total costs are given; DLCD understands that FEMA “CAP-MAP” funds will likely require a 75/25% cost share. All cost figures, except hardware/software, are listed on an annual basis. Costs for hardware and software are projected as a one-time expense. Costs are given in 2004 dollars.

Item	Description	Cost
DLCD Staffing*	3 FTE's	\$218,000/year
Travel	Program Manager GIS Analyst	7,000/year
Training	NFIP-related Training GIS-related Training	\$1,500/year \$2,100/year
Hardware	2 Workstations 1 Laptop Computer Projector	\$3,000 year 1 \$3,000 year 1 \$1,500 year 1
Software	GIS (ArcGIS 8.x – ArcInfo) Office SW	\$7,100 year 1
Indirect	Phone, fax, photocopy, mail charges, office space, services/supplies, etc.	\$12,000/year

*\*DLCD believes that there may be a need for an additional, limited duration GIS analyst (IS 5) during the first and second years of implementation. This would add \$80,100/year to the minimum FTE costs shown above for a total of \$298,100/year for years 1 and 2.*

**Table 5 – Staffing/Resource Needs Summary**

## Mapping Plan for Oregon

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<b>YEAR</b>	<b>2 GIS Analysts (Years 1 &amp; 2)</b>	<b>1 GIS Analyst (Year 1 &amp; 2)</b>
1	335,300	255,200
2	320,700	240,600
3	240,600	240,600
4	240,600	240,600
5	240,600	240,600
TOTALS:	1,377,800	1,217,600

**Table 6 –Summary of Map Modernization Organization Costs for 5-Year Implementation**

### **10. Business Risk Factors/Requirements for Success**

Participation in FEMA’s Map Modernization initiative raises numerous budget issues for DLCD. Section 9 identifies the minimum anticipated FTE and other costs for the state to actively participate in the Map Modernization initiative. Additional federal funding will be required for the state to effectively participate in the Map Modernization initiative. This section describes budget process issues, including challenges that may be faced by DLCD in applying for and accepting federal funds and obtaining state dollars (if needed above and beyond in-kind contributions) and FTE.

One clear challenge has been the need to prepare this business plan without knowing the short- or long-term potential for federal funding and other federal support for the Map Modernization initiative. DLCD does not know the likely amount of federal funding available to the state or what other forms of support will be available under FEMA’s Map Modernization initiative. The state’s role in the Map Modernization initiative and the timeframe for achieving project objectives could increase or decrease depending on the level of funding and other support ultimately provided by FEMA. Therefore, this business plan will need to be re-evaluated when FEMA provides additional guidance regarding these issues.

Another challenge is to ensure that DLCD has the necessary budget authority to apply for and accept federal funds and to secure necessary FTE or state dollars. To explain these potential budget challenges, a brief explanation of the state budget process is required. The state budget covers two fiscal years (a biennium). A biennium runs from July 1 of an odd-numbered year to June 30 of the next odd-numbered year. For example, the 03-05 and 05-07 bienniums run from July 1, 2003 to June 30, 2005 and July 1, 2005 to June 30, 2007, respectively. The state’s budget development process has the following phases: Agency Request, Governor’s Recommended, Legislatively Adopted, and Legislatively Approved budgets. DLCD begins the budget development process in the spring of even-numbered years. For example, the Department will begin work on the 05-07 budget in April 2004.

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Changes to DLCD's Legislatively Adopted Budget can be made through two mechanisms during a biennium. The Oregon Emergency Board, a legislative body, can, at the request of the Governor, DLCD, or others, make some changes to the budget between legislative sessions. The Department's budget could also be changed during a special legislative session called by the Governor or Legislative leadership.

DLCD's approved budget defines how much money the Department has to expend over the biennium and how that money is to be expended. For example, the approved budget identifies funding sources, program budgets, and sets personnel (i.e. FTE) as well as expenditure limitations for the Department.

In order to apply for and accept additional federal funds and to secure necessary state dollars and FTE authority, DLCD will need to address the following budget issues:

- 1) Obtain legislative authority to apply for federal funds
- 2) Obtain sufficient expenditure limitation and authority to accept additional federal funds.
- 3) Obtain legislative authority to establish new "Map Modernization" positions and/or investigate limited duration positions.
- 4) Seek any state dollars needed to achieve sufficient state match
- 5) Educate the Governor's office and Oregon Legislature about the Map Modernization initiative, with emphasis on anticipated benefits for Oregon and its NFIP communities.

*Budget Issue 1) and 2):* DLCD's Legislatively Approved Budget for the 03-05 biennium does not provide the Department with sufficient expenditure limitation to accept additional FEMA funds for Map Modernization. Furthermore, the budget does not specifically authorize the Department to participate in the implementation of FEMA's Map Modernization initiative. Depending on FEMA's timing for Map Modernization funding and other variables, DLCD will need to determine which of the following three options is appropriate:

- *Option A: DLCD Request to the Oregon Emergency Board (E-Board) To Apply For and Accept Federal Funds*  
DLCD would develop a written proposal for consideration by the E-Board. The proposal would need to address at a minimum: (1) staff needs, (2) funding source, (3) funding/position duration, and (4) purpose. DLCD would then ask to be placed on the E-Board schedule and would present the proposal at the allotted time. Note that this option will be the only available option if application for federal map modernization funds is required during the 03-05 biennium. The Department would first need to obtain E-Board approval to apply for the new federal funds and then would need to go back to the E-Board for approval to accept any new federal funds offered by FEMA and establish new FTE.
- *Option B: DLCD Policy Package in Agency Request Budget for 05-07 Biennium*

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DLCD has already prepared a placeholder policy package for consideration by the Governor's office and DAS. The package will be updated as necessary during the budget development process. The package addresses: (1) what is proposed, (2) what would be accomplished if the proposal were funded, (3) how the work would be accomplished, (4) what resources would be needed, and (5) why the proposal is a priority for the Department. DLCD would need to request that the policy package be carried forward into the Governor's Recommended Budget. If the policy package were then placed in the Governor's Recommended Budget, DLCD would work with the Governor's office and key legislative contacts to support the package throughout the legislative budget process.

- *Option C: Combination of DLCD E-Board Request and Policy Package*  
The Department may need to look at a combination of an E-Board Request and budget policy package. The E-Board request may be necessary to pursue federal funds available during the 03-05 biennium and the budget policy package to address longer-term funding for the Map Modernization Initiative.

A key point that applies to all three budget options is the need for DLCD to have sufficient time to work through the budget process. FEMA must provide sufficient notice about funding opportunities. Should FEMA not provide sufficient notice, then DLCD may be forced to forgo the opportunity to apply for or otherwise capitalize on federal funding. The inability to apply for or accept federal funds would jeopardize implementation of the Map Modernization initiative within Oregon. In addition, if FEMA funding opportunities change unexpectedly (e.g., increased funding or new requirements), then DLCD may not have sufficient time to address such changes through the necessary budget process(es).

*Budget Issue 3) and 4):* Neither DLCD nor key state agency partners have sufficient FTE at this time to implement this business plan. In association with the federal funding issues discussed under Budget Issue 1) and 2), DLCD would need to pursue legislative authority to create new, permanent positions and then would need to retain personnel to work on the Map Modernization initiative. DLCD would also need to work with FEMA to determine the fiscal value of state in-kind contributions so that the Department can determine if state dollars must be requested to cover match requirements.

*Budget Issue 5):* Education of the Governor's office and key legislators is essential if DLCD is to find success obtaining the legislative approvals needed to implement this business plan. DLCD will develop a strategy for the timing and content of educational contacts with Oregon's executive and legislative leadership. However, DLCD finds that it is difficult to have effective conversations at these levels when so little is known about future FEMA funding or other federal support for the Map Modernization initiative.

### **11. Flood Mapping Priorities**

We know from experience that priorities are very dynamic and will change over time. Also, DLCD intends to complete a more rigorous mapping needs assessment to ensure

## Mapping Plan for Oregon

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that priorities accurately reflect the needs of the state and NFIP communities (See Section 7.2.3). The following criteria for establishing flood-mapping priorities are a compilation of FEMA's "Atlanta" factors and DLCD experience gained from community assistance visits and outreach activities:

- High population density
- History of repetitive losses/flood claims/flood disaster
- High growth areas
- Relative NFIP policy base
- Age of FEMA flood hazard maps
- Number of stream/shoreline miles
- Ability to leverage other federal, state, and local agency work
- Availability of cost sharing with state and regional/local entities
- Congressional mandate
- Community willingness and readiness to participate
- Large or increasing number of LOMC's
- Findings of Community Assistance Visits

Priorities for Map Modernization activities are shown in the Table 7. This table is based upon the data documented in the August 2002 *Flood Map Modernization Plan for Oregon* (Appendix A). Due to time and resource constraints, DLCD was not able to conduct any further needs assessment as part of business plan development. High priority projects identified in the 2002 plan but already completed or underway are not listed here. These are listed in alphabetical order by county name; the order does not reflect a ranking of priorities.

As stated previously, updates to coastal floodplain mapping have been delayed until new methodology is developed and adopted by FEMA. When the new coastal mapping methodology is available for use, DLCD will need to reassess priorities and begin to schedule re-mapping in coastal communities. It is likely that some and perhaps all coastal communities will be placed high on the priority list for remapping. FEMA currently anticipates that an updated coastal methodology will be available late in 2004.

<b>Oregon Floodplain Mapping Priorities*</b>	
Clackamas County (Damascus)	unmapped community
Clatsop County	restudy coastal v-zones+
Coos County	conversion inland, restudy coastal v-zones+
Curry County	conversion inland, restudy coastal v-zones+
Douglas County	limited restudy, (include coastal v-zones)+
Gilliam County	conversion
Jackson County	combination conversion/restudy
Josephine County	conversion
Lane County (Eugene area)	limited restudy
Lane County (Springfield area)	limited restudy (McKenzie area)

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Lincoln County	conversion inland, restudy coastal v-zones+
Marion County	limited restudy
Morrow County	combination conversion/restudy
Multnomah County	combination conversion/restudy
Sherman County	conversion
Tillamook County	conversion inland, restudy coastal v-zones+
Umatilla County	combination conversion/restudy
Union County	combination conversion/restudy
Wallowa County	conversion
Washington County (Banks)	unmapped community
Yamhill County	conversion
+Pending completion of updated coastal mapping methodology for Pacific	

*\*DLCD will need to update this priority list after more detailed mapping needs assessment work has been completed.*

### **Table 7 - Oregon Floodplain Mapping Priorities**

DLCD anticipates a need to review the priority list on an annual basis to account for changing circumstances and new information. Possible steps for updating the priority list are:

- Obtain updated information, where applicable, on population, growth, other basic land use data needed to assess criteria
- Come to agreement with FEMA and affected communities about flood prone areas that already have sufficient source materials, or that will not be re-studied
- Identify flood prone areas near and within municipalities and other population concentrations and determine with FEMA and affected communities which specific areas require detailed floodplain mapping
- Identify any other flood prone areas outside municipalities and other population concentrations and determine with FEMA and affected communities which of these areas may, for reasons besides population, require detailed floodplain mapping
- Estimate the costs of utilizing the existing source material
- Using appropriate unit costs, estimate the cost of detailed mapping for all of the initially identified detailed study areas
- Identify all remaining flood prone areas to be studied, apply appropriate unit costs for less than detailed floodplain mapping, and add those estimated costs to the estimated costs for detailed mapping

**APPENDIX A**

**2002 FLOOD MAP MODERNIZATION PLAN FOR  
OREGON**

## Flood Map Modernization Plan for Oregon

### FEMA Flood Map Modernization

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**August 2002**

## Acknowledgments

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## Executive Summary

Updates of the Federal Emergency Management Agency's (FEMA's) floodplain maps are proposed in the President's Fiscal Year (FY) 2003 budget. FEMA is calling on individual states to identify how they would implement flood map updates. This plan addresses the state of Oregon's role in updating maps, the need for updates based on current flood map information and how states propose to produce these maps. This plan outlines the State of Oregon's strategy for flood map modernization.

The State of Oregon would like to take a "mid-level participation" role in the flood map modernization. The state is capable of coordinating the majority of the needs assessments and assisting with outreach and community coordination on mapping projects. The University of Oregon's InfoGraphics Lab and Natural Hazards Workgroup may play a role in this. If additional resources are provided for state, Oregon may have the capacity to manage some flood mapping projects however, the state will not conduct flood studies or produce the new flood maps. These activities will continue to be conducted by FEMA's mapping contractors and others with experience in conducting flood studies and producing digital map products.

According to the initial needs assessment conducted by the State of Oregon Department of Land Conservation (DLCD), the State's lead agency on map modernization, a few counties stood out as having a particularly high priority needs for map updates. Clackamas County is identified as having the greatest need according to a variety of analyzed categories surrounding relating to the status of existing maps, community size and development as well as flood issues and past flood history. The level of map upgrade in Clackamas County is suggested as a mix of Level 1 and 2 (less detailed and more detailed studies). Other counties proposed for immediate map updates include Gilliam, Sherman and Yamhill for countywide Level 1 updates, and Douglas, Jackson, Morrow, Multnomah, Umatilla and Union for combined Level 1 and Level 2 updates. Level 1 studies will also be done in a number of Counties where new base map information is available. In addition to these priorities, the state has identified flood-related hazards that are specific to Oregon and the Pacific Northwest that should be considered as part of the mapping effort.

In terms of map production, the state of Oregon proposes that FEMA spearhead the efforts to produce the flood maps. The state would however be willing to help coordinate and scope the work to be done for map production.

# Mapping Plan for Oregon

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**Oregon will meet help FEMA meet the GPRRA goals by:**

- **reducing the average age of the state's flood maps from 14.6 years to 11.0 in the first year of the project;**
- digitizing maps for eight (8) counties in the first year; and
- mapping one of the state's two remaining unmapped floodprone communities.

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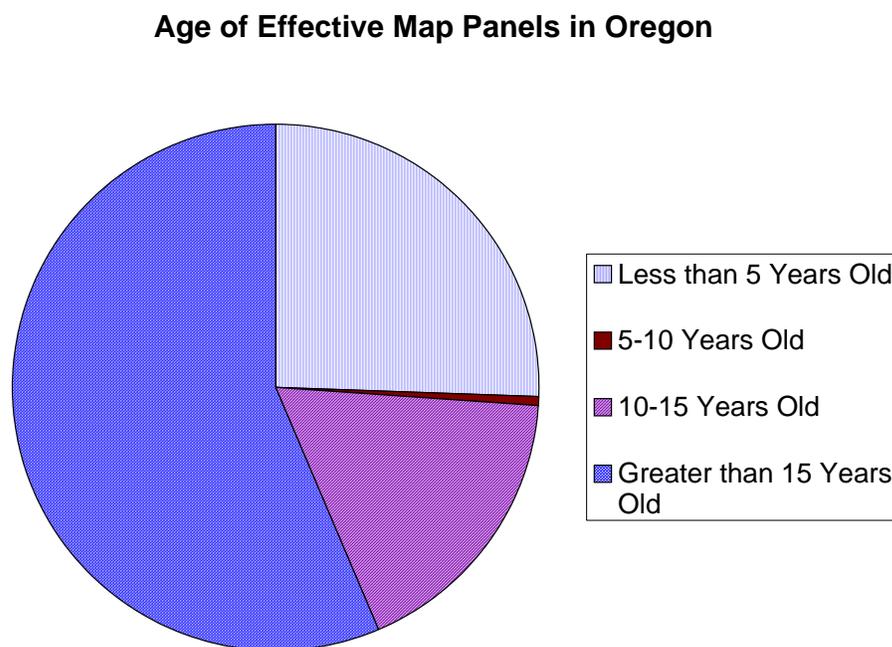
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## ATTACHMENT - OREGON MAPPING PLAN SPREADSHEET (BAKER)

## Background and Purpose of Oregon's Mapping Plan

The Federal Emergency Management Agency's (FEMA's) flood hazard maps are one of the essential tools for flood hazard mitigation in Oregon and in the United State in general.

**Figure 1 - Age of Oregon's Flood Map Panels**



Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002

In many cases, the older maps reflect outdated flood hazard information that limits their utility for insurance and floodplain management purposes. Additionally, most of the maps were prepared using now outdated road network information and manual cartographic techniques, which make the maps difficult for State and local customers to use and expensive for FEMA and the state of Oregon to maintain. In addition, FEMA has not produced flood maps for three of Oregon's floodprone communities.

The State of Oregon is committed to working with FEMA to update flood maps. As seen in Figure 1, the majority of Oregon's maps are more than 15 years old. Many maps were originally produced in the early 1980s. Since then, Oregon's population has increased significantly, particularly in the floodprone Willamette Valley and in some coastal communities. The state suffered significant flood losses in 1996 and 1997 when 27 of the

## Mapping Plan for Oregon

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state's 36 counties were declared federal disaster areas. In many cases, flooding occurred in areas with no mapped flood hazards.

To address these and other map problems, the President's budget for Fiscal Year (FY) 2003 (which starts on October 1, 2002) includes \$351 million for initiating FEMA's national Map Modernization Program. Similar funding amounts are proposed for subsequent years.

This plan was prepared to assist in the development of regional and national plans for implementing the FEMA's Map Modernization Program. This Plan summarizes the role that Oregon will play in completing the required mapping activities and how these activities will be managed and performed. This Plan identifies mapping priorities, explains how mapping priorities were established for each county in Oregon and outlines an approach for addressing these mapping priorities.

In accordance with Government Performance Results Act (GPRA) performance measures suggested by the Office of Management and Budget (OMB), the details of this plan have been developed to assist FEMA in accomplishing the following:

- Reducing the average age of flood maps nationwide from 13.6 years to 6 years or less (in Oregon, the average age of flood maps is 14.6 years);
- Producing digital flood hazard maps with up-to-date flood hazard data for the 15% highest priority areas in the state; and
- Developing flood hazard maps for half of the unmapped, floodprone communities in Oregon.

In addition, Oregon hopes to implement a plan that includes a 20% cost-share provided by State and local partners to support the mapping effort.

The remainder of this plan outlines the role the State will play in future flood hazard mapping efforts, and how such efforts will be managed and performed.

### **The Role of the State in the Flood Hazard Mapping Program**

The State of Oregon's role in updating flood hazard maps will initially be at the mid-level of participation. The state will manage some mapping activities and will work with FEMA to develop a partnership agreement that will clearly identify the respective roles of the state and FEMA's regional office. This plan proposes a role in which the state assumes the lead in project coordination, mapping needs assessment including more detailed project scoping, data collection, and *some* aspects of map production but leaves long-term data/database management and flood studies to FEMA and flood mapping contractors. The state will work with local governments to perform outreach efforts.

#### Lead Agency

The Oregon Department of Land Conservation and Development (DLCD) will take the lead for the State of Oregon in the Statewide Flood Hazard Mapping Program as part of its ongoing floodplain management responsibilities. The agency's role will be project coordination. DLCD will coordinate with local governments in the project scoping phase and will assist local governments in developing Cooperating Technical Partnership agreements with FEMA. A key part of the lead agency's coordination role will be to facilitate the acquisition and preparation of statewide GIS and base mapping data. The lead agency will focus primarily on acquiring base mapping data that is in the public domain and free from proprietary licensing agreements and making this information available to FEMA's mapping partners.

#### Coordination / Managing with Partners

The Department of Land Conservation and Development (DLCD) will work closely with partnering state agencies, local governments and the University of Oregon InfoGraphics Lab, to coordinate and facilitate the Statewide Flood Hazard Mapping Program.

The State of Oregon currently has an organizational structure for creating, collecting and distributing geographic information. The lead agency will work with the Oregon Geographic Information Council (OGIC) and the Oregon Geographic Data Clearinghouse (OGDC) in its role to collect data. OGIC members include agency directors, deputy directors, and policy level alternates from local governments, federal agencies and state agencies. The lead agency will work in particular with the Geoscience Framework Implementation Teams (FIT) to identify and collect existing datasets.

FIT currently coordinates efforts on the 7 framework layers identified by the Federal Geographic Data Committee (FGDC): elevation, hydrography, geodetic control, tax lots (cadastral), transportation, administrative boundaries, and digital aerial photography (orthoimagery). The FIT group has also defined several additional framework layers specific for Oregon; bioscience, climate, cultural, geoscience, land cover/land use, and utilities.

# Mapping Plan for Oregon

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The GeoScience FIT group has identified flood hazard boundaries as a framework development priority. This will serve in an advisory role for the State Flood Mapping Plan.

Members of the FIT group are:

Andrew Rorick, US Forest Service  
Courtney Cloyd, US Forest Service  
Ron Geitgey, OR Geology & Mineral Ind.  
Paul Stuab, OR Geology & Mineral Ind.  
Doug Terra, OR Watershed Enhancement Bd  
Sharon Clarke, OSU - Forest Science  
Ian Reid, USDA – Nat Resource Conserv. Ser.  
Jim Meacham, Univ. of Oregon  
Transport.

Teresa Gaffney, Tillamook County  
Daryl Gusey, US Forest Service  
Nancy Tubbs, US Geologic Service  
Fred Lissner, OR Water Resources  
Cy Smith, OR Administrative Services  
Susan Nelson, US Bur. Of Land Mgt.  
Paul Pedone, USDA-NRCS  
Fred Gullixson, OR Dept. of

Major tasks for both lead and partner agencies will be the scoping of the individual map update project as well as collecting and assembling data.

## Scoping

The state will also assume a lead role in coordinating and managing the “scoping” portion of the flood mapping program. The scoping process will entail: researching and inventorying available elevation, flood hazard, and digital base map data, assessing adequacy of existing flood hazard data, outreach to, and input from, counties and communities, identifying data to be developed or acquired, determining proposed scales, paneling scheme, and format for DFIRM production. To assist the state in the areas of Geographic Information Systems (GIS) mapping and hazards planning potential sources of expertise include the University of Oregon’s InfoGraphics Lab and Oregon Natural Hazards Workgroup. The State will also work closely with the Oregon Geographic Information Council (OGIC) and Oregon Geographic Data Clearinghouse (OGDC) during the scoping process.

## Collecting and Assembling Data

The state will gather and provide existing statewide topographic/elevation, orthophotography, and base mapping data, focusing on data that can be obtained in a timely manner and can be freely distributed. The state will prioritize the collection of statewide and countywide datasets that enables the creation of the greatest number of countywide DFIRMs. When data is available at the local level, as determined through the scoping process, that data will be evaluated and, if it exceeds the accuracy of state base data, it will be integrated into the DFIRM.

# Mapping Plan for Oregon

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## Map Upgrade Plan

FEMA has identified two categories for those communities that are currently mapped but are in need of upgrades; flood map upgrade Level 1, and flood map upgrade Level 2.

### **Level 1 Upgrades**

Level 1 map upgrades are improvements to existing flood maps that are not based on the development of new detailed flood hazard information. These improvements consist of:

- a) converting manually produced paper maps to new DFIRM specifications or upgrading existing digitally produced maps to the new DFIRM specifications,
- b) utilizing current base maps that meet current FEMA specifications,
- c) when feasible, enhancing the flood theme by using all existing and readily available data that meets or exceeds National Flood Insurance Program (NFIP) mapping standards,
- d) incorporating Letters of Map Change (LOMCs), and
- e) fixing mismatched flood hazard boundaries across corporate limits.

Level 2 map upgrades include all of the elements of a Level 1 upgrade, as well as establishing or revising Base Flood Elevations through an engineering study or restudy or other existing data sources. In addition, there is a Flood Map Creation category for those communities that are unmapped and floodprone.

The state will prioritize the creation of countywide flood hazard maps and databases, focusing on "Level 1" upgrades that will create 979 maps in DFIRM format. With almost 1,000 maps in need of updating, Level 1 upgrades are much less expensive per panel update than both the more comprehensive Level 2 map upgrades and new map creation. These maps are particularly well suited for areas with limited development potential and areas that have not experienced significant flooding. Focusing predominately on Level 1 Flood Map Upgrades will have the greatest impact on reducing the average age of flood maps in Oregon. Upgrades at this level will increase base map currency, provide a building block for the next phase of map modernization, and will reflect flood hazard data in a format that is easily accessed and less difficult to manage and distribute.

### **Q3 to DFIRM and Base data to DFIRM**

Within Level 1 upgrades, the state will focus on converting those counties with existing flood hazard data in Q3 format to DFIRM specifications and collecting current base data

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in DFIRM format. Focusing on these two elements of the Level 1 upgrade process provides the most appropriate opportunity to use the state's GIS mapping resources to effectively reduce the age of flood hazard maps.

### Level 2 Upgrades

Level 2 map updates involve the development of new detailed flood hazard information. These upgrades typically require updated topographic data, structure and cross-section surveys, hydrologic and hydraulic engineering analysis, and floodway and floodplain boundary delineation or redelineation.

The state will identify those communities most in need of level 2 upgrades, based on an initial screen of communities and further needs assessment and discussion with Oregon communities. The state will play a lead role in gathering and compiling the data necessary for creating the upgraded base maps for producing DFIRMs. The state may serve as a contracting agent but conducting engineering and flood studies, and providing oversight and quality control, will be left to FEMA and its National Mapping Partners.

### New Maps for Unmapped / Floodprone Communities

The state will also identify those communities that are candidates for new mapping. Oregon is fortunate to have a low number of unmapped communities in the state. Of those unmapped communities, most are not floodprone. Of the two communities that are unmapped and have flood hazards, one is under the jurisdiction of its respective counties for floodplain management (Damascus in Clackamas County) but still may need detailed mapping done. The other, Banks in Washington County is in need community level flood maps. The state will play a lead role in gathering and compiling the data necessary for creating base maps necessary for producing DFIRMs for half of the unmapped, floodprone communities and may manage contracts to have the flood studies performed. However, the state will leave the technical oversight and production of flood studies to FEMA and its National Mapping Partners.

## Mapping Needs Assessment

To evaluate the State's mapping needs, Oregon's Department of Land Conservation and Development (DLCD) initiated a mapping needs assessment in June 2002. This mapping needs assessment included the following tasks:

- Reviewing information in FEMA's Mapping Needs Update Support System (MNUSS);
- Revising available community-specific data;
- Assigning preliminary map upgrade methods and priorities to each county; and
- Assessing whether the proposed map update options would achieve the GPRA performance measures.

The State has begun discussions with individual jurisdictions to evaluate the identified state mapping priorities and to get feedback on the accuracy of the map update methods (e.g., Number of Level 1 or Level 2 updates) recommended for each jurisdiction.

The mapping needs assessment was undertaken in cooperation with, and with the support of FEMA and the region's Flood Map Production Contractor (Michael Baker). The following data was collected and assessed on a county-by-county basis:

- Age of the existing Flood Insurance Rate Maps (FIRMs);
- Known mapping needs according to the Mapping Needs Update Support System (MNUSS);
- Status of existing maps (digital, manual, none);
- Existing or potential local mapping partners;
- Number of unmapped, floodprone communities;
- Availability of existing base map, topographic data and or flood hazard data;
- Numbers of letters of map change (LOMC's);
- Population and population growth;
- Flood insurance claims and/or repetitive losses;
- Availability of State and/or local funding;
- Format of existing maps (countywide or community-based);
- Ongoing map updates; and
- State specific mapping priorities associated with flood related hazards.

### Methodology

Region X provided an extensive set of data on Oregon's flood maps and community characteristics. The data comes from the Mapping Needs Update Support System (MNUSS) and other existing databases and reflects information available as of May

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2002. This data was analyzed to identify Oregon's highest priority areas for flood map updates.

In addition, to supplement the MNUSS data, other data provided by FEMA, and data available from various State agency offices, the Oregon Department of Land Conservation and Development, in collaboration with the University of Oregon's InfoGraphics Lab undertook additional data collection and outreach activities. Specific data collection and outreach activities are described in the following discussion of Oregon's needs assessment.

Because Oregon plans to conduct map updates in a countywide format, the characteristics of communities and existing maps were analyzed at the county level. An initial screen to identify high priority counties was done by ranking all 36 counties based on the mapping needs assessment factors listed above. The highest priority counties are those that ranked high in several of the assessment factors. More detail is provided in the discussion of each of the assessment factors.

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### Age of the Existing FIRMs

Nearly 2,000 Flood Insurance Rate Map (FIRM) panels cover the State of Oregon. Each of these panels was sorted according to their age, oldest to youngest. The data set dated May 10, 2002 from Michael Baker showed that the age of the maps ranged from 26.4 years (City of Eastside in Coos County) to the most recently produced map in May of 2002 (City of Gresham, Multnomah County). Table 1 summarizes the oldest FIRM panels in the State. According to this information it appears that Coos, Clackamas, Tillamook, and Clatsop counties have the most immediate need for map updates due to the fact that they each have multiple map panels of the top ten oldest maps in the state. Appendix Figure 1 and Appendix Table 1 show the average map age for each county.

**Table 1 – Oldest Federal Insurance Rate Map Panels (FIRMs) in the State of Oregon**

County Name	City / County Name	Date of Last Map Produced	Years Since Production
COOS	EASTSIDE, CITY OF	12/19/75	26.4
COOS	POWERS, CITY OF	6/30/76	25.9
JACKSON	BUTTE FALLS, TOWN OF	6/30/76	25.9
CLACKAMAS	GLADSTONE, CITY OF	3/15/77	25.2
CLACKAMAS	WEST LINN, CITY OF	3/15/77	25.2
TILLAMOOK	WHEELER, CITY OF	11/16/77	24.5
CLATSOP	HAMMOND, CITY OF	4/17/78	24.1
TILLAMOOK	GARIBALDI, CITY OF	4/17/78	24.1
CLATSOP	WARRENTON, CITY OF	5/15/78	24.0
CLATSOP	CLATSOP COUNTY*	7/3/78	23.9
CLATSOP	ASTORIA, CITY OF	8/1/78	23.8
TILLAMOOK	BAY CITY, CITY OF	8/1/78	23.8
TILLAMOOK	TILLAMOOK COUNTY *	8/1/78	23.8
CLATSOP	CANNON BEACH, CITY OF	9/1/78	23.7
UMATILLA	MILTON-FREEWATER, CITY OF	9/12/78	23.7
UNION	NORTH POWDER, CITY OF	9/29/78	23.6
DOUGLAS	CANYONVILLE, CITY OF	11/1/78	23.5
UNION	ELGIN, CITY OF	11/15/78	23.5
DOUGLAS	DOUGLAS COUNTY *	12/15/78	23.4
UNION	UNION, CITY OF	12/15/78	23.4

\* Maps in unincorporate aspects of the respective Counties

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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## Known Mapping Needs

The Oregon Department of Land Conservation and Development evaluated the twenty-five communities with the highest mapping needs as identified in the Mapping Needs Update Support Service (MNUSS) database. The MNUSS data has not been updated in several years and this table reflects more current information. Communities are separated into three categories: already completed, Level 1 and Level 2 studies. It is possible that some of the Level 1 communities may also require level 2 analysis (Table 2).

Most of the communities identified through MNUSS are located in county's that have been identified as high priorities for flood map updates.

**Table 2 - Mapping Needs from MNUSS**

<i>Community (City unless otherwise noted)</i>	<i>CID</i>	<i>County</i>	<i>Cost (\$)</i>	<i>Benefit/Co st(\$)</i>	<i>Notes/Recommendations</i>
<b>STUDIES COMPLETED</b>					
Forest Grove	410241	Washington	79,000	218.22	Updated as part of Clean Water Services work in Washington County
Sherwood	410273	Washington	41,250	42.19	Updated as part of Clean Water Services work in Washington County
Seaside	410032	Clatsop	86,816	9.03	Draft maps done - digitize as part of Clatsop Cty. Update
Albany	410137	Linn	210,690	8.75	Updated in 1999
Independence	410189	Polk	179,780	26.60	Work underway
Beaverton	410240	Washington	228,270	3.03	Updated as part of Clean Water Services work in Washington County
<b>LEVEL 1 AS PART OF COUNTY UPDATE</b>					
Winston	415593	Douglas	488,970	34.42	Do as part of Douglas Cty. Update - Level 1
Cascade Locks	410087	Hood River	115,000	76.12	Minimal flood losses; minimal flood hazard
Medford	410096	Jackson	74,500	58.90	Crooked Creek study underway?
Scio	410144	Linn	36,700	24.35	Some losses; limited new development
Central Point	410092	Jackson	84,040	21.01	LOMR done recently; flood studies underway
Newport	410131	Lincoln	57,850	18.77	Wait for coastal erosion methodology
Portland	410183	Multnomah	390,000	17.21	Johnson Creek completed;
Talent	410100	Jackson	45,345	14.98	Wagner Creek remapping done in 1999
Manzanita	410199	Tillamook	36,700	11.99	Check V zones
Fairview	410180	Multnomah	39,339	10.29	Assess need for Level 2
Happy Valley	410026	Clackamas	42,160	6.39	
La Grande	410260	Union	133,650	6.06	Assess need for Level 2 work
Toledo	410033	Lincoln	79,490	5.91	
Warrenton	410033	Clatsop	54,900	5.33	Assess need for Level 2 work
Gresham	410181	Multnomah	54,460	5.02	Johnson Creek done;
Ashland	410090	Jackson	53,340	3.93	Assess need for Level 2 work
Dayton	410252	Yamhill	34,880	3.72	
Lakeside	410278	Coos	58,540	2.59	Assess need for Level 2 work - City proposes floodway re-evaluation
<b>Level 2 studies</b>					
Springfield	415592	Lane	289,610	10.43	On schedule for FY 2003 - Level 2

(Source: MNUSS Database)

## Mapping Plan for Oregon

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In addition the communities listed in the MNUSS database, Madras (Jefferson County), and Heppner (Morrow County) and Stanfield (Umatilla County) have approached the DLCDC to determine the feasibility of new flood studies to make adjustments to their floodways. For example, in Stanfield, the city has removed a number of houses from the existing floodway, thus reducing the city's flood hazards.

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### Status of Existing Maps

Table 3 outlines the formats of the existing flood maps for Oregon counties. The only county in a completely digital format is Lane County, however this format is based on FEMA's old standards for digital maps. Most of the maps in Lane County are based on the original flood study data generated in the 1980s. FEMA recently provided copies of flood maps statewide that have been scanned into a digital format. In some counties, such as Washington County, several communities have been digitally modernized up to new standards, and the rest of the county remains in the old digital format. Thirteen of Oregon's thirty-six counties have flood maps that are still only available in a paper format.

**Table 3 –Status / Format of Existing Oregon Flood Maps**

<i>All</i>	<i>Some</i>	<i>Manual</i>
LANE	BENTON CLACKAMAS CLATSOP GRANT HOOD RIVER DESCHUTES DOUGLAS GRANT HARNEY JACKSON JEFFERSON LINCOLN LINN MARION MULTNOMAH POLK TILLAMOOK UMATILLA WASCO WASHINGTON	COOS* CROOK GILLIAM* JOSEPHINE* KLAMATH LAKE MALHEUR MORROW* SHERMAN* UNION* WALLOWA* WHEELER YAMHILL*

\* Counties listed by Baker as having manual maps but still Q3 Data.

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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### Existing or Potential Local Mapping Partners

DLCD has just finished identifying the initial state mapping priorities. The agency is beginning to approach local governments to identify their interest in acting as mapping partners in updating flood maps. Clackamas County, the state's highest priority for flood map updates, is in the process of developing a partnership agreement. Many local governments are likely to have data that will support the remapping effort and will be able to provide staff support for project oversight and public outreach efforts. However, it is unlikely that many rural Oregon counties will be able to participate as full cooperating technical partners (CTPs).

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### Number of Unmapped / Floodprone Communities

In addition to the communities listed in Table 4, Oregon has several Tribal governments that manage large areas of land. The Warm Springs and the Burns Paiute tribes already participate in the National Flood Insurance Policy (NFIP). The Umatilla tribe is working with the Army Corps of Engineers to map flood hazards in lands under their jurisdiction. The state will work with the remaining tribes in Oregon that have lands with flood hazards to assess their mapping needs and interest in participating in the National Flood Insurance Program. These discussions will occur in FY 2003.

From the information in the Mapping Needs Update Support System (MNUSS) database, two (2) of the 21 listed communities are unmapped *and floodprone*. These are the communities of Banks in Washington County, and Damascus in Clackamas county. Mapping efforts of Damascus will be covered by the countywide update conducted in Clackamas County as the number one priority county to map.

Some cities/communities listed in MNUSS as being unmapped have had maps recently completed . Both the City of Spray and the Warm Springs Reservation have just finished establishing flood maps for their communities. Some of these maps were finalized in early 2002.

A large number of the unmapped communities listed in MNUSS do not have flood hazards associated with them according to initial surveys conducted by DLCD. Of those communities the city of Imbler in Union County has had some drainage issues caused by heavy precipitation and frozen ground that has prevented ground filtration. This flooding is not associated with any local waterway. The remaining communities (Richland, Unity, Adair Village, Granite, Metolius, Malin, Donald, Maywood Park, Moro, Antelope, and Shaniko) all are quite small (under 1,000 people) and have no flood hazards associated with them according to initial research. The only larger community, Redmond (population 14,950) has no flood hazard associated with it.

In order to meet an aspect of GPRA performance goals, mapping half of the unmapped floodprone communities, the state of Oregon proposes that one (1) of the two (2) communities be mapped in the first year of map modernization. The map the state has nominated for initial update in year one is Damascus. Banks will be mapped in the second year of map modernization.

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*Table 4 - Unmapped Oregon Communities*

City/Community	County	Population 2000	Hazard Source	Notes
<b>Floodprone communities</b>				
Banks	Washington	1286	West Dairy Creek	Small flood concerns, a part of larger recently updated flood region
Lonerock	Gilliam	24	Robinette and Brown Creek	Very Small Community, study would not be cost effective, No local land use plan; development subject to County jurisdiction
Sodaville	Linn	290	Oak Creek	Small community; No local land use plan; development subject to County jurisdiction
Damascus	Clackamas	-	-	Rock / Richardson Creek Study will address this
<b>Unmapped communities without flood hazards</b>				
Richland	Baker	150	None	
Unity	Baker	130	None	
Adair Village	Benton	600	None	
Redmond	Deschutes	14,960	None	
Granite	Grant	20	None	
Metolius	Jefferson	660	None	
Malin	Klamath	640	None	
Donald	Marion	610	None	
Imbler	Union	280	None	Some drainage issues
Merrill	Klamath	900	None	
Maywood Park	Multnomah	780		
Moro	Sherman	340		
Antelope	Wasco	60	None	
Shaniko	Wasco	30	None	
<b>Communities that have maps</b>				
Warm Springs Tribe	Jefferson			Map finalized in 2002

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Spray	Wheeler	140	John Day	Map already completed
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Source: Mapping Needs Update Support System (MNUSS)

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### Number of Communities

For each of the high priority counties identified in this plan, the number of communities within each county is provided.

### Existing Flood Hazard Data

#### Data Collected / Provided by the State

The state can provide a wide range of existing GIS and base mapping data to FEMA and its mapping partners that can greatly reduce the time and cost of the flood mapping projects. Through the collaborative efforts of many state agencies and the Oregon Geospatial Data Clearinghouse a great deal of spatial data is being organized in a manner that facilitates easier project collaboration. The data can also be provided in a common geographic projection, which will also greatly reduce the time and cost involved in processing the data to be used for flood mapping and DFIRM creation (See Appendix B for detailed section summarizing data provided by the state).

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### Flood-Related Disaster Declarations

Table 5 summarizes the number of flood-related disasters declared in each county during the period from 1978 to May 2002. Counties with fewer than five (5) declarations since 1978 are not included in this table. The number of disaster declarations provides an indication of flood risk for a particular county.

**Table 5 – Oregon Counties with 5 or More Flood Related Disaster Declarations as of 5/02**

<i>County</i>	<i>Flood-Related Disaster Declarations</i>
DOUGLAS COUNTY	7
LANE COUNTY	7
TILLAMOOK COUNTY	7
CLATSOP COUNTY	6
COOS COUNTY	6
WASHINGTON COUNTY	6
CLACKAMAS COUNTY	5
GILLIAM COUNTY	5
JOSEPHINE COUNTY	5
LINCOLN COUNTY	5
WALLOWA COUNTY	5
WASCO COUNTY	5
YAMHILL COUNTY	5

Source: Oregon State Mapping Data from FEMA Region X – May 10, 200 (Michael Baker)

According to Oregon Emergency Management, there are currently no open flood disasters in the state.

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## Number of Letters of Map Change (LOMC)

## Letter of Map Revision (LOMR)

The greater the number of LOMRs in any county may indicate a higher need for updating flood maps. Table 6 shows the top ten counties of reported LOMR cases. According to the data provided by FEMA, Clackamas County exhibits a high need for map updates because it has the highest number of reported LOMR cases at 13. Twenty-two counties reported no LOMR cases.

***Table 6 – Top Ten Oregon Counties with Highest Number of LOMR Cases***

<b>County</b>	<b>LOMR</b>
CLACKAMAS	13
MULTNOMAH	11
LANE	10
MARION	10
WASHINGTON	10
JACKSON	7
POLK	7
LINCOLN	4
COOS	2
BENTON	1

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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## Letter of Map Revision Based on Fill (LOMR-F)

Another category that indicates a level of need for map modernization is the number of Letters of Map Revision Based on Fill (LOMR-F). Table 7 notes the counties with the highest number of LOMR-F cases. Lane County leads the list of counties with the most at 41. Twenty-two Oregon counties reported zero LOMR-F cases. The cumulative effects of fill on flood storage may not be reflected in current maps so a high number of LOMR-F cases may suggest a need for map updates.

*Table 7 – Top Ten Oregon Counties with Highest Number of LOMR-F Cases*

<i>County</i>	<i>LOMR-F</i>
LANE	41
WASHINGTON	25
CLACKAMAS	23
MULTNOMAH	17
MARION	15
BENTON	9
POLK	8
COOS	5
DOUGLAS	5
LINN	5

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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## Letter of Map Amendments (LOMA)

Letters of Map Amendments (LOMAs) are also examined as a category in which communities with higher LOMAs may have a more significant need for map modernization due to potential map inaccuracies. Table 8 indicates that Lane County as clearly having the most LOMAs. There were five counties (Gilliam, Lake, Sherman, Wasco and Wheeler) with no LOMA requests.

***Table 8 – Top Ten Oregon Counties with Highest Number of LOMA Cases***

<b>County</b>	<b>LOMA</b>
LANE	359
WASHINGTON	119
MARION	101
CLACKAMAS	86
BENTON	85
JACKSON	77
DOUGLAS	71
MULTNOMAH	59
LINCOLN	57
LINN	51

Source: Oregon State Mapping Data from FEMA Region X - May 10, 2002 (Michael Baker)

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## Population Growth

### Population Change - 1980-1990

Population growth from 1980-1990 was most dramatic for Washington County (21.10%). The largest loss in population in the state for the same period occurred in Gilliam County (-19.80%). A total of 13 of the 36 Oregon counties had decreases in population from 1980 to 1990. Each of the listed counties in Table 9 experienced the highest population growth rates in Oregon from 1980-1990 (Table 9).

*Table 9 – Oregon Counties with the Greatest Population Change (1980-1990)*

<b>County</b>	<b>Population, 1980</b>	<b>Population, 1990</b>	<b>Population Change (1980-1990) % change</b>
WASHINGTON	245,808	311,554	21.10%
DESCHUTES	62,142	74,958	17.10%
YAMHILL	55,332	65,551	15.59%
JEFFERSON	11,599	13,676	15.19%
CLACKAMAS	241,919	278,850	13.24%
CURRY	16,992	19,327	12.08%
MARION	204,692	228,483	10.41%
JACKSON	132,456	146,389	9.52%
LINCOLN	35,264	38,889	9.32%
POLK	45,203	49,541	8.76%

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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### Population Change - 1990-2000

Table 10 highlights those Oregon counties with the highest population growth from 1990 - 2002. Oregon experienced unprecedented growth during this decade with Deschutes County leading the way (53.88% increase). Only 3 of the 36 total counties experienced declines in population during this decade. Sherman County experienced the greatest loss of population at (-7.56%).

*Table 10 – Oregon Counties with the Greatest Population Change (1990-2000)*

<i>County</i>	<i>Population, 1990</i>	<i>Population, 2000</i>	<i>Population Change (1990-2000) % change</i>
DESCHUTES	74,958	115,342	53.88%
MORROW	7,625	10,987	44.09%
WASHINGTON	311,554	418,377	34.29%
YAMHILL	65,551	85,150	29.90%
POLK	49,541	63,684	28.55%
CROOK	14,111	18,047	27.89%
JEFFERSON	13,676	17,064	24.77%
GILLIAM	1,717	2,118	23.35%
COLUMBIA	37,557	46,248	23.14%
CLACKAMAS	278,850	342,786	22.93%

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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## Flood Insurance Claims and / or Repetitive Losses

### Repetitive Losses – Zone A – 100-Year Floodplain

Table 11 highlights the Oregon counties with the most repetitive losses /claims that were in zones designated as being within the 100-Year Floodplain. Tillamook County had the largest number of reported repetitive loss / claims at 122 for the measured period. Curry, Harney and Union counties reported zero repetitive losses in Zone A. Additionally, the data set included 13 counties that did not have any information that stated their reported losses.

***Table 11 – Oregon Counties with Highest Number of Repetitive Losses in Zone A***

<b><i>County</i></b>	<b><i>Repetitive Loss / Claims, A Zones</i></b>
TILLAMOOK	122
LINCOLN	103
CLACKAMAS	77
WASHINGTON	73
LANE	55
MULTNOMAH	25
MARION	20
DOUGLAS	19
LINN	10
CLATSOP	8

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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### Repetitive Losses – Zone B, C and X - Areas Outside the 100-Year Floodplain

For the hazard Zones B, C, and X, areas outside the 100-year floodplain, the top ten counties with the greatest reported repetitive losses or claims are listed in Table 12. Clackamas County (47) has more than twice the number of repetitive losses / claims as Washington County (22), the second highest county. Clatsop, Douglas, Grant, Harney, Josephine, Lake and Umatilla counties all reported zero repetitive losses in Zones B, C, and / or X. No losses in any of these zones were reported in 13 of the 36 Oregon counties.

***Table 12 - Oregon Counties with Highest Number of Repetitive Losses in Zone B, C, or X***

<b><i>County</i></b>	<b><i>Repetitive Loss / Claims, B,C,X Zones</i></b>
CLACKAMAS	47
WASHINGTON	22
MULTNOMAH	21
LINCOLN	15
TILLAMOOK	13
BENTON	6
COLUMBIA	4
JACKSON	4
LANE	4
LINN	4

Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker).

### Availability of State and / or Local Funding

Most of the contributions to the map update effort in Oregon will be based on provision of in-kind services and data. Contribution of hard match will be assessed on a project by project basis. This information will be collected in the scoping process in working with individual jurisdictions.

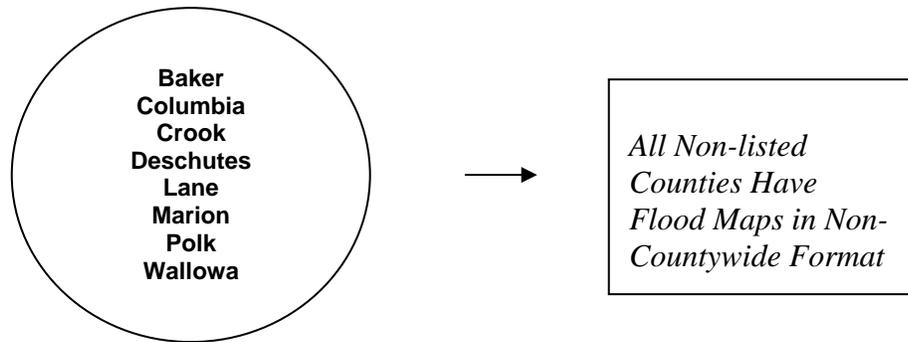
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## Format of Existing Maps

Figure 2 shows only eight (8) counties with maps in a countywide format.

***Figure 2 - Oregon Counties with Existing Flood Maps in Countywide Format***



Source: Oregon State Mapping Data from FEMA Region X – May 10, 2002 (Michael Baker)

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### Ongoing Map Updates

Table 13 summarizes ongoing map updates in Oregon. The State will work with FEMA to determine the number of panels for each community.

***Table 13 - State of Oregon Ongoing Map Updates***

<i>Community</i>	<i>Estimated Panels</i>	<i>Date</i>	<i>Notes</i>
Central Point	*	Fall 2002	
Washington County	8	Oct 2002	Fanno Creek
	20*		
Portland	13		Crystal Springs and Johnson Creek
Seaside/Clatsop Cty	*		Necanicum, Neawanna, Circle and Beerman Creeks
Talent	*	Done 5/2002	Wagner Creek
Salem/Marion County	*		Mill Creek
Gresham	*		Johnson Creek
Eugene	3		Amazon Creek
Keizer	2		
Umatilla Tribe	15		Flood study work completed but maps have not been provided to FEMA
Independence/ Monmouth	3	Sept. 2002	

\* Information not yet readily available  
(Source: FEMA and State of Oregon Flood Map Data)

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## Other Oregon Flood Mapping Priorities

Oregon and the other coastal Pacific Northwest states have several unique flood related hazards including coastal erosion, winter storm surges, tsunamis and landslides. The state proposes addressing these hazards as part of the flood study updates.

### **Coastal Erosion**

Oregon's coastal maps are among the oldest in the state. Many flood map panels for coastal counties can be updated at "Level 1." Those panels along the coast will need additional work to accurately reflect the "V zone" and areas of coastal erosion. The state would like to work with Region X and the other coastal states (Alaska and Washington) to make sure that a methodology is available to incorporate coastal erosion factors into "V zone" development. Thus, updates of those panels will coastal flooding hazards will be postponed until year 2 or 3 of the Map Modernization project or until such time as the methodology has been approved by FEMA Region X.

### **Tsunamis**

Oregon's Department of Geology and Mineral Industries (DOGAMI) has done significant work on assessing the tsunami hazard for Oregon's coastal communities. DOGAMI proposes an effort to assess the inclusion of tsunami run-up information on flood insurance maps that would include a pilot project.

### **Storm Surge**

DOGAMI would also like to assess data that shows that wave heights now are greater than they have been in priory decades due to long-term weather patterns in the Pacific. They are proposing a project to assess the impacts of the higher waves on coastal flooding patterns. The project would include a review of existing literature as it relates to flood hazards and a possible pilot study.

### **Mudslides**

The National Flood Insurance Program (NFIP) recognizes mudslides as a flood-related hazard. However, no protocol for mapping mudslides has been developed and damages

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related to this hazard have not been reimbursed by the NFIP. DOGMAI has mapped the distribution of mudslides in western Oregon. According to DOGAMI, these maps need further refinement to address the need for probabilistic treatment in order to be relevant to the actuarial applications of the NFIP.

The Oregon Department of Land Conservation and Development (DLCD) will continue to work with Region X, Alaska and Washington to make sure that coastal erosion is considered in remapping coastal "V zone" areas. DOGAMI has proposed work on Tsunami hazards, storm surge and mudslides. These proposals are discussed in more detail in Appendix C and cost estimates for this work are included there as well.

# Mapping Plan for Oregon

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## Needs Assessment Summary

Mapping priorities for Oregon were established based on the age of FIRMs, the known mapping needs, a list of potential mapping partners, the number of LOMCs for each county, the population growth for each county, the number of flood insurance repetitive losses and the format of existing maps. The results were examined and are all illustrated in Figure 1 and Tables 1-11. Once a more complete assessment of this data is complete, it will be used to evaluate the mapping needs of each county and to determine which of the following five mapping options are most appropriate for each analyzed county.

Various scenarios will be evaluated to determine the best combination of the above activities that achieve the GPRA performance measures. It is anticipated that it will take approximately 6 to 9 months to complete the data collection and assessment. Based upon a preliminary analysis, it is anticipated that the performance measures could be met by conducting the following:

- FIRM creation for approximately 2 panels;
- Restudies of approximately 73 panels;
- Digital conversions of approximately 2315 panels; and
- Upgrades of approximately 2388 panels.

Because Oregon hopes to update flood maps on a countywide basis, DLCD has analyzed mapping priorities for the state's 36 counties based on the map assessment factors described above. Oregon counties were evaluated based on the frequency with which they appeared in the "top ten" for each assessment factor. This somewhat simplistic method for analysis weighted each category equally and counted each time a county appeared in a category.

## **Level of Highest Priority – Clackamas County**

Based on the examined assessment factors, Clackamas County is identified as being the highest potential priority area because it appears most frequently in the examined areas. Clackamas County was the fifth fastest growing county, in terms of population, from 1980-1990 and tenth fastest from 1990-2000. Continued population growth and development pressure is likely.

Clackamas County was also third in terms of Repetitive Loss / Claims in Zone A and first in terms of Repetitive Loss / Claims in Zone B, C, or X. For policies in force, it ranked second among all measured counties. It is first in the number of LOMRs, third in LOMR-F cases, and fourth in LOMAs. Clackamas County also contains two of the oldest flood map panels in the State: the Cities of Gladstone and West Linn each have maps that are 25.2 years old. Most maps in the county range from 13 to 25 years old. Several (2) panels were updated in 2001 for Johnson Creek including the section that lies in Clackamas

## Mapping Plan for Oregon

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County. These results make Clackamas County a strong candidate for map modernization

Due to the significant needs previously outlined for this county, a variety of flood map modernization and updates are proposed. More detailed investigation of the data and meetings with Clackamas county staff indicated that a mix of both Level 1 and Level 2 updates for the entire county were needed. Waterways that have created the greatest number of problems are the Sandy River, the Clackamas River, and the Salmon River. More detailed level 2 studies are suggested for these rivers within the 8 selected panels 415588 0040, 415588 0045, 415588 0090, 415588 0180, 415588 0202, 415588 0206, 415588 0208, and 415588 0209. These panels are the first map panels that should be modernized in the state of Oregon. Less detailed Level 1 studies are called for in the remaining map panels in the county. DLCD will continue working with Clackamas County by communicating with individual cities to assess their mapping needs.

### Other High Priority Areas

Jackson County is also identified as being a high priority for map modernization. Some of the county's map panels are among the oldest in the state, its population is among one of the fastest growing for the period of 1980-1990, plus it has a particularly high level of LOMCs. Jackson County is additionally a good choice for FY 2003 map modernization because information in this county is available in a format (Q3) that is more convenient to update to DFIRM status. Jackson County has other panels necessary for Level 2 updates as well. Additionally, Yamhill, Sherman, Gilliam, Josephine, and Wallowa have similar status requiring predominately Level 1 upgrades and can do so easier because the information they currently have is in a Q3 format.

### Other Communities with Need for Map Modernization

Despite recently converting flood maps countywide to an all-digital format, Lane County still experiences an extremely high number of flood map inaccuracies. LOMCs for the county rank far and above the levels of the rest of the state. More detailed investigations have determined that there are several map panels that continuously show up as having a significant number of LOMAs associated with them. These panels are predominately connected with the greater Eugene-Springfield metro area. An update of the county's flood map data would be beneficial, but is not held with as much regard as the counties ranked before it due its recently completed digitizing work. The City of Springfield has also identified a need to conduct new detailed study work on the McKenzie River.

## Mapping Plan for Oregon

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Both Lane and Marion County flood maps are also currently available in countywide format and have been digitized. However, most panels are still based on flood maps that are 20 years old. Both of these communities have had a significant number of LOMAs / LOMRs in recent years and both have had fairly significant population growth. Communities within these counties are likely to continue to experience growth. An update each county's flood map data would be beneficial, but is not held with as much regard as the counties ranked before it due its recently completed digitizing. Updates for both Lane and Marion Counties are slated for the FY 04, the second year of map modernization.

Washington County is the second most frequently appearing county in the examined categories. However, most of Washington County's maps have been updated through a Cooperating Technical Partnership agreement with Washington County Clean Water Services. These maps are slated to be available soon. The state will work with Washington County and FEMA to map the unmapped community of Banks and other unmapped areas of the county during the second year of map updates.

Multnomah County as well is suggested as a priority region in the FY 03 update, predominately because of its dramatically developing region

Clatsop, Tillamook, Lincoln, Curry, and Coos each contain coastal flooding hazards. These counties and incorporated cities within them, are high priorities for remapping efforts. The state proposes working with these counties to update base maps in non-coastal areas of the county and to issue new maps for those areas where flood studies are not necessary. However, the remapping of coastal flood hazards will be contingent on completion and testing of a methodology to assess coastal flood hazards for Pacific Northwest states. Only level 1 updates are proposed at this time so that money and efforts would not have to be replicated by after these new methodologies have been established. We will also continue to work with the Oregon Department of Geology and Mineral Industries to assess flood related hazards associated with tsunamis and storm surges and determine whether or not to include information on flood maps.

There are a number of Oregon Counties that have not experienced much population growth and have had limited flood losses. Increased development in these counties is unlikely in the next 10 to 20 years. The base maps for these communities are 15-20 years old. The state proposes working with these communities to provide level 1 flood maps, identify areas where additional flood hazard data is available or where there is a need for additional flood studies due to local conditions (e.g., major culvert work, stream relocations...). Oregon will work to finalize this list of Level 1 map updates by October 1, 2002.

A more detailed needs assessment will provide the information necessary to refine these findings and overall estimates.

### **Flood Study Production**

The State of Oregon will take the lead role in coordinating the flood mapping program, by playing an active lead role in; identifying and collecting flood and base mapping data, managing Level 1 map upgrades, and leading the scoping process. The state is however proposing to leave the direct management of flood studies to FEMA, unless project management funds are made available by FEMA through the CAP-SSSE program or map modernization project. The state will assist FEMA in identifying regional flood study contractors and coordinating initial meetings between state and local agencies with regional flood study contractors. The state will work with local agencies to assist in the identification of potential cost-share sources. At this time, the lead agency and state does not have the resources or experience necessary to directly manage flood studies.

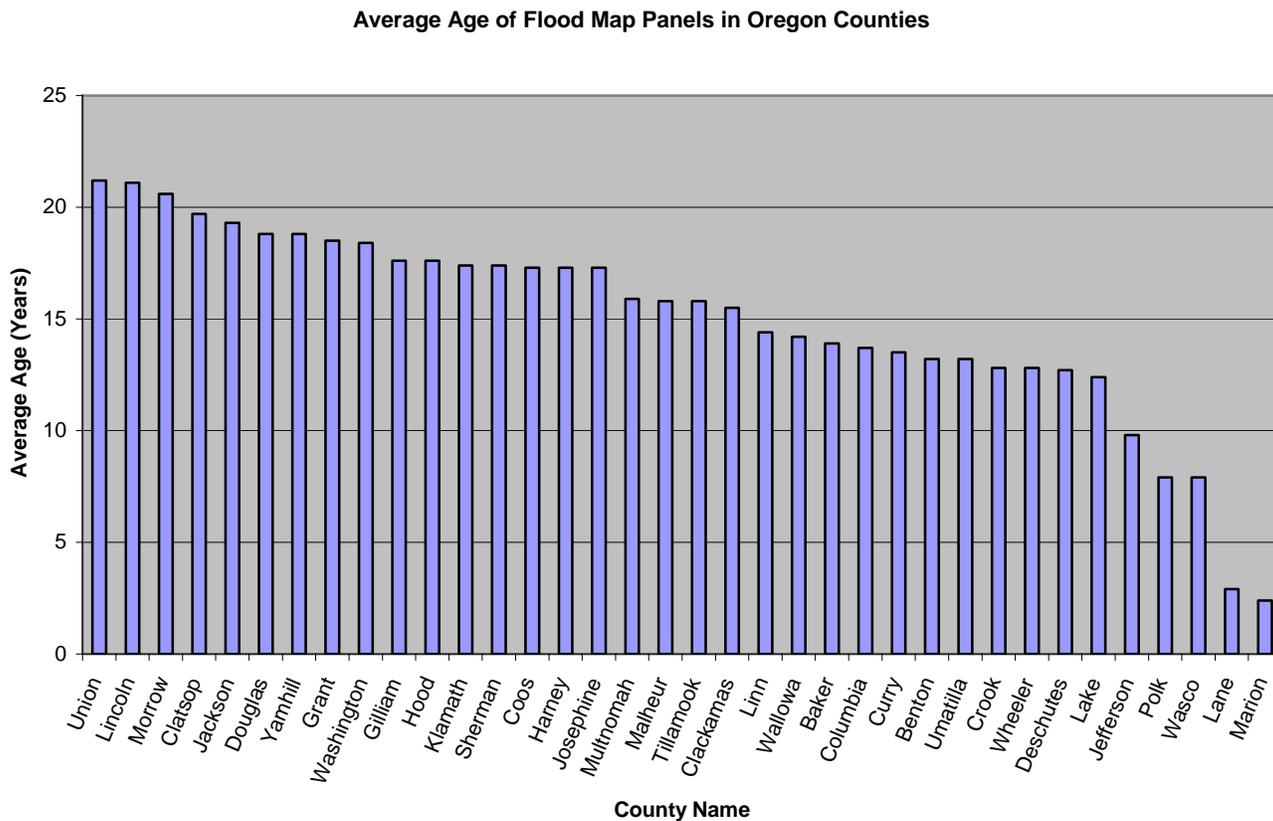
# Mapping Plan for Oregon

## Attachments

### Appendix A

Figure and Table Showing Average Age of Maps for Each County

*Appendix Figure 1 – Average Age of Flood Map Panels in Oregon Counties*



(Source: State Flood Insurance Rate Maps and Baker Data (2002))

## Mapping Plan for Oregon

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*Appendix Table 1 – Counties with the Oldest Average Flood Map Panels*

<b>County Name</b>	<b>Average Age of Map Panel</b>
Union	21.2
Lincoln	21.1
Morrow	20.6
Clatsop	19.7
Jackson	19.3
Douglas	18.8
Yamhill	18.8
Grant	18.5
Washington	18.4
Gilliam	17.6
Hood	17.6
Klamath	17.4
Sherman	17.4
Coos	17.3
Harney	17.3
Josephine	17.3
Multnomah	15.9
Malheur	15.8
Tillamook	15.8
Clackamas	15.5
Linn	14.4
Wallowa	14.2
Baker	13.9
Columbia	13.7
Curry	13.5
Benton	13.2
Umatilla	13.2
Crook	12.8
Wheeler	12.8
Deschutes	12.7
Lake	12.4
Jefferson	9.8
Polk	7.9
Wasco	7.9
Lane	2.9
Marion	2.4

(Source: State Flood Insurance Rate Maps and Baker Data (2002))

# Mapping Plan for Oregon

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## Appendix B

### Detailed Information of Data Provided by the State

The State of Oregon uses a Lambert Projection for the transfer of data between state agencies. The state had determined that agencies commonly used up to ten major different map projections, all having varied error in different parts of the state. Because Oregon includes two UTM zones as well as two state plane projections a single projection was needed for display and analysis of statewide data. This custom projection has a total area error for the entire state is 0.0045% (2,900 acres out of 64 million) and an average length error for the entire state is 0.0176% (1.76 in 10,000). The data sources listed below can all be collected and provided in this projection.

Oregon Lambert Projection:

```
PROJECTION LAMBERT /* Lambert Conformal Conic
DATUM NAD83 /* North American Datum 1983
SPHEROID GRS1980 /* Required spheroid with NAD83
UNITS 3.28084 /* International Feet, (.3048 meters)
PARAMETERS
43 00 00.000 /* 1st standard parallel
45 30 00.000 /* 2nd standard parallel
-120 30 0.000 /* central meridian
41 45 0.000 /* latitude of projection's origin
400000.00000 /* false easting (meters), (1,312,335.958 feet)
0.00000 /* false northing (meters)
```

### Topographic Data

The state can provide to FEMA USGS 10 meter DEMs that have been converted and processed in a manner to accommodate easier countywide mapping. The 10 meter DEMs have been projected to the Oregon Lambert projection, edge-matched, mosaiced/merged into one continuous DEM, also divided up into 9 individual sections covering Oregon to better manage their large file size. While the use of LIDAR for generating elevation / topographic data have many advantages it remains prohibitive both for cost and data management. Small projects have been flown for specific projects around the state but LIDARs availability is still limited. Where available, as determined through the scoping process, the state will work to make the data available to FEMA.

### Orthophotography

# Mapping Plan for Oregon

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The state can provide to FEMA and its mapping partners digital orthophotography derived from USGS and USFS DOQs (1 & 2 meter source resolution). The Oregon Departments of Forestry, Water Resources and Oregon Geospatial Data Clearinghouse have processed in a manner to accommodate easier countywide mapping. The DOQs have been reprojected, edgematched, merged, clipped to USGS 15 minute quad boundaries and converted to both MrSID and TIFF format. Coverage is complete for the entire state.

## Base Map Data

The following are the datasets that can be made available.

### Roads

The state can provide to FEMA and its mapping partners a copy of the BLM General Transportation (GTRN). The GTRN is a statewide base originally derived from USGS 1:24K digital line graphs (DLGs); however, it substitutes USFS data coverage for DLGs in Mt. Hood National Forest.

The state can provide copies of the ODOT County and City CAD (dgn) Transportation Planning Maps to FEMA and its mapping partners. These maps are compiled at 1:24K within cities and at 1:100K scale countywide. These maps are an excellent source of base mapping information including; government jurisdictional boundaries, lat/lon ticks, township and range, etc.

The state can provide to FEMA and its mapping partners a copy of the ODOT State Highway Network. This file (CAD or GIS) is a network of all state-owned/maintained roadways, recently updated to 1:24K accuracy via orthophoto; linear referenced attribution linked to ODOT Integrated Transportation Information System (ITIS).

The state can provide to FEMA and its mapping partners a copy of the National Bridge Inventory point coverage that has been dynamically segmented onto ODOT highway network via ITIS.

### Hydrology

The State can provide to FEMA and its mapping partners a copy of the Northwest River Reach files. The Intergovernmental Resource Information Coordinating Council (IRICC) has specified the Northwest River Reach files as its official source for hydrography. The files are based on 1:100K-scale DLGs, but with several additions and improvements.

# Mapping Plan for Oregon

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Currently the State is working on a 1:24K Hydro Framework layer. The data set is still under construction but may be available for use during the 2003 – 2005 FEMA flood mapping project timeline (see <http://hydro.reo.gov/> for more details).

## Watershed Boundaries

The State can provide to FEMA and its mapping partners access to 5th and 6th Level watersheds that have been compiled based on all available state and federal agency watersheds for Oregon and Washington and Northern California. Hydrologists from these agencies have agreed on these boundaries and reviewed the draft map for accuracy. This coverage includes all 5th and 6th level watersheds in a 'regioned' coverage. These are fully attributed to the Pacific Northwest and national data standards.

## Digital Raster Graphics (DRGs)

The State can provide to FEMA and its mapping partners with copies of the USGS DRGs that have been reprojected into the Oregon Lambert Projection. DRGs are digitally rectified versions of the USGS 7.5minute quad maps.

## Populated Place Names

The State can provide to FEMA and its mapping partners a copy of the point theme representing populated place names. This point theme shows the location of populated places in the state of Oregon as derived from the 1:24,000 GNIS theme.

## City Limits

The State can provide to FEMA and its mapping partners with copy of a city limit coverage. The coverage, created by ODOT, locates city limit boundaries in Oregon at a scale of 1:24K.

## Urban Growth Boundaries (UGBs)

## Mapping Plan for Oregon

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The State can provide to FEMA and its mapping partners with copy of urban growth boundary coverage. The coverage, created by ODOT and DLCD, locates urban growth boundaries in Oregon at a scale of 1:24K. Because the majority of new development in Oregon occurs within UGBs, this coverage will be helpful in assessing the need for detailed flood studies or updates to current flood studies.

### Dams

The State can provide a copy of a dams coverage produced by the department of Water Resources to FEMA and its mapping partners. The coverage is at a scale of 1:24K and identifies the approximate location of dams in the state of Oregon that the State has statutory authority over. These are dams that are greater than or equal to 10-feet in height and store greater than or equal to 9.2-acre-feet of water behind them.

### Railroads

The State can provide a copy of a railroad coverage to FEMA and its mapping partners. The coverage, created by ODOT and ODF, locates railroads in Oregon at a scale of 1:24K.

### Willamette Valley Natural Wetlands

The State can provide FEMA and its mapping partners with a copy of a wetlands coverage. The coverage, created by the Oregon National Heritage Program, locates wetlands in Oregon's Willamette Valley at a scale of 1:24K.

### Soils

The State can provide FEMA and its mapping partners with a copy of NRCS SSURGO 1:24K soil surveys in shapefile format. The coverage is not complete for the entire state, however, nearly all of the unmapped areas are on federally owned land.

### Quad Boundaries and Tick Marks

## Mapping Plan for Oregon

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The State can provide a copy of a quad boundary and tick mark coverages. The coverages, created by the Oregon Geospatial Data Clearinghouse (formerly State Service Center), locate USGS quad boundaries and tick marks in Oregon at a scale of 1:24K.

# Mapping Plan for Oregon

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## Appendix C

Oregon's Unique Flood Hazards - Department of Geology and Mineral Industries  
The following is documentation from the Oregon Department of Geology and Mineral Industries (DOGAMI) regarding the importance of flood map updates incorporating Oregon's unique geologic issues.

July 31, 2002

Ann Beier

Department of Land Conservation and Development

636 Capitol Street NE, Suite 15

Salem, Oregon 97310

Dear Ms. Beier:

Thank you for your July 28, 2002 request for general ideas regarding the expenditure of enhanced funding for the National Flood Program as it relates to responsibilities of the Oregon Department of Geology and Mineral Industries.

As you are aware mudslides have been part of the Act for over 30 years and are the cause of much damage in Oregon. Tsunamis have been linked to the Flood Maps in technical/policy discussions for a number of years. Storm surge is a part of coastal flooding. As it changes the maps may also need to change.

As lead technical agency on these phenomena in Oregon, a state where "things look different" partly because floods are different, we see the need to evaluate the merits of integrating these Oregon phenomena into the national Flood Program at least as it is implemented in Oregon.

We appreciate your efforts and the interest of the Delegation and the Governor's Office. As you request we are here providing general ideas regarding the furtherance of the effort. Thank you for your interest.

Sincerely,

John Beaulieu, State Geologist

DRAFT

YEAR ONE

Scope of the Effort

0.5 FTE

Service and Supplies

Indirect Costs

\$60,000

Public Education, Workshops, Outreach

## Mapping Plan for Oregon

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\$40,000

TSUNAMI: The hazards would be described and appropriate references of the distribution and frequency would be cited. Included would be DOGAMI tsunami maps. The citations would be strategic and not exhaustive. Losses historically would be stated including general narrative for the 1700 event. The nature of the various lines for tsunamis on the DOGAMI products would be generally evaluated in terms of possible application to probabilistic treatment within the context of the Flood Act. Areas in need of more mapping would be listed. The V zone would be addressed conceptually in terms of the results of current modeling and the capabilities of present modeling. Other areas of inundation greater than that shown on 100-year flood maps would also be addressed in general terms. The effort would be aimed at gaining a perspective on the relevance and possible

treatment of tsunamis on flood maps. Options would be pursued in Year Two. A pilot area for further study will be identified.

SURGE: Pacific data shows that wave heights are greater now than in prior decades and that this pattern is the product of long term cyclonic cell activity in the pacific. These higher waves must be accommodated properly in the update of coastal flood maps. The core literature would be reviewed and restated to match the context provided by the National Flood Insurance Program. Data sources will be listed and references cited. The probabilistic aspects of the latest trends will be addressed in general terms. Perspectives will be developed regarding whether or not this dimension of coastal flooding needs further treatment, and if so, which kinds of treatments might be most feasible. A possible pilot area for possible further study will be identified.

MUDSLIDES: The hazard will be described in general terms and the relevance of the recent SB 12 maps will be reviewed. Basically the maps demonstrate the distribution of further study areas and show that the distribution of mudslides generally does not correspond to (lie within) the distribution of 100-year floods, even though this is an assertion of FEMA in their 2000 Response to Issues. We will note the extent of damages in the 1996-1997 events including the loss of life. Douglas County will be asked to restate an earlier statement that persons were not reimbursed by the National flood Program. Specific cases of relevance, if any, will be reviewed for identification of information of general applicability. A list of key references on mudslides in Oregon will be developed.

The current mudslide maps and model lend themselves to further refinement to address the need for probabilistic treatment to be relevant to the actuarial applications of the National Flood Insurance Program. Concepts for evolving the maps to the probabilistic treatment needed will be evaluated. Pilot areas will be identified for further study.

# Mapping Plan for Oregon

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DRAFT

YEAR TWO

Pilot Studies

FTE

Service and Supplies

Contracts

Indirect Costs

\$250,000

Public Education, Publications, Outreach

\$50,000

TSUNAMI: Digital files will be submitted to FEMA for evaluation in terms of the National Flood Insurance Program. Included will be general lines and models for the coast and detailed lines for one or more study areas that have already been completed. Input will be solicited regarding application to V zone and the probabilistic needs of the FEMA Program. Data will be compared to the pre-existing 100-year flood maps. Attempts will be made to specifically relate some data for the 1964 tsunami to the flood maps.

One area will be studied extensively and will be carried to completion with conclusions drawn as to how the tsunami data relates to pre-existing flood maps in terms of total extent, probability of occurrence, and V zone distribution. The results will suggest the relative merits of pursuing various ways of portraying the tsunami data on flood maps. One pathway is to integrate the tsunamis into the 100-year flood; a second is to contemplate a subset of coverage; a third is to overlay the data for general public education purposes.

SURGE: Digital files for a pilot area will be submitted to FEMA for evaluation in terms of the National Flood Insurance Program. Included will be general lines and models for the coast and detailed lines for one or more study areas that have already been completed. Input will be solicited regarding application to V zone and the probabilistic needs of the FEMA Program. Data will be compared to the pre-existing 100-year flood maps. One area will be studied extensively and will be carried to completion with conclusions drawn as to how the surge data relates to pre-existing flood maps in terms of total extent and probability of occurrence. The results will suggest the relative merits of pursuing various ways of portraying the surge data on flood maps. One pathway is to integrate the

## Mapping Plan for Oregon

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surges into the 100-year flood; a second is to overlay the data for general public education purposes.

MUDSLIDES: A pilot study area will be investigated to refine the existing model maps to better address the probabilistic aspects of the Flood Program. Avenues of investigation will include a mix of climatic patterns, land use patterns, and rigorous field investigation to discern evidence of frequency for existing mudslides. The task is difficult, but it is noted that flood maps are generally logarithmic rather than arithmetic. Reference durations are 10 years, 100 years, and 500 years in a general sense. This renders this effort doable. Results in the study area will be compared rigorously with the existing 100 year maps and conclusions will be drawn about disparities in general distribution and frequency.

Impact and mitigation are also a concern and general conclusions will be drawn there as well, since it is not desirable to have to formulate entire new mitigation schemes for the mudslide aspect of flooding unless it is necessary and warranted. This area of discussion needs realistic treatment and is difficult; these facts, however, do not negate the reality that mudslides are part of the National Flood Insurance Act. FEMA staff will be expected to provide practical and candid input.

DRAFT

YEAR THREE PLUS EXTENSION

6 FTE (one year, or fewer persons for more years)

Service and Supplies

Selected Contracts

Indirect Costs

\$1,400,000

Public Education, Workshops, Publications, Web Site Development

\$200,000

TSUNAMI: Tsunami Data probably will be accommodated on the National Flood Insurance Maps in one form or another. The events are obviously flooding and they obviously have a probabilistic dimension to them that has been documented. It is unclear

## Mapping Plan for Oregon

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whether the representation will fall within the bounds of insurance coverage. It might be that the lines will be presented as a public education function. Requirements of Oregon law might also be referenced.

Depending on the outcome of the initial scooping of year one and the pilot work of year two the final decisions will be made and a decision for the entire coast will be implemented. The effort may or may not included completion of modeling for the few remaining bays of risk interest. V- zones will be of particular interest in any scenario, but the frequency of the V zone behavior will largely dictate the most appropriate manner in which the issue should be treated. We anticipate considerable policy discussion by the state and FEMA in year Three Plus Extension efforts.

Outreach will include explanation of the new data to the public, response to inquiries, workshops, web site development, development and release of digital files, cooperation with DLCDC and Building Codes, and technology transfer.

SURGE: We anticipate that storm surge will be integrated into updated models of coastal flooding or will otherwise be accommodated. These efforts are so much a part of the basic flood modeling that the DOGAMI efforts would be minimal on the technical side, except for oversight and review.

Outreach will include explanation of the new data to the public, response to inquiries, workshops, web site development, development and release of digital files, cooperation with DLCDC and Building Codes, and technology transfer.

MUDSLIDES: The Senate Bill 12 maps for western Oregon will be refined based on climatic data, field observations, site-specific data from field work and site specific data from available site reports in agency and county files. Existing data will be utilized in GIS systems for extrapolation and interpolation of general frequency determinations for all polygons suitable for the loose probabilistic requirements of the National Flood Program.

Outreach will include publications, web site development, workshops in cooperation with other agencies, technology transfer and advice to counties as they link the opportunities of the Flood Program with any pre-existing proto-cols relative to the requirements of SB 12 (1999). In the simplest of terms the structure, acceptance, and benefits of the National Flood Insurance program are a desirable supplement to the regulatory framework of SB 12. Counties may opt for the federal program and may combine it with aspects of the SB 12 effort to provide and innovative and effective approach to mudslides in Oregon. Such an evolution may provide a proto-type for consideration in analogous parts of the rest of the nation at a time when climate and demographics might otherwise further increase the risk of mudslides to society.

The existing national approach to mudslides in the National Flood Program is possibly becoming less and less viable as it becomes clear that losses are increasing, demographics will make them continue to increase, and distribution of the mudslide polygons lies largely outside the confines of the 100-year flood distributions as presently mapped.

**Appendix B**

**DLCD/State Authorities for Floodplain Management**

# Mapping Plan for Oregon

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## **DLCD's Mandate for Floodplain Management – Map Modernization**

### **ORS 197, 215, 227: Oregon Land Use Statutes**

Oregon Revised Statutes (ORS) Chapters 197, 215 and 227 address land use planning. ORS 197 requires counties and cities to develop and administer comprehensive land use plans and land use regulations. ORS 197 also establishes the Department of Land Conservation and Development (DLCD) as the state's land use planning agency. ORS 215 and 227 address county and city authorities for land use planning.

### **OARs Chapter 660: Oregon Land Use Rules**

Chapter 660 of the Oregon Administrative Rules (OAR) contains rules for the statewide land use planning program. OAR 660-015 is the rule that adopts the statewide planning goals as the state's primary land use policies. Local comprehensive plans and land use regulations developed and administered under the above reference statutes must comply with the statewide planning goals.

### **Goal 7: Areas Subject to Natural Disasters and Hazards**

Goal 7 (OAR 660-015-0000) is the statewide planning goal that directs local governments to address natural hazards in their local land use programs. Goal 7 addresses multiple types of natural hazards, including floods (coastal and riverine). The Goal imposes several broad requirements on local governments:

- 1) develop inventories of hazardous areas for inclusion in the local comprehensive plan;
- 2) adopt land use policies to address known areas of natural hazards;
- 3) enact land use regulations based on hazard inventories and plan policies to protect life and property from losses associated with development in hazard areas; and,
- 4) update inventories, policies, and land use regulations on a periodic basis to reflect new information and changing circumstances in the community.

Goal 7 addresses flood hazards by stating that “local governments will be deemed to comply with Goal 7 for coastal and riverine flood hazards by adopting and implementing local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements. In evaluating the need for additional local policies or regulations to address flood hazards, local governments are directed to consider:

- 1) the frequency, severity and location of the hazard;
- 2) the effects of the hazard on existing and future development;
- 3) the potential for development in the hazard area to increase the frequency and severity of the hazard;
- 4) the types and intensities of land uses to be allowed in the hazard area
- 5) the need to avoid development in hazard areas where the risk to people and property cannot be mitigated; and
- 6) the need to prohibit the siting of essential facilities, major structures, hazardous facilities and special occupancy structures in identified hazard areas

## Mapping Plan for Oregon

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Under Goal 7, local governments are strongly encouraged to also consider a number of guidelines for natural hazards management including the following:

- 1) the benefits of maintaining hazard areas as open space, recreation and other low density uses;
- 2) the beneficial effects that hazards can have on natural resources and the environment;
- 3) the effects of development and mitigation measures in identified hazard areas on the management of natural resources;
- 4) programs to manage stormwater runoff as a means to help address flood and landslide hazards;
- 5) limiting placement of fill in floodplains;
- 6) prohibiting the storage of hazardous materials in floodplains or otherwise providing for safe storage of such materials;
- 7) elevating structures above the elevation required by the NFIP and the state building code;
- 8) non-regulatory approaches to natural hazard management; and
- 9) requiring site-specific reports for development, appropriate for the level and type of hazard.

In addition to Goal 7, statewide planning Goals 17 and 18 establish additional authority and requirements for coastal communities.

### **Goal 17: Coastal Shorelands**

Goal 17 (OAR 660-015-0010) addresses conservation, protection, and appropriate development of Oregon's coastal shorelands. The goal also aims to reduce hazards to human life and property and adverse effects to water quality and habitats resulting from the use and enjoyment of Oregon's coastal shorelands.

### **Goal 18: Beaches and Dunes**

The purpose of Goal 18 (OAR 660-015-0010) is conservation, protection, and where appropriate, development on or restoration of the resources and benefits of coastal beach and dune areas. The goal also addresses the need to reduce hazards to human life and property from natural or man-induced actions associated with beach and dune areas.

### **DLCD State Coordinator Function - National Flood Insurance Program**

DLCD is the State of Oregon's designated coordinating agency for purposes of administering the NFIP in Oregon. Under a continuing agreement with the FEMA, DLCD works cooperatively with FEMA to ensure that Oregon communities remain in compliance with the NFIP and associated state requirements. DLCD provides technical assistance to Oregon communities regarding the NFIP and related floodplain management issues. DLCD also coordinates with other state agencies and programs that affect floodplain management within the state.

Community participation in the NFIP requires the adoption and enforcement of a floodplain management ordinance that controls development in the floodplain.

## Mapping Plan for Oregon

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Participation in the NFIP has been accepted by Land Conservation and Development Commission (LCDC) as sufficient to comply with Statewide Planning Goal 7 for flood hazards. (See earlier discussion under Goal 7.)

### **DLCD/LCDC Strategic Plan**

The Land Conservation and Development Commission (LCDC) adopted a strategic plan that identifies a vision, mission, goals and objectives for work by LCDC and the Department. The strategic plan is supported by a series of performance measures that address the goals and objectives laid out in the plan. The following mandates found in these documents support DLCD's proposal to pursue involvement in the FEMA map modernization initiative:

*1) Objective: Increase the percentage of environmental resources and natural hazards that are mapped, protected, and appropriately considered in buildable land inventories.*

Relation to Map Modernization: The above objective can be better achieved if updated, easy to use flood hazard maps are available to Oregon communities.

*2) Objective: Increase the efficiency and effectiveness of the department's services to citizens, local governments, and agencies.*

Relation to Map Modernization: Implementation of the state participation strategy outlined in Oregon's business plan for Map Modernization would allow for more efficient and effective service to local communities in terms of flood hazard mapping.

*3) Objective: Expand funding sources to support new initiatives and on-going efforts while maintaining baseline funding for core programs.*

Relation to Map Modernization: Implementation of the state participation strategy outlined in Oregon's business plan for Map Modernization is contingent on DLCD's ability to obtain additional federal funding to support flood hazard mapping. DLCD has stated that baseline funding for core programs, including federal funds received under FEMA's CAP-SSSE program, cannot cover the costs associated with Map Modernization. The plan also explains how Legislative and other approvals would be required before any additional federal funds could be accepted by the Department.

*4) Performance Measure: Percentage of urban areas that have updated buildable land inventories to account for natural resource and hazard areas.*

Relation to Map Modernization: Buildable lands inventories adopted by Oregon communities could more accurately account for hazard areas if updated, easy to use flood hazard maps were available.

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*5) Performance Measure: Percentage of state agencies with programs affecting land use that have agreed with DLCD on a process to align strategic goals, objectives, performance measures and agency projects.*

Relation to Map Modernization: The state participation strategy outlined in Oregon's business plan for Map Modernization was developed in recognition of the need to coordinate with and align mapping efforts with other state agency programs.

*6) Performance Measure: Number of stakeholder groups, including state, local, and tribal governments, who actively participate in workgroups that advise LCDC or DLCD on policy, operations or projects.*

Relation to Map Modernization: The state participation strategy outlined in Oregon's business plan for Map Modernization accounts for continuing stakeholder involvement in the map modernization process.

### **Other State Authorities for Floodplain Management**

#### **Building Codes Division (BCD) State Building Codes**

The Oregon Building Codes Division (BCD) adopts statewide standards for building construction that are administered by the state and local municipalities throughout Oregon. The One and Two-Family Dwelling, Structural Specialty, and Manufactured Dwelling codes contain requirements to elevate a building at least one foot above base flood elevations as shown on FEMA maps. These building codes also contain provisions for flood proofing, underfloor drainage, and directing stormwater away from buildings. ORS 455.447 and the State Structural Code also establish restrictions on the location of essential facilities in tsunami inundation zones along the coast subject to flooding following an earthquake. Essential facilities include hospitals, fire and police stations, emergency response facilities, and special occupancy structures, such as large schools.

#### **Office of Emergency Management (OEM) Hazard Mitigation**

“The purpose of Oregon Emergency Management (OEM) is to execute the Governor's responsibilities to maintain an emergency services system as prescribed in ORS 401 by planning, preparing and providing for the prevention, mitigation and management of emergencies or disasters that present a threat to the lives and property of citizens and visitors to the State of Oregon.” OEM coordinates and facilitates emergency planning, preparedness, response and recovery activities with the state as well as local emergency services agencies and organizations. (Source: <http://www.osp.state.or.us/oem/index.htm>, February 6, 2004)

OEM directs the work of the Interagency Hazard Mitigation Team, of which DLCD is a member. The full membership of the IHMT is listed below:

- Governor's Natural Resources Office
- Department of Administrative Services, Risk Management Division

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- Department of Agriculture
- DCBS - Building Codes Division
- DCBS - Insurance Division
- Economic and Community Development Department
- Department of Environmental Quality
- Department of Fish and Wildlife
- Department of Forestry
- Department of Geology and Mineral Industries
- **Department of Land Conservation and Development**
- Division of State Lands
- Oregon State Police, Office of Emergency Management
- Oregon State Police, Office of State Fire Marshal
- Public Utility Commission
- Department of Transportation
- Water Resources Department

The IHMT mission is to understand losses arising from natural hazards and to recommend strategies to mitigate loss of life, property, and natural resources. Support for hazard mitigation and education are key goals for the IHMT. One way that the IHMT has worked towards this mission has been through development of the *State of Oregon Hazard Mitigation Plan*.

### **Department of Environmental Quality – 401 Water Quality Certification Program**

The Oregon Department of Environmental Quality (DEQ) is responsible for water quality certification under section 401(a) of the federal Clean Water Act. This certification is required as part of the federal wetlands permitting process (e.g. U.S. Army Corps of Engineers, Section 404 of Clean Water Act). DEQ also participates in the DSL Removal and Fill permit process described above.

### **Division of State Lands (DSL) Removal and Fill Program**

Oregon's Removal-Fill Law (ORS 196.800-990) requires individuals who remove or fill 50 cubic yards or more in "waters of the state" to obtain a permit from the DSL. "Waters of the state" are defined as "natural waterways including all tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and non-navigable, including that portion of the Pacific Ocean which is in the boundaries of this state." In State Scenic Waterways or areas designated by DSL as essential indigenous anadromous salmonid habitat, most removal fill activities require a permit, regardless of the number of cubic yards affected.

*Credits: Some of the above information was derived from the Oregon Technical Resource Guide for Natural Hazards Planning, Chapters 3 and 4, 2000.*

**Appendix C**

**Description of FEMA Mapping Process**

# Mapping Plan for Oregon

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# Mapping Plan for Oregon

## FEMA's Process for Flood Hazard Mapping

The following chart represents the general flow process and inputs and outputs of the FEMA Mapping Process.

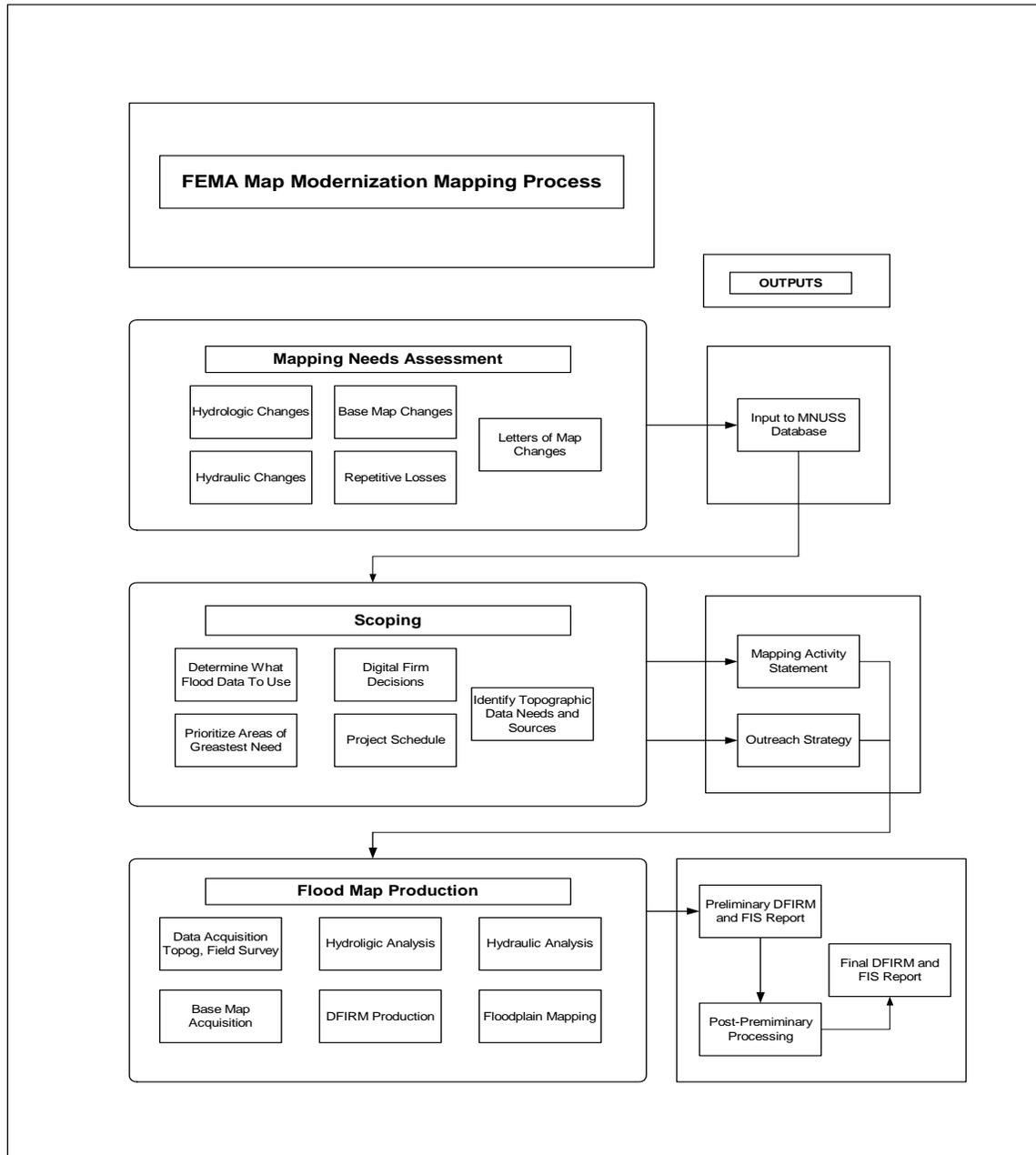


Figure 1 – FEMA Map Modernization Mapping Process

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## **Mapping Needs Assessment**

The Mapping Needs Assessment (MNA) is an ongoing process to maintain accurate flood data and to help in prioritizing work. The MNA information is used to update FEMA's Mapping Needs Update Support System (MNUSS).

## **Project Scoping**

Project scoping is intended for projects that result in a modernized (digital) Flood Insurance Rate Map (DFIRM) that may or may not include updated flood data. Comprehensive Project Scoping is a collaborative effort that ensures the plan for a Flood Map Project considers all of the factors. All Project Team members are involved in project scoping which results in a Mapping Activity Statement and a Statement of Work.

Project Scoping also includes the development of a project outreach strategy to maximize stakeholder involvement, enhance map accuracy, minimize formal appeals and protests, and ensure timely release of maps.

## **Flood Map Production**

Flood Map Production consists of the engineering and mapping activities of new studies or restudies to update flood data, the compilation of base map layers and the production of DFIRMs. This phase may include incorporating available topographic data or development of new topographic data. Since acquisition of new topographic data can constitute 50% of the cost of flood map updates, all sources of existing topographic data must be explored before deciding to acquire new data.

The purpose of the hydrologic analysis is to determine the magnitude and frequency of flood discharges. From a hydrologic perspective, there should be a valid reason why previously computed flood discharges are revised. FEMA provides a list of accepted models that are to be used for hydrologic analysis.

The purpose of the hydraulic analysis is to take into account the flood discharge, topography of the floodplain and control structures to then establish flood profiles and floodways, define floodplain boundaries, Base Flood Elevations and prepare the Flood Insurance Study report.

The final phase of Flood Map Production entails the integration of the base map layers and floodplain mapping and the creation of the DFIRM.

**Appendix D**

**DLCD Organization Chart**

**Appendix E**

**Survey for Digital Base Map Inventory**

## ***DIGITAL BASEMAP INVENTORY SURVEY***

This survey consists of four sections: contact information, GIS data layers, GIS data distribution and additional comments. Please answer the questions or fill in the requested information in each section. For the GIS data layers section, if you do not produce the specific data layer answer no to the first question and skip the remaining questions for that layer.

### **A. CONTACT INFORMATION**

1. Organization:
2. Name:
3. Title:
4. Mailing Address:
5. City:
6. State:
7. Zip Code:
8. Telephone:
9. Fax:
10. Email:
11. Website:

### **B. GIS DATA LAYERS**

#### **Political Jurisdictions**

##### **County Boundaries**

1. Do you produce county boundary data? Yes  No
2. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)
  - 1" = 1,000' (1:12,000)
  - 1" = 2,000' (1:24,000)
  - Other Please describe:
3. What type of features do the data contain (check all that apply)?
  - Polygons
  - Lines
  - Points
  - Other Please describe:
4. Which of the following information do the data contain?
  - County name
  - Other Please describe:
5. Do you have complete coverage of your jurisdiction?

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- Yes  
 No Please describe the coverage:
6. When was the last update?
7. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
8. What is the coordinate system for the data?
- OGIC Lambert projection  
 Oregon State Plane  
 UTM  
 Latitude/Longitude  
 Other Please describe:
9. What are the units of measure for the data?
- US survey feet  
 Meters  
 International Feet  
 Other Please describe:  
 N/A
10. What is the horizontal datum for the data?
- NAD83  
 NAD27  
 Other Please describe:
11. Do you have metadata for the data? Yes  No

### Municipal Boundaries

1. Do you produce municipal boundary data? Yes  No
2. What is the scale of the data?
- 1" = 100' (1:1,200)  
 1" = 200' (1:2,400)  
 1" = 400' (1:4,800)  
 1" = 1,000' (1:12,000)  
 1" = 2,000' (1:24,000)  
 Other Please describe:
3. What type of features do the data contain (check all that apply)?
- Polygons  
 Lines  
 Points  
 Other Please describe:
4. Which of the following information do the data contain?
- Municipality name  
 Other Please describe:
5. Do you have complete coverage of your jurisdiction?
- Yes  
 No Please describe the coverage:
6. When was the last update?

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7. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
8. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
9. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
10. What is the horizontal datum for the data?
  - NAD83
  - NAD27
  - Other Please describe:
11. Do you have metadata for the data? Yes  No

### **Publicly Owned Lands (Parks, Forests, Military Reservations, Native American Lands, etc.)**

1. Do you produce publicly owned lands data? Yes  No
2. What types of publicly owned lands do the data contain (check all that apply)?
  - Parks
  - Forests
  - Military Reservations
  - Native American Lands
  - Other Please describe:
3. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)
  - 1" = 1,000' (1:12,000)
  - 1" = 2,000' (1:24,000)
  - Other Please describe:
4. What type of features do the data contain (check all that apply)?
  - Polygons
  - Lines
  - Points
  - Other Please describe:
5. Which of the following information do the data contain?
  - Publicly owned land name
  - Other Please describe:

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6. Do you have complete coverage of your jurisdiction?  
 Yes  
 No Please describe the coverage:
7. When was the last update?
8. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
9. What is the coordinate system for the data?  
 OGIC Lambert projection  
 Oregon State Plane  
 UTM  
 Latitude/Longitude  
 Other Please describe:
10. What are the units of measure for the data?  
 US survey feet  
 Meters  
 International Feet  
 Other Please describe:  
 N/A
11. What is the horizontal datum for the data?  
 NAD83  
 NAD27  
 Other Please describe:
12. Do you have metadata for the data? Yes  No

### Transportation

#### Street Centerlines

1. Do you produce street centerline data? Yes  No
2. What is the scale of the data?  
 1" = 100' (1:1,200)  
 1" = 200' (1:2,400)  
 1" = 400' (1:4,800)  
 1" = 1,000' (1:12,000)  
 1" = 2,000' (1:24,000)  
 Other Please describe:
3. What type of features do the data contain (check all that apply)?  
 Polygons  
 Lines  
 Points  
 Other Please describe:
4. Which of the following information do the data contain?  
 Road name  
 Road type (i.e. primary, secondary, trail)  
 Road status (i.e. paved, proposed, under construction, unimproved)  
 Address Range

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- Mile Post
  - Other Please describe:
5. How are the feature labels stored?
- GIS attributes
  - Graphic text/annotation
  - Other Please describe:
  - None

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6. Do you have complete coverage of your jurisdiction?  
 Yes  
 No      Please describe the coverage:
7. When was the last update?
8. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
9. What is the coordinate system for the data?  
 OGIC Lambert projection  
 Oregon State Plane  
 UTM  
 Latitude/Longitude  
 Other      Please describe:
10. What are the units of measure for the data?  
 US survey feet  
 Meters  
 International Feet  
 Other      Please describe:  
 N/A
11. What is the horizontal datum for the data?  
 NAD83  
 NAD27  
 Other      Please describe:
12. Do you have metadata for the data?    Yes     No

### Railroads

1. Do you produce railroads data?    Yes     No
2. What is the scale of the data?  
 1" = 100' (1:1,200)  
 1" = 200' (1:2,400)  
 1" = 400' (1:4,800)  
 1" = 1,000' (1:12,000)  
 1" = 2,000' (1:24,000)  
 Other      Please describe:
3. What type of features do the data contain (check all that apply)?  
 Polygons  
 Lines  
 Points  
 Other      Please describe:
4. Which of the following information do the data contain?  
 Railroad name  
 Railroad status (i.e. active, abandoned)  
 Other      Please describe:
5. How are the feature labels stored?  
 GIS attributes

## Mapping Plan for Oregon

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- Graphic text/annotation
- Other Please describe:
- None
- 6. Do you have complete coverage of your jurisdiction?
  - Yes
  - No Please describe the coverage:
- 7. When was the last update?
- 8. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
- 9. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
- 10. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
- 11. What is the horizontal datum for the data?
  - NAD83
  - NAD27
  - Other Please describe:
- 12. Do you have metadata for the data? Yes  No

### **Other Transportation Features (Airports, Ferries, etc.)**

- 1. Do you produce other transportation data? Yes  No
- 2. What types of transportation features do the data contain (check all that apply)?
  - Airports
  - Ferries
  - Other Please describe:
- 3. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)
  - 1" = 1,000' (1:12,000)
  - 1" = 2,000' (1:24,000)
  - Other Please describe:
- 4. What type of features do the data contain (check all that apply)?
  - Polygons
  - Lines
  - Points
  - Other Please describe:

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5. Which of the following information do the data contain?

Feature name

Other Please describe:

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6. How are the feature labels stored?
  - GIS attributes
  - Graphic text/annotation
  - Other Please describe:
  - None
7. Do you have complete coverage of your jurisdiction?
  - Yes
  - No Please describe the coverage:
8. When was the last update?
9. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
10. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
11. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
12. What is the horizontal datum for the data?
  - NAD83
  - NAD27
  - Other Please describe:
13. Do you have metadata for the data? Yes  No

### **Hydrography (Lakes/ponds, rivers/streams, shorelines, wetlands, estuaries, swamps/marshes, etc.)**

1. Do you produce hydrography data? Yes  No
2. What types of hydrography features do the data contain (check all that apply)?
  - Lakes/ponds
  - Rivers/streams
  - Shorelines
  - Wetlands
  - Estuaries
  - Swamps/marshes
  - Other Please describe:
3. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)

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- 1" = 1,000' (1:12,000)  
 1" = 2,000' (1:24,000)  
 Other Please describe:
4. What type of features do the data contain (check all that apply)?  
 Polygons  
 Lines  
 Points  
 Other Please describe:
5. Which of the following information do the data contain?  
 Water feature name  
 Water feature type  
 Stream class  
 Stream order  
 Other Please describe:
6. How are the feature labels stored?  
 GIS attributes  
 Graphic text/annotation  
 Other Please describe:  
 None
7. Do you have complete coverage of your jurisdiction?  
 Yes  
 No Please describe the coverage:
8. When was the last update?
9. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
10. What is the coordinate system for the data?  
 OGIC Lambert projection  
 Oregon State Plane  
 UTM  
 Latitude/Longitude  
 Other Please describe:
11. What are the units of measure for the data?  
 US survey feet  
 Meters  
 International Feet  
 Other Please describe:  
 N/A
12. What is the horizontal datum for the data?  
 NAD83  
 NAD27  
 Other Please describe:
13. Do you have metadata for the data? Yes  No

### Bench Marks

1. Do you produce bench mark data? Yes  No

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2. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)
  - 1" = 1,000' (1:12,000)
  - 1" = 2,000' (1:24,000)
  - Other Please describe:
3. What type of features do the data contain (check all that apply)?
  - Polygons
  - Lines
  - Points
  - Other Please describe:
4. Which of the following information do the data contain?
  - Permanent, unique identifier
  - Other Please describe:
5. Do you have complete coverage of your jurisdiction?
  - Yes
  - No Please describe the coverage:
6. When was the last update?
7. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
8. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
9. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
10. What is the horizontal datum for the data?
  - NAD83
  - NAD27
  - Other Please describe:
11. What is the vertical datum for the data?
  - NAVD88
  - NGVD29
  - Other Please describe:
12. Do you have metadata for the data? Yes  No

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### Geodetic Control

1. Do you produce geodetic control data? Yes  No
2. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)
  - 1" = 1,000' (1:12,000)
  - 1" = 2,000' (1:24,000)
  - Other Please describe:
3. What type of features do the data contain (check all that apply)?
  - Polygons
  - Lines
  - Points
  - Other Please describe:
4. Which of the following information do the data contain?
  - Permanent, unique identifier
  - Other Please describe:
5. Do you have complete coverage of your jurisdiction?
  - Yes
  - No Please describe the coverage:
6. When was the last update?
7. What is the positional (horizontal) accuracy of the data (use distance in units of measure)?
8. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
9. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
10. What is the horizontal datum for the data?
  - NAD83
  - NAD27
  - Other Please describe:
11. Do you have metadata for the data? Yes  No

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### Elevation

1. Do you produce topography data? Yes  No
2. What is the type of elevation data (check all that apply)?
  - Contours Enter contour interval in feet:
  - Spot Heights Enter source:
  - Digital elevation model (DEM) Enter post-spacing in feet:
  - Digital terrain model (DTM) Enter source:
  - Triangular Irregular Network (TIN) Enter source:
  - Other Please describe and enter source:
3. What is the scale of the data?
  - 1" = 100' (1:1,200)
  - 1" = 200' (1:2,400)
  - 1" = 400' (1:4,800)
  - 1" = 1,000' (1:12,000)
  - 1" = 2,000' (1:24,000)
  - Other Please describe:
4. Which of the following information do the data contain?
  - Elevation value
  - Other Please describe:
5. Do you have complete coverage of your jurisdiction?
  - Yes
  - No Please describe the coverage:
6. When was the last update?
7. What is the horizontal positional accuracy of the data (use distance in units of measure)?
8. What is the vertical positional accuracy of the data (use distance in units of measure)?
9. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
10. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
11. What is the horizontal datum for the data?
  - NAD83
  - NAD27
  - Other
12. What is the vertical datum for the data?

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- NAVD88
- NGVD29
- Other Please describe:

13. Do you have metadata for the data? Yes  No

### Digital Orthophotography

1. Do you produce digital orthophotography? Yes  No
2. Which describes the dataset?
  - Complete Flight date of most recently completed imagery:
  - In-progress Flight date:
  - Currently contracting Anticipated flight date:
3. What is/will be the imagery type?
  - Color-infrared
  - True color
  - Black/white
  - Other Please describe:
4. Do/will you have complete coverage of your jurisdiction? Yes  No
5. What map scales and pixel resolutions were/will be used to collect the images?  
(fill in a row for each applicable map scale):

	3 inch pixel	½ foot pixel	1 foot pixel	2 foot pixel	1 meter pixel	2 meter pixel	other
<b>1:1,200</b>	<input type="checkbox"/>						
<b>1:2,400</b>	<input type="checkbox"/>						
<b>1:4,800</b>	<input type="checkbox"/>						
<b>1:12,000</b>	<input type="checkbox"/>						
<b>1:24,000</b>	<input type="checkbox"/>						
<b>other</b>	<input type="checkbox"/>						

6. What is the coordinate system for the data?
  - OGIC Lambert projection
  - Oregon State Plane
  - UTM
  - Latitude/Longitude
  - Other Please describe:
7. What are the units of measure for the data?
  - US survey feet
  - Meters
  - International Feet
  - Other Please describe:
  - N/A
8. What is the horizontal datum for the data?
  - NAD83

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NAD27

Other Please describe:

9. Do you have metadata for the data? Yes  No

### C. GIS DATA DISTRIBUTION

1. Do you normally restrict access to your data?

Yes

No

Sometimes

2. Do you normally charge for data?

Yes

No

Sometimes

3. If you normally charge for data, please describe your charge policy:

4. Do you normally restrict redistribution of your data?

Yes

No

Sometimes

### D. ADDITIONAL COMMENTS