

Thurston County’s Annex to the Natural Hazards Mitigation Plan for the Thurston Region

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RESOLUTION NO. 14290

A RESOLUTION adopting the “Natural Hazards Mitigation Plan for the Thurston Region.”

WHEREAS, Thurston County, its residents and property are vulnerable to natural disasters; and

WHEREAS, the Thurston County Board of Commissioners realizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community; and

WHEREAS, Thurston County has been an active participant in the Hazard Mitigation Planning Workgroup, which has established a comprehensive, coordinated planning process to eliminate or decrease these vulnerabilities; and

WHEREAS, Thurston County staff have identified, justified and prioritized a number of proposed initiatives intended to mitigate the vulnerabilities of unincorporated areas of Thurston County to the impacts of future disasters; and

WHEREAS, these proposed initiatives and projects have been incorporated into the second edition of the “Natural Hazards Mitigation Plan for the Thurston Region” that has been prepared and issued for consideration and implementation by the jurisdictions and organizations of Thurston County;

NOW THEREFORE, the Board of County Commissioners of Thurston County, Washington, does resolve as follows:

1. Thurston County hereby approves and adopts the “Natural Hazards Mitigation Plan for the Thurston Region” as its natural hazards mitigation plan and comprehensive flood hazard management plan.
2. Thurston County staff are authorized to include minor language changes required by the Federal Emergency Management Agency to obtain federal approval without Board re-adoption of the plan.
3. Thurston County staff are requested and instructed to pursue available funding opportunities for implementation of the mitigation initiatives designated by the County.
4. Thurston County will, upon receipt of such funding or other necessary resources, seek to implement the proposals contained in its section of the mitigation initiatives, and
5. Thurston County will continue to participate in the updating and expansion of the “Natural Hazards Mitigation Plan for the Thurston Region” in the years ahead, and

6. Thurston County will further seek to encourage the businesses, industries and community groups operating within Thurston County to also participate in the updating and expansion of the "Natural Hazards Mitigation Plan for the Thurston Region" in the years ahead.

ADOPTED: October 27, 2009

BOARD OF COUNTY COMMISSIONERS
THURSTON COUNTY, WASHINGTON

ATTEST:

Roberto J. Bourmas
Clerk of the Board

Cathy Wolfe
CATHY WOLFE, Chair

APPROVED AS TO FORM:
EDWARD G. HOLM
PROSECUTING ATTORNEY

Sandra Romero
SANDRA ROMERO, Vice-Chair

BY: [Signature]
Deputy Prosecuting Attorney

Karen Valenzuela
KAREN VALENZUELA, Commissioner

Community Profile Thurston County

Information: (360) 754-3800

www.co.thurston.wa.us

Demographics

Population, 1990	161,238
Population, 2000	207,355
Population, 2008	245,300
Av. Ann. Pop. Growth, 1990-2000	2.5%
Av. Ann. Pop. Growth, 2000-2008	2.1%

Households, 2000	81,625
Average Household Size, 2000	2.5

Age Structure, 2000:

19 and under	58,486	28%
20 - 64	125,240	60%
65 and over	23,629	11%
Median Age	37	--

Race and Ethnic Categories, 2000:

White	177,617	85.7%
Black/African American	4,881	2.4%
American Indian & Alaska Native	3,143	1.5%
Asian	9,145	4.4%
Native Hawaiian & Other Pacific Islander	1,078	1.0%
Other Race	4,584	2.2%
Two or More Races	4,225	2.0%
Hispanic*	9,392	4.5%

Salish Indian groups from the tribes now known as Nisqually, Squaxin, and Chehalis gathered shellfish and frequented the inlets and prairies of Puget Sound for centuries before Euro-American exploration and settlement.



The arrival of the early settlers established an American foothold in the area, and by 1846 helped determine that the area would be part of the American Oregon Territory instead of British (now Canadian) land when the boundary was set at the 49th parallel, between the two countries.

Thurston County, originally to be called Simmons County, was named for Samuel Thurston when it was founded in 1852. By the end of 1853, the area north of the Columbia was established as a separate territory from Oregon — named Washington Territory. Thurston County was the most populous area in the new Washington in 1853 and it would continue to be so until the mid 1870s, when the Northern Pacific Railroad by-passed Olympia and made its westernmost terminus in Tacoma.

Housing

Housing Units, 2000:

Single-Family	55,035
Multifamily	19,872
Manufactured Homes	11,355

Census Median House Value, 2000	\$145,200
Average House Sale Price, 2007	\$298,290

Employment and Income

Median Household Income:

1989 (Census 1990 in 1999 \$'s)	\$39,561
1999 (Census 2000)	\$46,975

Households by Income Category, 1999:

Less than \$14,999	9,673	12%
\$15,000 to \$24,999	9,099	11%
\$25,000 to \$49,999	24,918	31%
\$50,000 to \$74,999	19,489	24%
\$75,000 or more	18,487	23%

Taxable Retail Sales, 2007 \$4,195,878,250

Total Jobs, 2003:

Manufacturing	4,780
Retail	19,310
Finance/Services	40,130
Federal, State, & Local Gov't	35,508
Tribal Gov't & Enterprises	1,531
Other	14,079

Development Activity

Total New Permitted Residential Units, 2007:

Single-Family	1,781
Multifamily	804
Manufactured Homes	122
Total	2,707

Subdivision Activity, 2007:

Short Plat	# Appl.	# Lots
	39	132
Long Plat	35	2,069
Large Lot	66	310

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Thurston County Plan Development Process

Hazard Mitigation Plan Development Staff

Thurston County Emergency Services (formerly Emergency Management Division) led the development of the County's update to its hazard mitigation strategy and plan process. The following individuals served as key staff throughout the planning process:

Department/Title	Representative(s)
Emergency Services , Program Manager	Kathy Estes
Emergency Services, Emergency Management Coordinator	Sandy Johnson
Emergency Services, Emergency Management Coordinator	Andrew Kinney

Additional staff played a key role in providing technical and staff support throughout the plan process. These functions included reviewing and updating the region's risk assessment, providing information on flood hazards, documenting the county's participation in the National Flood Insurance Program, and assisting with public outreach. The following staff provided key support functions throughout the planning process:

Department/Title	Representative(s)
Development Services, Senior Plans Examiner and Fire Marshal (former)	Joe Butler
Resource Stewardship Department, Natural Resource Program Manager	Mark Swartout
Water and Waste Management, Environmental Monitoring Program Supervisor	Mark Bieber
Environmental Health, Hydrogeologist	Nadine Romero
Emergency Services, Emergency Management Coordinator	Vivian Eason

Hazard Mitigation Plan Development

The following activities supported the development of the County's local hazard mitigation planning process:

Date	Location	Activity	Subject
11/15/2007	Thurston Regional Planning Council	Meeting attended by Sandy Johnson and Paul Brewster, Associate Planner, TRPC	Strategy for mitigation plan development
1/8/2008	County Emergency Operations Center	Meeting attended by Sandy Johnson, Kathy Estes and Paul Brewster	Mitigation plan scope and content
4/29/2008	County Emergency Operations Center	Meeting attended by Sandy Johnson and Paul Brewster	Mitigation plan scope and content

Date	Location	Activity	Subject
5/30/2008	Thurston Regional Planning Council	Meeting attended by Sandy Johnson, Andrew Kinney, Paul Brewster, Joe Butler and Scott Carte	Data requirements and data mining for updating the risk assessment.
5/30/2008	Thurston Regional Planning Council	Meeting attended by Sandy Johnson and Paul Brewster	Plan status and future steps
4/9/2009	Heritage Court	Meeting attended by Sandy Johnson, Andrew Kinney and Paul Brewster	Plan status and future steps
4/17/2009	Thurston Regional Planning Council	Meeting attended by Sandy Johnson, Andrew Kinney and Paul Brewster	Risk Assessment Review, Plan scope and timeline
4/28/2009	Thurston Regional Planning Council	Meeting attended by Sandy Johnson, Andrew Kinney and Paul Brewster	Risk Assessment Review, Plan scope and timeline
5/6/2009	County Emergency Operations Center	Meeting attended by Sandy Johnson and Andrew Kinney	Strategy for mitigation initiative development
6/2/2009	E-mail distribution	Distribution to 22 county staff	Introduction to the discussion and development of mitigation initiatives, existing initiatives
6/15/2009	Central Services	Meeting attended by Kathy Estes, Ed Burnett and Dan Threatt	Discussion and development of mitigation projects
6/17/2009	Heritage Court	Meeting attended by Sandy Johnson, Jim Bachmeier, Mark Biever, Brian Ferris, Guy Jaques, Nadine Romero	Discussion and development of mitigation initiatives
6/23/2009	County Emergency Operations Center	Meeting attended by Sandy Johnson, Karen Axtmann, Vivian Eason, Kathy Estes, Cindy Hambly, Sonya Kroese, Steve Romines and Pete Suver	Discussion and development of mitigation initiatives
7/14/2009	County Emergency Operations Center	Meeting attended by Sandy Johnson, Karen Axtmann, Vivian Eason, Kathy Estes, Sonya Kroese, Steve Romines and Pete Suver	Finalization of mitigation initiatives
7/23/2009	Thurston Regional Planning Council	Meeting attended by Andrew Kinney and Paul Brewster	Discussion and development of mitigation initiatives
7/23/2009	Building 4	Meeting attended by Andrew Kinney and Jim Bachmeier	Discussion and development of mitigation initiatives
7/23/2009	Building 4	Meeting attended by Andrew Kinney, Sue Davis and Art Stary	Discussion and development of mitigation initiatives
7/27/2009	Building 1	Meeting attended by Andrew Kinney and Owen Reynolds	Discussion and development of mitigation initiatives
7/27/2009	Building 1	Meeting attended by Andrew Kinney and Scott Clark	Discussion and development of mitigation initiatives
7/27/2009	Heritage Court	Meeting attended by Andrew Kinney and Amy Calahan	Discussion and development of mitigation initiatives
7/28/2009	Phone Conservation	Discussion between Andrew Kinney and Jim Bachmeier	Discussion and development of mitigation initiatives
7/28/2009	Phone Conservation	Discussion between Andrew Kinney and Nadine Romero	Discussion and development of mitigation initiatives
7/28/2009	Building 1	Meeting attended by Andrew Kinney and Mark Swartout	Discussion and development of mitigation initiatives
7/30/2009	Phone Conservation	Discussion between Andrew Kinney and Scott Clark	Discussion and development of mitigation initiatives

Date	Location	Activity	Subject
7/31/2009	Phone Conservation	Discussion between Andrew Kinney and Mark Swartout	Discussion and development of mitigation initiatives
8/3/2009	County Emergency Operations Center	Meeting attended by Andrew Kinney and Sandy Johnson	Mitigation initiative status and strategy to complete mitigation initiative development
8/4/2009	Phone Conservation	Discussion between Andrew Kinney and Mark Neary	Discussion and development of mitigation initiatives
8/5/2009	Heritage Court	Meeting attended by Andrew Kinney and Dale Rancour	Discussion and development of mitigation initiatives
8/10/2009	Building 1	Meeting attended by Andrew Kinney and Mark Neary	Discussion and development of mitigation initiatives
8/10/2009	Phone Conservation	Discussion between Andrew Kinney and Mark Swartout	Discussion and development of mitigation initiatives
8/10/2009	Central Services	Meeting attended by Andrew Kinney, Kathy Estes, Ed Burnett and Dan Threatt	Discussion and development of mitigation projects
8/17/2009	Heritage Court	Meeting attended by Kathy Estes, Steve Romines, Andrew Kinney, Mark Swartout, Art Starry (by proxy), Vivian Eason, Cliff Moore, Dale Rancour and Pete Suver	Prioritization of mitigation initiatives

Mitigation Initiative Prioritization Process

Thurston County ranked its mitigation initiatives using a multi-voting process. The final draft mitigation initiatives were sent to all stakeholders for review. A prioritization worksheet was also sent with instructions on the prioritization process. The stakeholders were given a choice to submit their priorities by proxy using the spreadsheet or to attend a meeting. The stakeholders were encouraged to invite other interested parties to the meeting.

The following individuals participated in the Thurston County mitigation initiative prioritization process:

- Sandy Johnson, Emergency Management Coordinator, Emergency Services (facilitator)
- Kathy Estes, Emergency Management Manager, Emergency Services
- Steve Romines, Emergency Management Director, Emergency Services
- Andrew Kinney, Emergency Management Coordinator, Emergency Services
- Vivian Eason, Emergency Management Coordinator, Emergency Services
- Pete Suver, Advanced Life Support Coordinator, Emergency Services
- Cliff Moore, Director, Resource Stewardship Department
- Mark Swartout, Natural Resource Program Manager, Resource Stewardship Department
- Art Starry, Director of Environmental Health, Public Health and Human Services
- Dale Rancour, County Engineer.

At the meeting, a large-scale list of the initiatives was posted on the wall. Each stakeholder was given ten dots and instructed to place one dot by each of their priority initiatives. All dots carried the same weight. No one was allowed to place more than one dot by any one initiative. Priorities sent by proxy were also posted.

Initiatives were ranked according to the number of dots; the initiative with the most dots was identified as the top priority. Ties were broken by further discussion and a subsequent vote using a simple show of hands. Initiatives that did not receive any votes were ranked in order of presentation on the list.

During the prioritization process, two of the initiatives were amended based on consensus. Additionally, everyone agreed to keep all of the initiatives even those that did not receive any votes.

Thurston County Risk Assessment

Introduction

The risk assessment provides information about the hazards that threaten Thurston County, Washington. This information provides the factual basis to identify and support a strategy that can effectively mitigate the effects of the hazards that threaten Thurston County's safety and challenge local governments' ability to perform essential functions during disaster events.

The content and structure of this plan's risk assessment was developed using the Federal Emergency Management Agency's (FEMA) 2008 "Local Multi-Hazard Mitigation Planning Guidance." Table 1 shows the Disaster Mitigation Act (DMA) Risk Assessment Planning Requirements that must be met in order for this plan to receive a "satisfactory" score. The plan's region wide risk assessment covers the entire Thurston County planning area, therefore Thurston County's risk assessment planning requirements are met through the information contained in Chapters 4.0 through 4.8.

Table 1: Disaster Mitigation Act Risk Assessment Planning Requirements

DMA Section	Requirement
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction ...
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii):	[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
§201.6(c)(2)(ii):	[The risk assessment in all] plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.
§201.6(c)(2)(ii)(A):	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas ...
§201.6(c)(2)(ii)(B):	[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate ...
§201.6(c)(2)(ii)(C):	[The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii):	For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

In general the Federal DMA planning requirements with the words "**shall**" and "**must**" indicate that the item is mandatory and must be included in the plan, otherwise it will not be approved by FEMA. Regulations with the word "**should**" indicate that the item is strongly recommended to be included in the plan, but its absence will not cause FEMA to disapprove the plan.

Hazard Analysis Definitions

The following terms are used in this plan to analyze and summarize the risk of the hazards that occur in Thurston County:

Risk Rating:

An adjective description (High, Moderate, or Low) of the overall threat posed by a hazard is assessed for the next 25 years. Risk is the subjective estimate of the combination of any given hazard's probability of occurrence and vulnerability.

- **High:** There is strong potential for a disaster of major proportions during the next 25 years; or History suggests the occurrence of multiple disasters of moderate proportions during the next 25 years.
- **Moderate:** There is medium potential for a disaster of less than major proportions during the next 25 years.
- **Low:** There is little potential for a disaster during the next 25 years.

Probability of Occurrence:

Probability is an adjective description (High, Medium, or Low) of the likelihood of a hazard impacting the County within the next 25 years.

- **High:** There is great likelihood that a hazardous event will occur within the next 25 years.
- **Moderate:** There is medium likelihood that a hazardous event will occur within the next 25 years.
- **Low:** There is little likelihood that a hazardous event will occur within the next 25 years.

Vulnerability:

Vulnerability can be expressed as combination of the severity of a natural hazard's effect and its consequential impacts to the community. An adjective description (High, Medium, or Low) of the potential impact a hazard could have on the community. It considers the population, property, commerce, infrastructure and services at risk relative to the entire County.

- **High:** The total population, property, commerce, infrastructure and services of the community are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worst case scenario, there could be a disaster of major to catastrophic proportions.
- **Moderate:** The total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence; or the total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence, but not all to the same degree; or an important segment of

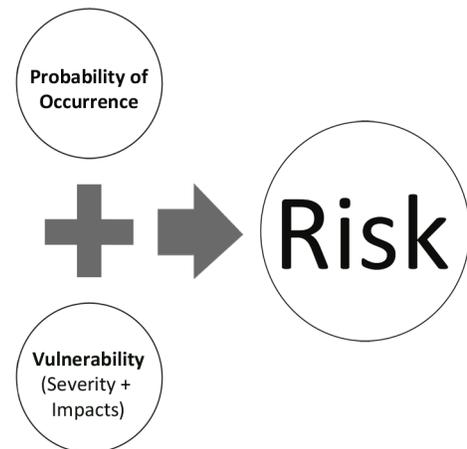


Figure 1: Risk is a subjective estimate of the combination of a hazard's probability of occurrence and a community's vulnerability.

population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard. In a worst case scenario there could be a disaster of moderate to major, though not catastrophic, proportions.

- **Low:** A limited area or segment of population, property, commerce, infrastructure, or service is exposed to the effects of a hazard. In a worst case scenario, there could be a disaster of minor to moderate proportions.

Summary Risk Assessment

Detailed Hazard profiles for earthquake, storm, flood, landslide, wildland fire, and volcanic events can be found in Chapters 4.1 through 4.6. Each hazard profile contains the following information: hazard description, severity, impacts, probability of occurrence, historical occurrences, and maps depicting the extent of the hazard. Summaries of the affected population, employment, housing, and infrastructure for unincorporated Thurston County and its Urban Growth Areas are also presented in the hazard profiles.

Table 2 summarizes the probability of occurrence, vulnerability, and the risk for each of the hazards that pose the greatest threat to Thurston County.

Table 2: Natural Hazard Risk Assessment for Thurston County

Hazard	Probability of Occurrence	Vulnerability	Risk
Earthquake	High	High	High
Storm	High	High	High
Flood	High	Moderate	High
Landslide	Moderate	Low	Moderate
Wildland Fire	High	Moderate	Moderate
Volcanic Event	Low	High	Moderate

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Thurston County Mitigation Initiatives

Current Adopted Mitigation Initiatives

The current mitigation initiatives consist of new initiatives identified by Thurston County during the plan update process. They also consist of existing initiatives that were carried over in their original form from the first edition of this plan, other plans, or modified from their original form to reflect present needs.

Priority	2003 Rank	I.D. Number	Category	Action	Status
1 of 30	2	TC-EH 1	Critical Facilities Replacement/Retrofit	Perform preliminary evaluations of county owned critical facilities to identify seismic vulnerabilities in those structures. Implement appropriate retrofitting/strengthening measures to improve their ability to withstand the effects of earthquakes.	Existing
2 of 30	n/a	TC-MH 4	Hazard Damage Reduction	Improve alert and warning capabilities.	New
3 of 30	14	TC-MH 1	Hazard Preparedness	Prepare a plan and subsequent mitigation initiatives for how essential functions of county government will be reestablished during or after a disaster.	Existing
4 of 30	n/a	TC-FH 25	Hazard Damage Reduction	Develop evacuation plans for communities and residents situated downstream from the Nisqually and Skookumchuck River dams	New
5 of 30	n/a	TC-FH 22	Hazard Damage Reduction	Draft a prioritized list of road segments and bridges that should be elevated above the 100 year floodplain and culverts that will fail under flood flow. Upgrade these structures if state or federal monies become available	New
6 of 30	1	TC-FH 1	Plan Coordination and Implementation	Continue Thurston County's enrollment in the Community Rating System (CRS) program as a part of the National Flood Insurance Program	Existing
7 of 30	n/a	TC-FH 24	Plan Coordination and Implementation	Develop a southeast flood detour plan for the Thurston County Comprehensive Emergency Management Plan.	New
8 of 30	3	TC-FH 7	Data Collection and Mapping	Remap the floodplains for all rivers, streams, and high groundwater areas and update the Flood Insurance Rate Maps (FIRMs)	Existing
9 of 30	n/a	TC-FH 23	Data Collection and Mapping	Acquire MIKE 11, a three-dimensional hydrological modeling software package and AQUARIUS, a USGS standard streamflow modeling software package	New
10 of 30	4	TC-FH 15	Hazard Damage Reduction	Draft a prioritized list of which floodplain residences the county would acquire (buyout) if state and federal monies are available	Existing
11 of 30	11	TC-FH 4	Plan Coordination and Implementation	Continue to be actively involved in the multiple jurisdiction flood hazard reduction efforts within the Chehalis River basin	Existing
12 of 30	26	TC-LH 1	Development Regulations	Limit activities in identified potential and historical landslide areas through regulation and public outreach	Existing
13 of 30	21	TC-FH 9	Data Collection and Mapping	Develop mapping protocols to archive all flood maps and data sets so they can be reused at a later date	Existing

14 of 30	18	TC-MH 2	Hazard Preparedness	Coordinate existing plans for post disaster inspections of critical facilities and other publicly owned buildings.	Existing
15 of 30	n/a	TC-MH 7	Hazard Preparedness	Develop plans to address the medical needs of people who rely on electrically powered medical equipment and/or do not have dependable transportation.	New
16 of 30	15	TC-LH 2	Hazard Damage Reduction	Prepare a landslide vulnerability index for county roads	Existing
17 of 30	n/a	TC-MH 3	Hazard Preparedness	Improve the capability to identify moderate to long term road impedances, and put them into the CAD (Computer Aided Dispatch).	New
18 of 30	19	TC-FH 8	Data Collection and Mapping	Map the channel migration zones for all rivers in the region and the extent of high quality riparian habitat	Existing
19 of 30	n/a	TC-MH 6	Hazard Preparedness	Conduct a study of private roads and bridges to determine their capacity to provide access to emergency vehicles	New
20 of 30	5	TC-FH 16	Hazard Damage Reduction	Draft a prioritized list of which residences the county would help elevate above the 100-year floodplain, if state or federal monies are available	Existing
21 of 30	8	TC-FH 2	Plan Coordination and Implementation	Secure funding for flood related projects within the 20-year Stormwater Capital Facilities Plan	Existing
22 of 30	28	TC-FH 21	Hazard Damage Reduction	Undertake a study of repetitive public cost losses, this would include residential structures, but also include properties such as livestock, out-buildings and rescue costs not already identified by FEMA	Modified
23 of 30	24	TC-FH 11	Development Regulations	Revise shoreline regulations to encourage "shoreline protective structures" to be "bioengineered"	Existing
24 of 30	27	TC-FH 20	Plan Coordination and Implementation	Implement the recommendations of the adopted stormwater drainage basin plans	Existing
25 of 30	13	TC-FH 10	Development Regulations	Reevaluate land uses and zoning based upon new floodplain maps	Existing
26 of 30	20	TC-FH 12	Development Regulations	Work with others to determine the width and conditions of buffers along river and stream shorelines	Existing
27 of 30	23	TC-FH 13	Development Regulations	Draft a Comprehensive Plan policy which encourages the creation and use of wetland mitigation bank	Existing
28 of 30	7	TC-FH 14	Data Collection and Mapping	Prepare new drainage basin plans in priority areas such as Salmon and Yelm Creeks	Existing
29 of 30	22	TC-FH 17	Hazard Damage Reduction	Work with landowners and others to establish reforested corridors along river and stream shorelines	Existing
30 of 30	25	TC-FH 18	Hazard Damage Reduction	Encourage research into bioengineering and other techniques which provide streambank protection and improve fisheries through the use of large woody debris. Support local demonstration projects which could provide such research	Existing

Hazard Category Codes are as follows: EH=Earthquake Hazard; FH=Flood Hazard; LH=Landslide Hazard; MH=Multi Hazard; SH=Storm Hazard; WH=Wildland Fire Hazard; and VH=Volcanic Hazard.

Completed or Removed Mitigation Initiatives

Initiatives that were completed in the last five years are included in this plan to provide evidence of progress made. These initiatives are no longer relevant and no longer part of Thurston County's adopted mitigation strategy. These initiatives are not ranked as they are no longer relevant.

Priority	2003 Rank	I.D. Number	Category	Action	Status
N/A	16	TC-FH 3	Plan Coordination and Implementation	Expand the Thurston County Stormwater Utility rate boundary to include all unincorporated areas	Completed
N/A	12	TC-FH 5	Hazard Preparedness	Install and maintain flood elevation poles and staff gauges along major rivers and within chronic groundwater flooding areas.	Completed
N/A	10	TC-FH 6	Public Information	Prepare and distribute public information program which focuses on the consequences of floods	Removed
N/A	6	TC-FH 19	Hazard Damage Reduction	Develop a warning system for the Nisqually and Skookumchuck River dams with their property owners, the Department of Ecology, the downstream communities and residents.	Removed
N/A	9	TC-EH 2	Public Information	Develop a public outreach program for earthquake preparedness	Removed
N/A	17	TC-SH 1	Public Information	Develop a public outreach program for storm preparedness	Removed

Priority: 1 of 30**Status: Existing****Hazard Addressed: Earthquake Hazard****Category: Critical Facilities Replacement / Retrofit**

TC-EH 1: Perform preliminary evaluations of county owned critical facilities to identify seismic vulnerabilities in those structures. Implement appropriate retrofitting/strengthening measures to improve their ability to withstand the effects of earthquakes.

Rationale: Critical facilities may play a major role in the response and recovery phases of a disaster and community assistance. It is essential that these facilities are functional after a disaster. At a minimum the critical facilities which would be screened include the Thurston County Courthouse complex, Tilley Shop, Capcom, two sewage treatment facilities, and a water system at Ground Mound. The county already maintains a seismic evaluation on each of the bridges in unincorporated Thurston County.

Relates to Plan Goal(s) and Objectives: 3B, 4C**Implementer:** Thurston County Central Services**Estimated Cost:** \$20,000**Time Period:** 2010 - 2015**Funding Source:** Grants and annual budgets**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-EH 1**Reference Page:** V-153

Initiative and Implementation Status: Thurston County has completed facility inspections for the Courthouse complex, Tilley Shop, CapCom, Mottman Building, Building 5, two sewage treatment facilities and a water system at Ground Mound. These facilities have been prioritized based on vulnerabilities. Thurston County is starting a program to correct vulnerabilities as mitigation funds become available. Thurston County will continue to update their facility workplan and priority list as projects are completed and as new facilities are acquired.

Priority: 2 of 30**Status: New****Hazard Addressed: Multi Hazard**
Category: Hazard Damage Reduction**TC-MH 4: Improve alert and warning capabilities.**

Rationale: During disasters, local officials and emergency managers must provide the public with information quickly. The advent of new media has brought a dramatic shift in the way the public consumes information. In addition to audio, digital media via the internet, and email, text messaging is an increasingly popular form of communication. This initiative will provide for an alert and warning system for all hazards that is capable of geographic-based notifications using multiple communications media. It will also provide alert and warning to those with disabilities and to those without an understanding of the English language.

Relates to Plan Goal(s) and Objectives: 5B**Implementer:** Thurston County Emergency Services**Estimated Cost:** \$350,000+annual cost**Time Period:** 2010-2015**Funding Source:** Grants and Local Match**Source and Date:** N/A**Adopted Plan Number:** N/A.**Reference Page:** N/A.**Initiative and Implementation Status:** This initiative replaces TC-FH 19.

Priority: 3 of 30**Status: Existing****Hazard Addressed: Multi Hazard****Category: Hazard Preparedness****TC-MH 1: Prepare a plan and subsequent mitigation initiatives for how essential functions of county government will be reestablished during or after a disaster.**

Rationale: While the loss of a utility such as electricity, phone, sewer or water can affect the recovery of a community, the loss of essential governmental functions is no less a threat. If critical county facilities are damaged or destroyed, then alternative locations are needed. The county auditor, treasurer, coroner, and assessor are just some of the functions which reside at the Thurston County Courthouse Complex. It may be difficult to replicate these services in off-site buildings. Accessibility to county records and non-digital databases are also components of these functions which may be impossible to replicate at a replacement location.

This initiative would begin the process of county departments working together to prepare a plan and identifying actions which need to be taken (e.g. future mitigation initiatives).

Relates to Plan Goal(s) and Objectives:**Implementer:** Thurston County Emergency Management and Central Services**Estimated Cost:** \$20,000 (planning only)**Time Period:** 2010-2015**Funding Source:** Grants and annual budgets**Source and Date:** Thurston County Information Technology Recovery Plan (2008)**Adopted Plan Number:** N/A.**Reference Page:** N/A

Initiative and Implementation Status: The county is currently developing its continuity of operations plan. This plan includes relocation, support and coordination of critical county functions. To date, the county has scanned most of its non-digital databases into digital format. Data is stored redundantly both onsite and offsite. The county has developed plans to build a redundant computer center.

Priority: 4 of 30**Status: New****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 25: Develop evacuation plans for communities and residents situated downstream from the Nisqually and Skookumchuck River dams.**

Rationale: In the event of a large release from the Nisqually or Skookumchuck River dams, downstream residents and communities must be moved out of harm's way as effectively and quickly as possible. This initiative will establish procedures for warning, evacuating, and sheltering those within the dam inundation areas. It will also identify procedures for securing the perimeter and the interior of the affected area and for allowing evacuees to return to their homes. The procedures will be designed to accomplish these functions with minimum confusion and maximum speed.

Relates to Plan Goal(s) and Objectives: 2A, 3A, 3D, 3E, 3G, 5B, 8A**Implementer:** Thurston County Emergency Services, Resource Stewardship**Estimated Cost:** \$50,000**Time Period:** 2010-2015**Funding Source:** Grants and Local Match**Source and Date:** N/A**Adopted Plan Number:** N/A.**Reference Page:** N/A.**Initiative and Implementation Status:** New

Priority: 5 of 30**Status: New****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 22: Draft a prioritized list of road segments and bridges that should be elevated above the 100 year floodplain and culverts that will fail under flood flow. Upgrade these structures if state or federal monies become available.****Rationale:** Thurston County has actively pursued grants and programs to elevate residential structures, this initiative would actively pursue public infrastructure elevation. Criteria will be developed to rank potential road segments and bridges for elevation opportunities and culverts that may fail during flooding, for replacement. This will assist the County in being more proactive to flood management, not reactive.**Relates to Plan Goal(s) and Objectives: 4D****Implementer:** Thurston County Public Works, Thurston County Resource Stewardship, Thurston County Central Services – Thurston GeoData Center**Estimated Cost:** \$25,000**Time Period:** 2010 – 2015**Funding Source:** Unknown**Source and Date:** N/A**Adopted Plan Number:** N/A**Reference Page:** N/A**Initiative and Implementation Status:** New

Priority: 6 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TC-FH 1: Continue Thurston County's enrollment in the Community Rating System (CRS) program as a part of the National Flood Insurance Program.**

Rationale: The Community Rating System (CRS) is a voluntary program within the National Flood Insurance Program. Thurston County enrolled in the CRS program in 2000. The County's current rating is Class 5. At that time, this was one of the highest ratings in the entire nation for a county. This certification provides residents within unincorporated areas with a 25% reduction in their private flood insurance rates. This reduction will be very important to the residents of Thurston County when the flood plains are remapped. It is likely that the new flood boundaries will be for a larger area, and will mean that these new parcels will have to purchase flood insurance. In 2009 there were 663 flood insurance policies in unincorporated Thurston County providing coverage of \$141.8 Million with annual premiums of \$316,352. The CRS program provides the framework for flood hazard mitigation initiatives and other activities to reduce the county's exposure to flooding. The CRS program requirements also exceed those for a natural hazard mitigation plan in the areas of habitat protection, relationship to threatened and endangered species, and in how the public/flood plain residents are engaged in the adoption process. Therefore, it will be desirable to merge the CRS provisions into this plan during the next update cycle.

Relates to Plan Goal(s) and Objectives: 6E**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$18,000**Time Period:** 2010 - 2015**Funding Source:** Program annual budget**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-FH 1**Reference Page:** V-157

Initiative and Implementation Status: The Community Rating System (CRS) is a voluntary program within the National Flood Insurance Program. Thurston County enrolled in the CRS program in 2000. The County's current rating is Class 5. Thurston County's next evaluation is in the fourth quarter of 2009. At that evaluation Thurston County expects to receive a rating of four. (See also Thurston County Participation in the National Flood Insurance Program).

Priority: 7 of 30**Status: New****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TC-FH 24: Develop a southeast flood detour plan for the Thurston County Comprehensive Emergency Management Plan.**

Rationale: During a major flood event in the Nisqually Watershed, Bald Hills Road SE, a County arterial, is closed due to flooding of Lackamas Creek. This road closure can potentially isolate or severely limit travel for thousands of southeast Thurston County residents. By establishing flood detour routes through privately owned forest lands, essential surface transportation system redundancy can provide temporary mobility options for the affected population.

Relates to Plan Goal(s) and Objectives: 1A, 3D, 8A**Implementer:** Thurston County Emergency Management Division**Estimated Cost:** \$5,000**Time Period:** 2010 or 2015**Funding Source:** Unknown**Source and Date:** N/A**Adopted Plan Number:** N/A**Reference Page:** N/A**Initiative and Implementation Status:** New

Priority: 8 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Data Collection and Mapping****TC-FH 7: Remap the floodplains for all rivers, streams, and high groundwater areas and update the Flood Insurance Rate Maps (FIRMs).**

Rationale: The floods of 1990 and 1996 have indicated the inadequacy of the 1982 FEMA 100 year floodplain maps. Although Thurston County amended its Flood Plain Ordinance to require consideration of aerial photos showing the extent of the “flood of record”, it and the Critical Area Ordinance rely upon an officially adopted map. Once the aerial topography project is complete, Thurston County should begin to develop new flood maps based upon new USGS protocol contained within “Updating Flood Inundation Maps Effectively”, as amended or updated. Remapping should be in the following order: Nisqually, Deschutes, Skookumchuck, Chehalis, and Black River.

Relates to Plan Goal(s) and Objectives: 2A**Implementer:** FEMA Region 10, WA Dept. of Ecology, Thurston County Central Services – Thurston GeoData Center.**Estimated Cost:** Unknown**Time Period:** 2010 - 2015**Funding Source:** Unknown**Source and Date:** County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** MR-1**Reference Page:** VIII-9

Initiative and Implementation Status: Thurston County is continuing to discuss re-mapping the flood hazard areas of the county with FEMA. In late 2009 early 2010, FEMA, WADOE and Thurston County representatives will hold a scoping to discuss scheduling and completing this project. Presently, the Thurston GeoData Center (TGC) in cooperation with WADOE completed a project to map documented high water levels and high flows recorded from USGS gauging stations. This work will be utilized by Thurston County planning staff in the Critical Area Ordinance which will be revised in February 2010.

Priority: 9 of 30**Status: New****Hazard Addressed: Flood Hazard****Category: Data Collection and Mapping****TC-FH 23: Acquire MIKE 11, a three-dimensional hydrological modeling software package and AQUARIUS, a USGS standard streamflow modeling software package.**

Rationale: Numerical hydrological models will provide data to better inform land use decisions that will serve to protect environmentally critical areas and protect the public's health. Model forecasts and simulations will enhance Thurston County's understanding of the timing, frequency, duration, and location of high groundwater and riverine flooding. Models can also be used to safeguard municipal water sources by examining the conditions that cause groundwater contamination from various pollutants. In addition, models are critical for forecasting future water supply from a variety of ground- and surface water sources. This information can enable water resource managers and the public to more effectively adapt to changes in water supply that are likely to be affected by the effects of climate change.

Relates to Plan Goal(s) and Objectives: 2A, 2C, 3A, 5A**Implementer:** Thurston County Resource Stewardship, Thurston County Storm and Surface Water Utility, Thurston County Public Works, Thurston County Emergency Services**Estimated Cost:** MIKE 11 \$6,000; AQUARIUS \$10,000 (modeling will be covered in program annual budgets)**Time Period:** 2010 - 2015**Funding Source:** Grants, local match, program annual budgets**Source and Date:** N/A**Adopted Plan Number:** N/A**Reference Page:** N/A**Initiative and Implementation Status:** New

Priority: 10 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 15: Draft a prioritized list of which floodplain residences the county would acquire (buyout) if state and federal monies are available.**

Rationale: The 1995/1996 floods along the Nisqually River caused the most significant damage in the county. Of the approximately 800 countywide residences damaged by the floods, approximately 120 along the Nisqually River were damaged to the degree that the home's structural integrity was evaluated by Thurston County. Many of those located in the floodway were destroyed by the flood or were later abated by Thurston County. In 1998, the County obtained a State Community Development Block Grant to help make the lives of 23 former valley residents right again. However, the grant is not large enough to address all affected properties, let alone evaluating properties with similar potential along other rivers. In the future, criteria will need to be developed to rank potential buy-out properties before and not after the next large scale flooding event. A buyout program is most appropriate for residences within river floodways or areas at the highest risk of flooding.

Relates to Plan Goal(s) and Objectives: 4C**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$20,000 (Note: To be done with TC-FH 16)**Time Period:** 2010 - 2015**Funding Source:** Unknown – Currently this is unfunded, mitigation grants would be needed to complete this project**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** FDR-1**Reference Page:** VIII-15

Initiative and Implementation Status: In 2003 Thurston GeoData Center developed a footprint map based upon the year 2000 aerial photos. They have now identified approximately 3,300 structures which lie within the mapped 100-year floodplain of unincorporated Thurston County. This does not include the mapped high ground water areas. Additional work will be required to screen out garages and agricultural buildings, and create a data layer of only habitable structures. Once this is complete, it will then be necessary to add a depth of flooding component (depth of water in the structure) to screen out the areas of nuisance flooding from those structures which may be severely impacted by the 100-year flood event. Thurston County has flown the county at three inch pixel resolution in 2009 and will utilize this photography to update the building footprint inventory. The county has also completed mapping the extent of high water in the major river basins. Structures

which are found to lie within the designated “floodway” and which have a depth of water greater than 3 feet and a water velocity of 3 cubic feet per second would be at the highest risk and will be prioritized for buyout.

Priority: 11 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TC-FH 4: Continue to be actively involved in the multiple jurisdiction flood hazard reduction efforts within the Chehalis River basin.**

Rationale: Thurston County has been involved with federal, state, local and tribal jurisdictions to seek ways of reducing flood hazards along the Skookumchuck and Chehalis Rivers. Thurston County stakeholders seek comprehensive solutions. Measures that benefit stakeholders outside the Thurston Region must not produce adverse environmental conditions to the detriment of stakeholders down river from project areas.

Relates to Plan Goal(s) and Objectives: 2A**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$4,500**Time Period:** 2010 - 2015**Funding Source:** Annual budget and outside funding

Source and Date: Thurston County Flood Hazard Management Plan (1999); Resolution #11947 and re-authorized in April 2008 with approval of the Interlocal Agreement.

Adopted Plan Number: IM-4**Reference Page:** VIII-5

Initiative and Implementation Status: Thurston County continues to be involved with flood studies, the program Advisory Board, and public information activities of adjacent counties regarding the potential for floods and other impacts from volcanic flows including lahars.

Priority: 12 of 30**Status: Existing****Hazard Addressed: Landslide Hazard**
Category: Development Regulations**TC-LH 1: Limit activities in identified potential and historical landslide areas through regulation and public outreach.**

Rationale: Thurston County is required by the state Growth Management Act (GMA) to protect Critical Areas. One of the five major types of Critical Areas is geologic hazards, of which landslide hazards are a major concern along the county's marine shorelines and along streams in ravines. The areas with the most significant potential for landslide hazards are Black and Bald Hills, where forestry is the major land use. In 1992 Thurston County adopted development regulations for landslide hazards areas in its Critical Area Ordinance (CAO). An update of the County CAO is due by December 2010, to be compliant with the state GMA. GIS maps of landslide hazard were prepared for the county CAO, and comprehensive plan. These maps are being updated, and are available on-line from Thurston GeoData Center at www.geodata.org.

Relates to Plan Goal(s) and Objectives: 6B, 8A**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$15,000**Time Period:** 2010 – 2015**Funding Source:** Community Trade and Economic Development, annual budget of Resource Stewardship**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-LH 1**Reference Page:** V-199

Initiative and Implementation Status: In 1992 Thurston County adopted development regulations for landslide hazards areas in its Critical Area Ordinance (CAO). An update of the County CAO is due by December 2010, to be compliant with the state GMA. GIS maps of landslide hazard were prepared for the county CAO, and comprehensive plan. These maps are being updated, and are available on-line from Thurston GeoData Center at: www.geodata.org.

Priority: 13 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Data Collection and Mapping****TC-FH 9: Develop mapping protocols to archive all flood maps and data sets so they can be reused at a later date.**

Rationale: As Thurston County adds an increasing number of data layers to its GIS system there will be an increasing need to label and maintain digital archives of all flood maps. While hard copies of old GIS maps may exist, the National Flood Insurance and the CRS programs will require the reuse of old data sets to identify repetitive loss structures, which could be targeted for voluntary buy-out or elevation programs.

Relates to Plan Goal(s) and Objectives: 2A**Implementer:** Thurston County Central Services – Thurston GeoData Center and Thurston Regional Planning Council**Estimated Cost:** \$8,000**Time Period:** 2010 - 2012**Funding Source:** Uncertain, potential grants and program annual budgets**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** MR-5**Reference Page:** VIII-11

Initiative and Implementation Status: Technologies for field data collection, mapping display and analysis, and data storage are being reviewed and evaluated. However, material on historical flood loss has not been organized. GIS maps for critical facilities and repetitive loss structures were prepared for this Natural Hazard Mitigation Plan. It is likely that there will be additional requests for GIS maps of tabular data.

Priority: 14 of 30**Status: Existing****Hazard Addressed: Multi Hazard****Category: Hazard Preparedness****TC-MH 2: Coordinate existing plans for post disaster inspections of critical facilities and other publicly owned buildings.**

Rationale: This task will require coordination between four Thurston County departments. The building inspectors from Resource Stewardship and Central Services would be inspecting the structures, whereas the inspectors from Public Works would focus on bridges and the other pieces of the County's transportation infrastructure. Emergency Services will coordinate these plans and personnel before a disaster so that all the critical facilities are inspected in a timely fashion and one of the County's facilities is not overlooked in the process. Over time, the County would like to broaden this initiative to include all jurisdictions. Therefore, it may be appropriate to shift this to a "County Wide" initiative during the next update cycle.

Relates to Plan Goal(s) and Objectives: 4A, 4E**Implementer:** Thurston County Resource Stewardship, Thurston County Public Works, Thurston County Central Services, and Thurston County Emergency Services**Estimated Cost:** \$7,500**Time Period:** 2010 - 2012**Funding Source:** Unknown**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-MH 2**Reference Page:** V-205**Initiative and Implementation Status:** Planning and coordination is continuing and should be completed as Emergency Services completed the ESF update work program.

Priority: 15 of 30**Status: New****Hazard Addressed: Multi Hazard****Category: Hazard Preparedness****TC-MH 7: Develop plans to address the medical needs of people who rely on electrically powered medical equipment and/or do not have dependable transportation.**

Rationale: Recent disasters have highlighted the importance of planning for people with medical needs during times of disaster. In particular, people who depend on electrically powered medical equipment are especially vulnerable during power outages and transportation disruptions.

This initiative will create strategies, plans, practices and education for assisting this unique population, their families, guardians and care givers. It will specifically address those who need dialysis, but do not have dependable transportation during times of disaster. It will consider specific requirements, legislative guidelines, best practices, and lessons learned. It will include procedures for coordinating with utilities when wind storms or winter storms down trees across roadways.

Relates to Plan Goal(s) and Objectives: 2A, 3G, 5B, 8A**Implementer:** Thurston County Emergency Services, Thurston County Public Health and Social Services, LMTAAA (Lewis, Mason, Thurston Area Agency on Aging)**Estimated Cost:** Unknown**Time Period:** 2010-2015**Funding Source:** Grants and Local Match**Source and Date:** N/A**Adopted Plan Number:** N/A.**Reference Page:** N/A.**Initiative and Implementation Status:** New

Priority: 16 of 30**Status: Existing****Hazard Addressed: Landslide Hazard****Category: Hazard Damage Reduction****TC-LH 2: Prepare a landslide vulnerability index for county roads.**

Rationale: Create a roadway hazard data layer relating to unstable slopes. Utilize the County's list of problem roads and previous damage locations. Inspect, evaluate and rank each potential slope. Use a hazard classification system similar to WSDOT including the potential impact on health and safety, as well as commercial disruption. Also use this list to prioritize repairs and identify first response plans for high risk sites.

Relates to Plan Goal(s) and Objectives: 7A**Implementer:** Thurston County Public Works and Thurston County Central Services**Estimated Cost:** \$525,000 (including acquisition of LIDAR data for Thurston County in 2010)**Time Period:** 2010 - 2012**Funding Source:** Grants**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-LH 2**Reference Page:** V-201

Initiative and Implementation Status: Thurston County has acquired Liquefaction and Land motion data and maps From the Washington State Department of Natural Resources and Soil (DNR) Classification updates from Natural Resources Conservation Service (NRCS) to utilize in this analysis. Thurston County is also applying for grants to fund the acquisition of updated LIDAR to assist in critical slope analysis.

Priority: 17 of 30**Status: New****Hazard Addressed: Multi Hazard****Category: Hazard Preparedness****TC-MH 3: Improve the capability to identify moderate to long term road impedances, and put them into the CAD (Computer Aided Dispatch).**

Rationale: The emergency response community depends on getting to incidents and medical facilities as rapidly as possible. Unscheduled delays caused by floodwater over roadways and earthquake damage to roads and bridges put lives and property in jeopardy.

Impedances are used by the county's Computer Aided Dispatch (CAD) system when it performs routing calculations prior to selecting which response units to dispatch. This initiative will enable information about road system problems that are expected to last longer than one day to be entered into CAD.

Relates to Plan Goal(s) and Objectives: 2A, 3A, 3D, 3G**Implementer:** Thurston County Department of Communications (CAPCOM)**Estimated Cost:** Unknown**Time Period:** 2010-2015**Funding Source:** Grants and Local Match**Source and Date:** N/A**Adopted Plan Number:** N/A.**Reference Page:** N/A.**Initiative and Implementation Status:** New

Priority: 18 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Data Collection and Mapping**TC-FH 8: Map the channel migration zones for all rivers in the region and the extent of high quality riparian habitat.**

Rationale: Mapping of valuable or important natural features is just as a important role for a GIS system as mapping hazardous areas. Areas with excellent riparian habitat have very low impact upon the river during flood events. Given these conditions, the importance of identifying these existing high quality habitats will establish baseline conditions from which future restoration projects (e.g. TC-FH 17) can build upon. The historic meander belt has been mapped for the Deschutes River. GIS mapping of similar channel migration zones will be needed for the Black, Chehalis, Skookumchuck, and Nisqually Rivers, with an update for the Deschutes River using the same methodology.

Relates to Plan Goal(s) and Objectives: 2A**Implementer:** Thurston County Resource Stewardship, Thurston County Stormwater Utility, and Thurston County Central Services – Thurston GeoData Center**Estimated Cost:** \$930,000**Time Period:** 2010 - 2015**Funding Source:** Some grants, some still unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** MR-3**Reference Page:** VIII-10

Initiative and Implementation Status: Thurston County has used its 2 foot contour maps to create GIS topographic shape maps which indicated where the channel migrations zones have been since the end of the last period of glaciation. Note, there is disagreement on the appropriate methodologies for mapping the 100 year channel migrations. It will be important to do this mapping with a comprehensive understanding of the 100 year flow estimates, erodible soils, hardened shorelines, forested corridors, and the fluvial dynamics of lowland river systems. The mapping of high quality riparian habitat is an activity which began in the late 1990's and will continue for an indefinite period. A "Limiting Factors Report" has been prepared for each of the drainage basins. Each of the WRIA (watershed) planning projects is collecting information within its WRIA boundary, so it will be important to merge that data together into a common layer for the entire Thurston region. Thurston County Stormwater Utility has initiated a program to characterize the basins within the county. This will aid in the development of basin plans, the update of the Critical Area Ordinance, and the County's Comprehensive Plan.

Priority: 19 of 30**Status: New****Hazard Addressed: Multi Hazard**
Category: Hazard Preparedness**TC-MH 6: Conduct a study of private roads and bridges to determine their capacity to provide access to emergency vehicles**

Rationale: During disasters, emergency responders are required to gain access to the scene of the emergency by traversing private roads and bridges. Too often, these roads and bridges have not been constructed or maintained in accordance with state or county standards, nor designed by a licensed engineer. As a result, they pose a risk to response personnel and equipment. Additionally, state law does not allow fire equipment to travel across bridges that do not have their capacity posted.

This initiative will inventory, assess and develop post seismic inspection plans for private roads and bridges used by responders during disasters. Additionally, it will identify funding sources to replace or retrofit roads and bridges that do not meet established criteria and to post bridge capacity information.

Relates to Plan Goal(s) and Objectives: 2A, 3B, 3D, 7A**Implementer:** Thurston County Emergency Services**Estimated Cost:** \$100,000**Time Period:** 2010-2015**Funding Source:** Grants and Local Match**Source and Date:** N/A**Adopted Plan Number:** N/A.**Reference Page:** N/A.**Initiative and Implementation Status:** New

Priority: 20 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 16: Draft a prioritized list of which residences the county would help elevate above the 100-year floodplain, if state or federal monies are available.**

Rationale: There were approximately 120 residences along the Nisqually River which were damaged to the degree that their structural integrity was evaluated after the floods of 1995/1996. Of these, approximately 50-60 homes continue to be habitable structures which could greatly benefit from having their first floor level elevated. In 1998 the Thurston County Housing Authority obtained a State Community Development Block Grant to elevate 4 residences in unincorporated Thurston County. Although costs for elevation generally average about \$40,000 per structure, this is much less per structure than a buy-out program. As a result, a greater number of structures could be flood proofed and an established neighborhood maintained, in comparison with an equally funded buy-out program. In the future, criteria will need to be developed to rank potential residence elevation opportunities before and not after the next full-scale flooding event. An elevation program is most appropriate for residences within the floodplain away from high velocity flows, or in areas of high groundwater.

Relates to Plan Goal(s) and Objectives: 4D**Implementer:** Thurston County Resource Stewardship, Thurston County Central Services – Thurston GeoData Center**Estimated Cost:** \$20,000 (Note: To be done with TC-FH 15)**Time Period:** 2010 - 2015**Funding Source:** Unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** FDR-2**Reference Page:** VIII-15

Initiative and Implementation Status: The Thurston County Storm and Surface Water Utility created a partial list as a result of the disaster declaration for the February 2001 Nisqually earthquake. Their focus, which related to their work on the Salmon Creek Drainage Basin Study, was only for high ground water areas. They identified 100 properties which high groundwater maps and flood damage records indicated a possible benefit to elevating the structure. A total of 100 letters were sent out with a response rate of 20. Of these respondents, only 10 had a benefit to cost ratio of more than 1 to 1. Of these, no mitigation monies from the Nisqually earthquake were made available. However, two properties qualified for funds from the federal Community Development

Block Grant which was awarded to Thurston County for the Nisqually River flooding of 1996. In the end, one structure was elevated. This initiative is to be done with TC-FH 15 and after the remapping of all the flood plains (TC-FH 7). Priorities will most likely be based on the depth of flooding for the habitable structures. In 2008 Thurston County obtained a State Community Development Block Grant to elevate up to 35 residences in the Chehalis River basin unincorporated area of Thurston County. Although costs for elevation generally average about \$26,000 per structure, this is much less per structure than a buy-out program. As a result, a greater number of structures could be flood proofed and an established neighborhood maintained, in comparison with an equally funded buy-out program. An elevation program is most appropriate for residences within the floodplain away from high velocity flows, or in areas of high groundwater flooding.

Priority: 21 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TC-FH 2: Secure funding for flood related projects within the 20-year Stormwater Capital Facilities Plan.**

Rationale: The current Stormwater Utility Rate will provide funding for all the high and medium priority projects in the Capital Facilities Plan (CFP). These projects were first identified in the various drainage basin plans. In 1998, the scope of works and cost estimates for all stormwater projects were reviewed and updated. These were adopted in 2000.

Relates to Plan Goal(s) and Objectives: 6A**Implementer:** Thurston County Storm and Surface Water Utility**Estimated Cost:** \$650,000/year**Time Period:** 2010 - 2022**Funding Source:** Thurston County – Storm and Surface Water Utility**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** IM-2**Reference Page:** VIII-4

Initiative and Implementation Status: The Thurston County Board of County Commissioners adopted a Capital Facilities Plan to implement this initiative in 2000 and was re-authorization during 2004. The highest seven priorities have been completed. The CFP still has approximately \$7,500,000 in proposed projects to be completed. Completion is estimated in 2022.

Priority: 22 of 30**Status: Modified****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 21: Undertake a study of repetitive public cost losses, this would include residential structures, but also include properties such as livestock, out-buildings and rescue costs not already identified by FEMA.****Rationale:** FEMA's list of repetitive loss structures is very limited. This study would create a list of repetitive public cost which have been damaged or caused by floods over a longer period of time, or have received other types of services from the County.**Relates to Plan Goal(s) and Objectives: 2A****Implementer:** Thurston County Resource Stewardship and Thurston County Emergency Services**Estimated Cost:** \$20,100**Time Period:** 2010 - 2015**Funding Source:** Unknown**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-FH 21**Reference Page:** V-197**Initiative and Implementation Status:** Thurston County Emergency Services has been discussion the concept and approach, but at present no work program has been developed.

Priority: 23 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Development Regulations**TC-FH 11: Revise shoreline regulations to encourage “shoreline protective structures” to be “bioengineered”.**

Rationale: The past decade has brought a fundamental transformation in how stream bank erosion projects are approached. The technique, called “bioengineering”, combines the fields of engineering, landscaping, hydro-geology and fisheries biology. It uses bits and pieces of these disciplines in an attempt to mimic natural river conditions. This text change is necessary because several stream bank restoration projects constructed by federal agencies were approved under the guise of restoration projects but were constructed as rip-rap or rock only jobs.

Relates to Plan Goal(s) and Objectives: 6D**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$5,000**Time Period:** 2010-2011**Funding Source:** Annual budget for Shoreline Management Plan update**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** MR-8**Reference Page:** VIII-12

Initiative and Implementation Status: Thurston County is currently updating their Shoreline Management Plan (Feb. 2011) which includes bioengineering for shoreline protection. In initiative TC-FH-18 are examples of existing bioengineered projects within the county.

Priority: 24 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TC-FH 20: Implement the recommendations of the adopted stormwater drainage basin plans.**

Rationale: Thurston County has adopted five stormwater drainage basin plans. These cover areas in and around the north county urban growth area boundary. While another initiative has targeted the capital facilities plan items, each plan contains recommendations for other non-CFP activities. These may include adopting new development regulations, developing new capital facility projects, and developing new policies for the comprehensive land use plan. For example, the *Green Cove Creek Drainage Basin Plan* (2000) contained a recommendation for maintaining a certain percent of forest canopy. To implement this would involve changes to zoning densities, and other development regulations. It may also include the acquisition of conservation easements and reforestation of parcels to help attain the target for forest cover.

Relates to Plan Goal(s) and Objectives: 6A, 6D**Implementer:** Thurston County Storm and Surface Water Utility**Estimated Cost:** \$190,000 (*NOTE: \$45,000 Annually*)**Time Period:** 2010 - 2015**Funding Source:** Unknown (Combination of grants and annual budget)**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-FH 20**Reference Page:** V-195

Initiative and Implementation Status: This work is ongoing as part of the Comprehensive Plan Update, The Shoreline Management Plan update, the Watershed Characterization Program, and current work in the Thurston County Storm and Surface Water Utility.

Priority: 25 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Development Regulations**TC-FH 10: Reevaluate land uses and zoning based upon new floodplain maps.**

Rationale: After preparing the new floodplain maps, the very next step will be to incorporate this new data into the development permit review process. It is likely to assume that the areas covered under these maps will increase, and that those new coverages (data sets) will extend into already built up areas or developing areas. Therefore, the adoption process for each new floodplain map will need to include a detailed analysis of impacts and options not unlike a sub-area plan. These reviews would be phased to coincide with the river system being mapped.

Relates to Plan Goal(s) and Objectives: 6A, 6B, 6D**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$5,500**Time Period:** 2010 - 2011**Funding Source:** Program annual budget**Source and Date:** Thurston County Flood Hazard Management Plan (1999)**Adopted Plan Number:** MR-6**Reference Page:** VIII-11

Initiative and Implementation Status: The 100 year floodplains for Thurston County have not yet been re-mapped (see TC-FH 7). Discussions are ongoing with FEMA and WADOE. However, the mapping of the extent of flooding and high water has been completed and this information will be utilized in the Comprehensive Plan Update to be completed in 2011. If the 100 year floodplain re-delineation is completed in an appropriate time frame, that information will also be included in the plan update.

Priority: 26 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Development Regulations**TC-FH 12: Work with others to determine the width and conditions of buffers along river and stream shorelines.**

Rationale: This recognizes the listing of certain salmon stocks under the Federal Endangered Species Act in Puget Sound and the potential for similar actions on all rivers within Thurston County and the importance of the Puget Sound Partnership objectives for improving the Sound. It also acknowledges the importance of forests along these shorelines for quality fish habitat. As documented in the Budd Inlet-Deschutes River Watershed Action Plan (1995), issues of bank erosion, water quality and salmon habitat are all directly related to the presence or absence of a forested canopy along the river. These new or revised regulations would likely become a part of the Thurston County Critical Areas Ordinance

Relates to Plan Goal(s) and Objectives: 6B, 6D**Implementer:** Thurston County Resource Stewardship and Thurston County Stormwater Utility**Estimated Cost:** \$25,000**Time Period:** 2010 - 2012**Funding Source:** Community Trade and Economic Development and grants**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** MR-9**Reference Page:** VIII-13

Initiative and Implementation Status: Thurston County has been working to update its Critical Areas Ordinance (CAO) regulations, as a part of a required update for the Growth Management Act and the Shoreline Management Plan (SMP). Both of these documents will include regulations and practices which include stream buffers, based upon “Best Available Science”. The SMP is scheduled to be adopted in December 2009 and the CAO in February 2010.

Priority: 27 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Development Regulations**TC-FH 13: Draft a Comprehensive Plan policy which encourages the creation and use of wetland mitigation bank.**

Rationale: This proposal would shift the County's approach away from small, independent wetland and stream mitigation projects with each road and bridge improvement project. There would be cost and environmental advantages to grouping all of these incremental projects into an improved site(s) within one or several watersheds. This would allow for the creation at a later time of a "wetland mitigation bank" for County-owned projects. While currently an option within the Thurston County Critical Area Ordinance, a policy basis would be needed before grants for such a project could be obtained.

Relates to Plan Goal(s) and Objectives: 6D**Implementer:** Thurston County Resource Stewardship**Estimated Cost:** \$5,000**Time Period:** 2010 - 2012**Funding Source:** Annual budget for Resource Stewardship**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** MR-10**Reference Page:** VIII-13

Initiative and Implementation Status: The Washington Department of Ecology developed a draft rule to help guide local governments, but in 2002 abandoned that process due to budgetary constraints. However, Thurston County has continued exploring the use and utility of wetland mitigation banks. Guidance for wetland mitigation banking is being worked on for the sever year Comprehensive Plan update scheduled for 2011, the Shoreline Management Plan update in 2010, it is incorporated in the Watershed Characterization Program, and is informally evaluated by Thurston County Public Works when they have appropriate road projects.

Priority: 28 of 30**Status: Existing****Hazard Addressed: Flood Hazard****Category: Data Collection and Mapping****TC-FH 14: Prepare new drainage basin plans in priority areas such as Salmon and Yelm Creeks.**

Rationale: Drainage basin plans have been prepared for six watersheds within northern Thurston County. These plans have been the basis for recommended solutions for flooding, habitat, and water quality projects. These needs have been incorporated into a list of capital facility projects. It is also not possible to generate this sort of targeted list on a countywide level. The plans can also identify other aspects of land use or zoning that may require further integration or analysis.

Relates to Plan Goal(s) and Objectives: 2A**Implementer:** Thurston County Storm and Surface Water Utility**Estimated Cost:** \$200,000 - \$400,000**Time Period:** 2010 - 2015**Funding Source:** Unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999)**Adopted Plan Number:** MR-12**Reference Page:** VIII-14

Initiative and Implementation Status: The City of Yelm began its *Yelm Creek Comprehensive Flood Hazard Management Plan* process in 1999 and adopted the plan in August 2001 via Resolution # 1234. Thurston County is presently working on the Yelm Basin Plan. Thurston County began working on Salmon Creek basin plan in 1999. The Salmon Creek Comprehensive Drainage Basin Plan was completed in June 2004 and was approved by Thurston County and the City of Tumwater.

Priority: 29 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 17: Work with landowners and others to establish reforested corridors along river and stream shorelines**

Rationale: To reestablish a forested edge along river and stream shorelines countywide is a significant long-term project that will involve more just than Thurston County. It would require working with thousands of property owners and involve planting of countless trees and plants. Easement or use restrictions may be employed, since reliance on completely voluntary incentives, such as the Open Space Tax Program, have shown that other techniques will need to be employed if the State's Salmon Strategy is to be a success.

Relates to Plan Goal(s) and Objectives: 5A**Implementer:** Thurston County Resource Stewardship, Thurston County Public Works, Thurston Conservation District, and U. S. Natural Resources Conservation Service**Estimated Cost:** Unknown**Time Period:** 2010 - 2024**Funding Source:** Unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** FDR-3**Reference Page:** VIII-16

Initiative and Implementation Status: Since 1999 Thurston County has been engaged with the watershed based salmon recovery projects sponsored by the Salmon Recovery Funding Board (SRFB). This accounted for 80 projects totally approximately \$26.2 million (Nisqually WRIA, \$17 million; Deschutes WRIA, \$6.5 million; Kennedy-Goldsborough WRIA, \$547,000; and Chehalis WRIs, \$2.1 million). It has been necessary to undertake some data collection efforts before on the ground activities. It is likely that riparian restoration activities will increase in the future as the restoration standards are better understood, and more property owners understand the financial and environmental benefits.

Priority: 30 of 30**Status: Existing****Hazard Addressed: Flood Hazard**
Category: Hazard Damage Reduction**TC-FH 18: Encourage research into bioengineering and other techniques which provide streambank protection and improve fisheries through the use of large woody debris. Support local demonstration projects which could provide such research.**

Rationale: Local knowledge is often gained through local examples. The State has funded several bioengineering pilot projects on the Deschutes River. Not only did these projects solve existing problems, but they added to the local cumulative knowledge and were successful projects in their own right. If the State Salmon Strategy is to succeed, it will be necessary to continue to learn how to protect shorelines while providing as much fish habitat as possible.

Relates to Plan Goal(s) and Objectives: 2A**Implementer:** Thurston County Resource Stewardship, Thurston County Public Works, Thurston Conservation District, and Natural Resources Conservation Service.**Estimated Cost:** Unknown**Time Period:** 2010 - 2015**Funding Source:** Unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** FDR-4**Reference Page:** VIII-16

Initiative and Implementation Status: Thurston County has been sharing data with other governmental entities regarding engineered logs, due to the presence of a significant log jam on the Deschutes River near Offut Lake. Several engineered log jam have been built throughout the Puget Sound region and are now being monitored for their performance. It is likely that preliminary results on the performance of these structures will not be complete until 2010 or later. In addition to this research, Thurston County has utilized large woody materials (LWM) on 6 other projects (see next page for details).

Thurston County Public Works uses the Integrated Streambank Protection Guidelines, 2002, which was a cooperative effort by WDFW, Ecology, Army Corps of Engineers, WSDOT, WDNR, and USFWS. We also use Stream Habitat Restoration Guidelines, 2004, by Ecology, USFWS and WDFW for design of riparian crossings and bank protection projects. Thurston County is also looking at including bioengineering in their Shoreline Management Plan update.

Independence Road Erosion Project CRP 61375. This project includes protecting approximately 140 feet of Independence Road from the eroding south bank of the Chehalis River by bioengineered bank stabilization, including placing large rock at the toe, topped with layers of geotextile lifts interspersed with layers of willow wattles. Above the rock, approximately 45 pieces of large wood, including large tree trunks with root wads attached will be anchored to provide fish habitat and recruit more wood and sediment to the site. Construction is taking place in 2009.

Independence Road North Project CRP 77095. The proposed project extends for 300 feet along the left bank of the Chehalis River. The project has four major elements that are intended to augment the existing bank stabilization and provide mitigation for the emergency placement of rock due to heavy rains and high water levels in the Chehalis that threatened Independence Road in December 2006. The elements include:

Partial removal of existing riprap, which was placed on an emergency basis during December 2006 to prevent severe erosion that threatened the road;

Sloping back of the slope between the river and Independence Road to increase stability and reduce adverse effects on the river by incorporating approximately 24 pieces of large wood, including poles and large tree trunks with rootwads attached, into the bioengineered slope;

Placement of a wood toe upstream of the existing riprap to reduce the potential for flanking around the structure; and

Revegetation of the entire site with native riparian and upland species.

Houston St off of 17th NW. This site consisted of a degraded channel, perched culvert and slumping bank. We installed two medium size rootwads with stems trenched back into the bank and modified the existing weirs to create pools and elevate the channel bed at the outlet.

Holiday Valley NW (Schneider Creek). The failure consisted of channel migration and failing bank upstream of a large diameter culvert. Crews installed 4 LWM at various elevations along the bank and some toe rock for protection and habitat. We replanted the bank and disturbed soils last year and this site is functioning very effectively.

Lackamas Creek SE on Bald Hills Road. The site consists of a new bridge and utilizes existing LWM onsite (two maple trees) to protect the northwest abutment. This LWM was placed upstream during construction and created some great habitat for various species. The site has experienced numerous high flow events and has successfully protected the structure.

Cedar Flats Road SW. The new bridge was installed after Swift Creek washed out the culvert during a major storm event. This past fall the crews noticed that channel started to shift towards the west and the potential of the bank and abutment failure was high. LWM was incorporated into the bank to push the channel back in its original location and protect the abutment.

Priority: N/A**Status: Completed****Hazard Addressed: Flood Hazard****Category: Plan Coordination and Implementation****TC-FH 3: Expand the Thurston County Stormwater Utility rate boundary to include all unincorporated areas.**

Rationale: This recommendation is not without some controversy. It is not consistent with the 1997 South Thurston County Water Focus Group Report which recommended that Thurston County fund water issues in the “south county through existing county tax dollars - the general fund.” The limited nature of county financial resources was the central reason for the creation of a countywide Storm and Surface Water Utility in 1989. Past projects and activities have been limited to the utility rate boundary in north county, with the exception of emergency work for the Hopkins and Hickman Ditch areas (Salmon Creek Drainage) in 1996/97 due to high groundwater flooding. Records indicate that flooding and high groundwater problems are becoming more acute throughout rural unincorporated areas. The expansion of the rate boundary would provide equity throughout the county and would help fund south county projects or activities which are currently not financially feasible.

Relates to Plan Goal(s) and Objectives: 6A, 6D**Implementer:** Thurston County Board of County Commissioners**Estimated Cost:** \$20,000**Time Period:** 2004 - 2008**Funding Source:** Thurston County Storm and Surface Water Utility**Source and Date:** Thurston County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** IM-3**Reference Page:** VIII-5**Initiative and Implementation Status:** January 1, 2008 Thurston County approved a county-wide Stormwater Utility.

Priority: N/A**Status: Completed****Hazard Addressed: Flood Hazard****Category: Hazard Preparedness****TC-FH 5: Install and maintain flood elevation poles and staff gauges along major rivers and within chronic groundwater flooding areas.**

Rationale: Staff gauges are an essential part of flood preparedness and equally important as an emergency backup to the automated USGS stations. Staff gauges are also an important element of education as a year round reminder of the winter character of each of our local rivers. Having flood elevation poles will be important within chronic groundwater flooding areas. Floods in Thurston County have on average destroyed one gauging station during each of the most recent flood events. Budget cuts over the past decade have resulted in incomplete records, with significant events occurring when the stations have been turned off. This is also a problem in the summer where low flows can affect fisheries habitat. It is important that river gauges which the County and others rely upon for flood information are upgraded to provide real time data. The Deschutes River is the only major river which does not have multiple gauges connected to the GOES weather satellite. The gauge at the “E” Street Bridge in Tumwater does not provide any telemetry, but few rely on this gauge. The gauge at Rainier is critical. It has been upgraded, but the phone line necessary to get the flood stage data was not installed. The Washington State Department of General Administration relies on this gauge as an input to its METASYS software which controls the tide gates at the Capitol Lake dam. Poor data in this situation may lead to potential flooding in downtown Olympia.

Relates to Plan Goal(s) and Objectives: 8A**Implementer:** Thurston County Emergency Services**Estimated Cost:** \$47,000 (NOTE: Not including the “E” St Bridge)**Time Period:** 2004 - 2008**Funding Source:** Unknown**Source and Date:** County Flood Hazard Management Plan (1999); Resolution #11947**Adopted Plan Number:** PI-1**Reference Page:** VIII-6

Initiative and Implementation Status: This work has been completed. -Thurston County has been working with a number of agencies to provide “real time” data to local and State government managers and to find funding to operate the Rainier gauging stations year round.

Priority: N/A**Status: Removed****Hazard Addressed: Earthquake Hazard****Category: Public Information****TC-EH 2: Develop a public outreach program for earthquake preparedness.**

Rationale: The County would need to develop public outreach materials for earthquake hazards. Key activities would include encouraging the reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices, along with the purchase of earthquake hazard insurance. This outreach program would be similar to the material that has been developed for flood hazards. It has been proven that doing structural and non-structural mitigation activities, citizens, businesses, government and academia would all reduce and in some cases eliminate loss of property and life and reduce recovery time and costs. Regarding the purchase of insurance, the pertinent question for residents of Thurston County is not “if” a catastrophic earthquake will occur, but “when.” Most homeowners insurance does not cover earthquake damage as part of its basic plan. Encouraging the purchase of earthquake coverage will help our community recover from a devastating quake.

Relates to Plan Goal(s) and Objectives: 8A**Implementer:** Thurston County Emergency Services**Estimated Cost:** \$42,000 (NOTE: \$8,500 Annually)**Time Period:** 2004 - 2008**Funding Source:** Pre-Hazard Mitigation Grant and EMC funds**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-EH 2**Reference Page:** V-155**Initiative and Implementation Status:** The function of this initiative has been replaced by a County wide initiative, CW-MH 6.

Priority: N/A**Status: Removed****Hazard Addressed: Flood Hazard****Category: Public Information****TC-FH 6: Prepare and distribute public information program which focuses on the consequences of floods.**

Rationale: There is a need to continually provide citizens current information on: the consequences of living in a flood plain; the National Flood Insurance program; and the County's flood related activities. This is especially true in the areas of low cost housing that has a transient population.

Relates to Plan Goal(s) and Objectives: 8A**Implementer:** Thurston County Emergency Services**Estimated Cost:** \$25,000 (Note: \$5,000 Annually)**Time Period:** 2004 - 2008**Funding Source:** Unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999)**Adopted Plan Number:** PI-4**Reference Page:** VIII-7

Initiative and Implementation Status: The function of this initiative has been replaced by a County wide initiative, CW-MH 6.

Priority: N/A**Status: Removed****Hazard Addressed: Flood Hazard****Category: Hazard Damage Reduction****TC-FH 19: Develop a warning system for the Nisqually and Skookumchuck River dams with their property owners, the Department of Ecology, the downstream communities and residents.**

Rationale: With the large population downstream from the dams, an adequate warning system is essential. This need is independent of any proposal to modify the structures and/or add storage capacity to the dams.

Systems for both rivers would require coordination with the adjacent counties and local governments and tribal entities. The cost listed below would be for only the Thurston County portion of such a system.

Relates to Plan Goal(s) and Objectives:**Implementer:** Thurston County Emergency Management**Estimated Cost:** \$100,000t**Time Period:** 2004-2008**Funding Source:** Unknown**Source and Date:** Thurston County Flood Hazard Management Plan (1999)**Adopted Plan Number:** FP-1.**Reference Page:** VIII-17

Initiative and Implementation Status: This initiative has been incorporated into TC-MH 4 for multi-hazard alert and warning capabilities.

Priority: N/A**Status: Removed****Hazard Addressed: Severe Storm Hazard****Category: Public Information****TC-SH 1: Develop a public outreach program for storm preparedness.**

Rationale: The County would need to develop public outreach materials for earthquake hazards. This would be similar to the material that has been developed for flood hazards. Prepare and distribute public education materials regarding protecting life, property, and the environment from storm events. Place links to this material on the Thurston County home page.

Relates to Plan Goal(s) and Objectives: 8A**Implementer:** Thurston County Emergency Services**Estimated Cost:** \$42,500 (*NOTE: \$8,500 Annually*)**Time Period:** 2004 - 2008**Funding Source:** Unknown**Source and Date:** Natural Hazards Mitigation Plan for the Thurston Region (2003)**Adopted Plan Number:** TC-SH 1**Reference Page:** V-207

Initiative and Implementation Status: The function of this initiative has been replaced by a County wide imitative, CW-MH 6.

Thurston County Implementation of the National Flood Insurance Program

Introduction

All Local Mitigation Plans approved by FEMA after October 1, 2008 **must** describe each jurisdiction’s participation in the NFIP and **must** identify, analyze and prioritize actions related to continued compliance with the NFIP. Basic compliance NFIP actions could include, but are not limited to:

- Adoption and enforcement of floodplain management requirements, including regulating all and substantially improved construction in Special Flood Hazard Areas (SFHAs);
- Floodplain identification and mapping, including any local requests for map updates, if needed; or
- Description of community assistance and monitoring activities.

Requirement §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction’s participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

National Flood Insurance Program Participation

Summary of National Flood Insurance Program Premiums, Policies, and Claims

Community	Total Premium	Number of Policies			Total Coverage	Total Claims Since 1978	Total Paid Since 1978	Repetitive Losses	Severe Losses
		V Zone	A Zone	Total					
Bucoda	\$55,051	0	64	74	\$10,033,700	42	\$249,262	0	0
Lacey	\$4,652	0	0	14	\$3,871,000	3	\$8,088	0	0
Olympia	\$90,555	0	31	82	\$25,265,400	16	\$347,006	0	0
Rainier	\$326	0	0	1	\$280,000	0	\$0	0	0
Tenino	\$1,327	0	0	4	\$633,700	7	\$105,233	0	0
Tumwater	\$2,707	0	0	6	\$1,482,000	2	\$12,515	0	0
Yelm	\$17,617	0	11	28	\$7,313,400	2	\$7,603	0	0
Thurston County	\$316,352	3	281	663	\$141,785,400	215	\$3,389,280	10	0
County Total :	\$488,587	3	387	872	\$190,664,600	287	\$4,118,937	10	0

Source: FEMA NFIP Insurance Report, Washington, May 5, 2009.

Thurston County government has actively participated in the National Flood Insurance Program (NFIP) since 1982 and the Community Rating System (CRS) program since 2000. Thurston County has a Class 5 rating in the CRS program. A Class 5 rating saves policyholders 25% or an average of \$238 per policy. Thurston County government has made a concerted effort to exceed minimum floodplain management requirements, provide increased public awareness regarding the local flood hazard, and provide protection from flooding.

Currently there are 10 repetitive loss properties within unincorporated Thurston County and there are no properties that meet the severe repetitive loss criteria. In November 2008, Thurston County received a Community Block Grant from the Washington State Department of Community Trade and Economic Development. The grant provide funding to elevate approximately 30 to 47 residences in the Chehalis and Deschutes River Basins that were damaged by the December 2007 Flood. The first floor above the crawlspace must be 24” above the FEMA mapped elevation for the property or the highest known flood level, whichever is greater. The grant will serve to prevent future flood damage to residences in the affected areas and therefore reduce the number of potential repetitive loss structures.

Thurston County government will continue to participate in both the NFIP and the CRS program because they are integral to current and future flood mitigation efforts within the unincorporated portion of Thurston County. In addition, the hazard mitigation strategy for unincorporated Thurston County is based upon continued participation and compliance with the National Flood Insurance Program as well as the Community Rating System program.

Flood Plans, Ordinances, and Regulations

A large portion of Thurston County is located within the 100-year floodplain. In addition, portions of the County are located within a designated floodway or are located in a coastal high-hazard V zone. Since 1972, Thurston County has been declared a federal disaster area for floods 14 times resulting in substantial losses. Through federal and state grants, a number of repetitive loss properties, in areas prone to flooding, have been purchased by the County and the buildings either demolished or removed. Also, through the same grant sources a number of flood damaged houses have been raised two feet above base flood elevation to prevent further damage in future flood events.

Thurston County has a strong framework of policies and laws that help reduce property damage due to floods as well as protecting the natural functions of floodplains. Beginning with the Thurston County Comprehensive Plan, which contains the following Goal, Objective and Policies that pertain to floodplains:

GOAL: Protect life and structures from flood hazards and retain the flood storage, transmission capacity, and habitat value of floodplains.

OBJECTIVE: To provide the highest degree of flood protection at the least cost.

POLICIES:

1. The county should provide the highest degree of flood protection at the least cost through identification and accommodation of natural flooding and channel migration processes that

pose hazards to life or property. Protection and management should be based on best available science and cumulative impact assessments of existing and planned future land and resource uses within the floodplains, channel migration zones, and watersheds.

2. The county should prohibit development and emplacement of fill in floodways and floodplains, except to the minimum extent necessary to accommodate public infrastructure and utilities that cannot be accommodated elsewhere and to stabilize channels against erosion in order to protect existing agricultural lands, public roads and bridges, public infrastructure, utilities and significant private structures, and to achieve habitat enhancement. Any development in the floodways should be designed to avoid habitat degradation. Stream bank stabilization, if necessary, should be of a type that maintains or enhances habitat functions. Rip-rap and other hard armoring should only be used if there is no effective alternative, based on sound engineering principles, to protect existing structures or public facilities.
3. The county should provide for land uses such as forestry, open space, public recreation, existing agriculture and water-dependent uses in areas subject to river flooding to minimize risks to life and structures and help retain or enhance habitat functions. Other uses and development in the floodplain should be restricted to minimize public safety risks (e.g., through compensating design features) and loss of habitat function.
4. The county should minimize disruption of long-term stream channel migration processes that allow formation of essential habitat features by prohibiting construction of new structures in channel migration zones and minimizing streambank stabilization.
5. The county should actively participate in the multi-jurisdictional flood hazard reduction efforts within the Chehalis River Basin.
6. The county should regulate uses in and around areas where groundwater periodically surfaces as necessary to avoid property damage and protect groundwater quality.
7. The county should maintain the county's enrollment in the Community Rating System through the National Flood Insurance Program.

Thurston County Codes as they pertain to restrictions to building in the floodplain includes:

Thurston County Code Chapter 14.38 Development in Flood Hazard Areas is part of the County's Building Code. It includes the following intent and purpose:

It is the purpose of this chapter to promote the public health, safety and general welfare, and to minimize losses due to flood conditions in specific areas by provisions, which will:

1. Require that uses vulnerable to floods, including public facilities, which serve such uses, be provided with flood protection at the time of initial construction;
2. Restrict or prohibit uses, which are dangerous to human health, safety or property in times of flood, or cause increased flood heights or velocities;
3. Control filling, grading, dredging and other development, which may increase flood damage;
4. Control the alteration of natural floodplains, stream channels and natural protective barriers, which help accommodate or channel floodwaters;

5. Alert individuals to lands, which are in areas of special flood hazard.

Thurston County's Critical Areas Ordinance (Chapter 17.15) identifies floodplains as a critical area. The Critical Areas Ordinance includes the following restrictions to protect floodplain functions:

Chapter 17.15.865 (F) (Special Management Areas – High Groundwater Flood Hazard Area Standards: All new structures shall be set back a minimum of fifty feet from the boundary of any designated high ground water flood hazard area. All residential structures within three hundred feet of a designated high ground water flood hazard area shall have the lowest floor, including basement, elevated a minimum of two feet above the known high ground water flood elevation

Chapter 17.15.900 (Floodplains, Streams, and Wetlands) – Purpose: It is the policy of Thurston County to accomplish the following: A. To preserve natural flood control, stormwater storage and drainage or stream flow.

Chapter 17.15.925 prohibits fill, single family residences, utility facility, and agricultural buildings in a floodplain.

Chapter 17.15.935 retains the natural buffers for one hundred feet from the ordinary high water mark for Type 1, 2, and 3 streams, fifty-feet for Type 4 streams, and twenty-five feet for Type 5 streams.

In the event a structure is built within the floodplain due to a Reasonable Use Exemption Chapter 17.15.1005 B (Floodproofing Certificate) requires a registered professional engineer's or architect's certification that the structure is constructed in accordance to Thurston County's Code 14.38.040.

Thurston County Community Rating System Mitigation Activities

The following activities are carried out as part of Thurston County's participation in the NFIP Community Rating System program in an effort to further reduce the effects of flooding in the unincorporated portions of Thurston County.

1. Elevation Certificates: Thurston County maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available upon request and may be viewed on the County website.
2. Map Information: Thurston County furnishes flood zone information from the community's latest Flood Insurance Rate Map (F.I.R.M.), annually publicizes the service and maintains records.
3. Outreach Projects: A brochure is mailed annually to all properties in the Special Flood Hazard Area. Flood hazard information is also provided through displays at public buildings and the annual County Fair. Thurston County also has flood insurance and general flood information on its Development Services Department and Emergency Management websites.
4. Hazard Disclosure: Thurston County recognizes the disclosure requirements of the State of Washington disclosure law.
5. Flood Protection Information: Documents relating to floodplain management and locally pertinent flood issues are available throughout the Timberline Regional Library system.

6. Flood Protection Assistance: Thurston County provides technical advice and assistance to interested property owners and annually publicizes the service.
7. Additional Flood Data: Thurston County maintains a high-level restrictive floodway and floodplain standard and uses the flood of record elevations when applying its regulations. Thurston County is a participant in the Cooperating Technical Partnership (C.T.P.) Program.
8. Open Space Preservation: Thurston County is preserving approximately 8,422 acres in the special flood hazard area as open space.
9. Higher Regulatory Standards: Thurston County enforces regulations that require freeboard for new construction and substantial improvement, protection of critical facilities, natural and beneficial functions, other higher regulatory standards, land development criteria and state mandated regulatory standards.
10. Flood Data Maintenance: Thurston County has established and maintains a system of elevation reference marks and maintains copies of all previous F.I.R.M. maps and Flood Insurance Study Reports.
11. Stormwater Management: The State of Washington has instituted a Clean Water Program and the County has adopted the Department of Ecology's Stormwater Manual for Puget Sound. The County enforces regulations for stormwater management, freeboard in non-special flood hazard area zones, soil and erosion control and water quality.
12. Repetitive Loss: As of the NFIP Report of Repetitive Losses provided by FEMA for 2008, the County has 16 repetitive loss properties.
13. Acquisition and Relocation: Thurston County has acquired and demolished or removed 21 properties in the Nisqually flood hazard area thus removing them from the repetitive loss roster.
14. Flood Protection: Thurston County receives credit for buildings that have been flood proofed, elevated or otherwise modified to protect them from flood damage.
15. Drainage System Maintenance: Thurston County's drainage system is inspected regularly throughout the year and maintenance is performed as needed by the Thurston County Public Works Department. Records are maintained for both inspections and required maintenance. The Thurston County's Comprehensive Plan Chapter 6 - Capital Facilities Plan is a financial planning and budgeting tool that includes capital drainage improvement projects. The County also enforces a regulation prohibiting dumping in the drainage system.
16. Flood Warning Program: Thurston County provides a program for timely identification of impending flood threats, disseminating warnings to appropriate floodplain residents and coordinating flood response activities.
17. Dam Safety: All Washington communities currently receive Community Rating System credit for the Washington State Department of Ecology Dam Safety Program.

For additional information regarding the National Flood Insurance Program Community Rating System and Thurston County's participation in the CRS Program, please contact: Mark Swartout, Thurston County CRS Coordinator, (360) 709-3079.

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