

Community Flood Preparedness

How can your town
begin to adapt?

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This workshop is part of a study on decision-making and flood preparation in Upper Valley communities. This workbook has been designed to gather your input to answer specific research questions. As a participant in this workshop, your involvement is central to this research. The intended outcome of this project is to provide a better understanding of how communities and policies in the Upper Valley, and other flood prone regions, can better support flood preparedness at the local level.

Please know that your time in this workshop is highly valued and appreciated. Don't hesitate to ask questions on any material at any time.

Thank you,



Jonathon Loos

VOLUNTARY PARTICIPATION

I understand that my participation in this study is entirely voluntary, and that refusal to participate will involve no penalty or loss of benefits to me. I am free to withdraw or refuse consent, or to discontinue my participation in this study at anytime without penalty or consequence.

I voluntarily give my consent to participate in this research study. I understand that by choosing to provide responses to the questions in this workbook I am giving consent to use my responses for research at Plymouth State University.

BACKGROUND INFORMATION

1. Where do you live? Town/State: _____
(OR)
Prefer not to say.
2. How long have you been a resident of that town?
 - a. 0–5 years
 - b. 6–15 years
 - c. More than 15 years
3. Did you consider the risk of flooding when making the decision to live in your current town?
 - a. Yes
 - b. No
 - c. Unsure
4. Do you perceive your community to be at risk of flooding?
 - a. Yes
 - b. No
 - c. Unsure

If answered (a. Yes) to question 4, please answer questions 4A and 4B:

 - 4A. How do you perceive the risk of flood to your community today, compared to when you first moved there?
 - a. Greater today
 - b. Less today
 - c. About the same
 - d. Unsure
 - 4B. In your community, would you suppose that the greatest risk of flood is posed by:
 - e. A large river, such as Connecticut River
 - f. Medium or small river, such as the Mascoma River
 - g. Streams or brooks
 - h. Stormwater or rain runoff
 - i. Other: _____
5. Has your own personal property (residence, vehicle, belongings, etc.) ever been damaged by flood or runoff waters?
 - a. Yes
 - b. No
 - c. Unsure
6. Please indicate to what level you agree with the following statement:
“Local environmental factors such as; land cover, riverbank structure, and wetland or forest areas play an important role in determining the severity of floods.”
 - a. Strongly agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly disagree

MITIGATION PROJECTS

The term 'mitigation' means to lessen the intensity, severity, or consequences of something negative. In planning for natural hazards, mitigation efforts aim to lessen the damage that results from a destructive event, such as a flood. The objective of flood mitigation projects is to reduce the amount of damage and loss from a flood. Oftentimes, flood mitigation projects work to enhance community structures and better manage the movement of water. As introduced in the presentation, mitigation projects may involve built improvements to community structures, as well as supporting natural features of a landscape.

The inserted page of tables present a range of projects that a community might undertake to reduce damage from future flood events. Projects are organized into two categories; those that contribute to waterway stabilization, and those that manage stormwater runoff. Projects in each table are presented with factors that might be considered when deciding whether to implement each. Please consider the flood preparation scenario below, and then use **Tables 1 and 2** to answer the questions that follow.

SCENARIO:

Your community is looking for ways to reduce the level of damage and loss caused by the next flood. A 250 ft. segment of waterway in your area has been identified as especially vulnerable to erosion and collapse from high waters. Additionally, local stormwater structures and roads have experienced damage from runoff in past storms. Your town is considering waterway stabilization projects in **TABLE 1** and runoff management projects in **TABLE 2** to address these problems for the next flood event.



The Pemigewasset River floods after Hurricane Irene hits Plymouth, NH in August of 2011.

MITIGATION PROJECTS

1. Considering only **Table 1**, use the Priority Ranking row to indicate the priority that you would give each waterway stabilization project for implementation in your community. Use numbers "1" to indicate highest priority, "2" to indicate second highest priority, and so on for each project.
2. When deciding whether to implement the projects in **Table 1**, which criteria are most important to consider? Please indicate this with a rank from 1 (most important) to 6 (least important) of the criteria below.

Cost (\$)	_____	Co-benefits	_____
Environmental Impact	_____	Lifetime	_____
Effectiveness	_____	Aesthetics	_____
3. Of the projects presented in **Table 1**, is there one that should NOT be pursued by your community?
 - a. Yes. If yes, which one? _____
 - b. No
 - c. Unsure
4. Now considering only **Table 2**, please use the Priority Ranking row to indicate the priority that you would give each runoff management project for implementation in your community. Use numbers "1" to indicate highest priority, "2" to indicate second highest priority, and so on for each project.
5. When deciding whether to implement the projects in **Table 2**, which criteria are most important to consider? Please indicate this with a rank from 1 (most important) to 6 (least important) of the criteria below.

Cost (\$)	_____	Co-benefits	_____
Environmental Impact	_____	Lifetime	_____
Effectiveness	_____	Aesthetics	_____
6. Of the projects presented in **Table 2**, is there one that should NOT be pursued by your community?
 - a. Yes. If yes, which one? _____
 - b. No
 - c. Unsure

MITIGATION GRANT ASSISTANCE

There are a number of programs through state and federal offices designed to provide financial assistance to community flood mitigation projects. Those include the Pre-Disaster Mitigation (PDM)¹ fund, the Flood Mitigation Assistance program², the Hazard Mitigation Grant Program, and the Repetitive Flood Claims and the Severe Repetitive Loss programs³, among others. These funds may provide up to 75% of a project’s cost to a community.

The two tables below reflect the reduced costs of projects upon receiving potential grant funds. Please use them to answer question 7.

7. Considering the adjusted costs below alongside the criteria in **Tables 1 and 2**, does your prioritization of projects change for either table?
- No
 - Yes. If yes, indicate new priority rankings in the “Revised Rank” row.

Waterway Stabilization	BANK ARMORING	SOFT BANK STABILIZATION	CHANNEL REALIGNMENT	CHANNEL SLOWING FEATURES (<i>Rock Vanes, Logs</i>)
ADJUSTED COST (\$)	\$3,750 per 250 ft.	\$938 per 250 ft.	\$6,000 per 250 ft.	\$500–2,000 depending on width.
REVISED RANK				

Stormwater and Runoff Management	CULVERT UPGRADES	ROADBED UPGRADES	PERMEABLE GROUND COVER	URBAN VEGETATED SWALES
ADJUSTED COST (\$)	\$1,500–4,000 per culvert.	\$24,000 per 1000 ft. of road	\$3,155 per 5,000 sq. ft. lot (roughly the size of a basketball court)	\$1,125 per 50 ft.
REVISED RANK				

¹ www.nh.gov/safety/divisions/hsem/HazardMitigation/pdm.html

² www.nh.gov/safety/divisions/hsem/HazardMitigation/fma.html

³ www.nh.gov/safety/divisions/hsem/HazardMitigation/rfc.html

COMMUNITY ADAPTATION TO FUTURE FLOOD RISK

Adaptation to flooding involves preparing community structures and planning to better live with risk of flood for the long term. This includes structural upgrades as well as adopting community zoning ordinances that work to avoid or reduce damage from flood permanently.

A range of actions exist that can help a community better adapt to flood risk in the long term. Some of those actions are presented in **Tables 3 and 4** in the following inserted page. Actions have been organized into two categories; those that involve community planning initiatives, and those that improve retention of excess water. Projects in each table are presented with attributes that might be considered when deciding whether to implement each. Please consider the flood adaptation scenario below, and use **Tables 3 and 4** to answer the questions that follow.

SCENARIO:

Your community is trying to reduce its risk of damage from flood in the long term. Your state's Emergency Management Office and Floodplain Manager offer guidance on local planning and zoning initiatives that can reduce risk of flood damage to buildings in your town. Additionally, your town is considering investing in projects that can provide greater water retention, and reduce the height of floodwaters. The community planning initiatives being considered are presented in **TABLE 3**, and the improved water retention projects being reviewed are presented in **TABLE 4**.



The April 15, 2014 flood along the Pemigewasset River in Plymouth, NH. Heavy rain on top of high spring snow-melt caused the river's flow to rise from less than 5,000 cubic feet per second, to over 23,000 in just 10 hours time.

COMMUNITY ADAPTATION TO FUTURE FLOOD RISK

1. Considering only **Table 3**, use the Priority Ranking row to indicate the priority that you would give each initiative for implementation. Use numbers "1" to indicate highest priority, "2" to indicate second highest priority, and so on for each project.
2. When deciding whether to implement the projects in **Table 3**, which criteria are most important to consider? Please indicate this with a rank from 1 (most important) to 6 (least important) below.
Cost (\$) _____ Co-benefits _____
Environmental Impact _____ Social and Political Acceptance _____
Effectiveness _____ Aesthetics _____
3. Of the projects presented in **Table 3**, is there one that should NOT be pursued by your community?
 - a. Yes. If yes, which one? _____
 - b. No
 - c. Unsure
4. Considering only **Table 4**, use the Priority Ranking row to indicate the priority that you would give each project for implementation. Use numbers "1" to indicate highest priority, "2" to indicate second highest priority, and so on for each project.
5. When deciding whether to implement the projects in **Table 4**, which criteria are most important to consider? Please indicate this with a rank from 1 (most important) to 6 (least important) below.
Cost (\$) _____ Co-benefits _____
Environmental Impact _____ Social and Political Acceptance _____
Effectiveness _____ Aesthetics _____
6. Of the projects presented in **Table 4**, is there one that should NOT be pursued by your community?
 - a. Yes. If yes, which one? _____
 - b. No
 - c. Unsure

FLOOD INSURANCE AND THE UPPER VALLEY

The National Flood Insurance Program (NFIP) is a partnership between a community and the federal government. Communities participate by agreeing to adopt and enforce a floodplain management ordinance designed to reduce future flood risks. All residents in participating communities (whether in a floodplain or not) can purchase flood insurance. All Upper Valley communities currently participate in the NFIP, giving residents and businesses within each community access to flood insurance policies.⁴ The average annual cost for flood insurance in New England is around \$1,200, compared to around \$1,500 in the Upper Valley.⁵

COMMUNITY ADAPTATION TO FUTURE FLOOD RISK

The community rating system (CRS) is a NFIP program that rewards communities for going beyond minimum NFIP requirements to prevent or reduce flood losses. Communities earn credit points that determine classifications. There are 10 CRS Classes: Class 1 requires the most credit points and provides the largest flood insurance premium reduction (45 percent), while Class 10 means the community does not participate in the CRS or has not earned the minimum required credit points, and residents receive no premium reduction. The CRS Classes are based on completion of 19 creditable activities that include various flood mitigation projects and initiatives.⁶

The adjacent table indicates the number of flood insurance policies in each Upper Valley town and the number of which are currently high-risk subsidized policies. Subsidized policies are subject to increase in the coming years.

Town	Total Policies	# Subsidized
Plainfield, NH	13	6
Lebanon, NH	138	72
Hanover, NH	33	8
Lyme, NH	12	6
Orford, NH	29	18
Piermont, NH	1	0
Hartford, VT	63	21
Norwich, VT	30	22
Thetford, VT	30	22
Fairlee, VT	3	2
Bradford, VT	9	6

7. Please indicate to what level you agree with the following statement:

"I am concerned about the cost of flood insurance for properties in my town."

- a. Strongly agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly disagree

8. The criteria below have been used to compare a variety of flood mitigation and adaptation projects in this workbook. Now considering the community rating system (CRS) described above how important is a project's CRS credit to consider when deciding which projects to implement?

- a. Very important
- b. Important
- c. Neutral
- d. Unimportant
- e. Very unimportant

9. When deciding whether to implement any flood mitigation or adaptation project in your town, in general, which criteria are most important to consider? Please indicate this with a rank from 1 (most important) to 6 (least important) below.

- Cost (\$) _____
- Environmental Impact _____
- Effectiveness _____
- Co-benefits _____
- Aesthetics _____
- Credit towards CRS classification _____

10. Do you have flood insurance?

- a. Yes
- b. No

⁴ www.nh.gov/oep/planning/programs/fmp/index.htm

⁵ New Hampshire Office of Energy and Planning, based on 2013 rates for Upper Valley towns.

⁶ www.floodsmart.gov/floodsmart/pages/crs/community_rating_system.jsp

CONCLUDING QUESTIONS

1. Please indicate to what level you agree with the following statement:
“Local environmental factors such as; land cover, riverbank structure, and wetland or forest area, play an important role in determining the severity of floods.”
 - a. Strongly agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly disagree
2. [Optional] What projects and/or initiatives has your town undertaken to prepare for flooding, which you are aware of?

DEMOGRAPHIC INFORMATION

1. Do you hold a position as a decision maker in your community, region, or state? This may include positions in bodies of planning, permitting, review boards, committees/subcommittees, legislative, etc.
 - a. Yes
 - b. No
2. What is your highest level of education?
 - a. High school
 - b. Some college coursework
 - c. College degree
 - d. Professional degree
 - e. Advanced degree beyond college
 - f. Prefer not to share

PICTURE SOURCES

blountlibrary.org/soil/

kitsapcd.org/

shandaken.us/disaster-prep-response/recovery-news/; Town of Shankaden

wildlifedepartment.com/fishing/streams/erosion.htm

dec.ny.gov/lands/; Scenic Hudson Organization

nh.gov/oep/; Jennifer Gilbert

watershedmanagement.vt.gov/rivers/htm/rv_restoration.htm

enviroatlas.epa.gov/enviroatlas/InteractiveMapEntrance/InteractiveMap/

nae.usace.army.mil/Missions/CivilWorks/FloodRiskManagement/Vermont/UnionVillage.aspx

lakegeorgeassociation.org/what-we-do/Lake-friendly-Living/Permeable-Pavement.htm [porous asphalt]

abbey-associates.com/splash-splash/picture_gallery.html



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