

Appendix

Appendix A. Community Story Mapping Instructions for Workshop Facilitators

This document was used to ensure that all members of the research team understood the plan for the workshop, and could easily reference protocol and needs while in smaller group settings without interrupting the process of the conversation.

Protocol for Facilitators (6/28/24)

A. **Greeting** – Research Assistants and PIs greet people at the door, share info sheets for informed consent, and facilitate sign in.

- a. Charis start and whole group say hello, introductions all around.

B. **Participatory mapmaking introduction:** Sarah

- Why is this helpful: Today we are doing a first round of participatory mapmaking.
 - What we will be doing today: We will be doing a three-part exercise. First, for roughly a half hour but we can go longer if needed, you will work in small groups to map what happened during the 2023 summer floods. Then we will take a break to get food and to do what we call a ‘silent art walk’. Prior to breaking well do a quick check in about how the first exercise went. We will then post all the maps to the walls, and you all will have time walk around and observe all the maps. For this second part, we would rather that no one presents their maps yet. After taking the time to use the bathroom, get some food, and check out the maps, we will then move into the third activity, which is that each group will present their map. Given the size, we are asking that each group limits their presentation to 3-5 minutes.
 - We have created a few icons that we suggest you all include in your maps based on what we know and have heard about the flooding.

What is a map? A map is a **symbolic representation of selected characteristics of a place**, usually drawn on a flat surface and to scale. There are a lot of assumptions and decisions that go into making every map, but we as the viewers or users may not know all of those decisions. A map has the power to communicate a certain version of a place. Maps are useful tools, and they help us to visualize how activities are spread out in space. Often times, official maps done by outsiders can miss important places, processes, etc. So, the importance of doing participatory mapmaking is that you all can start to represent your own experiences and observations of flooding in summer 2023. Mapping as a process also helps to facilitate that you speak and share information among each other and can

then share that work among groups. All of us learn differently, and maps are helpful for multiple types of learners (but not always everyone!).

What is a map icon? Maps have symbols to represent different features of a landscape or place. Icons are one form of symbol on a map. For example, hospitals are often represented with an H icon and mountains can sometimes be represented by a small triangle icon.

And part of our “findings” will be starting to gather other icons based on your observations and lived experiences. Our end goal is continue doing mapping exercise to help create new resources or tools, or help to support the improvement and access of existing tools.

Mapping as process can also help to diagnose, systematize, and inform difficult decisions, like some of the ones you all face about where to focus repair and where to consider relocating certain structures, etc.

Ground rules: No right way to do this, be respectful of others, take a break if you need to (separate mapping exercise if needed), try to make space for everyone to speak and map, may have spatial disagreements, that’s ok.

C. Mapping Directions

- Icons we are suggesting.
 - a. Places of flooding damage/concern
 - b. Places of erosion damage/ concern (if these are the same, that’s ok)
 - c. Critical infrastructure (can be bridges, roads, but can also be what they need like super market)
 - d. Hubs of resources (can be formal or community organized)
 - e. Bottlenecks or places where you could not pass to help people/receive resources.
 - f. Other areas of value or concern – use another color and note what they are

You will be representing all of these with colored circles, and then numbering them. On the corresponding paper spreadsheet, you will label all the numbers and what they correspond to. For example, for the supermarket that got damaged, that may have an orange circle placed where it happened with a number 1. Then in the spreadsheet you would write the name of the supermarket and include any relevant details that you may like to. Some of these icons may not correspond to a single spot on the map. Maybe a

bottleneck was a whole section of a road, for example. If you have any questions, raise a hand and one of us will come over to help. But you can also put two points to note the starting and ending point of an issue like that.

Questions? [If using two rooms, now we will move.]

D. Begin participatory mapmaking exercise

- Ok, now let's move into groups. Charis, Sarah, Noah, students, and community interlocutors, help people move into smaller groups.
 - a. let them self-select, suggest that it's groups of 8 maximum.
 - b. Facilitators go around to groups, sit, listen, find materials needed. Give advice but try not to intervene too much into their process.
 - Questions: start with the first question, then go asking the questions as need be. If the groups take off, walk around asking these questions to each group. If the room is more silent with less activity, ask these for everyone together as they go.
1. Where were the areas that you observed flooding that concerned you during the 2023 floods? If it was whole sectors, can you place dots on areas where the flooding was most extreme?
 2. Where were the areas that you observed erosion or landslides that created impacts which were concerning?
 3. What critical infrastructure in your town or region were affected by the flooding? (clarify that this is their definition – what infrastructure do they need to take care of themselves, be safe, etc)
 4. What areas were impassable during the flooding and flood recovery? Feel free to note if certain areas remained impassable for longer amounts of time.
 5. What hubs formed for support, to get resources, etc? This can be formal spaces like one hosted by the state or FEMA, and ones that you as community members created.
 6. What other places of value or concern can you think about in terms of the flooding? What else do you think should be on this map that isn't yet?

Walk around groups, see how it's going. Ask what questions they have and if people want to talk, listen to their experiences of the process. As some groups start to slow, check with the groups about how much more time they need. When a few groups are starting to finish, give an announcement to the others to work on finishing up.

E. Take break. Use the bathroom, get some food, come back. [Facilitator team pastes all maps on the wall after final changes]

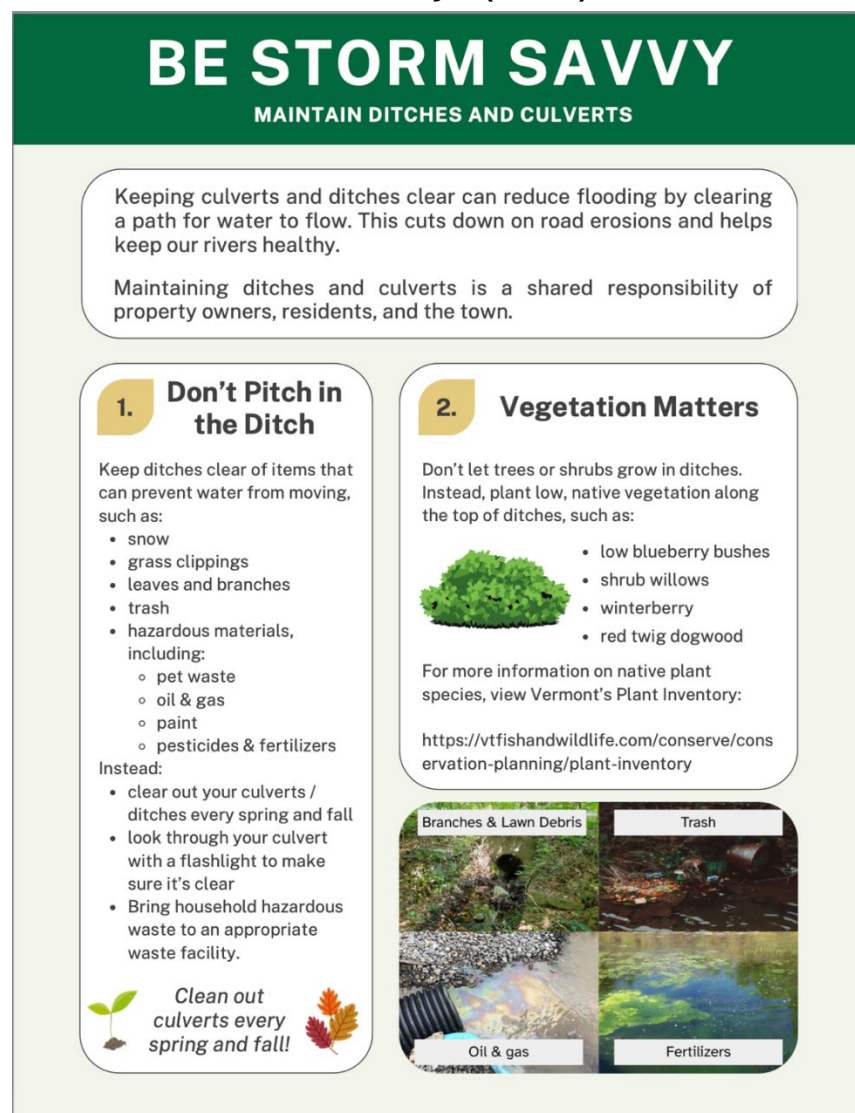
1. Charis and Sarah ask a few questions about the process
2. Begin silent art walk. No policing talking, but ask people to not present maps yet. Approx 10-15 minutes, observe when majority of group is done.
3. Begin presentations of maps. In general let people stand around maps, but bring in some chairs for those who need them. Facilitators watch time and wave at 5 min.
4. Come back for synthesis. How did the mapping exercise go? What did you learn? What were you surprised about? What might be helpful next steps with maps? Who felt they wanted to help create maps in the future, let us know!

Appendix B. Examples of Culvert Crawlers Outreach Materials

Examples of outreach materials include:

1. A video tutorial on using the Culvert Crawlers app can be found on the Rural Rivers YouTube channel at https://youtu.be/UtlO0O_n3-s
2. An example of a public-facing update on the Rural Rivers project website can be found here: <https://sites.dartmouth.edu/mappingforresilience/2024/10/>
3. A two-sided flyer (represented below) made by students and research assistants to inform community members about culverts and culvert maintenance, encouraging regular cleanup, and providing information for further resources.

Culvert Flyer (side 1)



Culvert Flyer (side 2)

3. Check for Damage

Look for wear or damage to culverts on, or next to, your property. If you see any damage, make repairs or contact the town to clarify your responsibility.

- Check for cracks, misalignment, and blockages.
- Openings should be free of sediment, rubbish and debris
- Remove any obstructions you can see including large branches, overgrown fencing and any other barriers
- Be safe and smart. Don't enter water higher than your ankles if you can't see the bottom, only use hand tools (rake, shovel, broom)
- Work in pairs or teams when you can.

If you need help clearing a culvert, contact culvert.crawlers@gmail.com



Before



After



Culvert Crawlers helping clean a ditch.

Resources

Cavendish Town Office:

(802) 226-7291 or (802) 226-7292

www.cavendishvt.com

Vermont Highway Maintenance Resources

<https://vtrans.vermont.gov/contract-admin/resources/highway>

Flood Ready Vermont

https://floodready.vermont.gov/improve_infrastructure/roads_culverts

Vermont Culvert Web App

vtculverts.org

Cavendish Connects

<https://www.cavendishconnects.com/about>

Black River Action Team

culvert.crawlers@gmail.com

Black River Valley Resources

The long term recovery group for Cavendish, Ludlow, Plymouth, and Mt. Holly

Contact Black River Good Neighbor Services: (802) 228-3663



Appendix for Boke, C. F. M., Kelly, S. H., Spang, A., Sullivan, H., Valenciano Coronado, D., Reddy, E., Bezanson, N., & Silvestro, A. (2025). *Assessing the 2023 Floods in Rural Vermont: Multimodal Methodology and Community Science for Mitigation in the Black River Valley*. (Natural Hazards Center Weather Ready Research Report Series, Report 17). Natural Hazards Center, University of Colorado Boulder.

<https://hazards.colorado.edu/weather-ready-research/assessing-the-2023-floods-in-rural-vermont>

Appendix C. Interview Guides

This document is an interview guide that outlines core key questions to ensure similarity across interviewers. The first guide is for use with those acting in an informal capacity during the floods; the second is for use with those acting in a formal capacity.

Interview Guide #1: For use with those acting in an informal, unofficial capacity during the floods / now

Note where are you, who are you interviewing, what's the date and time?

- 1) Give Info Sheet and talk about involvement in project; invite questions; reconfirm consent to proceed
- 2) Give Info Sheet and talk about involvement in project; invite questions; ask for consent to proceed
- 3) What's your connection to this town?
 - a) How about your connection to the river? Generally.
 - b) Where do you spend your time - in town or somewhere else? Whereabouts?
 - c) What do you like about it?
- 4) Would you mind telling us about your flood experience?
 - a) Open ended opportunity to say more about this
- 5) What did you do during and after the floods? Were you with particular people?
- 6) Where did you access information about the flooding?
- 7) Where did you access information about flood recovery?
- 8) How did you get where you were going? (e.g. on foot, by car, how did you navigate)
- 9) What helped? What felt challenging?
- 10) Are there things that happened because of the floods that you didn't expect?
- 11) Do you know about any town, state, or federal government policies or programs that deal with flooding?
 - a) If yes, what have you heard about them?
- 12) What do you think should happen next?
- 13) Would you be willing to share photos or videos from your flood experience?
 - a) If so, what's your email so we can send you a link to upload them.
- 14) Anything else you'd like to share?
- 15) Thank you for your time and input. We will follow up.

Interview guide #2: For use with those acting in an **official/formal capacity** at the time of the floods or now.

Note where are you, who are you interviewing, what's the date and time?

- 1) Give Info Sheet and talk about involvement in project; invite questions; ask for consent to proceed
- 2) What does your formal role entail?
- 3) How was your work in this role impacted by the flooding?
 - a) Were you personally impacted by the floods?
 - b) Open ended opportunity to say more about this
- 4) Did you use maps at all during/after the flood? If so which ones?
 - a) Why did you use those maps?
 - b) How did you use them?
- 5) What other tools did you use during and after the flood?
 - i) Why did you use those tools?
 - ii) How did you use them?
- 6) What's your perspective on the relationship between Town, State, and Federal roles in response the 2023 flood? and/or to flooding in general?
- 7) What's going on in terms of recovery and mitigation?
 - a) Are there particular challenges and barriers you see?
 - b) How about innovations and insights?
- 8) Would you be willing to share photos or videos from your flood experience, either in your official role or in your personal experience?
 - a) If so, what's your email so we can send you a link to upload them?
- 9) Anything else you'd like to share?
- 10) Thank you for your time and insight. We will follow up.