Fluvial Geomorphology Taskforce Meeting

Date: 11/10/2014

Location: Integrated Science Building Room #145

Attendees:

Amy Singler
Brian Yellen
Carrie Banks
Christine Hatch
Dana Olsen
Daniel Malone
Dave Nyman
Eve Vogel
Jerry Schoen
Jim MacBroom
John Field
John Niedzielski
Katie Campbell-Nelson
Kimberly Noake MacPhee
Marie-Françoise Hatte
Mike Kline
Nick Nelson
Nicole Gillet
Noah Slovin
Noah Snyder
Peter Huntington
Roy Schiff
Ruth Hazzard
Shane Csiki
Steve Mabee
Tim Dexter
Tom Maguire (via phone)

9:14AM

Christine Hatch: Introduction, agenda for day.

-FGM Workshop 2012:

  -Outcomes: Management objectives

       To manage FGM hazards in MA.

       Tri-track approach needed:
1. policy statements

2. technical aspects- incorporation of rural-urban regions of MA, emergency protocol, train agencies, develop database of structures of FGM data

3. Education and outreach: Develop training programs and train agencies

Next steps:
- Create a Task Force
- Determine a funding mechanism for the task force
- Develop a meeting schedule
- Develop a task list
- Develop a marketing plan for soliciting funds to support the effort
- Develop fact sheets
- Prepared presentations

- Pilot FGM Assessment (MA Geol. Survey)
  - Green River- maps completed in 2013. Learned that the method was too complex and technical to start all at once.
  - FRCOG started a FGM in South River that will use VT ANR protocols.

- Funding:
  - FEMA Proposal by Steve Mabee in 2013 (denied, may contest the decision or write a new proposal)
  - RiverSmart I (Hatch and Vogel) funded by CAFE
  - FFFGM (RiverSmart II) Hatch, funded by USDA NIFA
  - RiverSmart III – Vogel, funded by USACE IWR
  - MA DOT (Rees, Mabee, Jackson and others)
    - Looking at the vulnerability of crossings, what are the implications for design of infrastructure at road stream crossings. Develop a systems-based approach to improve the assessment, prioritization, planning, protection and maintenance of roads and road-stream crossings that: is proactive with respect to upgrading structures to account for climate change, etc.
    - An integrated approach. Vulnerability assessments under current conditions, and future climate conditions.
Eve Vogel on RiverSmart Communities:

- Overview of projects, social science, science, and extension confluence.
- Institutional and policy research
- Lessons learned from VRP (Vermont River Program)
  - Designing and constructing natural channels is expensive and didn’t always work.
  - .....  
  - Data and projects can be ambassadors
  - Floods can be allies to our FGM cause, but in an emergency, be helpful first

Planned Products: [list of items, steps]

- ACE project: Attuning federal agencies and programs

Christine Hatch: The Task at Hand...

We are going to present to you 2 screening techniques that could be applied throughout MA with minimal staff and budget... You are the experts, what works?

Mike Kline (The Vermont River Program): The River Corridor

Typical “Channel Migration Zone” developed in western US does not work in VT because of channel movement due to unnatural phenomena such as deforestation.

“Mapping River Corridors in VT”

Meander Belt Concept

Minimal area required to accommodate the meander geometry, slope, and active erosion/depositional features of a river’s least erosive, vertically stable form (e.g., equilibrium condition)

Vermont Resource Atlas – a comprehensive statewide map and analytical tool, about to come online (currently in round 5 of QA/QC). This map is an expression of 10 years of learning about FGM processes through phases I and II, put into GIS. They will then integrate the existing Phase II data to tune and improve the corridor. They already integrate stream power analysis in the statewide map and are using it in a VTRANS (Vermont Transportation) project.

VR Corridor – not intended to predict future channel location. Moving away from Fluvial Erosion Hazard terminology. Does represent center of river, but focuses on
“how do we create a management zone where these fluvial erosion processes can play out in such a way that we minimize hazards over time?” Looking for equilibrium, where we can minimize erosion over time. It is a management boundary, not a predictor of where erosion will take place.

Over half of VT’s river channels are straightened. Over 75% or VT rivers are incised, going through channel evolution processes.

Ideas converging around how to draw corridors. Papers coming out of Washington. Valley accretion vs. straightened river a century ago - what is the meander belt that we could establish to get to a stable condition?

For past decade, have been doing Phase 1 and Phase 2 assessments + channel width multiplier based on channel sensitivity. Statewide river corridor based on remotely sensed data.

Data inputs differ slightly between Phase 2 Corridor and Statewide Corridor.

They have computed River Corridors for streams with a watershed at least 2 square miles (which is half of VT streams)

Pub: TNC- “The Active River Area” (2008) tool, used to define the automated valley wall

For active river area, The PATHDISTANCE modeling uses distance and slope from stream to calculate cost.

Cost of “550” is used to define VT valley walls.
Slope multipliers – surrogate for channel sensitivity
<2%  x3
>2%

Adding Riparian Buffer Component. In state statute, requires riparian buffer in corridor. Has caused confusion, trying to establish additional setback area to complement streambank buffer. If you don’t create that buffer, people will build up to red line, not allowing for protective buffer in future. It’s really all about channel management. It’s a margin of safety component.

SLIDES on Maps of valley bottoms, reaches with meander centerlines.

“crossovers of streamline”, Bumping corridors, Shifting buffer/meander zone:

Clip and Bump procedure: When a State highway is within the river corridor, they remove its area from the corridor but add an equivalent area on the opposite side of the stream (on map, removed blue and added yellow)

The public can comment on the River Corridors and communicate corrections to ANR that were not detected with this computer/aerial photos/GIS method (e.g. if
there is a rock ledge that was not identified, a local can email ANR and they’ll come verify in the field).

RT107 in VT, they built rail lines just to move rock to rebuild the road

~A million $/mile to move a road.

All state highways were rebuilt in Vermont after Irene.

Importance of giving management zone to river, don’t want to pinch on both sides with development because that’s bad for everyone.

VRP plays regulatory role in state infrastructure, utilities, and agricultural development in river corridor.

River Corridor to be published on ANR Atlas at end of 2014

Q/A:

Q: Why not regulate the whole valley floor as a management zone?
A: Because of politics. We compromise for the least amount of that valley floor that accommodates the active river regime.

Q: Are there regulation limits for agriculture?
A: No, but limits to agricultural structures. Working toward minimal erosive channel.

Roy Schiff (Milone and MacBroom) River Sensitivity Coarse Screening Using Stream Power

The ability of a stream to do work dictates the morphology and behavior of the channel

VT River data:

Coarse screen, Phase 1, Phase 2, Corridor Plan, Phase 3

Cost, detail, accuracy--------→

Project is a statewide mapping to fill holes in science.

Calculating power of streams based on Phase 1 data (formula see powerpoint prez)

Erosion potential screen (levels of risk: low, moderate, high)

SLIDE river corridor flood sensitivity screen, map of Tweed River in Killington – road washouts mapped on risk levels.
Discharge across the whole network is obtained from
- USGS stream stats
- regression equations

Slope is obtained off rough DEM 30m or LIDAR

High ability to do work = high specific stream power

Confinement, specifically unnatural confinement really increases stream power and
the ability to do damage.

Culverts: Half constrict channels in VT >> deposition will occur there

Q: For stream power, do you use bankfull discharge?
A: Yes, but it’s the specific power, which is normalized by the stream width, so it
may be more than 100 yr flood Q power

100 yr flood ~ 4-5 times greater stream power than bankfull power

Floodplain width vs. stream width ~ 4 – 5 x and is proportional to stream power

Where to Begin? A database of past damage locations (Steve Mabee)

Provides evidence for repeated failures in the same locations funding upgrades and
repairs.

Workshop 2012 outcomes- Fluvial Erosion Hazard Zones (desktop assessment).
Meander Belt width (field assessment). Other objectives...

Q+A

S. Mabee- what to do about FEMA grant? (appeal decision?)

Amy Singler- what does it need to look like and who else needs to be involved to
make it useful? What has been the key in Vermont to have this be accepted across
agencies and move forward?

M. Kline- Through going through assessments, we have built a constituency. This
allies watershed groups, and planning districts through framework and looking at
data. Using coarse screen tool as “defendable science basis” for policies. Some place
to put the data is crucial: Database.
“If this were my first year on the job, I could do this River Corridor map and have a
process-based, defensible management zone.”

Shane Csiki – (on dealing with a smaller program) The NH experience trying to
implement VT’s program. Some folks hastily wanted to use to impose land use
restrictions (this blew up). Transitioned to a site-specific agency (due to limited
staff, resources), worked with wetlands bureau. Solidified relationship with homeland security and emergency management. HSEM gets FEMA funds and work with Shane’s department to approve plans for projects. Emphasis on relationship building, education, getting people to understand FGM processes in departments. NH is a small state so people can work well together. River corridor delineation happened too fast in the state. River protection program and shore land protection program are existing programs that already have regulatory authority. Complicates river management. Silver Jackets- education and outreach focuses (basically taking baby steps at this point).

Kline – VRP has all regulation in one program. In other states these policies and regulatory agents are spread across multiple agencies. Rivers can’t be managed as static systems. Project by project evaluations are a huge step. Conversations about avoidance (river corridor work) would be less developed without people explaining in a textual way how to manage rivers. Vermont has better tax base than NH. Massachusetts needs regulatory (DEP) on task force. FGM folks thought the river corridor process was too fast and that people don’t want to hear it; we need to look at rules and regulations first. A rivers management protection program is already in place (1/4 mile). Shoreland program for 4th order and larger streams.

Q: Tidal rivers with bi-directional flow (how to apply principles)?

The coarse screening tool is a great starting point. Probably doesn’t work well in coastal areas because floods may be coming from the other direction. We should talk with CZM to see if they have any tools.

Jim – It’s not easy to integrate Vermont’s system (a mountain state) to coastal zones.

Christine- Do we use a different protocol then?

Jim – I’d be inclined to talk to Massachusetts people

Tim- MASS DOT is modeling the Atlantic Ocean, and storms coming into Boston. This will be expanded to the whole Mass Coast under current and future predicted climatic conditions.

Christine- Mass has that part well covered, but it would be good to integrate the data.

Tim- IT is a multiple agency collaboration, eventually the data will be available to the Commonwealth.

Amy- All the states are organized so differently, we need to figure out where the nexus of organizations is in Mass where there’s an opportunity to integrate these programs. E.g. Watershed groups talking about land use and env. Impacts in towns. We should try to use the Massachusetts Watershed Initiative model, there is a new
administration coming in, may be a good time to suggest this idea to do something similar within EOEEA

Steve- What bothers me is social and political acceptance. We don’t want to upset people and have it blow up in our faces. Education and outreach should be a real starting point.

Jerry- Let’s figure out the acceptable ways. Referenced VRP in getting legislature on board. That was a one time thing! But, does it happen in state government, or particular agency. Where are the toe holds? With non profits, or within agencies?

Kline- You have to go agency by agency, look at their missions, and tie this into it. IT's strategically going into this broad array of river management and seeing how to fit in other groups. Paying attention to the dynamics of rivers is important for infrastructure development and something that has to be worked with...

Jon Niedzielski- One of our go-tos is working with the COG- Franklin Regional Council of Governments and the Pioneer Valley Planning Commission. Linda Dunlavy at FRCOG is someone we should meet with, Stean Rosenberg, Steve Kulik in the house of representatives would be key to talk to, Paul Mark (covers Greenfield and Franklin county). Meet with these people, have your message clear. Natalie Blais (from McGovern’s office in Northampton, 413-341-8700, ) is a key player, would be helpful to get strategies on how to do this effectively. “I’d be happy to go, with Chris Clark from the NRCS” - a 45 minute meeting would be good to lay it out.

Nick- The division of Ecological Restoration and the Regional economic and planning division, and also the conservation commissions - MACC (meeting in March) – they rule on all river projects.

Amy – Bay State Roads did stream crossing trainings for highway crews and engineers (who get continuing education credit).

Tim- Wants to adapt VTRANS online training for MASS DOT. [Feb/March training]

Suggestion that we offer a workshop that gives CEUs for professionals (DPWs, MACC).

Steve- Next September Mass is hosting the highway geology symposium. Maybe this a forum where we could talk about this. There will be a field trip to the Deerfield. It’s a national group, but plenty of Mass folks will be there.

Christine- What do you all think of these tools?

Nick- It’s good, but we need them to be adapted to Mass for the coast, urban areas, cranberry bogs, swamps, other areas.

1- DPWs are a great resource for knowing where hotspots are that will need attention.
Noah Snyder– [on how to use LIDAR for mapping] Mass has high resolution LIDAR, which is a great opportunity to implement models on a larger scale. “I think that you could use existing GIS databases and do a coarser pass just using existing GIS data and get something useful to begin prioritization efforts. If you knew slope and area of every piece of the river, that’s a big piece of it. You don’t need Lidar for that.”

Steve – slope and area can be measured differently.

Noah – but if you used a consistent metric, you would have intercomparable data.

Christine – can we pull back out the idea of derivative stream flow data? Is some of these stream power able to give us information

To work on between now and our next meeting:

1. Keep talking about a Phase I type of desktop assessment for Mass, we need to talk about what that could look like: Sort out urban, low gradient, coastal areas. Take into account lessons from MA DOT project implementation.
2. Set up a “Political Landscape Meeting” as described by Jon Niedzielski. Just to throw out this idea, not to strong arm.
3. Continue education: Talk to different groups about FGM, such as with concoms, DPWs, FRCOG. This could be the Task Force’s job, just to get our message out.
4. Establish relationships with key agencies (including Emergency Management folks – State Hazard Mitigation).

Noah – that’s sort of what I mean, you could use this coarse data. Maybe use USGS slope and centerline data. Multiply slope and area together, and that’s a proxy for stream power. That’s very coarse, but it gets you something. You’d have a layer that you could work with. LIDAR doesn’t give you drainage basin information. It makes it worse. Valley confinement is harder to measure.

Jon – CREP is not in Mass, we don’t have the partner in the state to work with the agency.

Kline – Our state Hazard mitigation Committee in VT is made up of all the different agencies [key leverage point].

Jerry – the climate adaptation and resiliency projects in the state are also working on this too.
Steve – I’m on the state hazard mitigation subcommittee, I will work harder on getting this into our 3 year plans.