Floodplain Mapping

More Than a Line on a Map

GRCA
D. Boyd, Director of Engineering
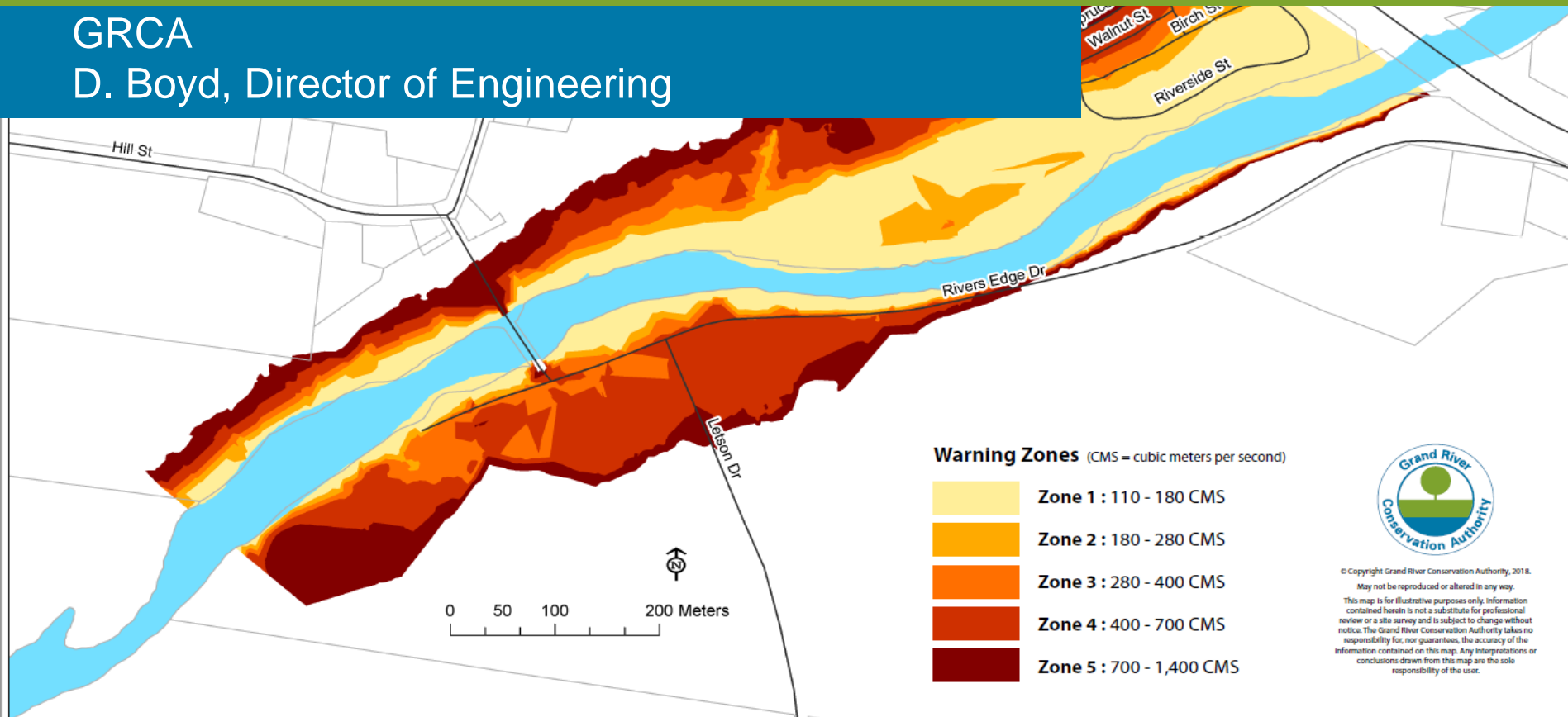
Warning Zones (CMS = cubic meters per second)

Zone 1 : 110 - 180 CMS	
Zone 2 : 180 - 280 CMS	
Zone 3 : 280 - 400 CMS	
Zone 4 : 400 - 700 CMS	
Zone 5 : 700 - 1,400 CMS	

Desired Outcome of Floodplain Management

Fundamental Outcomes

1. **Reduced Risk to Life**
2. **Reduced Property**

Approaches to Achieve Outcomes

1. **Structural approaches**
   a. **Dikes**
   b. **Channelization**
   c. **Dam/Reservoirs**
2. **Non Structural Approaches**
   a. Floodplain Regulation
   b. Manage existing development in floodplains
   c. Avoidance of new development in floodplains
   d. Flood Warning and Flood Response Plans

An important adaptation to **climate change** is preparedness plans. Flood Forecasting and Warning, Municipal flood response plans and a Floodplain Regulation. Floodplain mapping underpins all these elements.
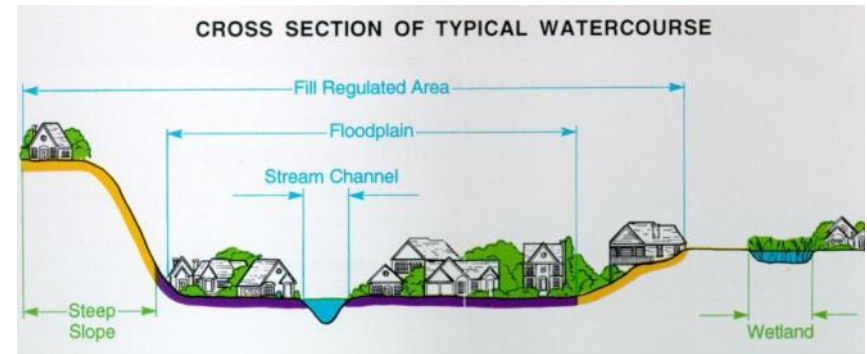
Reducing Flood Damages and Risk to Life

Structural Methods Keep Water Away from People	Non Structural Methods Keep People Away from Water

Multipurpose Reservoirs

Floodplain Regulation

CROSS SECTION OF TYPICAL WATERCOURSE

Fill Regulated Area

Floodplain

Stream Channel

Steep Slope
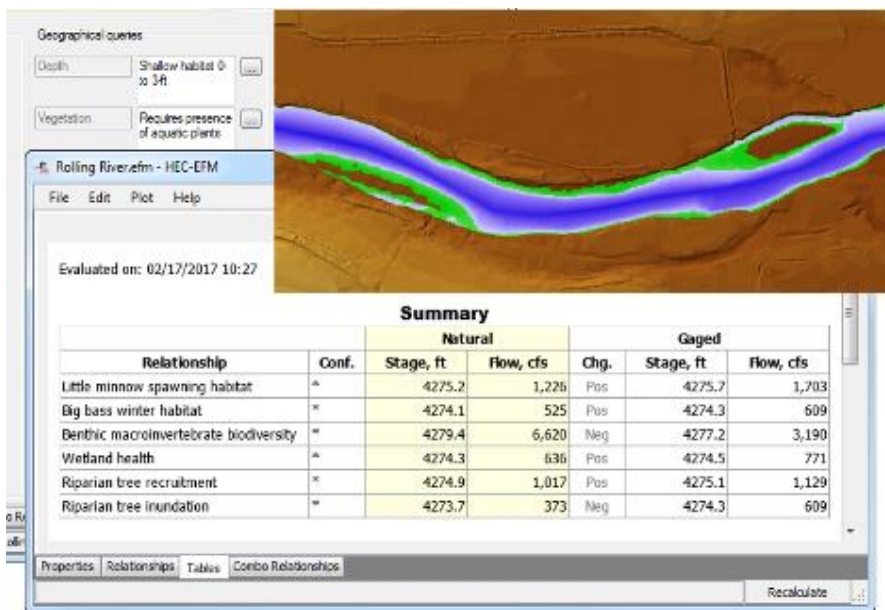
Wetland

Flood Forecasting and Warning

Dams and Dykes **Reduce the Risk** of flooding they don't eliminate the risk.

Flood Risk can be **Managed** not solved or eliminated.

Reduced Disruption to residents in the floodplain and the economy.

Dykes

Floodplain Mapping
Multiple Applications

http://www.hec.usace.army.mil/software/hec-efm/

The Ecosystem Functions Model (HEC-EFM) is designed to help study teams determine ecosystem responses to changes in the flow regime of a river or connected wetland

1. Floodplain **regulation** mapping line.
2. Flood frequency mapping/**flood risk** mapping
3. Flood **insurance assessment**
4. Flood **emergency response** mapping/flood zone mapping
5. **Dam safety** HPC and emergency plans
6. Flood **inundation mapping** flood extent, depth, velocity.
7. **Flood damage** assessment.
8. **Life safety** modeling.
9. Stream gauge **rating curve estimates** for extreme events.
10. Environmental flow **ecological habitat** monitoring.
11. **Assimilative capacity** and water quality modeling.
12. **Spills travel time** modeling.
13. **Ice characterization** and assessment.
14. **Geomorphology** modelling.

Multi program multi agency benefiting.

Not Just the Maps
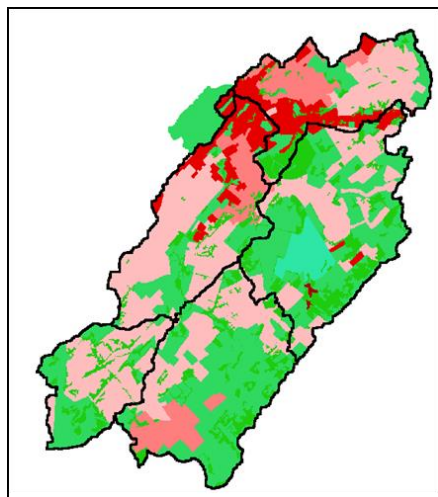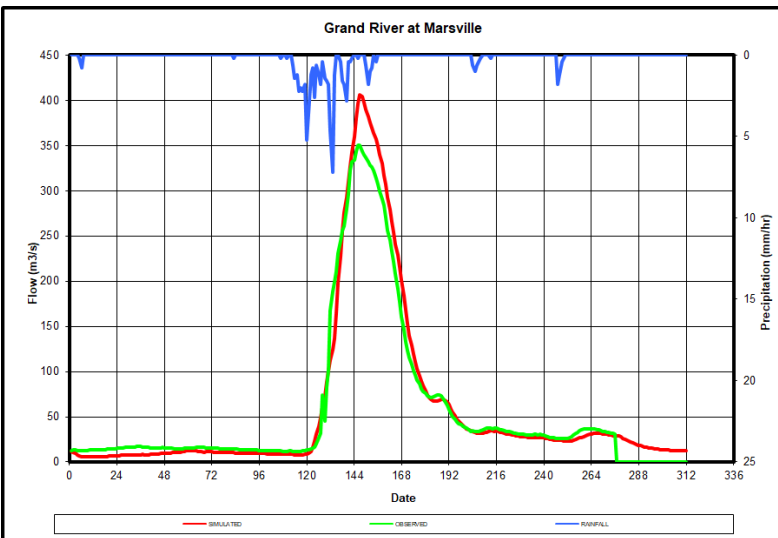
Grand River at Marsville

Models
1. Hydrology models
2. Hydraulic models
3. Digital elevations models
4. Flood damage models
5. Risk to Life Models

Data
1. Quality checked climate and flow data
2. Structure field survey data
3. Check point survey data
4. Observed high water observation data
5. Flood damage structure data
6. Soils data
7. Land Use data
8. Surface geology data

Parameter Estimates
1. Soil parameters
2. Digressional storage parameters
3. Snow pack parameters and factors

The products of floodplain mapping are more than maps, models, data and parameter estimates are all products of a floodplain mapping study.

Why is Continued Funding Is So Important

On the cusp of changing technology that will revolutionize how floodplain mapping can be create, updated and maintain. Good potential to reduce cost.

Still many area to be completed, models to be updated and flood damage assessments to be created.

Planning for succession, models help capture knowledge and prepare the next generation of water manager for success. Provides opportunity to develop water professionals.
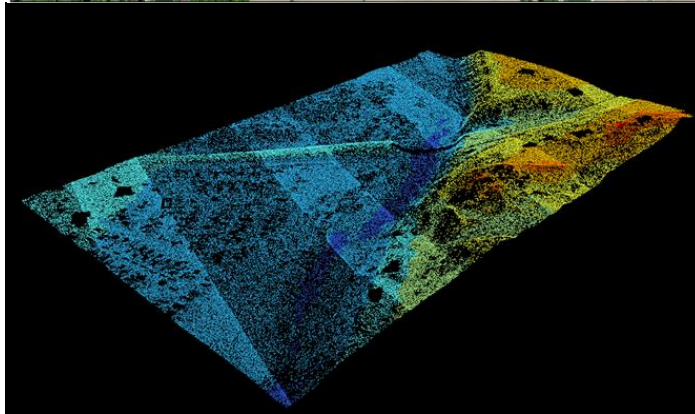
Large scale capture of base information like LIDAR bathometry appears to be feasible. Federal or Provincial large scale capture can create economies of scale and indirectly support floodplain mapping.

Finite public sector resources, floodplain mapping products improve organize and efficiencies that benefit the overall economy.

We are on the cusp of changing technology that can revolutionize how we build, update and maintain floodplain mapping and models.

Effective management of floods and water in general enables/supports the economy.