Future PFHA Research at NRC

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NRC HQ, Rockville, MD
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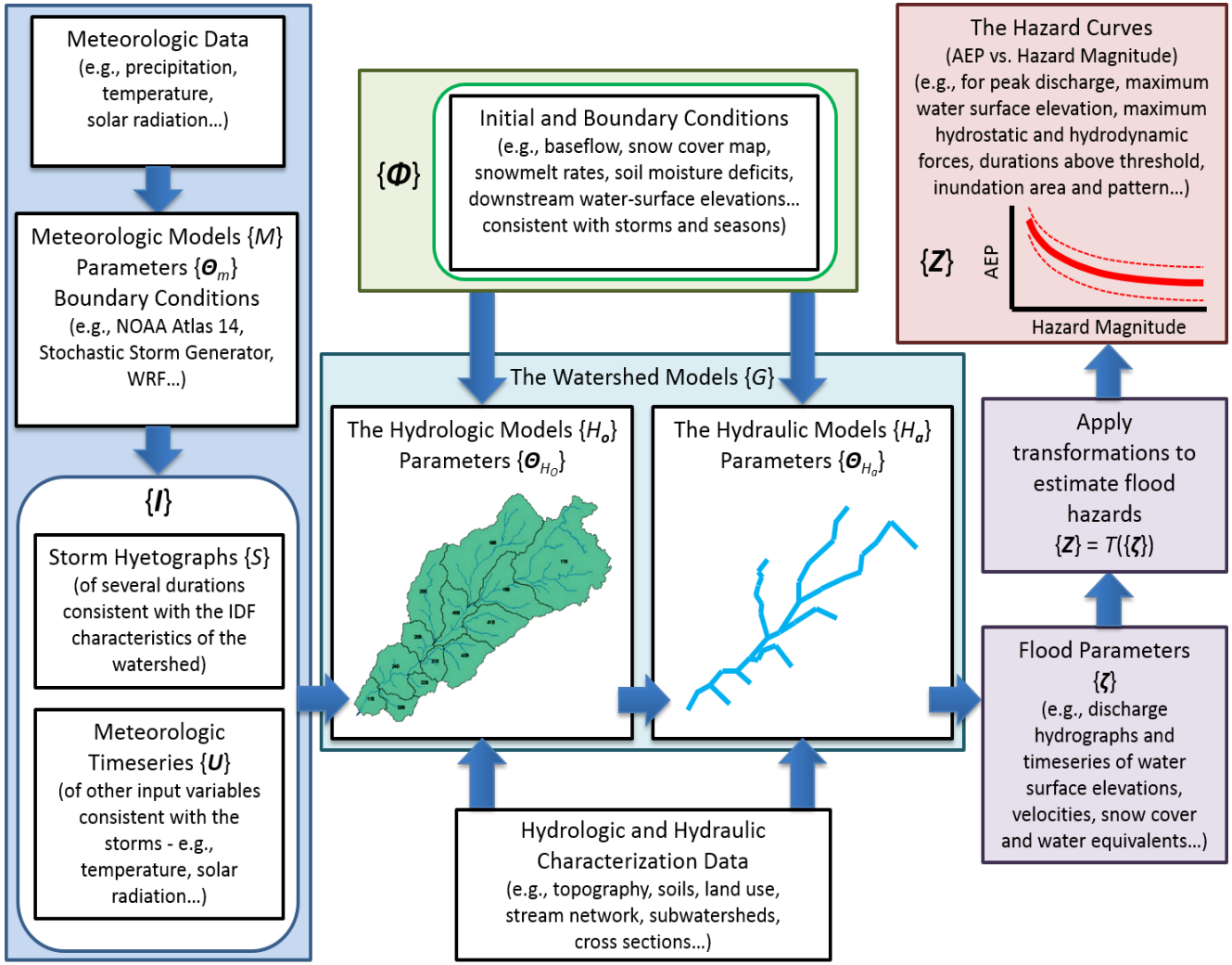
Expected Project Completions in FY17

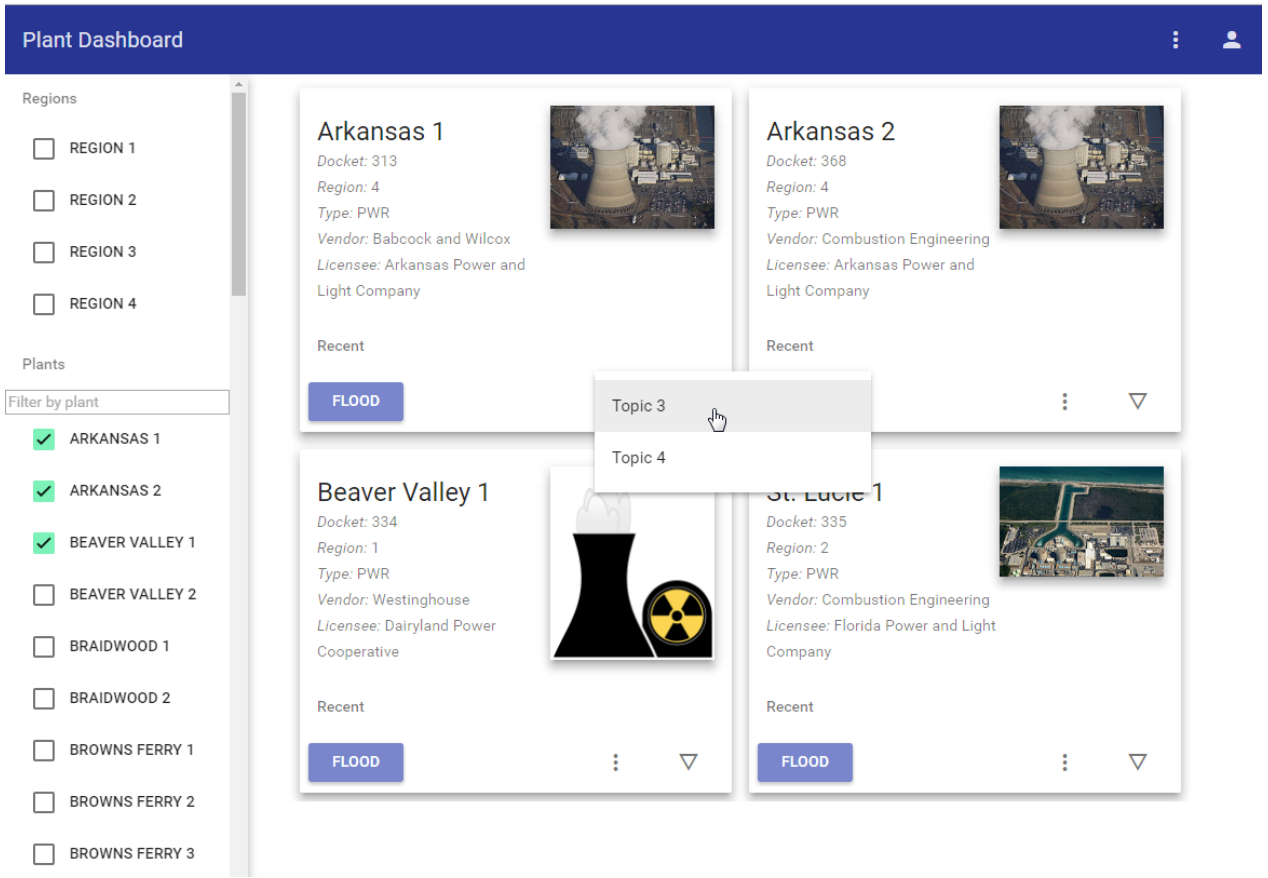
- **PFHA Technical Basis – Riverine (PNNL)**
  - Project competed in FY16
  - NUREG/CR publication expected in FY17-Q3



*** Subject to availability of funding**

Expected Project Completions in FY17

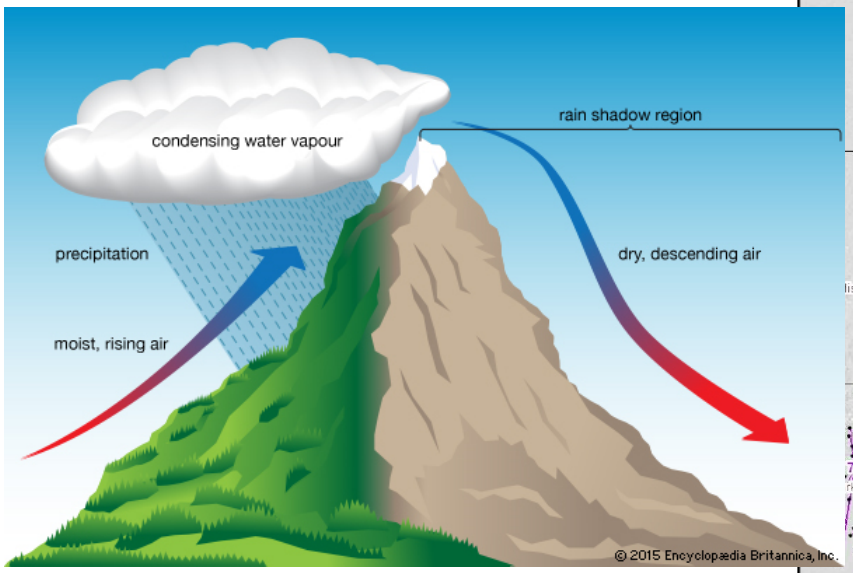
- **Flood Hazard Information Digest (INL)**
  - Complete population of the database and Finalize User Guide (FY17-Q4)

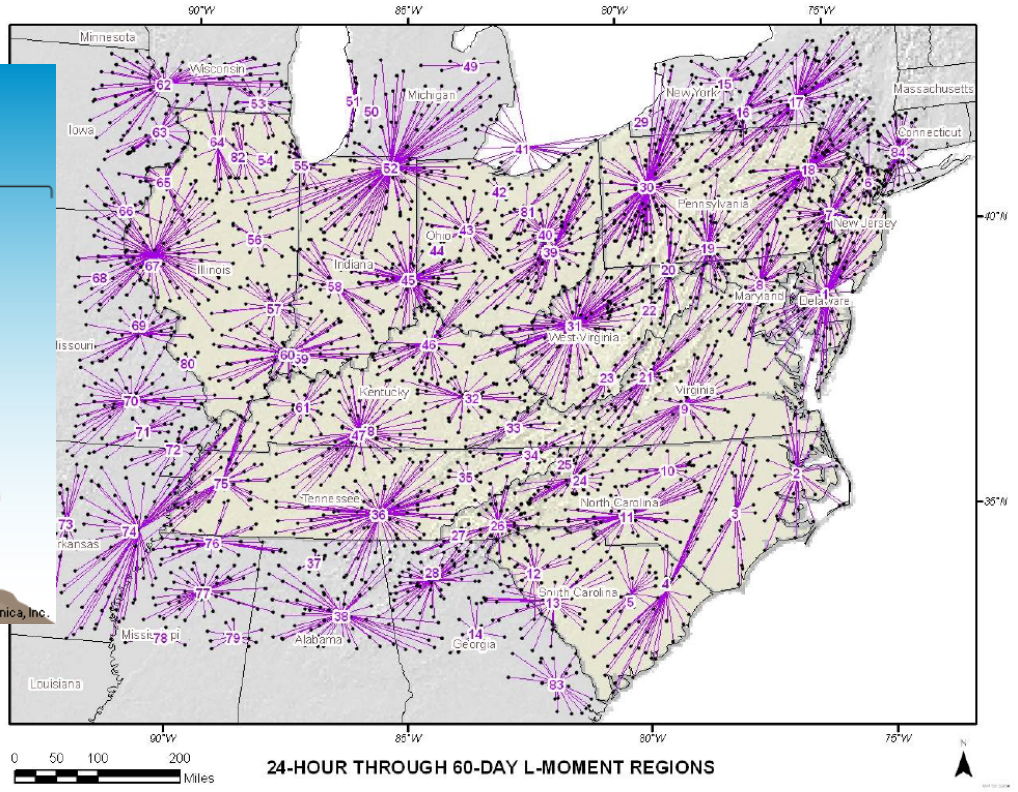


*** Subject to availability of funding**

Expected Project Completions in FY17

- **Precipitation Frequency Estimates in Orographic Regions (USBR)**
  - Expected completion in FY17-Q4 (NUREG/CR and Seminar)





*** Subject to availability of funding**

Expected Project Completions in FY17

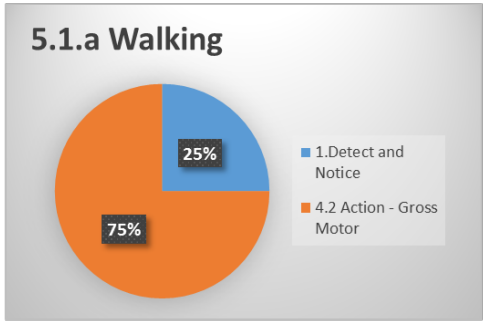
- **Effects of Environmental Factors on Manual Actions for Flood Protection and Mitigation at NPPs (PNNL)**
  - Expected completion in FY17-Q3 (NUREG/CR)

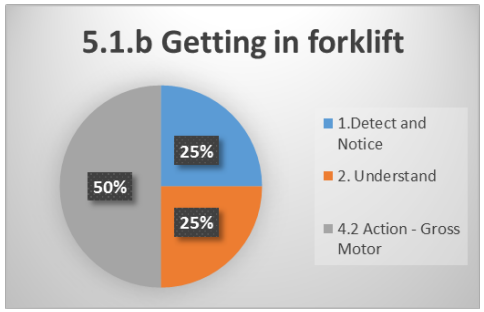
5.1.1 Position Forklift

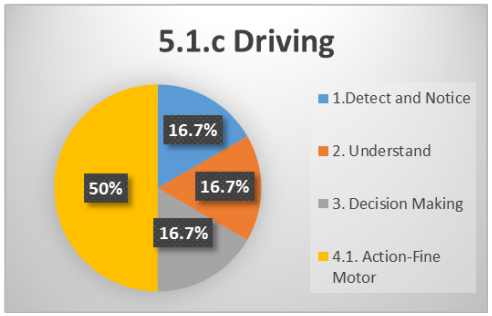
5.1.a Walking	
1.Detect and Notice	4.2 Action – Gross Motor
0.25	0.75

5.1.b. Getting in forklift		
1. Detect and Notice	2. Understand	4.2 Action - Gross Motor
0.25	0.25	0.5

5.1.c. Driving			
1. Detect and Notice	2. Understand	3. Decision Making	4.1. Action-Fine Motor
0.167	0.167	0.167	0.5



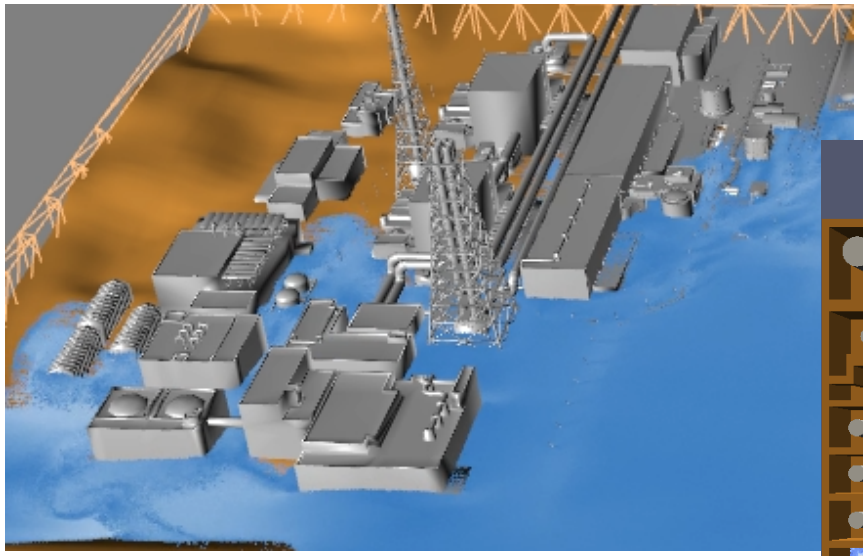


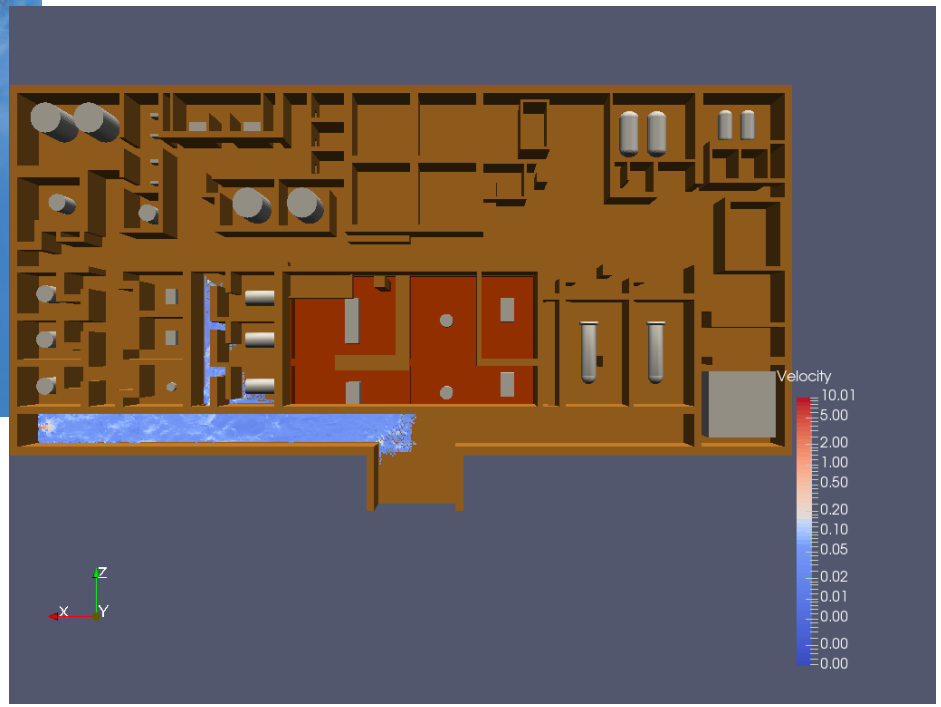


*** Subject to availability of funding**

Expected Project Completions in FY17

- **Modeling Total Plant Response to Flooding Events (INL)**
  - Expected completion in FY17-Q3 (NUREG/CR)

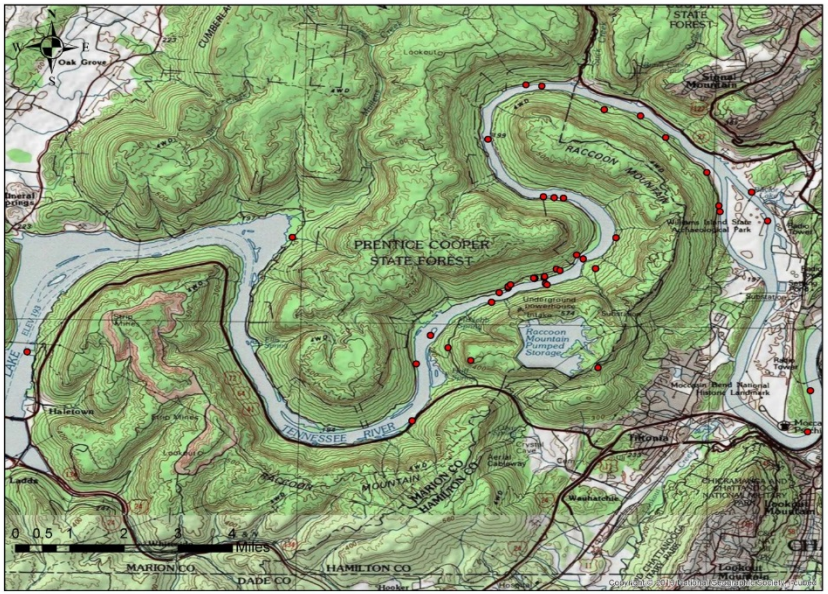


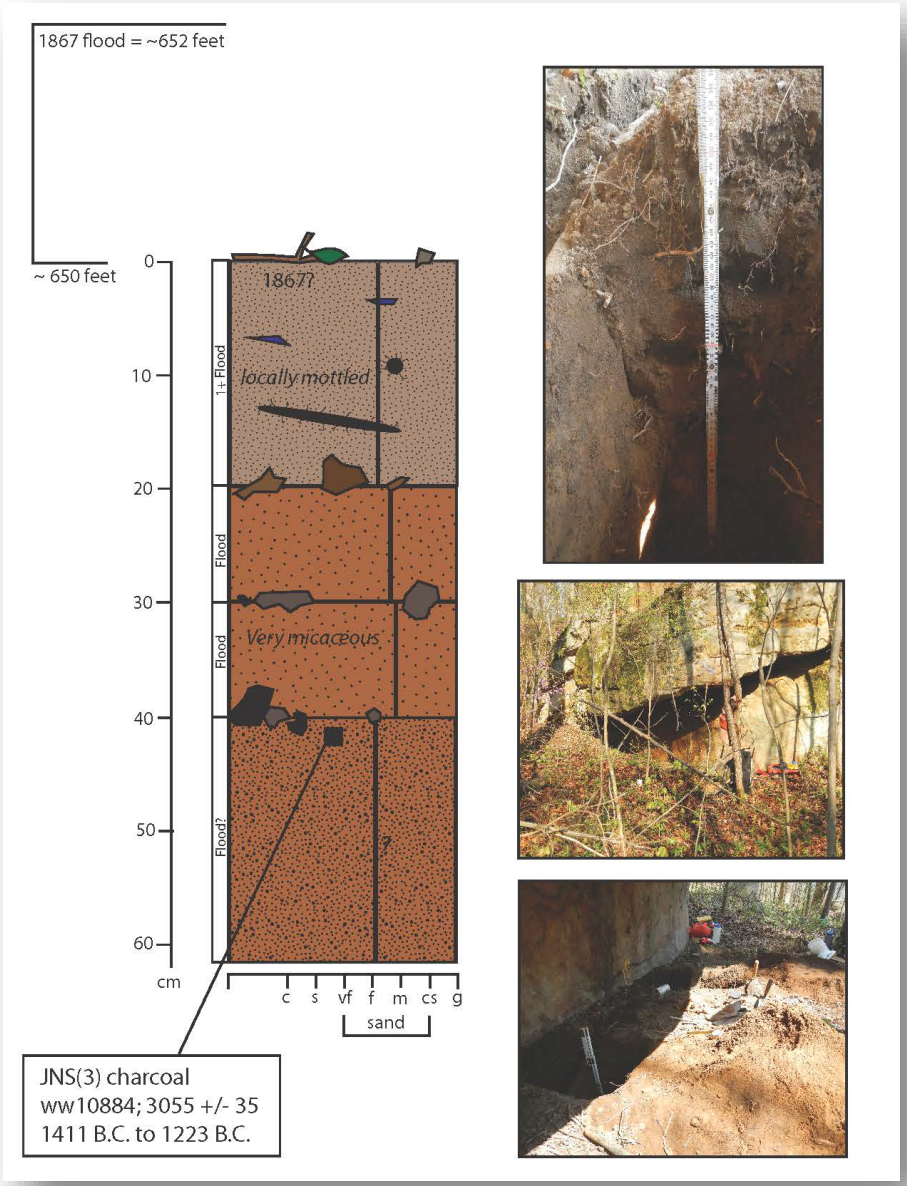


*** Subject to availability of funding**

FY17 – Initiatives*

- **Detailed TN River Flood Geomorphology Study in Gorge below Chattanooga**
  - *Contractor: USGS*
  - *NRC PM: Mark Fuhrmann*





*** Subject to availability of funding**

FY17 – Initiatives*

- **Critical Review of the State of Practice in Probabilistic Risk Assessment for Dams**
  - *Contractor: TBD*
  - *NRC PM: TBD*
    - System modeling
    - Operation and human actions
    - Failure modes and fragility
  - Coordinate with partner federal agencies (public workshop?)

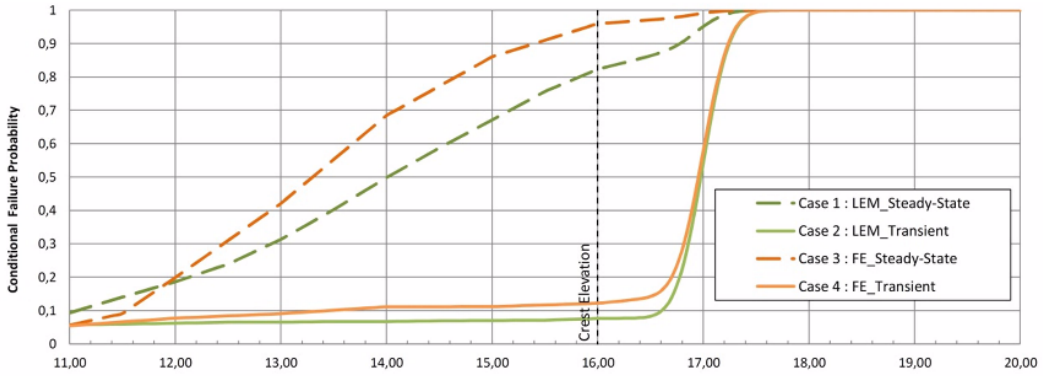


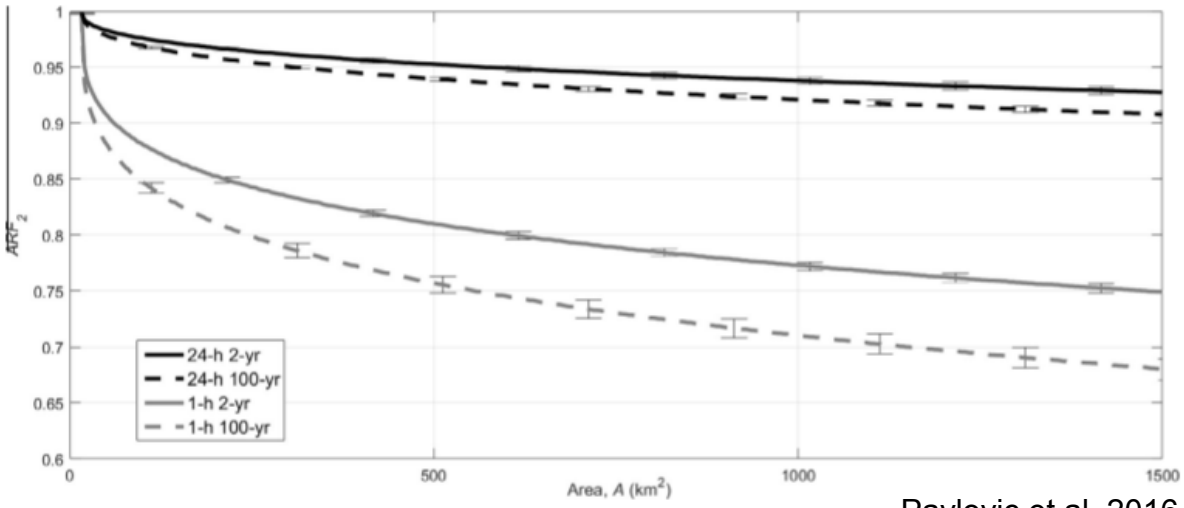
Figure 5: Reference Fragility Curves of the embankment structural behavior
Mouyeaux et al, 2015

U.S. Bureau of Reclamation

*** Subject to availability of funding**

FY17 – Initiatives*

- **Application of precipitation frequency estimates to watersheds**
  - *Contactor: Under discussion with NOAA/NWS*
  - *NRC PM: Yegorova*
    - Leverage point precipitation estimates (e.g., NOAA Atlas 14)
    - Areal reduction factors
    - Temporal and spatial patterns
    - Uncertainty



Pavlovic et al, 2016

*** Subject to availability of funding**

FY17 – Initiatives*

- **Interfacing Flood Hazard Modeling Outputs with Plant PRA Models**
  - Internal effort (collaboration between FXHAB and PRAB)
  - Focus on incorporating flooding hazard in SPAR Models

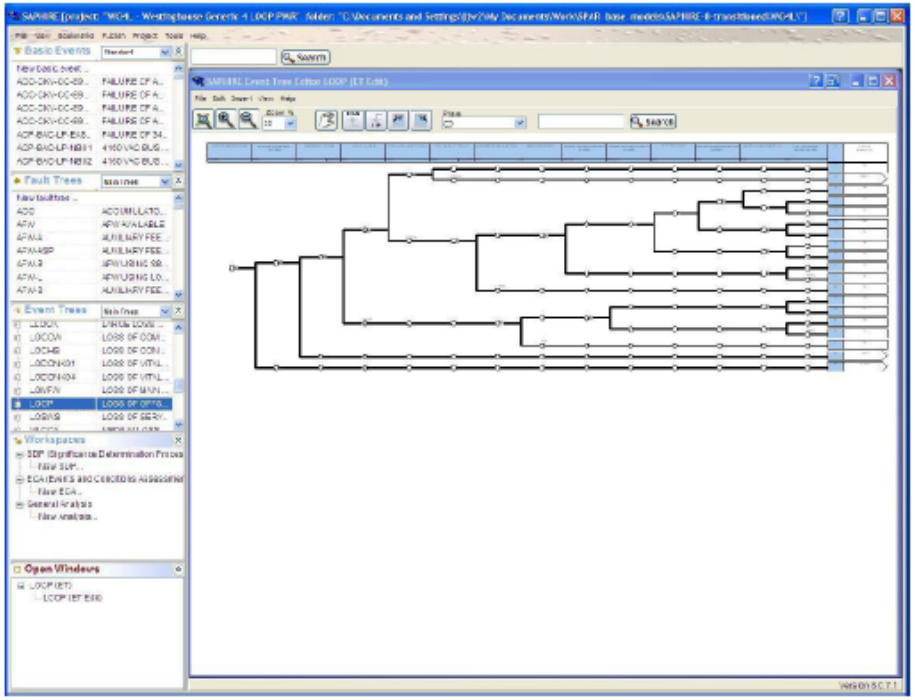


Figure 5.9 Example Loss of Offsite Power SPAR Model Event Tree Display with SAPHIRE Version 8

FY17 – Initiatives*

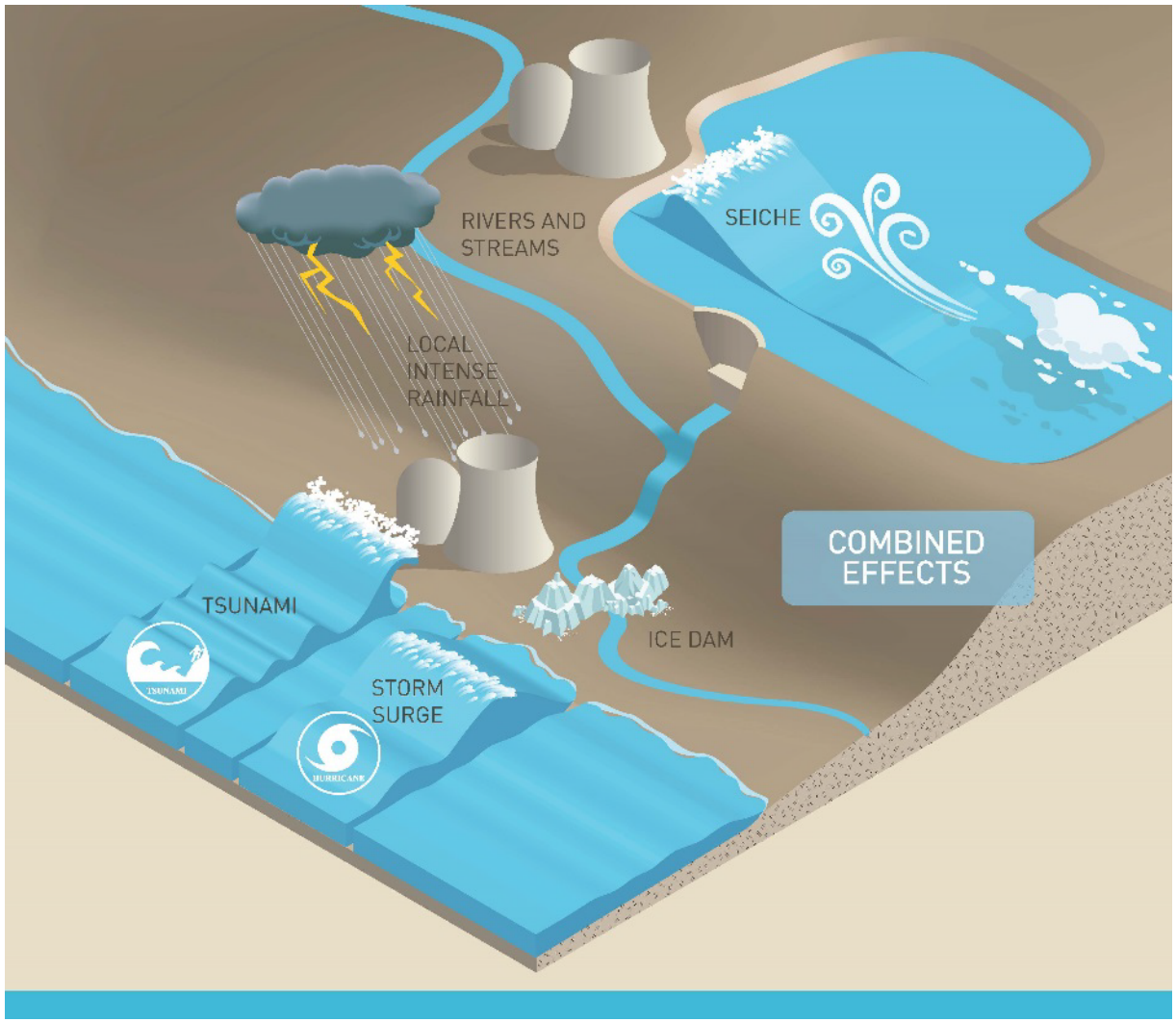
IRSN
INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

- Formalize collaboration with IRSN
- Potential areas under discussion
  - Comparison of storm surge modeling
  - Riverine flooding uncertainty
  - Probabilistic flood hazard assessment: development and application including Plant Response

* Subject to availability of funding

Projected FY18-19 Work*

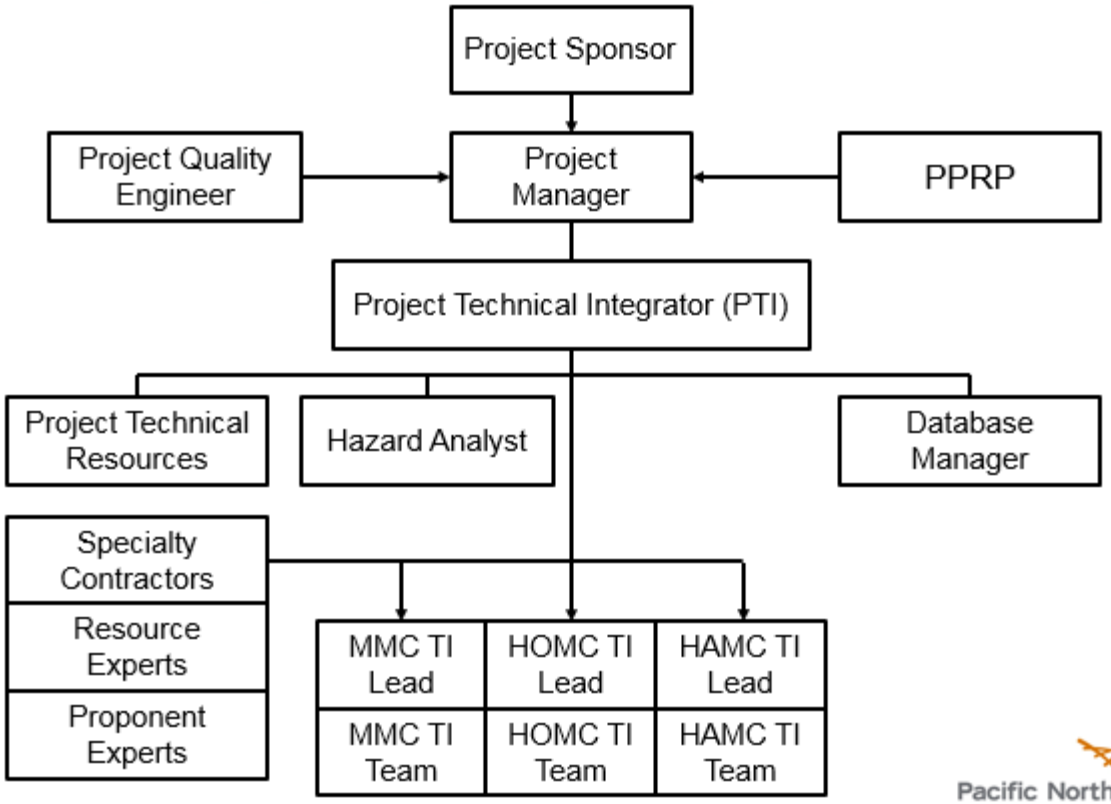
- Develop Pilot Tests
  - *Work with Industry, other Agencies*
  - *Inland location, coastal location*



*** Subject to availability of funding**

Projected FY18-19 Work*

- Further Development of SHAC-F
  - *Coastal flooding mechanisms*

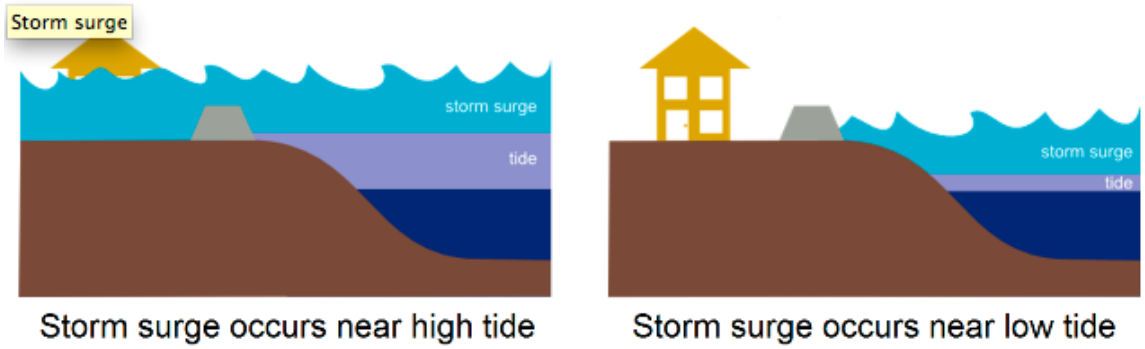


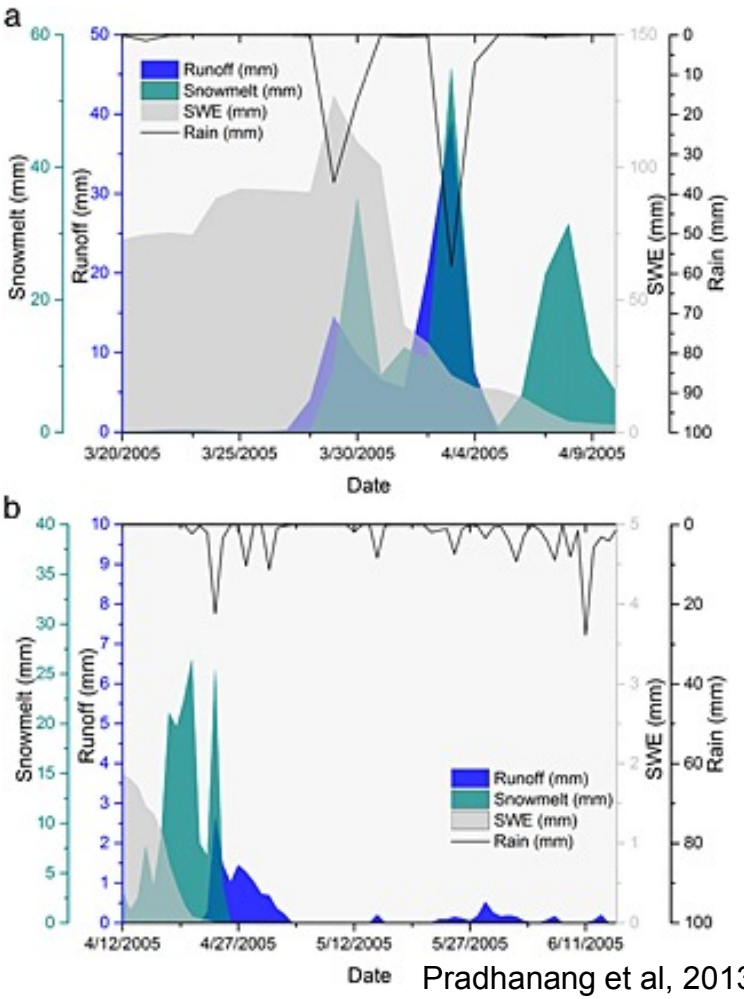
Pacific Northwest NATIONAL LABORATORY

*** Subject to availability of funding**

Projected FY18-19 Work*

- Probabilistic treatment of combined processes/events



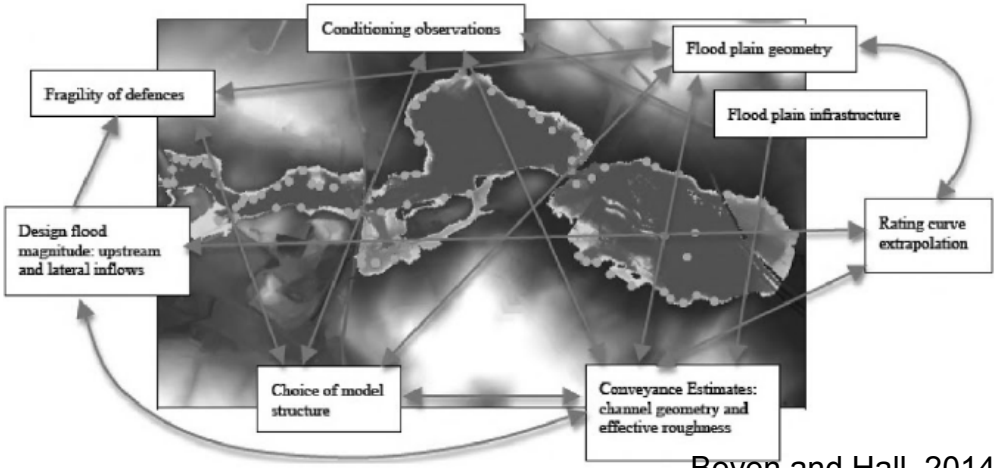


Pradhanang et al, 2013

*** Subject to availability of funding**

Projected FY18-19 Work*

- Quantifying Uncertainties in Probabilistic Riverine Flood Models



Beven and Hall 2014

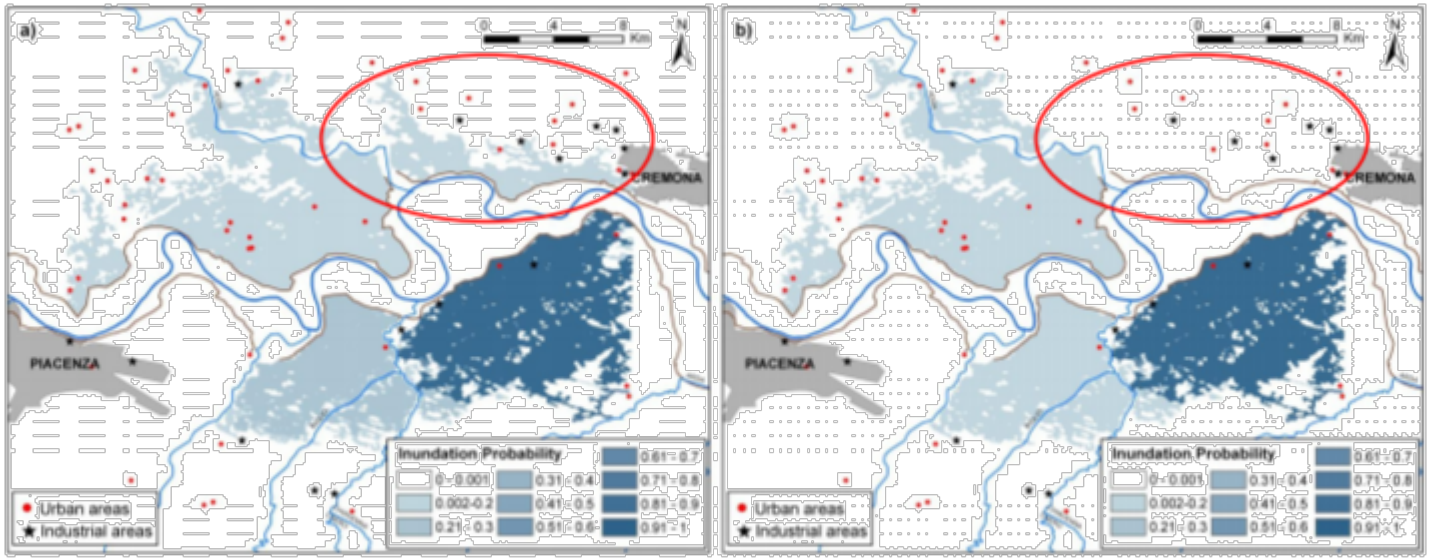


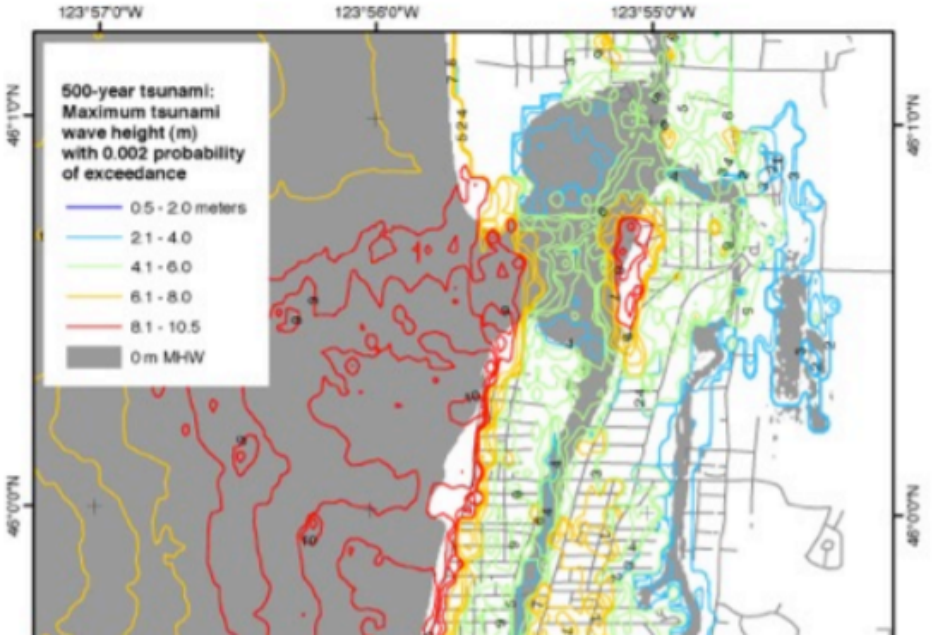
Fig. 9. Probabilistic flood hazard maps for the Tr200 event obtained with variable Traditional (**a**: RandomT subset) and Constrained (**b**: RandomC subset) rating curves.

Domeneghetti et al, 2013

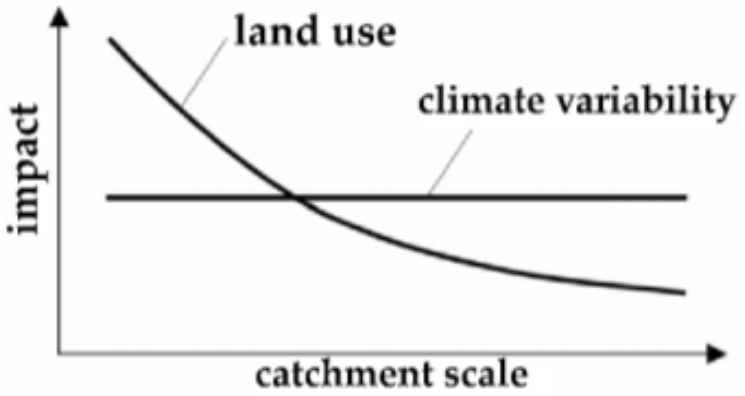
*** Subject to availability of funding**

Projected FY18-19 Work*

- Assess probabilistic tsunami modeling methods
  - Assess current state of practice (low priority)
- Application of Land Use/Land Cover Change Models for Assessing Potential Changes in Watershed Flooding Risks
  - Assess current state of practice (low priority)



Vasily, 2011

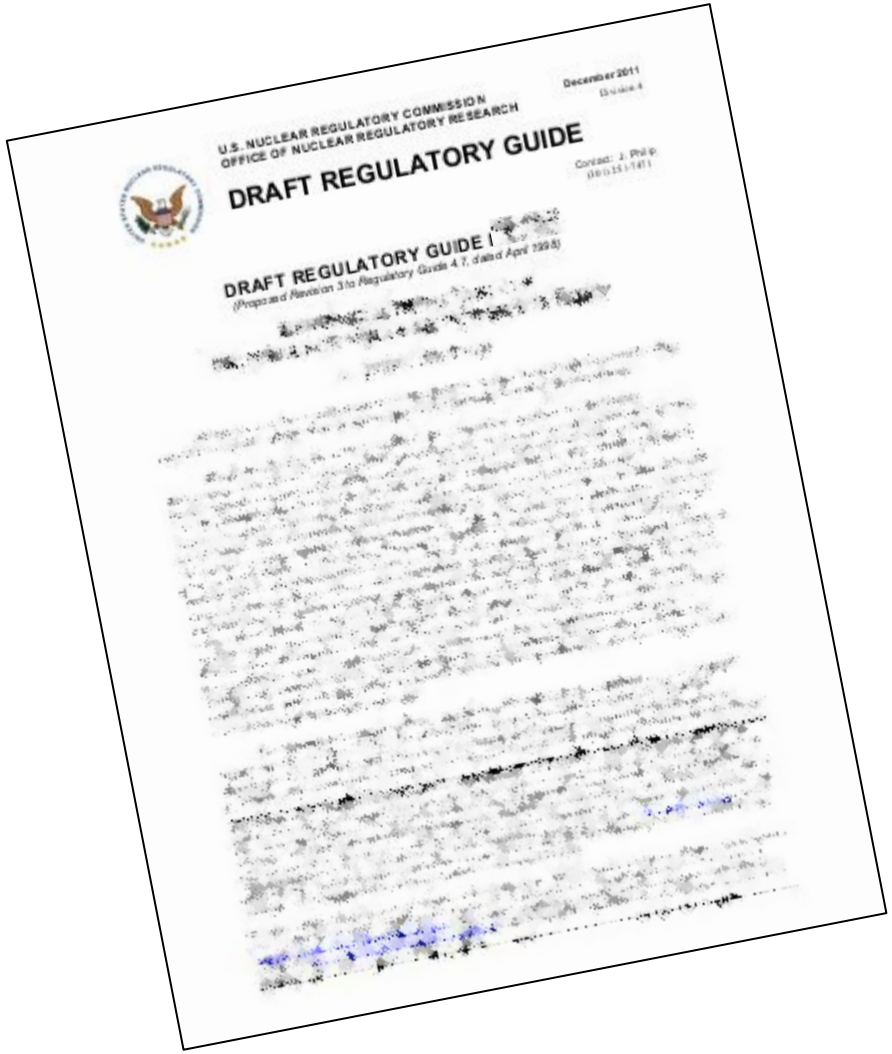


Bloschl et al, 2007

*** Subject to availability of funding**

Projected FY18-19 Work*

- Develop Draft Regulatory Guide


U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REGULATORY RESEARCH

December 2011

DRAFT REGULATORY GUIDE

DRAFT REGULATORY GUIDE

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