California Building Standards Code Update Project

Public Meeting

Mitigating the Consequences of Flooding

January 21, 2009

Sacramento, CA

Purposes of the Public Meeting

- Provide Building Standards Code Update Project (BSCUP) overviews including context, scope, and processes
- Provide project development framework, current progress, and schedule
- Receive public input

Agenda

- Welcome and Introduction
- Context for the BSCUP
- Potential Geographic Areas Affected
- Project Development Process
- Current Thinking
- Q&A
- Summary/Next Steps

Context of the BSCUP

- History of flooding in California
- DWR actions are mandated by California Health and Safety Code §50465
- Code update is part of the comprehensive flood management
- Project is conducted as part of FloodSAFE California

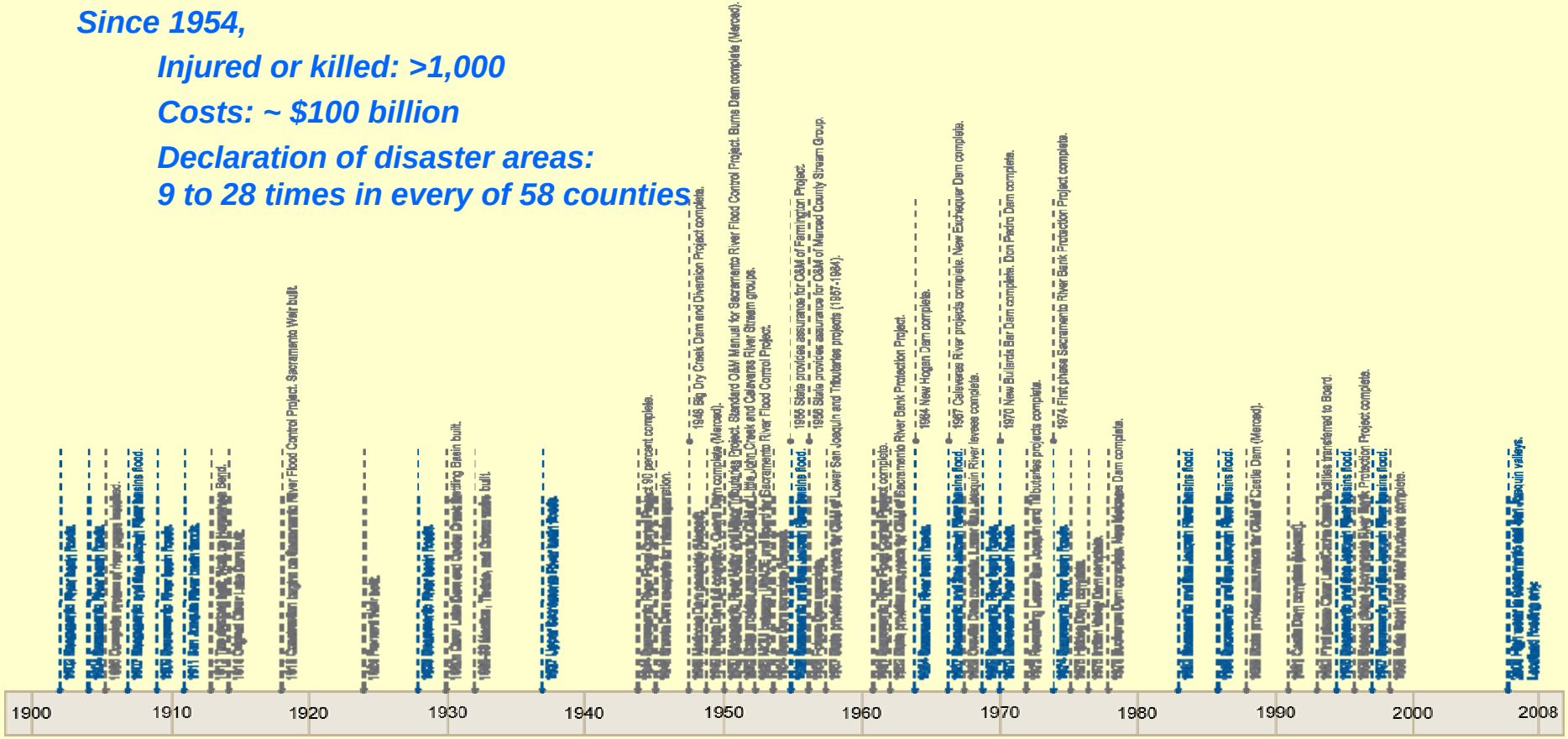
Creating Context
Historical California Flooding

Since 1954,

Injured or killed: >1,000

Costs: ~ $100 billion

Declaration of disaster areas:
9 to 28 times in every of 58 counties



Creating Context
Health and Safety Code §50465

50465. (a) On or before January 1, 2009, the Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 200-year flood event. The amendments to the California Building Standards Code shall be sufficient to reduce the risk of flood damage and protect life, safety, and the construction in those areas.

(b) Before the department proposes the amendments to the California Building Standards Code required pursuant to subdivision (a), the department shall consult with the Central Valley Flood Protection Board, the Division of the State Architect, and the Office of the State Fire Marshal.

Creating Context

Health and S

Schedule revised to incorporate time for public comments and match the Commission process schedule

50465. (a) On or before January 1, 2009, the Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 200-year flood event. The amendments to the California Building Standards Code shall be sufficient to reduce the risk of flood damage and protect life, safety, and the construction in those areas.

(b) Before the department proposes the amendments to the California Building Standards Code required pursuant to subdivision (a), the department shall consult with the Central Valley Flood Protection Board, the Division of the State Architect, and the Office of the State Fire Marshal.

Creating Context
Health and Safety Code §50465

50465. (a) On or before January 1, 2009, the Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to ex[illegible]ed three feet for the 200-year flood event. The amendments to the California [illegible] Standards Code shall be sufficient to reduce the risk of flood damage [illegible] life, safety, and the construction in th[illegible]

A separate effort conducted concurrently under FloodSAFE, developing a flood management plan, with a 5-year update cycle, for the areas receiving protection from the State-Federal flood management system in the Central Valley

(b) Before the department proposes the amendments to the California Building Standards Code required pursuant to subdivision (a), the department shall consult with the Central Valley Flood Protection Board, the Division of the State Architect, and the Office of the State Fire Marshal.

Creating Context
Health and Safety Code §50465

50465. (a) On or before January 1, 2009, the Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 200-year flood event. The amendments to the California Building Standards Code shall be sufficient to reduce the risk of flood damage and protect life, safety, and construction in those areas.

Increased level of protection in comparison with the current FEMA standards, as considered in the CVFPP for urban and urbanizing areas

Depth reference suggests the concerns over deep flooding

(b) In developing the amendments to the California Building Standards Code required pursuant to subdivision (a), the department shall consult with the Central Valley Flood Protection Board, the Division of the State Architect, and the Office of the State Fire Marshal.

Creating Context
Health and Safety Code §50465

50465. (a) On or before January 1, 2009, the Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 200-year flood event. The amendments to the California Building Standards Code shall be sufficient to reduce the risk of flood damage and protect life, safety, and the construction in those areas.

(b) Before the department proposes the amendments t California Building Standards Code required pursuant to subdivision (a) rtment shall consult with the Central Valley Flood n of the State Architect, and the Office of the State

A broad range of purposes for the proposed update, presenting the needs for prioritization

Creating Context
Health and Safety Code §50465

50465. (a) On or before January 1, 2009, the Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 200-year flood event. The amendments to the California Building Standards Code shall be sufficient to reduce the risk of flood damage and protect life, safety, and the construction in those areas.

(b) Before the department proposes the amendments to the California Building Standards Code required pursuant to subdivision (a), the department shall consult with the Central Valley Flood Protection Board, the Division of the State Architect, and the Office of the State Fire Marshal.

Necessary coordination will be much broader than this list of essentials.

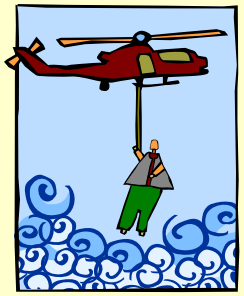
Creating Context

Building Code Update in Flood Management

Reduce Threat
- Levees
- Reoperation
- Land use, etc.

Flood Management Strategy

Reduce Consequences
- Design
- Construction



Improve Response
- Planning
- Readiness
- Self-help

Creating Context

Building Code Update in FloodSAFE California

Major Programs and Projects

Reduce the Chance of Flooding

- Emergency Repairs (multiple)
- Early Implementation Projects (multiple)
- Improvement of Operations and Maintenance
- Federal/State/Local Implementation Actions

- Statewide Flood Management Planning
- Central Valley Flood Management Planning Program
- Ecosystem Conservation Strategy
- Central Valley Local Assistance Program
- Levee Evaluation Program
- Central Valley Floodplain Delineation and Evaluation Program
- Levee Flood Protection Zone
- Flood Hydrology Update

Reduce the Consequence of Flooding

- Building Code Amendment
- Emergency Responses
- Flood Risk Notification
- Federal/State/Local Implementation Actions

CALIFORNIA BUILDING STANDARDS CODE UPDATE PROJECT

FloodSAFE CALIFORNIA

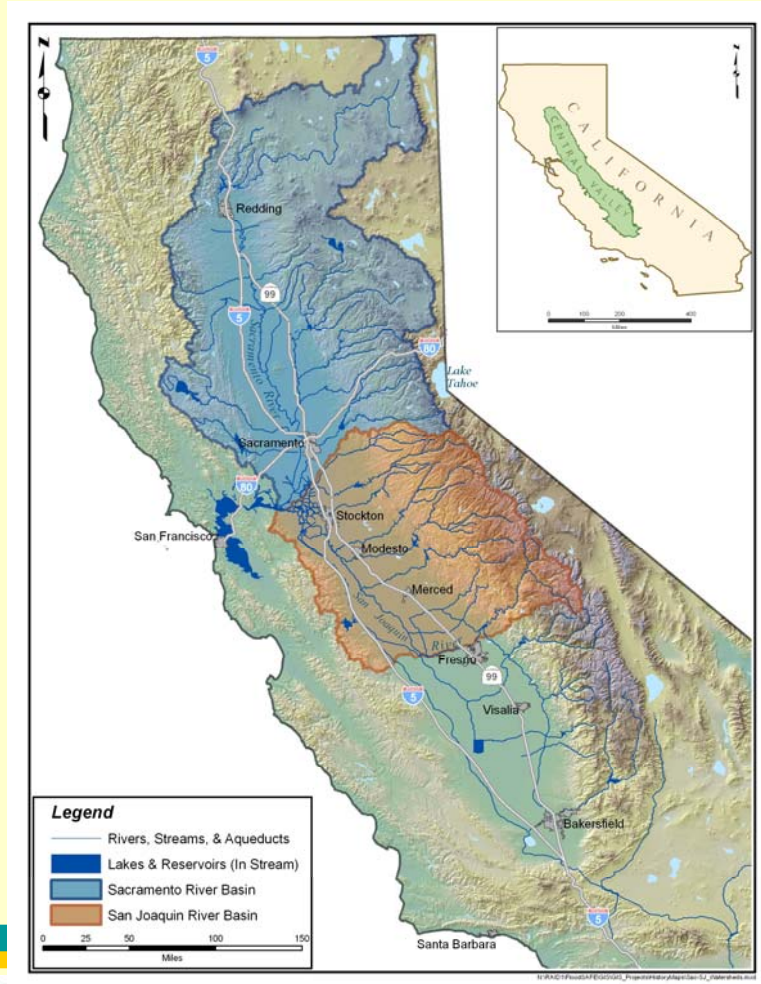
Programs/Actions Within FloodSAFE California

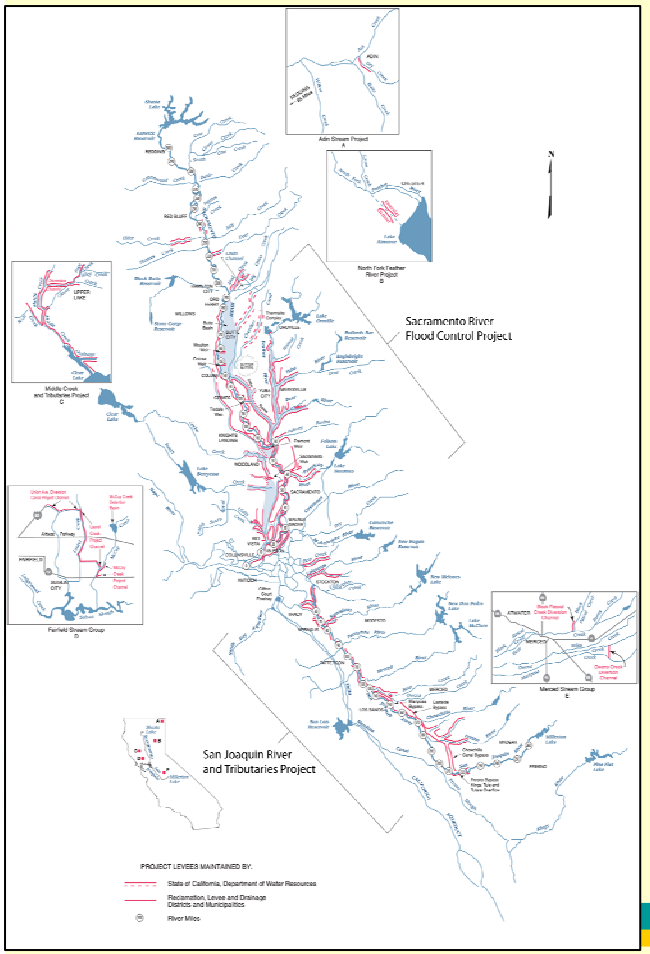
Programs/Actions Outside of FloodSAFE California

January 21, 2009

Project Study Area

Consistent with the Area in the Central Valley Flood Protection Plan





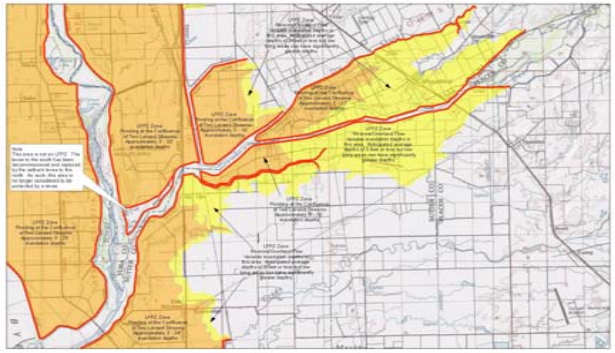
CALIFORNIA BUILDING STANDARDS CODE UPDATE PROJECT

FloodSAFE CALIFORNIA

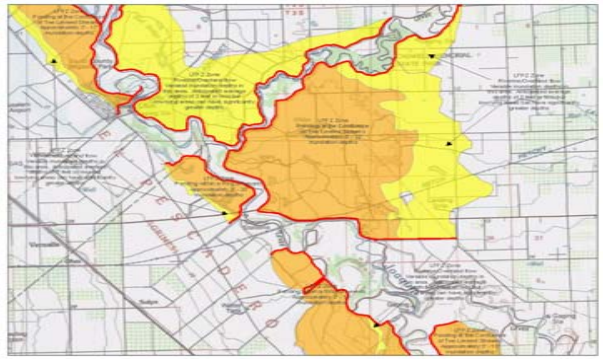
January 21, 2009

Areas May be Affected by Code Update

- Key reference: 200-year floodplain map
  - Definition of 200-year floodplain
  - Preliminary map available; revision is underway
- LFPZ maps for illustrative purposes only
  - Definition of Levee Flood Protection Zone
  - Inferences for the building code update



Example: Lower Sacramento River



Example: Lower San Joaquin River

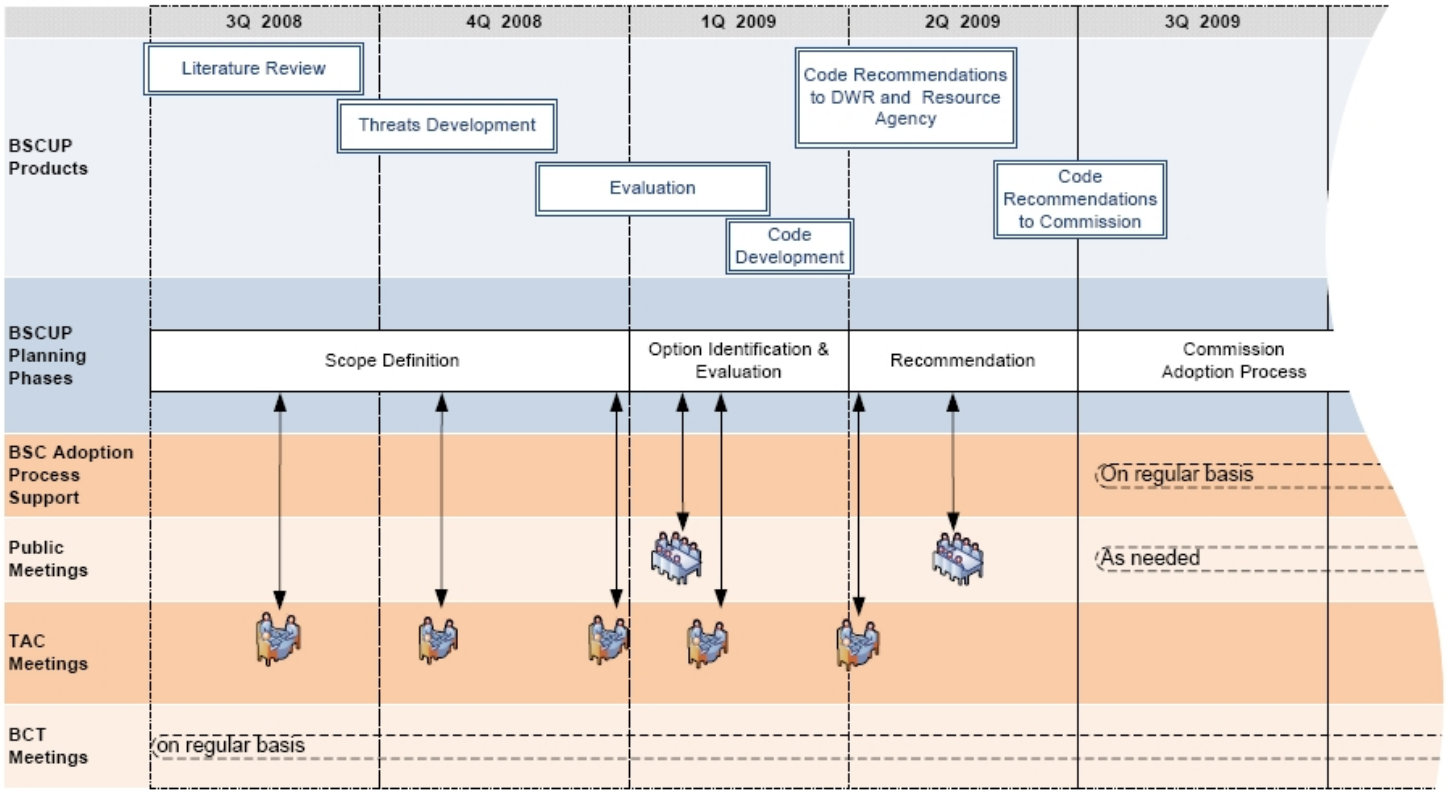
Project Development Framework

- Approach
  - A dedicated Building Code Team
    - Including experts in floodproofing, NFIP, and California Building Standards Code
  - A systematic process to prioritize chief flood threats for code development
    - Extensive research on flood threats in California and other states
    - Assignment of threat attributes and prioritization
  - A Technical Advisory Committee with a broad representation of expertise, interested parties, and regulatory agencies
  - An inclusive public engagement process for information sharing and inputs

Project Development Framework

- Four phases of development
  - Scope Definition
    - Literature research
    - Establishment of Technical Advisory Committee
    - Identification of chief flood threats for Code update
  - Option Identification and Evaluation
    - Identification of Code update options for each chief threat
    - Evaluation of Code options
  - Recommendation
    - Assembly of the recommendation package for management approval and public review
  - Building Standards Commission Adoption Process

Building Standards Code Update Process



Legend

- BSCUP Major Milestone
- Public Meeting
- TAC Meeting
- BSCUP Product Delivery Team Activity
- BSCUP Communication Team Activity

Systematic Threat Identification and Prioritization

Strategic Intent

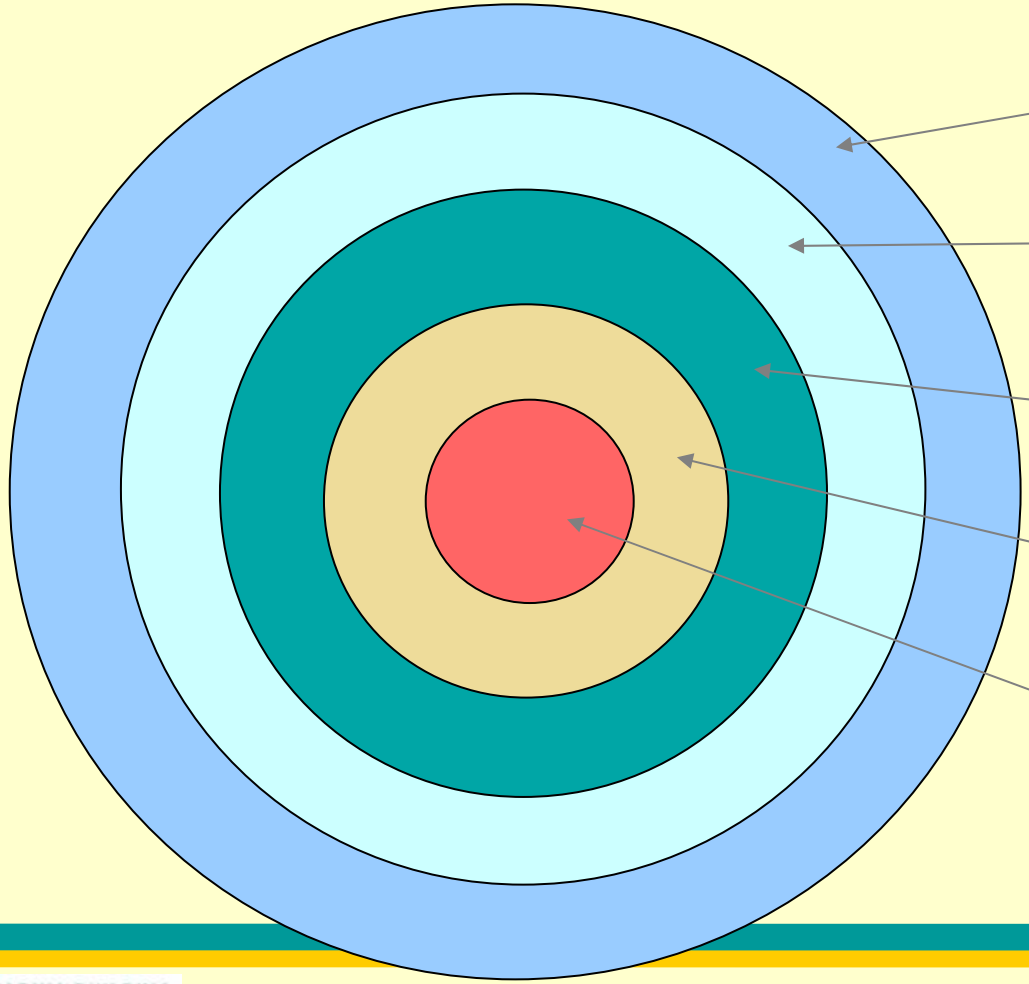
Flood threats best addressed through Code update

Degree of Flood Consequence	Unlikely	Possible	Likely
High Impact	x	X	X
Low Impact	x	X	X

Probability of Threat Occurrence

Systematic Threat Identification and Prioritization

Process Steps



1. Adverse effects from floodwaters (i.e., mitigation required)

2. Threats cause mortality, injury, and/or structural damage

3. Threats Reasonably Reduced by Building Code Amendment

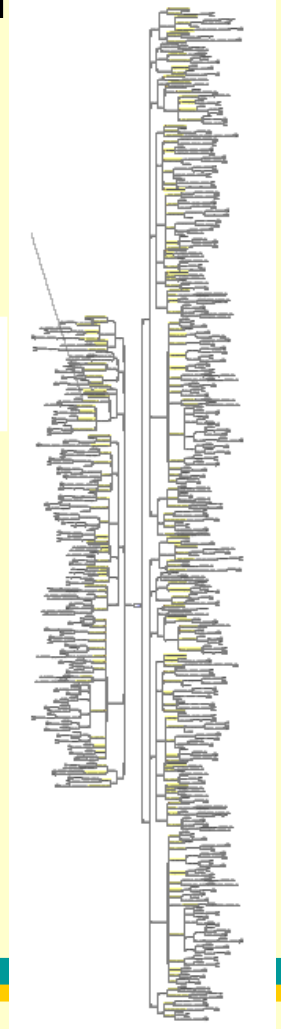
4. Factoring Likelihood and Severity of Threat Occurrence

5. Prioritized likely occurring threats that can be reasonably reduced by BC amendment and supported by the public and State

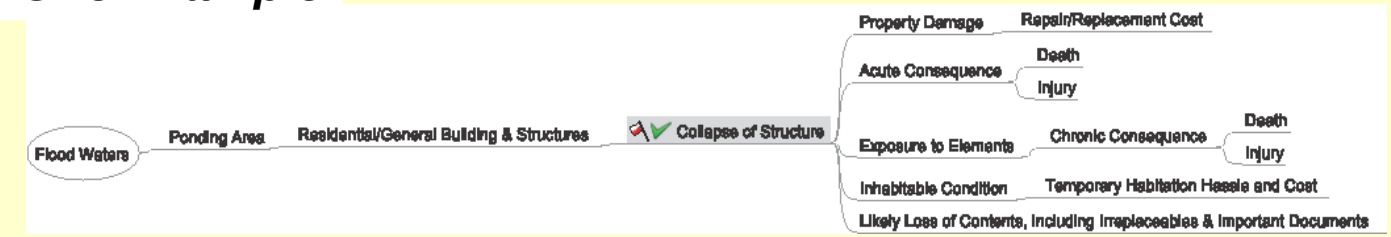
Systematic Threat Identification and Prioritization

Comprehensive Threat Identification

- Completed literature search to identify documented threats from flooding.
- Developed comprehensive threat and consequence path tree.
- Identify threats that may be managed by building code updates.



One Example



Systematic Threat Identification and Prioritization

Focus on Threats Addressable by Building Code

FLOODING MECHANISM				STRUCTURE USE																		CONSEQUENCE									OBJECTIVE
Ponding	Overland Flow	Channelized Flow	Is Rate of Inundation a Factor?	Residential - See following options:	- Single Family	- Multi-Family	- Hotel/Motel	Emergency Shelter	Commercial / Retail	Critical Care	Emergency Services	Agricultural	Governmental - Education	Governmental - Non-Education	Industrial - See following options:	- Manufacturing	- Water Utility	- Sanitation Facility	- Electrical Utility	- Natural Gas Facility	- Communications Utility	Death	Physical Injury	Building Damage	Property Damage	Infection Caused by Unsanitary Conditions (e.g. Staph)	Emotional Trama - General Public	Emotional Trama - Property Owner	Loss of Service	Specific Description	OBJECTIVE: What do we want the code to address for this specific threat?
•	▪	•			•	•	•	▪	▪	•	•		▪									AC,U	AC,U		P		U	U		A - Electrocution, C - Exposure to elements	

One Example

Heating, Ventilation, & Air Conditioning (HVAC) Equipment being inundated/damaged by flood waters

- Flooding Mechanism
- Structure Use
- Consequences and Likelihood (Step 4)
- Define Objectives for Provision Under Consideration (PUC)
- Prioritize Chief Threats (Step 5)

Systematic Threat Identification and Prioritization

Chief Threat Identification

- HSC §50465: potential code update for public safety and structural property damage
- The chief threats for this first Code cycle have been selected based upon severity of consequence to **public safety**:
  - **Death, serious injury**, injury or trauma
  - **Acute** and chronic
  - **Likely,** Possible, or Unlikely occurrence
- Damage reduction is a secondary consideration

Identified Chief Threat #1:
Entrapment by Lack of Access to Safety

Cause: the lack of a safe temporary shelter or evacuation location above the flood water surface elevation (e.g., 200-year level) or clearly marked and functional egress facilities

Demographics: Dependent persons (elderly, children, disabled, etc.), and able-bodied persons

Facilities: (a) residential structures, (b) school and preschool structures, (c) hospital and emergency care structures, and (d) nursing home and assisted living structures

Identified Chief Threat #1:
Entrapment by Lack of Access to Safety

Potential Solution: User-friendly egress accommodation and/or a safe temporary location above the predicted floodwaters until rescue can be provided

Roof Hatch; an example for illustrative purposes only

Identified Chief Threat #2:
Death and/or Serious Injury by Structure Collapse

Cause: structural failure due to standing water and water velocity forces on the walls

Demographics: dependent persons (elderly, children, disabled, etc.), and able-bodied persons

Facilities: (a) residential structures, (b) school and preschool structures, (c) hospital and emergency care structures, and (d) nursing home and assisted living structures

Identified Chief Threat #2:
Death and/or Serious Injury by Structure Collapse

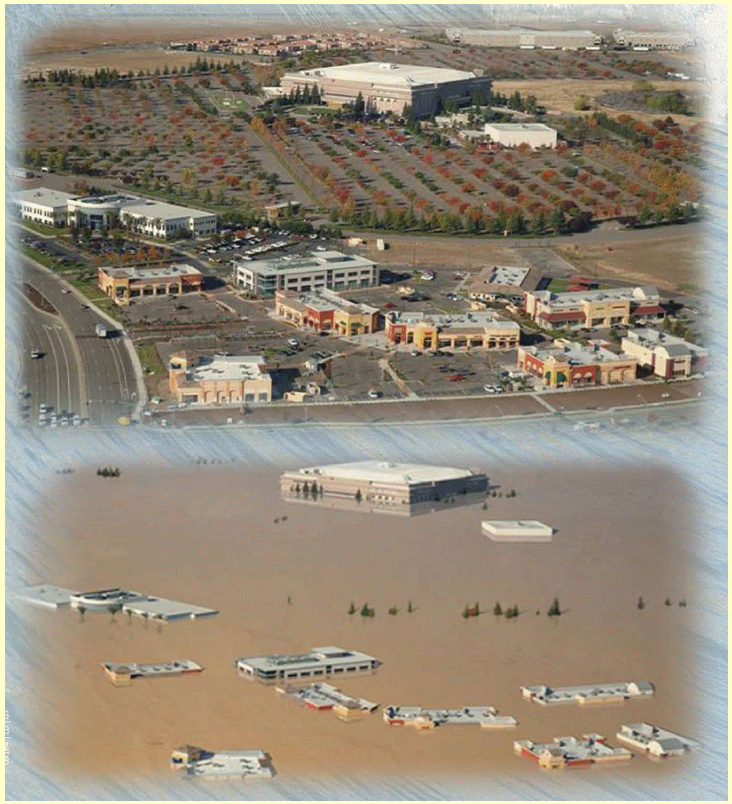
Potential Solution:
Code update for structures in a flood zone to reduce the chance of collapse in a reasonable timeframe (for example, until persons are rescued)

Identified Chief Threat #3:
Loss of Emergency Response Functions

Cause: facilities being inundated or damaged by floodwater

Facilities: (a) emergency care facilities (hospitals and medical clinics), particularly emergency rooms and (b) emergency responder facilities (police, fire stations, and ambulance dispatch centers)

Potential Solution: Keep essential operations functional at emergency facilities



Identified Chief Threat #4:
Hazardous Chemicals from Industrial Facilities

Cause: release of hazardous chemicals and/or hazardous contents into floodwater

Facilities: industrial facilities

Potential Solution: reduce public exposure to harmful or fatal hazardous contamination by better preparing industry for major floods

Q&A

Next Steps

- Identify options and perform evaluation
- Prepare recommendation package
- Additional TAC meetings and public meetings

For more information:

http://www.water.ca.gov/floodsafe

http://www.water.ca.gov/BuildingCodeUpdate

California Building Standards Code Update Project

Public Meeting

Mitigating the Consequences of Flooding

THANK YOU