

Tualatin Valley Water District's Framework for Emergency Preparedness

April 29, 2015



Outline

- Impacts of Natural Disasters & Other Events
- Social Context for Disasters
- Dimensions of Dependency
- TVWD's Draft Framework



Impacts of Natural Disasters & Other Events

- Many types of events that cause problems with water systems (examples):
 - 2005 Hurricane Katrina
 - 2012 Hurricane Sandy
 - 2013 Colorado flooding
 - 2014 West Virginia source
 - 2014 Toledo source
 - Local boil water notice

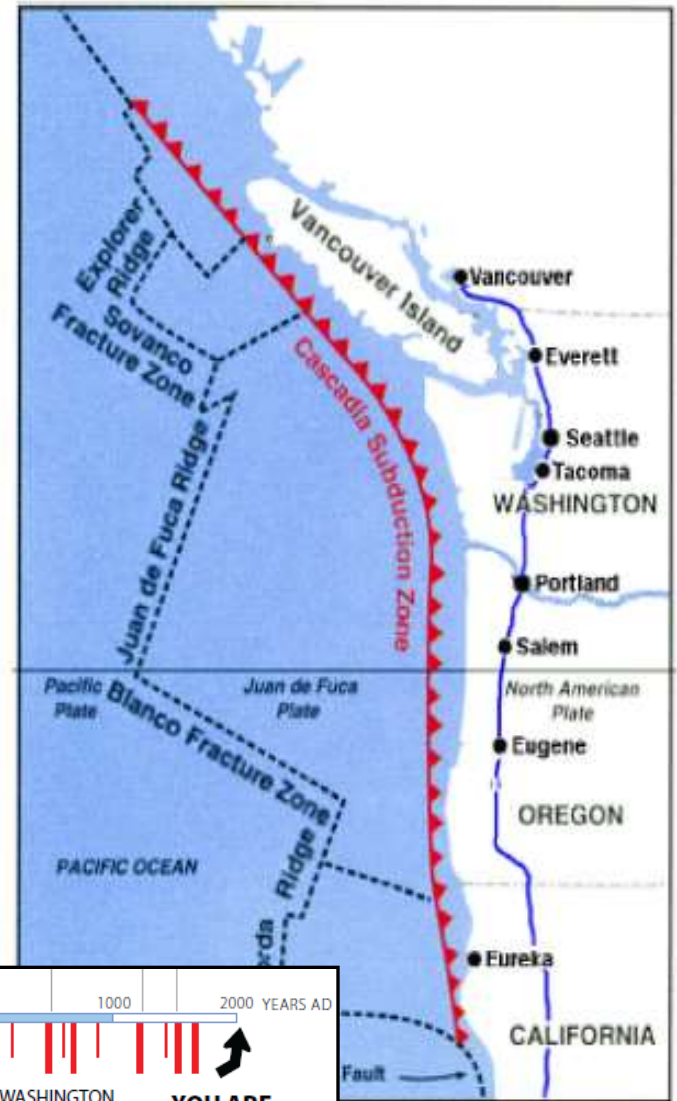


Cascadia Subduction Zone Earthquake



FEMA

- 9.0 m. Earthquake
- February 6, 2012 at 9:41 AM PST
- Direct Impact to 3 States, 2 FEMA Regions
- Complete rupture of the 800 Mile Fault Line
- Impacts affecting over 140,000 sq. mi.
- Ground shaking lasts up to 5 minutes
- Numerous aftershocks with several of M7.0+
- 1,100+ Deaths From Earthquake 24,000+ injuries
- 10,600+ Deaths from tsunami & 2,600 injuries



KNOWN CASCADIA EARTHQUAKES ALONG THE CASCADIA SUBDUCTION ZONE IN NORTHERN CALIFORNIA, OREGON, AND WASHINGTON
(from Goldfinger et al., 2012)

**YOU ARE
HERE!**

Where to Start?



"Don't let the perfect be the enemy of the good." – Voltaire

"We cannot solve our problems with the same thinking we used when we created them." - Einstein

Social Context for Disasters



Figure 2-2: The hierarchy of human needs (Adapted from Maslow's *Hierarchy of Needs* – a psychological perspective)



Alaska 9.2 M Earthquake. March 27, 1964, at 5:36 p.m. Duration ~ 4 minutes

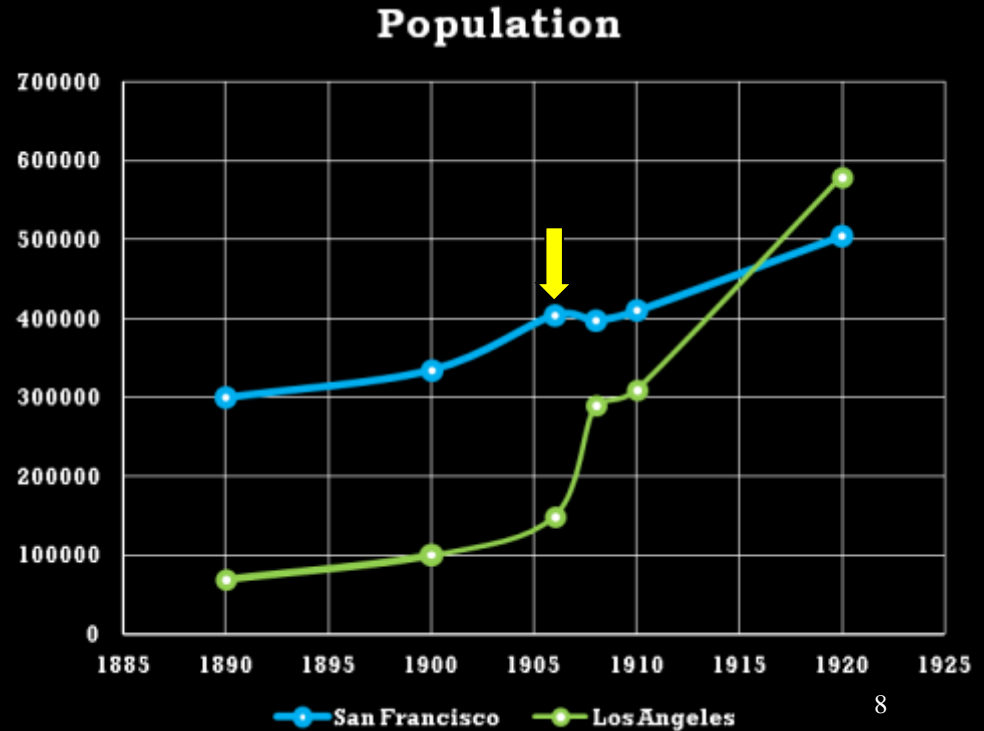
Critical Needs

- Healthcare
- Fire & Emergency Response
- Key retail
 - Groceries
 - Pharmacies
- Banking



Long-Term Impacts (From 1906 San Francisco Earthquake)

- The population leaves



Long-Term Impacts (Hurricane Katrina)

- Long-term economic impacts

New Orleans vs. Nashville Economic Growth



Recovery Time

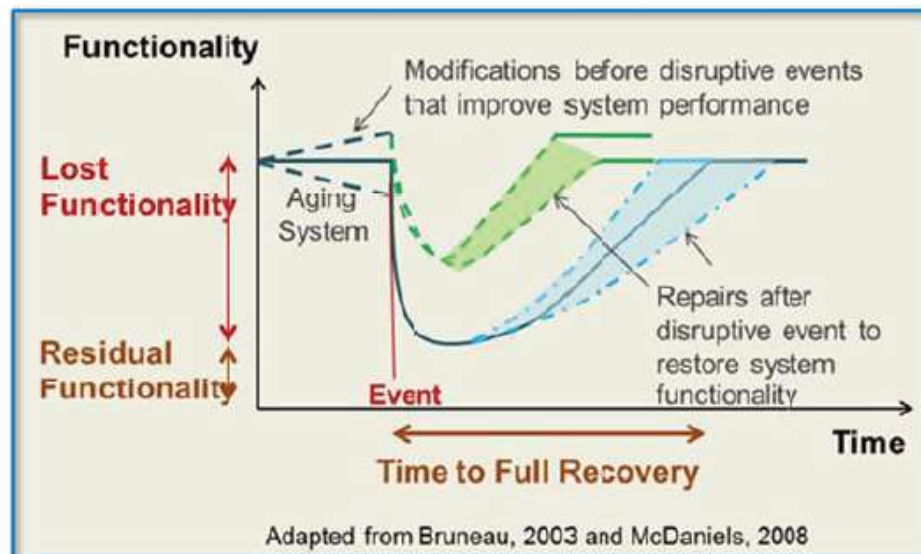
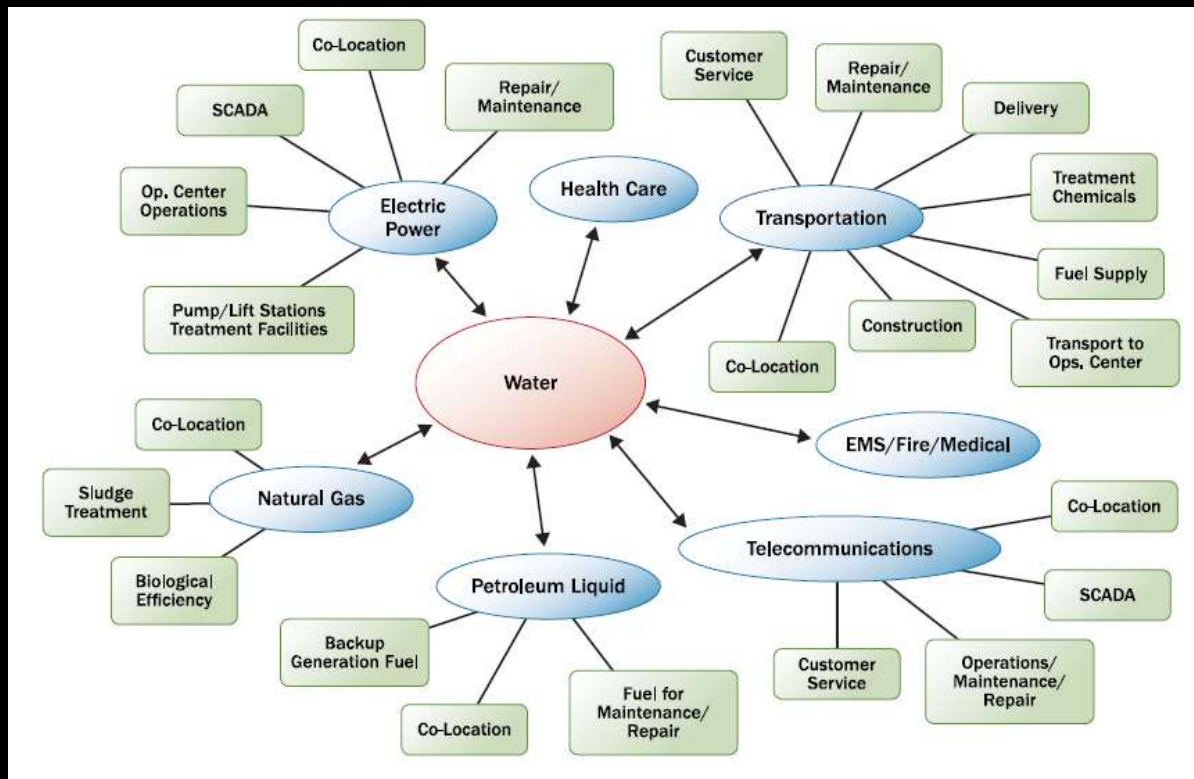


Figure 1-3: Resilience can be expressed simply, in terms of system functionality and the time to recover functionality following a disruptive hazard event.

Dimensions of Dependency

- Water Sector Interdependencies



Source: 2010 Water Sector Specific Plan



TVWD's **DRAFT** Framework for Emergency Preparedness



Need your feedback on this

Policy & Liaison

- Includes things like:
 - Governance
 - Resiliency policies
 - Formal & informal agreements with various parties (e.g. interties, mutual aid, etc...)
 - Building relationships
 - Level of service goals
 - Delegated authority

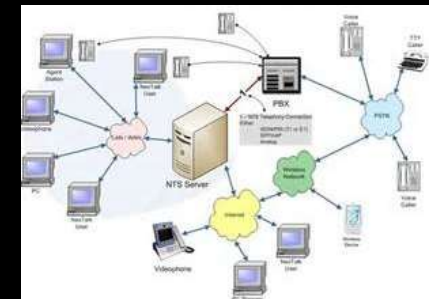


TARGET STATES OF RECOVERY: WATER & WASTEWATER SECTOR (VALLEY)

| Event | 0-24 hours | 1-3 days | 3-7 days | 1-2 weeks | 2 weeks-1 month | 1-3 months | 3-6 months | 6 months-1 year | 1-3 years | 3+ years |
|---|------------|----------|----------|-----------|-----------------|------------|------------|-----------------|-----------|----------|
| Demetrius Water Supply | | | | | | | | | | |
| • Potable water available at supply source (RTD, wells, transmission) | R | Y | | G | | | | X | | |
| • Main transmission facilities, pipes, pump stations, and reservoirs (backflow operational) | G | | | | | | X | | | |
| • Water supply to critical facilities available | Y | G | | | | X | | | | |
| • Water for fire suppression—at key supply points | G | | X | | | | | | | |
| • Water for fire suppression—at fire hydrants | | | R | Y | G | | | X | | |
| • Water available at community distribution centers/pools | | Y | G | X | | | | | | |
| • Distribution system operational | | R | Y | G | | | | X | | |

Business Systems

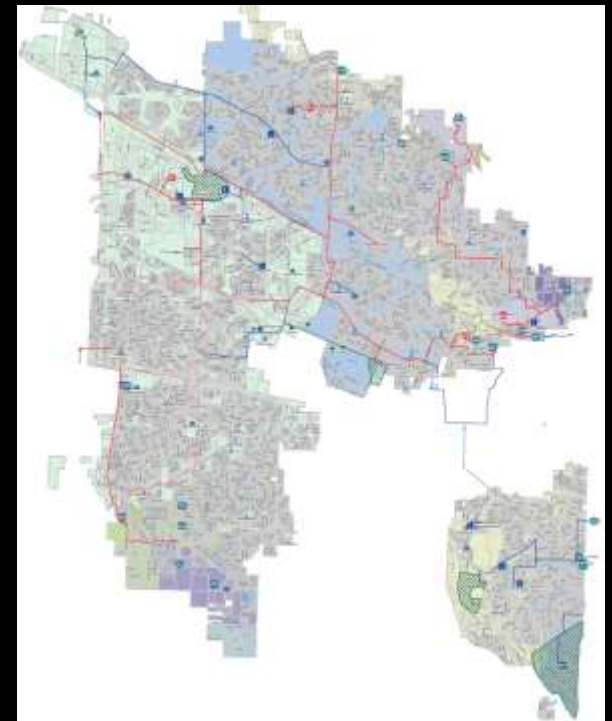
- Software
 - SCADA
 - GIS/mapping
 - Enterprise Resource Planning
 - Collaborative systems
 - Communication systems
 - Customer information & billing
- Hardware – servers, laptops, etc...
- Enterprise architecture
- Internet connectivity redundancy



PPD-21: The term "**resilience**" means the ... to withstand and recover from *deliberate attacks*,... [**cyber security – e.g. remote access policies, etc...**]

Infrastructure

- Planning
 - Establish key locations for water
 - Project prioritization
 - Operational flexibility
 - CIP
- Design standards
 - New infrastructure
 - Existing infrastructure
- Condition assessment
- Vulnerability & risk assessments



Resource Planning

- Human capital
 - Staff
 - Outside professional services
 - Outside contractors
- Critical inventory
 - Parts, equipment, fuel, etc...
 - Supplies/chemicals
- Key stockpile locations



Communications

“Communications is one of the most common types of failures during disasters” – FEMA

- Establish procedures, protocols for communications & sharing information for:
 - ✓ Staff
 - ✓ Key stakeholders
 - ✓ Elected officials
 - ✓ Customers
 - ✓ News organizations



C.O.L.T. – Cell on light truck

Finance

- Capital for ongoing operations:
 - Payroll
 - Paying vendors
 - Adequate cash on hand
 - Customer billing systems
 - Tracking expenditures/FEMA reimbursements
- Insurance
- Long-term financial planning



Response Planning

- Training & preparations
 - Various exercises (internal & external stakeholders)
 - Using the critical equipment, ICS, forms, checklists, etc.
 - Staff and family
- Operations
 - Testing interties
 - Alternative operating procedures (i.e. flexibility)
 - Operational strategies
- Emergency Response Plan
 - Prioritized response
 - Damage assessment
 - Standard operating procedures

National Fire Academy/Emergency Management Institute



Community-Specific Integrated Emergency Management Course (CS IEMC) - Earthquake Hazard - April 14 – 18, 2014 Emmitsburg, MD



NIST Flow Chart for Developing Resilience Plan

Could be applied to each element including conducting a gap analysis



TVWD's **DRAFT** Framework for Emergency Preparedness



Questions

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