USGS Tsunami Scenario; Perspective on PBTE from an Applied Research Project

Keith Porter, University of Colorado

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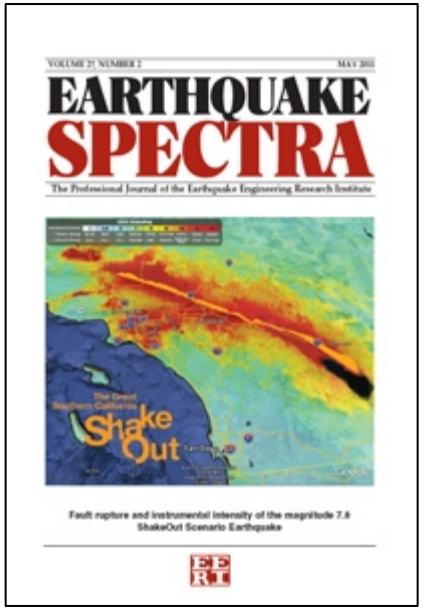
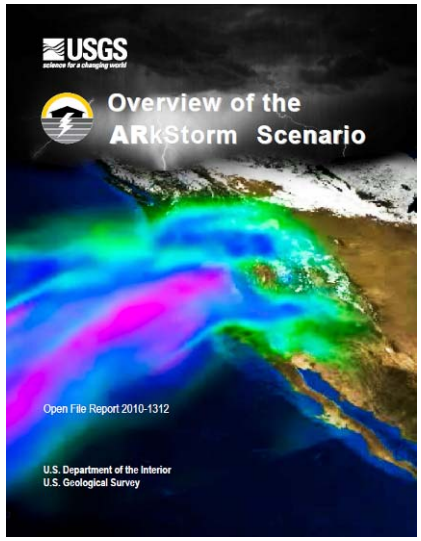
Outline

- USGS SAFR Project
- Tsunami scenario elements
- Possible engineering scope
- Possible engineering research needs
- Engineering impact studies
- SAFR engineering priorities vs PEER PBEE

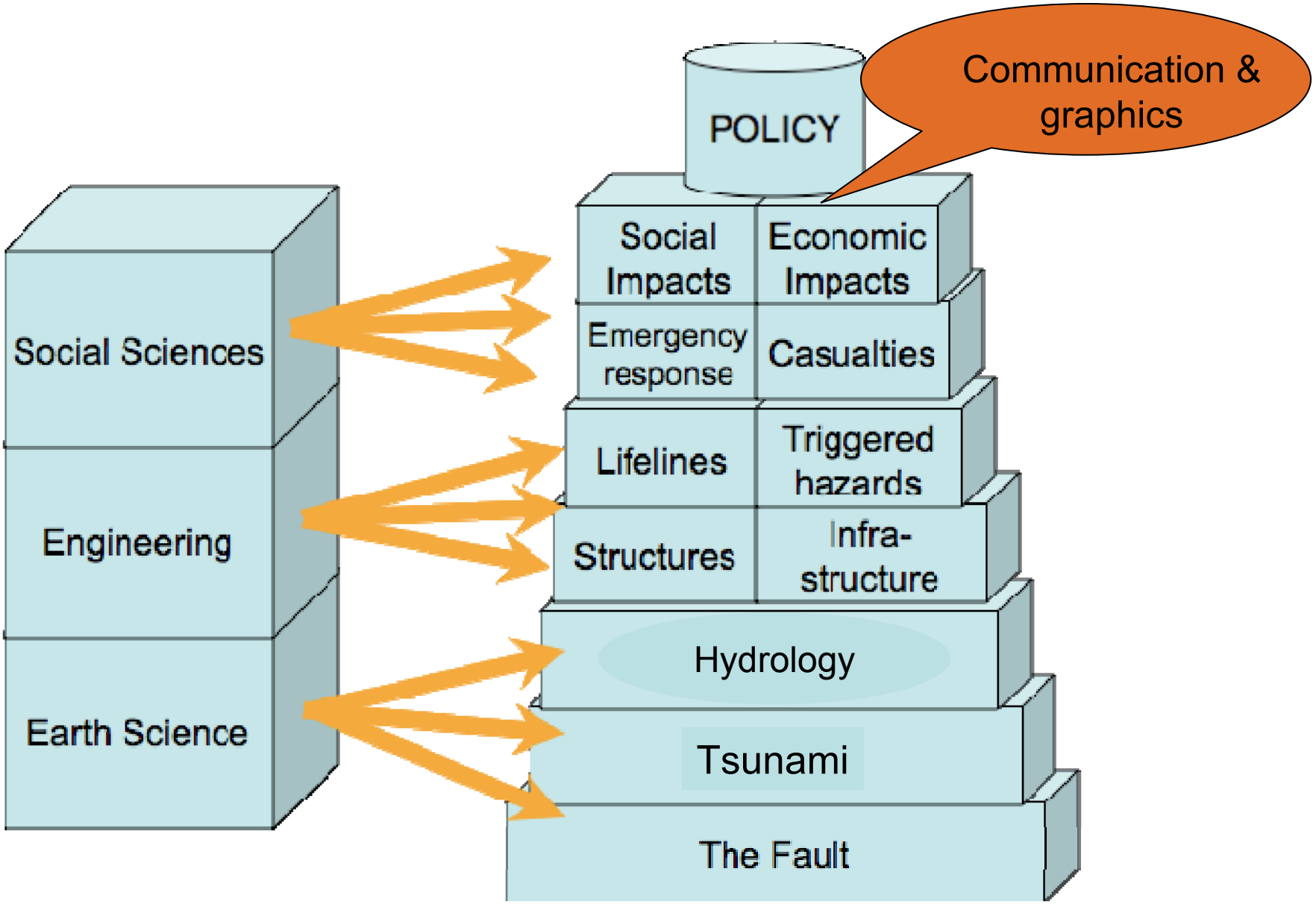
USGS SAFR Project

- SoCal Multihazards Demonstration Project becoming Science Applications For Risk Reduction (SAFR) Project
- Demonstrate how science can improve resiliency to natural hazards
- Multi-hazard: earthquakes, floods, tsunamis, wildfires,…
- Stakeholders set priorities: *one* severe event worth planning for; not worst case
- “ShakeOut” involved 50+ agencies and 8M+ exercise participants annually
- Next: Eastern Aleutian tsunami scenario



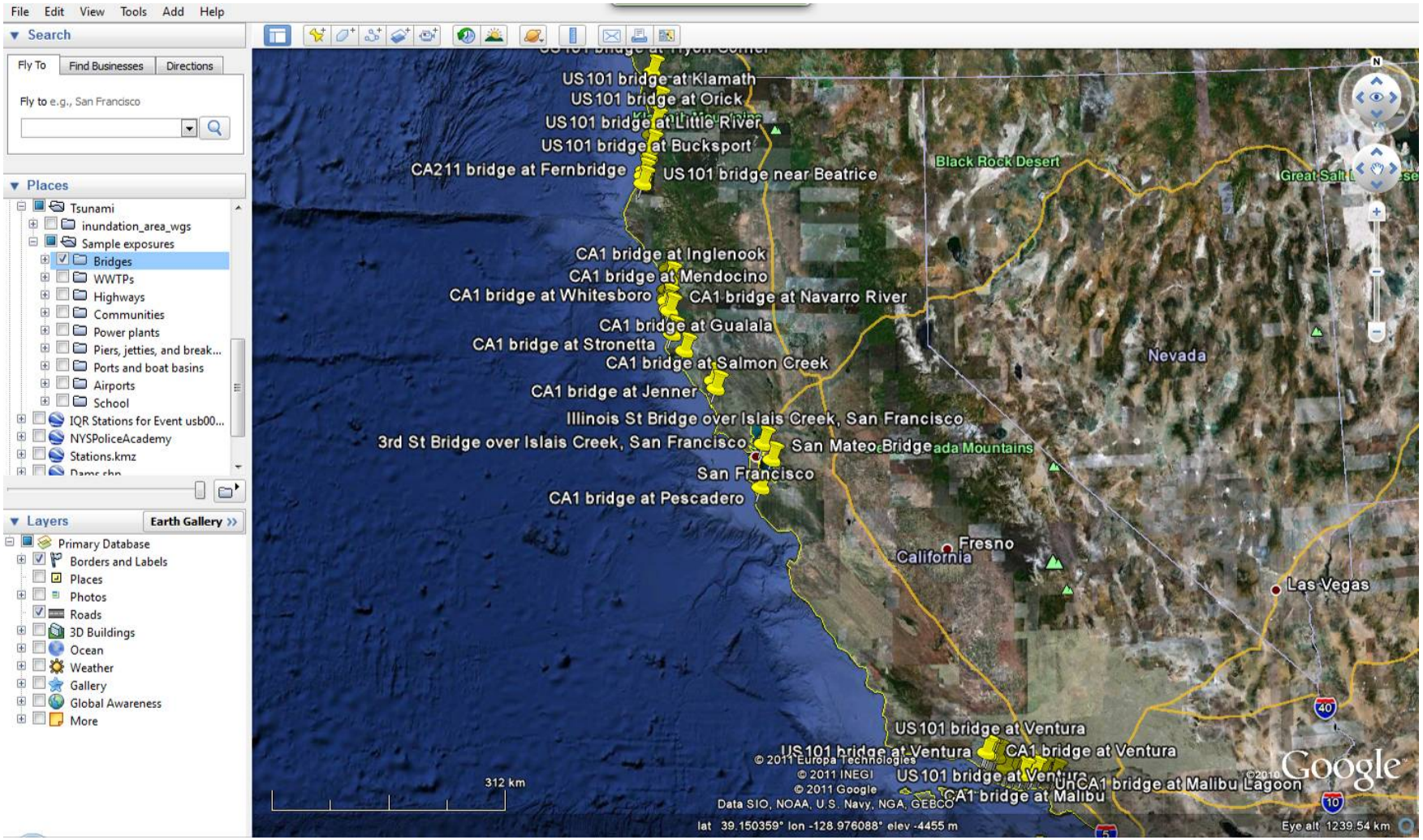


Scenario elements

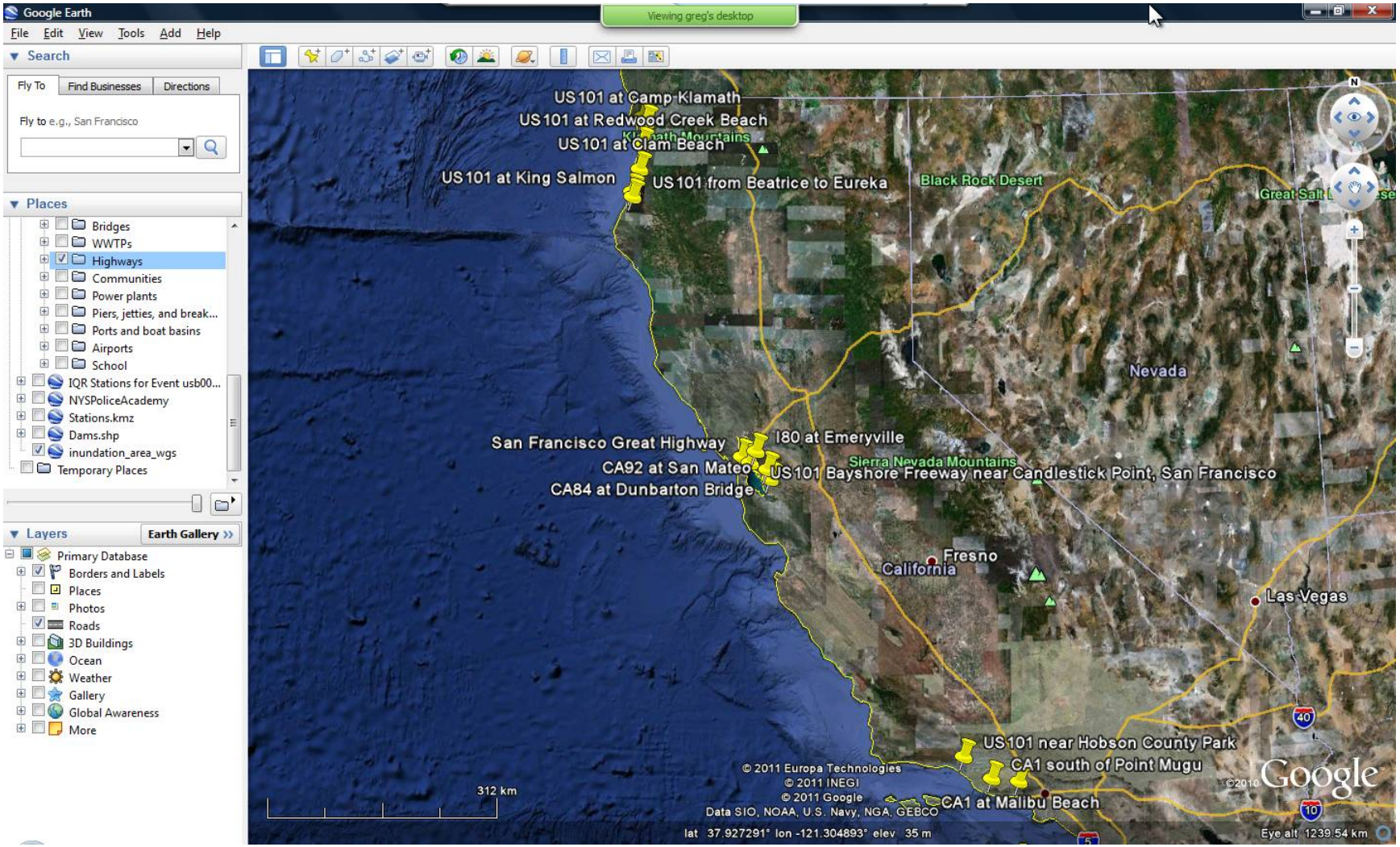


What is out there to be damaged?

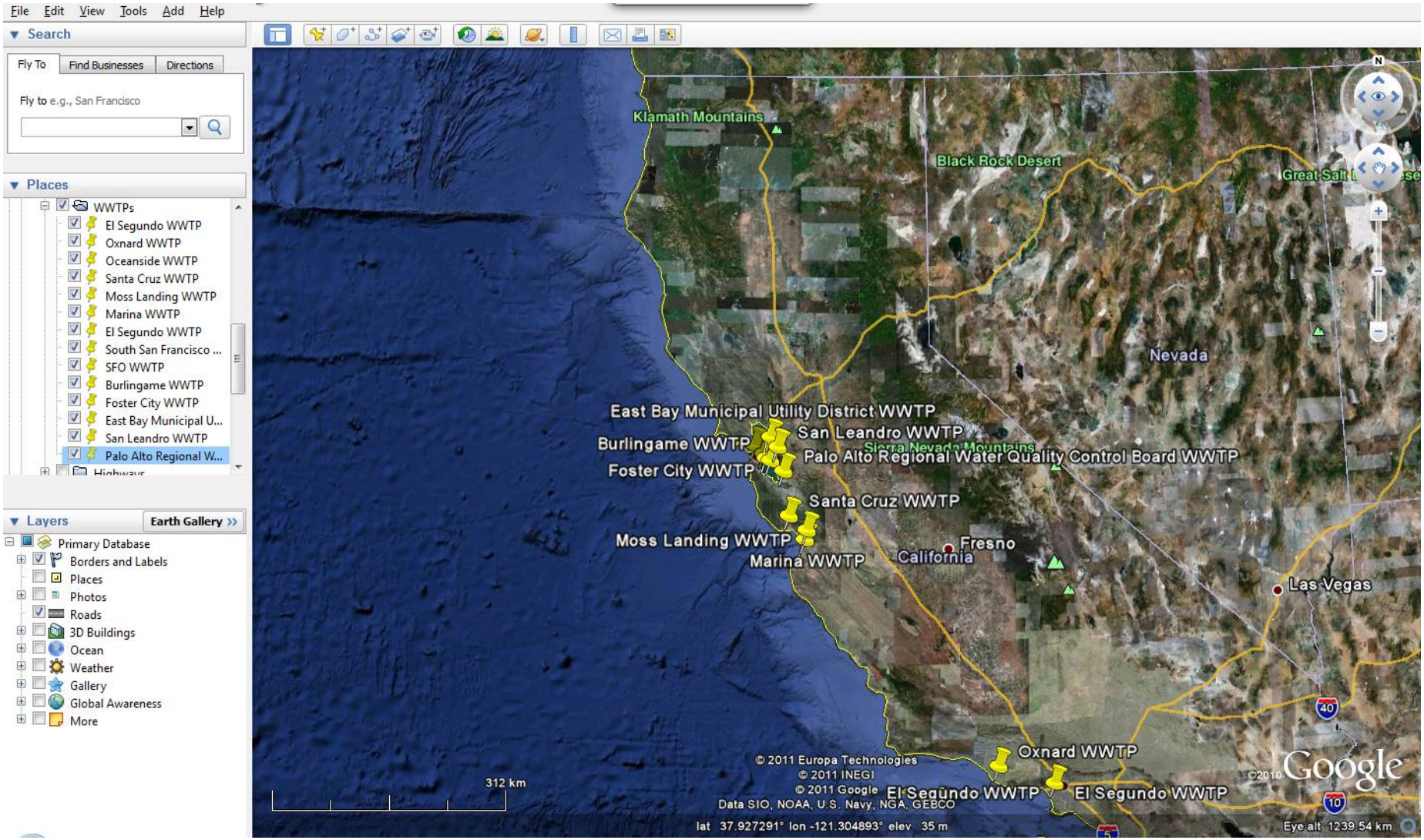
44+ bridges w/abutments ≤20’ AMSL



14+ stretches of highway



14+ WWTPs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Palo Alto Regional W...
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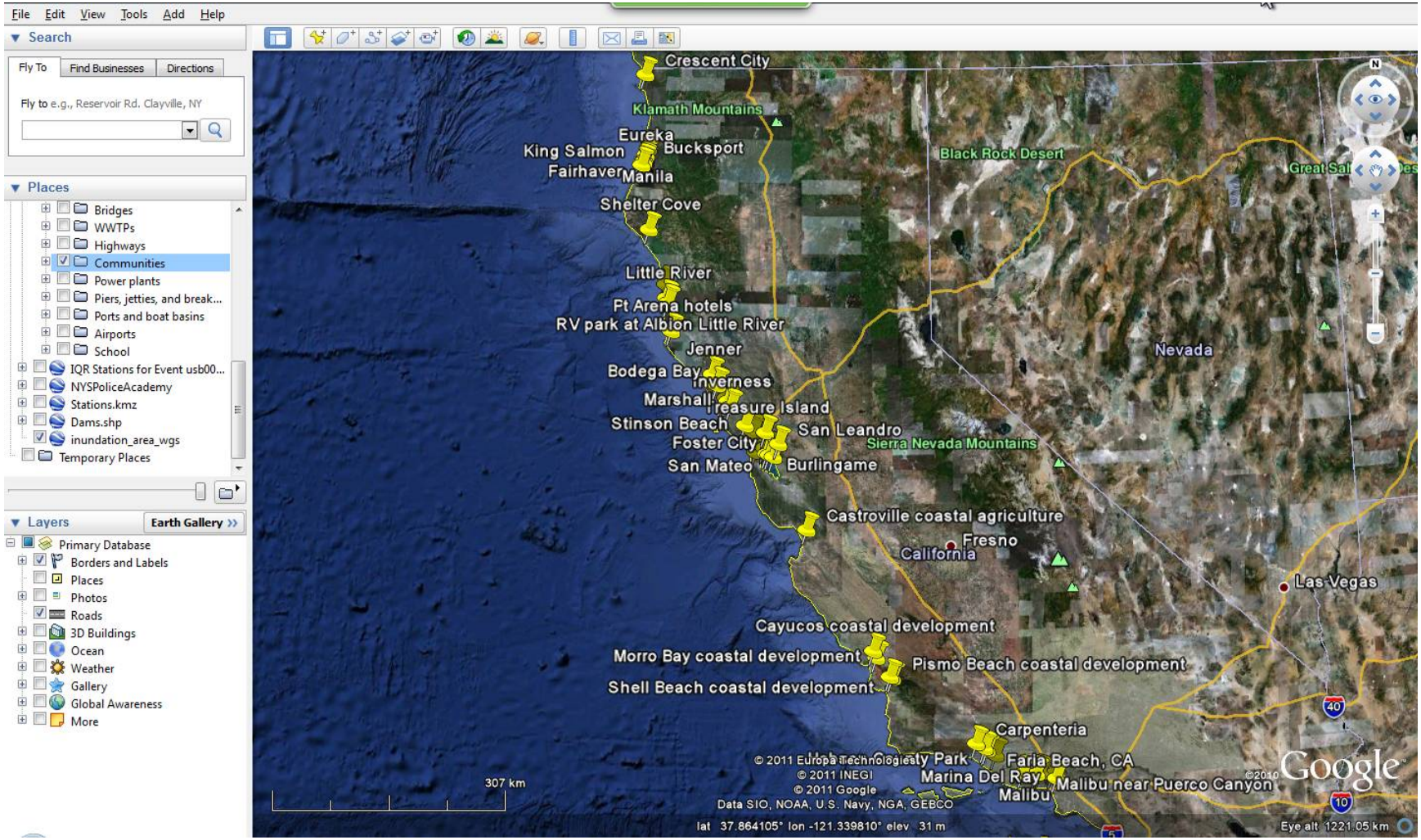
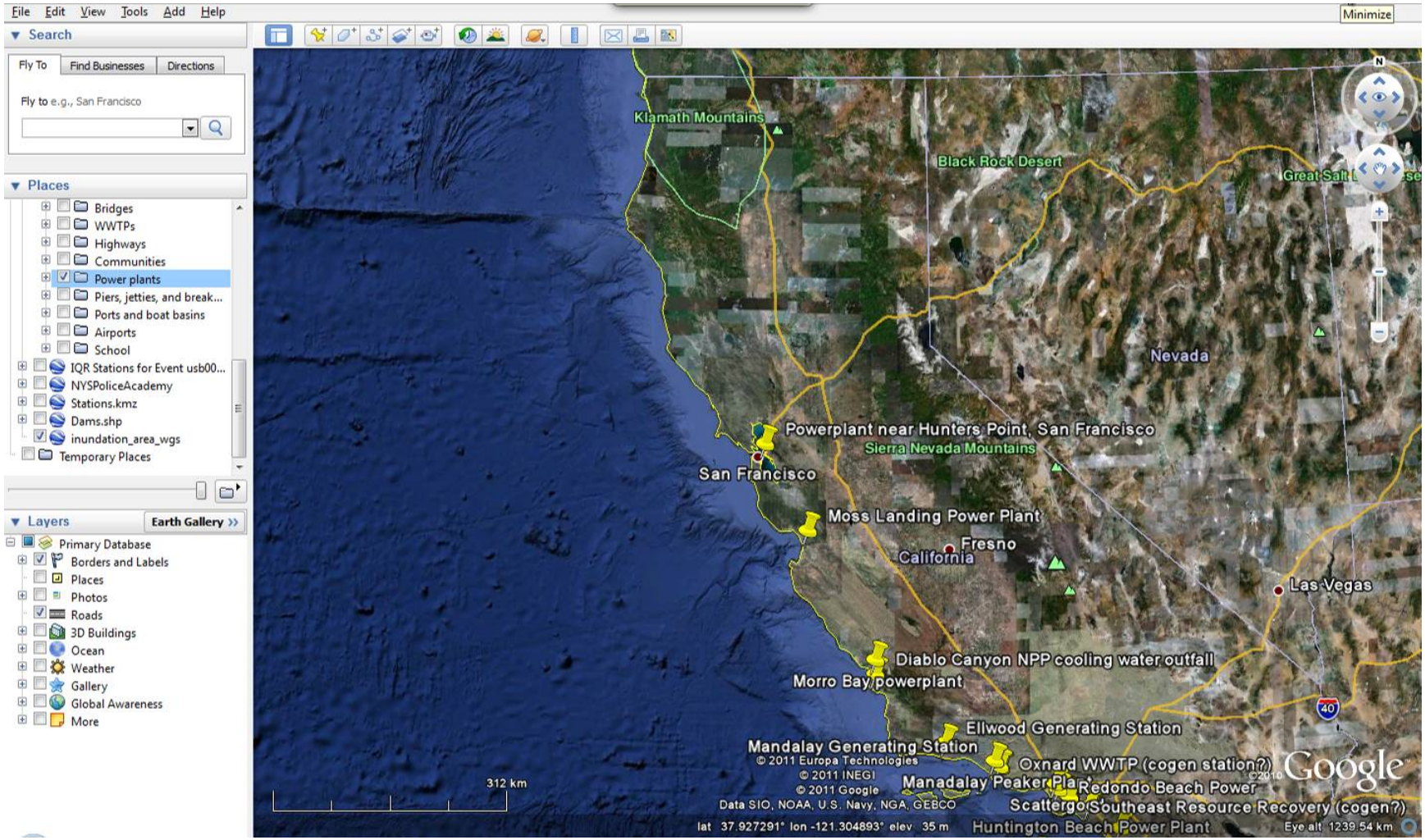
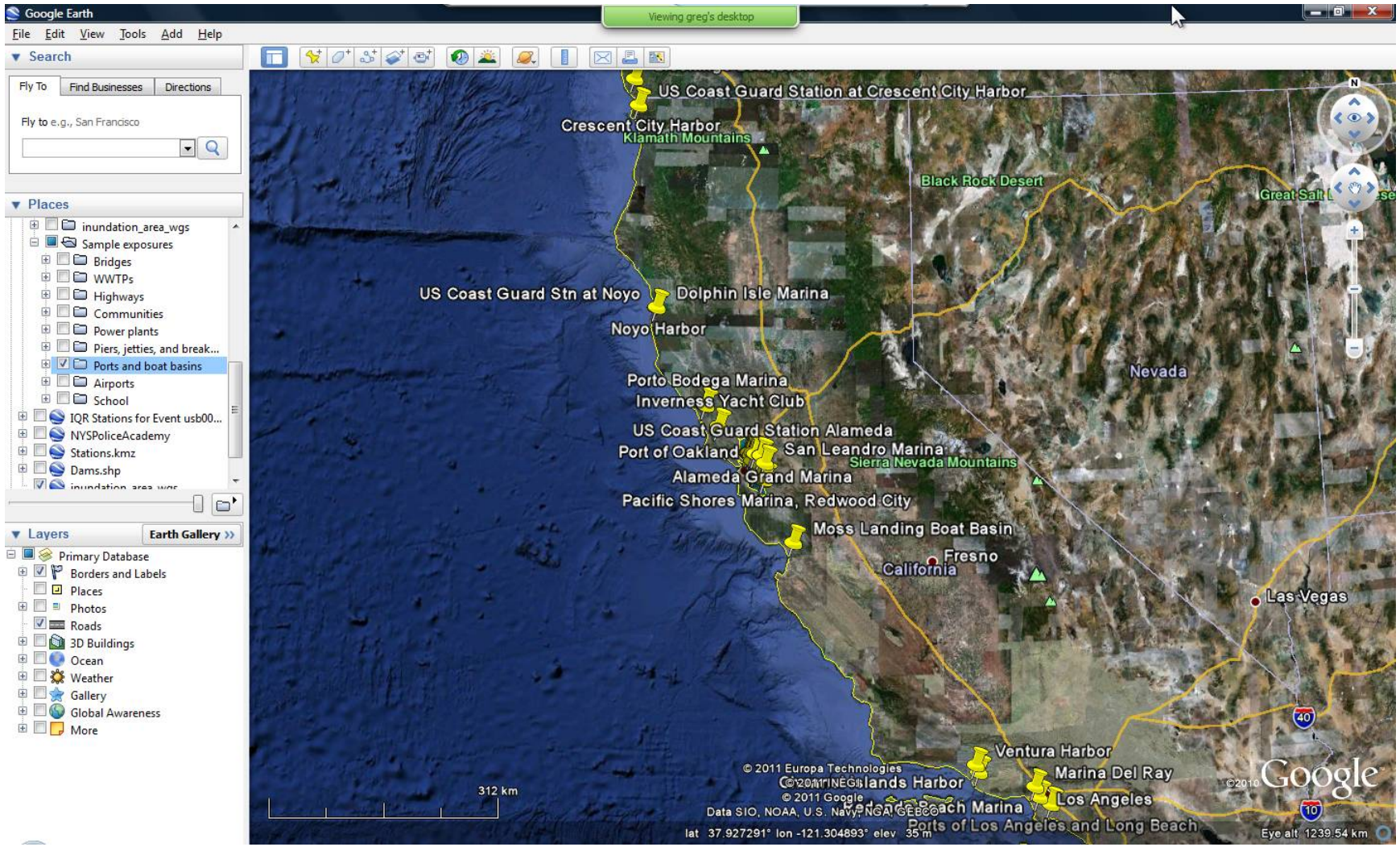
44+ communities



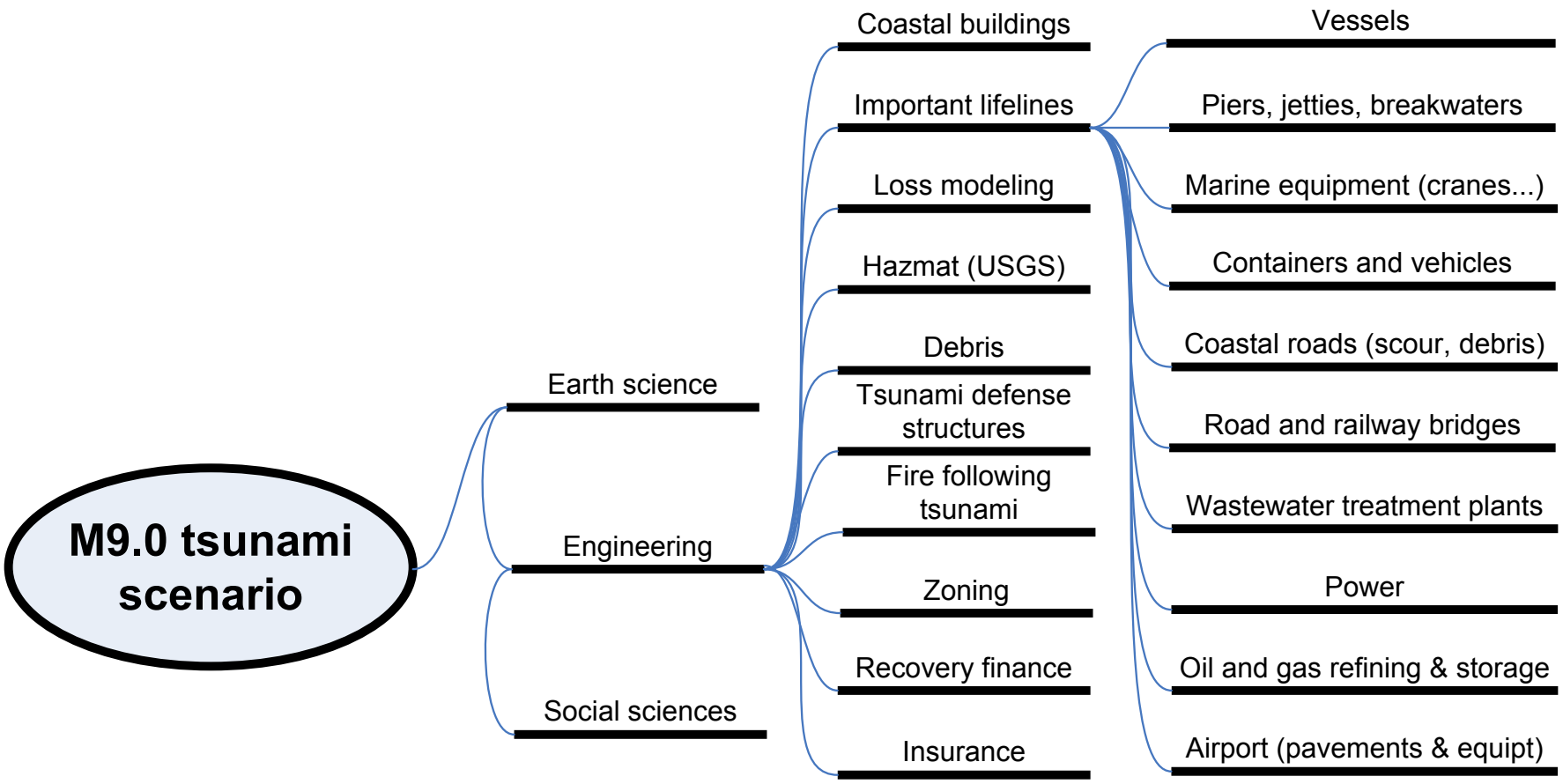
26+ power plants



Ports, marinas, boat basins

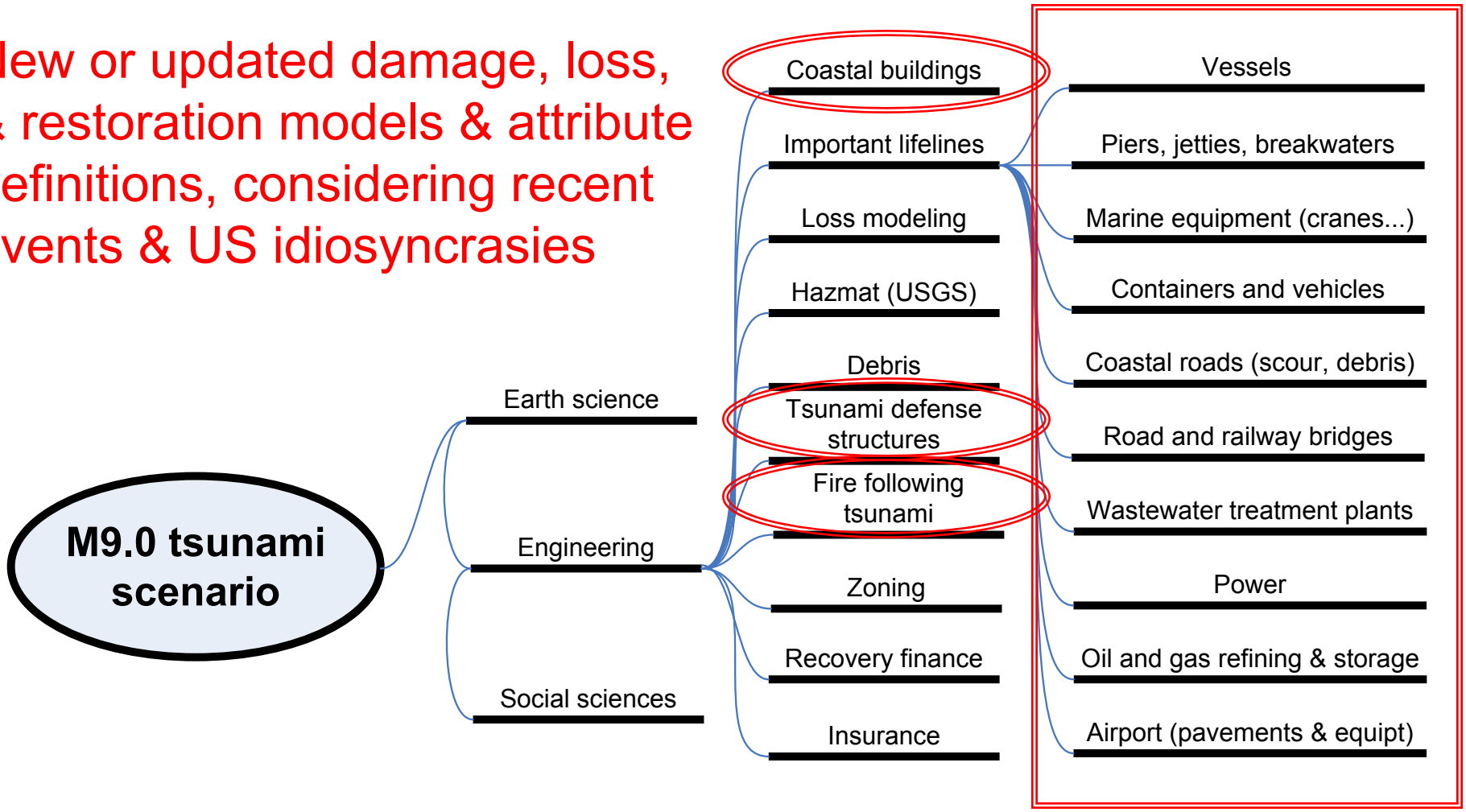


Possible engineering scope



Possible engineering research needs

New or updated damage, loss, & restoration models & attribute definitions, considering recent events & US idiosyncrasies



Engineering impact outline

- Exposure: what is out there to be damaged & what are its relevant attributes ("asset definition")?
- Literature: evidence of past losses & vulnerability
- Environmental excitation (PEER's "IM")
- Realistic damage ("DM"), repair costs ("$DV_{\$}$")
- Restoration activities & time ("$DV_{\clock}$"), interactions
- Low-hanging fruit for mitigation
- Research needs

SAFR versus PEER PBEE

- More emphasis on category-level performance
  - Interest in community-level resiliency
- More interest macroscopic category attributes
- More emphasis on restoration activities
- Less on probabilistic performance
- More on emergency planning & mitigation
- More on lifeline interaction
- More on operator judgment & experience
  - How do we demonstrate model quality?

Thanks

keith@cohen-porter.net

(626) 233-9758