



TTX#3 Probabilistic Asteroid Impact Risk Assessment

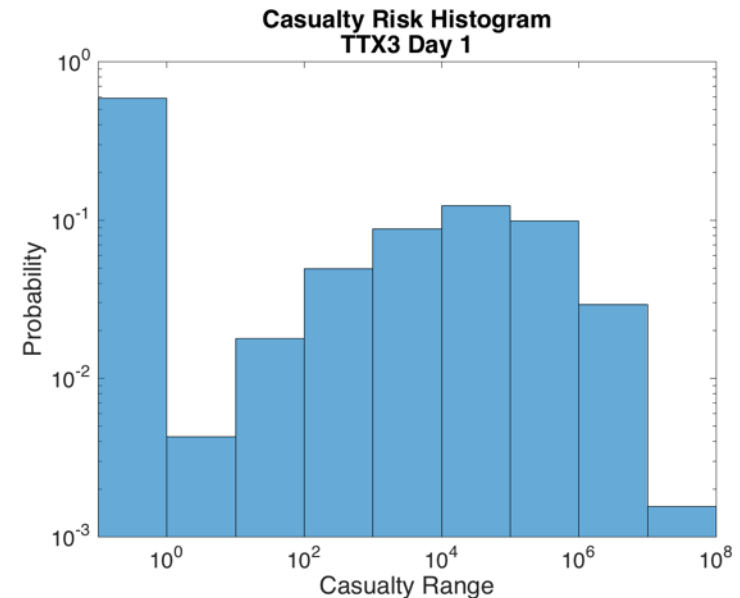
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TTX3, Pasadena, CA
October 24, 2016



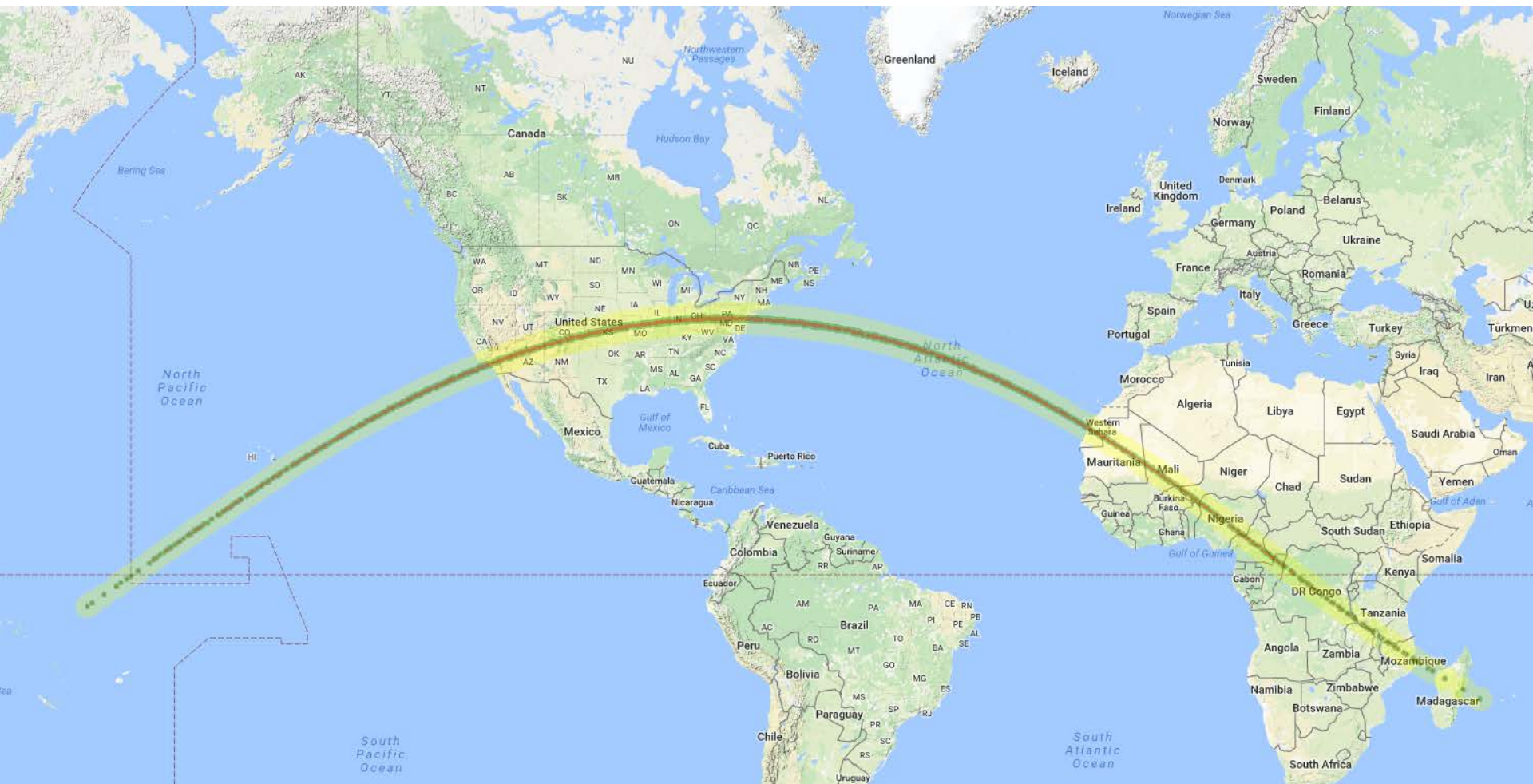
Inject 1 Risk Assessment

- Small percentage chance of Earth being hit.
- If impact does occur, based on the location and compositional uncertainty, the accompanying plot shows the range of possible casualty outcomes.
- Following chart shows swath of *possible* damage.
 - Yellow represents window breakage and minor structural damage potential.
 - Green represents significant structural damage.
 - Red represents potential for total devastation.
 - Only one impact could happen (not bulldozer path).



Histogram of possible casualty outcomes conditioned on impact occurrence.

Inject 1 Hazard Zones

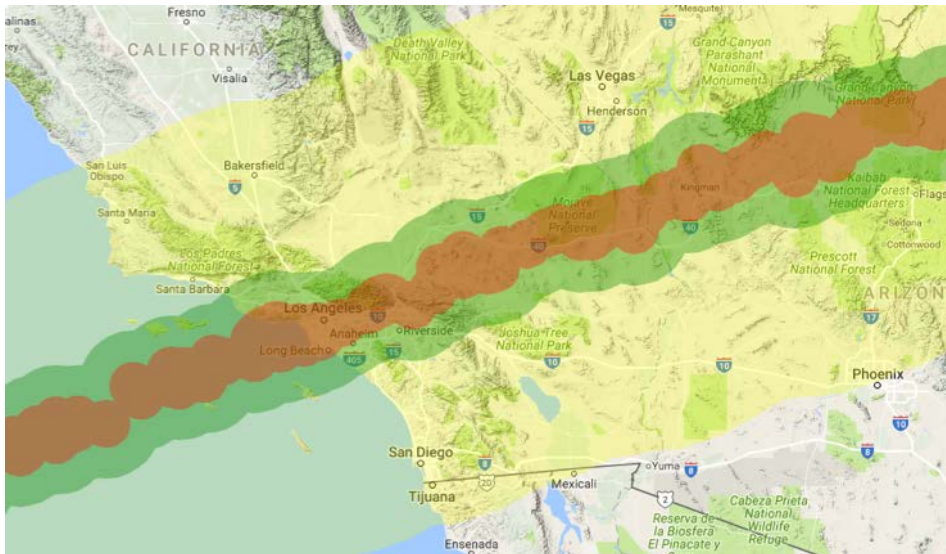


Window breakage, minor structural damage (1-4 psi)

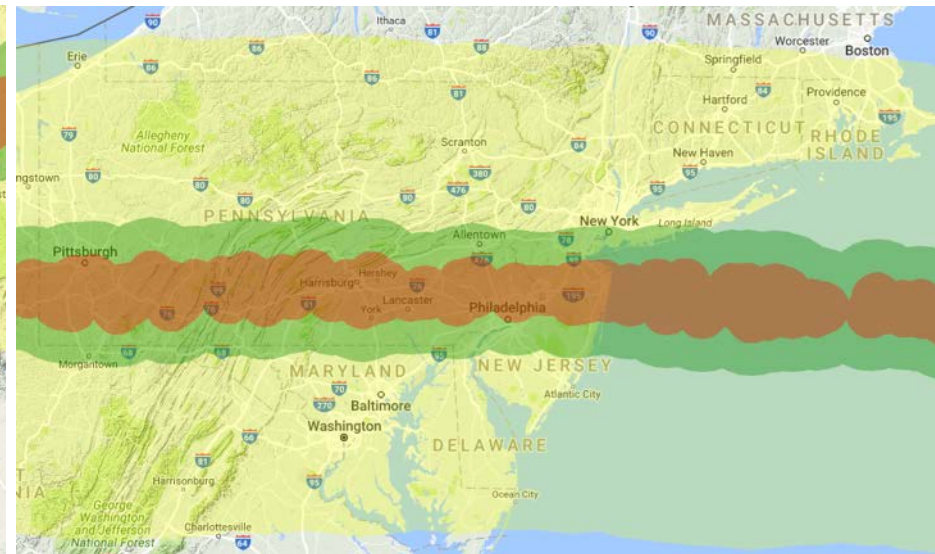
Moderate to severe structural damage (4-10 psi)

Complete devastation (10+ psi)

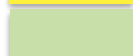
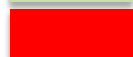
Inject 1 Worst Case Close-ups



Western CONUS hazard zones

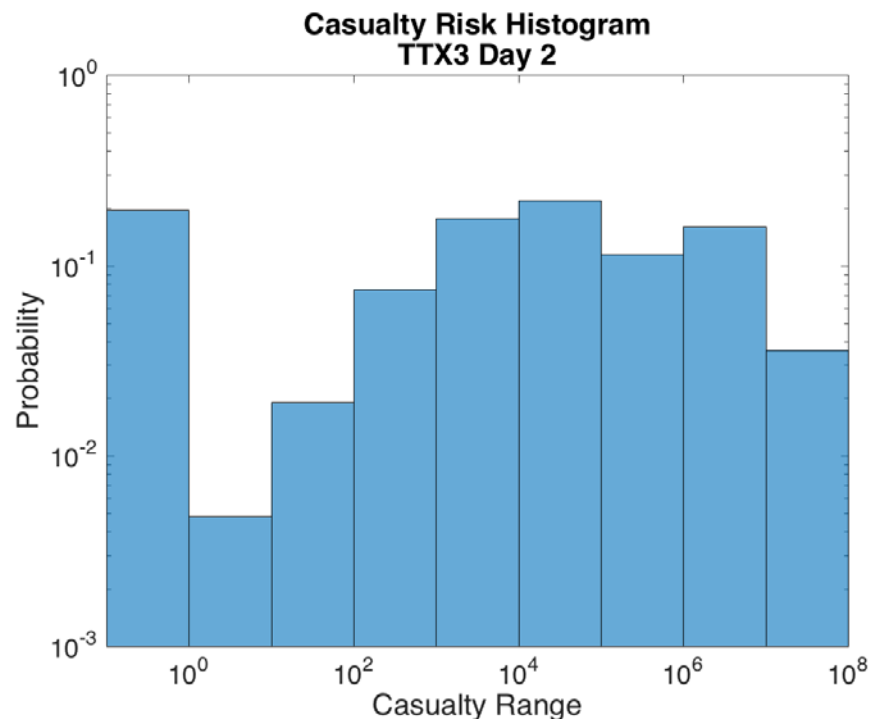


Eastern CONUS hazard zones

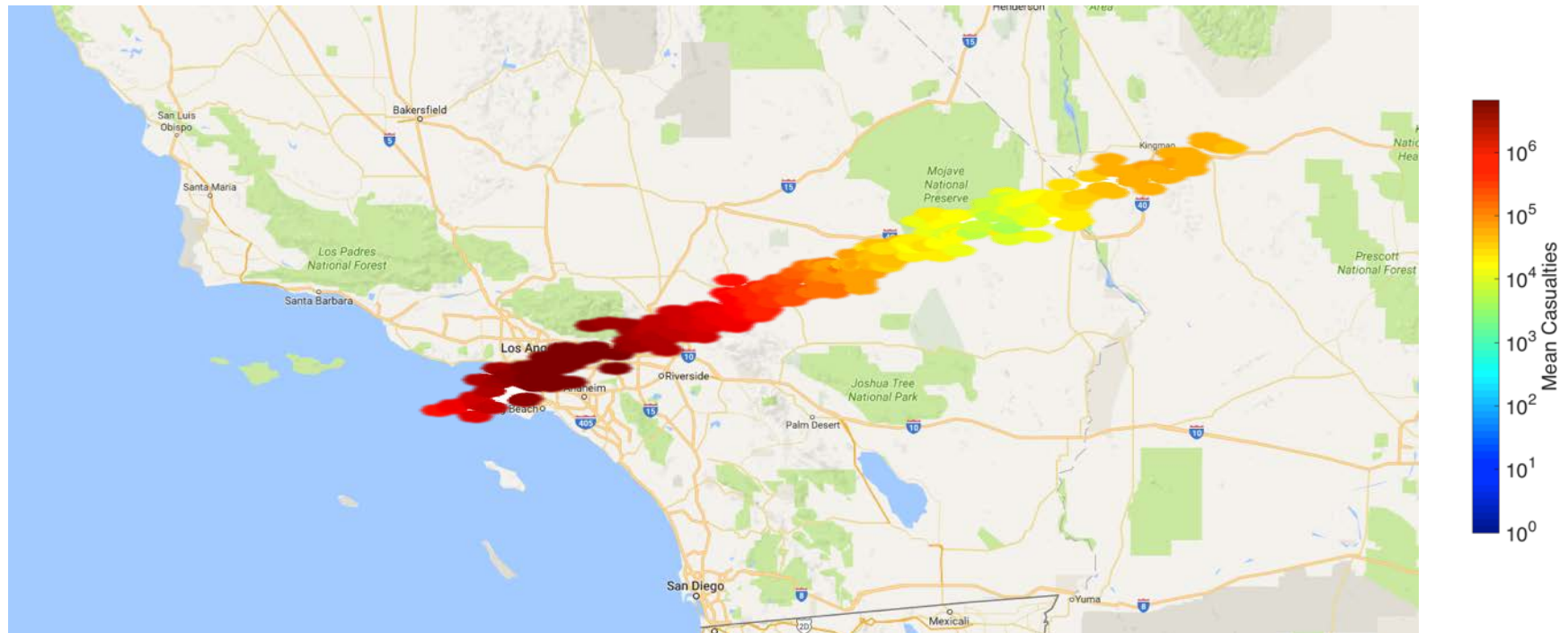
-  Window breakage, minor structural damage (1-4 psi)
-  Moderate to severe structural damage (4-10 psi)
-  Complete devastation (10+ psi)

Inject 2 Risk Assessment

- Earth strike is confirmed.
- Large uncertainty still exists for object size and composition.
- Consequence estimates:
 - 20% chance of no casualties
 - 75% chance of >1,000 casualties
 - 25% chance of > 1,000,000 casualties

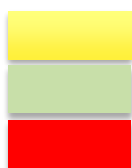
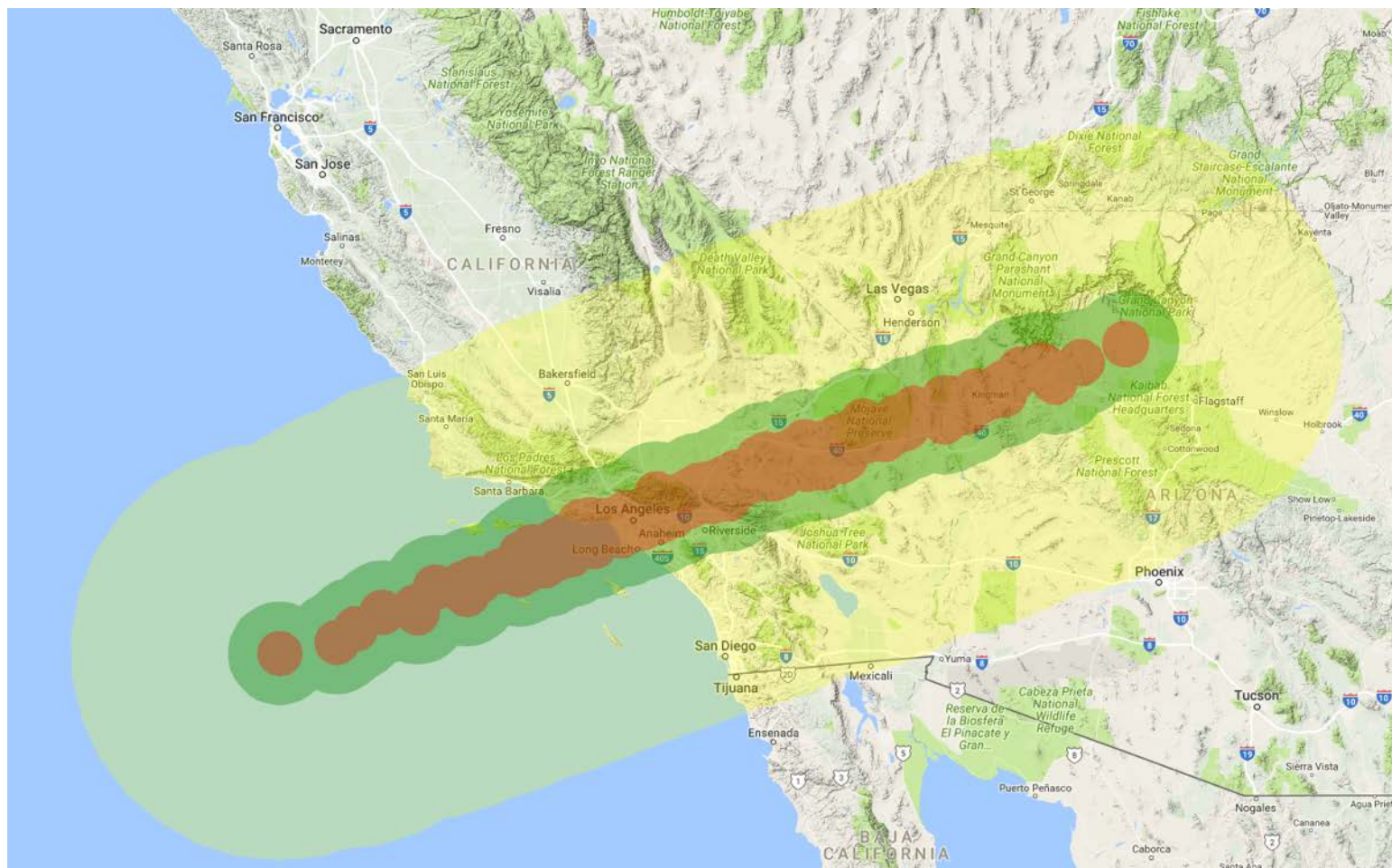


Inject 2 Expected Casualties



- Each circle represent the expected (average) casualties associated with impact at its location.
- Only one actual impact will occur.
- Ocean impacts include tsunami and airburst damage potential.

Inject 2 (Worst Case) Hazard Zones



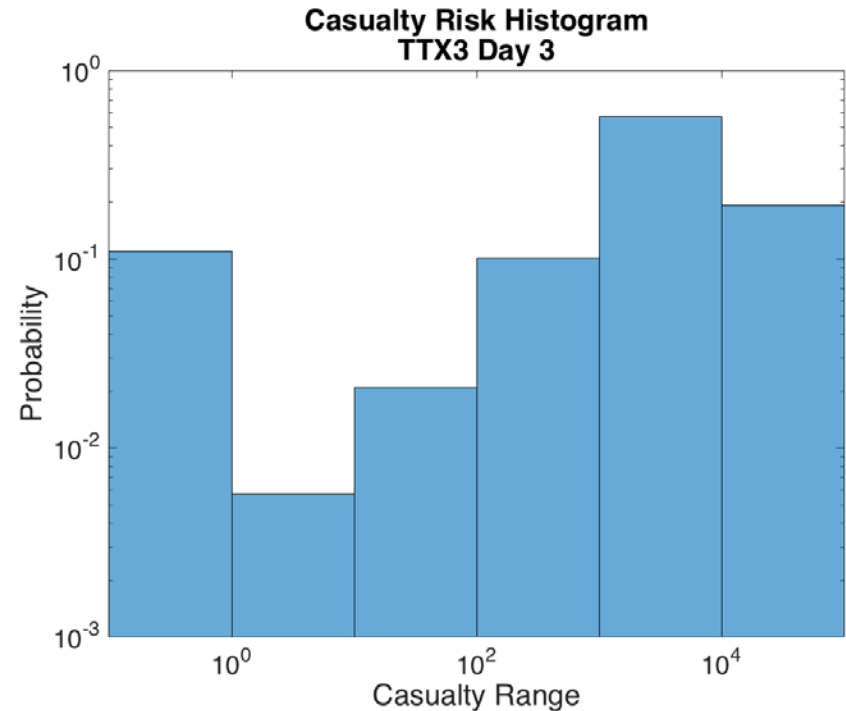
Window breakage, minor structural damage (1-4 psi)

Moderate to severe structural damage (4-10 psi)

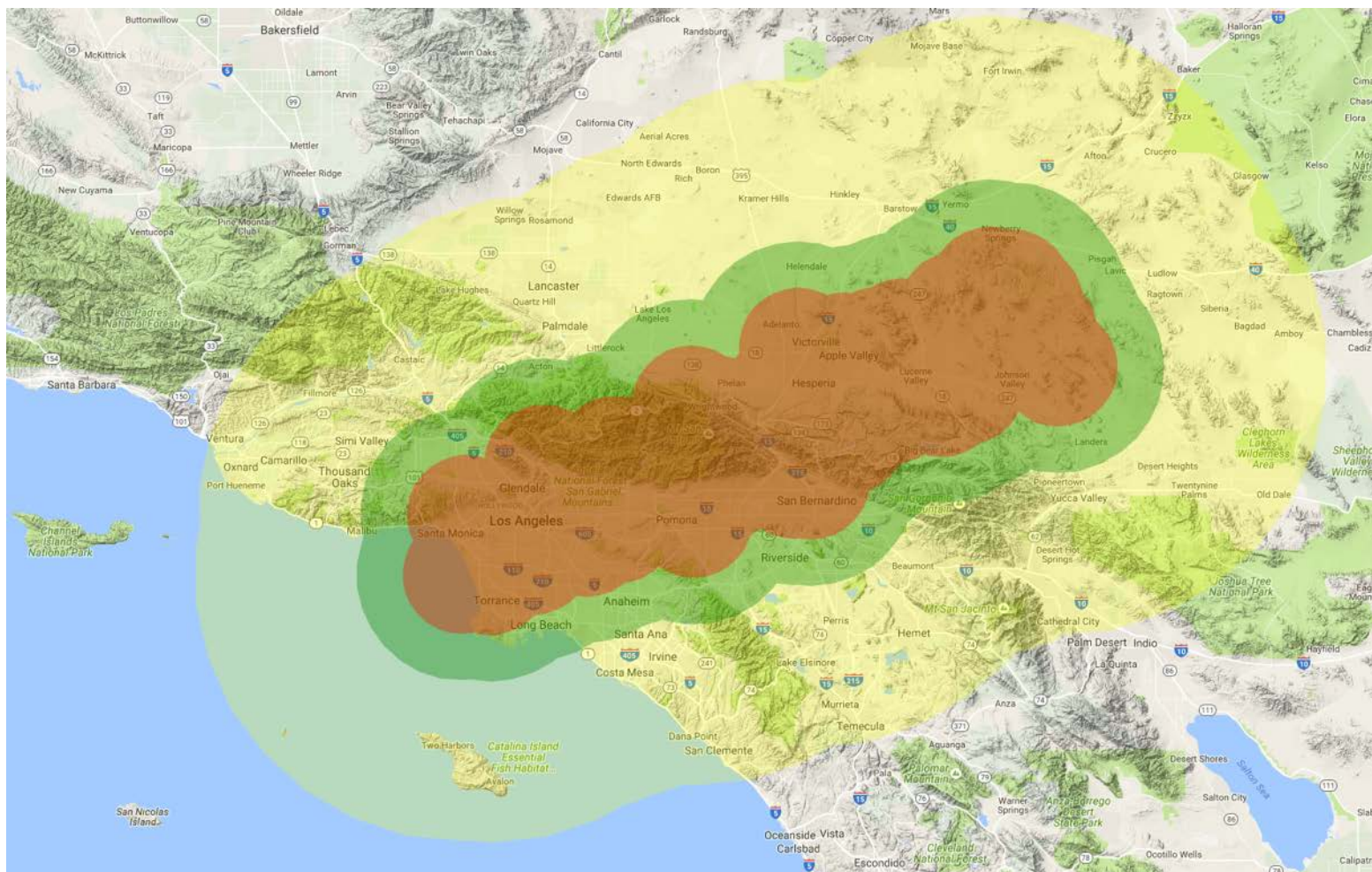
Complete devastation (10+ psi)

Inject 3 Risk Assessment

- Location of impact refined.
- Diameter confirmed 90-150m, 120m most probable.
- Stony composition.
- Consequence estimates:
 - 10% chance of no casualties
 - 75% chance of >1,000 casualties
 - 20% chance of > 10,000 casualties

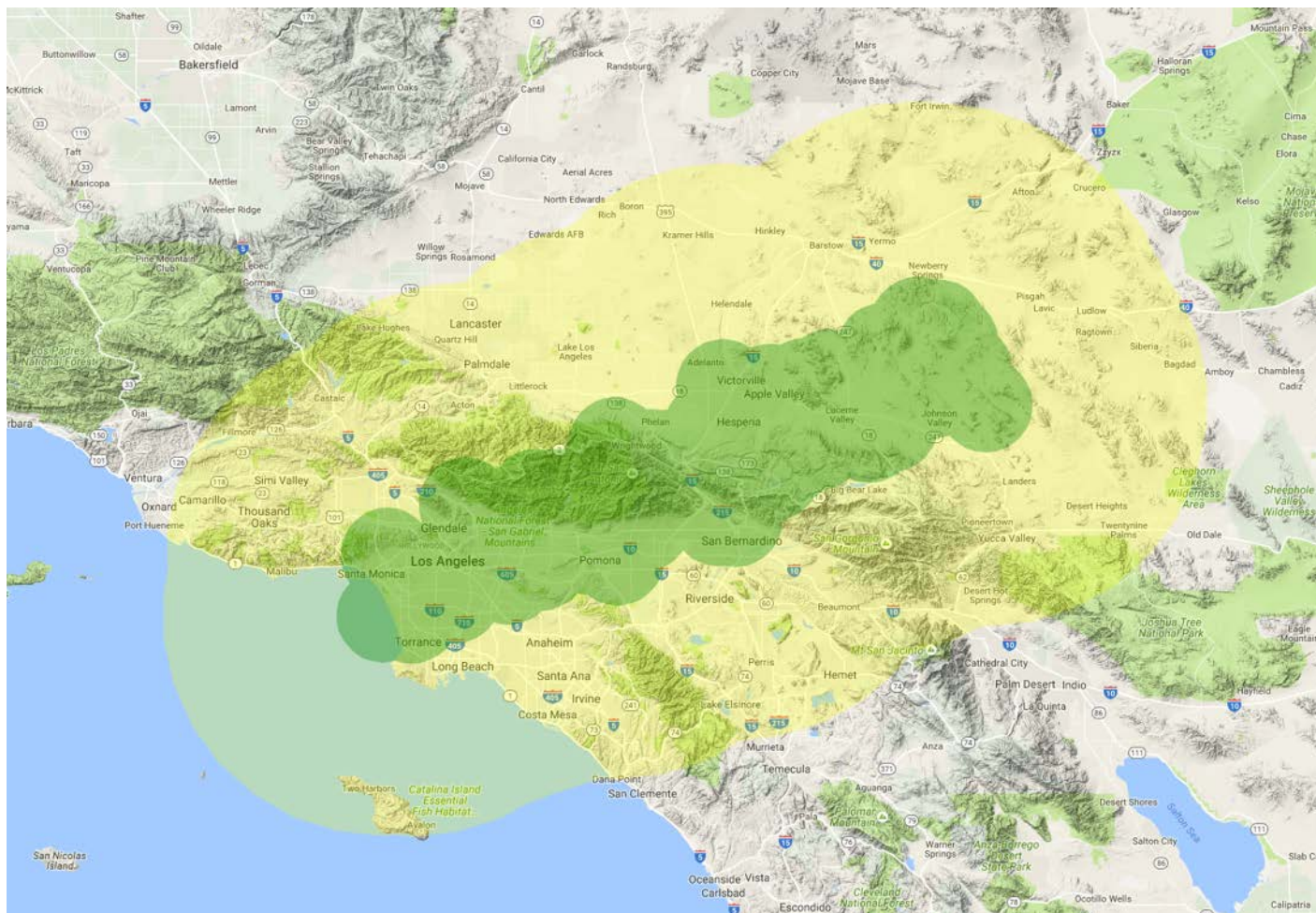


Inject 3 Worst Case Hazard Zones



- Window breakage, minor structural damage (1-4 psi)
- Moderate to severe structural damage (4-10 psi)
- Complete devastation (10+ psi)

Inject 3 Median Hazard Zones



Window breakage, minor structural damage (1-4 psi)
 Moderate to severe structural damage (4-10 psi)
 Complete devastation (10+ psi)—None present in median case.