

Needs/Issues for Site-Specific Geotechnical Applications of the NSHMP Maps and Tools

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Issues Addressed

- Accessing the NSHMP information
- Targeted-risk-free design maps
- Spectral shape
- Site Response Considerations

Accessing the NSHMP information

2008 Interactive Deaggregation

FAQ Documentation 1996 Update 2002 Update Feedback

Site Name

[Enter address instead](#)

Latitude Longitude

Exceedance Probability 2% in 50 years

Spectral Period 0.0 seconds (Peak Ground Acceleration)

V_{s30} (m/s) 760.0 [What values can I use at various locations?](#)

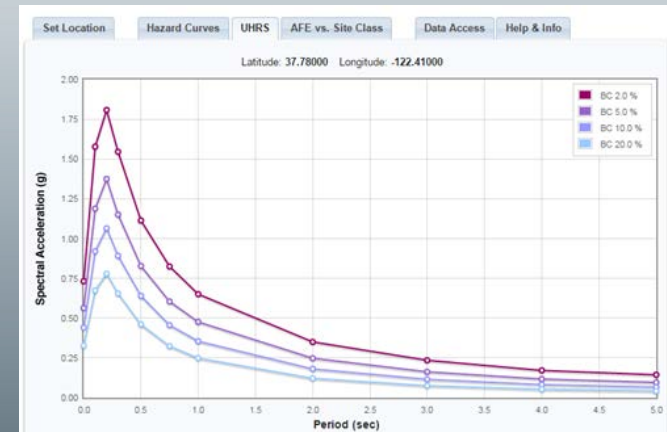
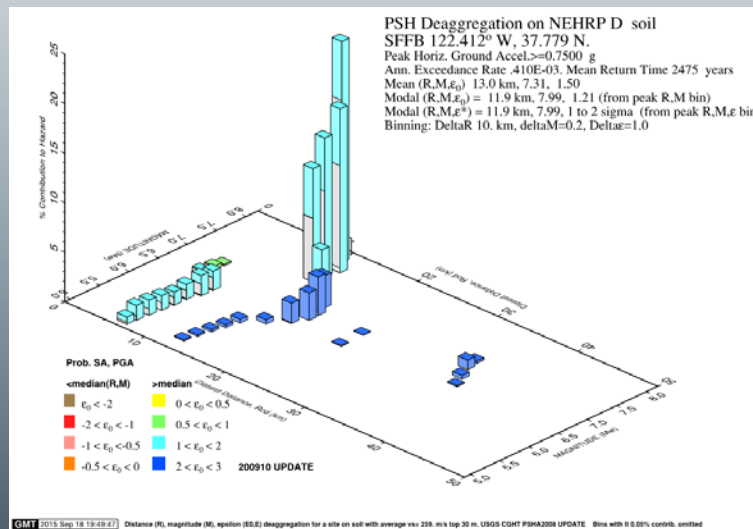
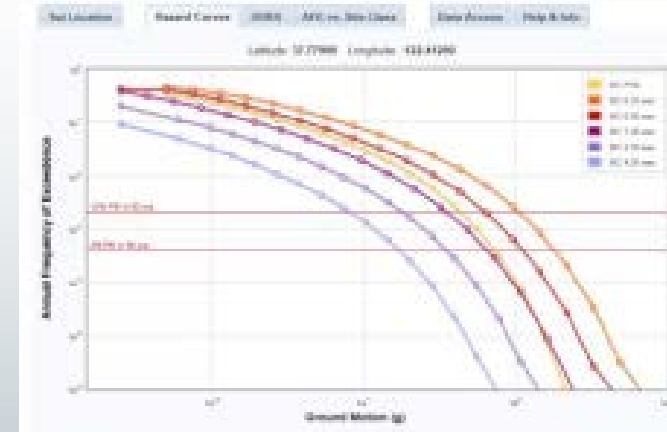
Run GMPE Deags? Yes No [What's this?](#)

Additional Output Geographic Deagg [What's this?](#) Conditional Mean Spectra None

[\(Show Map\)](#)

SHRRF

Hazard curve application



...accessing the NSHMP information

U.S. Seismic Design Maps

The screenshot shows the 'U.S. Seismic Design Maps' web application. On the left, there are tabs for 'Application', 'Batch Mode', and 'Help'. Below these is a 'Design Code Reference Document' section with a dropdown menu and a list of design codes, including 'Derived from USGS hazard data available in 2008' (2013 ASCE 41, 2012 IBC, 2010 ASCE 7, 2009 NEHRP) and 'Derived from USGS hazard data available in 2002' (2009 AASHTO, 2005/09 IBC, 2005 ASCE 7, 2003 NEHRP). A 'Site Longitude' input field and a 'Compute Values' button are also present. The main area is a map of North America with a search bar at the top. The map is powered by Leaflet and OpenStreetMap.

Risk Targeted Ground Motion Calculator

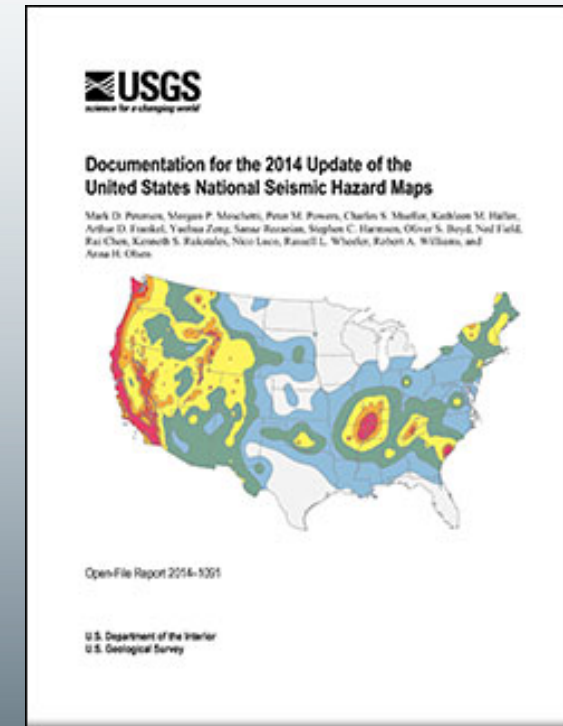
The screenshot shows the 'Risk Targeted Ground Motion Calculator' web application. The interface includes a sidebar with navigation options like 'Earthquakes', 'Hazard', 'Data', 'Learn', 'Monitoring', and 'Research'. The main content area has a title 'Risk Targeted Ground Motion Calculator' and a description. It features several input fields: 'Curve Title' (SFFB - BC @ 1s), 'Spectral Response Acceleration Values' (141, 216, 324, 432, 540, 648, 756, 864), 'Annual Frequency of Exceedance Values' (0.0136, 0.0141, 0.0145, 0.0147, 0.0149, 0.0151, 0.0152, 0.0153), and a 'Compute RTGM' button. Below the inputs is a 'Hazard Curve' plot showing 'Annual Frequency of Exceedance' on a logarithmic y-axis (10⁻⁴ to 10⁻¹) versus 'Spectral Response Acceleration (g)' on a logarithmic x-axis (0.156 to 10.182). The plot shows a downward-sloping curve with a vertical line at 1.000g. A legend indicates 'All Iterations'.

...accessing the NSHMP information

Interactive Quaternary Fault and Fold Database of the United States



UCERF3 - The Future



Targeted-risk-free design maps/tool

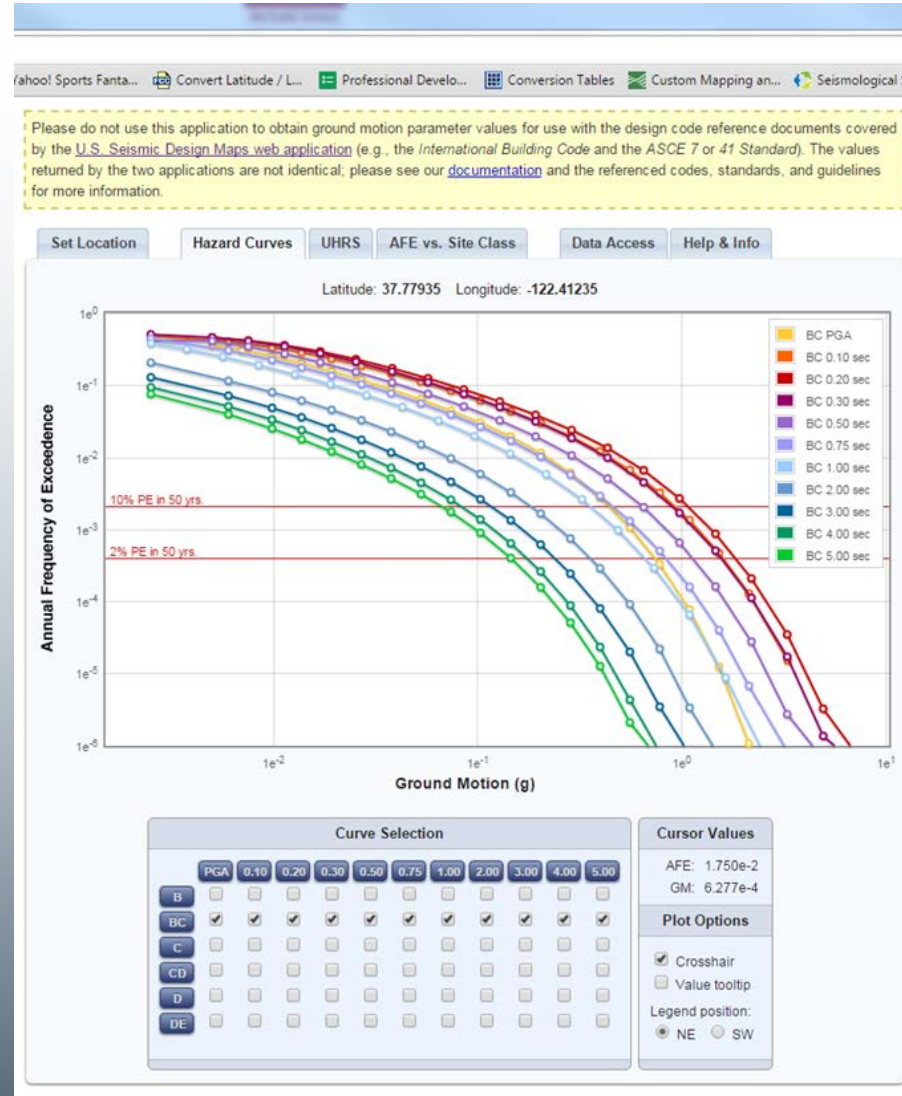
Reasons:

- Don't mix risk into hazard
- Numerous types of structures, other than generic buildings
- Different risk targets and fragility relationships may be appropriate
- Period-dependent risk coefficients
- Site Class-dependent risk coefficients
- Comparison of NSHMP results to site-specific hazard assessments

Suggestions

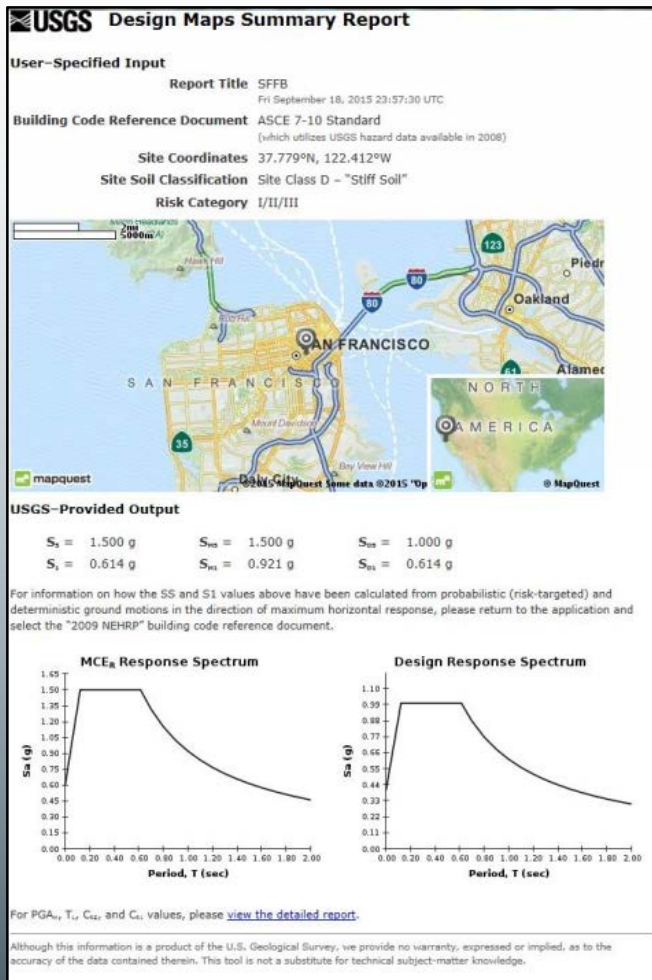
- Allow user to choose whether or not hazard results include the risk-targeted factors
- Separate, but parallel map tool

Targeted-risk-free design maps/tool

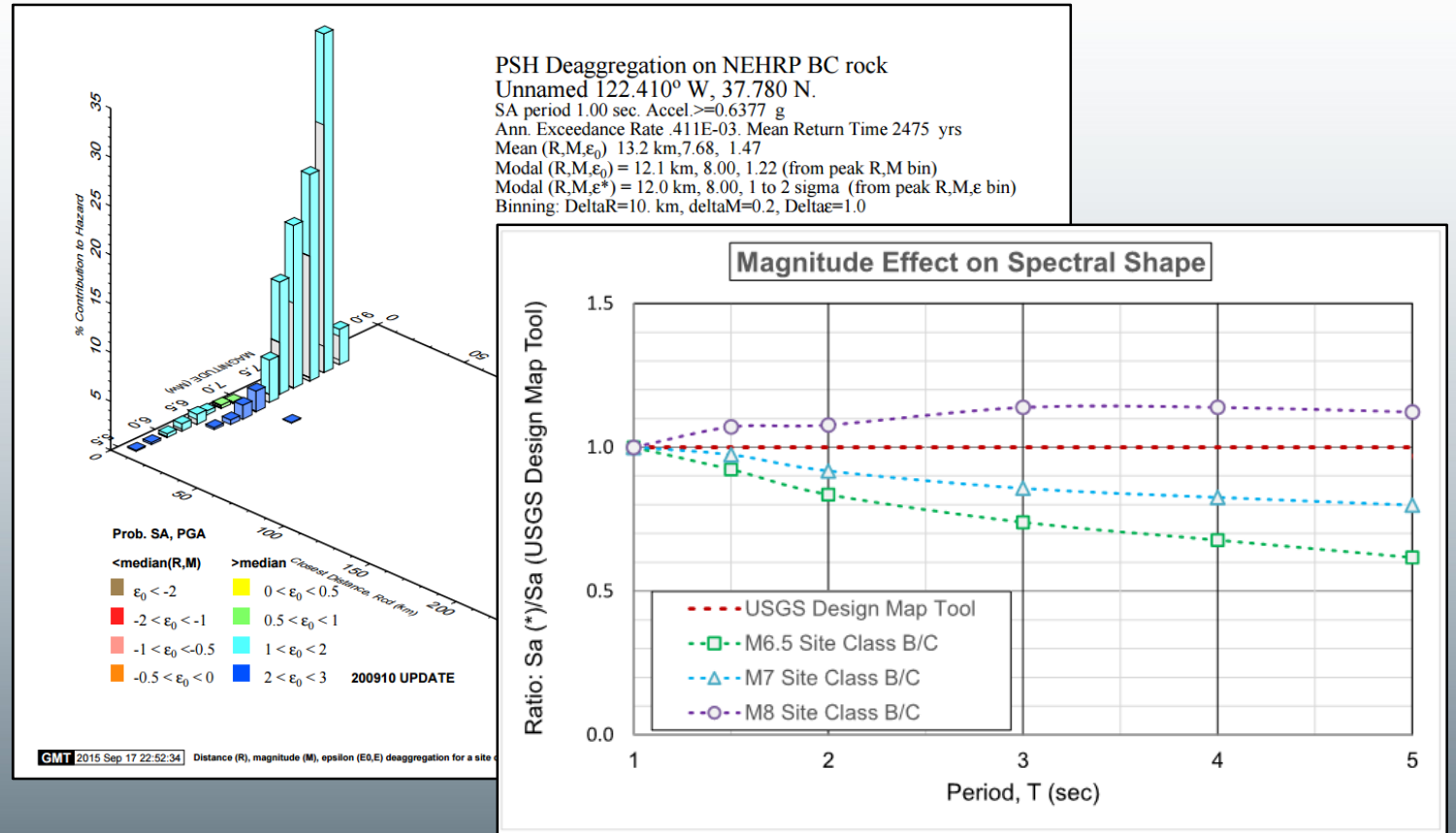


Spectral Shape

What many geotechnical engineers grab and report

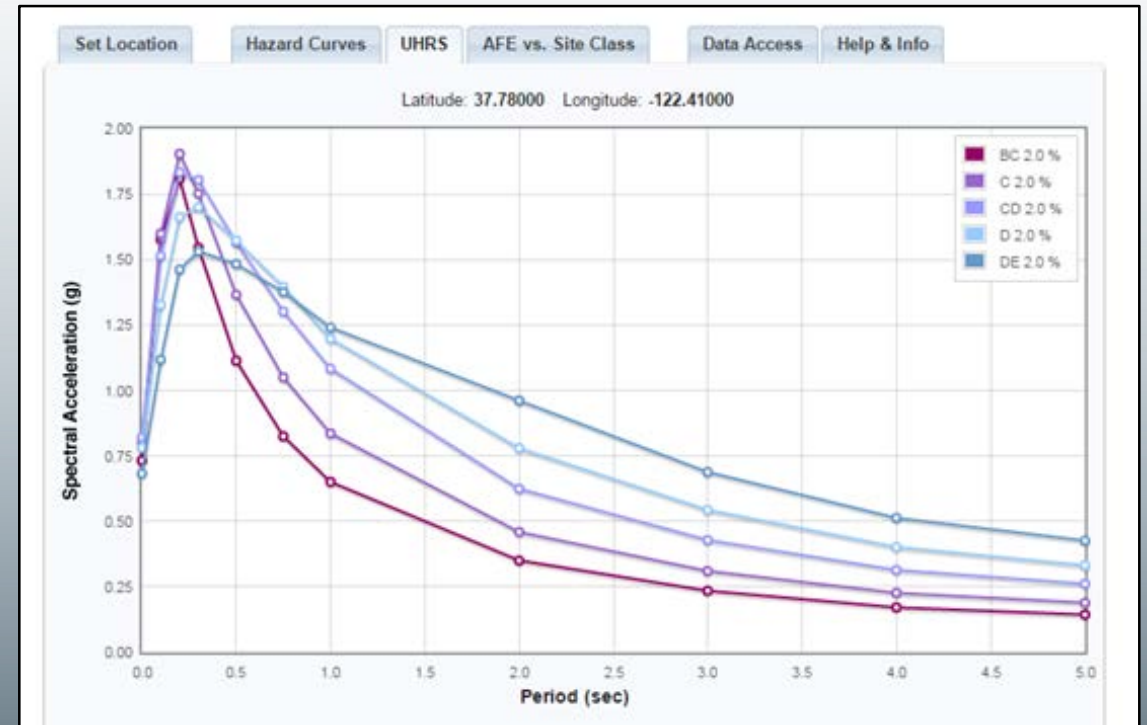
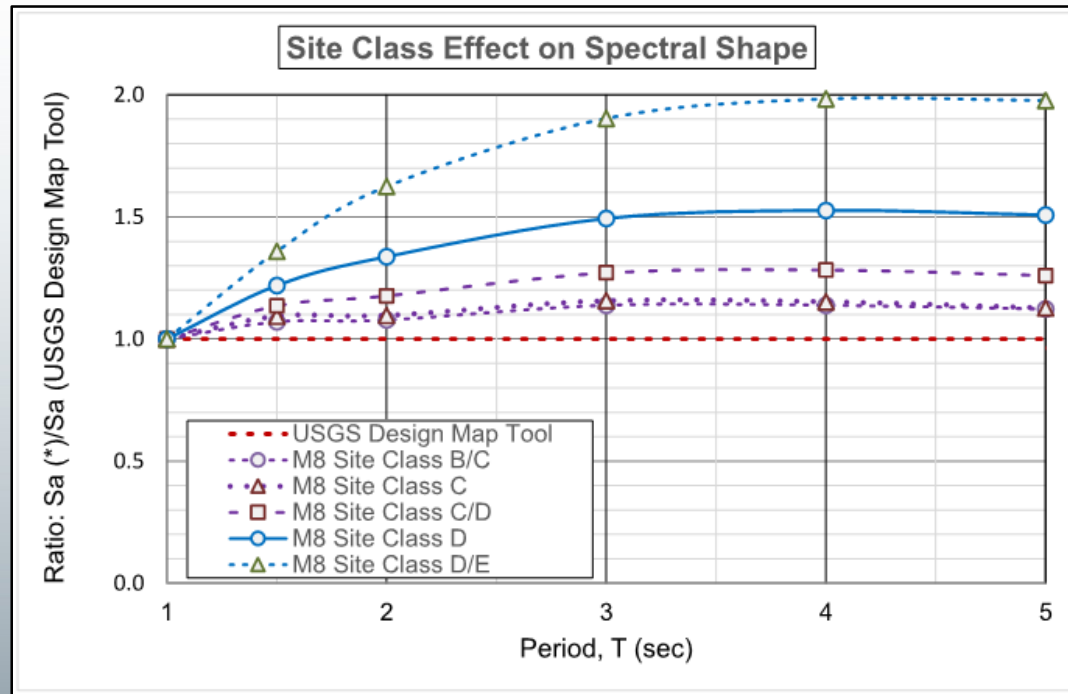


What he/she neglects to consider...

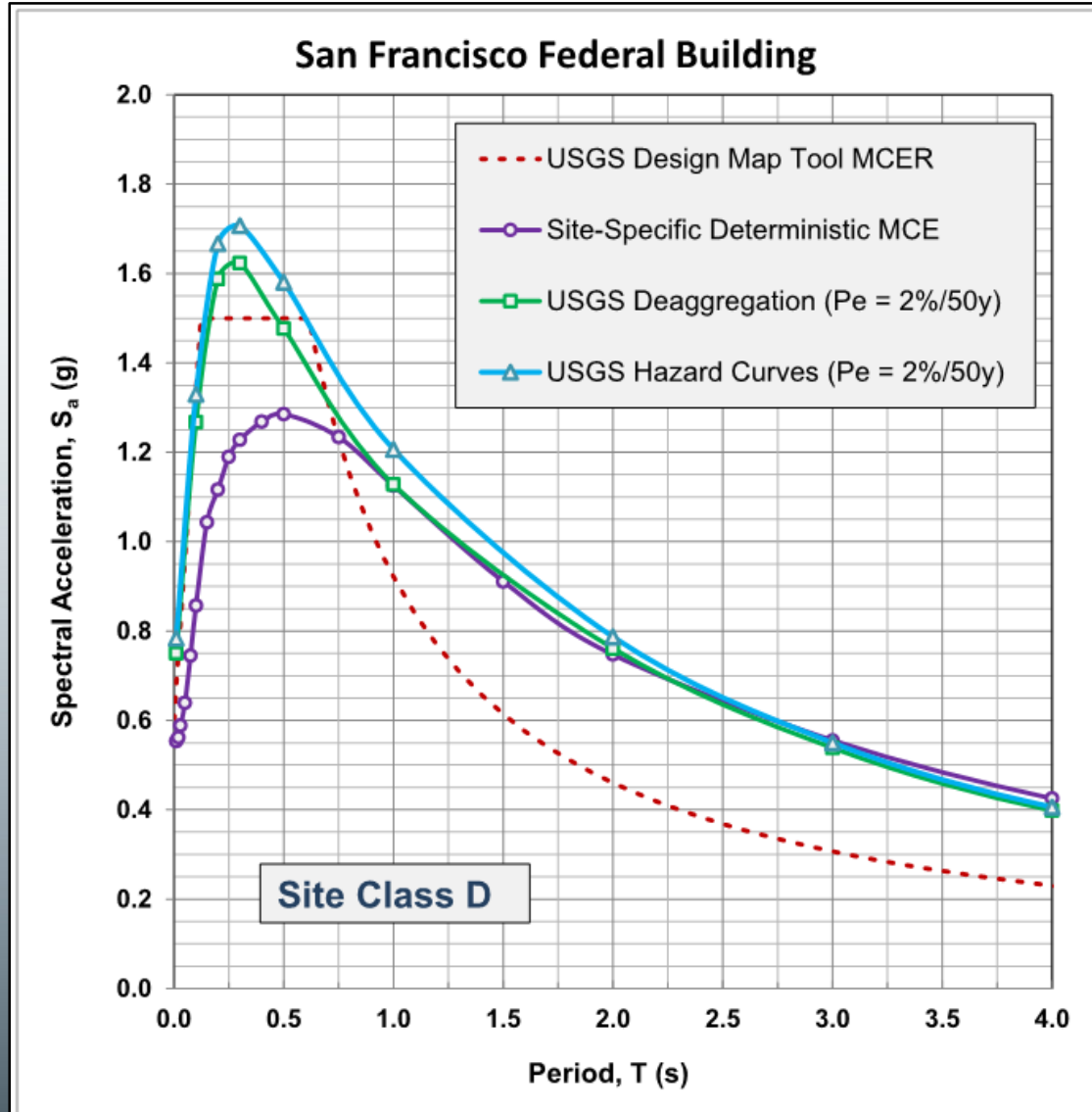


Spectral Shape

....and



Spectral Shape



Multi-period USGS UHRS & site-specific deterministic spectra

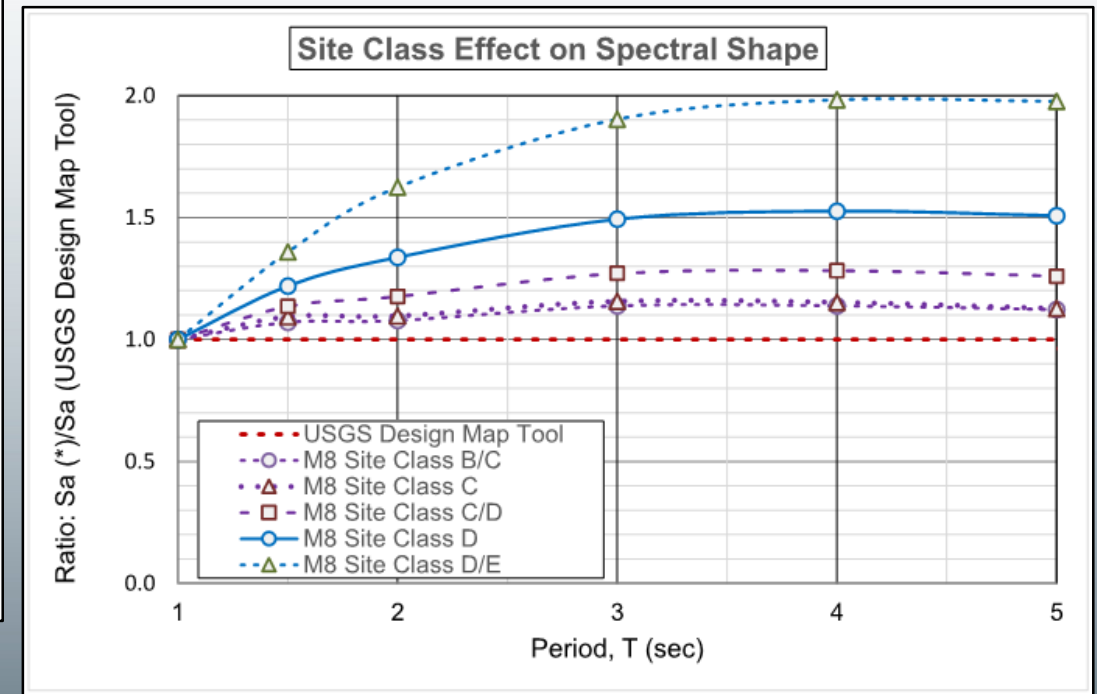
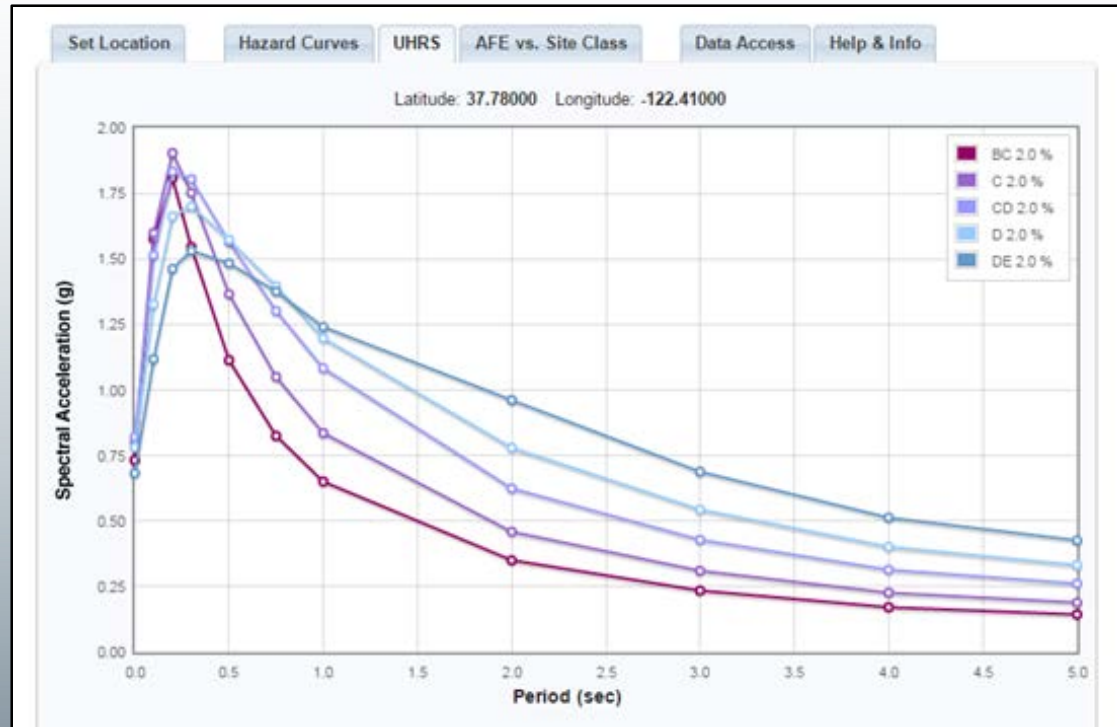
- Longer-period spectral ordinates for SFFB site are substantially higher than MCE_R spectrum from USGS Design Map Tool
- Results from effects of larger magnitude events dominating hazard and Site Class/ V_{S30}
- In EUS, converse magnitude effect may occur at many locations

Suggestion

- indicator in the U.S. Seismic Design Map tool could be triggered to alert a user that the hazard deaggregation and/or Site Class for the site indicate that such effects are a possibility and should be examined by the user

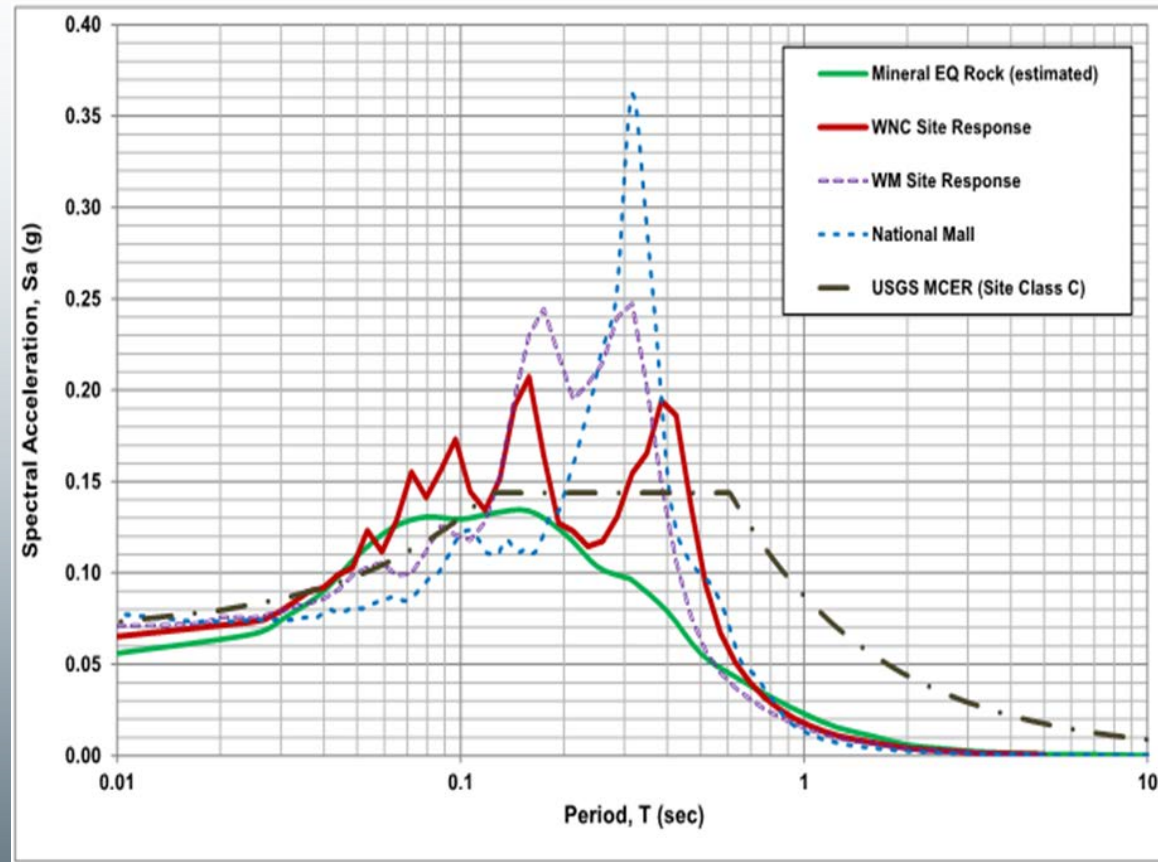
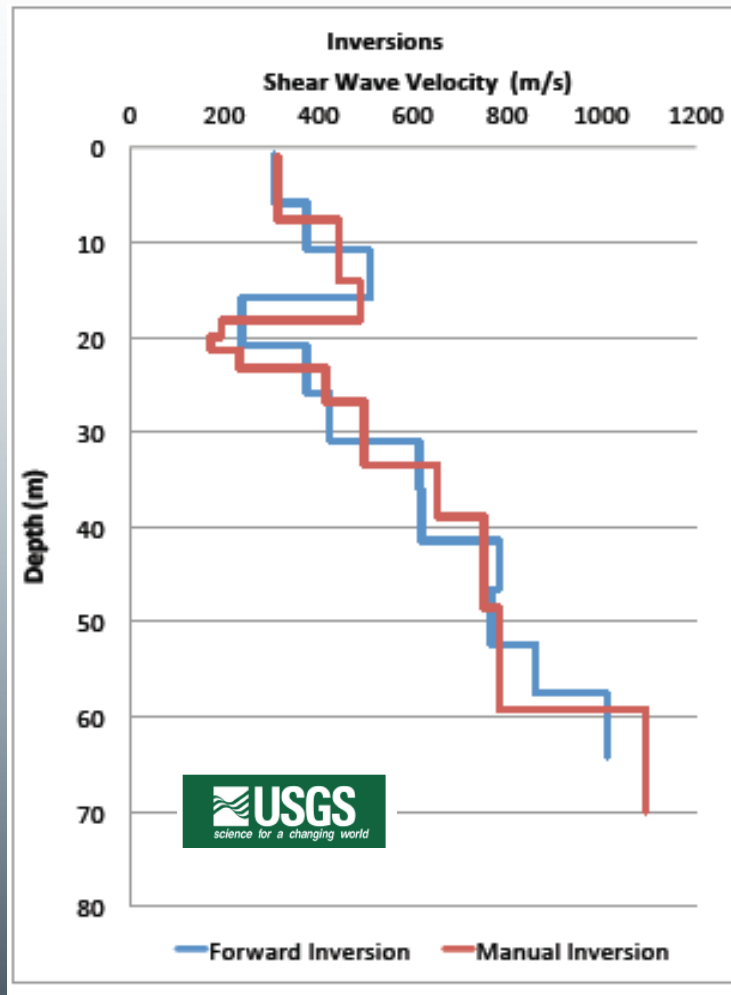
Site response considerations

Site Class F_a & F_v –vs- V_{S30} effects



Site response considerations

Non-standard V_s profiles – Washington, D.C., National Mall



Conclusions

- NSHMP provides valuable seismic hazard information
- Useful comparison for site-specific assessments
- USGS Design Map Tool is **easy to use**
-and **easy to misuse**
- Users need to look deeper than the surface
 - ✓ Targeted-risk
 - ✓ Spectral shape
 - ✓ Site Response Considerations