



ARKSTORM

SUMMIT



January 13-14, 2011 Sacramento, CA

ARKSTORM SUMMIT

Agenda

Thursday, January 13, 2011: Day 1

	7am	Registration/Coffee	
Plenary 1 (Ballroom 1)	8am 8:30am to 10:00am	Welcome Introducing the ARkStorm: What is an ARkStorm and how often does one happen? This plenary session will provide an overview of the science behind creating the USGS Multi-Hazard Project winter storm scenario. With a storm this big, the state may suffer permanent damage. This session will present experts delving into topics such as the levee and flood control systems, agricultural & economic impacts, and environmental impacts and how these issues differ in the ARkStorm versus storms we've known in the past.	Michael Shulters Lucy Jones Mike Dettinger Dan Hoover Chris Wills Keith Porter Anne Wein Laurie Johnson Art Center College of Design
Break	10:30am to 11:am	Break	
Workshop A-1 (Redwood Room)	11am to 12:30pm	ARkStorm and CA's Flood Control Infrastructure: This breakout session will examine the current state of our flood control system across the state with a focus on levees and dams. Representatives from FEMA, The US Army Corp of Engineers, and other experts will also lead a discussion on how it can be improved and what investments could be made in our infrastructure.	Kathleen Schaefer DWR Representative
Workshop A-2 (Ballroom 2)	11am to 12:30pm	The Economics of the ARkStorm: The ARkStorm could have an economic impact on the order of \$750 billion, including property damage and business interruption. Both the public and private sectors in California are impacted more by the ARkStorm than a large earthquake. This session will review in detail the economic impacts as well as explore economic resilience strategies during recovery, which can potentially reduce business interruption losses.	Keith Porter Anne Wein Laurie Johnson James Costner Selby Mohr
Workshop A-3 (Ballroom 3)	11am to 12:30pm	The ARkStorm and the Environment: The environmental impacts of a great storm in modern California are very different from those 150 years ago. This session will investigate the environmental impacts of the storm and resulting impacts in planning a response in modern California.	Geoff Plumlee Chris Higgins Art Center College of Design
Lunch (Ballroom 1)	12:30pm to 1:30pm	Luncheon Speaker	Marcia McNutt, Director of the US Geological Survey




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Day 1 (continued)

Workshop B-1 (Redwood Room)	1:45pm to 3:45pm	ARkStorm Evacuations: With intense wind & rainfall and the resulting impacts from the ARkStorm, large-scale evacuations on the order of a million people may be required. This session will examine what plans are in place and how the state will work with local agencies to achieve this massive effort.	Jim Brown Anne Wein Ron Baldwin Lt. Timothy Yuhas
Workshop B-2 (Ballroom 2)	1:45pm to 3:45pm	Developing a Scaling System for West Coast Storms: The ARkStorm has winds that rival hurricanes and intensive periods of rainfall, yet we have no formal system to talk about the scale of a storm like we do for Hurricanes & Tropical Storms. Work has been done to draft a scaling system for storms, and this session will present the latest work being done and offer an opportunity for attendees to help fill in the blanks to create a tool useful in educating the public and state leaders in increasing resiliency.	Dale Cox Dave Reynolds Mike Dettinger Mark Jackson Mark Bassett
Workshop B-3 (Ballroom 3)	1:45pm to 3:45pm	The Critical Role of Lifelines in the ARkStorm: This session will examine the current status of our water pipeline and conveyance system and facilitate discussion on what can be done with all the water from a large storm. Issues of lifeline enhancement and resiliency will be addressed related to water systems, but can be applied to other lifelines like electric systems, roads, gas lines, sanitation systems, etc.	George Del Toro Gary Sturdivan Art Center College of Design
Break	3:45 to 4:15pm	Break	
Plenary 2 (Ballroom 1)	4:15pm to 5pm	Lessons from Katrina: What a Major Flood Can do to Your Community In this plenary session, noted disaster sociologist Dennis Mileti will illustrate the societal impacts of Katrina in the greater New Orleans area, which will in turn inventory the types of impacts that could occur in California after the ARKStorm. With extensive experience as a member of the American Society of Civil Engineer's Expert Panel overseeing the Army Corps of Engineer's assessment of the New Orleans levee failures and consequences, Dr. Mileti's insights will provide a sobering look at what happen in New Orleans and how that experience can enlighten us here in California.	Dennis Mileti



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Friday, January 14, 2011: Day 2

	7:30am	Registration/Coffee	
Plenary 3 (Ballroom 1)	8:30am 9am to 10am	Welcome ARKStorm: Now What? This plenary session will take into account the conversations from the first day of the summit and delve into issues related to what this means going forward for FEMA, CalEMA, and the USGS.	Michael Shulters Lucy Jones Michael Shulters Nancy Ward Mike Dayton
	10am	Break	
Workshop C-1 (Redwood Room)	10:30am to 12:30pm	Flood Inundation Mapping This session will examine efforts underway to provide inundation mapping tools to emergency managers and first responders. This tool will help address issues of preservation of life and property based on impacts currently underway during and after the event.	Dale Cox Justin Ferris Marie Pepler
Workshop C-2 (Ballroom 2)	10:30am to 12:30pm	For the Locals: How to Plan for an Event This Big This session will focus on how a local leader can prepare for an event like the ARKStorm. What resources are available and how can counties, cities, and local jurisdictions be a part of the planning for such an event? Resources will be presented focused on local government and local leaders.	Jeff Lusk Jim Brown Mark Johnson Art Center College of Design
Workshop C-3 (Ballroom 3)	10:30am to 12:30pm	How to Finance Enhanced Flood Control Existing flood protection systems are designed to protect major urban areas from flooding that has recurrence periods of anywhere between 75 years and in some places up to 200 years, but they are not intended to prevent all foreseeable flooding. Enhancing urban sections of the state's flood protection system to 500-year levels could realistically cost \$10s of billions. Not doing so could realistically cost \$100s of billions. This session will examine the way such an investment might be made here in California.	Keith Porter Kathleen Schaefer Ken Worman Jose Hermocillo
Lunch (Ballroom 1)	12:30pm to 1:30pm	Lunch	
Plenary 4 (Ballroom 1)	2pm to 3pm	Communicating the ARKStorm: How to use the Scenario This plenary workshop will offer useful ways to use the scenario report and the information therein to increase the resiliency of the communities of California. Experts will present practical applications of the science and resources created to support the efforts of the Summit attendees when they return to their workplaces, service areas, and businesses.	Lucy Jones Jeffrey Dell Steve Sellers Art Center College of Design
Break	3pm	Break	



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Day 2 (continued)

Discussion Session 1 (Redwood Room)	3:30pm to 4:30pm	FEMA Flood Maps As FEMA works to make even more usable flood maps, this session will present the latest mapping efforts and solicit input as the agency moves forward to create usable maps.	Kathleen Schaefer
Discussion Session 2 (Ballroom 2)	3:30pm to 4:30pm	Agricultural Impacts of ARkStorm This discussion session will examine the impacts to agriculture as presented in the ARkStorm and discuss some next steps needed to work with the agriculture community in California.	Anne Wein
Discussion Session 3 (Ballroom 3)	3:30pm to 4:30pm	ARkStorm Policy Roundtable This discussion session will review the policy recommendations from the ARkStorm Scenario report, as well as those emerging from the Summit's 2-days worth of discussions. Leaders of the policy section of this report will offer some insights, and then facilitate a discussion with the attendees.	Ken Topping Laurie Johnson Charles Eadie Ken Worman

NOTES:



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ARKStorm Summit Speakers

Ronald E. Baldwin, San Joaquin County Ron has held the position of Director of Emergency Operations for San Joaquin County since 1982. During his tenure, Ron has directed response to major floods in 1982-83, 1986, 1995, 1997, 1998, 2004, and 2006. He has been involved for many years in efforts to develop better flood contingency and evacuation plans through the use of GIS mapping technology. He has also dealt with a wide range of Homeland Security, medical disaster, and earthquake preparedness planning activities during his career. He is the author of the *Guide to Flood Contingency Mapping* and *Guide to Urban Evacuation Mapping* prepared under a grant from the Federal Emergency Management Agency (FEMA). Ron is a fourth-generation native of the Central Valley and grew up on his family farm near Modesto. He holds a BA in Political Science from the University of California, Santa Barbara and a Masters of Public Administration from California State University, Stanislaus. He lives in Ripon with his wife and two sons.

Jim Brown, Cal EMA Jim Brown has over twelve years experience in Emergency Management, currently serving as Regional Administrator for Cal EMA's Inland Region. Prior to this appointment Jim served as the Acting Inland Region Administrator. Previously he was a Program Manager in the region after spending two years as an Emergency Management Coordinator / Instructor in the Training Branch. Some of Jim's past accomplishments include serving as the Emergency Manager with the California Conservation Corps and being assigned as the Incident Commander during the deployment of 140 young Californians to Louisiana to assist with debris removal after Hurricanes Katrina and Rita. Jim was appointed by Governor Schwarzenegger to be the Statewide Community Emergency Response Team Program Officer for the Governor's Office on Service and Volunteerism. As an Inland Region Emergency Services Coordinator, Jim was specially chosen to deploy to the New York State Operations Center to establish Donations Management operations during the response.

James H. Costner, Willis Risk Solutions North America Mr. Costner is a graduate of Arkansas State University and the Graduate School of Sales Management and Marketing at Syracuse University. He holds the CPCU and ARM designations. He has taught Risk Management at the American University in Washington, D.C., Insurance Law, Property Insurance, and Property Insurance Underwriting at Nashville Tech in Tennessee. He speaks frequently at seminars on property insurance and risk management.

Dale A. Cox, USGS Dale A. Cox is the Chief of Staff for the USGS Pacific Southwest and Region IX Lead of the Department of Interior, Regional Emergency Coordination Council. He was formerly the Project Manager USGS Multi-Hazards Demonstration Project (MHDP) where he led ARKStorm, the disaster scenario that explored modern impacts to a storm analogous to those that impacted California in 1861/62. Cox coordinated the work of over 300 scientists and experts in 2008 to create the ShakeOut Earthquake Scenario, the most comprehensive earthquake scenario ever created. He is one of the creators of the "The Great ShakeOut" and winner of the 2009 Shoemaker Award for Communications Excellence. Mostly recently, Cox coordinated the 2010 Tsunami Summit in an effort to improve community resiliency in the Pacific. Cox also coordinated the USGS 2007 Firestorm Response that included ash chemical analysis, endangered species assessment and recovery, and a real-time debris flow warning system completed in time for the first rains.

George Del Toro, MWD George Del Toro as worked for Metropolitan Water District (MWD) for 37 years with a diverse background in maintenance and operations and has worked in a leadership capacity for the past twenty four years which involves maintenance and repair to conveyance and distribution delivery network, pipeline integrity inspections, emergency repair, and emergency response patrols. He currently manages the Operation Control Center at Eagle Rock accountable for water and power delivery system. He also oversees MWD emergency response program responsible for EOC/ICC training, coordination of emergency distribution and facility inspections, training of personnel in Incident Command Systems (ICS), advance emergency exercises, and synchronize communication system in an activation. George currently serves as a Board Member of the California Utility Emergency Association (CUEA).



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Jeffrey Dell, Bank of America While in school, Jeffrey Dell was employed at NASA – Ames Research Center in both the Engineering and Security fields. He began in Facilities Engineering, concurrently developing and managing NASA security programs for the visiting Military, Boeing, Lockheed, General Dynamics, Northrop, and various NASA Divisions. He moved to NASA Science and Applications Aircraft Division, Medium Altitude Missions Branch to provide various engineering services to Flight Operations with continuing support to security programs. To carry forward a family tradition, he joined the San Jose Police Department where he worked for 8 years and earned 35 letters of commendation as well as the Medal of Valor. He resigned from the Police Department to start up and manage a safety and security business with family and friends. After growing it to 148 employees and approximately 4.5 million dollars, he sold the business. His transition back into the corporate world began as Regional Director, Safety and Security for Interstate Hotels and Resorts and presently, Bank of America. Jeff has been with the Bank for 9 years. His responsibilities have included corporate security, coordination to manage the bank through planning, response and recovery from any threat that may impact life, operations, production and customers – both domestically and globally. He is currently Senior Vice President with the Crisis Management, Strategic Planning and Industry Engagement Team.

Mike Dayton, Cal EMA Mike Dayton is the Acting Secretary of the California Emergency Management Agency (Cal EMA) in the Administration of Governor Jerry Brown. Acting Secretary Dayton is only the second person to lead Cal EMA, which was formed in 2009 after the merger of the Governor's Office of Emergency Services (OES) and Homeland Security (OHS), where he worked since its inception in 2003. After the formation of Cal EMA, Mike served as the agency's first Chief of Staff and Deputy Secretary until his promotion to Undersecretary, before being named Acting Secretary. As Acting Secretary of Cal EMA, Mike is stalwart in his efforts to continue to strengthen California's abilities to prepare for, prevent, deter, respond to and recover from any disaster, man-made or natural. His mission of empowering Cal EMA employees to perform their roles to the utmost in the mission of helping and protecting the public is paramount in the daily activities of the agency. His expertise in leveraging existing resources to facilitate efficiency and effectiveness are vital to the effort he leads. While not only offering a wide-ranging, innovative vision of the mission and purpose of Cal EMA, Mike also enables the team of professionals at the agency to oversee the day-to-day management and operations. He is responsible for the overall strategic initiatives and provides guidance on the investment of federal and state funds to enhance homeland security and emergency preparedness capabilities in California. In previous roles he coordinated the agency's collaboration with the California Legislature and Congressional delegation and managed the communications, audits, civil rights, legal, legislative affairs and policy divisions at Cal EMA. Prior to joining the office of Homeland Security and Cal EMA, Mike was a Congressional staffer in Washington D.C. for 13 years. Mike graduated from California State University, Sacramento and received a B.A. degree in Government.

Michael Dettinger, USGS Dr. Michael Dettinger is a research hydrologist for the U.S. Geological Survey, National Research Program, and a research associate of the Climate, Atmospheric Sciences and Physical Oceanography Division at Scripps Institution of Oceanography, La Jolla, California. Dettinger has monitored and researched the hydrology, climate, and water resources of the West for almost 30 years, focusing on regional surface water and groundwater resources, watershed modeling, causes of hydroclimatic variability, and climate-change influences on western water resources. He has authored over 80 scientific articles in scholarly journals and books, 20 government reports, and another 70 articles in outreach and less formal outlets. Among other activities, he was the physical-sciences team leader for DOI-DOD ecosystem planning in the Mojave Desert, founding member of the multi-institutional CIRMONT Western Mountain Climate Sciences Consortium, climate advisor to the CALFED Bay-Delta Restoration Program and co-editor of the CALFED 2008 State of Bay-Delta Science report, member of the external Science Steering Group for the federal Global Water Cycle Program, research advisor for USGS Surface-Water Discipline, and a member of the USGS Global Change Science Strategic Planning Team. He has degrees from the University of California San Diego, Massachusetts Institute of Technology, and a Ph.D. from the University of California, Los Angeles (Atmospheric Sciences).

Justin Ferris, USGS Justin Ferris currently serves as the Project Chief for a prototype regional flood frequency study, the Co-Coordinator for the USGS Multi-Hazard Demonstration Project's Flood Hazard Working Group, and the Acting Surface-Water Specialist at the USGS California Water Science Center. Justin's areas of scientific expertise include surface-water hydrology, paleoflood hydrology, fluvial geomorphology, oceanography, and Martian hydroscience. His research primarily concerns catastrophic flood hazard; examples include the enormous paleofloods of Mars, post-wildfire flood hazard in the Rocky Mountains, rainfall-runoff flood relationships in high-gradient watersheds, the



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role of deterministic chaos in flood frequency and magnitude, tsunami hydrodynamics and coastal hazards, and the regional flood magnitudes and frequencies in the State of California.

Jose Hermocillo, APCO Worldwide Jose Hermocillo, senior vice president and managing director of APCO Worldwide's Sacramento office, is one of California's leading specialists on public policy communications. After having been a principal in a political and public affairs consulting firm, Mr. Hermocillo helped establish APCO's Sacramento office in 1996. He also served as a lobbyist for a major public employee union, a policy committee consultant in the California State Senate and a practicing attorney. Mr. Hermocillo is a senior fellow of the Mountain Valley Chapter of the American Leadership Forum and also serves as a director of Sierra Health Foundation and Portland-based Umpqua Bank. In 2008, Mr. Hermocillo was named one of Sacramento Magazine's "100 Most Powerful and Influential" people. That previous year he was recognized as "Public Affairs Executive of the Year" by *PR News*, the industry's leading national publication. Mr. Hermocillo earned his Bachelor of Arts from Pomona College, where he was recognized with distinction in the government department. He went on to obtain a Juris Doctor from the University of the Pacific's McGeorge School of Law, where he was named one of two outstanding student advocates of his class in moot court competition. He was admitted to the State Bar of California and received a certificate in trial and appellate advocacy from Hastings College of Law, University of California.

Chris Higgins, CGS Since graduation from the University of California, Davis, Chris has spent over 30 years of his professional career as a geologist with the California Geological Survey in Sacramento. His studies with the CGS have included research in mineral hazards, mineral resources and the mining industry, geothermal resources, remote sensing, geographic information systems, offshore sand resources, geologic mapping, and seismology. Over the last several years as a Senior Geologist, he has helped develop digital map products that address potential for mineral hazards in different parts of California. Throughout his career, he has participated in many activities to help educate students and the general public about the earth sciences.

Dan Hoover, USGS Dan Hoover is an Oceanographer with the USGS in Santa Cruz, CA. In addition to co-coordinating the Coastal Hazards component of ARKStorm with Patrick Barnard, he has worked on a number of coastal geology projects in the San Francisco and Santa Barbara areas, primarily in the area of sand transport. Prior to joining the USGS in 2008, Dr Hoover was the resident physical oceanographer for the PISCO (Partnership for Interdisciplinary Study of Coastal Oceans) program at UC Santa Cruz, and he has worked extensively on the geochemistry and ecosystem impacts of runoff in Hawai'i. He has a PhD in Geochemical Oceanography and an MS in Biological Oceanography from the University of Hawai'i, and an ME in Engineering from Harvey Mudd College.

Mark Jackson, NOAA/NWS Mark Jackson is the Meteorologist in Charge (MIC) with NOAA's National Weather Service (NWS) in Oxnard, California, serving Los Angeles, Ventura, Santa Barbara, and San Luis Obispo Counties. Mark has been the MIC in Oxnard since August of 2005. The Oxnard office provides forecast and warning support for the public and fire weather, aviation, and hydrologic interests. Mark began his NWS career in 1995 in Brownsville, Texas, where he served as the science and operations officer in the Brownsville office, then moved on to Honolulu, Hawai'i to be a regional scientist at the NWS Pacific Region Headquarters. In 2001 Mark moved to Salt Lake City to serve as a science and operations officer with the Salt Lake City NWS office prior to moving to California. Mark has a B.S. in Meteorology from the University of Nebraska and an M.S. in Meteorology from the University of Oklahoma.

Laurie Johnson, Laurie Johnson Consulting Laurie A. Johnson is Principal of Laurie Johnson Consulting and a senior science advisor to Lexington/Chartis Insurance. She has over 20 years of experience in urban planning, risk management, and disaster recovery management, and studied most of the world's recent major urban disasters. In 2006, she was a lead author of the recovery plan for the City of New Orleans and coauthored the book, *Clear as Mud: Planning for the Rebuilding of New Orleans*. She was a contributor to the USGS 2008 Shakeout scenario for M7.8 striking southern California, and also a coauthor of the Policy section of the USGS ARKStorm scenario. Laurie completed her Doctorate degree at Kyoto University, Japan in March 2009. She also has a Master of Urban Planning and a B.S. in Geophysics, both from Texas A&M University. She is on the Steering Committee for GEER – Geotechnical



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Extreme Event Reconnaissance, and also on the Board of Directors of the Public Entity Risk Institute and the San Francisco Planning and Urban Research Association. She is a member of the American Institute of Certified Planners, American Planning Association, and Earthquake Engineering Research Institute.

Mark Johnson, Cal EMA Mark has served his community for 38 years as an emergency manager. From 1973 to 1989 Mark performed as an engine company fire captain and fire academy instructor. During that period he taught classes in course design and instructional methodology at the National Fire Academy, Emmitsburg, Maryland. From 1989 to 2002, Mark worked as an emergency manager in Orange County, California, developing countywide emergency plans and responding to state and federally declared disasters. He became staff to the City Manager in Dana Point, California, where he was elected Chairperson of the Interjurisdictional Planning Committee for the San Onofre Nuclear Generating Station. He also participated on the Cal State Fullerton's Disaster Management Certificate Program Advisory Committee. In 2002, Mark was employed by the California Emergency Management Agency as a Regional Manager. Mark now serves as the Planning Branch Chief overseeing development of the 2009 State Emergency Plan and participating in the development of joint state-federal catastrophic plans. Mark has a Bachelors' Degree in Fire Administration from Cogswell Polytechnical College, in Sunnyvale, California.

Lucy Jones, USGS Dr. Jones has been a seismologist with the US Geological Survey and a Visiting Research Associate at the Seismological Laboratory of Caltech since 1983. She is currently serving as the Chief Scientist for the Multi Hazards Initiative in Southern California, developing a new program to integrate hazards science in urban areas with economic analysis and emergency response to increase community resiliency to natural disasters. Major products of this Initiative include the ShakeOut Earthquake Scenario that led to the creation of the Great Southern California ShakeOut, a public emergency preparedness event involving over 5 million people, the ARkStorm scenario, a model of a great storm in California, and the Southern California Debris Flow Warning System (in partnership with the National Weather Service). Dr. Jones has authored over 90 papers on research seismology with primary interest in the physics of earthquakes, foreshocks and earthquake hazard assessment, especially in southern California. She serves on the California Earthquake Prediction Evaluation Council and was a Commissioner of the California Seismic Safety Commission from 2002 to 2009. She has received numerous awards, including the Alquist Award from the California Earthquake Safety Foundation, and the Shoemaker Award for Lifetime Achievements in Science Communication from the USGS. Dr. Jones received a Bachelor of Arts degree in Chinese Language and Literature, Magna Cum Laude, from Brown University in 1976 and a Ph. D. in geophysics from the Massachusetts Institute of Technology in 1981. Dr. Jones, a fourth-generation resident of southern California, currently lives in La Cañada, California, with her husband, Dr. Egill Hauksson, also a seismologist.

Jeff Lusk, FEMA Mr. Jeff Lusk is Deputy Federal Preparedness Coordinator for the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region IX, which covers Arizona, California, Hawaii, Nevada, American Samoa, Guam and the Northern Marianas. Mr. Lusk has been with FEMA Region IX for 15 years in various positions. From 1995 until August of 2002, he worked with the National Flood Insurance Program (NFIP), and was responsible for conducting much of the NFIP training for state and local stakeholders. As a certified floodplain manager, he worked closely with Napa County on its groundbreaking comprehensive floodplain management project. From August of 2002 until early 2007, Mr. Lusk served as the regional earthquake specialist for Region IX, and was responsible for implementing the National Earthquake Hazards Reduction Program (NEHRP). He served as the liaison to consortia including the Western States Seismic Policy Council, the Earthquake Engineering Research Institute, Southern California Earthquake Center, and the State Seismic Safety Commissions of California, Guam, Hawaii, and Nevada. He was also responsible for writing or revising many of the agency's public information materials for earthquakes. He served as the Response Operations Branch Chief for Region IX from 2007-2009. Until recently, he was the Chief of the Integration Branch in the National Preparedness Division, which is responsible for Training, Exercise, and NIMS programs.

Marcia McNutt, USGS Director Marcia K. McNutt, is a distinguished scientist and administrator and the first woman director of the USGS in its 130-year history. Dr. McNutt previously served as president and chief executive officer of the Monterey Bay Aquarium Research Institute (MBARI), in Moss Landing, CA. As a scientist, Dr. McNutt has participated in 15 major oceanographic expeditions and served as chief scientist on more than half of those voyages. She has published 90 peer-reviewed scientific articles. Her research has ranged from studies of ocean island volcanism in



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French Polynesia to continental break-up in the Western United States to uplift of the Tibet Plateau. McNutt received a BA degree in Physics, *summa cum laude*, Phi Beta Kappa, from Colorado College in Colorado Springs. As a National Science Foundation Graduate Fellow, she studied geophysics at Scripps Institution of Oceanography in La Jolla, California, where she earned a PhD in Earth Sciences in 1978. She then spent three years with the USGS in Menlo Park, CA, working on earthquake prediction. Dr. McNutt joined the faculty at MIT in 1982 where she became the Griswold Professor of Geophysics and served as Director of the Joint Program in Oceanography & Applied Ocean Science & Engineering, offered by MIT & the Woods Hole Oceanographic Institution. She served as President of the American Geophysical Union from 2000-2002. She was Chair of the Board of Governors for Joint Oceanographic Institutions, helping to bring about its merger with the Consortium for Ocean Research and Education to become the Consortium for Ocean Leadership, for which she served as Trustee. She is a fellow of the American Geophysical Union, the Geological Society of America, the American Association for the Advancement of Science, and the International Association of Geodesy. McNutt's honors and awards include membership in the National Academy of Sciences, the American Philosophical Society, and the American Academy of Arts and Sciences. She also holds honorary doctoral degrees from the University of Minnesota and from Colorado College. She was awarded by the American Geophysical Union the Macelwane Medal in 1988 for research accomplishments by a young scientist and the Maurice Ewing Medal in 2007 for her significant contributions to deep-sea exploration. She has served on numerous evaluation and advisory boards for institutions such as the Monterey Bay Aquarium, Stanford University, Harvard University, Science Magazine, and Schlumberger. McNutt is a native of Minneapolis, MN, where she graduated class valedictorian from Northrop Collegiate School in 1970.

Dennis S. Milet, University of Colorado at Boulder Dr. Dennis S. Milet is Professor Emeritus at the University of Colorado at Boulder where he served as Director of the Natural Hazards Center and as Chair of the Department of Sociology. He is author of over 100 publications. Most are on the societal aspects of hazards and disasters. His book *Disasters by Design* summarized our nation's effort to assess knowledge and national policy for hazards and disasters. He has served on a variety of advisory boards including as Chairman of the Committee on Natural Disasters in the National Academy of Science's National Research Council and Chair of the Board of Visitors to FEMA's Emergency Management Institute. He was a member of the Board of Directors of the Earthquake Engineering Research Institute, the Advisory Board to the U.S. Geological Survey's Research Program on Earthquakes and Volcanoes, the Expert Advisory Panel to the National Institute of Standards and Technology's study of Evacuation of the World Trade Center Towers on September 11th and the American Society of Civil Engineer's Expert Panel overseeing the Army Corps of Engineer's assessment of the New Orleans levee failures and consequences. He was given the Outstanding Civilian Service Medal in 2007 by the Department of the Army for that work. Dennis was the Founder and Co-Editor-in-Chief of the all-hazards, all-disciplines journal the *Natural Hazards Review*. He is currently a member of the Department of Homeland Security's National Social Science Research Center on Terrorism and Vice Chair of the California Seismic Safety Commission.

Selby Mohr, Sacramento Municipal Utility District Selby is the Emergency Preparedness Supervisor at the Sacramento Municipal Utility District (SMUD) where he oversees compliance issues related to the NERC/FERC license activities involving the bulk transmission and generation systems; DOT/DHS issues associated with the Natural Gas Pipeline Operations specifically the emergency response, training, and exercising of plans, the FERC license and related activities associated with the UARP and the Emergency Action Plan. This is in addition to representing the District in discussions with WEI, EEI, LPPC, APPA and others concerning Mutual Assistance Agreements and related response activities, including development and implementation of upgrades and improvements to current operations and relationships. Selby is also responsible for a staff involved in the emergency preparedness-related activities of the District's energy systems (electric and gas), business facilities, supporting the emergency preparedness activities associated with the hydro and nuclear generating facilities, the natural gas pipeline, and the hazardous materials plans.

Marie C. Pepler, USGS Marie is currently a physical scientist with the USGS Wisconsin Water Science Center. In this role, her current projects revolve around flooding. She is working on assessment and monitoring of gully erosion control in Bark River, WI; channel changes from submerged flow deflectors and large floods in North Fish Creek, WI; the USGS National Water-Quality Assessment Program (national trends in urbanization effects on hydrology and stream geomorphology); effects of grazing on bank erosion in the Fever River, Pioneer Farm, Platteville, WI; and Regional Hydraulic Geometry Curves. She is one of the members of the USGS Flood Inundation Mapping Initiative (FIMI) project,



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which seeks to provide a consistent appearance and functionality of all USGS inundation products and to guide the future development of inundation mapping science.

Geoff Plumlee, USGS As part of ongoing US Geological Survey (USGS) research into the links between earth materials and human health, Dr. Geoff Plumlee and earth- and health-science colleagues examine the role that mineralogy, morphology, and chemistry play in the biosolubility, bioreactivity, and toxicity of geological materials. Examples of materials studied to date include volcanic ash, asbestos, contaminated and natural soils, coal fly ash, mine wastes, dry lakebed dusts, wildfire ash, flood sediments, and lunar regolith simulant. These studies integrate detailed mineralogical and chemical characterization of the earth materials with geochemical solubility studies and various toxicity tests. The solubility studies utilize simulated biofluids (simulated lung, lysosomal, gastric, and intestinal fluids) and serum-based fluids to simulate how minerals may react chemically in the body. The toxicity tests carried out by colleagues in the health sciences provide a means for directly interpreting toxicity effects in terms of particle mineralogy, composition, and solubility. Geologic materials range from highly biosoluble materials with bioaccessible, potentially toxic heavy metals (such as dusts from dry lake beds), to biodurable materials (such as asbestos or crystalline silica) whose toxicity in part results from long-term stability in the body, to reactive materials that can produce significant short-term shifts in fluid chemistry (such as highly alkaline concrete dusts). The results of these studies show that most geologic materials commonly are complex mixtures of many different minerals that may interact chemically in the body to produce unique chemical and toxicity effects that vary considerably from those produced by the individual minerals.

Keith Porter, University of Colorado Dr Porter is a Caltech structural engineer, currently holding the title of GW Housner Senior Researcher. His expertise is in loss estimation, performance-based earthquake engineering (PBEE), and multi-hazard risk management. He received his PhD from Stanford University in 2000, for developing a second-generation PBEE methodology that estimates the future seismic performance of individual buildings in terms of dollars, deaths, and downtime. He holds BS and MEng degrees from UC Davis and UC Berkeley in civil and structural engineering, respectively. He has 8 years of professional engineering experience in construction contracting, structural design, and multihazard risk management. Recent work includes development of global earthquake loss-estimation methods for the USGS, open-source risk management methods and software for the Alliance for Global Open Risk Assessment, PBEE tools for practitioners, and end-to-end risk modeling methods for the Southern California Earthquake Center. He is the author of 60 scholarly publications.

Dave Reynolds, NOAA/NWS Mr. David Reynolds has held the position of Meteorologist-in-Charge of the National Weather Service (NWS) San Francisco Bay Area Forecast Office since June of 2002. Prior to assuming this position he was Chief of Operations of the Hydrometeorological Prediction Center, one of the service centers of the National Centers of Environmental Prediction in Washington DC. His primary interest is in Quantitative Precipitation Forecasting and in climate change impacts in California. He is a member of the American Meteorological Society, served as Chairman of the AMS Committee on Weather Modification, and is currently on the Committee on Mountain Meteorology. Mr. Reynolds received the National Oceanic and Atmospheric Administration's Administrator Award and has been the recipient of a Department of Commerce group Gold Medal — the Department's highest honorary award — in 1999 for HPC's excellent rainfall forecasts associated with Hurricane Floyd. He also received two NOAA group Bronze Medals associated with his participation in the restructuring of the NWS's quantitative precipitation forecasting process.

Kathleen Schaefer, FEMA For more than the past three years Kathy, a licensed P.E. in the state of California and a Certified Floodplain Manager, has served as Engineer/Program Specialist for the Map Modernization (Map Mod) Program both in Region IX and as an employee of the Regional Management Center (RMC) with Baker, Corp. She has served as the Region IX liaison with FEMA headquarters on policy guidance, review and development for Map Modernization; serves as the Multi-Hazard Information Platform (MIP) Champion and Earned Value Management System Lead for the program; and maintains on ongoing working relationships with mapping partners at the Sacramento District Office — USACE. Previously, Kathy worked as Project Manager/Senior Engineer for engineering and water resources consulting companies and in local government as an engineer. She has supervised professional staff; developed major urban/city Stormwater Master Plan(s); been responsible for the design, construction, management and budget oversight for capital improvement projects; conducted post-flood hazard verification, training/outreach and disaster field support; and has provided oversight for IDIQ mapping task orders for the Map Modernization Program — including several of Region IX's highest profile Central Valley of California counties. Kathy brings experience in the application of various



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engineering models (HEC 1 & 2, HEC-RAS, HEC-HMS) for flood hazard verification in the production of Flood Insurance Rate Maps (FIRM). She has earned a master's degree in Chemical Engineering from the University of VA – Charlottesville and a bachelor's degree in Civil Engineering from the University of NE – Lincoln. Ms. Schaefer is recognized as a leader in FEMA's Map Mod implementation and program delivery.

Stephen Sellers, Cal EMA Stephen began his career with the state in 1995 with the Governor's Office of Emergency Services (OES). He served in a variety of staff assignments at OES including the Hazard Mitigation program and Southern Region. In 2004, he received an executive assignment as the Southern Region Administrator. In 2008, he was appointed by Governor Arnold Schwarzenegger as the Deputy Director of Regional Operations. In 2009, he was selected to serve as the Assistant Secretary for Prevention, Information Sharing and Operations for the California Emergency Management Agency (CAL EMA). Stephen has been involved in 59 disasters since 1995, 11 of which were federally declared. His work included an appointment as the Deputy State Coordinating Officer for the 2007 Southern California fires serving as the State of California's lead representative in the Joint Field Office with the Federal Emergency Management Agency for the disaster. Stephen graduated with a BA in Government from California State University, Sacramento in 1979 and an MA in Political Science from University of California, Santa Barbara, in 1981.

Michael Shulters, USGS Michael Shulters has been with the USGS for 38 years and is currently the Regional Executive for the Pacific Southwest, where he has responsibility for 14 USGS science centers in Hawaii, California, Arizona, Nevada, and Utah doing basic and applied research in hydrology, earthquake and volcano hazards, geography, ecosystems, mineral and energy resources, coastal and marine geology, and astrogeology. Prior to being appointed as Regional Executive, Mike served as the Director of the USGS California Water Science Center from 1993 to 2008. Mike is co-creator of the USGS Multi-Hazard Demonstration project in Southern California, which has spawned new partnerships with local agencies and the public and culminated in the "Great Shakeout", the largest ever earthquake disaster response exercise.

Gary Sturdivan, East Valley Water District Gary Sturdivan has over 15 years of experience in emergency planning, safety training and security. He is currently the Safety Regulatory Affairs/Emergency Director at East Valley Water District. He was recently appointed National Chair of the Emergency Planning/Security Committee for the American Water Works Association (AWWA.) He is the first chair chosen from the West coast in 7 years and the first in Southern California.. He is also Chair of the California Water/Wastewater Agency Response Network Cal WARN Region 6 and Vice-chair of the CalWARN state Steering committee. Gary is also the founder and Chair of the Emergency Response Network of the Inland Empire (ERNIE) which now has more than 20 member agencies since it began in 2004. He served on the USGS/Caltech Pasadena, Golden Guardian 2008 committee and the San Bernardino County Fire Office for Emergency Services, as well as the Lifeline Recovery Committee. Gary received his Bachelor of Science degree in Business Management and Business Administration from the University of Phoenix. A resident of San Bernardino County since he was born, Gary now lives in Yucaipa.

Ken Topping, Cal Poly SLO Recently, Mr. Topping has been speaking and writing on the linkage between CO2 emissions and what planners can do through smart design and mitigation planning to reduce long-term impacts of global warming and climate change ("Hot Topic" Planning Magazine August/September 2006 issue; Viewpoint, May 2005 issue). He has been directly involved with emerging post-Katrina sustainability issues, having participated on a four-member nationwide panel invited by the Rockefeller foundation and Greater New Orleans Foundation to screen and interview planning firms selected to undertake recovery planning in New Orleans. Major speaking engagements on sustainability issues have included New Orleans, May 2006; San Antonio, April 2006; UCLA, April and January 2006; Tokyo, March 2006; Manila, March 2006; Stanford University, February 2006; USC, October 2005; Shreveport, Louisiana, October 2005; and Monterey, California, June 2005.

Nancy Ward, FEMA Nancy L. Ward was appointed Regional Administrator of Region IX for the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in October 2006. Ms. Ward had been the Administrator of FEMA's Response and Recovery Division in Region IX since 2000. In her new position, she is responsible for coordinating FEMA mitigation, preparedness and disaster response and recovery activities in Arizona, California, Hawaii, Nevada, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Republic of



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the Marshall Islands and the Federated States of Micronesia. Ms. Ward was appointed FEMA's senior transition official for the presidential transition and served as Acting Administrator for FEMA from January 21, 2009 to May 16, 2009. She returned to her position as the Regional Administrator of the FEMA Region IX office when Craig Fugate was confirmed by the U.S. Senate to be the Administrator of FEMA. She worked two details at FEMA headquarters as the Deputy Director of the Recovery Directorate during FEMA's response and recovery operations for the 2004 and 2005 hurricane seasons. She also served in various senior management positions in more than 20 disasters, most recently during the March and April 2006 severe storms, flooding, landslides and mudslides in California, and the earthquake in Hawaii. Ms. Ward has received awards for special accomplishments at FEMA. Before joining FEMA, Ms. Ward was Chief of the Disaster Assistance Branch and Deputy State Coordinating Officer for the California Office of Emergency Services. She administered the state's Natural Disaster Assistance Act program assistance provisions, which provide disaster assistance funding to local governments for state-level emergencies and disasters. She provided guidance and technical support to other state and local agencies in the planning, development and implementation of program policies and procedures for disaster recovery activities. She also was a Program Administrator for another California state agency.

Dr. Anne Wein, USGS Dr. Anne Wein is an Operations Research Analyst in the Western Geographic Science Center of the USGS located in Menlo Park, California. Since 2002, she has participated in interdisciplinary research to quantify the value of earth-science information, enhance natural-hazard risk assessment and analysis methodologies, and interface ecologic indicators and societal values. She (and her co-authors) received the 2007 USGS Geography Best Scientific paper award for a publication on the value of updated and more detailed geologic information for mineral exploration. Prior to working at the USGS, Anne Wein worked in industry, education (elementary to university) and the New Zealand government as an analyst, project manager, and/or teacher. In industry, she analyzed the complex systems of semi-conductor fabrication and computer VAXcluster systems. At Digital Equipment Corporation, she received an outstanding achievement award for her work on VAXcluster system availability. She has taken on leadership and volunteer roles with numerous environmental, political, and civic committees and organizations in Massachusetts. Her activities centered on solutions to environmental and financial issues of local and state trash incineration, and school curriculum enrichment. Dr. Wein received a Ph.D. in Decision Sciences from the Graduate School of Business at Stanford University (1988), an M.S. in Operations Research from Stanford University (1985), and a B.Sc. Hons. in Operations Research from the University of Canterbury, New Zealand (1983).

Chris Wills, CGS Chris Wills is a Supervising Engineering Geologist with the California Geological Survey in Sacramento, CA. He is responsible for projects that involve seismic hazard estimation, landslide hazards, and geologic mapping. The California Geological Survey is an agency dedicated to finding practical application for the latest geological research. As part of those efforts, Chris Wills has contributed to Alquist-Priolo Earthquake Fault Zones and Seismic Hazard Zones maps, where development is regulated due to the earthquake hazards; preparation of landslide maps, evaluation of hazards following major earthquakes and landslides, review of geologic hazards for construction of new school and hospital facilities; and numerous outreach activities to geologic, engineering, and planning professionals and the general public regarding geologic hazards. Mr. Wills received an M.S. degree in Geological Sciences from the University of Wisconsin-Madison in 1984, and a B.S. degree in Geological Sciences from USC in 1981. He is a member of the American Geophysical Union, the Geological Society of America, the Seismological Society of America, the Association of Engineering Geologists and the Earthquake Engineering Research Institute.

Ken Worman, Cal EMA Ken Worman is currently serving as the State Hazard Mitigation Officer (SHMO) for the California Emergency Management Agency (Cal EMA). Ken joined Cal EMA in 1995 and has worked in all aspects of emergency management, including response, recovery, preparedness and mitigation. Ken joined the Hazard Mitigation Branch in 2000 as a Program Manager, where he supervised the administration of various federal mitigation grants and activities. In his current position, he is responsible for overseeing the Hazard Mitigation Planning Division and for ensuring that Cal EMA meets the Federal Emergency Management Agency's (FEMAs) planning requirements under California's Enhanced State Hazard Mitigation Plan. In addition, Ken's staff is responsible for the review of all Local Hazard Mitigation Plans, the Dam Inundation Program and hazard identification and analysis. Ken is a long-time resident of Folsom and is a graduate of CSU Chico.

Lt. Timothy Yuhas, US Navy LT Yuhas attended the University of Arizona in Tucson where he enrolled in the Reserve Officer Training Corps (ROTC) and earned a Bachelors of Arts in History with a minor in Political



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Science. After commissioning, he reported aboard USS HOWARD (DDG-83) as the Anti-Submarine Warfare (ASW) Officer from 2005-2007 where he executed two Ship Anti-Submarine Warfare Readiness and Evaluation Measurements (SHAREMs) and numerous ASW exercises with the Swedish Submarine HSWMS GOTLAND. While assigned to HOWARD he was hand picked by Commander DESTROYER SQUADRON 21 to assist the USS JOHN C. STENNIS Strike Group Surface Combatant Commander to certify in ASW. While attached to DESRON 21 he earned his Force Anti-Submarine Warfare Evaluator Qualification. Upon the successful completion of the JCSSG workups he flew to the North Arabian Gulf to rejoin HOWARD for the rest of deployment as Scene of Action Commander for the Al Basra Oil Terminal. There he acted a "RHIB Boss" and was directly responsible for the defense of the Oil Terminal. In July 2007, he reported aboard USS NICHOLAS (FFG-47) as the Training Officer. As such, he saw NICHOLAS through Neptune Warrior, numerous pre-deployment preparations and certifications. In December of the same year he was selected as the Command's Ship Handler of the Year. He deployed with NICHOLAS to the Sixth Fleet AOR with STANDING NATO MARITIME GROUP ONE. In March 2009 he reported to Naval Postgraduate School to earn a Masters Degree in Operational Research. He will graduate in March 2011 and will report to the ROTC Unit at the University of Arizona to instruct Naval Science. His decorations include the, the Navy and Marine Corps Commendation Medal, Achievement Medal with two gold stars, and various service and campaign awards.