DISASTER RESPONSE IN THE PACIFIC NORTHWEST:

HOW READY (OR NOT) ARE WE AND OUR FIRST RESPONDERS?

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WHAT I AM GOING TO TALK ABOUT

- The Context
- Specific Research Interest
- The 2014 Oso/SR530 Landslide
- The Cascadia Rising 2016 Exercise
- Literature *(I will skip this, please take a look at the papers)*
- Research Questions
- Methodology *(I will skip this to boot, please take a look at the papers)*
- Findings
- Discussion
- Conclusions and Future Research
- Questions and Comments

THE CONTEXT

- Who has grown up here?
- Who has lived here for more than 10 years?
- Who has recently arrived here (up to two years back)?

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- Who has lived here for more than 10 years?
- Who has recently arrived here (up to two years back)?

- What is so special about the Pacific Northwest (PNW)?

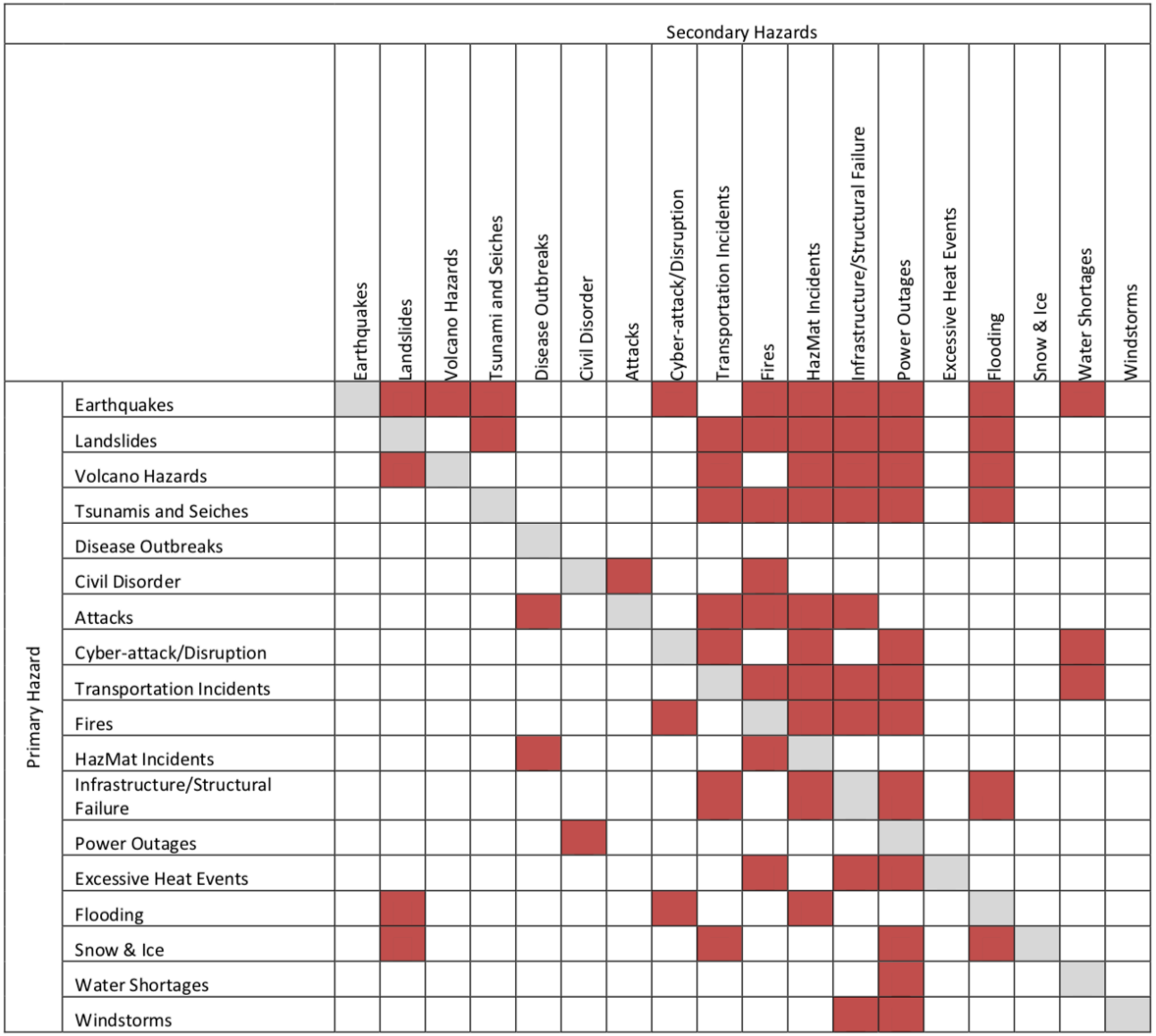
SEATTLE HAZARD RANKING

	Most Likely Scenario															Maximum Credible Scenario																
	Geographic Scope	Duration	Health Effects	Displacement	Economy	Environment	Structures	Transportation	Critical Services	Confidence in Govt	Base Score	Frequency (F)	Cascading Effects (CE)	Multiplier (F + CE)	Subtotal	Geographic Scope	Duration	Health Effects	Displacement	Economy	Environment	Structures	Transportation	Critical Services	Confidence in Govt	Base Score	Frequency (F)	Cascading Effects (CE)	Multiplier (F + CE)	Subtotal	Future Emphasis	**Combined Ranking**
Earthquakes	5	2	2	2	2	2	3	2	2	1	2.3	4	4	8	18.4	5	5	5	5	5	5	5	5	5	5	5.0	2	5	7	35	3	**56.4**
Snow & Ice Storm	5	3																									3	3	6	18.6	5	**39.0**
Windstorms	5	1																									3	3	6	18.6	3	**36.3**
Power Outages	3	2																									3	3	6	19.2	3	**34.8**
Cyber-attack/Disruption	5	4																									2	4	6	21	5	**34.4**
Landslides	4	3																									2	4	6	18	3	**33.6**
Disease Outbreaks	5	5																									3	2	5	17.5	5	**33.5**
Flooding	5	2																									2	3	5	16.5	5	**33.5**
Excessive Heat Events	5	3																									3	2	5	16	5	**33.0**
Tsunamis and Seiches	3	2																									2	4	6	21	3	**32.8**
Infrastructure & Structural Failure	1	2																									1	3	4	14.4	5	**32.7**
Fires	2	2																									2	4	6	17.4	3	**31.8**
Transport Incidents	1	1																									2	5	7	18.2	3	**31.7**
Water Shortages	5	5	1	2	2	2	2	1	3	1	2.4	5	2	7	16.8	5	5	1	3	3	3	2	1	3	3	2.9	2	2	4	11.6	3	**31.4**
Social Unrest	3	1	2	3	3	1	2	2	2	3	2.2	5	2	7	15.4	5	3	3	5	3	1	3	2	2	5	3.2	2	2	4	12.8	3	**31.2**
Attacks	1	1	2	2	2	2	2	2	1	3	1.8	5	2	7	12.6	4	2	3	3	2	1	2	4	4	3	2.8	2	1	3	8.4	5	**26.0**
HazMat Incidents	3	1	3	4	2	2	2	2	2	1	2.2	3	2	5	11.0	3	3	2	2	3	4	2	3	2	5	2.9	1	3	4	11.6	3	**25.6**
Volcano Hazards	2	5	1	4	3	2	3	2	3	1	2.6	2	1	3	7.8	5	5	2	2	3	2	4	5	2	1	3.1	1	3	4	12.4	3	**23.2**

1. Earthquakes
2. Snow & Ice Storms
3. Windstorms
4. Power Outages
5. Cyber attack/disruption
6. Landslides

Seattle Hazard Identification And Vulnerability Analysis, 2019, Table 2.1

RELATIONSHIPS BETWEEN PRIMARY AND SECONDARY HAZARDS



Seattle Hazard Identification And Vulnerability Analysis, 2019, Table 2.3

GROWING AWARENESS, CONCERN, AND RESEARCH INTEREST

- Trentham, G., & Scholl, H. J. (2008, January 7 to 10). Current Practices in Field Force Automation: Decision Support and Information Management for the Field Force. Paper presented at the 41st Hawaii International Conference on System Sciences, Waikoloa, HI.
- Scholl, H. J., & Patin, B. J. (2012). Resilient Information Infrastructures: Mobilizing Adaptive Capacities under Extreme Events. Paper presented at the 18th Americas Conference on Information Systems, Seattle, WA.
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- Scholl, H. J., & Chatfield, A. T. (2014). The Role of Resilient Information Infrastructures: The Case of Radio Fukushima during and after the 2011 Eastern Japan Catastrophe. International Journal of Public Administration in the Digital Age (IJPADA), 1(2), 1-24.

GROWING AWARENESS, CONCERN, AND RESEARCH INTEREST

- Trentham, G., & … mation Management for … H.
- Scholl, H. J., & … . Paper presented at the …
- Chatfield, A. T., … co-production of ti…
- Chatfield, A. T., … Information dur… (HICSS-47), Wa…
- Scholl, H. J., & … and after the 2011 Easter…

A PLEDGE FOR DISASTER INFORMATION MANAGEMENT

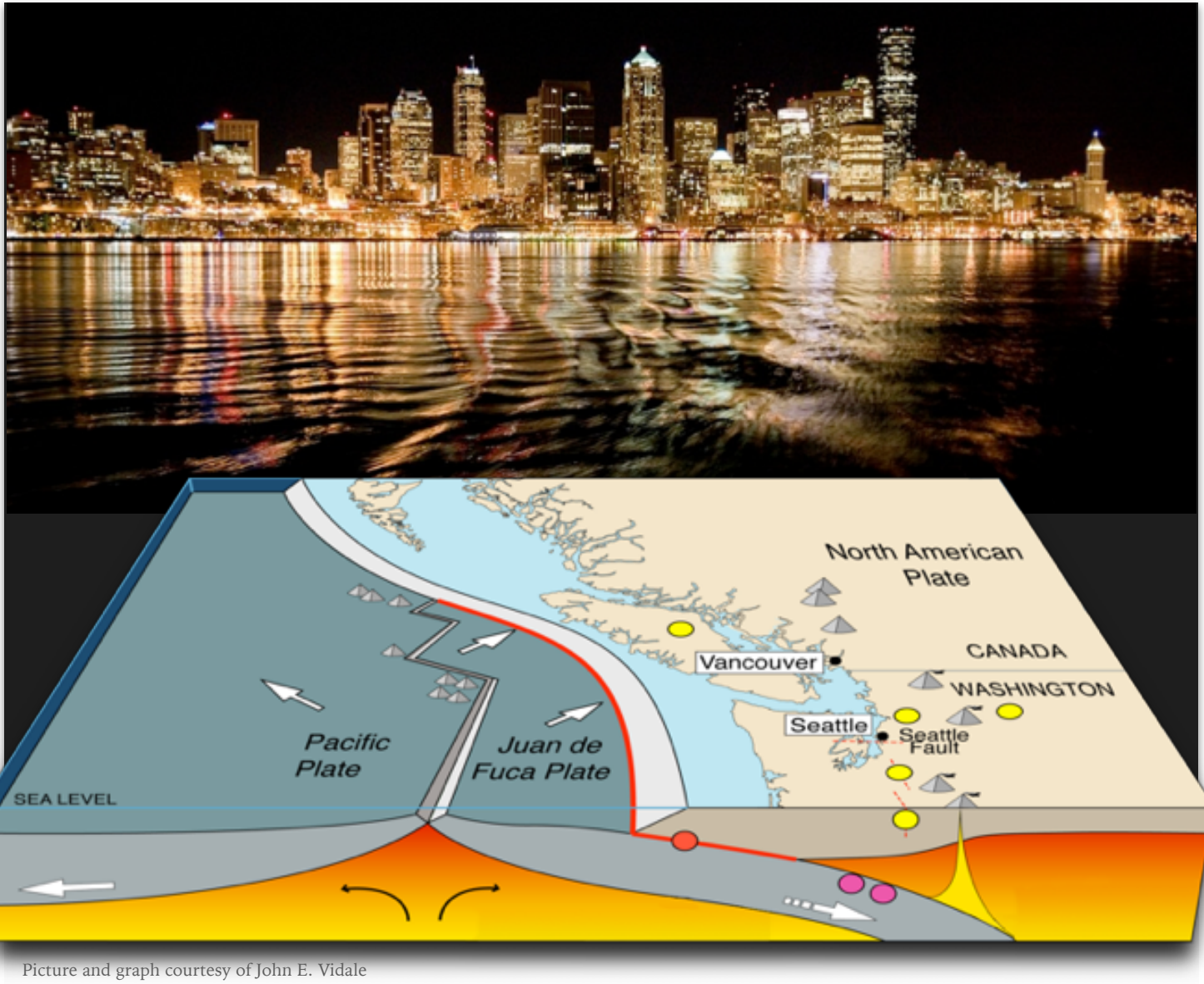
- I strongly believe that we (the iSchool) need to engage in this subfield of disaster sciences more deeply and more widely
- A chance to make a real difference in mitigating the impact of catastrophes
- An opportunity to save lives
- A need and an opportunity to develop an unattended academic subfield in the basket of disaster sciences

Research Conversation at the iSchool, UW, Seattle, WA, USA, December 2, 2013 --- Hans J. Scholl, Disaster Information Management (Why We Need Resilient Information Infrastructures For Coping With Extreme Events) 29

OSO, WA – MARCH 22, 2014

- A hillside of about **180m** in elevation from the valley bottom collapsed and unleashed about **8m m³ of mud and debris** in an **avalanche-like slide** that ran across the North Fork of the Stillaguamish River for about **1.7 km at top speeds of over 140 km/h** to the other side of the valley, where it bounced back.
- The slide instantly **killed 43 people** along with an unknown number of animals, completely destroyed some 50 buildings and structures, and **covered State Route 530 at a length of 1.6 km**. Mud and debris piled up in some areas to 21m in depth.
- A total of **119 government agencies** and non-governmental organizations were actively involved and co-operated
- Over **1,100 individuals were involved in the response**, some 350 of whom were from the WA National Guard
- Incident Command was passed from local (after day 1) to regional (type-3), from regional (after day 5) to state (type-2), from the first type-2 team to the second type-2 team (after day 17), and back (after day 39) to the regional type-3 team
- **All victims were recovered and identified;** the final death toll was 43
- Estimated cost (life, damage, and response): $1b

THE CASCADIA RISING 2016 EXERCISE (1)



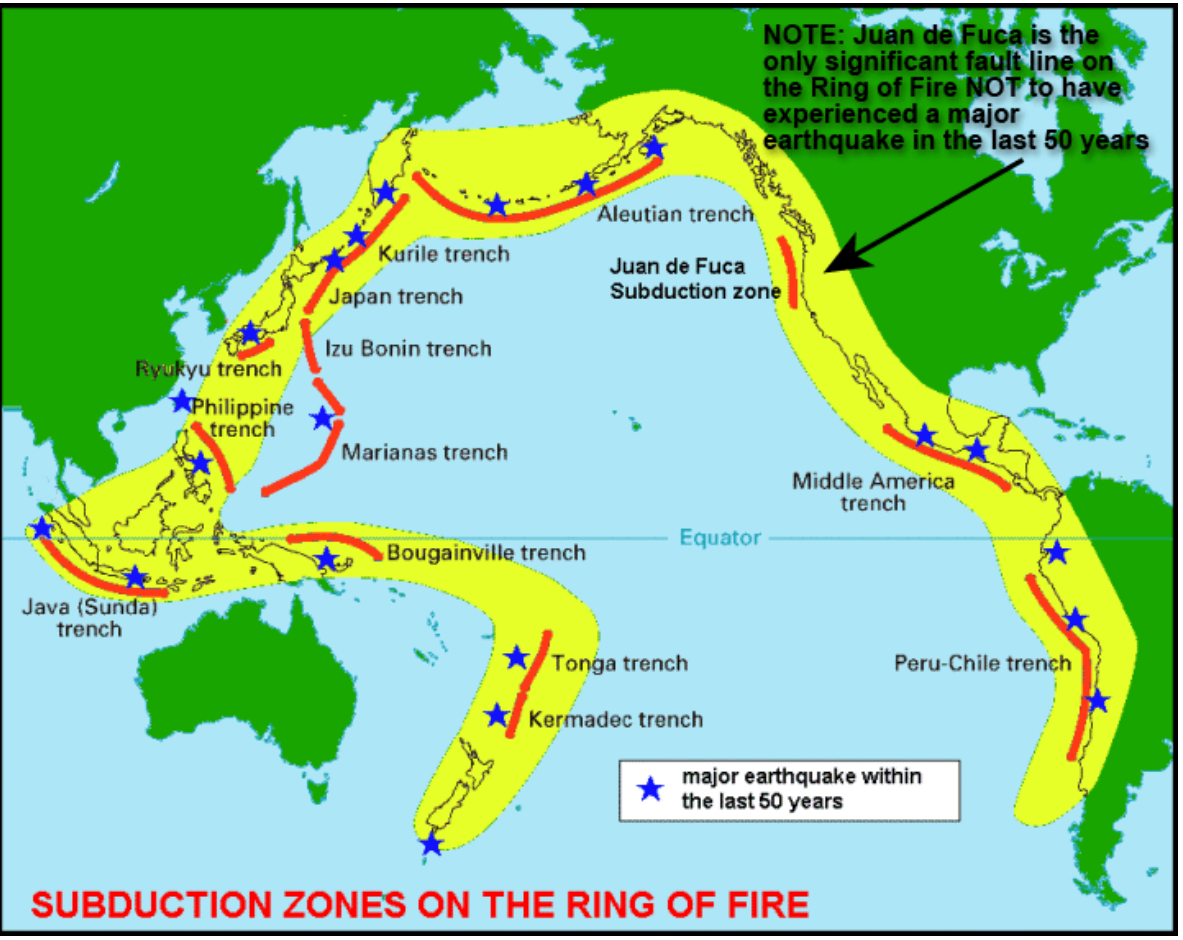
Picture and graph courtesy of John E. Vidale

Exercise Details

- Conducted between June 7 and 10, 2016 (military: between June 7 and 14, 2016) after two years of preparation
- Involved 23,000 participants across local, state, federal, tribal, Department of Defense, and non-governmental entities in Oregon, Washington, and Idaho with British Columbia associated
- One of the largest exercises ever conducted in the US; the largest multi-state exercise in the Pacific Northwest so far
- ***Objective***: Through disaster simulation, the purpose of this exercise was to test and validate catastrophic CSZ plans; the ability of Emergency Operations Centers (EOCs), throughout the whole community, to coordinate and communicate priorities and objectives; to share situational information; and to request, order, and transport life-saving resources to the areas most heavily impacted
- Scenario similar to the devastating March 2011 Tōhoku earthquake and tsunami in Japan

THE CASCADIA RISING 2016 EXERCISE (2)

The Threat



Slide content courtesy of Lt.Col. Clayton Braun, WA National Guard and Wikipedia

- Ring of Fire
  - Accounts for 90% of all earthquakes, and 81% of the world's largest earthquakes
  - All but three of the world's 25 largest volcanic eruptions of the last 11,700 years occurred at volcanoes in the Ring of Fire.
  - Subduction zones are shown in red
  - The CSZ fault line is part of the Ring of Fire
- The CSZ is the only significant fault line on the Ring of Fire without a major quake in the last 50 years (see blue stars)

THE CASCADIA RISING 2016 EXERCISE (3)

Figure 1 *Cascadia Rising 2016 Exercise – M9.0+ Megathrust Impact Assumptions (Paci-Green et. al, 2015, p. 14)*

Impact Area

- West of and including the Interstate-5 corridor
- Zipper-like rupture from one end of the subduction line to the other is expected to occur along the 800-mile-long subduction line
- Thirty to forty-foot high tsunami would reach the coastline about 20 to 30 minutes after the rupture
- Several aftershocks of significant magnitude would be expected to follow the initial rupture inflicting more damage
- Impact on human lives and infrastructure would be the greater the closer the location to the coastline
- Impacted areas West of the Cascadian Mountain range would be inaccessible by ground transport or sea transport for extended periods of time
- Relief would first come predominantly by air transport
- Responders would find themselves stripped from using most modern information and communication technologies for the lack of power and intact communication infrastructures

LITERATURE (ON DISASTER CATEGORIZATION)

Category	Disaster Scale	DIsruption	Example
DC-1	**EVERYDAY EMERGENCY**	Minor in Scale, Scope, Duration; Minor in Scope, Major in Scale & Duration; Partial in Scope, Minor in Scale & Duration	A single house afire
DC-2	**SEVERE EMERGENCY**	Major in Scope, Minor in Scale & Duration; Major in Scale & Duration, Minor in Scope	Snowstorm disrupting normal activity
DC-3	**PARTIAL SMALL TOWN**	Major Scale & Duration, Partial Scope	Crash of an airplane in a small town
DC-4	**MASSIVE SMALL TOWN**	Major Scale, Scope, Duration – Town	Forest fire that threatens to destroy an entire community
DC-5	**PARTIAL SMALL CITY**	Major Scale, Duration, Partial Scope	Airliner crash in a small or medium sized city
DC-6	**MASSIVE SMALL CITY**	Major Scale, Scope, Duration	Earthquake severely impacting most of the city
DC-7	**PARTIAL LARGE CITY**	Major Scale, Duration, Partial Scope	Terrorist attack such as 9/11/2001, Earthquake Christchurch, 2010
DC-8	**MASSIVE LARGE CITY**	Major Scale, Scope, Duration	Severe earthquake in San Francisco, 1906, Lisbon earthquake and tsunami, 1755
DC-9	**CATASTROPHE**	Major Scale, Scope, Duration (**Several Populated Areas**)	2004 Indian Ocean earthquake and tsunami, 2011 Tōhoku/East Japan earthquake and tsunami
DC-10	**ANNIHILATION**	Major Scale, Scope, Duration (**Society**)	Delivery of weapons of mass destruction (WMD)

Henry W. Fischer's Disaster Categories (2003)

RESEARCH INTEREST

(From a Disaster Information Management Perspective AND a First Responders' Perspective)

- First responders' biggest challenges in early response have been reported as
  1. Lack of ***situational awareness (SA)*** and/or ***shared situational awareness (SSA)*** leading to an incomplete and distorted ***common operating picture (COP)***
  2. Role of information and communication technologies (ICTs) as ***part of the solution*** or ***part of the problem***
  3. Attributable but not limited to 1. and 2. are ***managerial challenges*** encountered by first responders
- The Oso/SR530 Response Study and the Cascadia Rising 2016 Exercise Study used the same theoretical lens, methodology, and instrument
- So far, resulting in five peer-reviewed publications:

GROWING AWARENESS & CONCERN AND RESEARCH INTEREST

- Trentham, G., & Scholl, H. J. (2008, January 7 to 10). Current Practices in Field Force Automation: Decision Support and Information Management for the Field Force. Paper presented at the 41st Hawaii International Conference on System Sciences, Waikoloa, HI.
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- Scholl, H. J., & Patin, B. J. (2014). Resilient Information Infrastructures: Criticality and Role in Responding to Catastrophic Incidents. Transforming Government: People, Process and Policy, 8(1), 28-48.
- Scholl, H. J., Ballard, S., Carnes, S., Herman, A., & Parker, N. (2017). Informational Challenges in Early Disaster Response: The Massive Oso/SR530 Landslide 2014 as Case in Point. Paper presented at the 50th Hawaii International Conference on System Sciences (HICSS-50), Waikoloa, HI. http://hdl.handle.net/10125/41458
- Scholl, H. J., & Carnes, S. L. (2017). Managerial challenges in early disaster response: The case of the 2014 Oso/SR530 landslide disaster. In ISCRAM (pp. 961-972). Albi, France: Proceedings of the. ***Best Insight Paper Award***
- Scholl, H. J., Hubbel, K., & Leonard, J. (2018). Communications and Technology Challenges to Situational Awareness: Insights from the CR16 Exercise. In Proceedings of the 1st ISCRAM Asia-Pacific Conference (pp. 1-15). Wellington, NZ: ISCRAM. ***Best Paper Runner-up***
- Scholl, H. J., Hubbell, K., & Leonard, J. G. (2019). Information Sharing and Situational Awareness: Insights from the Cascadia Rising Exercise of June 2016. In Proceedings of the 52nd Hawaii International Conference on System Sciences (HICSS-52) (pp. 1-11). Maui, HI.
- Scholl, H. J. (2019). Overwhelmed by Brute Force of Nature: First Response Management in the Wake of a Catastrophic Incident. In I. Lindgren, M. Janssen, H. Lee, M. P. R. Bolívar, E. Tambouris, & H. J. Scholl (Eds.), Electronic Government: Proceedings of the 18th IFIP WG 8.5 International Conference, EGOV 2019 (pp. [1-18] in print). Cham: Springer.

RESEARCH QUESTIONS

- What are specific SA-related ***information sharing*** challenges for disaster response teams, and what are specific challenges to responders' information behaviors?
- What are ***specific SA-related challenges*** for disaster response teams on different levels of involvement, and what are specific challenges to meet the information needs?
- What were specific ***managerial challenges*** during the multi-agency/multi-level response to the 2014 Oso/SR530 Landslide?
- What were the ***specific challenges regarding the use of NIMS/ICS*** during the multi-agency/multi-level response to the 2014 Oso/SR530 Landslide?

Oso/ SR530 Landslide 2014

- What are specific ***information-sharing challenges*** for professional responders in a catastrophic incident response?
- What are ***specific SA/SSA-related challenges*** for professional responders in a catastrophic incident response?
- What are specific ***SA/SSA-related communications challenges*** to professional disaster responders on all levels in the early stages of response to a (simulated) catastrophe?
- What are specific ***SA/SSA-related information and communication technology (ICT) challenges*** to professional disaster responders on all levels in the early stages of response to a (simulated) catastrophe?
- How do ***coordination and collaboration challenges*** change or stay the same when responding to a catastrophic incident (as opposed to a non-catastrophic emergency response)?
- How do other managerial challenges change or stay the same when responding to a catastrophic incident (as opposed to a non-catastrophic emergency response)?

Cascadia Rising Exercise 2016

DATA COLLECTION SUMMARY

- 48 (31/17) individuals from different responder groups (FEMA, State, Counties, Municipalities, etc)
- 59 hours (44.5/14.25) of interview recordings
- 32 (9/23) After-action Reports (AARs)
- Incident log files
- Numerous planning documents, press releases, and other documents
- Tool and ICT demonstrations

FINDINGS (1)

Lack of *Situational Awareness (SA)* and *Common Operating Picture (COP)* — Oso/SR530 Landslide

- Five full days needed to finally arrive at the so-called ***projection stage***
  - According to M. Endsley, after an incident (i) SA progresses through the stages of perception, comprehension, and projection
  - i+1d perception was not complete, i+2-3d comprehension increased leading to finally dispatching an IMT type-II team, which arrived on i+5d
  - Disconnect between air crews and ground responders
  - Lack of involvement of and coordination from County EOC
  - Physical obstacles (SR530 impassable, communication lines down, separation of responders on either side of the slide)
- No collection of Essential Elements of Information (EEIs)—lack of planning
  - Responders (including mutual aid responders from neighboring jurisdictions) had to start from scratch
  - Spotty and unsystematic information sharing in the first few days to the response
  - No standards for information sharing
  - Multiple formats and media

FINDINGS (2)

Role of **Information and Communication Technologies (ICTs)** as ***part of the solution*** or ***part of the problem*** — Oso/SR530 Landslide

- Heterogeneity of logistics and other systems (including WebEOC) as well as networking arrangements
  - Impossibility to easily, timely, and comprehensively share documents and messages among responders
- Media breaks
- Radio communications as most important tool for coordinating and messaging among responder teams
  - Incompatibility of radios
  - Need for frequency and equipment compatibility
- Lack of an integrated and secure interoperability platform for vertical or horizontal exchanges among responders

FINDINGS (3)

Managerial challenges encountered by first responders — Oso/SR530 Landslide

- The evolution of a unified command structure during the response was slow
- Frictions between the ICP and County EOC over requesting resources and the use of volunteers
- EOC director refraining from involving himself; rather a new hire was put in charge
- Influx and involvement of mutual-aid responders was uncoordinated and unmanaged
- Information sharing among responders was happenstance
- Lack of and unwillingness to collaborate on part of the County's medical examiner
- Lack of standardized resource request procedures
- Problem with scaling-up the response effort
- Lack of training and experience with NIMS/ICS
- Confusion between NIMS/ICS and ESFs
- Lack of standardization in NIMS/ICS and rising complexity in larger incidents

FINDINGS (4)

Lack of *Situational Awareness (SA)* and *Common Operating Picture (COP)* — Cascadia Rising

- Lack of standardized information flows, protocols, and flow frequencies
  - No standardized push mechanism nor any standardized pull mechanism for sharing information between responder units, even within the same jurisdictions
  - Using the all-purpose standard ICS213 message forms does not do the trick
- Information sources, information needs, and information overload/overflow
  - Problem of identifying the adequate lists and paths for distribution of important information to recipients with a need to know
  - Lack of checklists known as hazard-specific "Essential Elements of Information" in many jurisdictions
  - Balance between detail of information and aggregation/consolidation of information
  - Data overflow problems
- Information inconsistencies, obsolescence, vetting, and information sharing anxieties
- Impacts of shift changes and physical separation

FINDINGS (5)

Role of **Information and Communication Technologies (ICTs)** as ***part of the solution*** or ***part of the problem*** — Cascadia Rising

- WebEOC™ — Javascript-based browser operated; runs from local servers and/or in the Cloud; versions 7.3, 7.6, and 8.1 with an enhanced graphical user interface were in use; basically a logistics and event logging systems
  - Severe functional rigidities and limitations
    - Not self-explicatory nor intuitive to use in any way
    - Lack of integration of GIS metadata from the popular ArcGIS software
    - No sophisticated tracking or data manipulation methods like sorting certain data
    - Multiple boards such as “status update,” “significant events,” “task manager” among others along with user-generated ones
  - Interoperability issues, performance issues, and workarounds
    - State WebEOC system crashed under the load and appeared to have been unavailable for an extended period of time
    - Lack of readiness for large incidents
    - Workaround in providing each other direct access to their respective WebEOC systems

FINDINGS (6)

Role of **Information and Communication Technologies (ICTs)** as ***part of the solution*** or ***part of the problem*** — Cascadia Rising

- Radio technologies
  - Lack of HF Radio interoperability
    - Incompatible radios (frequency/equipment)
    - Interoperability as a major problem until both frequency/channel allocation and equipment compatibility via standardization have been secured
  - Limitations of alternate and auxiliary communications
    - Bandwidth problems and equipment incompatibilities also hampered backup infrastructure of stationary HF backup stations and satellite phones
    - Amateur (or, HAM) radio used at municipal, county, State, and Federal levels as an auxiliary communication infrastructure
    - Lack of training on part of amateur HAM operators
    - Lack of bandwidth

FINDINGS (7)

Managerial challenges encountered by first responders — Cascadia Rising

- Physical obstacles
  - Electrical power would be immediately lost in wide geographical areas and not return for months and in some cases even for more than a year
  - Grave impact on all communication infrastructures
  - Immensely degraded transportation infrastructure barriers and impediments of all kinds
  - "Islands" with no ingress nor egress
    - Blockages by landslides
    - Fallen trees
    - Tumbled-over buildings
    - Downed power lines
    - Cracked-up road surfaces
    - Fires, flooded areas, and spills of hazardous materials and fuels
  - Inter-jurisdictional coordination challenges
    - Unified Command Structure was slowly formed
    - Lack of standards, for example, in resource request procedures
    - Lack of pre-disaster plan integration across jurisdictions (vertically and horizontally)

FINDINGS (8)

Managerial challenges encountered by first responders — Cascadia Rising

- Lack of standardized operations, processes, and functions despite NIMS/ICS and NRF
  - No standards for processes and procedures
- Staffing
  - Quite a number of responders did not report to duty
  - Understaffing has to be expected as the norm (victimization, absenteeism, COIs, physical obstacles)
  - Essential expertise was and will be missing
  - Extended work hours leading to fatigue, wear-down, and mistakes
  - Staff rotation as work-around
  - Over-reliance on volunteers
- Resource management
  - Worked well between FEMA and State, not so well between lower levels of gov and with State/FEMA
  - Redundant and/or incomplete r resource requesting
  - Lack of familiarity with FEMA/federal reimbursement requirements
  - Push concept not well known -- further confusion
  - Lack of knowledge about advanced capabilities

FINDINGS (9)

Managerial challenges encountered by first responders — Cascadia Rising

- Planning
  - Double work of lack of knowledge regarding pre-existing plans
  - Existing plans as starting points (not suited for M9+ CSZ)
  - Missing plans for mass fatalities, mass care and sheltering, and mass evacuation as well as fuel and fuel distribution
  - Basic elements missing (updated contact info, org charts, vendor lists, information access points etc.)
  - Many continuity-of-operations plans (COOPs) out of date
  - Lack of plan sharing and plan cycle synchronization
  - Lack of planning for paper-based response
  - Lack of planning for unprepared populations
  - Lack of preparedness for a humanitarian crisis of proportions
  - Need for paradigm shift from pull to push
  - Need for paradigm shift from only operating from 100 percent vetted information bases

DISCUSSION (1)

- Persisting known problems (Oso to Cascadia)
  - Several SSA/COP-related issues had been observed and analyzed before (missing standards for information sharing, the need for developing hazard-specific EEI checklists and contact lists, lack of information integration
  - The CR16 study re-confirmed exactly the unabated persistence of these key issues
- In the CR16 study additional issues and more detail regarding the known problems
  - Need for standardizing information collection, verification, and dissemination methods
  - Inclusion of mechanisms and methods for collection (push and/or pull)
  - Verification methods and levels (for example, confidence levels from unverified, verified in part, or fully verified)
  - Dissemination methods and formats (for example, standardized SitReps)
  - ICT mirror infrastructures outside impact area as alternative
- Importance of "Essential Elements of Information" (hazard-specific lists) provide guidance through information collection and dissemination regarding assets of critical infrastructures

DISCUSSION (2)

- Rethinking the information sharing paradigm
  - Vetting and verifying information before passing on or using it for informing response efforts ("erring on the side of caution")
  - Passing on information with a status label, which informs the recipient of the vetting status, might be preferable to hoarding and siloing information. This change of information sharing practice and policy may need some effort to implement including culture change efforts
- Information integration and visualization
  - Separate formats basically stayed separate and were not compiled into a single whole, so that information remained incomplete and distorted.
  - Once properly integrated information needs to be also adequately visualized (interactive charts or on paper/whiteboard-based status boards)
- Shift overlaps for maintaining SSA/COP as low-hanging fruits
- Need for contingency planning and extended paper-based operations

DISCUSSION (3)

- State of currently used emergency ICTs in light of the 2004 DERMIS recommendations
  - ***Extreme ease of learning*** was seen as a foremost requirement: Unmet by any of the systems in use
  - ***Usability by trained responders***: Met in part by all investigated systems
  - ***Conciseness*** (relating to a user interface): None of the systems comes even close to matching up with this requirement
  - ***Customizability to responders' specific needs***: In part met by WebEOC; however, becoming very cumbersome when system is increasingly populated
  - ***Support for all EOC/IMT functions***: Mainly lacking––for example, major GIS-related information could not easily be integrated into a system like WebEOC
  - ***Independence from a particular physical location***: Met by WebEOC; however severe limitations in terms of scalability
  - ***Support for structured communication processes***: Can be met by a number of the systems studied———lack of standardization in forms and processes

DISCUSSION (4)

- Manifold obstacles to coordination and collaboration
  - Coordination and collaboration heavily reliant on ICTs, which are heavily reliant on properly functioning networks, which are heavily reliant on the availability of electrical power
  - Degradation of other critical infrastructures, first and foremost, transportation, would severely stifle coordinated responses
  - Lack of plan integration and planning synchronization
  - Absence of standardization of structures, processes, procedures, and forms
  - Lack of policy decision alignment
- Addressing coordination & collaboration obstacles
  - Develop and negotiate among governments of all levels a “Regional Disaster Response Coordination Framework" (home-rule state)
  - Need for defining mechanisms for policy decision alignment between and among jurisdictions

DISCUSSION (5)

- Need to plan for and practice paper-based operations
  - CR16 with no focus on practicing paper-based operations
  - Paper-based and messenger-based response would inevitably be slow-so practice badly needed
  - Gradual restoration of power and connectivity (with new outages)
  - Degraded connectivity for extended periods of time
  - Planning and testing of up-/down-scalable paper/ICT-based operations
- Planning for backup trained and expert staff
  - Staff levels were predicted to go below the 50 percent threshold
  - Need for backup staffing also considering fatigue and wear-down
- Resource management paradigm shift
  - From “pull” to “push” allocating unrequested resources in presumed areas
  - Assumptions and simulation model-based planning incorporating damage forecasts
  - Conflict with both the NIMS/ICS response doctrine and the home rule
  - Practical problems with push allocation (who is responsible?)
  - Need for pre-negotiated and pre-planned/practiced coordination framework

DISCUSSION (6)

- Need for extended training/re-training and funding
  - In particular, functional exercises in scaling between paper-based and ICT-based operations
  - Funding for multiple, also functional exercises, not only CR22
  - Need for CR22 to be more realistic
- Exercise specifics
  - Current statewide planning and preparedness levels were found appropriate only for responding to non-catastrophic incidents

CONCLUSION AND FUTURE RESEARCH

- Response to a catastrophe markedly differs from responses to “regular” emergencies and non-catastrophic disasters
- Need for scalability (back to pre-IT times and back forward)
  - Paper-based, runner-based, as well as low- or no-technology-based operations need to be redeveloped and practiced along with their gradual transition to more advanced procedures and methods as soon as those become available
- Cascadia Rising 2022
  - It now is planned that the exercise will be repeated and conducted under the assumption of an even more severe scenario with stingier injects
- Currently, the US Pacific Northwest would be caught absolutely flat-footed by a mega-thrust and tsunami

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1st Oso/SR530 Paper

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2nd Oso/SR530 Paper

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1st CR16 Paper

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3rd CR16 Paper

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AFTERTHOUGHT

Quoting Eric Holdeman

- Four Modes of Denial

  - "It will not happen during my lifetime."
  - "It happens during my lifetime, but I will not be impacted."
  - "It happens, I will be affected, but I will be fine."
  - "One cannot do anything about it anyway."

THANK YOU!

QUESTIONS OR COMMENTS?