



Thoughts about Creating New Risk Assessment Paradigms to Demonstrate How **Geographic Factors** Affect the Human Impacts of Natural Disasters

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Slides for a Presentation to the Rotary Club of West Ottawa
Ottawa, Ontario

<https://www.facebook.com/RotaryClubOfWestOttawa>

December, 2017

1. QUESTIONS, QUESTIONS, QUESTIONS

Question 1: Why bother with risk assessment?

Question 2: What's old about natural disasters?

Question 3: What's new about natural disasters?

Question 4: What's new about the human impacts of natural disasters?

Question 5: What's new about geographic factors affecting the human impacts of natural disasters?

Question 6: Why new risk assessment paradigms?



2A. WHY BOTHER WITH RISK ASSESSMENT?

IN THIS PRESENTATION RISK ASSESSMENTS ARE SEEN TO BE DONE TO AVOID “NASTY SURPRISES” THAT ARISE AS A RESULT OF BEING IMPROPERLY PREPARED FOR NATURAL DISASTER EVENTS. THE FOLLOWING PHRASES ILLUSTRATE THE NOTION OF NASTY SURPRISES THAT BEFALL THOSE WHO DO NOT HAVE DUE REGARD FOR RISK ASSESSMENT.

He didn't look before he leapt.

A stitch in time would have saved nine.

Poking the bear is never a good idea.

Playing with fire can get you in hot water.

Running on empty can leave you stranded.

Yes, we built in a flood plain, but who knew

The dam's sub-surface was not as stable as imagined.

They thought the ice was thicker, which is why

The city did not clear leaves from the storm drain covers, so its flood insurance policy is negated.

OK, it's a snow belt, but who needs winter tires?

Trust me, this rope is plenty strong.



2B. WHY BOTHER WITH RISK ASSESSMENT?

MORE PHRASES WHICH ILLUSTRATE THE NOTION OF NASTY SURPRISES THAT BEFALL THOSE WHO DO NOT HAVE DUE REGARD FOR RISK ASSESSMENT.

Let's assume there will be less snow this year.

Big mistake not super-sizing the storm sewer pipes.

Anyone check the back-up generator?

I just wanted to see if

Measure, schmeasure, let's roll.

Poison ivy? Maybe, you'll know soon enough.

Whoa, are we in an earthquake zone?

An avalanche? Here?

No, we did not take drill cores in that area, it looked like really hard rock.

The city can cut costs by not clearing ice and snow from sidewalks.

Whose idea was it to plant only elm trees along the boulevard?

It takes time and costs money to compile evidence. Let's just go with our guts.



3A. WHAT'S OLD ABOUT NATURAL DISASTERS?

HEADLINES OF MEDIA STORIES USED 25-30 YEARS AGO IN DESIGNING THE *DOOMSDAY MAP* ILLUSTRATE THAT CURRENT CONCERNS ABOUT THE INCIDENCE OF NATURAL DISASTER EVENTS, THE IMPACTS OF NATURAL DISASTERS ON HUMANS, AND THE CREATION OF NATURAL DISASTERS BY HUMANS THROUGH LAND, WATER, AND AIR ABUSES ARE FAR FROM NEW.




3B. WHAT'S OLD ABOUT NATURAL DISASTERS?

FOR THE PURPOSES OF THIS PRESENTATION “OLD” IS TAKEN TO BE 25-30 YEARS, BUT THIS SPAN IS JUST A MOMENT IN NATURAL DISASTER HISTORY. FURTHER, ONLY A SMALL SELECTION OF AVAILABLE HEADLINES IS USED HERE. OTHER HEADLINES CAN BE ACCESSED VIA THE LINKS AT THE END OF THE PRESENTATION, AND/OR BY LITERATURE SEARCHES AND REVIEWS OF HARD COPY AND DIGITAL MEDIA FILES.



3C. OLD NATURAL DISASTER HEADLINES

25 years ago, land conflict headlines



MAKING CONNECTIONS:
**LAND AS RESOURCE
AND COMMODITY**

Farmland in central valley gobbled up by developers
Los Angeles Times

Careful land use key to saving space
Ashbury Park (N.J) Press

Revisions eliminate too much of wetlands
Baltimore Sun

3D. OLD NATURAL DISASTER HEADLINES

25 years ago, water problem headlines



MAKING CONNECTIONS:

WATER, WATER EVERYWHERE?

Water quality management urged as part of land use planning
Newark Star Ledger


Tax bills aim to conserve water supply
Miami Herald

The Great Lakes: World's largest body of "fresh" water is filthy, probably dangerous and not likely to be cleaned up soon
Toronto Star



3E. OLD NATURAL DISASTER HEADLINES

25 years ago, global warming headlines



MAKING CONNECTIONS:

GLOBAL WARMING?


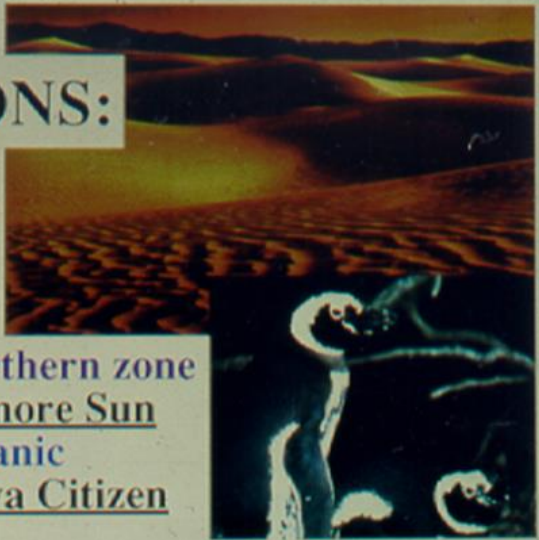
GLOBAL FRYING?

Scientists finding many 'leaks' in northern zone
Baltimore Sun

Ozone threat: Time for action, not panic
Ottawa Citizen


Europeans try to plug ozone hole
Philadelphia Inquirer

Ozone-hole conditions spreading: High concentrations of key pollutants discovered over U.S.
Washington Post



3F. OLD NATURAL DISASTER HEADLINES

25 years ago, nasty toxic waste headlines




MAKING CONNECTIONS:

**TOXIC WASTES:
WHAT TO DO?
WHERE TO DO IT?**

Site decisions on hazardous waste on hold
Atlanta Constitution

Toxic ghosts still lurk along banks of the Bow
Calgary Herald

Illinois N-waste plan sparks fear and anger
USA Today



3G. OLD NATURAL DISASTER HEADLINES

25 years ago, more nasty toxic waste headlines



**MAKING CONNECTIONS:
GIS & TOXIC WASTE
IN LOUISIANA:
BEST WORST CASE**

The wasteland: Abandoned toxic dumps
brimming with hazards

Underground hazards: Drinking-water fears spread with waste

Dumping ground: State a final stop for nation's toxic waste

The Times-Picayune, New Orleans, LA
March 24-26, 1991



4A. WHAT'S NEW ABOUT NATURAL DISASTERS?

TWO ASPECTS ARE PERTINENT: 1. WHEN PERCEPTIONS, PREDICTIONS, FORECASTS, ESTIMATES, GUESSES, WORRIES, ETC., PREVIOUSLY EXPRESSED ABOUT NATURAL DISASTERS BECOME CONFIRMED REALITY; AND 2. WHEN PREVIOUSLY UNKNOWN NATURAL DISASTERS EMERGE WE ENCOUNTER NEW IMAGES, CONCEPTS, IDEAS, DATA, INITIATIVES, CLAIMS, MAPS, ETC., ABOUT THE STATE OF NATURAL DISASTER PHENOMENA, INCLUDING CAUSE-EFFECT RELATIONSHIPS.

Stories on the following topics are indicative of what's new about natural disasters:

Global temperatures rising more quickly than expected.

Hurricanes larger and more frequent than usual.

Tornadoes more widespread this decade than ever before.

Ice coverage and thickness decreasing rapidly.

More inland areas now flooded by rising sea levels.



4B. WHAT'S NEW ABOUT NATURAL DISASTERS?

More stories on the following topics are indicative of what's new about natural disasters:

Permafrost zones significantly reduced.

Ocean acidification increasing faster than predicted.

Species declines widespread.

Migration patterns changing for birds and animals.

Increased spread of insect-borne illnesses.

Longer droughts.

Major changes in plant cycles.

Potable water crisis reaching global proportions.



4C. WHAT'S NEW ABOUT NATURAL DISASTERS?

More stories on the following topics are indicative of what's new about natural disasters:

Increased intensity and frequency of wildfires.

Later freezing and earlier melting of ice roads.

Snow cover changing significantly.

Earthquakes more frequent, more powerful.

Flood levels reach new highs.

Air quality crisis having deadly effect worldwide.

Deserts spreading at a more rapid rate.

Climate change evidence now widely accepted as the fact base underlying weather variations.



4D. WHAT'S NEW ABOUT NATURAL DISASTERS?

OUR ABILITY TO MORE QUICKLY AND MORE COMPREHENSIVELY LEARN WHERE NATURAL DISASTERS ARE IMPENDING AND OCCURRING IS A MAJOR FORCE FOR MITIGATING HUMAN IMPACTS, AND IS A HUGE CHANGE FROM THE 1980s AND 1990s. THIS NEW STATE OF INFORMATION IS DUE TO ADVANCES IN SCIENCE AND TECHNOLOGY SUPPORTING.

Global-wide **OBSERVING** systems

Global-wide **RECORDING** systems

Global-wide **MAPPING** systems

Global-wide **REPORTING** systems



5A. EXAMPLES OF NATURAL PHENOMENA EVENTS AND TRENDS WITH KNOWN OR LIKELY HUMAN IMPACTS

Air quality deterioration

Avalanches

Climate change

Desertification

Droughts

Earthquakes

Floods

Glaciers melting

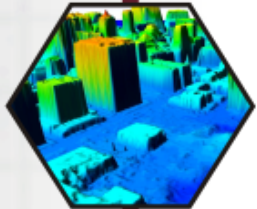
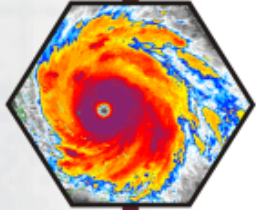
Global warming

Hurricanes

Ice caps melting



5B. MORE EXAMPLES OF NATURAL PHENOMENA EVENTS AND TRENDS WITH KNOWN OR LIKELY HUMAN IMPACTS



Landslides

Lightning strikes

Permafrost melting

Soil loss

Species loss

Tornadoes

Water excesses

Water shortages

Weather (extreme) events

Wetland loss

Wildfires

6A. WHAT'S NEW ABOUT THE HUMAN IMPACTS OF NATURAL DISASTERS?

AS A RESULT OF THE KNOWN CONSEQUENCES ARISING FROM NATURAL DISASTERS, SUCH AS THOSE LISTED IN SLIDE SECTIONS 3, 4 AND 5 ABOVE, NO DOUBT MANY GOVERNMENTS AROUND THE WORLD, INCLUDING THE CITY OF OTTAWA, THE PROVINCE OF ONTARIO, AND THE GOVERNMENT OF CANADA, HAVE COMPILED SUBSTANTIAL DATA BASES, INFORMATION BASES, AND KNOWLEDGE BASES WHICH DOCUMENT THE IMPACTS OF NATURAL DISASTERS ON HUMANS.



6B. WHAT'S NEW ABOUT THE HUMAN IMPACTS OF NATURAL DISASTERS?

GIVEN THE KNOWN CONSEQUENCES WHICH NATURAL DISASTERS HOLD FOR HUMANS, I THINK IT IS REASONABLE TO EXPECT THAT CANADA'S GOVERNMENTS HAVE DECIDED TO BETTER TAKE INTO ACCOUNT AND ACT UPON WHAT GOVERNMENTS ELSEWHERE HAVE DONE TO IDENTIFY, ADOPT, AND IMPLEMENT MEASURES WHICH MITIGATE THE IMPACTS THAT NATURAL DISASTERS HAVE ON HUMANS, WITH THE RISK ASSESSMENT COMPONENT ASSIGNED FIRST-ORDER PRIORITY IN THE SEARCH, REVIEW, AND ACT PROCESSES.



7A. WHAT'S NEW ABOUT GEOGRAPHIC FACTORS AFFECTING THE HUMAN IMPACTS OF NATURAL DISASTERS?

ON A GLOBAL SCALE WE ARE WITNESSING FUNDAMENTAL CHANGES IN THE GEOGRAPHIC ASPECTS OF NATURAL DISASTER EVENTS. FOR EXAMPLE, ONCE WHAT WAS SEEN TO HAPPEN “OVER THERE” IS NOW BEING FELT “OVER HERE”, AND VICE VERSA, WHERE HERE AND THERE CAN BE OCEANS APART, MOUNTAIN RANGES APART, ELEMENTS OF THE SAME DRAINAGE BASIN, OR WARDS IN THE SAME METROPOLITAN REGION.



7B. WHAT'S NEW ABOUT GEOGRAPHIC FACTORS AFFECTING THE HUMAN IMPACTS OF NATURAL DISASTERS?

YEARS AGO I CREATED LISTS OF GEOGRAPHIC CONCEPTS USED IN RESEARCH ON PUBLIC POLICY FORMATION. I SUGGEST THAT THE FOLLOWING CONCEPTS FROM THOSE LISTS ARE AMONG THE GEOGRAPHIC FACTORS THAT WARRANT PRIMARY CONSIDERATION IN RISK ASSESSMENT SITUATIONS INVOLVING THE IMPACTS OF NATURAL DISASTERS ON HUMANS.

Accessibility; Adjacency; Areal Differentiation; Barrier; Buffer; Closeness; Cluster; Compactness; Concentration; Congestion; Connectivity; Density; Dispersion; Distance; Encroachment; Environs; Habitat; Hinterland; Integration; Intensification; Interaction; Island; Isolation; Linkages; Migration; Mobility; Movement; Near; Path; Pattern; Periphery; Proximity; Region; Remote; Scale; Separation; Shape; Spatial Interaction; Zoning.



7C. WHAT'S NEW ABOUT GEOGRAPHIC FACTORS AFFECTING THE HUMAN IMPACTS OF NATURAL DISASTERS?

COMPARISON OF STORIES BEHIND MEDIA HEADLINES OF 25-30 YEARS AGO (EXAMPLES IN SECTION 3) AND THE STORIES BEHIND THE NEW FEATURES OF NATURAL DISASTERS (EXAMPLES IN SECTION 4) REVEALS THAT A MAJOR SHIFT HAS OCCURRED REGARDING THE DEGREE AND EXTENT OF IMPACTS OF NATURAL DISASTERS ON HUMANS, AND MANY OF THOSE IMPACTS ARE OF A SPATIAL NATURE. AS A RESULT, CRITICALLY EXAMINING GEOGRAPHIC FACTORS IN CAUSE-EFFECT RELATIONSHIPS IS A *SINE QUA NON* CONDITION OF SOUND POLICY RESEARCH AND POLICY INITIATIVES WHICH ARE INTENDED TO SIGNIFICANTLY MITIGATE THE IMPACTS OF NATURAL DISASTERS ON HUMANS.



7D. WHAT'S NEW ABOUT GEOGRAPHIC FACTORS AFFECTING THE HUMAN IMPACTS OF NATURAL DISASTERS?

THE TERM “NEW” MEANS THAT I AM NOT THINKING IN THE “SAME OLD, SAME OLD” MODE WITH REGARD TO GEOGRAPHIC FACTORS. THAT IS, WHILE MANY OF THE CONCEPTS IN 7B HAVE LONG BEEN PART OF GEOGRAPHIC EDUCATION, TRAINING, RESEARCH, AND APPLICATIONS, I SUGGEST THAT WE NEED A MAJOR RE-THINK OF THOSE CONCEPTS IN TWO RESPECTS: 1) HOW THEY HELP TO DESCRIBE AND EXPLAIN THE HUMAN IMPACTS OF NATURAL DISASTERS; AND 2) HOW THEY CONTRIBUTE TO POLICIES, PLANS, AND PROGRAMS DESIGNED TO MITIGATE THE IMPACTS.



8A. WHY NEW RISK ASSESSMENT PARADIGMS?

IF THE CURRENT RISK ASSESSMENT PARADIGMS FOR DEALING WITH THE IMPACTS OF NATURAL DISASTERS ON HUMANS ARE NOT BROKEN, AND RESPECTING THE ADAGE “IF IT AIN’T BROKE DON’T FIX IT”, THERE WOULD BE NO NEED FOR THIS PRESENTATION SINCE THERE WOULD BE NOTHING THAT NEEDS FIXING.



8B. WHY NEW RISK ASSESSMENT PARADIGMS?

HOWEVER, AS SHOWN IN SECTION 4 AND SECTION 5, THE PARADIGMS ARE BROKEN AND NEED FIXING BECAUSE MANY THINGS GONE AND GOING WRONG IN THE NATURAL DISASTER DOMAIN 25-30 YEARS AGO CONTINUE TO THIS DAY, AND OVER THE INTERVENING YEARS ADDITIONAL NATURAL DISASTER IMPACTS ON HUMANS HAVE BEEN OBSERVED, RECORDED, MAPPED, AND REPORTED.



8C. WHY NEW RISK ASSESSMENT PARADIGMS?

SINCE RISK ASSESSMENTS IN THIS PRESENTATION ARE SEEN TO BE DONE TO AVOID NASTY SURPRISES THAT CAN ARISE AS A RESULT OF BEING IMPROPERLY PREPARED FOR NATURAL DISASTER EVENTS, THE CALL FOR NEW PARADIGMS EMERGES BECAUSE OLD PARADIGMS WERE INEFFECTIVE, MANY CURRENT PARADIGMS ARE NOT WORKING VERY WELL, AND THERE APPEARS TO BE LITTLE EXTANT EVIDENCE THAT PARADIGMS IN CURRENT USE BY CANADA'S MUNICIPAL OR PROVINCIAL GOVERNMENTS, OR THE FEDERAL GOVERNMENT, ARE LIKELY TO SUCCEED IN SUBSTANTIALLY MITIGATING THE HUMAN IMPACTS OF NATURAL DISASTERS IN THE FORESEEABLE FUTURE.



9A. CONCLUDING THOUGHT 1

SOME 25-30 YEARS AGO, I THOUGHT THAT THE *DOOMSDAY MAP* CONCEPT WOULD CONTRIBUTE TO A MEGA SHIFT IN HOW WE PERCEIVE WHAT IS BEING DONE WITH AND TO OUR LAND, WATER, AND AIR RESOURCES. REGRETTABLY, MY PRESCRIPTION WAS NOT AS EFFECTIVE AS I WOULD HAVE LIKED.



9B. CONCLUDING THOUGHT 2

HOWEVER, WHETHER CAUSED WHOLLY OR IN PART BY NATURAL FORCES OR BY HUMANS, NATURAL DISASTERS CONTINUE TO HAPPEN AND CONTINUE TO HAVE HUMAN IMPACTS, WHICH LEADS ME TO PROPOSE A COMPANION PRESCRIPTION WITH RESPECT TO MITIGATING THE IMPACTS OF NATURAL DISASTERS ON HUMANS.



9C. CONCLUDING THOUGHT 3

IN ADDITION TO USING THE *DOOMSDAY MAP* CONCEPT TO MOTIVATE THOUGHTS AND ACTIONS ABOUT MITIGATING THE IMPACTS OF NATURAL DISASTERS ON HUMANS, I SUGGEST THAT NEW PARADIGMS MUST HAVE HIGHEST REGARD FOR GEOGRAPHIC CONCEPTS SUCH AS THOSE IN SLIDE 7B. THE DISASTERS AND IMPACTS ARE LOCATION-BASED, SO THERE IS EVERY REASON TO ORGANIZE RESEARCH AROUND GEOGRAPHIC CONCEPTS, AND TO ENSURE THAT GEOGRAPHIC CONCEPTS ARE CORE CONSIDERATIONS WHEN IDENTIFYING, ADOPTING, AND IMPLEMENTING THE MEANS TO MITIGATE THE HUMAN IMPACTS OF NATURAL DISASTERS.



10. LINKS TO PUBLICATIONS LEADING UP TO “Thoughts about Creating New Risk Assessment Paradigms to Demonstrate How Geographic Factors Affect the Human Impacts of Natural Disasters”

[Abuse v. Care of Land, Water, and Air, 1990 ... - wellar.ca](#)

[B. Wellar 2006 Geography and Geographic Information ...](#)

<https://www.slideshare.net/wellarb/sustainable-transport-best-practices-and>

http://www.geomatics.uottawa.ca/gisday/Corel/GISDay_UofO.pdf

http://wellar.ca/wellarconsulting/COLLOQUIUM_PROCEEDINGS.pdf

<https://www.slideshare.net/wellarb/esri-gis-retro-colloq-paper-ddm-final>

<https://www.slideserve.com/mikasi/geography-and-geographic-information-systems-gis-new-realities-of-canada-as-an-emerging-information-society>

<http://slideplayer.com/slide/5149674/>

http://wellar.ca/wellarconsulting/COLLOQUIUM_PROCEEDINGS.pdf

<https://www.slideshare.net/wellarb/summary-of-the-gis-retrospective-research-colloquium-final>

<https://www.slideshare.net/wellarb/gis-day-2014-final>

<http://proceedings.esri.com/library/userconf/fed16/index.html>



11. ACKNOWLEDGEMENTS

I am pleased to acknowledge Marjorie Wellar for proof-reading assistance, Keenan Wellar, Co-Leader and Director of Communications, LiveWorkPlay, for PowerPoint slide assistance, and Sam Herold, Technical Advisor, Information Research Board Inc., for assisting with the PowerPoint slide deck used for the presentation and for website posting.

In addition, I wish to thank the Rotary Club of West Ottawa for the opportunity to wrap up my public service, teaching, and consulting careers by means of a public presentation on the topic, *"Thoughts about Creating New Risk Assessment Paradigms to Demonstrate How **Geographic Factors** Affect the Human Impacts of Natural Disasters."*

As everyone in this room knows, Rotary is a global network of 1.2 million neighbors, friends, leaders, and problem-solvers who come together to make positive, lasting change in communities at home and abroad, and I am honoured to be invited to speak to a topic that I believe is of profound importance to making urgently needed positive, lasting change in communities at home and abroad.

