

Life and Personal Accident Catastrophe Market

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**CAS Annual Meeting
November 16, 2004
Montréal (Qc)**

Life and PA Cat – What is it?

- It covers accumulation of losses to a Life or PA writer resulting from an Accident.
- It is an Accident cover so P&C...but also Life !!
 - Not Life but P&C (Mgt of accumulation)
 - Not P&C but Life (U-L cover)

Catastrophe Markets: before and after 9/11

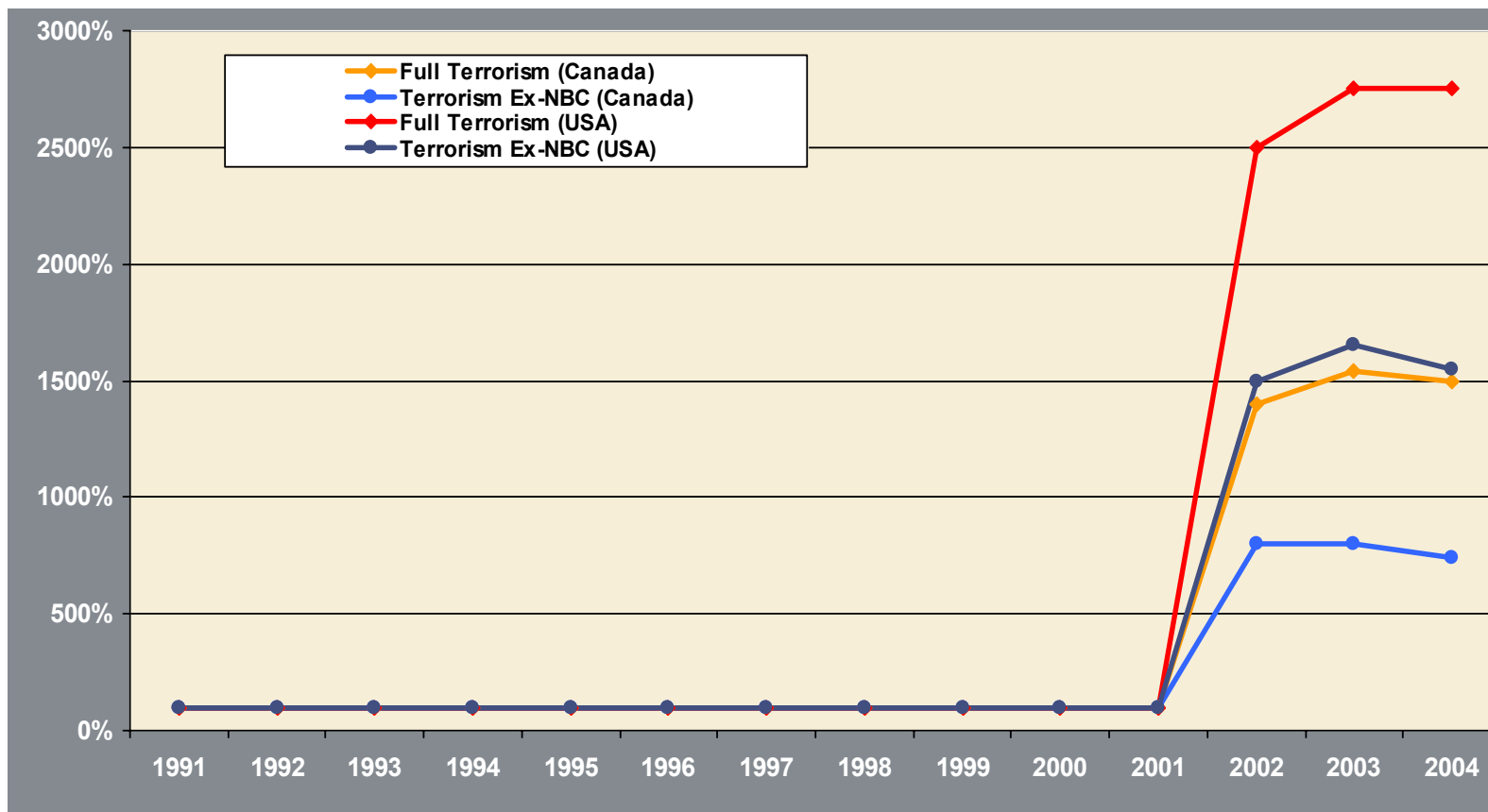
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Cat Life and PA Markets: before 9/11

- Frequency nearly non-existent
- Accumulation management non-existent
- Pricing very "soft"
- 100M xs 100M for \$28,500, ROL = 0.0285%
- In Canada only, about twenty (re-)insurers with large capacity and excellent security

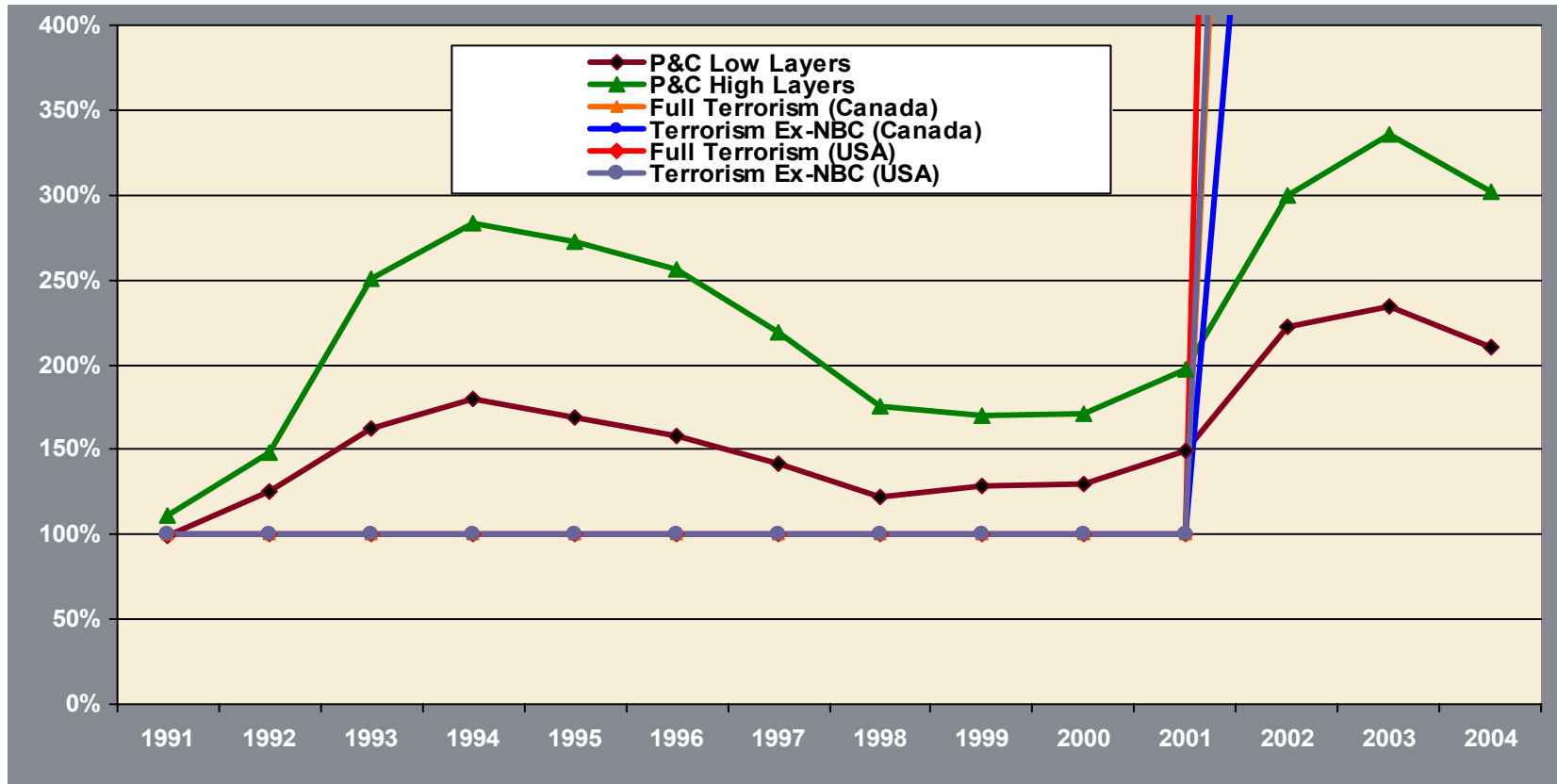
Life CAT Rates*



*** For illustrative purposes only**

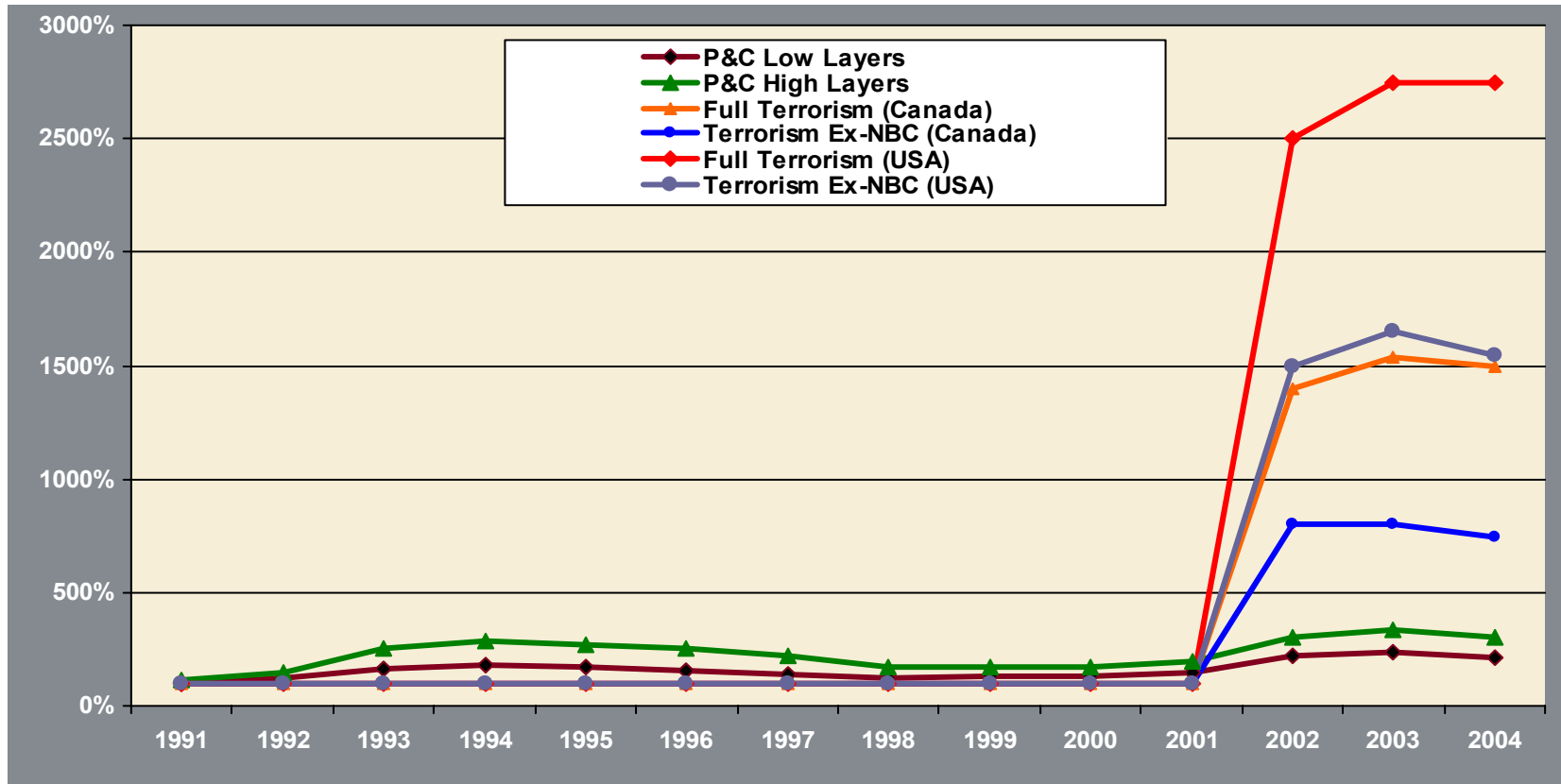
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Comparison of Life and P&C CAT Rates*



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Comparison of Life and P&C CAT Rates*



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Impact of 9/11 on Cat Life and PA

- 16 reinsurers out – 4 left operating, none in retro
- Terrorism exclusions
- Pricing dislocated
- Very superficial underwriting information
- Now mostly seen as P&C cover in North America (minimum ROL, mgt of accumulations, correlation, etc.)

Cat Life and PA – An Example

- Reinsurance Premium 2001 \$243K
- Deductible x 10, Limit increased by 33%
- Reinsurance Premium 2003 \$2M
- Bottom half covers full terrorism
- Top half covers terrorism ex-NBC

Cat Life and PA Retro – An Example

- Premium 2001= \$80K
- Deductible x 5, Same limit
- Premium 2002 = \$4M
- Covers full terrorism

Extending the Reach of the P&C Actuary

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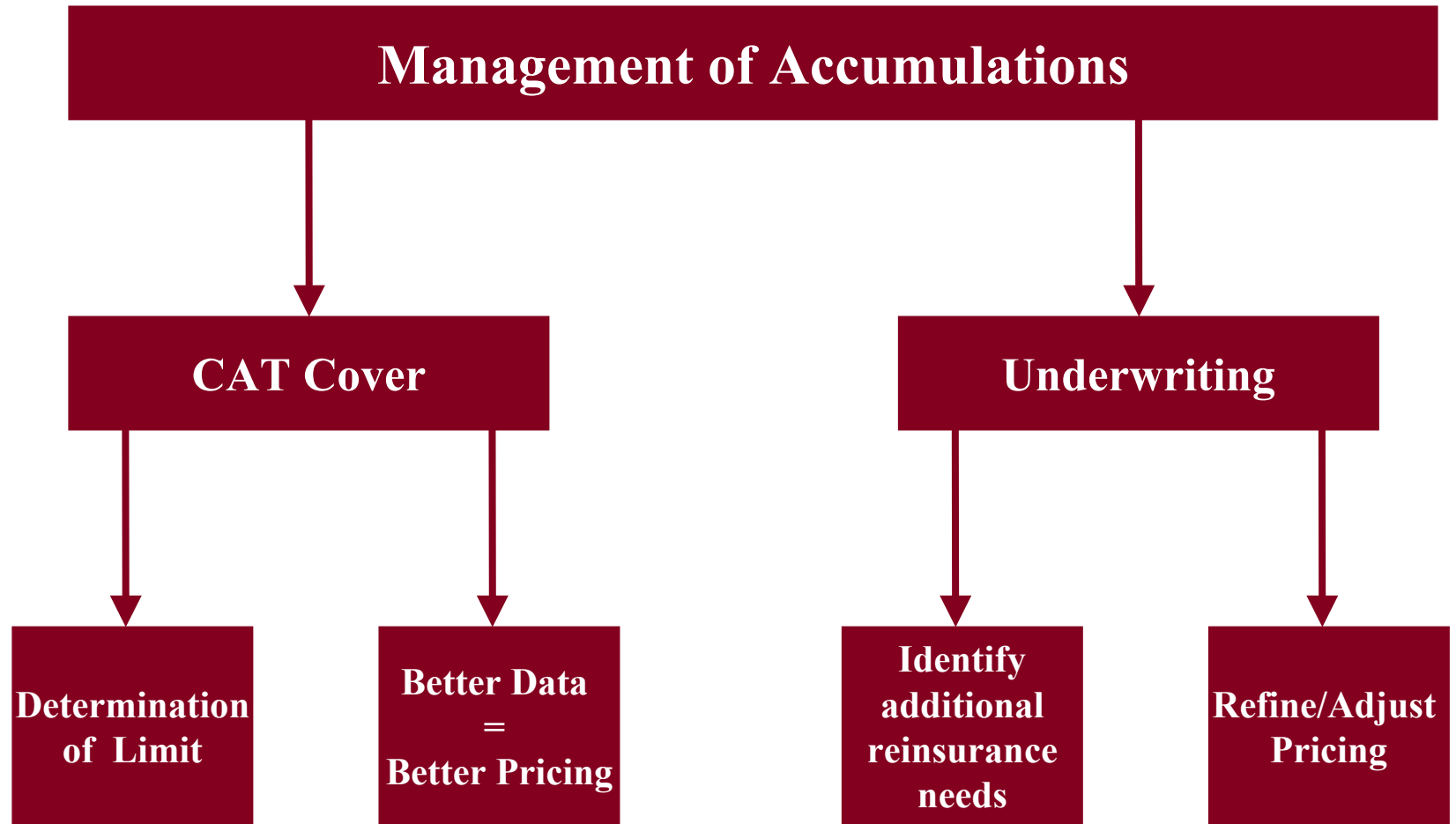
Impact of P&C Actuaries on Life and PA Cat Market

- Impact on data requirements
- Accumulations management
- Extension of P&C Cat models

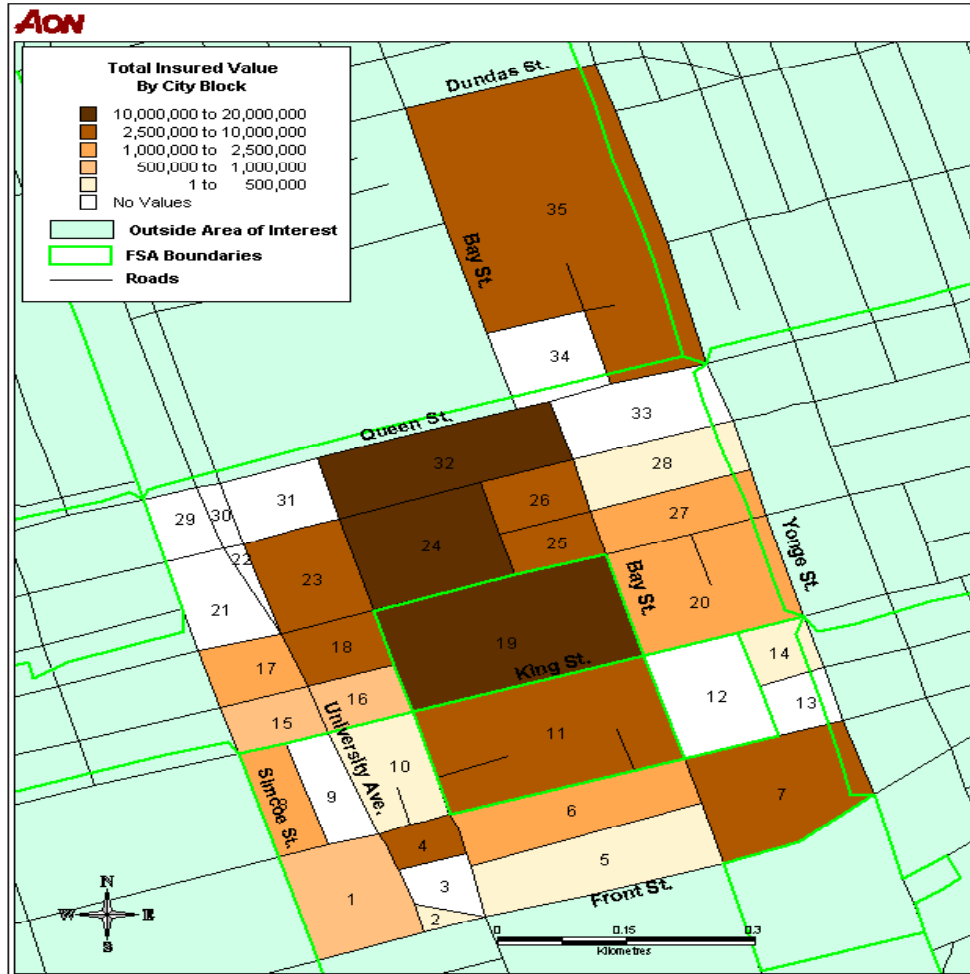
Impact on Data Requirements

- **Finer geographical breakdown**
 - By zip/postal code
 - By CRESTA for other countries/regions
- **Group concentration**
 - By zip/postal code
 - It gets even more detailed
 - Shifts
 - Size and shape of the building / plant
 - Address of each site, not of home office
- **Qualitative**
 - Accumulations management
 - Underwriting guidelines
 - Exposure to Terrorism and Earthquake

Management of Accumulations

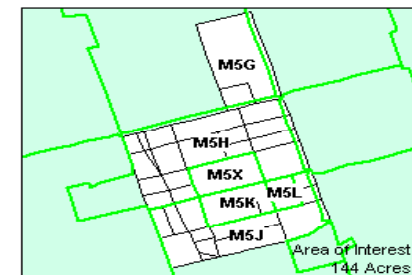


Management of Accumulations

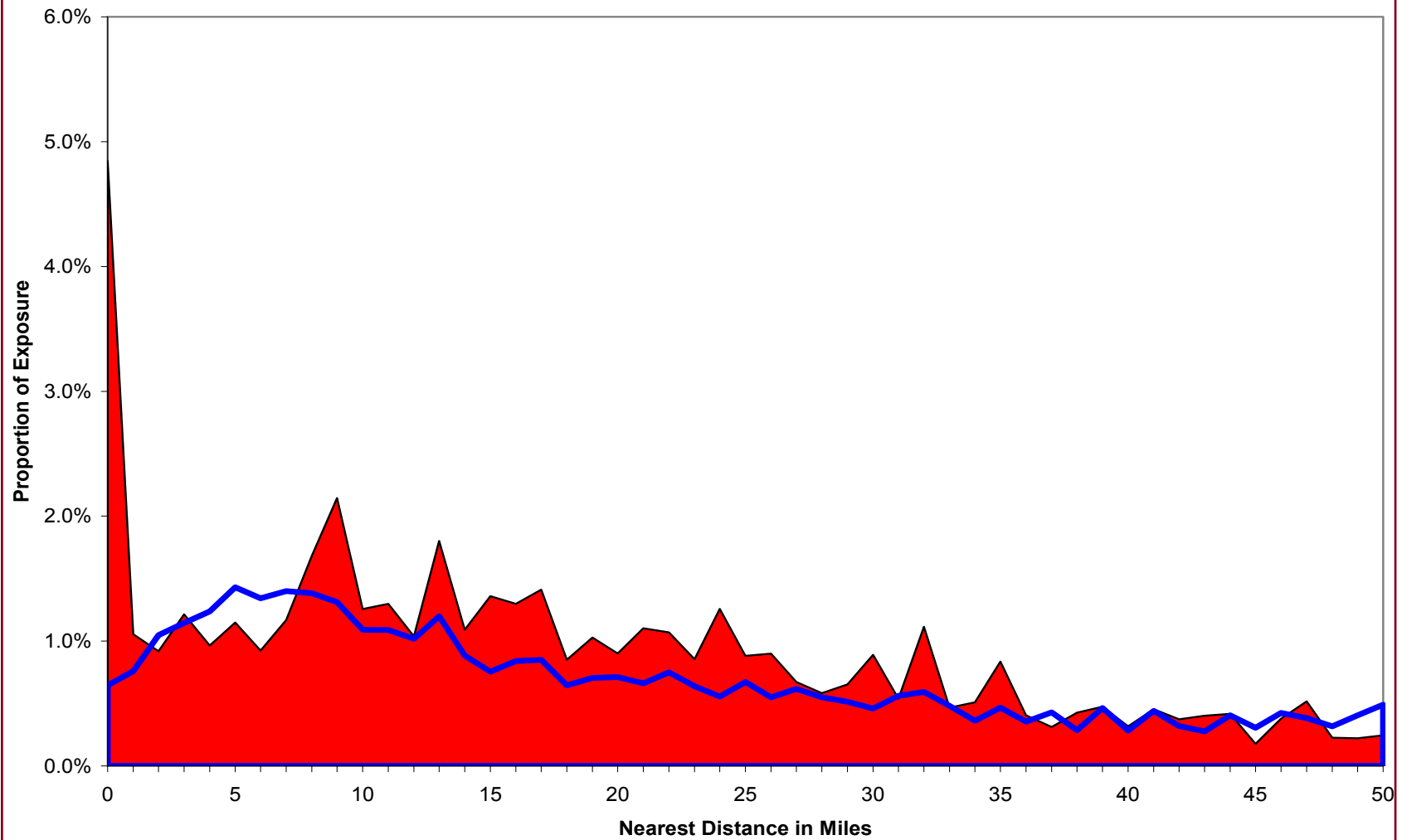


Toronto
Gross Total Insured Value by City Block

Block	FSA	TIV	# of Lives
24	MSH	19,722,750	21
19	MSJ, MSX, MSK, MSL, ME	13,724,649	45
32	MSH	12,187,644	37
35	MSH	8,787,500	2
11	MSH, MSJ	7,053,843	16
7	MSJ	4,848,510	7
26	MSH	3,118,000	10
25	MSH	2,965,519	11
18	MSH	2,927,500	5
4	MSJ	2,842,700	21
23	MSH, MSJ	2,563,700	10
20	MSH	2,356,000	11
27	MSH	1,520,000	6
6	MSJ	1,209,000	3
17	MSH	1,162,000	3
8	MSJ	1,118,400	5
35	MSG	754,800	3
1	MSJ	709,000	3
16	MSH	540,000	3
15	MSJ, MSH	507,800	2
14	MSH	401,800	3
5	MSJ	381,000	2
28	MSH	354,500	3
10	MSJ	285,000	2
2	MSJ	192,000	1
TOTALS		92,233,615	235



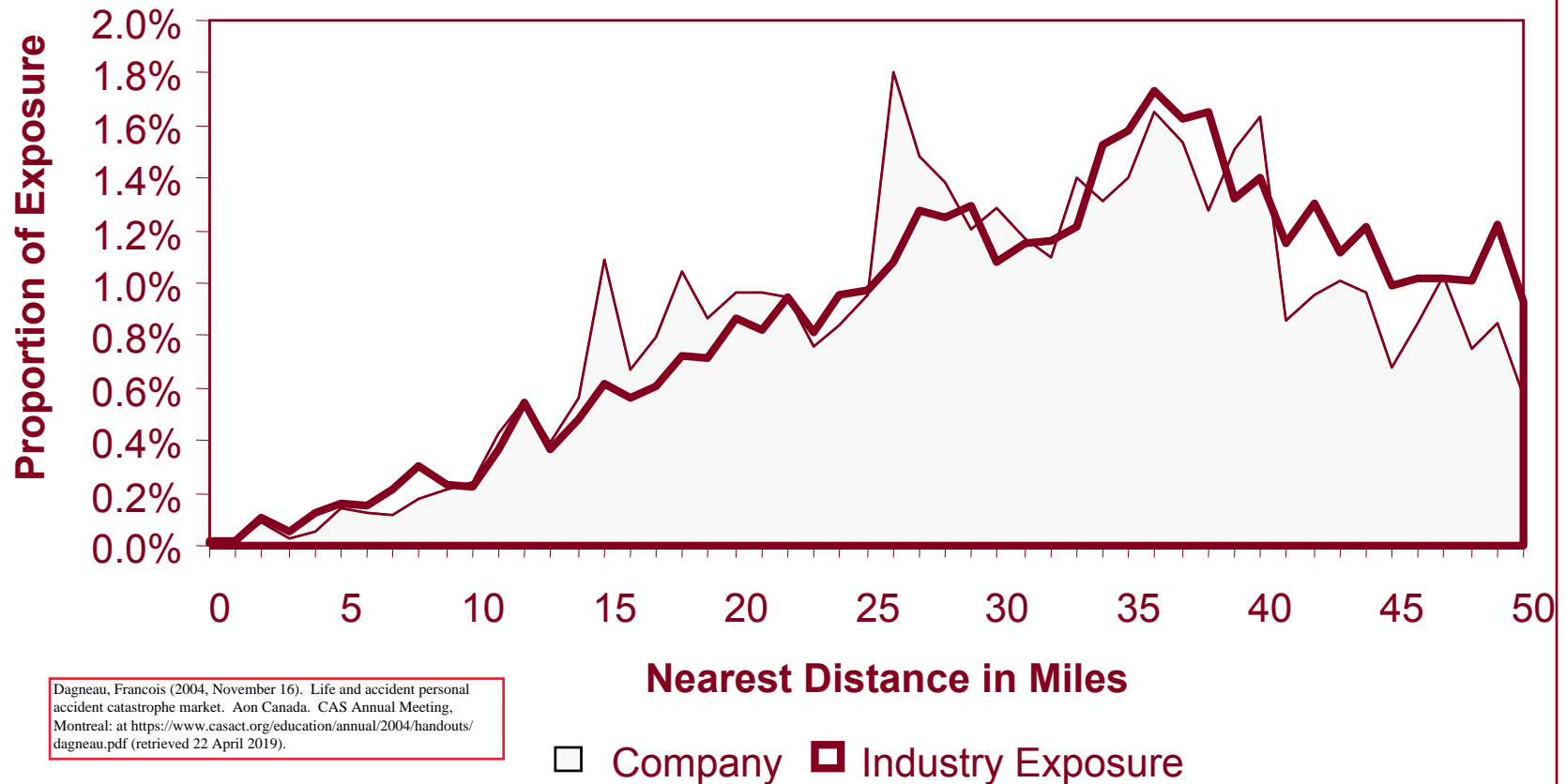
Target Relativity Comparison Major Skyscrapers (Top 100)



Company Census

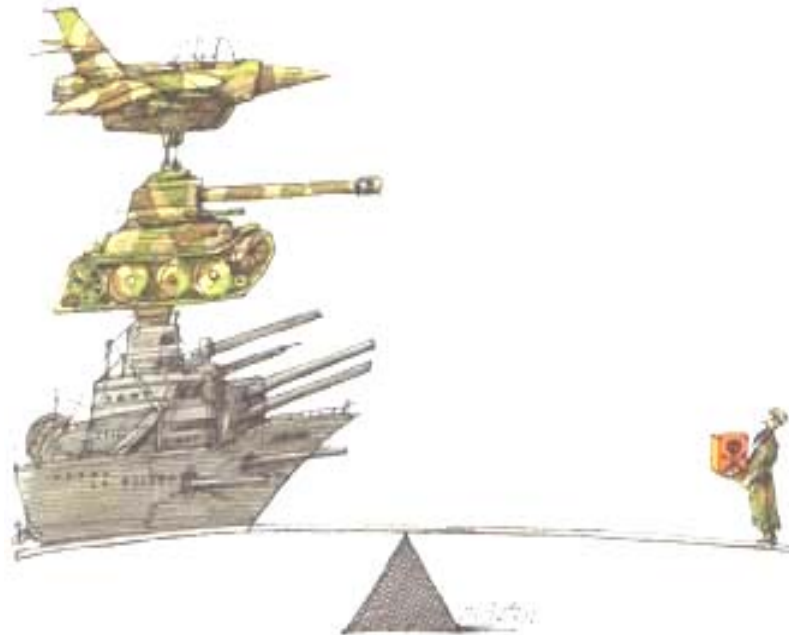
Management of Accumulations

Nuclear Power Plants — Terrorism Relativity Index = 118



Modeling Catastrophe

- Terrorism
 - Frequency? Severity?
 - Targets
 - Attack types
 - Distance from attack
- Earthquake
 - Magnitude, type of shake
 - Type of soil, construction
 - Distance from epicenter
- Data required: # of insureds and sums insured by postal code

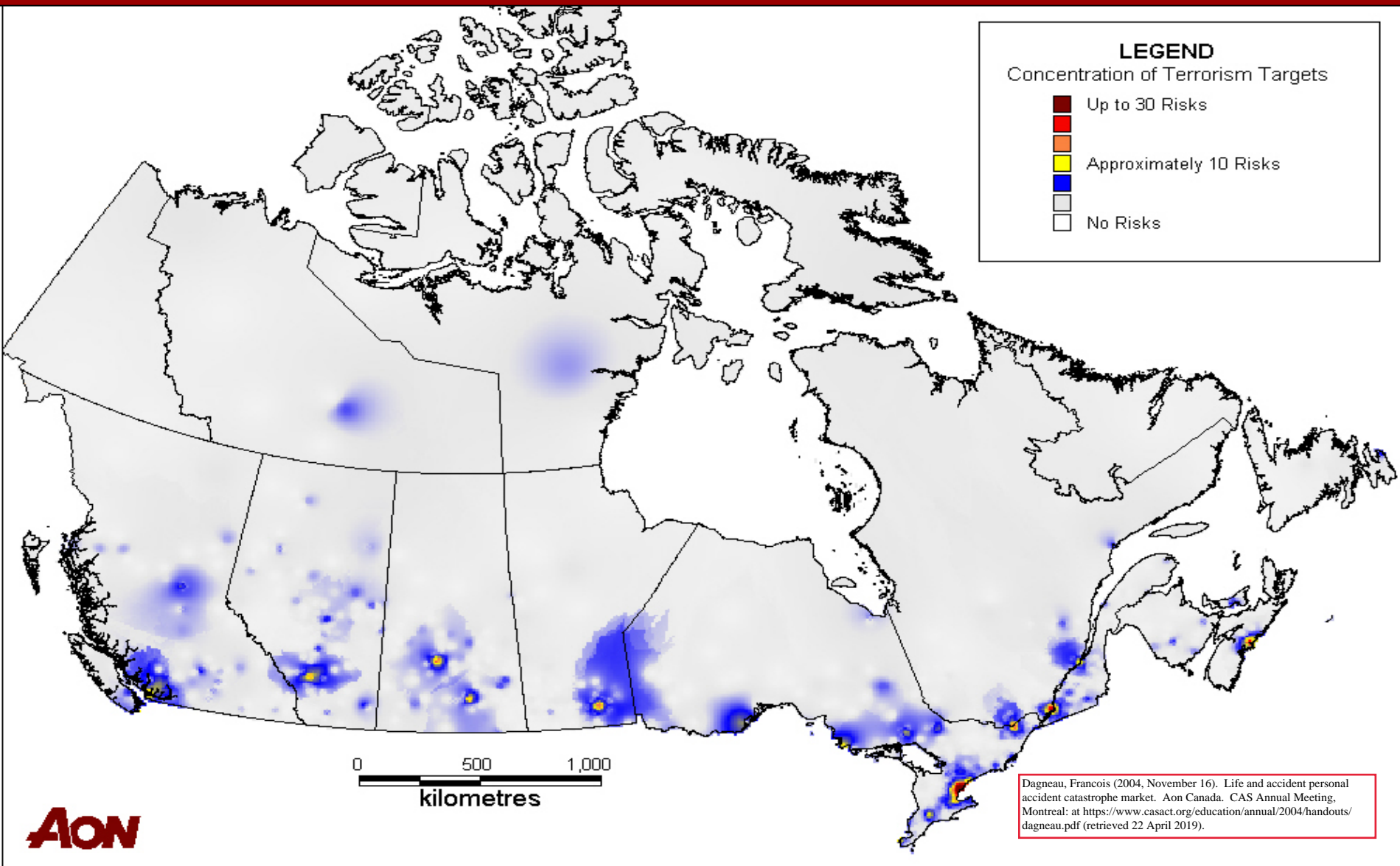


Modeling – Difference with P&C

- Non-Terrorism: very low frequency
- Terrorism: history no predictor
- Miss-factor:
 - WTC was (at least) 100% property loss
 - WTC was less than 10% life loss
 - Timing: EQ outside business hours reduces exposure
 - How to account for that in terms of:
 - Capacity vs exposure charge
- Individual life policies have long duration
 - Cannot exclude a terrorism exclusion on inforce
 - Unlike WC – it provides 24 hours coverage

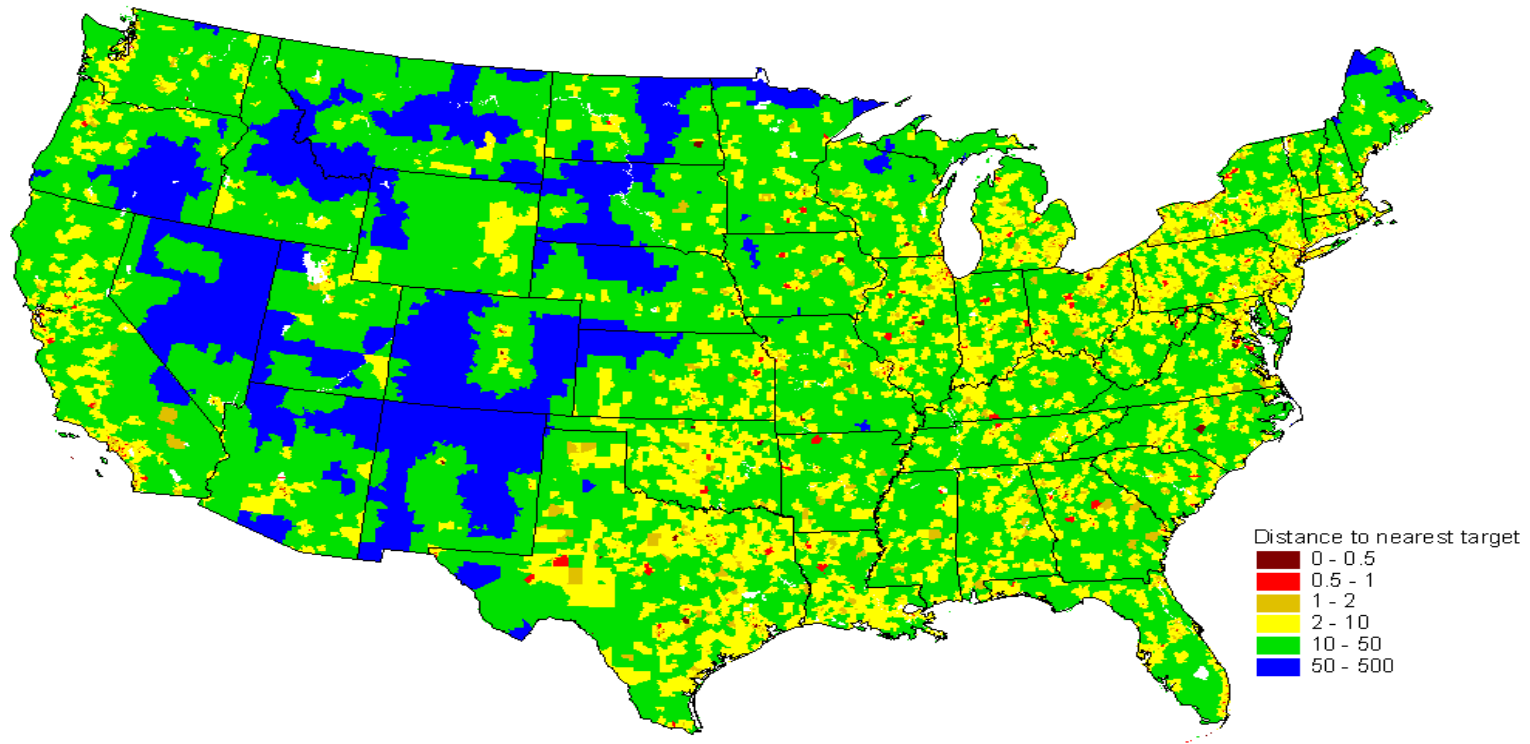


Concentration of Terrorism Targets in Canada



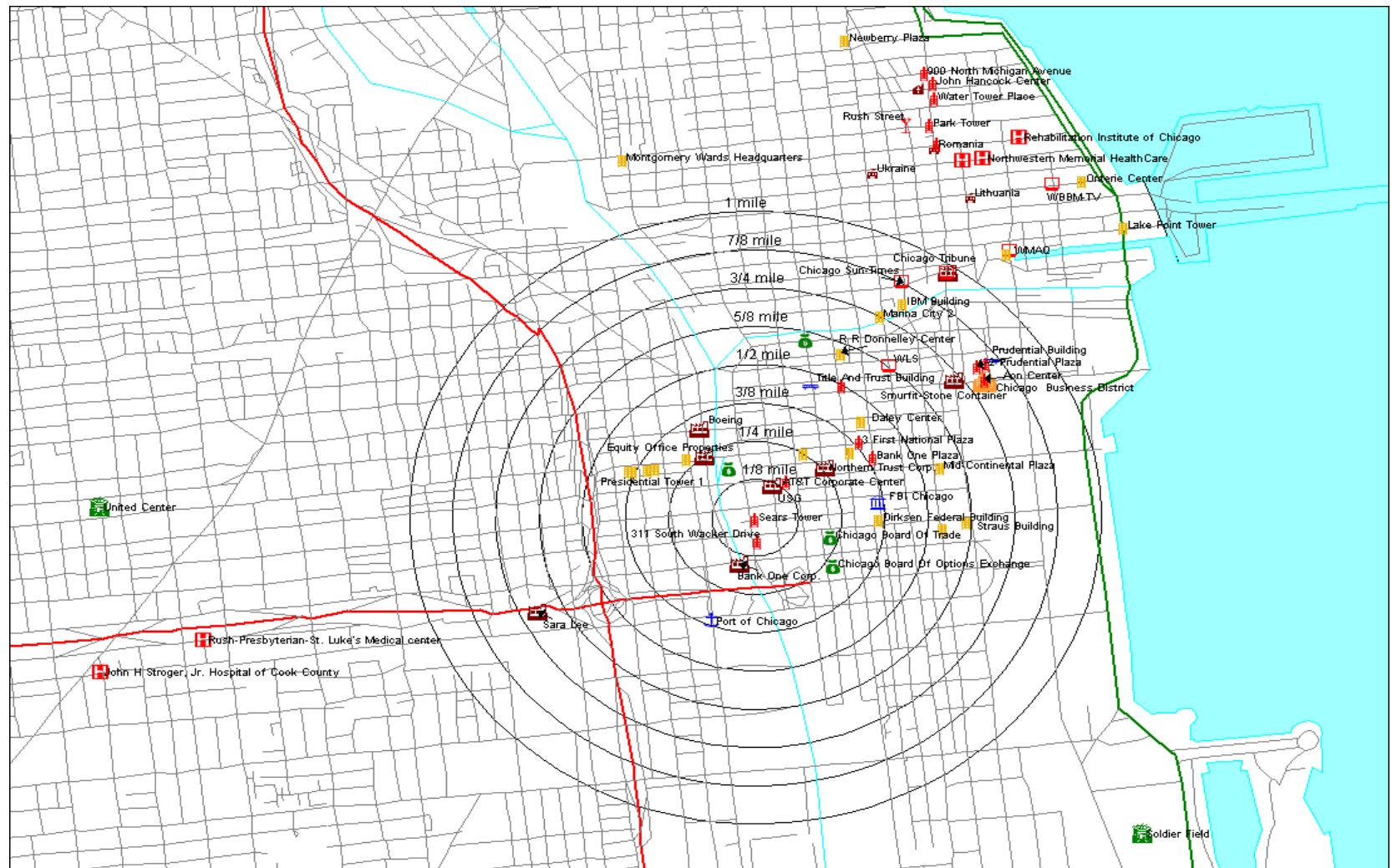
Aon Terrorism Risk Database

Distance to Nearest Target in Miles



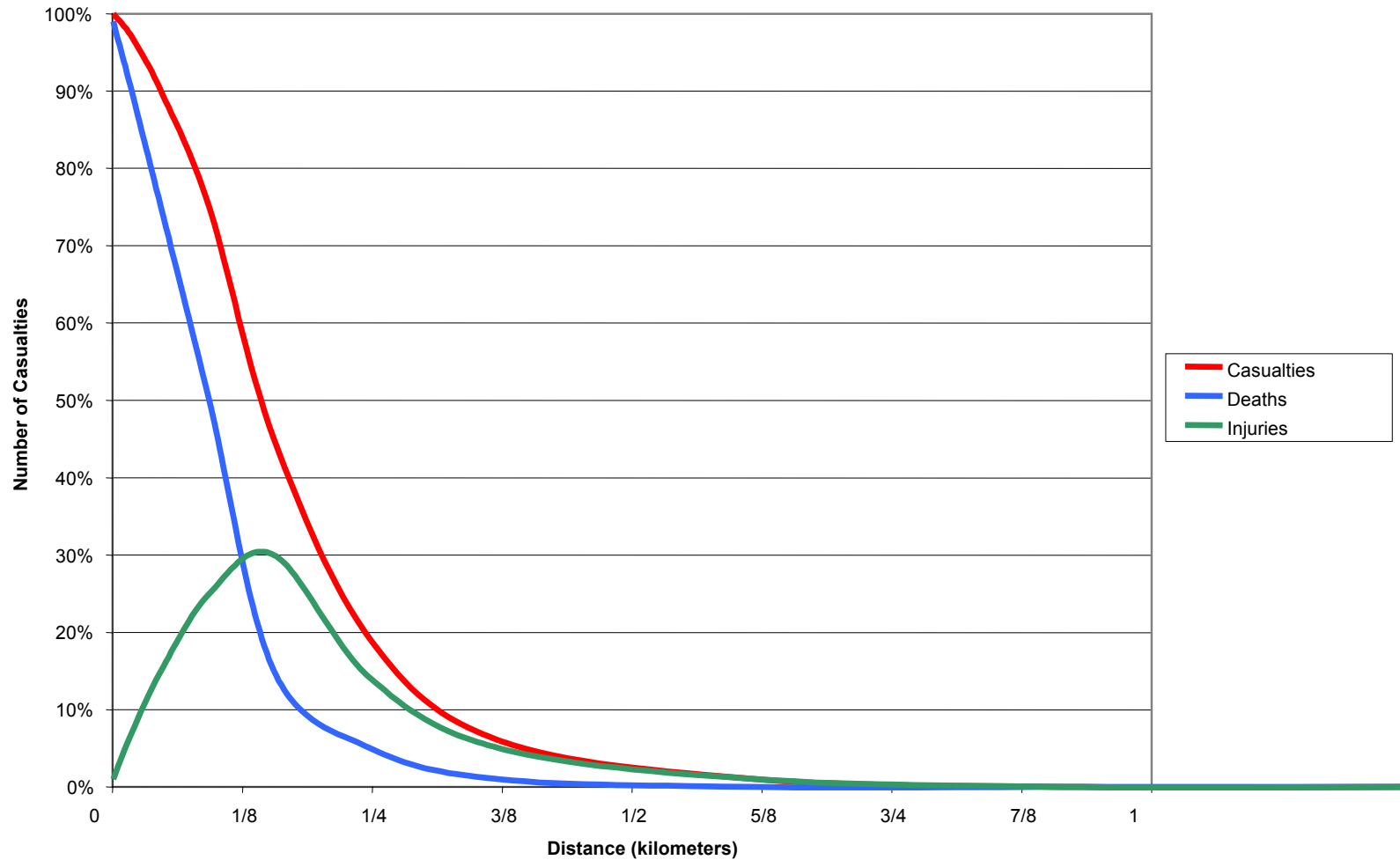
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Deterministic Geo-spatial Analysis



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Damage Curves



Thank You !!!

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