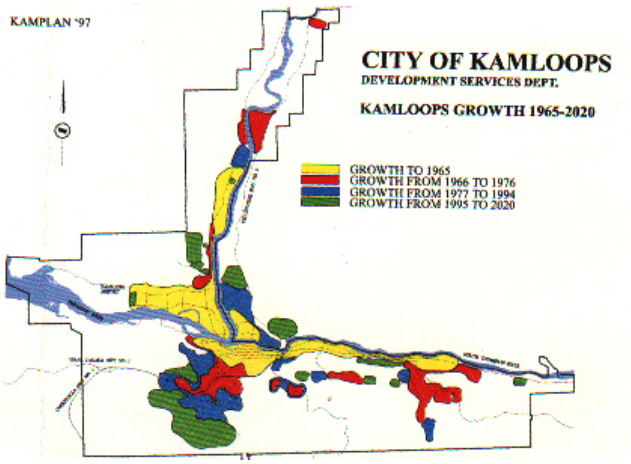
Social and Economic Significance of Landslides

Increasing population and development in confined mountain valleys



Competition between natural hazards and protection of environmental values and agricultural land

Social Significance of Landslides

British Columbia, 1880-2001 (Evans, 2003):

Period (years):	*Number of Incidents:*	*Fatalities:*	*No. per year:*
120	4	126	1
50	13	59	1
25	16	16	0.6
		Total	Approx. 3

Annual probability of death for an average citizen: 10^{-6}

Social Significance of Landslides

Country	Deaths/year	Annual probability for an average person
Canada	3	10^{-6}
Italy	50	10^{-6}
Japan	30	10^{-5}
China	1000	10^{-6}
The World	8000	10^{-6}

Social Significance of Landslides

But:

Vaiont, Italy, 1963, 2,000 dead

Huascaran, Peru, 1970, -18,000

Nevado del Ruiz, Colombia, 1985 -22,000

Vargas State, Venezuela, 1999 -30,000

Loess Plateau, China, 1921 – 230,000

→ Landslide damage is highly focused, affects selected groups

Economic Significance
British Columbia (Hungr, 2004)

Sector and Landslide Types	Estimated Annualized Losses ($ million/year)	
	Direct Damage[1]	Prevention
Residential (debris flows, slides)	2.5 - 3.5	1 - 2
Roads and bridges (debris flows, rock fall, slides)	4	5.5
Railways (debris flows, rock fall, slides)	2.5 - 3.5	2 - 4
Hydro power network (rock slides)	1	4
Pipelines (earth and rock slides)	1 - 2	2 - 4
Forestry[1] (debris avalanches and flows)	2 - 3	1
Subtotal	**12 - 16**	**16 - 21**
Residential land sterilization		10 - 50
Forest harvestable land loss	16 - 48	
Total	**28 - 64**	**26 - 71**

[1]Exclusive of environmental and fisheries losses

Total Damage: CDN $7 to $33 per capita per year (0.2% GDP)

Potential Damage,
British Columbia (Hungr, 2004)

Possible Event	Potential Fatalities	Potential Cost ($ million CDN)
Landslide cutting a pipeline and causing an oil spill	0	30 - 50
Debris flow or rock fall impacting a bus or train	20 - 50	5 - 50
Cluster of debris flows impacting communities and transportation links in a region	10 - 50	10 - 50
Rock avalanche impacting a community	0 - 200	10 - 50
Rock and earth slides triggered by a major earthquake	0 - 200	10 -100
Rock avalanche destroying a major dam	Thousands	1,000