Managing Climate Change Risks in BC's Mining Sector

Fraser Basin Council - March 14, 2012

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Presentation Outline

- Climate Change & Mining in BC
- Examples of Climate Change Impacts
- Climate Change Considerations at Each Step of the Mining Cycle
- Perceptions of Climate Change Impacts
- Business Case for Adaptation Planning

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Climate Change & Mining in BC

Even with concerted action to reduce GHGs by all countries, some climate change is inevitable

Climate change in BC has the potential to cause both significant, short term effects and incremental shifts for the Canada's mining sector through:

- operational delays
- revenue losses
- increased production costs
- labour shortages
- environmental damage
- loss of reputation
- adverse mine legacies

If properly understood and managed at the right time in the mine life cycle, these risks can be accounted for in planning, investment and operational decisions.

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Examples of Climate Change Impacts

- Threats to mine water supply security
- Damage to mines and associated transport infrastructure from flooding, cyclones and bushfires
- Threats to port operations and infrastructure from sea level rise and storm surges
- Overtopping of tailings dams, leading to failure and environmental contamination
- Delays in construction of mine infrastructure or in production and shipping of product
- Changes in surface water and groundwater interactions, with implications for acid mine drainage or movement of contaminants
- Threats to vulnerable ecosystems in areas within mining operations from direct climate impacts or via climate sensitive agents, such as fire, pests, weeds or diseases.

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Remote Sites, Extreme Weather

Diavik Diamond Mine, NWT

Temperature trends need to be taken into account

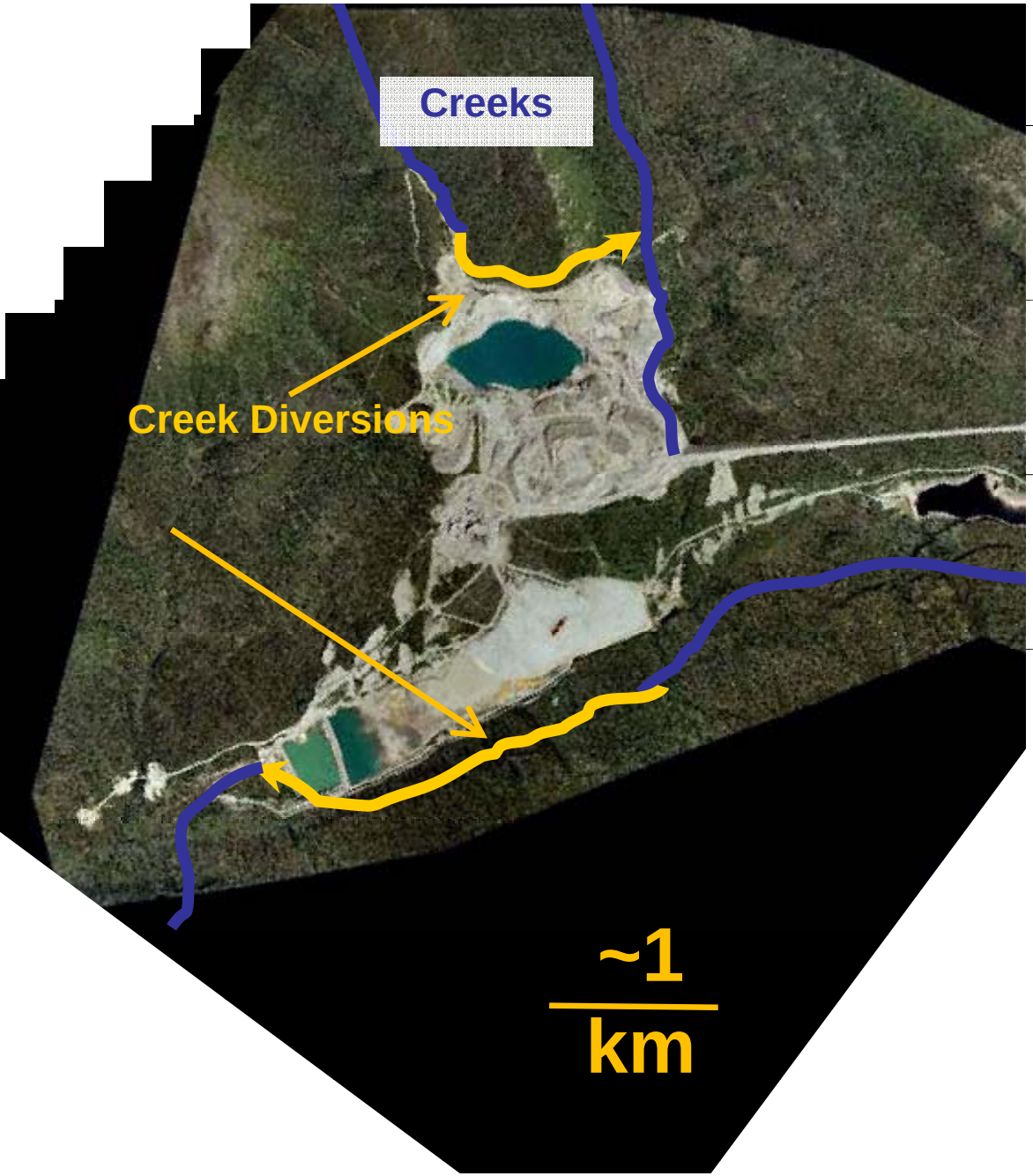
Shorter Operating Season on Frozen Ground

Impacts to Transportation Routes and Access

Debris Flow With Enormous Destructive Potential

Flooding Presents Risks for Infrastructure

Water Control and Diversion



Creek Diversions are a common feature at mines in BC

Diversions are strategically located to keep water away from critical infrastructure and are vulnerable to extreme weather events

Diversion Overtopping Above Tailings Dam

Water Covers and Groundwater Flows Subject to Changing Climatic Conditions

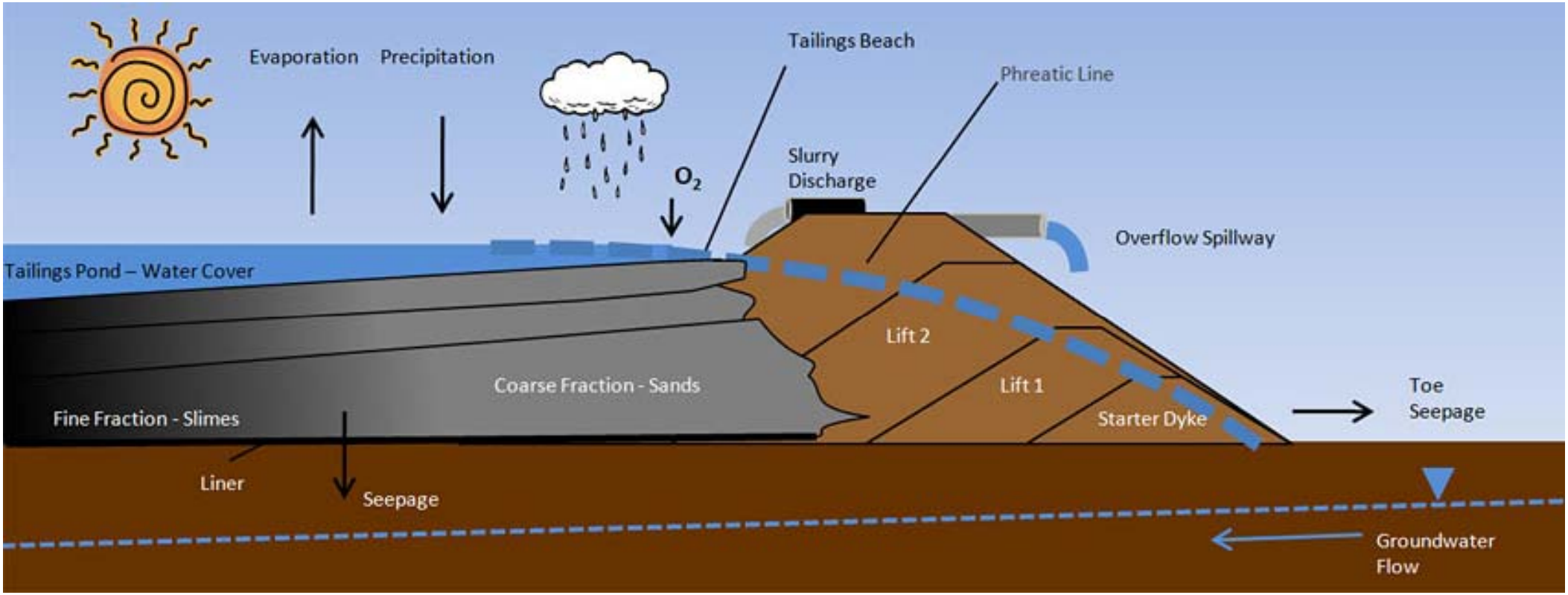


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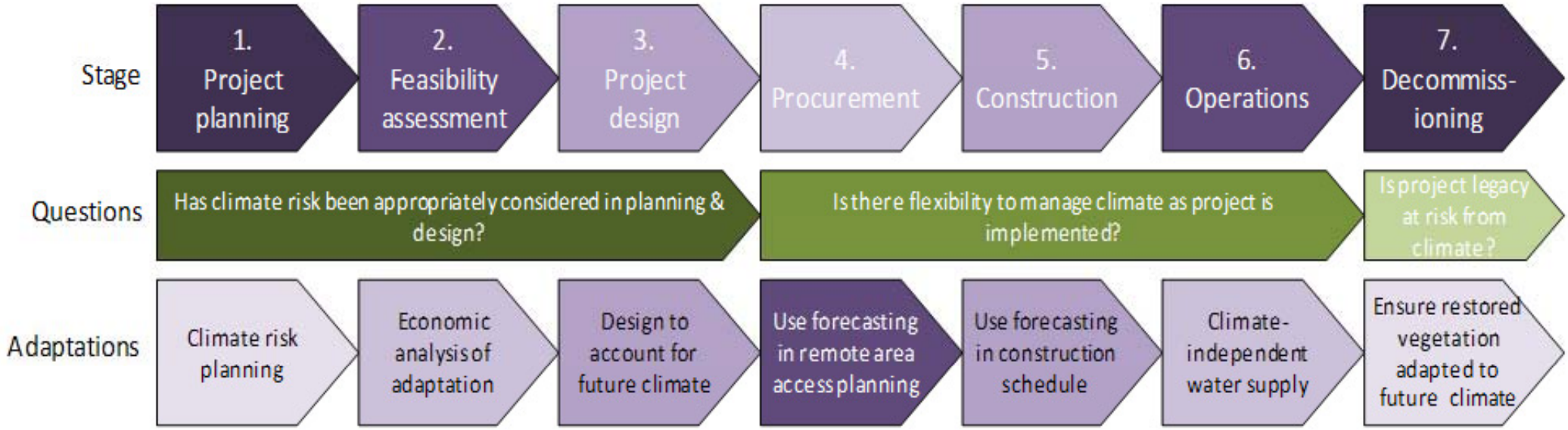
Diagram from the International Network for Acid Prevention, Global Acid Rock Drainage Guide, http://www.gardguide.com/images/b/b7/ARDNMDandSDinaSubaqueousTailings2.jpg

Consider Climate Change at Each Step Of the Mining Life Cycle



Extreme Weather Events and the Mining Industry, Sincair Knight Merz magazine. http://www.globalskm.com/Knowledge-and-Insights/Achieve-Articles/2011/ExtremeWeatherEvents.aspx

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A Changing Environment Means:

Mine sites need maximum flexibility to make decisions locally

Less centralized regulatory systems that recognize regional variation

Adaptation is done locally and requires intimate knowledge of landscapes and operations

Practitioners and scientists must work closely – “embedded science” model

Adaptation planning must be done *by* managers *for* local conditions, assisted by science community

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Perceptions of Climate Change Impacts at Mine Sites

Between 34% and 48% of mining stakeholders believe that climate change is already having a negative impact on their operations,

Of those miners who expect climate change to affect their company, 45% perceive the impact to be bad for business.

The most commonly identified climatic hazards among the mining group were too much rainfall (71%), too much snowfall (56%), storm events (33%), flooding (25%) and cold temperatures (19%).

58% of those responding expect future climate changes to have an impact on mining operations

43% of the respondents were concerned about impacts on processing, 30% on activity timing and 24% on mine drainage

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Kosich, D, 2009, Cross-Canada Mining Survey: Miners Say Global Climate Change Definitely Hurts Mining. www.mining.com/issues/0911/Vol02-05-CrossCanadaSurvey-20-21.pdf

Potential Barriers to Taking Proactive Approach

- Not always a priority concern at executive level
- Decentralized and fragmented weather / climate / climate impact information generation and governance in Canada
- Gradual changes (e.g., sea-level rise) seen as too far into the future
- Little incentive to invest now on long-term risks

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Business Case for Factoring in Adaptation

- Investors are taking greater note of operational risks like those presented by climate change
- Climate change risks are factoring more prominently into insurance rates
- Regulation are taking into account worst case scenarios like probable maximum floods
- Extreme weather and changing conditions have implications for worker safety
- Threats to access and infrastructure increase risk of business disruption
- Climate change has short and long term implications for environmental protection

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What is Needed?

- Better and more targeted weather and climate information
- Awareness and education
- Investment in and protection of critical infrastructure
- Improving infrastructure design criteria and standards
- Equipping mines with the necessary support tools to assess risks and implement adaptive measures

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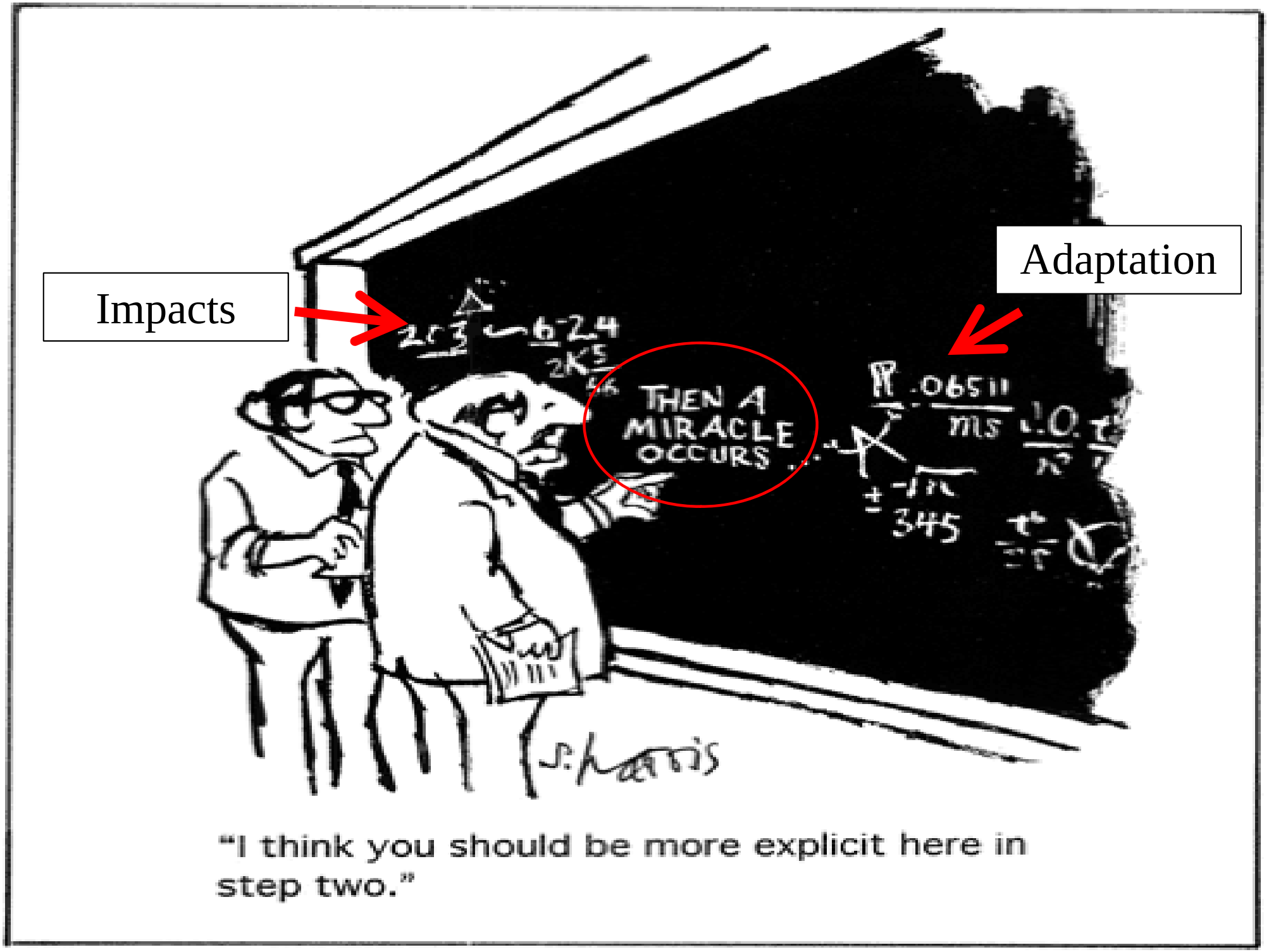
Impacts
Adaptation
THEN A MIRACLE OCCURS
"I think you should be more explicit here in step two."