A REVIEW OF SOME REQUIREMENTS FOR DROUGHT INFORMATION ON THE CANADIAN PRAIRIES

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Drought a deficiency of precipitation from expected or “normal” that, when extended over a season or longer, is insufficient to meet the demands of human activities and the environment.

Drought is often difficult to address because:

- It is a slow-onset, creeping phenomenon.

- It means different things in different sectors (E.g. agriculture, hydrology, forestry, etc) without a universal definition.

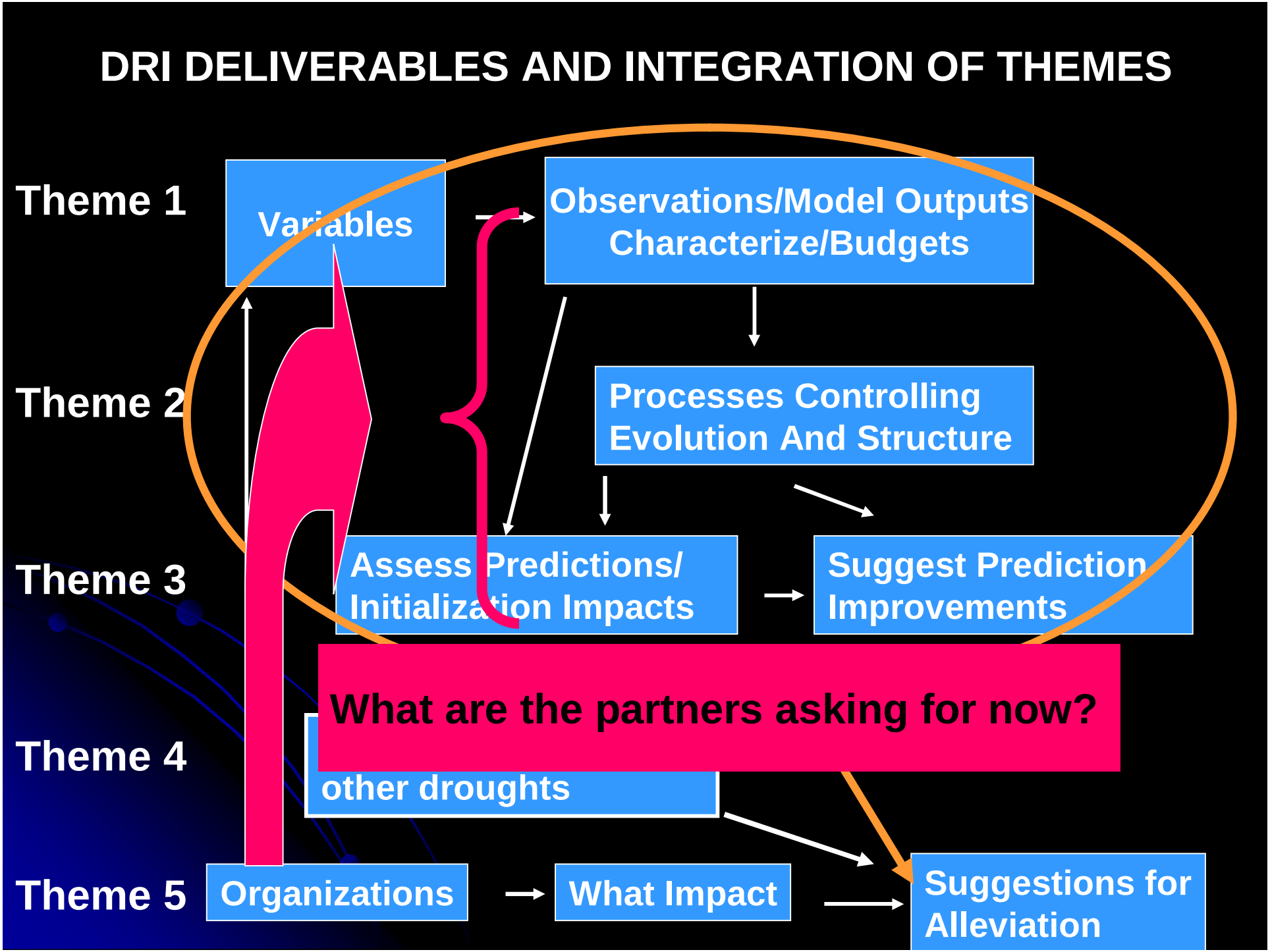
- Its impacts are non-structural and spread over large areas.

RESULT, adoption rate for drought mitigation/preparedness planning has lagged other natural hazards

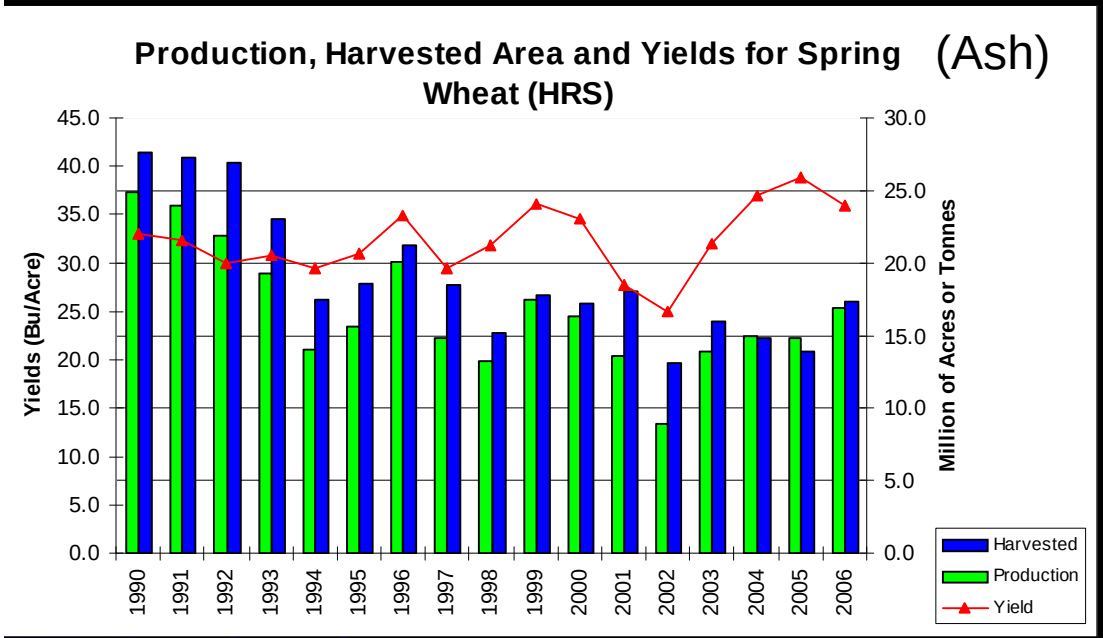
Drought is the most Costly Natural hazard in Canada (after Hanuta)

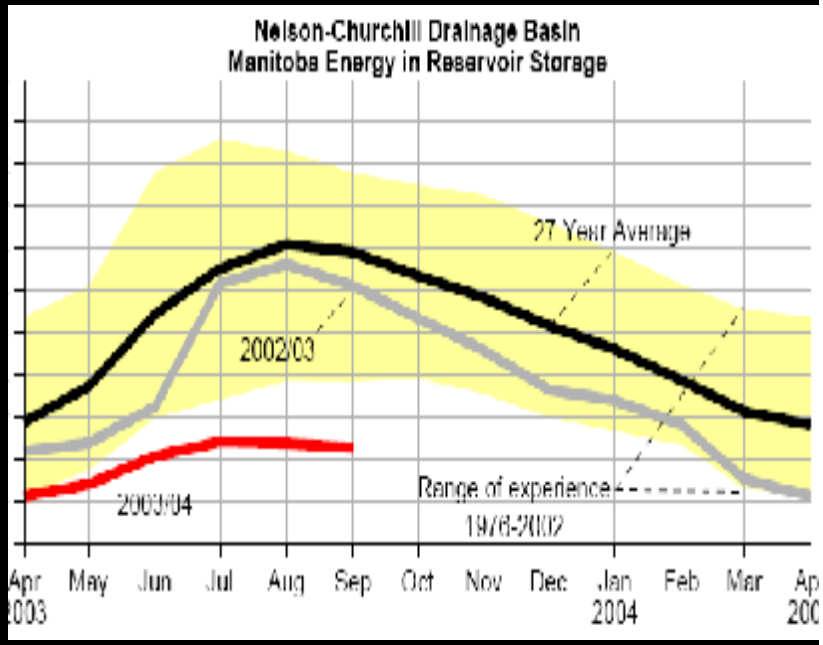
Disaster	Year(s)	Location	Cost (billions 1999$)
Drought	1980	Prairies	5.8
Freezing Rain	1998	Ontario to New Brunswick	5.4
Drought *	2001/2002+/-	National	5.0
Drought	1988	Prairies	4.1
Drought	1979	Prairies	3.4
Drought	1984	Prairies	1.9
Flood	1998	Saguenay, Quebec	1.7
Flood	1950	Winnipeg, Manitoba	1.1
Drought	1931-38	Prairies	1.0
Drought	1989	Prairies	1.0
Hailstorm	1991	Calgary, Alberta	1.0

Source: An assessment of natural hazards and disasters in Canada: A report for decision-makers, 2004


DRI DELIVERABLES AND INTEGRATION OF THEMES
Theme 1
Variables
Observations/Model Outputs
Characterize/Budgets
Theme 2
Processes Controlling
Evolution And Structure
Theme 3
Assess Predictions/
Initialization Impacts
Suggest Prediction
Improvements
What are the partners asking for now?
Theme 4
other droughts
Theme 5
Organizations
What Impact
Suggestions for
Alleviation

To get feedback on Partner needs and expectations, DRI has formed a Partners' Advisory Committee (PAC) that reports to its Board of Directors.

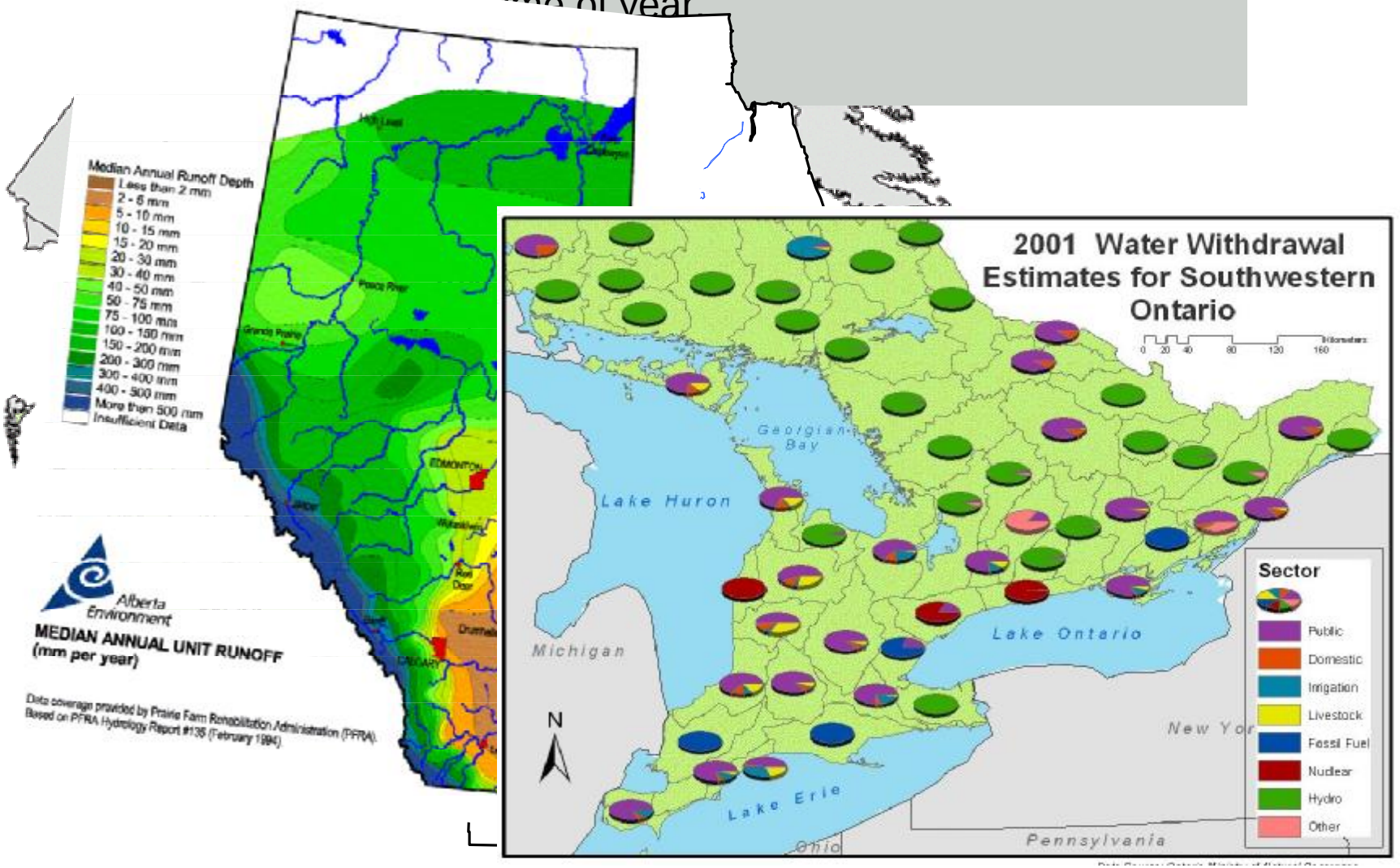




This Committee has representation from PFRA, Saskatchewan Watershed Authority, Manitoba Water Stewardship, Saskatchewan Research Council, Alberta Environment (TBC), Manitoba Hydro, Saskatchewan Agriculture, Alberta Agriculture (TBC).

FACTORS FOR CONSIDERATION IN DROUGHT PROGRAMS

The requirements for drought information vary according to **climate, water use,** and **regional water infrastructure**.



Why PFRA is developing a Drought Strategy?

- No existing national drought strategy for medium- to long-term
  - Sustain environment & economy
  - Stay competitive
- Drought is a business risk to be managed (coordinated efforts with provinces to reduce impacts and vulnerability)
- Prepare for long-term climate change
- Prepare for potential increasing variability (now and in the future)
- Provide a planned approach to developing tools to reduce impacts (now 88 programs)
  - Build on current activities that work
  - Develop and implement new activities

LESSONS LEARNED REGARDING DROUGHT PLANS (A provincial perspective)

- Every drought is different
- Every community responds differently
- Drought Management Plans must be specific to the community
- Local Drought Management Team is key
- Drought Management Plans must contain sufficient detail that anyone can follow them
- Drought Management Plans must be practiced to find the flaws

"And it never failed that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years. It was always that way."

- John Steinbeck, East of Eden

Some Provincial Impacts of Drought

Province	Agriculture	Other	Plans
BC	Yes	Hydro	Draft Plan
Alberta	Yes	Energy, Dev	Plan since 2002
Saskatchewan	Yes	Energy	Draft Plan
Manitoba	Yes	Hydro	Diverse Pgms
Ontario	Yes	Transp., Rec	Diverse Pgms
Quebec	Yes	Hydro	Diverse Pgms
PEI	Yes	___	_____
N. Brunswick	Yes	_____	_____
Nova Scotia	Yes	_____	_____
Newfoundland	Maybe	_____	_____

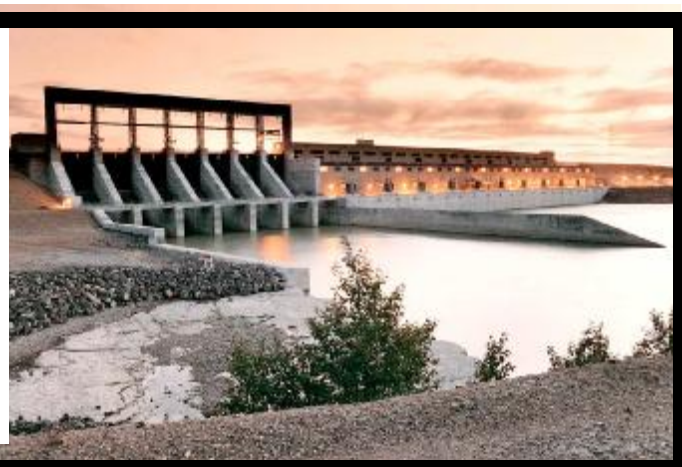
Examples of Actions to reduce vulnerabilities

"Activities implemented in advance of drought to reduce it's negative effects"

1)Water supply development (dams, reservoirs and pipelines),
2) water management (water transfers),
3) water conservation and education programs (US WaterWiser program),
4) land management initiatives (reduce land in production, use wetlands for forage cropping),
5) economic and social empowerment (community management councils)
6) Livestock management (community pastures, downsizing the herd)
7) Federal and provincial government support programs.

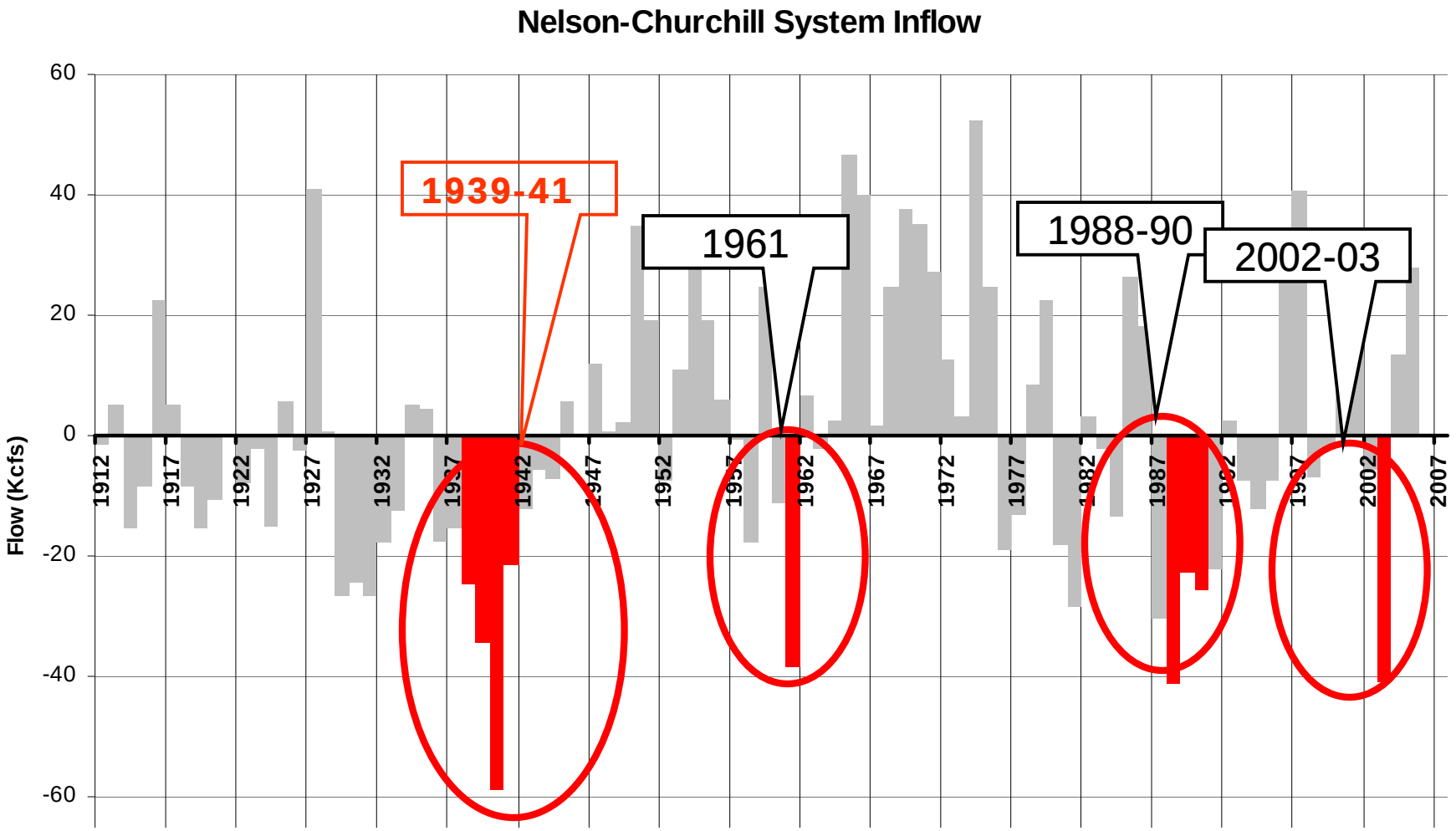
Manitoba Hydro must plan for the Impact of drought in many basins

It frequently takes 9 to 12 months to seriously draw down a reservoir to the point where a continued drought affects production.



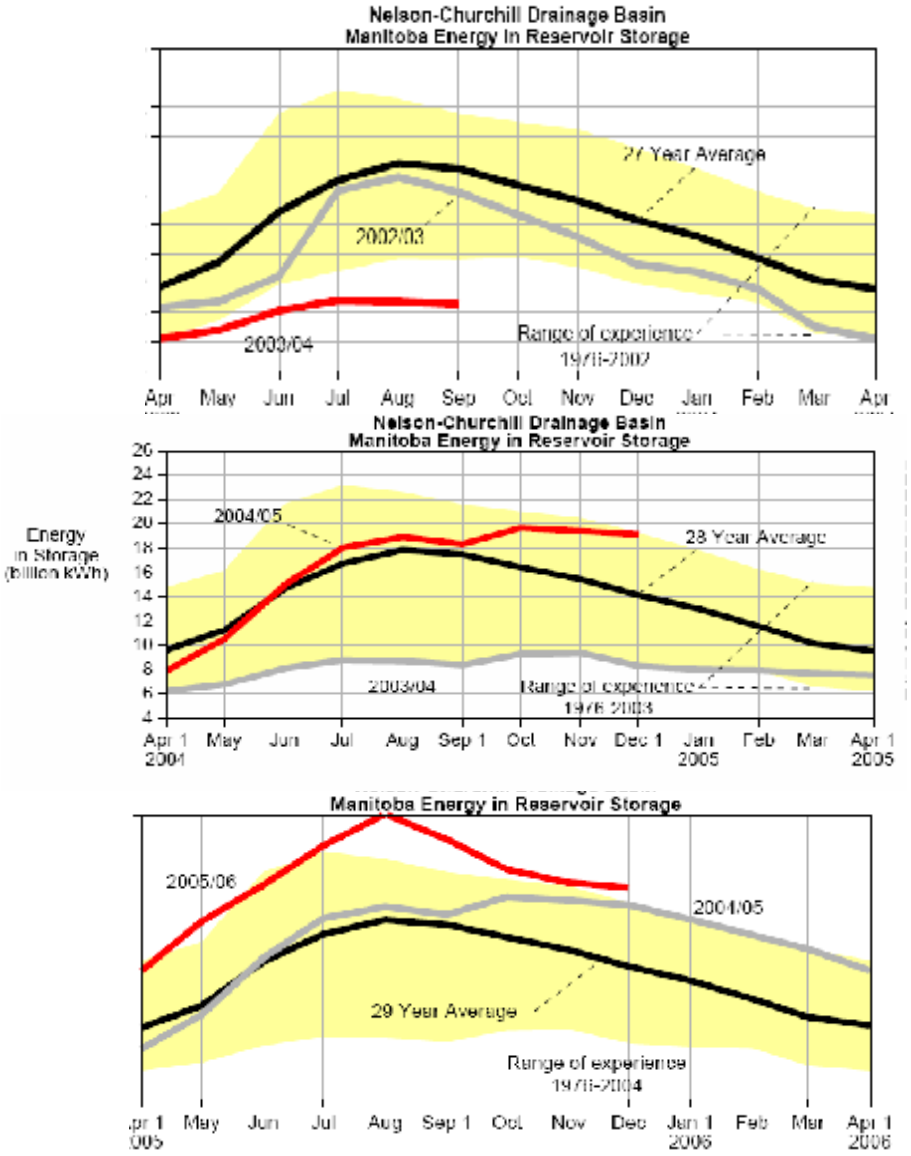
Source of most of Manitoba Hydro's generating capacity.

Historical Drought of Record



The Manitoba Hydro challenge is to define the drought of record so they can plan sufficient capacity to ensure they will be able to supply the firm demand even under the worst conditions.

- Internal risk assessment & sensitivity analyses of more severe drought
- The 2003 to 2005 period represents the single most significant transition from system-wide drought to flood in history
- Climate change or variability?



Risk = Threat × Vulnerability

The climate factor

The contextual factor: economic condition, farm capabilities, flexibility to accept alternatives for cropping, destocking, etc.

Drought is a major risk for producers in many parts of the Canadian prairies. The agricultural community is looking for inputs from DRI that will help them reduce their risk.

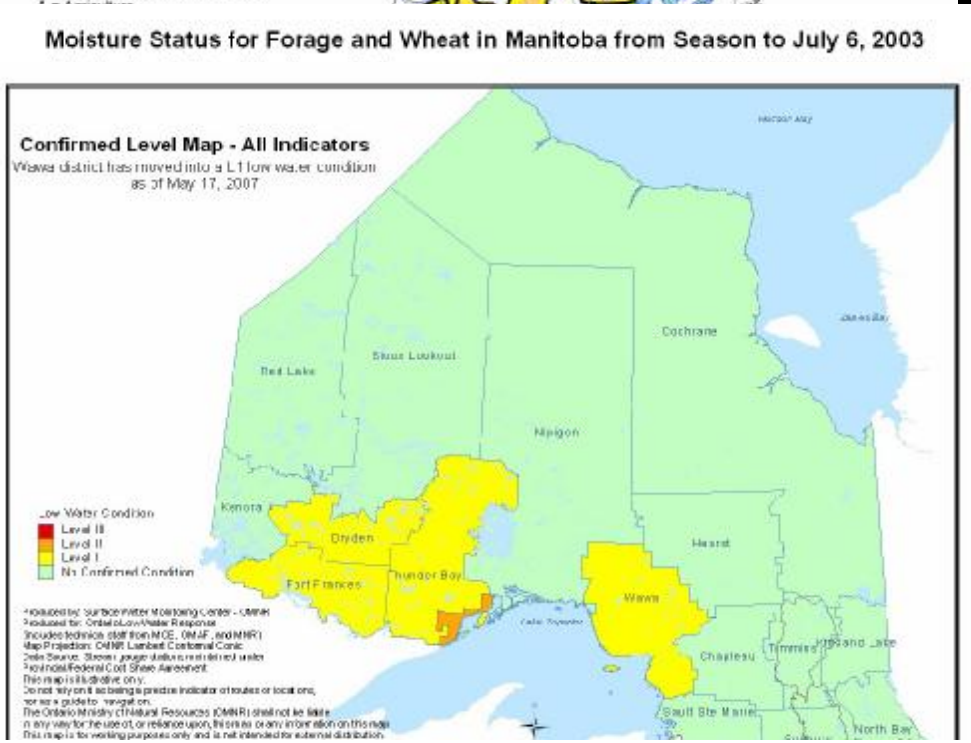
The heat is on

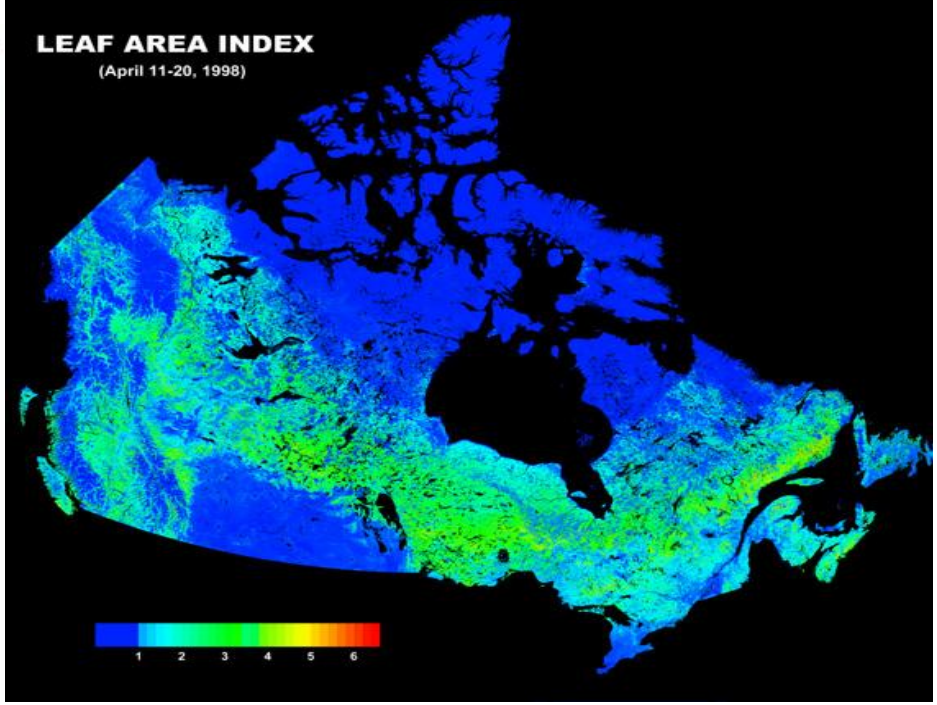
Rancher Ley Fenton of Irma, Alta., checks on his remaining cattle yesterday. Farms on the Prairies are baking in record temperatures and with scorched grass and crops, Mr. Fenton can only afford to keep fewer than 200 cattle from a 1,200-strong herd.

Drought wounds Prairie farmers

Drought Characterization is an important step in drought mitigation plans

DRI Theme 1 directly addresses the concerns of the agriculture community for ways to characterize the extent and severity of drought.





Examples of the use of Indicators of Drought

DRI analysis can help to define the thresholds for drought. Some provinces already use objective criteria based on data and science.

Alberta

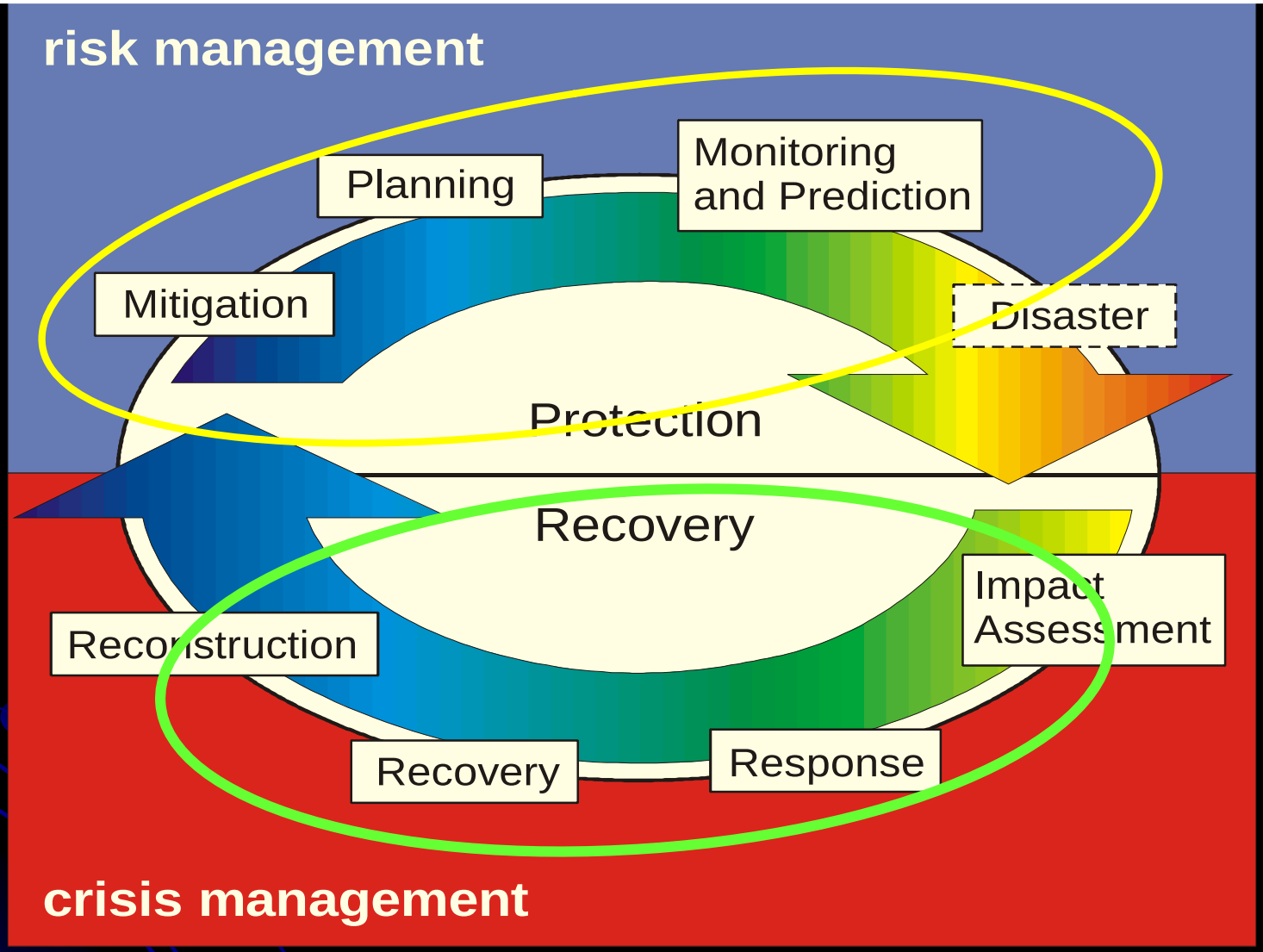
extremely low	drier less than 1 in 25-years
very low	drier less than 1 in 12-years
low	drier less than 1 in 6-years
moderately low	drier less than 1 in 3-years
near normal	every 1 in 3-years
moderately high	wetter less than 1 in 3-years
high	wetter less than 1 in 6-years
very high	wetter less than 1 in 12-years
extremely high	wetter less than 1 in 25-years

lowest average summer month flow

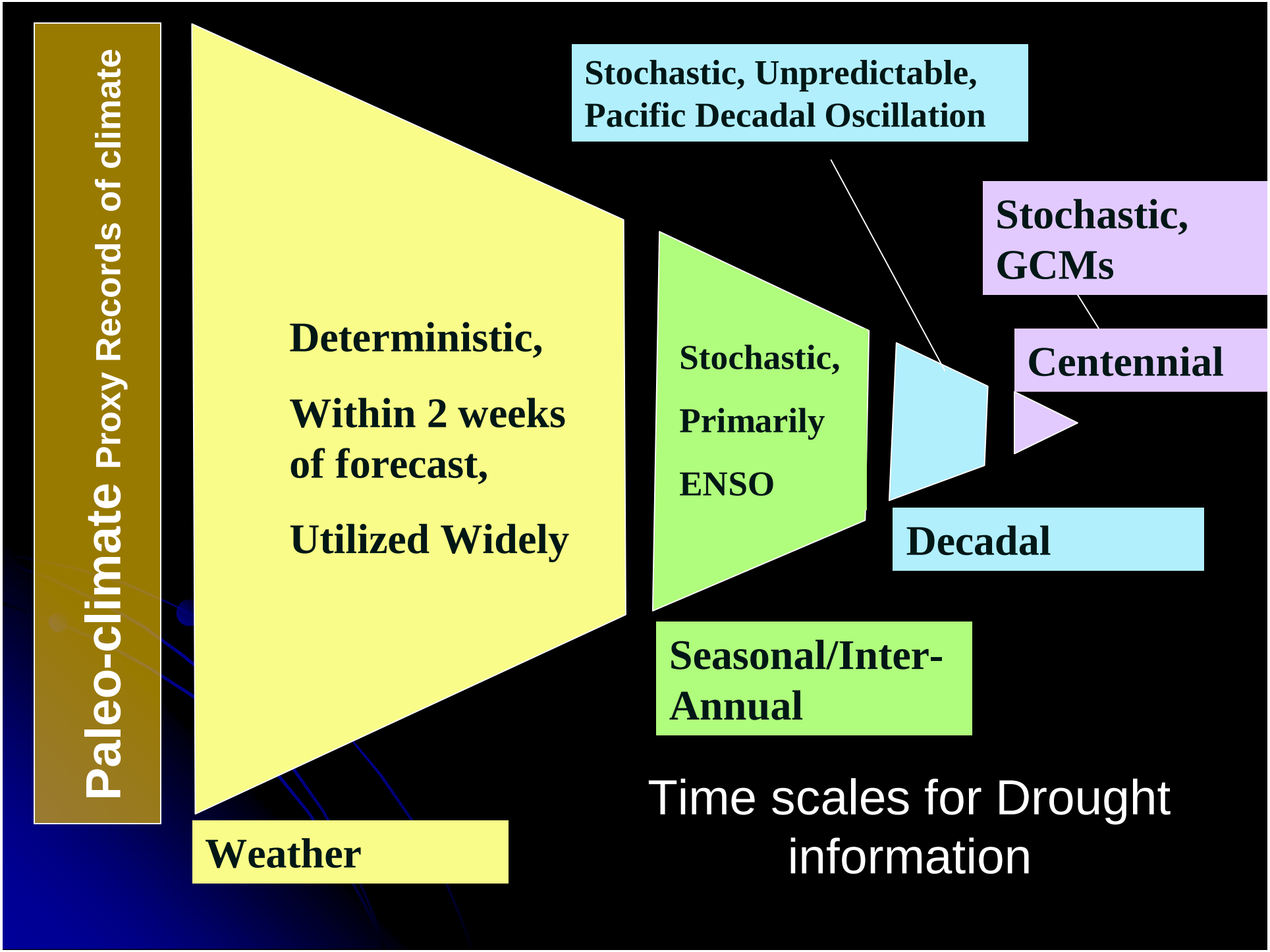
But there are obstacles in this process:

For very extreme events legislators are often reluctant to declare the worst level (even when the data show that exists) because of the substantial commitments that are required to help affected people. Some provinces appear to have failed to ratify agreements because they do not like to have payouts and actions triggered by decisions based on physical conditions.

GOAL: Replace Crisis management by risk management



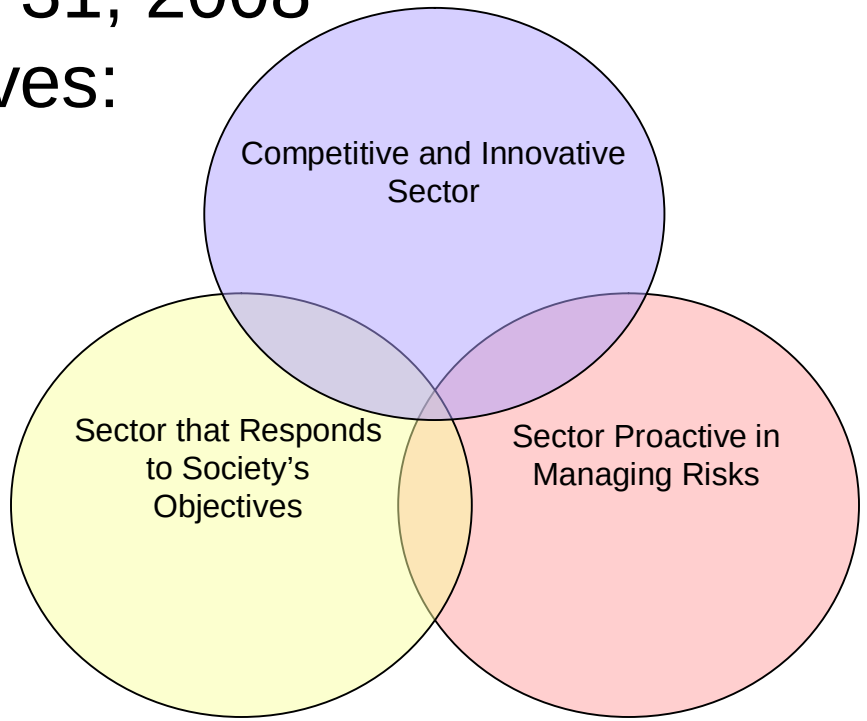
DRI and the climate community can help this transition by providing prediction capabilities, monitoring systems and knowledge needed to reduce vulnerabilities.


Paleo-climate Proxy Records of climate
Deterministic,
Within 2 weeks of forecast,
Utilized Widely
Weather
Stochastic, Unpredictable, Pacific Decadal Oscillation
Stochastic, Primarily ENSO
Seasonal/Inter-Annual
Stochastic, GCMs
Centennial
Decadal
Time scales for Drought information

Present Opportunities: The Agriculture Policy Framework II is being developed

- Federal Provincial committees are developing the next generation of an updated agricultural policy framework.
- Expected to be ready by the time current framework expires March 31, 2008
- Focus on 3-policy objectives:

How can DRI effectively incorporate drought monitoring and prediction Into this new policy framework?



What Partners want from DRI (or any drought program)

Better understanding of the causes of drought, its impacts and the factors that bring drought to an end.

Better forecasts of the onset, intensity, extent and termination of drought events.

Better understanding of drought processes (Evapotranspiration, land and hydrological process parameterizations, land use and wetlands).

An understanding of how the drought of 1999-2005 related to historical droughts (typical or atypical) and future droughts?

Understanding of droughts in specific watersheds for infrastructure planning.