

# ***Improving Drought Resilience in Alberta Through a Simulation***

## ***Project Team Terms of Reference***

Approved by the Alberta Water Council on: February 25, 2020  
Amended: June 15, 2023

### **CONTEXT:**

Drought is a natural, recurrent phenomenon in Alberta that has environmental, economic, and social impacts. Recent studies have shown we can expect more frequent and extended droughts. Several initiatives are underway in the province to improve drought preparedness, including:

- The Government of Alberta's *Drought and Water Shortage Plan* will outline management and communication actions in times of drought.
- The Alberta Water Council (AWC) guide to assist Watershed Planning and Advisory Councils (WPACs) as they engage municipalities to better prepare for, mitigate the effects of, respond to, and recover from multi-year droughts.
- The Miistakis Institute is a research institute, conservation charity, and social enterprise Non-Government Organization (NGO). They are working with a pilot community to develop a process for drought mitigation planning.

A drought evolves slowly, and its beginning and end tend to be unclear. Managing a drought involves complex monitoring, decision-making, and communication before, during, and after its occurrence to mitigate the impacts proactively and respond effectively. Droughts are often difficult to anticipate and strategize for when not in a time of drought. Simulation exercises provide an opportunity to work through one or multiples scenarios that closely mimic real-life acute and/or chronic drought events and can be a powerful tool to test management structures and communication strategies.

### **STRATEGIC INTENT (GOAL):**

The purpose of this work is to use appropriately scoped and scaled simulation(s) to assist the Government of Alberta, municipalities, Indigenous communities and other groups (e.g., WPACs, Alberta Irrigation Districts Association) to understand and plan for drought preparation and response, including mitigation, monitoring, decision-making, and communication before, during, and after a drought.

### **OBJECTIVES:**

- 1) Compile existing information on drought management resources, roles and responsibilities, regulations, metrics, thresholds, indicators, and responses in Alberta and other jurisdictions.
- 2) Identify necessary models and decision support tools and review simulation methodology options.
- 3) Develop the scope for a science-based drought scenario or scenarios that meet the needs of the stakeholders involved.
- 4) Integrate and complete background and simulation exercise materials.
- 5) Execute the drought simulation(s) with relevant stakeholders.
- 6) Compile the simulation results, lessons learned, and any project team recommendations in a final report and disseminate to relevant stakeholders.

## KEY TASKS:

- 1) Develop a work plan that includes key tasks, deliverables, and timelines.
- 2) Compile summaries and studies of historical examples of drought and its impacts in Alberta and other provincial jurisdictions, lessons learned, and expected changes due to climate change through a literature review.
- 3) Document drought-related information and resources relevant to Alberta (including, but not limited to decision-making processes, drought management agreements, roles and responsibilities, regulations, communication processes, existing tools and programs).
- 4) Identify gaps in drought management and make a recommendation on standardization of drought indicators, thresholds, and responses to test during the drought simulation.
- 5) Assemble a group of subject matter experts to:
  - a. Define the types of models and tools available (e.g., hydrologic models, decision support tools).
  - b. Review existing models and decision support tools used regionally, provincially, and federally, and in other jurisdictions.
  - c. Identify appropriate existing or components of existing models for use in a drought simulation at the appropriate provincial, regional or watershed scale to be determined as an outcome of the literature review and given the costs and available resources.
  - d. Determine any modifications needed to these models and decision support tools for use in the context of Alberta's historical and predicted droughts.
  - e. Generate and evaluate (cost/benefit) a list of potential adaptation strategies which may be incorporated into the models or decision support tools.
  - f. Provide the project team with different simulation methodology options based on their review of available models, decision support tools, and resource requirements.
- 6) Examine drought simulation case studies from Alberta and other jurisdictions.
- 7) Develop drought simulation scope, including identifying the following:
  - a. Level of complexity (e.g., live modelling vs. pre-modelled adaptation strategies)
  - b. Simulation methodology based on task group recommendations (e.g., cumulative impacts of strategies chosen, feedback on decisions, simulation type)
  - c. Standardized metrics, indicators, regional thresholds, and responses.
  - d. Simulation boundaries and considerations (e.g., licensed priorities (FITFIR), inter-basin transfers, transboundary agreements).
  - e. Balance of environmental, social, and economic impacts.
  - f. Geographic scope and level of regional detail required.
  - g. Communication needs and managing expectations
  - h. Timeline scoping for drought scenario and climate projections.
  - i. Key stakeholders and their roles in the simulation.
- 8) Develop a simulation handbook, including objectives, ground rules, background, methodology, boundaries, and any other relevant information.
- 9) Test the simulation with a focus group and sector engagement and revise the materials as necessary based on feedback.
- 10) Assemble a subgroup to develop event communications and simulation supporting materials.
- 11) Execute drought simulation(s) with stakeholders.
- 12) Document simulation outcomes in a Post Exercise Assessment and distribute to stakeholders.
- 13) Provide regular updates to the AWC board during the project and a final report and supporting simulation materials.

**TIMELINES and DELIVERABLES:**

The Project Team will provide the following deliverables to the AWC:

- Share findings from the literature and jurisdictional review February 2021
- Share the simulation handbook April 2022
- Share post-simulation draft report and results from fall 2021 simulation November 2022
- Final report and supporting simulation materials October 2023

**MEMBERSHIP:**

Open to AWC members and other relevant groups identified by the project team. The project team will operate in a manner that is consistent with the rules, policies, and procedures adopted by the AWC, including the use of consensus to make decisions in a multi-stakeholder process.

Key sectors identified for participation include:

- Provincial government subject matter experts
- Federal government subject matter experts
- WPACs and Watershed Stewardship Groups
- Municipalities
- Regional boards
- Indigenous communities
- Alberta Irrigation Districts Association
- Food grower associations
- Food processors
- Individual growers/ag producers
- Insurance organizations (AFSC)
- Academic institutions
- Hydroelectricity generators
- Oil & gas sector
- The SSRB Interbasin Water Coordinating Committee (IWCC)

**BUDGET:**

The working group estimates a budget of \$210,000 as follows:

Core Funding Costs (covered by the AWC)

Type	Amount
Stakeholder support	\$50,000
Hosting	\$5,000
Communications	\$15,000

Project Funding Cost (provided by stakeholders)

Type	Amount
Literature review on drought tools and models	\$50,000
Simulation hosting & materials	\$15,000
Simulation development & facilitation	\$75,000