Water Shortage in Alberta

AEMA Stakeholder Summit
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Outline

- Overview
- Water Modelling, Monitoring and Forecasting
- AEP Water Shortage Procedures for the SSRB
- Other Water Shortage Strategies

Overview

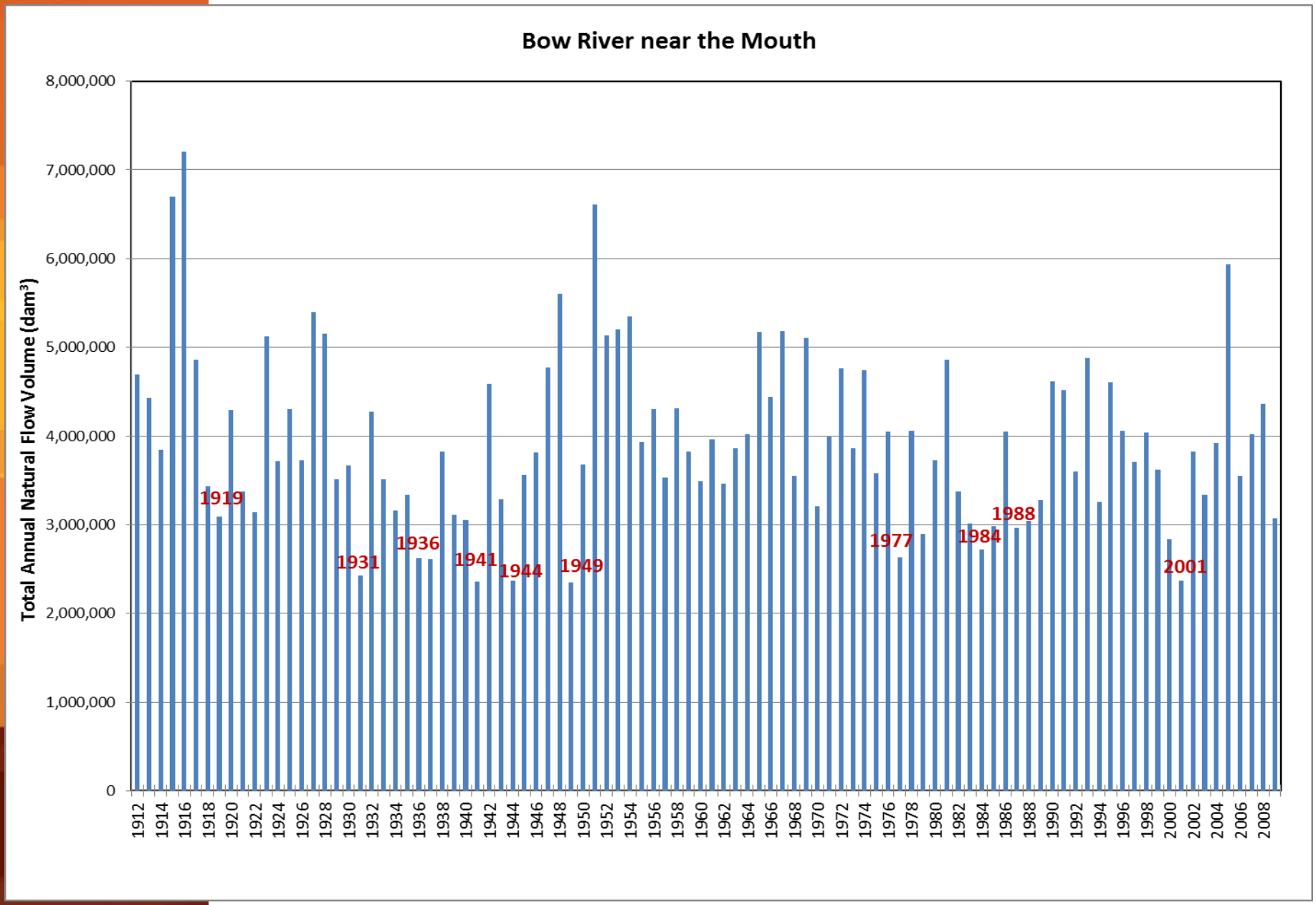
WATER ACT

- **Prior Allocation (First in Time, First in Right)**

- **Section 32 (1) of the Water Act**
  - **If there is a dispute with respect to the order in which water is to be diverted, the Director may administer priorities within a water management area**

Lead up to a Water Shortage

- A water shortage usually starts slowly and builds over time
- Management of water escalates with the duration and intensity of a water shortage
- Sound management is necessary to mitigate severity of impacts to water users
- Working in collaboration critical to promote water sharing and conservation through Water Act Assignments and Transfers
- Department responsible for administering the priority system


Bow River near the Mouth
Total Annual Natural Flow Volume (dam³)
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1919
1931
1936
1941
1944
1949
1977
1984
1988
2001
1912 1914 1916 1918 1920 1922 1924 1926 1928 1930 1932 1934 1936 1938 1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008

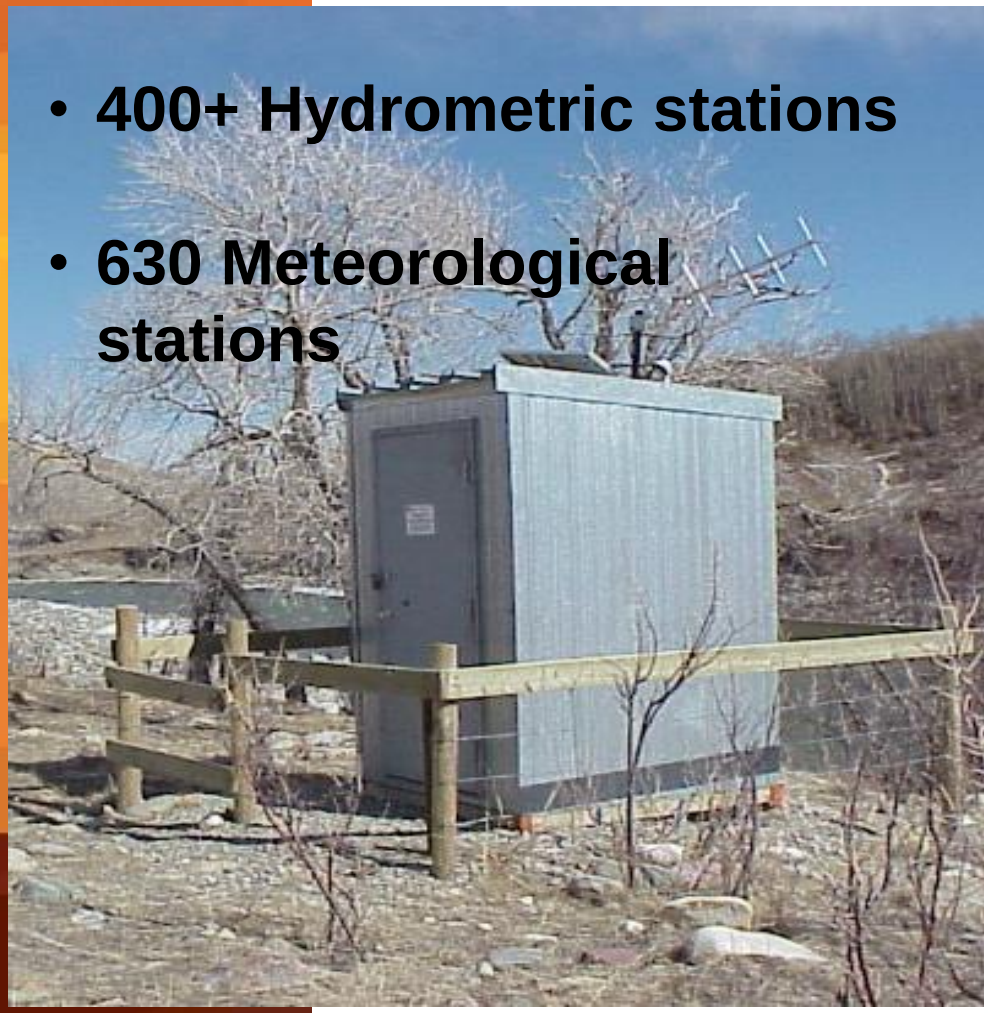
Water Modeling, Monitoring and Forecasting

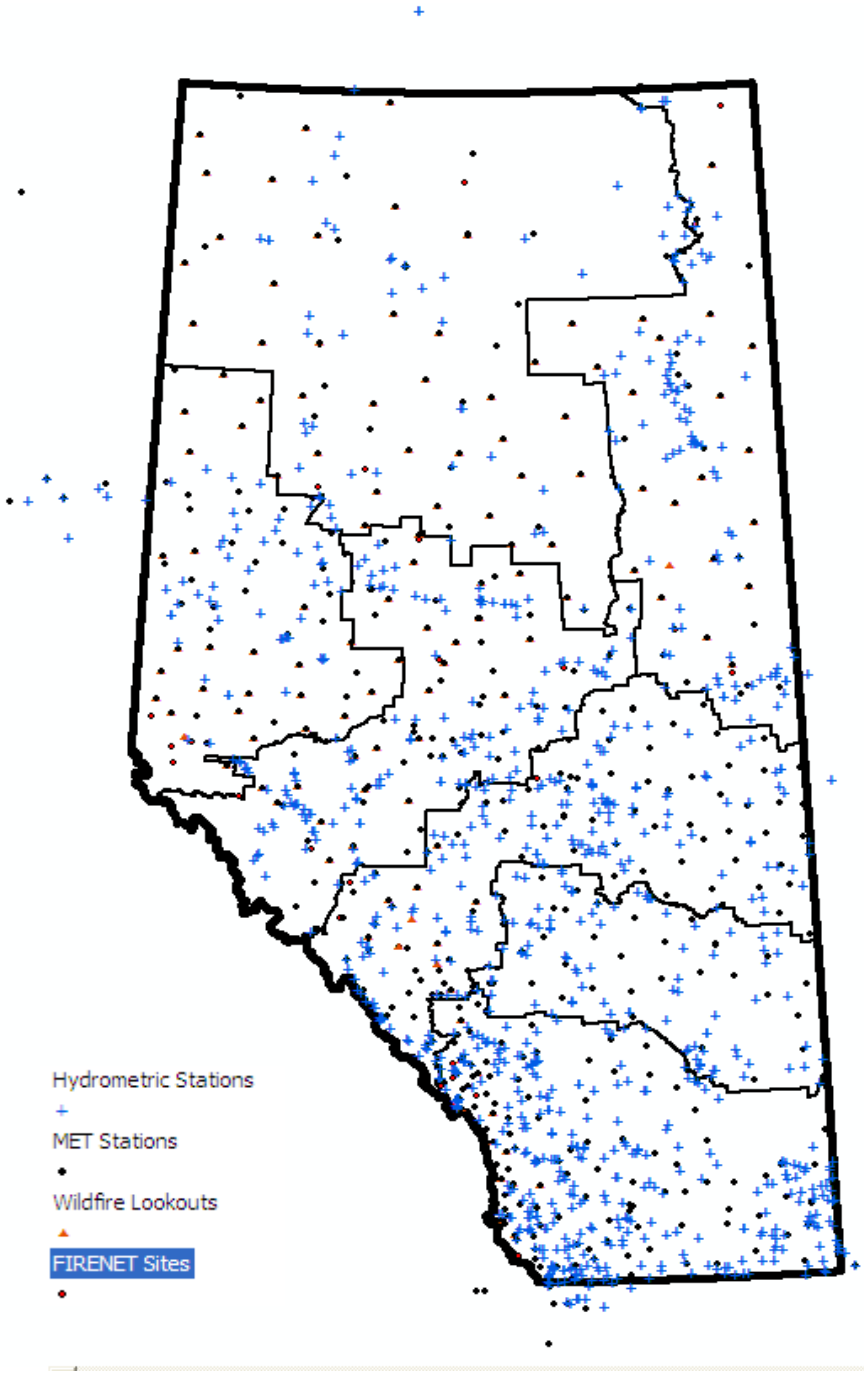
Modeling, Prediction, and Warning Systems

- **Primary declining river flow concerns are caused by:**
  - **Below average precipitation**
    - Below average snow pack
    - Below average soil moisture
    - Above average seasonal temperatures
    - Increased water withdrawals
- **Open water forecasting period: mid-mid-March to mid-October**
- **24 x 7 operations to provide forecasting services during extreme flow events**
  - **Critical period for extreme flow events: mid-May to mid-July**

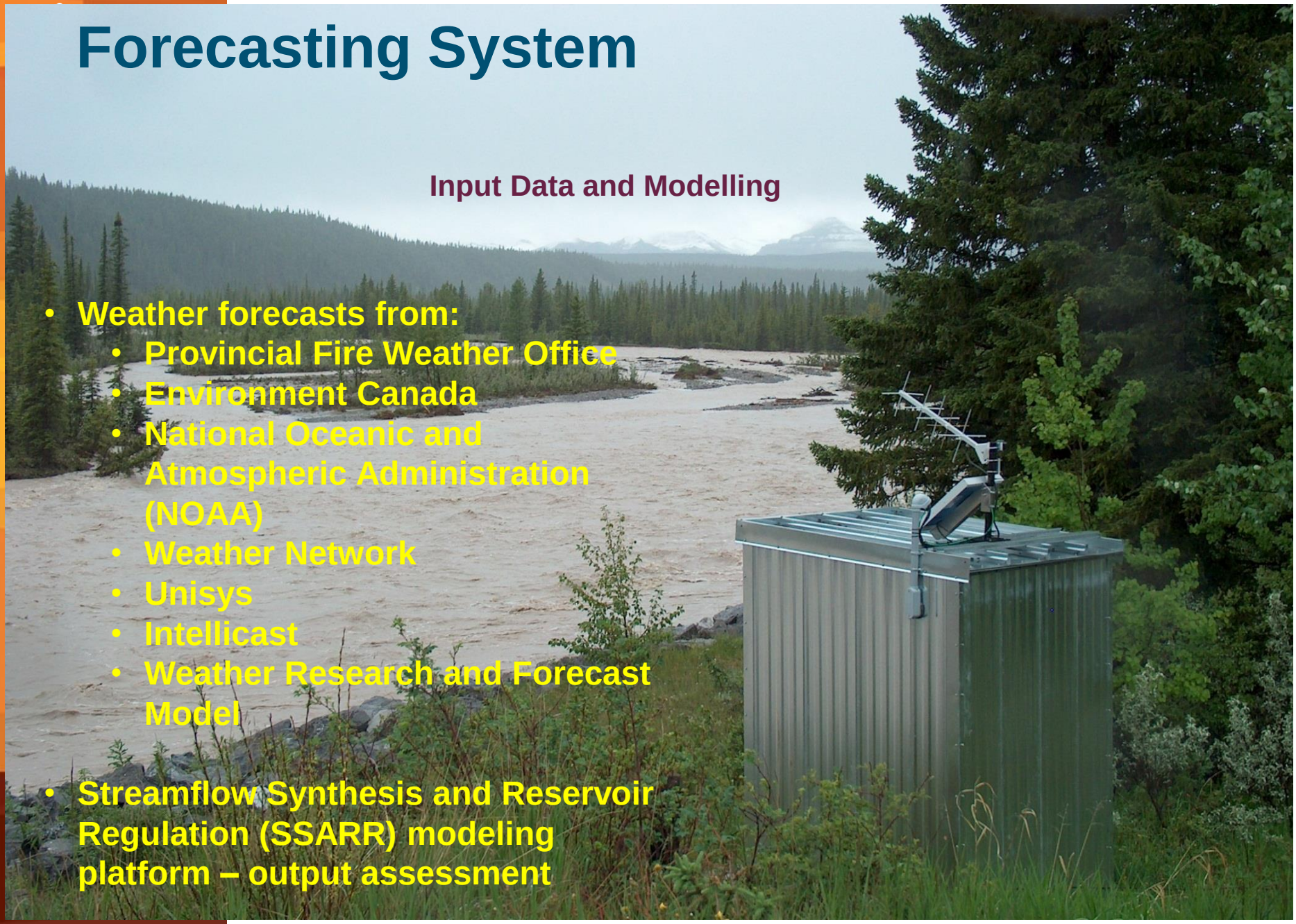
Monitoring System

- 400+ Hydrometric stations
- 630 Meteorological stations





Forecasting System



Input Data and Modelling

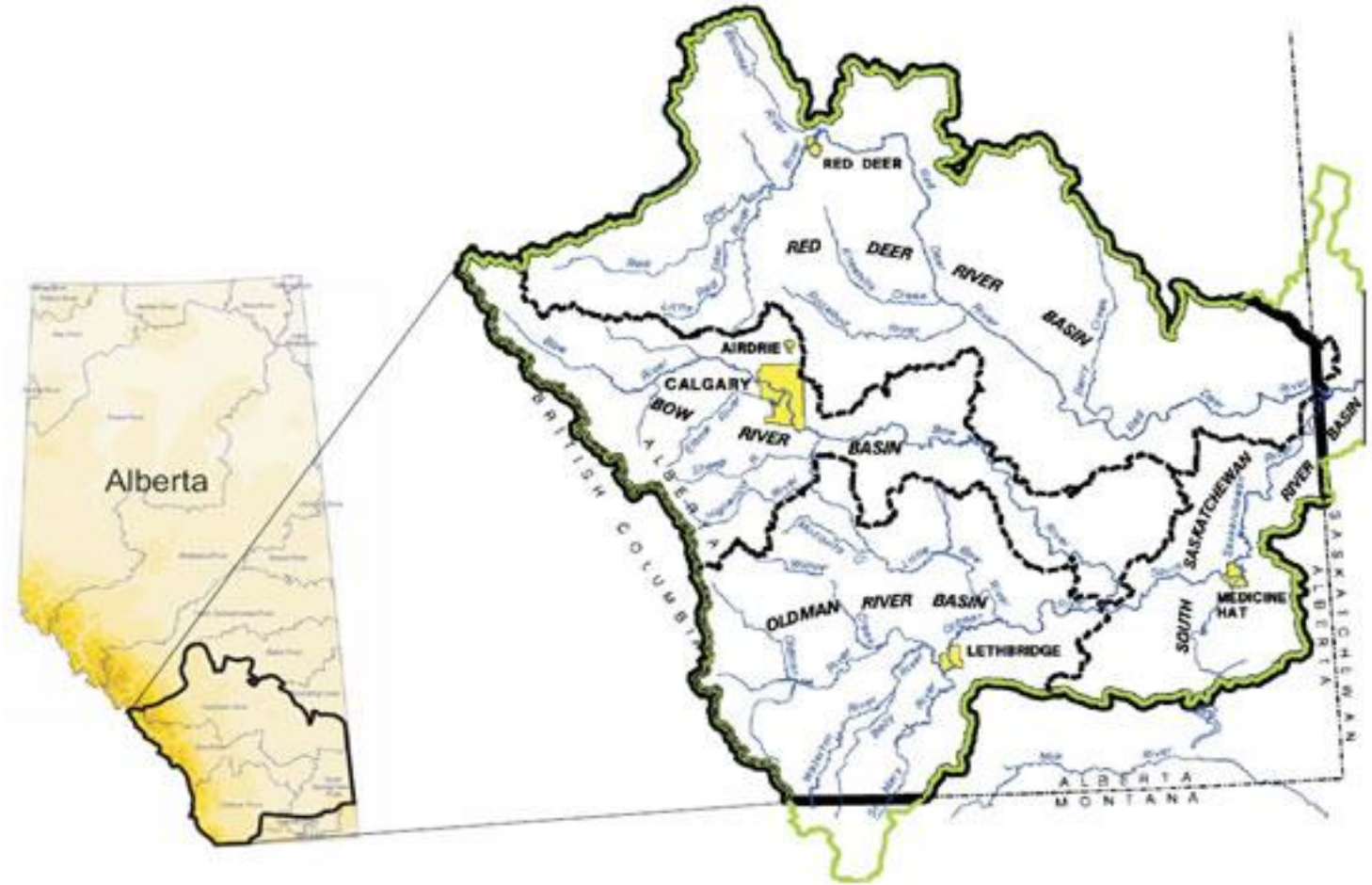
- Weather forecasts from:
  - Provincial Fire Weather Office
  - Environment Canada
  - National Oceanic and Atmospheric Administration (NOAA)
  - Weather Network
  - Unisys
  - Intellicast
  - Weather Research and Forecast Model
- Streamflow Synthesis and Reservoir Regulation (SSARR) modeling platform – output assessment

AEP Water Shortage Procedures for the South Saskatchewan River Basin

AEP Water Shortage Procedures for SSRB

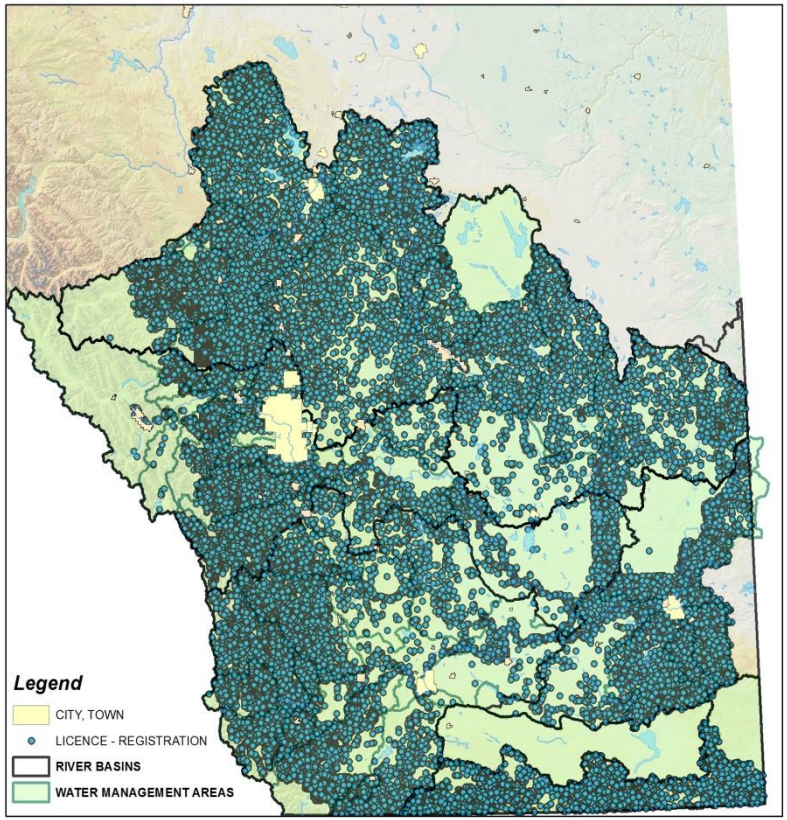
- Water shortage response is broken into 5 stages
- Provide consistent procedures for a response to water shortage
- Water users can understand when and how AEP will respond during a shortage

South Saskatchewan River Basin



Assessing Priority

- Identify Licences and Registrations by priority number
- Determine those licences with minimum flow restrictions (WCO, IO, etc.)
- Exercise use of automated water management tools



Stage 1 – Observation and Preparedness

Stage 1 occurs when:

- **Rate of flow is less than median**
- **Water Supply Outlook indicates potential water shortages**
- **Water users are able to divert, however, there is an elevated risk**
- **Instream objectives or WCOs not being met.**

Stage 1 – Management Response

- Determine impact on water users
- Based on ICS, form a shortage committee
- Monitor stream flows
- Calculate all diversions in affected area
- Compare diversion and flow requirement to predicted natural flow
- Assess fish population

Stage 2 – Active Management Begins

Stage 2:

- **Public contact phase begins**
- **Stream flows below instream objective**
- **Stress conditions for fish populations**

Stage 2 – AEP Management Response

- Implement a communications plan
- Inspect licensed projects
- Confirm list of water users
- Promote water conservation measures
- Suspend or cancel temporary diversion licences
- Work with Transboundary re apportionment
- Angling advisories and angling closures

Stage 3 – Priority Call Assessment and Administration of Priority

Stage 3 occurs when:

- **Conditions degrade in the affected water management area from Stage 2**
- **The department received a priority call from a water user**
- **An apportionment agreement may not be met.**

Stage 3 – AEP Management Response

Priority Call Assessment

- Determine whether administering priority will remedy a dispute over a priority call
- Have alternatives like water conservation and storage been exhausted

Administration of Priority

- Water Management Orders issued
- Agreements to assign water
- Cut off date based on supply and demand
- Angling advisories and closures

Stage 4 – Multiple Water Management Areas

Stage 4 occurs when :

- **Multiple water management areas impacted**
- **A significant number of water users are impacted and are unable to divert water**
- **Water shortage persists**

Stage 4 – AEP Management Response

- Responses additive from Stages 2 and 3
- Manage department owned works
- Expand scope of advice
- Conscript staff

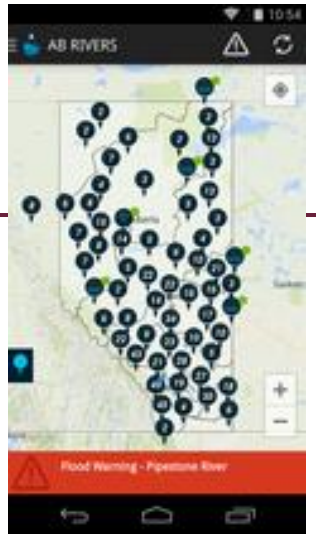
Stage 5 – Declaring an Emergency under the Water Act

Stage 5 is considered when:

- **Elevated risk to human health and safety**
- **Elevated stress on the health of the aquatic environment**
- **Water Shortage Response Plans implemented**
- **Temporary transfers or assignments implemented**
- **Unable to address the extent and magnitude of the water shortage.**

Other Water Shortage Strategies

Communication



- **Alberta River Basin Mobile App**
  http://www.programs.alberta.ca/16905.aspx#ad-image-0

- **Alberta's River Basins website**
  http://www.environment.alberta.ca/apps/basins/

- **Fact Sheet – Alberta's Water Priority System**
  http://esrd.alberta.ca/water/education-guidelines/documents/AlbertasWaterPrioritySystem-FactSheet.pdf

Water Shortage Response Plans

Guidance document "Preparing Water Shortage Response Plans"

http://esrd.alberta.ca/forms-maps-services/directives/documents/PreparingWaterShortageResponse-Apr23-2014A.pdf

Water Shortage Response Plans

- develop full appreciation of risk to the intended purpose of water use
- opportunities are considered and analyzed in advance
- sustainable during water shortage periods
- an operating plan recognized as a term and condition of the licence

Strategies for Licence Holders

Demand Reduction

- **Water Conservation methods (water restrictions, bylaws, etc.)**
- **Social Media (drought shaming, grasshole)**

Supply Augmentation

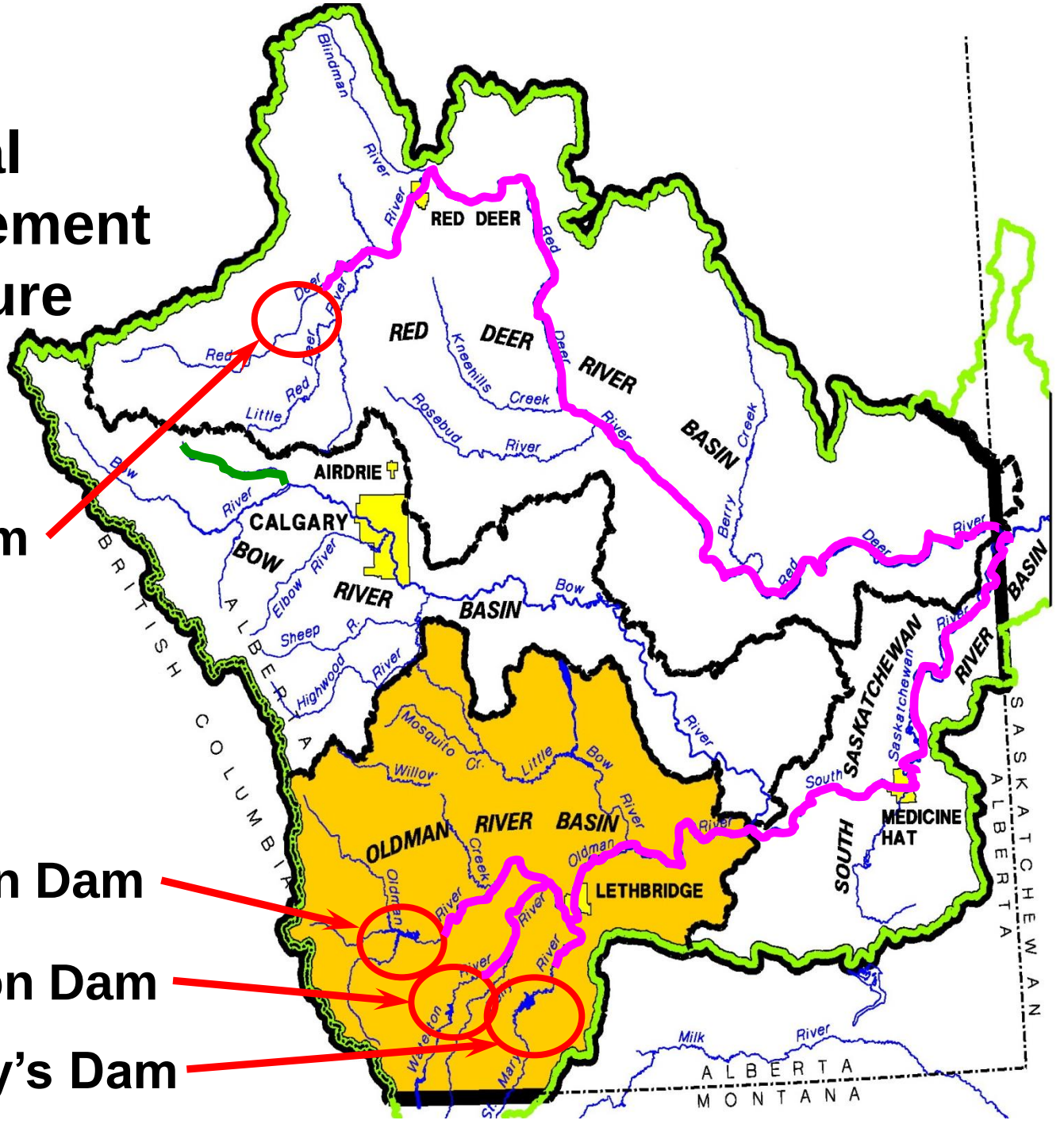
- **Water Act Assignments**
- **Water Act Transfer – secure a more senior priority**
- **Storage**

Nevada Water Authority

Reservoir Operations

Oldman Dam

Provincial Water Management Infrastructure



Tools

- Automated water management tool
- Real time water use information
- Enhance daily low flow forecasting capability
- Develop a low flow alert system
- Develop a water shortage advisory system
- Consideration for a real-time allocation modelling

Questions