

Southern Region Modelling Initiatives

**Regional Science and Planning
Environmental Modelling Team**

Southern Region

Drivers of Model development in the Southern Region

- Population Growth
- Water Scarcity
- Large water consumers
- Need for safe, secure water supply

Southern Region Modelling Team

Primarily Water Modelling

- Allocation
- Quality

Support to

- Approvals
- WMO
- Planning
- Apportionment negotiations

Development Plans

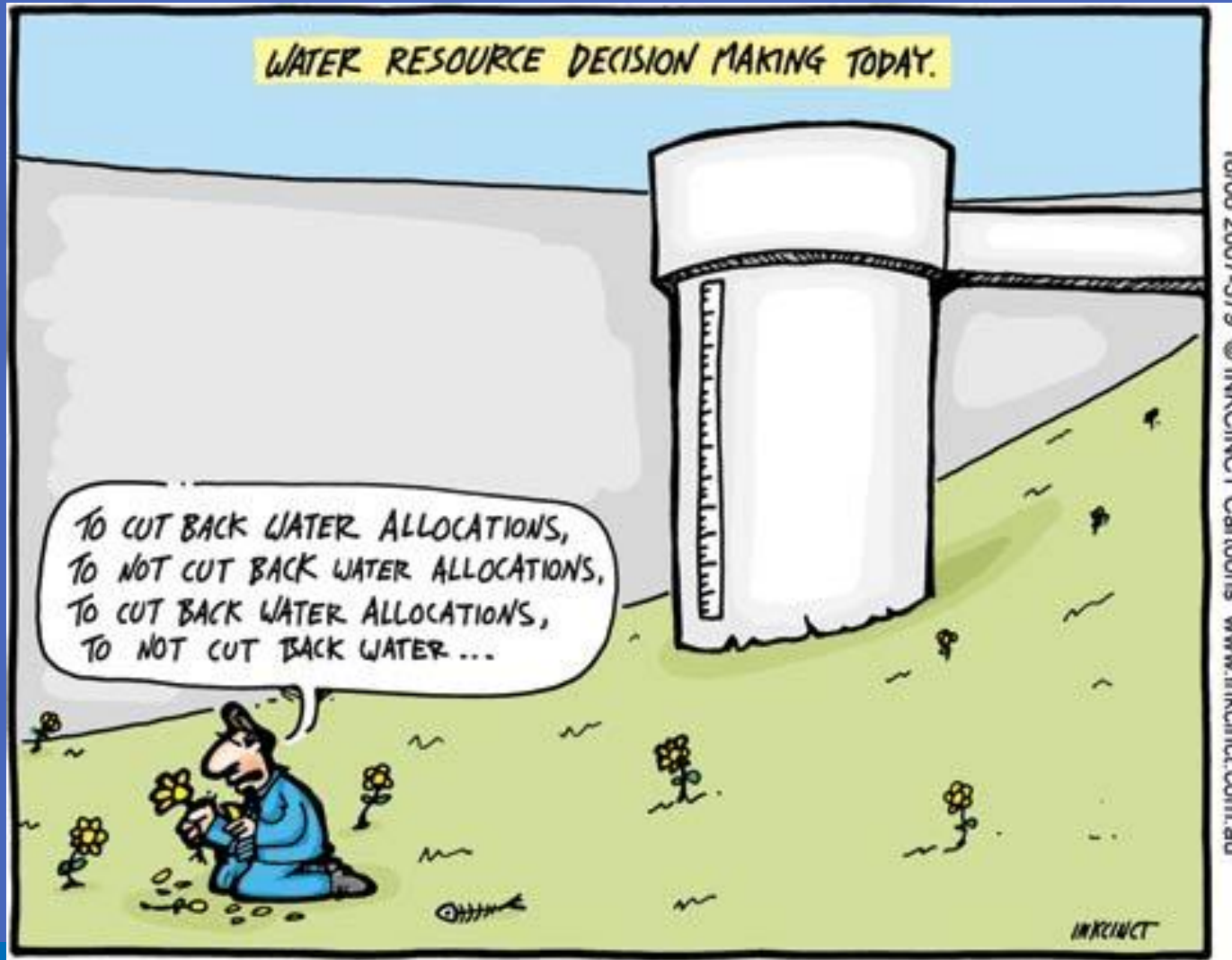
Supporting

- **SSRB (South Saskatchewan River Basin) Plan**
 - Approved water management plan
 - Basin closure to new applications (except Red Deer basin)
 - Updating of WRMM to support implementation
- **SSRP (South Saskatchewan Regional Plan)**
 - Land use framework planning
 - Building capacity for Water Quality and Land Use modelling

WRMM

Water Resources Management Model

The Water Allocation Problem



The Water Allocation Problem (in words)

How do you allocate a scarce resource (water) among competing demands in the most efficient way?

More than simple accounting

Constraints add complexity:

- Priorities.
- Instream objectives.
- Sharing agreements.
- Storage
- Variable flow from week to week , month to month, year to year

Origin of WRMM



Water scarcity in southern Alberta led to SSRB planning program

- WRMM was built for Alberta Environment.

To meet our ongoing needs

- WRMM models have grown in number and complexity over time.

Uses of WRMM

Major projects and studies

- SSRB planning program (1980's, 2000's)
- Meridian Dam analysis
- Highwood / Little Bow diversion plan
- Special Areas Water Supply Study
- Acadia Irrigation Proposal
- Negotiations with Siksika on Bassano dam claim
- Expansion of the Carseland Headworks
- Alberta/Montana sharing of flow in the St. Mary and Milk

Model Versions

WRMM (the original)

- Owned by Alberta ESRD
- Designed specifically for Alberta
 - Water Act
 - Instream objectives
 - Reservoir operating policy
- Runs quickly
- Proven itself in Southern Region Projects and GOA Studies
 - 30+ years history

Model Versions

Wrm-Dss (Wrmm version 2)

- New method of formulating solution
 - More optimal solution than WRMM
- No limitation on size of schematic
 - Commercial solver replaces built-in OKA solver
- No longer needs text files (uses databases)
 - Backwards compatible with existing model documents (can still use text files)

Model Versions

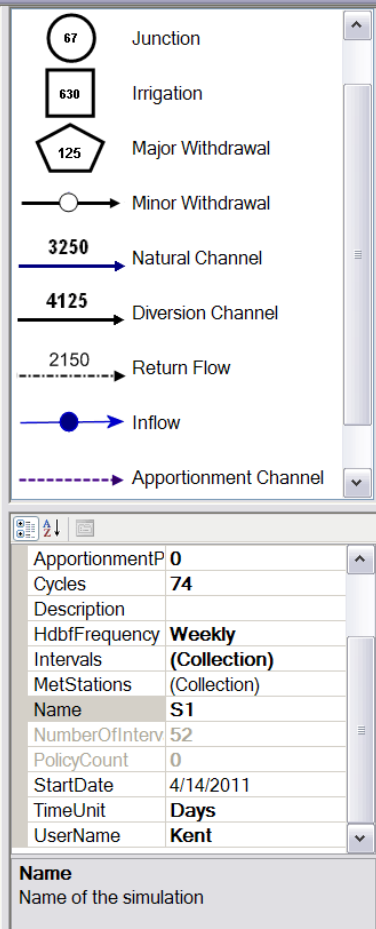
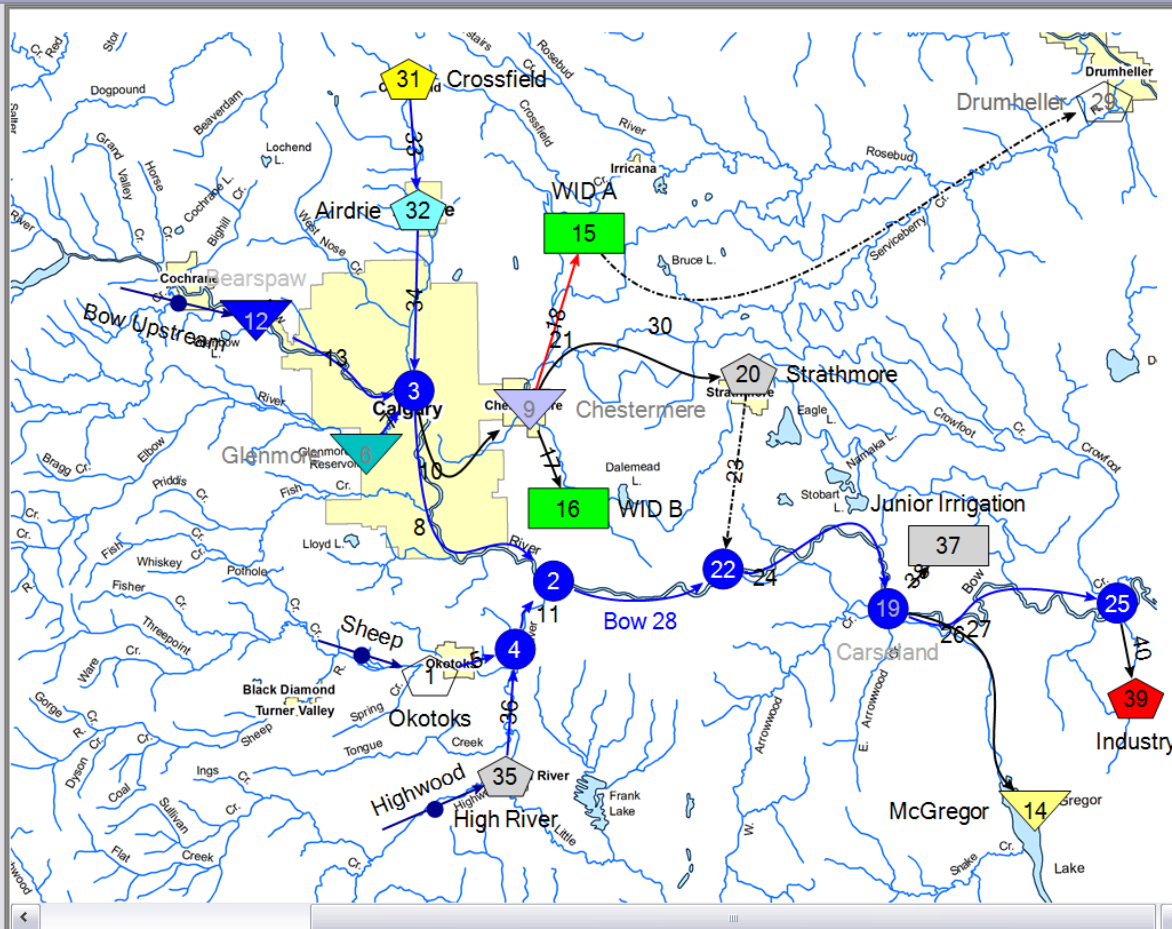
Wrm-Dss (cont'd)

- Includes Channel Routing features
 - For daily operational decision support
- State of the art programming for adaptation to other computing platforms

Wrm-Dss Utility

Graphical User Interface

- Makes model design visual
- Can use maps or images created in GIS applications as backgrounds
- State of the art industry standard programming
 - Potential to migrate to the Web
- Can be developed independently and in parallel to Wrm-Dss application
- No licencing / maintenance fees for dep't







Air



Water

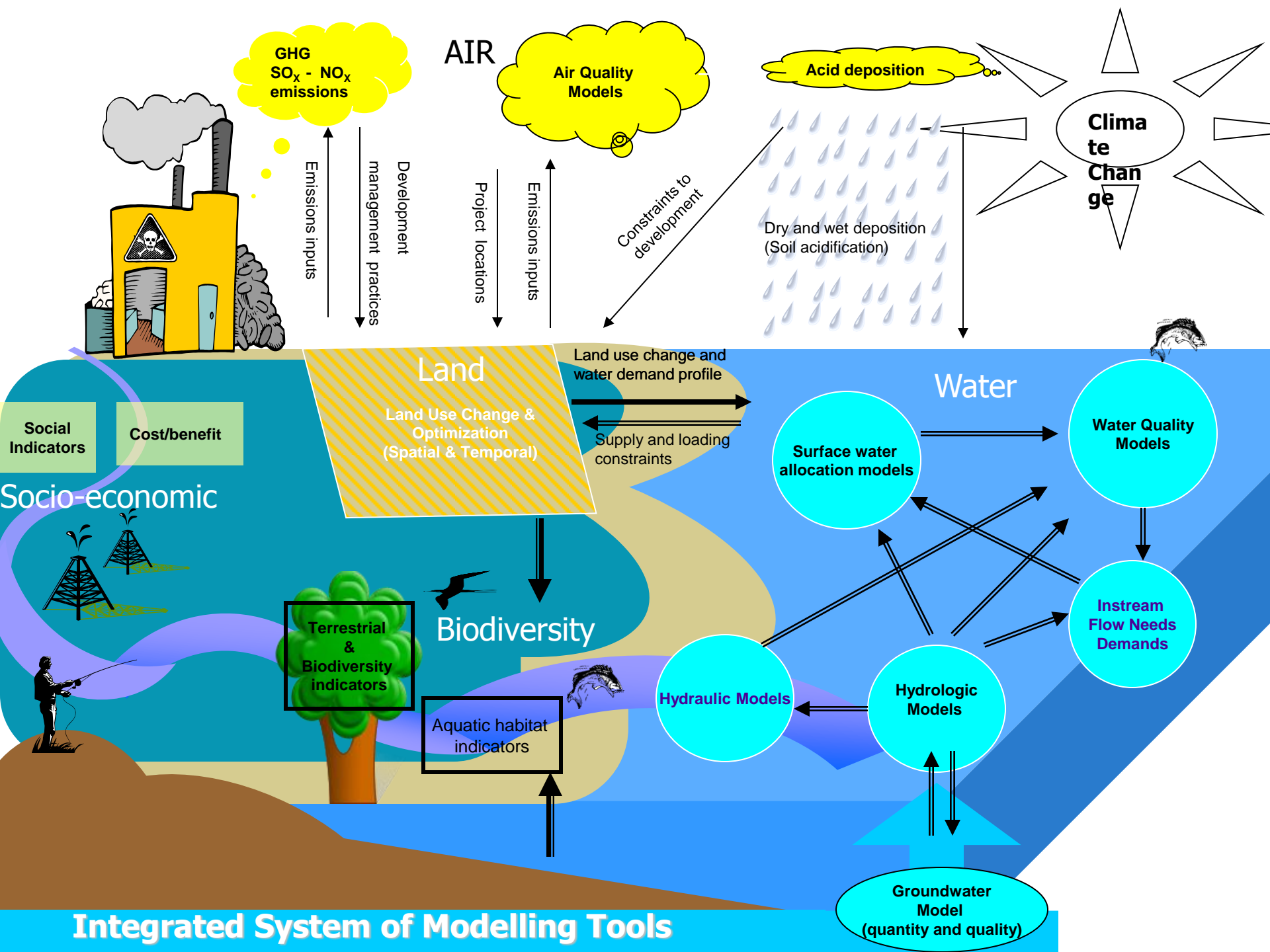


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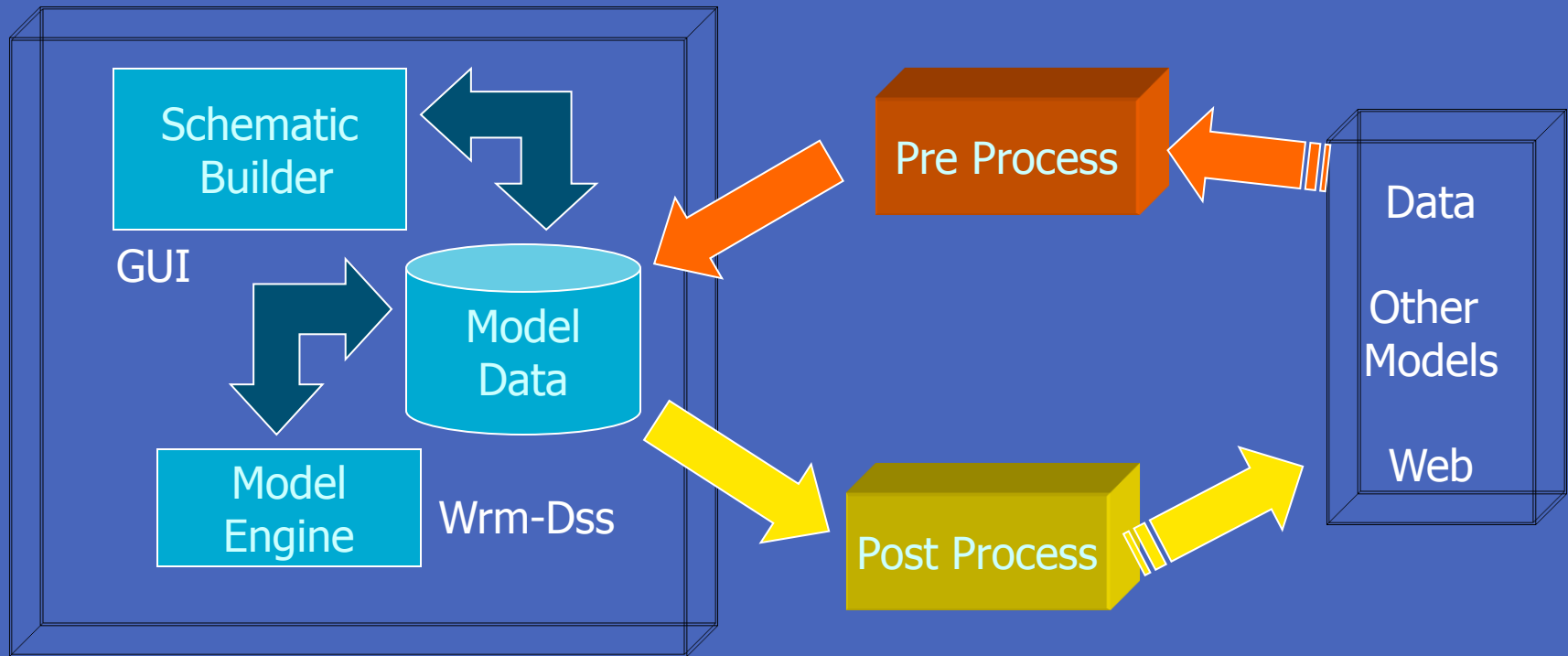


Life





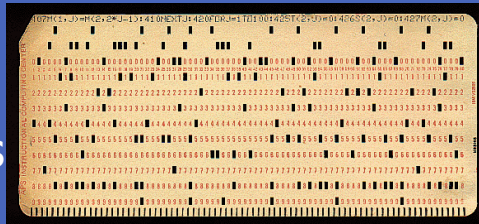
WRMM Linkages



WRMM

Evolving with technology

1970's
to 90's



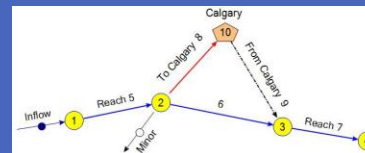
1990's
to 2010



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Current to
Future



Alberta