CHAPTER 8: KNOWLEDGE GAPS

Nature's Bouquet – OWC

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Many knowledge gaps exist for several of the indicators. This information will be instrumental in accurately assessing the overall health of the Sub-basins and the Oldman watershed as a whole and needs to be considered in future watershed planning and management.

8.1 Terrestrial and Riparian Ecology

Terrestrial and Riparian knowledge gaps include:

1. Land cover data for the Sub-basins is taken from the Native Prairie Vegetation Inventory and AVI based on aerial photography of 1992 to 1993 and 1988 respectively, while data for Waterton National Park was from interpretation of 1997 Landsat imagery. To present more recent data, the Statistics Canada census of 2006 was used to provide detailed information on agricultural lands and crop types. These data generally show that a larger area of each Sub-basins has been disturbed by agricultural activities compared to the older land cover data. This difference should not be considered a trend of increasing land conversion to agriculture. Rather, the difference reflects the way the data are collected, the accuracy of the original air photo interpretation (80%), as well as the difficulty of distinguishing vegetation classes that are fairly similar such as native prairie from seeded or tame pasture land.

   The land cover in this report should be considered as a baseline and be re-evaluated at a future date to determine what, if any, trends occur. The soon to be completed Grassland Vegetation Inventory (GVI) and updates to AVI should serve as the basis for refining the land cover data.

   There were several limitations to the use of the agriculture land cover data from Statistics Canada. In several cases only a portion of the 2006 agricultural area of the MDs or Counties were located in the Sub-basins, so the land use was assumed to be uniformly distributed over the portion of each municipality or county, which may not always be the case.

2. Potential soil erosion rates were predicted by a computer model Agricultural Region of Alberta Soil Inventory Database (AGRASID) from a base map at a scale of 1:100 000. Depending on the land use issues, soil erosion could be modeled at a scale relevant to the individual activities. For example, additional modelling could be done for areas within the Oldman watershed with fair to poor soil erosion rankings (i.e., 25 to >50% risk of erosion). Mapping of the local soils within these areas, to the soil series level, and using this information in the AGRASID model would generate local erosion risk values that can inform future management decisions.

3. *Land Use:* The extent of forest harvest areas could be added to the land use disturbance for the Mountain, Foothills and Southern Tributaries sub-basins. Perhaps the harvest areas within the last 5 to 10 years could be added as well as the areas that have been reforested to regeneration standards.

   There are no land use data for the Peigan (North Piikani) and Blood (Kainai) Indian Reserves No. 147 and 148 in the Foothills and Southern Tributaries sub-basins.

   The population of the municipalities outside of the towns and villages was assumed to be uniformly distributed, which may not always be the case.

   Random recreation data in terms of linear extent of active trails, number of users or number of random campsites was not readily available particularly in the Mountain, Foothills and Southern Tributaries sub-basins.

   Livestock data, in the form of animal unit months (AUMs) for publically-managed land and location of confined feeding operations (CFOs) for private lands is presented in this report. The AUM data provides information on the land's carrying capacity but the CFO data does not. Further reports should consider an indicator that combines carrying capacity information for both public and private livestock operation.

4. *Biodiversity:* Biodiversity could be considered as an indicator of aquatic ecology in future state of the basin reports.
5. Economic growth patterns and factors influencing a shift from rural to urban populations as well as increased pressure for intensive recreational developments (e.g., on Travers Reservoir, off-highway vehicles (OHV) use, etc.) are difficult to measure within the Oldman watershed. Population changes have been noted in this report. However, an indicator that measures economic growth within the watershed should be considered for future reports.

8.2 Water Quantity

Water quantity knowledge gaps include:

1. Current natural flow data extends only to 2001. Up-to-date natural flows for all indicator hydrometric stations is needed.
2. Increased monitoring and systematic compilation of actual water use and return flow data is needed.
3. Research on availability of groundwater, the extent of current use, and the relationship between groundwater use and surface water flows is needed, particularly since closure of surface water to new licences allocations.
4. A groundwater indicator should be identified and included in future State of the Watershed reports.
5. On unregulated streams, such as the Castle River and Lee Creek, there is no way to meet Instream Objectives (IOs) or Water Conservation Objectives (WCOs) that are set higher than natural flows. On such streams, instream targets should be limited to a target value or natural flow, whichever is less, to avoid a false impression of mismanagement. On regulated streams, the IOs and WCOs could be set higher than natural flow to provide instream benefits beyond that of natural conditions or to mitigate anthropogenic impacts. Such instream conditions could become targets for regulation of stream flow.

8.3 Water Quality

Water quality knowledge gaps include:

1. Trends in water quality indicators could not be determined for many sites of interest in the Oldman watershed because of a lack of water quality data collected on a regular basis. Most of the data available and used were collected for reasons other than long-term statistical analysis and, therefore the period of record was relatively short.
2. The ability to use indicators in mass balance calculations and assessment of influences in the watershed scale is limited with the current data because of an absence of simultaneous data for concentrations of indicators and stream flow, which limits calculations of loadings.
3. A monitoring program that will support watershed adaptive management plans and decision making processes has to be developed. This program could use the existing data to the extent possible and provide regular data to update trends, loadings, and future mass balance modelling. Review all current monitoring programs to determine how well they are providing the information base required for adaptive management.

Water Erosion – ARD

Rainy Street – A. Hurly