

# DEERWOOD



## Soil and Water Management Association

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### **RRBC Jan. 15<sup>th</sup>, 2004 Presentation** **Presenter: Bill Turner**

#### **South Tobacco Creek Small Dam Network**

Water management has been a serious concern since settlement of the Red River Watershed. When talking about historical water management in the Red River Valley it's most often too much water and too fast. Although lately we are starting to hear rumblings about water allocation and the need to maintain minimum flows during current dry periods.

With the Red River watershed having a wide variety of soil types including heavy clay soils, steep slopes on the escarpment to virtually flat land in the valley, the tools required for water management are many. Water management begins not at the bottom of a watershed, but at the point of origin through out the watershed.

As land and water managers we should be looking for increased water retention at the field (on farm) level through such management tools as increased organic matter and improved cropping practices to maximize our use of the available moisture. And in turn follow this up with a well designed, responsible infield and channel drainage system. When operating as an agricultural watershed with our historical climatic conditions we can generally accept that we will need to have assurance that an adequate drainage system is in place and maintained.

The traditional concept has been to get as much of the water into the drainage system as quickly as possible. As this practice is implemented through out the watershed it creates a compounding effect further down the watershed all the way to Lake Winnipeg.

The Manitoba (Pembina) Escarpment on the western side of the Red River watershed has its own unique problems, some areas have up to 600 feet of elevation change in 7 miles. The problems were apparent from the time of early settlement. By the late 1950s the Rural Municipality (RM) of Thompson councilors had constructed several small dams (approximately 15-20 ac. ft. in size) to alleviate a number of local problems with municipal infrastructure damage and agriculture soil loss. They could see the concept of headwater storage provided a direct benefit towards addressing their concerns. In the early 1960s to 1980s the municipal councilors in the RM decided to approach the Provincial and Federal governments for help in addressing the perpetual problem. Government's study on headwater storage to reduce escarpment flooding and erosion created several options, as well as many questions. The study results recommended headwater storage with one large dam, but this was proven to be uneconomical.

In 1985 the local farm organization “Deerwood Soil and Water Management Association” (DSWMA) formed and secured government funding to assist in implementing soil and water management practices within the local farm community. One of the key objectives was to establish a network of small dams for headwater storage. After construction of a number of these structures DSWMA approached the federal government to initiate an evaluation of the small dam impact as to reducing downstream flow rates.

The results from the study have demonstrated up to 90% flow reduction immediately below the small dam during major rainfall runoff events. This validated the previous generation’s observations. As well, the network of 26 small dams on the South Tobacco Creek has reduced flow at the bottom of the escarpment. The study calculates flow rates at Miami Manitoba to have been reduced by upwards to 25% for rainfall runoff and 17% for snowmelt runoff events. This is only a few percentages lower than the estimated impact of the one large dam proposed in the 1988 study.

When the costs were reviewed the 26 small dams came in at \$253, 580 versus the 1 larger dam at an estimated at \$900,000.

A cost benefit study supported by one of the founding partners of your organization (The International Coalition) showed an economic payback period of 16 years for an undiscounted rate and 25 years at a discount rate of 5%. The annual savings within the 2 RMs below the escarpment came in with an estimated savings of about \$50,000 per year.

Another study looking at the positive impacts of the headwater structures as to their impact on water quality has produced interesting interim results. The downstream movement of total nitrogen (TN) and total phosphorus (TP) has been reduced. Interim figures are in the range of; TN reduced by 24-42% and TP reduced by 25-35%.

We view the concept of a small dam network specifically designed to reduce downstream flow rates as a positive and important tool in any watershed management plan, especially for agricultural escarpment regions on the Great Plains.

Due to the proven effectiveness of an on-farm headwater storage network (combined with sound land management practices as components of a comprehensive watershed management plan) we are now working together with five other rural municipalities and conservation districts to expand the potential for science-based watershed management solutions throughout the Tobacco Creek system. We call it the Tobacco Creek Model Watershed.

