

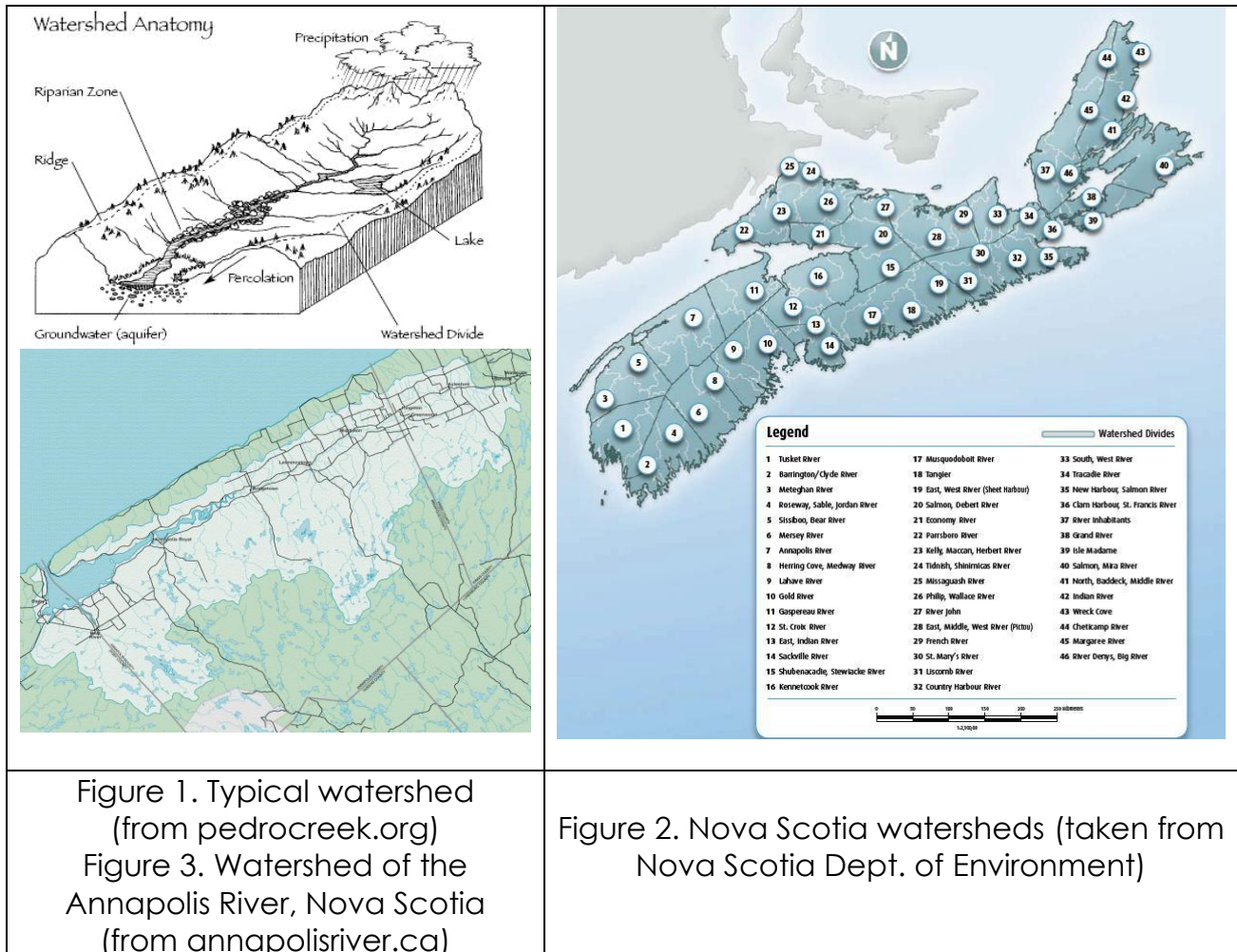
# Background on Watershed Management (with context in Nova Scotia)

Adapted from Barbara Veale's

A Review of the State of Research and Practice in Sustainable Watershed Management, 2006

## What is a Watershed?

A watershed is a geographic area in which all water that falls on the land (precipitation) flows to a central location, most often a lake or river (Figure 1). For this reason they are often referred to as river basins. Nova Scotia is composed of approximately 46 large watersheds (Figure 2) including the Annapolis River Watershed (Figure 3).



## Why Choose Watersheds?

Reasons for selecting watersheds as the units in which to undertake management include;

1. There is a finite amount of land and water contained within a watershed, allowing for proper allocation between users
2. Changes within a watershed in terms of land use are reflected in the waters there with regard to quality and quantity
3. A watershed is a concrete, easily defined unit that communities can "see".

4. Watersheds are flexible units; they can be broken into smaller nested sub-catchments or left as large river basins.

Having a defined region for management allows stakeholders to be organized and directed to a common goal. A challenge to using the watershed as a management unit is the fact that political boundaries are arbitrary when viewed against natural ones; in Figure 2 this is illustrated by the fact Nova Scotia is divided into 24 municipal units versus the 46 watershed units. This problem has been run into many times in conservation and natural resource management efforts, for example with the Great Lakes, endangered species protection and fisheries management.

### **Why Watershed Management?**

Watershed management is viewed as a vital step to achieve sustainable use and protect the quality of natural resources, increase ecosystem resiliency and improve the communication between decision-makers and members of the community. Changes in climate, political and community motivation and availability of resources make it difficult to preserve the integrity of ecosystems. Steps need to be taken now in order to address these issues. Watershed management has the potential to be able to tackle issues like flooding, drought, contamination, degradation, habitat protection and land use.

The World Wildlife Foundation defines watershed management, or integrated river basin management (IRBM), as "...the process of coordinating conservation, management and development of water, land and related resources across sectors within a given river basin, in order to maximise the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems" (panda.org).

### **What Makes Watershed Management Work?**

Implementation of a successful strategy is dependent on addressing the barriers identified by Barbara Veale (Table 1). Watershed management plans are created using a multi-stakeholder process. This allows for a balance between corporate, community and conservation needs. There is also the challenge of designing effective indicators to measure watershed management success, and ensuring that the plan includes measures for defining the issues, developing and implementing plans of action, as well as monitoring and review of activities.

### **What is Going on Now in Nova Scotia?**

Watershed management in Nova Scotia is in its formative stages. Legislated responsibility for water resource management is fragmented and poorly communicated to the public. The majority of work done is by non-profit community groups who band together against a perceived threat to a water supply or use of a body of water, and by government agencies that are sometimes under-funded and understaffed. This has resulted in degraded water resources, evidence of which can be seen in terms of high sedimentation and fecal coliform

contamination in rivers, loss of fisheries due to degraded habitats, and flooding events.

**Table 1. Barriers to Watershed Management (Veale, 2006)**

<b>Barrier</b>	<b>Description</b>
Politics, competing interests and societal inequalities	Sound decisions based on science are difficult in the face of vested interests, political motivation, and inequalities of power. Commitment to the watershed management process across multiple decision-making levels is generally weak.
Weak legislation	The absence of strong enabling legislation undermines implementation of watershed management (i.e., inadequate penalties for environmental violations, lack of national water quality standards and guidelines, and lack of environmental operating standards for industry).
Excessive bureaucracy/horizontal and vertical fragmentation and boundary issues	Unclear mandates, duplication of responsibilities, poor interagency cooperation, and conflicting missions among agencies lead to interagency battles making it difficult to share data, secure funding and partnerships, coordinate activities and to respond quickly to issues. Most watersheds are managed on the basis of overlapping political boundaries.
Risk aversion/reluctance to share power	In hierarchical decision-making structures, agencies are reluctant to shift from a known top-down, linear approach (safe) to an unknown participatory approach (risky) and are unwilling to share decision-making control and power.
Accountability concerns	Clear lines of responsibility are often obscured in collaborative watershed partnerships and mechanisms to ensure accountability are often lacking, hindering watershed management processes.
Preference for a standardized approach	There is a tendency to ignore differences in the biophysical and socio-economic contexts by applying the same approach to problem solving.
Resistance to change	Water resources practices typically focus on single use rather than a multiple use, holistic perspective requiring interdisciplinary or transdisciplinary approaches. The well-established status quo, steeped in a tradition of 'rationale' domination, is difficult to change.
Lack of useful data, practical decision-support tools and technical expertise	There is either a lack of baseline data or inconsistent formats for data collection, storing and reporting across agencies. Basic and applied research and technical expertise is typically not adequate to provide the appropriate data, information and tools necessary to make informed decisions about key issues.
Lack of monitoring and evaluation procedures	The expense of data collection has caused governments to reduce monitoring sites thereby affecting the quality and quantity of available water data. Evaluation procedures to assess the effectiveness of the actions taken are inconclusive or absent; the state of science around the selection of appropriate indicators to measure success is in its infancy.
Lack of sustainable funding	There is often a lack of dedicated, sustained resources for coordination and few cost-sharing mechanisms to attribute costs among all relevant players on a long-term basis.
Lack of incentives/disincentives for changing current approaches	An alternative mix of incentives and disincentives is necessary to effect change such as tax rebates, cost sharing and stricter regulations and penalties.
Unrealistic expectations/conflicting time horizons	Some recently established watershed agencies are expected by other government agencies and the public to show immediate results even though water issues develop over a number of years and are cumulative; there is a need for practical procedures that consider risk and uncertainty so that expectations regarding research and decision-making are reasonable.
Heavy reliance on community-based initiatives	Without support from different government levels, community-based initiatives have limited capacity to deliver outcomes and face volunteer burnout.

