SUMMARY SHEET:
Key Learnings on Surface Water Non-Point Source Pollution

What is non-point source pollution?

To effectively manage watershed health, we need a good understanding of all sources of pollution. Non-point source pollution (NPSP) is contamination that enters a water body from many dispersed points of discharge and thus has no single place of origin. This is different from point source pollution, which comes from one source and is generally easier to measure and manage because the emissions are licensed and controlled.

NPSP origins and diffuse points of discharge are not easily identifiable and can be sporadic. Unlike PSP, NPSP is associated with particular land uses as opposed to individual points of origin or discharge. NPSP can arise from activities related to agriculture, forestry, urban development, mining, oil and gas, construction, and recreation. Such diverse sources along with the fact that NPSP can be transported by rainwater, snowmelt, runoff, air deposition and groundwater, make it difficult to prevent, measure, control, quantify and manage this type of pollution. Land surface (e.g., slope), soil texture, geology, vegetation, hydrology and climate also affect the timing and extent of NPSP.

The Issue with NPSP

NPSP problems are occurring more often in Alberta. For example, poor water quality in some tributaries has required specific remediation plans; water quality objectives are being exceeded in some mainstem rivers; and popular lakes are being closed to contact-recreational use due to water quality issues. Reduced water quality can lead to economic costs and impacts, such as loss of tourism dollars from beach closures and increased water treatment requirements for municipalities. Currently, NPSP discharges to surface water are often not regulated or covered by an approval or code of practice.

Although we know NPSP is occurring, its extent and associated risks in Alberta are unknown. Streams, tributaries, and lakes are most affected by NPSP because they are least able to dilute such pollution. Reduced water quality in these water bodies is of particular concern for fisheries, as small streams and lakes provide much of Alberta's primary fish habitat.

Quantifying NPSP remains a challenge on many scales. This is due largely to gaps in knowledge about inputs and to difficulty distinguishing between natural background loads and actual NPSP. As well, the links between specific land uses and the amount and type of NPSP that may result are unclear.

NPSP has been studied using a sector-by-sector approach, which makes it difficult to understand and gauge the cumulative impact of NPSP across sectors within a watershed. This is of particular concern for areas where disturbances such as logging, ranching, oil and gas, and recreational uses occur concurrently, such as in the headwaters.

How is NPSP being managed?

Although many jurisdictions are beginning to address NPSP, few have a comprehensive, integrated program and even fewer have significantly reduced NPSP. Most jurisdictions, including Alberta, manage NPSP using various tools and approaches, including education and awareness; incentives and voluntary practices; low impact development guidelines; monitoring and assessment; total loading or discharge

limits; water quality credit trading systems; stormwater management plans; bylaws for pesticide and nutrient application backed by enforcement and penalties for non-compliance; and policies that set goals and desired outcomes.

Jurisdictions that have achieved some level of success in managing NPSP tend to take a watershed approach. They also have a clear lead agency; good baseline data; ongoing monitoring and assessment; a sound regulatory framework and effective enforcement program; and strategic partnerships with both government and non-government bodies.

Alberta's current policy framework focuses on water quality monitoring programs for the major rivers. However, evidence suggests that NPSP shows up largely in lakes and tributaries. Alberta is starting to look more closely at NPSP as population growth and economic development continue at a steady pace. The scientific knowledge by sector is variable with some more advanced than others. The forestry, agriculture, and municipal sectors have done work on NPSP. There are gaps that still exist, particularly around the effectiveness of best or beneficial management practices (BMPs).

A proactive approach to managing NPSP is more cost-effective and timely than remediation, and incorporating focused NPSP management into Alberta's land-use and watershed management systems will help the province become more proactive. As the AWC notes, several knowledge gaps currently exist for NPSP management. Existing water management initiatives focus on water quality as a whole. However, in order to effectively manage NPSP in particular, an understanding of the contributing factors for NPSP and the ability to quantify those contributions needs to be known.

In summary, the need for knowledge and tools to determine how much there is (quantification), where it is coming from (research), if it is a problem (evaluation) and what we can do about it (mitigation) are the necessary components to improve our management of NPSP. The development and implementation of the right tools to manager NPSP can enable land-use decision makers to make meaningful and informed decisions to protect water bodies from NPSP, and more proactive solutions may be needed.

This fact sheet is one in a series prepared by the Alberta Water Council. All fact sheets are available on the Council's website at www.awchome.ca.