

Water Quality Objectives
for the
North Saskatchewan River

NSWA Annual General Meeting
June 16, 2010

Outline

- Purpose of WQO's
- How proposed WQO's developed
- The proposed WQO's
- Implications
- WQO Consultation Process

Purpose

- *What future water quality do stakeholders want in the North Saskatchewan River?*
- Key part of the NSWA's Integrated Watershed Management Plan (IWMP)

Purpose

- Recognize cumulative limits to human impacts
- Decide how to measure (indicators)
- Set specific limits for indicators
- Identify management actions and responsibilities

Objective Setting Project

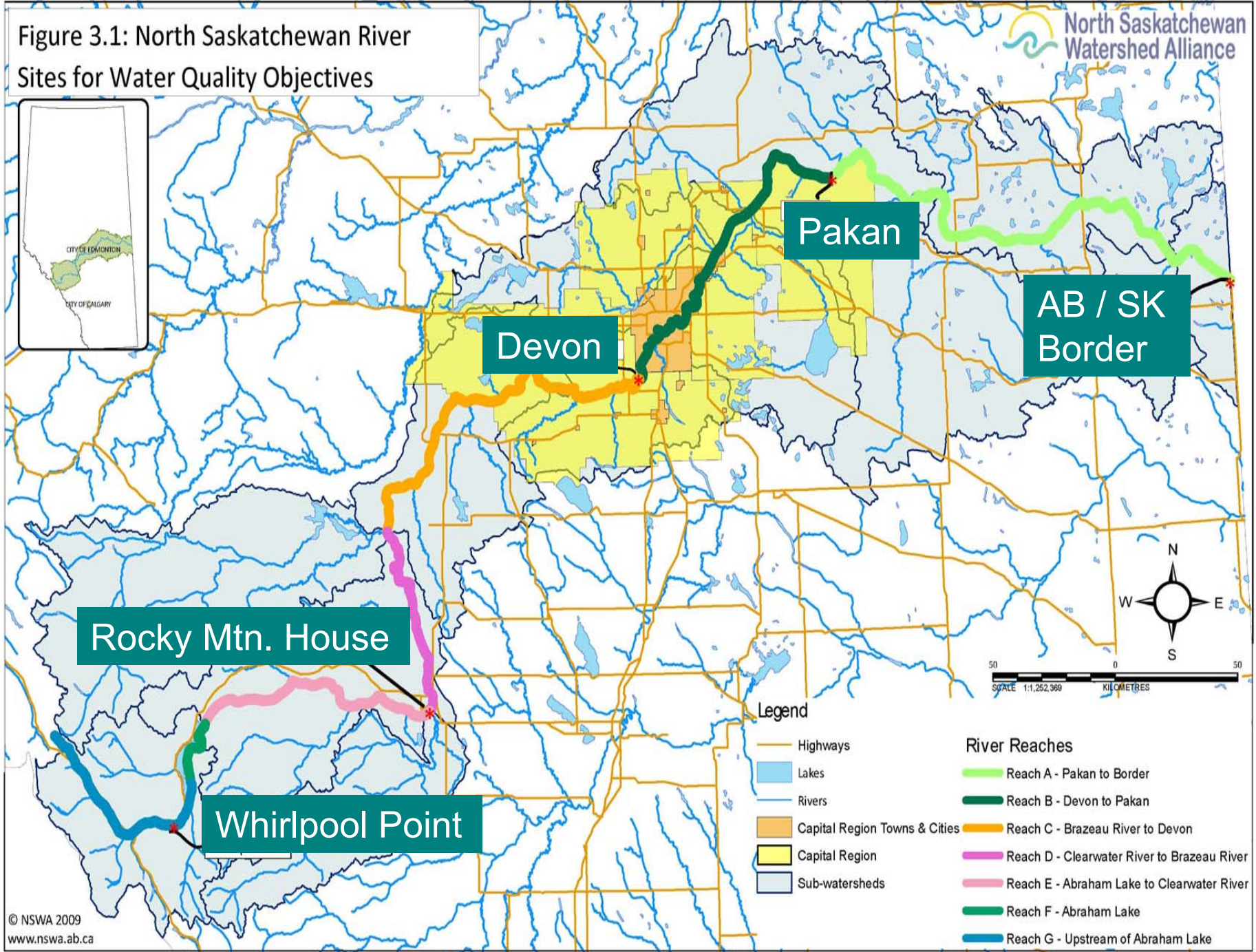
To propose site-specific water quality objectives for the NSR mainstem that protect all current water uses

- Done by a Technical Advisory Committee working with Golder
- Starting point for stakeholder consultation / collaboration

What We Did

- Identify river reaches, monitoring sites, and water uses
- Select basic water quality indicators for the water uses
- Derive site-specific limits for the indicators to protect the most sensitive use

Figure 3.1: North Saskatchewan River
Sites for Water Quality Objectives



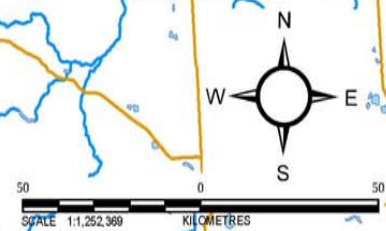
Devon

Pakan

AB / SK
Border

Rocky Mtn. House

Whirlpool Point



Legend

- Highways
- Lakes
- Rivers
- Capital Region Towns & Cities
- Capital Region
- Sub-watersheds

River Reaches

- Reach A - Pakan to Border
- Reach B - Devon to Pakan
- Reach C - Brazeau River to Devon
- Reach D - Clearwater River to Brazeau River
- Reach E - Abraham Lake to Clearwater River
- Reach F - Abraham Lake
- Reach G - Upstream of Abraham Lake



Aquatic
Ecosystem



Select Indicators

- Basic physical, chemical, and biological properties, routinely measured
- Data available
- Published, quantitative guidelines to protect uses

Indicators Selected

- total suspended solids
- turbidity
- temperature
- oil & grease
- dissolved oxygen

- total dissolved solids
- calcium
- sulphate
- chloride
- fluoride
- sodium absorption ratio

- total phosphorous
- dissolved phosphorus
- ammonia
- nitrate
- nitrite

- total coliforms
- fecal coliforms
- *e. coli*
- *giardia*

Evaluate Indicator Data

- Statistical analysis of water quality data for past 20 years (1988-2007) at specific sites
- Consider variability with season and flow rate
- Compare actual water quality with site-specific limits

Basic Assessment

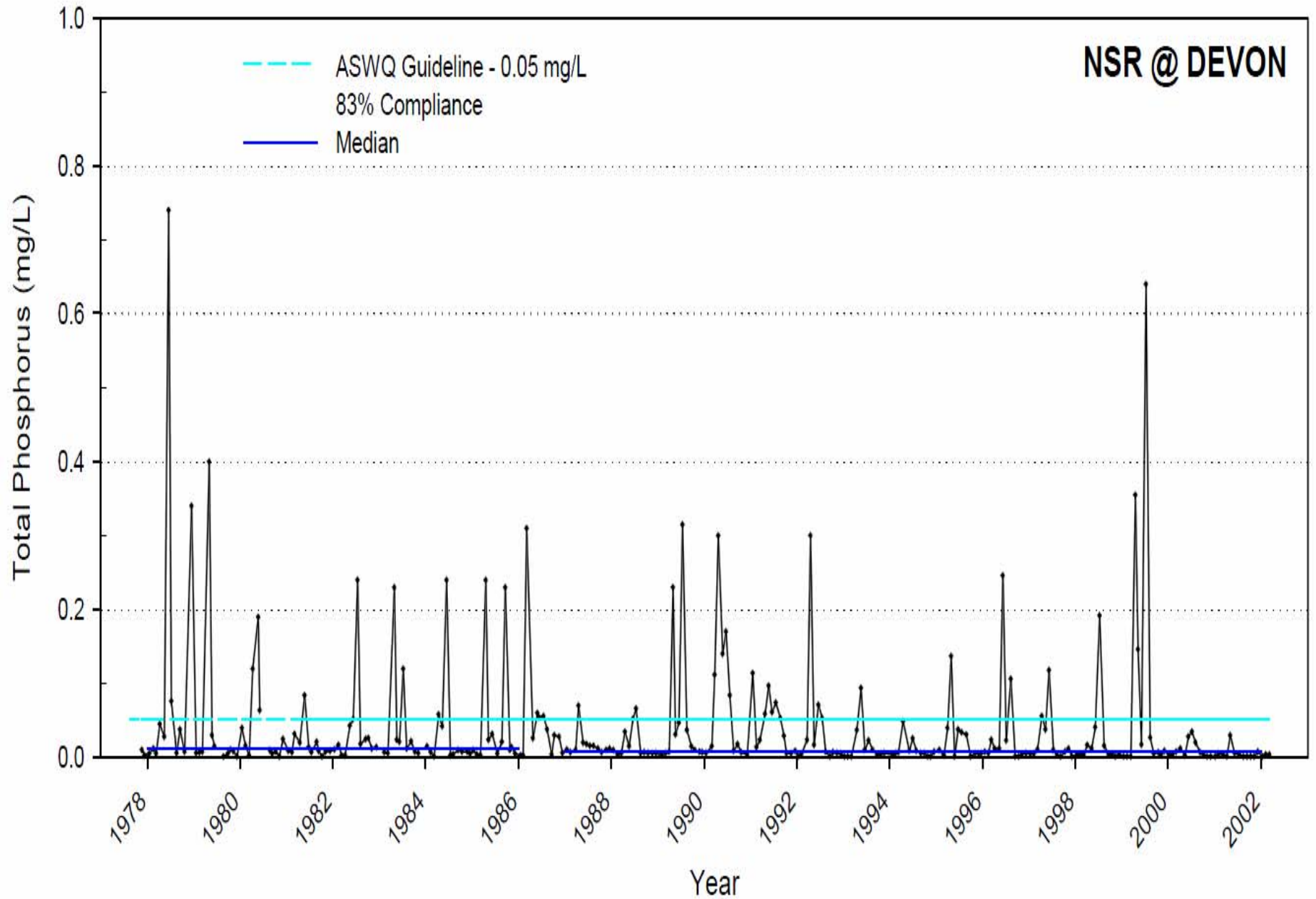
Whirlpool Point, RMH and Devon:

- All indicators much better than guideline limits
- Occasional peak runoff conditions can affect drinking water treatment (suspended solids, organic material, pathogens)

Proposed Upstream Objectives

Preserve existing water quality at Whirlpool, RMH and Devon:

- Maintain current medians, no significant increasing trends
- Maintain current 95th percentiles, no significant increasing trends

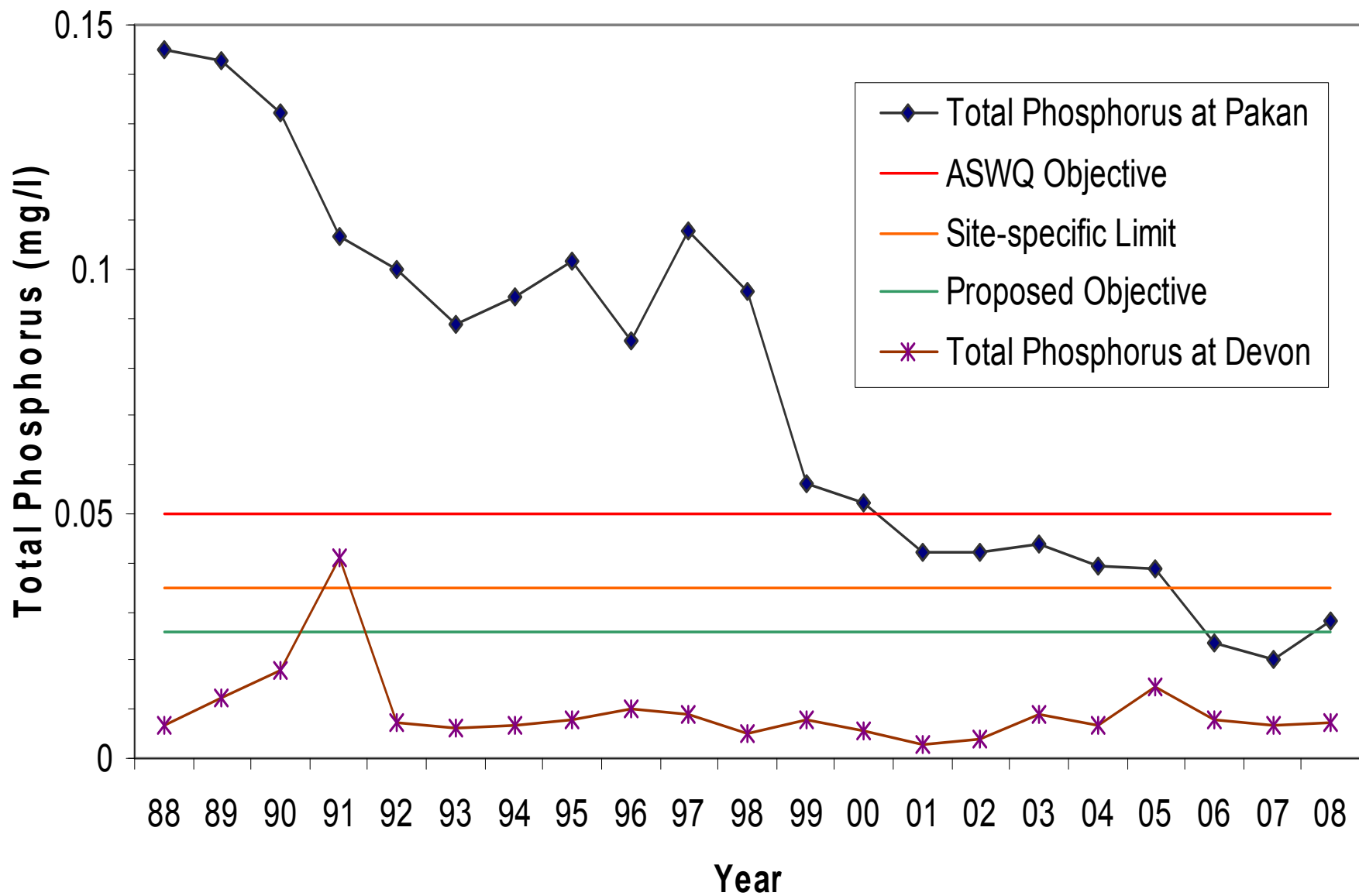


Basic Assessment

Pakan and AB/SK Border:

- Long-term improvement
- Urban, industrial & other impacts evident
- Most indicators better than guideline limits but a few exceed (TSS/Turbidity, F, TOC, pathogens)

Median Annual Phosphorus at Devon and Pakan



Site-specific Objectives

Pakan and AB/SK Border:

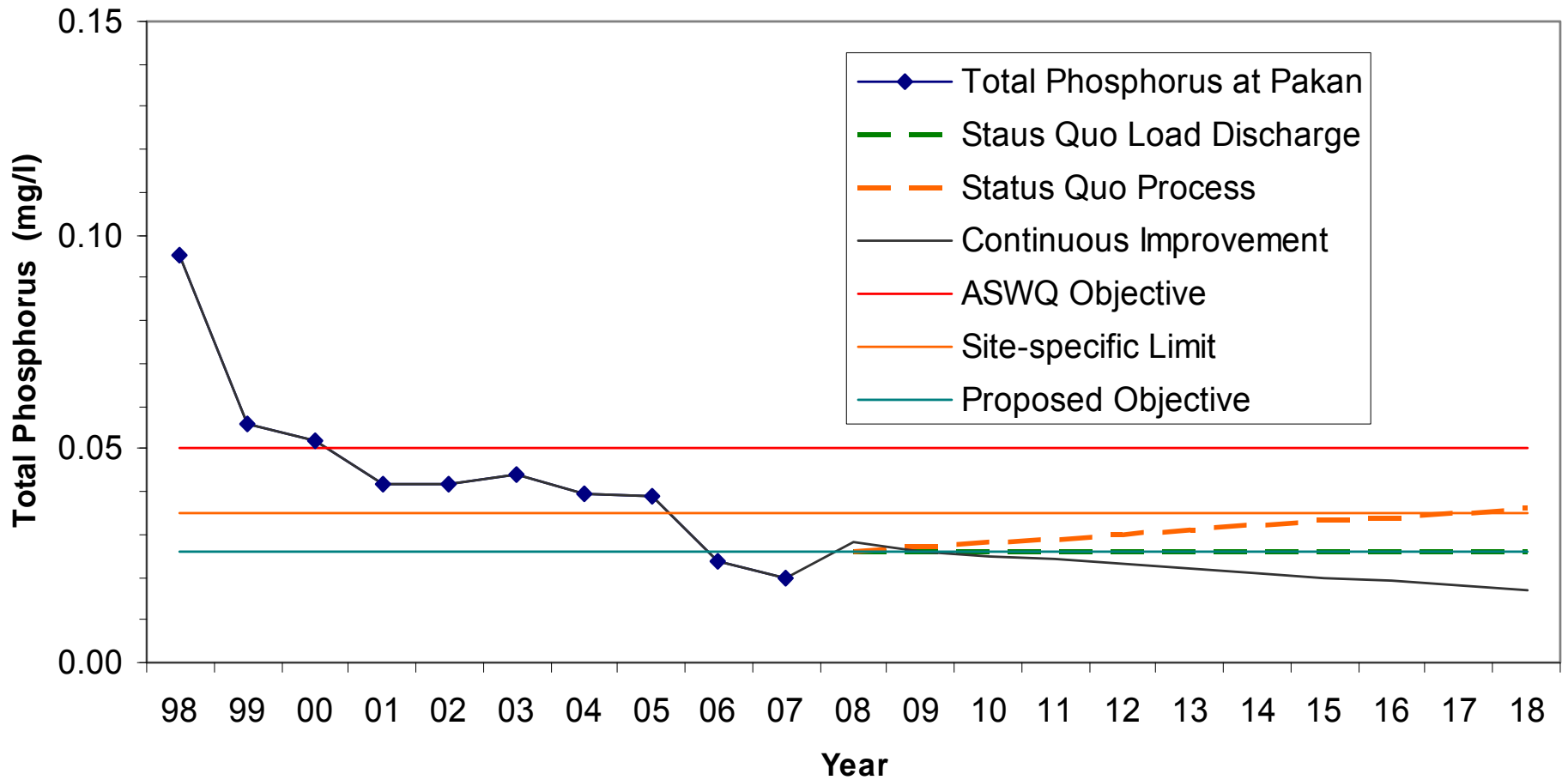
- Indicators exceeding guideline - meet guideline (declining medians until at or below guideline)
- Indicators better than guideline - maintain current water quality (no increasing trend in medians and 95th percentiles)

Implications of Proposed WQO's

- New loads need to be minimized
- Remaining increases need to be offset by reducing current loads
- Continuing load reduction in Capital Region
 - Eg. municipal WWTP's, Edmonton CSO strategy, industry regulation
 - Key driver for the IH WMF
- Lower river flows or increased use would require load reductions

Effect of Development

Future Phosphorus Scenarios at Pakan



Proposed WQO's → IWMP

All stakeholders to:

- Evaluate implications and management options
- Consider environmental, social and economic balance
- Accept objectives or propose alternatives (more or less protection or risk)
- Collaborate to set final, consensus-based objectives for the IWMP

WQO Collaboration

- Stakeholder forums & meetings
- Specific technical task groups
- Understanding sources and quantities of current and future contaminants
- Identify management options

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- 
- A photograph of a meeting room. In the foreground, several people are seated at long tables covered with blue tablecloths, facing away from the camera. In the middle ground, a woman in a white shirt is standing and presenting to the group. To her right, a large projection screen displays a presentation slide. To her left, there are several informational displays, including maps and charts, with labels like 'Central' and 'Lakeland' visible. The room has a drop ceiling and wall-mounted speakers.

WQO's - Summary

“What water quality do stakeholders want in the NSR?”

NSWA stakeholders will decide the final WQO's for IWMP and implementation plan

Expect WQO's to inform GoA environmental and planning initiatives

