Designing Environmental Management Plans for Municipalities:
Parkland County and Sylvan Lake Examples

Alberta Lake Management Society Conference

Caitlin Smith, MLA – Landscape Planner

Thursday September 24, 2015

11:00 a.m. – 11:30 pm

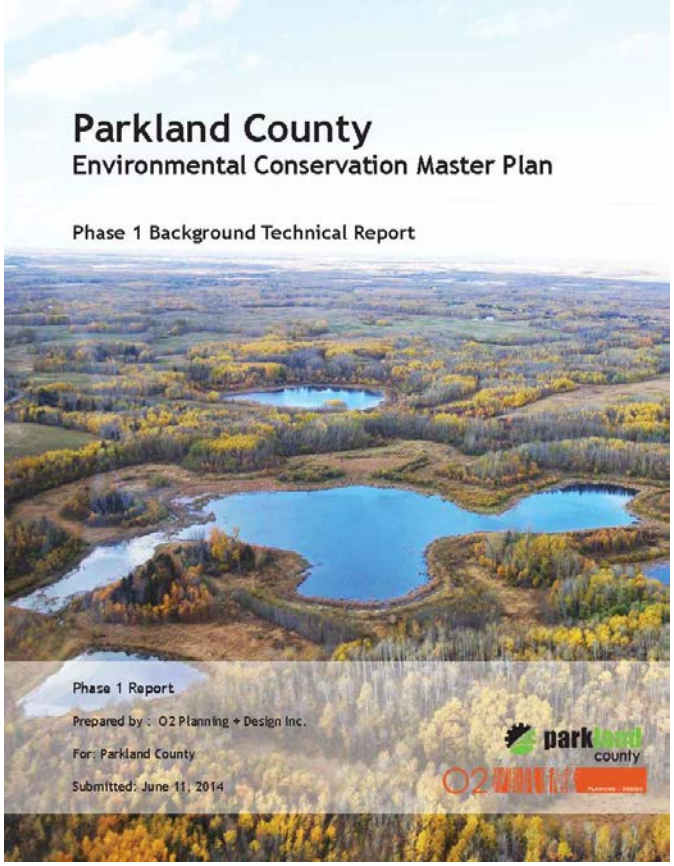
About O2 Planning + Design

Innovation
Understanding
Consultation
Tools
Research
Analysis
Synthesis
Experience

30 person firm of landscape architects, urban designers, architects, civil and water resource engineers, urban and regional planners, landscape ecologists, environmental planners, restoration ecologists, project managers, geodesign and visualization specialists

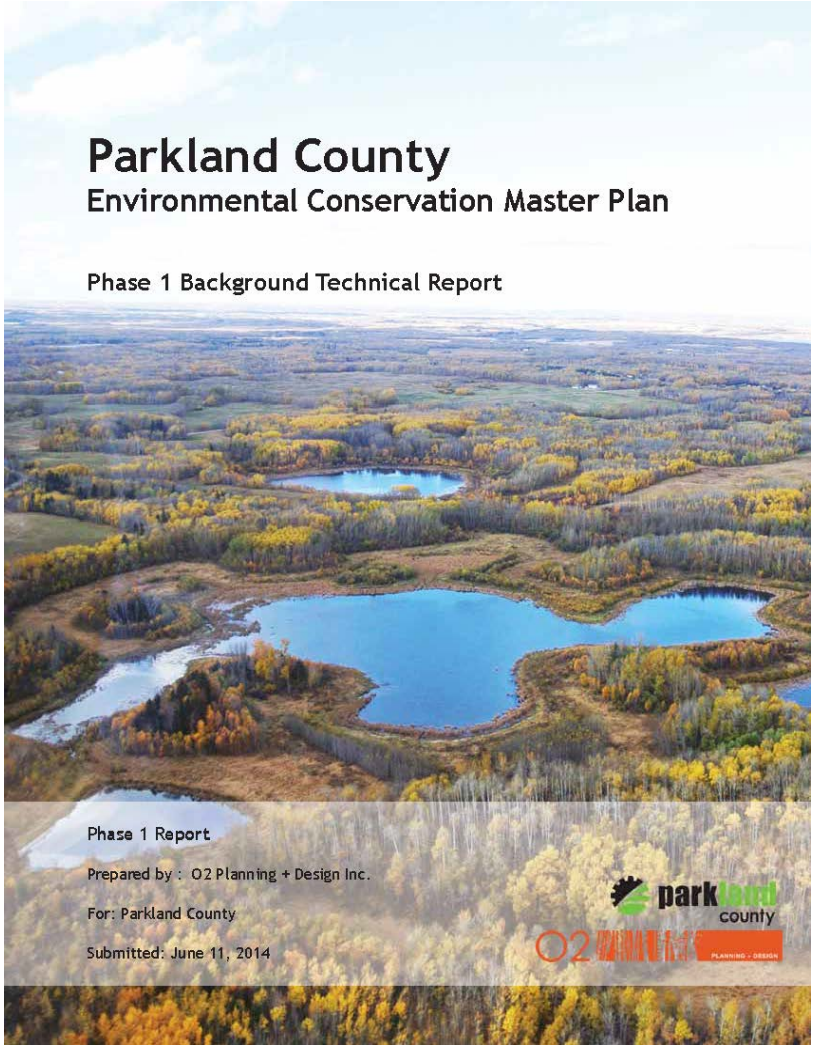
Presentation Objectives

- Present the goals, processes, and outcomes of two projects
- Discuss challenges and lessons learned from each
- Summarize implications for future work



Sylvan Lake Photo Credits:
Cajun Paradis, Lacombe County

Parkland County ECMP



Environmentally Significant Areas (ESA) Study

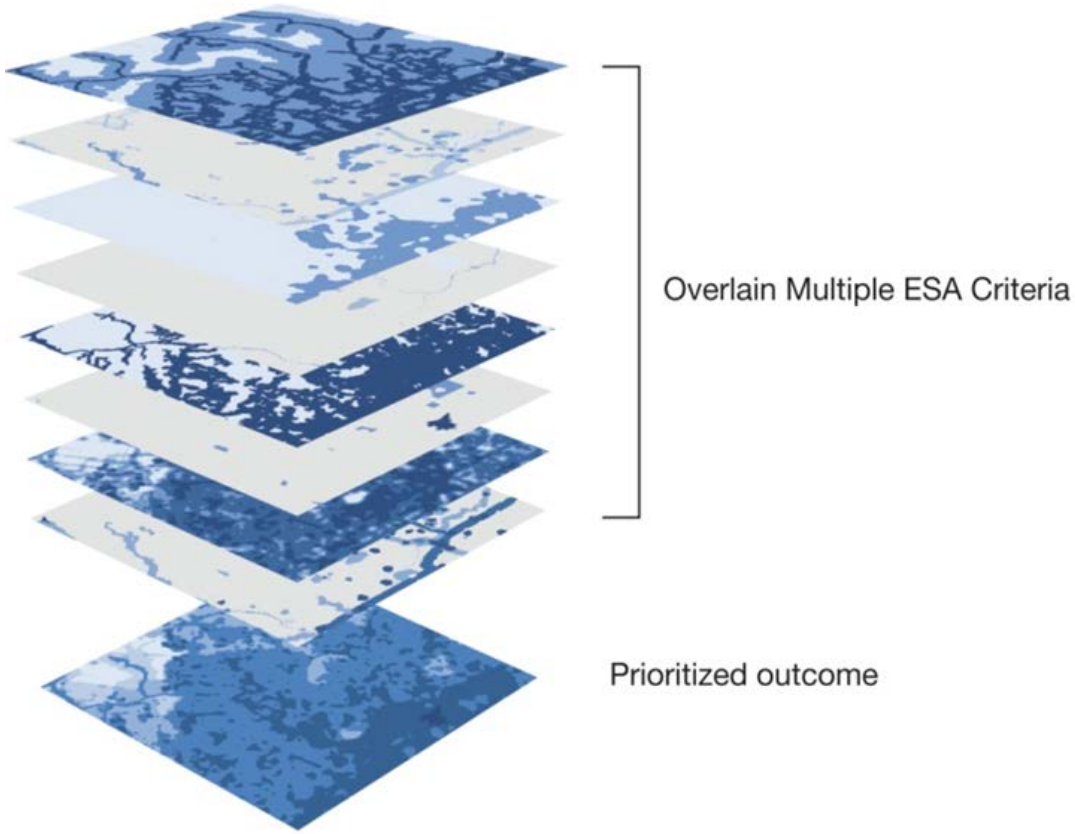
- Identify and map areas of outstanding biological and physical resources in the County as Environmentally Significant Areas (ESAs).
- ESAs are priority areas for conservation used to guide policy development for environmental section of the new Community Sustainability Development Plan (CSDP)
- Will also be used to inform future Area Structure Plans (ASPs) and update existing plans

There are certain "indispensible patterns"
in any landscape that, if protected, will conserve the majority of important ecological functions in that landscape.

Inventory + Analysis

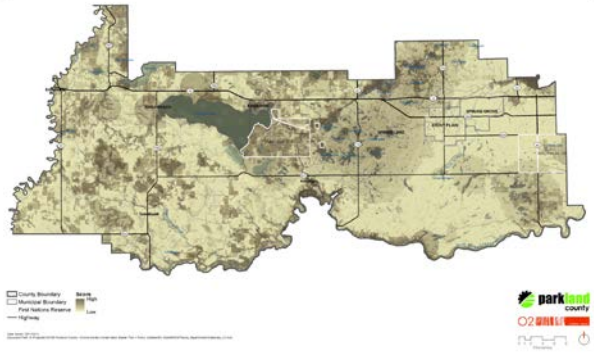
Methodology

- Identify conservation objectives
- Define ESA criteria
- Collect GIS data to match criteria
- Maps generated for each criteria theme
- Overlain to produce a map of overall environmental significance



ESA Criteria Theme Maps

MAP 6: SPECIES AND HABITATS OF CONSERVATION CONCERN



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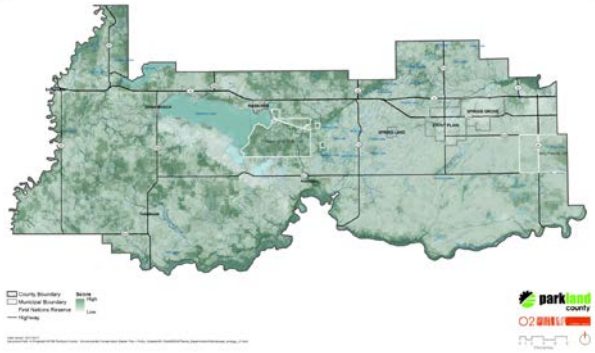
MAP 7: LANDSCAPE ECOLOGY MEASURES



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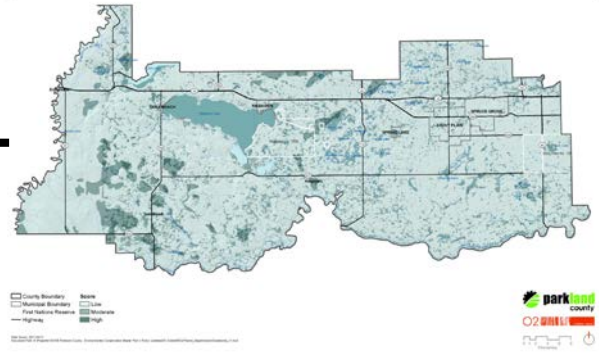
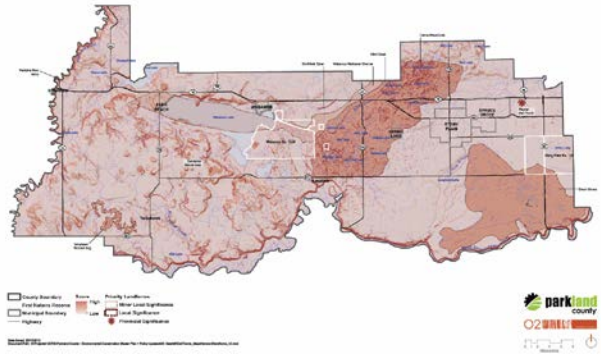
MAP 8: WETLANDS



MAP 9: LANDFORMS AND SLOPES



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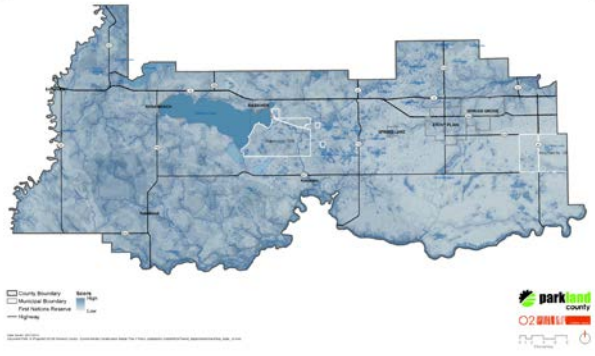
MAP 11: SURFACE WATER RESOURCES



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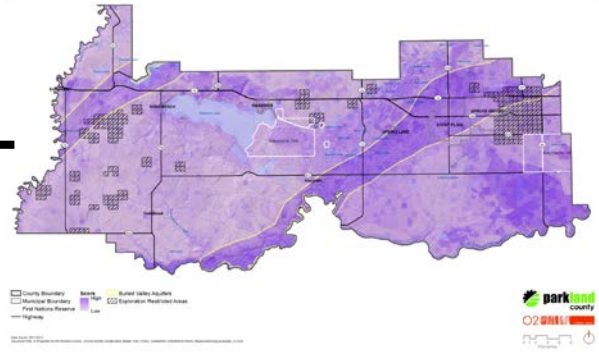
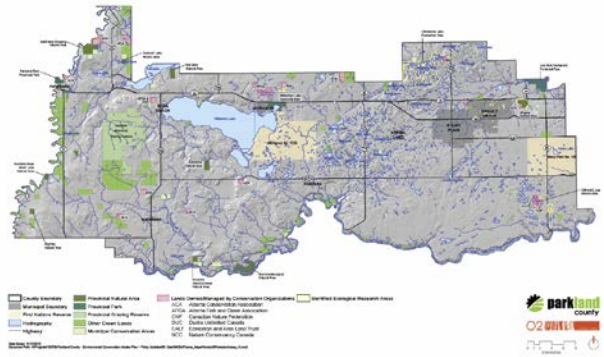
MAP 10: GROUNDWATER RESOURCES



MAP 12: PROTECTED/CONSERVATION AREAS



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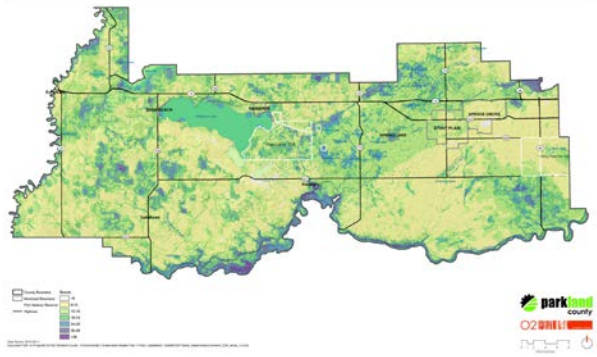
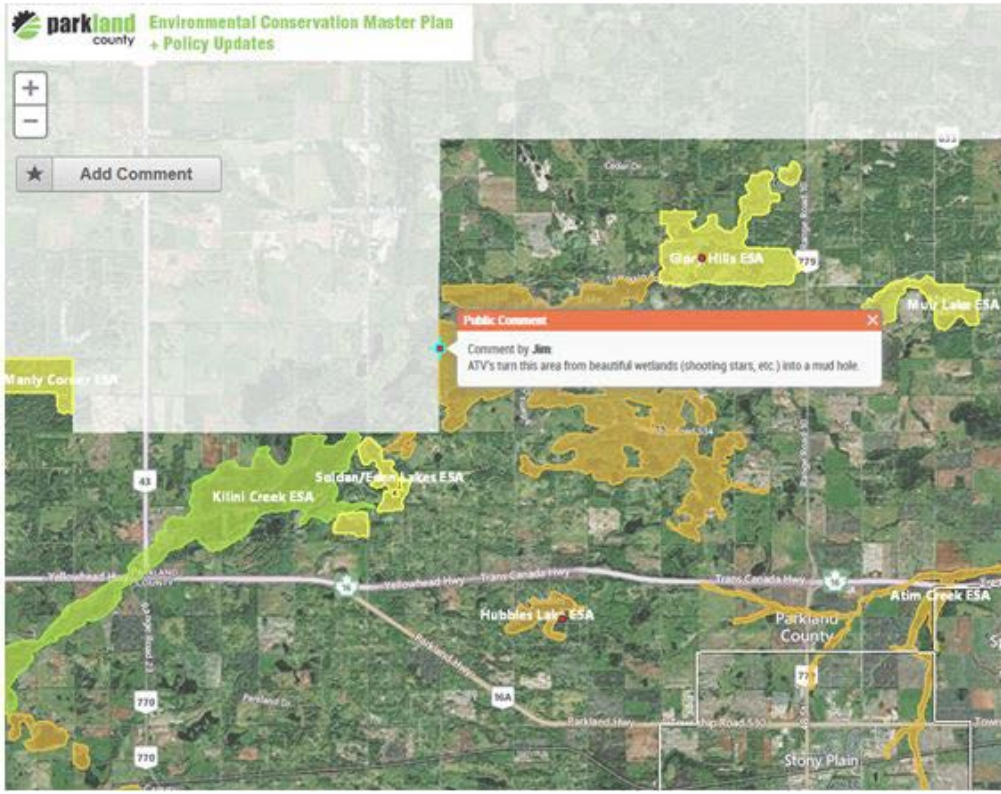
MAP 13: OVERALL ENVIRONMENTAL SIGNIFICANCE SCORE



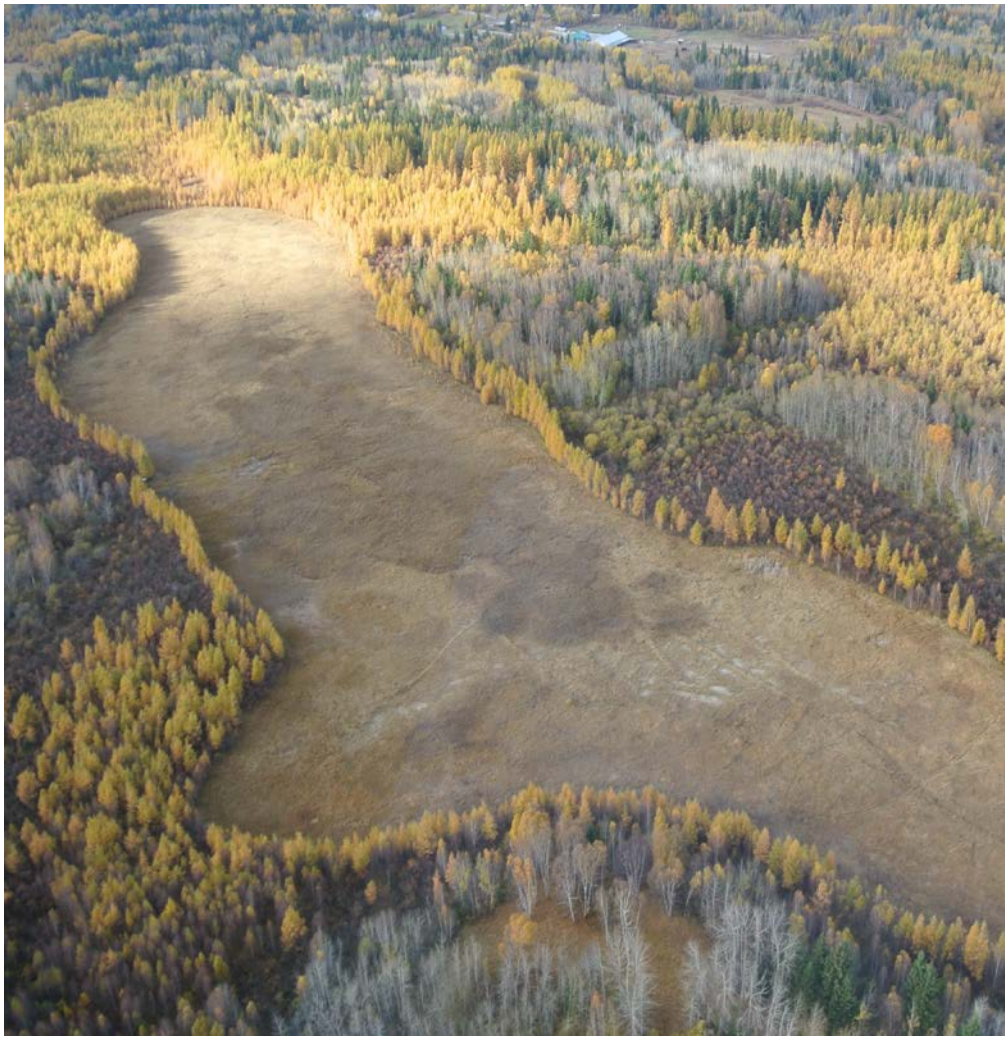
Centralized + Decentralized Engagement

Stakeholder workshop to inform ESA identification and significance rating



Online map tool to collect feedback from a dispersed rural population

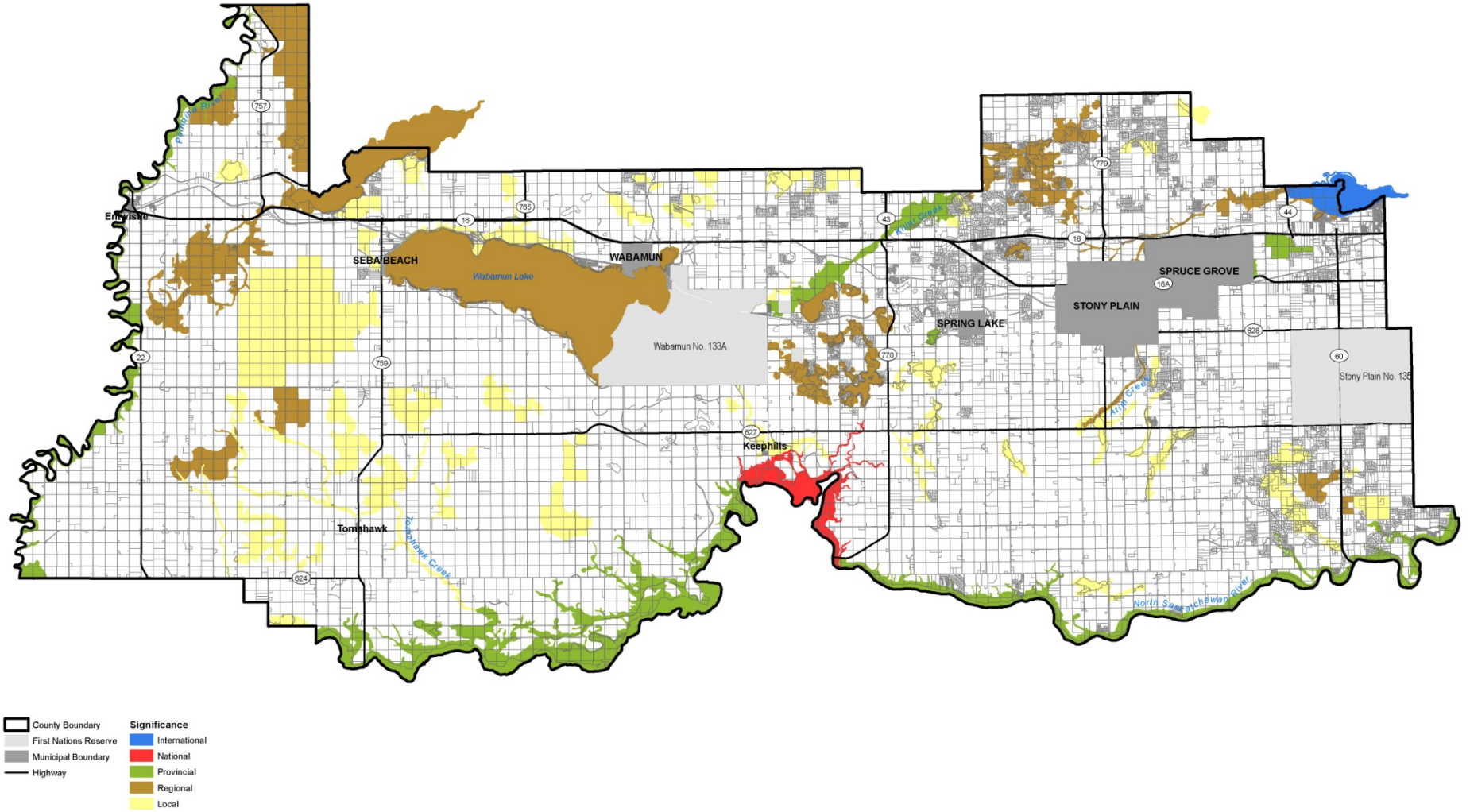
Ground Truthing



Field reconnaissance to inform ESA identification and significance rating

Environmentally Significant Areas

ENVIRONMENTALLY SIGNIFICANT AREAS OF PARKLAND COUNTY (NEW 2013)



County Boundary
First Nations Reserve
Municipal Boundary
Highway

Significance
International
National
Provincial
Regional
Local

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0 1 2 4 6 8
Kilometres

ESA Fact Sheets

Wagner Natural Area and Surrounding Forest ESA

This ESA functions as an important stepping stone and core habitat. It is one of the few remaining natural habitat areas between Edmonton and Stony Plain

Site Location: Approximately 6.5 km west of Edmonton, and directly south of Highway 16 east of Atim Road (Range Road 270). The ESA includes Wagner Natural Area, as well as some surrounding adjacent areas that are not protected by the province.

Area: 392 ha

Description:

Located between Edmonton and Spruce Grove, the Wagner Natural Area represents a microcosm of boreal forest in the midst of agricultural fields and the nearby Acheson Industrial Area. The ESA includes the Wagner Provincial Natural Area, as well as surrounding forest areas just north of the neighborhood of Osborne Acres (the Fath Group property) and between the Natural Area and Spruce Grove.

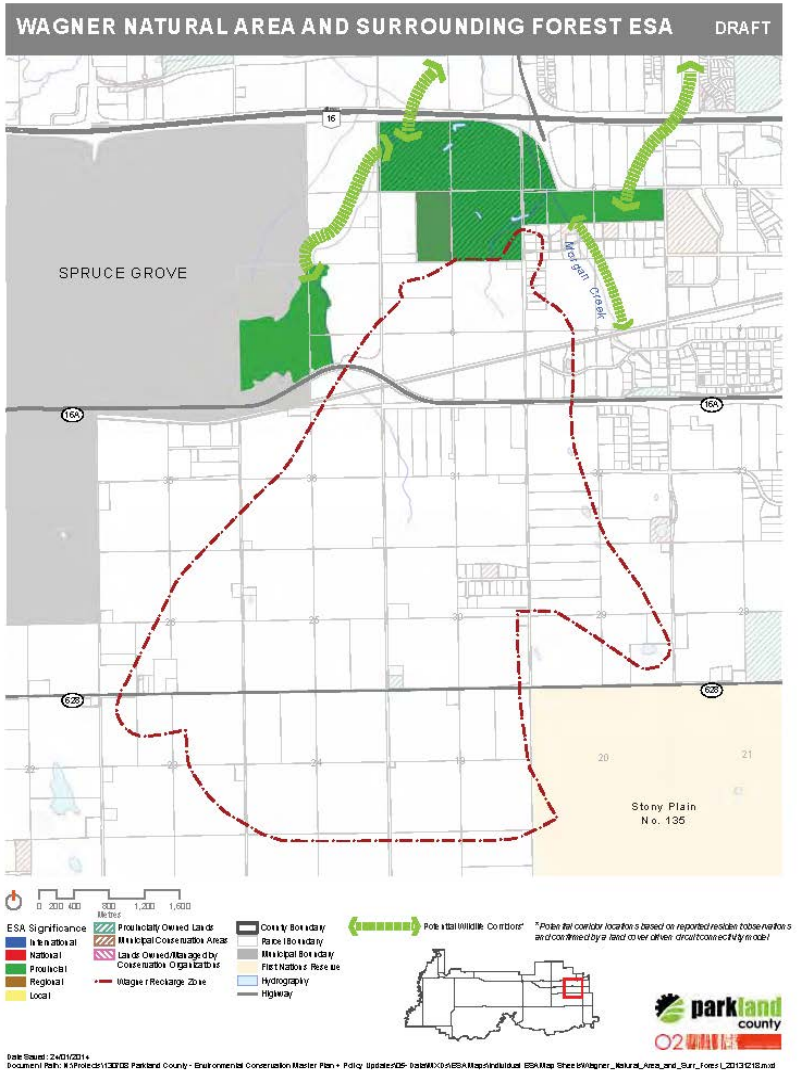
The Wagner Natural Area is a diverse ecosystem consisting of calcareous fens and marl ponds, willow swamps, drier coniferous and deciduous forests and creeks. Distinct marl ponds exist with the Natural Area proper, while the surrounding forest areas to the SW and SE of the Wagner Natural Area also contain similar calcareous marl (Rostron, 2013). These varied habitat types account for a rich diversity of flora and fauna, including several provincially rare orchid species, carnivorous plants, and mosses. Rare plants that occur in the area include the following species: *Campylium radical, Desmatodon cernuus, Lecanora caesiorubella ssp. Saximontana, Lecanora hybocarpa, Eupatorium maculatum, Amblyodon dealbatus, Brachytheciom acuminatum, Rhynchospora capillacea, Doellingeria umbellata var. pubens, Riccardia latifrons, Dreparnocladus crassicentatus,* and *Malaxis paludosa* (ACIMS). Two newly discovered orchid species in Alberta (*Amerorcis rotundivolia var. linnaeta* and *Amerorcis rotundivolia var. immaculata*) also exist in the Natural Area (Rostron, 2013).

Insects, amphibians, and birds, as well as larger mammals such as white-tailed deer and moose also inhabit the area. Residents have reported numerous wildlife observations in the Wagner Natural Area and the adjacent areas, including the Osborne Acres neighbourhood. White tail deer and moose have been observed in particularly high numbers in the forested lands east and southeast of the Natural Area, along riparian areas in the fields located south of the Natural Area and Osborne Acres, and west of the Nature Conservancy property along Atim Road and Highway 16. Possible locally important wildlife corridors have also been reported along Spruce Valley Road north of Osborne Drive, Along Morgan Creek, and along the north and south boundaries of the Osborne Acres neighbourhood.

A Biological Resource Assessment conducted for the Fath Group property (SE 8-53-26-4) north of Osborne Acres cited numerous occurrences of sensitive wildlife and rare plant species. These include the bared owl and the pileated woodpecker, as well as several of the same provincially ranked S1 and S2 rare plant species recorded in the Wagner Provincial Natural Area. Similar to conditions found in the Natural Area proper, the diverse vegetation communities on the Fath Group property provide unique microhabitat conditions that support a high diversity of rare plants, including a number of rare plants, lichens, and mosses. Rare lichens were concentrated in the old-growth mixed-wood forest where species diversity was high, particularly for tree dwelling lichens. In addition, a significant population of an uncommon vascular plant species, Viola selkirkii, were found in the area (Fiera Biological Consulting, 2008).

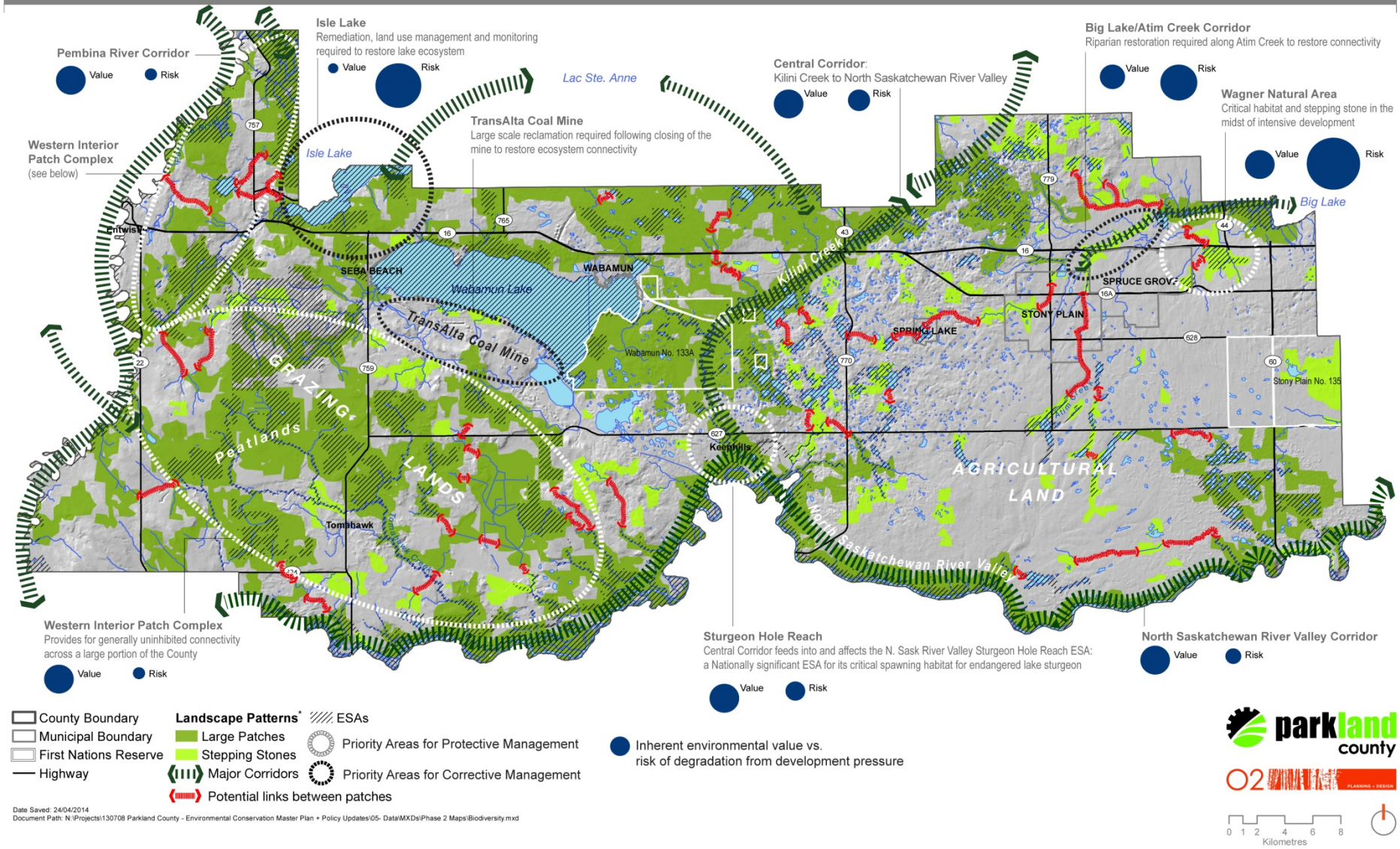
The Wagner Natural Area is distinct in part due to the mineral springs that flow year round at a relatively constant temperature, creating a microclimate which support a rich diversity of flora and fauna that are unique to the area. These springs are fed by the Beverly Buried Valley aquifer underlying the Wagner Natural Area and surrounding lands to the northeast and southwest. The Natural Area is one of approximately ten peatlands found in Alberta in which boreal spring fens and the marl ponds are characteristic features (Parkland County, 2012).

The Wagner Natural Area Society has leased the Natural Area from the Province since 1983, serving as a volunteer steward and manager of the area (Wagner Natural Area, 2013). Since 1997, over 253 acres (102 ha) have been added to the originally designated Natural Area. The Nature Conservancy of Canada has been involved with these land acquisitions, and retains approximately 80 acres of land in SW 7-53-26-4.



Environmental Policy Maps

PRIORITY BIODIVERSITY AND LANDSCAPE CONNECTIVITY AREAS



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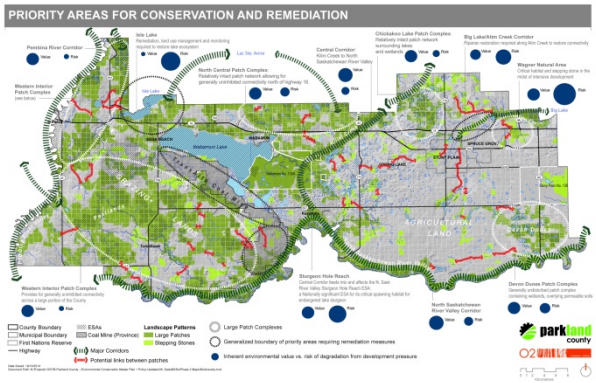
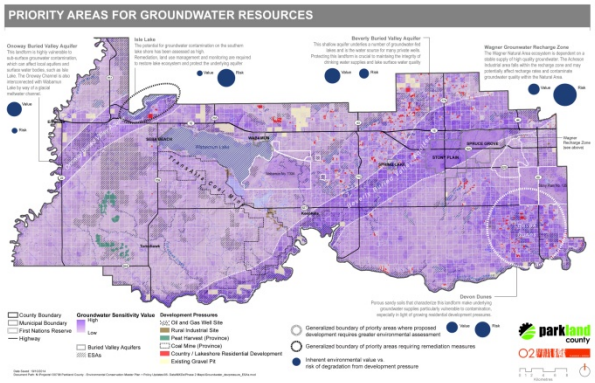
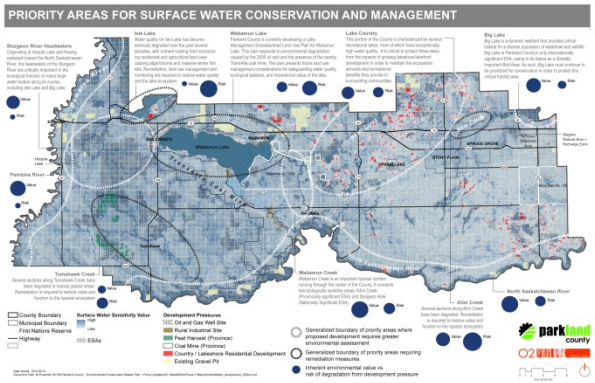
Environmental Policy Maps



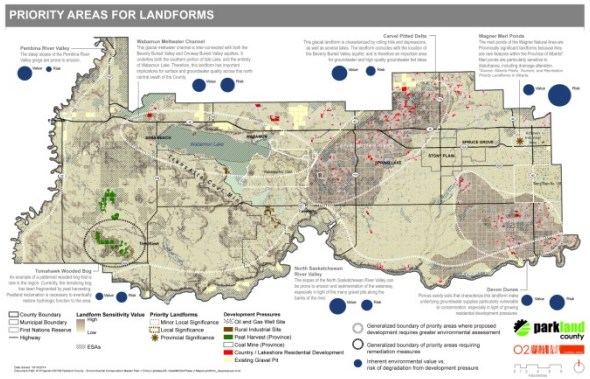
Biodiversity



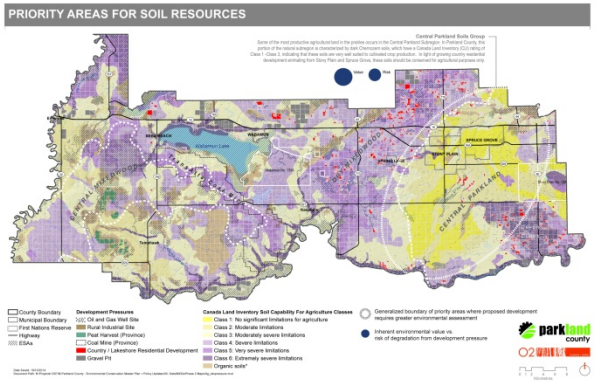
Groundwater



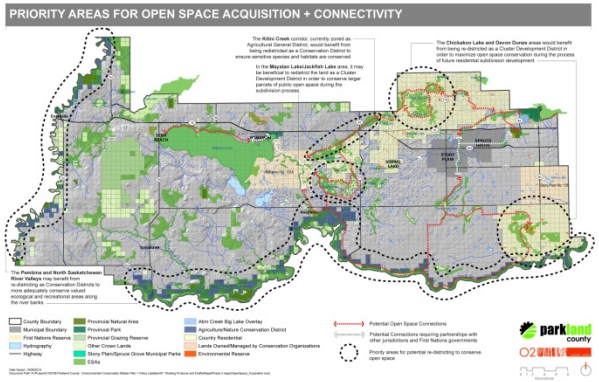
Surface Water



Landforms



Soil Resources



Open Space + Connectivity

Environmental Planning Checklist

Environmental Planning Checklist

1. **Proposed development is located in an environmental planning priority area, as identified in Schedules A – F.** (Utilize mapping to locate developments)

   ☐ Yes — If "yes", proceed to question 2
   ☐ No — If "no", proceed to question 6

2. **If yes, identify the environmental planning priority area in which the proposed development is located.**

   ☐ Schedule A: Environmentally Significant Areas
   ☐ Schedule D: Priority Areas for Surface Water Conservation and Management

   Provide ESA Name: _____

   ☐ Schedule B: Priority Areas for Conservation and Remediation
   ☐ Schedule E: Priority Areas for Groundwater Resources
   ☐ Schedule C: Priority Areas for Landforms
   ☐ Schedule F: Priority Areas for Soil Resources

3. **If the development is located within an ESA as per Schedule A:**
   - ☐ Review the ESA fact sheet in the Environmental Conservation Master Plan (ECMP)
   - ☐ Identify the management considerations and applicable best practices in the work table
   - ☐ Identify if there is an interest in pursuing a conservation easement for any land parcels within an ESA
     - ☐ Yes
     - ☐ No
   - ☐ Ensure that proposed development addresses specific management considerations

ESA Work Table	
Management Considerations	**Best Management Practices (BMPs)** (by land use and environmental value)
a) <<insert consideration>>	a) <<insert BMP>>
b) <<insert consideration>>	b) <<insert BMP>>

4. **If the development is located in Schedule B or in the proposed CCR overlay area:**
   - ☐ If the proposed development is a residential use, review the Rural by Design principles and conservation subdivision design steps contained in the CSDP
   - ☐ If the proposed development is an industrial or recreation use, review Integrated Land Management ((ILM) best practices to reduce footprint requirements
   - ☐ Incorporate relevant principles / best practices in site layout and design

5. **If the development is located in Schedule D or E:**
   - ☐ Identify methods to retain and enhance natural drainage patterns (eg. conserve on-site wetlands, do not alter, enclose or channelize watercourses)
   - ☐ Identify and apply Low Impact Development (LID) techniques to mimic pre-development hydrology
     - ☐ Bioswales
     - ☐ Splash Pads
     - ☐ Bioretention Areas
     - ☐ Infiltration Ponds
     - ☐ Foundation Planters
     - ☐ Permeable Paving
     - ☐ Infiltration Trenches
     - ☐ Rainwater Capture and Reuse
     - ☐ Green Roofs
     - ☐ Cisterns
   - ☐ Identify opportunities to use water saving fixtures and/or appliances

6. **If the development is a Multi-Parcel Subdivision or a Major development, identify whether the proposed site includes a lake, waterbody or major river:**
   - ☐ Yes
     If "yes", utilize the Riparian Setback Matrix Model (RSMM) to identify minimum setback requirements and ER dedication at the time of subdivision for development and recreation uses along lakes, waterbodies and major rivers.
   - ☐ No

7. **Identify opportunities to reduce energy use:**
   - ☐ Solar panels / site design to maximize solar energy
   - ☐ Wind power
   - ☐ Energy-saving appliances and fixtures
   - ☐ Geothermal heating
   - ☐ Other LEED® standards

8. **Identify any technical studies required to support the development application.**

Study Name	Required for Subdivision or a Major Development
☐ Biophysical Assessment	All or part of the proposed site is located within Schedules A, C, D, and E, or within 0.8 km of an ESA
☐ Wetlands Impact Assessment	The proposed development may potentially impact a wetland
☐ Geotechnical Assessment	The proposed site is located on hazard lands as defined by the *Municipal Development Act*, or on a slope of ≥20%.
☐ Groundwater Hydrologic Assessment	The proposed development is located within a sensitive groundwater overlay areas, as identified in Schedule E
☐ Flood Hazard Study	The proposed site is located within the floodplain of a watercourse or water body.
☐ Riparian Setback Matrix Model	The proposed site is located along lakes, waterbodies and major rivers.

9. **Undertake pre-consultation with Parkland County staff to ensure a complete application.**

Parkland County: Challenges + Lessons

Challenges

- Data resolution at the landscape scale; refinement at the site level is needed
- Engaging a rural population across a broad geographic area
- Communicating complex analysis and ideas to the public in a meaningful way

Lessons Learned

- ESA study informed the development of practical policy tools to conserve interconnected ecological processes and resources across the entire landscape
- Stakeholders were unflagging in their commitment and played an important role in ensuring that the ECMP reflects the diverse values of Parkland County
- Applied use of landscape ecological principles as a framework for analysis and planning were effective at this scale

Sylvan Lake Watershed CEMS Phase 2

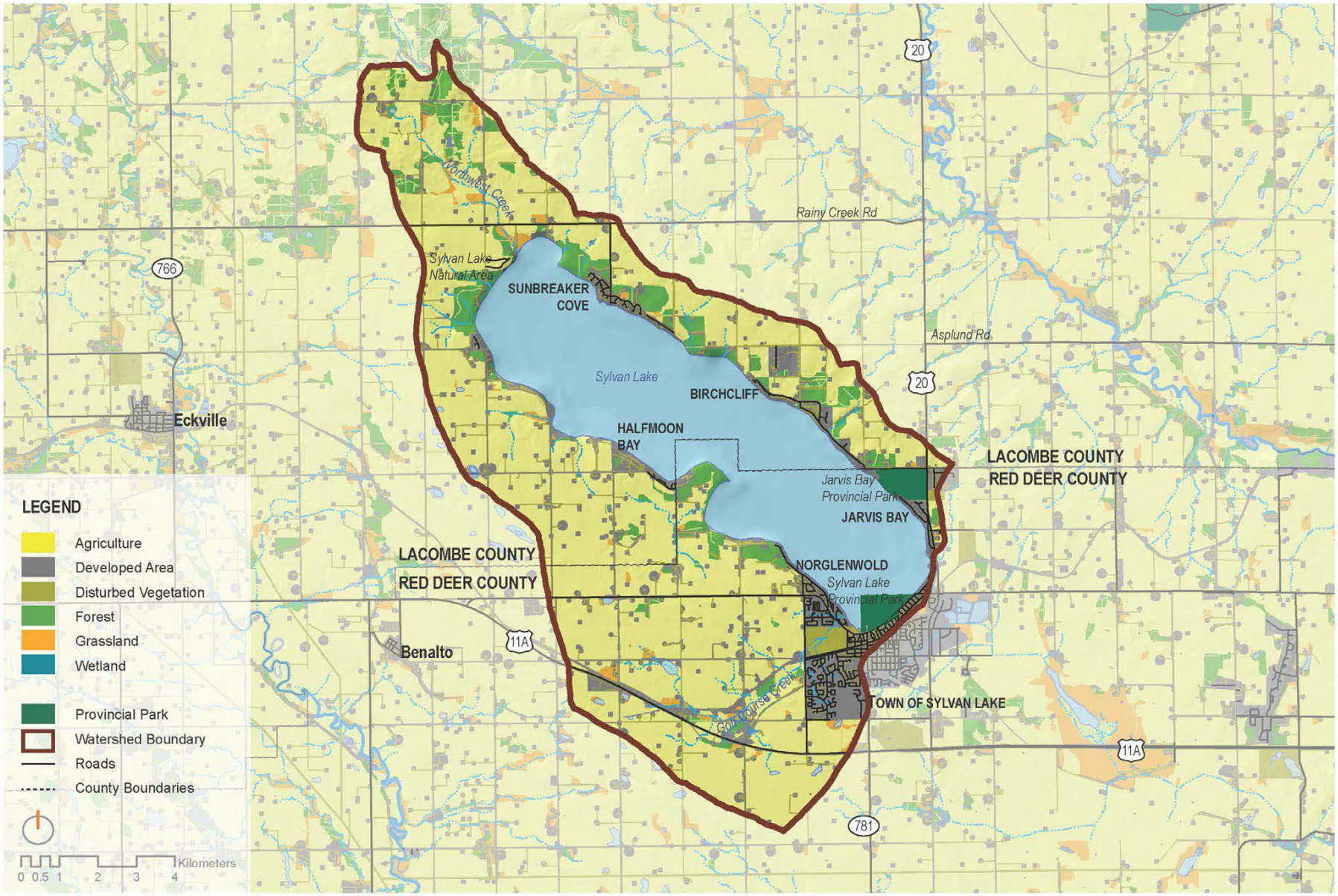
CEMS Phase 2: Implementation Plan

- Builds upon the desired outcomes related to water quality objectives of the CEMS Phase 1 background technical report
- Proposes actions required to achieve those short-term water quality objectives
- Provides resource estimates, budget, and monitoring mechanisms required to complete actions

Plan Structure

1. Overview of current conditions in the watershed
2. Gap analysis of existing watershed initiatives by municipality
3. Implementation actions for cumulative effects management

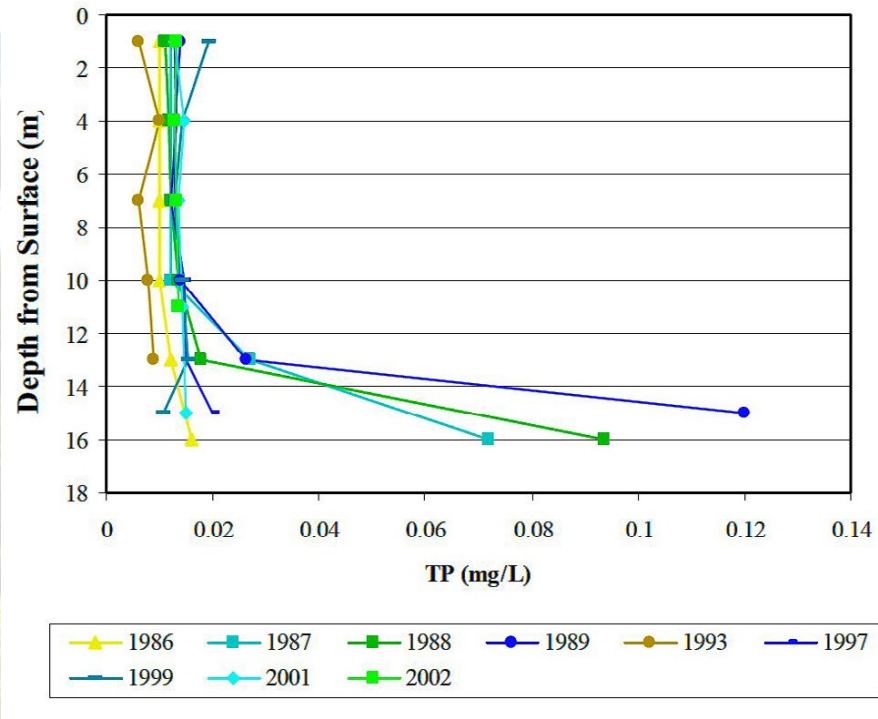
Study Area: A Shared Watershed



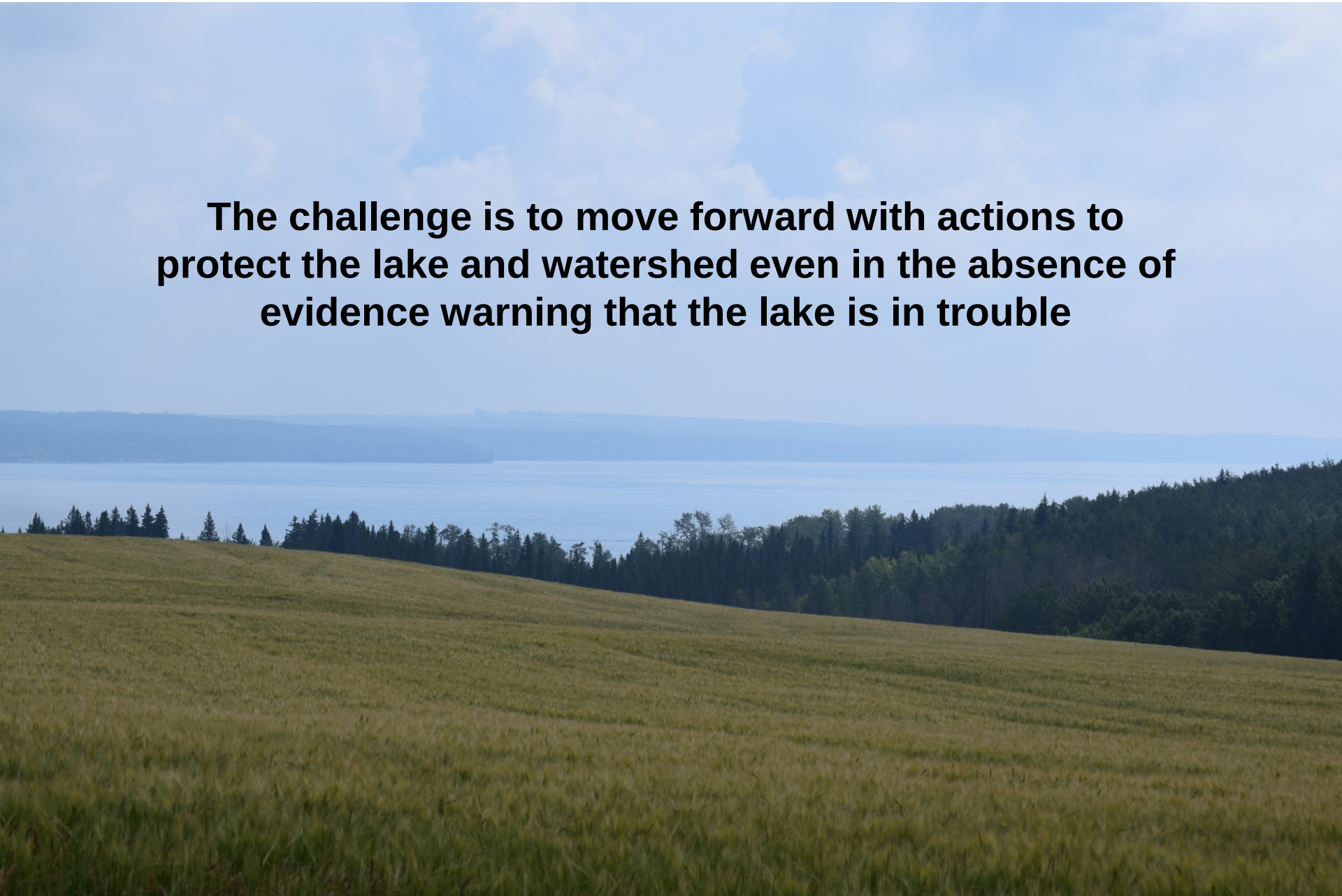
Issues + Challenges

- CEMS Phase 1 established total phosphorus (TP) and total nitrogen (TN) as indicators of water quality in the watershed
- Golf Course Creek and Northwest Creek are the primary sources of these nutrient to Sylvan Lake
- Tributaries are consistently above Alberta Surface Water Quality Guidelines, but lake nutrient conditions have remained relatively stable over time
- The relationship between tributary nutrient loading and lake nutrient concentrations is poorly understood

- The data do no provide much insight into the lake's long-term capacity to absorb additional nutrients
- Internal nutrient loading is a factor contributing to a potential "tipping" point
- TP and TN triggers and limits framework may not be the best evaluative system for this lake



Issues + Challenges



The challenge is to move forward with actions to protect the lake and watershed even in the absence of evidence warning that the lake is in trouble

Taking Action

Implementation Actions to Achieve CEMS Phase 1 Water Quality Objectives:

Collaborative Planning

- Gap Analysis of Existing Watershed Initiatives
- Subregional Plan for the Sylvan Lake Watershed

Environmentally Healthy Watershed + Lake

- Subregional Plan for the Sylvan Lake Watershed
- Research + Monitoring
- Environmentally Significant Areas Inventory
- Riparian Setback Matrix Model
- Development Controls
- Education + Incentive Programs

Sample Implementation Action Guidelines

Related CEMS Phase 1 Water Quality Objectives:

- Understand the current watershed ecological health and risks
- Improve management of the watershed
- Work to protect and enhance water quality in the watershed

Applicable to:

- Lacombe County
- Town of Sylvan Lake
- Summer Villages

Estimated Resource Requirements:

- Estimated cost/staff time: $75,000 - $80,000
- Consultant Required (Y/N): Yes

Sylvan Lake: Challenges + Lessons

Challenges

- Watershed is governed by numerous and often disparate rules, regulations, and policies
- Coordination among municipalities + municipal watershed stewardship programs is difficult
- Despite three decades of monitoring, the relationship between land use and lake water quality remain largely a mystery
- Moving forward with actions to protect the lake and watershed in the absence of water quality triggers as evidence

Lessons Learned

- Individual municipalities have their own stewardship resources and programs, however coordination is an issue. Project succeeded in exposing what everyone is doing.
- CEMS may not have been the best model for this watershed
- Graeme will elaborate more...

Questions?