

Central Alberta Recreational Lakes

Science & Regulation 101

Introduction

- The purpose of the presentation:
 - To create a more widespread awareness and understanding of the science and regulations that are relevant to recreational lakes in Central Alberta
 - To foster behaviours that improve lake and watershed health

The Issues

- There is an increasing pressure on lakes due to shoreline development, intensive land-use and increased recreational use
- Long-term human activity has caused a decrease in water quality
- Climatic variability also affects water quantity and quality



Changing Behaviours

- Changing how we live or recreate around lakes is important as good practices will:
 - Safeguard water supplies
 - Maintain recreational opportunities
 - Reduce water borne health issues
 - Conserve habitat for plants and animals
 - Enhance value of property & overall enjoyment of lake

Activities that could impact water quality

- Agriculture
- Contributions to climate change
- Cottage/acreage development
- Industry
- Recreational activities
- Sewage disposal systems
- Shoreline modification & treatments



Science and Legislation

- The scientific study of lakes helps us assess lake conditions and monitor changes over time (Part 1 of presentation)
- Legislation helps us to manage activities around lakes in an agreed upon, legally binding way (Part 2 of presentation)

Part 1: Understanding the Science of Lakes



Water Quality

- There are many measures of lake water quality – the most common being trophic status (the biological productivity of a lake)
- We can monitor:
 1. Physical indicators
 2. Chemical indicators
 3. Biological indicators
 4. Trophic Status

1. Physical measurements

- Water clarity - is an important factor as plants need light to grow
- Murky water is usually related to high nutrient levels and high algae growth or excessive erosion or disturbance
- Most lakes in Central Alberta range from moderately clear to murky depending on season



- Water temperature – changes with season & depth and can affect aquatic life and the metabolic activity of organisms
- Dissolved oxygen – used by fish & aquatic organisms. Decomposition of algae or plant material can reduce O₂ levels to those that may cause fish kills
- As temperature increases the ability of water to hold oxygen decreases

2. Chemical measurements

- pH (acidic/basic) – refers to the presence of hydrogen ions in the water – a healthy lake has a pH of 6.5 to 9
- Alkalinity – refers to the amount of calcium carbonate in water – relates to the capacity of the lake to neutralize acid
- Conductivity/Salinity – a measure of dissolved ions in water - changes may relate to alterations to lake water quantity and nutrient balances

State of Lakes - Physical/Chemical measurements

- Relative to these measurements, most of the lakes in Central Alberta are shallow, turbid, warm, alkaline, productive and capable of supporting a variety of aquatic animals and plants



3. Biological Measurements

- Occasionally ESRD evaluates sediment and aquatic invertebrates in lakes to assess aquatic ecosystem health
- ESRD evaluates fish tissue contaminants in terms of possible effects to the growth and reproduction of the fish species
- Risk to human health as a result of consumption of tainted fish tissue is evaluated by the local health authority or Environment Canada

- Fish population statistics are evaluated by ESRD
- Fish habitat requirements are assessed by the Department of Fisheries and Oceans
- Recreational health concerns are monitored by Alberta Health (i.e. fecal coliforms and E.coli)
- Water used for livestock watering and irrigation is evaluated by Alberta Agriculture

State of Lakes – Biological measurements

- Relative to human health factors, lakes in Central Alberta are generally safe for human recreational uses
- Bacteria, pesticides and metals are not routinely sampled in lakes and occur infrequently and at low concentrations where they have been measured
- Information on fish contaminates is not sufficient to assess trends or patterns
- Lake beach closures are rare in Central Alberta



4. Trophic Status

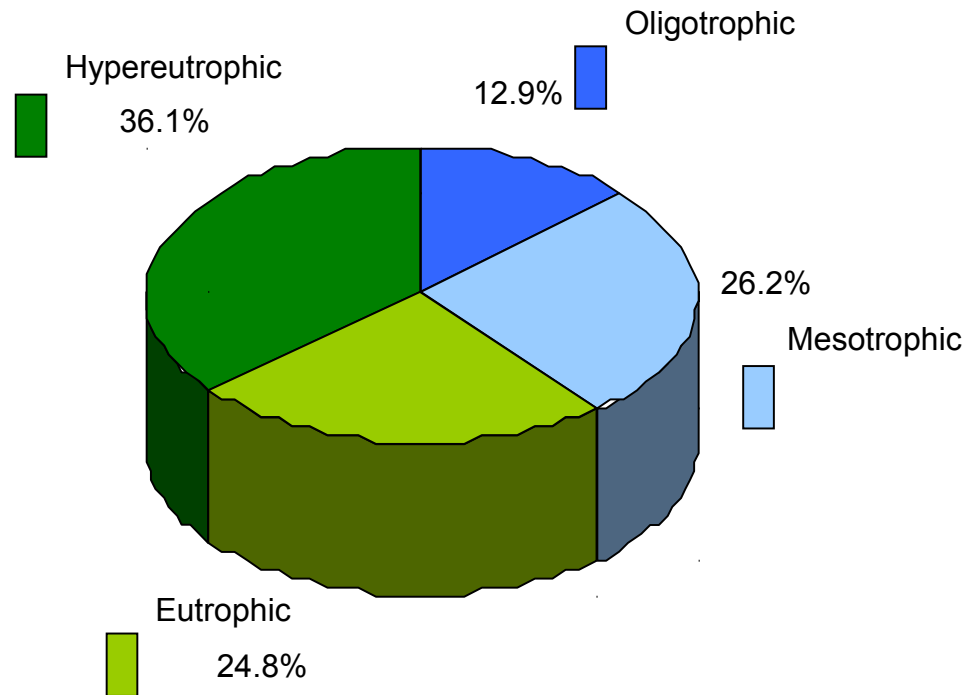
- Water quality is affected by both human activities and the natural attributes of a lake
- One measure of lake productivity or a lakes ability to support life is the trophic status:
 - Low productivity = oligotrophic lake
 - Moderate productivity = mesotrophic
 - High productivity = eutrophic
 - Very high productivity = hypereutrophic

- While nutrients are needed by aquatic life, very high levels can negatively affect aquatic health and other uses of a lake
- Most common nutrients and indicators of lake productivity include:
 - Phosphorus: an essential nutrient that can limit the growth of algae and plants
 - Chlorophyll *a* – is a light gathering pigment that is common to all algae and plants
 - Secchi depth – measures the depth of light penetration



Trophic State of Alberta Lakes

Chlorophyll-a



Preliminary data

Recreational Lake Productivity

Mean Chl_a Concentration over monitoring record

Hypereutrophic

Eutrophic

- lake productivity varies in time and space
- difficult to separate between natural and human contributions

Historic reconstructions of lake productivity

- Reconstructions of lake productivity in Central Alberta show that human settlement and land-use changes have increased nutrient and contaminant loading to lakes
- To date, these studies have been conducted on Isle Lake, St. Anne, Pine, Pigeon, Nakamun and Wabamun
- Water quality of most lakes likely deteriorated before our current monitoring programs started

<http://environment.gov.ab.ca/info/library/7868.pdf>

State of Lakes – Trophic Status

- The majority of our lakes are naturally productive (eutrophic) due to soil chemistry and geographical location:
 - Our lakes are naturally nutrient-rich, which means that they respond quickly to external nutrient inputs
 - Changes to a lake trophic state can alter the water quality and aquatic communities to less desirable states with decreased biodiversity

State of Lakes – Trophic Status

- The most pronounced changes to water quality in central Alberta recreational lakes have already occurred due to changes in land-use
- Recent changes or trends in water quality deterioration are less pronounced and largely absent (1980 to present)
- We suggest adopting a “maintain or improve” approach to lake management



Water Quantity

- Water levels have historically varied considerably due to fluctuations in precipitation and evaporation
- Lakes in Central Alberta are generally experiencing stable or decreasing water levels
- Of 41 Central Alberta lakes evaluated:
 - 44% had no trend
 - 51% had a decreasing trend
 - 5% had an increasing trend in water level



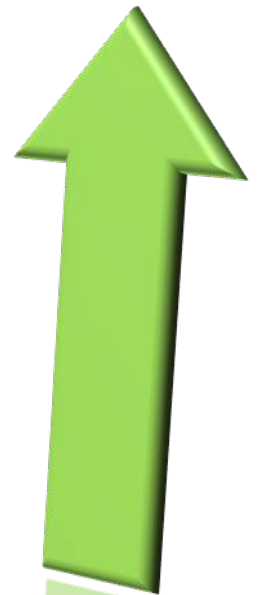
Part 2: Understanding the Legislation of Lakes



Respect Our Lakes

An education & extension program about lake & lakeshore values and regulatory requirements:

- A program designed by ESRD
- Promotes and encourages best management practices
- Increases knowledge of lake environments
- Increases awareness and understanding of the regulatory requirements and shared stewardship of Alberta lakes



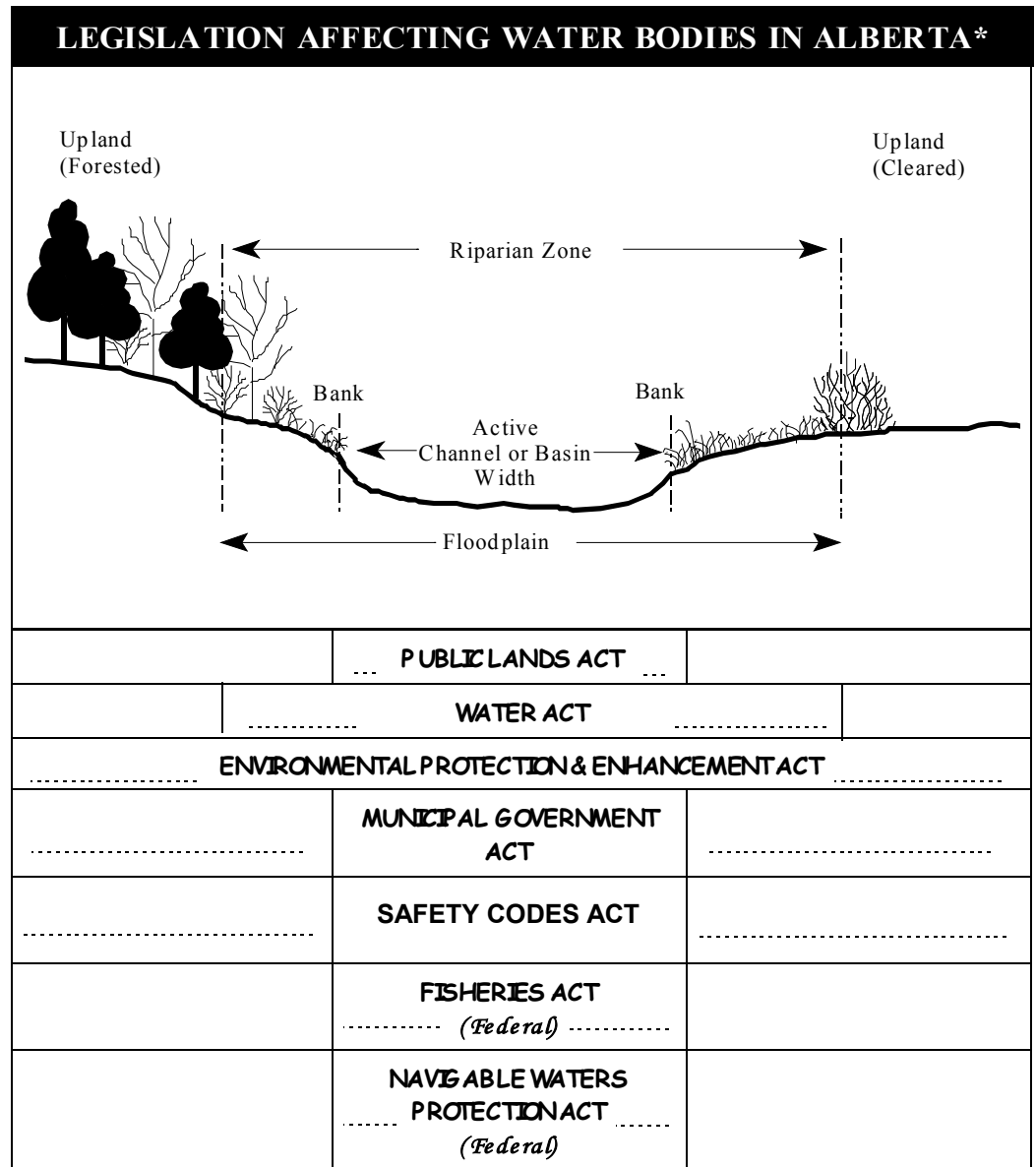
Legislation

- Federal and Provincial legislation
 - in place to manage and conserve our natural resources for the
and for



Legal Framework

Most commonly encountered legislation



* Not all applicable legislation is depicted in the table, only the most commonly encountered.

Legal Framework

Provincial (Alberta) Law

- *Water Act*
- *Public Lands Act*
- *Surveys Act*
- *Municipal Government Act*
- *Safety Codes Act* (Private Sewage Disposal System Reg. and Standard of Practice)
- *Environmental Protection and Enhancement Act*
- *Public Health Act*
- *Weed Control Act*
- *Fisheries (Alberta) Amendment Act*



Legal Framework

Federal Law

- *Fisheries Act*
- *Migratory Birds Convention Act*
- *Navigable Waters Protection Act*
- *Species at Risk Act*
- *Canada Shipping Act* (Boating Restrictions Regulation & Pleasure Craft Sewage Pollution Prevention Regulation)
- *Canadian Environmental Protection Act*



Water Act

- Primary legislation dealing with water and its management
- Supports and promotes the conservation and management of water, including the wise allocation and use of water



Water Act

Relates to, but is not limited to, the following water bodies:

- Lakes
- Rivers
- Creeks
- Gullies
- Floodplains
- Wetlands
- Ponds, sloughs
- Bogs
- Muskeg
- Riparian areas
- Aquifers



Water Act

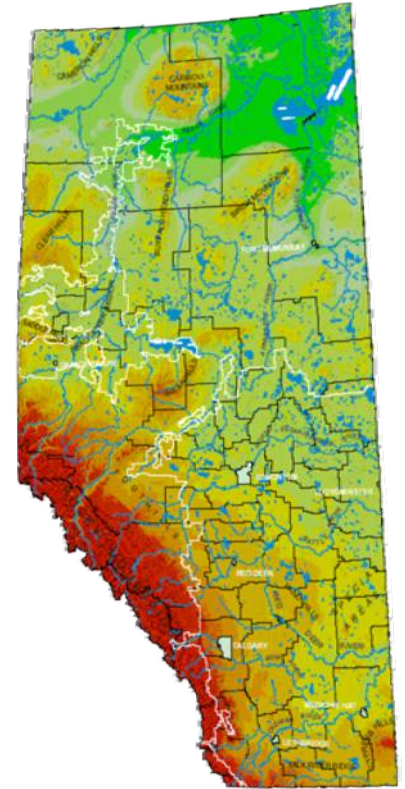
- ESRD is responsible under the Water Act for water management planning and decision making with respect to all waters in Alberta, including both surface and ground water - Sec. 3(2)
- Approvals and/or licenses are required for a wide range of activities (Sec. 36 and Sec. 49) such as:
 - Water diversion
 - Alteration/modification to a water body and bed or shore
 - Storm water management works
 - Aquatic vegetation control & removal
 - Activity that causes or may cause an adverse effect on the aquatic environment

Environmental Protection & Enhancement Act (EPEA)

- Prohibits the release of substances into the environment that may cause a significant adverse affect
- Also covers:
 - Pesticide regulation
 - Fertilizer storage and application
 - Storm water drainage systems
 - Municipal wastewater treatment facilities
 - Septage disposal
 - Waste minimization and management, i.e. waste on water/ice or public lands

Public Lands Act

- Primary legislation dealing with the bed and shore of water bodies and their management
- All bed and shores are owned by the Province, including - Sec. 3:
 - Permanent and naturally occurring bodies of water (wetlands)
 - Naturally occurring rivers, streams, watercourses and lakes



Public Lands Act - Section 54 (1)

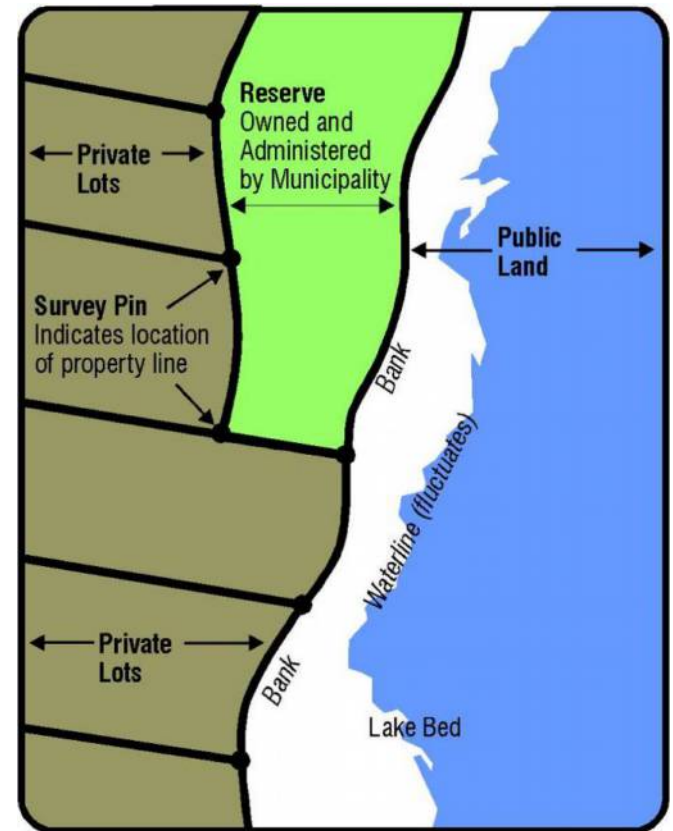
No person shall do anything on public land that:

- May injuriously affect watershed capacity
- Is likely to result in injury to:
 - bed and shore of any river,
 - stream, watercourse, lake or
 - other body of water or land in the vicinity of that public land
- Is likely to result in soil erosion



Property Boundaries

- Most lakeshore properties do not extend to the water's edge
- Usually extend only to the “bank”
- A reserve may separate the property from the lake
- Reserves are owned and administered by the local municipality
- Check land title description, lot survey plan, or subdivision plan



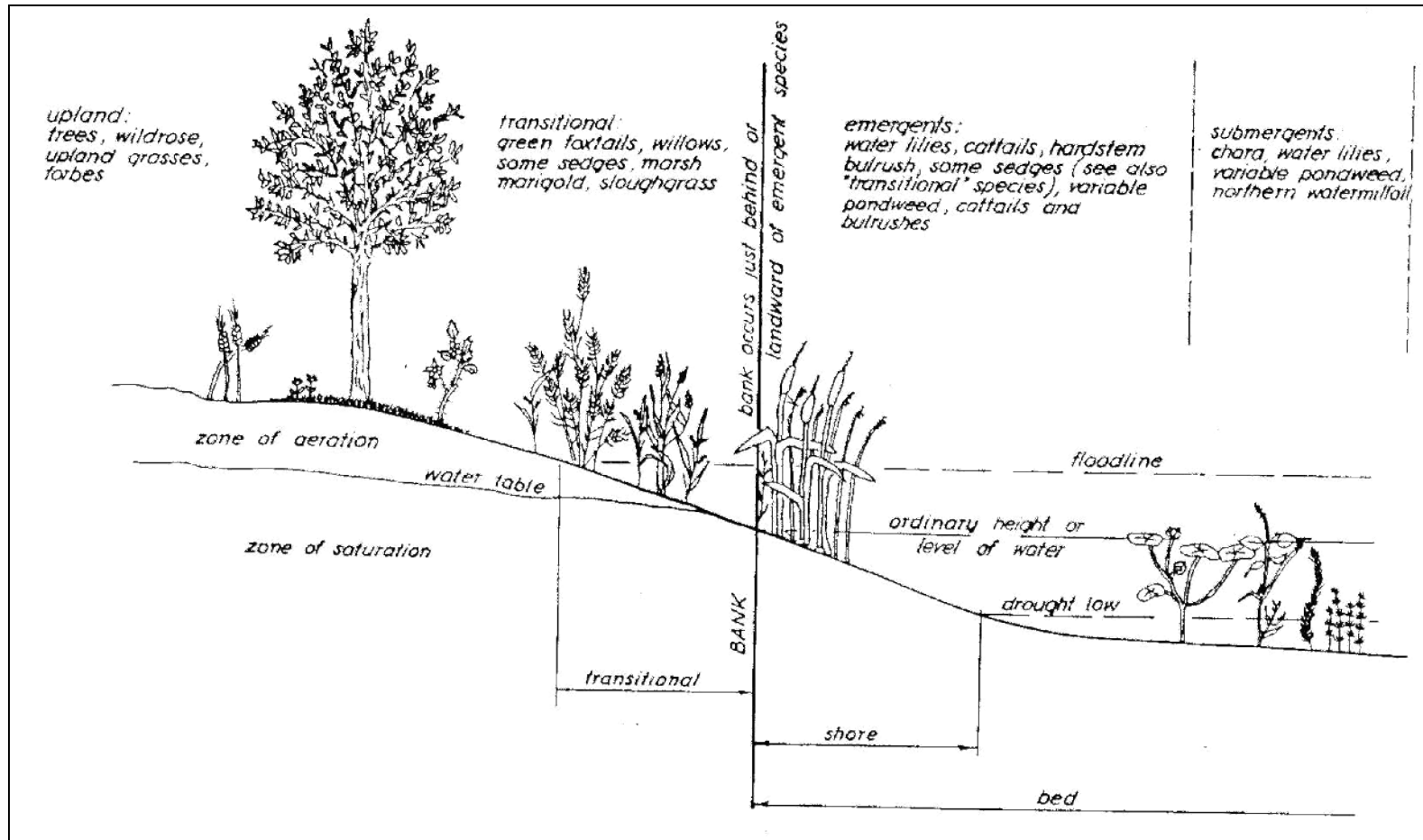
NOTE: If reserve land separates your land from the lake, check with local government before doing any shoreline modification/activity

Water Body Boundaries



OHWM = Ordinary High Water Mark

Effect of ordinary high water mark on natural vegetation



“I own the property right to the water’s edge”

- Vast majority of lakefront property owners do not
- Very few exceptions exist
- The land title and survey plan will state the extent of the property and its boundaries.
- It is the responsibility of a landowner to know where his/her property boundaries are.
- If the current location of a property boundary next to a water body needs to be established, the services of an Alberta Land Surveyor should be sought.
- Private shoreline ownership does not exempt the landowner from obtaining authorization for shoreline work



Public Access on Provincial Shorelands

- Where Albertans have legal access to a provincial water body, their right of access to and around a water body is not to be unreasonably restricted
- ESRD recognizes the importance of public access/passage, while still respecting landowner common law rights
- First Nations Indian Reserve Lands – consult with First Nations before accessing shorelands



Authorization

- It is everyone's responsibility to be aware of the regulations before doing something that could affect the environment
- Before starting any project that may alter the shoreline area of a water body, you must contact the appropriate regulators for authorization

Authorization

- Written authority must be received from all applicable regulators before any activity is started
- A copy of the written authorization must be on the worksite with the contractor

Use of Shorelands

Examples of activities requiring authorization:

- Sand dumping, beach creation and/or maintenance
- Aquatic vegetation control and removal
- Boat lift, swimming dock or pier
- Septic/sewage systems
- Erosion protection works & other shoreline modifications
- Water diversion
- In-filling or re-grading
- Bottom dredging and excavation



Beach Creation and Maintenance

- Can be a form of “pollution”
- Can cover and destroy fish habitat
- Often encroaches onto Crown land
- Sand is easily eroded where there are no natural beaches
i.e. “filling in” your lake
- Promotes shoreline alteration and increases risk of erosion
- Requires constant maintenance and money



Check with ESRD, local government and DFO if approval is required

Beach Creation and Maintenance (continued)

- These may be permitted at public use areas:
 - beach renovation
 - on-going maintenance
 - aquatic vegetation control in designated swimming areas
- Provincial goal:
 - redirect public activity to common community areas
 - Reduce the cumulative impact of many individual shore modifications



Check with ESRD, local government, and DFO if approval is required

Aquatic Vegetation Control & Removal

- Cumulative impact contributes to loss of fish and bird habitat, loss of fish productivity, increased erosion potential, and increase in nutrients = more algae
- Generally approvals are limited to mechanical cutting, to a max. 4m width, and stands that cover less than 75% must remain intact
- Larger areas may be approved for public use areas (e.g. common beach & swimming areas)



Check with ESRD, local government and DFO if approval is required

Boat lift, Swimming raft, Dock, or Pier

- Seasonal & Temporary
 - Exempted from ESRD approval if:
 - Removed completely from lake by end of the open water season
 - Non-commercial use
 - Water can flow freely underneath
 - Does not interfere with the public's right of access
 - Not restricted by local or federal government environmentally sensitive areas or management plans, and
 - Does not increase probability of shore erosion



Check with ESRD, local government, DFO, and Transport Canada if approval is required

Boat lift, Swimming raft, Dock, or Pier

- Commercial and/or Permanent
 - Requires an approval
 - not issued to individuals
 - may be issued to commercial or government groups



Check with ESRD, local government, DFO, and Transport Canada if approval is required

Septic/Sewage Systems

- If your home is not connected to a municipal sewer system, you must have a private sewage disposal system
- The system must be installed and maintained to the standard set by Alberta Municipal Affairs
- **Routine Maintenance is required!**
- Distance setbacks apply from the property line, building, and from water sources/courses, e.g.:
 - Water-tight septic tanks – 10m
 - Sub-surface treatment fields – 15m
 - Treatment mounds – 15m
 - Open discharge systems – 45-50m
 - Sewage lagoon (single dwelling) – 90m

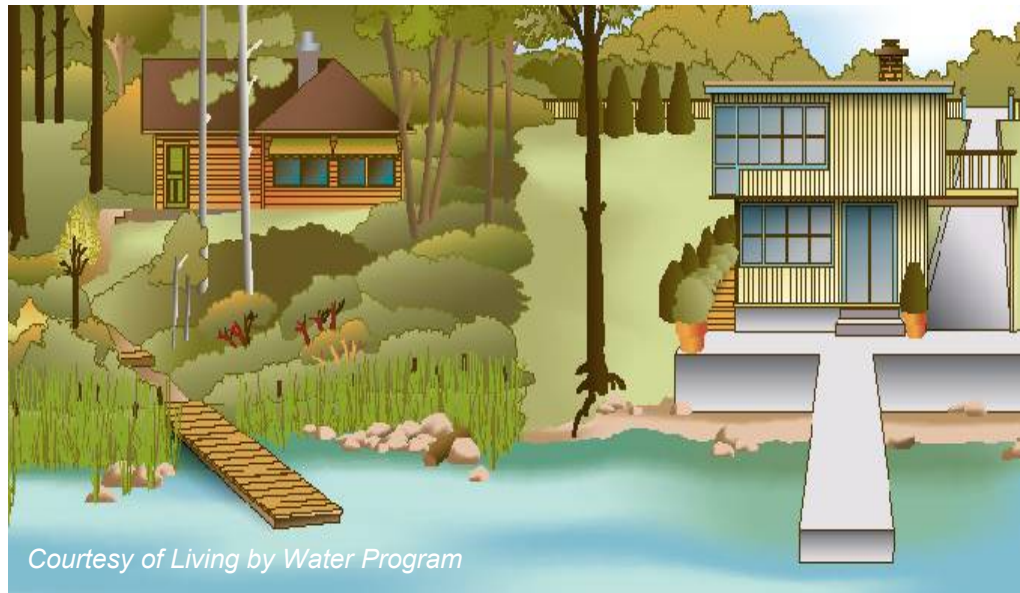


Contact your local government and Alberta Municipal Affairs for permits

Erosion Protection Works

- Naturally occurring vegetation found on the shoreline dampens wave energy and can even protect against ice scouring.
- When riparian vegetation is cut or removed, erosion increases.

“Soft” armoring
(e.g. plants)
maintains wildlife
habitat, reduces
sediment, filters
run-off, and
protects water
quality



“Hard” armoring
(e.g. rocks)
is only approved
in situations
where erosion risk
is very high

Check with ESRD, local government, DFO and Transport Canada if approval is required

Water Diversion

- Landowners adjacent to (bordering) a water body are exempt from approval to divert up to:
 - 1250 m³/year for household purposes
 - 6250 m³/year for agricultural purposes (if owned prior to 1999)
- Diversion over this limit requires a license
- If a water supply line and/or pump disturbs the bed and shore of a water body, approval must be obtained prior to installation



Check with ESRD if approval is required

Off Highway Vehicles on Shorelands

- Cause nuisance/noise, public safety, erosion, wildlife/livestock harassment, habitat loss, etc.
- Is a “community” issue too as lakeshore ATV users are often local residents
- **Need for residents to apply peer pressure**
- ESRD promotes responsible use, consideration of neighbors, safety, and conservation of shoreland resources
- Generally occurs on vacant Crown land – currently can only enforce traffic violations or damages if caught in act
- Current ESRD legislation is under review
- Some seasonal sanctuaries exist to protect and assist in recovery of Endangered Species (e.g. Piping plover nesting areas)



Approval Process

- ESRD Application form
- Submit a copy to:
 - Regional Approvals Center
 - Need to submit background information, e.g. plan location and cross-section drawing of land, etc.
 - if a lakeshore activity has the potential to impact a FN's Indian reserve lands, then AENV will work with the applicant to notify the appropriate FN's and provide direction and guidance on how to proceed.

(2002) 045, 2000

Alberta Application for Shore Line / Water Body Modification Under the *Public Lands Act* and the *Water Act*

Documents or information provided to Alberta Environment pursuant to section 15(1)(4) of the *Water (Industrial) Regulation* are public records which are accessible by the public.

1. Purpose

Aquatic Vegetation Control Bank Stabilization Beach Construction Domestic Waterline
 Erosion Protection Outfall Construction Permanent Boat Launch Permanent Pier Site
 Reservoir Construction Other _____

Applicant Information

1. Name or Regional Company Name: _____

2. Address (Street, PO Box, etc.), Floor, Province, Postal Code: _____

3. Mailing Address (if different than above): _____

4. Contact Information: _____

5. Home Telephone: () _____

6. Business Telephone: () _____

7. Fax: () _____

8. Is the applicant the riparian landowner? Yes No → If no, PROVIDE and ATTACH written consent from the riparian landowner.

9. Consent Attached? Yes No

10. Is the applicant a Canadian citizen? Yes No

11. Has the applicant attained the age of 18 years? Yes No

12. Is the applicant an employee of the Government of Alberta or member of the Legislature? Yes → No Dept. _____

13. Authorized Representative (if not the same as Applicant)

14. Signature of Applicant: _____

15. Signature of Authorized Representative: _____

Name or Company Name: _____

Address (Street, PO Box, etc.): _____

Province: _____

Postal Code: _____

Business Telephone: () _____

Fax: () _____

Project Location

16. Location of Proposed Works: _____

17. Name of Water Body: _____

18. Name of Subdivision: _____

19. Plan No., Block, Lot, Parcel: _____

20. Proposed Date of Commencement: _____

21. Proposed Date of Completion: _____

22. Required Information to Accompany Application Form

(a) A location and site plan of proposed activity. See department's "Content Requirements for Deposits in Plans" and "methods plan" (attached).
 A location and site plan shall show:
 • Proposed works in relation to property lines and banks of water body
 • If applicable, show any municipal source levels between the applicant property and the water body
 • Location of proposed works and the stream, highway, and lowest known water levels
 • Dimensions of the site (e.g. water boundaries of the area required to achieve the stabilization)
 • Minimum plot size: 21.3 m x 13.3 m
 Cross sections need show:
 • Existing site conditions and proposed modifications
 • All relevant measurements
 • Minimum plot size: 21.3 m x 13.3 m

(b) A written description of the proposed project and why the works are required

(c) A photograph or copy of a photograph showing the existing shoreline to ensure needed to facilitate project

Attached? Yes No

Attached? Yes No

Attached? Yes No

23. NOTE: 1. A development permit may be required from the local authority if the proposed activity may involve the use or interference with municipal source lands.
 2. A federal Fisheries Act (Fender) or Geographic Features Protection Act (Fender) approval may be required from the Government of Canada if the proposed works may impact fish, habitat or riparian in the water body.

Date: _____ Signature: _____ Print Name: _____ Title: _____

Departmental Use Only

Authority under the *Water Act*: _____

Authority under the *Public Lands Act*: _____

Notice of Application: _____

Letter of Decision: _____

Approval Issue Date: _____

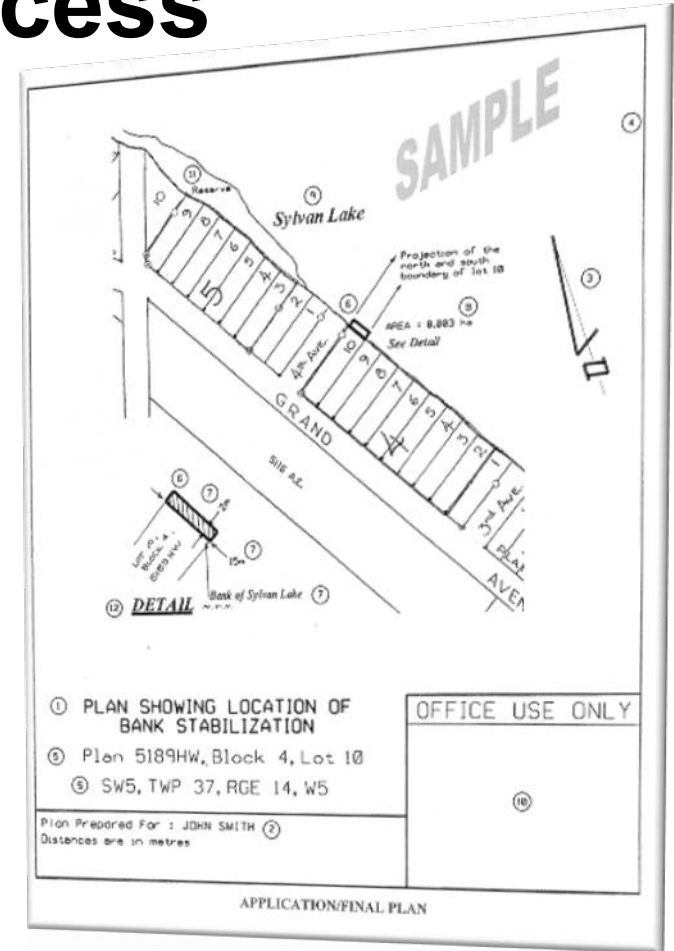
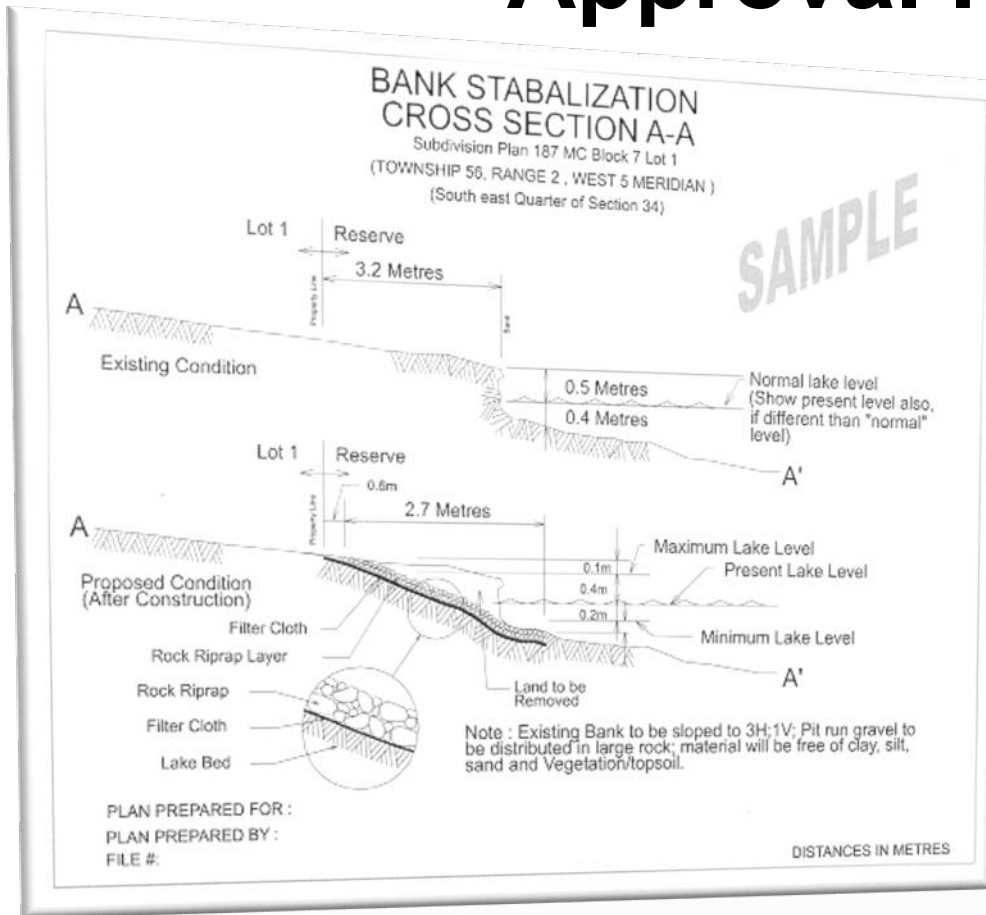
File Number: _____

Approval Number: _____

Client I.D. Number: _____

File Number: _____

Approval Process



Compliance

- Regulators assess non-compliance
- Aim to work with those in non-compliance to achieve compliance
- Under the *Public Lands Act* and *Water Act*
 - Failure to obtain approval is subject to administrative penalties
 - Administrative penalties for unauthorized use (\$5,000 for each day or part day)
 - Activities that cause or have potential to cause injury or an adverse effect to the bed and shore and/or water are offences
 - Enforcements could include prosecution
 - Court penalties for offences:
 - PLA (\$25,000 for individual, \$100,000 for corporation)
 - WA (\$50,000 for individual, \$500,000 for corporation)
 - Compensation for loss of Crown's property

For more information:

- ESRD web site: <http://environment.alberta.ca>
- CARL Sharepoint:
<https://external.sp.environment.gov.ab.ca/CR-R ecLakes/default.aspx>
- Respect Our Lakes site:
<http://environment.alberta.ca/03036.html>
- ESRD Info Centre: **1-780-427-2700**
- Alberta Environmental Hotline:
1-800-222-6514

You can also contact:

- Spruce Grove Office
Suite 1, 250 Diamond Avenue
– Main Switchboard: (780) 960-8600
- Red Deer Office
304, 4920 – 51 Street
– Main Switchboard: (403) 340-7052