



 **Land-use**
FRAMEWORK

Understanding Land Use in Alberta

Alberta

April 30, 2007



Albertans have a special relationship with the land. Our prairies and parklands, our forests and foothills, our majestic Rockies — each shapes how we live and work on a daily basis. Our land is big, beautiful and bountiful, and we are grateful for the opportunities it has given us.

Over the last 10 years, we have enjoyed unprecedented prosperity. But with this prosperity have come new challenges and new responsibilities. Now is the time to ensure that this land — and all the activities it sustains — is managed responsibly so that our children and grandchildren can enjoy the same quality of life that we have.

Today's hyper-growth in population and economic activities is putting unprecedented pressure on Alberta's landscapes. There are competing demands for oil, gas, forestry, agriculture, industrial development, housing, recreation and conservation — often on the same lands.

While our land management processes and systems have worked in the past, we now face new challenges. In the past 25 years, our population has grown to 3.4 million from 2.3 million — an increase of nearly 50 per cent. If this rate of growth continues, we could see upwards of 5 million people living here 25 years from now. Every region of Alberta is being affected by this growth. These new realities call for new approaches to managing land, resources and our natural environment.

To manage these growth pressures, Premier Stelmach has identified the development of a Land-use Framework as one of his new government's priorities — and has made this my top responsibility as the new Minister of Sustainable Resource Development. The Land-use Framework will put a process in place for balancing the competing economic, social and environmental aspirations of Albertans.

The development of the Land-use Framework is a cross-ministry initiative. My team at Sustainable Resource Development is working closely with other departments — Energy; Environment; Municipal Affairs and Housing; Agriculture and Food; International, Intergovernmental and Aboriginal Relations; and Tourism, Parks, Recreation and Culture — to develop a provincewide land-use framework that reflects Albertans' vision for land use.

We will be consulting Albertans through a variety of ways, and I encourage each of you to become involved in the development of the Land-use Framework. This is your province, and this process will shape how Alberta grows over the next 100 years. So please take a little time to make your voice heard.

Learn more about the issues through this publication and have your say by responding to the questionnaire in the Land-use Framework Workbook. You can also provide feedback by completing the questionnaire online at www.landuse.gov.ab.ca.

Alberta's land is not only our future, but it is also the future of our children. They are counting on us to choose wisely.

Sincerely,

[Original signed by:]

Honourable Ted Morton
Minister of Sustainable Resource Development

The Land-use Framework Consultation Process to Date

Spring 2006. In the initial phase, an Ideas Group of prominent and knowledgeable Albertans was asked to identify the key elements needed for the development of a comprehensive Land-use Framework that accounts for the interests of all Albertans.

August-October 2006. Building on advice from the Ideas Group, stakeholder focus groups were held at a number of locations across the province involving individuals from a variety of land related sectors and organizations — oil and gas, mining, forestry, agriculture, transportation, recreation users, conservation and environmental groups, Aboriginal, municipal representatives and academics. Participants were asked to identify both the key issues that should be addressed by a land-use framework and the principles it should reflect. Some topics that were discussed included:

- agricultural land preservation,
- land-use decision making at the municipal level,
- growth pressures and the need for growth management strategies at all levels,
- land-use conflicts and competing land interests,
- integrated regional land use planning,
- pressures on municipal resources,
- comprehensive integrated resource management planning,
- cumulative effects management,
- long-term planning for transportation and utilities, and
- integration of land, air and water management.

December 2006. A Cross Sector Forum was held in Red Deer, and attendees included many who had taken part in the earlier sessions. Participants were asked to confirm key outcomes, issues and challenges, to identify possible actions and solutions, and to outline the key elements required in a framework.

Each phase of the Land-use Framework consultation process builds on what was learned from the earlier phases.

Reports from all of these sessions are posted under Reports on the website at www.landuse.gov.ab.ca

Learning More About Land Use, Its Management and Challenges

This booklet is intended to help Albertans understand the ways in which the land is used, the land-use issues, and the choices required to best manage and sustain land for Alberta's future.

The first section provides a broad overview of Alberta's land, its uses, management and challenges.

The second section provides more information about the many ways in which Alberta's lands are used and the contributions the land makes to our well-being. It includes information about agriculture, forestry, energy, tourism and recreation, settlements, First Nations, Métis Settlements, climate change, watersheds, biological diversity, fish and wildlife, and parks and protected areas.

The companion piece to this booklet is the *Land-use Framework Workbook*. The workbook questionnaire gives you the opportunity to provide your input on land-use issues.



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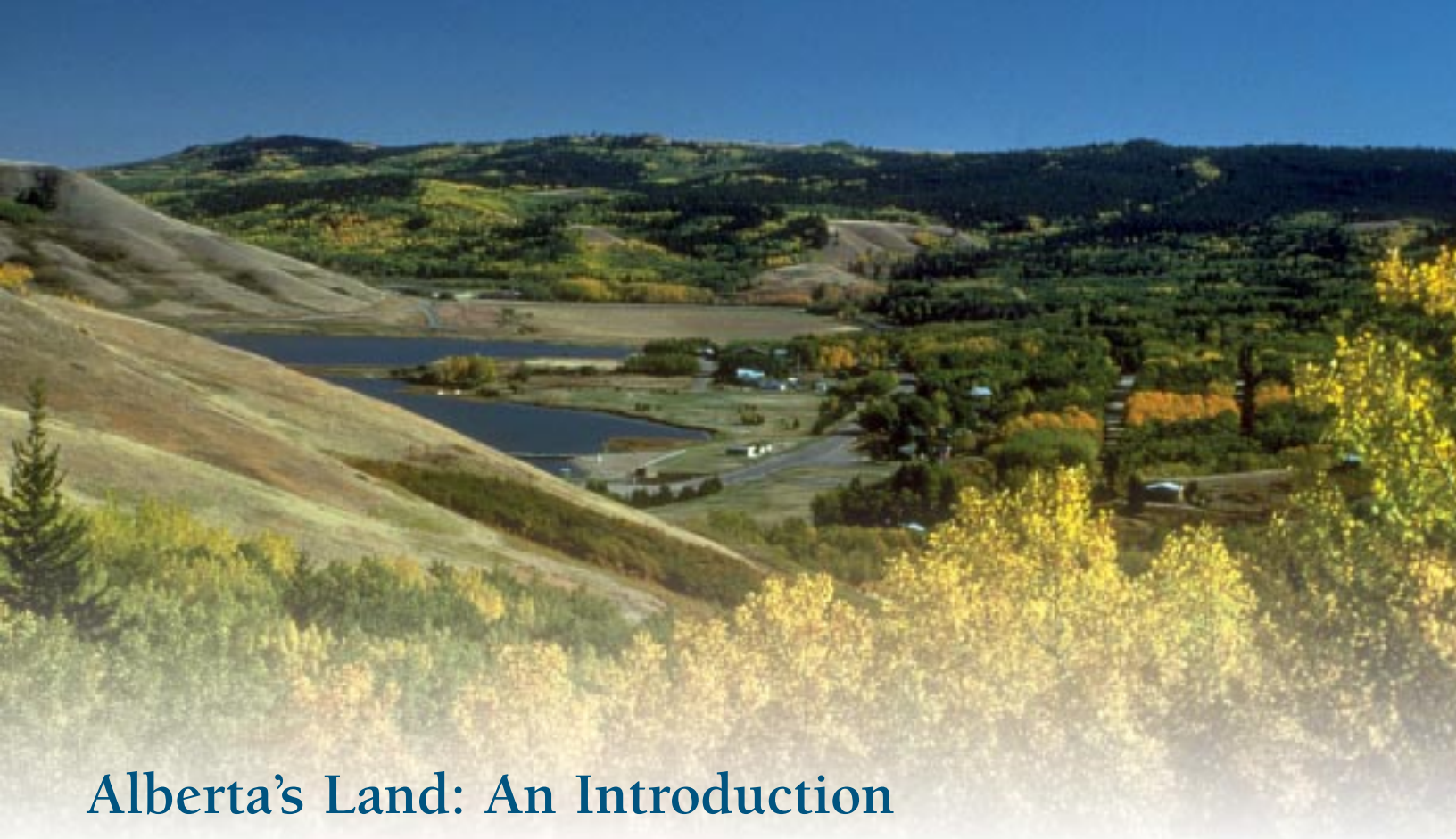
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Alberta's Land: An Introduction

The Bounty of Our Land

As Albertans, we have a special relationship with the land. We take pride in our province's landscapes and in the opportunities the land gives us. Alberta's land provides the places where we live, work and play — from cities to rural areas, oil fields to agricultural lands, and the prairies to the boreal forest. It also provides the clean air, water and fertile soil that we depend on for our day-to-day lives.

The land and the choices we make about its use touch each and every Albertan in one way or another. The places where we live, work and visit are all affected — communities, recreational lands, industrial areas, farms, First Nations lands, Métis Settlements, archaeological resources, protected areas and tourist destinations.

Growing Pressures

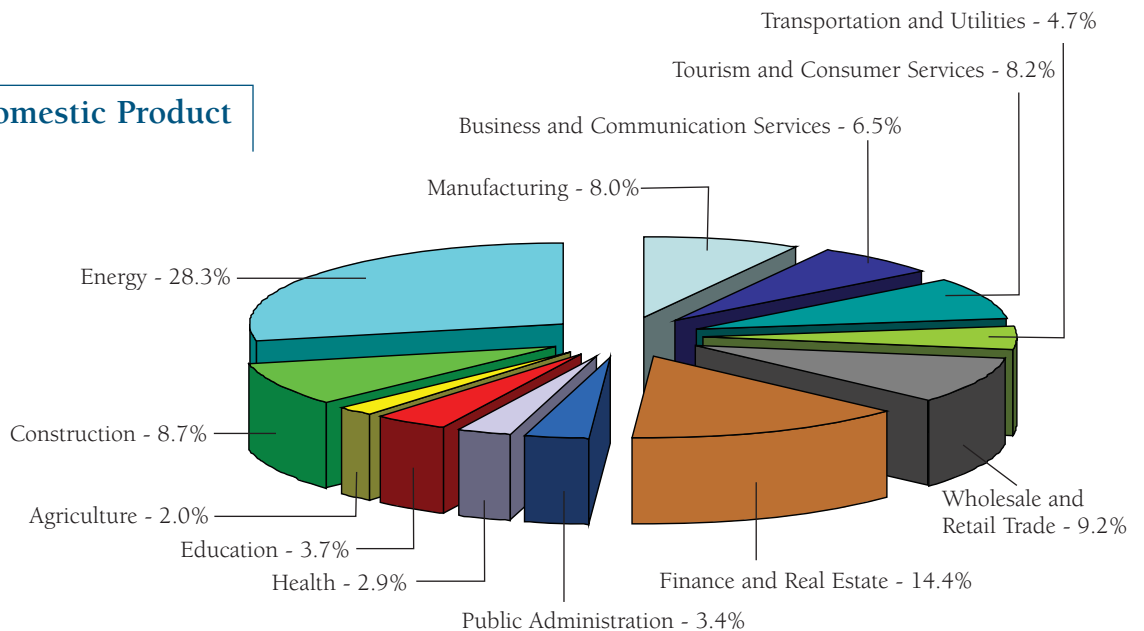
For nine of the last ten years, Alberta’s population has grown faster than that of any other province. Over the same period, our economy has grown at an average rate of 4.3 per cent a year — the fastest growth rate in Canada. It is estimated that by 2010 an additional quarter million people will live in Alberta — most of them in urban areas. Our economic growth is expected to remain strong in the foreseeable future.



Alberta’s abundance of natural resources contributes to our quickly growing economy. People come to Alberta for employment and business opportunities. While this is good news for our economy, there are consequences for Alberta’s land. Cities and towns are expanding onto neighbouring areas. Land that was once used only for farming or ranching is being used for acreages and other urban developments. Resource companies, the agricultural industry and tourism developers often want to use the same land. This demand also creates pressures on Alberta’s sensitive areas and natural habitats.

Increasingly, Alberta’s landscape is a busy place. With oil and gas, forestry, mining, tourism, agricultural activities and many rapidly growing communities, the impact on public and private land is increasing. There are competing demands for land in many areas of the province — and these will intensify as Alberta’s economy and population continue to grow.

Figure 1
Alberta’s Gross Domestic Product by Industry 2005



Land-use Challenges

With all the demands on Alberta's land, we have reached a critical point.

Growth, Mounting Land-use Pressures and Cumulative Effects

Growth places demands on the landscape. As people move into the province, more land is needed for housing, transportation, utilities, community services and recreation. And as the global market for energy expands, there is increased need for access to energy resources and further exploration.

Growth usually enlarges the “human footprint” on the land. Over time, the impacts of additional land uses begin to accumulate — these are known as cumulative effects. But growth is inevitable. Our challenge is how to manage the effects that growth has on the landscape.

QUICK FACTS

- In the past 25 years, our population has grown to 3.4 million from 2.3 million — an increase of nearly 50%. If this rate of growth continues, we could see upwards of 5 million people living here 25 years from now.
- In 2005, Alberta's gross domestic product was over \$218 billion in current dollars — an increase of about 15 per cent from 2004.

What are cumulative effects?

They are the changes to the environment caused by an activity in combination with other past, present, and reasonably foreseeable human activities. For instance, these might include all the effects on wildlife habitat from a range of land uses.

Competing Demands for Land

Often land is used for more than one purpose at the same time. This can result in competing interests, and a decision must be made as to which use has precedence. For instance, is it agriculture, housing, protection of habitat, natural resource development, or a combination of these? As there are more uses on a piece of land, the buffers between different types of land use diminish and conflicts increase.

Making decisions about land use involves careful consideration of the competing demands for the land. What is most important to protect? What are the consequences of the various uses? How do we balance our economic, social and environmental goals?

Ensuring Sustainability

We all want to ensure the benefits we realize from Alberta's lands continue — not just for our lifetime, but also for future generations. Sustainability involves protecting the natural environment and ensuring our economic and social well-being. To sustain our quality of life, decisions need to consider what is good for the environment, the economy and society.

Integrated Land-use Policies

As growth continues and demands for land increase, it becomes more and more important to integrate direction for land use. Alberta needs integrated land-use policies to help clarify priorities, assist with decisions, minimize conflicts and ultimately help ensure sustainability.

Looking Ahead

How do we anticipate and prepare for a future with six or eight million people? We need to consider where people would live, work and play. We need land for agriculture and forestry, yet we must balance that need with land required for energy and industrial developments, transportation and utilities, tourism and recreation, natural areas and habitat for a rich diversity of wildlife.

To ensure our children and grandchildren benefit from the land as we do today, we must manage the land and activities associated with it in a responsible manner. To this end, the Government of Alberta is developing a Land-use Framework. It will provide a vision for land use in Alberta and the overall direction needed to manage growth and activities on Alberta's landscape.



QUICK FACTS

What is industrial development?

In a public land-use context, it means natural resource development activities like exploration, harvesting and extraction of natural resources.



Alberta's Landscapes and Land Uses

Landscapes

Alberta includes an area of just over 164 million acres (660,000 square kilometres) — more than 97 per cent is land and the rest is water. As Albertans, we are fortunate to have a great variety of landscapes. We are the only jurisdiction in North America where the grassland, boreal forest and mountain regions converge.

Across the province there are six natural regions — each reflects differences in factors like climate, landforms and vegetation. These different factors generally influence the land-use activities and management practices that can occur in an area. For instance, the prairies and parkland support farming and ranching while the foothills and boreal forest are rich in forests. All six natural regions support and sustain a diversity of life and a wealth of ecological values including fish and wildlife.

In addition to the marketable goods and services provided by these natural regions, the landscapes provide clean air and water, productive soils, habitat, and flood and erosion control. They are also a source of inspiration and connection to the natural environment. Many of the social and economic benefits we enjoy as Albertans come from the use, development and protection of the natural resources in these regions.

QUICK FACTS

Acres and Hectares

An acre is 4,046 square metres. A hectare is 10,000 square metres or 2.47 acres. There are 100 hectares in a square kilometre. One hectare is about two football fields, side by side.

Figure 2 Alberta's Natural Regions

Natural regions are a way of describing broad ecological variations in the landscape. They reflect differences in climate, geology, landforms, hydrology, vegetation, soils and wildlife. There are six natural regions in Alberta:

Boreal Forest – This is Alberta's largest natural region, covering just over half the province with deciduous, mixedwood and coniferous forests interspersed with wetlands. Forestry, oil and gas, recreation and grazing are the primary land uses.

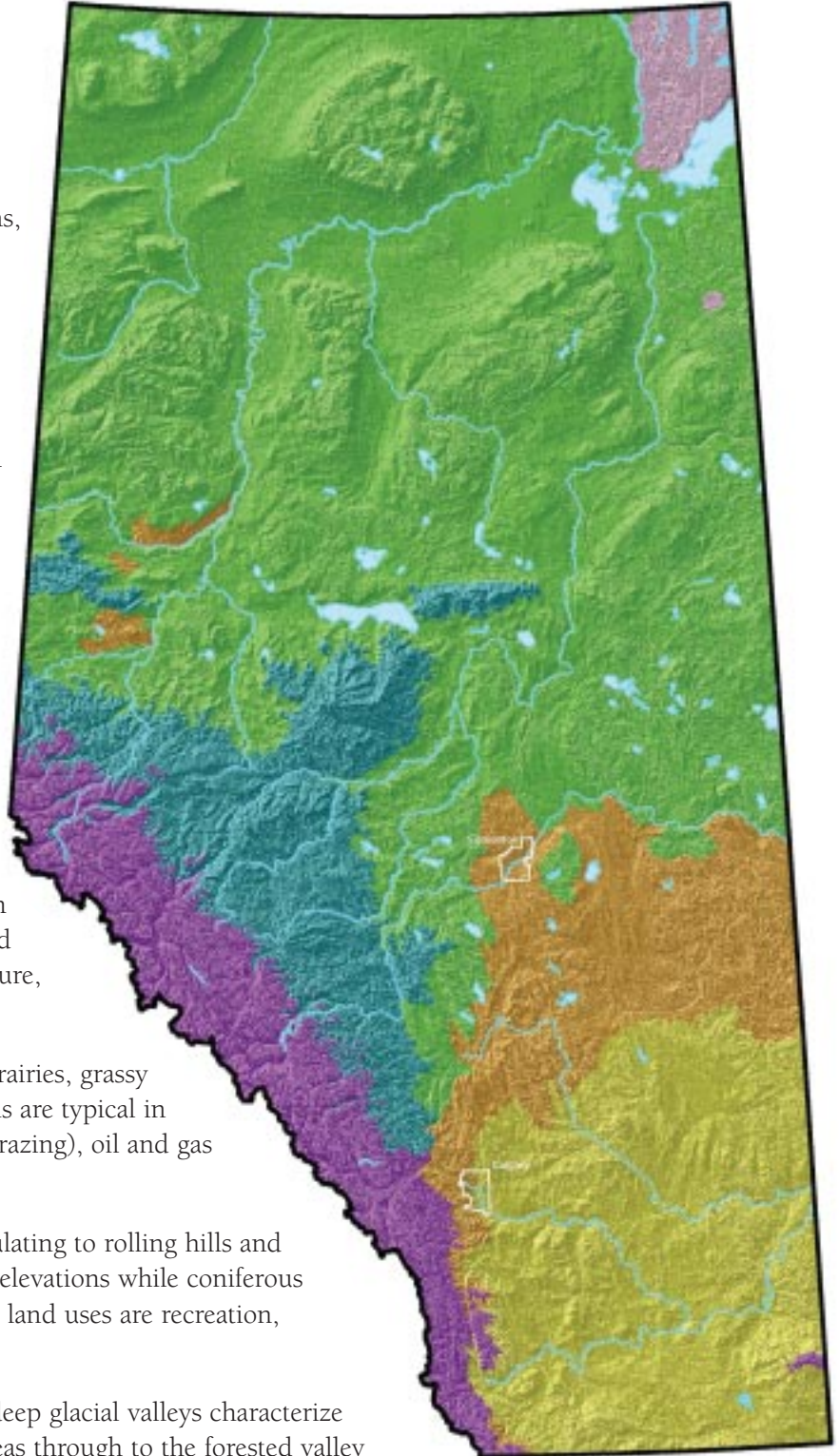
Canadian Shield – Many small lakes, sparsely vegetated granite bedrock and glacial deposits characterize this natural region. This area is less than 2 per cent of the province and land uses are limited to mineral extraction and recreation.

Parkland – This region includes patches of aspen and willow shrublands mixed with native grasslands. Much of this region has been cultivated. It is also the most densely populated natural region in Alberta and supports agriculture, settlement, oil and gas and recreation.

Grassland – Level to rolling land with native prairies, grassy foothills and cultivated croplands on vast plains are typical in this region. Agriculture (irrigation-based and grazing), oil and gas and recreation are the key land uses.

Foothills – The terrain varies from gently undulating to rolling hills and plateaus — deciduous trees grow in the lower elevations while coniferous forests are found at higher locations. The main land uses are recreation, forestry, oil and gas and grazing.

Rocky Mountain – Foothills, mountains and deep glacial valleys characterize this region — it includes the treeless alpine areas through to the forested valley bottoms. This region supports recreation and tourism, oil and gas, forestry and grazing.



Land Ownership and Use

Who Owns the Land in Alberta?

- **Private** – Just under 30 per cent of land in Alberta is privately owned by individuals, groups, companies or organizations. Private land provides habitat for wildlife, supports biological diversity and is used for farming, ranching, housing and industrial development.
- **Provincial** – More than 60 per cent of land is owned by the provincial government. This is called public land and it accommodates many uses including timber harvesting, livestock grazing, recreation, and the development and transportation of oil, gas, electricity and other natural resources. As well, public land plays a critical role in habitat conservation and the protection of watersheds and biological diversity.
- **Federal** – The federal government owns about 10 per cent of land in the province — most of it is national parks, Indian Reserves or military reserves. Alberta's Land-use Framework does not address federal land.

How Is Alberta's Land Used?

Almost a third of Alberta's land is used for agriculture and close to another third is used for forest management areas. Alberta's land is also used and valued for other purposes, such as energy and mineral development, tourism and recreation, rural development, transportation and utilities, wildlife habitat and biological diversity. That is one of the challenges — there are many demands for use of the same land. Some uses are compatible and can occur together while others are incompatible. This is one of the issues that will be raised throughout this booklet.

Land Administration

Both the nature of the landscape and its ownership affect how land is used and managed. For instance, grasslands are suitable for grazing and growing crops and over the years, these lands have been privately purchased for agricultural land. Most of the forested areas in the boreal forest are owned by the province, which provides rights for timber harvesting in these areas to forestry companies. The spectacular scenery of the Rocky Mountains, the world-famous badlands and beautiful northern lakes prompted creation of government-owned parks and protected areas — also popular places for tourism and recreation.

The White and Green Areas

Alberta has two major land designations — the White Area and the Green Area. These two areas were created in 1948 to guide development of the province and to deal, in part, with the failure of homesteads on lands unsuitable for agriculture. The White Area was set aside as land primarily suited for agriculture and settlement. The Green Area included forested land for forest management planning and protection of important watershed areas.

Today, Alberta's White Area and Green Area reflect differences in the landscape, land use and ownership. As well, there are differences in the way land in the two areas is planned and managed.

Figure 3
Land Use in Alberta
(Per Cent of Total)

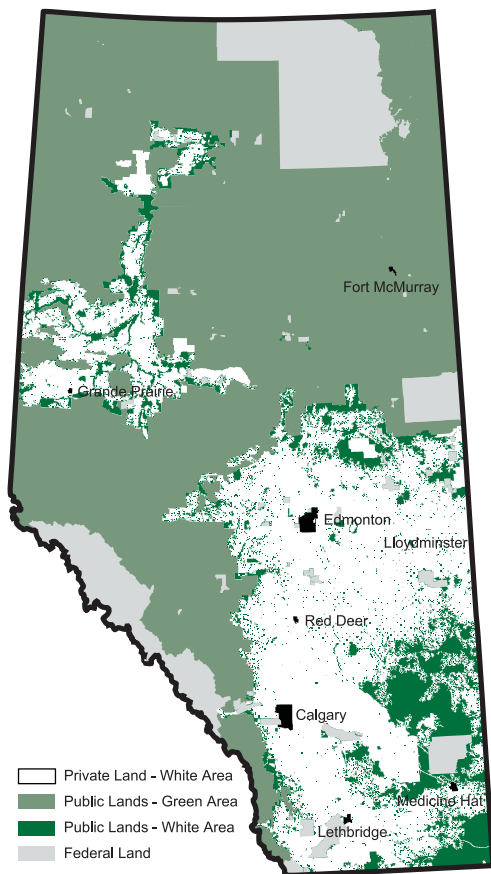
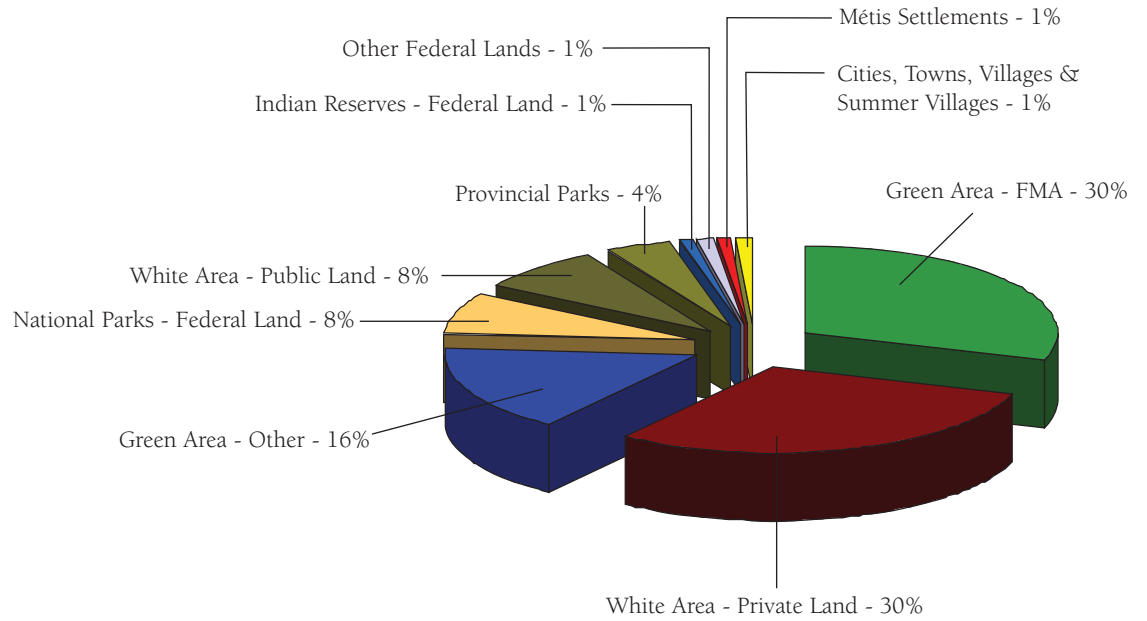


Figure 4
Green and White Areas Including
Private and Public Lands

Table 1
Green and White Areas of Alberta

White Area	Green Area
<ul style="list-style-type: none"> • Settled lands 	<ul style="list-style-type: none"> • Forested lands
<ul style="list-style-type: none"> • Covers about 39 per cent of Alberta 	<ul style="list-style-type: none"> • Covers about 61 per cent of Alberta
<ul style="list-style-type: none"> • Three-quarters privately owned – by more than 1.7 million individual title holders 	<ul style="list-style-type: none"> • Nearly all publicly owned
<ul style="list-style-type: none"> • Primarily in the populated central, southern and Peace River areas 	<ul style="list-style-type: none"> • Primarily in northern Alberta, some in the mountains and foothills
<ul style="list-style-type: none"> • Main land uses – settlements, agriculture, oil and gas development, tourism and recreation, conservation of natural spaces and fish and wildlife habitat 	<ul style="list-style-type: none"> • Main land uses – timber production, oil and gas development, tourism and recreation, conservation of natural spaces, watershed protection and fish and wildlife habitat
<ul style="list-style-type: none"> • Authority to set regulations and make decisions is primarily with municipal governments on private land and with the provincial government on public land 	<ul style="list-style-type: none"> • Authority to set regulations and make decisions is primarily with the provincial government

Although there are differences in the primary land uses in the Green and White Areas, both areas support some of the same uses — recreation, natural resource development, conservation of soil and water, and protection of watersheds and habitat.



Making Decisions About Alberta's Land

Who Is Responsible for Land Decisions?

Generally, the provincial government regulates the planning and management of publicly owned lands, most of which are in the Green Area. The municipal governments regulate the planning and development of privately owned lands, most of which are in the White Area. About 10 million acres of public land in the White Area are managed by the provincial government in partnership with disposition holders, primarily grazing lessees.

The provincial government has some provincewide regulatory responsibilities. These include air and water quality as well as historical and natural resources such as fish and wildlife, minerals, oil and gas, timber, water, archaeological sites, palaeontological sites and traditional cultural sites.

QUICK FACTS

What are municipalities?

1. *Urban municipalities* – cities, towns, villages, summer villages
2. *Rural municipalities* – counties and municipal districts (which often contain hamlets within their boundaries)
3. *Specialized municipalities* – may include both urban and rural communities such as the Regional Municipality of Wood Buffalo (including Ft. McMurray) or Strathcona County (including Sherwood Park)

Because of the variety of land uses in Alberta, land holders, municipalities, provincial government departments and agencies, as well as a range of organizations, stakeholders and publics are involved in land-use decisions.

How Are Land Decisions Made?

One way to understand how land-use decisions are made is to consider the differences between publicly and privately owned lands.

Decisions About Private Lands

The province has given municipalities the authority for land-use planning on private land. Municipalities include cities, towns, villages, summer villages, municipal districts or specialized municipalities. Below are some of the authorities (policies and agencies) related to municipal decisions about private land use:

- The **Municipal Government Act** – This provides direction about the rights, responsibilities and powers of municipalities including their role in land-use planning. The *Provincial Land Use Policies*, developed according to this legislation, provide broad direction to guide municipalities in their decisions.
- **Municipal Planning** – Municipal plans and bylaws direct development and use of the land and help enhance the quality of life in the municipalities. While these plans and bylaws conform to the broad requirements of the *Municipal Government Act*, the province does not review or approve individual municipal plans and bylaws — this is the role of locally elected councils.
- **Development Permits and Planning Decisions** – Across Alberta, municipalities issue more than 50,000 development permits and planning decisions each year. In doing so, they must consider the social, economic and environmental impacts of these decisions.

- **Other Agencies** – The Alberta Energy and Utilities Board and the Natural Resources Conservation Board issue provincial approvals for activities such as oil and gas wells or pipelines and confined feeding operations. Municipal decisions must reflect approvals made by these provincial agencies.

Private Land Issues

- Through the *Municipal Government Act*, Planning and Subdivision regulations and the *Provincial Land Use Policies*, the government provides broad direction to municipalities — but it does not review or approve individual municipal plans or planning decisions. Some people believe the provincial government should be involved in assuring or monitoring compliance with these policies. Others have concerns with an increased provincial government role in the planning responsibilities currently delegated to municipalities.
- Local planning issues often involve many interests and a high degree of citizen involvement. While municipalities try to respond to issues raised by local citizens, they cannot respond to matters outside their Council's jurisdiction even when these involve land uses located within their boundary.

QUICK FACTS

The *Provincial Land Use Policies* deal with provincial and inter-municipal planning and cooperation, and specific aspects of planning. These include land-use patterns, the natural environment, resource conservation (agriculture, non-renewable resources, water resources, historical resources), transportation and residential development.

Decisions About Public Lands

The provincial government makes decisions about public lands, most of which are in the Green Area although about 10 million acres are in the White Area. When planning public land use, the provincial government follows these approaches:

- Integrated Resource Management Philosophy**
 This philosophy recognizes that the use of any resource inevitably affects other resources and that we must consider those resources together when we make decisions. It also requires that we manage resources to realize both present and future benefits and that our management practices reflect a commitment to provide the same range of opportunities to future generations that we enjoy today. Integrated land management ensures that environmental, social and economic issues are considered and helps integrate industry, government and public uses of Alberta's land and resources. Cooperation and communication with stakeholder groups, local municipalities and the public are key components.
- Integrated Resource Plans and Regional Strategies**
 These strategies and plans provide direction for land use in a specific area or region. They include an assessment of resource values and identify policies for long-term management and uses that address stakeholder and community needs. It is important to coordinate the direction in an integrated resource plan with that in municipal plans for the area. Some examples of strategies are the Northern East Slopes Strategy, the Eastern Slopes Policy and the Regional Sustainable Development Strategy for the Athabasca Oil Sands.
- Dispositions** – These include land-use contracts such as agreements, easements, leases, letters of authority, licences, permits or quotas. Dispositions are a way that the government gives individuals, companies or organizations rights to use public land for a specific purpose — such as grazing, farm development, timber harvesting, surface access for oil and gas, commercial use or recreation. Applications for public land dispositions are referred to provincial government

resource managers and municipalities who review and identify any concerns related to their mandate. Following this, the provincial government makes a decision based on the concerns raised.



Public Land Issues

- Stakeholders have different, often conflicting expectations about how the various uses of public lands should be integrated. Resource management approval processes need to be better integrated to address natural resource developments, fish and wildlife habitat, watershed impacts and other factors.
- The growth in natural resource development has opened up new access to previously undeveloped public lands and increased access to existing areas.
- Increased and continued use of public lands is resulting in fragmentation and loss of habitat — this affects wildlife, natural vegetation and biodiversity.
- Population growth in centres next to public land in the Green Area (e.g., Fort McMurray, Canmore) has created a demand for more land to be made available for settlement and a corresponding need for recreational or commercial opportunities. Expanding

communities in the Green Area are spreading into places where timber production and oil and gas developments have been the primary land uses.

Issues Common to Private and Public Land

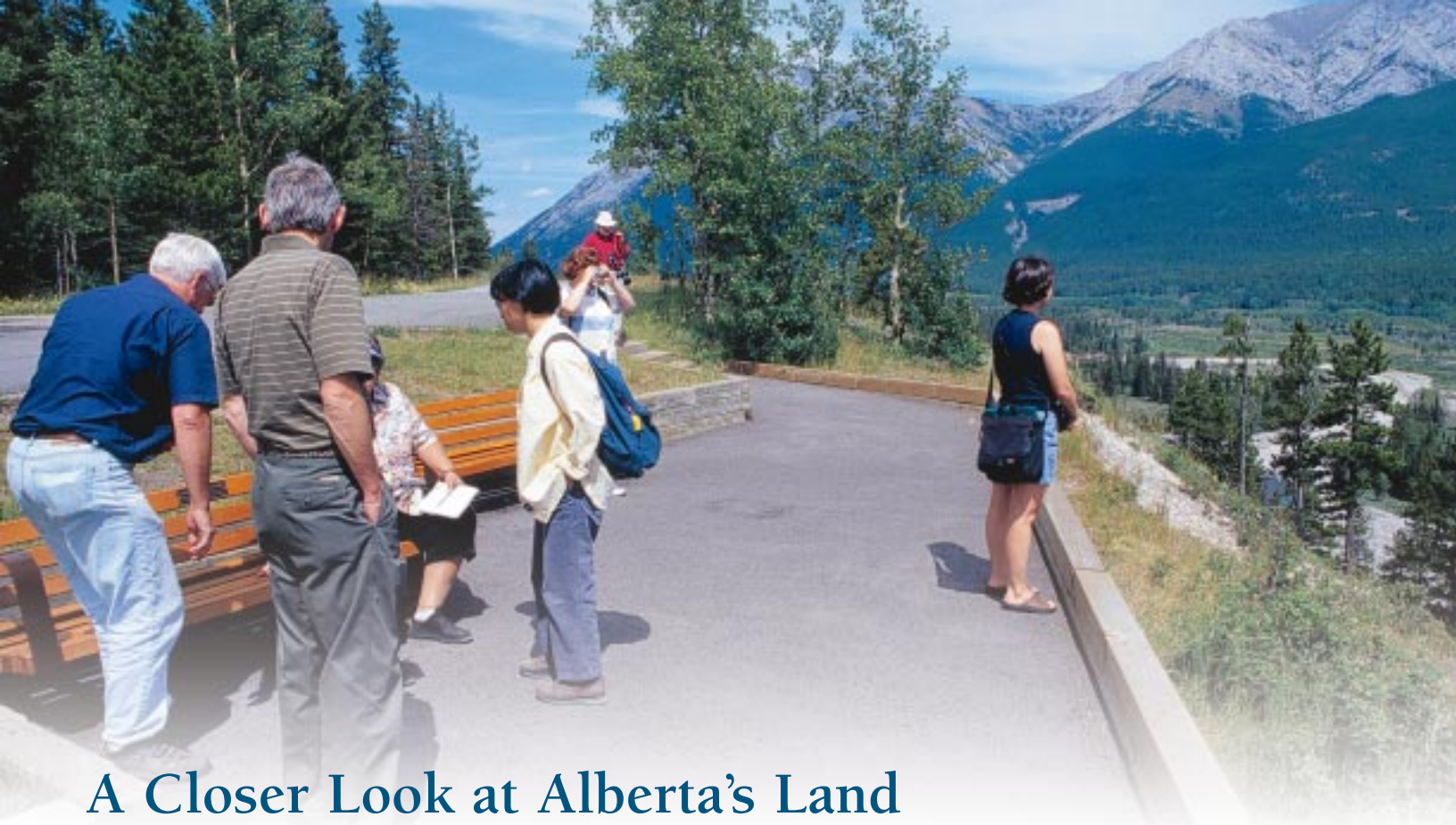
- Given the province's economic and population growth, it is becoming more and more challenging to manage the increasing pressures and conflicts among land uses in various parts of the province, as well as the cumulative effects from activities on the land.



Others Involved with Land-use Decisions

Although municipalities and the provincial government play a significant role in land-use decisions, many others are also involved. We all make decisions that affect the land. As individuals, we make decisions about the land we own or reside on, use for recreation, farming or other means of making a living. As members of organizations, we make choices about land related to the needs of our recreational clubs or land conservation groups.

Companies make decisions about ways to access the land or use the natural resources and also through their corporate environmental practices and policies. As well, when we become involved in land-use planning discussions or advocate changes in land-use policies or practices, we are shaping land-use decisions.



A Closer Look at Alberta's Land

Alberta's land is a mosaic of uses. The next section of this booklet provides more specific information about the many ways Alberta's lands are used and the contributions the land makes to our well-being. This booklet focuses on 11 key areas:

- Agriculture
- Forests
- Energy and Minerals
- Settlement
- First Nations
- Métis Settlements
- Tourism and Recreation
- Historical Resources, Parks and Protected Areas
- Watersheds
- Biodiversity, Ecological Goods and Services, and Fish and Wildlife
- Climate Change

For each area there is information about the current situation, important trends and the key land-use challenges. By reading about each area, we begin to see the “big picture” and understand some of the trade-offs that need to be considered.

Agriculture

Looking Back

- Alberta's first record of cultivation dates back to 1779, when a fur trader named Peter Pond grew vegetables in a garden at his isolated post near Lake Athabasca. Early agricultural activities were limited to growing vegetables and wheat around forts and missions.
- The influx of settlers nearly 100 years later, after the Canadian Pacific Railway reached Alberta, started an agricultural land-use pattern that exists today. As settlers arrived, they chose lands that were easiest to cultivate and the most productive.

What We Know

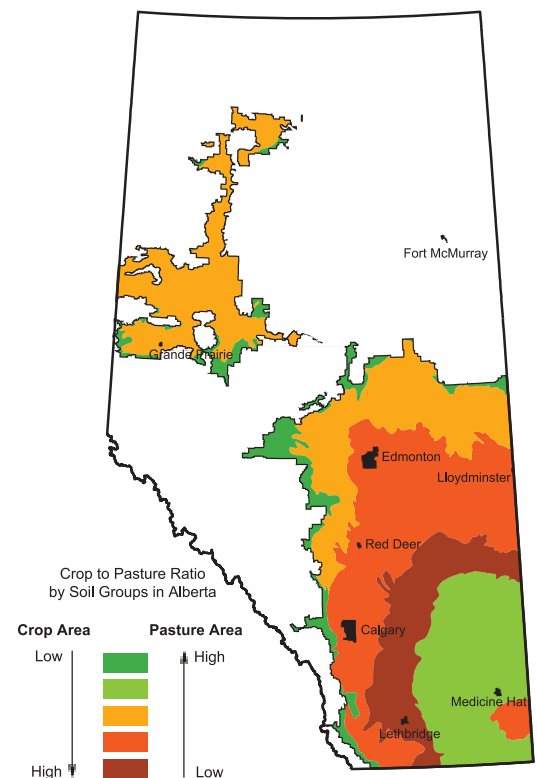
- About 52 million acres of Alberta's land is used for agriculture, mostly in the White Area. This land is used for crop and livestock production (primary production), as well as for value-added products such as meat products, cereals, beverages, sugar, hides, pet foods and nutraceuticals. The vast majority of agriculture occurs on private land but about 15 per cent of livestock grazing occurs on public land.
- Alberta is the largest cattle-producing province in Canada.
- In 2006, agriculture and food industries employed 79,300 people. The industry generated \$7.8 billion in farm gate revenue for producers while the food and beverage manufacturing sector contributed \$9.6 billion to Alberta's economy.
- Over one million acres in Alberta are irrigated — about 65 per cent of the total irrigated area in Canada. Irrigation contributes to over 19 per cent of agriculture's gross primary production in Alberta.
- The *Provincial Land Use Policies*, adopted in 1996 pursuant to the *Municipal Government Act*, includes policies intended to help maintain and diversify Alberta's agricultural industry. The policies encourage

municipalities to identify land where agriculture should be a primary use, limit fragmentation and premature conversion to other uses, direct development to areas where it will not constrain agricultural activities, and minimize conflict between intensive agricultural operations and other land uses.

- In 2002, the *Municipal Government Act* was amended to require that municipalities address the protection of agricultural operations in their municipal development plans and land-use bylaws. While this supports farmers in continuing their normal farming practices, municipalities are not required to protect or preserve agricultural land. If a landowner wishes to sell his or her land for non-farm purposes or wishes to change the use of his or her land, a municipality may

Figure 5

Profile of Agriculture in the White Area



decide that the land can be used for purposes other than agriculture. Factors that may influence this decision-making process include the desire of the municipality to diversify the municipal tax base or settlement development pressures.

- Rangelands and other agricultural lands are home to many species of wildlife and contribute to Alberta's biodiversity.

Trends

- Farm incomes have dropped as a result of increased expenses (e.g., fuel and fertilizer), unexpected events (e.g., the BSE crisis) and years of drought.
- Consolidation of agricultural operations has resulted in fewer but larger farms. As farms become larger, it becomes more cost effective to bring more farmland into production.
- Bio-diesel processors will consider using canola as a renewable energy source. Their interest could contribute to increased market opportunities for oilseed processors, which might increase the demand for land to grow canola.
- Alberta's farmers are aging — the current average age is about 48 years. Many farmers may want to retire in the next decade or two. If family members do not want to take over the farming operations, there is an increased likelihood that land close to major urban centres will be sold to developers.

Challenges

- Rural and urban growth has resulted in the loss or *conversion* of some of the province's most productive farm and ranch lands. *Fragmentation* of the land base — dividing land into smaller parcels — is also a significant problem. This is most notable in the vicinity of the Edmonton-Calgary and Canmore corridors, Lethbridge and Grande Prairie areas.

Conversion of Agricultural Land

- Alberta has monitored the conversion of agricultural land to other uses since 1976. Agricultural land that has been converted to other uses has usually been the most productive land in the province, while the land converted to agriculture has generally been less productive — more suited to forage and pastures.



- In some areas of the province, the market value of land for settlement development may exceed the value of land for agriculture. As a result, it is difficult to slow down or prevent conversion of agricultural land to other uses since sometimes conversion can make better economic sense than continuing to use the land for agriculture. And once land is converted to other uses, it may not be available for agricultural production or the remaining parcels of land may be too fragmented for intensive agricultural operations.
- Some landowners have expressed concern that restricting the sale of agricultural land for other purposes in high market value areas could limit their opportunities to sell their land for high market value to offset business losses, support retirement or leave the agricultural industry.

- When a municipality approves a landowner's request to use land for non-agricultural purposes, the impacts of the land conversion are considered from a municipal perspective. Cumulative effects of land conversion — across a region, landscape or watershed — may not be assessed.
- Although the *Provincial Land Use Policies* encourage municipalities to limit fragmentation or retain agricultural land, there is no mechanism for tracking conversion or preventing municipalities from rezoning the land to allow other land uses.

Fragmentation of Agricultural Land

- New subdivisions, urban and rural growth, transportation routes or energy and utility corridors can fragment land and result in pieces that are too small or unsuitable for some agricultural uses. This limits the kinds of agricultural uses and can reduce a producer's ability to farm. For instance, neighbour concerns or bylaws may restrict dust, light and noise but this may also limit farming operations to certain times of the day or week, posing problems for weather-dependent activities like seeding, spraying and harvesting. Small parcels of land also mean that confined feeding operations must expand to areas where there is enough land to accommodate buffers between their operations and other land uses.

More Information

Alberta Agriculture and Food:
www.agric.gov.ab.ca

Alberta Agriculture and Food's Loss and
 Fragmentation of Agricultural Land report:
www.agric.gov.ab.ca/farmland

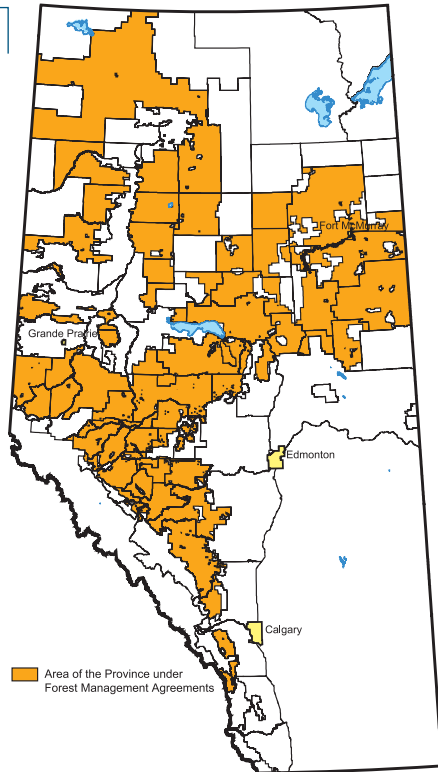
Forests

Looking Back

- In the early days of Alberta's settlement, forests were seen as covering up valuable farmland and needing to be cleared to make way for the railroads. Later, forests were valued as a source of timber and for their role in providing clean air and water.
- In 1930, Alberta took ownership of its forests and other natural resources from the federal government. In 1953, Alberta's first Forest Management Agreement was signed with North Western Pulp and Power in Hinton and the timber quota system was authorized in 1966.
- During the 1980s, new manufacturing facilities were developed throughout Alberta. This was the result of a government focus on industrial diversification and the discovery of a new use for Alberta's deciduous trees (oriented strand board).

What We Know

- Over half of Alberta's land base is forested — about 80 million acres (38 million hectares).
- In 2006, Alberta's forests contributed over \$11 billion in revenues and supported more than 47,000 jobs. The forest industry is the third largest in the province, next to energy and agriculture.
- Forests are home to many species of wildlife and provide a range of tourism and recreational opportunities. They produce oxygen, control stream temperatures and preserve soil by preventing erosion.
- Most of Alberta's forested lands are publicly owned and in the Green Area. Only about 4 per cent of the total forested land in Alberta is privately owned.
- The right to harvest forests is managed through Forest Management Agreements (FMAs), quotas and permits.

Figure 6**Forest Management Agreement Map****QUICK FACTS**

A *Forest Management Agreement (FMA)* is a large, area-based agreement between the province and a company. It gives a company the right to establish, grow, harvest and remove timber from a particular area of land. An FMA is granted for 20 years, with options for renewal. The FMA holder is responsible for forest management plan development, reforestation, and maintenance of a manufacturing facility.

A *quota* gives a company the right to harvest a per cent of the annual allowable cut of a particular forest management unit (Coniferous Timber Quota) or a set volume of timber (Deciduous Timber Allocation). This is a 20-year renewable agreement where the quota holder is usually responsible for reforestation and participates in the development of the management plan.

A *permit* is a short-term timber agreement used to satisfy local demand for timber (e.g., Christmas trees, firewood). It usually is for one year but can be longer.

- In the Green Area, the use of forests is guided by approved forest management plans, prepared either by the government or a company that holds an FMA. The use of forests on public lands in the White Area is guided by local integrated resource plans. There are few harvesting restrictions on privately owned lands.

Trends

- The forest industry is looking for new places to harvest timber. Purchasing privately owned woodlots or Crown land in the White Area, purchasing wood directly from landowners and leasing privately owned land are options.
- Competition for land that could be used for forestry is expected to increase. The bio-energy sector is interested in using White Area timber fibre for the production of heat and electricity while the agricultural industry views woodlots as potential cropland.
- Public pressure for sound forestry practices has increased and in response the forest industry has developed more environmentally friendly practices. Increasingly, companies are becoming certified and can advertise that their products come from sustainably managed forests.

Challenges

- Only a very small amount of Alberta's timber remains uncommitted through an FMA, quota or permit.
- The forested landscape is used by industries other than forestry. Coordination of various industry activities, including forestry, is important to protect the forests and ensure their sustainability. Working together helps reduce road clearings, wood wastage and the industrial footprint.
- Mountain pine beetle infestations kill trees and reduce the annual allowable timber cut. Although harvesting timber killed by the beetles can provide short-term economic gain, it may result in a long-term reduction

in the volume of forest that is harvestable. As well, additional roads may be necessary to harvest mountain pine beetle-susceptible stands or salvage trees that are already infected.

- In the White Area, timber sustainability is impacted by the lack of forested areas and the few private landowners committed to sustainable woodlot management through a woodlot stewardship plan. As well, most of the forested areas are small and separated by large tracts of private land.
- The agricultural industry is looking for expansion opportunities in forested areas. These include land in the Green Area — especially near settlements on the fringe of the Green and White Areas and privately owned land leased by timber companies.

More Information

Alberta Sustainable Resource Development:
www.srd.alberta.ca/forests



Energy and Minerals

Looking Back

- Over 560 million years ago, carbohydrates and other organic materials produced by plants settled on the ground and in stream, lake and sea beds. As they became more deeply buried, they were transformed by heat and pressure into solid, liquid or gaseous hydrocarbons — fossil fuels.
- In 1788, Alexander Mackenzie wrote about bituminous seeps among Alberta's Athabasca tar sands, into which a six-metre pole could be inserted "without the least resistance." About 100 years later drilling began at the Athabasca oil sands — crews struck a reservoir of natural gas that blew wild for 21 years.
- After drilling 133 dry holes across western Canada, Imperial Oil struck oil at Leduc, Alberta in 1947, transforming Alberta into an oil-rich province.

What We Know

- In 2006, energy resources accounted for almost 70 per cent of the value of the province's total exports and more than one-quarter of its gross domestic product. Energy revenues from non-renewable resources made up about one-third of the total revenue collected by the province in 2005-06.
- Alberta's energy sector is the principal driver of the province's economy and a substantial contributor to the economy of the entire country. Nearly one in every six workers in Alberta is employed directly or indirectly by the energy sector.

QUICK FACTS

The Alberta government owns almost 81 per cent of the oil, natural gas and other mineral resources in the province. The remaining mineral rights are held by the federal government or are privately owned. Mineral title holders have a legal right to access their minerals.

- Alberta has a wealth of mineral, oil and gas resources: (Note: data current as of March 2007)
 - An estimated 1.6 billion barrels of established conventional oil reserves are remaining in the province.
 - Alberta's oil sands reserve is considered one of the largest in the world and brings Alberta's total oil reserves to the second-highest level in the world. To date, about 2 per cent of the initial established oil sands resource has been produced.
 - At the end of 2005, Alberta's remaining natural gas reserves totalled 41 trillion cubic feet.
 - The amount of natural gas in Alberta's coals (coal-bed methane) is estimated to be as much as 500 trillion cubic feet. It is not known how much of this gas may be economical to produce.
 - Canada is ranked tenth in the world for total proven coal reserves — Alberta has 70 per cent of Canada's total reserves. Eleven major coal mines operate in Alberta.
- The vast majority of new wind generation in Alberta has been installed since 2000. Southwest Alberta near the Crowsnest Pass is a key area and there is also potential for wind energy in the Cypress Hills. As well, interest in on-farm bio-energy is growing.
- There has been no significant investment in new electricity transmission over the last 20 years. With a growing economy, there is now an urgent need for transmission construction in all quadrants of Alberta. This may result in the need for increased land use through the widening of existing corridors and the construction of new ones.
- World energy markets are strong and there is a growing demand for energy.
- The United States has been a main market for Alberta's energy products and will continue to be a major market. The worldwide demand for energy is now increasing as economies around the world continue to grow, with Asia becoming an important driver of global economic growth. Alberta's stable political and economic environment offers an attractive investment climate for the energy industry.

Figure 7**Areas of Potential Energy Growth****Challenges**

- As energy development expands and intensifies, there are more concerns about land-use challenges and conflicts, the footprint of land that is being used for exploration, drilling and development, and potential impacts on other subsurface resources such as groundwater.

Access

- Many land-use challenges relate to access. Access to resources involves surface and subsurface rights while access itself relates to the physical and economic considerations and constraints involved with getting on to land for resource exploration and development.

Issues include:

- In some areas, residential expansion of cities, towns or acreage subdivisions is occurring on the land above existing oil and gas fields, coal and gravel deposits, or other subsurface resources. In other places, previously undetected oil and gas fields are being identified beneath existing urban and residential sites or new energy projects are being developed within expected growth areas. Accessing these resources increases the potential for conflict between industry, landowners and the public.
- Landowners, other sectors, and the public expect to be increasingly involved in resource access decisions.

- Access constraints, such as uncertainty or lack of timely access, may make energy industry investment and development less attractive. The potential for significant future natural resource development in the province makes resolution of access issues even more important.
- Access to land will be an important factor in further expansion of the electricity transmission and generation infrastructure needed to sustain the province's economic growth.

Planning and Approvals

- Various agencies, boards and departments are involved with energy resource approvals on private land, although their role may not always be clear to the public and other stakeholders.
- Licenses, permits and authorizations from the Alberta Energy and Utilities Board take priority over the direction in municipal plans and bylaws. This priority exists because of the recognition that:
 - Oil and gas development is important for the province and should not be subject to local bylaws that might vary from place to place.
 - Unlike other development, oil and gas resources occur where they occur and developments to extract the resource cannot be easily moved based on changes in local planning bylaws or goals.
- Resource development companies plan and seek approvals from the Alberta Energy and Utilities Board for extraction of energy resources such as oil and gas. Given that energy development is exempt from the *Municipal Government Act*, it is challenging to develop plans and planning processes that integrate municipal and energy development on the same landscape.

Figure 8
Generalized Areas of Mineral Potential



More Information

Alberta Energy: www.energy.gov.ab.ca

Settlement

Looking Back

- Records of First Nations living on land that is now in Alberta date back thousands of years.
- The earliest non-Aboriginals in Alberta were fur traders and explorers like Anthony Henday, Peter Fidler and David Thompson. Later, missionaries arrived in Alberta, followed by the early North West Mounted Police, which later became the RCMP.
- A few urban settlements were established around fur trading posts (like Fort Edmonton) or North West Mounted Police posts (like Fort McLeod). However, most of Alberta's towns and villages were established around railway stations in the late 1800s and early 1900s. During this time, the Canadian government was actively working with the railway companies to encourage the settlement of western Canada.
- Today, human settlements in Alberta include cities, towns, villages, summer villages and rural municipalities. They meet the social, recreational, commerce, and often the educational and health needs of Alberta's growing population.

What We Know

- Alberta has 356 municipalities, of which 278 are urban (cities, towns, villages and summer villages), 4 are specialized municipalities and 74 are rural municipalities including municipal districts.

QUICK FACTS

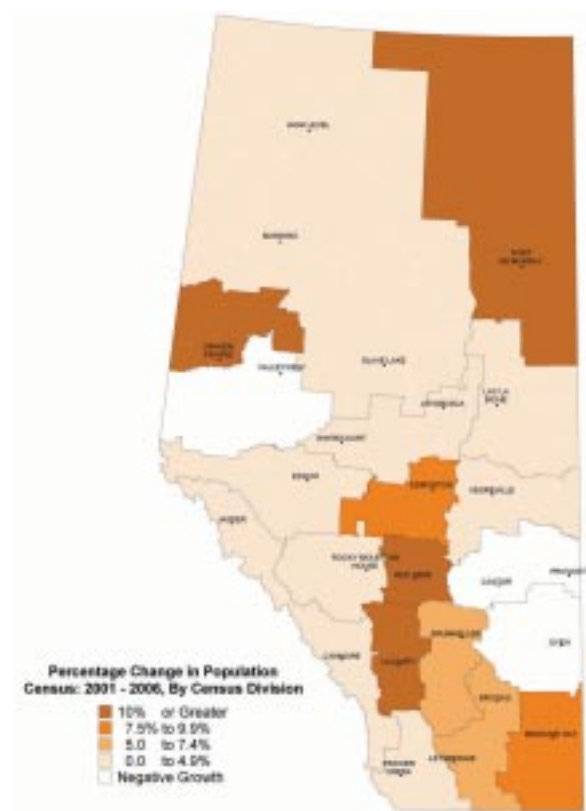
What is industrial development?

In the municipal planning/zoning context, industrial development means the infrastructure and activities associated with production e.g., manufacturing, fabricating, warehousing, processing, refining or assembly.

- In addition to municipalities, there are several other settlements including 3 Special Areas, 7 Improvement Districts, 8 Métis Settlements and 133 Indian Reserves. Of the total land in an urban municipality, typically two-thirds is used for residential, institutional or parks — industrial and commercial development, and land for future development account for the remainder.
- Municipalities are governed according to the *Municipal Government Act*.
- Over 80 per cent of Alberta's population lives in urban areas.
- Over the past five years, communities that are close to major urban areas or along growth corridors have increased in both population and area.

Figure 9

Percentage Change in Population



- Growth has pushed a number of municipalities such as the Regional Municipality of Wood Buffalo (which includes the community of Fort McMurray) beyond their planned development capacity and has strained human, financial and land resources.
- Because of population growth, housing starts increased in many communities between 2000 and 2004. Calgary and greater Edmonton had the highest number of units built between these years, consuming an estimated 11,800 acres of land in four years.
- Not all settlements are growing — some in the eastern parts of the province are declining.

Trends

- Over the next 20 to 25 years, substantial growth is forecast for the province's major urban centres and surrounding regions.
- Much new settlement growth is occurring within suburban neighbourhoods at increasing distances from the urban core. As well, development in suburban neighbourhoods continues to require extensive amounts of land.
- In most communities, residential lot sizes have decreased over the last decades and development is more compact, reflecting increasing land and servicing costs. Compared with one or two decades ago, there has been a substantial increase in the construction of multiple family types of housing (such as townhouses or condominium apartments) being constructed.
- In northeast Alberta, settlement and infrastructure needs have increased, primarily because of resource development.
- Communities are planning for longer horizons, sometimes for 100 years, and there is an increasing emphasis on planning for communities that are sustainable from an economic, social and environmental context.

Challenges

- Human settlement patterns not only influence land use and development but are also affected by these patterns. With high growth rates and strong projections for housing and development within Alberta's municipalities, it is critical that human settlement needs are considered in all land-use decisions.
- Residential, industrial and commercial development in rural areas is increasing the demand for land and services in rural municipalities and is changing the landscape.
- Traffic has increased as a result of business travel, tourism and commuters — particularly between Calgary and Edmonton and around major towns or cities close to the Highway 2 and 63 corridors. This has strained road capacity and resulted in more exhaust and particulate matter in the air.
- Water availability is a mounting concern, particularly in regions and areas that are growing.
- Strong population projections coupled with economic pressures for development will increase the land needed to meet settlement demands. Several major annexations are currently under consideration and will affect Calgary, the Municipal District of Rocky View, the City and County of Grande Prairie, the City and County of Red Deer and others.
- Recreational communities are growing, particularly in summer villages and areas close to the mountains. Balancing demands for growth with protection of the natural environment will become more challenging.
- Some citizens are concerned that municipalities are not giving proper consideration to environmental, social or community impacts of planning decisions.
- Some urban and rural communities compete with each other to attract new residents and business investment. As a result there may be inefficient land use and more widely spread development patterns (i.e. sprawl).

More Information

Alberta Municipal Affairs and Housing:
www.municipalaffairs.gov.ab.ca

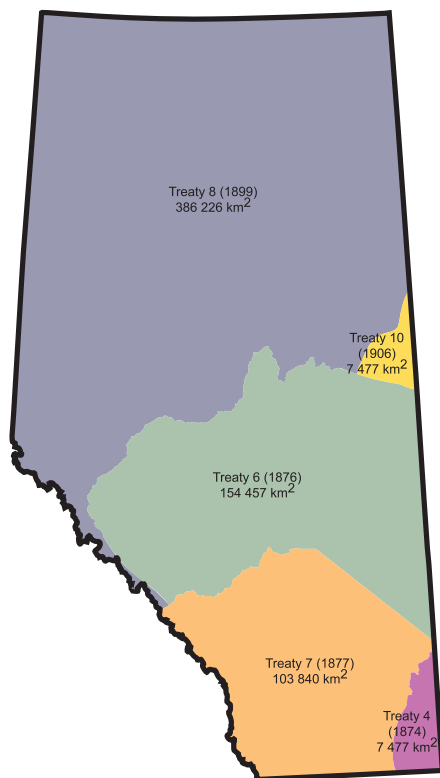
First Nations

Looking Back

- First Nations have lived on the land that is now in Alberta for thousands of years. Archaeological records dating back more than 10,550 years ago indicate camps on the shores of the Vermilion Lakes near Banff.
- Anthony Henday, the first European fur trader to reach Alberta, recorded meeting First Nations in 1754.
- Treaty 6 (1876), Treaty 7 (1877) and Treaty 8 (1899) were created, and cover most of what is now Alberta.

Figure 10

Treaty 6, 7 and 8 in Alberta



What We Know

- There are 47 First Nations in Alberta with a total population of 98,000. About two-thirds live on reserves, one-third live off reserves and a small number live on Crown land.

- Over the past decade, the growth of Alberta's First Nations population has increased consistently by 2.5 per cent to 3 per cent each year.
- Indian reserves in Alberta were set aside in accordance with the provisions of Treaty 6, Treaty 7 and Treaty 8. Reserves in Alberta cover about 1.6 million acres and range in size from a few acres to over 350,000 acres.
- All validated treaty land entitlement claims in Alberta are either settled or under negotiation.
- First Nations share a desire to identify, protect and preserve historical, spiritual and cultural sites on Crown land. Traditional-use studies identify these sites to help avoid infringement on First Nations rights as well as to reduce conflicts between government, industry and First Nations.
- Recent Supreme Court decisions indicate that consultation must occur when land management and resource development decisions may adversely impact First Nations' rights and traditional uses on Crown lands.
- Cabinet approved the Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development in 2005 and the corresponding consultation guidelines were released in the fall of 2006. The guidelines provide direction on how consultation for land management and resource development should occur in relation to activities such as exploration, resource extraction, and management of forests, fish and wildlife.
- Although some First Nations have signed a resolution concerning the consultation guidelines, the Alberta government is proceeding with implementation and continuous monitoring of these. This includes dialogue with First Nations and industry, accepting ongoing feedback and adjusting the guidelines as necessary.
- First Nations want to contribute to the growth of Alberta's economy. Through the First Nations Economic Partnerships Initiative, First Nations are developing partnerships with industry and strengthening the First Nations private sector.

Challenges

- Alberta has a responsibility to consult with First Nations where legislation, regulations or other actions infringe on treaty rights. The province wants to have a practical consultation process that avoids or minimizes impacts on First Nations' rights and traditional uses, and also creates greater certainty for industry.
- The cultural and environmental cumulative effects of land use — including concerns about access management and habitat considerations — require more consideration. Project-specific consultation often does not consider the broader impact of continued long-term development.
- Some sites of utmost importance to First Nations, such as gravesites, or areas of spiritual or ritual significance, are on private lands. Protecting these sites from development while allowing access for First Nations communities, is a priority for some First Nations. In some cases, the *Historical Resources Act* has been used to protect and manage sites of critical importance.

Métis Settlements

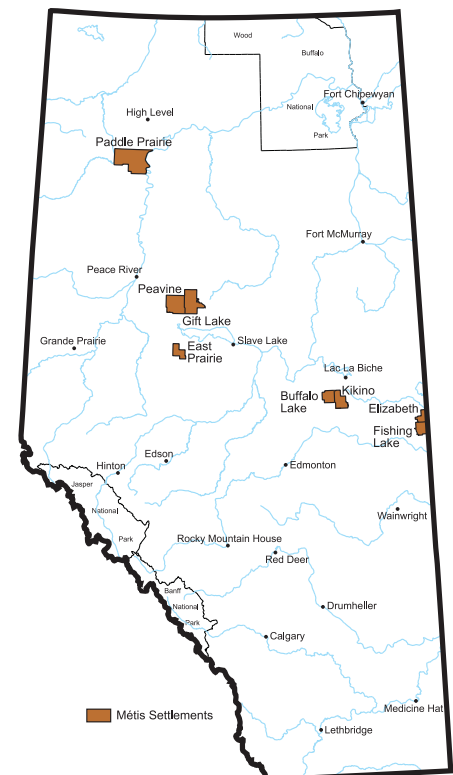
Looking Back

- Many of the first Métis communities grew up near fur trading posts but other communities developed as a distinct Métis culture emerged.
- In 1938, following the Ewing Commission of 1934, the Province of Alberta established Métis land bases in Alberta.

What We Know

- Alberta is the only province in Canada that has a recognized Métis land base. There are eight Métis Settlements in Alberta, all located north of Edmonton around the Lac La Biche-Bonnyville area and Lesser Slave Lake. The Métis Settlements cover approximately 1.3 million acres (528,000 hectares) of land and include Buffalo Lake, East Prairie, Elizabeth, Fishing Lake, Gift Lake, Kikino, Paddle Prairie and Peavine. About 6,950 Métis reside in the Settlements.
- In 1990, by Letters Patent, the Crown granted the Métis Settlements General Council ownership in fee simple of the lands within the eight Métis Settlements.
- There is a co-management agreement between Alberta and the Métis Settlements. This agreement provides for the co-management of exploration and development of subsurface minerals under Settlement lands.

Figure 11
Métis Settlements in Alberta



Tourism/Recreation

Looking Back

- In the fall of 1883, three Canadian Pacific Railway construction workers stumbled across a cave containing hot springs on the eastern slopes of Alberta's Rocky Mountains. That discovery resulted in the creation of Canada's first national park — Banff National Park — and the start of Alberta's tourism and recreation industry.

Current Situation

- Alberta's growing tourism industry generates almost \$5 billion in annual revenues and about \$2.3 billion in total taxation revenues, of which \$635 million is credited to the provincial government. The industry provides over 103,000 person-years of employment in Alberta.
- This is in addition to the many health and social benefits associated with tourism and recreation. Non-monetary benefits — physical fitness, personal achievement, cultural exploration and a connection with the environment — contribute to the quality of life for Albertans and others who visit the province.
- While many people think of tourists as being visitors from distant lands, anyone travelling for non-work purposes is considered a tourist. Approximately two-thirds of provincial tourism revenues arise from residents of Alberta, British Columbia and Saskatchewan travelling throughout this province. Our other important markets include the rest of Canada, the United States, the United Kingdom, Germany and Japan.
- Half the tourism expenditures in Alberta occur in areas other than Edmonton and Calgary. Alberta's rural landscapes and natural environments also offer major tourist attractions.

- Alberta's rural landscapes provide a range of opportunities including agro-tourism, bed and breakfasts, campgrounds and heritage sites.
- Alberta's public lands provide the setting for a variety of pursuits and attractions ranging from less intensive backcountry camping, hunting, fishing and trail riding to more intensive land use through lodges, campgrounds and golf courses.



- Maintaining the esthetic quality of the natural environment and sustaining access to nature and the outdoors is becoming increasingly important for attracting visitors and Albertans.

Trends

- Significant growth is occurring in all forms of tourism and recreation — Aboriginal experiences, rural tourism, ag-tourism, recreational trail use, nature, culture and heritage tourism, hunting and fishing, urban tourism and sports tourism. The Alberta government and stakeholders are committed to continued expansion of tourism and recreation.
- The public's demand for a wide range of recreational opportunities continues to be on the rise.
- Interest in eco-tourism, nature-based and heritage tourism is rising.

- More and more individuals who live in the communities along the Calgary-Edmonton corridor want to use public land for recreation, particularly along the Eastern Rocky Mountain slopes. There are also increasing demands for recreation pursuits in more northern wilderness areas.

Challenges

- Many communities regard tourism as a way to diversify their economies. However, there are other interests competing for the same land base. For example, forestry, grazing, energy and mineral development interests often seek or need access to the same land base.
- Much of Alberta's landscape is already committed to use, including agriculture, residential, industrial and forestry. As a result, it is increasingly difficult to accommodate demands for tourism development and recreation use.
- Albertans' desires to pursue recreation activities are on the rise. It is challenging to adequately address the impacts of demands for greater access to private and public lands. This includes both increasing public safety concerns and cumulative effects on the land and on resources.
- The recreation community operates primarily with volunteers and lacks a common voice. This impacts its capacity to participate in planning and policy initiatives.
- Local municipalities, hospitals and emergency personnel resources are being challenged to respond to emergencies and manage hazards (e.g., fire) related to some recreational activities. This is a particular concern for activities that are becoming more "extreme," and for those located in more remote areas.
- Tourism and recreation activities are sustainable if managed appropriately. However, without appropriate management tools they have the potential to negatively impact other activities and the landscape.

- Increasing pressure for recreation access to public and private lands is producing more frequent conflict between recreation users themselves as well with private landholders and public land disposition holders.
- The anticipated long-term growth in tourism and recreation demand combined with the dramatic increase of Alberta's population stimulates the need for new products and destinations. Without new or enhanced destinations, Alberta has a limited ability to compete in the regional, national and global marketplace.

More Information

Tourism Development and Services; Tourism, Parks, Recreation and Culture:
www.alberta-canada.com/tourism

Travel Alberta consumer site:
www.travelalberta.com

Travel Alberta industry site:
industry.travelalberta.com

Historical Resources, Parks and Protected Areas

Looking Back

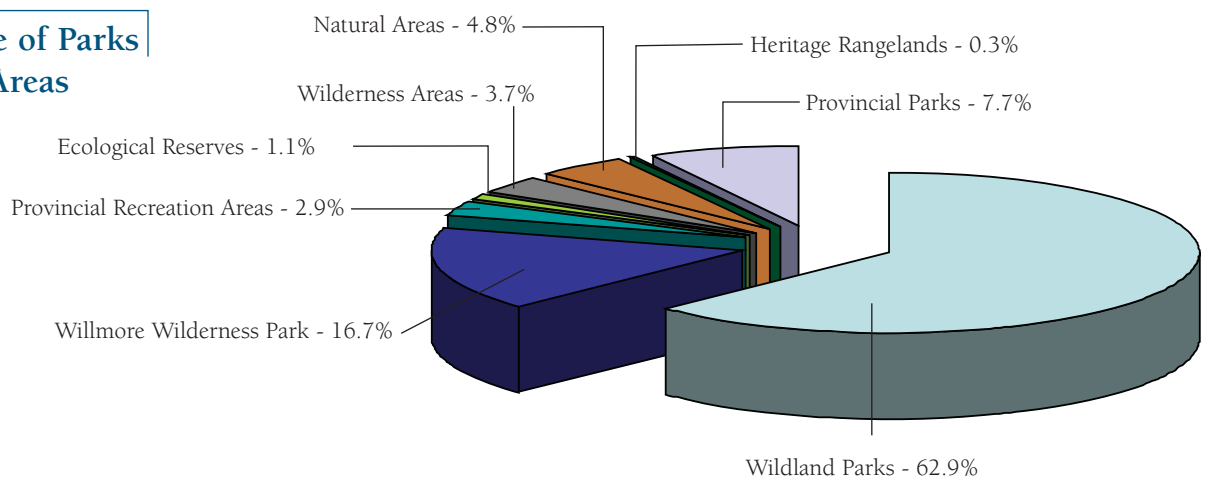
- The establishment of Aspen Beach Provincial Park in 1932 signalled the official beginning of Alberta's provincial park system. Early parks were small recreation sites that provided Albertans with scenic spots to swim and picnic.
- In 1964, Alberta's provincial parks network was expanded to include wilderness areas and natural areas. In 1980, the legislation was amended to allow establishment of ecological reserves.

What We Know

- Alberta's parks and protected areas network includes a spectrum of sites — from developed recreation areas to pristine wilderness. The network consists of more than 520 areas and protects almost seven million acres — just over 4 per cent of Alberta's land base. An additional 8 per cent of Alberta's land base is federal land protected as national parks.
- Parks and protected areas showcase each of Alberta's six natural regions, preserve our natural heritage and biodiversity, and protect habitats and watersheds. As well, they contribute to the province's environmental quality and provide many recreational opportunities.
- The full environmental diversity of the province's six natural regions is not yet represented in the parks and protected areas network. Some significant gaps exist, particularly in the Parkland, Foothills and Grassland Natural Regions.
- The province identifies, evaluates and protects Alberta's historical resources and operates 18 provincial historic sites, museums and interpretive centres. The enjoyment and protection of historical resources contributes to Alberta's identity and provides a sense of place.
- Protection of historical places allows Aboriginal people to practice their traditional cultural ways, which is central to their cultural identity.
- When a new park or protected area is established, the province honours existing commitments for resource development. However, new subsurface mineral rights that are sold after a park or protected area is established, must be developed from lands outside a park or protected area.
- Forest management in parks and protected areas includes pest management and FireSmart programs to reduce wildfire risk for adjacent communities.
- Alberta has identified Environmentally Significant Areas — landscapes with special biological diversity or other natural features. Inventories of these areas provide valuable information for the management of both private and public lands. Some, but not all, of these Environmentally Significant Areas are located within parks and protected areas.

Figure 12

Total Land Base of Parks and Protected Areas



Alberta's historical resources include archaeological sites, palaeontological deposits and historical buildings, and any other works of humans or nature that are of interest for Alberta's posterity. There are just over 33,000 archaeological sites recorded, with more than 30,000 known palaeontological sites estimated. These sites are protected by the *Historical Resources Act*. Historical structures are usually protected by a combination of legal designations and incentives.

Trends

- There is significant and growing public and media interest in archaeology and palaeontology, including preservation of these resources.
- As more baby boomers enter retirement, the demand for heritage tourism will increase, such as exploring historic resources and sites.



- First Nations are becoming more and more interested in the condition and preservation of sacred sites, as well as the location and nature of non-sacred archaeological sites. Consultation with these groups regarding their heritage will increase.
- There will continue to be public pressure to complete the parks and protected areas network as well as public concern about management and protection of individual parks and protected areas. At the same time, population growth will place more recreational pressure on these areas and more intensive use of lands surrounding them.

Challenges

- Parks and protected areas play a significant role in watershed management, particularly in headwater areas. However, many of Alberta's different wetland features are either not included in the existing parks

and protected areas network or the current boundaries are insufficient to either properly represent or protect key wetland features.

- Private land could help protect and represent the province's natural diversity. However, the existing management tools for private conservation do not include resource protection comparable to that provided in a provincial protected area. Voluntary initiatives such as conservation easements cannot control subsurface activities that could result in surface disturbances.
- Most individual parks and protected areas are not large enough to ensure long-term preservation of biodiversity and therefore may be at risk of becoming ecological islands.
- Currently, when decisions are made about lands surrounding parks and protected areas, the impact on these areas is not considered. For instance, neighbouring parks and protected areas are not included in forest management planning.
- Existing incompatible activities in designated protected areas make it challenging to ensure these areas will continue to be representative of the lands and features they were set aside to preserve.
- In some provincial parks and protected areas, invasive alien plant species affect the integrity of the ecosystems and how well the area represents the province's natural diversity.
- It is a challenge to properly protect historical resources where they are affected by adjacent land-use activities. For example, noise levels or fumes in the vicinity of a sacred archaeological site such as a medicine wheel can affect its spiritual values.
- Some people are concerned that measures to help conserve historical resources prevent developers from accessing natural resources.

More Information

Parks and Protected Areas:
www.cd.gov.ab.ca/preserving/parks/

Watershed

What is a Watershed?

- A watershed, or basin, is the area of land that catches precipitation and drains it to a water body such as a marsh, lake, stream or river. Watersheds can range in size from a few hectares to thousands of square kilometres.
- Watershed management considers the whole landscape in a watershed — land, water, plants, animals and people — and how all these components interact to affect the watershed.

What We Know

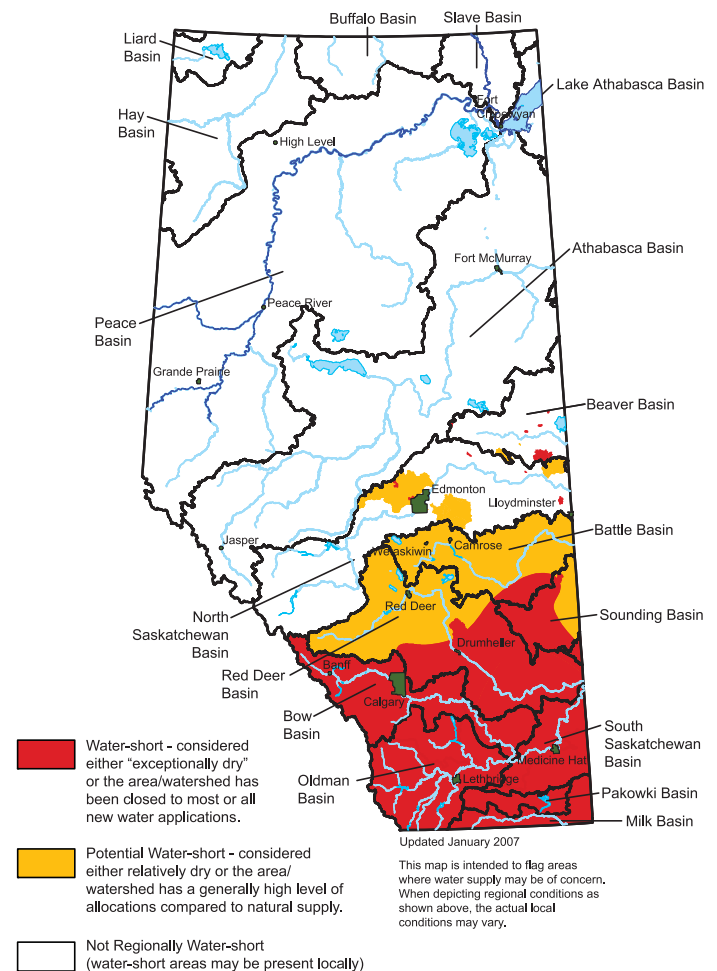
- Alberta has seven major watersheds — Milk River, South Saskatchewan, North Saskatchewan, Beaver River, Athabasca River, Peace/Slave River and Hay River.
- Healthy, functioning watersheds can provide clean and abundant water resources to agricultural, municipal, industrial and recreational users, help maintain healthy crops and crop yields, support wildlife habitat, and regulate natural processes such as soil erosion and sedimentation. Healthy watersheds contribute to the overall health of the environment.
- Water for Life is the Alberta government's strategy for addressing water quality and water quantity issues and the need for sustainability of water resources.
- Watershed Planning and Advisory Councils — multi-stakeholder groups that include governments as partners — provide leadership for watershed management planning and reporting on the state of the basin.
- The watershed planning process identifies issues, gathers information, evaluates management options and makes recommendations to provincial and local government decision makers, as well as to industry and communities.

Challenges

- Alberta is facing significant pressures on its water resources. Population growth, drought, agriculture and industrial development all put stress on the water supply and water systems.
- Watershed management is closely linked to land use. Activities on the land, such as agricultural, industrial or recreational activities, can directly affect water quality and quantity. Specific issues include:
 - Protecting riparian habitat (areas next to flowing or still waters) for biodiversity and addressing the pressures on this habitat from agricultural activities and reduced stream flows.

Figure 13

Water-Short Areas in Alberta



- Dealing with pressures on aquatic ecosystem health from the effects of various land uses.
- Addressing the effects of land uses that occur upstream, particularly source waters for municipalities.
- Managing water demand, especially in water-short areas.



- Better communication and coordination among the various planning and approval processes is needed. Watershed management and land-use planning are not undertaken at the same time in an area.

More Information

Alberta's Water Strategy: www.waterforlife.gov.ab.ca

QUICK FACTS

Water as an Ecological Good

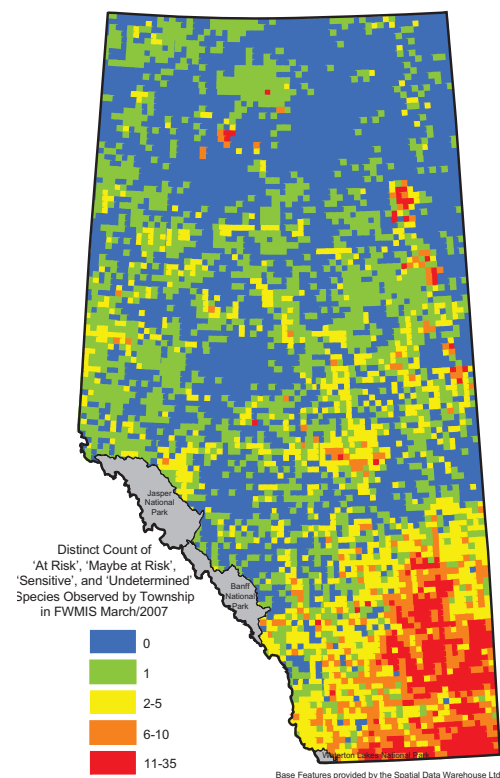
An example from the City of New York shows the value of water as an ecological good. Increasing demands on the water supply and risks to it from pollution and human developments in the watershed led to the creation of a major plan for the continuing supply of potable water. The city determined that spending \$300 million on land acquisition for conservation and protection of the watershed would save the two to eight billion dollars that would have been required for mechanical water filtration and treatment.

Biodiversity, Ecological Goods and Services, Fish and Wildlife

What Is Biodiversity?

Biodiversity refers to the assortment of life on earth. It is the variety of all animals, plants and microorganisms interacting in all types of environments found on the planet. Biodiversity includes the variety of genetic material in all living things, the variety of species on earth and the different kinds of living communities and the environments in which they occur.

Figure 14
Species at Risk in Alberta



What Are Ecological Goods and Services?

Ecological goods and services are the economic and social benefits resulting from the natural processes of a healthy environment and biodiversity. They are available to all of society and essential to sustaining a healthy and prosperous way of life. Ecological goods and services include groundwater recharge, flood and erosion control, wildlife habitat, productive soils, carbon sequestration, and abundant clean air and water. Unlike resource commodities, the marketplace usually does not place a value on ecological goods and services.

What We Know

- Alberta has a wealth of biological diversity on both public and private land — more than 80,000 wild species living in six natural regions. The majority of these species are small and seldom seen — like the 35,000 species of insects. Of the species Albertans are most familiar with, there are 93 species of mammals, 10 amphibians, 411 birds, 8 reptiles and 63 fish.
- Both public and private lands play critical roles in habitat conservation and the protection of biological diversity.
- Alberta has many types of aquatic habitats: small streams in the mountains and foothills; large rivers extending through the prairie, parkland and boreal regions; alpine lakes, prairie potholes and reservoirs, and large lakes of the northern boreal forest. These aquatic ecosystems contain fish populations made up of 65 species, of which 51 are native, 4 have been introduced intentionally by government agencies, and 10 have been introduced illegally or accidentally. Compared to most other provinces, and elsewhere in North America, Alberta has a relatively sparse fish fauna.
- Although it is hard to determine the full value of ecological goods and services, there is information about the economic benefits for nature-related activities. When this was last studied in 1996, Albertans spent \$1.2 billion on nature-related

activities — \$171.6 million on wildlife viewing, \$147.8 million on fishing, \$71 million on hunting and most of the remainder on transportation, food and accommodation related to these activities. Nature-related activities supported 23,600 jobs and provided local and provincial governments in Alberta with \$369 million in tax revenue.



- Biodiversity, environmental goods and services, and fish and wildlife have other non-monetary values:
 - Healthy fish and aquatic life are key indicators of the fresh, pure water that is needed by all life.
 - Healthy waterfowl populations are indicators of viable water sources including wetlands that supply and filter much of this water.
 - Biodiversity supports recreation and tourism and provides us with a source of beauty and inspiration.
- Biodiversity is an indicator of the status or health of landscapes or watersheds — changes in biodiversity may indicate cumulative effects of land uses and activities.
- Five species of vertebrates and one plant are known to no longer live in Alberta, but we know very little about the loss of most plant species or invertebrates. The Grassland Natural Region of southeast Alberta,

which has been largely altered by human settlement and agricultural development, is considered an area of concern for species at risk — most of the species considered legally endangered or threatened in the province occur in this region.

Challenges

- Human activity and many of the land uses considered valuable to Albertans — settlement, building roads, industrial development, agriculture, recreation and forestry — can affect natural processes of a healthy environment. As well, an increased human footprint on the land can threaten biodiversity through loss, degradation and fragmentation of habitat.
- Land reclamation is not keeping pace with the rate at which industrial land is being retired.
- Increased water demand for domestic, industrial and agricultural uses threaten aquatic ecosystems.
- Wild species and biodiversity respond to human activities and habitat alteration in different ways — populations of specialized, less adaptable species may decline and be displaced by less specialized, more adaptable species.
- The introduction of non-native exotic species has displaced some native species and may significantly disrupt local ecosystems.
- There is a lack of mechanisms to support conservation of ecologically important areas, outside the formal legalized parks and protected areas network.
- We take our clean air, clean water and nature for granted. We all enjoy these public goods and expect them to be sustained. And that poses a challenge — how to reward landowners for practicing sound land stewardship so that in the future we can continue to rely on clear air and water.
- As a society we are challenged to find ways to encourage landowners who provide ecological goods and services that benefit all of us. New ways of looking at the economics of stewardship are emerging, such as tax incentives and direct payments.
- Alteration of riparian areas (those bordering flowing or standing water) and fragmentation of watercourse and fish habitat are particular concerns:
 - Riparian areas are more biologically productive and support a greater variety of species than adjacent uplands. About 80 per cent of Alberta's wildlife use these areas for all or part of their life cycle. Cottage development, recreational use and agriculture have affected lakeshores, stream banks and riparian vegetation.
 - There are approximately 225,000 culvert crossings in the province, many of which have resulted in fragmentation of stream and river habitats and created barriers to fish migration and movement of other aquatic species. As roads continue to be built, the number of culvert crossings will increase.

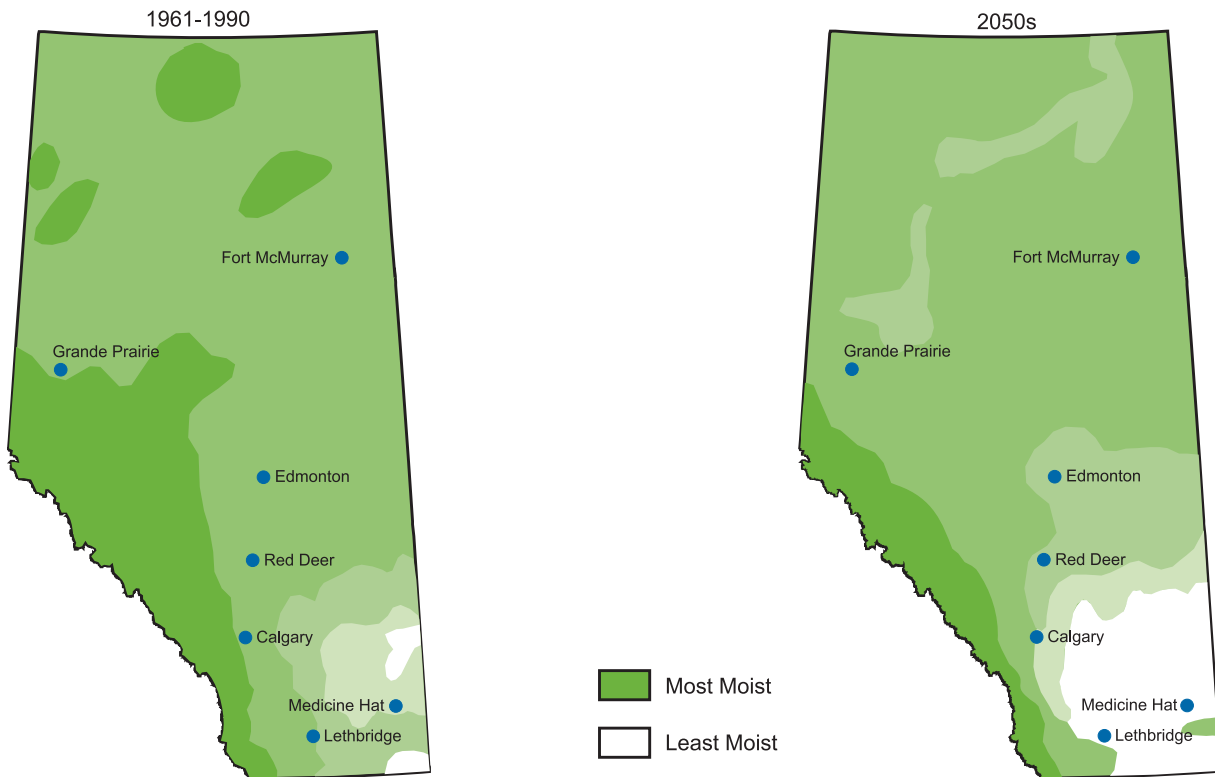
More Information

A series of fact sheets on biodiversity is available from Alberta Sustainable Resource Development:
www.srd.alberta.ca/fishwildlife/biodiversity.aspx

Climate Change

What is Climate Change?

- Weather is what we see on a day-to-day basis. Climate is average weather over at least 30 years. So, for example, if the amount of snow we get over 30 years is lower than the amount we had in the previous 30 years, that shows a change in our climate. If we see more serious weather events — like storms and hurricanes and unusual temperatures — not just one year but over a long period time, that could reflect a change in the climate. Year-over-year changes are just normal variations in weather — the kind we have all seen over many years.

Figure 15**Annual Moisture Index**

- Our climate is warming and it is doing so at a faster rate than at any other time in our recorded history. There is considerable evidence that humans have contributed to this warming. Greenhouse gases, which trap heat in the atmosphere, include carbon dioxide, methane and nitrous oxide. Trapped heat causes global temperatures to rise — this is called “the greenhouse effect.”
- According to the United Nations Framework Convention on Climate Change, the average temperature of the earth’s surface has risen by 0.74 degrees Celsius since the late 1800s. By the year 2100, depending on the scenario, the possible range of increases are another 1.1 to 6.4 degrees Celsius. Even if the minimum predicted increase takes place, it will be larger than any century-long trend in the last 10,000 years.

What We Know

- Future climate models for Alberta have been developed using Global Climate Models downscaled to Alberta. These models include a median scenario that shows a temperature increase of about three degrees Celsius by the 2050s. Under this scenario, the climate now observed in southern Alberta would occur more northerly, and the climate now seen in lower elevations in the mountains and foothills would occur at higher elevations.
- The models also indicate that while annual precipitation may increase, moisture levels across the province, as shown in the maps in Figure 15, could decrease due to higher evaporation rates brought on by increasing temperatures. This could have large impacts on the availability of surface and groundwater which in turn would affect existing ecosystems and land uses as well as future development.

- Climate change may have a significant impact on the types of vegetation in both native ecosystems and managed land areas in Alberta.
- In particular, the agriculture and forestry industries could be impacted. For example, areas now considered dependable agricultural lands may be less so in 10 to 15 years. As well, approaches to respond to climate change such as water storage structures, increased irrigation and alternative cropping and livestock management will alter the landscape for farming.
- There may be a higher risk of wildfire, insects and disease — over time this could alter the pattern and distribution of forests in Alberta. Changes in available moisture in the forested area could lead to changes in forest composition and structure as well as shifts in vegetation patterns.
- Biodiversity conservation — species distribution and the survival of species in their native ranges — may be altered.
- Water supplies will likely be affected, particularly in the southern portions of the province. Declining stream flows, melting glaciers, changes in precipitation and longer drought periods may limit the potential for land development.
- Climate changes that have the potential to affect land use or water availability need to be considered as risks when planning future land use. Since we cannot really predict future climate, we need to use scenarios and assess the risks associated with these as part of policy decision making.
- The Alberta Climate Change Action Plan (*Albertans & Climate Change – Taking Action*) identifies initiatives to reduce and manage greenhouse gases as well as adapt to a changing future climate. This plan focuses on improving energy efficiency, enhancing use of technology, seeking out new environmentally friendly energy sources and better managing our emissions today and in the future.
- In particular, two initiatives in the Taking Action plan will have an impact on land use in Alberta:
 - *Climate Change Adaptation* focuses on identifying and managing risks associated with a changing climate. Even with actions to control greenhouse gases, it is anticipated that climate warming will influence water availability, vegetation patterns and the sustainability of some land uses. A changing climate will affect the land and its use and we will need to adapt to the changes.
 - *Enhancing Biological Sinks* deals with promoting environmentally sustainable agriculture and forestry practices in order to reduce greenhouse gas concentrations and maintain or enhance ecosystem health and integrity.
- In 2002, Alberta established a target to reduce emissions intensity by 50 per cent below 1990 levels by 2020.
- An interim target of achieving a 30 per cent reduction in emissions intensity by 2010 was also set. As a result, by 2004 Alberta's emissions intensity decreased by 16 per cent from 1990 levels, but total emissions have increased by 40 per cent. This means that while Alberta's economy is growing, steps have been taken to reduce the growth in emissions.

Challenges

- Since climate change issues emerged in the late 1980s and early 1990s, the Alberta government and partners in industry, academic institutions, municipalities and environmental organizations have been actively involved in the search for effective solutions.

More Information

Alberta Environment: www3.gov.ab.ca/env/climate/



Alberta's Land: Our Future

We have seen how the land supports us. It provides places for us to live and enjoy as well as ways to make a living. We enjoy the benefits of our province's healthy economic growth and we want to ensure that our way of life is sustainable. But there are many challenges facing Alberta's land.

How do we anticipate and prepare for a future with six or eight million people? How do we maintain land for agriculture and forestry, yet balance that with land for energy and industrial developments, transportation and utilities, tourism and recreation? What is most important to protect? How do we balance our goals for the economy, the environment and our way of life?

Each of us has a role in determining the future of Alberta's land. As Albertans, we need to talk about what is most important to us — and how that affects our land. What do you value most?

And each of us is also faced with a challenge — to manage our activities so that the land and the land uses we rely on can be sustained. Our actions will help ensure that the land continues to sustain us, our way of life, and all other forms of life.

The Government of Alberta wants Albertans to have the information they need to make decisions about the land. If you would like more information, please see the Land-use Framework website at www.landuse.gov.ab.ca.

Glossary

Archaeological Sites

Places where objects or landscape features may be found that show evidence of manufacture, alteration or use by humans, the patterning of which is of value for the information that it may give on historic human activities.

Biodiversity

The assortment of life on earth — the variety of genetic material in all living things, the variety of species on earth, and the different kinds of living communities and the environments in which they occur.

Conventional Oil

Hydrocarbons which occur in a liquid state and are found in underground rock reservoirs. Conventional oil can be extracted through drilling and is refined for use as energy or industrial materials.

Forest Fibre

All standing, fallen or harvested trees and woody shrubs used in the production of primary and secondary wood products.

Disposition

A way the government gives individuals, companies or organizations rights to use public land for a specific purpose such as grazing, farm development, timber harvesting, surface access for oil and gas, commercial use or recreation.

Ecological Goods and Services

Economic and social benefits resulting from the natural processes of a healthy environment and biodiversity. These are available to all of society and essential to sustaining a healthy and prosperous way of life. They include groundwater recharge, flood and erosion control, wildlife habitat, productive soils, carbon sequestration, and abundant clean air and water.

Forest Management Agreement (FMA)

A large, area-based agreement between the Province of Alberta and a company.

Headwater

The source for a stream, located in the upper tributaries of a drainage basin.

Historical Resources

Any works of nature or of humans that are primarily of value for their palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest

Industrial Development

When referring to land use, this term means natural resource development activities like exploration, harvesting and extraction of natural resources. But it can also mean, in a municipal planning/zoning context, the use, infrastructure and activities associated with production; e.g., manufacturing, fabricating, warehousing, processing, refining or assembly.

Municipal Districts

A form of government in rural areas of the province, also sometimes referred to as a county. Land in these areas includes working landscapes such as resource-based areas or farmlands as well as unincorporated communities such as hamlets and rural residential subdivisions.

Natural Gas

Hydrocarbons that occur in a gaseous state at original conditions. Methane, ethane and propane are the most common types. Nitrogen, carbon dioxide or hydrogen sulphide are also examples of natural gas. Natural gas can be extracted through drilling and is processed for use as energy.

Natural Region

A way of describing broad ecological variations in the landscape. Natural regions reflect differences in climate, geology, landforms, hydrology, vegetation, soils and wildlife. There are the six natural regions in Alberta.

Oil Sands

Oil sands are deposits of naturally occurring hydrocarbons that are very viscous and are known as bitumen. Bitumen is found predominantly in sandstone but in Alberta may also be found in carbonate rocks. Bitumen may be recovered by open cast mining techniques (digging) or by unconventional techniques such as injecting steam into the earth to bring the hydrocarbons to the surface. Bitumen is refined for use as energy.

Oriented Strand Board (OSB) and Waferboard

Panel products made of aspen or poplar strands or wafers bonded together under heat and pressure using a waterproof phenolic resin adhesive or equivalent waterproof binder.

Palaeontological Deposits

Rocks or soils containing evidence of extinct multi-cellular organisms.

Riparian

The lands adjacent to streams, river, lakes and wetlands, where the vegetation and soils are strongly influenced by the presence of water.

Rural Municipalities

Areas where there is a lower concentration of people and buildings than in urban municipalities, such as municipal districts. The designation “rural” should not be interpreted to include farm or resource-based areas only — some rural areas contain substantial country residential populations.

Specialized Municipalities

Unique municipal structures that can be formed without resorting to special Acts of the Legislature. Often, specialized municipalities allow urban and rural communities to coexist in a single municipal government.

Subsurface

Subsurface is used to describe the resources (e.g., oil and gas, coal, metallic and industrial minerals such as limestone) identified under the *Mines and Minerals Act* which are located underground. It also refers to the titles, rights and activities to access those resources below ground. Subsurface resources do not include sand and gravel — as these are considered surface materials.

Surface

Resources, activities, and development that occur on the land, e.g., sand, gravel, topsoil, roads, and buildings. This term can also be associated with land titles, e.g., the title to individual properties is for the ownership of the land surface (not the resources underneath the land unless expressly noted as including such).

Urban Municipalities

Areas where there is a concentration of people and buildings, such as cities or towns.

Watershed

A watershed is the area of land that catches precipitation and drains into a larger body of water such as a marsh, stream, river or lake. Watersheds can range in size from a few hectares to thousands of square kilometres.

Woodlot

Tracts of land of any size and shape that contain areas of trees either naturally occurring or planted.

Notes