National Farmers Union

Submission to the

House of Commons Standing Committee on

Environment and Sustainable Development

on the issue of

Tar Sands and Water Resources

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Introduction

The National Farmers Union (NFU) welcomes this opportunity to put forward our views on the issue of bitumen extraction from the tar sands and its impact on Canadian water resources.

The NFU is a democratic, voluntary-membership organization made up of thousands of farm families across Canada. Our organization is also a member of La Via Campesina, an international network of organizations representing family farmers and fisher-folk. Our members produce a wide variety of commodities, including grains, oilseeds, livestock, fruits and vegetables. The NFU advocates farm policies which enhance farmers' economic power in the marketplace, promote environmental sustainability, and strengthen rural communities.

While primary food production remains the heartbeat of rural Alberta, the economic and environmental health of rural communities is increasingly threatened by relentless exploitation of hydrocarbon resources.

The NFU has consistently advocated policies that promote environmental sustainability. As food producers, we are acutely aware how critically important it is to ensure that our water, air and land resources are protected and nurtured. The NFU has voiced concern in the past about the precedence given to industrial interests over the long-term health of the environment, agriculture and people's health. In June, 2007, the NFU presented a brief to the Alberta Minister of the Environment, the Alberta Minister of Energy, and the Alberta Energy Utilities Board, outlining our concerns over the escalation of the use of fresh water in the extraction of conventional oil and gas reserves throughout rural areas of the province. In that presentation, the NFU brought to the government's attention the fact that surface rights conflicts between landowners and drilling companies had escalated dramatically as a result of the relaxed regulatory environment and the increased activities of the oilpatch operators. Currently, oil companies use approximately 40,000,000 cubic metres of fresh water annually for Enhanced Recovery (ER) purposes across

Alberta.[1] Many of our own members have experienced sharp declines in water quality from their wells as a direct result of the contamination of underground aquifers.

But farmers' concerns go well beyond legitimate surface rights issues. Indeed, we are increasingly worried about the future of a basic necessity of life: our province's – and our nation's - fresh water supplies. This is particularly true in the case of the exploitation of the tar sands area of northeastern Alberta. The unprecedented scale and rate of extraction of this non-renewable resource in a fragile northern boreal ecosystem poses a serious threat to the well-being of the environment, and by extension, a serious threat to food production, agriculture and fisheries.

It makes no sense to sacrifice our precious food and water resources for short-term profit. Humankind has survived for millennia without oil, but not without water and food.

Tar Sands projects accelerating

Although the Canadian government knew as far back as the 1880s that the tar sands constituted a potentially vast petroleum resource,[2] commercial tar sands development in the Fort MacMurray area began in earnest in 1967 when Suncor established its first mine and upgrader on the banks of the Athabasca River. Since 1996, more than 50 tar sands projects have been approved, and over the past 12 years, the world's most powerful oil companies, including Imperial Oil, Shell, ConocoPhillips, and British Petroleum have all established a presence in the area.

In 2003, there were three mine projects, three upgrader projects and five "in situ" projects in operation. In August, 2008, there were seven mine projects, nine upgrader projects, and nineteen "in situ" projects in operation or scheduled for start-up within the year. By the 2030s, there may be as many as 40 upgraders, 33 mines and 83 "in situ" projects, based on what has been announced, applied for, or is currently in operation. The projection of tar sands is expected to grow from 1.7 million barrels a day production in 2007 to 5 million barrels a day in 2030.[3]

Extraction process affects water quantity and quality

The extraction of bitumen from tar sands affects water quantity and quality in the following ways, according to a report by the Pembina Institute:[4]

1. Removing forest, draining wetlands and digging mine pit areas;
2. Draining the basal aquifer, which could reduce groundwater discharge and lower the water levels in nearby wetlands and other surface water bodies;
3. Withdrawing freshwater from the Athabasca River;

[1] Water Conservation and Allocation Guideline 2006 for Oilfield Injection, Government of Alberta www.waterforlife.gov.ab.ca/docs/Oilfield_Injection_GUIDELINE.pdf
[2] Andrew Nikiforuk, Tar Sands: Dirty Oil and the Future of a Continent, 2008, Greystone Books/David Suzuki Foundation.
[3] Peggy Holroyd and Terra Simieritsch, "The Waters That Bind Us: Transboundary Implications of Oil Sands Development", The Pembina Institute, February, 2009
[4] Holroyd and Simieritsch, Pembina Institute, ibid.

4. Converting freshwater into tailings waste water from oils sands extraction process;
5. Potentially contaminating water due to spills or leaks from oil sands operations;
6. Leaking pollutants from the tailings ponds into the surrounding environment and groundwater;
7. Releasing emissions such as nitrogen oxide and sulphur dioxide that may travel, deposit and raise the acidity of soil and water in other regions.

Brute force: separating bitumen from tar sands

Easily-accessible hydrocarbon reserves worldwide have been largely depleted, creating a situation where remaining fossil fuel sources are more remote, more expensive and of poorer quality. The extraction methods needed for exploiting these reserves are much more energy-intensive and environmentally-destructive. The tar sands of northern Alberta, which occupy roughly one-quarter of the land mass of the province, are extremely energy-intensive and highly destructive of the environment.

Bitumen deposits are buried underneath an area encompassing 140,000 square kilometres in northeastern Alberta. Significant deposits have also being confirmed in northwestern Saskatchewan.[5] Extraction of oil from tar sands is done by either a process of open-pit mining or "in situ" deep mining, and both methods have a massive impact on water resources in the overall drainage basin. Not only does the mining process require clearing vegetation and draining wetlands to allow for construction of roads, mine pits, well-sites and pipelines; the actual extraction process of separating out the bitumen from the sands requires large amounts of water; and upgrading the bitumen also requires even more water. The bulk of the water used in the tar sands operations is drawn from the Athabasca River and underground aquifers.

It is a misnomer to refer to the tar sands as "oil sands" because the end product is not oil. The end product is bitumen, a thick, heavy mixture of clay, water and hydrocarbons that is "five percent sulphur, half a percent nitrogen and 1,000 parts per million heavy metals." In its natural state it is "hard as a hockey puck". It took billions of Canadian tax dollars and seventy years for scientists to come up with a method for separating bitumen from the sand. The method involved is "brute force".[6]

As author Andrew Nikiforuk explains, water is essential to the process. "On average, the mines consume between three and four barrels of fresh water to produce one barrel of bitumen. Most of the water is heated to separate the hydrocarbons from sand and clay in a process akin to operating a giant washing machine. Although companies such as Syncrude recycle their water as many as 18 times, the industry still procures most of its water from the Athabasca River or from aquifers that feed the river." The degree of water use is directly related to the quality of ore recovered, which means that as the clay content in the tar sands increases, the volume of water needed in production will also increase. The industry now accounts for more than 76% of the

[5] Oilsands Quest exploration permits in northwest Saskatchewan. www.oilsandsquest.com
[6] Andrew Nikiforuk, Tar Sands: Dirty Oil and the Future of a Continent, 2008, Greystone Books/David Suzuki Foundation

water allocations on the Athabasca River. Current licenses allow industry to take 3.2 billion barrels of fresh water a year – enough to supply two cities the size of Calgary. Planned expansions could bring the total to 4.2 billion barrels per year. Informed estimates by Natural Resources Canada say the river does not have sufficient flows to accommodate that much water being diverted.[7]

Will there be sufficient water?

The tar sands are located in the Mackenzie River Basin – the third largest water drainage basin tin he world – only the Mississippi and Amazon Rivers drain a bigger area. The major river that runs through the tar sands area is the Athabasca River, but alterations in the ecosystem of one river will have effects on other areas of the drainage basin. While the tar sands are located in a boreal forest area, there are also significant regions within the Mackenzie River drainage basin which are major agricultural areas. These include the Peace River region and the farming area northwest of Edmonton. Water resources are of vital concern in agricultural areas, and reductions in river flow levels due to water diversions for industrial uses can have severe consequences for family farming operations.

The Government of Alberta issues licenses for the allocation of all surface water and groundwater on a "first in time and first in right" basis. This means that the oldest licenses get higher priority in water allocations. Each license specifies a maximum amount of water that can be diverted and used within a certain period of time. Before a license is issued for a large scale tar sands project, the potential environmental impact of water diversion is supposed to be assessed. Recent water licenses have typically been granted for ten years and are subject to periodic reviews. Environmental assessment requirements are a relatively recent development, however, and many allocations were granted in perpetuity without an assessment of the potential environmental impacts or appropriate size of the allocation.

The issuing of water allocation licenses to drain water from the Athabasca River for tar sands projects is not based on comprehensive scientific data that takes into account the amount of water required for maintaining ecosystem health. It is only recently that the provincial and federal governments implemented a regulatory framework for water diversion. Under this plan, the province has only until 2010 to determine if the industry permits already issued will leave enough water in the river to sustain fish and wetlands. "In the meantime, the provincial plan will work like a primitive stoplight. Green-light conditions allow industry to withdraw up to 15 percent of the Athabasca's flow: a yellow light encourages industry to proceed with caution by reducing water consumption to 10 percent of flow; and a red light, or fish-killing zone, restricts allocations further. But even during a drought, industry will get enough water to fill fifty bathtubs per second. Bitumen, in other words, comes before fish."[8]

Current permits allow the tar sands industry to divert 2.3 billion barrels of fresh water annually from the Athabasca River. Planned expansions of mines and upgraders will increase that

[7] Andrew Nikiforuk, "Liquid Asset: Could the oil sands, Canada's greatest economic project, come undone simply because no one thought about water?" Globe and Mail, March 28, 2008.
[8] Andrew Nikiforuk, Tar Sands: Dirty Oil and the Future of a Continent; ibid.

allocation to 3.3 billion barrels of freshwater each year. Draining this much water from the river is not sustainable.

Plans to build $30 billion worth of upgraders in the area east of Edmonton pose significant threats to the water supply in the North Saskatchewan River and also the remaining prime agricultural land situated near the province's capital city. The North West Upgrader, currently under construction, will draw 5.6 billion litres of water every year from the North Saskatchewan River. A recent report by the North Saskatchewan Watershed Alliance predicts that by 2015, the nine planned upgraders' demands on the river will increase water use by 278%, and by 2025, by 339%.[9]

The land targeted for construction of the upgraders is ideally suited to production of potatoes, vegetables and other commodities. The farms which produce these commodities have found an eager "local food" market in the city of Edmonton and surrounding suburbs. However, a few years ago, rumours began circulating in the area that huge swathes of farmland were being secretly optioned at lottery prices. Petro-Canada and Suncor each purchased land, and then, after the fact, the local authorities rezoned the land to allow heavy industry.[10] The land is prime agricultural land - ideal for potato and vegetable production because of the microclimate of the river valley which adds precious frost-free days to a short growing season. Petro-Canada proposes to stockpile the top layers of farmland for reclamation when the tar sands are depleted. However, local farmers are sceptical that soil built up over thousands of years can be returned to its original form a century later, particularly for growing root crops.

The massive quantities of water needed for diversion from the Athabasca River is especially worrisome given its highly-variable flow levels from year to year. According to a 2007 study by Dr. David Schindler of the University of Alberta, summer flows in the Athabasca River declined by 29% between 1970 and 2005. This study pointed to the shrinking Columbia Icefields glacier in the Rocky Mountains – the source of the Athabasca – declining mountain snowpacks and earlier spring melts as primary causes of reduced water flows in the summer months. The study projected that water flows in the watershed of the oil sands region would decrease by an additional 8 to 26% by 2050 as a result of climate change. Combined with the massive increases in water diversions for tar sands projects and other industries, the Athabasca and Peace River ecosystems could be irreparably damaged as a direct result of low water flows.

The majority of established tar sands reserves lie deep underground, and must be extracted by "in situ" techniques. The most widely used technique is "steam assisted gravity drainage" (SAGD), which injects high-pressure steam into a bitumen formation with one pipe and then brings the melted hydrocarbon to the surface with another pipe."[11] The amount of land leased for this type of deep mining operation now covers an area larger than Vancouver Island, which means the drilling could affect water resources over an area 50 times greater than the open-pit mines. It takes at least one barrel of raw water to produce a barrel of oil using this method of mining. The water is used primarily to make steam. In addition to requiring the drainage of aquifers in the

[9] Andrew Nikiforuk, Globe and Mail, ibid.
[10] Cheryl Muhaffy, "Tar Sands fever threatens Edmonton farmland", Citizens for Public Justice website, http://www.cpj.ca/en/content/tar-sands-fever-threatens-edmonton-farmland
[11] Andrew Nikiforuk, Globe and Mail, ibid.

Athabasca River basin to obtain enough water to make the steam, the deep mining operations will also require massive amounts of natural gas to heat the water for the steam. According to some estimates, this type of bitumen extraction could ultimately consume the equivalent of the entire gas supply of western Canada.[12]

The massive requirements for natural gas in the tar sands is a major reason for the escalating pace of methane gas well drilling and production in prime agricultural land in southern Alberta. This has a direct impact on farm families and rural communities. Methane gas production requires more wells and more land disturbance than conventional gas and poises a huge threat to groundwater, which often moves along coal seams. As author Andrew Nikiforuk points out, "the quick removal of natural gas from underground pools and coal deposits creates a void that could, over time, fill up with either water or migrating gas. Nobody really knows at the moment how many old gas pools connect with water aquifers or how many are filling up with water."[13]

The investment in this type of "in situ" extraction process is expected to be $4 billion annually until 2015, which will put such an enormous strain on the area's aquifers that the supply of fresh water will not keep up. Companies could use saline groundwater, but these supplies must first be desalinated, and that produces solid wastes of salts and water-solvent carcinogens. These solid wastes are disposed of in landfills, and the carcinogens they contain are likely to contaminate groundwater.

The deep mining of bitumen will also likely result in changes to the region's water table over time because underground water has a tendency to migrate to areas where vacancies in the rock and sediment occur. There is very little data at present to allow researchers to understand surface and groundwater connections in the tar sands region.

Toxic waste water in tailings ponds

Water used in the process of extracting bitumen from tar sands becomes contaminated and cannot be returned to the natural water cycle.

Approximately 90% of the water withdrawn from the Athabasca River for the tar sands ends up as waste water – about the consistency of ketchup - stored in above-ground tailings "ponds"[14] or in deep wells. As of June, 2008, 720 million cubic metres of tailings[15] were stored in nearly a dozen tailings ponds on both sides of the Athabasca River, all of them posing serious potential threats to the water quality of the river. Approximately 1.8 million cubic metres of tailings are produced every day.[16] Many of these "ponds" – which are already leaking – are so large they resemble lakes. Tailings ponds cover over 130 square kilometres and are among the largest man-made structures on earth. The dykes surrounding the ponds can reach up to 100 metres in height. The largest tailings pond is owned by Syncrude, which alone accounts for 500,000 tons of

[12] Andrew Nikiforuk, Globe and Mail, ibid.
[13] Andrew Nikiforuk, Tar Sands: Dirty Oil and the Future of a Continent, Greystone Publishers/David Suzuki Foundation, 2008. Page 68.
[14] Andrew Nikiforuk, Globe and Mail, ibid.
[15] Peggy Holroyd and Terra Simieritsch, "The Waters That Bind Us: Transboundary Implications of Oil Sands Development", February, 2009, The Pembina Institute. http://www.pembinaorg
[16] Holroyd and Simieritsch, Pembina Insitute, ibid.

tailings being dumped daily. The Syncrude Tailings Dam is deemed by the US Department of the Interior to be the world's largest dam by volume of construction material. The pond was built in 1973 and covers 22 square kilometres, holding "540 million cubic metres of water, crud and sand."[17]

While scientists originally thought the tailings waste material would settle out, leaving clear water at the top, that did not happen due to the clay component of the mixture. The tailings containment structures are built of earth, and it is not reasonable to expect them to last for the thousands of years it will take for the waste material to finally settle. Given the toxicity of the tailings[18], the failure of a dyke would result in a major catastrophe for the aquatic ecosystem of the Mackenzie River basin. While tar sands companies are required to contain their waste under a zero-discharge policy, pollutants have been found to leak from the tailings ponds into the surrounding groundwater, soil and surface water. As much as 11 million litres of contaminated water leaks from the tailings ponds every day.[19]

Because the tailings ponds are inherently unstable and become more prone to structural failure as the amount of waste water they contain increases, engineers are seeking alternative storage solutions. One proposal involves depositing tailings at the bottom of mine pits, which are then filled with water to create an open pit lake ranging in depth from 65 to 100 metres. The theory is that the depth of the lake will prevent the surface waters from mixing with the tailings at the bottom. Despite the fact that this reclamation strategy is untested and poses a significant risk to long-term ecosystem health, tar sands projects continue to be approved based on this proposal.[20]

Health effects on wildlife and people

The toxic mixture in tailings ponds is potentially lethal to both wildlife and humans. During the extraction process, compounds such as naphthenic acids that occur naturally in bitumen become concentrated in the water, making it poisonous to aquatic organisms and mammals. Leaching of toxic waste water from the tailings ponds inevitably ends up in surface and groundwater, and eventually the pollutants released in this manner will travel downstream. Deterioration of water quality will significantly impact the health of residents in the region. In 2006, a physician and medical examiner in Fort Chipewyan, Dr. John O'Connor, drew attention to the high rate of rare cancers, thyroid problems and other immune-related diseases in the community. A subsequent study by the Alberta Cancer Board failed to find any significant increases in cancer rates, but that study has been justifiably criticized for its short timeline and lack of community involvement.

A 2007 study commissioned by the local health board in Fort Chipewyan summarized water quality monitoring of the Peace River, Athabasca River and Peace-Athabasca Delta. It also linked water quality to the health problems in the area. It determined that arsenic levels in Lake Athabasca were relatively high in comparison to other regional values. Among its conclusions

[17] Nikiforuk, Globe and Mail, ibid.
[18] "Every tailings pond contains poliycyclic aromatic hydrocarbons (PAHs), napthenic acids, heavy metals, salts and bitumen. The Canadian Association of Petroleum Producers reports that of 25 PAHs studied by the US Environmental Protection Agency, 14 are human carcinogens. Both PAHs and napthenic acids kill fish." Source: Nikiforuk, Globe and Mail, ibid.
[19] Holroyd and Simieritsch, Pembina Institute, ibid.
[20] Holroyd and Simieritsch, Pembina Institute, ibid.

was the finding that "the people and biota of the Athabasca River Delta and western Lake Athabasca are exposed to higher levels of metals than those upstream. Higher arsenic levels than elsewhere, coupled with the clear link between arsenic exposure and various diseases, call for in-depth study of the issue. Arsenic exposure is associated with bile duct, liver, urinary tract, and skin cancers, vascular diseases and Type II diabetes.[21]

Wetlands and land reclamation efforts

Wetlands are an integral part in maintaining the health of ecosystems in all parts of Canada. In the northern Boreal forest area of Alberta, the wetlands play a critical role by filtering and storing water.

In fact, wetlands are sometimes referred to as the "kidneys" of the ecosystem because they regulate water flow and remove contaminants.

When water tables are lowered as a result of tar sands mining operations, surface water has a tendency to flow downwards to fill the void left in the aquifers below ground. This subsequently reduces the amount of surface water available in wetlands, streams, lakes and rivers for critical wetland functions.

The mining of bitumen in the tar sands region of Alberta is expected to result in the digging up of an area roughly the size of Lake Erie that is composed almost entirely of boreal wetlands.[22] Reclaiming this land is not simply a matter of refilling a hole. In fact, it is unlikely the land can ever be restored to its natural state for a variety of reasons.

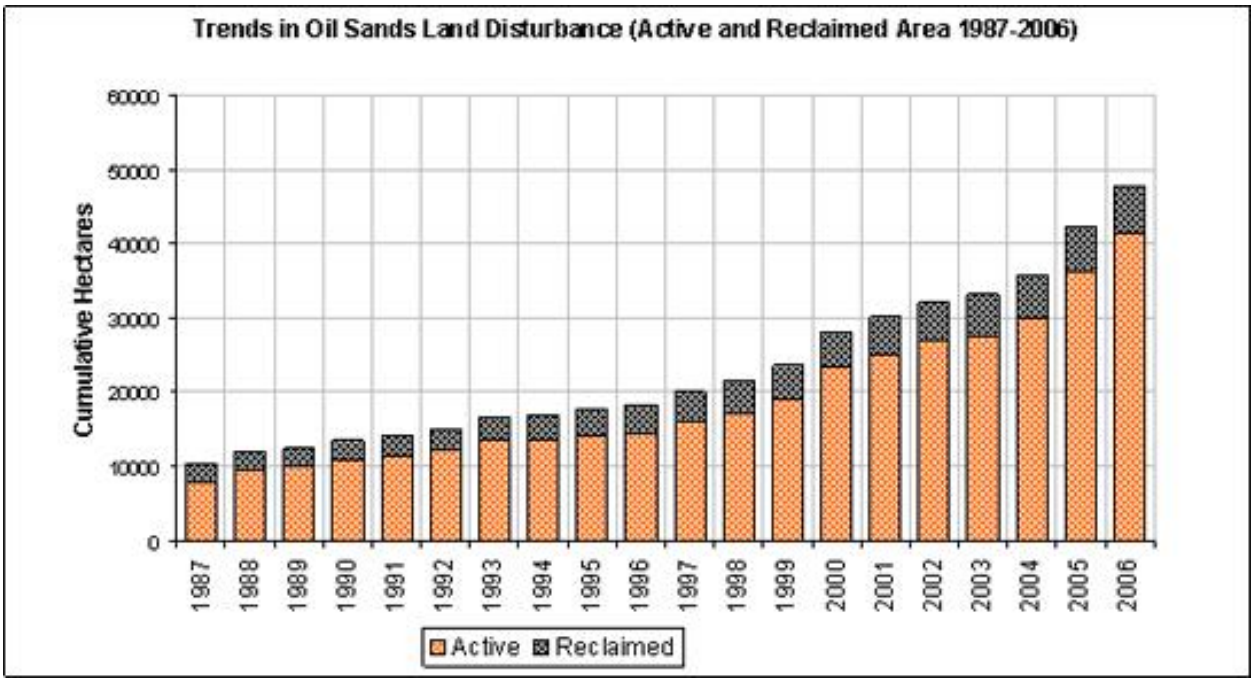
One reason is the sheer cost involved. According to one estimate by a wetlands specialist at the University of Alberta, the cost of replacing the projected 96,000 hectares of mined wetland, depending on the replacement standards adopted, could, at $25,000 a hectare, range between $7 billion and $24 billion.[23]

Another reason is that the pace of "reclamation" is agonizingly slow, particularly in comparison to the rate of approvals for new strip mining and "in situ" operations. After nearly fifty years of mining, the Alberta government has certified only 257 acres of forest, or 0.2 percent of the land dug up since 1963.[24] This certificate of reclamation, issued in March, 2008, was apparently the first since the process started. Significantly, this parcel of forest did not contain a tailings pond.

In November, 2007, the Alberta Environment Department website indicated that 42,000 hectares of land was currently "active for oil sands mining" and "almost 6,500 hectares of land was undergoing reclamation by the end of 2006. The bulk of the reclamation work has been done by the two senior operations in the region, Suncor Energy Inc. And Syncrude Canada Ltd. Operators can apply for a reclamation certificate once they are satisfied that the reclaimed land will meet the determined reclamation certification criteria for that landform. Reclamation certificates have

[21] Holroyd and Simieritsch, Pembina Institute, ibid.
[22] Andrew Nikiforuk, Globe and Mail, ibid.
[23] Andrew Nikiforuk, Globe and Mail, ibid.
[24] Andrew Nikiforuk, Tar Sands: Dirty Oil and the Future of a Continent, Greystone Publishers/David Suzuki Foundation, 2008.

not been issued for any lands in the area to date. However, one application for a certificate has been received and is under review."[25]



Land reclamation in the tar sands area. Source: Alberta Environment

Given the vague definition of "reclamation" in the Alberta Environmental Protection and Enhancement Act, the fact that it took nearly fifty years to certify one parcel of reclaimed land is very telling. The Act defines reclamation as "stabilization, contouring, maintenance, conditioning or reconstruction of the surface of the land." Operators of the open-pit mines must "conserve and reclaim disturbed land to an equivalent land capability." In its statistics on reclaimed land, the Alberta Environment Department includes land "undergoing reclamation" – which obviously constitutes virtually all the land in that category.

The record of land reclamation in the tar sands area is similar to that of oil and gas wells in southern areas of the province. The standard for restoring land disturbed by well pads has dropped to 60 percent of original soil content. In the last ten years, the number of abandoned sites and facilities has risen dramatically. There are currently more than a hundred thousand abandoned sites across Alberta – much of it in prime farmland areas. These sites pose a serious threat to groundwater and agriculture. Estimates by the government itself put taxpayers' liability for cleanup of these sites at approximately $18 billion.[26]

There are a number of serious "challenges" confronting oil companies which seek to reclaim land and wetlands in the tar sands area. The fundamental problem is that reconstruction of the

[25] Alberta Environment, "Oil Sands Mining Development and Reclamation", Last Edited/Reviewed November 19, 2007. http://www3.gov.ab.ca/env/soe/land_indicators/41_oilsands_reclamationn.html
[26] Andrew Nikiforuk, Tar Sands: Dirty Oil and the Future of a Continent, Greystone Publishers/David Suzuki Foundation, page 102.

natural layers of soil is impossible, and the inevitable addition of toxic materials as a result of the mining process reduces the productive capabilities of the soil.

A 2004 paper by Stephen Hanus of the University of Alberta, entitled: "Oil Sands Reclamation: Associated Challenges and mechanisms ensuring compliance" summarized the difficulties this way:

"GEOLOGY: The geological formations composed of Clearwater formation, glacial sediments and recent sediments. During the mining phase of the oil extraction process, overburden is transferred to holding areas and drawn upon during the reclamation phase when the mine site is being backfilled. The transfer of overburden mixes the various geological layers, and thus cannot be reconstructed. The impacts of this reality relate to changes in the ground water flow, direction and quality. In addition, the process of backfilling the mine leads to an overall increase in overall volume of material than in that of the material prior to disturbance. Thus, contouring the landscape will also pose as a potential challenge.

"GROUNDWATER: Two primary ground water issues arise as a result of reclaiming oil sand mines. First, ground water flow is closely associated with geological formations. Thus, the movement of ground water will likely change considerably once the mine site has been backfilled. Ground water in reclaimed areas have not been fully recharged, so the true impacts of ground water alterations have yet to be determined. It is likely that the water table will either rise or fall, which will influence flow patterns, such as rate, volume and direction. Of primary concern is the 100-fold increase in permeability of sand once bitumen has been extracted. Lowered water tables have a direct impact on vegetation productivity following site reclamation. Second, the ground water system has the potential of becoming contaminated if leachates from tailing ponds enter the system. Manipulating ground water quality and flow have trans-boundary implications to surrounding water bodies. For example, alterations of ground water flow rate and direction will impact wetland recharging. Pre-disturbance quality of ground water ranged from 1,000 to 30,000 milligrams of saline per litre depending on the ground water zone, but the salinity of groundwater post site reclamation will be difficult to predict."

The boreal forest that once dominated the tar sands extraction sites was composed largely of nine species of trees including Trembling Aspen, Balsam Poplar, White Spruce, Paper Birch, Balsam Fir and Jack Pine, as well as Black Spruce and tamarack. "The primary challenge for reclamation will be to revegetate disturbed lands to a level of diversity and productivity that was present prior to disturbance." While Hanus suggests reclamation may be "attainable" in upland forest areas – a suggestion that has not yet been accomplished in reality – the same cannot be said for lowland areas. "Establishment of muskeg communities will not be attainable due to the challenges associated with emulating complex hydrological regimes associated with this community type."[27]

Efforts to reclaim wetlands that have been mined for bitumen have not been successful. As Andrew Nikiforuk puts it: "Reclamation in the tar sands now amounts to little more than putting

[27] Stephen Hanus, "Oil Sands Reclamation: Associated challenges and mechanisms ensuring compliance", February 20, 2004, University of Alberta. http://www.business.ualberta.ca/CABREE/pdf/2004%20Winter/Stephen%20Hanus-OilSands.pdf

lipstick on a corpse." He states: "The uncomfortable truth remains simply this: the rapid mining of the boreal forest has outpaced the science on the reclamation of wetlands, soil and forest uplands by decades. No one has a handle on the real costs of reclamation. Security deposits remain laughably inadequate. And both Alberta and Canada have an appalling record of environmental negligence and disregard for taxpayers."

Conclusion and recommendations:

Extraction of bitumen from tar sands carries many severe negative consequences for water resources in Alberta and throughout the Mackenzie River drainage basin. Not only do the mining and upgrading processes draw down the available surface and groundwater supplies while leaving toxic contaminants at risk of leaching back into the ground, rivers and lakes, the negative impact on the health of the environment, wildlife and people is profound.

The National Farmers Union agrees with recommendations put forward by the Pembina Institute report entitled "The Waters that Bind Us", released in February, 2009. Our recommendations, therefore, include:

1. The government of Alberta should suspend new tar sands lease sales and tar sands project approvals until environmental rules protecting water quality and quantity are in place and enforced.

2. The government of Alberta should stop granting new water licenses for tar sands mining projects and upgrader projects.

3. The governments of Alberta, Canada and the Northwest Territories should complete a trans-boundary agreement on water which sets clear baseline criteria for water quantity and quality and aquatic ecosystems, and which sets out emergency procedures in the event of a tailings pond dam collapse.

4. The government of Alberta should implement a water management framework for the Athabasca and North Saskatchewan Rivers which set a protective Ecological Base Flow below which water withdrawals are prohibited.

5. The government of Alberta should prohibit the production of liquid tailings for new tar sands projects.

6. The government of Alberta should establish a consistent, transparent and integrated monitoring system, at arm's length from industry, on water quality and quantity and aquatic ecosystems in the Athabasca River, the Peace-Athabasca Delta, Lake Athabasca and the Slave River.

All of which is respectfully submitted by

The National Farmers Union

May 12, 2009, Edmonton, Alberta