Thinking Ahead

Best Practices in Industrial Land Stewardship

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LAND STEWARDSHIP INITIATIVE

This document is part of the Canada West Foundation's Land Stewardship Initiative—a two-year research and communications endeavour focused on the role of public policy in facilitating land stewardship in western Canada. Land stewardship is the practice of responsible land use to ensure that natural capital is maintained or enhanced for future generations.

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Executive Summary

Western Canada's natural and agricultural land is under intense pressure. As the population grows and the economies of the region mature and diversify, industrial and natural resource users are swallowing untouched land and changing the use of working landscapes such as farms and ranches. Our hunger for new areas to live in and new roads to drive on, and the world's hunger for oil, gas, minerals, lumber and other bounty, consumes land, and often leaves it damaged or unrecognizable. Much of that is inevitable, but it needs to be carefully planned and managed so that the impact on our lives and those of future generations is minimized.

The industrial and natural resource land stewardship issues faced by western Canadians are not unique. Governments around the world are wrestling with the same issues, and employing a wide range of public policy options to address and contain the problems. Some of these have worked and some have not. Furthermore, no single solution can be viewed as a miracle cure for the woes a region faces, but when properly applied to an appropriate region and industry, each approach has the potential to mitigate the impact our industrial lifestyle is having on our land.

This report takes a look at six different public policy approaches. Four of the cases are located in the United States, one is under development in Australia, and one is effectively accomplishing its goals in Alberta. They vary great in scope, ambition, and history, but each has something valuable to be learned for the western Canadian context. The underlying philosophies differ, but the six case studies share at least four common traits. Each successful approach features a high degree of government involvement. Each requires the selfless cooperation of multiple levels of government. Each was carefully planned before initial execution to anticipate and avoid potentially damning problems. Finally, all of the programs have a clearly defined goal and limited ambition. None seek to solve a region's land stewardship struggles in one effort, and that means that they are manageable and can achieve results that can be observed and communicated.

From the examination of the case studies a blueprint for future land stewardship efforts in western Canada emerges. To ensure a solid chance of success, any future land stewardship initiative should, at the very least, consider these recommendations to see if they are appropriate and sufficiently addressed:

- Recognize and use reputation as an incentive
- Tightly define goals
- Embrace multiple approaches
- Replace function, not area
- Combine resources to maximize impact
- Establish independent oversight

Given the overwhelming statistics chronicling the rapid demise of our natural land in western Canada, it would be easy to become depressed and hopeless. There are countless pressures on the land, innumerable interests that must be considered, and limited time to act before it's too late. Hopefully, though, this report helps to lift that depression and provide a sense of optimism. There are brilliant, energetic people around the world engaged in land stewardship efforts. The public policy options available are fueled by their creativity, passion and foresight. Better land stewardship in western Canada won't be an easy battle, but it is certainly a battle worth fighting, and the weapons exist to score a victory.

1. Introduction

Land stewardship is the practice of responsible land use to ensure that natural capital is maintained or enhanced for future generations and land stewardship policies are actions taken by governments that require, enable or encourage land users to manage land in ways that maintain or enhance natural capital for future generations. If you read these definitions quickly and don't think too much about it, then land stewardship might not sound too difficult. One should not, however, underestimate the challenge that land stewardship presents to governments. Not to give away the ending of the story in the first paragraph, but the complexity of this endeavour as it pertains to industrial and natural resource land users, the immense task facing governments, and the burning need not just for solutions, but also creativity and commitment, combine to make this a daunting area of public policy. That being said, the lessons that can be drawn from approaches that are underway around the world and the people and resources that are dedicated to protecting our natural resources are reasons to be optimistic that we can achieve success in this critical area and improve industrial stewardship policy and outcomes in western Canada.

Western Canada is a natural resource provider to the world. Oil and gas, forestry, mining and agriculture make us valuable contributors to the world economy. The exploration for, and production of, those resources has caused our economies to flourish and our populations to grow. New residents need places to live and work, cars to drive and roads to drive them on, and food on their plates. Needless to say, land in western Canada is under extreme pressure from these forces. Land near cities and towns is being swallowed up by developers looking to build and sell. Forests, wetlands and other native areas are intensely pressured by the relentless search for oil, minerals, and lumber. The list of dreary statistics about diminishing natural and agricultural land and the associated environmental damage is long.

Increasingly, industrial users are choosing for themselves to improve their land stewardship practices. That's a positive trend, but it isn't enough. Industrial users will act in their self-interest, and they can't be blamed for that. Corporate self-interest and the public good don't necessarily intersect when it comes to land stewardship. The governments of western Canada need to push industrial and natural resource land users (referred to as industrial users for simplicity) to embrace and practice responsible land stewardship to the fullest extent. They obviously aren't alone—the same story is heard throughout the world. There are dozens of examples of proven public policy approaches, and just as many lessons to learn from approaches that have not achieved their goals.

What follows is an examination of six different public policy approaches to industrial and natural resource land stewardship used in North America and Australia. This is not a comprehensive survey, but rather an exploration of a variety of approaches that have had varying levels of success. Some case studies are looked at very specifically, while others are a more general examination of a widely used method. Some approaches are proven and successful, while others are not entirely positive. One is even mired in a planning and development stage that seems to be never-ending. They all have different goals, address different types of industrial users, and have different approaches to achieving their outcomes. At their core, they all have a sense of optimism surrounding them because of their potential, in their current form or an adapted one, to improve industrial land stewardship practices in western Canada.

2. Proactive Approaches

The first four case studies each take a different approach to land stewardship, but they all share at least one trait—they are all proactive. Each program attempts to either protect land and avoid damage to it, or to offset damage before it occurs.

2.1 Transfer of Development Credits

Transfer of Development Credits programs, depending on the jurisdiction, can also be called Transfer of Development Rights programs. Whether they are TDCs or TDRs, the concept at their heart is an elegant one. Instead of developing agricultural or natural land, or selling it to a developer, the landowner can sell the development rights associated with the land while conserving the land itself as a natural or agricultural landscape. Those development credits can then be purchased by developers and used in an area where development is already happening. With the extra credits, developers can, for example, add extra density to their projects, or extra height to their buildings. On paper, at least, this is a great way to protect threatened land while increasing development in areas where services and infrastructure already exist.

As cities in western Canada continue to spread virtually unchecked, the ability to provide land cushions that are not developed grows increasingly attractive. If embraced ambitiously and creatively on a regional or provincial level, development credits from an area like the northern boreal forests could be used to add density to downtown Calgary. As a potential structure, then, TDCs are very relevant to the land stewardship discussion in western Canada. And, while TDC programs have typically targeted individual landowners, there are many ways to use the programs to encourage land stewardship among industrial users.

Of particular significance to western Canada, TDCs also hold tremendous potential as a means of protecting agricultural land from the threats of industrial and natural resource use. Agricultural land is under pressure because of a simple economic problem—it is often more lucrative for landowners to sell the land for development than it is to use it for agricultural purposes. TDCs could allow landowners to realize some of the

revenue potential of the land without having to give it up to other uses.

2.1.1 King County, Washington

If we are going to look at TDC programs, then we might as well start with the biggest. King County, Washington, is the 14th largest county in the US. Seattle is the largest city and home to a large chunk of the nearly two million county residents.

In terms of land conserved, the King County TDR Program, with about 92,000 acres, is by far the national leader— nearly twice as much as the next best. That's especially noteworthy since the program was only established in 1999, years after some of the other leading programs. The asterisk beside that is that 90,000 of those acres were part of one single transaction, so there are other TDC programs that have dealt with more individual property owners. This program stands out as a model, though, for four distinct reasons:

The large parcel—King County used the TDC program to secure the development rights in the Snoqualmie Forest. The deal shows the potential of TDCs, when used creatively, to encourage land stewardship among industrial users. The forest covers the foothills of the Cascade Mountains, and it has long been part of plans for eventual suburban development. Hancock Timber Resource Group purchased the land in 2003 and maintains it as a working forest. The county purchased the development rights to the entire 90,000 acres for $22 million (the money came from the Conservation Futures Tax, a tax levied on all property in the county to be used for conservation). Hancock Timber will continue to use the forest responsibly, and the county does not have to worry about losing its buffer against urban sprawl, even when Hancock no longer needs it. The county should also be able to more than recover their investment from the sale of the 990 development credits established in the transaction.

Credit bank—The Snoqualmie Forest deal would not likely have been possible if the county had not established a credit bank when it started the TDC program. It was originally funded with a $1.5 million investment, and it is used to buy and sell credits as needed. The bank allows for key credits to be purchased even if there isn't immediately a buyer for them, and it allows the administrators of the program to hold credits until needed to ensure that there will always be a market for credits— a key to the long-term success of the program. The 990 credits from the Snoqualmie Forest are in the credit bank, and will be sold only if and when they will not affect the general liquidity of the market or depress prices.

Inter-governmental cooperation—King County realized that it didn't make sense to take development credits from one rural property and transfer them to another rural property. They needed an urban base for receiving credits. Their first target, and eventual partner, was the City of Seattle. Credits purchased from land in King County can be used in the Denny Triangle neighbourhood of Seattle to allow developers to increase density or add height to buildings under the guidelines of the Denny Triangle neighbourhood plan. King County now has similar agreements with two other cities in the county and is actively pursuing more. They face the challenge of renewing the Seattle agreement when it expires in the summer of 2008.

Political will—This program has been the success it is because of the enthusiastic support of the elected officials in the county. County Executive Ron Sims is a frequent and vocal advocate of the program, and so are several members of the council. Their support makes the program more visible to landowners and developers, and their willingness to aggressively employ the potential of the program has made the Snoqualmie Forest and other forest conservation projects possible.

Darren Greve is the TDR Program Manager in King County. Though he remains enthusiastic about the program, and hinted at a bright and aggressive future if the council adopts recommended plans for the program, he did have some interesting insights to share. First, the TDR program is affected directly by the performance of the real estate market. The current downturn means that fewer developers are building new projects, so the market for credits is depressed. Therefore, any program needs to have a long-term view and an awareness of market realities if it wants to survive.

Greve also pointed out something that would seem to be a flaw of many conservation projects. Though the sale of credits are market-based, his experience is that they are not

price competitive compared to the outright sale of land for development. *People who participate in the program, then, need to have an interest in conservation that outweighs their lost revenue potential.* That really means that this program is most effective when targeting individual land owners or companies who would already be inclined to find a way to conserve their land. It is less likely to convince someone with no previous conservation interest to participate.

This program opens our eyes to a significant reality. 92,000 acres is 372 square kilometres. That's a remarkable amount of conserved land—until you consider that Alberta alone is almost 662,000 square kilometres. The King County TDC program is the runaway conservation champion, and it has conserved the equivalent of 1/18th of one percent of Alberta in almost a decade. King County shows that TDCs can clearly be a powerful tool, but reality has yet to show that they alone could solve the land stewardship woes of western Canada.

2.1.2 San Luis Obispo

San Luis Obispo County would fulfill some people's definition of paradise. Nestled on the Pacific coast of California between L.A. and San Francisco, it is home to about 250,000 people and is the third biggest wine producing region in the state. The rugged beauty and agricultural integrity of the area has been threatened by rural subdivision, so in 1996 the county looked towards a TDC program as a potential solution. The degree to which it has failed to solve their problems is illuminating.

On the surface, the program, which has conserved 5,500 acres of land, has been a moderate success. A closer look reveals a less optimistic truth. The land conserved came from just three landowners, and more than 5,200 acres came from one transaction. No credits have been created in several years, and many existing credits remain unsold. In retrospect, the failure of the program came about from three key mistakes:

No incentives for buyers or sellers—Potential sellers of credits would be attracted by the potential for revenue. Revenue comes from the sale of credits, but there is little need for developers to buy credits. None of the cities in the county agreed to be receiving sites for the credits, so urban developers were not interested. In the areas around cities, planning authorities continued to approve requests to change zoning or density, so developers had no need to incur the added expense of credit purchases. Market demand was never created, so failure was almost certain.

Including non-threatened land—The biggest property involved, at more than 5,200 acres, is the Bonnheim ranch. The inclusion of the ranch in the program is controversial. The land is located in an area of the county that is not under immediate or even mid-term development pressure. Much of the land is steep and unsuitable for development. Part of the ranch was protected under the Williamson Act, so it was not under threat of being developed for at least a decade. (The Williamson Act is another land stewardship tool that restricts development and limits land to agricultural use in exchange for tax relief. It takes ten years for land to be removed from under the Williamson Act.) More than a thousand acres of the parcel was purchased from the Bureau of Land Management just one year earlier at a low price because it was of low quality. Perhaps the land was accepted into the program to provide early admittance, but it didn't satisfy the intentions of the program, and it created a glut of credits that still exists today.

Allowing rural development—The primary market for credits appears to be rural land holders looking to subdivide property. Maria Lorca is an anti-TDC activist in the county. She lives in an area where the minimum land parcel size is 160 acres. A neighbour bought a development credit in order to subdivide his land below that threshold. Lorca rallied other neighbours and was able to get that purchase overturned, but several other purchase attempts have been successful. Shifting development from one rural area to another would seem to do little to achieve the initial goals of the program.

The program has stalled under the weight of public controversy and administrative reviews. Since 2001, it has been the subject of two grand jury investigations. A moratorium was proposed in 2005, but it was pushed aside in favour of a blue ribbon committee that is made up of a cross-section of interested parties. The committee meets regularly, but Lorca, who sits as a member, feels less than optimistic about the progress that is being made.

It is simplistic to say that the TDC program in San Luis Obispo County would have succeeded if it had been carefully planned from the outset and if it enjoyed the support of all levels of affected government. What is clear, though, is that several missteps were made that significantly decreased the chances of success for the program. That's a stark reminder for any jurisdiction considering the implementation of a program of their own.

2.1.3 TDCs in Canada

Given that there are more than 50 active TDC programs in the US, it is striking that there isn't a single active program in Canada. At least one came close. Cypress County, in the very southeastern corner of Alberta, explored a program and went as far as voting on it, but ultimately chose not to be the first. Currently, at least two counties in Alberta—Red Deer and Beaver—are conducting feasibility studies. Though wide-scale acceptance and employment of TDC programs for industrial or individual use are a long way off, the concept of trading development rights isn't entirely foreign to Canadians. For example, Encana recently purchased air rights from a neighbouring building to allow their new Bow building in downtown Calgary to be higher than original zoning allowed.

2.2 Wetland Mitigation Banking

Wetlands perform so many important functions that science doesn't yet have a full grasp of their capabilities. They are also under attack. Every day, wetlands are converted into industrial, agricultural and development uses. This is nothing new—analysis in the 1970s told us that about half of all original wetlands in the US had already been converted.

By the time the first George Bush was President, no net loss (NNL) had become the catch phrase when it came to wetlands conservation in the US. The loss of some wetlands is inevitable. When wetland loss can't be avoided, no net loss means that there should be an offsetting gain of wetland acreage and, as much as possible, ecosystem function somewhere else. Legally, NNL falls under Section 404 of the Clean Water Act. Any project that will result in the filling of a wetland must secure a permit from the Army Corps of Engineers. The permit holder bears the legal responsibility to offset their wetlands losses.

Initially, the offsetting wetland gains were created on the same property as the lost wetlands. This on-site compensatory mitigation still occurs, but it was found to be less than ideal on a large scale. Enforcement was a major challenge for the Corps given the number of projects, so many compensatory wetlands were never built or were built inadequately. Even if they were built properly, it would take years for a wetland to mature, so there was a loss of habitat for a period of time. Finally, users who only destroyed a small piece of wetland often weren't required to offset it because it was impractical, so NNL wasn't achieved in this way.

Several different types of off-site compensatory mitigation have been tried and are used. An entrepreneurial solution has emerged to be a force in the market known as wetland mitigation banking. Entrepreneurs acquire land and establish or restore a wetland on the land. Once the wetlands are ecologically viable, or a financial assurance like a bond is in place to ensure that they will be, credits are generated that can be sold to developers or industrial users to offset the wetlands that they have to fill. There is an expectation that the wetland bank will exist as a wetland in perpetuity, which is typically achieved through conservation easements or transfers to public ownership. Some jurisdictions also require an endowment for the long-term management of the wetland.

Not surprisingly given that the state is one giant wetland, Florida is a leader in the use of wetland mitigation banks. As of 2006, there were 43 banks that were in various stages of development, including three that were sold-out of their credits. The banks covered 117,000 acres, and if fully utilized would generate 36,000 credits—approximately one for every three acres. More than 1,000 projects had used credits. The price of credits is not public knowledge, but it is known that one bank that sold-out in the late 1990s had sold credits at $45,000 each. Needless to say, this is big business.

In theory, this is another elegant, market-aided land stewardship policy. The reality isn't quite so elegant, but mitigation banking definitely has its merits. Not the least of those merits is that it does a better job of achieving the no net loss goal than previous attempts at offsetting. A smaller number of large banks is also

much easier for the Corps to monitor than many small wetlands, so compliance is more likely.

Less than 20% of all wetland credits are currently generated from mitigation banks. The benefits of mitigation banking are limited to an extent by two factors that cause investment to be limited. The more successfully a program can minimize these negative factors, the more successful the program will be at attracting private investment, and therefore at conserving land:

Investor capital needs—The cost of establishing a mitigation bank is very high. Land must be purchased, water rights negotiated, dirt moved, and vegetation added. Lawyers are needed to clear legal and regulatory hurdles, and consultants are used to ensure compliance to strict criteria for wetlands. The cost of all that just to establish the bank combined with the cost of the capital required, the need to ensure the long-term viability of the project, and the time involved to establish the project and clear all the regulatory hurdles makes the prospect of starting a mitigation bank a daunting one. The cost and time involved is a significant barrier to entry.

Uncertainty inhibits investment—Until the mitigation bank is established, it is impossible to know how many credits it will produce, and therefore how much revenue will be generated. It is also impossible to know if the regulatory environment will still necessitate the purchase of credits by the time credits are available. A change in government, a change in legislative priorities, or a high court ruling could significantly and rapidly change the market for credits, or it could change the requirements for a mitigation bank and thereby increase costs. Furthermore, the sale of credits is affected by demand for them, and therefore by the state of the economy and the real estate market—factors that are impossible to predict or control. Uncertainty is the enemy of investment.

There is another problem with the mitigation banks that needs to be discussed, but before it is a qualification is needed. The purpose here is not to be unrelentingly negative or to suggest that the mitigation banking concept is flawed beyond hope. That is certainly not the case. If the ultimate goal is to identify land stewardship opportunities for western Canada, though, then an understanding of problems with other solutions provides insight into the required scope of our solutions.

By definition, an off-site mitigation bank moves wetlands, and often quite a distance. However, a wetland has several impacts that are specific to the land immediately surrounding it— impacts on weather, groundwater, humidity, flood mitigation, water filtration, pollution control, and much more. By moving a wetland, we remove those benefits from the area of the original wetland. You could argue that there would still be no net loss of benefits; they would just be shifted to the area of the new wetland. That may not be the case, though. Generally, the mitigation banks are going to be placed on lower cost land. That land is generally going to be in less inhabited areas. The destroyed wetland is more likely near a major center of population since population growth would be the major driver of development. It would seem reasonable, then, that more people would benefit from the positive effects of the wetland in its original location than would in the new location. That could mean a net loss of personal benefit. Whether this is always the case or not, what is certain is that there are economic costs beyond the obvious associated with this program or any offset program, and people who will suffer a loss of environmental impact whether there is a net loss or not. These factors must be considered if a program is to be truly successful.

2.3 BioBanking in New South Wales

When it comes to the possibilities and challenges of developing biodiversity offset programs in western Canada there is perhaps no better comparison than the current efforts in New South Wales, Australia. In rough terms, NSW has about the same population as Alberta and BC combined, and it is the same size as BC. The NSW government is in the process of introducing the Biodiversity Banking and Offsets Scheme. This ambitious program is an attempt to incorporate the no net loss philosophy we encountered in the wetlands mitigation banking and to expand it to include all types of land threatened by commercial development.

The law at the foundation of the program was passed in 2006, but the scheme is not yet in full operation. The first amendment to legislation, aimed at building a framework for the program came in 2004, so it has taken four years of serious effort to date and there hasn't been so much as an isolated trial of program operation. Repeated deadlines for aspects of the program have been set and missed as delays in drafting legislation, developing methodology, and

securing public support have arisen. The immensity of the task of implementation of BioBanking is eye opening. Like the land stewardship options discussed above, BioBanking relies on the market, at least to some extent, as the mechanism for land stewardship. In many ways it is similar to TDC programs, but there is a key difference: TDCs are concerned directly with the development rights, leaving the preservation of biodiversity as a positive side-effect, while BioBanking is directly concerned with the maintenance of biodiversity. A landowner who makes a commitment to protect and enhance biodiversity on their land can generate credits that can be sold to developers and industrial users to offset the destruction of biodiversity elsewhere.

The program is voluntary, so it is intended to be another tool industrial users can employ to responsibly manage the environmental impact of their activities. A strength of this scheme is that it builds on previous government initiatives instead of trying to replace them. If BioBanking were implemented as the only choice for impact reduction, then there would be the potential for disruption as the scheme is introduced, and that disruption would have a negative impact on the attitude of developers towards the scheme. Sole reliance on BioBanking could also create a market breakdown if the supply of credits couldn't match the demand. The existence of alternatives for industrial users ensures that this won't happen, or at least that the impact will be minimized if it does.

Depending on your perspective, the greatest strength or weakness of this scheme is that industry seems to be firmly in favour of it. A well designed offset scheme should be well supported by the intended buyers of credits. It allows them to minimize their costs and efforts for environmental protection. They don't need to set aside the land for on-site conservation or develop the expertise to properly conserve the land. A market for credits allows them to predict their costs with some accuracy, and to control the time they must spend on these necessary tasks outside of their core business. The industry support from the outset gives the scheme a much better chance of ultimate success, but critics suggest that industry enthusiasm is a sign that the scheme isn't a severe enough solution to a crippling problem.

BioBanking credits aren't applied to preservation of an acre in exchange for development of another. Instead, credits will be applied specifically to the types of species affected and the degree to which they are affected. On the surface this is a significant philosophical advantage to the scheme—you can't destroy the habitat of an endangered animal until you have preserved equivalent habitat for the same animal. That creates an extra level of complexity, though. Indeed, the biggest impediment to the introduction of the scheme is currently the development of a methodology to calculate credits that is comprehensive enough to be meaningful while still being easy enough to apply to be practical. To understand the scope of the problem, just consider the factors involved in assessing biodiversity on a piece of land:

Population—To accurately provide an offset, the population of flora and fauna on the land needs to be calculated. Even on a small piece of land, this requires a good deal of time, effort, and expertise.

Seasonality—You need to consider not just what is on the land at the time of the assessment, but what is on the land throughout the year. Is the land habitat for migrating endangered birds? Is it the winter home for some animals? Does it have endangered plants that only grow in a short time frame? A single snapshot of the land is not adequate to accurately assess biodiversity.

External impacts—Land also has an impact on the biodiversity of the land surrounding it. A significant area of forest will affect the climate, wildlife and vegetation of the land it borders. It is a major challenge to quantify this impact so that it can be offset. If it isn't measured and offset, then the concept of no net loss is challenged.

Number of credits—Some types of credits are easy to define and measure. Carbon credits, for example, are simple—a credit refers to the amount of carbon created or absorbed within a given time frame. It's a much more imprecise task to quantify the impact on biodiversity of a given area and what is required to effectively replace that area.

Unintended consequences—The bearded dragon has experienced a recent population crash in parts of NSW. They are at their happiest when able to move freely among the debris and deadfall on the ground in a wooded area. In a

biodiversity bank, though, credits may be created from land by improving it, and that improvement could include the clearing of deadfall. That may make the woodland more attractive for some plants and animals, but the improvement would actually decrease bearded dragon habitat. Every action has a reaction that could be positive or negative. Calculating it and compensating for this is a huge task.

Time—A landowner may have the best of intentions to preserve the biodiversity on some credit-generating land, but it could take years to know if the landowner's efforts have had the desired impact. In a perfect world, a credit would only be issued after preservation has been fully proven, but this would require a massive upfront investment by landholders and would serve as a severe impediment to the creation of credits, and therefore the operation of the scheme as a whole. Credits must at times be created on the assumption that they will eventually exist. There is an inherent risk in this that threatens the no net loss ideal.

With all that in play, and much more, it is no wonder that the government of NSW has encountered delays and criticism in coming up with a credit calculation methodology. The point isn't to suggest that it can't be done. It is merely to suggest that it is a massive task that should not be undertaken lightly.

BioBanking relies on the creation and maintenance of a market for credits. When someone opens a widget store, the inventory challenges are relatively simple—when it runs out of widgets, it just makes or orders more. If business goes well and they expand their product line, though, things get much more complicated. They have to manage the demand for small, medium and large widgets in blue, green and yellow. More factors create more challenges in managing supply and demand, and more potential for a shortage that could cost sales. If TDCs are the first store, then BioBanking is the expanded store. With a TDC program, all that is needed is an adequate number of development credits. BioBanking requires not only an adequate number, but also the correct type. A surplus of manna gum tree credits would do nothing to address a developer's need for river oak credits. You could have exactly the number of credits you need to maintain a system, but if they are of the wrong kinds then either the market will falter or compromises will have to be made that will maintain the market but challenge the overall goal of maintaining biodiversity. This type of system requires careful management and widespread acceptance and participation if it is to succeed. It has proven to be a challenge in many cases for the much more simple TDC markets to be active and vibrant, so a market for more complex BioBanking credits is a complex challenge.

BioBanking requires the cooperation of different levels of government. Once a developer or industrial user receives a BioBanking statement from the NSW government that reflects the impacts on biodiversity of their proposed project, the local governments are not allowed to further consider these impacts. They can't require further environmental considerations from the user than required by the offset program. They maintain the right to refuse an application for development or commercial activity for other reasons, but not for environmental ones. That isn't a problem if the local governments embrace the program and accept their loss of power in this area. If they don't, though, then the program is destined to stall in that area.

Public opposition for the BioBanking scheme has been strong and has come from a wide variety of groups. Environmental groups, as expected, are determined in their opposition, but they are not alone. Academics have voiced their concerns, and newspapers haven't been shy with their opinions. Opposition is a fact of life with virtually all programs, but the challenges of this program, and the resulting delays, have given the opponents of the program ample time and fodder to build their cases.

2.4 United States Department of Energy

What we have looked at so far deals with the conservation or remediation of land through offsets. The US Department of Energy, as part of their awkwardly named Fossil Energy Oil and Natural Gas Environmental Program, takes another approach. They recognize that land stewardship can also be accomplished by actively minimizing the impact industrial users have on the land.

Instead of just encouraging research and development in the area of minimizing environmental impacts or providing incentives, the DOE has taken a more aggressive approach. Whether in partnership or by themselves, they are directly funding research. Their motivations are two-fold. First, a quarter of American oil and nearly 40% of natural gas comes from federal lands. By

minimizing drilling impact they are directly protecting the land under their control. As significantly, any improvements they make could have a wider impact beyond just their own land. In essence, they are able to leverage their research dollars.

At this point you might be thinking that you've heard this tale before. There's a difference between this program and others that might sound similar—this one is producing impressive results. Working with Anadarko Petroleum, they have demonstrated the "Arctic Platform," an elevated 100-by-100 foot aluminum platform. It is designed to stand on steel legs above the tundra, significantly limiting impact. It could eliminate the need for gravel pads and ice roads in the arctic. Further south, it could be used for drilling in wetlands. It has a dramatically smaller footprint that traditional rigs, and it could be just the beginning.

Beyond technology, the department's work is having other significant impacts on land. A department study worked with the state of Alaska to determine when equipment could safely be moved over the tundra without causing damage. Previously, the standard was set without a scientific basis. As a result of the work, the 2004-2005 drilling season was able to start two weeks earlier and last three weeks longer without causing any more environmental damage. That might not sound like much, but the drilling season was only three months long to begin with. The extra time allowed some exploration projects that used to take two seasons to complete to be finished in just one. Oil is produced sooner, and the effect of the exploration on the land is minimized.

The purpose isn't to suggest that this program is unique, or that the results could only possibly come from this kind of approach. Instead, it is to point out that a relatively small amount of government investment, when properly leveraged, has the ability to make a significant impact on land stewardship.

3. Reactive Approaches

Our second set of case studies require a shift in thinking. Up until now, we have looked at proactive solutions to land stewardship problems. These programs have all sought to avoid damage to land or to offset damage as or before it happens. The next two approaches instead attempt to effectively repair damage after it has occurred. It would be overly simplistic to suggest that one approach is superior to the other. Each approach has strengths and weaknesses that tailor their appropriateness to different situations.

3.1 Reclamation Bonds

Reclamation bonds are used widely in the mining, forestry, and oil and gas businesses across North America. The specific mechanisms, approaches, and sizes of bonds differ by jurisdiction and industry, but the philosophy behind them is the same. A reclamation bond is a financial assurance that the site of resource activity will be properly cleaned up and restored when the activity ceases. This includes not just working to restore the flora and fauna in the area, but addressing any damage to the soil, water, or general environment. The bond is in place to cover all or part of the financial costs of the reclamation if the industrial user can't or won't undertake it themselves.

At the risk of oversimplifying, here's the basic bond system. The regulator and industrial user together project the cost of having a third party reclaim the land after the intended activities are completed. The regulator then determines the appropriate size of bond to ensure that the reclamation is done. In general, the regulator will assess the risk associated with the company defaulting on their reclamation responsibilities and act accordingly. The industrial user then posts the required bond in cash, as a letter of credit, a certificate of deposit, or through a third party such as a surety provider. One major exception to this approach is that some jurisdictions assign a required bond per acre instead of looking at the specific costs of a reclamation project. This significantly decreases the up-front administration costs, but may not reflect the real costs of reclamation.

Reclamation bonds do three key things. First, they ensure that the entire burden of cleaning up and reclaiming a deserted site isn't put upon the government, and therefore the public. Second, they act as an incentive for a company– the financial costs of non-reclamation and the damage to reputation and credit are often enough to encourage companies to do the right thing, even if the price is high. Finally, and perhaps most significantly, bonds shift the burden of proof onto the industrial user. The bond will only be released if the industrial user has satisfactorily proven that any damage has

been mitigated. That saves the government from having to resort to the legal system to have the site restored.

Bonding also effectively makes use of companies' concern about their reputation. The better the reputation a company has—their environmental record, history of corporate responsibility, and credit rating, among other factors—the smaller the bond a regulator will request, and the easier it will ultimately be to have that bond released. Industrial users are concerned about more than just financial considerations when making decisions about reclamation, and that is therefore an added benefit of this approach. As a side benefit, the bonding system can have a similar impact upon regulators. The better their reputation is for fairly administering a bond program, the higher the likelihood that companies will invest in their region.

These factors seem to make bonding an attractive approach to land stewardship, not to mention one that is comparatively easy to administer. That may be the case, but you know by now that nothing about the challenge of land stewardship is simple. There are challenges and problems. Some of those include:

Cost—Though bonding can be relatively inexpensive to administer once the bond is in place, the costs associated with establishing an effective contract to initially accompany the bond can be high for the regulator. In order to be effectively enforceable, the contract needs to detail what is expected of the industrial user in order to have the bond released. This adds both cost and complexity to the process of establishing a bond, and increases the chances that a bond is ultimately ineffective, or at least doesn't achieve its ultimate goal.

Financial burden—A bond can impose a high financial cost on a company. This can create liquidity issues, and those issues can be exasperated by the costs associated with establishing and developing the particular project. This can lead to a real problem—a bankrupt company will certainly not actively reclaim land. Though the bond itself will compensate for some of the direct costs, it may not be sufficient. Even if it is, it is not the ideal outcome for the government to undertake the reclamation. The bonds, then, can act as a negative financial factor in an already volatile industry.

Burden on smaller companies—For a mega-corporation undertaking a massive project, the cost of a bond can be basically incidental. These companies are well-capitalized and have the ability to endure short-term losses. Smaller companies may not have this luxury. It is also more expensive for smaller companies to secure third-party financing for bonds because their credit and reputation is likely worse than the large companies. As such, bonds can disproportionately favour large companies over small and can act as an impediment to investment for smaller companies or smaller projects.

Third-party factors—To avoid having to pay the entire amount of a bond up front, industrial users will often use a surety provider, such as an insurance company, to control costs. The user would pay a portion of the bond as well as an annual fee or premium to the surety provider, and that provider in turn assures the regulator that the bond will be paid as required. This lowers the cash costs to the industrial user, though it does not change the overall financial situation because the bond amount is recorded as a liability on the user's balance sheet. For the regulator, it has the advantage of spreading liability across another party and therefore limiting risks.

The problem is that the surety market is not always as secure as it may seem. The early years of this decade saw a collapse of the surety business in the US fueled in large part by the terrorist attacks of September 11, 2001. Though the attacks didn't have a direct impact on reclamation efforts, most surety providers were either part of insurance companies or were owned by them, so the effect was indirect but significant. These effects, coupled with a surety industry that was already losing choice and variety because of mergers and market activity, led to a much less friendly surety environment. Also contributing was the fact that surety bonds are long-term liabilities, and they are associated with industries with high levels of underlying volatility.

The net result is that industrial users have found it much more difficult to fund their bonds. Though some would applaud the fact that the bonding system can act as a barrier to entry for industrial users, others would suggest that it is the job of a land stewardship program to ensure that the public interest is

protected, but not necessarily to artificially affect the market to the extent that once viable projects are no longer so.

The surety crisis also exposed another problem. Some surety providers actually went bankrupt. Though the regulators forced the industrial users to find alternative means to fund their bonds, it meant that in the short-term, the regulators were not protected as they were meant to be by a bond. It was a startling reminder of the risks involved.

Effectiveness of reclamation—There is a philosophical debate well beyond the scope of our discussion that must be touched on briefly. Though reclaimed land is unquestionably better than non-reclaimed land, there is and will continue to be much debate as to whether reclaimed land is adequate. Reclaimed land will be contoured and will have native vegetation replanted, but the fact remains that it is not the same as untouched land and is unavoidably artificial. That's better than nothing, but policy-makers must be aware of the limitations and determine if this is an acceptable cost. Further, there is the question of time. Beyond just planting vegetation, effective reclamation requires time and patience to ensure that the vegetation is sustainable, and maintenance to address any issues that arise. The bonding mechanism doesn't necessarily ensure that this will happen and therefore won't necessarily achieve its goals.

Past actions—Though bonds have the ability to effectively address issues that could arise with new projects, they don't address problems associated with current projects or with projects that have already been deserted. That's not necessarily a fault of the bonding system, but it clearly calls for other solutions to work in tandem with bonding to address those situations.

The length of the list of problems is not meant to suggest that bonding cannot work. Used properly and responsibly, bonds seem to be an effective means of encouraging responsible behaviour among industrial users, and their versatility means that they are not limited to one type of user or application. Like so many other approaches, though, it's clear that bonds cannot by themselves be looked upon as the sole solution to land stewardship woes. They only seek to address certain problems in certain situations, and those situations are far from comprehensive.

3.2 Orphan Well Association

Our general look at reclamation bonds sought to address potential environmental problems with new projects. A more specific example, Alberta's Orphan Well Association (OWA), is a useful complement. It is the first program that we have addressed that seeks to deal with the impact that previous industrial use has had on land. The environmental sins of the past were often committed so long ago that the perpetrators are forgotten, or perhaps they no longer exist. The burden to reclaim and maintain this damaged land then falls to the public, so creative solutions are required to ensure that the needed stewardship work is completed.

The Orphan Well Association was established in Alberta in January 2002 and began operations on April 1 of the same year. It began as a partnership between the provincial government and the upstream oil and gas industry, and it operates as a financially independent nonprofit organization. An orphan is a well, pipeline, or other oil or gas related facility that is no longer in use, and for which no entity claims legal responsibility. If the last owner is no longer financially viable, then they will not be able to safely abandon the well and reclaim the surrounding land. The OWA takes over that responsibility.

Most of the funding for the OWA comes as a result of the Orphan Well Fund. This levy is collected annually by the Energy Resources Conservation Board, a department of the Alberta government, and remitted in its entirety to the OWA. The levy is calculated based on the proportional abandonment and reclamation liabilities each industry licensee holds. That is to say, the more wells and facilities a company owns that could one day be orphaned, the more they must contribute to the fund. The total revenue from the levy was just over $12 million in the 2007-2008 fiscal year. The rest of the revenue, about $1.6 million, comes from a first time licensee fee, special board directed transfer fees, and interest. Since the origin of the OWA, the levy has contributed about $72.5 million to reclamation and abandonment efforts.

In the most recent fiscal year, the impact of OWA efforts was significant. Proper abandonment of a well involves the removal of piping and the sealing of the well so that nothing dangerous is released and the containment of any contaminants. The OWA abandoned 12 wells last year, including one in Turner Valley bordering a new development that cost more than $2.2 million. Four pipelines were also properly abandoned. Facility decommissioning work was done at 14 different facilities. Most significantly, site reclamation and remediation work was done on 485 different sites at a cost of just short of $8 million.

On a philosophical level, this isn't a perfect solution. The funds to pay for orphan wells don't actually come from the people that have orphaned those wells. Because every company that is active is assessed the levy, the program does not act as a disincentive for poor environmental behaviour. The levy can therefore be viewed as a necessary cost of doing business that has no direct relationship to the activities of abandonment. That being said, most would agree that the payment for abandoned wells by those that could at some point abandon wells is a far better solution than payment coming from government and taxpayers. This solution also ensures that the funds are in place for orphan management and that a mechanism is in place for the effective management of those funds. In this way, orphan well activities can continue without concern for changing budget priorities or political environments that could threaten momentum. Effective land stewardship has to be an ongoing concern, and this program, in its own small domain, ensures that it is.

4. Finding Common Ground

We have now looked at six very different approaches to the same problem of how to encourage land stewardship among industrial users with effective public policy. None of the programs or approaches are perfect, but each has strengths that make it worthy of attention, and each could be useful in the western Canadian context if properly applied. Beyond the specific examples, though, what clearly emerges is some common traits of all of the programs. All six programs, when successful, share at least these four traits. Any program that is aimed at becoming a long-term solution to land stewardship problems in western Canada needs to, at the very least, consider these traits to determine if they are important and applicable.

High degree of government involvement—This one is particularly important because it will be counterintuitive to many people who embrace some of the solutions we have discussed. A common trait of several of the programs is that they are, or at least are perceived to be, market-based. It would be a common opinion that a market solution would work best when the government's involvement is limited. In these situations, though, this is not the case.

The TDC program in King County, Washington is very actively managed by the county government, and it wouldn't be nearly the success that it is if it didn't have the credit bank in place that allows the government to limit the supply of credits on the market so that the price is not depressed. Mitigation banking requires careful government involvement to approve the wetlands and to police the creation and sale of credits to be sure that the required mitigation actually happens. BioBanking, when it becomes active, will require heavy government involvement to assess the needed offsets and the appropriateness of the land in question for involvement in the program. The Orphan Well Association requires the involvement of the government to collect the levy, and to require it from companies.

Any of the potential solutions that were covered would require the firm commitment, well beyond the spoken word, of the government to the long-term success of the program. None of these programs are quick fixes, or are suitable for a short lifespan, so they are best deployed outside of the reach of changing political winds. The longest running programs that were examined, mitigation banking and reclamation bonds, have survived changes of government at the federal, state and municipal levels.

Inter-governmental cooperation—Land stewardship is not simply the domain of one level of government. The land that needs protection, and the right to give permission to industrial users to want to use it, falls under the control of federal, provincial, regional and municipal governments. The TDC program in San Luis Obispo showed us how a

program can go awry if affected levels of government don't buy in from the start. The King County program, on the other hand showed what can happen when the county and the city of Seattle were able to cooperate. Mitigation banking, when at its most effective, is a federal program working on state or municipal land. The Department of Energy's research efforts were notably effective when they partnered with the state of Alaska. In order for BioBanking to succeed, the New South Wales government will have to have the cooperation of municipal governments. It seems highly unlikely that any land stewardship effort which is taken on by one level of government without the cooperation and support of the other levels involved either directly or indirectly is destined for failure.

High level of front-end planning—Without exception, the approaches that have worked to any extent have been the programs that were well designed from the start. The consistent reality is that these land stewardship programs are complex and fragile—they can be easily derailed by what starts as the smallest oversight or loophole. The successful approaches took the time to assess the existing situation and the approaches that had not worked in the past, or those that needed improvement. They detailed the goals of the program, and ensured that mechanisms were in place to increase the chances of reaching those goals. They also had mechanisms in place to evaluate progress and correct any issues. The BioBanking program in Australia has been criticized widely for the time it has taken to implement, and it serves as a lesson in the complexity of such a program.

Limited scope – It would be tempting to design or advocate for a single land stewardship approach that could be relied upon to solve the problems faced by the governments of western Canada. Indeed, a large, comprehensive program would probably be easier to for a government to sell as a concept to those who elect them. What we have learned from these examples, though, is that even the most ambitious programs have a single goal. TDCs target development in appropriate areas. Mitigation banking targets the conservation of wetlands. BioBanking protects biodiversity from the threat of development. Reclamation bonds aim to repair the damage inflicted on land by industrial users. With a slightly different approach, so does the Orphan Well Association. Each program attempts to do one thing and do it well. As such, the land stewardship approaches are not in competition. Indeed, several American jurisdictions would have TDCs, reclamation bonds, and mitigation banking coexisting in reasonable proximity. An effective land stewardship program would seem to have a single, easy to define goal with progress that can be measured and communicated.

5. Public Policy Recommendations

Based on the six different approaches that have been explored, and the analysis of those approaches, six policy recommendations have emerged. Regardless of the land stewardship approach taken, each of these recommendations would increase the chances of success.

1. Involve reputation factors—Industrial users must be increasingly aware of their reputations—how they are perceived by government, lenders, and the public. A program that uses improved, or at least maintained, reputation as an incentive for compliance and the threat of diminished reputation as an outcome of non-compliance will be more successful than one that doesn't. For most companies, and certainly for larger ones, reputation will provide much more leverage than monetary considerations will by themselves.

2. Tightly define goals—A program with a single specific goal will be more successful than an ambitious broad reaching one. The program will be easier to define and initiate, there will be a better chance that problems that could derail the program can be anticipated and addressed, and momentum can be more easily captured and maintained. Early success can be analyzed and, if appropriate, replicated. The challenge of enforcement is lessened. Positive results can more effectively be communicated.

3. Embrace multiple approaches—Encouraging land stewardship is a complex and varied challenge, so the solution can't be as simple as implementing a single approach. Instead, it requires identifying a specific problem and implementing a solution to address it. No solution is universally perfect, but each is appropriate in a specific situation, and there is no reason why multiple solutions can't, or shouldn't, be used at once. As long as approaches aren't attempting to address the

same problem, and they aren't competing for or taxing the same resources, then more is almost certainly merrier.

4. Replace function, not area—Inevitably, industrial progress will require damage to previously untouched land. Offset programs are increasingly being embraced as a solution in these situations. That's appropriate, but will ultimately be most effective when the focus is on replacing lost function, not just lost area. All land is not created equal—an acre of Okanagan crop land not only has a different economic value than an acre of desert land near Drumheller or an acre of northern Boreal forest, but each also supports very different flora and fauna, and each has a different impact on the land and people surrounding it. If a program doesn't seek to replace the specific function of a damaged piece of land as closely as it can, then the overall loss will be too high.

5. Combine resources to maximize impact—Repeatedly we have seen the power of combined resources to maximize the effectiveness of a program. A credit bank has been successful in King County. Banking of credits is a recurring, effective component of offset programs. Bond pools are a potential means of simplifying access to reclamation bonds. When appropriate, the pooling or centralizing of resources can minimize administration, stabilize a market, and leverage the impact of a program.

6. Independent oversight—Any effective land stewardship program will have to balance the needs and interests of government, the industrial users, and the public. Those interests won't always co-exist peacefully. In the interest of progress and momentum, there must be an independent body in place for the purpose of mediating inevitable conflicts and ensuring that all needs are considered.

6. The Last Word

In addressing the land stewardship issues raised by industrial users, the governments of western Canada must strike a fine balance. On one hand, the need for public policy aimed at mitigating current and existing environmental damage and preventing more in the future is immediate and widespread. No delay in action can be afforded. If that action is undertaken without forethought, careful planning, and without the cooperation of all levels of government affected, it is destined to fail. Many examples of public policy options are being tested and implemented around the world. These six provide a taste of the range of options, but many more exist. As significant as the option, or options, that are chosen to be implemented in western Canada is the firm and sincere commitment of the governments involved to the long-term success of the approaches. With planning, foresight, commitment, and effort, land stewardship in western Canada can, and will, be significantly advanced.

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