

2005 Cottonwood and Riparian Zone Enhancement Project

Summary Report



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Bow River Chapter**

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By

Emily Minshull  
Project Crew Leader (2005)

## Executive Summary

Riparian zones are essential to the health of waterways for a number of reasons. They support a great deal of biodiversity, help to protect and purify water resources while also creating a popular recreational area for many outdoor enthusiasts.

Despite the obvious advantages provided by the continued health of these zones, their existence remains threatened for several reasons. The Cottonwood Project has worked to address some of these threats, particularly that of excessive beaver graving in cottonwood groves found in the Bow River Basin. One other major threat facing this area has been a disruption in the reproductive cycle of cottonwood trees due to weather patterns and dam activity. The floods in June 2005, while causing large amounts of damage to property and roadways, was actually a positive thing for riparian zones in that it allowed the natural reproductive cycle of cottonwood trees to take place.

The Cottonwood Project continued in its efforts to protect remaining Cottonwood groves by wrapping trees in wire mesh along the Bow River and its side channels. Between July 4 and August 5, a crew of six people wrapped trees in eight separate locations. In total, 1110 trees were wrapped using approximately 6524 feet of stucco wire mesh. In addition to its wrapping activities, the crew also removed noxious or restricted weeds from various locations and collected garbage left by receding flood waters.

In the future, two main challenges will exist for the Cottonwood project. The first of these will be the removal of wire wrappings on trees uprooted by the flood. While it is important for this mesh to be removed before it potentially enters the waterway, many of the trees are located in large, potentially hazardous piles along the river's edge. The second major challenge will be to ensure that all past sites are properly monitored and maintained. As new areas are added each year, it is essential that project leaders are able to easily determine when past sites need to be revisited.

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## I. Introduction and Background

*Riparian Habitat*, as defined by Gillilan and Brown (1997), is the area immediately adjacent to flowing and standing water bodies such as rivers, lakes and sloughs. Cottonwood trees (*Populus spp.*) and willow trees (*Salix spp.*) are characteristic of the riparian areas that skirt the river and stream valleys of southern Alberta. These groves support a disproportionate level of biodiversity compared to neighboring uplands (Gillilan and Brown, 1997), providing food and shelter for various species of animals, fish and insects.

Riparian zones also help to protect and purify water resources by creating shade that regulates water temperature and climate (McClusky et al., 1983). The extensive root systems of cottonwoods prevents sloughing and removes excess sediments and nutrients from the water system (Gillilan and Brown, 1997), while trees that have fallen into the watercourse create important water structures such as pools and riffles that help to control channel stability, stream bank stability and gradient (Platts and Rinne, 1985).

As well as the many ecological advantages created by riparian zones, these areas are also popular recreational areas. Enjoyed by hikers, fishermen and other outdoor enthusiasts these zones tend to remain busy all year round.

Despite the obvious advantages offered by the existence of healthy riparian zones, these areas remained threatened for several reasons. The Cottonwood and Riparian Zone Project has worked since 2000 to address some of these threats, particularly that of beaver grazing. The removal of many cottonwood groves for urban and agricultural development coupled with a decrease in the number of beaver predators found in the wild has led to a disproportionate concentration of beavers in what groves remain. While beavers are a natural part of the environment, too much beaver grazing can remove valuable forest cover, causing sloughing of streambanks, a reduction in water velocity and siltation and changes in water chemistry upstream of beaver activity (Christensen et al., 1961).

The Cottonwood Project has worked to protect remaining cottonwood groves from this overgrazing by wrapping tree bases in a wire mesh, a method that has proven highly effective in areas wrapped thus far. However, the greatest threat to the continued vitality of riparian zones lies beyond the scope of this project, as it involves the reproductive cycle of the tree itself.

While there are three species of cottonwood trees found in southern Alberta (Western Plains, Narrowleafed and Balsaam) these trees all reproduce in the same manner. Cottonwoods tend to grow almost exclusively on the relatively flat flood plains surrounding major rivers and streams as their reproduction depends largely on ice scouring and spring flood conditions. During spring flooding, water flows carry seeds downriver and then deposit them when waters begin to recede. The seeds can be carried for miles downriver, increasing the genetic diversity found in cottonwood groves throughout the zone. Receding flood waters also leave fresh alluvium deposits along

flood plains and banks, creating an ideal environment for seed germination. The exposed soil created by ice scouring is also essential, as young cottonwood seedlings do not compete well with overtopping vegetation. As seeds remain viable for only one to two weeks, it is essential that these factors be in place to ensure the continued growth of new saplings (USDA Forest Service, 2005).

In recent years the ability of Cottonwood trees to reproduce sexually has been greatly reduced by the drought-like conditions that have been maintained in the Bow River Basin. While these conditions are partially due to the hot, dry weather systems Alberta has experienced through most of the last decade, there has also been an abrupt reduction in the flow of river water due to the operation of dams upstream. This has affected the seasonal cycle of Cottonwood reproduction while also lowering the depth of the water table found in riparian zones (Mahoney, 1995). Because of this most reproduction in recent years has been asexual, particularly in the forms of suckering and coppicing. While this method of reproduction is capable of *maintaining* the groves found along river, in the long term it could lead to diminished genetic diversity in new growth, reducing the trees' ability to respond to disease or other changes in their environment (Rood and Bradley, 1993).

The early summer of 2005 saw these conditions radically change however as flood water along all major rivers and tributaries in southern Alberta reached unprecedented levels. Heavier than usual precipitation in the southwestern mountainous regions of the province created dangerously high water levels throughout mid to late June in the Red Deer River basin, the South Saskatchewan River basin, the Oldman River basin and the Bow River basin. Different storm systems moving through the region between June 1 and June 19 dumped anywhere from 170 to 510 mm of precipitation in some areas, causing the Bow River to peak on three separate occasions (Alberta Government, Precipitation, 2005). At these times, the river flow at Carseland Dam on the Bow River was over 1000 m<sup>3</sup>/s, as compared to average historical flows of only 200 to 300 m<sup>3</sup>/s in the same month (Alberta Government, Bow River, 2005).

The floods caused massive damage to buildings and roadways across the region. Albertan insurers estimated that they would need to pay out a total of \$217.5 million in flood-related claims, while uninsurable losses could amount to as much as \$100 million to \$200 million. If total estimates are correct, these floods could become Alberta's most expensive natural disaster to date (Gauntlett, 2005).

The flood damage created new challenges for the Cottonwood project as well. Many areas were difficult to get to as spillways had washed away entrance roads and bridges. Large accumulations of flood debris also made the wrapping of trees in some areas impossible, while extra care had to be taken along weakened riverbanks and streambeds.

Despite this, the benefits of the flood to the Bow River and surrounding areas were understood by all crew members. The large deposits of silt and gravel left behind by the flood would create perfect conditions for the germination of new cottonwood seedlings, while new spawning habitat was created along the river and its tributaries. In order to

maintain the vitality and health of riparian zones and thus the continuance of programs such as the Cottonwood Project, these natural occurrences need to take place every year, rather than infrequently as has been the case.

## II. Field Methods

### **A. Tree Wrapping;**

Cottonwood Trees were wrapped along waterfronts and side channels within a zone of approximately 20 meters from the water's edge. While a 20 meter distance was used as a benchmark, this was made more difficult by the higher than usual waterways. The spring and early summer floods eroded large sections of the bank away while also creating new "spillways" along the waters edge. Discretion was used in judging whether or not these areas would normally become spillways in the spring or if they were created by the higher than normal water volume.

The wire used to wrap the trees was 48"X 112 ½' Stucco Mesh. This mesh was significantly heavier and more durable than the poultry mesh used in the past, with the added bonus that it does not need to be stapled directly to the tree. This wire should have many benefits, the foremost of which includes an increased resiliency to damage caused by natural events such as ice flows. The flood damage of this year highlighted how easily the poultry mesh could be damaged, with many areas along the flood plane needing to be rewrapped specifically because of this damage.

The trees were wrapped leaving room for approximately 3-5 years growth. As the wire was rigid, a "tube" was created around the tree with the ends then overlapped and wired together. Approximately 15-20 cm of extra wire was used in the overlap section so that in future years the pieces can be expanded rather than requiring complete replacement.

At the beginning of the project teams of two people were used to wrap the trees as suggested by past project reports. However, as a different type of wire was used this year as compared to years in the past it was eventually found that the wrapping was accomplished more quickly and efficiently with every person working individually. The team was divided into two groups; with one group cutting the wire and the other wrapping the trees. The first group was small, with only one to two people estimating the size of trees in the surrounding area then cutting wire pieces to fit those trees. The second group would consist of three to four people actually wrapping the trees as directed by the cutters. This system had two main benefits in that it cut down on wire wastage while also ensuring that the tree wrappers had a steady supply of wire at all times. When this new system was perfected, it increased the number of trees the group was able to wrap every day by at least 30-40%.

## **B. Weed Picking;**

Weeds generally originate in, but are not limited to, areas of human activity such as boat launches and areas of natural or unnatural disturbances, such as sloughing or road sides. It has been found that targeting one weed species at a time is the most efficient and effective way to deal with an infestation. Restricted weeds were targeted first, then noxious weeds in order of abundance and locale. Weeds were bagged on site then removed by truck for disposal.

## **C. Garbage Collecting:**

The higher than usual flood waters experienced this year caused significant damage to most boat launches, parking lots and parks found along the waterway. The Cottonwood Crew attempted to mitigate some of this damage by collecting debris and garbage carried by the water in areas where it was needed. The crew would spread out and proceed in a line, bagging the garbage on site and then removing by truck for disposal.

## III. Results and Site-Specific Activities

### **Week 1: July 4 – July 8**

#### **Day 1 (Mon. July 4): Administration Day**

- Made trip to Legacy island (TU-BRC's 50 year lease property)
- Filled out necessary paperwork at Trout Unlimited Office
- Discussed goals of project with crew

#### **Day 2 (Tues. July 5): Policeman's Flats**

- Wrapping of some trees
- Weed removal
- Assessed damage caused by flood
- May require boat for further work

#### **Day 3 (Wed. July 6): Legacy Island**

- Removed wire and rewrapped 17 trees
- Attempted to clean fence found in parking lot, however area is severely logged with silt
- Sign was cleaned of debris and dirt
- Removed wire from a number of trees close to river where wire was damaged by flood debris or was girdling the tree

#### **Day 4 (Thurs. July 7): Educational Nature Walk**

- Learned about various plants and trees found in riparian zones. Special emphasis was placed on the identification and removal of noxious weeds, especially the kerrighana bush.
- In the afternoon helped pack boxes in the Trout Unlimited office as office is moving next week.

**Day 5 (Fri. July 8):** Trout Unlimited Office

- Helped to pack boxes and remove/recycle garbage to ready office for moving

**Week 2: July 11 – July 15**

**Day 6 (Mon. July 11):** McKinnon Flats

- Unwrapped 26 trees wrapped in poultry wire, replaced with Stucco wire
- Wrapped 52 trees in morning, 32 wrapped in afternoon
- Some trees could not be wrapped because of flood debris
- Replaced signs in kiosk

**Day 7 (Tues. July 12):** Dexter Nelson's

- Very hot day
- Used two rolls of wire (224 feet)
- Wrapped western and central sections

**Day 8 (Wed. July 13):** Dexter Nelson's

- Very hot day
- In the morning wrapped approx. 48 trees over a 2 mile stretch
- In the afternoon wrapped/rewrapped 32 more trees

**Day 9 (Thurs. July 14):** Legacy Island

- Cleaned off fence and made it visible
- Unwrapped several trees
- Wrapped 14 trees
- Cleaned Company Truck in Calgary

**Day 10 (Fri. July 15):** Trout Unlimited Office

- Helped to pack boxes and remove/recycle garbage to ready office for moving

**Week 3: July 18 – July 22**

**Day 11 (Thurs. July 21):** Bow River Conservatory

- Temp: 21°
- Heavy going as brush was very thick, worked east of Lodge
- Wrapped approx. 65 trees, using 3 ½ rolls of wire

- Went back to office early as truck was needed

**Day 12 (Fri. July 22):** Bow River Conservatory, Legacy Island

- Temp: 19°
- Worked west of Lodge, going was much easier due to scouring of flood waters
- Had to stop at bend of river as flood damage became extensive
- Many uprooted trees had wire on them, will need to be removed in the future
- Moved to Legacy Island in the afternoon, wrapped trees on Southeast side.
- Too much flood debris on west end of island to replace wrap there, will need to be monitored
- Unwrapped approx. 20 trees
- Between both places wrapped approx. 100 trees, using 5 ½ rolls of wire

**Week 4: July 25 – July 29**

**Day 13 (Mon. July 25):** Policeman's Flats, Deerfoot Extension

- Temp: 22°
- Due to restricted hours of entry for Deerfoot Extension, went to Policeman's flats for 2 hours in morning
- Cleaned litter on island carried by flood waters, extensive damage to picnic and parking areas
- Moved to Deerfoot Extension, worked on north bank, east of the bridge
- Heavy bush in some areas, evidence of extensive beaver damage
- Had to carry in wire (very heavy going)
- Wrapped approx. 100 trees, using 5 ½ rolls of wire

**Day 14 (Tues. July 26):** Deerfoot Extension

- Temp: 22°
- Started at 6 am due to restricted hours of entry
- Continued on north bank, east of the bridge
- Hard going as wire had to be carried in quite a distance
- Crossed side channel and finished day on island
- Had to miss some trees because of extensive flood debris
- Wrapped approx. 140 trees, using 7 ½ rolls of wire

**Day 15 (Wed. July 27):** Deerfoot Extension

- Temp: 24°
- Started on south bank, just west of bridge
- Had to unwrap a large number of trees, wire seemed quite old as many of the trees had grown around staples, these had to be left and wire cut from edge of bark
- Continued on east side of bridge in afternoon
- One crew member missing due to sickness, one crew member's last day
- Wrapped approx. 140 trees, using 6 rolls of wire (trees quite small)

**Day 16 (Thurs. July 28): Deerfoot Extension**

- Temp: 28° (feels hotter!)
- Only two crew members today
- Finished up on south bank, east of the bridge
- Moved to north bank on west side, worked to property line
- Removed a lot of old Stucco wire, despite having been there a few years was still in good shape, saved what pieces were still good to use again
- Wrapped approx. 90 trees, using 5 rolls of wire

**Day 17 (Fri. July 29): Carseland, Legacy Island**

- Temp: 25°
- Only two crew members today
- Finished more during week than anticipated, new sites to wrap don't start until next week
- Went to Carseland to check kiosks, need new keys as ones we had didn't work
- Went to Legacy Island, cleaned along shore line and assessed trees for wrapping

**Week 5: August 1 – August 5**

**Day 18 (Wed. Aug. 3): G. Groeneveld**

- Temp: 28°
- One crew member's last day
- Took a bit of time to find the place initially
- Worked from western property line along south side of river, quite a beautiful spot!
- Extensive beaver damage in some spots
- Wrapped approx. 130 trees, using 5 new rolls of wire and recycled wire from last week

**Day 19 (Thurs. Aug. 4): G. Groeneveld**

- Temp: 28°
- Continued working eastward on property
- Stopped when trees changed to mostly coniferous varieties
- Stopped by Carseland to change signs in kiosks
- Wrapped approx. 110 trees, using 5 ½ rolls of wire

**Day 20 (Fri. Aug. 5): Administration Day**

- Final day of work!
- Picked up cache of old wire left at Deerfoot extension and disposed of it
- Cleaned the inside and outside of company truck
- Organized and stored equipment in office storage space
- Finished up administrative work at office, crew members completed their evaluations

## IV. Recommendations

### **A. Organizational;**

1. It is strongly recommended that a database be constructed to improve the organizational capabilities of project leaders. As the number of areas visited increases every year, in the future more emphasis will need to be placed on replacing/expanding tree wraps already in place. The database will not need to be complex, but will require a comprehensive list of areas that have been wrapped in the past as well as areas that may require it in the future. It will then be easy for project leaders to scroll down the list and know which areas specifically need to be revisited from year to year. While a spreadsheet has been created (see Appendices) a database accessed in the Calgary office will be a more permanent solution to this problem.

2. Areas that have been wrapped should be visited at least every 3 years to ensure that the wrap is still in place and is not causing ecological damage. Due to the increased flood damage this year, I would recommend that all areas be visited by next year's crew. While many places were looked at this year to assess damages, excessive flood debris prevented most clean-up activities. A particular problem will be trees that have been wrapped in the past but were uprooted by the flood. Once the banks regain stability, many of the areas where these trees have washed up should be examined and the wire removed if possible to prevent it from entering the waterways.

3. Continuity of personnel from year to year has definite advantages. Try to retain at least one veteran crewmember each year if possible.

4. Maintaining the existing commercial account with Home Depot will be advantageous. The location of the store (in the Southeast of the city) was convenient as most field work was done in this area, while the service and quality of the material purchased was excellent. It was also beneficial in that material could be purchased on a bulk basis but picked up as-needed rather than all at once, cutting down significantly on the problems of storing extra or unused wire from week to week.

### **B. Technical/Field;**

1. The new stucco wire used this year has several advantages over the poultry wire used in the past. While being more durable it is also less invasive towards the growth of the tree as staples are not required. The major disadvantage of using this wire is the size of the rolls which can make it difficult to transfer through uneven or overgrown terrain. This problem can be mitigated by cutting the wire from a "central" location in a stand of trees then moving it forward only when needed. It was also found that the truck could be driven close to most areas being wrapped, cutting down significantly on the distance each roll needed to be carried.

2. Except for trees that are overgrown or difficult to get to, it is recommended that most wraps can be accomplished individually. As all the trees in one area would be

completed at a time, the crew still worked closely enough together that no one minded working individually. It also worked well to have one or two designated cutters, as they were able to monitor what trees still need to be completed from their central vantage point and direct crew members accordingly. The cutters were also put in charge of their pliers and any garbage from the rolls, cutting down significantly on the amount of equipment lost or left behind.

3. With the more durable wire it is very important to leave an overlap for expansion. It is possible that the wire will remain in good condition for many years into the future while the bending over of the wire at the seams (as compared to using staples) makes it much more convenient and easy to simply expand the wire rather than replace it entirely. In this way, the additional costs of the Stucco wire over the poultry wire will be mitigated over the long-term.

4. It is recommended that the crew leader inspect the trees done in an area before moving on. While I experienced little to no difficulty with the work completed by my crew, there is always the danger of a tree being started and not fully completed or equipment being left behind. A quick walk through the area ensures that these things are spotted before they create additional problems.

### **C. Safety;**

1. *Mosquito netting;* This year mosquito netting was purchased for all members of the crew. This helped to alleviate most of the discomforts of working in areas where the insect was prevalent while also reducing the risks associated with being bitten, particularly the threat of West Nile Disease. The netting also meant that minimal amounts of bug repellent needed to be used, making working conditions much more comfortable.

2. *Clothing;* Crew members should be made immediately aware of the proper attire required. Long pants and long sleeves should be worn at all times, especially as the stucco wire has sharp edges. Extra jackets were kept in the truck in case of rain or colder weather. It is also recommended that in the future wading/rubber boots be purchased for the crew, as many areas can only be reached by wading across small waterways.

3. *Gloves;* The heavier wire makes the purchase of sturdy gloves a must. As the wire is bent over using mostly the index fingers and thumbs, it is important that these areas especially have extra reinforcement. The gloves used should be inspected and replaced on a regular basis, as the wear on them is quite high.

4. *I-Pod's and MP3 players;* As these devices become more popular it can be expected that most crew members will use them. Because of this I was required to make certain rules regarding their use; particularly that the volume was not set too high and only one ear piece was used at a time. If these rules are not followed communication

between crew members becomes difficult, creating a possible safety hazard. If crew members are unwilling to follow these rules using the devices should be banned.

5. *Decreased bank stability*; Extra care had to be taken this year and may need to be taken in the future around river banks eroded by the flood waters. It was important to remind the crew of the dangers associated with the weakened bank while also monitoring them closely to make sure no one was working too closely to potentially dangerous areas.

6. *Canoe experience/swimming ability*; All selected crewmembers should have some ability or experience in this regard for obvious reasons.

7. *Safety kit*; This should contain an ‘Epi-pen’ or other safety device for those who may be allergic to bee stings. Face masks or antihistamines should be available to any crew members with allergies to pollen, grasses or other irritants. Crew leaders should inspect and familiarize themselves with all contents of the safety kit prior to the field component.

## V. Crew Evaluation

### **A. Charles Andreasen;**

Charles was a pleasure to work with due to his positive attitude and sometimes “entertaining” viewpoints. A popular member with the crew, he not only worked hard but also helped the day go just a bit faster. Due to his social nature I found it was desirable to have Charles work as the cutter, as it allowed him to still interact with other crew members while maintaining a steady work pace.

### **B. Stewart Sharpe;**

Stewart was an extremely hard-working and efficient worker. He was the last one to leave at the end of the day and the first to volunteer for the “extra” jobs. Besides this, Stewart was always cheerful and interacted very well with the rest of the crew.

### **C. Samantha Herald;**

Samantha was also an extremely hard worker. She possessed a “let’s get this done” attitude that sometimes made it hard to keep track of her, as she often completed her work early and moved ahead of the group. While working individually did not seem to bother Samantha, she was still very socially involved with the group at break times and after the workday was ended.

### **D. Kaitlin Watson;**

Despite being the youngest member of the crew, Kaitlin showed a great deal of maturity at the work site. She worked hard and remained focused on the task at hand. Despite the occasional reminder to turn down her MP3 player volume, Kaitlin was a pleasure to work with and have around.

### **E. David Oliveres;**

David was definitely one of the most entertaining members of the group. While he sometimes needed to be reminded to return to the task at hand, his positive attitude and energy made him a joy to work with. The crew and I were also sorry to see him leave early.

## VI. Summary

The six person TUC-BRC cottonwood crew visited 8 sites situated along the Bow River over 17 field days. This amounted to approximately 800 man hours (including travel time) of labor dedicated primarily to tree wrapping. Other activities included litter collection, weed removal and the postage of signage.

Tree wrapping took place on 12 of 20 days, resulting in the usage of approximately 828 feet of mesh and 139 trees in each area visited. The total linear footage of new stucco mesh used was 6524, with recycled mesh amounting to approximately 100 feet. In total, approximately 1110 trees were wrapped in the 2005 season.

Besides the tree wrapping, 6 days were spent in litter collection and pulling noxious weeds. While the silt and gravel deposits left after the flood decreased the presence of weeds in many areas, litter collection was an important activity in most of the areas visited.

## VII. Conclusion

The TUC-BRC Cottonwood Project for 2005 was undoubtedly a success. Once crew members adapted to the new wiring used, the pace and efficiency of the work completed was excellent. While the spring floods definitely created new challenges, the benefits of the flood to the Bow River and surrounded waterways was clearly understood by everyone in the crew. The greatest problem created by the floodways could not be addressed in this year due to bank instability, but crews in the future will need to develop ways to deal with the wire left on uprooted trees. If this wire is not removed it could cause ecological damage to the surrounding area and reduce support from the public for future projects. Besides this, monitoring and maintaining an increasing number of sites will be one of the biggest challenges facing this project in the future.

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## IX. Appendices

### A. Summary of Costs

Item	Place of Purchase	Date	Cost	Quantity	Subtotal	Taxes	Total
<b>Salaries-crew</b>	Trout Unlimited	/	\$10.00	744.25	\$7,442.50	/	<b>\$7,442.50</b>
<b>Salaries-crew leaders</b>	Trout Unlimited	/	\$14.00	373	\$5,222.00	/	<b>\$5,222.00</b>
<b>48"x112 1/2' Stucco Mesh</b>	Home Depot	5/7/2005	\$64.97	60	\$3,898.20	\$272.87	<b>\$4,171.07</b>
<b>Diesel</b>	Co-op Shawnessy	5/7/2005	\$40.00	2	\$80.00	\$5.60	<b>\$85.60</b>
<b>Bug Jacket</b>	Wal-Mart	5/7/2005	\$14.96	6	\$89.76	\$6.28	<b>\$96.04</b>
<b>Bandana</b>	Wal-Mart	5/7/2005	\$1.97	6	\$11.82	\$0.83	<b>\$12.65</b>
<b>Outdoor Camera</b>	Wal-Mart	5/7/2005	\$5.98	1	\$5.98	\$0.42	<b>\$6.40</b>
<b>Sunscreen</b>	Wal-Mart	5/7/2005	\$4.93	1	\$4.93	\$0.35	<b>\$5.28</b>
<b>Welded Fence</b>	Home Depot	5/7/2005	\$38.97	3	\$116.91	\$8.18	<b>\$125.09</b>
<b>Snips</b>	Home Depot	5/7/2005	\$9.95	3	\$29.85	\$2.09	<b>\$31.94</b>
<b>8" Pliers</b>	Home Depot	5/7/2005	\$8.95	4	\$35.80	\$2.51	<b>\$38.31</b>
<b>Longnose Pliers</b>	Home Depot	5/7/2005	\$6.84	2	\$13.68	\$0.96	<b>\$14.64</b>
<b>Brace Wire</b>	Home Depot	5/7/2005	\$3.87	5	\$19.35	\$1.35	<b>\$20.70</b>
<b>unknown tool</b>	Home Depot	5/7/2005	\$5.97	3	\$17.91	\$1.25	<b>\$19.16</b>
<b>unknown tool</b>	Home Depot	5/7/2005	\$3.87	5	\$19.35	\$1.35	<b>\$20.70</b>
<b>Snacks</b>	London Drugs	6/7/2005	\$9.98	1	\$9.98	\$0.70	<b>\$10.68</b>
<b>Repellent</b>	London Drugs	6/7/2005	\$9.99	1	\$9.99	\$0.70	<b>\$10.69</b>
<b>Claritin</b>	London Drugs	6/7/2005	\$18.99	1	\$18.99	\$1.33	<b>\$20.32</b>
<b>Claritin</b>	London Drugs	6/7/2005	\$6.99	1	\$6.99	\$0.49	<b>\$7.48</b>
<b>Opticrom</b>	London Drugs	6/7/2005	\$9.99	1	\$9.99	\$0.70	<b>\$10.69</b>
<b>Vulcan County Map</b>	Maptown	15/6/2005	\$23.50	1	\$23.50	\$1.65	<b>\$25.15</b>
<b>Rockyview Map</b>	Maptown	15/6/2006	\$20.00	1	\$20.00	\$1.40	<b>\$21.40</b>
<b>Foothills Map</b>	Maptown	15/6/2007	\$20.00	1	\$20.00	\$1.40	<b>\$21.40</b>
<b>County 16 Wheatland</b>	Maptown	15/6/2008	\$33.00	1	\$33.00	\$2.31	<b>\$35.31</b>
<b>Car Cleaning</b>	unknown	unknown	\$4.00	1	\$4.00	\$0.28	<b>\$4.28</b>
<b>Mobile Bill</b>	unknown	unknown	\$2.25	1	\$2.25	\$0.16	<b>\$2.41</b>
<b>Total:</b>							<b>\$17,481.89</b>

**B. Future Considerations:**

Land owner/Manager	Section	Township	Range	Tel. # (home)	Tel. # (work)	Comments
Spicer, John	4 c, d	22	28	938.7829		
	5 W.5d	22	28			
Kambeitz, Bob	3 c+isle	22	28	246.9671	266.555	
Lammie, Barry	11a,b	22	29	9389601		
Mchugh, M.	30 a, b	21	27	652.1069		
Thompson, F.	20 c	21	27	652.7231		
Lanz, Larry	19	21	26	936.5689		
Lorenson, L. & N., & L. Cleaveland	20	21	26			
Bertens, J. & A.	27 b	21	26			
Groeneveld, George, F. & M., and E.	21, 19 a, b	21	26	Flores - 684.3522	George- 684.3800	Section 23 a, b completed in 2005
	20 a, b	21	26			
	24 a, b	21	27			
Limbow Farms	23 a, b	21	26			not accessible by land only approx. 30 trees to wrap
Rolling Mix Mgmt	30 a, b, d	21	25		253.6426- Marco	
Rumple, Glen - Stampede Toyota	28 a	21	27	286.9682 - Stampede Toyota		

### C. Sites Visted 2000-2005

Land owner/Manager	Section	Township	Range	TEL. #	Tel # work	Year Visited	Comments
Alberta Fish and Game Association	19 a	20	1			2003	Sheep River west of Okotoks
Augustina Farms	25	21	28	Clint-830.2231	Joseph Shaughoff (mngt)-652.7632 (c) 540.7070	2001, 2002, 2004	
Bowvista Farm's Ltd.	3 a, c 34, 35, 36 30	22 21	21 28 28 27			2000, 2001	
Brown, I.-Mrs. Brown's Nature Hideaway	26 c	21	28			2001	
Burnswest Corporation	8 c, d	22	28			2000	
Campbell Estate	20 d	20	1			2003	Sheep River west of Okotoks
Cottonwood Golfcourse					Tiffany Gordon 938.7577	2001	
Danube Farming							No trees to wrap along river-steep escarpment
Deerfoot Extension						2005	Managed by Alberta Transportation
Evan, Brian	7 b	22	28			2000, 2001	
Groeneveld, G.	23 a, b	21	27			2005	
Hamilton, T.- owner Mike Mailey - mngt.	27 W.5a S.5b	21	26	Mike-684.3573	(c) 807.8194	2004	
Johnson's Island						2001 - 2004	
Kambietz, B.						2001, 2002	
Lance, H., Wheeler,N. Bow River Lodge	24 c,d	21	27	936.5492	Michelle Stuart-936.5639	2004	May have also been visited before 2004
Legacy Island						2000-2006	Wire replaced on east side 2006, still needs replacing on west side
Lyster, E. - owner Mike Mailey-mngt	22 d	21	26	Mike-684.3573	(c) 807.8194	2002- 2004	
Mansion Run						2000-2002	
McKinnon Flats						2001 - 2005	
Morrison, Don & Lois Bow River Conservancy	27 a, N.5b	21	26	242.4505		2003, 2005	Old wire needs to be removed from flood damaged trees
Nelson, Dexter	23 d	21	26	934.2903	240.6509	2001 - 2005	
Nelson, Mervin	25 a	21	26			2004	
Nodwell, J.	30 c	21	26			2004	
Phillips, Leland & Jerri Bow River Resort	28 a,b	21	26	540.5462		2003	
Pine Creek						2004	Access by boat
Policemans Flats						2001-2005	Access by boat, flood damage
Shields, Jay	12 c,d	22	29	938.7996		2004	
Spicer, John	8 c; 5 b, d	22	28			2001, 2003	
Strath, J.	25 d	21	26			2004	
Urgai, K. & C.	12 b	22	29			2004	

