ECONOMICAL ALTERNATIVES
to cropping adjacent to riparian areas

Healthy Riparian Areas and Their Functions

Riparian areas are the areas adjacent to creeks, rivers and wetlands that are influenced by water. Healthy riparian areas are often able to support unique water-loving plant communities made up of shrubs, trees, grasses, sedges, rushes, and forbs. These important areas provide clean water, forage and wildlife habitat.

Healthy riparian areas are important because they perform essential functions such as:

- producing abundant vegetation;
- filtering out sediment, fertilizer and pesticide residues in runoff from agricultural lands;
- trapping sediment and building banks through the deposition process;
- protecting banks and shorelines from erosion;
- slowing water to allow percolation into the soil, recharging ground water; and
- slowly releasing water from shallow groundwater into streams during dry periods.

Because healthy, functioning riparian areas generate many economic and environmental benefits, it is important that producers strive to retain riparian and wetland areas. Landowners, particularly crop producers, receive benefits through soil and water retention and reduced impacts associated with flooding, while members of society receive downstream benefits such as reduced contamination of water sources from agriculture, recreation and tourism opportunities, and improved fish and wildlife habitat.

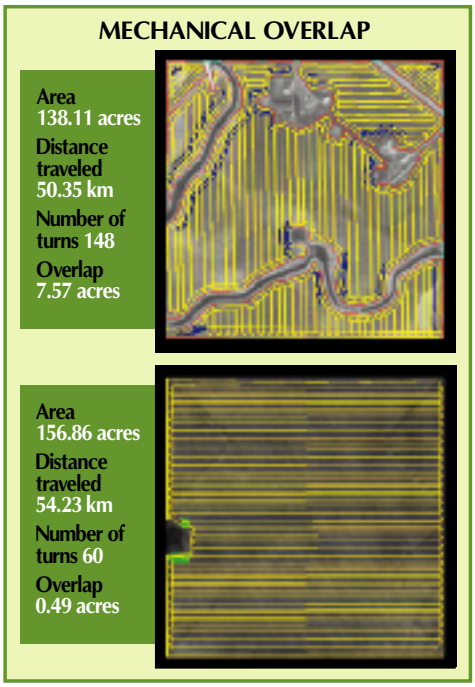


Figure 1. These aerial photographs illustrate how farming irregularly shaped fields increases mechanical overlap, turning time and the distance traveled for field operations.

Crop Farming Along Riparian Areas

Often, lands adjacent to creeks and rivers have highly productive soils suitable for crop production. However, the meandering courses of creeks and rivers, in addition to geological features such as prairie potholes, create fields that are quite irregularly shaped. Technological change has increased the size of field equipment that is used for cultivation, spraying, seeding, swathing and combining. Farming these areas with large equipment results in increased mechanical overlap, greater turning time and more areas that simply get missed. This ultimately leads to increased inputs of labour, fuel, fertilizer and pesticides. Overlap of inputs results in decreased crop production, and misses will result in weed invasion.

This combination of factors negatively impacts the economics of cropping operations.

Even in fields without irregular features, the economic cost of overlap and misses are large enough to generate an entire new industry in precision farming technology and services. The economic cost of overlap and misses only increases with the inclusion of riparian areas and prairie potholes.

Riparian Beneficial Management Practices

Some of the Beneficial Management Practices that crop producers working near riparian areas can implement include:

- buffer strips of perennial vegetation;
- grassed runways; and
- bioengineered erosion control.

The conversion of croplands adjacent to riparian areas to perennial cover acts to reduce sediment, fertilizer and pesticides in runoff from fields from entering the water systems. However, uniform buffer strips and grassed runways do not address the problem of farming around obstacles. Therefore, it is important to design buffer strips that 'square up' the field, resulting in more efficient field operations and reduced input costs. Ideally, riparian Beneficial Management Practices contribute to both healthy riparian functions and to a healthy bottom line for the farm.

Alternative Perennial Crops that can be used as Riparian Beneficial Management Practices

Once fields are 'squared up' with perennial crops, the question becomes, 'How does a producer profit from that perennial crop?'

Six options for using different perennial crops to "square up" fields are outlined below. The economic impact of establishing these perennial crops was examined by comparing the Net Present Value of each option. In each case, it was assumed that 120 acres on each quarter section could be annually cropped. Then, 25 acres was converted to perennial cover to act as a buffer between the cropland and the riparian area.

By calculating Net Present Value, we are able to account for, using 2005 values, the full cost of all the activities that would need to be undertaken to complete the conversion to perennial crop, based on current provincial cost averages. That includes all seeding, weed control, establishment, management and infrastructure costs over a ten year period.

Each of the options presented here removes land from annual crop production, but continues to generate income from perennial cover. However, it is important to keep in mind that there are up-front costs involved in converting to any of these perennial crops, and that the costs of doing so will vary from operation to operation. In some cases the cost of implementing these Beneficial Management Practices may be significant, so it is crucial that each producer take the time to carefully analyse their own situation. Furthermore, there may be other, more viable Beneficial Management Practices that would be better suited to a given operation than those illustrated here.

WHAT IS NET PRESENT VALUE (NPV)?

Adopting alternative crops adjacent to riparian areas can generate a wide range of economic benefits. These expected benefits are described as Net Present Value – a calculation that shows the result of a multi-year investment in today's dollars.

Net Present Value is calculated by adding the net gains from selling the new commodity (e.g hay) using current (2005) market values and the input expenses over a specified time period, and then subtracting the establishment cost and the previous crop income for each year. This yearly net income is in turn converted to today's dollars, thus Net Present Value.

When Net Present Value is positive, that tells us that a producer who adopts a riparian Beneficial Management Practice will realize an improved economic return through this change in management. In some cases the returns might improve slightly, while in others the returns may improve significantly.

For example, producers in the black soil zone can expect to see improved return of $64/acre from hay sales. The return of $64/acre is the income stream value for ten years if taken today.

Forage for hay production

The 25 acres designated for perennial cover are converted to an alfalfa and grass mixture. Hay is harvested and sold on an annual basis. In this scenario, Net Present Value ranged from $30 to $64/acre over ten years depending on the soil zone. It is important to note that in this case, one-time rejuvenation of the stand was included over the ten year period.

Fall Pasture Lease

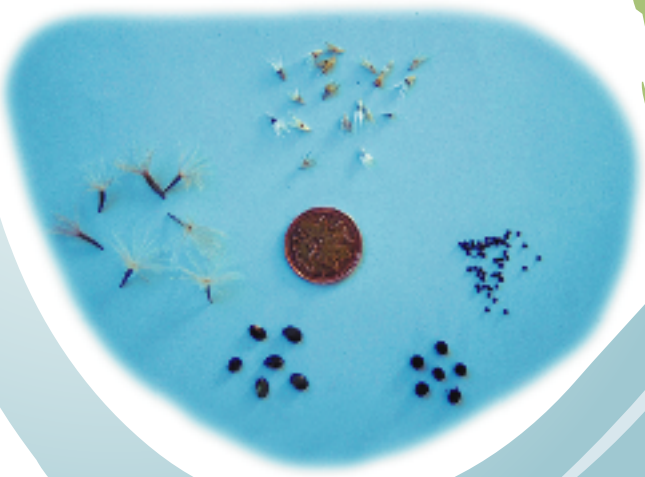
The 25 acres designated for perennial cover are converted to forage and fenced, along with the cropland. The stubble and the stockpiled forage can be fall grazed after the growing season, allowing the crop producer to lease the whole area to a cattle producer on an annual basis. This was the only option to show a negative Net Present Value, due to the fact that costs included constructing two miles of four-strand barbwire fence and developing a remote livestock watering system, on top of all the costs associated with utilizing forage for hay production. There are other fencing and watering options which make this scenario more viable.

Saskatoon Fruit Production

The 25 acres designated for perennial cover are converted to Saskatoon berry bushes and harvested as fruit. The calculated Net Present Value of this scenario approached $40,000/acre, which makes it look very attractive. While costs included a lengthy start up time and a considerable cash investment, this option needs special attention in areas of marketing and labour requirements. As with all options, do your homework.

Native Seed Production

The 25 acres designated for perennial cover are converted to native grasses. The grasses are then harvested for seed and sold on an annual basis. The Net Present Value of growing native seedstock is also very attractive, ranging from $165/acre in the brown and dark brown soil zones to $192/acre in the black soil zone. As with the Saskatoon fruit production option, the producer will need to take a hard look into their marketing options, so careful analysis is required.



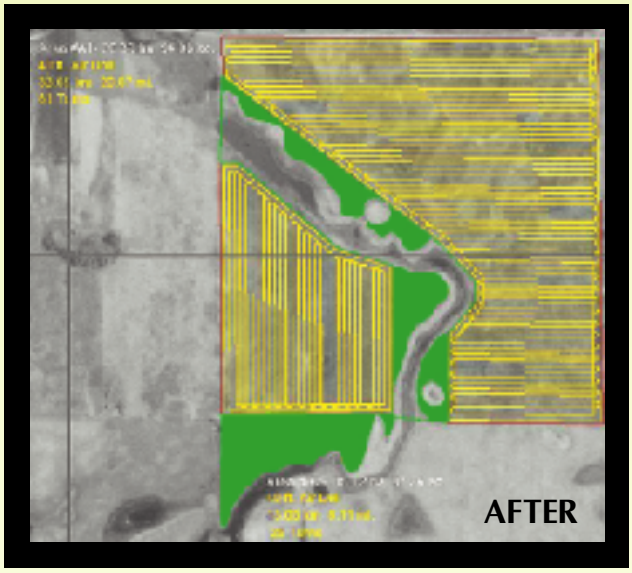
Afforestation Plantation

The 25 acres designated for perennial cover are converted to a hybrid poplar that can be harvested and sold after a twenty year period. In the brown and dark brown soil zones the Net Present Value was positive, but only in the range of $10-$13/acre. However, in the black soil zone where moisture is not a limiting factor, the average Net Present Value was $78/acre over a twenty year period.

Poplar Stooling Beds

The 25 acres designated for perennial cover are converted to plantings of poplar that are harvested annually and sold for seedstock production. This is another labour intensive option that focuses on a niche market, but it is worth investigation. The Net Present Value averaged $1,800/acre over a ten year period.

This economic analysis shows that producers are better off carefully considering Beneficial Management Practices for their farms, but these initiatives are not easy in the beginning. It is important to consult knowledgeable people as a source of valuable information and ideas for your farm situation.



HOW TO "SQUARE UP" A FIELD

Cultivated Acres	
Before	After
151.42	132.22

Distance Traveled (km)	
Before	After
53.54	46.64

Number of Turns	
Before	After
96	86

In this example, the producer stands to benefit from reducing the amount of mechanical overlap by nearly 4 acres (or approximately 3 percent of the total field acreage), from eliminating areas which would be difficult to work in wet spring years, and from converting over 19 acres from annual crop to one of the perennial crop options discussed here.

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PROJECT PARTNERS

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