

AN ECONOMIC SPREADSHEET TEMPLATE TO ESTIMATE THE BENEFITS AND COSTS OF LOW MANAGEMENT TIMBER FILTER STRIPS

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Notes on Spreadsheet Template:

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Software: Microsoft Excel version 7.0

Notes and Acknowledgments:

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Introduction

This paper provides directions for using a spreadsheet template that assesses the impact vegetative filter strips have on the finances of a farm operation. A *low management timber option* is explored here, where the land along a stream or ditch is taken completely out of production and converted to timber. Timber harvests occur to provide future benefits.

For general background information on vegetative filter strips, please see AEX-467, "Vegetative Filter Strips: Application, Installation and Maintenance." For general background on the environmental, economic, and financial decisions related to vegetative filter strips, please see AE-6-98, "The Economics of Vegetative Filter Strips." That Fact Sheet focuses on the most important economic considerations associated with the decision to install a filter strip. It provides estimates of the economics of four different types of vegetative filter strips, using the typical costs and benefits one might expect in the state of Ohio.

While the estimates in the Fact Sheets above are useful for many purposes, they may not always fit a particular situation. Because land values, the size of the application, the cost share payment, and the project duration differ from place to place, the financial impacts may vary from landowner to landowner. This template provides a tool for farmers to determine the benefits and costs for their own situation.

Additional templates that explore hay, grass and legumes, and high timber management, as well as the Fact Sheets described above, are available through the Department of Agricultural, Environmental, and Development Economics at The Ohio State University at

<http://www-agecon.ag.ohio-state.edu/Faculty/bsohngen/bmp/bmpinfo.htm>.

Discounting and Present Value

Because the costs and benefits of vegetative filter strips occur at different times, financial considerations must use the net present value approach. While discounting can be a complicated subject to learn, the spreadsheet template does these calculations automatically. All necessary components to correctly account for interest rates are included. All that is needed is the user's preferred project duration and interest rate.

The spreadsheet template is set up to calculate the net benefits of the project, accounting for benefits and costs that occur today and in the future. This is the relevant decision variable that will allow landowners to determine how much of an impact the proposed project will have on their bottom line over the life of the project. The final net benefit or cost estimate is the net present value of the gain or loss in profits that the farmer may expect over the life of the project. In addition, the annual values are presented to show the average effect on profits from year-to-year.

Template Instructions

These instructions are organized to help individuals input ten necessary values in the spreadsheet, and to understand the results. The worksheet is set up so that the user first inputs the ten necessary pieces of information. Once this information is entered, the calculations occur automatically and the results can be viewed at the bottom of the page.

Each step in the calculation is explained below. The initial numbers used in this worksheet represent typical values for the state of Ohio. Users have the ability to alter certain numbers according to their own situation.

The rows in the worksheet represent particular cost or benefit items that occur with the establishment of the filter strip. They are numbered from row 1.1 to row 2.4. Although there may be additional benefits and costs, depending on the landowner's particular situation, these represent the most common to most applications in Ohio.

The first column in the spreadsheet template lists the names of the benefits or costs. Column A lists the number of years over which these costs and benefits occur. Column B is the dollar value of the benefit or cost for each acre in each year the benefit or cost is presented, and Column C is the present value of Column B over the correct number of years. Values in Column D are the present value of the costs or benefits for the number of acres specific for the filter strip application. Negative numbers indicate costs inside brackets (in red) and positive numbers indicate benefits (in black).

Required Inputs

There are ten necessary inputs for this spreadsheet template to work:

(1) Interest rate: The interest rate chosen should be the same as the interest rate a bank has charged you for a recent loan.

(2) Time period: The user must input the length of time they plan to maintain the filter strip.

The default value used in the spreadsheet is 80 years. Since this spreadsheet analyzes a timber filter strip, we caution against using numbers lower than 40 years. Timber stands in Ohio take 40-80 years to mature without management, and shorter time period may reduce the quality and value of the stock at harvest, below which the parameters in this spreadsheet would not be accurate.

(3) Number of acres: Input the size of the filter strip in acres.

- (4) Cost-share contract length:** Input the length of time the cost-share contract will run. For CRP contracts, this is typically 10-15 years.
- (5) Signup bonus:** Some cost share programs have sign-up bonuses. These bonuses can be factored in directly by providing the dollars per acre provided by the program. \$150 per acre per year is the default value for the input.
- (6) Cost share for initial establishment costs:** Cost share programs like CRP often pay half the cost of establishing a filter strip. Individual contracts may vary, however, so landowners should input the expected amount of cost share paid by the program they choose. The default value is \$200 per acre in the spreadsheet.
- (7) Cost share for rental payments:** Cost share programs like CRP often pay half of the annual value of land rent for the life of the contract, usually 10-15 years. The default value is \$60 per acre per year for the years the contract is in force. Note that while CRP contracts last only 10-15 years, timber filter strips must be maintained longer to obtain future benefits of harvest. The value of these payments is calculated only for the number of years given in (4).
- (8) Timber harvests:** Input a 1 if you expect to harvest the trees and sell them on the market, and a 0 if you expect to clear the land without selling trees.
- (9) Annual rental rate:** Input the value of the land you are using for the filter strip in crops. \$120 is used as the default value to represent a typical land rental rate for corn-soybean rotations in Ohio.
- (10) Timber price:** Timber prices differ from species. The table of average stumpage prices is therefore provided to the right of the template for reference purposes. Users can choose an appropriate price to fill the column from your own consideration.

Information on Calculations

The calculations in this spreadsheet are given for each row. The rows in the spreadsheet are identified by numbers corresponding to the text below. Some values for the worksheet are provided for the users, based on typical usage. These calculations have been protected from change.

Costs

ROW 1.1 Seedling Purchase and Planting Costs

Seedling purchase and planting costs occur only at the very beginning of the project. Typically purchase and planting costs in Ohio are \$378 per acre. These costs are not discounted because they occur at the beginning of the first year.

ROW 1.2 Mowing Cost

Mowing is assumed to occur five times per year over the first 3 years, with an estimated cost of \$25/acre per mowing. The present value of these costs for each acre in the filter strip is calculated in column C. Mowing costs are assumed to occur at the beginning of the year, so that discounting only happens in the second and third years.

ROW 1.3 Land Rent

The present value of land rent is calculated in this row for all acres in the filter strip. Land rents occur for the entire life of the project, and are assumed to occur at the end of each year. Note that while cost share payments for land rent may occur only for 10-15 years, land rent is a continuing cost of removing land from agricultural production for many farmers.

ROW 1.4 Total Costs

This row sums the values from row 1.1 to 1.3.

Benefits

ROW 2.1 Initial Cost Share Payment

Signup bonus and the establishment cost share payment are the initial benefits landowners receive. The category sums up both of the bonus and the cost share, the inputs by the user in the top of the spreadsheet. These are assumed to occur at the beginning of the first year.

ROW 2.2 Rental Cost-Share Payment

This row provides the present value of the cost share payments for land rent. Land rent cost share payments will occur for the number of years in the contract, as input above. These payments are assumed to occur at the end of each year.

ROW 2.3 Timber Returns

Timber returns reflect the value of the stock in the year it is harvested. The value per acre at the time of harvest is shown in column B. The present value of this is shown in column C. While timber returns rise as trees age, the present value can fall because of the effect of interest rates. The following assumptions were used to calculate tree volume in the year of harvest: (1) Doyle Rule; (2) 8 years to grow 2 inches of diameter; (3) 2 logs harvested per tree; (4) 50 merchantable trees per acre at harvest.

ROW 2.4 Total Benefits

Total benefits represent the sum of rows 2.1 to 2.3.

Net Benefits (Costs) with Cost Share

ROW 3.1 Present Value of Net Benefits (Costs)

This row represents the impact of the filter strip on farm profits over the life of the project with the cost share program. Positive numbers (in black) indicate that the filter strip adds to profits while negative numbers inside brackets (in red) indicate the filter strip is a cost.

ROW 3.2 Annual Net Benefits (Costs)

This row shows the average annual benefits or costs of the filter strip.

Net Benefits (Costs) without Cost Share

ROW 4.1 Present Value of Net Benefits (Costs)

This row represents the net benefits or costs without the cost share program benefits in row 2.1 and row 2.2. These values can be compared to rows 3.1 and 3.2 to determine the value of the cost share program to the landowner. Positive numbers (in black) indicate that the filter strip adds to profits while negative numbers inside brackets (in red) indicate the filter strip is a cost.

ROW 4.2 Annual Net Benefits (Costs)

This row shows the average annual benefits or costs of the filter strip when the landowner does not participate in any cost share program.