

# **FORVAL-XL: FOrest VALuation and Investment Analysis in Microsoft Excel**



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FOREST AND WILDLIFE RESEARCH CENTER

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# **FORVAL-XL: FOREst VALuation and Investment Analysis in Microsoft Excel**

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# Guidelines for Initial Access to FORVAL-XL

Using Microsoft Excel on a Personal Computer

## — Instructions for Enabling Macros in Excel —

### Step 1: Unblock the File if Marked as an “Untrusted Source.”

#### Locate the File:

Navigate to the location where the Excel file is saved on your computer.

#### Open the File Properties:

Right-click on the file and select Properties from the context menu.

#### Unblock the File:

In the General tab of the Properties window, look for a checkbox that says Unblock under the “Security” section. If the option is visible, check the Unblock box. Click Apply and then OK to save the changes. Open the file in Excel.

### Step 2: Enable Macros in Excel.

#### Open Excel:

Open Microsoft Excel.

#### Go to the File Menu:

Click on **File** in the top-left corner.

#### Access Excel Options:

Scroll to the bottom of the File menu and select **Options**.

#### Trust Center:

In the Excel Options window, select **Trust Center** from the left-hand menu.

Click on **Trust Center Settings** on the right-hand side.

#### Enable Macros:

In the Trust Center window, select **Macro Settings** from the left-hand menu.

Choose **Enable all macros (not recommended)**.

(Optional) Check the box for **Trust access to the VBA project object model** if your project requires it.

#### Trusted Documents:

Select Trusted Documents from the left-hand menu and ensure the **Allow documents on a network to be trusted** option is checked.

#### Click OK:

Click **OK** to close the Trust Center and then **OK** again to close Excel Options.

### Step 3: Save and Open the File.

Open the file in Excel. If macros are properly enabled, the file should function as intended without any warnings. If a yellow **Security Warning** bar appears at the top of the Excel window, click **Enable Content**.

# INTRODUCTION

Forestry and timberland investments often involve large amounts of capital and long periods of time. The time value of money is therefore a critical factor for forest owners and managers.

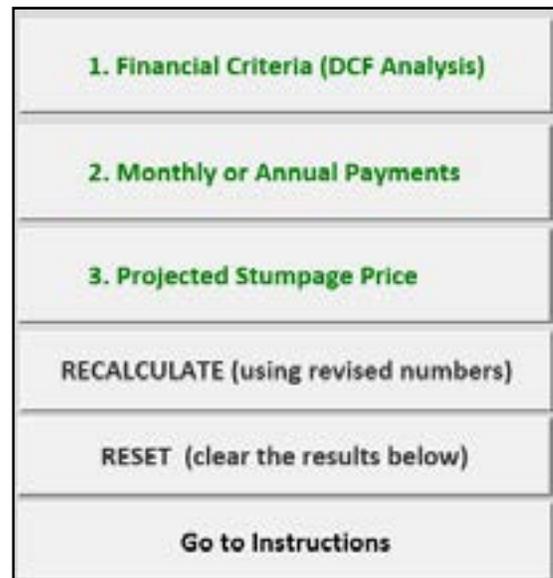
Forest valuation and investment analysis must accurately account for costs and revenues that occur at different points in time, and that can be of several types. They can be single sums like reforestation costs and final harvest revenues, for example, or they can be annual like yearly hunting lease income, or annual management costs and property taxes. They can also be periodic in nature, like thinning revenues or prescribed burning expenses. A forester's education involves considerable economic and business coursework to learn to accurately account for the time value of money, preparing him or her to calculate and evaluate financial criteria for making forest management decisions.

FORVAL (FORest VALuation) was originally created in the 1990s as a simple, easy-to-use forest valuation and investment analysis computer program. FORVAL is basically a specialized calculator—a handy tool to assist foresters in forest valuation and investment analysis. It was popular from the very beginning due to its user-friendly design and because of its focus on forestry financial applications. For decades, FORVAL has been available free-of-charge through the Forest and Wildlife Research Center at Mississippi State University.

The 2025 version of FORVAL has advantages similar to the original version of the program, i.e., the modeling approach focuses on a simple input process, tabular displays oriented to the timing of costs and revenues, and discounted cash flow (DCF) results for all the major forestry investment criteria. FORVAL has gone through several iterations, with floppy disk, Windows, and online versions. The current version, FORVAL-XL, operates within Microsoft Excel using a macro programming language called Visual Basic for Applications. Those familiar with the earlier versions

of FORVAL will find the current version has the same simple analysis framework, with easier inputs, better presentation of results, and the added ability to generate sensitivity graphs. Also, FORVAL-XL has the RECALCULATE option to reestimate the financial criteria with revised cash flow inputs, and the RESET option to begin a new analysis.

FORVAL-XL offers three main analysis options: **Financial Criteria, Monthly or Annual Payments, and Projected Stumpage Price** (Figure 1).



**Figure 1.** FORVAL-XL analysis options from the main menu, including **RECALCULATE** and **RESET** options.

The three main options include sub-options to define the type of information desired. Input data and financial results are produced in easy-to-read tables and the results can be printed for use in reports. After analysis there is an option to re-enter discount rates, as a means of performing a sensitivity analysis of how the financial criteria are impacted by the interest rate (results are produced in tabular and graphical formats and can be printed). The specifics of FORVAL-XL's options are described below.

## FINANCIAL CRITERIA

The Financial Criteria option provides the primary investment analysis tools, all based on standard discounted cash flow (DCF) analysis. After entering the cost and revenue data, the user has options to generate three types of financial analysis results:

- (a) NPV, B/C, EAI, and ROR;
- (b) LEV; or
- (c) Premerchantable Timber Value.

Most of these are standard financial analysis criteria, with LEV and Premerchantable Timber Value applicable specifically to forestry.

These criteria, their interpretation, and forest valuation and analysis are described in substantial detail in a textbook by Bullard and Straka (2011), available free-of-charge online from <https://scholarworks.sfasu.edu/forestry/460>. A more complete description of the financial criteria is available in a Forest Landowner magazine article (Straka and Bullard 2001), available online at <https://scholarworks.sfasu.edu/forestry/91>. The investment and cash flows used in the discussion below come directly from that article, and we refer the user to that source or the textbook for detailed financial criteria descriptions. Premerchantable Timber Value is discussed in the textbook.

Simple definitions of the criteria are: Net Present Value (NPV) is the present value of all revenues minus the present value of all costs at a specified discount rate (the basic DCF analysis result). Equivalent Annual Income (EAI) is the annual sum of money that is equivalent to a projected stream of costs and revenues at a specified discount rate. EAI is often used to compare or rank investments that are not equal in duration. The Benefit/Cost Ratio (B/C Ratio) indicates a project's return per dollar of investment in present value terms. B/C Ratio is the present value of all revenues divided by the present value of all costs. The Rate of Return (ROR) is the interest rate that makes the net present value of an investment equal to zero. This is the rate of return actually earned on the investment. Land Expectation Value (LEV) is the value of land for perpetual forest production. It is the net present value of all revenues and costs associated with growing timber on the land for perpetual timber rotations. LEV is often called "bare land value" or "soil expectation value." Premerchantable Timber Value

is today's value of a young timber stand without commercial value considering expected future cash flows.

In FORVAL-XL, the input of financial data for the Financial Criteria option occurs in simple steps. In step 1, each cost is entered separately, either as a single sum or an annual series using "Submit" for each entry. When all costs have been submitted, "Exit" is entered to move to step 2. In step 2, each revenue is entered separately in the same manner as step 1 (Figure 2). Commas should not be used in large numbers. Step 3 is the selection of the financial criteria to be calculated, and then the user specifies the discount rate for the DCF analysis. The financial summary is then generated automatically.

A simple forestry investment timber rotation cash flow will be used to illustrate the process (Table 1). In step 1, establishment cost will be entered as a single sum and submitted, followed by management and property taxes entered as an annual cost, then exiting to step 2. In step 2, the three revenues will be submitted separately, then exiting to step 3. Step 3 is selecting Financial Criteria, and then a discount or interest rate is entered for the analysis. The data in Table 1 will generate the final report in Figure 3 using a 4% interest rate. Notice that toward the top of the results there are options to "Open DCF Results as a PDF file" and to "Print DCF Results." Also note that a title and other details can be added to the final results.

The NPV of this investment is \$363.41 per acre. This means the investment would earn a 4% rate of return, plus \$363.41/acre in today's money. The B/C Ratio is 2.81 to 1, indicating that each dollar invested in this project generates \$2.81 in present value terms. At 4% interest, benefits exceed costs by a factor of 2.81 to 1.00. The EAI is \$22.25—the investment yields a net income equivalent to an annual income of \$22.25/acre per year over the 27-year rotation. The investment has an ROR of 8.7%.

The discount rate used to calculate the financial criteria strongly influences the results. Analysts will often wish to recalculate results using a range of discount rates, which may allow them to better discuss financial options with a forest landowner. FORVAL-XL allows for an easy sensitivity analysis

of a range of discount rates as part of the Financial Criteria option; this occurs as a prompt where you're asked if you'd like to "recalculate the financial criteria with a different discount rate?" Figure 4 illustrates the sensitivity analysis report generated using the original 4% interest rate and in addition 3, 5, 6, and

8.7% interest rates. Notice at 8.7%, which is the ROR, that the NPV is essentially zero, as expected given the definition of ROR. The ROR remains constant over the range of discount rates since it is independent of the discount rate.

The image shows two side-by-side screenshots of a software interface for entering financial data. The left window is titled "STEP 1 of 3: Enter and Submit Each Cost" and contains instructions, a description field with "Establishment Cost", two columns for "Single Sum" and "Annual Series" with input fields for cost and year, and "Submit" buttons. The right window is titled "STEP 2 of 3: Enter Each Revenue" and contains similar instructions, a description field with "Harvest Revenue", and input fields for revenue and year with "Submit" buttons. Both windows have an "Exit" button at the bottom.

Figure 2. Steps 1 and 2 require separate input of each cost and revenue. Step 2 completion requires exiting to the next step.

| Table 1. Cash Flows from a Typical Forestry Investment (per acre) |               |                         |                  |
|---|---------------|-------------------------|------------------|
| Item  | Year Incurred | Type of Cost or Revenue | Amount (Dollars) |
| Establishment Cost  | 0             | Single Sum              | 160.00           |
| Management & Taxes  | 1-27          | Annual                  | 2.50             |
| Thinning Revenue  | 16            | Single Sum              | 97.50            |
| Thinning Revenue  | 22            | Single Sum              | 156.00           |
| Final Harvest Revenue   | 27            | Single Sum              | 1,287.00         |



Return to Main Menu

Open DCF Results As A PDF File

Print DCF Results

Generate Sensitivity Graphs

Final Financial Criteria Results for the Example Problem

**Cost Summary**

| Cost# | Single Sum Costs |      | Annual Series of Costs |            |          | Description                      |
|-------|------------------|------|------------------------|------------|----------|----------------------------------|
|       | Cost             | Year | Cost                   | Begin Year | End Year |                                  |
| 1     | 160              | 0    |                        |            |          | Establishment Cost               |
| 2     |                  |      | 2.5                    | 1          | 27       | Management and property tax cost |

**Revenue Summary**

| Revenue# | Single Sum Revenues |      | Annual Series Revenues |            |          | Description           |
|----------|---------------------|------|------------------------|------------|----------|-----------------------|
|          | Revenue             | Year | Revenue                | Begin Year | End Year |                       |
| 1        | 97.5                | 16   |                        |            |          | Thinning revenue      |
| 2        | 156                 | 22   |                        |            |          | Thinning revenue      |
| 3        | 1287                | 27   |                        |            |          | Final harvest revenue |

**Discounted Cash Flow (DCF) Results:**

- DR** The discount rate = 4% per year.
- PVR** The Present Value of revenues = \$564.23/unit of area.
- PVC** The Present Value of costs = \$200.82/unit of area.
- NPV** The Net Present Value = \$564.23 - \$200.82 = \$363.41/unit of area.
- B/C** The Benefit/Cost Ratio = \$564.23 / \$200.82 = 2.81
- EAI** The Equivalent Annual Income = \$22.25/unit of area per year for 27 years.
- ROR** The estimated Rate of Return for this investment is 8.71 % per year.  
NOTE: Using any discount rate greater than 8.7% financial criteria like NPV and EAI will be negative and the B/C Ratio will be less than 1.

Figure 3. FORVAL-XL output for the Table 1 scenario showing results for the NPV, B/C, EAI, and ROR financial criteria.

| FORVAL-XL: Discounted Cash Flow Results with Multiple Discount Rates |          |          |          |          |          |
|--|----------|----------|----------|----------|----------|
| Discount Rate =  | 4.00%    | 3.00%    | 5.00%    | 6.00%    | 8.70%    |
| PV Revenues =  | \$564.23 | \$721.57 | \$442.72 | \$348.55 | \$185.88 |
| PV Costs =   | \$200.82 | \$205.82 | \$196.61 | \$193.03 | \$185.71 |
| NPV =  | \$363.41 | \$515.75 | \$246.11 | \$155.53 | \$0.17   |
| B/C Ratio =  | 2.81     | 3.51     | 2.25     | 1.81     | 1        |
| EAI =  | \$22.25  | \$28.14  | \$16.81  | \$11.77  | \$0.02   |
| ROR (constant) =   | 8.70%    | 8.70%    | 8.70%    | 8.70%    | 8.70%    |

Figure 4. Results of a sensitivity analysis, showing DCF results for the original 4% rate and also for 3, 5, 6, and 8.7% discount rates.

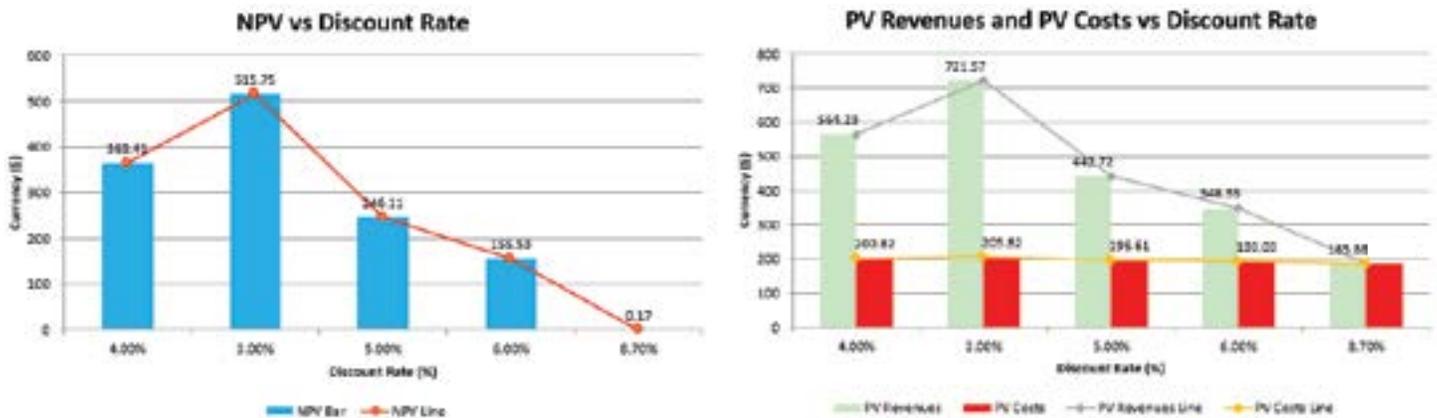


Figure 5. Sensitivity analysis graphs, illustrating the DCF results for the example problem (graphs of the numbers shown in Figure 4 for each discount rate).

Figure 5 shows the sensitivity analysis in two graphs (an option at the top of table, and notice the sensitivity graphs button on the bottom). This illustrates the effect of the discount rate on the NPV. The higher the discount rate, the lower the net present value. Notice, while the impact on revenue is great, the impact on costs is very low. This is because the major cost is at time zero (meaning it is not discounted at all) and the other cost is relatively small. Revenues are more affected because they are discounted to the present over longer periods of time.

Land Expectation Value (LEV) is the value of bare land if put into perpetual forest production. It is also called bare land value. The calculation involves compounding all costs and revenues to the end of a single rotation.

This compounding includes establishment cost, but it does not include land cost (land value is what the user is calculating). This net future value is assumed to occur at the end of every rotation length to form a perpetual series. The value of bare land in perpetual forest production is a fundamental forest valuation calculation. The data in Table 1 can be used to illustrate the calculation because land cost was not included in the problem and the 4% interest rate is a real interest rate (net of inflation). The LEV is \$556.37. This represents the maximum amount that could be paid for the land for forestry uses—if the required 4% rate of return must be earned and if the timber values assumed are those actually expected for the property. For LEV, FORVAL-XL generates a report, with exactly the same outputs and sensitivity analysis option as

for the original financial criteria problem. It includes the original financial criteria results and is essentially the same report with LEV added to the results. LEV's unique status in forestry requires it be treated as a specialized calculation. The sensitivity analysis for LEV is the same as that for NPV, since LEV is a specialized NPV calculation; it represents the present value of an infinite number of net timber cash incomes, so the implications are the same. However, since LEV is the bare land value in timber production, the sensitivity analysis will be useful as a valuation tool in valuing forest land, as it will show the decline in bare land value as the discount rate, representing an opportunity cost of capital is increased.

Premerchtable Timber Value was added to FORVAL due to the high interest of consulting foresters in the tough decision of valuing precommercial timber stands. For example, following a wildfire, what would the value have been of a five-year-old loblolly pine stand destroyed in the fire? It had no value in the market, other than carried costs, but the young timber certainly had a future value.

This option calculates the value of a stand of premerchtable timber at the stand's current age. Premerchtable timber is all timber that is less than the age of commercial harvest; these stands tend to be undervalued because they often contain lower-valued timber products that will grow into higher-valued products over time (e.g., a pulpwood stand that will be a sawtimber stand in a few years). It includes precommercial timber stands that are too young to contain any timber products of commercial value. The calculation discounts the future stand value using the rate of return earned by the timber rotation as the discount rate. Land opportunity cost is included in the calculation (annual land rent), as growing timber requires an investment in land. Inputs are costs and revenues for one rotation, beginning and ending land values, and the stand's current age. The theory behind this calculation is explained in the textbook referenced earlier (pages 7.16 - 7.21), and in Bullard and Monaghan.

The Premerchtable Timber Value option does not involve a standard financial tool and justifies some additional explanation. Consider a simple example. You need to calculate the value of a 10-year-old pine plantation that is managed on a 25-year rotation. Originally the land was worth \$400/acre. To keep the calculation simple, assume no land appreciation. That

is, at the end of the rotation, the land will still be worth \$400/acre. Regeneration cost at year 0 was \$100/acre, and timber revenue at year 25 will be \$2,500/acre. FORVAL-XL calculates a 7.29% rate of return and an estimated value of timber of \$610.56/acre. How was this estimate calculated?

Because this is a simple example, the calculation can be easily illustrated. First, both costs occurred at year 0 (land cost of \$400 and regeneration cost of \$100), equating to a single cost of \$500/acre at year 0. Second, both revenues occur at year 25 (land sale of \$400 and timber sale of \$2,500), equating to a single revenue of \$2,900/acre at year 25. With a single cost and a single revenue, the rate of return can be directly calculated:  $[(2,900/500)^{1/25} - 1] = 7.29\%$ . That is, a single rotation using these costs and revenues earns a 7.29% annual rate of return.

Knowing the rate of return for the timber rotation allows for discounting costs and revenues to year 10 to determine the value of the premerchtable timber. First, the regeneration cost of \$100 is compounded to year 10 using a 7.29% discount rate:  $(1.0729)^{10} = \$202.11$ . Second, the annual opportunity cost of holding the land must be calculated (the \$400 of capital tied up in growing the trees). Using the rate of return as the interest rate, this opportunity cost is  $0.0729 \times \$400 = \$29.16/\text{acre}$  per year. The opportunity cost is the value of \$29.16 per year for 10 years. Using the future value of a terminating annual series formula and a 7.29% discount rate, this is:  $\$29.16 [(1.0729^{10} - 1)/0.0729] = \$408.45$ . The value of the two compounded costs equals \$610.56/acre, or the value of the precommercial timber as calculated by FORVAL-XL in Figure 6 (with few cents difference as FORVAL-XL uses more decimal places in its rate of return).

Since the rate of return for the timber rotation is used as the discount rate, this approach is consistent and would produce the same value using future costs and revenues. The discounted value of the \$2,500 harvest value and discounted \$29.16 annual land opportunity cost would result in the same premerchtable timber stand value. Thus, this method produces a consistent valuation using the standard concepts of both seller's and buyer's value.

FORVAL-XL inputs are identical to earlier requirements in terms of timber rotation data, and an identical cost and revenue table is produced. Once the timber rotation data is entered, the user is prompted for four

additional inputs: initial land value, ending land value, rotation length, and current age of the stand. Ending land value might be determined using the Projected Stumpage Price option, which will adjust any “price,”

requiring only an estimate of current land value and expected annual land appreciation percent.

| FORVAL-XL Financial Criteria: Costs, Revenues, and DCF Results Date: 6/2/2025   |         |                                |  |                        |                   |          |                       |
|---|---------|--------------------------------|--|------------------------|-------------------|----------|-----------------------|
| Return to Main Menu   |         | Open DCF Results As A PDF File |  |                        | Print DCF Results |          |                       |
| <b>Generate Sensitivity Graphs</b>  |         |                                |  |                        |                   |          |                       |
| An example calculation of Premerchtable Timber Value  |         |                                |  |                        |                   |          |                       |
| Cost Summary  |         |                                |  |                        |                   |          |                       |
| Single Sum Costs  |         |                                |  | Annual Series of Costs |                   |          |                       |
| Cost#   | Cost    | Year                           |  | Cost                   | Begin Year        | End Year | Description           |
| 1   | 100     | 0                              |  |                        |                   |          | Regeneration Cost     |
| Revenue Summary   |         |                                |  |                        |                   |          |                       |
| Single Sum Revenues   |         |                                |  | Annual Series Revenues |                   |          |                       |
| Revenue#  | Revenue | Year                           |  | Revenue                | Begin Year        | End Year | Description           |
| 1   | 2500    | 25                             |  |                        |                   |          | Final Harvest Revenue |
| Results for Premerchtable Timber Value at Stage Age = 10 years:   |         |                                |  |                        |                   |          |                       |
| Projected rotation length = 25 years.   |         |                                |  |                        |                   |          |                       |
| Land value at rotation beginning = \$400.00/acre (or other unit of area).   |         |                                |  |                        |                   |          |                       |
| Land Value at rotation end = \$400.00/acre (or other unit of area).   |         |                                |  |                        |                   |          |                       |
| Given the projected costs and revenues, including the beginning and ending land values, the projected rate of return on land and timber = 7.29 %. |         |                                |  |                        |                   |          |                       |
| At age 10, the compounded cost value of the trees = \$610.14/acre (or other unit of area).  |         |                                |  |                        |                   |          |                       |
| At age 10, the projected value of the land = \$400.00/acre (or other unit of area).   |         |                                |  |                        |                   |          |                       |
| At age 10, the total estimated value of land and trees = \$1,010.14/acre (or other unit of area).   |         |                                |  |                        |                   |          |                       |

Figure 6. FORVAL-XL output for the premerchtable timber value example.

## MONTHLY OR ANNUAL PAYMENTS

FORVAL-XL is capable of calculating the amount of a monthly or annual payment necessary to repay an installment loan (capital recovery) or to accumulate a future sum of money (sinking fund). These two options are general applications and not necessarily forestry-oriented like earlier ones. However, they are common applications and so useful that they have been included in all FORVAL versions.

In FORVAL-XL, the payments option begins with the question: “Are the payments to repay a loan?” Responding “yes” prompts an installment loan problem and responding “no” prompts a sinking fund problem. Whether a loan repayment or a sinking fund, payments can be recalculated by simply clicking on the values in the spreadsheet, re-entering input data, and clicking on the RECALCULATE (using revised numbers) button. Two simple examples will illustrate installment loan and sinking fund options.

First, assume you need to replace \$500,000 of logging equipment in ten years. What amount would you need to deposit annually into an account that pays 4% interest to accumulate the \$500,000 in 10 years? In FORVAL-XL, choose “no” since you’re not repaying a loan—you want to accumulate a future sum. The program then asks for the future sum (\$500,000), then for the number of years in the accumulation period (10), then for the interest rate (4), and finally for the number of deposits to be made into the account each year (1 for annual and 12 for monthly). The result is 10 annual payments of \$41,645.47 (Figure 7). Or, if the type of payment is changed to monthly (12), the payment would be \$3,395.59/month for 10 years (120 monthly payments).

| Summary - Annual Deposit to Accumulate a Future Sum: |  |              |
|--|--|--------------|
| The Future Sum to be accumulated =                   |  | \$500,000.00 |
| Length of time to accumulate the sum (years) =       |  | 10           |
| Interest earned in the account (% per year) =        |  | 4.00%        |
| Number of Deposits to the Account per Year =         |  | 1            |
| Annual Deposit =                                     |  | \$41,645.47  |

Figure 7. FORVAL output for the example annual sinking fund problem involving annual deposits.

Second, the opposite problem would be borrowing \$500,000 at a 4% annual interest rate for ten years. What is the annual payment? The first prompt in this case would be “yes” for an installment loan. All the following prompts would be identical to the sinking fund problem above. Ten annual payments of \$61,645.47 would be needed to repay the loan. Or 120 monthly payments of \$5,062.26 would repay the same loan in 10 years (Figure 8).

| Monthly Payment Summary:                             |  |              |
|--|--|--------------|
| The amount borrowed (\$) =                           |  | \$500,000.00 |
| Length of the loan (years) =                         |  | 10           |
| The annual interest rate for the loan (% per year) = |  | 4.00%        |
| Number of Payments/Year =                            |  | 12           |
| Monthly payment =                                    |  | \$5,062.26   |

Figure 8. FORVAL output for the example monthly installment loan problem.

This installment loan option in FORVAL-XL offers one additional feature. The program will create an amortization table showing the interest and principal as the loan is repaid (Figure 9). An additional prompt at the end of the process offers this option.

| AMORTIZATION TABLE |                |             |             |              |
|--------------------|----------------|-------------|-------------|--------------|
| Payment #          | Annual Payment | Interest    | Principal   | Loan Balance |
| 1                  | \$61,645.47    | \$20,000    | \$41,645.47 | \$458,354.53 |
| 2                  | \$61,645.47    | \$18,334.18 | \$43,311.29 | \$415,043.24 |
| 3                  | \$61,645.47    | \$16,601.73 | \$45,043.74 | \$369,999.49 |
| 4                  | \$61,645.47    | \$14,799.98 | \$46,845.49 | \$323,154.00 |
| 5                  | \$61,645.47    | \$12,926.16 | \$48,719.31 | \$274,434.69 |
| 6                  | \$61,645.47    | \$10,977.39 | \$50,668.08 | \$223,766.61 |
| 7                  | \$61,645.47    | \$8,950.66  | \$52,694.81 | \$171,071.80 |
| 8                  | \$61,645.47    | \$6,842.87  | \$54,802.60 | \$116,269.20 |
| 9                  | \$61,645.47    | \$4,650.77  | \$56,994.70 | \$59,274.49  |
| 10                 | \$61,645.47    | \$2,370.98  | \$59,274.49 | \$0.00       |

Figure 9. Amortization table for the annual installment loan example: a \$500,000 loan repaid in 10 annual payments at 4% compound annual interest.

## PROJECTED STUMPAGE PRICE

The projected stumpage price option calculates the future value of a specific stumpage price. It is a simple model, using only the formula for the future value of single sum. There are three inputs: the current stumpage price, the number of years in the projection, and the annual rate of price appreciation. This option allows for recalculation of results by simply clicking on the values in the spreadsheet, re-entering input data, and clicking on the recalculate button.

As a simple example, consider a current stumpage price of \$40 per ton, with an expected price appreciation of 2.25% annually, and a 10-year

projection period. The stumpage price in 10 years is projected to be nearly \$50 (Figure 10).

| Projected Stumpage Price Summary:                         |                |
|---|----------------|
| Current stumpage price (\$ per unit of volume) =          | \$40.00        |
| Length of the projection period (years) =                 | 10             |
| Rate of price increase (percent per year) =               | 2.25%          |
| <b>Projected stumpage price (\$ per unit of volume) =</b> | <b>\$49.97</b> |

Figure 10. Projected stumpage price example results.

## REFERENCES

**BULLARD, S.H., MONAGHAN, T. 1999.** What's the monetary value of your premerchantable timber? *Forest Landowner* 58(2):10-14. Online at: <https://scholarworks.sfasu.edu/forestry/95>.

**BULLARD, S.H., STRAKA, T.J. 2011.** Basic Concepts in Forest Valuation and Investment Analysis. Online at: <https://scholarworks.sfasu.edu/forestry/460>.

**STRAKA, T.J., BULLARD, S.H. 1996.** Land expectation value calculation in timberland valuation. *The Appraisal Journal* 64(4):399-405. Online at: <https://scholarworks.sfasu.edu/forestry/49>.

**STRAKA, T.J., BULLARD, S.H. 2001.** Introduction to forestry investment analysis, part I: Basic investment characteristics and financial criteria. *Forest Landowner* 60(6):9-14. Online at: <https://scholarworks.sfasu.edu/forestry/91>.





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