Private Woodland Planner User Guide

Version 2.0

Developed for the Small Woodlands Program

Updated May 2007

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Small Woodlands Program

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Private Woodland Planner

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Acknowledgements

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Individuals that contributed to Private Woodland Planner version 2.0:

- Chris Hollstedt, RPF, FORREX Forest Research Extension Partnership, Kamloops, BC
- Dennis Lozinsky, RPF, BC Small Woodland Partnership Outreach
- Rod Bealing, Private Forest Landowners Association, Victoria, BC
- Wendy Cocksedge, Centre for Non-Timber Resources, Royal Roads University, Victoria, BC.
- Jerry Smith, Forest Resource Enterprises, USFS, La Pine, Oregon.
- Thomas White, Canadian Forest Service, Victoria, BC

References incorporated in Private Woodland Planner version 2.0:

- The Tree Book, BC Ministry of Forests, 2001/08/09 http://www.for.gov.bc.ca/hfd/library/documents/treebook/index.htm
- A Harvesters Handbook, Coastal Edition, Royal Roads University, Centre for Non-Timber Resources, Victoria, BC, Canada, December 2006.
- VDYP Batch 6.6d4, BC Ministry of Forests and Range, Victoria, BC, Canada.
- BatchTIPSY 3.2m, BC Ministry of Forests and Range, Victoria, BC, Canada.
- Silviculture costs provided by PricewaterhouseCoopers LLP for projects funded under the Forest Investment Account from 2002-2007, summarized by Enfor Consultants Ltd.
- Interior Appraisal Manual, Ministry of Forests and Range, Effective November 1, 2004, Amended July 1, 2006.
- Coast Appraisal Manual, Ministry of Forests and Range, Effective February 29, 2004, Amended December 1, 2006.

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Private Woodland Planner

1.0 Introduction

Private Woodland Planner (PWP) was developed to assist small landowners analyze timber and non-timber forest product values and options on their property. PWP was designed to help you estimate:

- current and future timber volume growth and yield,
- costs and returns for harvesting timber,
- costs and returns for harvesting non-timber forest products, and
- potential gains and returns from alternate silviculture investments.

PWP was developed in conjunction with the Small Woodlands Guidebook: Business Planning and Marketing. The guidebook has much helpful information and lists many sources for further reading, including Internet websites. The Small Woodlands Guidebook is available on the internet at http://www.woodlot.bc.ca/swp/Downloads/files/SWBUSP7E3.pdf

PWP was designed to be as user friendly as possible. PWP comes with regional default values to help fill information gaps, though users should be somewhat familiar with types of trees and some non-timber forest products on their land and harvesting cost items. Alternately, users can supply their own information in most cases.

Originally developed in 2000, PWP was updated in 2007 for costs, values and some additional functionality. Additional information on PWP is available from the developer, Enfor Consultants Ltd. at www.enfor.com

This guide describes the basic functions of PWP. If you have any questions on the application or information used, please contact FORREX Forest Research Extension Partnership.

2.0 Obtaining PWP

Private Woodland Planner version 2.0 and the Private Woodland Planner User Guide are available on the Internet for downloading from the following sources. Follow the installation instructions on these websites:

1. Enfor Consultants Ltd. – http://www.enfor.com/software/pwp
2. BC Small Woodland Partnership Outreach - http://www.woodlot.bc.ca/swp/Downloads/Downloads/PWP_software.html
3. FORREX Forest Research Extension Partnership – http://www.forrex.org

The Private Woodland Planner User Guide is also available under the Help menu in PWP.

3.0 Computer System Requirements

PWP can be installed on any personal computer that uses Windows 2000 or XP operating systems. The program requires up to 30mb of hard drive space for installation. (Note that PWP will run on a 64 bit operating system but VDYP will not because it is a DOS based application.)

You will require a pdf viewer for the user guide and some information brochures included in PWP, or an Internet browser and access to the Internet.

4.0 Some Basics for Running Private Woodland Planner

PWP was designed to be as user friendly as possible, though we have assumed that users will be somewhat familiar with forestry terms. You are encouraged to ask a forester or forest technologist if you have any questions.

PWP runs like most Windows programs, using the same conventions. Some features and conventions to note in PWP include:

- **Menu List**: All major functions in PWP can be accessed from the menu list displayed below the blue title bar. You can open and close files, save and print, and navigate to parts of PWP as you would in any Windows program from these commands.
- **About Screen**: The About screen provides information on the program, such as the version number and program credits.
- **Help**: The Help item provides access to the user guide and several website links for more information.
- **White data boxes**: Enter your information in the white data boxes. Some data boxes can be edited by double clicking them.
- **Yellow data boxes**: usually indicates the need to check the data you are working with. It usually means some data is missing, does not add up or is inconsistent for a comparison in some way.
- **Grayed data boxes**: results of calculations are displayed in grayed boxes, which can only be viewed and not edited.
- **Default values**: Default information is provided, where possible, and is based on broad averages. You should replace default information if you have better local numbers. You may override default numbers by selecting "Custom" or typing over the data box.
- **Advanced Features**: Advanced features are provided in some areas of PWP allowing you to view and/or edit some default variables. Checking the "Advanced" box can activate these.

Font sizes can be adjusted for the display grid on the main page. To change the font size, go to the Edit menu and select Font Size. Refer to page 8 for more information.

The grid columns can be resized. Simply click on a column border and stretch it sideways.

Save your information regularly! This will ensure that you can use your work next time you run PWP, and to access the latest version of your data should you cause the program to end accidentally.

5.0 Information You Will Need

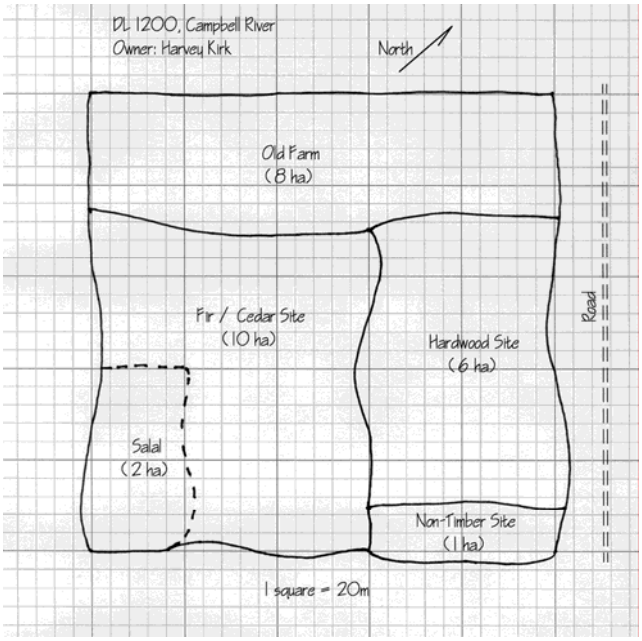
To use PWP, you will need to enter basic information about your location and areas of timber and non-timber forest products. You will need to know the type of trees on your property and general growing conditions, types of non-timber products, costs and values.

In PWP, these are provided in menu picks or selections; many have default average costs and values that you can use if you don't have better information.

A new feature in PWP version 2.0 is the addition of information on most tree species and some non-timber forest products. Simply click the question mark next to the species, or refer to the Help menu for access to this same information. Information is available on-line if you are connected to the Internet (trees), or in a pdf document if the information is not available on-line (trees and non-timber forest products).

Before you start your work with PWP, you should walk your land, make a sketch map to delineate your “forest polygons” and summarize the information you know about your land. Its these forest polygons that you will enter into PWP and analyze. In delineating your polygons, you can get assistance by contacting a local forestry consultant, or possibly the local Ministry of Forests and Range forest district office.

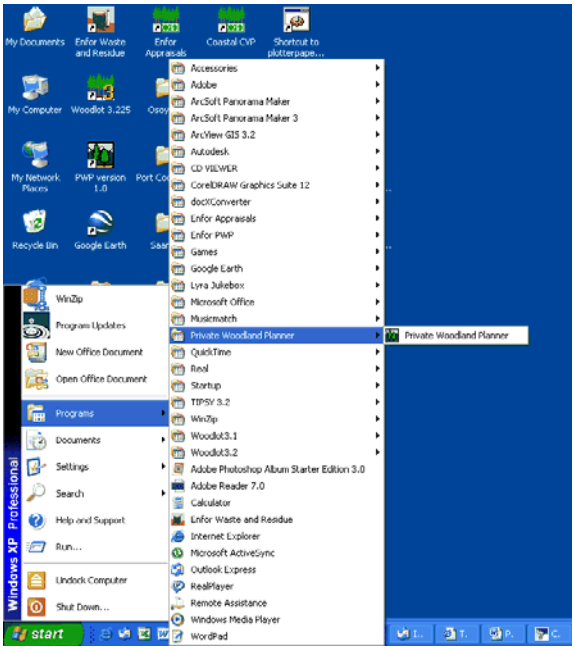
Sample Location Map



Each of your forest polygons will be an area of land that have similar forest characteristics. For example, one of your polygons might have a stand of Douglas-fir and cedar exhibiting similar features fairly evenly over 10 hectares. This would be an area that you could draw on your map, and would be distinguished for your analysis from other forest types on your property. Much of this information can also be picked up by referring to a Ministry of Forests forest cover map. Appendix 1 provides a more detailed example.

6.0 Running Private Woodland Planner

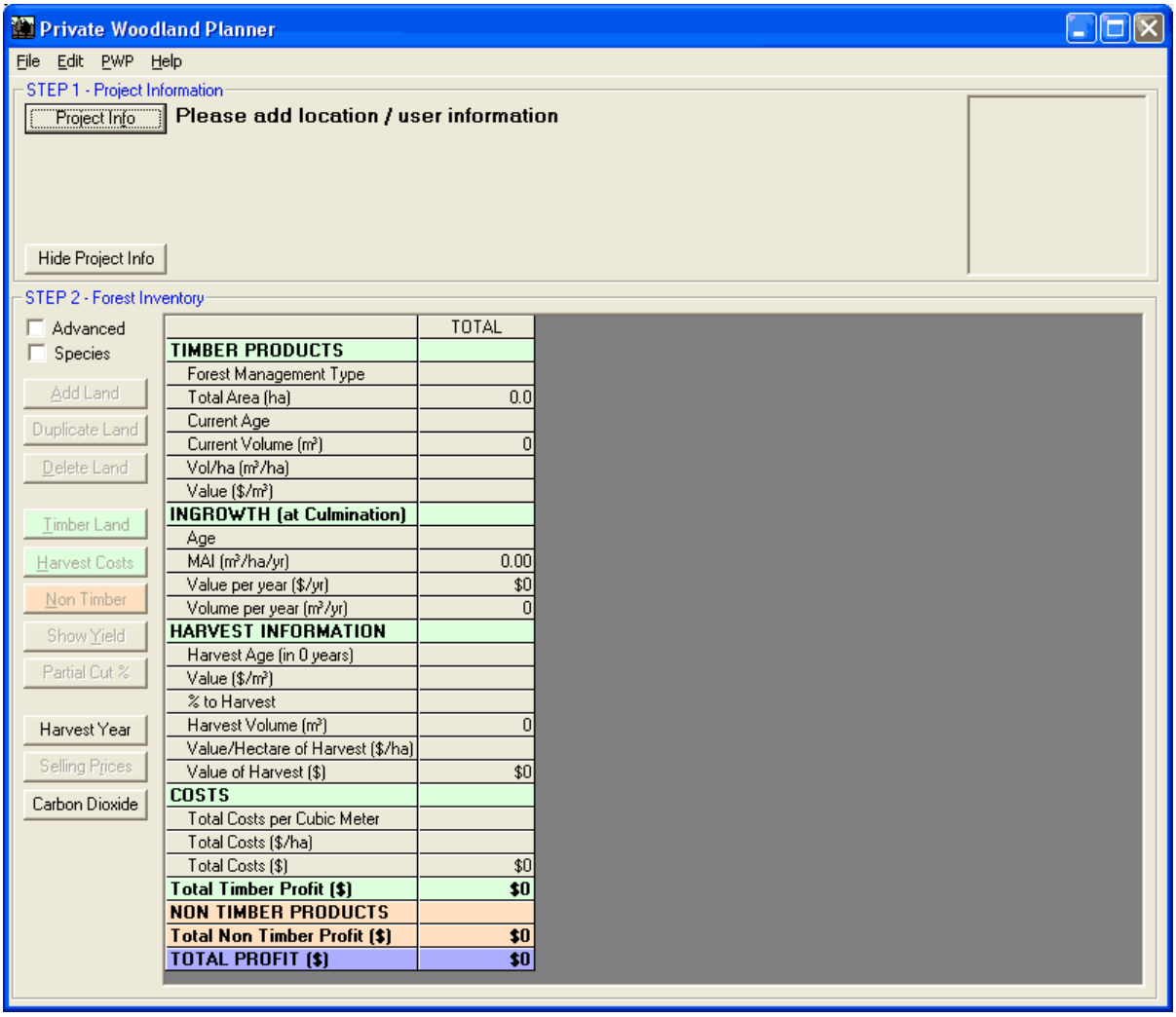
To run PWP, click on **Start Programs, Private Woodland Planner** (or use your shortcut icon).



The **About** screen will appear, then leave after a few seconds. You can always return to the About screen from the Help menu item on the Main screen. The About screen has important information on the version and contact information.

Next, the **Main** screen of PWP will appear. The Main screen leads to all other areas in PWP. This is where you will:

- create a new project or open an existing project file,
- save your file,
- navigate to all other areas of the program,
- enter Project Information (information on your location),
- edit timber and non-timber inventory information,
- undertake analysis for timber and non-timber forest products,
- view your results,
- get help,
- print your results.

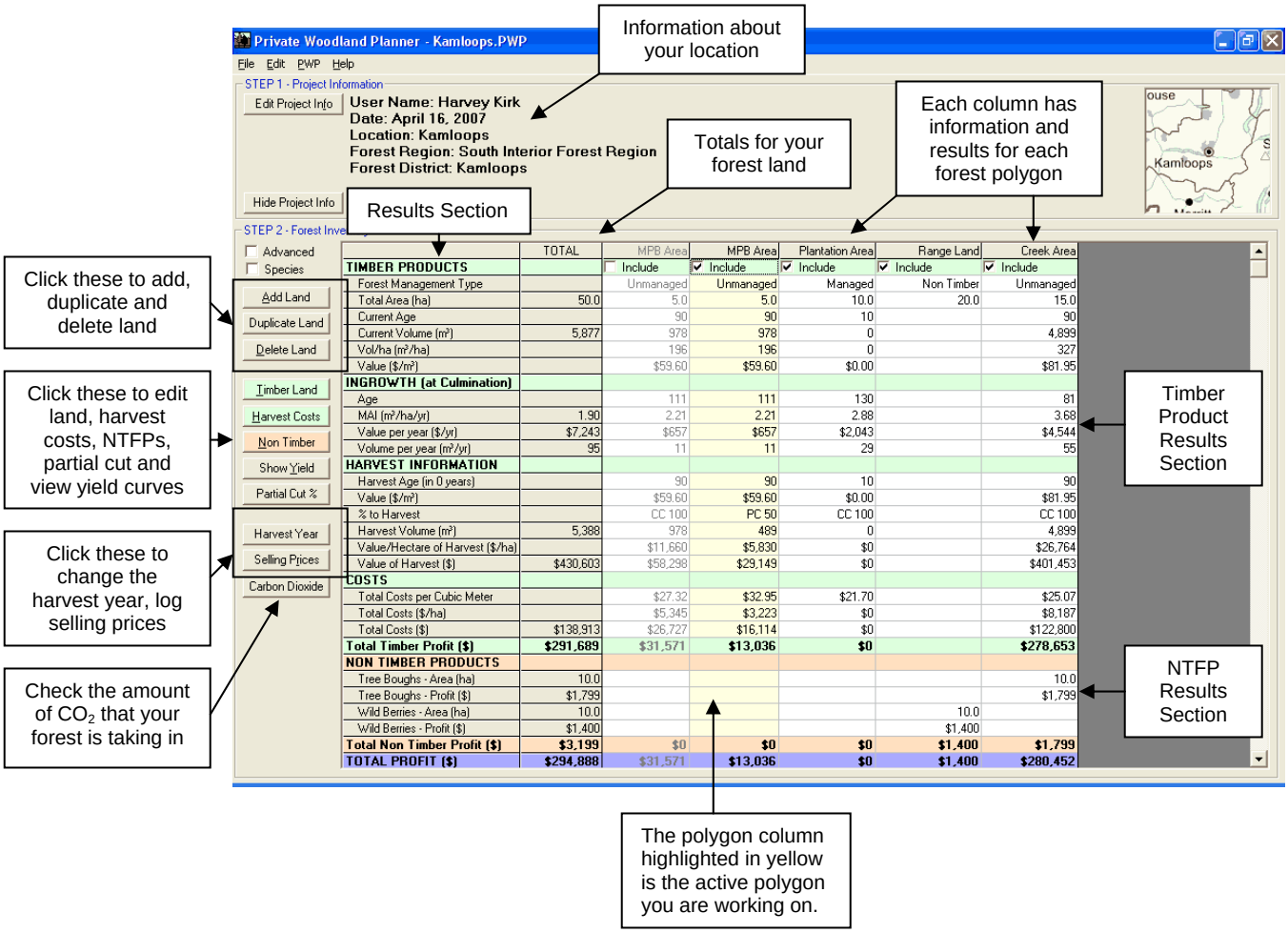


6.1 PWP Main Screen Functions

The Main PWP screen is used to access all features in PWP; for creating projects and adding information, viewing results, saving, editing and printing information.

Each column of information in the Main screen represents information for a "forest polygon". All information in PWP is summarized by forest polygon, and then totalled for your entire woodland.

Recall that a polygon is an area of land that has similar forest characteristics and can be drawn on a map (refer to section 5.0 or Appendix 1 for a definition and example of a forest polygon.)



	TOTAL	MPB Area	MPB Area	Plantation Area	Range Land	Creek Area
TIMBER PRODUCTS		Include	Include	Include	Include	Include
Forest Management Type		Unmanaged	Unmanaged	Managed	Non Timber	Unmanaged
Total Area (ha)	50.0	5.0	5.0	10.0	20.0	15.0
Current Age		90	90	10		90
Current Volume (m^3)	5,877	978	978	0		4,899
Vol/ha (m^3/ha)		196	196	0		327
Value ($/$m^3$)		$59.60	$59.60	$0.00		$81.95
INGROWTH (at Culmination)						
Age		111	111	130		81
MAI (m^3/ha/yr)	1.90	2.21	2.21	2.88		3.68
Value per year ($/yr)	$7,243	$657	$657	$2,043		$4,544
Volume per year (m^3/yr)	95	11	11	29		55
HARVEST INFORMATION						
Harvest Age (in 0 years)		90	90	10		90
Value ($/$m^3$)		$59.60	$59.60	$0.00		$81.95
% to Harvest		CC 100	PC 50	CC 100		CC 100
Harvest Volume (m^3)	5,388	978	489	0		4,899
Value/Hectare of Harvest ($/ha)		$11,660	$5,830	$0		$26,764
Value of Harvest ($)	$430,603	$58,298	$29,149	$0		$401,453
COSTS						
Total Costs per Cubic Meter		$27.32	$32.95	$21.70		$25.07
Total Costs ($/ha)		$5,345	$3,223	$0		$8,187
Total Costs ($)	$138,913	$26,727	$16,114	$0		$122,800
Total Timber Profit ($)	**$291,689**	**$31,571**	**$13,036**	**$0**		**$278,653**
NON TIMBER PRODUCTS						
Tree Boughs - Area (ha)	10.0					10.0
Tree Boughs - Profit ($)	$1,799					$1,799
Wild Berries - Area (ha)	10.0				10.0	
Wild Berries - Profit ($)	$1,400				$1,400	
Total Non Timber Profit ($)	**$3,199**	**$0**	**$0**	**$0**	**$1,400**	**$1,799**
TOTAL PROFIT ($)	**$294,888**	**$31,571**	**$13,036**	**$0**	**$1,400**	**$280,452**

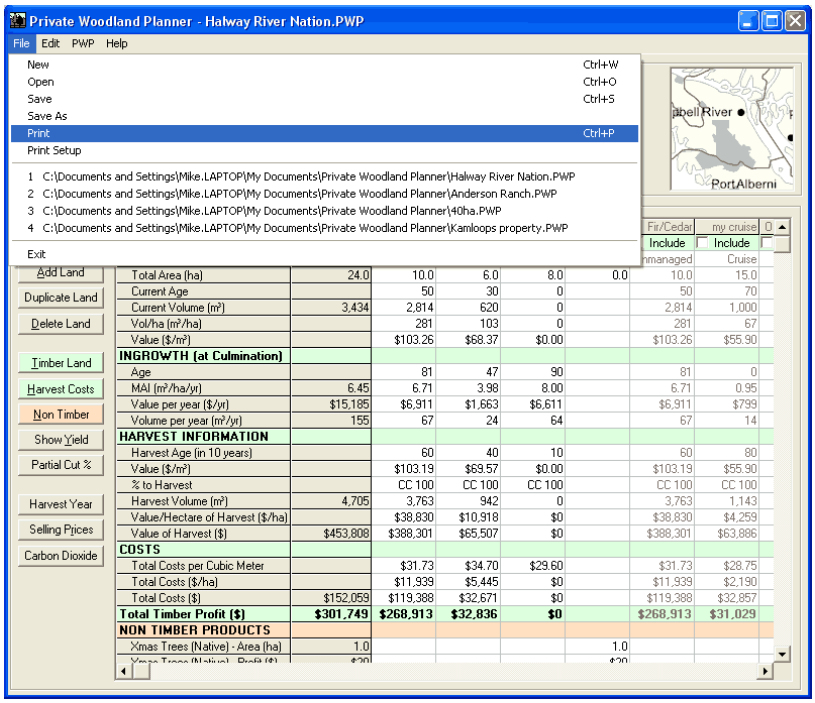
6.1.1 Menu Items

Menu items are provided for quick access to several main functions in PWP. The number of menu items will vary from screen to screen. There are four main menu items on the Main PWP screen, which include:

1. File menu item

You may do the following from the File command:

- **New**: Creates a new project file.
- **Open**: Opens an existing project file.
- **Save**: Saves your project file.
- **Print**: Prints your report.

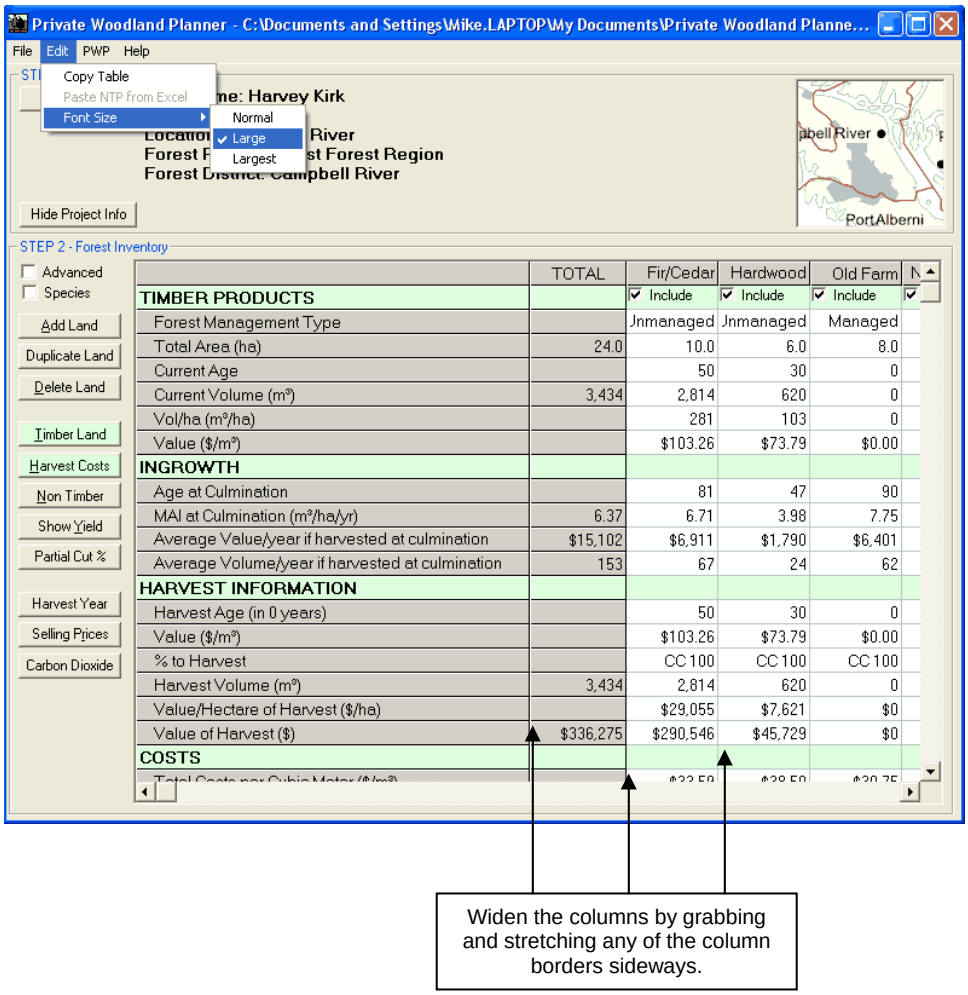


2. Edit menu item

This menu allows users to copy the results displayed in the Main screen to another program, such as Excel or Word.

Font Sizes and Grid Columns

You can adjust the font and grid size on the main screen. Select Edit, Font Size. Select one of the three sizes available in PWP.



	TOTAL	Fir/Cedar	Hardwood	Old Farm
TIMBER PRODUCTS		Include	Include	Include
Forest Management Type		Unmanaged	Unmanaged	Managed
Total Area (ha)	24.0	10.0	6.0	8.0
Current Age		50	30	0
Current Volume (m³)	3,434	2,814	620	0
Vol/ha (m³/ha)		281	103	0
Value ($/m³)		$103.26	$73.79	$0.00
INGROWTH				
Age at Culmination		81	47	90
MAI at Culmination (m³/ha/yr)	6.37	6.71	3.98	7.75
Average Value/year if harvested at culmination	$15,102	$6,911	$1,790	$6,401
Average Volume/year if harvested at culmination	153	67	24	62
HARVEST INFORMATION				
Harvest Age (in 0 years)		50	30	0
Value ($/m³)		$103.26	$73.79	$0.00
% to Harvest		CC 100	CC 100	CC 100
Harvest Volume (m³)	3,434	2,814	620	0
Value/Hectare of Harvest ($/ha)		$29,055	$7,621	$0
Value of Harvest ($)	$336,275	$290,546	$45,729	$0
COSTS				

3. PWP menu item

This allows users to access all major parts of PWP.

4. Help menu item

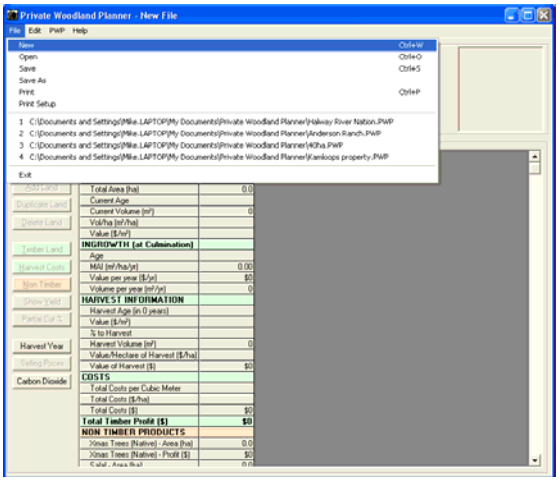
The Help item provides access to the user guide and several website links for more information. This feature also includes access to the About screen.

6.1.2 Creating New Projects

The first step in PWP is to create a new project file and enter basic project information. This step is required for all timber or non-timber analysis, as well as for conducting a silviculture investment analysis.

6.1.2.1 Start a project file

To start a new project, click on the **File** menu item and select **New**. You're ready to start entering or viewing information on your property.

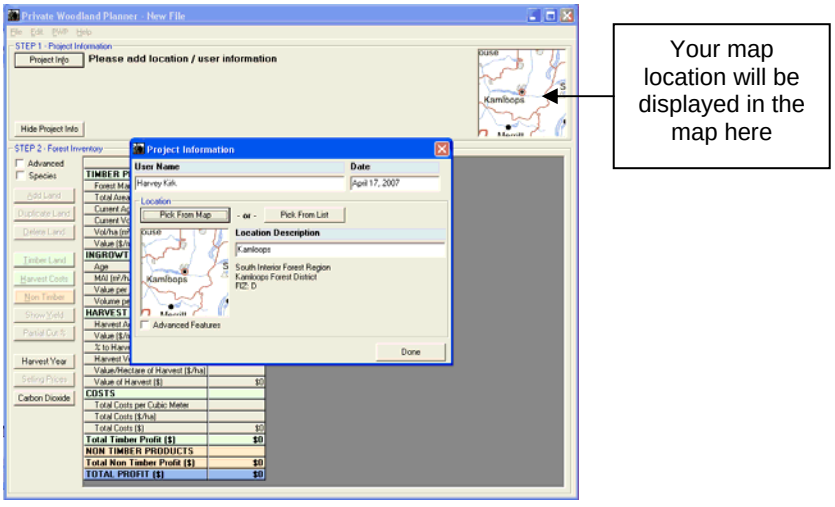


6.1.2.2 Project Information

To start your work, click on the **Project Info** button and enter basic information about your project or private land.

In addition to identifying your property, this will locate you within the province, and provide PWP with some basic forest information used later for inventory, cost and values. It will provide basic information for your printed report.

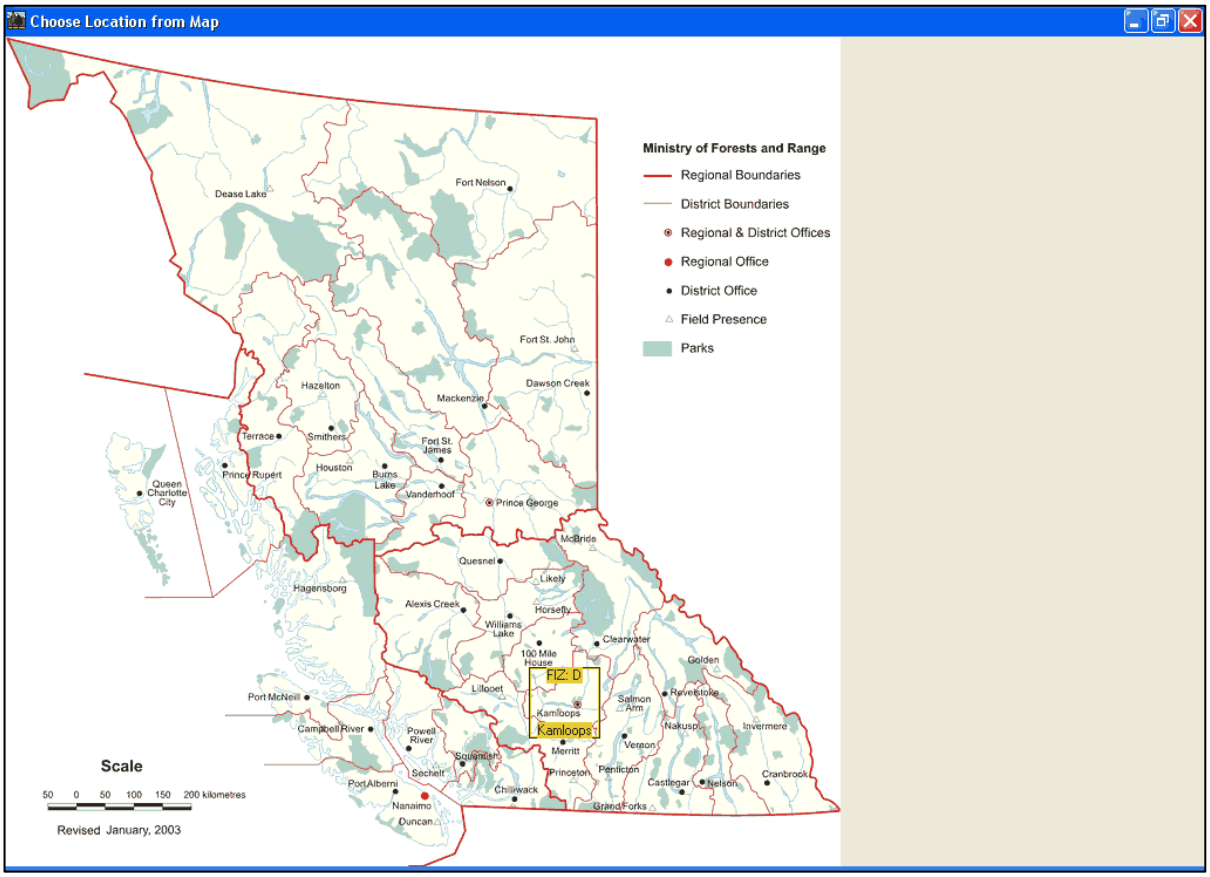
Pick your location from the map, from the list, or enter in your own location (closest to a community).



6.1.3 Using the Map

Select your location either using the drop down pick list or by clicking on the map of BC. (Note, the resulting forest inventory zone (FIZ) is used later for timber yield estimates, so be as accurate as you can.) Click "Done" when you have finished.

You may view a copy of the map by navigating to the Help menu item and selecting **Map of BC**, or by going back into Project Info and double clicking on the map.



6.1.4 Saving and Opening Projects

You will need to save your project information after you set it up. Also save periodically through your work, and after each use. The save features are located throughout PWP in the top menus under **File**.

You can open your files as you would in any Microsoft product. Simply click on **File** then **Open**, then select the file name you wish to work on.

Files that you create will be automatically saved under “My Documents” unless you choose another location. My Documents is a Windows standard location, and is required for some people that use secure network systems.

Files that you open will be automatically selected from “My Documents” unless you select another location.

6.2 Timber and Non-Timber Forest Products

The first main feature of PWP is for timber and non-timber forest products analysis. You can estimate the quantity and value of the timber and non-timber products on your property. Follow these steps to complete an analysis. Refer to the sample project file "Kirk2.pwp " and Appendix 1 for a complete example project.

To start, create a new project or open an existing project file (refer to Section 6.1.4). This will provide basic information for your printed report, and will locate you within the province for some basic inventory zonal information.

You will be directed through a series of screens to add additional cost information, and to select non-timber forest products. Once you have entered your data, timber volumes will be calculated for you based on the data you provide.

Typical cost and revenue data is provided for you based on BC Ministry of Forests and Range information, industry data sources, and practitioner information. You can use your own cost and revenue information by simply highlighting and typing over numbers in the white data boxes.

You can use the buttons along the left side to edit and view other information. Advanced silviculture investment analysis is also available by selecting Silviculture Investment under the PWP menu item.

6.2.1 Forest Inventory

Once you have entered your Project Information, the next step is to enter information for your land. Click the **Add Land** button to proceed, adding land and forest information on your land, both in terms of timber and non-timber information, costs and values. (Tip: before your start, you should have a map or similar information that you can use as a reference for entering inventory data for your forest polygons, refer to Section 5.0).

Information is added on a forest polygon by forest polygon basis. You will be taken through a series of screens for each polygon to enter or calculate various types of information, including:

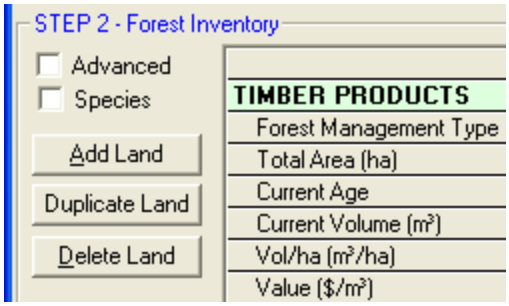
- Forest Management Type and area, including forestry data
- Yield Information (calculated for you)
- Timber Harvesting Cost
- Non-Timber Forest Products information

PWP will fill in all other cost and value information, and report this back to you in a column on the Main screen.

To highlight or edit the polygon information, click anywhere on it and it will highlight in a light yellow. All forest polygons can be edited using the side margin buttons, or by double clicking on a particular cell as described in the following sections.

6.2.1.1 Add Land

To build up your file, click the **Add Land** button on the Main screen to create a forest polygon. You will need to do this for each forest polygon. You may add and delete up to 50 forest polygons, but we suggest you work with 5-10 polygons on your first application for simplicity.



This will activate the Forest Polygon screen, which will allow you to identify the polygon and its area. You can select one of three forest management types noted below.

6.2.1.2 Duplicate Land

You can duplicate any polygon by clicking once on it and then clicking **Duplicate Land**. All attributes will be copied over into the new duplicated column. Use duplicated polygons for simple comparisons of alternatives.

6.2.1.3 Delete Land

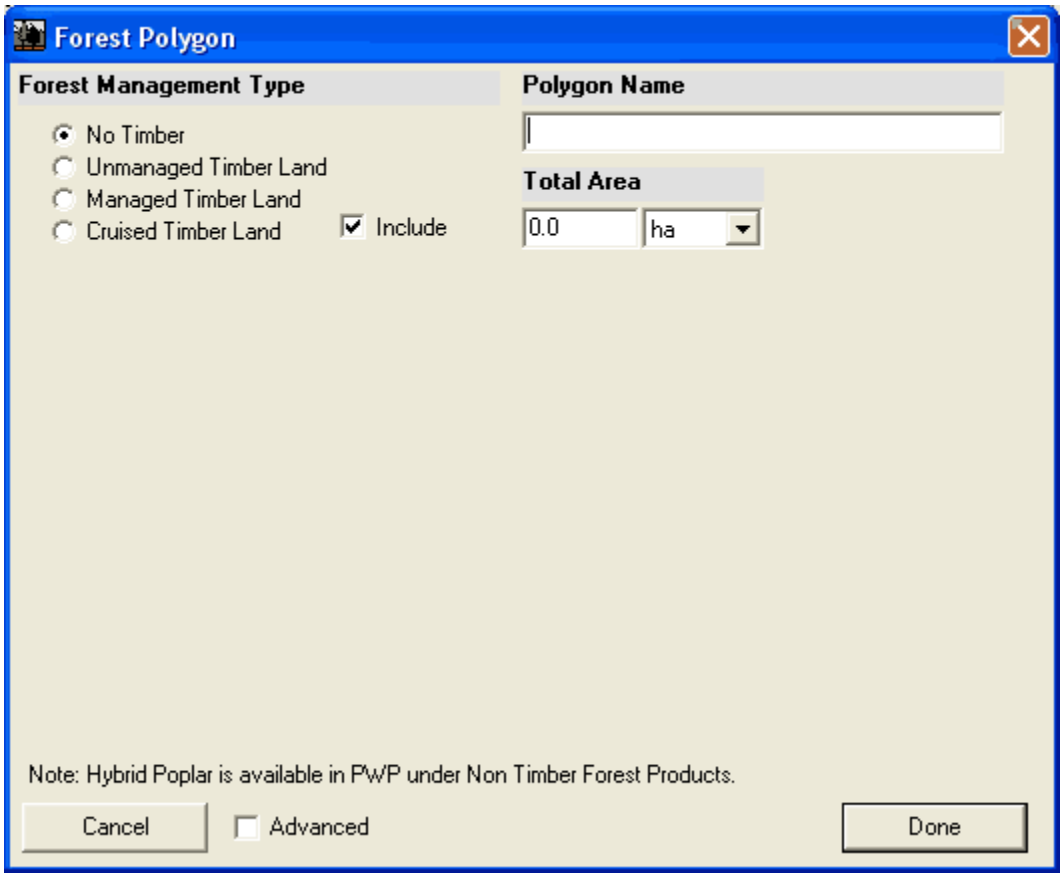
You can also delete forest polygons from your project by selecting on them in the Main screen and clicking the **Delete Land** button.

6.2.2 Forest Polygon Screen

After you have clicked **Add Land** or double click your forest polygon column, you will be taken to the **Forest Polygon** screen. Once here, you must select one of four forest management types, then type in the polygon name or number and include its area.

If you wish to include Hybrid Poplar trees, please add this in the Non-Timber Forest products Screen (refer to section 6.2.10)

The “Include” checkbox will activate the polygon in the Main screen. Leave it checked on unless you plan to test options; you turn this on or off from the Main screen once you have created a polygon.



The next step is to add your forest management type and data in the white boxes.

6.2.2.1 Forest Management Type

Select one of the following forest management types depending on your current or intended uses for your polygon, then enter the name of the polygon and the area in hectares:

- **No Timber**: select this only if the polygon has no timber, or you wish to exclude it from timber harvesting. You will be moved on to the Non-Timber Forest Products screen for this polygon.
- **Unmanaged Timber Land**: select this if you have timber from natural unmanaged land. Unmanaged stands were regenerated naturally, and have had no human intervention (typical of most stands older than 30 years). If you don't know which stand type to use, assume that you have a natural stand.

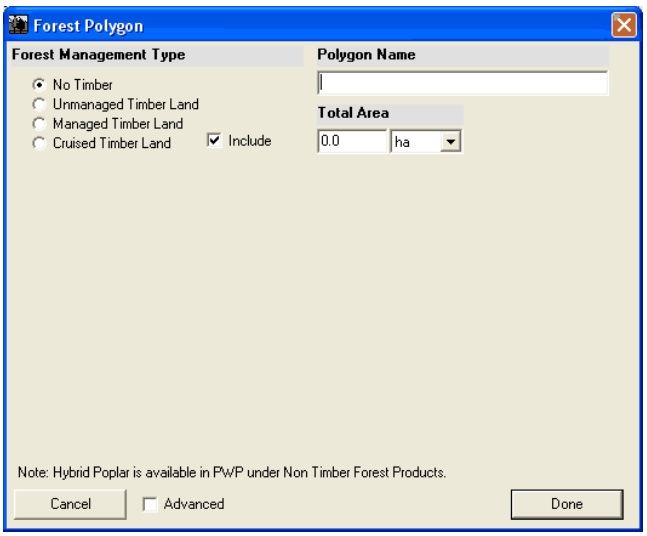
  If the polygon is currently not-stocked and you intend to allow it to reforest naturally with the same species that it originally had, you will have to enter the same information as you would for a stocked natural stand; however, select "custom age" under the Age Class data box, and show the current age as 0.

  You can also have Non-Timber Forest Products on the same piece of land, and will move to the Non-Timber Forest Products screen after completing the timber information.
- **Managed Timber Land**: select this if you have timber from planted and/or natural managed land (some stands younger than 30 years). Managed land is forest land that has had human intervention to produce a well stocked, fully reforested stand (e.g. planting) or stand tending (e.g. spacing).

  If the polygon is currently not-stocked and you intend to plant it, you will have to enter the reforestation information and select "custom age" under the Age Class data box, and show the current age as 0.

  You can also have Non-Timber Forest Products on the same piece of land, and will move to the Non-Timber Forest Products screen after completing the timber information.
- **Cruised Timber Land**: select this option if you have a timber cruise or your own estimate of timber volumes you would like to use. In this case, PWP will assume an average growth for future based on the volume of timber and age of the stand.

  You can also have Non-Timber Forest Products on the same piece of land, and will move to the Non-Timber Forest Products screen after completing the timber information.
- **Advanced**: selecting on the Advanced checkbox will allow you to enter additional detailed information. These items will be displayed in blue text boxes. You may want to use this if you have the advanced information available.

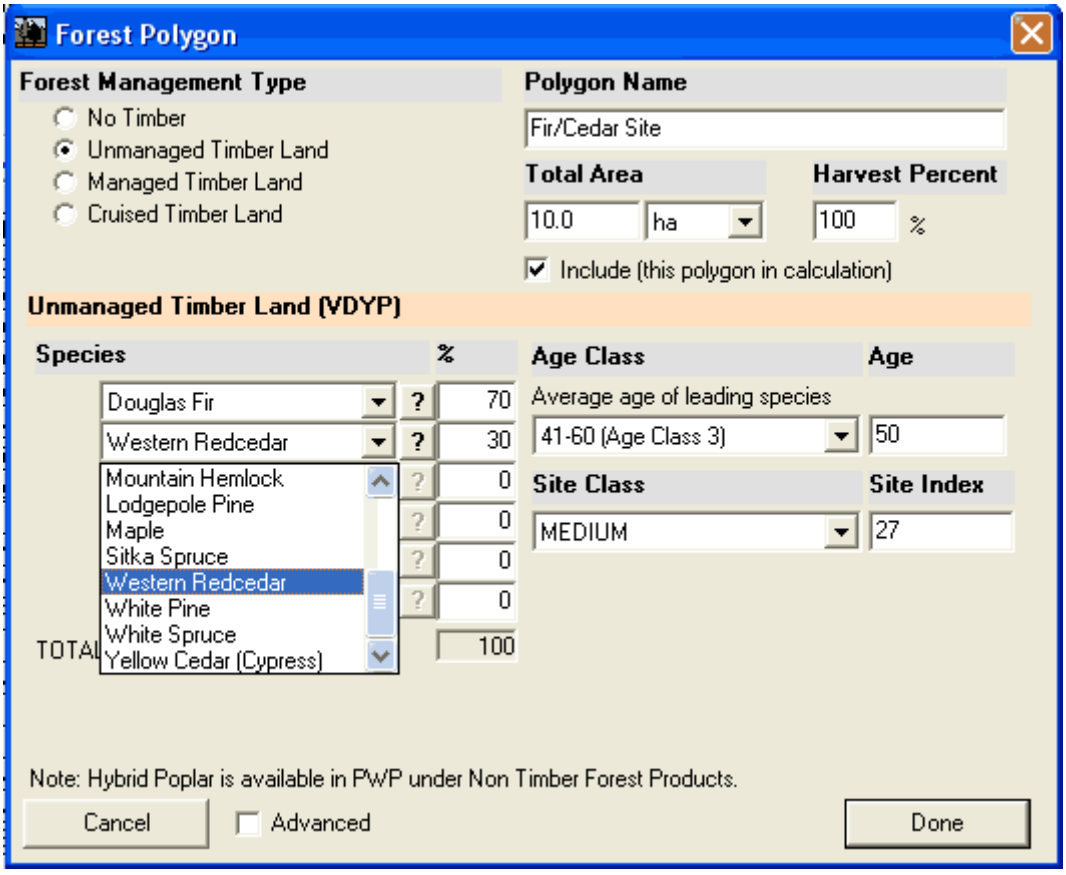


6.2.3 Forest Management Type - Unmanaged Timber Land

If you selected Unmanaged Timber Land, you will be directed to the following data screen. After you enter your data and choose "Done", a calculation will occur to derive timber information. You will move to the harvesting cost screen and then the Non-Timber Forest Products screen.

The following information must be entered. PWP will use this to calculate a timber yield curve[1] to estimate the volume of timber on your polygon. Note that PWP will display items in yellow (critical for the calculations) if they are incomplete. Click "Done" when you are finished.

This screen may also be accessed and edited from the Main PWP screen by clicking the "Timber Land" button or double clicking the polygon column.



6.2.3.1 Forest Management Type Data for Unmanaged Timber Land:

Enter data in the white data boxes, some data can be selected from drop down list boxes:

- **Harvest Percent**: enter the percent of timber to be removed. This can imply that you wish to harvest only a part of the polygon, or selectively harvest through your whole polygon. Your costs and future management will differ depending on which you choose. This item may also be adjusted from the Main PWP screen "**Partial Cut %** " button..

[1] The Variable Density Yield Projection (VDYP Batch 6.6d4) is used in PWP for natural unmanaged stands.

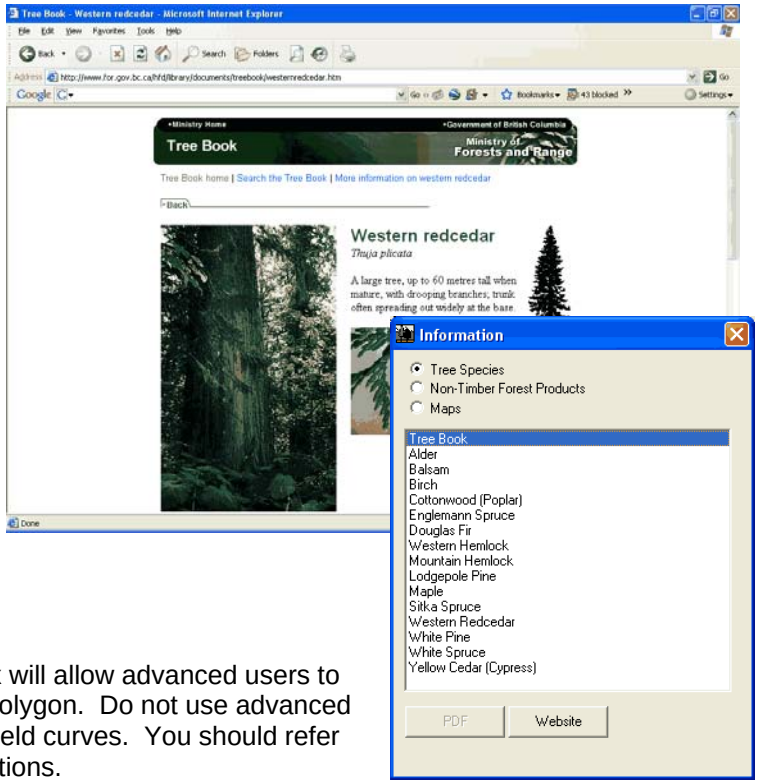
- **Age Class**: enter the approximate age group of the dominant older tree species.
- **Age**: this will be filled in from Age Class. You can enter your own age if you wish.
- **Site Class**: enter the growing potential of the site. Use Poor, Medium or Good. The respective site index for your polygon will be shown next to the site class. You may select "Custom" if you would like to use your own site index information.
- **Site Index**: this is a specific measure of site productivity, measured as the height of the tallest trees (in meters) at breast height age 50 years, and will be filled in from Site Class for you. You can override the site index by clicking on "Custom Site Index" to enter your own information.
- **Species**: enter the tree species and the approximate percent composition in descending order. The top species is the "leading species" and will have the biggest influence on your timber yields.

6.2.3.2 Tree Information

Click on the **?** next to the species name to bring up information on the tree species. Your browser will be activated if you are connected to the Internet and the Tree Book will be displayed for the tree species.

If you are not connected to the Internet, an Adobe pdf page will be displayed.

These information pages can also be accessed from the **Help** menu on the Main screen.



6.2.3.3 Advanced Features:

Clicking on the Advanced Features checkbox will allow advanced users to override default regional information for the polygon. Do not use advanced features unless you are familiar with VDYP yield curves. You should refer to a VDYP user manual if you have any questions.

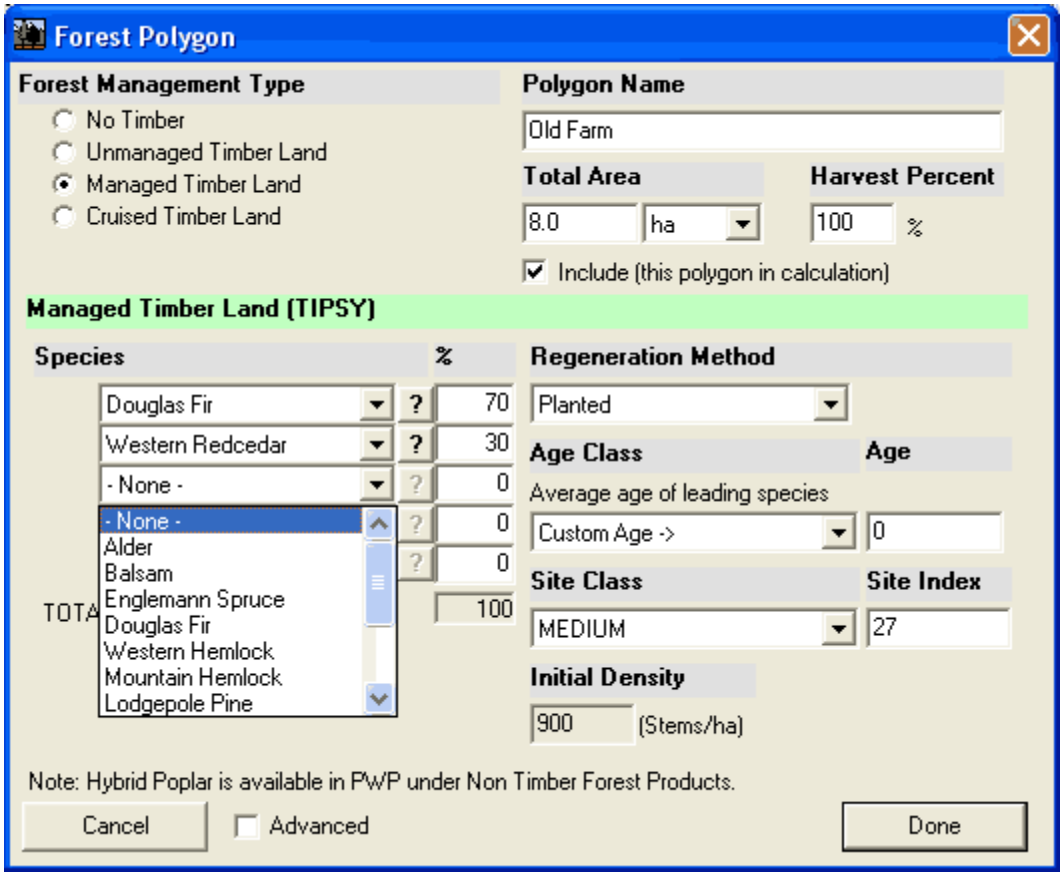
- **CC**: the Crown Closure is the measure of area covered by tree canopy. PWP uses default values for CC unless you enter your own.
- **VAF**: the Volume Adjustment Factor is included in PWP to allow users to adjust the volume up or down if local measurements differ from VDYP predicted yields. A VAF of 1.2 means the volume will be increased by 120% of the normally predicted VDYP volume at every age. A VAF of 0.8 means VDYP predicted volumes will be reduced to 80% at every age.
- **Stocking Class**: this is the measure of how well stocked your land is. PWP only uses two levels of stocking, either fully stocked or residual. Use “residual” if the stand was recently selectively logged to remove more than about 80% of the volume. Use a Volume Adjustment Factor (see Advanced below) to reduce volumes if the stand was partially cut.

6.2.4 Forest Management Type - Managed Timber Land

If you selected Managed Timber Land, you will be directed to the following data screen. After you enter your data and choose "Done", a calculation will occur to derive timber information. You will move to the harvesting cost screen and then the Non-Timber Forest Products screen.

The following information must be entered. PWP will use this to calculate a timber yield curve[1] to estimate the volume of timber on your polygon. Note that PWP will display items in yellow (critical for the calculations) if they are incomplete. Click "Done" when you are finished.

This screen may also be accessed and edited from the Main PWP screen by clicking the "Timber Land" button.



6.2.4.1 Forest Management Type Data for Managed Timber Land:

Enter data in the white data boxes, some data can be selected from drop down list boxes:

- **Harvest Percent**: enter the percent of timber to be removed. If you select other than 100%, this can imply that you wish to harvest only a part of the polygon, or selectively harvest through your whole polygon. Your costs and future management will differ depending on which you choose – please remember to add the Partial Cutting Costs in the Timber Harvesting Cost screen when you are prompted.

[1] PWP uses BatchTIPSY 3.2m for managed stands.

- **Species**: enter the tree species and the approximate percent composition in descending order. The top species is the "leading species" and will have the biggest influence on your timber yields. (Note that there are currently no deciduous species available for managed stands with this yield model, though you can use the VAF adjustments with VDYP as a proxy for managed deciduous stands.)
- **Regeneration Method**: choose between planting and natural.
- **Age Class**: enter the approximate age group of the dominant older tree species.
- **Age**: this will be filled in from Age Class. You can enter your own age by selecting "Custom Age".
- **Site Class**: enter the growing potential of the site. Use Poor, Medium or Good. The respective site index for your polygon will be shown next to the site class. You may select "Custom" if you would like to use your own site index information.
- **Site Index**: this is a specific measure of site productivity, measured as the height of the tallest trees (in meters) at breast height age 50 years, and will be filled in from Site Class for you. You can override the site index by clicking on "Custom Site Index" to enter your own information.
- **Initial Density**: PWP will provide a default number of planted stems/hectare for you. You may override this by clicking on the Advanced check box.

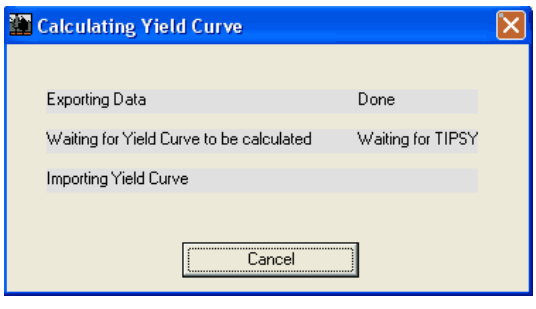
6.2.4.2 Advanced Features:

Clicking the check box can activate advanced features. These allow advanced users to override default regional information. Do not use advanced features unless you are familiar with TIPSY yield curves. You should refer to a TIPSY user manual if you have any questions.

- **Initial Density**: PWP will provide a default number of planted stems/hectare for you. You may override this by clicking on the Advanced check box.
- **Thin-to Density**: PWP will provide a default number of spaced stems/hectare for you (which will occur when the stand reaches 4-6m in height). You may override this by clicking on the Advanced check box.
- **OAF1**: The OAF1 is used to account for holes in a stand. It will reduce the stand yield by the % chosen (i.e. an OAF1 of 15% will reduce the stand yield by 15%). OAF1 = 15% is a standard used across BC and should not be adjusted unless you have better information.
- **OAF2**: The OAF2 is used to account for losses to pests (insects and disease) over time, and results in lowering the tail end of the yield curve. OAF2 = 5% is a standard used across BC and should not be adjusted unless you have better information.

6.2.5 Calculating Yield Curve

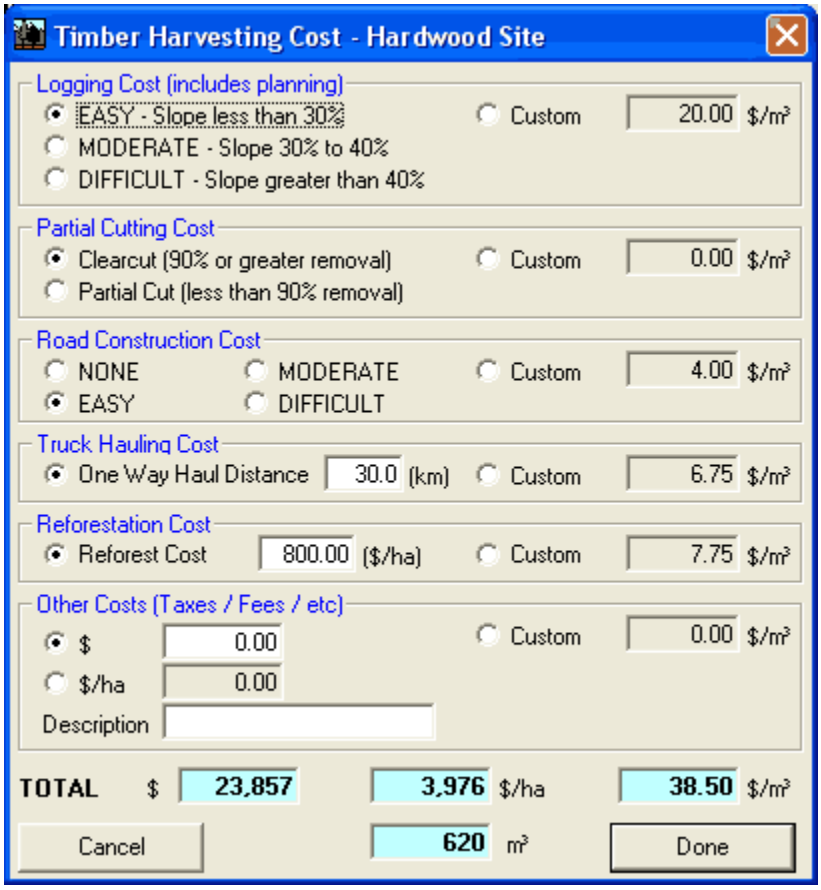
When you have filled the Forest Polygon information and clicked "Done", in the next few seconds PWP will display a screen for your unmanaged (VDYP) or managed stand (TIPSY) and will calculate the timber volume information from the data you supplied.



The Timber Harvesting Cost screen will then display for you to enter or edit harvesting costs (see below). Once you have included your harvesting costs and pressed 'Done', you will be brought back to the Main screen.

6.2.6 Timber Harvesting Costs

You will be brought to the Timber Harvesting Costs screen once you have added new land and had yields calculated for your forest polygon. This will display your polygon name and harvesting costs for the polygon.



The Timber Harvesting Costs screen provides basic cost items you can expect. This is the only cost item screen for timber harvesting in PWP. Costs from here are carried forward to the Main PWP screen for your forest polygon. Costs are provided in $, $/ha and $/m3. All costs are converted by PWP back to $/ m3 for the cost summary.

You will need to confirm this information for each polygon, as costs may change from site to site.

The following sum totals are provided at the bottom of this screen:

- Average total harvest cost is calculated as follows: Total $ = (total cost $/m3) X volume for the polygon (m3).
- Total cost by area ($/ha)
- Total cost by volume ($/m3)
- Total timber volume for the polygon (m3)

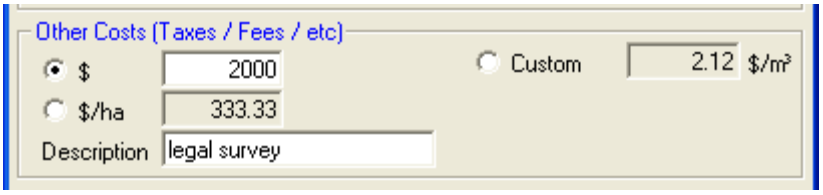
Costs provided with PWP are based on approximations from Ministry of Forests timber appraisal and other data sources, simplified for this application. They automatically display values from for the coast or interior based on your location. You may use these, or select Custom to add your own cost item.

Timber Harvesting costs include:

- **Logging Costs**: these include all normal harvesting costs associated for a clearcut scenario (at least 90% removal), and includes the planning, falling, bucking, yarding of logs to a roadside storage area, and loading onto trucks.
- **Partial Cutting Costs**: this is a cost for partial cutting that may be incurred if you remove less than about 90% of the stand's original volume. This cost is added to the logging cost.
- **Road Construction**: includes all costs for upgrades, new roads and maintenance.
- **Truck Hauling**: enter your one-way haul distance. PWP will calculate a return trip rate based on the round trip haul. For example, if the distance from your property to the mill is 30km, enter 30km into the data box and PWP will calculate your truck haul rate for the round trip of 60km.
- **Reforestation cost**: provides a cost allowance for reforesting your land after you harvest all trees. Includes average costs for site preparation, planting, brushing and spacing to bring the new forest to a free growing state, as might be expected on Crown forest land.
- **Other Cost**: allows you to add other costs associated with harvesting or managing your timberland. This might include taxes or fees you have in addition to harvesting costs, and which add to the cost of your project.

  You may want to add any additional costs for additional stewardship reasons, such as special forest management for Mule Deer winter range or fisheries management.

  This is also how you can include lump sum costs for any particular phase for that polygon if you do not want to convert to a $/m3 basis. For example, you may have an extra road cost for a polygon, or you may have some additional cleanup items to account for.



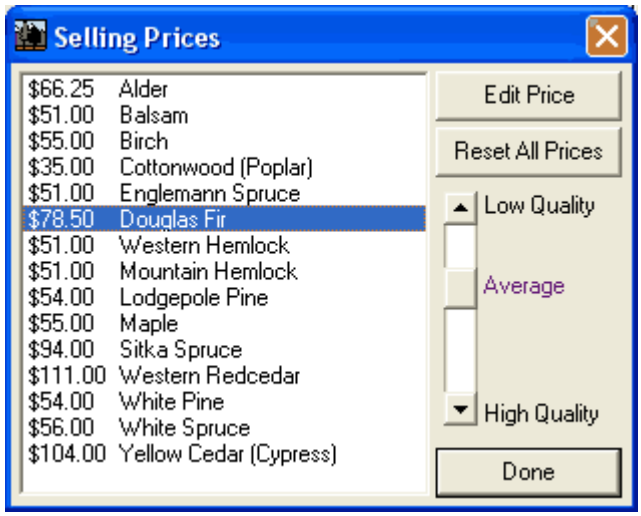
Once you have added your cost items, click "Done", and your timber harvesting costs will be automatically updated on the Main PWP screen for that polygon.

Information in this screen may be edited at any time from the Main PWP screen with the green **Harvesting Costs** button.

If you are working on a polygon for the first time, the Non-timber Forest Products screen will appear next for you to include your non-timber information.

6.2.7 Log Selling Prices

Log selling prices are automatically chosen for you from the Selling Prices screen, and reported in dollars per cubic meter ($/m^3.) This screen is not displayed in PWP unless you click the **Selling Prices** button on the Main PWP screen. Prices are brought forward to the Main PWP screen. Total values ($) for each species = selling price by species ($/m^3) x volume by species (m^3). The average values provided with PWP have been derived from industry averages, and will automatically be displayed for the coast or interior based on your location.



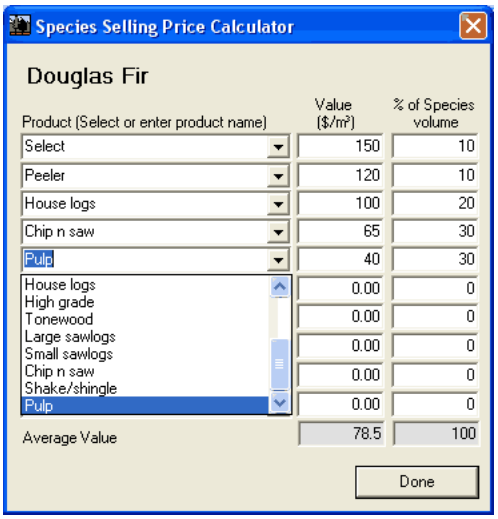
Selling prices change with market conditions and vary depending on the area of BC that you are in. You can edit these with the scroll bar, or by double clicking the species and entering your own prices. Values increase and decrease by 1% per click. Click on "Reset All Prices" to reset to saved default values.

Selling Price Calculator

You may want to derive your own log prices based on the log products and prices you expect. While in the Selling Prices screen, click on the **Edit Prices** button to activate a Species Selling Price Calculator. Enter as much information as you have on prices.

Contact a log buyer or the Ministry of Forests Revenue Branch website
http://www.for.gov.bc.ca/hva/timberp/amv.htm

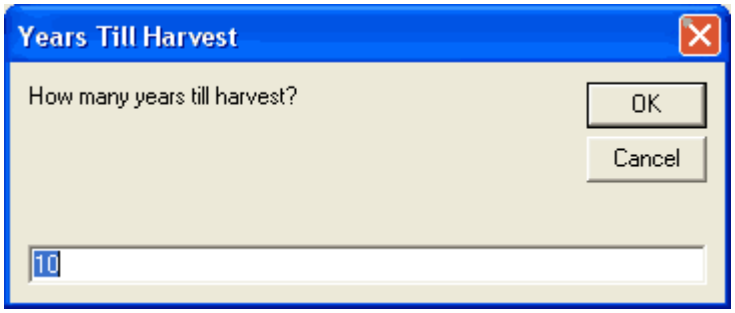
for suggested products and prices.



Once you click "Done", your log values will be automatically updated on the Main PWP screen. These are also the log prices used in the Silviculture Investment screen.

6.2.8 Harvest Year

You may project your harvesting into the future, to test the effects of delaying harvest for a number of years. This is something to consider for younger forests that are growing fast but may not have reached an economical harvest age yet.

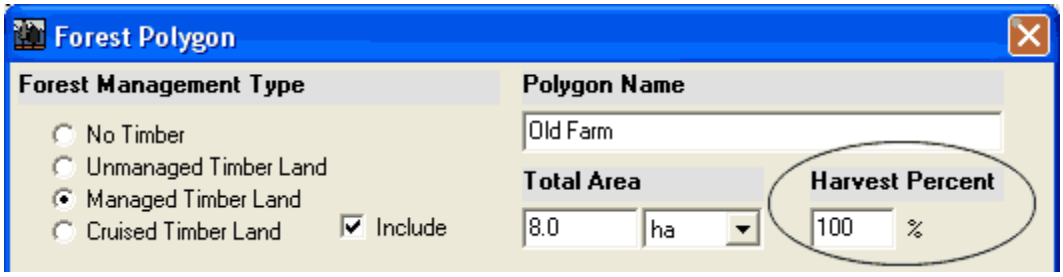


In the Main PWP screen, click on the "Harvest Year" button to activate the Years Till Harvest screen. The number of years you select will be added to the current age of all of your forest polygons, and displayed on the Main PWP screen.

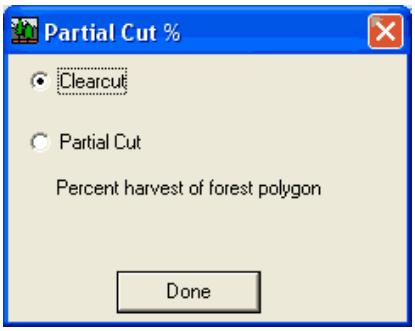
The volume at the harvest age will be used in all subsequent calculations. It does not adjust values or costs for inflation or interest over time.

6.2.9 Partial Cut and Selection Harvesting

If you intend to partially harvest your forest polygon, you can adjust the % removal. PWP defaults to a 100% removal (clearcut) unless you set some other level of removal. This can be done in two ways. First, you can set the removal in the Forest Polygon screen under Harvest Percent when you set up your forest polygon.



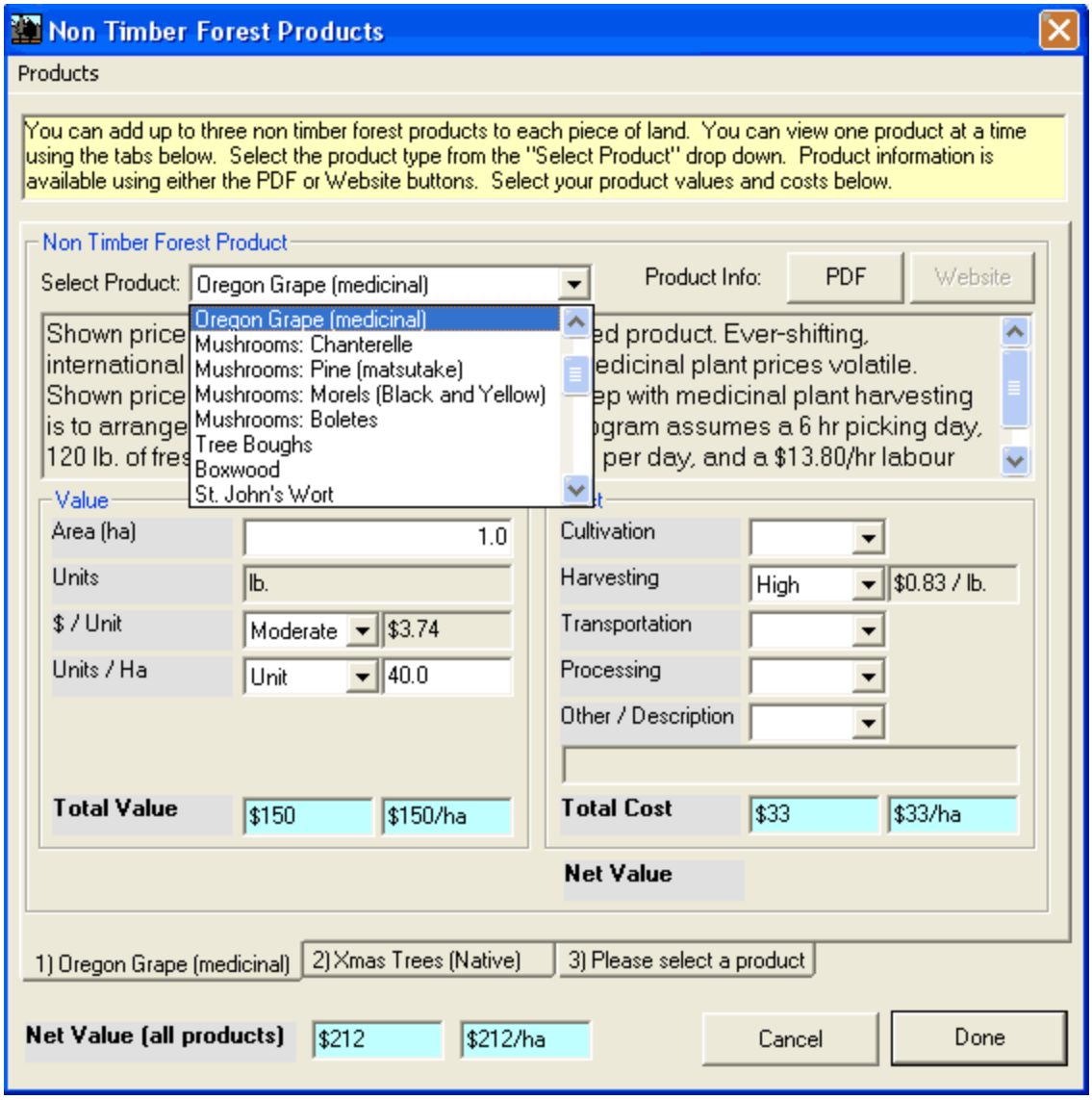
Alternately, on the Main PWP screen, click on the "Partial Cut %" button to activate the Partial Cut % screen for that forest polygon. Ensure that you have selected the correct forest polygon column.



6.2.10 Non-Timber Forest Products (NTFP)

If you plan to harvest non-timber forest products from your forest, you can select from a list of the more common products that you might find on your forest, or create a new product. PWP provides a brief description, some expected costs and prices for each NTFP, and access to information on each NTFP.

You can do this when adding land or from the Main screen once you have created a polygon. PWP will automatically bring up the Non-Timber Forest Products screen as the next step after you enter timber harvesting cost information. If you don't plan to harvest non-timber forest products, click "Done" to return to the Main PWP screen.



PWP lets you enter data for three non-timber products per polygon. PWP has 24 of the more common NTFPs in its library for you to select from, or you can select "none". There are hundreds of possible NTFP products in the forest. You may edit the PWP library to include any number of your own non-timber forest products and costs or values.

PWP presents high, medium and low cost and price estimates for some NTFPs, allowing you to enter any price information you have. Consult a NTFP specialist, the BC Ministry of Forest and Range, the BC Ministry of Agriculture and Lands, Royal Roads University or USFS for other product ideas.

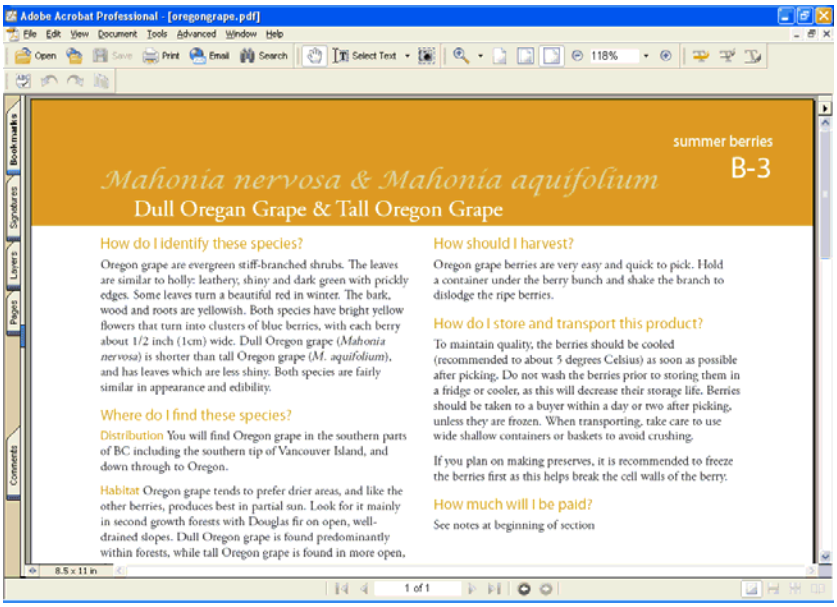
The cost side is broken down into harvesting, transportation, processing and other costs. There are several categories of NTFPs and each has distinctive cost profiles. To keep PWP simple to use, we have adopted the same four cost categories for every NTFP. The processing and other cost boxes will be zero where a landowner does not plan to add further value to a NTFP (a likely example is the harvesting of wild mushrooms and sale to a field buyer, although drying and packaging them is an alternative). Native stand Christmas trees is an example where a landowner is likely to undertake some processing (such as sorting and baling) and possibly marketing, in addition to harvesting. None of the transportation boxes have default values because the transportation circumstances (distance and vehicle) will be different for each landowner. The PWP user must insert his or her own transportation costs.

The default prices in PWP are estimated prices that a wholesaler would pay. Prices for some NTFPs (e.g. wild mushrooms) can be volatile from year to year and even within a harvesting season. Other products (e.g. salal) have demonstrated fairly stable prices. NTFP markets are immature in comparison to timber markets. Price and cost information is collected and published by well-established organizations for timber products; not so for NTFPs. A PWP user can select default values in the program to develop initial estimates but s/he should undertake some research to obtain current cost and price information. Consult the Small Woodlands Guidebook for sources and methods of conducting this research.

There is no default data in PWP on growth and yield of non-timber forest resources because of the lack of information. PWP allows a user to enter his or her own productivity estimates for non-timber resources. PWP has growth and yield estimation capability in the timber module of PWP - a tremendous tool that is available because of the years of research by the BC Ministry of Forests and others. There has been little research on growth and yield of non-timber forest resources. This situation is slowly changing; as an example there is recent research on growth of pine mushrooms.

6.2.10.1 Non Timber Forest Products Information

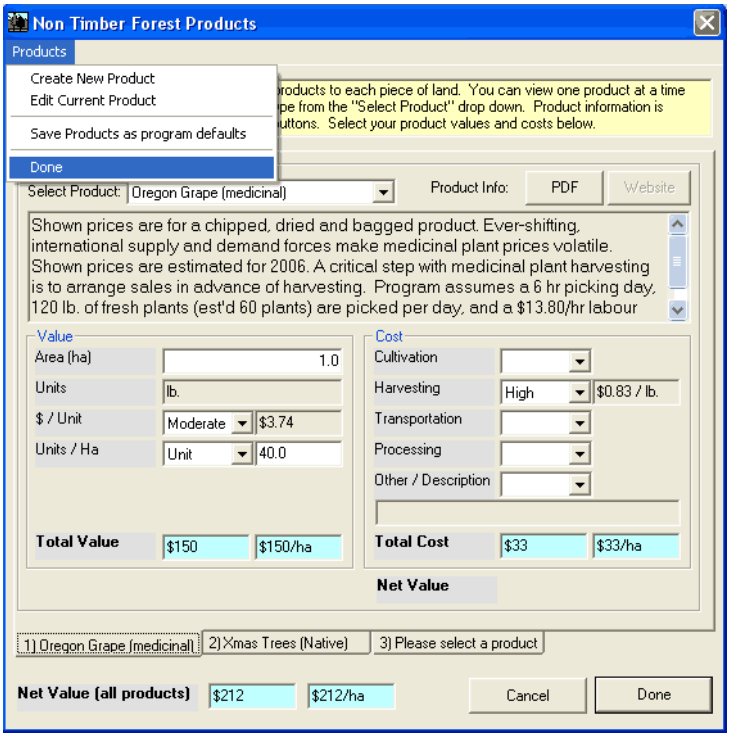
You can access information about the NTFP product by clicking the “PDF” or “Website” buttons next to the product name. The Website button will be grayed out if there are no products in the library available to view on the Internet.



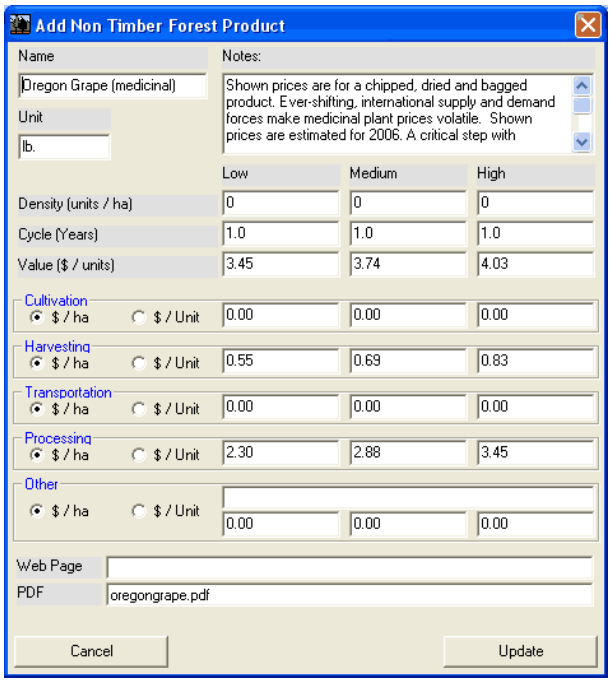
6.2.10.2 Editing, Adding and Saving NTFPs

You may wish to edit or create your own NTFP. While PWP contains some price and cost estimates, current local data is always best.

You do this by selecting the **Products** menu item, then selecting **Create New Product** or **Edit Current Product**. This will bring up the Add Non-Timber Forest Products screen. You can edit any of the white data boxes, or modify costs and values.



- **Edit Current Product:** You can edit NTFP production costs and selling prices.
- **Create New Product:** Allows you to create a new NTFP product and values to be selected in PWP.



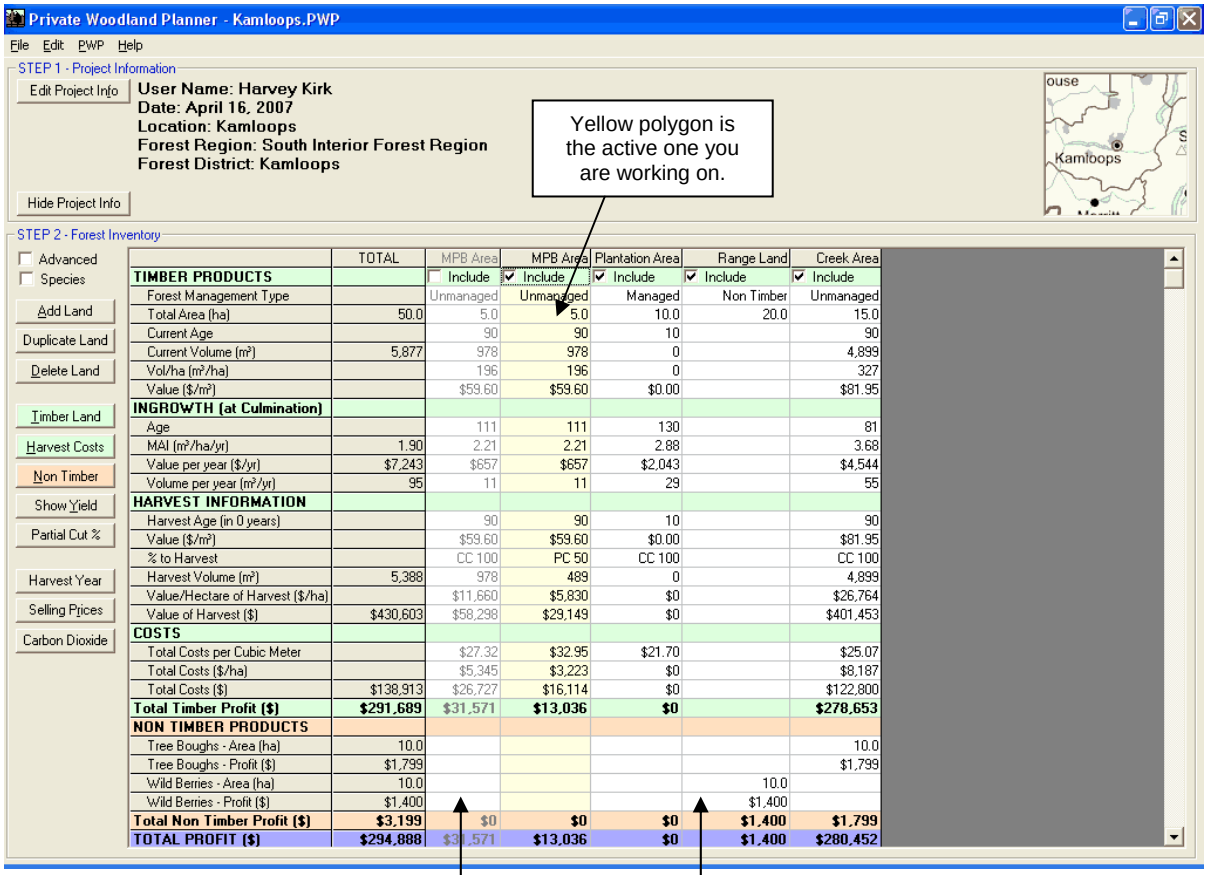
When you have completed the updates, click on Update.

7.0 Viewing Results

You view the results of your timber and non-timber analysis on the Main PWP screen. All results are totaled for each forest polygon (column), and then for each variable (row).

These results can be expanded by clicking on the "Advanced" and "Species" check boxes to view more detailed information.

The total is summarized along the left Total column. Only the columns that have the “Include” checkbox turned on will be included in the Total (refer to the next section for a description on including polygons).



	TOTAL	MPB Area	MPB Area	Plantation Area	Range Land	Creek Area
TIMBER PRODUCTS		Include	Include	Include	Include	Include
Forest Management Type		Unmanaged	Unmanaged	Managed	Non Timber	Unmanaged
Total Area (ha)	50.0	5.0	5.0	10.0	20.0	15.0
Current Age		90	90	10		90
Current Volume (m³)	5,877	978	978	0		4,899
Vol/ha (m³/ha)		196	196	0		327
Value ($/m³)		$59.60	$59.60	$0.00		$81.95
INGROWTH (at Culmination)						
Age		111	111	130		81
MAI (m³/ha/yr)	1.90	2.21	2.21	2.88		3.68
Value per year ($/yr)	$7,243	$657	$657	$2,043		$4,544
Volume per year (m³/yr)	95	11	11	29		55
HARVEST INFORMATION						
Harvest Age (in 0 years)		90	90	10		90
Value ($/m³)		$59.60	$59.60	$0.00		$81.95
% to Harvest		CC 100	PC 50	CC 100		CC 100
Harvest Volume (m³)	5,388	978	489	0		4,899
Value/Hectare of Harvest ($/ha)		$11,660	$5,830	$0		$26,764
Value of Harvest ($)	$430,603	$58,298	$29,149	$0		$401,453
COSTS						
Total Costs per Cubic Meter		$27.32	$32.95	$21.70		$25.07
Total Costs ($/ha)		$5,345	$3,223	$0		$8,187
Total Costs ($)	$138,913	$26,727	$16,114	$0		$122,800
Total Timber Profit ($)	**$291,689**	**$31,571**	**$13,036**	**$0**		**$278,653**
NON TIMBER PRODUCTS						
Tree Boughs - Area (ha)	10.0					10.0
Tree Boughs - Profit ($)	$1,799					$1,799
Wild Berries - Area (ha)	10.0				10.0	
Wild Berries - Profit ($)	$1,400				$1,400	
Total Non Timber Profit ($)	**$3,199**	**$0**	**$0**	**$0**	**$1,400**	**$1,799**
TOTAL PROFIT ($)	**$294,888**	**$31,571**	**$13,036**	**$0**	**$1,400**	**$280,452**

The column widths can be adjusted by simply placing your cursor over name on the column header and dragging the separator.

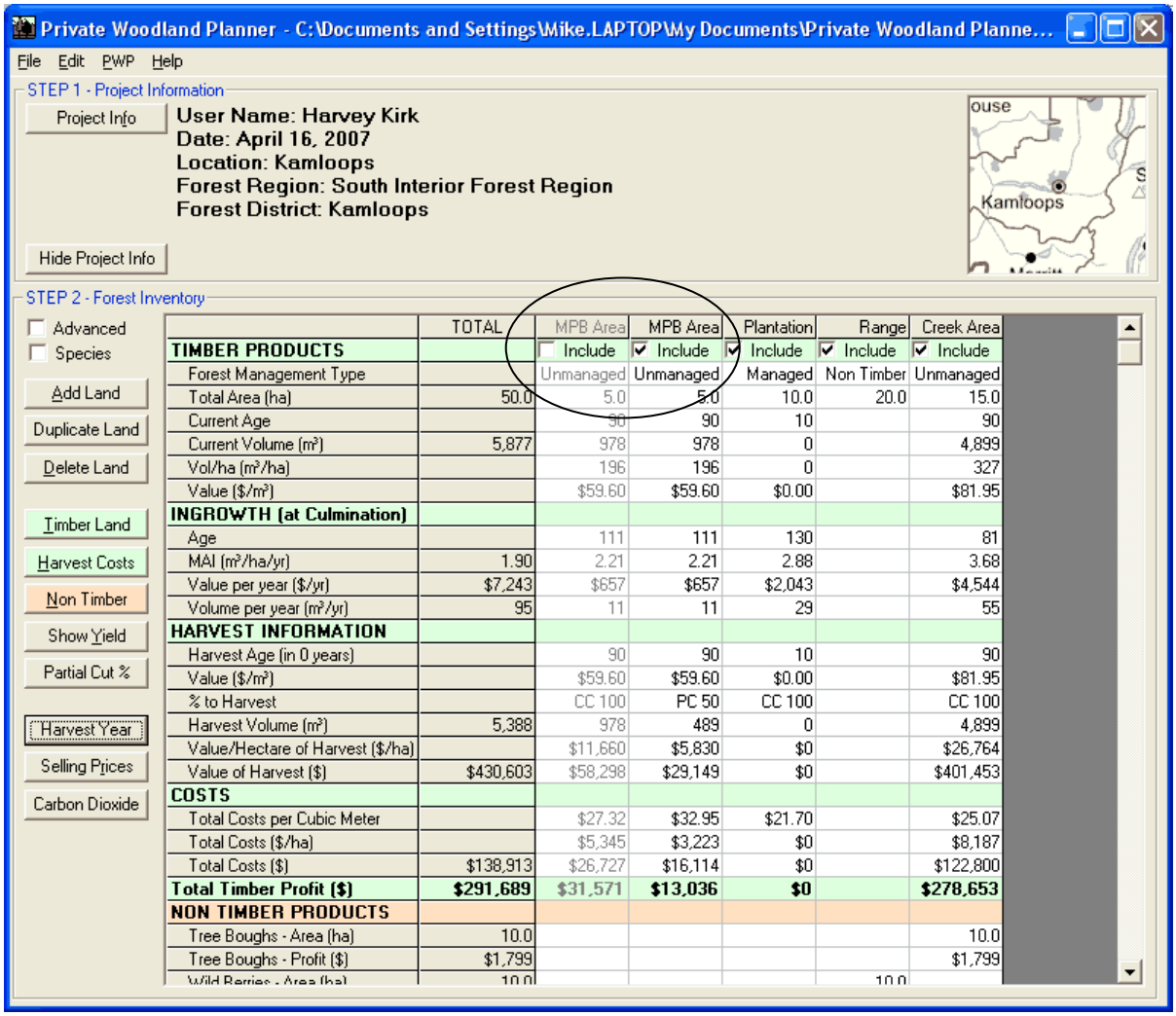
Results from your “Silviculture Investment” analysis are displayed on the Silviculture Investment screen.

7.1.1 Using the "Include" Feature – Comparing Polygons

You can include and exclude polygons from calculations in PWP. Included polygons will show up as part of the summary information along the left Total. This is useful for comparing the implications of different management assumptions on the same piece of land, or when testing the implications of adding land or not including land.

Polygons are "included" automatically unless you choose to not include them in the Forest Polygon screen when you create the polygon. Simply double-click the polygon you wish to not-include along the green header. The check box will uncheck and the column of information will gray out. The polygon is no-included if the check box is not checked on, and will not be included in the addition on the left column.

To compare two polygons, create a duplicate and change the attributes of one. To do this, simply click the **Duplicate Land** button, change the attributes for your land in the duplicated polygon, then double click the header to include and exclude the polygon. In the example below, we compared two different harvesting costs on a Mountain Pine Beetle area. You can compare any timber or non-timber forest product attribute in the forest polygon.

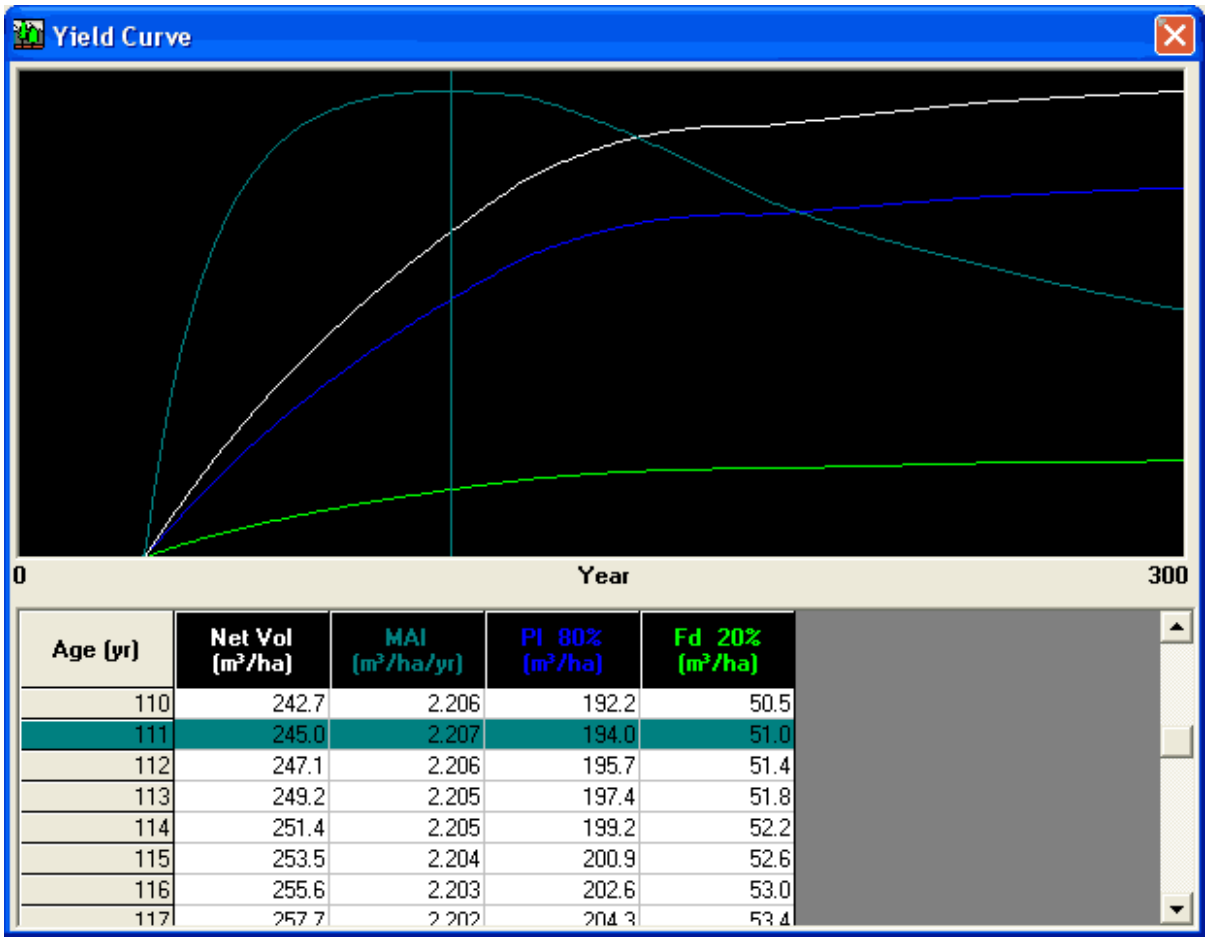


	TOTAL	MPB Area	MPB Area	Plantation	Range	Creek Area
TIMBER PRODUCTS		Include	Include	Include	Include	Include
Forest Management Type		Unmanaged	Unmanaged	Managed	Non Timber	Unmanaged
Total Area (ha)	50.0	5.0	5.0	10.0	20.0	15.0
Current Age		90	90	10		90
Current Volume (m³)	5,877	978	978	0		4,899
Vol/ha (m³/ha)		196	196	0		327
Value ($/m³)		$59.60	$59.60	$0.00		$81.95
INGROWTH (at Culmination)						
Age		111	111	130		81
MAI (m³/ha/yr)	1.90	2.21	2.21	2.88		3.68
Value per year ($/yr)	$7,243	$657	$657	$2,043		$4,544
Volume per year (m³/yr)	95	11	11	29		55
HARVEST INFORMATION						
Harvest Age (in 0 years)		90	90	10		90
Value ($/m³)		$59.60	$59.60	$0.00		$81.95
% to Harvest		CC 100	PC 50	CC 100		CC 100
Harvest Volume (m³)	5,388	978	489	0		4,899
Value/Hectare of Harvest ($/ha)		$11,660	$5,830	$0		$26,764
Value of Harvest ($)	$430,603	$58,298	$29,149	$0		$401,453
COSTS						
Total Costs per Cubic Meter		$27.32	$32.95	$21.70		$25.07
Total Costs ($/ha)		$5,345	$3,223	$0		$8,187
Total Costs ($)	$138,913	$26,727	$16,114	$0		$122,800
Total Timber Profit ($)	**$291,689**	**$31,571**	**$13,036**	**$0**		**$278,653**
NON TIMBER PRODUCTS						
Tree Boughs - Area (ha)	10.0					10.0
Tree Boughs - Profit ($)	$1,799					$1,799
Wild Berries - Area (ha)	10.0				10.0	

7.1.2 Viewing Yield Curves

Timber yield curves may also be viewed. Click on the "Show Yield" button on the Main PWP screen. This displays:

- “Net Vol” - Yield curve for the total net volume (m3/ha) of all species,
- “MAI” - Mean annual increment (m3/ha/yr),
- The timber yield curve for the net volume contribution by species (m3/ha),
- The timber yield table for each year. The highlighted row is for the “culmination age”, the year at which the tree growth is at a maximum average rate.



Age (yr)	Net Vol (m³/ha)	MAI (m³/ha/yr)	Pl 80% (m³/ha)	Fd 20% (m³/ha)
110	242.7	2.206	192.2	50.5
111	245.0	2.207	194.0	51.0
112	247.1	2.206	195.7	51.4
113	249.2	2.205	197.4	51.8
114	251.4	2.205	199.2	52.2
115	253.5	2.204	200.9	52.6
116	255.6	2.203	202.6	53.0
117	257.7	2.202	204.3	53.4

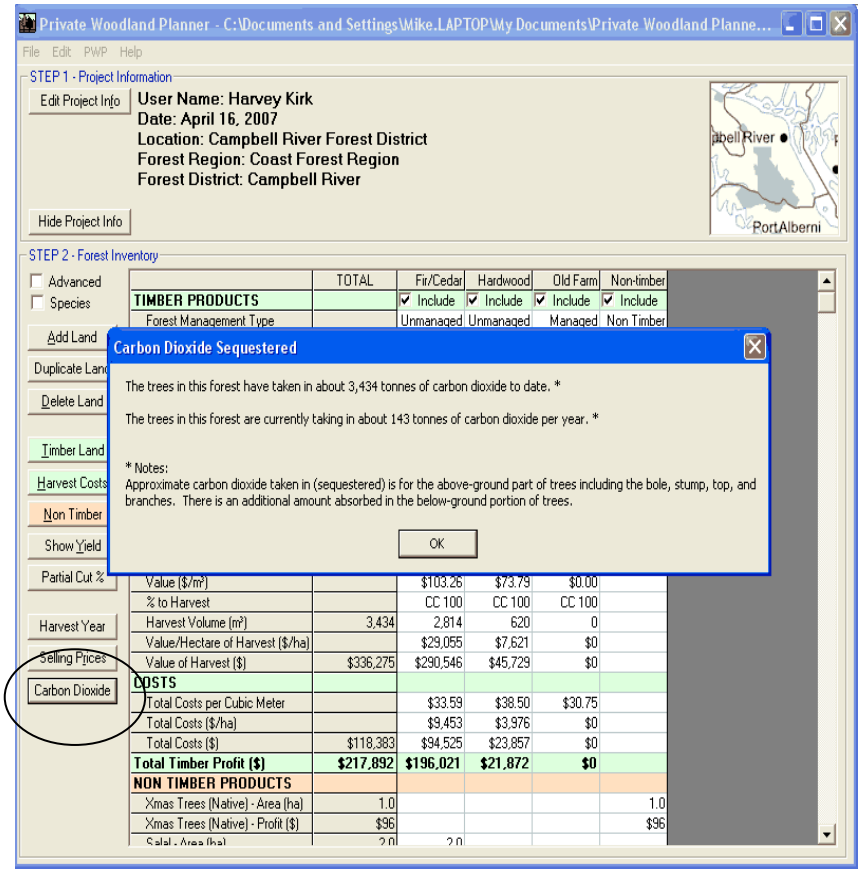
Note that the "Y" axis is not labeled since there are two different variables displayed.

7.1.3 Carbon Dioxide

A new feature in Private Woodland Planner version 2.0 is an approximation of the Carbon Dioxide (CO2) that your forest is taking in (the technical term is “sequestering” Carbon Dioxide.)

To view the amount of CO2 being sequestered in your forest, click the **Carbon Dioxide** button on the Main screen and view the message displayed.

Note: 1 tonne = 1000 kg



PWP reports the approximate Carbon Dioxide intake in two ways:

- For the total amount that has been sequestered on your forest (tonnes) to date.
- For the amount being sequestered annually (tonnes/year), based on the in-growth at that particular year (as measured from the yield curve)

The amount of Carbon Dioxide taken in to date covers the above ground portion of the tree, including the stump, bole, top and branches. (There is an additional amount also taken in the below ground portion of trees in the root system that is not reported.)

For simplification of conversion, the amount of merchantable bole volume almost equals the total above ground CO2 in tonnes[2]. PWP uses a rough correlation of 1m3 = 1tonne CO2 sequestered. For more information on Carbon sequestering, refer to the Canadian Forest Service.

[2] Per. Comm.. Thomas White, Researcher, Canadian Forest Service, Victoria, BC March 9, 2007. Also refer to the report titled “Carbon Sequestration Aspects of Afforestation Program in British Columbia, Canada”, Nawitka Renewable Resource Consultants, Victoria, BC, April 1999.

The average Canadian makes a series of decisions every day that results in the emission of approximately 9 tonnes of CO2 per year. The per capita values for Canada, that is, the total amount the country emits including industry divided by the number of Canadians is approximately 18 tonnes of CO2 per person per year in 2002. 1 kg of CO2 will fill approximately 20 birthday balloons. (Source: www.zerofootprintkids.com and http://unstats.un.org/unsd/environment/air_co2_emissions.htm)

8.0 Silviculture Investment Analysis

The Silviculture Investment Analysis feature is provided to help you with a basic analysis of silviculture investments. There have been no significant updates to this feature in PWP version 2.0.

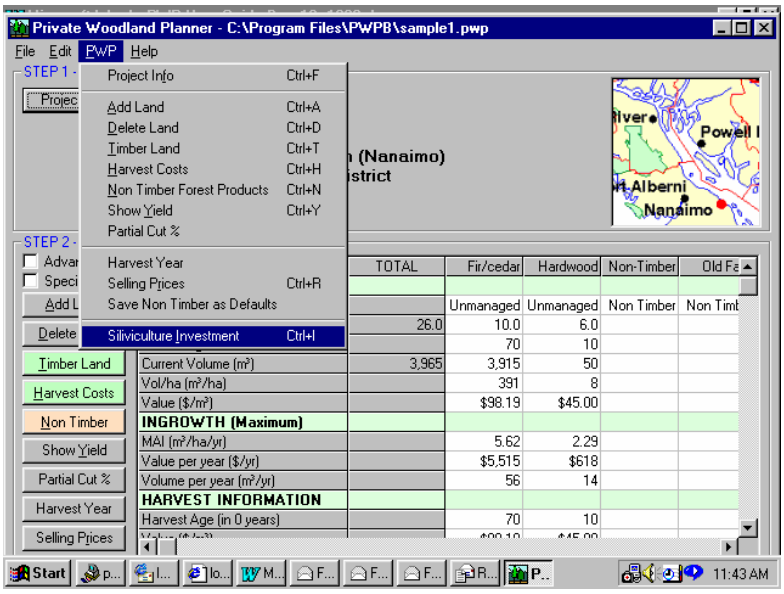
Before you get started, you should be aware that some of the concepts used here are somewhat advanced, and require some knowledge of forest planning. Consult a forester should you require assistance with this feature.

This feature will allow you to compare the financial benefits of letting nature take its course (reforesting your land naturally) versus you re-planting and undertaking some stand-tending activities. You can compare the total benefit to you from investing in silviculture and managing your stand in terms of timber values and volumes versus leaving the stand to grow naturally and putting the same money in some other investment. The two features are as follows:

- **The simplest is a comparison** – This is a measure of the net future return from a silviculture-treated stand versus the net future return from the naturally regenerated stand + the return on the monies that were not invested in silviculture.
- **The second is a Net Present Value Calculation**[3] – Present value is the discounted value of the future stream of revenues less the discounted value of the future stream of costs. In this case, revenues will be monies from log sales, and costs will be expenditures on re-planting and stand tending. The costs and revenues that you expect to incur or realize in the future, whether a year or several years from today are "discounted" by a net-of-inflation interest rate to reflect the time value of money. The interest rate (commonly referred to as discount rate) reflects your hurdle rate of return; by hurdle we mean the level of return that you would like to see for an investment. The program uses a default discount rate of 3%, which reflects a net-of-inflation rate of return on a five-year GIC (as of the writing of this guide). PWP allows you to alter the discount rate to reflect your own investment criteria. The end result is a figure in today's dollars, not some far off in the future number. A positive net present value (even a small one) indicates a worthwhile investment in comparison to the alternative reflected in the selected discount rate.

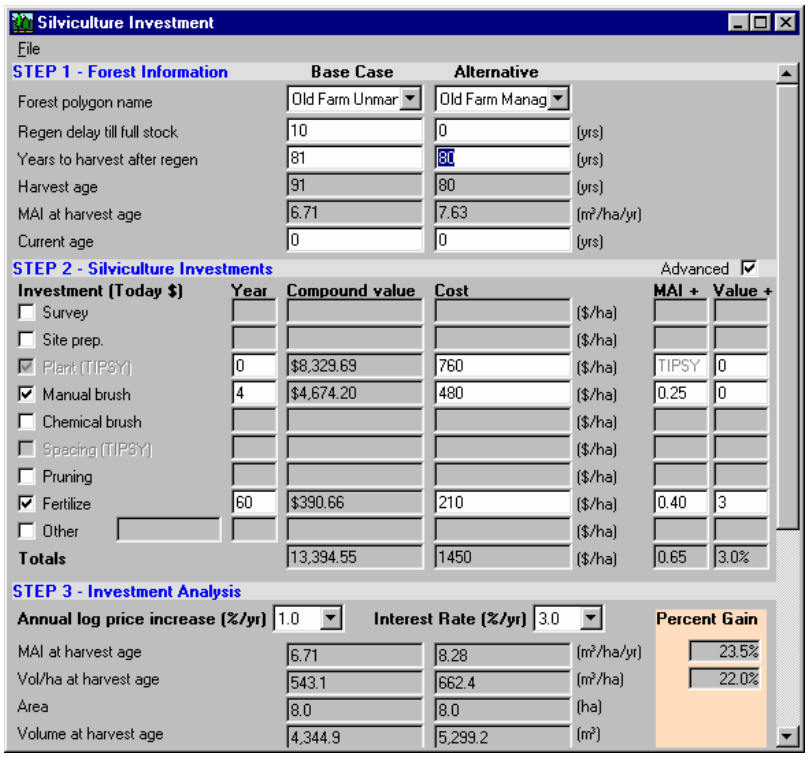
[3] It is desirable to undertake a net present value calculation for a silviculture investment because they are long-term investments. You have investment choices and a present value calculation can compare the results of a long-term silviculture investment with an alternative investment in today's dollars.

To activate the Silviculture Investment feature, in the Main PWP screen click on the PWP menu item, then select 'Silviculture Investment'.



A single screen will open, which will be used for your data entry and to review results. (Note that you will need to move your cursor to another data box and click when you make changes to activate the changes.)

In order to carry out a silviculture analysis, you will need to use forest polygons created in the Main PWP screen (which is where timber yield information is compiled for the analysis). If you wish to try a polygon not in your list, you will have to create one in the Main PWP screen. We suggest that you create a separate file of polygons you wish to analyze for silviculture investments.



8.1.1 Forest Information

The first step is to select forest polygons and basic analysis data for the base case and alternative investment case for a comparison. To do this, select or enter the following data:

- **Forest Polygon Name:** Select the forest polygon from the pick list for a Base Case and one for an Alternative investment. For example, a Base Case might be a forest polygon that assumes natural regeneration (unmanaged, VDYP), and some later harvest age. The Alternative might be the same forest polygon, but assuming that it was planted (managed, TIPSY) and harvested at an earlier age.

  Recall that you will need to have added forest polygons and attributes in the Main PWP screen if you haven't already done so, as this is where PWP will get the timber yield information for the investment analysis. We suggest that you create a separate PWP work file for your timber yields that you wish to compare.

  You will need to select the planting and spacing features in the Forest Polygon screen when you wish to use these silviculture investments.

- **Regen delay till full stock**: Enter the anticipated regeneration (regen) delay until you have a fully stocked forest. Re-planting typically uses a 0-2 year regen delay; allowing a stand to regenerate naturally usually takes several years longer depending on the severity of conditions (usually 5+ years).

- **Years to harvest after regen**: Enter the age of the timber at which you wish to harvest. PWP will use the culmination age (age at which the trees are growing their fastest) unless you indicate otherwise.

- **Harvest Age**: PWP will add the regen delay and years to harvest to arrive at the “Harvest Age”.

- **MAI @ Harvest Age**: PWP will determine the mean annual increment (MAI) at harvest age. This is the average tree volume per hectare of land at harvest divided by harvest age. It is the measured of the amount of timber volume that is growing on your land over time, in terms of m3/ha/year. 1m3 is about equal to an average municipal telephone pole; a highway logging truck carries about 35-40m3 per load. An MAI of 1-2 m3/ha/yr is considered normal for many “Poor” sites, 3-6 is considered normal for many “Medium” sites and 7+ is considered normal for many “Good” sites.

- **Current Age**: Enter the current average age of the dominant trees in the stand.

8.1.1.1 Silviculture Investments

The next step is to identify silviculture investments you plan to make. To do this, select the investment type by clicking on the adjoining boxes. Only checked boxes will be used in the analysis. Enter the following:

- The **year** in which you would like the investment to occur. PWP provides defaults for typical years, which you can override by typing over.

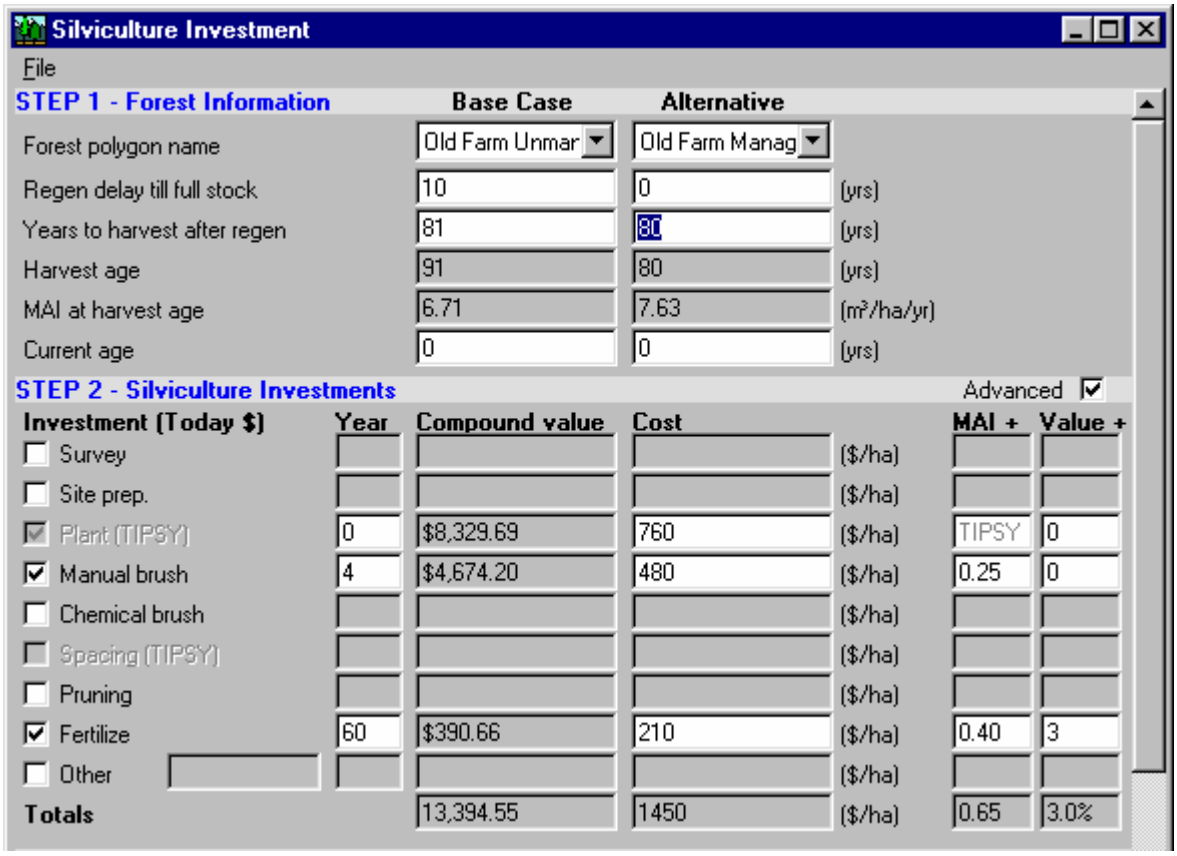
- **Cost** in $/ha. PWP provides defaults for typical costs under the Managed column, which you can override by typing over.

PWP multiplies the dollar cost/ha by the area of the treated polygon to give a total dollar cost for the item. It is displayed under the Natural column.

8.1.1.2 Silviculture Benefits

The anticipated benefits from silviculture[4] are displayed using the "Advanced" checkbox. These values were broadly defined in 1999 to estimate financial and volume benefits. They include:

- **MAI +:** The first right column shows anticipated timber yield gains in mean annual increment (m3/ha/yr.)
- **Value +:** The second right column shows the anticipated timber value percentage (%) gains relative to current average log prices.



The object of the exercise is to analyze a silviculture investment. If you don't put money into silviculture, you would do something else with it, perhaps spend it on a consumer item or put it into another investment vehicle. The grayed column under Base Case displays a compounded return of the money that is not spent on silviculture. The return is shown as $/ha. PWP assumes the money would be invested in a financial institution GIC (if it were not spent on silviculture). To avoid having to project inflation far into the future, PWP uses prices and costs net of inflation[5]. The default return on

[4] Source of benefits information: Performance Indicators for Assessing Investment Benefits in the Backlog and Enhanced Forestry Program, BC Ministry of Forests, Forest Practices Branch, July 1999

[5] For purposes of analysis, inflation needs to be handled consistently. Either inflation is included or it is excluded from prices, costs and interest rates.

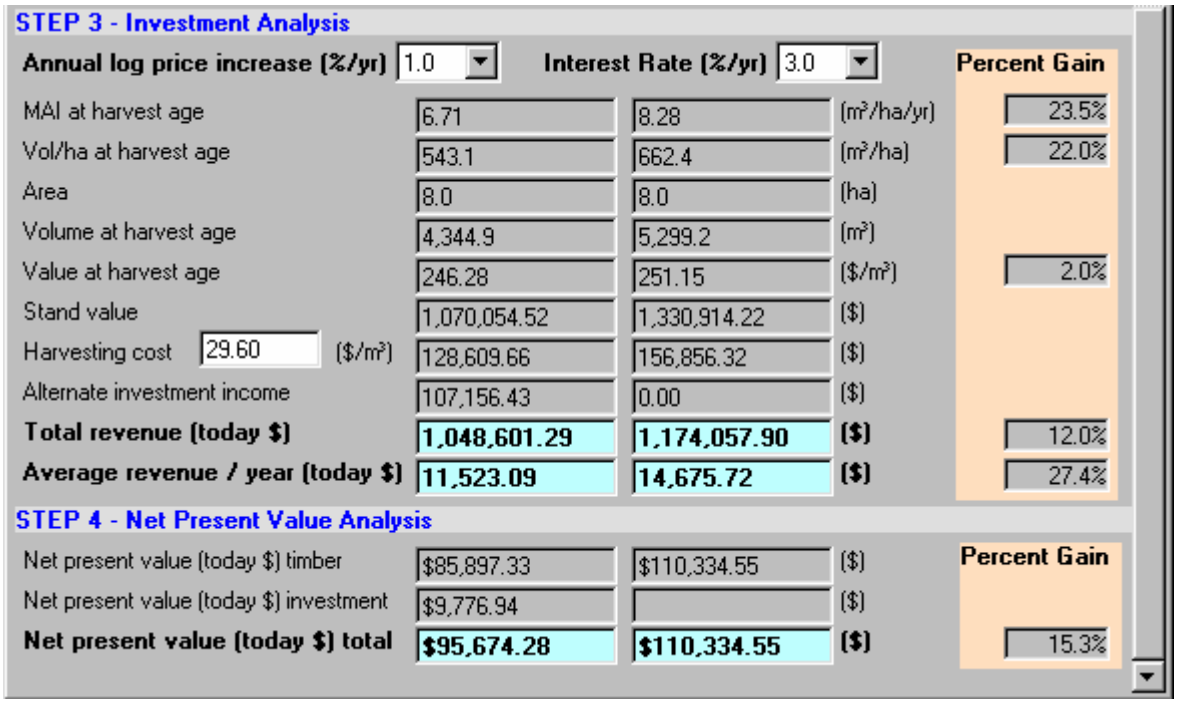
investment is 3% on a five-year financial institution GIC. The user can override this figure and replace it with his or her own net of inflation rate of return[6]. (refer to Step 3.)

8.1.1.3 Investment Analysis

You may review the results of an investment analysis in step 3 once you have completed the information for step 1 and 2. PWP will fill in values that have been calculated for you, while you must select or use default information on the interest rate and harvest costs.

The information is reported for each column of the investment (e.g. column 1 is the natural, and column 2 is the managed stand).

Gains are also denoted in the tan colored column for easy reference.



[6] PWP assumes that the alternative to investing in silviculture is investing in a GIC. There are many other investment alternatives of course. As well, money that is not invested in silviculture could be spent on consumer items. Once expended, silviculture dollars are locked in for the long-term, a good or bad thing depending on your investment preferences.

The following information is used in this analysis:

- **Annual log price increase (%/yr)**: This is the net real increase in wood value expected over time. Economists suggest that wood will increase in value by 1% per year over time, over and above inflation[7].
- **Interest rate (%)**: PWP allows users to select a discount interest rate for the investment analysis. As noted above, 3% is the default discount rate (net of inflation), which is a generally accepted discount rate for forestry analysis. A discount rate is different from an interest rate in that the user who is carrying out the net present value analysis chooses it. Interest rates are determined in capital markets, i.e., rates paid by banks, returns earned on mutual funds[8]. The usual approach to selecting a percentage discount rate is to select a rate at which the investor could lend money without significant danger of default or at which he or she could borrow if the collateral were so good that the lender would sense no risk of default. In this instance, it reflects the annual long-term alternative return to investing in silviculture.
- **MAI @ Harvest Age**: This is the mean annual increment (MAI) brought forward from the original MAI in step 1 + the added MAI gain from silviculture investments (Silviculture Benefits).
- **Vol/ha @ Harvest Age**: This is the volume/ha based on the latter MAI.
- **Area**: the area being analyzed from step 1.
- **Volume @ Harvest Age**: This is the volume of timber expected at the harvest age.
- **Value at Harvest**: This is the value of harvest at harvest age, with the added annual value gain from silviculture investments (Silviculture Benefits above), and compounded by the annual increase in value (e.g. 1%) to the year used for analysis. Value is originally derived from the log prices in the Main PWP screen.
- **Stand Value**: This is the total value of the stand.
- **Harvesting cost**: Enter the harvest cost. PWP values are net of inflation. Default costs are derived from the Main PWP screen.
- **Alternate Investment Income**: The alternate investment is the value of the silviculture investment (= ($/ha cost) X (ha treated)), compounded annually based on the Interest Rate for the number of years until harvest.
- **Total Revenue**: Total revenue is the total of the Stand Value - Harvesting cost + Investment.
- **Average Revenue Per Year**: This is Total Revenue divided by Harvest Age. It is displayed to show that annual volume growth is akin to an annual investment return in a “Forest Bank”.

[7] This percentage increase reflects timber’s scarcity in the face of population increase. The user can override this value

[8] An individual can choose what type of investment he or she would make but the capital markets determine the rate of return.

8.1.1.4 Net Present Value (NPV)

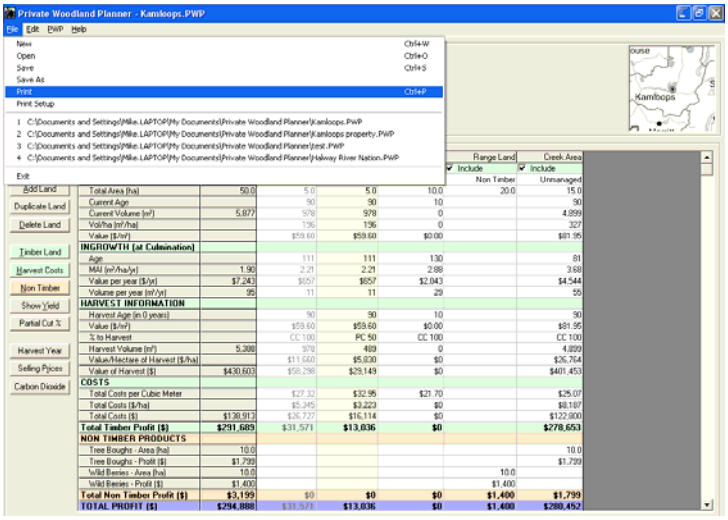
You may also review the results of your analysis in step 4. This feature will allow you to determine the net present value of the silviculture investment. A positive net present value indicates a worthwhile investment in comparison to a safe alternative investment.

PWP displays the results of the NPV calculation as follows:

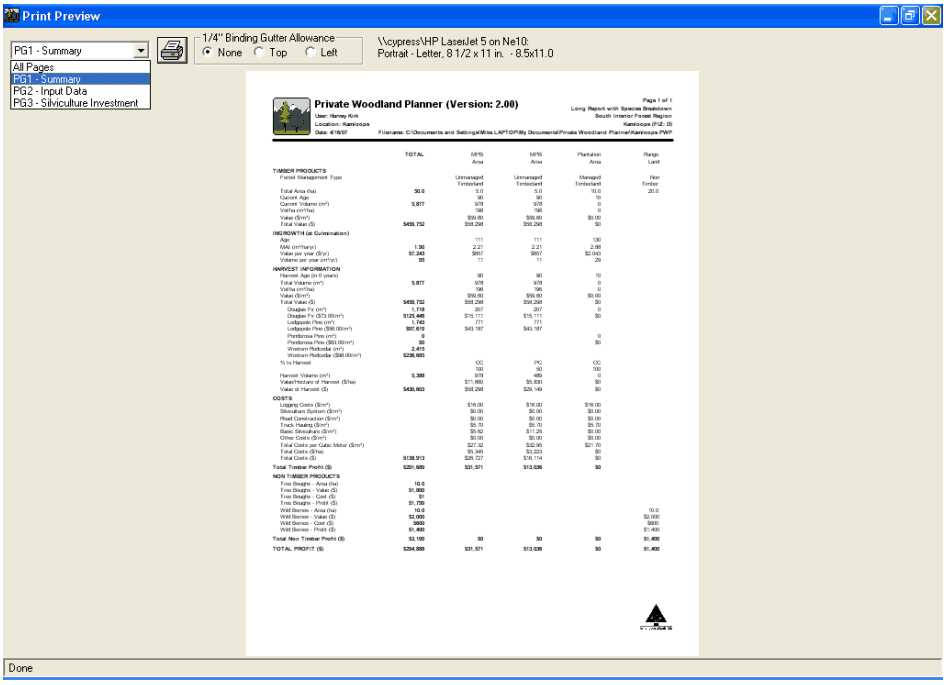
- **Net present value (today $) total**: This is the net present value (NPV) of each scenario, natural and managed. A higher NPV suggests a better investment. For example, if the NPV for the managed scenario is higher than natural scenario's NPV, then the managed scenario is a better investment.

9.0 Printing Reports

To print your report, return to the Main screen or Silviculture Investment screen and select Print.



The report will print out the level of details that you have selected on the Main screen (Advanced and Species in this example). Format your report as you require.



Copy Table

You can also copy report tables to another program using the “Copy Table” function under Edit in the Main Screen.

10.0 Key Assumptions Used and Limitations in PWP

PWP was developed to provide a “ballpark” estimate of values and costs on small woodlands, and was designed for use by non-forestry personnel.

Normally complex calculations have been simplified in the interest of providing a tool that can be used by a wide variety of landowners and operating conditions. Users can override most default variables provided with the program to suit local needs.

In deriving the numbers used in PWP, the following assumptions were used:

- Natural stand timber yields are drawn from the BC Ministry of Forests yield model batchVDYP (Variable Density Yield Projection, version 6.6d4). This model was developed for use on naturally established stands older than 30 years, with data derived and averaged over very large timber supply areas. It is somewhat variable on an individual stand basis.
- Managed stand timber yields are drawn from the BC Ministry of Forests yield model batchTIPSY (The Table Interpolation Program for Stand Yields, version 3.2m). This model was developed for use on managed stands, with data derived and averaged over very large timber supply areas. It is somewhat variable on an individual stand basis.
- Cruised timber land has a yield projection based on a straight-line growth to a maximum age of 120 years, then flattens out. This was done to provide a very simplified projection of tree growth over time when a full dataset is not available.
- Timber values are estimated from rates from MOF appraisal manuals and industry averages.
- Logging costs are estimated from MOF appraisal manuals and simplified for this application.
- The Carbon Dioxide approximation is based on broad averages. Please consult with the Canadian Forest Service for more information on Carbon Dioxide sequestering in your location.
- Private Woodland Planner is limited to working with 50 forest polygons.
- While the estimates made by PWP are reasonable based on the information available, you should consult with a forester before making commitments based on this analysis.

11.0 Questions and Support

Contact your Small Woodlands Program representative if you have any questions on the use of Private Woodland Planner. Periodic updates to PWP may also be available from the websites:

1. Enfor Consultants Ltd. – www.enfor.com/software/pwp
2. BC Small Woodland Partnership Outreach - http://www.woodlot.bc.ca/swp/Downloads/Downloads/PWP_software.html
3. FORREX Forest Research Extension Partnership – http://www.forrex.org

Appendix 1. Sample Private Woodland Analysis

The following is a sample scenario to help new users with PWP. The files developed are saved as Kirk2.pwp and KirkSI2.pwp in PWP. The following steps were used by the Kirk's, and can be followed by most users:

1. Identifying The Kirk Family Property Forest Values

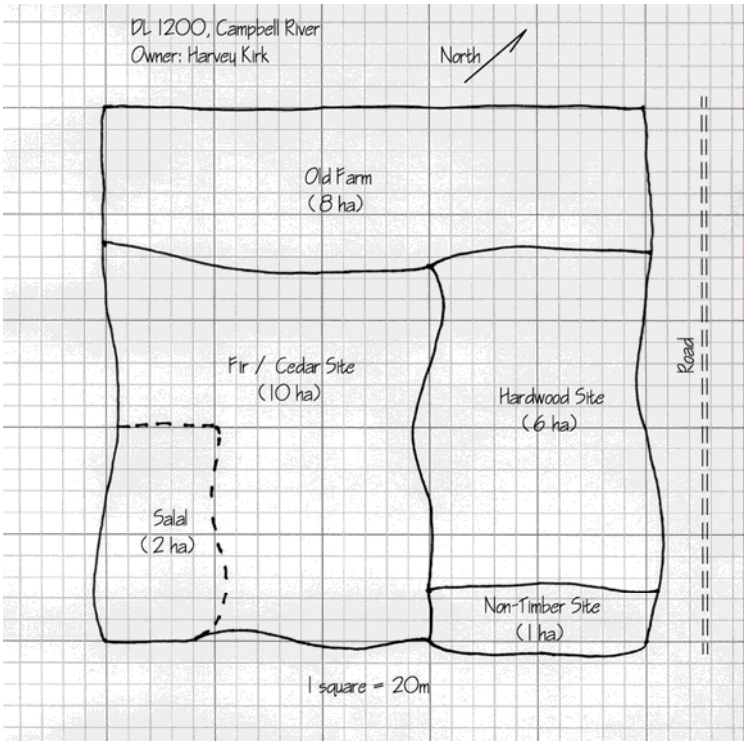
The Kirk family owns a 25 ha. property in the Campbell River area of Vancouver Island. They have decided that they would like to evaluate some of the forestry options, starting with a quick evaluation of their timber and non-timber values.

Harvey Kirk has organized his information. He started with a walk of the property, and drew the following sketch map showing the approximate area of similar types of forest and non-forest land. He also spoke with a forestry representative from the Small Woodlands Program to find some of the forestry information about their property. He was told that the sites were all medium quality growing sites, that the timbered areas were considered fully stocked, and that the logging and management work would be fairly easy for this area.

He was told that the old farm would be suitable to plant with trees similar to the fir/cedar site. He was told that each of the areas he drew on his map would be considered "polygons", as they describe the various sites on his property.

Property Map and Description:

The property includes the following forested areas, and a piece of unused farmland, including:



Fir/Cedar Site: 10 ha of forest with fir (70%) and cedar (30%). Trees are about 50 years old, the growing condition is medium quality and fully stocked. This area also has good quality Salal growing on about 2 ha, and Yellow Chanterelle mushrooms are scattered throughout the site, which might be harvested as well.

Hardwood Site: 6 ha of hardwoods, Alder (80%), Maple (10%) and Cedar (10%). Trees are about 30 years old, the growing condition is medium quality, and fully stocked.

Old Farm Site: 8 ha of abandoned farmland which could be planted with fir and cedar. Medium quality site.

Non-Timber Site: 1 ha of land, which is not growing mature trees, but has Oregon Grape that could be picked, and 10 yr old fir trees, which could be harvested as wild Xmas trees.

2. Information for PWP and Analysis

Harvey Kirk wanted to run two separate evaluations in PWP. One evaluation was for his timber and non-timber products; the other was for the silviculture investment. The following information was summarized and entered into PWP:

a) Timber and Non-Timber Evaluation

Site Name (polygon)	Total Area (ha)	Timber Products	Forested Area (ha)	Non-Timber Forest Products (NTFP)	NTFP Area (ha)
Fir/Cedar Site	10.0	Douglas fir (70%) and Cedar (30%); about 50 years old, medium site quality, stocked site	10.0	Salal picking potential Yellow Chanterelles potential	2.0 10.0
Hardwood Site	6.0	Alder (80%), Maple (10%), Cedar (10%); about 30 years old, medium site quality, stocked site	6.0	none	0.0
Old Farm Site	8.0	None existing. We should think about planting (managing it) to Douglas fir 70% and Cedar 30%, medium site quality	8.0	none	0.0
Non-Timber Site	1.0	none	0.0	Oregon Grape potential wild natural Xmas trees potential	1.0 1.0
Total	**25.0**		**24.0**		**14.0**

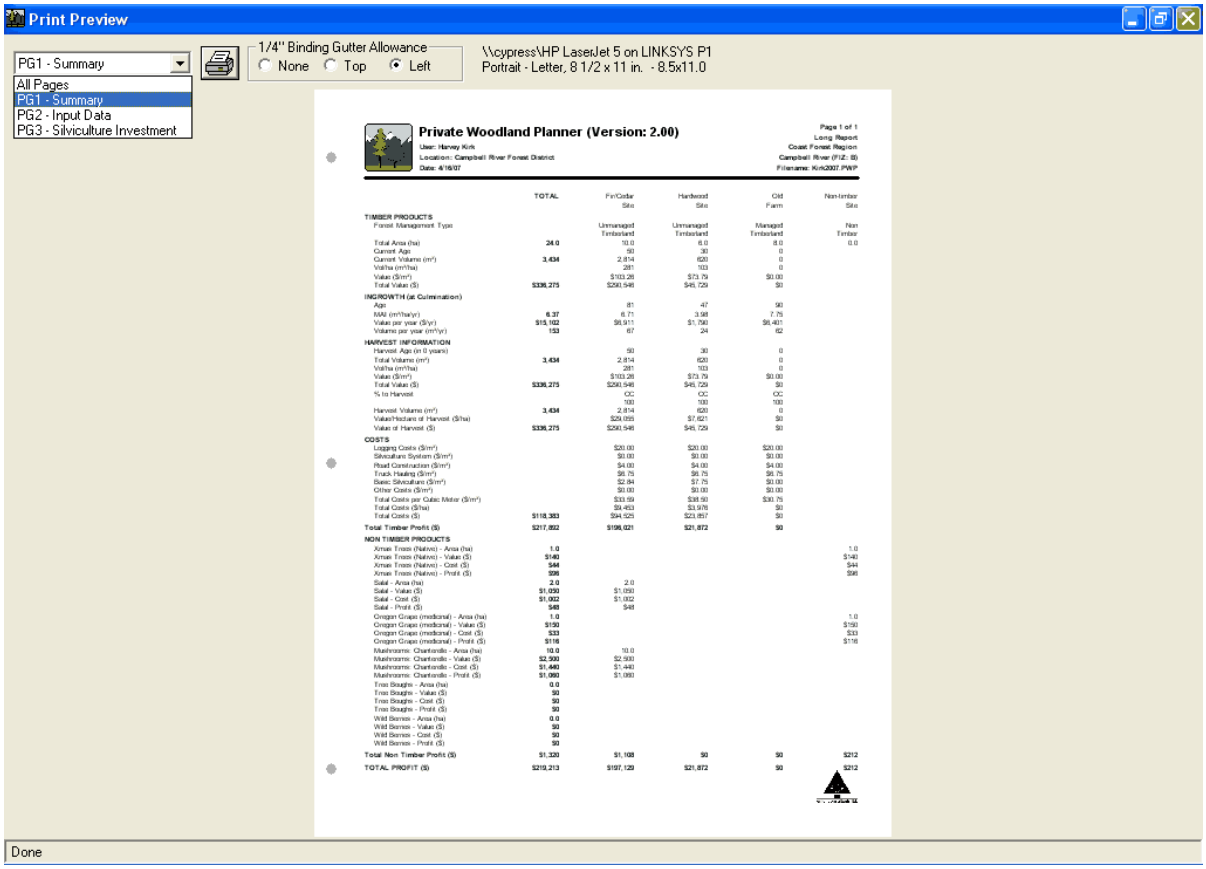
b) Silviculture Investment Evaluation

Variable to Consider	Base Case Old Farm left to grow back naturally	Alternative Old Farm to be planted and spaced
Area	8 ha	8 ha
Tree Species	Douglas fir 70% and Cedar 30%, medium site quality, stocked	Douglas fir 70% and Cedar 30%, medium site quality, planted to 900 stems/ha,
Age	0 years old (Custom Age)	0 years old (Custom Age)
Regeneration period until full stocking	10 yrs	0 yrs
Regeneration Method	Natural, unmanaged	Planted, managed
Yield Prediction Method	VDYP	TIPSY
Harvest Age	Culmination age	Culmination age
Treatments	None, let it come back by itself	Planting this year in yr 0 Manually brush in yr 4
Other investment variables and interest rates	None- use PWP suggested information of 1% and 3%	None- use PWP suggested information of 1% and 3%

With the first evaluation, they wanted to find out the bottom line total value of the timber on their property today, and then at some time in the future. They also wanted to find out how much his land was increasing in value each year from the annual timber growth.

With the other evaluation, he wanted to test out various silviculture investment scenarios. He wanted to know if he would be better off putting his money into a GIC, or investing in planting.

Results of this analysis can be printed out from PWP as noted below, and can be viewed in the project files.



Kirk Property Analysis Printout – Timber and Non-timber Forest Products

Private Woodland Planner (Version: 2.00)

User: Harvey Kirk
Location: Campbell River
Date: 4/17/07

Page 1 of 1
Long Report
Coast Forest Region
Campbell River (FIZ: B)
Filename: Kirk2.PWP

	TOTAL	Fir/Cedar Site	Hardwood Site	Old Farm	Non-timber Site
TIMBER PRODUCTS					
Forest Management Type		Unmanaged Timberland	Unmanaged Timberland	Managed Timberland	Non Timber
Total Area (ha)	**24.0**	10.0	6.0	8.0	0.0
Current Age		50	30	0	
Current Volume (m³)	**3,434**	2,814	620	0	
Vol/ha (m³/ha)		281	103	0	
Value ($/m³)		$103.26	$73.79	$0.00	
Total Value ($)	**$336,275**	$290,546	$45,729	$0	
INGROWTH (at Culmination)					
Age		81	47	90	
MAI (m³/ha/yr)	**6.37**	6.71	3.98	7.75	
Value per year ($/yr)	**$15,102**	$6,911	$1,790	$6,401	
Volume per year (m³/yr)	**153**	67	24	62	
HARVEST INFORMATION					
Harvest Age (in 0 years)		50	30	0	
Total Volume (m³)	**3,434**	2,814	620	0	
Vol/ha (m³/ha)		281	103	0	
Value ($/m³)		$103.26	$73.79	$0.00	
Total Value ($)	**$336,275**	$290,546	$45,729	$0	
% to Harvest		CC	CC	CC	
		100	100	100	
Harvest Volume (m³)	**3,434**	2,814	620	0	
Value/Hectare of Harvest ($/ha)		$29,055	$7,621	$0	
Value of Harvest ($)	**$336,275**	$290,546	$45,729	$0	
COSTS					
Logging Costs ($/m³)		$20.00	$20.00	$20.00	
Silviculture System ($/m³)		$0.00	$0.00	$0.00	
Road Construction ($/m³)		$4.00	$4.00	$4.00	
Truck Hauling ($/m³)		$6.75	$6.75	$6.75	
Basic Silviculture ($/m³)		$2.84	$7.75	$0.00	
Other Costs ($/m³)		$0.00	$0.00	$0.00	
Total Costs per Cubic Meter ($/m³)		$33.59	$38.50	$30.75	
Total Costs ($/ha)		$9,453	$3,976	$0	
Total Costs ($)	**$118,383**	$94,525	$23,857	$0	
Total Timber Profit ($)	**$217,892**	**$196,021**	**$21,872**	**$0**	
NON TIMBER PRODUCTS					
Xmas Trees (Native) - Area (ha)	**1.0**				1.0
Xmas Trees (Native) - Value ($)	**$140**				$140
Xmas Trees (Native) - Cost ($)	**$44**				$44
Xmas Trees (Native) - Profit ($)	**$96**				$96
Salal - Area (ha)	**2.0**	2.0			
Salal - Value ($)	**$1,050**	$1,050			
Salal - Cost ($)	**$1,002**	$1,002			
Salal - Profit ($)	**$48**	$48			
Oregon Grape (medicinal) - Area (ha)	**1.0**				1.0
Oregon Grape (medicinal) - Value ($)	**$150**				$150
Oregon Grape (medicinal) - Cost ($)	**$33**				$33
Oregon Grape (medicinal) - Profit ($)	**$116**				$116
Mushrooms: Chanterelle - Area (ha)	**10.0**	10.0			
Mushrooms: Chanterelle - Value ($)	**$2,500**	$2,500			
Mushrooms: Chanterelle - Cost ($)	**$1,440**	$1,440			
Mushrooms: Chanterelle - Profit ($)	**$1,060**	$1,060			
Total Non Timber Profit ($)	**$1,320**	**$1,108**	**$0**	**$0**	**$212**
TOTAL PROFIT ($)	**$219,213**	**$197,129**	**$21,872**	**$0**	**$212**

Kirk Property Analysis Printout – Silviculture Investment

Private Woodland Planner (Version: 2.00)

User: Harvey Kirk
Location: Campbell River
Date: 4/17/07

Long Report
Coast Forest Region
Campbell River (FIZ: B)
Filename: KirkSI2.PWP

	TOTAL	Old Farm Unmanaged	Old Farm Managed
TIMBER PRODUCTS			
Forest Management Type		Unmanaged Timberland	Managed Timberland
Total Area (ha)	8.0	8.0	8.0
Current Age		0	0
Current Volume (m³)	0	0	0
Vol/ha (m³/ha)		0	0
Value ($/m³)		$0.00	$0.00
Total Value ($)	$0	$0	$0
INGROWTH (at Culmination)			
Age		81	90
MAI (m³/ha/yr)	7.75	6.71	7.75
Value per year ($/yr)	$6,401	$5,529	$6,401
Volume per year (m³/yr)	62	54	62
HARVEST INFORMATION			
Harvest Age (in 0 years)		0	0
Total Volume (m³)	0	0	0
Vol/ha (m³/ha)		0	0
Value ($/m³)		$0.00	$0.00
Total Value ($)	$0	$0	$0
% to Harvest		CC	CC
		100	100
Harvest Volume (m³)	0	0	0
Value/Hectare of Harvest ($/ha)		$0	$0
Value of Harvest ($)	$0	$0	$0
COSTS			
Logging Costs ($/m³)		$20.00	$20.00
Silviculture System ($/m³)		$0.00	$0.00
Road Construction ($/m³)		$4.00	$3.00
Truck Hauling ($/m³)		$6.75	$6.60
Basic Silviculture ($/m³)		$0.00	$0.00
Other Costs ($/m³)		$0.00	$0.00
Total Costs per Cubic Meter ($/m³)		$30.75	$29.60
Total Costs ($/ha)		$0	$0
Total Costs ($)	$0	$0	$0
Total Timber Profit ($)	$0	$0	$0
NON TIMBER PRODUCTS			
Xmas Trees (Native) - Area (ha)	0.0		
Xmas Trees (Native) - Value ($)	$0		
Xmas Trees (Native) - Cost ($)	$0		
Xmas Trees (Native) - Profit ($)	$0		
Salal - Area (ha)	0.0		
Salal - Value ($)	$0		
Salal - Cost ($)	$0		
Salal - Profit ($)	$0		
Oregon Grape (medicinal) - Area (ha)	0.0		
Oregon Grape (medicinal) - Value ($)	$0		
Oregon Grape (medicinal) - Cost ($)	$0		
Oregon Grape (medicinal) - Profit ($)	$0		
Mushrooms: Chanterelle - Area (ha)	0.0		
Mushrooms: Chanterelle - Value ($)	$0		
Mushrooms: Chanterelle - Cost ($)	$0		
Mushrooms: Chanterelle - Profit ($)	$0		
Total Non Timber Profit ($)	$0	$0	$0
TOTAL PROFIT ($)	$0	$0	$0

Private Woodland Planner
Small Woodland Timber and Non-Timber Forest Products Calculations Made Easy

FORREX
Supporting Sustainable Natural Resource Management Decisions

Private Woodland Planner v2.0 - Synopsis of 2007 Updates

Private Woodland Planner (PWP) software is a utility to help small woodland managers in British Columbia assess their timber and non-timber forest product values (NTFPs). PWP was originally developed in 2000 and was updated in 2007.

Updates and new features in PWP version 2 include:

- updated timber yield information (batchVDYP 6.6d4 and batchTIPSY 3.2m);
- updated and added new products, values, and costs for timber forest products;
- updated and added new products, values, and costs for non-timber forest products;
- updated silviculture costs;
- updated maps and administrative boundaries used in PWP;
- new features to help identify tree species and uses (internet and PDF Tree Book);
- new features to help identify NTFP products and uses (internet and PDF);
- new feature for a log price calculator;
- new feature to compare forest polygons (include and exclude);
- new features to report approximate CO2 uptake of the forested land;
- new and updated links to informational websites;
- updated screens, reports and program install;
- updated User Guide;
- updated website for Private Woodland Planner.

Private Woodland Planner version 2 is available for downloading at no cost from any of the following locations:

1. Enfor Consultants Ltd.: http://www.enfor.com/software/pwp
2. BC Small Woodland Partnership Outreach: http://www.woodlot.bc.ca/swp/Downloads/Downloads/PWP_software.html
3. FORREX Forest Research Extension Partnership: http://www.forrex.org

May, 2007

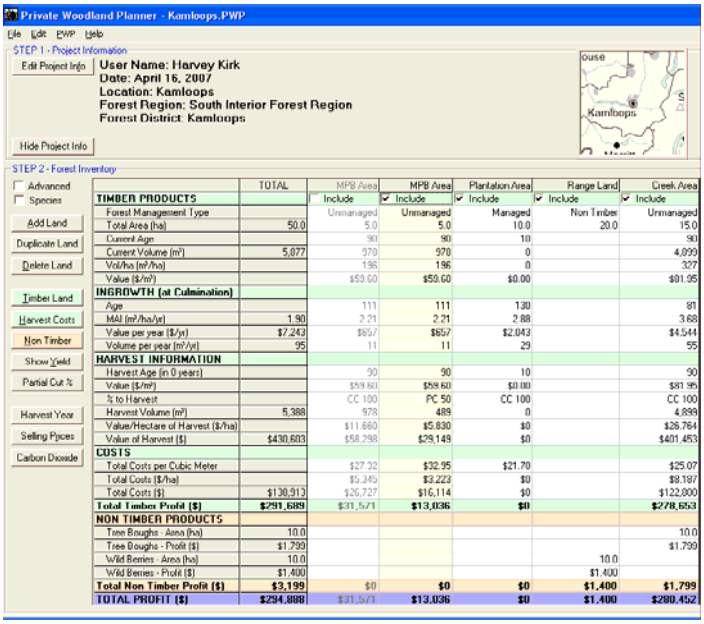
Private Woodland Planner

Small Woodland Timber and Non-Timber Forest Products Calculations Made Easy

Developed for the **small woodland manager**, some of the **key features** of PWP are:

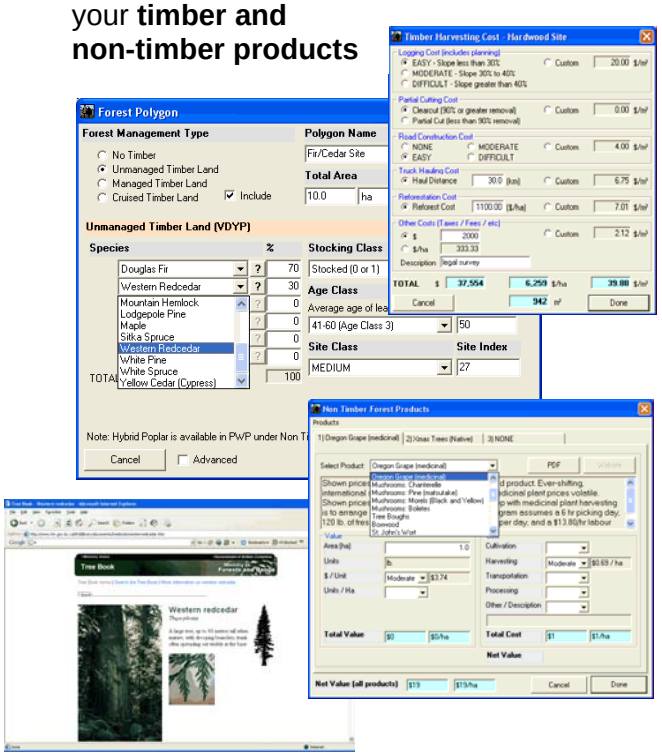
- User friendly, informative
- Estimate timber forest products
- Estimate non-timber forest products
- Estimate value of timber growth
- Estimate CO2 uptake of your forest
- Silviculture investments
- Your values and costs
- For use anywhere in BC, Canada

User friendly screens for easy data entry and use

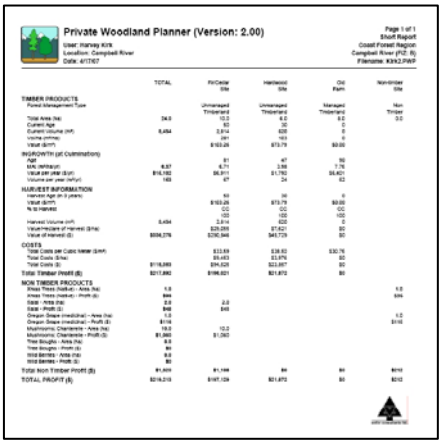


	TOTAL	MPB Area	MPB Area	Plantation Area	Range Land	Creek Area
TIMBER PRODUCTS		Include	Include	Include	Include	Include
Forest Management Type		Unmanaged	Unmanaged	Managed	Non Timber	Unmanaged
Total Area (ha)	50.0	5.0	5.0	10.0	20.0	15.0
Current Age		90	90	10		90
Current Volume (m³)	5,077	970	970	0		4,099
Vol/ha (m³/ha)		196	196	0		327
Value ($/m³)		$59.60	$59.60	$0.00		$81.95
INGROWTH (at Culmination)						
Age		111	111	130		81
MAI (m³/ha/yr)	1.90	2.21	2.21	2.88		3.68
Value per year ($/yr)	$7,243	$857	$857	$2,043		$4,544
Volume per year (m³/yr)	95	11	11	29		55
HARVEST INFORMATION						
Harvest Age (in 0 years)		90	90	10		90
Value ($/m³)		$59.60	$59.60	$0.00		$81.95
% to Harvest		CC 100	PC 50	CC 100		CC 100
Harvest Volume (m³)	5,388	978	489	0		4,899
Value/Hectare of Harvest ($/ha)		$11,660	$5,830	$0		$26,764
Value of Harvest ($)	$430,603	$58,298	$29,149	$0		$401,453
COSTS						
Total Costs per Cubic Meter		$27.32	$32.95	$21.70		$25.07
Total Costs ($/ha)		$5,345	$3,223	$0		$8,187
Total Costs ($)	$138,913	$26,727	$16,114	$0		$122,900
Total Timber Profit ($)	**$291,689**	**$31,571**	**$13,036**	**$0**		**$278,653**
NON TIMBER PRODUCTS						
Tree Boughs - Area (ha)	10.0					10.0
Tree Boughs - Profit ($)	$1,799					$1,799
Wild Berries - Area (ha)	10.0				10.0	
Wild Berries - Profit ($)	$1,400				$1,400	
Total Non Timber Profit ($)	**$3,199**	**$0**	**$0**	**$0**	**$1,400**	**$1,799**
TOTAL PROFIT ($)	**$294,888**	**$31,571**	**$13,036**	**$0**	**$1,400**	**$280,452**

Simple analysis of your **timber and non-timber products**



Summary **reports**.



Private Woodland Planner was developed to assist small woodland managers assess the timber and non-timber forest product values on their land. PWP version 2.0 was updated with the support of FORREX Forest Research Extension Partnership, funded by the Forest Investment Account.

PWP is available at no cost from:

1. Enfor Consultants Ltd: www.enfor.com/software/pwp
2. BC Small Woodland Partnership Outreach: www.woodlot.bc.ca/swp/Downloads/Downloads/PWP_software.html
3. FORREX: www.forrex.org