

# CVAl: A Spreadsheet Tool to Evaluate the Direct Benefits and Costs of Carbon Sequestration Contracts for Managed Forests

Forests sequester carbon dioxide (CO<sub>2</sub>), and that carbon could potentially be sold as offsets to manufacturers and others who emit CO<sub>2</sub> into the atmosphere. However, forest owners face the question of whether potential income from selling carbon credits will be enough to cover costs such as enrollment, and verification, that are involved with participating in an exchange, , and trading. After all those expenses have been paid, will there be enough left over to make it worth the trouble?

CVAl is a Microsoft® Excel 97-2003 Worksheet that helps answer these questions. It is available for free download from the Forest Products Laboratory ([www.fpl.fs.fed.us/documnts/fplgtr/fpl\\_gtr180.html](http://www.fpl.fs.fed.us/documnts/fplgtr/fpl_gtr180.html)) or the Forest Service Carbon Tools website ([www.nrs.fs.fed.us/carbon/tools/](http://www.nrs.fs.fed.us/carbon/tools/)).

<b>Summary financial information for Peavey Pines as of year 6</b>	
<b>Total net benefit at 5.0%:</b>	<b>\$ 504</b>
<b>Internal rate of return :</b>	<b>16.6%</b>
<b>Modified internal rate of return*:</b>	<b>13.2%</b>
*MIRR at a finance rate of 5.0% and a reinvestment rate of 5.0%.	

**How you could benefit:** CVAl offers systematic and transparent analysis of costs and benefits involved with carbon-offset transactions. The program automatically calculates present value of the net benefit or cost, internal rate of return (IRR), modified internal rate of return

(MIRR), ending balance on a per-acre and per-project basis, cash outflows and inflows over the life of the contract, sensitivity analyses of carbon prices, hurdle rates, up-front costs, and annual costs.

<b>Break-even sensitivity analysis for Peavey Pines</b>							<b>Run B-E</b>
Minimum initial carbon price (\$/tonne CO <sub>2</sub> e)	Minimum tract size (acres)	Min. yr. 1 carbon sequestration rate (tonnes CO <sub>2</sub> e/ac/yr)	Maximum total up-front costs (\$/tract)	Maximum total end-of-project costs (\$/tract)	Maximum annual costs sensitivity factor	Maximum up-front costs sensitivity factor	Maximum end-of-project costs sensitivity factor
\$ 2.95	204	1.22	\$ 2,504	\$ 806	62%	25%	222%

CVAl is also set up to calculate a number of break-even analyses to determine maximums or minimums for key values that, if

exceeded, will cause the project to produce less than its desired financial return. The program would be of interest to individuals advising landowners on the possibility of managing their forest land for carbon sequestration or registering their forest on the Chicago Climate Exchange.

1. CASH FLOW INPUTS					
Click here to restore default values					
Tract size	250	acres	Initial inventory cost	\$ 1,000	per tract
Year 1 carbon sequestration rate	1.50	tonnes CO <sub>2</sub> e/ac/yr	Management plan cost	\$ 1,000	per tract
Sequestration rate is...	Constant		Certification cost	\$ -	per tract
Carbon reserve pool factor	20%		Other up-front costs	\$ -	per tract
Initial carbon price	\$ 3.50	per tonne CO <sub>2</sub> e	Contract year (year that up-front costs occur)	6	(counter year)
Carbon price is...	Constant		Ending inventory cost	\$ 250	per tract
Aggregator's fee	10%		Other end-of-project costs	\$ -	per tract
Verification fee	\$ 0.25	per tonne CO <sub>2</sub> e	Hurdle rate	5.0%	
Annual re-certification cost	\$ -	per tract	Finance rate	5.0%	
Trading fee	\$ 0.20	per tonne CO <sub>2</sub> e	Count pre-contract carbon?	No	
Other annual costs	\$ -	per acre	End-of-project year	2010	
Up-front costs sensitivity factor	0%				
Annual costs sensitivity factor	0%		Total up-front costs	\$ 2,000	per tract
End-of-project costs sensitivity factor	0%		Total end-of-project costs	\$ 250	per tract

**User Options:** CVal is available in versions with and without macros. Calculations can be done in the version without macros, but the macros automate the calculations and make “What if?” analysis faster and easier. The macros version also offers the option to automatically store and restore values so that a user can perform an analysis and then easily get back to initial starting values.

**Example of CVal’s user inputs:** CVal comes with a set of demonstration data for a fictitious project called “Peavy Pines.” Using these data allows users to practice running “what if” scenarios, become familiar with how the data are incorporated into the worksheet, and see how results are affected by changes in the inputs.

**Documentation:** A 30-page user guide (General Technical Report FPL-GTR-180, which can be downloaded along with the CVal worksheet) provides thorough explanation of the data, terms, and formulas in the worksheet. Within the worksheet itself, comments attached to most of the cells (identified by a red triangle in the upper right corner of the cell) provide explanations and descriptions of the cells’ significance. Scrolling the mouse over any cell containing a note makes that note visible. In addition to the documentation and cell notes, an hour-long web-based seminar (“webinar”) introducing CVal was presented by Sarah Hines, a Forest Service resource specialist. The webinar is archived at [www.fs.fed.us/nrs/video/Hines\\_March\\_1.wmv](http://www.fs.fed.us/nrs/video/Hines_March_1.wmv) (a Windows Media Player file).

**Development:** CVal was conceived by Peter Becker, research coordinator at the Eastern Ozarks Forestry Council, and Tim McAbee, a consultant initially with Clearwater Forest Consultants, LLC, and then with LandMark Systems. Programming and documentation were developed jointly with E.M. (Ted) Bilek at the U.S. Forest Service Forest Products Laboratory.

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