



Net Present Value (NPV)

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Many decisions on a ranch require significant capital investment to facilitate a change. This type of investment typically includes initial costs but also provides returns over a period of time.

Because these returns occur over time, the time value of money must be included in an investment analysis. Net Present Value (NPV) analysis is a tool that allows us to compare future returns with current costs (or vice versa).

Investments are almost always associated with some level of risk. When a cow is purchased, there is no guarantee she will be productive or even survive. There are many other similar investments on ranches. Although the future revenue from these capital investments is not guaranteed, the cost to purchase the investment is certain.

NPV discounts future returns based on the riskiness of the investment and compares them directly to current or future costs. Using this direct comparison, we are then able to determine if we will be better or worse off for making the investment.

The following example explains NPV in a nutshell. If Bob were to offer Dan \$500 today, or \$1,000 two years from now, which would Dan prefer? Dan may have several thoughts before he is able to answer that question like: How much is Bob to be trusted (how risky is Bob)? Is Bob willing to sign a contract? Dan may also examine his own finances to determine how much he needs the money now, or if he is able to wait to receive the funds. Bob could also offer Dan differing upfront amounts like \$425, \$725 or \$815. At some point based on Dan's risk tolerance, financial needs, trust level, and other factors, there would be an amount offered where it would be equal. For example, Dan may value \$712 today to be exactly equal to \$1,000 two years from now. NPV analysis equates potential future payments to costs incurred today.

NPV analysis is accomplished through the use of a discount or interest rate. Oftentimes when a capital investment is needed on a ranch, the method of obtaining those funds is through a loan. Loans are rarely interest free, so we must, at a minimum, account for the interest cost of the money. The discount or interest rate should always start with the loan interest rate.

Depending on the riskiness of the investment, adding an additional percentage amount to the interest rate to get an accurate reflection of the cost of the money (known as a risk premium) may be necessary. Even if the ranch has the capital on hand and does not need a loan, we still must account for interest. The same capital used for changes on the ranch could be used for other investments on and off the ranch. We need to figure-in a reasonable rate of return on the investment.

The minimum discount rate that should be used is the interest rate on any loan used to make the investment. Again, if the investment is relatively risky, we may need to add to this percentage. A ranch may use a 10 percent discount rate for a risky investment; however, an investment purchased on a credit card would need to start with the interest of the card (often 15 percent or higher) and add any risk premium to that amount.

The NPV tool on the Wyoming Ranch Tools website (<http://uwyoextension.org/ranchtools/>) allows users to calculate the NPV of an investment. A user enters the amount of the investment, the discount or interest rate, and the annual costs and returns associated with the change. The best method for calculating the annual costs and returns for this analysis is using a partial budget.

Figure 1 depicts a \$20,000 investment at a 7 percent discount rate. The annual costs associated with the investment are \$94,175. The annual returns are \$96,780. If the time value of money is ignored, the cumulative net benefit after 15 years would be \$19,075. However, accounting for the time value of money, it would take 11 years for this investment to break-even (at a 7 percent return on the capital). The cumulative NPV at 15 years is \$5,386.94.

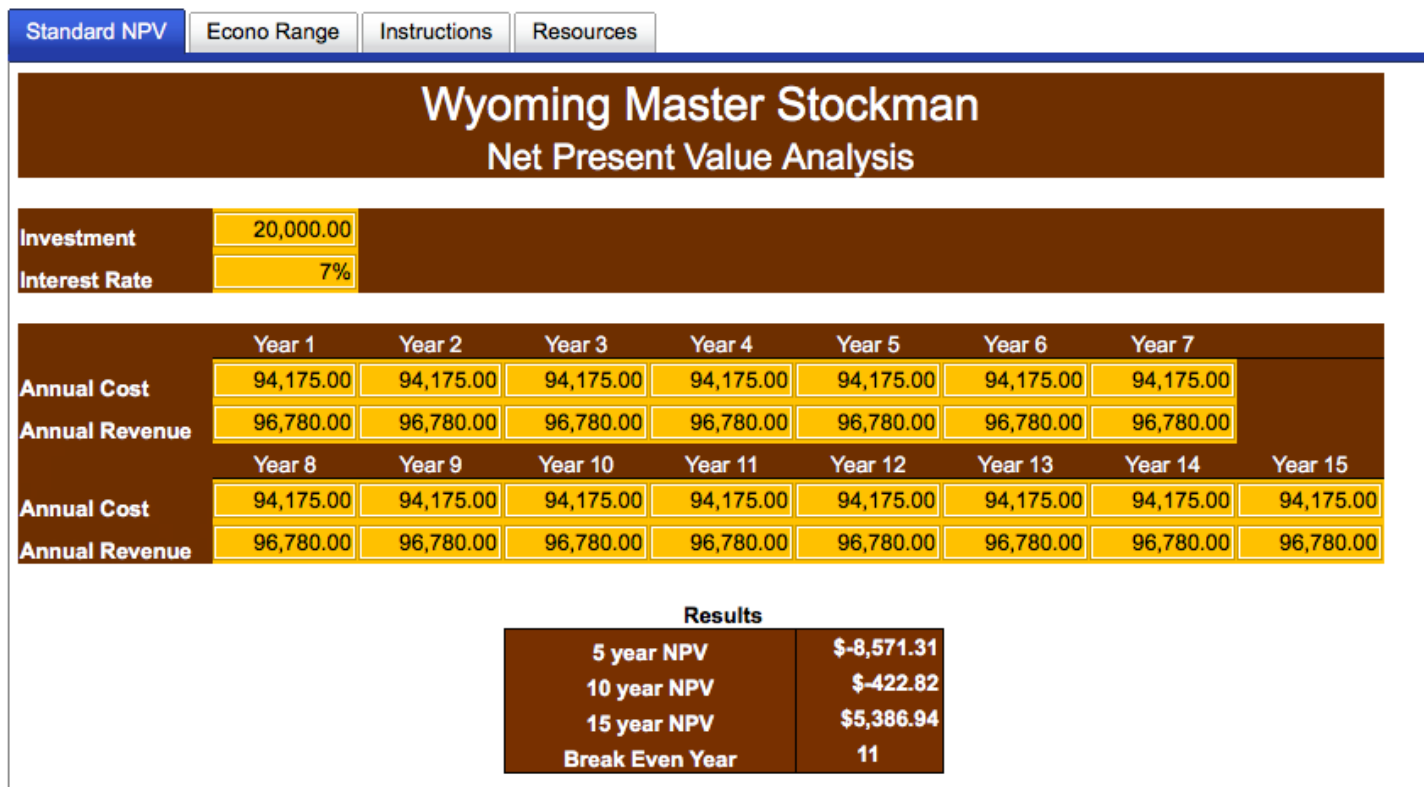


Figure 1

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