Idaho Forest, Wildlife and Range Policy Analysis Group

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Taxing Forest Property:

Analysis of Alternative Methods and Impacts in Idaho

by

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- The Idaho Forest, Wildlife and Range Policy Analysis Group was established by the Idaho Legislature in 1989 to provide objective analysis of the impacts of natural resource proposals (see Idaho Code § 38-714).
- The Policy Analysis Group is administered through the University of Idaho's College of Natural Resources, Leonard R. Johnson, Acting Dean.

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About the Policy Analysis Group (PAG)

Role and Mission. The Idaho Legislature created the Policy Analysis Group (or "PAG") in 1989 as a way for the University of Idaho to respond quickly to requests for information and analysis about current natural resource issues. The PAG's formal mission is to provide timely, scientific and objective data and analysis, and analytical and information services, on resource and land use questions of general interest to the people of Idaho.

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Executive Summary

In Idaho, forests are taxed under the property tax system. Property taxation policies for forest land and timber are set by the State of Idaho, but county commissions levy the taxes and use the revenues to fund local government. Property taxes affect private forest land management decisions and the subsequent flow of tax revenue to local governments.

Forest landowners in Idaho have two tax options: [1] the productivity tax option and [2] the bare land & yield tax option. Forest landowners with over 5,000 acres of forest land in Idaho can only use the productivity tax option. Land parcels of less than 5 contiguous acres must be appraised, assessed, and taxed as real property, without regard to the land's ability to produce timber. Owners of between 5 and 5,000 acres of forest land in Idaho are eligible for either option. All designated forest land owned by one individual must be placed under the same tax option.

Under the productivity tax option, the annual property taxes are paid on an assessed taxable value of the land's ability to produce timber. When timber is harvested, the forest landowner is not required to pay an additional yield tax. Under the bare land & yield tax option, annual taxes are paid on an assessed value of the bare land only. In addition, the county collects a 3% yield tax whenever timber is harvested.

If a forest landowner chooses one of the two tax options, he or she commits to it until the end of a 10-year designation period. The next designation period begins in 2002. With the end of the current designation period approaching, forest landowners are making choices about their taxation options for the next 10 years.

Currently, the number of private forest landowners in Idaho is almost evenly split between the two tax options, but most forest land acres (82%) are in the productivity tax option. During the 1990s, however, there was a substantial increase in taxable forest values under the productivity tax option, and a significant number of forest landowners may switch to the bare land & yield tax option for the 2002-2011 designation period. This switch could have significant impacts on the timing and amount of forest tax revenue collected by counties.

The first objective of this analysis is to examine the impacts on forest landowners of the current formula used to determine the assessed taxable value of forest land under the productivity option. We also discuss alternative methods of forest property taxation used by other states and the impacts of forest property taxes on forest management and investment decisions. The second objective of this analysis is to analyze the potential impact on county revenues beginning in 2002 from the potential shift of forest landowners from the productivity tax option to the bare land & yield tax option. Both objectives are accomplished by answering a series of focus questions.

Focus Questions: Objective 1. Forest Productivity Valuation Formula and Impacts on Landowners

Information on the methods for determining assessed taxable value is presented as replies to a series of focus questions.

Under the current Idaho forest productivity valuation formula used in the productivity tax option, how do changes in stumpage value, and other variables in the formula, impact tax levels assessed to forest landowners? The taxable value of forest land under the productivity option is determined by Idaho's forest productivity valuation formula, which is:

Taxable value per acre =
$[(MAI \times SV) + A - C] / R$

where:

MAI = Mean Annual Increment of timber growth (board feet/acre/year),

SV = Stumpage Value ($/thousand board feet); preceding five (5) year rolling average of timber harvested within the forest value zone from state timber sales or the best available data for the same five (5) year period,

A = Agricultural and other related income ($/acre); i.e., grazing income from the forest land,

C = Costs ($/acre); annualized expenses directly related to producing the forest crop, including, but not limited to the establishment, maintenance, improvement, and management of the crop over the rotation period, including the forest protection and forest practices fees currently charged by the Idaho Department of Lands,

R = Rate of capitalization; determined in accordance with procedures described in Idaho Code § 63-1705(4).

For the purpose of applying the forest productivity valuation formula, the state is divided into four valuation zones. Within each valuation zone, land is classified into three productivity classes: poor, me-

dium, and good. MAI and SV vary by zone and productivity class. "A" and "C" vary by zone but not productivity class.

Between 1992 and 1999 taxable forest land values more than tripled. A falling capitalization rate (R) and increasing stumpage values (SV) were responsible. In 2000, the Idaho Legislature provided relief to forest landowners taxed under the productivity option by providing alternative forest land values directly in statute. County assessors must use the lesser of this alternative value or the value resulting from the forest productivity valuation formula to determine the taxable forest land value between January 1, 2000 and January 1, 2006.

What alternative ways exist for taxing forest lands? Forest property taxation systems can be separated into four major types: ad valorem, productivity, site value, and flat tax systems. In application, the productivity value and site value systems are modifications of the ad valorem system. Brief descriptions follow. In addition, when trees are harvested, a yield or severance tax is sometimes combined with the tax on land.

- Ad valorem. This property tax system applies a tax in proportion to the assessed or taxable value of property. The value of both land and trees form the basis for tax collection.
- Productivity value. This system is based on the land's capability to produce timber, and converted to an annual income value. The annual property tax is based on the capitalized value of annual revenue from the forest. Idaho's productivity tax option is this type system.
- Site value. This system attempts to remove the value of trees from the tax base, and property tax is then collected only on the value of the bare land. Determining the assessed taxable value is problematic. Idaho's bare land & yield tax option is a site value tax set by the Idaho State Tax Commission and adjusted annually for stumpage value changes combined with a yield tax of 3% of the value of stumpage at the time of harvest.
- Flat property tax. This system collects the same amount of money per acre of forest land regardless of its value, ignoring productivity.

What methods do other states use, and what would be comparable tax rates from such methods in Idaho? Each state has the authority to set up its own property tax system. Forest property tax systems therefore vary considerably among states. There is no simple way to compare forest land and timber property tax rates between states, as the tax rates within one state will vary by many factors such as location of the forest land, productivity, accessibility, tree species, size of land holding, amount of timber harvested annually, stumpage values, and choice of options available to landowners within the tax system. Also, many states change tax systems for forest land periodically so a particular time period for comparison must also be specified. We provide two hypothetical examples to illustrate forest land tax differences between Idaho and three adjacent states. Based on such examples, it is difficult to draw conclusions. Idaho's productivity option over time raises more revenues for counties than do property tax systems in the three neighboring states. Idaho's bare land & yield option raises more county revenue than the Montana and Oregon systems, but less than the Washington system.

What is the impact of forest property taxes on management and investment decisions of private forest landowners? Analysts have debated the impacts of forest property taxes on forest management and investment decisions for decades. The methods of analysis and assumptions heavily influence results. Forest tax analysts generally use economic efficiency and equity as criteria for evaluating the impacts of taxation. However, what is and is not an efficient and equitable forest tax policy is often difficult to delineate, especially considering the revenue constraints faced by local governments.

What is the impact of property taxes on landowners' investment returns over the life of the timber crop? Property tax is an annual expense and will reduce investment returns over the life of the timber crop, as will other expenses of land ownership. The impact will vary with each landowner and depends on numerous factors including the tax rate of the county in which the land is located, timber management actions that produce costs and revenues, and the discount rate chosen for the analysis. An illustrative example shows annual taxes of $6.82 per acre represent a present value of $153 per acre over a typical forest life cycle.

Does the tax impact lead forest landowners to sell property for non-forest purposes (such as commercial or residential investment)? Landowners' decisions to sell land are based on their personal or organizational criteria for doing so. Some landowners may use financial criteria related to timber. Other landowners may use nonfinancial criteria. Some may use a combination of both. The impact of

property taxes may or may not affect a particular landowner's decision to sell forest land.

Factors such as how forest land will be used by the buyer are often out of the seller's control. Before forest land can be sold for commercial or residential property a market for such uses must exist in the area.

Does the tax impact lead forest landowners to sell Idaho forest land to invest in other states with different forest property tax systems? We were unable to find any empirical studies that address this question, but it would seem that other factors, such as cost of land and transportation costs to processing facilities, might be more important to location decisions than property tax rates.

Focus Questions: Objective 2. Forest Tax Option Switching and Potential Impacts to Counties

How many forest landowners could this affect? The Idaho State Tax Commission estimates that there are 12,200 private forest landowners in Idaho eligible to redesignate their lands in 2002.

How much land could be affected? The Idaho State Tax Commission has estimates that approximately 800,000 acres of the 1.8 million acres enrolled in the productivity tax option are eligible to switch to the bare land & yield tax option.

Which counties could be affected? Sixteen of Idaho's 44 counties have lands receiving forest land taxation treatment and thus could potentially be affected. They are: Boundary, Bonner, Kootenai, Benewah, Shoshone, Latah, Clearwater, Nez Perce, Lewis, Idaho, Adams, Valley, Boise, Gem, Elmore and Bannock counties.

What would the tax reduction amount to annually? We computed the effects on property tax revenues of each 1% shift in the number of acres from the productivity-based taxable value to the bare land taxable value. Based only on the change in the taxable land value, each 1% shift in acreage would result in a statewide loss of $65,348 out of $9.5 million currently collected in forest property tax revenue, a decrease of 0.68%. The potential for increased yield tax revenues offsets some of the loss, as a 1% increase in yield tax revenues statewide would result in a $3,954 increase based on the 1994-1999 average. However, one should not assume a one-for-one percentage increase in yield taxes with each percentage increase in acres in the bare land & yield tax option. Landowners control the timing and amount of timber harvests and thus influence the timing and amount of yield tax revenues. Impacts of the shift will vary considerably by county, depending on the number of landowners eligible to switch tax options and the acres of forest land they own.

What other possible sources of revenue could the tax burden shift to? All property within the state of Idaho that is not expressly exempted is subject to taxation; therefore, the tax burden could be shifted to numerous other types of property. In 2000, estimated property tax collections statewide were $914 million. Forest property, yield, and deferred taxes accounted for approximately $13.3 million, or 1.5% of the total. Counties collect property taxes, and county commissions will make decisions about levels of tax revenue and shifts in sources of tax revenues to meet their needs.

What could be the long-term implications of this shift on tax policy and private forest land and resource management? One of the long-term implications of a shift towards more forest lands taxed under the bare land & yield tax option would be a less predictable flow of tax revenues to counties. Yield tax revenues will depend upon landowners' decisions to harvest and the market stumpage prices at that time. If it is desirable to help smooth the distribution of tax revenues to counties, the literature suggests techniques such as distributing revenues based on a five-year rolling average.

Introduction

In this world nothing is certain but death and taxes.
—Benjamin Franklin, 1789.

In Idaho, forests are taxed under the property tax system. County commissions levy taxes on property and use the revenues to fund local government functions such as schools, roads, rural fire protection, cemeteries, parks, and noxious weed control. Property taxation policies for forest land and timber are set by the State of Idaho. These taxes affect private forest land management decisions and the subsequent flow of property tax revenue to local governments.

Idaho offers two tax options that provide special tax treatment to forest landowners who manage their property for long term timber production: [1] productivity tax option and [2] bare land & yield tax option, as described in the 1982 Forestland Taxation Act (Idaho Code § 63-1701 et seq.).

[1] Productivity tax option. Under the productivity tax option, the annual property taxes are paid on an assessed value of the land's ability to produce timber (Idaho Code § 63-1705). The value is determined by a formula, and based on how much timber the land is capable of producing. No deferred taxes are due when a land use or ownership change occurs. When timber is harvested, the forest landowner is not required to pay an additional yield tax. Forest lands enrolled in the productivity tax option are identified as Category 6 lands by the Idaho State Tax Commission and county assessors (IDAPA 2000). The productivity tax option is described more fully in **Objective 1.1.**

[2] Bare land & yield tax option. The bare land & yield tax option is a partial deferred-tax option (Schlosser 1996). Annual taxes are paid on the assessed value of the bare land only. In Idaho, this value is administratively determined and adjusted annually at half the timber stumpage market value change. In addition, the county collects a 3% yield tax whenever timber is harvested (Idaho Code § 63-1706).This option is described more fully in **Objective 1.1.3.**

Eligibility. A forest landowner with over 5,000 acres of forest land in Idaho can only use the productivity tax option (Idaho Code § 63-1704). Land parcels of less than 5 contiguous acres must be appraised, assessed, and taxed as real property, without regard to the land's ability to produce timber (Idaho Code § 63-1702).

Owners of between 5 and 5,000 acres of forest land in Idaho are eligible to apply for the productivity tax option or bare land & yield tax option if [a] their property is used primarily for the continuous purpose of growing and harvesting trees of a marketable species, and [b] they have designated their property as forest land by means of an application on file with the county assessor. All designated forest land owned by one individual must be placed under the same taxation treatment even if he or she owns forest land in more than one county (Idaho Code § 63-1703).

Designation periods. If a forest landowner chooses one of the two taxation options, he or she commits to it until the end of a 10-year designation period (Idaho Code § 63-1703). The beginning of a new designation period corresponds to the 10-year anniversaries of the Idaho Forestland Taxation Act, which became law in 1982. The current designation period began in 1992, and the next one will begin in 2002. Landowners in the bare land & yield tax option who change to the productivity tax option at the end of a designation period are required to pay any deferred taxes due (Idaho Code § 63-1703). Deferred taxes accrue for a maximum of 10 years (Idaho Code § 63-1703).

With the end of the current designation period approaching, forest landowners are making choices about their taxation option for the next 10 years. The better choice between the two taxation options depends greatly on a landowner's financial objectives and plans for timber harvest.

Objectives of analysis. Currently, forest landowners are almost evenly split between the two tax options, 51% productivity and 49% bare land & yield. However, most forest land acres (82%) are in the productivity tax option. During the 1990s taxable forest values more than tripled. A significant number of forest landowners may switch to the bare land & yield tax option for the 2002-2011 designation period. This switch could have a significant impact on the timing and amount of forest tax revenue collected by counties.

Objective 1 of this analysis is to examine the impacts on forest landowners of the current formula used to determine the taxable value of forest land under the productivity tax option. We also discuss alternative methods of forest property taxation, and the impacts of forest property taxes on management and investment decisions.

Objective 2 of this analysis is to analyze the potential impact on county revenues beginning in 2002 from the potential shift of forest landowners from the productivity tax option to the bare land & yield tax option. Both objectives are accomplished by answering a series of focus questions.

Objective 1: Analyze the impacts on private forest landowners of the current forest productivity valuation formula and other forest property tax formulas that might serve as alternative methods of taxation.

1.1. How does the Idaho forest productivity valuation formula work?

The taxable value of forest land under the productivity tax option is determined by Idaho's forest productivity valuation formula. It is based on the general formula for calculating the present value of a perpetual annual series of payments (Klemperer 1996). "Present value" is an interest-rate driven concept. The premise is that payments received in the future are worth less today than equal payments received today. The reasoning is that if payments were received today, they could be invested in alternative opportunities that would earn interest (Leuschner 1984). The "capitalization rate" represents the alternative rate of interest that a landowner could earn. Idaho's forest productivity valuation formula is:

Taxable forest value per acre =
[(MAI×SV) + A – C] / R

where:

MAI = Mean Annual Increment of timber growth (board feet/acre/year),

SV = Stumpage Value ($/thousand board feet); preceding five (5) year rolling average of timber harvested within the forest value zone from state timber sales or the best available data for the same five (5) year period,

A = Agricultural and other related income ($/acre); i.e., grazing income from the forest land,

C = Costs ($/acre); annualized expenses directly related to producing the forest crop, including, but not limited to the establishment, maintenance, improvement, and management of the crop over the rotation period, including the forest protection and forest practices fees currently charged by the Idaho Department of Lands,

R = Rate of capitalization; determined in accordance with procedures described in Idaho Code § 63-1705(4).

Further discussion of these variables is provided below.

1.1.1. How are the forest productivity valuation formula variables determined?

Mean Annual Increment (MAI). The value of mean annual increment (MAI) of timber growth used in the productivity valuation formula is prescribed in the Idaho Administrative Code (IDAPA 2000) and is a function of geographic zone and productivity class (Figure 1-1). For the purpose of applying the forest productivity valuation formula, the state is divided into four valuation zones:

Zone 1—Boundary, Bonner, and Kootenai counties;

Zone 2—Benewah, Shoshone, Latah, Clearwater, Nez Perce, Lewis, and Idaho counties;

Zone 3—Adams, Valley, Washington, Payette, Gem, Boise, Canyon, Ada, Elmore, Camas, Blaine, Gooding, Lincoln, Jerome, and Minidoka counties; and

Zone 4—the remaining 19 counties.

There are almost no lands classified as forest land for taxation purposes in Zone 4; therefore, our analyses will focus on Zones 1, 2, and 3.

Within each valuation zone, land is classified into three productivity classes: poor, medium, and good (Figure 1-1). These broad classes are based on estimates of the actual productivity of the forest land using habitat typing (IDAPA 2000). For example, the "Good" productivity class for Zones 1 and 2 is defined as

> "forest land having a mean annual increment, MAI, of three hundred fifty (350) board feet per acre per year, based on an eighty (80) year rotation and sixty-five percent (65%) of normal stocking by the end of the rotation period. This productivity class includes western white pine site index 61 and above and ponderosa pine site index 111 and above. Three hundred fifty (350) board feet per acre MAI shall be used in the productivity formula" (IDAPA 2000:57).

The MAI used in the forest productivity valuation formula is based on the midpoint of each class and varies by forest valuation zone (see Table 1-1). The same value is applied to all forest land in the same zone in the same productivity class. For example, all forest land in Zone 1 - Good classification uses 350 board feet per acre as the MAI. The MAI values have remained unchanged since 1984.

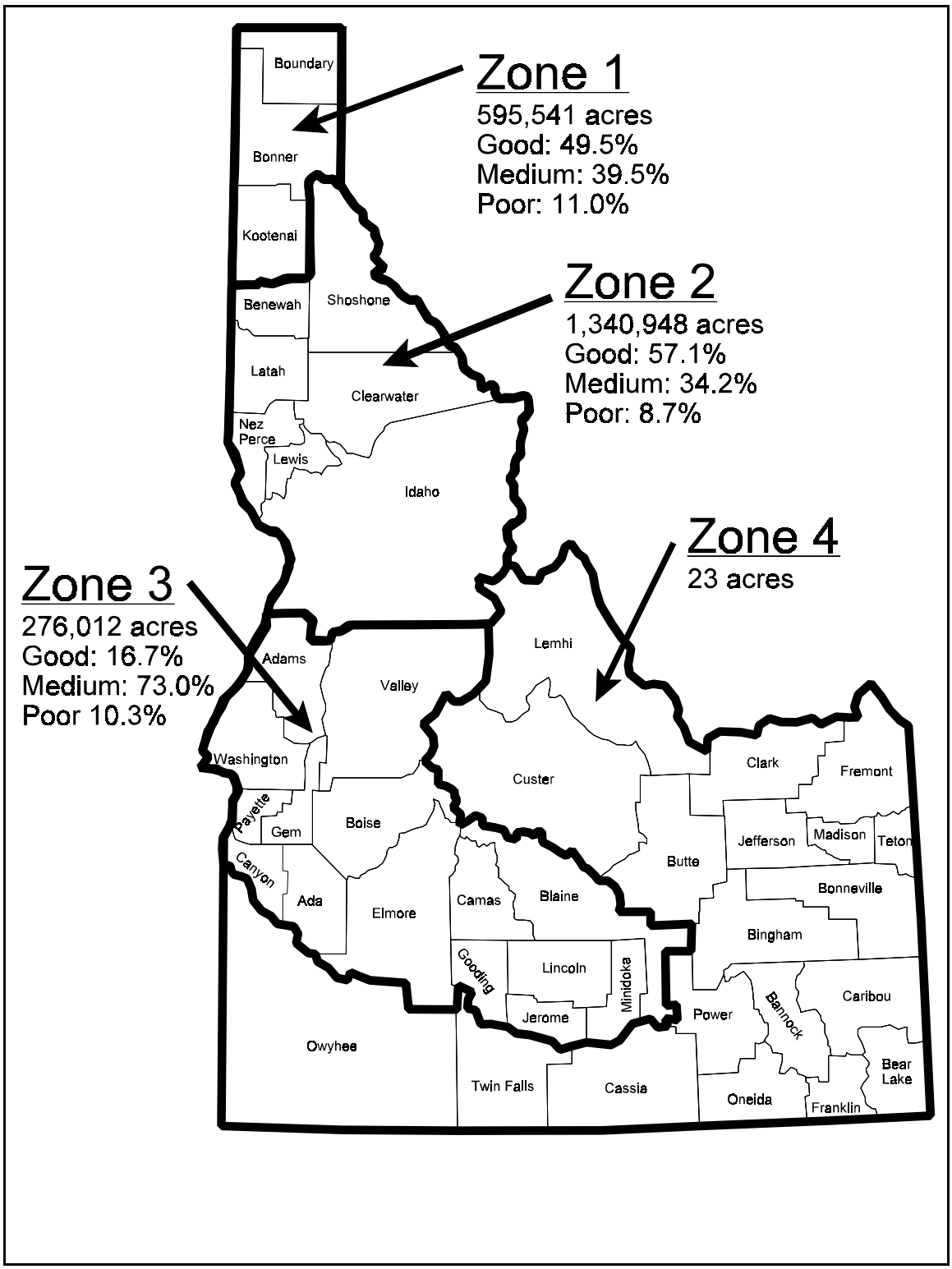

Figure 1-1. Idaho forest valuation zones, acres enrolled in forest land taxation options, and percent of forest land acreage in each productivity class.

Table 1-1. Mean annual increment used in the forest productivity valuation formula by zone and productivity class	
Zones 1 and 2:	
Poor	38 - **100** - 162 board feet per acre
Medium	163 - **225** - 286 board feet per acre
Good	287 - **350** and greater board feet per acre
Zones 3 and 4:	
Poor	44 - **100** - 156 board feet per acre
Medium	157 - **213** - 268 board feet per acre
Good	269 - **320** and greater board feet per acre
Note: **Bold** figures are used in the productivity valuation formula	

Stumpage Value (SV). According to Idaho administrative law (IDAPA 2000), stumpage value (SV) is the preceding five (5) year rolling average price paid for timber harvested within the forest valuation zone from state timber sales or the best available data for the same five (5) year period. In practice, however, the Idaho State Tax Commission computes SV based on data from surveys of lumber mills and sometimes includes data from Idaho Department of Lands and private timber sales (Rod Brevig, personal communication).

SV varies by geographic zone and productivity class. For example, the historic values for SV in the Zone 1 - Good classification are illustrated in Figure 1-2. From 1984 until 1991, SV remained fairly constant, between $80 and $100 per thousand board feet, but then increased significantly, reaching $296 in 1999.

Agricultural and other related income (A). The only other agricultural-related income ("A") included in the forest productivity valuation formula is grazing income. The values used for "A" vary by zone, but not by productivity class. For example, "A" is $0.02/acre in Zone 1, $0.09/acre in Zone 2, and $0.26/acre in Zone 3. These values have remained unchanged since 1984. The estimates of grazing income are based on grazing land data from the Idaho Department of Lands and verified in a study of forest products firms in the early 1990s (Rod Brevig, personal communication).

Costs (C). Two components are considered as cost variables. First, a fire protection fee ($0.45/acre) and a forest practice fee ($0.05/acre) charged by the Idaho Department of Lands (IDL) are subtracted from all revenue ([MAI×SV]+A), and then a general management cost is computed as a percentage of the remaining revenue. The IDL fee does not vary by zone or productivity class. The percentage used for management costs is derived from data collected periodically from forest landowners (Rod Brevig, personal communication). The management cost percentage varies by zone, but not productivity class. The historic values for the IDL fees and the management cost percentage for Zone 1 - Good forest land are presented in Table 1-2.

Rate of capitalization (R). The basis for the capitalization rate ("R") is the interest rate for the Farm Credit Services bank district serving Idaho, located in Spokane, Washington. To this is added 0.85%, plus a component for the local tax rate. The 0.85% value was set by statute in 1999 (Idaho Code § 63-1705(4)). The component for the local tax rate is based on the average county levy rate for forest land statewide (Rod Brevig, personal communication). Currently at about 10% (or 0.10 in decimalized form as used in the formula), "R" is near its lowest level since 1984 (Figure 1-2).

1.1.2. How do changes in stumpage value, and other variables in the formula, impact tax levels assessed to forest landowners?

Because the forest productivity valuation formula is a mathematical equation, we can determine the effects of changes in the variables on the taxable land value. The formula is a fraction with a numerator

Table 1-2. Values for Idaho Department of Lands fee and management cost used in the Idaho forest productivity valuation formula, Zone 1 - Good productivity class, 1984-2001.

Year	IDL fee	Management Cost	Year	IDL Fee	Management Cost
1984	$0.30	13%	1993	$0.40	15%
1985	$0.30	21%	1994	$0.40	16%
1986	$0.30	22%	1995	$0.45	14%
1987	$0.30	22%	1996	$0.50	24%
1988	$0.40	21%	1997	$0.50	24%
1989	$0.40	19%	1998	$0.50	23%
1990	$0.40	18%	1999	$0.50	23%
1991	$0.40	16%	2000	$0.50	25%
1992	$0.40	15%	2001	$0.50	26%

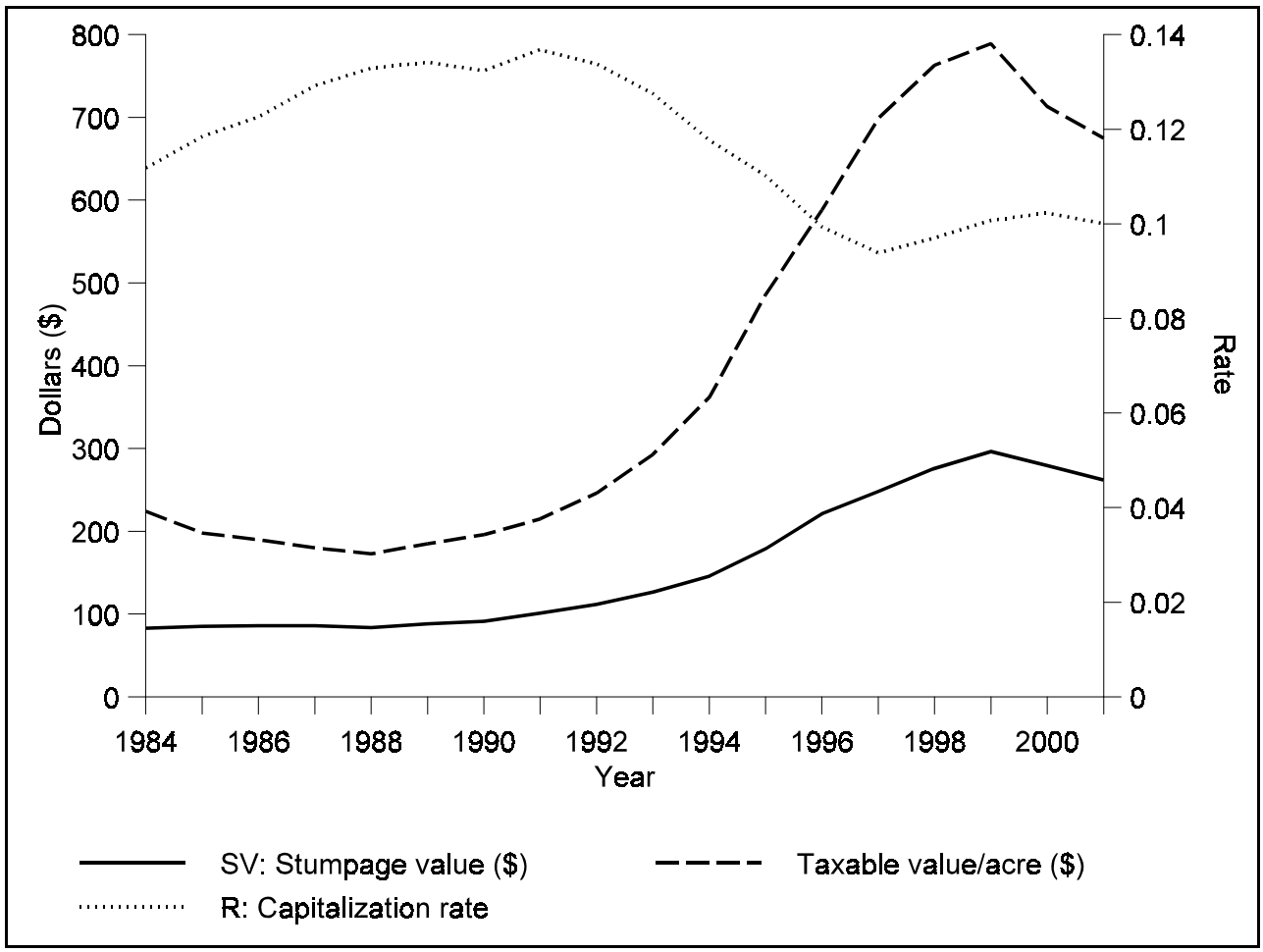

Figure 1-2. Stumpage value, capitalization rate, and taxable value under the productivity tax option, Zone 1 - Good productivity class, 1984-2001.

above the line and a denominator below. Increases in the variables in the numerator will increase taxable land values, if the denominator "R" remains the same or decreases (Table 1-3). Conversely, an increase in the capitalization rate "R" in the denominator will result in a decrease in taxable land value, if the variables in the numerator remain the same or decrease. The historic changes in formula variables illustrate these mathematical principles (Figure 1-2).

Forest values in the 1990s. Beginning around 1990 two circumstances caused taxable forest values to increase rapidly. The capitalization rate fell and stumpage values increased (Figure 1-2). Mathematically, the numerator of the forest productivity valuation formula increased at the same time the denominator decreased. Between 1992 and 1997, the average annual increase in stumpage value for Zone 1 - Good forest land was 16%, and the average annual decrease in the capitalization rate was 6%. This resulted in taxable forest values tripling during this time period. Figure 1-3 illustrates the relationship between stumpage value and taxable forest value based on percentage change. They have followed a strikingly similar pattern since 1984.

Alternative forest values. In 2000, the Idaho Legislature provided relief to forest landowners who were taxed under the productivity tax option, which is based on the forest productivity valuation formula. The 2000 law provides alternative forest values directly in Idaho Code (§ 63-1705(5)). The county assessor must use the lesser of this alternative value or the value resulting from the forest productivity valuation formula to determine the taxable forest value (Idaho Code § 63-1705(3)). These alternative values are effective for assessments done between January 1, 2000 and January 1, 2006 (Table 1-4). The issue of forest valuation will be revisited by the Idaho State Legislature in 2005 (Rod Brevig, review comments).

1.1.3. How does the Idaho bare land & yield tax option work?

Forest lands enrolled in the bare land & yield tax option are identified as Category 7 lands by the Idaho State Tax Commission and county assessors (IDAPA 2000). The taxable values for bare land under the bare land & yield tax option vary by geographic zone and productivity class. The values were originally set by the Idaho State Tax Commission in 1982 and now change at one-half the rate of stumpage value (SV) changes (IDAPA 2000). Taxable land values under the bare land & yield tax option have increased much less than under the productivity tax option (Figure 1-4).

The yield tax is 3% of the gross value of the harvested timber, calculated using average stumpage values provided by the Idaho State Tax Commission and applied to the amount of timber harvested, rather than the price the landowner actually received from the timber sale (Idaho Code § 63-1706). The Idaho State Tax Commission derives the stumpage values from buyers and sellers in the market place and averages these for each forest valuation zone using a five-year rolling average (Rod Brevig, review comments).

If a landowner sells the property or changes its use, under the bare land & yield tax option, the landowner must pay the taxes that have been deferred (Idaho Code § 63-1703). The deferred tax could be for as few as one or as many as ten years, depending on the number of years between the sale or land use change and the beginning of the designation period (see **Introduction**). If a new buyer meets the necessary requirements and agrees to keep the property in the bare land & yield tax option, then the payment of the deferred taxes can be delayed, but the new buyer must then also accept the previous owner's deferred tax liability. Whenever a landowner pays yield taxes from a harvest of timber, the amount of yield taxes paid offsets any deferred taxes owed resulting from a land use or designation change (Idaho Code § 63-1703).

1.1.4. How are property tax rates determined?

The amount of property tax paid by forest landowners varies depending on taxable land value and the levy rate for the "tax code area" where the forest land is located. Levy rate is the proportion of the taxable land value used to calculate the amount of tax owed. Tax code area consists of one or more taxing districts with one total levy within a particular geographic area. A "taxing district" is any entity with the statutory authority to levy a property tax. A county usually contains several tax code areas depending upon such things as school districts, water and sewer districts, and highway districts.

To illustrate, in 2000, the average levy rates for forest land varied from 0.00780 in Idaho County to 0.01400 in Latah County, both of which are in Zone 2 (Rod Brevig , personal communication). The 2000 taxable land value under the productivity tax option for Zone 2 - Good forest land was $679/acre. The property tax in Idaho County would have been

Table 1-3. Effect on taxable land value of changes in the values of Idaho forest productivity valuation formula variables.	
Change in formula variable	Effect on taxable land value
↑ Mean Annual Increment	↑
↑ Stumpage Value (SV)	↑
↑ Other Income (A)	↑
↑ Costs (C)	↓
↑ Capitalization Rate (R)	↓

↑ = increase

↓ = decrease

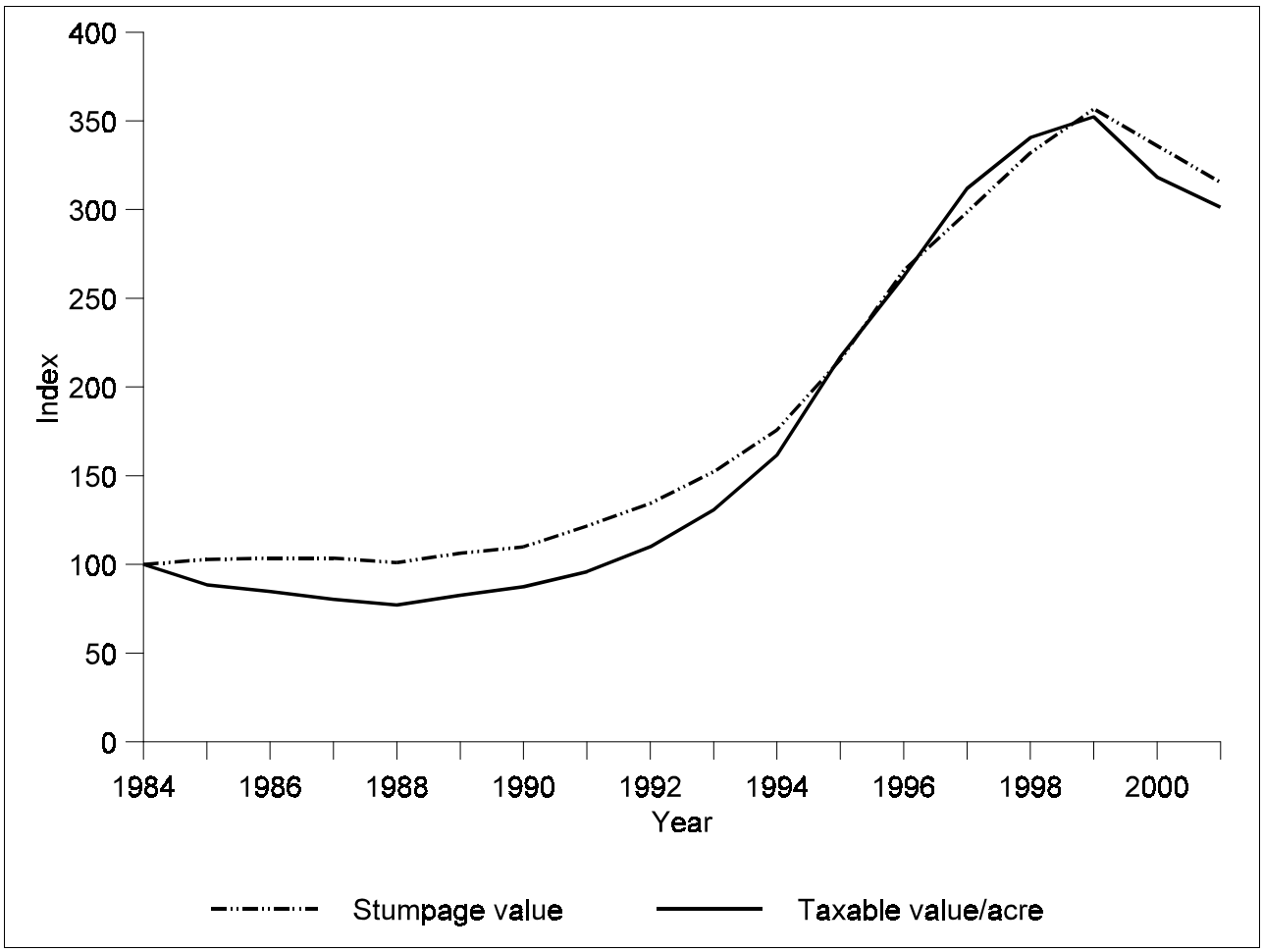

Figure 1-3. Indexed (1984=100) stumpage value and taxable value under the productivity tax option, Zone 1 - Good productivity class, 1984-2001.

Table 1-4. Alternative forest land values ($ per acre) for assessments done between January 1, 2000 and January 1, 2006 as prescribed in Idaho Code (§ 63-1705(5)).

		Productivity Class					Productivity Class		
Year	Zone	Good	Medium	Poor	Year	Zone	Good	Medium	Poor
2000	I	733	470	207	2003	I	564	361	159
	II	700	449	198		II	539	346	152
	III	553	368	172		III	426	283	132
	IV	379	252	117		IV	291	194	90
2001	I	676	434	191	2004	I	507	325	143
	II	646	415	183		II	485	311	137
	III	511	339	159		III	383	255	119
	IV	350	232	108		IV	262	174	81
2002	I	620	398	175	2005	I	451	289	127
	II	592	380	167		II	431	277	122
	III	468	311	145		III	341	226	106
	IV	321	213	99		IV	233	155	72

Source: Idaho Code § 63-1705(5).

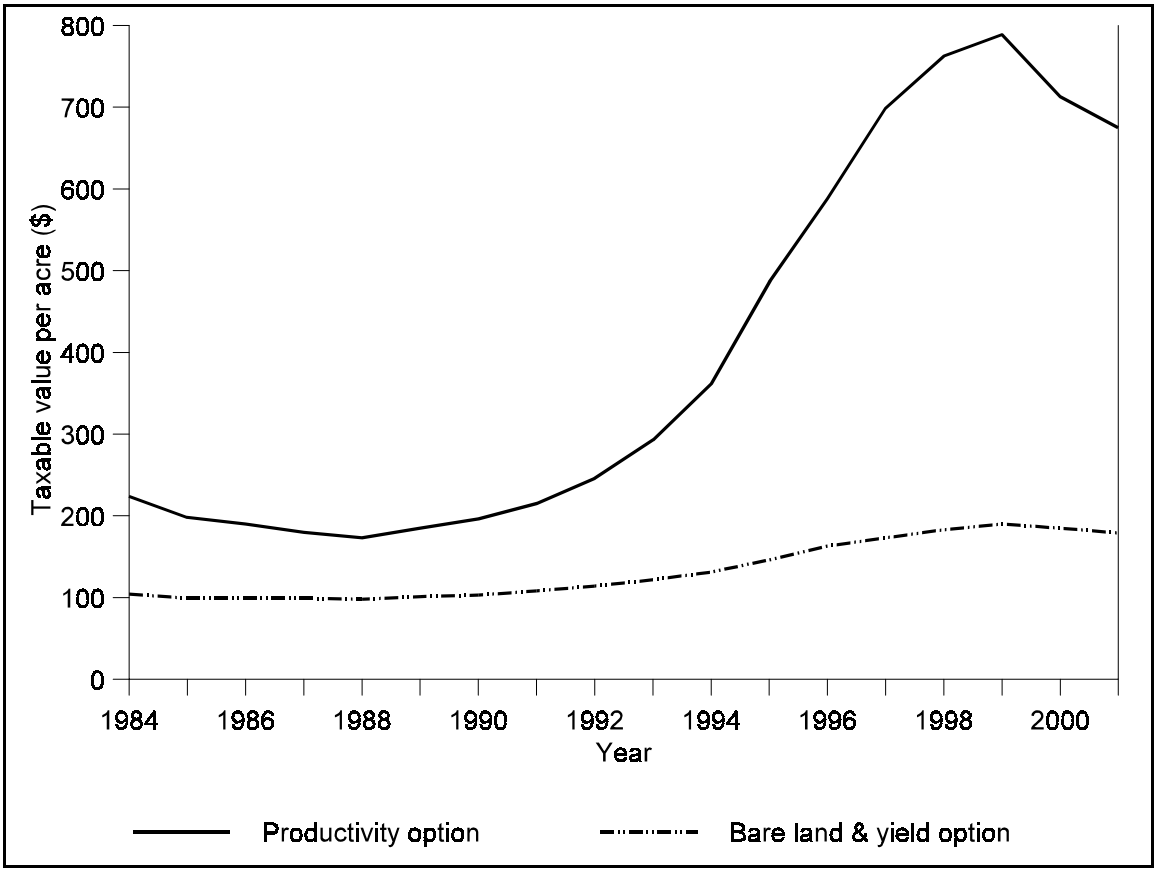

Figure 1-4. Taxable land value under productivity tax option and bare land & yield tax option, Zone 1 - Good productivity class, 1984-2001.

$5.30/acre ($679 × 0.00780); in Latah County the property tax would have been $9.51/acre ($679 × 0.01400).

1.2. What are alternative ways or methods of taxing forest lands?

In the United States, individual states have the authority to set up their own property tax systems, and as a result, forest property tax systems vary considerably among states (Chang 1996). Nevertheless, the value of trees, the value of land upon which trees grow, or both usually form the basis for forest property taxation.

Classification of forest property taxation systems. Forest property taxation systems can be separated into four major types:

- Ad valorem property tax
- Productivity tax
- Site value tax
- Flat property tax (Chang 1996).

Productivity and site value are modified ad valorem tax systems. In addition, when trees are harvested, a yield or severance tax is sometimes combined with the tax on land.

Ad valorem property tax. "Ad valorem" means according to value. Ad valorem property tax systems apply a tax annually in proportion to the assessed or taxable value of property (Kelley 1998). The value may be at the land's "highest and best" use, or it may be its current use. The value of both land and trees form the basis for tax collection (Chang 1996). As trees get older and bigger, they become more valuable, and thus the assessed or taxable value increases.

The assessed or taxable value can be determined in a number of different ways including using a market sales approach, an income capitalization approach, or legislatively or administratively establishing values (Kelley 1998). Assessed or taxable value also can vary by productivity class (site or soil class), or a single value may be applied to all forest land (Kelley 1998). An ad valorem tax base should be adjusted every year. This is often accomplished by using a value trend index or some other method to reflect changes in market factors (Kelley 1998).

The assessed or taxable value in an ad valorem property tax system is generally based on the fair market value, but it may be adjusted by an assessment ratio which in general reduces the market value by some factor or percentage. This adjustment creates a modified ad valorem tax system. These value reductions are usually legislatively established and may reflect preferential treatment for forest property or the existence of factors not easily quantified (Kelley 1998).

Current use assessment is one way of modifying an ad valorem tax system. Under current use assessment, property owners are taxed annually on the market value of their land based only on the current use, not its "highest and best" use. For example, a property designated as "forest" would be taxed only on its timber income potential rather than for its value as agricultural land or its development potential. Current use assessment is most common in areas where development pressures are highest (Costello 1997).

Another modified ad valorem system is to tax the value of products produced from the land. For forests in Idaho, this is done by the productivity option approach or the site value (plus yield tax) approach.

Forest productivity tax. This type of property tax system is used on about 82% of Idaho's private forest lands. In general, a forest productivity tax is based on the land's capability to produce annual value. The annual property tax is based on the capitalized value of either the gross or net mean annual revenue from the forest (Chang 1996). To determine the revenue stream, the average annual timber volume growth per acre is determined (often by species, site or productivity class, and geographic region) and then is multiplied by a recent or current stumpage price estimate (Kelley 1998). Adjustments for other annual income or costs may be included. Then this annual value is divided by a capitalization rate. Under the forest productivity tax, the tax base stays relatively constant regardless of timber stand age or age class distribution, and a fixed amount of tax is collected every year (Chang 1996).

Computing and interpreting productivity value is controversial (Klemperer 1983, 1988; McKetta 1990). Productivity valuation formulas based on capitalized annual revenue, such as Idaho's formula, assume that a forest provides equal annual income in perpetuity. This could actually happen in a fully-regulated, multi-age, sustained yield forest, with either even- or uneven-aged management. In theory, the productivity formula gives the total value of land and timber in a sustained yield forest, not just land alone. The productivity tax option therefore may violate state law (McKetta 1990, and review comments; Currin, review comments). State law says that inventory of timber shall not be included as part of the total forest asset for productivity taxation purposes (Idaho Code § 16-1705(2)). Under an annual production management system, for valuation purposes it is not possible to separate the value of

the land and trees (Straka and Bullard 1996, Bullard and Straka 1998).

An additional concern is the capitalization rate used in productivity valuation formulas (Klemperer 1983, 1988; McKetta 1990, and review comments; Currin, review comments). Most states, including Idaho, use a capitalization rate taken from current market indicators, such as the federal land bank or money markets, that include inflation. If other variables in the valuation equation assume constant (inflation-adjusted) prices, the capitalization rate, should be a real rate, which would be lower than market rates when inflation is greater than zero (Klemperer 1983, 1988; McKetta 1990). Idaho uses current stumpage values averaged over five years.

Site value tax. Under the site value tax system, the idea is to remove the value of trees from the tax base, and a property tax is then levied annually on only the value of the bare land. A yield tax at the time of timber harvest often is combined with the site value tax (Chang 1996). Idaho's bare land & yield tax option is a site value tax combined with a 3% yield tax on stumpage values.

In order to effectively administer a true site value tax, local governments must be able to accurately determine bare land values. Comparable sales or market appraisal is difficult because the majority of land transactions include timber and other improvements (Costello 1997). Methods exist for segregating bare land values from forest property sales that include timber, but have not been perfected (Klemperer 1979, 1981). No state in the U.S. has a forest site value tax based on market valuation. Most states, including Idaho, use formulas to compute taxable bare land value (Klemperer 1983, Amacher et al. 1991) (see **Objective 1.1.3.**).

Flat property tax. Under the flat property tax system the same tax per acre is levied on any acre of forest land regardless of its value (Chang 1996). Three states rely exclusively on this type of forest property taxation system: Maryland, North Dakota, and Vermont (Table 1-5).

Yield tax and severance tax. Yield and severance tax systems place a tax on trees as they are harvested. A yield tax is expressed as a percentage and is applied to the *value* of the harvested trees (Kelley 1998). A severance tax imposes a charge *per unit* of tree volume harvested (Chang 1982). The financial and economic effects of yield and severance taxes are similar (Haines 1995). For convenience, we refer to either system as a "yield tax." Yield taxes have the effect of deferring property taxes on timber until it is harvested.

Yield tax systems as an alternative to, or in addition to, an ad valorem tax system, have been widely implemented throughout the U.S. (Costello 1997, Kelley 1998). However, fluctuations in harvest levels, and thus the amount of yield tax, mean local governments may have difficulty in maintaining even tax revenue flows, especially in regions where timber age-class distributions are skewed. Such fluctuations in tax revenue are an important consideration for many local governments. However, strategies do exist to help smooth out revenue flows (see section ***2.3.***).

1.2.1. What methods do other states use?

It would be impractical to describe in detail the forest taxation methods of all the other states. Instead, we provide a summary of the systems used by all 50 states (Table 1-5) according to the tax classification outlined above. Details for individual state forest property tax laws are available through the National Timber Tax Website (2001) which also provides links to state statutes.

1.2.2. What would be comparable tax rates from such methods in Idaho?

There is no simple way to compare forest land and timber property tax rates between states. Tax rates within states vary by many factors such as location of the forest land, productivity, accessibility, tree species, size of land holding, amount of timber harvested annually, stumpage values, and landowners' choices of options within the tax system. Measurement techniques for many of these factors vary between states, which makes comparisons difficult. Also, tax systems for forest land are changing in many states; therefore, a particular time for comparison must also be specified.

Because of the complexities of comparative analysis, we provide only two hypothetical examples to illustrate differences in forest land taxes between Idaho and three adjacent states—Washington, Montana, and Oregon. We also take the point-of-view of county government, rather than a landowner, and include only the portion of forest and timber property taxes that provide revenues to counties. Some states have additional severance taxes that fund specific state programs for fire protection, forest practices, forestry research, or cooperative extension programs. Landowners must pay these additional taxes when timber is harvested, but we do not include them in our analysis. Table 1-6 summarizes all of the following comparisons.

Table 1-5. Forest property taxation systems in the United States.

State	Ad Valorem	Productivity	Site Value	Flat	Exemption	Yield
Alabama		X[2]				X
Alaska					X	
Arizona	X[5]					X
Arkansas		X[2]				X
California			X			X
Colorado		X[3]				
Connecticut		X[1]				X
Delaware					X	
Florida		X[2]				
Georgia		X[1]	X			X
Hawaii						
Idaho		X[3]	X			X
Illinois		X[2]				X
Indiana		X[1]			X	
Iowa					X	
Kansas		X[3]		X		
Kentucky	X					
Louisiana		X[2]				X
Maine		X[1]				
Maryland				X		
Massachusetts	X			X		X
Michigan				X		X
Minnesota	X	X[1]				X
Mississippi		X[2]				X
Missouri				X		X
Montana		X[2]				X
Nebraska		X[3]				

(continued)

Table 1-5. continued.

State	Ad Valorem	Productivity	Site Value	Flat	Exemption	Yield
Nevada						
New Hampshire	X					X
New Jersey		X[2]				
New Mexico						X
New York					X[4]	X
North Carolina			X			X
North Dakota				X		
Ohio				X	X[4]	
Oklahoma	X					
Oregon		X[1]	X			X
Pennsylvania		X[1]				
Rhode Island						
South Carolina		X[1]				X
South Dakota		X[3]				
Tennessee	X					
Texas		X[2]				
Utah		X[1]				
Vermont				X		
Virginia			X			X
Washington			X			X
West Virginia		X[2]				X
Wisconsin				X		X
Wyoming						

X[1] productivity tax based on gross mean annual revenue.

X[2] productivity tax based on net mean annual revenue.

X[3] productivity tax based on agricultural productivity of the forest land.

X[4] 80% of the assessed value or any assessed value in excess of $40/acre (equalized whichever is less)

X[5] Ad valorem property tax in theory. In practice, the value of the trees is not included in the value of the property for property taxation purposes.

Source: Chang (1996), National Timber Tax Website (2001).

Table 1-6. Summary of hypothetical examples of county tax revenues from forest property taxes on 100 acres of forest land, plus yield taxes for harvest of 100 thousand board feet of timber in Idaho and three adjacent states, 2001 and 2016.[1]

Location	Value assuming timber harvest occurs in 2001			Present value assuming timber harvest occurs in 2016[2]		
	Property Tax	Yield Tax	Total	Property Tax	Yield Tax	Total
Example 1[3]						
Boundary County, Idaho, productivity tax option	$681.75	$0.00	$681.75	$7,579.96	$0.00	$7,579.96
Boundary County, Idaho, bare land & yield tax option	$180.79	$759.00	$939.79	$2,010.09	$421.45	$2,431.54
Pend O'Reille County, Washington	$223.30	$1,265.00	$1,488.30	$2,482.74	$702.41	$3,185.15
Lincoln County, Montana[4]	$266.00	$0.00	$266.00	$1,715.31	$0.00	$1,715.31
Example 2[5]						
Adams County, Idaho, productivity tax option	$192.00	$0.00	$192.00	$2,134.73	$0.00	$2,134.73
Adams County, Idaho, bare land & yield tax option	$58.80	$723.00	$781.80	$653.76	$401.46	$1,055.22
Baker County, Oregon[6]	$42.42	$265.10	$307.52	$562.42	$0.00	$562.42

[1] See text for all assumptions used in calculations.
[2] Present value computed at 4% discount rate.
[3] Assumes land is in highest productivity category and all timber harvested is Douglas-fir.
[4] Assumes reduced taxable land values in future in accordance with current Montana statute; Montana has a severance tax, but revenues go to the cooperative extension system, not to the county.
[5] Assumes land is in lowest productivity category and all timber harvested is ponderosa pine.
[6] In 2001, yield tax is Eastern Oregon Privilege Tax, which will be eliminated in 2003. Forest land value after 2003 is also assumed to increase according to Oregon statute. A Forest Products Harvest Tax is also levied, with proceeds going to forest research and fire control purposes, not to counties.

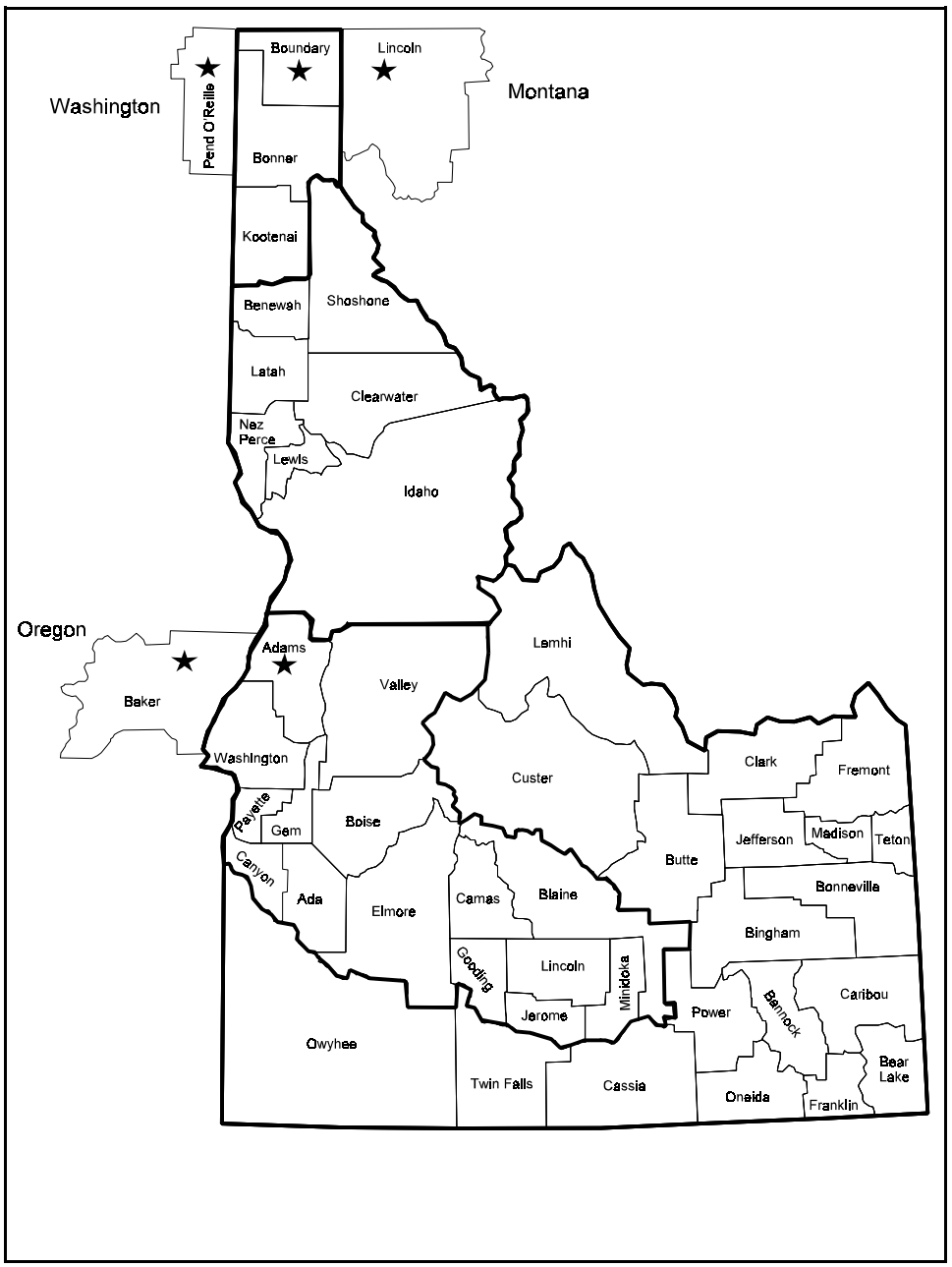

Figure 1-5. Locations of forest lands used in hypothetical examples comparing county tax revenues between Idaho and adjacent states (★ marks counties compared).

Comparison of northern Idaho productivity and bare land & yield tax options. For our first example, let's assume two landowners each own 100 acres of forest land in Boundary County, Idaho (Figure 1-5). Landowner P.T. participates in the productivity tax option, landowner B.L.Y. in the bare land & yield tax option. Boundary County is in forest valuation Zone 1. Let's also assume that both parcels are "good" productivity land. This is the most productive class in Idaho, capable of producing 287 and greater board feet per acre per year.

For landowner P.T. the taxable value for his land in 2001 is $675/acre under the productivity tax option. Boundary County's average levy rate for rural tax districts is 0.01010, so the tax due is:

100 acres × $675/acre × 0.01010 = $681.75.

If landowner P.T. decided to harvest timber this year, there would be no yield tax due because he participates in the productivity tax option.

For landowner B.L.Y. the taxable value for her land in 2001 is $179/acre under the bare land & yield tax option. Using Boundary County's average levy rate, the bare land tax is:

100 acres × $179/acre × 0.01010 = $180.79.
If landowner B.L.Y. decided to harvest this year, she must pay the 3% yield tax. Let's assume she harvests 100 thousand board feet (MBF) of timber, all of it Douglas-fir. The yield tax is based on stumpage values set by the Idaho State Tax Commission, which vary by geographic zone and species. In 2001, Douglas-fir in Zone 1 is valued at $253/MBF. The yield tax would be

100 MBF × $253/MBF × 3% = $759.
The total bare land & yield option tax bill for 2001, the year with a timber harvest, would be $939.79.

Looking only at 2001, when timber is harvested, the landowner in the productivity tax option pays less tax than the one in the bare land & yield tax option. However, this year is unusual because timber harvests probably do not occur every year for most landowners with less than 1000 acres.

If we assume the two landowners will not harvest timber until 15 years in the future, a different picture emerges. It is a common financial planning practice to "discount" future income and costs to the present in order to determine a "present value" to compare alternative investments. As we described at the beginning of this chapter, present value is an interest-rate driven concept. The premise is that payments made or received in the future are worth less today than equal payments made or received today. The reasoning is that money in hand today could be invested in alternative opportunities that would earn interest (Leuschner 1984). The "discount rate" represents the alternative rate of interest that a landowner could earn.

For our example, let's assume an annual discount rate of 4%. This is the discount rate that the U.S. Forest Service uses for analyzing long-term investments in resource management (Row et al. 1981). Let's also assume that property tax levy rates, land values, stumpage values, and other factors stay the same for the next 15 years so that the annual dollar amount of taxes computed in 2001 remains the same. Landowner P.T. will pay $681.75 each year for the next 15 years and will not pay any yield tax when the 100 MBF of timber is harvested in 15 years. The present value of 15 years of tax payments for landowner P.T. is $7,579.96.

Landowner B.L.Y. will pay $180.79 each year for the next 15 years and will make a one time $759 yield tax payment 15 years in the future. The present value of bare land tax payments is $2,010.09. The present value of the single $759 yield tax payment in 15 years is $421.45 for a total present value of both tax payments of $2,431.54 for landowner B.L.Y. The present value of the tax payments for her is $5,148.42 *less* than landowner P.T. pays under the productivity tax option.

Comparison of Idaho to Washington. Now let's assume a similar 100 acres in Pend O'Reille County, Washington, westwardly adjacent to Boundary County, Idaho (Figure 1-5). Washington's forest land taxation system is based on site value for the current use, plus a yield tax when timber is harvested (National Timber Tax Website 2001). The most productive forest land classification for eastern Washington is "Land Grade" 3—site index 140 feet and greater for Douglas-fir and ponderosa pine. Washington also includes an "Operability Class" in its valuation classification. We'll assume the land is Operability Class 1—the most operable. For 2001, taxable value for this land is $154/acre. The average levy rate for rural Pend O'Reille County for 2001 is 0.0145. Therefore, the property tax for this 100 acres is:

100 acres × $154/acre × 0.0145 = $223.30.

If this Washington landowner decided to harvest 100 MBF of Douglas-fir timber in 2001, she also must pay the yield tax all forest landowners in Washington pay when timber is harvested. The yield tax is 5% of the actual amount paid for stumpage or the actual amount received from the sale of logs minus the costs of felling the timber and delivering the logs to the buyer, provided that the landowner is a "small harvester"—cutting less than 2 million board feet per calendar year (Revised Code of Washington § 84.33.074). Stumpage values for "large harvesters" are determined by the Washington Department of Revenue. We'll assume this landowner is a "small harvester" and that she receives $253/MBF for stumpage, the same stumpage value used in our Idaho example. The yield tax is then

100MBF × $253/MBF × 5% = $1,265.

If instead we assume this landowner chooses to postpone the timber harvest for 15 years, and we use the same assumptions as in our Idaho example, the present value of the annual property tax is $2,482.74. The present value of the yield tax is $702.41, for a total present value of the taxes of $3,185.15.

Comparison of Idaho to Montana. Now let's assume a similar 100 acres in Lincoln County, Montana, eastwardly adjacent to Boundary County, Idaho (Figure 1-5). Montana's forest land taxation system is based on productivity. Lincoln County is located in "Forest Valuation Zone 1." The most productive forest land is "Class 1"—greater than 85 cubic feet of wood per acre per year. For 2001, the appraised value for Zone 1 Class 1 land is $1333.82/acre. However, in 2001, forest land ("class

ten property") has a taxable value of 0.57% of the appraised value. For 2001, the taxable value for this land is $7.60/acre. The average levy rate for rural lands in Lincoln County in 2001 is approximately 0.350. Therefore the property tax for this 100 acres would be:

100 acres × $7.60/acre × 0.350 = $266.00.

If this Montana landowner decided to harvest 100 MBF of timber, a severance tax would be paid at the time of harvest. However, the revenues raised from the tax are used for the state forestry extension service and do not flow directly back to counties. Therefore, we do not include the severance tax in our analysis.

We also cannot use all of our assumptions from the previous parts of this example because we know Montana's forest property tax system is changing. Specifically, in 2002 the taxable value of forest land will be 0.57% of the appraised value, and in 2003 and thereafter the taxable value will be 0.37% of the appraised value. Factoring in these changes and holding to our other assumptions, the present value of this Montana landowner's property tax payments for the next 15 years is $1,715.31.

Comparison of central Idaho productivity and bare land & yield tax options. For our second example, let's assume two nonindustrial private forest landowners each own 100 acres of forest land in Adams County, Idaho (Figure 1-5). Landowner A participates in the productivity tax option, landowner B in the bare land & yield tax option. Adams County is in forest valuation Zone 3. Let's also assume that the land is "poor" productivity land, which for Zone 3 grows 44 to156 board feet per acre per year. For 2001, the taxable value for land in the productivity option is $160/acre. Adams County's average levy rate is 0.01200, so for the landowner in the productivity option the tax due is:

100 acres × $160/acre × 0.01200 = $192.00.

If landowner A decided to harvest timber in 2001 or in 15 years, there would be no yield tax under the productivity tax option in Idaho. The present value of this landowner's property tax payments for the next 15 years is $2,134.73.

For landowner B in the bare land & yield tax option, the taxable value for his land for 2001 is $49/acre. Using Adams County's average levy rate, the bare land tax is:

100 acres × $49/acre × 0.01200 = $58.80.

If landowner B decided to harvest in 2001, he must pay the 3% yield tax. Let's assume he harvests 100 MBF of ponderosa pine timber. For 2001, Zone 3, ponderosa pine is valued at $241/MBF. The yield tax would be

100 MBF × $241/MBF × 3% = $723.00.

With a harvest, the total bare land & yield option tax bill for 2001 would be $781.80. However, if the harvest were delayed for 15 years and our assumptions from the first example hold true, the present value of the annual property tax payments would be $653.76. The present value of the yield tax would be $401.46 for a total present value of the bare land & yield taxes of $1,055.22.

Comparison of Idaho to Oregon. Now let's assume a similar 100 acres in Baker County, Oregon, westwardly adjacent to Adams County, Idaho. In eastern Oregon, including Baker County, forest land taxation rates are not stratified by productivity, so that is not a factor in taxable land values. However, Oregon is in the midst of a transition to a new forest land taxation system, which complicates comparisons. "Small" landowners (i.e., less than 5,000 acres) have a choice of how they move into the new system. In 2001, the taxable land value is either 75% or 20% of the "statutory land value," depending on which option the landowner has chosen. The taxable land value is also affected by "Measure 50," which set limits on assessed value growth (see Oregon Department of Revenue 1997). The net result is that for 2001 the taxable value for this hypothetical 100 acres is either $36.35/acre for those taxed at the 75% level or $9.68/acre for those taxed at the 20% level. Let's assume the landowner has chosen the 75% option. The average levy rate for rural Baker County is 0.01167; therefore, the property tax on this 100 acres is:

100 acres × $36.35/acre × 0.01167 = $42.42.

Eastern Oregon landowners harvesting timber in 2001 pay either 1.8% or 1.1% of the stumpage value in "Eastern Oregon Privilege Tax" if the land is taxed at the 20% or 75% rate, respectively. Our landowner will be taxed at 1.1% because she has chosen the 75% option. Landowners also can chose between two methods for determining stumpage value (Oregon Revised Statutes 321.430 and 321.432; Norm Miller, Oregon Department of Revenue, personal communication), but we'll assume that the stumpage value is the same as for our Adams County, Idaho landowner ($241/MBF). The Eastern Oregon Privilege Tax is then

100 MBF × $241/MBF × 1.1% = $265.10.

Oregon landowners who harvest timber also must pay a "Forest Products Harvest Tax." However, the revenues from this tax are used for a variety of forest research and fire reduction and suppression activities, and are not returned directly to counties. Therefore, we exclude the Forest Products Harvest Tax from our analysis.

If this landowner delays her harvest for 15 years, the calculation of present value becomes more complicated because Oregon also is in the midst of changing tax systems and some of our previous assumptions do not hold. In 2003 and beyond, forest land in Oregon will be taxed at 100% of its statutory value, subject to the limitations of Measure 50. We assume that beginning in 2003, the taxable value of forest land in Baker County will be $48.45/acre. Also, the Eastern Oregon Privilege Tax will not exist after 2003. Using the modified assumptions, the present value of the property tax for the next 15 years is $562.42.

Table 1-6 summarizes the results of these hypothetical examples. As the examples illustrate, comparing forest land taxes between states requires numerous assumptions about location, size of land holdings, productivity, harvesting, landowner's choice of taxation system, and the year of comparison. Local levy rates also will determine the actual tax expense for forest land. There is no simple answer to this focus question. Idaho landowners may be better off under either option, depending on when they plan to harvest timber. Idaho's productivity option over time raises more revenues for counties than do property tax systems in the three neighboring states. Idaho's bare land & yield option raises more county revenue than the Montana and Oregon systems, but less than the Washington system.

1.3. What is the impact of forest property taxes on management and investment decisions of private forest landowners?

Analysts and researchers have debated the impacts of forest property taxes on forest management and investment decisions for decades. Some of the earliest writings about forest taxation dealt with the impacts of ad valorem property taxes on both land and timber (Fairchild 1908). Answers to this focus question depend heavily on methods of analysis and assumptions.

Most studies of forest tax policy in North America have been based on the Faustmann (1849) financial model of forest management decision making (Amacher et al. 1991, Amacher 1997). The Faustmann model is a discounted cash flow formula used to calculate the land expectation value (LEV), which generally is the value of bare land for growing timber according to a specified management regime. Different regimes are compared to determine the optimal choice of forest management that gives the highest LEV. LEV is a present value, discounted at the investor's guiding rate of return, and the highest LEV indicates what the investor could afford to pay for bare land upon which to grow timber.

In the Faustmann model, or LEV approach, a landowner chooses rotation age, initial stand investment, and intermediate treatments to maximize the net present value (NPV) of timber production, which is converted to a perpetual or continuous series of discounted cash flows. The landowner starts with bare land, after a final clearcut harvest or conversion of land to forest use. Although many forest resources are economically valuable, only timber production is modeled. A timber stand is established, grown to the optimal economic rotation age indicated by the model, and harvested. The cycle continues in perpetuity. Stumpage prices, interest rates, and regeneration cost rates are generally held constant over time (Amacher et al. 1991). The Faustmann model is also useful for studying the effects of varying assumptions, including stand investment changes, pre-existing market distortions, uncertainty in production, "perfect foresight" on the part of landowners and government, market equilibrium, evaluation of taxes independently rather than as a system, the economy as a single landowner, the constancy of future parameters, and nontimber benefits (see Amacher 1997 for a complete review).

Another approach to analysis of forest taxation is based primarily on two-period representations of timber supply (Amacher 1997). The two-period approach relies on a single generation of landowners. This can be thought of as a short-run representation, whereas the Faustmann approach can be thought of as a long-run steady-state representation. The two are similar when policies are assumed constant in the two-period model. Conversely, the Faustmann model can be interpreted as a short run model when one rotation is considered (Amacher 1997).

Reviewing and comparing numerous forest taxation studies using both types of models, Amacher (1997) holds among his conclusions that the Faustmann model appears appropriate for the study of a single industrial forest firm with a fixed land base interested in profit maximization, or for a government that is interested in the stream of forest tax revenues from one representative forest owner over time. However, in cases where land changes affect the tax base, where budget and credit constraints are important to tax policy design, and where the choice of taxes is studied over a cross section of many landowners, the two-period model appears to be the more appropriate choice (Amacher 1997).

Despite the possible advantages of two-period models for our purposes, we concentrate our review on Faustmann-based studies because they are most prevalent in the United States. We want to be sure, however, that the reader is aware that other models exist that may result in different conclusions than those presented below. These other models are likely more appropriate for the nonindustrial private landowners in Idaho.

Efficiency and equity

Forest tax analysts generally use economic efficiency and equity as criteria for evaluating the impacts of taxation. However, what is and is not an efficient and equitable forest tax policy is often difficult to delineate, especially when considering that local governments face revenue constraints (Costello 1997).

An economically efficient property tax system is one that has little or no impact on timber production decisions, such as rotation length, thinning, or fertilization, and does not encourage timberland to shift to another use or from another use to forestry (Jackson 1980, Bare 1990). Although all tax systems affect efficiency, most analysts agree that the optimal forest tax policy should strive to be economically efficient, having no negative effect on forest management decisions or land use relative to the pre-tax condition when the latter is deemed socially desirable (Costello 1997). In this context economic efficiency is sometimes called neutrality.

Many studies have analyzed the equity, or fairness, of forest tax alternatives. When policymakers consider equity, they may or may not also consider efficiency (Costello 1997). Most analysts agree that it is desirable to have a tax that is fair no matter how fairness is defined (Chang 1996). Forest tax analysts have not agreed on a single measure of equity (Bare 1990). As a result, measures of fairness sometimes conflict with one another.

Numerous measures of equity exist including: [1] tax the same percent of market value for all properties, [2] equalize after-tax rates of return, [3] keep forest tax burden similar to that in other states, [4] allow the new tax to raise the same revenue as the old, [5] tax the same percent of annual income from all properties, and [6] equalize the tax ratio (Costello 1997). However, the two most common measures of equity for forestry are site burden and forest burden.

Site burden measures the reduction in the value of *land* resulting from the imposition of a property tax. Site burden (SB) may be defined as:

SB = (LEV w/o tax – LEV w/ tax) / LEV w/o tax

where LEV is the land expectation value, w/o is without, and w/ is with (Klemperer 1978). For a given tax to be neutral, the site burden would have to be equal for all land uses. The site burden concept hinges on the assumption that property taxes are capitalized into lower land values. This is conceivable for land uses such as forestry and agriculture because individual producers face a broad regional market and cannot shift the tax burden by raising prices.

Forest burden measures the reduction in the value of the forest—i.e., *trees* and *land*—resulting from the imposition of a forest property tax. Forest burden (FB) may be defined as:

FB = (FV w/o tax – FV w/ tax) / FV w/o tax

where FV is the forest value that is to be taxed (Klemperer 1978). The forest burden provides a measure of a landowner's loss in wealth of forest holdings.

When a tax imposes a heavier tax burden on a poor site than on a good site, as measured by either site burden or forest burden, the tax is regarded as "regressive" (Chang 1996). In contrast, when a tax imposes a heavier tax burden on a good site than on a poor site, the tax is regarded as "progressive." The basic sense of fairness would suggest that a tax should not be regressive in its tax burden (Chang 1996).

Summary of forest property tax studies

We summarize the literature on the effects of forest property taxation for ad valorem, productivity, site value, flat tax, and yield tax systems by considering whether they are neutral, progressive, or regressive (Table 1-7). However, as noted in the following discussion, these simple answers depend on numerous assumptions and may not hold true in every case (Amacher et al. 1991).

Ad valorem property tax. Forest tax analysts have long argued that an ad valorem (or percentage of the value) property tax is inherently biased against forestry and other land uses that produce income on a periodic, rather than an annual, basis and that this "deferred yield bias" is socially undesirable (Fairchild 1908, 1935; Bentick 1980*a*; Stier and Chang 1983; Klemperer 1989; Costello 1997). The theoretical foundation for modified property taxes on forests was provided decades ago (Fairchild 1935), whereby assessments or tax rates are reduced or another form of tax substituted (Klemperer 1989). Property taxes are not always biased against forestry (Klemperer 1974), but are likely to be. The bias

Table 1-7. Summary of the effects of forest property taxation systems on neutrality and tax burden.

Criteria	Forest property taxation system					
	Ad valorem	Productivity		Site value	Flat	Yield
		Gross	Net			
Neutrality	no	yes	yes	yes	yes	no
Tax burden (site)	regressive	regressive	progressive	proportional	regressive	regressive
Tax burden (forest)	regressive	regressive	progressive	regressive	regressive	regressive

Note: A regressive effect places a relatively higher burden on less productive land.
A progressive effect places a relatively higher burden on more productive land.

Source: Chang (1996).

would be against land uses with high establishment costs and long payoff periods, i.e., capital intensive uses (Klemperer 1989). An annual ad valorem tax on growing timber has the same effect on the owner's choice of the rotation age as an increase in the rate of interest in the Faustmann formula; both shorten the optimum rotation (Pearse 1990).

Other analysts have found that the property tax was not biased against forestry (Trestrail 1969, Lindholm 1973, Pasour and Holley 1976), based on the assumption that property taxes are fully shifted into higher stumpage prices. However, Klemperer (1977) and numerous other analysts have maintained that given the degree of competition in wood production nationally and worldwide, property taxes are more likely to be shifted back into lower land values than added to stumpage prices. Bentick (1980*a*) and Stier and Chang (1983) analyze these arguments and conclude that the issue remains unclear.

Chang (1982) concludes that, theoretically, increasing the ad valorem property tax will cause a shorter optimal forest rotation. However, if tax assessors do not update property values every year and the ad valorem property tax remains constant for some time, the impact of the ad valorem tax in shortening the optimal rotation tends to be much reduced. At its worst, the rotation is shortened by no more than one to two years. As such the impact of the imposition of an ad valorem property tax on the harvest age is likely to be rather insignificant. In this regard, stumpage price fluctuations plus insect and disease outbreaks probably have a bigger impact on the timber harvest decision than this form of property tax (Chang 1996).

Is the ad valorem property tax regressive? Yes, it imposes a heavier burden on less productive forest land than more productive forest land (Chang 1996). An increase in the ad valorem tax rate has the same effect as an increase in the interest rate (Pearse 1990). Consequently, the ad valorem property tax for forest land imposes a heavier site burden on less productive land than on more productive land. This is true whether the tax burden is expressed as site burden or forest burden.

Forest productivity tax. In terms of neutrality, the productivity tax theoretically has no effect on the optimal rotation age—one of many management decisions—because the amount of tax imposed is a fixed amount under either a gross or net mean annual revenue based productivity tax (Chang 1996). Although the productivity tax often is regarded as neutral, in practice it may not be. Problems exist in the methodology used to generate productivity values (Klemperer 1988; McKetta 1990, and review comments). For example, in order to assess the value for a given site under the productivity concept, assumptions must be made about typical management practices. Results can vary widely depending upon what interest rates, stumpage values, rotation lengths, species, or stocking levels are utilized (Williams and Canham 1972, Klemperer 1983).

Because productivity taxation uses a formula-based rather than a market-based valuation approach, it more than likely encourages inefficient resource allocation (Costello 1997). The impacts of a productivity tax on decisions such as rotation length and initial stand investment will vary with the form of the timber volume production function, tax rate, and interest rate (Amacher et al. 1991).

The typical productivity forest valuation formula, if correctly applied, could result in a tax more burdensome to forestry than the unmodified ad valorem tax (Klemperer 1989). Chang (1996) concludes that the tax burden based on the mean annual *gross* revenue method is heavier on the less productive land than on the more productive land. This result holds true whether the tax burden is measured as a site burden or forest burden. In short, the forest productivity tax based on the *gross* mean annual revenue is a regressive tax (Chang 1996).

The tax burden based on the mean annual *net* revenue method, on the other hand, places a lighter burden on the less productive forest land than on the more productive forest land as measured by both the site burden and forest burden. In short, the *net* mean annual revenue based forest productivity tax is a progressive tax (Chang 1996).

Site value tax. In terms of neutrality, because the site value tax is collected only on the value of the land, a fixed amount of tax is collected every year as long as the valuation parameters are constant. Consequently, the tax will not affect the optimal rotation age of the stand (Chang 1996). In terms of tax burden, the site value tax imposes the same site burden on forest land of different productivities. On the other hand, if the tax burden is measured in terms of the forest burden, the reduction in the value of the forest (both the land and the trees), the tax burden tends to be heavier on less productive forest land than on more productive land (Chang 1996). This is a regressive tax effect.

Flat property tax. In terms of neutrality, the flat property tax collects the same amount of money from all forest land regardless of its productivity, so the tax is neutral. The forest will be harvested at the same age with or without the flat property tax (Pearse 1990, Chang 1996). It will simply divert some of the value generated by the land from the owner to the government (Pearse 1990). In terms of tax burden, site burden and forest burden are heavier on less productive land (Chang 1996). This is a regressive tax effect.

Yield tax. A yield tax has the effect of reducing the value of the harvest to the owner in proportion to the tax rate. A yield tax can be postponed, and thereby reduced in present value, by postponing the harvest. The result is that a yield tax causes a lengthening of the economically optimal rotation (Pearse 1990, Costello 1997).

1.4. What is the impact of the current forest productivity valuation formula and annual property taxes on landowners' investment returns over the life of the timber crop?

Property tax is an annual expense. In investment analysis it is treated like other annual expenses. The tax is discounted over the time period in which it occurs to a common time period (usually the present time) using a chosen discount rate of interest. Property taxes determined using the productivity valuation formula will reduce investment returns over the life of the timber crop, as will other expenses.

The impact of property taxes on investment returns will vary with each landowner. Each landowner determines when to harvest timber, how much timber to harvest, and other management actions that generate costs and revenues during the life of the timber crop. Landowners also choose the discount rate they use in their investment analyses. The impact of the property tax on the investment also varies by county, because each county uses a different tax rate.

To illustrate, we provide a hypothetical example. Let's assume a forest landowner in Boundary County (Zone 1) begins with bare, "Good" productivity land. She plants the land with Douglas-fir and plans a clear-cut harvest in 58 years. This landowner uses a 4% discount rate in her investment analysis, and her timber investment has reached financial maturity at that time. We'll assume her timber harvest volume is 18,700 board feet per acre. Let's also assume that the taxable land value from the productivity formula, the stumpage value for Douglas-fir, and the tax levy in Boundary County remain at 2001 levels for the next 58 years. Respectively, those values for 2001 are $675/acre, $253/MBF, and 0.0101. How will her investment be affected by property taxes?

The net present value of her timber harvest revenues received in 58 years is $488/acre. The net present value of her annual property tax payment of $6.82/acre is $153/acre.

In this example, the landowner's returns were reduced $153/acre by the property tax. Other landowners in other locations who make other timber management decisions and use other discount rates for their investment analyses will be impacted differently.

1.4.1. Does the tax impact lead forest landowners to sell property for non-forest purposes (such as commercial or residential investment)?

Landowners' decisions to sell forest land are based on their personal or organizational criteria for doing so. Some landowners may use financial criteria related to timber. Other landowners may use non-financial criteria, and some landowners may use a combination of both. The impact of property taxes may or may not affect a particular landowner's decision to sell.

In 2001, forest property taxes under the productivity option averaged $4.93/acre statewide (Rod Brevig, personal communication). For some landowners, this impact may cause them to sell the land, but for others, it may not.

Factors such as how forest land will be used by the buyer after the land is sold are often out of the seller's control. For example, if a landowner chooses to sell her forest land for development as commercial or residential purposes, a market for that land use must exist in the area where the land is located.

Although we were unable to find literature that directly addressed the impacts of forest property taxes on landowners' decisions to sell land for non-forest purposes, there is literature that attempts to explain land use decisions in general. The following is a brief review of that literature.

Explanations for land use decisions have been offered by several academic disciplines including land and agricultural economics, sociology, forestry, and planning (Koontz 2001). Perhaps the most well-developed theory of land use decision-making is that of land and agricultural economics, in which individual decision makers compare expected net benefits and costs in light of risk preference (Koontz 2001). An underlying assumption is that land will be devoted to the use that yields the greatest returns to the land resource (Alig et al. 1988). More specifically, Ricardian economic theory suggests "land use-capacity" and "land rent" are important determinants of land use (see Barlowe 1978). Land use-capacity is the ability of a given unit of land to produce a surplus of returns and/or satisfactions above the costs of utilization (Barlowe 1978). Land rent is the portion of total returns that accrues to land after payment of total costs (Alig et al. 1988). According to classical land rent theory, allocation decisions among competing land uses are dictated by associated relative land rents (Alig 1986).

Empirical studies have yielded mixed results regarding the influence of *forest* land rents on land use (Alig et al. 1988, Kline and Alig 1999). Studies tend to agree that proxies for describing *urban* land rents, such as population and income, are significant variables in predicting land use (Alig et al. 1988, Kline and Alig 1999). The value of urban land is derived in large measure from its location with reference to population centers and community services. Rural lands have traditionally derived most of their value from productivity of the site, but location is becoming more important (Williams 1974).

Rural land use changes tend to be driven by demand forces besides the forestry sector (Alig 1986, Alig et al. 1988), and urban uses dominate resource uses in land markets (Alig and Healy 1987, Kline and Alig 1999). Some demand for commercial or residential development must exist in order for a landowner to sell forest land for these uses. Although demand for urban development appears to have increased around population centers in Idaho, much forest land is still located some distance away from population centers, where demand for urban uses appears to be low.

Economic theory suggests that property taxes contribute to the conversion of forest lands to more intensive urban uses (Barlowe 1978, Alig et al. 1988); however, the magnitude and timing of the effects depend largely on assumptions about land values and tax structures used in modeling (Bentick and Pogue 1988, Anderson 1993). Empirical studies have not provided conclusive evidence of the impact of property taxes on land uses (Alig et al. 1988). Property taxes usually amount to only a small percentage of property values and may not greatly influence landowners' decisions about conversion to other uses (Church 1986). The lack of evidence has led some researchers to question the effectiveness of using preferential tax treatment for forest and farm land to delay or prevent conversion to urban uses (Church 1986, Hoffman 1986, Borie 1987, Brockett and Gebhart 1999).

Landowner characteristics have been shown to influence land use decisions (Kline and Alig 1999, Koontz 2001), and some researchers suggest that reasons for owning land, particularly nonmonetary motivations, need to be included more explicitly in models of land use decisions. For example, Koontz (2001) suggests that strong nonmonetary motivations may exist among those who do not rely on their land for their economic well-being, and in the U.S., the amount of these landowners is increasing (Koontz 2001). Several studies of private forest owners in the U.S. suggest their primary interests

include wildlife, recreation, and aesthetics, rather than timber production for financial gain (Campbell and Kittredge 1996, Birch 1997, Birch et al. 1998). In a survey of nonindustrial private forest owners in Idaho, Force and Lee (1991) found that "to obtain income for timber" was the sixth ranked reason for owning forest land, behind preservation of beauty and wildlife, personal attachment, personal recreation, satisfaction from owning land, and having a place to practice conservation. One-fourth of their respondents did not ever plan to harvest timber and 45% were uncertain of their future timber harvesting plans. Birch (1997) found that income from timber was a primary or secondary expected benefit of forest land ownership for 9% of Idaho forest landowners, and 73% never intended to harvest timber.

These statistics should not be misinterpreted to mean that forest landowners do not care about the financial aspects of land ownership. Non-timber benefits of land ownership and financial returns from selling timber are not necessarily mutually exclusive. Financial objectives are just one of many considerations that landowners use to make decisions about land use and management.

Although the Idaho property tax statute defines "forest land" as land "being held and used primarily for the continuous purpose of growing and harvesting trees" (Idaho Code § 63-1701(4)), there is no provision for determining if that is the intent of each private forest landowner. Nor is there a legal provision that timber must be harvested within some specific time frame. Some landowners may be taking advantage of the property tax provisions for forest land without an intention to harvest.

Some observers have expressed concern about the size of forest landownerships getting smaller and landowner's propensity to harvest timber (McKetta, review comments). Force and Lee (1991) found that owners of smaller forest acreages in Idaho were less likely own forest land for its income from timber, less likely to have harvested timber, and more likely to say they do not plan to harvest timber in the future. Between 1980 and 2000 the number of forest landowners in Idaho increased from 38,084 to 65,506, a 72% increase, while forest acreage in Idaho remained relatively constant (Jim Colla, Idaho Department of Lands, personal communication). Ownerships in the 5 to 25 acre range increased by 81%, while those over 500 acres decreased 14% (Figure 1-6). The size of land holdings may affect their uses and management.

Landowner decision making about land uses and management is also difficult to predict because of the relatively rapid turnover in ownership. More land is changing hands, in less time, and there are more first-time landowners. For example, more than 40% of nonindustrial private forest owners across the United States have owned their land for less than 15 years (Birch 1996). Force and Lee (1991) found that 29% of Idaho nonindustrial private forest landowners had owned their properties for less than 10 years. Birch (1997) found that about 22% of Idaho's private forest landowners had purchased their properties since 1980 (Birch 1997).

Despite a general inability to model forest landowners' decisions to convert forest land to other uses in Idaho, statistics about the amount of land converted may be helpful. The Natural Resources Conservation Service of the U.S. Department of Agriculture periodically surveys land use conversions as part of its National Resources Inventory (NRI). The last assessment was completed in 1997 (NRCS 2000).

From 1982 to 1997, of the 3.8 million acres of private forest lands in Idaho a net total of 60,500 acres (1.6%) were converted to other uses (NRCS 2000*a*). Most of this (38,600 acres or 64%) was converted from forest land to urban uses. The conversion rate of forest land to urban land rose from 2,210 acres per year between 1982 and 1992 to 2,840 acres per year between 1992 and 1997 (NRCS 2000*b*). Conversion rates for other land uses were higher (NRCS 2000*b*). Conversions of forest land to farmsteads also occur in Idaho. The NRI classifies rural residences as either small urban areas or farmsteads, depending on density of development (NRCS 2000*b*). From 1982 to 1997, 6,700 acres of forest land were converted to farmsteads. The rate of conversion of forest lands to farmsteads decreased from 570 acres per year between 1982 and 1992 to 180 acres per year between 1992 and 1997 (NRCS 2000*b*).

1.4.2. Does the tax impact lead forest landowners to sell Idaho forest land to invest in other states with different forest property tax systems?

We were unable to find any empirical studies that address this question. We believe the answer is no, forest landowners do not sell land in Idaho to invest in other states because of the impact of property taxes. Property taxes are small compared to overall land value. Levy rates for forest land statewide vary from 0.5% to 1.4% of taxable property value, a small percentage.

Perhaps landowners who own forest land primarily for timber production might be more likely

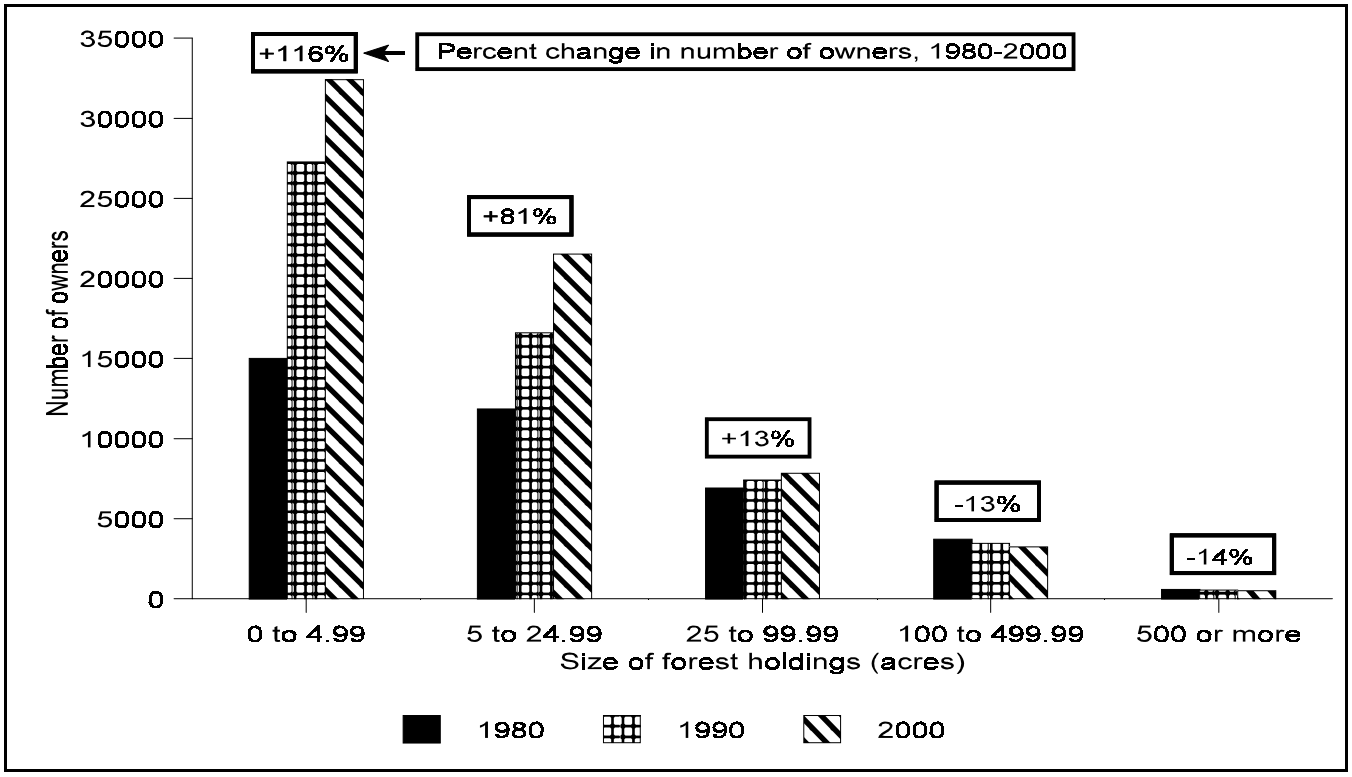

Figure 1-6. Number of forest landowners in Idaho by size of forest holding, 1980, 1990, and 2000.

Note: Number of owners is based on those in forest protective associations (see Idaho Code § 38-111). Acres of forests based on "forest land" as defined in statute related to forest protection (Idaho Code § 38-101(a)), not as defined related to property taxation (Idaho Code § 63-1701(4)).

Source: Jim Colla, Idaho Department of Lands (personal communication).

than other forest landowners to relocate to states with lower property tax rates, but we have no evidence that this is the case. If a landowner is primarily interested in forest land only as an investment, then it is conceivable the landowner would shop for the "best" property, i.e., that which may provide the highest return for the investment within the investor's time horizon. Idaho timberlands do not seem to have attracted institutional investors (i.e., pension funds), but neither have timberlands in Montana, eastern Washington, or eastern Oregon.

Even if financial considerations are the most important reason a landowner owns forest land, it seems probable that other factors, such as cost of land and transportation costs to processing facilities, might be more important to location decisions than property tax rates. In addition, the property tax advantage of the forest land is capitalized into the value of that land. Some current owners may factor that into the selling price of the land. The new buyer then purchases the capitalized tax advantage when he or she buys the land (McKetta, review comments). For these reasons we doubt property taxes impact decisions to sell forest land to invest in other states.

Objective 2: Analyze the potential impact to county budgets and county governments from the potential shift in 2002 by landowners from the productivity tax option to the bare land & yield tax option.

2.1. How many forest landowners could this affect?

All private forest landowners in Idaho are eligible to redesignate their lands from one tax option to the other in 2002 if they meet two conditions: [1] own between 5 and 5,000 acres of forest land and [2] have designated their land "forest land" (Categories 6&7) The Idaho State Tax Commission estimates that there are 12,200 private forest landowners in Idaho eligible to redesignate their lands in 2002 (Rod Brevig, personal communication).

2.1.1. How much land could be affected?

Currently, there are 1,833,744 acres enrolled in the productivity tax option and 395,432 acres enrolled in the bare land & yield tax option (Table 2-1). Because only those owners with less than 5,000 acres of forest land are eligible to select the bare land & yield option, the Idaho State Tax Commission estimates that approximately 800,000 acres, or 44% of the 1.8 million acres enrolled in the productivity tax option, are eligible to switch options (Rod Brevig, personal communication).

2.1.2. Which counties could be affected?

Table 2-1 shows enrollment in each tax option by county. Only Zone 1, Zone 2, and the counties listed in Zone 3 have lands receiving forest land taxation treatment. The remaining counties in Zone 3 do not contain lands receiving forest land taxation treatment. Only one ownership of 23 acres in Zone 4 (Bannock County) receives forest land tax treatment (Rod Brevig, review comments), and it is excluded from this analysis. Clearwater County has the most forest land acreage with 405,663 acres, but few forest landowners who are eligible to switch tax options. Bonner, Kootenai, Benewah, Shoshone, and Latah Counties also each have over 200,000 acres of private forest land. Kootenai and Bonner counties have the most eligible landowners (Rod Brevig, review comments).

2.2. What would the tax reduction amount to annually?

Because of increases in forest land values during the 1990s (see **Objective 1.1.2.** ***Forest Values in the 1990s***), our analysis is based on the premise that forest landowners are likely to shift from the productivity tax option to the bare land & yield tax option rather than the other way around. For counties, this will result in a decrease in the amount of property tax collected annually based on bare land value, as compared to productivtiy taxation, but over time probably will result in an increase in the amount of yield tax collected when timber is harvested (see Table 1-6). However, the outcome is dependent upon the timing and volume of timber harvests. For example, some landowners who planned to harvest early in the next decade may find it financially advantageous to harvest within the next year while still under the productivity tax option before switching to the bare land & yield option at the end of 2002. This suggests there could be some delay before counties see increased yield tax revenues, or perhaps they may not increase (McKetta, review comments).

We computed the effects on property tax revenues of a 1% shift in the number of acres from productivity-based taxable values to bare land taxable values by county (Table 2-2). We used 2001 values from the forest productivity valuation formula and 2000 levy rates for each county. We also computed a 1% increase in yield tax revenue for each county based on [1] average annual yield tax during 1994 to 1999 and [2] yield tax in 1999 alone (Table 2-2). The most recent year for which yield tax data statewide is available is 1999. Because stumpage values increased between 1994-1999, revenues in 1999 are generally higher than the 1994 to 1999 average for most counties.

One should not assume that a 1% increase in the number of acres in the bare land & yield tax option will necessarily lead to a 1% increase in yield tax revenues on an annual basis. Landowners control the timing and amount of timber harvests and thus influence the timing and amount of yield tax revenues.

Statewide each 1% shift in acreage from the productivity-based taxable values to the bare land taxable values would result in a loss of $65,348 out of $9.5 million currently collected in property tax

Table 2-1. Acres of forest land enrolled in the productivity tax option and the bare land & yield tax option, by county, 2000.

County	Productivity tax option		Bare land & yield tax option		Total
	(acres)	(%)	(acres)	(%)	(acres)
Zone 1					
Boundary	88,551	74%	31,211	26%	119,762
Bonner	182,234	79%	47,080	21%	229,314
Kootenai	197,388	78%	56,573	22%	253,961
Zone 2					
Benewah	188,148	78%	52,595	22%	240,743
Shoshone	297,858	95%	14,465	5%	312,323
Latah	178,808	83%	36,538	17%	215,346
Clearwater	392,108	97%	13,555	3%	405,663
Nez Perce	15,471	72%	6,087	28%	21,558
Lewis	30,978	75%	10,323	25%	41,301
Idaho	29,294	27%	77,008	73%	106,302
Zone 3					
Adams	67,332	85%	11,384	15%	78,716
Valley	108,507	89%	13,192	11%	121,699
Boise	56,184	74%	19,199	26%	75,383
Gem	286	34%	554	66%	840
Elmore	597	10%	5,668	90%	6,265
State total	1,833,744	82%	395,432	18%	2,229,176

Source: Idaho State Tax Commission (Rod Brevig, personal communication).

Table 2-2. Effect on county property tax revenue of a 1% shift in the number of acres taxed under productivity valuation to bare land valuation, and a 1% increase in yield tax revenues based on 1994-1999 average and 1999 only.

County	2000 levy rate[1]	2001 basis			Effect of a 1% shift in acreage from productivity-based to bare land-based property valuation[2]				1% increase in yield tax, based on '94-'99 average	1% increase in yield tax, based on 1999
		Productivity-based tax revenue	Bare land-based tax revenue	Combined total	Productivity-based tax revenue	Bare land-based tax revenue	Net total	% decrease from 2000		
Zone 1										
Boundary	0.01010	$403,410	$48,537	$451,948	($4,034)	$1,157	($2,877)	0.64%	$350	$924
Bonner	0.00930	$937,919	$67,097	$1,005,015	($9,379)	$2,565	($6,814)	0.68%	$468	$859
Kootenai	0.01190	$1,170,470	$99,759	$1,270,229	($11,705)	$3,275	($8,430)	0.66%	$622	$590
Zone 2										
Benewah	0.00920	$919,732	$62,526	$982,259	($9,197)	$2,526	($6,671)	0.68%	$576	$947
Shoshone	0.00870	$1,184,408	$16,749	$1,201,157	($11,844)	$3,268	($8,576)	0.71%	$224	$315
Latah	0.01400	$1,236,135	$70,774	$1,306,909	($12,361)	$3,377	($8,948)	0.68%	$271	$303
Clearwater	0.00920	$2,229,205	$20,104	$2,247,309	($22,272)	$6,136	($16,136)	0.72%	$97	$157
Nez Perce	0.00970	$58,145	$6,283	$64,428	($581)	$158	($423)	0.66%	$101	$113
Lewis	0.01130	$130,503	$11,642	$142,145	($1,305)	$357	($948)	0.67%	$78	$78
Idaho	0.00780	$88,311	$58,615	$146,926	($883)	$248	($635)	0.43%	$788	$1,084
Zone 3										
Adams	0.01200	$238,079	$16,613	$254,692	($2,381)	$687	($1,694)	0.67%	$93	$83
Valley	0.00580	$218,091	$8,754	$226,845	($2,181)	$613	($1,568)	0.69%	$95	$104
Boise	0.01110	$217,802	$21,135	$238,937	($2,178)	$607	($1,571)	0.66%	$172	$199
Gem	0.01140	$1,105	$594	$1,699	($11)	$3	($8)	0.47%	$0	$0
Elmore	0.00920	$1,780	$4,902	$6,681	($18)	$5	($13)	0.19%	$18	$0
State total		$9,033,096	$514,084	$9,547,180	($90,331)	$24,983	($65,348)	0.68%	$3,954	$5,756

[1] Average levy rate for forest land in county.
[2] Results exclude effects of changes in yield tax revenues.

Source: Idaho State Tax Commission (Rod Brevig, personal communication).

revenue, a decrease of 0.68% (Table 2-2). The potential for increased yield tax revenue offsets some of the loss.

Counties will feel varying impacts of a shift from the productivity tax option to the bare land & yield tax option. Obviously, the impact will vary by the number of landowners that are eligible and choose to shift and the number of acres they own.

For example, Kootenai County has a large number of forest landowners and acres that are eligible to make the shift. We cannot know what percentage of acres will shift, but if we assume 25% do, property tax revenues for Kootenai County would be reduced by $210,750. This represents a 0.26% reduction in the Kootenai County's overall property tax revenues of $82 million. Yield taxes will make up some of the difference, but timing of timber harvest is a large uncertainty. Nonindustrial private forest lands provide a high percentage of Kootenai County's timber harvests. From 1994 to 2000, 65% of the county's timber harvest volume from private lands came from nonindustrial lands (Kirk David, personal communication). Because of the acreage limitations, nonindustrial private landowners are eligible to make the shift to the bare land & yield option, rather than industrial landowners. The potential for increases in yield tax revenues is great, but increased variability in the annual level of yield tax revenues is also probable because they result from the timber harvesting decisions of many landowners.

In contrast, Clearwater County has very few forest landowners and acres that are eligible to make the shift from the productivity tax option to the bare land & yield tax option. Although each 1% shift would reduce property tax revenues by $16,136, few acres are eligible to shift because most forest land in Clearwater County is owned by forest industry companies that own more than 5,000 acres. From 1994 to 2000, only 12% of the county's timber harvest volume from private lands came from nonindustrial lands (Kirk David, personal communication). Yield tax revenues to the county are not likely to increase greatly because few landowners are eligible for the bare land & yield tax option. However, a 1% shift to the bare land & yield option with its potential $16,136 decrease in revenue is a 0.26% decrease in Clearwater County's $6 million total property tax revenues. This is the same percentage impact on property tax revenues as a 25% acreage shift in Kootenai County.

We did not include deferred tax revenues in our analysis, but they also will lessen the impact of a shift to the bare land & yield option. Deferred taxes are those that are due when a landowner changes from the bare land & yield tax option to the productivity tax option, sells the land, or opts out of the forest land tax program altogether (see **Introduction**). Average annual deferred tax revenues (1994-1999) and 1999 deferred tax revenues are presented in Table 2-3. Counties with many nonindustrial forest landowners, substantial acreage in the bare land & yield tax option, and growing demands for other land uses besides forests tend to have larger deferred tax revenues. Kootenai County is an example.

Table 2-3. Deferred tax revenues by county, 1994-1999 annual average, and 1999 amount.

County	Deferred tax, annual average '94-'99	Deferred tax, 1999
Zone 1		
Boundary	$18,026	$19,316
Bonner	$18,549	$26,985
Kootenai	$33,815	$68,568
Zone 2		
Benewah	$22,301	$7,941
Shoshone	$3,088	$15,827
Latah	$15,521	$15,308
Clearwater	$2,604	$268
Nez Perce	$0	$0
Lewis	$8,069	$8,509
Idaho	$7,856	$5,182
Zone 3		
Adams	$481	$0
Valley	$1,610	$4,199
Boise	$128	$0
Gem	$0	$0
Elmore	$0	$0
State total	$132,045	$172,103

Source: Idaho State Tax Commission (Rod Brevig, personal communication).

2.2.1. What other possible sources of revenue could the tax burden shift to?

In 2000, estimated property tax collections statewide were $914 million (Figure 2-1). Forest property, yield, and deferred taxes accounted for approximately $13.3 million, or 1.5% of the total (Gary Houde, personal communication). Counties collect property taxes, and county commissions will make decisions about levels of tax revenue and shifts in sources of tax revenues to meet their needs.

All property within the state of Idaho that is not expressly exempted is subject to taxation (Idaho Code § 62-203); therefore, the tax burden could be shifted to numerous other types of property. Property taxes apply to homes, farms, businesses, industry, warehouses, offices, and most privately owned real estate, as well as some personal property (Idaho State Tax Commission 2001).

2.3. What could be the long-term implications of this shift on tax policy and private forest land and resource management?

The theoretical implications of various types of property taxes on private landowners' management and investment decisions were discussed earlier (see **Objective 1.3**). As stated there, it is difficult to predict what the effects of a different tax structure will be on individual landowners' decisions.

One of the long term implications of a shift towards more forest lands taxed under the bare land & yield option would be a less predictable flow of tax revenues to counties. Yield tax revenues will depend upon landowners' decisions to harvest and stumpage prices at that time.

Techniques for helping to smooth the distribution of yield tax revenues to counties have been suggested. For example, Klemperer and Clements (1988) proposed basing tax revenue distributions on

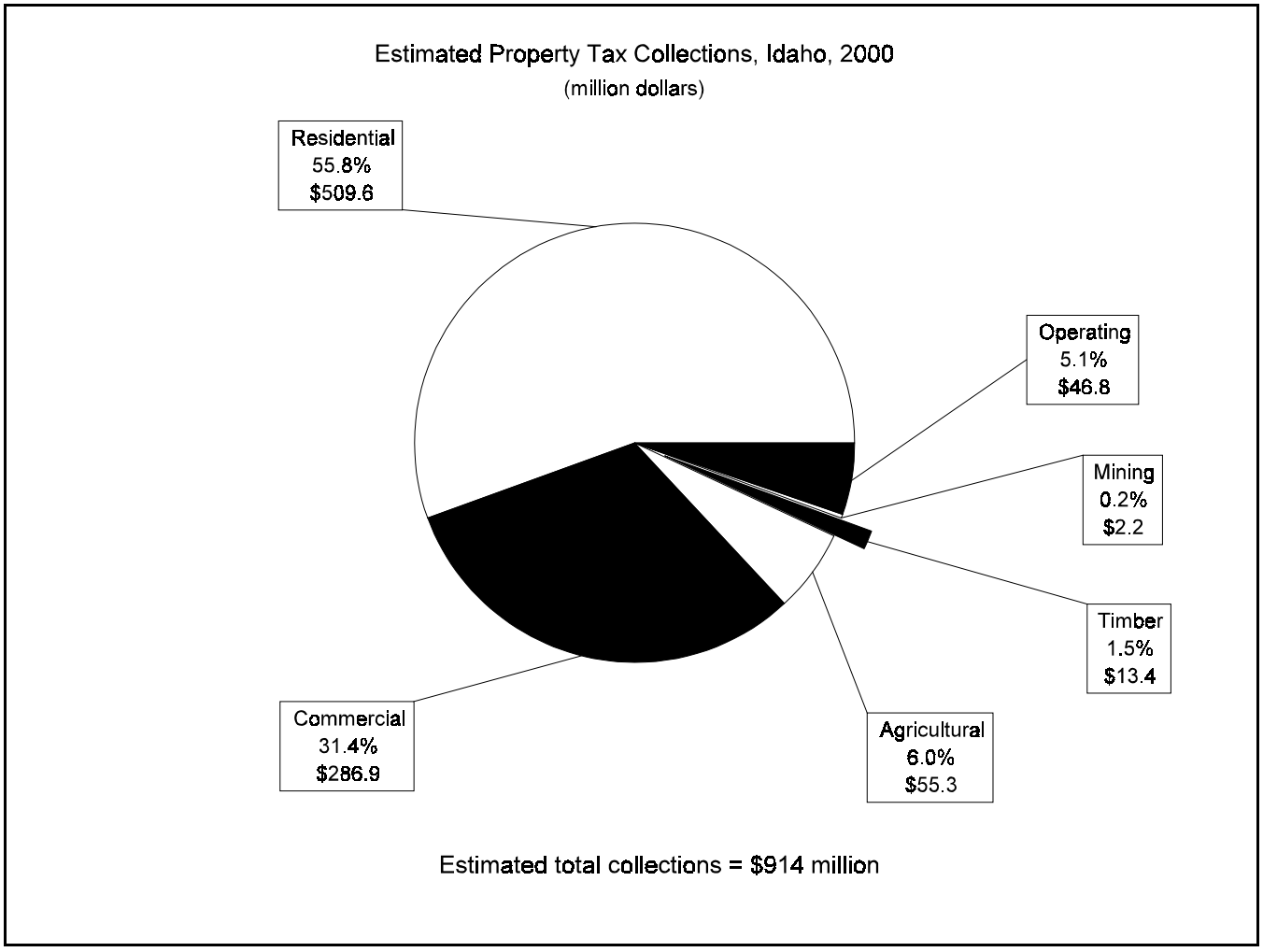

Figure 2-1. Estimated property tax collections, Idaho, 2000.

Source: Idaho State Tax Commission (Gary Houde, personal communication).

a rolling average of the last five years' yield tax collections. In years when the tax collection exceeds the rolling average to be distributed, the excess is deposited in a reserve account. When the rolling average exceeds collections, the shortfall is recovered from the reserve account. To fund the reserve account initially, a temporary surtax of 5% of collections is levied for deposit into the reserve account (Klemperer and Clements 1988).

If the experience of the state of Washington is instructive, this solution is probably not politically feasible in Idaho (Rod Brevig, review comments). In Washington, the legislature did not respect the integrity of the reserve account during a financial crisis and spent the reserve. Also, counties in Idaho collect the yield tax and it is doubtful they would relinquish that duty to the state. The cost of collection also may be excessive because not that much revenue is collected. In addition, county collectors have local knowledge that increases efficiency (Rod Brevig, review comments).

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