

Timberland Site Class on Private Lands Zoned for Timber Production

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Abstract

Under the Forest Taxation Reform Act, over 5.4 million acres of lands are specially zoned for timber production and compatible uses. These lands are assessed based on their ability to grow trees. This ability varies across forest landscapes. This technical paper describes how the ability to grow trees is characterized and how it is spread across California, county-based bioregions, and individual counties in the year 2000. California has highly productive timberlands, but the extent to which they are protected by special zoning varies among counties. Just over 2 million acres are in the most productive site categories (Sites I and II).

Forest economists have traditionally viewed the production of timber as a result of two primary inputs: the bare land (called “site”) and the tree itself. Typically the value of both the land and tree are reflected in property values that are assessed for property taxes. Because trees take a long time to grow to merchantable sizes, an annual property tax on land and timber value can lead to a serious mismatch between taxes and revenues.

For this reason, many states, including California, have modified the annual property tax as it applies to timber and timberlands. The California Forest Taxation Reform Act of 1976 made two modifications. It placed values on bare land that are related to its ability to grow trees, and it substituted a percent tax on the value of timber at the time of harvest (“yield” tax) for the annual property tax on the trees. In exchange for this tax benefit, landowners had to be willing to dedicate their timberland to timber growing and compatible uses for a period of at least ten years. Unless terminated by the county or landowner, these ten years renew each year, thus creating a rolling minimum or self-perpetuating ten-year commitment (California Board of Equalization, 2000).

Lands zoned in this manner are called Timberland Production Zone (TPZ). Total acres of TPZ ostensibly indicate land that is committed to timber growing and compatible uses, thus forming the long-term productive base of the State’s privately owned forestland base.

Methodology

This paper summarizes the results of a written survey of county assessors made by the Fire and Resource Assessment Program (FRAP) in 2001. Assessors were asked to indicate the acres of TPZ categorized by site class. In a few cases, there were additional phone conversations between FRAP and county assessor staff to clarify information. Explanations of site class and site productivity come from standard forestry literature.



Site Quality and Land Value

Each county assessor grades Timberland production zones for productivity based upon their ability to produce wood. In California, five general site classes are established within three general forest types: young-growth redwoods, whitewoods (Douglas-fir), and ponderosa pine and mixed conifers. Site I denotes areas as having the highest timber productivity while Site V denotes areas as having the lowest timber productivity. Using a formula contained in Section 434.5 of the Revenue and Taxation Code, the State Board of Equalization (SBE) annually establishes the value for each site by general forest type.

The following site classification tables and SBE set values show TPZ productivity ratings and associated value.

Table 1. Site Classification and potential tree heights in Timberland Production Zone

Productivity Potential¹ (Site Class)	Potential tree height Young-Growth Redwoods	2002 land value/acre²
I	>= 180	\$284
II	155-179	231
III	130-154	201
IV	105-129	175
V	< 105	55

*1-rated by potential tree height in feet at 100 years old, except the last column at 300 years old
2-State Board of Equalization 2002 timberland values*

Table 2. Site classification and potential tree heights in Timberland Production Zone

Productivity Potential ¹ (Site Class)	Whitewoods (All Douglas-fir) ²	2002 land value/acre ³
I	>= 194	\$201
II	164-193	149
III	134-163	124
IV	103-133	93
V	< 103	49

1-rated by potential tree height in feet at 100 years old, except the last column at 300 years old
 2-including also Sitka spruce, grand fir, hemlock, bishop pine, and Monterey pine stands
 3-SBE 2002 land values

Table 3. Site classification and potential tree heights in Timberland Production Zone for mixed conifer

Productivity Potential ¹	Potential tree height Ponderosa Pine and Mixed Conifers ²		2002 land value/acre ³
	Young Growth	Old Growth	
I	>= 114	>= 163	\$155
II	93-113	138-162	109
III	75-92	113-137	85
IV	60-74	88-112	60
V	< 60	< 88	33

1-rated by potential tree height in feet at 100 years old, except the last column at 300 years old
 2-including also Jeffrey pine, lodgepole pine, and true firs other than grand fir
 3-SBE 2002 land values

One way to understand the importance of site quality is to consider how long it would take a stand to reach an average tree diameter of 20 inches. On Site I land, this would only take 50 years while on Site V land it would take more than twice as long (Lindquist and Palley, 1963).

Table 4. Years for young-growth redwood stands to grow an average diameter of 20 inches

Productivity Potential (Site Class)	Young growth redwood site index ¹	Years for stand to grow average diameter 20 inches
I	180	50
II	160	60
III	140	70
IV	120	90
V	100	110

1-rated by potential tree height in feet at 100 years old

Another way to understand variation in site quality is to compare site class across forest type. This is shown in Table 5. The table illustrates that sites grow more timber volume, all other things being equal, in young-growth redwood and whitewood types.

Table 5. Variety of site measures by timber type

Site Index	Young Growth Redwood	White wood (All Douglas Fir)	Mixed Conifer	
			Young Growth	Old Growth
200	I	I	-	-
180	I	II	-	I
160	II	II	-	II
140	III	III	I	III
120	IV	IV	I	III
100	IV	V	II	IV
80	V	V	III	V
60	V	V	IV	V
40	V	V	V	V

For a variety of reasons, some redwood and Douglas fir stands grow much more wood fiber per unit time. Thus, Site Index 200 appears in only these two timber types. In contrast, with some exceptions, the best young-growth mixed conifer forest stands appear at Site Index 140, or about 30 percent less than their redwood or Douglas fir counterparts.



TPZ Acreage

Timberland Production Zone is also classified for operability based upon accessibility, topography, soil type, and legislative or administrative constraints. In this summary, all the inoperable land and homesteads in the following TPZ acreage table are lumped into the Site Class V. The TPZ acreage in this table is for 2000-2001 and was provided by each county assessor.

For the most part counties have just one forest type reflected in their site table. Two exceptions are Humboldt and Mendocino counties. Humboldt County’s forest conditions require use of both redwood and whitewood tables. Mendocino County forest conditions are even more diverse, requiring the use of all three-forest type value tables—redwood, whitewood, and pine. This is shown as Table 6.

Table 6. Humboldt and Mendocino counties TPZ acreage by Site Class for 2001

County	Site Class					Total
	I	II	III	IV	V	
Humboldt						
Redwood	9,014	309,102	80,876	2,864	1,151	403,006
Whitewood	1,222	94,588	395,191	87,450	1,717	580,167
Mendocino						
Redwood	341	193,456	411,805	29,948	1,944	637,504
Whitewood	-	561	71,942	28,245	238	100,985
Pine	26,518	21,192	7,735	297	36	55,778

Total TPZ land in Mendocino County has 794,267 acres classed as timber site and 59,464 classed as grass, hardwood, brush, and other categories. These are classified as Site Class V. The total TPZ land as reported is 853,731 acres, as shown in Table 7.

Table 7. Timberland Production Zone (TPZ) acreage by Site Class in California as of 2000-2001

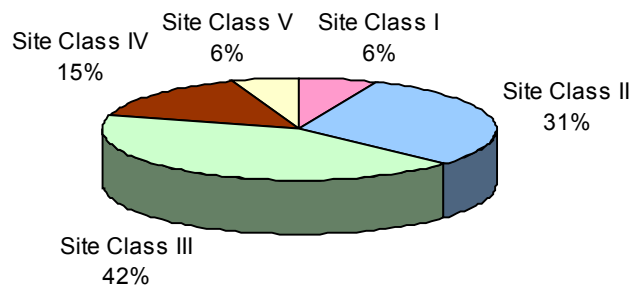
County	Total Acreage	Site Class				
		I	II	III	IV	V
Alameda	-					
Alpine	1,126	-	144	50	668	264
Amador	28,070	13,219	10,431	2,492	1,018	910
Butte	161,557	28,485	77,573	40,759	7,659	7,081
Calaveras	76,011	36,899	30,010	4,820	1,735	2,547
Colusa	-					
Contra Costa	-					
Del Norte	146,510	6,982	45,062	41,149	29,487	23,830
El Dorado	148,680	69,460	51,332	11,909	6,293	9,686
Fresno	1,506	678	535	121	-	172
Glenn	21,742	828	10,762	8,459	710	983
Humboldt	983,173	10,236	403,689	476,066	90,314	2,868
Imperial	-					
Inyo	-					
Kern	-					
Kings	-					
Lake	18,539	9,015	5,569	895	705	2,355
Lassen	310,118	-	12,170	158,195	112,410	27,343
Los Angeles	-					
Madera	220	-	-	-	220	-
Marin	-					
Mariposa	8,775	1,124	7,093	557	-	-
Mendocino	853,731	26,859	215,218	491,482	58,490	61,682
Merced	-					
Modoc	197,464	-	846	67,451	126,857	2,310
Mono	-					
Monterey	-					
Napa	19	-	19	-	-	-
Nevada	74,884	4,208	13,397	27,500	9,334	20,444
Orange	-					
Placer	115,983	4,130	25,490	38,471	13,506	34,386
Plumas	224,949	12,625	86,940	114,371	9,930	1,083
Riverside	-					
Sacramento	-					
San Benito	-					
San Bernardino	-					
San Diego	-					
San Francisco	-					
San Joaquin	-					
San Luis Obispo	-					
San Mateo	23,715	16	4,796	9,330	3,993	5,580
Santa Barbara	-					
Santa Clara	2,450	-	-	1,544	-	906
Santa Cruz	52,750	-	-	52,750	-	-
Shasta	614,306	22,615	262,471	235,516	75,435	18,269
Sierra	81,009	5,446	17,588	39,613	15,293	3,069
Siskiyou	568,585	9,230	138,276	235,579	146,800	38,700
Solano	-					
Sonoma	82,819	-	3,551	51,664	21,712	5,892
Stanislaus	-					
Sutter	-					
Tehama	240,861	7,067	131,849	82,229	3,332	16,384
Trinity	258,318	22,509	71,601	112,071	42,784	9,353
Tulare	6,627	4,590	1,368	211	100	356
Tuolumne	83,787	32,226	24,924	14,147	7,754	4,736
Ventura	41	41	-	-	-	-
Yolo	-					
Yuba	30,655	10,954	10,899	4,927	857	3,017
TOTAL	5,418,979	339,443	1,663,605	2,324,330	787,396	304,206

Discussion

In total, California has 5,418,979 acres of land classified into timberland production zone distributed in 32 counties. Approximately three quarters of private timberland in California is TPZ land (Shih, 1998). Timber is grown and can be harvested on the other acreage, but the land is not zoned or assessed based on its timber growing capability.

When considering the land's potential for timber production, the highest quality (Site Class I) TPZ land covers only six percent of the total TPZ acreage, while the lowest quality (Site Classes IV and V) TPZ land covers 21 percent. The remaining 73 percent of TPZ land are graded into the intermediate site quality classes (Sites II and III) in Figure 1.

Figure 1. Proportion of Timberland Production Zone (TPZ) by Site Class in California as of 2000-2001



There are distinct differences between county-based bioregions¹ (Figure 2). The Klamath/North Coast region has 52 percent of the TPZ in the state. However, the Site Classes I and II cover only 34 percent of its TPZ acreage as shown in Table 8. San Joaquin Valley has 8,353 acres of TPZ but has the highest percentage of Site Classes I and II at 86 percent. On average, Site Classes I and II cover 37 percent of the TPZ in California.

¹ County-based bioregions are groups of counties along county boundaries to approximate as closely as possible bioregions that reflect ecosystem differences.

Figure 2. County-based bioregions



Table 8. Acreage and percentage of Site Classes I and II in Timberland Production Zone (TPZ) by county-based bioregion

Bioregion	TPZ	Site Classes I and II	Percentage of Site Classes I and II in TPZ
Klamath / North Coast	2,828,856	964,246	34
Sacramento Valley	1,069,121	563,503	53
Sierra	843,274	446,686	53
Modoc	507,582	13,016	3
Bay Area / Delta	109,003	8,382	8
South Central Coast	52,791	41	0
San Joaquin Valley	8,353	7,171	86
Mojave	-	-	
Colorado Desert	-	-	
South Coast	-	-	
Total	5,418,979	2,003,045	37

At the county level, Humboldt, Mendocino, Shasta, and Siskiyou have more than three million acres of TPZ, which account for 56 percent of the total TPZ acreage in California (Table 9). However, within these three million acres, Site Classes I and II land covers only 36 percent in these four counties. Mariposa, on other hand, has 94 percent of its TPZ in Site Classes I and II though owns only 8,775 acres of TPZ. The ratio reaches 90 percent and 88 percent, respectively, in Tulare and Calaveras counties.

Table 9. Acreage and percentage of Timberland Production Zone (TPZ) by Site Class and county

County	I		II		III		IV		V		I+II
	Acres	Percentage	Acres	Percentage	Acres	Percentage	Acres	Percentage	Acres	Percentage	Percentage
Ventura	41	100	-	0	-	0	-	0	-	0	100
Napa	-	0	19	100	-	0	-	0	-	0	100
Mariposa	1,124	13	7,093	81	557	6	-	0	-	0	94
Tulare	4,590	69	1,368	21	211	3	100	2	356	5	90
Calaveras	36,899	49	30,010	39	4,820	6	1,735	2	2,547	3	88
Amador	13,219	47	10,431	37	2,492	9	1,018	4	910	3	84
El Dorado	69,460	47	51,332	35	11,909	8	6,293	4	9,686	7	81
Fresno	678	45	535	36	121	8	-	0	172	11	81
Lake	9,015	49	5,569	30	895	5	705	4	2,355	13	79
Yuba	10,954	36	10,899	36	4,927	16	857	3	3,017	10	71
Tuolumne	32,226	38	24,924	30	14,147	17	7,754	9	4,736	6	68
Butte	28,485	18	77,573	48	40,759	25	7,659	5	7,081	4	66
Tehama	7,067	3	131,849	55	82,229	34	3,332	1	16,384	7	58
Glenn	828	4	10,762	49	8,459	39	710	3	983	5	53
Shasta	22,615	4	262,471	43	235,516	38	75,435	12	18,269	3	46
Plumas	12,625	6	86,940	39	114,371	51	9,930	4	1,083	0	44
Humboldt	10,236	1	403,689	41	476,066	48	90,314	9	2,868	0	42
Trinity	22,509	9	71,601	28	112,071	43	42,784	17	9,353	4	36
Del Norte	6,982	5	45,062	31%	41,149	28	29,487	20	23,830	16	36
Sierra	5,446	7	17,588	22%	39,613	49	15,293	19	3,069	4	28
Mendocino	26,859	3	215,218	25%	491,482	58	58,490	7	61,682	7	28
Siskiyou	9,230	2	138,276	24%	235,579	41	146,800	26	38,700	7	26
Placer	4,130	4	25,490	22%	38,471	33	13,506	12	34,386	30	26
Nevada	4,208	6	13,397	18%	27,500	37	9,334	12	20,444	27	24
San Mateo	16	0	4,796	20%	9,330	39	3,993	17	5,580	24	20
Alpine	-	0	144	13%	50	4	668	59	264	23	13
Sonoma	-	0	3,551	4%	51,664	62	21,712	26	5,892	7	4
Lassen	-	0	12,170	4%	158,195	51	112,410	36	27,343	9	4
Modoc	-	0	846	0%	67,451	34	126,857	64	2,310	1	0
Madera	-	0	-	0%	-	0	220	100	-	0	0
Santa Clara	-	0	-	0%	1,544	63	-	0	906	37	0
Santa Cruz	-	0	-	0%	52,750	100	-	0	-	0	0

Comparing public policies that strive to protect “prime” agricultural land, Sites I and II can be viewed as “prime” timberland. These are the most productive forest sites to grow wood or to attain forest structure with large trees. To the extent that these considerations are important, public policy makers may wish to think about additional forms of support to keep these lands in TPZ.

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