

The New Economies of the Redwood Region in the 21st Century¹

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Abstract

The redwood region of California has experienced a number of major land use changes over the past one hundred and fifty years. A review of recent economic trends in the redwood region suggests the emergence of three new themes. First, it appears that the transition from an old growth to a young growth redwood industry is essentially complete. Lower revenues and relatively high operating costs may reduce landowner's interest to maintain large areas of expensive real estate in sustainable forest products based operations. A continued decline in the timber-based economy will probably not be compensated by a growth in economic activity associated with redwood parks. The recreational and tourism economy of the region has been, and will continue to be dominated by the coast rather than the forests. One of the most significant economic and environmental trends is the increase in rural residential land use in redwood forests. Most of the redwood forests in four areas in four separate counties now effectively have an understory of houses and associated residential land uses. The environmental impacts in terms of altering wildlife habitats and new sources of water pollutants may be greater than those typical of current best forest management practices.

Key words: economics, land use, parks, timber, tourism

Introduction

The redwood region of California stretches from the Oregon border to scattered canyons in Monterey. The region has experienced a number of major land use changes over the past one hundred and fifty years that have significantly affected regional economies. For the first one hundred and twenty-five years, the harvesting of massive inventories of old growth redwood and associated Douglas-fir dominated the economics of land use throughout the rural parts of the region and built much of the houses in the interspersed metropolitan areas. Over the past twenty-five years, an emerging young growth based timber industry, new approaches to conserving fish and wildlife habitats, additional park acquisitions, and the expansion of rural residential land use in the redwood region signal that future economic issues will not simply be limited to the 'jobs v parks' or 'jobs v owls' debates that dominated the 1980s and 1990s. The goal of this paper is to highlight a few emerging economic trends that will have considerable importance in this century.

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Methods

To identify potential trends that could have a significant economic impact on the redwood region in the current century, a number of spatially explicit data sets were used to illustrate patterns and trends that could have increasing importance in future decades. The main data sets used are the detailed vegetation coverage (FRAP 2002), county level economic data from the 2000 Census and the California Economic Development Department, county level redwood harvest statistics, park visitor statistics, and block level data from the 2000 Census (FRAP 2003a, FRAP 2003b, U.S. Census 2000).

Results

Redwood forests occur in twelve counties of California. *Table 1* summarizes redwood area, total area and county population for the counties in the region. The redwood forest area is based on the FRAP (2002) vegetation databases and excludes interspersed areas of Douglas fir dominated stands, tanoak, other hardwoods, other vegetation types, and urban areas within what is commonly considered to be the redwood region. More than three quarters of the redwood forests are in the three northern counties—Del Norte, Humboldt, and Mendocino—while the rest of the counties have both fewer acres of redwoods and considerably larger populations. Although some of the more central and southern counties have relatively small acreage, they also have the parks with the greatest numbers of visitors and the redwood forests with the more neighbors who value them as scenic open space.

Table 1—Redwood area, total area, and population of counties in the Redwood Region.

County	Redwood acres	Total acres	Population (2000)
Del Norte	42,000	649,000	27,000
Humboldt	424,000	2,293,000	127,000
Mendocino	542,000	2,248,000	86,000
Sonoma	94,000	1,015,000	458,000
Napa	500	505,000	124,000
Marin	5,000	336,000	247,000
Alameda	500	477,000	1,443,000
Contra Costa	600	475,000	948,000
San Mateo	49,000	291,000	707,000
Santa Clara	11,000	833,000	1,682,000
Santa Cruz	114,000	285,000	255,000
Monterey	15,000	2,120,000	401,000
Total	1,297,600	11,527,000	6,505,000

Sources: FRAP 2002, FRAP 2003a, US Census 2000

With economic diversification of all local economies, it is rare for any single land use based industry to dominate the county employment patterns in the manner that was common in rural California just a few decades ago. The following table compares 2000 Census data for the major employment sectors related to redwood forests for the six counties with substantial redwood to the state as a whole. Most of the jobs in the woods are combined into the broad category of Agriculture, Forestry, and Fisheries, while sawmilling jobs are classified under Manufacturing. Construction employment is a good measure of overall residential land use expansion

and the recreational category captures jobs in the travel and tourism sectors. Not surprisingly, all the non-metropolitan counties (Del Norte, Humboldt and Mendocino) have a considerably higher percentage of their work force involved in the Agriculture, Forestry and Fisheries sector. The most surprising pattern from the 2000 Census is the relatively small size of the manufacturing employment in Del Norte and Humboldt Counties. This area historically had many large sawmills to match the large timber land base, but recent downsizing in timber industry employment has resulted in these counties now being far below the statewide average in terms of the relative role of manufacturing employment. The lack of relatively high wage manufacturing jobs and the greater distance from the San Francisco Bay regional economy are two reasons for the relatively low median household incomes.

Table 2—Sectoral employment and median household incomes for California and selected counties in 2000.

Area	Agriculture, Forestry, Fisheries	Construction	Manufacturing	Recreation & Accommodations	Median Household Income (2000)
	-----percent-----				
California	1.9	6.2	13.1	8.2	\$ 47,493
Del Norte	6.2	5.4	4.4	13.0	\$ 29,642
Humboldt	4.9	5.8	8.7	9.8	\$ 31,226
Mendocino	7.1	7.9	10.1	12.0	\$ 35,996
Sonoma	2.6	8.5	12.7	7.9	\$ 53,076
Santa Cruz	4.4	7.9	12.4	8.6	\$ 53,998
San Mateo	0.4	6.2	10.3	7.4	\$ 70,819

Source: US Census 2000

It is important to note that the economic data captured in the 2000 Census were a relative high water mark in the larger economic cycles. Focusing on annual data for the three counties where economic activity related to redwood forests is not overshadowed by much larger economic factors illustrates the trends over a whole decade. There was continuous improvement from 1991 to 2002 in the total number of jobs and a decline in the overall unemployment rate. Since then, there has been a slight increase in the unemployment rate.

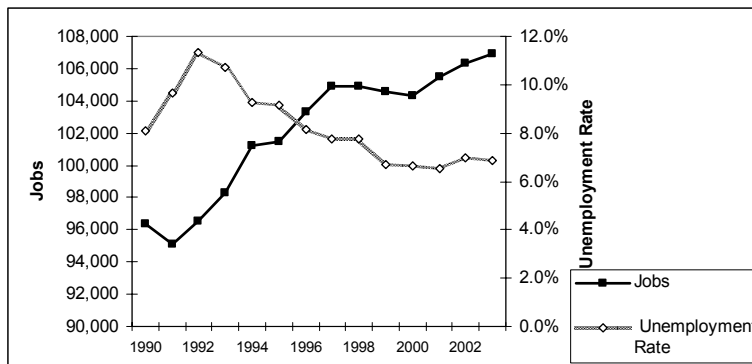


Figure 1—Jobs and Unemployment Rates for the combined Del Norte, Humboldt and Mendocino region, 1990 to 2003. Source: California Economic Development Department 2004

Current redwood harvests now are less than half of the levels seen twenty five years ago (*fig. 2*). It is often assumed that the redwood timber harvests will occupy a progressively smaller portion of all local economies. A more detailed review of harvest levels suggests a different interpretation. *Figure 2* shows that nearly all the decline in the overall redwood harvest is due to the decline in the volume of old growth redwood harvests. Young growth harvests, on the other hand, have been relatively stable for twenty five years with most of the variation due to changes in market prices. In 1999, the Board of Equalization stopped using different harvest value schedules for old growth and young growth due to the declining volumes of old growth. The harvest declines over the past five years are partly related to lower prices compared to the high levels of 1999. The harvest declines have had noticeable impacts on employment levels within the industry.

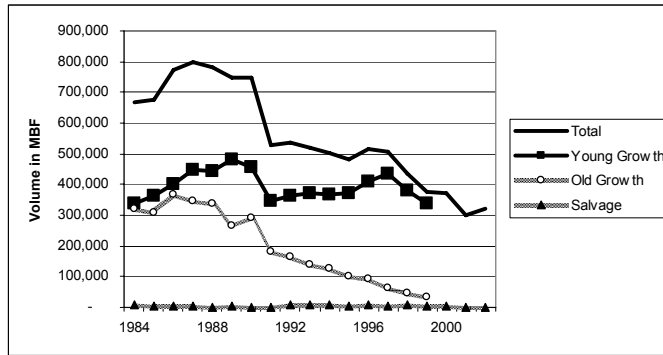


Figure 2—Total, Young, Old, and Salvage Harvest Trends for Redwood, 1984- 2002. Source: Board of Equalization 2004

Within the larger region, employment within the redwood timber industry is a substantial fraction of the county economy in Del Norte, Humboldt, and Mendocino. *Figure 3* shows job numbers for three sectors related to redwood forests from 1990 to 2003. While employment in sectors related to tourism have been relatively stable since the 1996, employment in the wood product manufacturing and natural resources sectors have declined significantly.

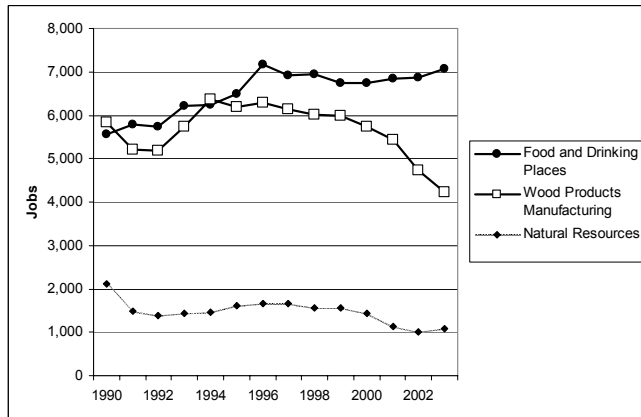


Figure 3—Forest-related employment in Del Norte, Humboldt and Mendocino counties from 1990 to 2003. Source: California Economic Development Department 2004

Since the expansion of Redwood National Park in the 1970s, increases in park visits and related tourism has been counted on to reduce the negative employment impacts of reduced timber harvests. In most cases, the increase in redwood park tourism has not matched increases in statewide tourism. The following data suggest two possible factors for the divergence between redwood-specific tourism and overall tourism. *Figure 4* shows use trends for 16 State beach parks and 13 State redwood parks in Mendocino, Humboldt and Del Norte Counties from 1991 to 1999. While both types of parks have millions of visitors, since 1991, the redwood parks experienced a 13 percent decline in visits while beaches experienced a six percent increase.

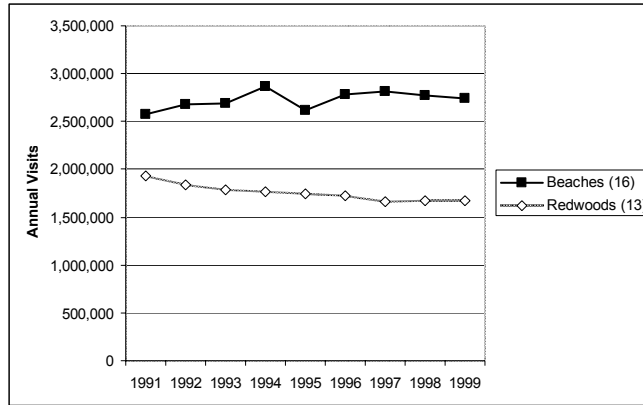


Figure 4—State Park Visits to Redwood and Beach Parks in Del Norte, Humboldt, and Mendocino counties. Source: FRAP 2003b

Table 3 compares use data for a number of redwood parks across the larger redwood region during the 1990s. One of the most significant relationships is the much higher use levels in the parks in close proximity to the populated San Francisco Bay Area.

Table 3—Visits, area, use intensity, and distance from the San Francisco Bay Area for major redwood parks.

Park	Acres	Annual visits	Visits/Acre	Distance from San Francisco
Muir Woods	549	1,311,000	2388	20
Armstrong Redwoods Samuel P. Taylor	780	200,000	256	80
Henry Cowell Redwoods	2,792	187,000	67	40
Big Basin	4,376	292,000	67	50
Jedidiah Smith	17,478	907,000	52	40
Del Norte Coast Redwoods	10,165	177,000	17	130
Humboldt State Redwood	6,325	84,000	13	380
National and State Park	53,672	637,000	12	210
	80,665	401,234	5	340

Source: FRAP 2003b

Figure 5 compares the increasing number of visits to the seven redwood state parks near the San Francisco Bay Area to the decreasing number of visits to the 13 redwood state parks in the Mendocino, Humboldt and Del Norte. This trend corresponds to California-wide trends of increases in day use of parks near metropolitan areas compared to flat or declining use patterns for more remote parks (FRAP 2003b). From an economic perspective, the major conclusion is that visitation and tourism related employment for redwood forests will continue to be an important aspect of our redwood forests but will probably not be an economic growth sector for areas not close to the San Francisco Bay Area.

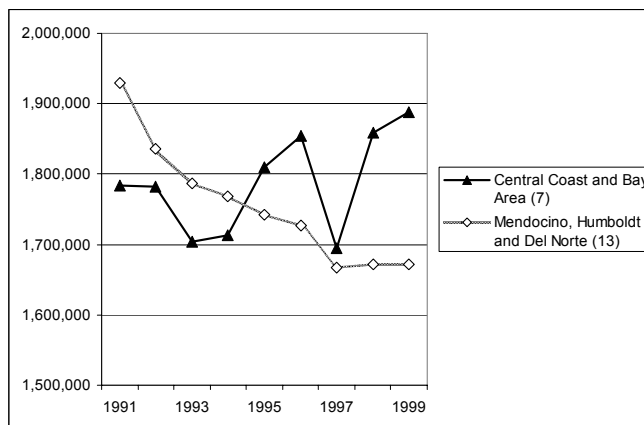


Figure 5—Redwood State Parks Visits for Metropolitan (Central Coast and Bay Area) and Non-metropolitan regions.

In comparison to declines in overall redwood timber harvests and park visits in the northern end of the redwood region, a very different trend is the significant increase in the area of redwood forests that also have an understory of houses. Table 4 summarizes an overlay of 2000 Census block population densities with redwood forest area. Approximately 17 percent of the total redwood vegetation type is now in census blocks where there is at least one house per 40 acres. While these housing densities will often have limited impact on the number of trees per acre (a single house typically covers a quarter acre, 100 feet by 100 feet, with the main building, immediate driveway and irrigated yard) they do signify a shift in land use away from unfragmented forest management towards a mix of forest management and residential land use parcels. Nearly all of the residential lands are concentrated in four distinct areas. The most unique county is Santa Cruz, where over half of all the redwood forests in Santa Cruz are also part of the rural residential landscape. As figure 6 illustrates, the same pattern exists in the Russian River region of Sonoma, the Mendocino to Fort Bragg region of Mendocino County, and the Humboldt Bay region of Humboldt County.

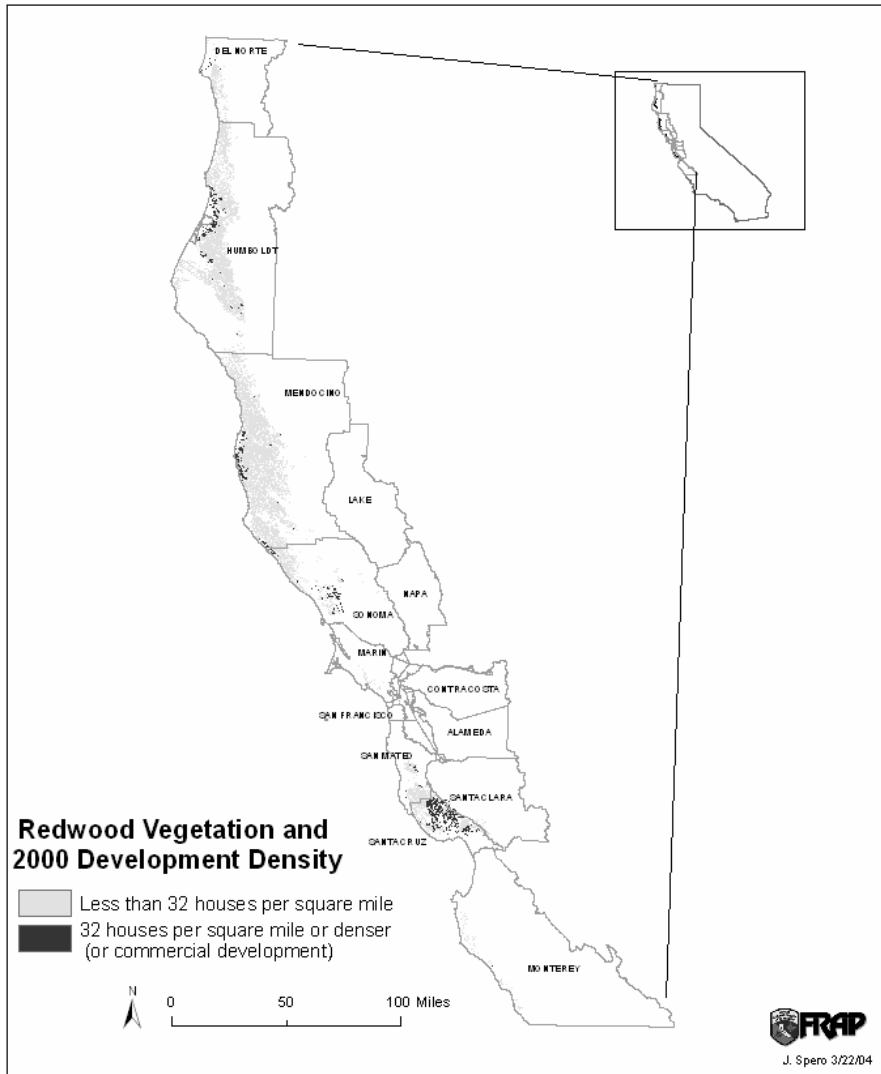


Figure 6—Residential housing densities in the redwood vegetation types.

Table 4—2000 Census based analysis of average residential parcels in the redwood region.

Total acres	County	Average Parcel Size based on 2000 Census block data				
		> 1/40	1/40- 1/20	1/20- 1/5	1/5 - 1/1	< 1/1
541,959	Mendocino	490,717	33,233	16,573	1,426	10
424,216	Humboldt	356,786	36,987	25,751	3,287	1,406
114,252	Santa Cruz	48,697	5,795	52,233	6,351	1,176
93,482	Sonoma	64,114	15,538	9,590	3,976	264
123,501	Others	111,106	3,138	7,240	1,927	89
1,297,410	Total	1,071,419	94,691	111,388	16,966	2,945
	Percent of total	83	7	9	1	0.2

Sources: FRAP 2002, US Census 2000

During the 1990s, significant shifts towards smaller lots occurred in four counties. *Table 5* shows that from 1990 to 2000 relatively few acres reached urban densities of more than one house per acre, but that the total acreage that moved into the rural residential category of more than one house per forty acres was more than the total acreage of new park acquisitions during the same period. *Table 6* shows the same data as a percentage of total acres in the counties. Santa Cruz had the largest percentage change, but the changes in the much larger county of Mendocino affected three times as many acres.

Table 5—1990 to 2000 change in redwood acreage at different housing densities.

		Average Parcel Size based on 2000 Census block data				
Total acres	County	> 1/40	1/40 to 1/20	1/20 to 1/5	1/5 to 1/1	< 1/1
541,959	Mendocino	-32,223	32,190	25	0	7
424,216	Humboldt	-13,504	11,658	1,502	-554	897
114,252	Santa Cruz	0	-12,311	12,244	-381	447
93,482	Sonoma	-3,170	991	1,611	568	0
123,501	Others	-54	-383	183	242	12
1,297,410	Total	-48,952	32,146	15,565	-124	1,364

Sources: FRAP 2002, US Census 2000

Table 6—1990 to 2000 percentage change in redwood acreage at different housing densities.

		Average Parcel Size based on 2000 Census block data				
Total acres	County	> 1/40	1/40 to 1/20	1/20 to 1/5	1/5 to 1/1	< 1/1
		-----percent-----				
541,959	Mendocino	-6	6	0	0	0
424,216	Humboldt	-3	3	0	0	0
114,252	Santa Cruz	0	-11	11	0	0
93,482	Sonoma	-3	1	2	1	0
123,501	Others	0	0	0	0	0
1,297,410	Total	-4	2	1	0	0

Sources: FRAP 2002, US Census 2000

Conclusion

A review of recent economic trends in the redwood region suggests the emergence of three new themes that will have major impacts on the future of redwood forests. First, it appears that the transition to a young growth redwood industry is essentially complete. Most of the major land owners also have forest management plans that include institutional arrangements to address fish and wildlife habitats, biodiversity, and watershed restoration investments. Habitat conservation plans, third party certification, and conservation easements are some of the institutional arrangements that can bring stability to long term forestland ownership and ensure sustainable management practices. However, continued decline in the amount of high value, very large redwood logs and relatively high operating costs required by California’s overlapping regulatory systems (Dicus and Delfino 2003) may reduce landowner’s interest to maintain large areas of expensive real estate in sustainable forest products based operations.

A continued decline in the timber-based economy will probably not be compensated by a growth in economic activity associated with redwood parks. Unlike visits to beach parks, visits to redwood parks declined in the 1990s in the non-

metropolitan counties. Statewide, there are many indications that the benefits of day use and associated open space values will continue to increase where the forest is in close proximity to large population centers. However, shorter trips by local residents will not generate the level of jobs associated with overnight visitors.

One of the most significant trends is the increase in the extent of rural residential land use in redwood forests. Most of the redwood forests in four areas—most of Santa Cruz county, the Russian River region in Sonoma, the Fort Bragg to Mendocino region of central Mendocino coast and the southeast side of Humboldt Bay in Humboldt county—now effectively have an understory of houses and associated residential land uses. The environmental impacts in terms of altering wildlife habitats and new sources of water pollutants may be greater than those typical of current best forest management practices. In addition, there will be new economic costs associated with environmental mitigations, increased public safety requirements, and increased residential infrastructure requirements.

References

- California Board of Equalization. 2004. **California timber harvests by county 1993 to 2002**. Available at <http://www.boe.ca.gov/proptaxes/pdf/ytr3692to01.pdf>
- California Economic Development Department. 2004. **2000 Census – demographic profiles**. Available at <http://www.calmis.cahwnet.gov/htmlfile/subject/DP2000.htm>
- Dicus, C.A.; Delfino, K. 2003. **Comparison of the California forest practice rules and two major certification systems**. Technical report to the California Forest Products Commission.
- Fire and Resource Assessment Program (FRAP). 2002. **Multi-source land cover, v02_1**. Sacramento, CA. Available at <http://frap.cdf.ca.gov/projects/frapgisdata/select.asp>.
- Fire and Resource Assessment Program (FRAP). 2003a. **The changing California: forest and range 2003 assessment: assessment summary**. See <http://www.frap.cdf.ca.gov/assessment2003/>
- Fire and Resource Assessment Program (FRAP). 2003b. **The changing California: forest and range 2003 assessment: wildland outdoor recreation assessment**. See http://www.frap.cdf.ca.gov/assessment2003/Chapter6_Socioeconomic/recreation.html
- U.S. Census Bureau. 2000. **Summary file 1**. Web site accessed April 22, 2003. See <http://www.census.gov/Press-Release/www/2001/sumfile1.html>