C I N T R A F O R

Working Paper

32

The Future Supply of Timber from Public Lands: Recent Sales Will Not Support Competitive Processing

1991

John Perez-Garcia

Bruce Lippke

CENTER FOR INTERNATIONAL TRADE IN FOREST PRODUCTS
UNIVERSITY OF WASHINGTON
COLLEGE OF FOREST RESOURCES AR-10
SEATTLE, WASHINGTON 98195

WORKING PAPER 32

THE FUTURE SUPPLY OF TIMBER FROM PUBLIC LANDS: RECENT SALES WILL NOT SUPPORT COMPETITIVE PROCESSING

John M. Perez-Garcia

Research Assistant Professor

and

Bruce R. Lippke

Professor and Director

CINTRAFOR

College of Forest Resources AR-10

University of Washington

Seattle, Washington 98195

25 February 1991

SUMMARY

Starting in late 1988, environmental litigation had a major impact on US Forest Service's timber sales from Westside Region 6 (the Pacific Northwest). Currently, the prices for most of the timber sold but not yet cut are above the price level that can be expected to be competitive in the market for the foreseeable future. In combination with a declining trend in softwood lumber demand, Pacific Northwest mills are facing a period of negative growth and restructuring. The reduction in forest industry output and the negative regional economic impact will be considerably greater than that being caused by the reduced harvest from spotted owl conservation. The quantity of uncompetitive timber is substantial. Between 1.5 and 3 billion board feet of the US Forest Service (USFS) inventory from Westside Region 6 is currently uncompetitive. Related problems exist on Bureau of Land Management (BLM) and state sales that will add to this volume.

Even though changes in contract terms were introduced after the timber buyout legislation in 1984, a setting for massive defaults on contracts has occurred again for the second time in just ten years. The social and economic costs associated with these problems are substantial, including lost revenue for the public sellers, bankruptcy losses by the processors and customers of the public sellers, substantial litigation costs, regional tax revenue losses, increased public assistance costs, and substantial costs to final consumers.

The current mechanisms in the timber sale contracts--stumpage adjustment clauses and early harvest discounts--have not prevented harvest price speculation and the occurrence of uncompetitive timber sales. Speculative or desperation bidding, as a result of the environmental litigation, has resulted in contracts for timber that will generate economic losses if the timber is harvested. Substantial increases in product prices would be needed to make these contracts competitive, which does not seem likely in the near future. A quick resolution of the current problems can reduce the magnitude of these negative impacts. More fundamentally, it needs to be recognized that the mechanics of current contracts are not conducive to making regional suppliers competitive or

to allow stable marketing relationships with their customers, fundamental parameters in fostering a healthy and sustainable economic environment. Policy changes are required both for relief of the current problem and for the long term benefit of public sellers, producers and consumers.

INTRODUCTION

Recent studies on the economic impact of spotted owl conservation (Lippke et al., 1990) noted that the increased bid prices on USFS timber sales may exceed that which would allow mills to economically process much of the timber under contract. This paper analyzes the changes in bid prices and whether the observed increase will surpass the predicted future price levels that would allow mills to make an economic return processing these contracts. Future market prices are predicted to remain lower than the historically high levels that occurred in the late 1970's, well below the average bid price of some recent sales. With competitive harvest prices below bid prices, one consequence could be a series of contract defaults similar to those that occurred in the early 1980s and resulted in the Federal Timber Contract Payment Modification Act (16 USC 618) of 1984 (GAO, 1989). As a result of the very high regional bid prices, competitiveness declines as increased local log costs for mills reduce profit margins while little impact is felt in national and international product markets.

The occurrence of defaults on volumes under contract depends on several factors. For one, there needs to be a significant amount of "higher-priced" timber in the remaining volume. The proportion of the remaining volume that is priced above an economically viable harvest price needs to be great enough that sufficient alternative "lower-priced" timber is not available and that mills cannot ride out a period of temporarily low product prices. That is, there needs to be a substantially long period of product prices below a level that would allow the current bid prices of timber under contract to be competitive. High bids on timber occur because bidders expect a short supply of timber relative to the expected future demand for and prices of lumber and plywood. Recent litigation impacting USFS timber sales and spotted owl preservation have raised the expectations of a short supply of timber in

the Pacific Northwest. However, with a general weakening of the economy, lumber and plywood demand are not expected to be sustained at levels that would require peak levels of production allowing the higher-priced timber to be harvested.

In view of the likelihood that lumber prices, and hence competitive stumpage prices in the supply regions, will not increase to levels necessary for the harvest of recent sales, it is important that policy makers understand the problems that the higher-priced timber from public land are likely to create and whether mill owners can anticipate these problems or manage them. The role of policy makers in stabilizing the economic harvest from public lands, and consequently the economic impact, goes considerably beyond national forest harvest and spotted owl conservation plans.

This paper analyzes some of the characteristics of timber under contract from USFS Westside Region 6 and recent changes that have occurred. The objectives of the paper are to demonstrate (i) the potential for the recurrence of defaults on over-priced timber under contract, (ii) some of the problems associated with higher-priced volumes, and (iii) likely courses of action that may alleviate these problems.

ORIGINS OF UNCOMPETITIVE TIMBER VOLUMES

The economic inventory of timber on public land is the remaining volume under contract. It represents a stock of timber that mills draw upon to produce lumber and plywood. As recent as 1987, the stock of timber under contract from USFS lands in the region contains about 60 percent of the total public inventory. This stock was supporting about one-fifth of the total log supply in the region.

The characteristics of the volume under contract vary as new timber is sold, cut, defaulted, or the sale expires or is canceled. Both the amount of timber volume under contract and the price of the remaining inventory -- the cost to the contract owner of harvesting the timber remaining under the contract -- change. Additionally, since the initial bid prices are now adjusted for changes in the

product prices, the value of remaining timber under contract also changes due to fluctuations in product prices.

In recent years timber sale volumes for the Westside region have declined and their bid price have increased. Figure 1 presents the changes in the volume of USFS timber sales under contract by bid

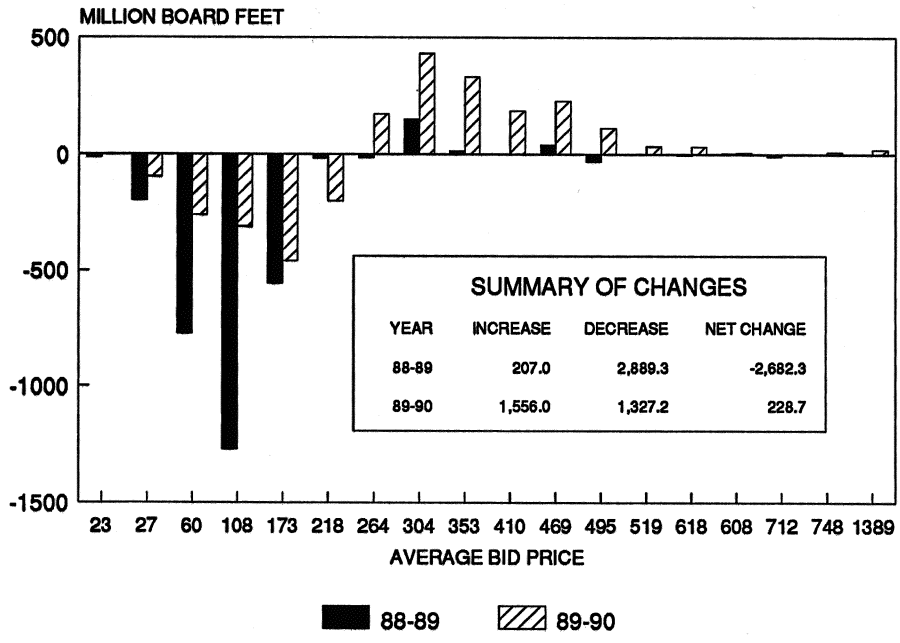


Figure 1: Low price sale volume dropped in 1988-89; higher price volumes increased in 1989-90

price categories that have occurred during the last two years.[1] These sale volumes under contract represent the original estimated timber volumes of all active sales. The figure illustrates large declines in the low bid price categories in 1988-1989 and the addition of higher price volumes in 1989-1990. The reason for these changes are several and include adjustments made during the year for sales that are defaulted, expired and canceled. They also include changes to the original

[1]The data used in the present study is from Timber Data Company. These data are for USFS Westside Region 6. The most recent data available for 1990 were for third quarter. For comparison purposes, data for 1989 and 1988 are also for the third quarter period.

bid prices prompted by the stumpage adjustment clause as product prices increased. However, the reduction in the volume of low bid sales and the increased bid prices that occurred in the more recent sales are responsible for a large portion of the changes.

In 1989 total sales volume under contract declined 2.7 billion board feet (bbf) from a total of 8.4 bbf in 1988. We attribute the majority of this reduction to the lower sales rate as environmental litigation prevented the normal rate of USFS sales. The reduction also includes the volume that is associated with expired, defaulted or canceled sales between the third-quarters of 1988 and 1989. The decline represents a thirty-two percent drop in volume sold under contract. The decline was primarily in timber with an average bid price of $173 per mbf or less. Figure 1 also illustrates an increase of nearly 150 million board feet (mmbf) of stumpage at an average price of $304/mbf in sold volume. Sales at much higher average prices comprise the remaining increase in total sale volume remaining under contract.

In 1990 total volume in sales remaining under contract increased slightly, about four percent, to nearly six bbf as sale levels slightly exceeded reduced harvest levels. A higher sales rate resulted from federal legislation in October of 1989 introduced as Section 318 of the Interior Appropriation Bill by Adams and Hatfield that mandated a USFS harvest of 7.7 bbf for 1990. It is worth noting that the increased sales rate was not sufficient to restore the volume of sales under contract to previous average levels, even though the sale volumes under contract stopped declining. In 1990 the sale volumes under contract of higher-priced timber increased, while lower-priced volumes continued to decline. Although total volume under contract was nearly the same as in 1989, overall, higher-priced timber sales replaced the lower-price timber that was economically competitive for processing and hence harvested. Nearly one-quarter of the total timber under contract in 1990 was replaced by the sale of higher-priced timber (stumpage with an average price greater than $218/mbf), all other things equal.

Figure 2 describes the changes that occurred when remaining volume is subtracted from sales volume under contract. For the most part, this difference reflects volumes harvested, but also includes the changes that have occurred in the sales and remaining volumes as noted above (i.e. expired, canceled or defaulted sales). In summary, these "harvested" volumes declined in 1989 and 1990, due primarily to the combined impact of a decrease in the volume sold, a reduction in the inventory of lower-priced timber and defaulted or expired sales.[2] The reduction in sales in 1989 did not result in an immediate reduction in harvest, as there was sufficient competitive volume remaining in the prior uncut inventory. Restoration of the sale rate in 1990 did not result in an increase in the harvest as less of the remaining inventory was competitively priced based on current markets.

The value of removed volume in 1989 increased as harvest of lower-priced timber declined and higher-priced timber was removed.[3] As the stock of lower-priced timber under contract was depleted, harvest began to occur in the higher-priced volumes. Increases in the harvest of higher-priced timber totaled 17 percent of all the volume cut. The higher-priced timber volume is a portion of the nearly 900 million board feet of sale volumes bid prior to 1982 in USFS Region 6. These contracts were due to expire in 1989 and 1990 (GAO 1989). Although total harvest in 1989 was down from 1988 by half a billion board feet to 2.7 bbf, it still reduced the uncut inventory by nearly 50 percent, primarily an impact of the decline in USFS sales.

In 1990, volume removals declined nearly one billion board feet to 1.7 bbf. This harvest consumed thirty percent of the uncut inventory in 1990. The year 1990 saw a continuation of the reduction in the harvest of lower-priced timber as the uncut inventory tightened, while a negligible increase in the harvest of higher-priced timber occurred. Among other factors, scarcity of the lower-priced timber explains the reduced harvest for 1990.

---

[2]"Harvest" is taken to contain cut volumes as well as volumes from sales that were defaulted, expired or cancelled. It can easily be replaced by the term "removed from sale volumes under contract" and should be interpreted as such.

[3]A portion of the increase in the value of the removed volume is attributed to the increase in the product price index promoting a shift in the value of the sales volumes.

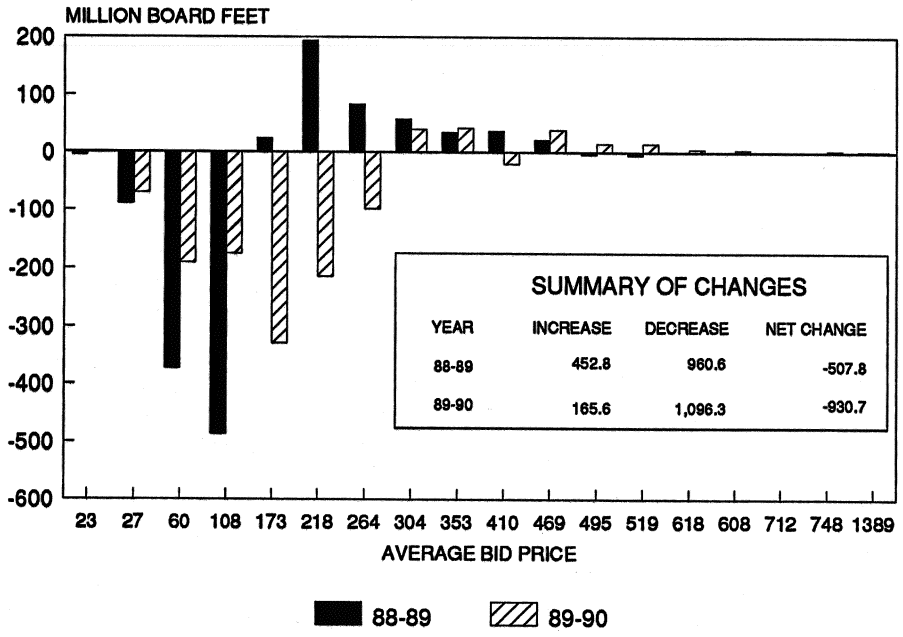


Figure 2: The rate of harvest declined as the volume in lower priced contracts decreased.

Figure 3 presents information on changes in remaining uncut volume, i.e. the economic inventory of public timber. Remaining volume is defined as the volume in contracts awarded that have not been harvested, expired, defaulted or canceled. This figure reiterates the changes already discussed above: that is, lower-priced timber has been replaced by higher-priced volumes. Much of the lower-priced timber was removed from the remaining volume in 1989. Without new sales of lower-priced timber to replace this removal, the net change was to increase the average value of the remaining uncut volume.[4] Much of the increase in the higher-priced timber volumes occurred in 1990, as timber removals continued to decline, but the volume of USFS sales of higher-priced timber rebounded.

[4]Note that in a period of rising product prices, sales of lower-priced timber cannot occur. One of the characteristics of the bid process is that these bids are pegged to the regional product price index.

A more intuitive representation of the remaining uncut volume, and a useful introduction to the analysis to be presented in the third section, is a graph of the cumulative remaining volumes and their price categories as shown in Figure 4. This figure presents the total cumulative remaining volume under contract as a function of bid price for the third-quarter data for 1988 through 1990.

The curves show the movements as described above. The 1988 curve shows larger volumes available at prices far below that in both the 1989 and the 1990 curves. Figure 4 also illustrates the decrease in remaining volume observed in 1989 and the rebound in 1990 as the sales rate increased but the harvest rate declined as a consequence of the reduction in the lower priced inventory. Finally, the figure represents the increase in the value of the remaining volume as depicted by the area under each curve.

NATIONALLY COMPETITIVE STUMPAGE PRICES WILL NOT SUPPORT HARVESTING RECENT TIMBER SALES

Much of the concern over the possibility of renewed default on timber sales rests on the future course of stumpage prices. If stumpage prices in the competitive supply regions increase sufficiently, much of the volume under contract can be harvested without incurring any economic loss. On the other hand if the equilibrium stumpage price does not increase, then the higher-priced stumpage will not be cut and defaults are likely to occur.

A second point to consider is the dramatic increases in the bid prices that have occurred in recent timber sales. These speculative bids have taken place even though product prices have risen at a much slower rate. Product prices increase at a slower rate than bid prices formed under speculation because the product prices respond to national trends in housing starts and other national economic indicators. Bid prices, on the other hand, respond to local supply conditions. Given the occurrence of these high bid prices and the future decline of product prices, mills will not be able to cover the log

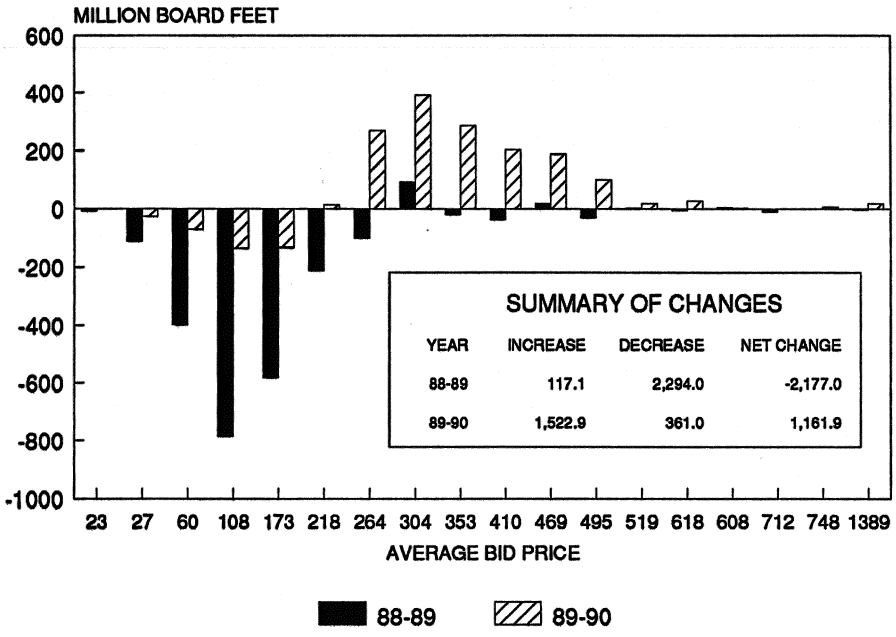


Figure 3: Value of remaining volume increases with greater high-priced contracts in 1990

costs associated with the excessive bid prices. Profit margins are already likely to be negative with the high bids that have been evident in recent sales.

The present study utilizes the stumpage price forecast provided by the global trade model (see Cardellichio et al., 1989) to analyze the future prospects of harvesting USFS timber under contract. The advantages of using the global trade model are that (1) public timber supply is based on the cut-to-inventory and past stumpage prices and (2) international price effects are considered within the model as the supply and demand for stumpage change in a region. In the global trade model, as in other models, end-use factors determine demand-driven prices. Prior studies have estimated the demand for lumber and plywood. These studies have utilized housing starts as the demand indicator. The demand for lumber products in the US is predicted to increase nearly 15 percent by the end of the century. Plywood demand is expected to increase nearly eight percent.

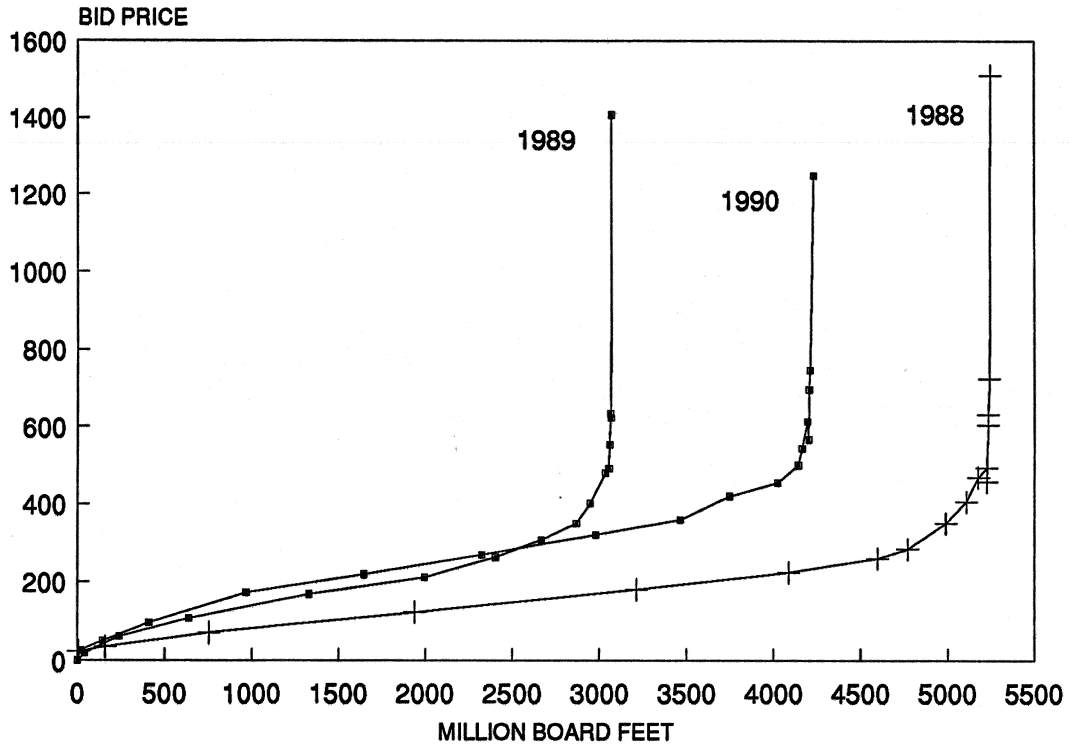


Figure 4: Total volume remaining increased in 1990 but at higher prices

Figure 5 presents the stumpage price series as predicted by the global trade model. The base case results indicate that a stable stumpage price level is likely to occur during the remaining decade after a slight increase.[5] It also indicates that stumpage prices are not likely to trend above $162 per mbf (in 1988 dollars).

Figure 5 also indicates stumpage price movements with the effects of the spotted-owl conservation program. Since the global trade model contains supply equations for both the public and private sectors, the impact of the spotted owl litigation was estimated by reducing the percent of timber sales from public lands by 44 percent in the Pacific Northwest region. This percentage was derived from sales information presented in Warren (1990). As expected, stumpage prices increase relative to the base case, but then remain stable for the rest for the decade. The results indicate that

[5]See Cardellichio, *et al.*, (1989), for a description of the base case results.

stumpage prices are not likely to surpass $172 per mbf given the impact of the spotted-owl conservation program.

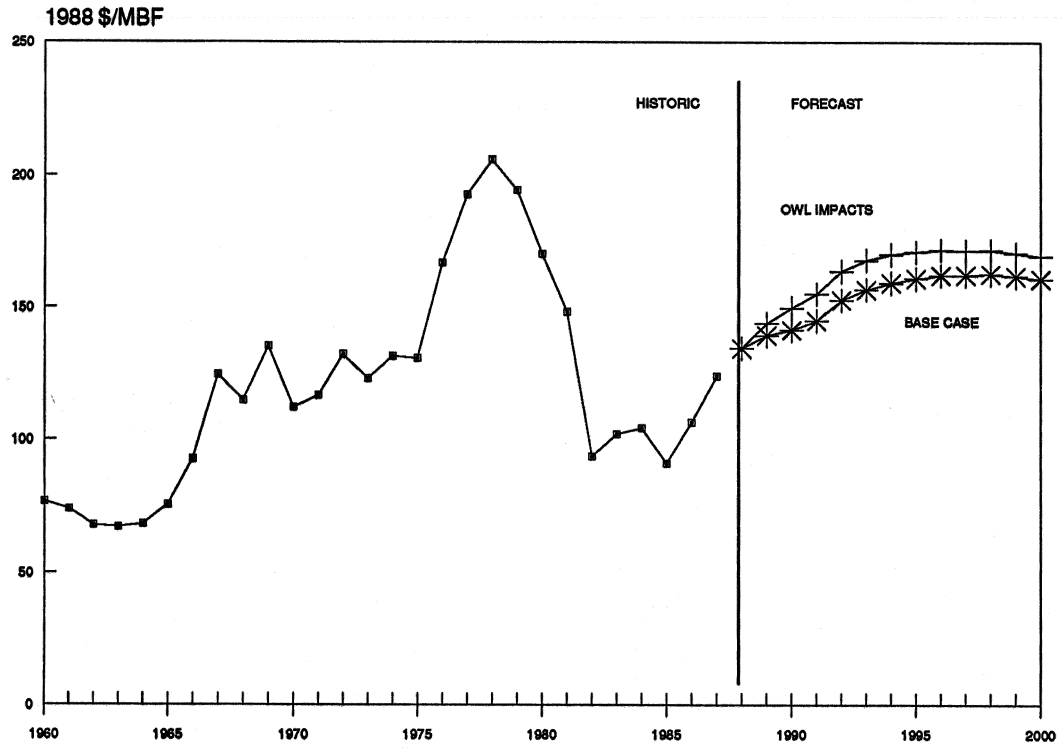


Figure 5: Predicted prices are up in trend but not to late '70's peak level

A second possible impact on stumpage prices may arise from the restriction of log exports from Washington State lands. These trade restrictions, however, will tend to decrease regional stumpage prices as domestic supply increases. Hence, an upper bound of $175 per mbf seems reasonable to use in the analysis of the future feasibility of near term harvests from USFS inventory.

An alternative shorter term justification for competitive stumpage prices under $175 is to note that the decline in US housing markets seems likely to be a greater percentage than the decline in North American timber supply caused by spotted owl conservation, at least over the next several years and beyond the normal contract period for timber sales. This suggests that for the near future, competitively-priced timber will not be significantly above the prices observed prior to the recent price

increases even if they are adjusted for inflation. As a consequence, it appears that in order for competitive stumpage prices to rise above $175, a very substantial US housing recovery in concert with strong international demand is required. Neither seems likely until well beyond the period covered by timber under contract.

UNCOMPETITIVE TIMBER VOLUME IS LARGE

Figure 6 presents the economically feasible remaining volume given a projected stumpage price of $175 per mbf. The top portion of the figure is a replication of Figure 4 with the addition of the projected stumpage price of $175 per mbf. The intersection of the stumpage price line and the cumulative volume curves for each year defines the economically competitive remaining volume. It is the line that defines competitively- and non-competitively-priced timber volumes. The lower portion of Figure 6 clearly illustrates the amount of remaining volume that is below and above the economically competitive stumpage price. This portion of the figure demonstrates the decline in lower-priced timber volumes and the associated increase in timber volumes of higher bid prices. Timber volumes with a stumpage price lower than $175 per mbf decline from 3.2 bbf in 1988 (third-quarter) to less than one bbf in 1990 (third-quarter). At the same time higher-priced timber volumes increased 1.2 bbf from 1988 to 3.3 billion in 1990 (third quarter). The high bid prices observed in 1990 are probably above the competitive stumpage price levels even given the bid price adjustments provided by the stumpage adjustment clause. Hence, between 1.5 and 3.2 bbf may be considered to generate economic losses to mill owners if they decide to implement these contracts.

DISCUSSION OF IMPACTS: REGIONAL DIFFERENCES IN STUMPAGE MARKETS VERSUS NATIONAL DEMAND

Recent data on USFS inventory indicate that the amount of timber in remaining volume that can be harvested economically has declined to less than one-quarter of the total remaining volume (as of

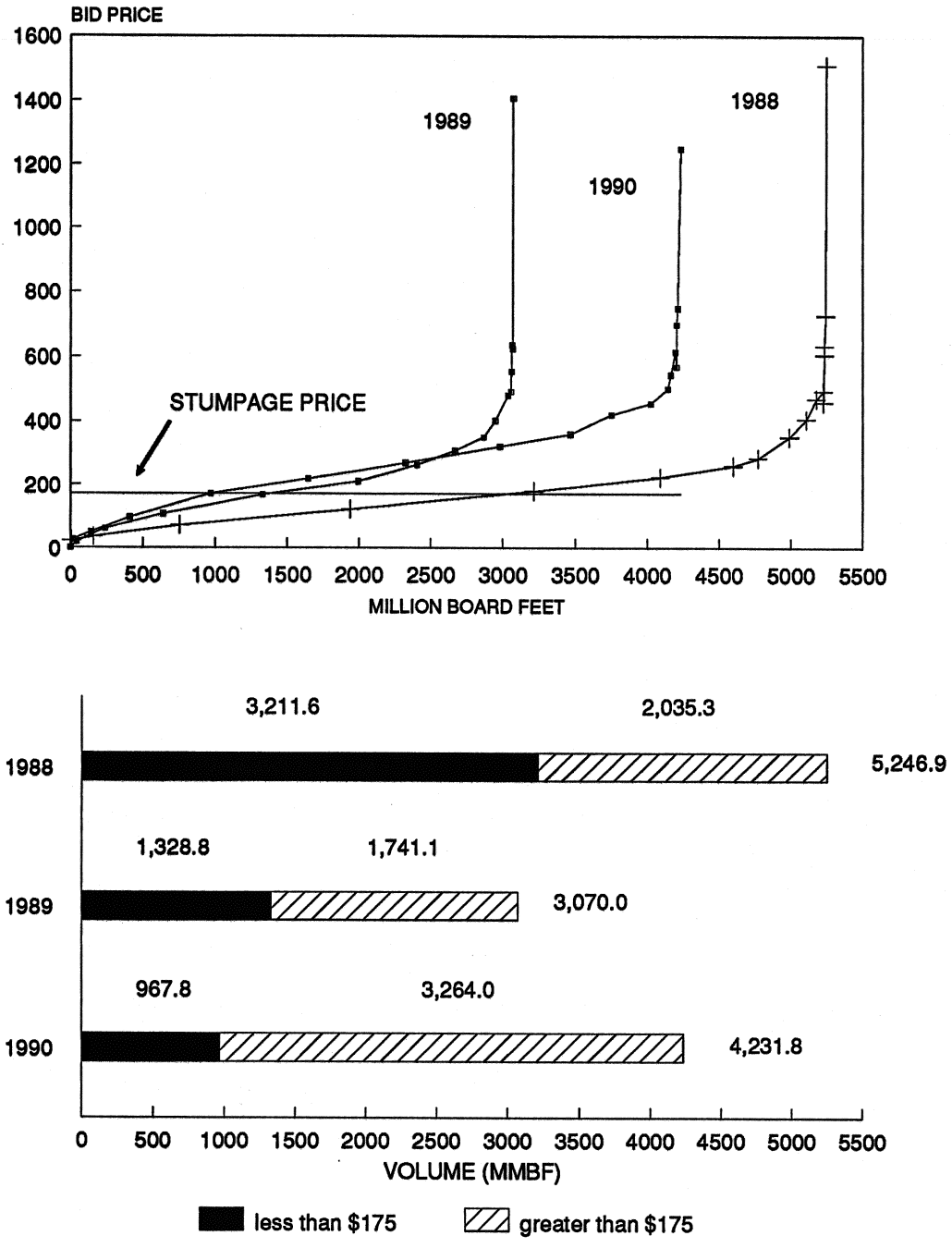
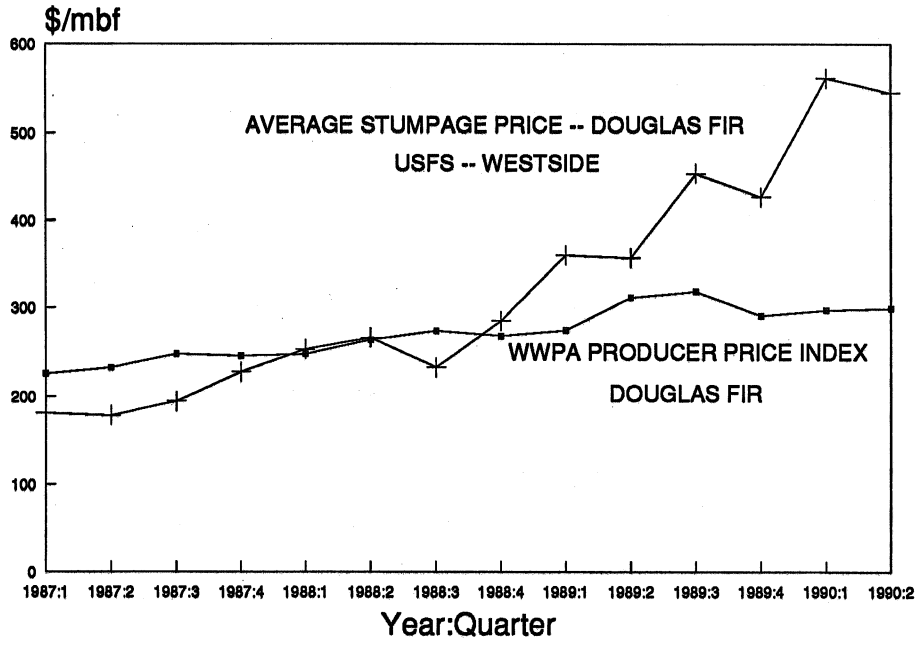


Figure 6: Remaining volume at predicted stumpage price down substantially

third-quarter 1990). This timber represents less than one bbf, roughly 60 percent of the harvest in 1990 (from third-quarter 1989 to third-quarter 1990) and less than one-third of the harvest from third-quarter 1988 to third-quarter 1989. Given the low probability of market conditions that will justify high stumpage prices in the near future it appears that most stumpage above $175 per mbf will not be economical to harvest. Only a very small volume of the total sales volume is composed of highly valued species and quality that will sell much above the market averages.

As a result of speculative bidding for public timber, the competitiveness of Northwest mills has decreased relative to other regions. Figure 7 illustrates how recent average bid prices for the USFS Westside Region 6 have grown much faster than product prices. This price difference, from which profit margins are determined, indicates that much of the recent sale volumes will generate economic losses if harvested with current or projected product prices. In comparison, stumpage prices for the southern region have maintained its growth similar to product price growth rates.

Assuming that these results hold, what are the implications for the future timber supply from USFS lands in the Pacific Northwest? As stated in the beginning, the USFS is one source of timber that is utilized by mills to supply their needs. If timber from the USFS is the only source for the mill then it appears that these mills may not survive economically processing high-priced timber volumes. Also, if these mills have already been weakened by the previous high-priced timber harvests, of which several hundred million board feet remain, then an additional period of reduced profits would severely undermine their economic stability and regional competitiveness. Mills that have a diversified source of logs may not be affected as severely. Their ability to ride out the period of low stumpage prices depends on the price of other log sources. It appears that most of the USFS timber under contract may not be harvestable within the period stipulated under contract. Unless mills are willing and able to absorb losses with the higher-priced timber, there will be defaults on most of the timber under contract.



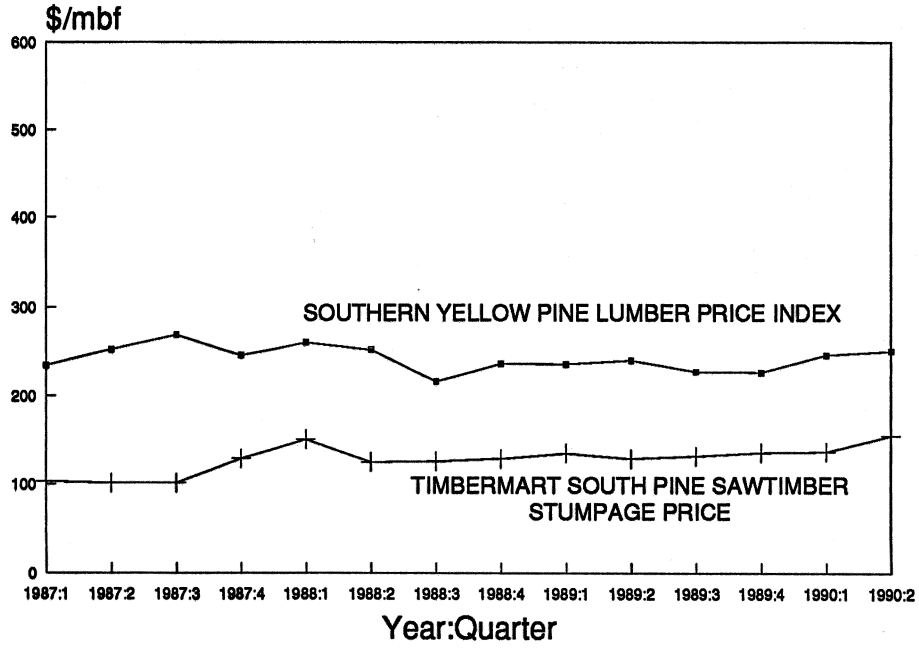


Figure 7: PNW bid prices grew substantially relative to prices in other regions

The expected reduction in USFS sales due to spotted owl conservation plans are not the only significant impact on the level of competitive production from Northwest mills. The contract mechanisms used on the sale of most public timber have resulted in the possibility of large volumes of the available timber that are not constrained by owl conservation becoming tied up at uncompetitive prices and extended default litigation. We can expect a 1.5 to 3 bbf decline in harvest spread over the next year or two as a consequence of the USFS sales alone, with related sales impacts on both BLM and state lands. About 60 percent of the public sales inventory derives from USFS sales with the remainder coming from BLM and State sales that are impacted by the same general market conditions.

What would be the impact of USFS defaults on overall Westside timber supply? Figure 8 shows both the contribution of the USFS and the Bureau of Land Management to the public harvest. In recent years, public lands have supplied nearly 35 percent of the logs produced in the region. BLM and state harvest levels exceed the harvest levels on USFS lands, even though the majority of sold contracts are USFS. The USFS is the most important single public contributor in the region providing one fifth of the volume of logs supplied to the mills. Comparing the private and public sector contributions illustrates that reducing the contribution of public supply of timber would affect stumpage prices in the region.

The inclusion of BLM and state sales into this analysis would only increase the magnitude of the problem of uncompetitive timber sales contracts, exacerbating the adjustment process for Northwest mills. The overall shutdown of mills will likely be considerably larger than those occurring solely from the production declines associated with timber not available for sale as a consequence of spotted owl conservation.

THE PROCESS OF UNWINDING THESE CONTRACTS

Once mill shutdowns have occurred that are permanent enough to constrain the remaining number of bidders for the available public timber supply, the bid prices for Northwest timber will decline to

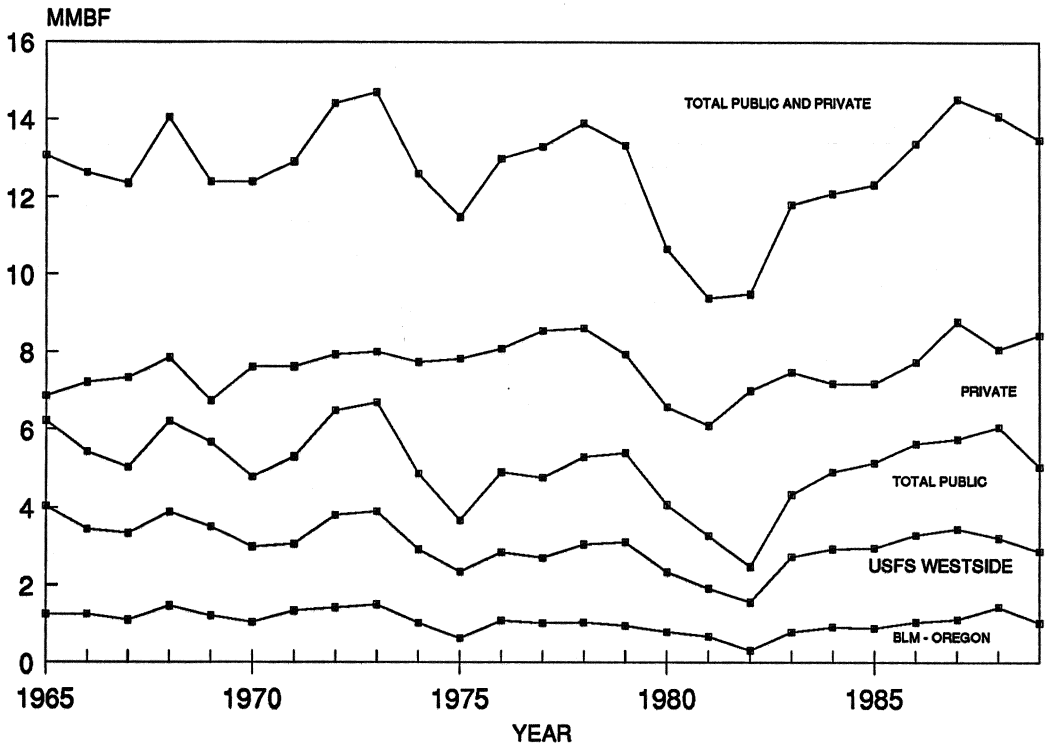


Figure 8: Public sales contracts have a substantial impact on regional output

levels competitive in the national and international markets. Remaining bidders will average the losses on existing contracts if they are allowed to extend these contracts and if they possess new or previous volumes below equilibrium stumpage price. To the degree that there are sufficient bidders who do not have high-priced contracts to absorb, or alternative sources of low-priced timber to allow the averaging process to occur, bid prices may not fall below equilibrium market levels with other regions. Also, since bid prices are pegged to product price indices, they are unlikely to drop to levels sufficient to eliminate losses. This increases the likelihood that most of the high-priced contracts will end up in default rather than being extended and harvested at a loss by averaging with profitable contracts.

While Federal bailout legislation of 1984 released a large portion of the uncompetitive federal contracts in that time period, similar legislation for state contracts was declared unconstitutional (Andrews, et al., 1984), resulting in a contract by contract settlement negotiation. The fact that there

are a large number of public sale contracts that are currently uncompetitive and apparently headed for default (or possibly new legislation or other settlement negotiation), suggests the contract terms are not an insignificant part of the problem. Timber contracts in the Northwest are speculative purchases since market prices change between the time of purchase and the first opportunity to harvest. In the south access to timber is easier, hence the lag between purchase and harvest time is very short. In the Northwest this lag time generally has exceeded 1 to 3 years since road building and seasonal factors require future planning. Bid prices have therefore moved above harvest prices in periods of rising product prices with the expectation that prices will increase before the time of the harvest.

Many contract changes were incorporated after 1984 to reduce the recurrence of massive contract defaults. For one, stumpage prices at harvest are adjusted from the original bid indexed to product price changes. Stumpage prices adjust 50 percent of the difference in rising product price periods and 100 percent of the difference in declining product price periods. A second change is the early harvest discount that provides discounts of up to 25 percent of the bid price if the contract is longer than 3 years in duration and early harvest occurs. These changes however do not eliminate the speculative nature of the bidding process. In periods of expected short supply, small purchasers who are dependent upon public timber have few choices but to bid higher in price or plan to shut down. Even if their projected margins may be negative based on current product prices, the shortages may suggest that rising product prices will eventually make higher priced contracts competitive. Failure to obtain contracts by bidding low prices produces certainty in reduced operations, where risky high bids could become competitive if the market is strong enough.

CONTRACT FEATURES THAT WOULD SUPPORT INCREASED COMPETITIVENESS AND LESSEN NEGATIVE IMPACTS

If the contract mechanism was such that the uncompetitive volumes were quickly restored to the market at competitively priced levels, negative economic impacts on the region would be far less

severe. Given the severity of the economic adjustment required from spotted owl conservation, a more rapid adjustment for these contractual problems will benefit the public seller, the buyers and processors, the regional economy, and the national consumers of wood products.

A more desirable policy prescription should recognize that the economic costs of the current contracting procedures are periodically substantial. The losses include lost revenue to the public, substantial litigation costs, and significant bankruptcy losses by the private investor (i.e., customers of the public sellers). Regional economic losses include tax revenues, adjustment assistance and infrastructure losses as well as national consumer losses resulting from alternative, higher-cost supply sources.

Attempts to resolve these problems should consider not just the direct nature of the current contract problems but also the nature of the markets served by these contracts. Since economically competitive producers would be capable of supporting the highest contract prices on a sustainable basis, the risk of recurring defaults on timber under contract would be reduced. New contract features should focus on making the buyers of these contracts, the producers, more competitive. Since (1) a large part of the Northwest production most fully serves international markets as an offset to imports from our free trading partner, Canada, and (2) sustainable supply relationships are considerably more important for international markets than domestic markets that are dominated by an efficient wholesale distribution channel, an appropriate contract mechanism should assist producers to serve international markets that operate counter-cyclical with US markets.

It is clear that the current contract mechanisms in the Pacific Northwest region have not responded to the regional differences in the separate stumpage markets to maintain competitiveness. For one, these mechanisms do not eliminate speculative bidding that occurs due to longer contract lengths than occur in the south, for instance. Although a desirable feature of new contracts would be to reduce the contract length, something that is already happening in the Northwest, regional differences due to road building, size of the sales and operating sessions still make bidding on

Northwest timber sales a speculative process. Making contracts easily resalable effectively shortens the length of contracts in a repurchase market and may separate the processor's risk from a speculator's opportunity. Speculation or desperation bidding has produced contracts that would generate economic losses even with immediate harvest. Only tight markets in the future with higher product prices can make these contracts competitive.

Northwest producers lose competitive advantage because it's timber supply markets react to both international markets and unstable supply factors. Indexation to domestic product markets is not a solution. An alternative mechanism providing a "net back" computation with the timber owner receiving a net share of the final prices and automatic resale rather than extending contracts may reduce speculation and provide better indexation.

Providing more stable supply relationships cannot be solved by contract terms alone, it also requires stable timber availability from public policy and perhaps market associations by smaller companies. Improved policy does not stop with sustained sales under the current contract terms or even a quick release mechanism for conditions of uncompetitive volumes under contract. It includes risk sharing features between buyer and seller and greater stability in supply in order to provide a more sustainable competitiveness. Consideration of these factors would improve both market position as well as regional stability for Northwest producers.

REFERENCES

Andrews, M., R. Bangert, M. Crutcher, R. Ingram, and B. Pearson. 1984. Report to the Commissioner of Public Lands from the Commissioner's Timber Sales Advisory Panel.

Cardellichio, P., Y. Youn, D. Adams, R. Joo, and J Chmelik. 1989. A preliminary analysis of timber and timber products production, consumption, trade and prices in the Pacific Rim until 2000. Working Paper 22, CINTRAFOR, University of Washington, Seattle.

Lippke, B., R. Lee, K. Gilless, P. Sommers. 1990. Three-state impact of spotted owl conservation and other timber harvest reductions: A cooperative evaluation of the economics of social

impacts. Institute of Forest Resources Contribution #69, College of Forest Resources, University of Washington, Seattle.

United States General Accounting Office. 1989. Federal Timber Sales: Legislative and Administrative Assistance Provided to Timber Purchasers. Report to the Chairman, Subcommittee on National Parks and Public Lands, Committee on Interior and Insular Affairs, House of Representatives, Washington DC.

Warren, D. 1990. Production, prices, employment, and trade in Northwest forest industries, second quarter 1990. USFS Pacific Northwest Research Station Resource Bulletin PNW-RB-176, Portland OR.