

# **An Assessment of Stumpage Payment Methods Used by State and County Timber Sale Programs**

by

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## Executive Summary

State and county timber sale programs collect revenue from timber products sold on stumpage timber sales using two methods: the consumer-scale and/or lump-sum stumpage payment method. The consumer-scale method (also commonly called pay-as-cut or log-scale) charges a purchaser for timber volume that is harvested and *scaled*. The lump-sum method (also commonly called sold-on-appraised-volume) charges a purchaser for the *estimated* volume of a timber sale, regardless of what volume is actually harvested and removed from the timber sale. The choice of stumpage payment method can influence the cost-effectiveness of timber sale programs and post-harvest ecological conditions.

A mail survey was used to evaluate how public state and county agencies used stumpage payment methods in their timber sale programs during the fiscal year 2013, as well as understand the ecological, financial and administrative differences of using the consumer-scale and lump-sum methods. The survey included 58 state agencies from across the United States and 46 county agencies from the Lake States region (Michigan, Minnesota and Wisconsin). The survey was administered in fall 2014. Seven agencies reported not having a timber sale program and were therefore removed from the survey population. Ninety agencies completed and returned questionnaires (93% response rate). A summary of the important findings are presented below.

### Use of Stumpage Payment Methods in Fiscal Year 2013

Overall, there was a higher use of the consumer-scale method over the lump-sum method as 34% of the responding agencies used *only* the consumer-scale method while 19% used *only* the lump-sum method. Of the remaining responses, both methods were used but with different approaches as 32% of the total response used both methods on separate timber sales while 15% used both methods on single timber sales but for different species-products. The use of both methods on single timber sales for different species-products (e.g., pulpwood sold with the consumer-scale method and sawtimber sold with the lump-sum method) is referred to as “blended methods.”

However, there was a difference on how stumpage payment methods were used depending on the type of agency, state or county. State agencies had a greater tendency to use the lump-sum method (30% used *only* the lump-sum method) while county agencies had a greater tendency to use the consumer-scale method (56% used *only* the consumer-scale method).

Agency size (as defined by number of timber sales sold in fiscal year 2013) was related to how stumpage payment methods were used. Small sized (defined as 1 to 7 timber sales sold in fiscal year 2013) agencies had a tendency to use only a single stumpage payment method (45% used only the lump-sum method and 40% used only the consumer-scale method), while larger sized (defined as 54 to 982 timber sales sold in fiscal year 2013) agencies had a greater tendency to use both methods on separate timber sales (40%) or blended methods (40%). Furthermore, use of stumpage payment methods weighted by number of timber sale acres sold in fiscal year 2013 also indicated that the largest agencies (in terms of acres sold) had a greater tendency to use both the consumer-scale and lump-sum methods, as 64% of the acres sold in fiscal year 2013 were sold by agencies that use both payment methods. Thus, while there are many agencies that use

only the consumer-scale payment method, they tend to sell a small number of acres for sale in fiscal year 2013.

### **Perceived Differences Between the Consumer-Scale and Lump-Sum Methods**

The survey included a series of statements that were designed to contrast the perceived ecological, financial, and administrative differences of using the consumer-scale and lump-sum methods. A summary of the perceived advantages and disadvantages, according to program supervisors who responded to the survey, follows:

Consumer scale advantages:

- Generates high stumpage bid prices and high timber sale revenue.
- Attracts bidders when a timber sale has a high percentage of low valued material and/or when harvest operating costs are high.
- Avoids financial risk to the agency on partial harvests (commercial thinning) and salvage timber sales.

Consumer scale disadvantages:

- Requires substantial administrative time during harvest operations (as inspections to ensure best utilization and to process scale tickets and other timber sale documents) and therefore becomes administratively costly to use.

Lump sum advantages:

- Requires fewer administrative personnel involved with a timber sale and thus becomes an administrative cost savings.
- Allows several active timber sales per single field forester.
- Encourages high utilization of low valued material.

Lump sum disadvantages:

- Requires a highly accurate estimate of merchantable timber sale volume and therefore requires substantial administrative time to cruise a timber sale.
- Encourages high utilization in riparian areas and therefore potentially influences post-harvest ecological conditions.

Both methods are equally perceived as:

- Encouraging competition for timber sales.
- Positively influencing post-harvest wildlife habitat.
- Allowing land managers to meet regeneration objectives.
- Positively influencing post-harvest visual and aesthetic qualities.

Program supervisors who used only a single stumpage payment method (i.e. only consumer-scale method or only lump-sum method in fiscal year 2013) perceived the advantages and disadvantages of using stumpage payment methods differently. The single stumpage payment method users often perceived the other method as having ecological, financial or administrative disadvantages. This suggests that program supervisors who use a single stumpage payment method in their timber sale program are most comfortable with that single method.

## **Differences in Cruise Standards, Use of Scale Tickets and Scaling Location**

The cruise standards, as reported by program supervisors, used to estimate merchantable timber sale volume were compared for the consumer-scale and lump-sum methods. Overall, program supervisors reported almost equal cruise *accuracy* standards the consumer-scale and lump-sum methods (highest response for both methods was  $\pm 10\%$  of actual stand volume). However, differences were cited from reported cruise *intensity* standards, with the lump-sum method generally requiring more inventory plots per acre.

Most (82%) program supervisors indicated that their agency uses and collects paper-scale tickets to account for the harvested volume on consumer-scale timber sales, while fewer (11%) indicated using both paper- and electronic-scale tickets. The use of electronic-scale tickets can result in increased efficiency by avoiding some of the basic tasks associated with processing (e.g., collecting, summarizing and generating invoices) scale tickets and decreasing the chance of lost or delayed scale tickets that arrive in the mail in paper form. Of the remaining response, 1% of program supervisors indicated using only electronic-scale tickets and 6% indicated using an “other” method (e.g., using security cameras to monitor loaded haul trucks as they leave the harvest site in combination with using paper and/or electronic scale tickets).

The majority (66%) of the reported volume sold on consumer-scale timber sales in fiscal year 2013 was scaled by the consuming mill or purchaser, a process that requires no additional time from an agency as the seller. Agency personnel scaled an average of 23% of reported volume sold, requiring additional administrative time on consumer-scale timber sales (likely because of frequent inspections and visits to an active timber sale to stick scale the harvested timber). An independent third-party (e.g., scaling bureau) scaled 8% of the reported volume and 3% was scaled by an “other” source.

## **Stumpage Payment Methods and Chain-of-custody Certification**

Considering that the consumer-scale method provides a system (i.e., using scale tickets) for accounting the harvested timber along the supply chain, the use of chain-of-custody certification can influence how stumpage payment methods are used by public agencies. Only one program supervisor reported a change in how timber products are tracked as a result of using chain-of-custody certification, indicating that scale tickets are used on lump-sum timber sales to maintain chain-of-custody along all steps of the timber sale process. The task of collecting scale tickets on lump-sum timber sales can be a significant additional administrative effort and therefore have a substantial impact on overall program efficiency. Another program supervisor reported that a procedure was developed to use “haul tickets” to maintain chain-of-custody on lump-sum timber sales but only when requested by the purchaser.

## **Conclusions**

Certain advantages and disadvantages of using the consumer-scale and lump-sum methods exist. Program supervisors perceived that the choice of stumpage payment method used to collect revenue from timber sales will affect the administrative efforts associated with timber sales, the net revenue generated, and the post-harvest ecological conditions. Therefore, program

supervisors and timber sale administrators need to consider the tradeoffs associated with the use of the consumer-scale and lump-sum stumpage payment methods and appropriate the best method for the given characteristics of a timber sale while considering the limitations of the administrative work force.

# 1. Introduction

All public forest land management agencies with a timber sale program have the common goals to control transactional costs during the administration of timber sales, collect fair-market value from the timber products that are sold, and avoid adversely impacting the long-term sustainability of their forest lands.

State-titled forest land makes up 22% of all public forest lands nationwide (Oswalt et al. 2014). Of the 69.5 million acres of state-titled forest land across the nation, 47% is located in the Pacific Coast region<sup>1</sup> (Alaska owns title to 40% of the nation's state forest land), 33% is located in the North region, 12% in the South region, and 8% in the Rocky Mountain region.

Much of the state-titled forest land base was acquired through federal land grants during each state's territorial negotiation and acceptance into the Union (Souder and Fairfax 1996). The purpose of these granted lands was to establish a trust resource from which each state could manage the natural resources and allocate revenues from those resources to the beneficiaries of the state's institutional school systems, formally referred to as School Trust Lands. States have established agencies that are responsible for implementing timber sale programs to generate timber sale revenue from the School Trust Lands. For example, the Minnesota legislature defined the intended use of the School Trust Lands to maximize the long-term economic return produced from the lands while maintaining sound natural resource conservation and management principles and efficient management expenditures (Minn. Stat. § 127A.30, 127A.31). These School Trust Lands are an important source of revenue to the trust beneficiaries. For example, timber sale revenue from School Trust Lands in Washington State amounted to \$78.4 million dollars in fiscal year 2013 (Washington State Department of Natural Resources 2013).

The county forest land base makes up about 1.7% of all forest land nationwide (Oswalt et al. 2014). County forest land is generally limited to certain geographic regions across the nation. Of the 13 million acres nationwide, 67% is located in the North region (Minnesota leads the nation with 2.8 million acres of county forest land, and Wisconsin contains the second largest amount with 2.3 million acres of county forest land).

The common history of county forest land in the Lake States (Michigan, Minnesota and Wisconsin) relates to lands that were once held in private ownership and reverted back to the state government as a result of tax delinquency with most transfers occurring after the Great Depression years (Souder and Fairfax 1996, Smith et al. 2009). Considering county forest land in Minnesota, the state government owns title to these tax-delinquent lands and the county government is responsible for management of the natural resources (Minnesota Association of County Land Commissioners 2011). In Minnesota, county governments receive payments-in-lieu-of-taxes (PILT) from the state to offset the loss from property tax revenue. Additionally, Minnesota county governments realized the potential for these lands to become county assets by generating earned income from the land resources. Therefore many Minnesota counties have developed a land department with a timber sale program to manage the timber resources. As defined by Minnesota statute, net proceeds from timber sale revenue from county-administered

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<sup>1</sup> Region as defined by the USDA-FS's Resources Planning Act (USDA-Forest Service 2012).

forest land can be appropriated to fund ongoing timber sale program costs with any remaining balance distributed to the county general fund and local jurisdictions (local school districts and/or town and city funds) (Minn. Stat. § 282.08).

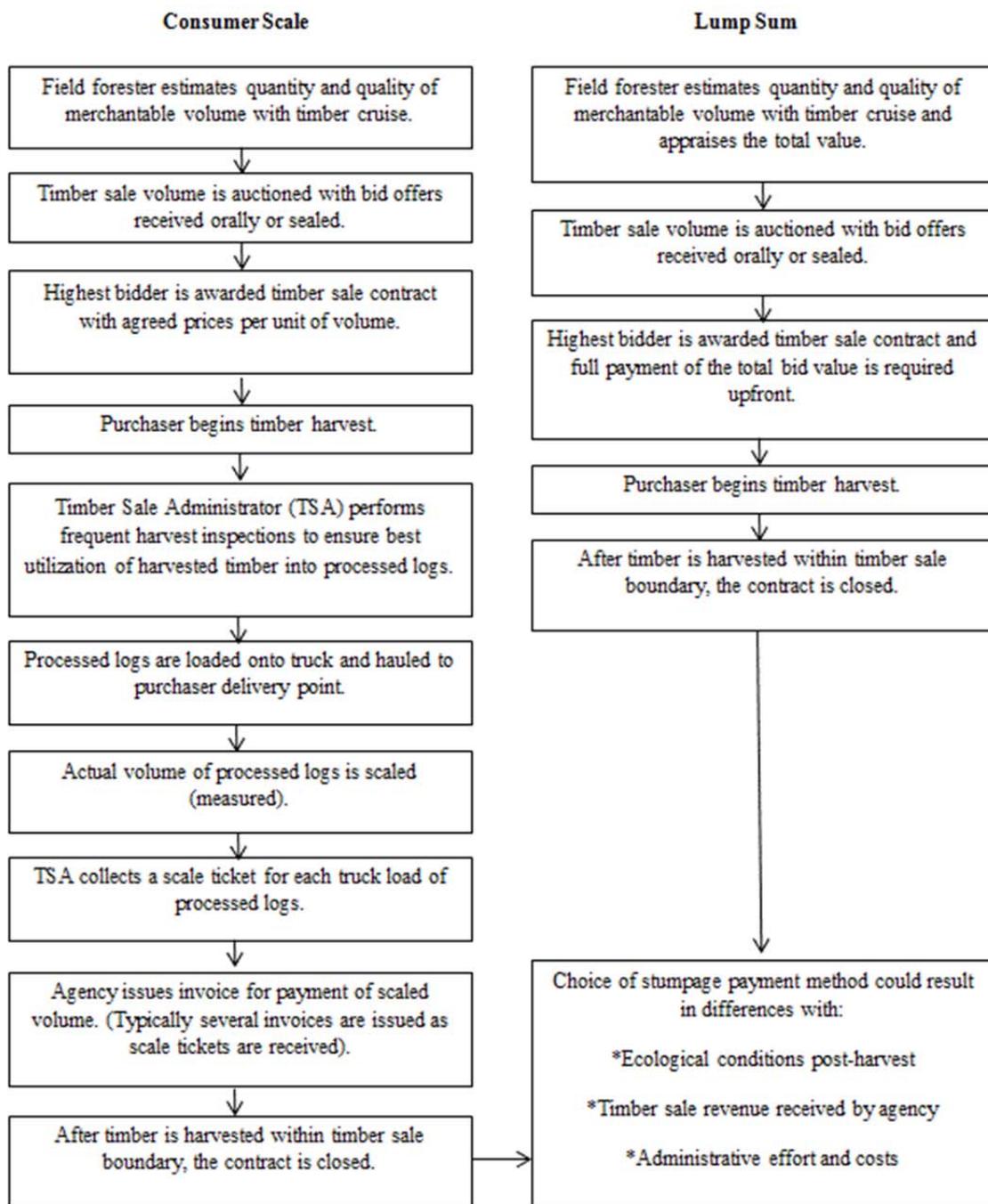
The choice of stumpage payment method used to collect timber sale revenue may influence the cost-effectiveness of timber sale programs, total net revenue collected and post-harvest ecological conditions. The term “stumpage” refers to timber products that are sold to a purchaser while the trees remain standing (not harvested) on the stump (Bowers and Punches 2007). The two stumpage payment methods commonly used are the consumer-scale and lump-sum methods. The consumer-scale method (also commonly called pay-as-cut or log-scale) is defined as when a purchaser pays for timber volume that is harvested and *scaled*. Thus, the seller’s final net revenue from the timber sale is not known until the harvest operation has been completed, all wood has been scaled, and the seller has reconciled the difference between any upfront payments received from the buyer with scaled volumes and sale prices. The lump-sum method (also commonly called sold-on-appraised-volume) is defined as when a purchaser pays for an *estimated* timber volume, regardless of what volume is actually harvested and removed from a timber sale (Bowers and Punches 2007). Typically, the lump-sum method involves a single upfront payment from the purchaser before timber harvesting can begin (Stelzer 2011). A third method of selling stumpage timber sales used by private landowners is called shares, in-which the seller and purchaser agree on a percentage cut (e.g., 60% to the seller and 40% to the buyer) of the total revenue produced from the timber products (Stelzer 2011).

Log sales are an alternative to stumpage timber sales. With log sales, a public forest management agency establishes a contract with a third-party logging business (or perform the work “in-house”) to harvest timber. The processed logs are then sold directly to a purchaser (and the agency is responsible for delivery) or the processed logs are temporarily stored at an agency owned “sort-yard” and offered to potential purchasers using competitive bids (Dramm et al. 2002, Bowers and Punches 2007).

The list of administrative tasks associated with consumer-scale and lump-sum stumpage timber sales are shown in Figure 1. In summary, the consumer-scale method first involves a timber cruise to determine an estimate of the timber volume. The timber volume is then sold at public auction to the highest bidder with agreed prices per unit of volume. After a form of financial security is collected (e.g., down payment) and once harvesting begins, all harvested volume is scaled<sup>2</sup> to determine the actual volume, as recorded on a scale ticket. The agency then issues an invoice for payment to the purchaser for the value of the timber harvested as reported on the scale ticket(s). The agency requires a timber sale administrator to frequently inspect the harvesting operation to ensure that the timber is best utilized in dimensions that result in maximum revenue to the agency (as well as ensuring that all of the contract specifications are adhered to and that the site conditions are protected with best management practices).

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<sup>2</sup> Two methods exist to scale material: stick scale and weight scale. Stick scale involves measuring the diameter, length and any possible defect (e.g., heart rot, sap rot, abundance of knots, sweep or crook or fire-char) of a log to determine a volume measure. Weight scale involves measuring the weight (e.g., U.S. tons or pounds) of harvested timber which has been hauled to a consuming mill and then measuring the weight of the empty haul truck to determine the net weight of processed logs (Bowers and Punches 2007).



**Figure 1.** List of the typical administrative tasks associated with the consumer-scale and lump-sum stumpage payment methods and some of the areas where differences could result from the choice of payment method.

The lump-sum method avoids the tasks associated with scaling processed logs and frequent utilization inspections (Figure 1). The lump-sum method involves a timber cruise to determine the estimated timber volume but then appraises the total value of that estimated volume. The timber volume is sold at public auction and typically a single lump-sum payment is required upfront before harvest operations begin.

The differences in the tasks associated with the consumer-scale and lump-sum methods are assumed to result in differences in administrative effort and their associated costs. For example, the tasks associated with collecting scaling tickets and harvest utilization inspections are the additional transactional costs of the consumer-scale method. It can be assumed that the lump-sum method results in an administrative costs savings by avoiding those tasks.

Considering lump-sum timber sales, any additional volume (beyond the appraised and fully paid volume) is available to a purchaser at no additional stumpage cost (considering that the purchaser stays with-in the timber sale boundary and not considering the additional variable harvest operation costs). Therefore, there may be an incentive for a purchaser to harvest more volume than the appraised and fully paid volume on a lump-sum timber sale. This has potential to influence post-harvest ecological conditions. For example, if additional timber volume (e.g., small diameter trees, standing dead material and on-the-ground dead material) is removed and utilized, then sensitive wildlife habitat could be affected. Additionally, the purchaser/logger might be encouraged to harvest more heavily in riparian areas on lump-sum timber sales. Riparian zones are known to be ecologically sensitive areas and important to a variety of wildlife (USDA-Forest Service 1985). The increased utilization in riparian areas can also influence post-harvest ecological conditions.

In summary, all public forest land management agencies need to be cost-efficient and responsible stewards of the public resource. Therefore, it is important to know how stumpage payment methods have the potential to influence administrative effort and costs, total revenue generated from timber sales, and the post-harvest ecological conditions. If opportunities exist to improve the efficiency of public timber sale programs as a function of what stumpage payment methods are used then the beneficiaries (e.g., local school districts, forest product industries and other stakeholder groups) of the public lands will also realize the improved efficiency.

## ***1.1 Literature Review***

The following discuss the published literature in the following three areas: (1) choice of stumpage payment methods and general use by public agencies; (2) administrative efforts and costs of using stumpage payment methods; and (3) potential for revenue differences between stumpage payment methods.

### **1.1.1 Use of Stumpage Payment Methods by Public Agencies**

Leffler and Rucker (1991) suggested that resource managers use the stumpage payment method that maximizes revenue from a timber sale while controlling administrative costs. Brown et al. (2012) gathered data from a nationwide survey of state agency timber sale program supervisors

and determined that in 2008, the majority (58%) of state agencies used the lump-sum method and 33% used the consumer-scale method in their timber sale programs.

Kueper et al. (2014) utilized a survey of loggers who purchased public agency timber sales and state agency foresters from the Lake States (Michigan, Minnesota, and Wisconsin) to determine the perceived preference of stumpage payment method by loggers. They concluded that most foresters (nearly 70%) believed that loggers preferred the consumer-scale method when, in fact, slightly less than 50% of loggers actually indicated their preference for consumer-scale timber sales.

Considering how different silvicultural prescriptions (e.g., clearcut, partial harvest) might influence the choice of stumpage payment methods, Flick (1985) and Leffler and Rucker (1991) suggested that the consumer-scale method avoids the risk of a purchaser and/or logger removing unmarked volume on partial cuts (commercial thinning). This suggests that the consumer-scale method may be more appropriate for a range of silvicultural treatments than lump-sum sales. However, Kueper et al. (2014) reported that field foresters disagreed that lump-sum timber sales are less likely to achieve management objectives.

Brown et al. (2010) used focus groups of state agency timber sale program supervisors to identify the issues and problems that public timber sale programs encounter when selling timber. The discussion revealed that some program supervisors preferred the use of the consumer-scale method because of the chain-of-custody certification requirements to track all timber products as truck loads are delivered to a consuming mill.

### **1.1.2 Administrative Efforts and Costs of Using Stumpage Payment Methods**

A number of studies (Muraoka and Watson 1983 and 1986, Paarsch 1993, Brown et al. 2010) specifically attribute the lump-sum method to potential cost savings by eliminating certain administrative tasks (e.g., collecting scale tickets from the purchaser, summarizing the total volume scaled, computing an invoice for payment, and storing scale tickets post-harvest) that are commonly associated with consumer-scale timber sales.

Leffler and Rucker (1991) and Paarsch (1993) found that the consumer-scale method requires increased administrative effort on timber sale inspections and contract enforcement. Leffler and Rucker (1991) argued that those administrative tasks are the largest transactional cost associated with the consumer-scale method and not the tasks associated with processing scale tickets.

In contrast to the administrative cost savings by eliminating the requirement for scale tickets with the lump-sum method, two studies reported that the lump-sum method generally requires an increased administrative effort to cruise the timber and determine an estimated and appraised value. In a survey, Brown et al. (2010) reported 65% of field foresters agreed with the claim that the lump-sum method requires more “presale” effort. As the purchaser may also perform a separate appraisal of the timber quantity and quality, Brown et al. (2010) reported that a majority (77%) of loggers indicated that the lump-sum method requires more bid preparation time. From a time study of Minnesota Department of Natural Resource timber sales, Deckard et al. (2011)

determined that lump-sum timber sales required on average twice the cruise time as consumer-scale timber sales with 1.4 hours and 0.72 hours staff time per appraised acre, respectively.

Considering that much of the literature related the lump-sum method to increased administrative efforts to cruise timber and determine appraised value, Peterson (1999) argued that all timber sales regardless of stumpage payment method require an accurate volume estimate. Peterson explained that poor volume estimates can impact a logger's cost/unit of production, scheduling for operations on timber sales, contracts with mills, and interest in purchasing stumpage from foresters who are consistently inconsistent in their volume estimates. Haley (2010) discussed the ability for clever bidders to skew bid prices, especially on consumer-scale sales to win a sale or maximize profit on poorly appraised species-products. For example, skewing bid prices involves knowing which species-product is underestimated and intentionally bidding an extra high value on that species-product to result in the best total bid value. Consequently, Haley (2010) advocated the need for an accurate timber cruise and volume estimate on consumer-scale timber sales. In contrast, Leffler and Rucker (1991) suggested that bidders on consumer-scale timber sales do not require a merchantable volume estimate because that measurement will give no useful information for them to exploit in their favor (in terms of bid skews).

### **1.1.3 Potential for Revenue Differences between Stumpage Payment Methods**

Peterson (1999) found that poor volume estimates using any stumpage payment method can result in cautious bidders, suggesting that purchasers who have experiences with poor volume estimates on previous timber sales will expect future timber sales from the same agency to have inconsistencies on volume estimates. Considering that the actual volume removed from a lump-sum timber sale will result in volume over-run or under-run (over-run is defined as more volume actually harvested than estimated while under-run is vice-versa), Deckard et al. (2011) suggested that the purchaser bears the financial risk of a volume under-run. Therefore, both Deckard et al. (2011) and Muraoka and Watson (1983) suggested that purchasers will discount their stumpage bids on lump-sum timber sales.

Discounted stumpage bids will give a purchaser financial assurance in the event that the appraised value of a lump-sum timber sale results in volume under-run. In contrast, Flick (1985) suggests that the lump-sum method elicits higher bid prices, potentially due to the ability for a purchaser to maximize utilization of the volume in the timber sale. Flick anecdotally argued that the increase in bid prices may be as much as a 20% premium. Kueper et al. (2010) evaluated the claim that the lump-sum method is a financial risk and found that loggers significantly perceived the lump-sum method to be a financial risk in comparison to foresters.

Nautiyal and Love (1971) and Flick (1985) suggested that a purchaser of a timber sale sold using the lump-sum method will have increased incentive to remove more volume than the appraised and purchased volume because there is no additional stumpage cost. Sendak (1991) discussed increased utilization specifically on low valued timber sales, while Muraoka and Watson (1983) advocated that the single lump-sum payment of appraised value represents a sunk cost to a purchaser and therefore results in increased utilization.

Another potential revenue difference between the consumer-scale and lump-sum methods can be related to the timing of harvest. Muraoka and Watson (1983 and 1986) and Deckard et al. (2011) discussed how the consumer-scale method results in a lower net present value than the lump-sum method. They explained that the single lump-sum payment can be collected upfront when the timber sale becomes awarded to a purchaser and thus the realized value can be accounted as accrued revenue. However, revenue collected from consumer-scale timber sales may become delayed if the harvest is delayed or completed towards the end of the contract length. Muraoka and Watson (1983 and 1986) argued that the lump-sum method results in more efficient economic rent because all bids are stated in present values.

Muraoka and Watson (1983 and 1986) also concluded that the upfront lump-sum payment avoids speculative bidding with regards to anticipated future stumpage prices. However, they also acknowledged that the upfront lump-sum payment could put small purchasers at a disadvantage because of the potentially large capital investment required at the time of purchase.

Continuing the discussion on revenue differences, Pendleton (1998) evaluated the different forms of timber theft and how those methods occur. Pendleton distinguished scaling fraud and load ticket fraud from timber theft affiliated with legitimate consumer-scale timber sales and those methods were confirmed by agency officials as being a real and significant source of revenue leakage. Interviews with loggers and community members revealed the generally accepted practice of illegal timber theft at the expense of the agencies potential timber revenue.

Considering competition and potential revenue, Buongiorno and Young (1984) advocated that the appraised value of the estimated volume of a timber sale should be low enough to attract bidders and encourage competition. Haynes (1980) emphasized the importance of multiple bidders for timber sales and related significant correlation between increased competition and increased timber revenue. Therefore, if the choice of stumpage payment method can influence competition than the potential revenue can be impacted. However, Kueper et al. (2010) concluded from a survey that both loggers and foresters disagreed that lump-sum timber sales are any less competitive than consumer-scale timber sales.

#### **1.1.4 Summary of Literature Review**

The stumpage payment method literature review revealed that much of the research has focused on the administrative tasks and possible revenue differences between the consumer-scale and lump-sum methods. A considerable amount of the literature is based on anecdotal observations as many of the authors discussed their statements in general ways with limited empirical evidence to support their assumptions.

Brown et al. (2010 and 2012) provided a comprehensive review of state timber sale programs including relevant information on their use of stumpage payment methods, and Kueper et al. (2014) provided valuable insight on stumpage payment method preferences by loggers who purchaser public timber sales and state foresters who prepare timber sales. While these studies did provide considerable information on state agency timber sale programs, a more in-depth analysis is needed to understand the effectiveness and efficiency of using stumpage payment

methods. For example, there was no available literature that discussed any direct ecological impacts of using stumpage payment methods; thus becoming a significant information gap.

## ***1.2 Study Objectives***

The objectives of this study are:

- Understand how state and county forest management agencies used stumpage payment methods in fiscal year 2013 and determine the policies (e.g., state statutes, administrative rules or agency guidelines) that influence how they are used.
- Understand the perceived ecological, financial and administrative tradeoffs associated with the use of stumpage payment methods.
- Determine whether chain-of-custody certification requirements have changed how agencies use stumpage payment methods or how timber products are tracked or accounted after harvest.

## **2. Methods**

### ***2.1 Survey Design***

A national assessment of public nonfederal agencies that have timber sale programs was conducted using a mail survey. The population surveyed was state agencies across the United States and county agencies from the Lake States (Michigan, Minnesota, and Wisconsin) that manage and administer timber sales on state- or county-titled forest land. The survey did not include federal level agencies. While the USDA-FS does have variations of timber sale programs between administrative regions, it was decided that the agency does not compare with state and county timber sale programs and therefore excluded from the study. Similarly, the United States Department of Interior–Bureau of Land Management was excluded from the study.

In total, 104 state and county agencies were surveyed. The population of 58 state agencies included 8 states having multiple agencies that administer a timber sale program. Information on state timber sale programs was generated by searching the internet for all 50 states. The contact position for each agency was determined to be the individual who had primary responsibility for leading or supervising the timber sale program. It was assumed that the program supervisor would have expert knowledge of the policies and procedures used regarding stumpage payment methods and be best suited to represent an agency. The contact person responsible for leading or supervising the forestry program for 13 state agencies was identified on the official agency Internet home page. The contact person for leading or supervising the forestry program for the other 45 state agencies was identified with phone calls

The 15 Minnesota county agencies that manage county forest lands were identified from a membership list for the Minnesota Association of County Land Commissioners ([mncountyland.org](http://mncountyland.org)). Contact information for 13 “Land Commissioners” was obtained from the county agency’s official internet home page; the two remaining contacts were identified with a phone call. Information on the 29 Wisconsin county agencies that manage county forest lands was generated from a membership list for the Wisconsin County Forest Association

(wisconsincountyforests.com). The association's Internet home page included contact information for each "Forest Administrator." The two Michigan county agencies that regularly conduct timber sales were identified by contacting an Extension Forester from Michigan State University to request expert information on Michigan counties that manage forest lands. The two Michigan counties were contacted with a phone call to verify that they had a timber sale program and to obtain contact information for the timber sales program supervisor.

The survey questionnaire contained 20 multiple choice, fill-in-the-blank, Likert-scale, and open-ended questions (Appendix A). The multiple choice and fill-in-the-blank questions were designed to collect discrete information on each agency's use of stumpage payment methods. The Likert-scale questions were designed to capture the respondent's perceptions of the ecological, financial, and administrative advantages and disadvantages of the consumer-scale and lump-sum methods as well as the degree to which various characteristics (e.g., timber value, sale volume, total sale acres) have on determining which stumpage payment to use on a timber sale. The open-ended questions were designed to evaluate how chain-of-custody certification requirements had influenced or changed why a stumpage payment method is used and inquire about other significant changes in the timber sale program regarding stumpage payment methods.

Likert-scale questions used a scale where "1" = Strongly Disagree, "2" = Disagree, "3" = Neutral, "4" = Agree, and "5" = Strongly Agree. The Likert-scale questions related to perceptions of the ecological, financial and administrative advantages and disadvantages allowed respondents to reply with "6" if they "did not know" the appropriate response for each statement. One additional Likert-scale question was designed using a 5-point scale where "1" = not influential and "5" = very influential and used to evaluate how influential a set of timber sale characteristics were on the choice of stumpage payment method used.

Prior to administering the survey, a pre-test was performed to evaluate the design of the questionnaire including how respondents progressed through sections of the questionnaire that were designed to be answered or skipped by agencies that use only a certain stumpage payment method(s). Five professional foresters, considered to be knowledgeable and experienced with their agency's timber sale program but who would not be asked to complete the final questionnaire, were included in the pre-test. Effort was made to ensure that the pre-test included one agency (Cass County Land Department) that used only the lump-sum method, one agency (Minnesota Department of Natural Resources) that used both the consumer-scale and lump-sum method on separate timber sales, and one agency (Carlton County Land Department) that used a combination of both methods on single timber sales. In addition, one professional forester with the USDA-FS was included in the pre-test and included as another public agency that used only the lump-sum method. All pre-test participants were asked to provide comments on their ability to answer each question (i.e., could they understand the wording and intent of each question, did they have ready access to the information necessary to answer each question) and the flow and layout of the questionnaire. Comments from pre-test individuals were incorporated into the design of the final questionnaire (Appendix A). One individual failed to return valuable comments and feedback and, therefore, a second professional forester was identified from the same agency, resulting in five foresters from four targeted agencies.

The survey process followed closely with methods developed by Dillman (2007), referred to as the Tailored Design Method. The survey utilized the following five-wave contact procedure: (1) pre-notice postcard; (2) survey questionnaire and cover letter; (3) reminder notice postcard; (4) second survey questionnaire and second cover letter; and (5) follow up phone calls to the remaining nonrespondents with the intent to explain the importance of their participation in the research study. Copies of the survey contact materials are included in Appendix B. Survey administration occurred as follows:

- Pre-notice postcards – October 9, 2014
- First survey questionnaires with cover letters – October 16, 2014
- Reminder notice postcards – October 23, 2014
- Second survey questionnaires with second cover letters – November 6, 2014
- Start of follow up phone calls to non-respondents – December 1, 2014

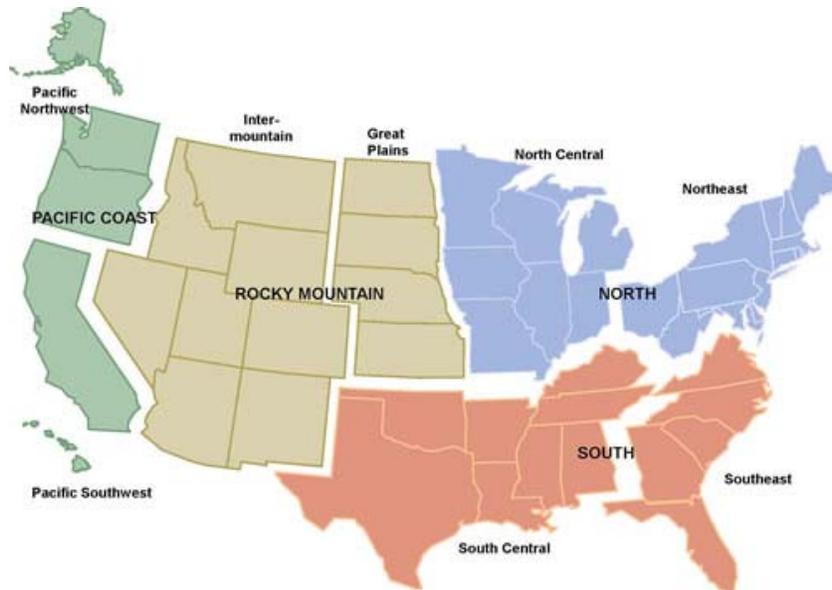
On October 28, 2014, a mistake was recognized on Question 1 of the survey questionnaire. The question requested the “Number of acres harvested” for each stumpage payment method in fiscal year 2013 and the information needed was “Number of acres sold.” A contact letter (included in Appendix B) was sent by email to all respondents who had already completed and returned the questionnaire requesting them to reply to the email with the corrected values and information. The correct values were edited on the original completed and returned survey questionnaire and used in the survey response database. Some respondents indicated with a comment in the survey side margin that the information provided was, in-fact, the number of acres sold and, therefore, not contacted for corrected data. The second round of survey questionnaires sent to nonrespondents as of November 6, 2014, included the correct wording of Question 1.

## ***2.2 Data Entry and Analysis***

The completed and returned survey questionnaires were assigned unique identification numbers, ordered by the date they were received. The responses from each question as they appeared on paper were entered into a Microsoft Excel database. The data was verified for accuracy by double checking every response entered into the database with the paper questionnaire copy. The data collected from the Likert-scale questions was verified by double checking every response entered into the database with the help of another graduate student providing oral call-outs.

Respondents were asked to indicate the number of timber sales sold in fiscal year 2013 by stumpage payment method. The use of stumpage payment methods was weighted by the number of timber sale acres sold in fiscal year 2013 to determine the effect of timber sale program size (in terms of acres sold) on the use of stumpage payment methods.

The data was categorized by agency type (county or state). Furthermore, the data was categorized using the geographical framework developed from the USDA-FS’s Resource Planning Act (RPA) (USDA–Forest Service 2012) (Figure 2). For several analyses (data collected from questions 1, 6, and 16), use of the RPA regions was helpful to observe differences and discuss responses by geographical region. For two analyses, the Pacific Coast and Rocky Mountain Region were grouped into a single “Western” region.



**Figure 2.** USDA-Forest Service’s Resource Planning Act regions.

The Likert-scale data (collected from questions 7, 8, and 9) was prepared for statistical analyses using IBM SPSS Statistics (IBM Corporation 2013). Preparing the data included removing the responses identified as “Don’t Know” (Likert-scale response value “6”) from the dataset. Additionally, the responses for each statement were paired (meaning that if a value was missing for either the consumer-scale or lump-sum response category than the single value was removed from the dataset). The resulting dataset was examined (using histograms of response values for each statement) to determine if the data showed normal distributions with central tendencies. With a couple of exceptions, the data distributions exhibited patterns associated with a normal distribution and therefore parametric statistical tests were performed. The Likert-scale data for each statement was analyzed using paired t-tests to determine if any statistical difference existed ( $\alpha = 0.05$ ) between the mean values associated with the consumer-scale and lump-sum methods.

Similarly, the Likert-scale data (collected from question 12) was prepared for statistical analyses using IBM SPSS Statistics (IBM Corporation 2013). The data distribution failed to exhibit patterns associated with normal distributions, as confirmed by Kolmogorov-Smirnov tests (Corder and Foreman 2009). Therefore, non-parametric statistical tests were performed using Kruskal-Wallis one-way ANOVA tests (Corder and Foreman 2009) to identify any significant differences ( $\alpha = 0.05$ ) among response categories for each timber sale characteristic. For all statistically significant characteristics, pair-wise comparisons (Moore 2007) were used to determine which category(s) were different from the other(s).

Respondents were classified into size categories according to the number of timber sales sold in fiscal year 2013 to further analyze the use of stumpage payment methods in fiscal year 2013. Quartiles were used to determine the breakpoints for three size classes: small, medium and large. Small sized agencies were defined as reporting a number of timber sales sold in fiscal year 2013 less than the first quartile value; medium sized agencies were defined as reporting between the second and third quartiles; and large sized agencies were defined as reporting greater than the third quartile value. Chi-square tests (Moore 2007) were calculated using IBM SPSS Statistics to

determine if any significant difference existed ( $\alpha = 0.05$ ) between size category groups and the use of stumpage payment methods.

All responses to the open-ended questions were categorized into common themes (listed in Appendix C). The themes were developed by first reviewing all responses and tabulating a list of topics discussed. Each individual response was then reviewed a second time and assigned the theme which best represented the response. The responses were defined by the most prominent comment and were not teased apart to separate single responses into multiple themes.

Many program supervisors provided comments that were written in the side margin of the survey questionnaire. These comments were used where appropriate in the Results and Discussion sections.

### 3. Results

Seven agency representatives reported that their agency does not have a timber sale program on their public forest land; thus reducing the survey population size to 97 agencies. Ninety respondents returned the survey questionnaire and one respondent verbally declined to participate in the research study resulting in a 94% response rate. The usable response rate was 93% (Table 1). The non-response was four county agencies from the North region, one state agency from the North Region and one state agency from the South Region (89% response rate for county agencies and 96% response rate for state agencies). Given the high response rate, it was determined that the data was representative of the survey population.

**Table 1.** Response to survey by type of agency and USDA-FS RPA region.

<b>Characteristic</b>	<b>Value</b>
Number of agencies by type and region	
County	
North	40
State	
North	22
Pacific Coast	6
Rocky Mountain	9
South	14
All agencies	91

Respondents to the survey are presumed to be knowledgeable with their agency's timber sale programs, as the average number of reported years' experience with their respective agency was 16 (values ranged from a minimum of 1 year of experience to a maximum of 36 years of experience) (Table 2). Furthermore, the average number of years of experience with timber sales, as reported by program supervisors, was 22 (values ranged from a minimum of 2 years of experience to a maximum of 44 years of experience) (Table 2). Their long tenure with timber sale program among respondents suggests they are experienced with the timber sale process and helps able to perceive the advantages and disadvantages of using stumpage payment methods.

**Table 2.** Respondent’s years’ experience with their agencies timber sale programs and timber sales.

<b>Characteristic</b>	<b>Value</b>
Total number of years of experience with agency/organization	
<i>n</i>	88
<i>min.</i>	1
<i>max.</i>	36
<i>Mean</i>	16
<i>st. dev.</i>	9
Total number of years of experience with timber sales	
<i>n</i>	87
<i>min.</i>	2
<i>max.</i>	44
<i>mean</i>	22
<i>st. dev.</i>	10

### **3.1 Information on State and County Timber Sale Programs**

#### **3.1.1 Reported Number of Timber Sales Sold in Fiscal Year 2013<sup>3</sup>**

The average number of timber sales sold in fiscal year 2013 for county and state agencies was 38 and 73, respectively (Table 3). The maximum number of reported timber sales sold in fiscal year 2013 by county and state agencies was 160 and 982, respectively. Five state agencies reported not having any timber sale activity in fiscal year 2013 (e.g., “timber sale activity paused in fiscal year 2013 for political reasons”). These agencies were still included in the survey population as being different from the seven agencies that directly reported not having a timber sale program and were therefore removed from the survey population.

**Table 3.** Number of timber sales sold and acres sold in fiscal year 2013 by responding counties and states.

<b>Statistic</b>	<b>Counties</b>	<b>States</b>
Number of timber sales sold in fiscal year 2013		
<i>n</i>	39	48
<i>min.</i>	2	0 <sup>1</sup>
<i>max.</i>	160	982
<i>mean</i>	38	66
<i>st. dev.</i>	38	170
Number of acres sold in fiscal year 2013		
<i>n</i>	39	44
<i>min.</i>	223	0 <sup>1</sup>
<i>max.</i>	9783	61200
<i>mean</i>	2078	6197
<i>st. dev.</i>	1926	11890

<sup>1</sup>Five state agencies reported not having any timber sale activity in fiscal year 2013 for a variety of reasons (e.g., timber sale activity paused in fiscal year 2013 for political reasons”) but didn’t report not having a timber sale program.

<sup>3</sup> This section discusses responses from question 1 on the questionnaire (Appendix A).

### 3.1.2 State and County Timber Sale Programs and Permanent FTE Employees<sup>4</sup>

The total number of FTE employees for counties ranged from 0.7 to 39.0, while state timber sale programs ranged from 2.0 to 185.0 (Table 4). However, the ratio of field-based positions (field foresters) to total number of employees was comparable for counties and states (0.70 and 0.77, respectively). The ratio helps understand the workforce (as field foresters) available to prepare and administer timber sales.

The average number of timber sales sold in fiscal year 2013 per FTE field-based employee for counties and states was 9.7 and 2.3, respectively. The large difference is likely a function of the additional work related tasks that state field foresters are responsible for (e.g., wildland fire suppression efforts).

**Table 4.** Number of permanent FTE employees within timber sale programs in fiscal year 2013 by counties and states.

Characteristic	<i>Minimum</i>	<i>Average</i>	<i>Maximum</i>
Number of permanent FTE employees in fiscal year 2013			
County (n=39)			
Field-based	0.3	4.8	32.0
Office-based	0.0	1.3	5.0
Program supervision	0.0	0.8	2.0
Total employees	0.7	6.9	39.0
State (n=49)			
Field-based	1.0	26.2	142.0
Office-based	0.0	5.5	37.0
Program supervision	0.0	2.7	15.0
Total employees	2.0	34.0	185.0
Number of timber sales sold per FTE field-based employee			
County (n=39)	0.8	9.7	66.7
State (n=46)	0	2.3	13.1

### 3.1.3 Distribution of Timber Sales by Volume Size and by Season of Harvest<sup>5</sup>

Most timber sales sold in fiscal year 2013 were greater than 100 cord equivalents (Figure 3). Only 8% of the volume sold was included in the smallest size category (less than 100 cord equivalents). The percent of volume sold within each of the other cord size categories was nearly equal (21% to 28%).

Differences were observed for timber sale volume when considering the geographic region of the responding agencies. Program supervisors from the Western region (USDA-FS RPA Rocky Mountain and Pacific Coast regions combined) indicated an increasing trend toward larger volume timber sales with 53% of volume sold in fiscal year 2013 being from individual timber sales each more than 2,000 cord equivalents (Figure 4). Program supervisors from the Northern region indicated a trend towards more volume sold as individual timber sales in the 501 to 1000

<sup>4</sup> This section discusses responses from questions 1 and 15 on the questionnaire (Appendix A).

<sup>5</sup> This section discusses responses to question numbers 6 and 16 on the questionnaire (Appendix A).

cord equivalent size category (32%) and program supervisors from the Southern region responded with a more balanced distribution of volume sold across the four largest size categories.

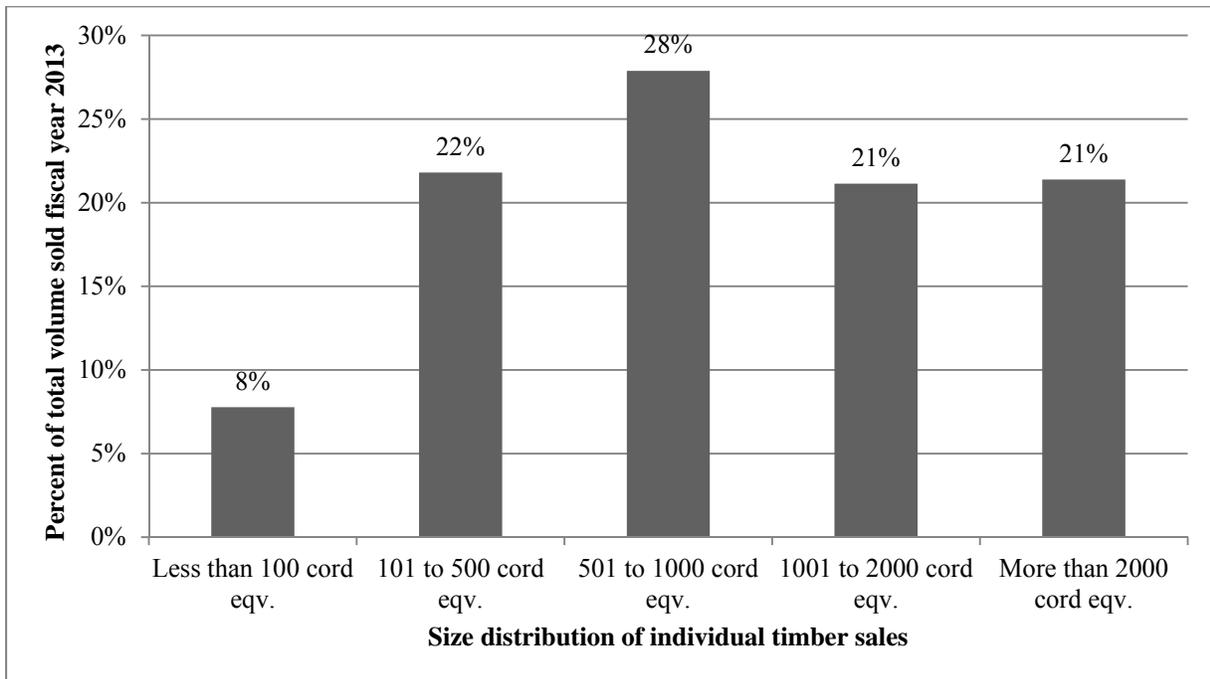


Figure 3. Size distribution of individual timber sales sold in cord equivalents during fiscal year 2013 (n=76).

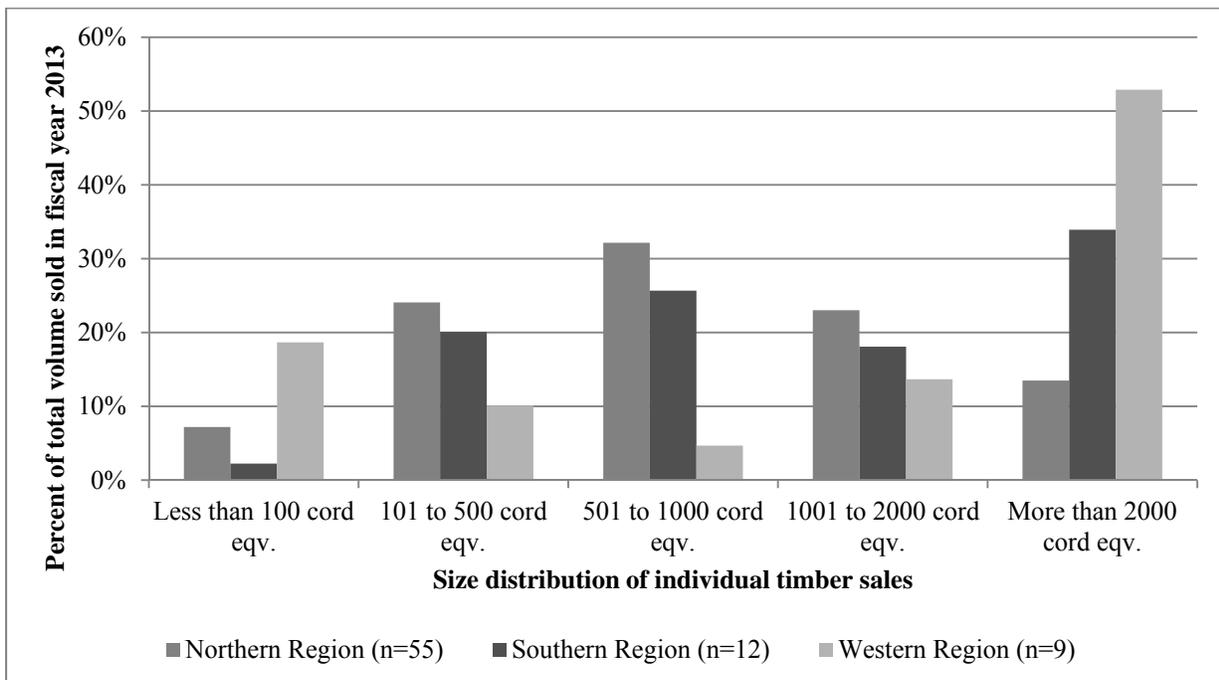
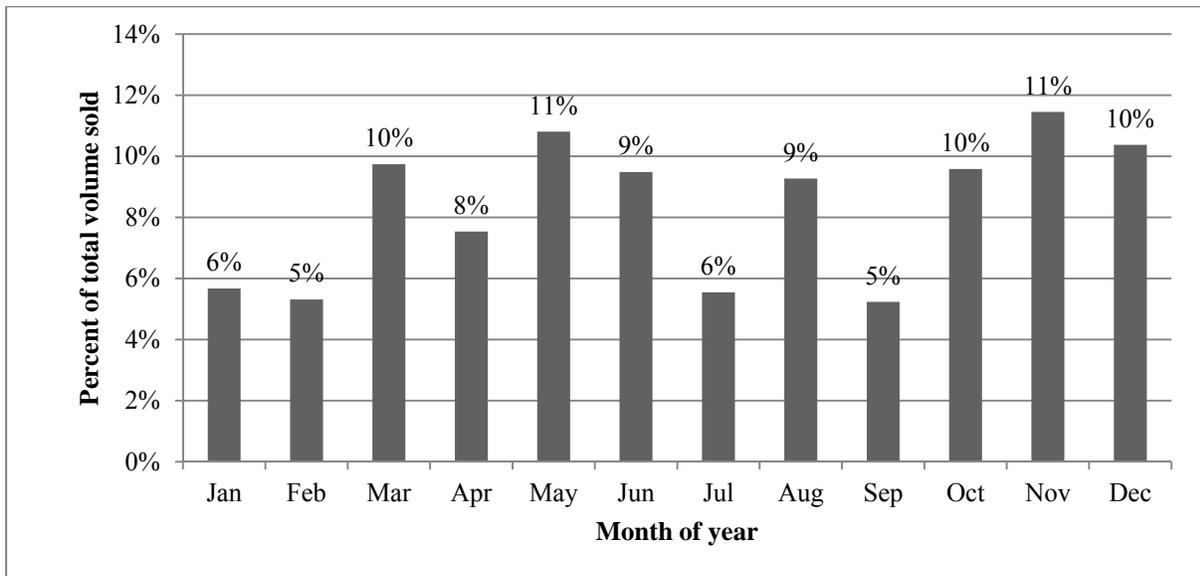


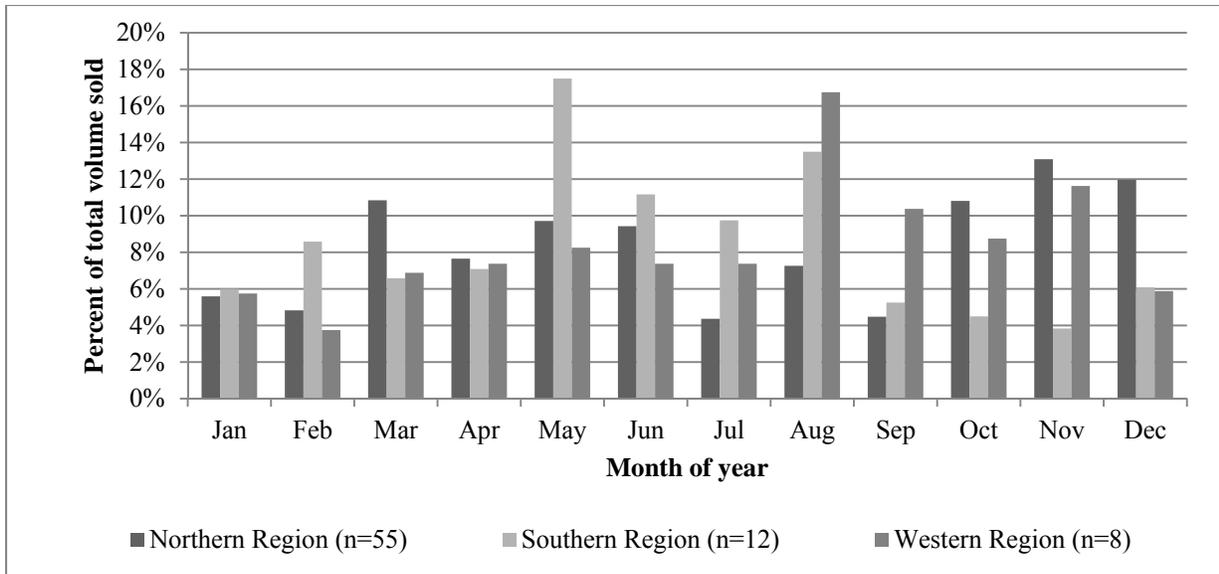
Figure 4. Size distribution of individual timber sales sold in cord equivalents during fiscal year 2013 by USDA-FS RPA region (Rocky Mountain and Pacific Coast regions are grouped into a single “Western Region”).

For all responding agencies, the distribution of timber volume sold in fiscal year 2013 ranged from 5% to 11% across the twelve calendar months, showing a slight trend in that the first and third quarters are lower than the second and fourth quarters (Figure 5).



**Figure 5.** Distribution of volume sold in fiscal year 2013 by month (n = 75).

Differences were observed in how agencies sold timber volume during the calendar year based on geographic region. Program supervisors from the western region (USDA-FS RPA Rocky Mountain and Pacific Coast regions combined) indicated a trend towards selling more timber volume in the third and fourth quarters (Figure 6). Program supervisors from the southern region indicated more timber volume sold in the second and third quarters with a peak (18%) in May. Program supervisors from the northern region indicated a lull in activity during the third quarter and a spike in the fourth quarter.



**Figure 6.** Distribution of volume sold in fiscal year 2013 by month and by USDA-FS RPA region (Rocky Mountain and Pacific Coast regions are grouped into a single “Western Region”).

### 3.1.4 Strategies for Ensuring that a Range of Timber Sale Sizes are Sold and Available to Small Purchasers<sup>6</sup>

Eighty percent (n=71) of program supervisors indicated that their agency does not have a strategy for ensuring that a range of timber sale sizes (by area or volume) are sold each year (e.g., specified minimum percent of all timber sales sold during a year contain no more than 1,000 cords in volume).

Of the 20% (n=18) of program supervisors that indicated a strategy, four indicated that their agency has an established or formalized forest management plan that provides the direction and outlines the strategy to meet the goals or targets for a range of timber sale sizes. Four program supervisors stated that timber sale sizes are designed around purchaser requests or accommodations to provide timber sales for small and large purchasers. For example, one program supervisor indicated:

“Our sales range from 25 MBF to 15,000 MBF. We try to have a mix of small sales for very small purchaser[s], medium sized sales less than \$150,000-1,000MBF and large sales over 1,000MBF and over \$150,000. Small sales are less than \$10,000 in value and 200 MBF in volume.”

The response of two program supervisors related to achieving financial goals or meeting budget targets. For example, one program supervisor indicated:

<sup>6</sup> This section discusses responses from questions 17 and 18 on the questionnaire (Appendix A).

“Annual target varies depending on budget requirements for each fiscal year. Must adhere to sustainability requirements as defined by annual allowable cut (defined by agency).”

The majority (78%; n=69) of program supervisors indicated that their agency does not have a strategy to accommodate small purchasers (e.g., a certain number of employees or annual harvest production). The term “small purchaser” was not defined qualitatively in the questionnaire and therefore it was expected that “small purchaser” can be interpreted differently by program supervisors. As such, the question was designed to capture any strategy used to increase the likelihood that timber sales will only be bought by the small purchaser demographic (e.g., limiting the amount of timber allowed to be purchased by any one company, or making small timber sales available without a competitive auction) within the agency’s jurisdiction.

Eleven of the 20 responding program supervisors indicated their agency has a strategy to accommodate small purchasers. Strategies cited included the following:

“Sales less than 200,000 bd ft are offered over the counter - no auction. If more than one person is interested in the sale it should be advertised and sold at oral auction.”

“We do break sales into smaller units - each unit paid for separately prior to harvest, in an attempt to accommodate smaller purchasers.”

“[We] allow lump-sum sales to be split up into several payment units so that a contractor does not have to pay the entire lump-sum at once.”

Four program supervisors explained a strategy that is designed to accommodate small purchasers that have a specific number of employees. For example, one program supervisor indicated that their program for targeting small purchasers is the following:

“[Some] sales are offered to operators with 20 or fewer employees only.”

Four program supervisors explained a strategy that limits or restricts the number of timber sales or percent of total auction volume allowed by a single purchaser at an auction. Suggesting that the strategy is designed to help small purchasers by providing a better opportunity that timber sales are available for bids. For example, one program supervisor indicated:

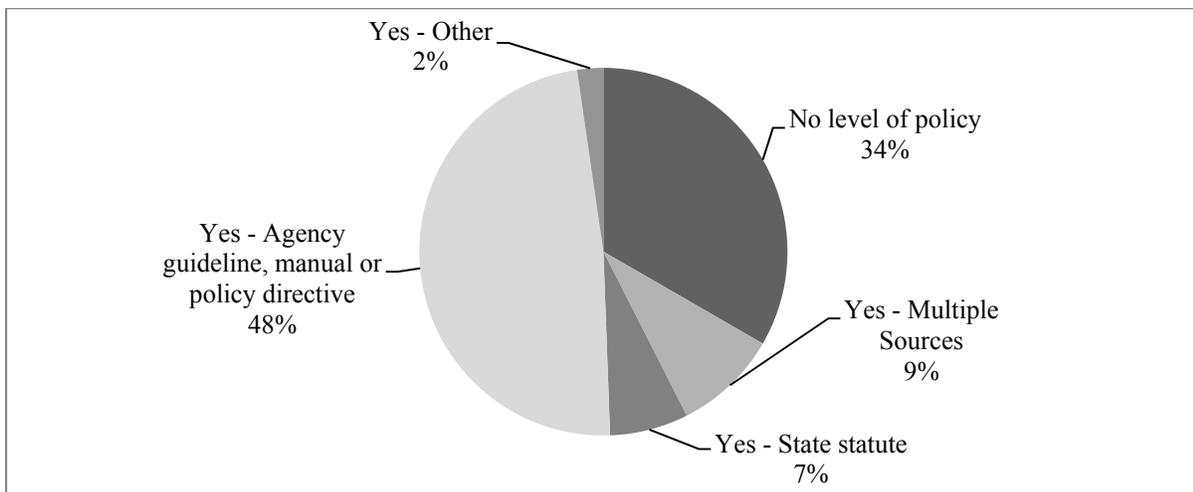
“Purchasers can only buy up to 25% of the offered tracts on the first round of bidding.”

## 3.2 Information on Timber Sale Stumpage Payment Methods

### 3.2.1 Policy Influences on Stumpage Payment Methods<sup>7</sup>

Thirty-four percent of program supervisors reported not having any agency policy that requires the use of a certain stumpage payment method(s) (Figure 7). Of the agencies that do have a formal policy, 48% indicated that the source of direction comes from an agency guideline, manual or policy directive. Less common levels of policy that dictate what stumpage payment method(s) are used are state statutes (7%) or an “other” source of direction (2%). The program supervisors who indicated “other” explained their response as being an agency preference or informal practice. Nine percent of program supervisors indicated multiple levels of policy guidance for determining how to collect payment for timber sold. One program supervisor who indicated use of an agency guideline, manual or policy directive for determining their stumpage payment method(s) provided further elaboration on how the payment method is determined:

“Newer employees are more restricted to having their sales sold by consumer scale in their first year or two of employment.”



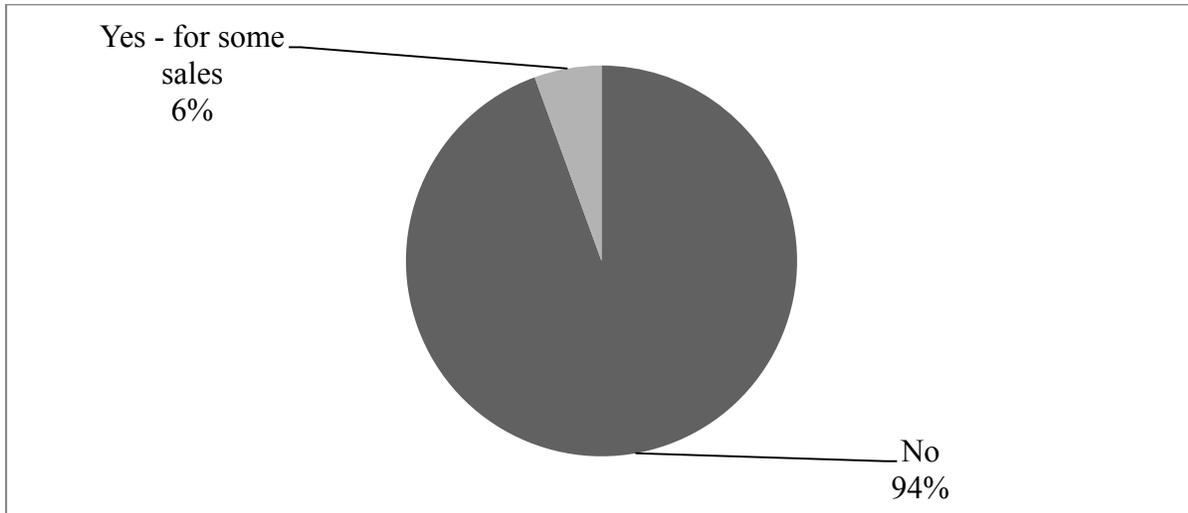
**Figure 7.** Summary of the policy sources that determine the use of stumpage payment method(s) (n=90).

Only five (6%) program supervisors indicated that their agency allows the purchaser to decide what stumpage payment method to use for timber sales that are offered (Figure 8). The five program supervisors further indicated that purchaser choice was only allowed for some timber sales, averaging 19% of their total volume sold in fiscal year 2013.

The majority (52%) of program supervisors indicated that the legal ownership of timber products transfers from their agency to the purchaser (or another party) when the timber is sold and payments have been collected from the purchaser (Figure 9), while 18% indicated the transfer of ownership occurs when the timber leaves the harvest site. When timber arrives at the consuming mill or purchaser delivery point (7%) or is severed from the stump (4%) were cited as being less common events when legal ownership of the timber transfers from the agency to the purchaser.

<sup>7</sup> This section discusses responses from questions 3 and 4 on the questionnaire (Appendix A).

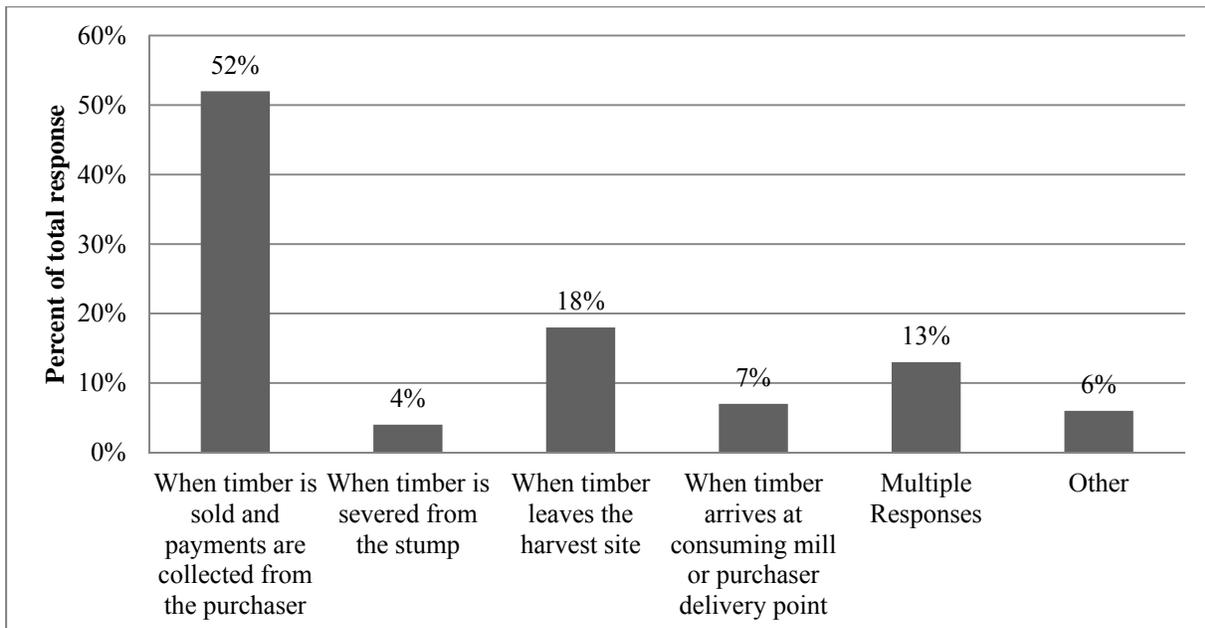
A few (6%) of program supervisors indicated an “other” time reference when ownership transfers (e.g., when authorized to cut by the agency or when the timber products have been scaled).



**Figure 8.** Summary of the percent of responses by use of purchaser choice for stumpage payment method (n=90).

Thirteen percent of program supervisors indicated multiple responses for when the legal ownership transfers. For example, one program supervisor explained that:

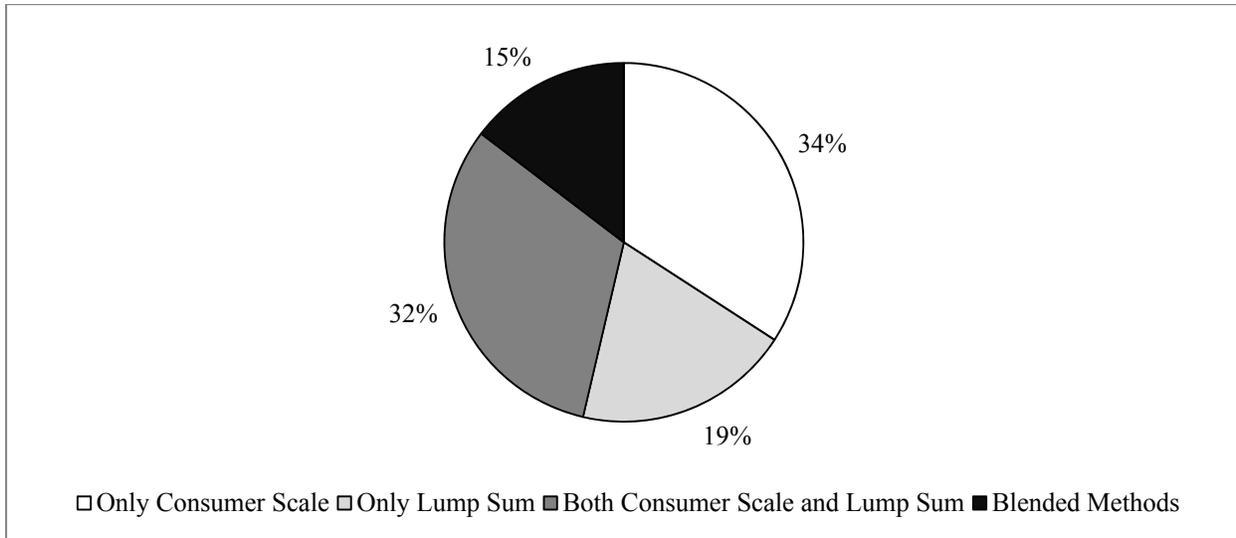
“Scaled sales: when wood has been scaled on landing or tickets are purchased for transport. Lump sum: purchaser pays before cutting begins.”



**Figure 9.** Summary of the percent of responses by time when legal ownership of timber products transfers from seller to buyer (n=90).

### 3.2.2 Public Agency Use of Stumpage Payment Methods in Fiscal Year 2013<sup>8</sup>

Use of the consumer-scale method was highest among all responding agencies (34% used only the consumer-scale method), while the use of only the lump-sum method was 19% (Figure 10). Of the remaining responses, both the methods were used but with different approaches. Thirty-two percent of agencies used both the consumer-scale and lump-sum methods but on separate timber sales while 15% used both methods on single timber sales (e.g., pulpwood sold consumer-scale and sawtimber sold lump sum) and is referred to as “blended methods”.

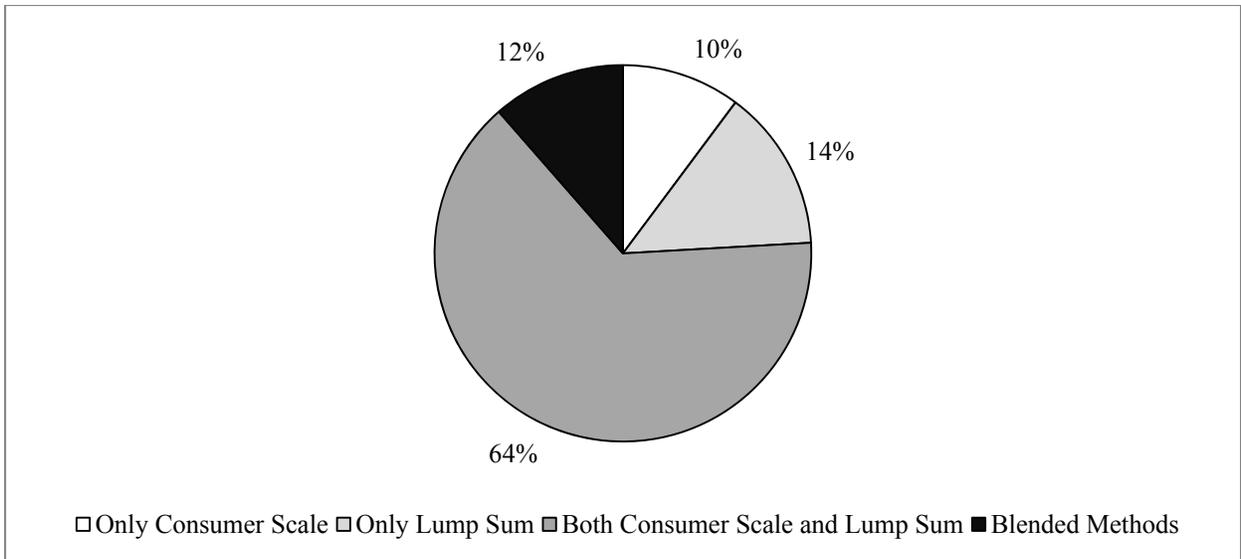


**Figure 10.** Unweighted use of stumpage payment methods in fiscal year 2013 by reported method(s) (n=82).

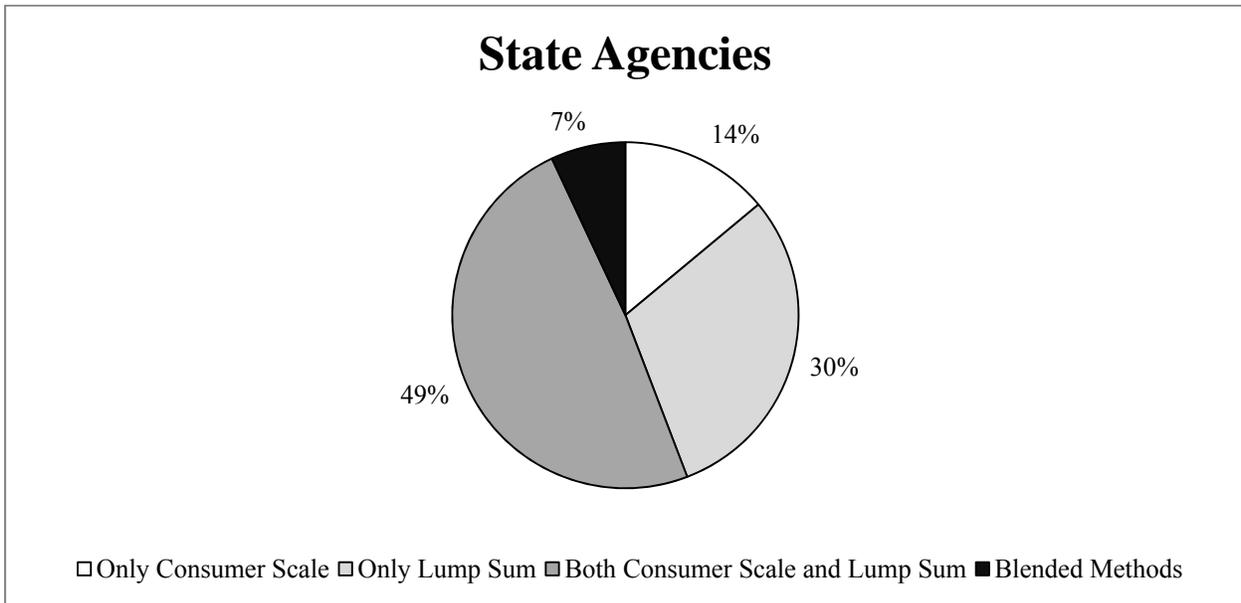
When use of stumpage payment methods is weighted by the number of timber sale acres sold in fiscal year 2013, the use of both the consumer-scale and lump-sum methods was highest (64% of total acres sold) (Figure 11). This indicates that the largest agencies (in terms of acres sold in fiscal year 2013) used both methods in their timber sale program while the smaller agencies had a tendency to use a single method or blended methods.

Use of stumpage payment methods in fiscal year 2013 was different depending of the type of agency, state or county. State agencies had a higher use of the lump-sum method (49% used only lump-sum method) (Figure 12). In contrast, county agencies had a higher use of the consumer-scale method (56% used only the consumer-scale method) (Figure 13).

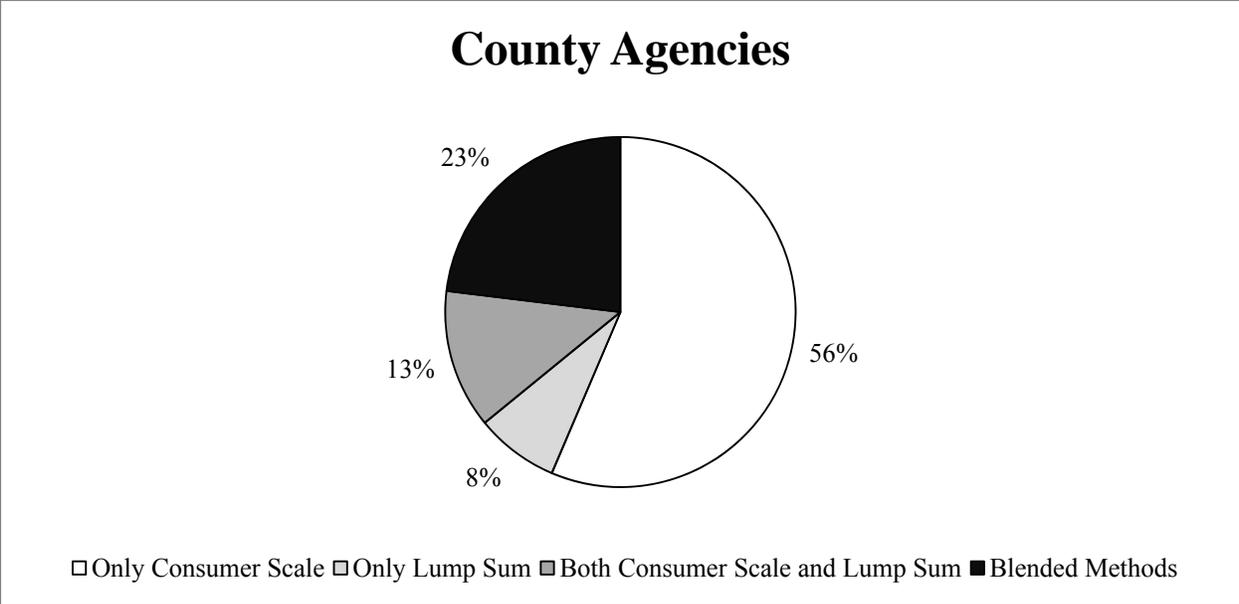
<sup>8</sup> This section discusses responses from question 1 on the questionnaire (Appendix A).



**Figure 11.** Use of stumpage payment methods weighted by number of acres sold by method in fiscal year 2013 (n=82).

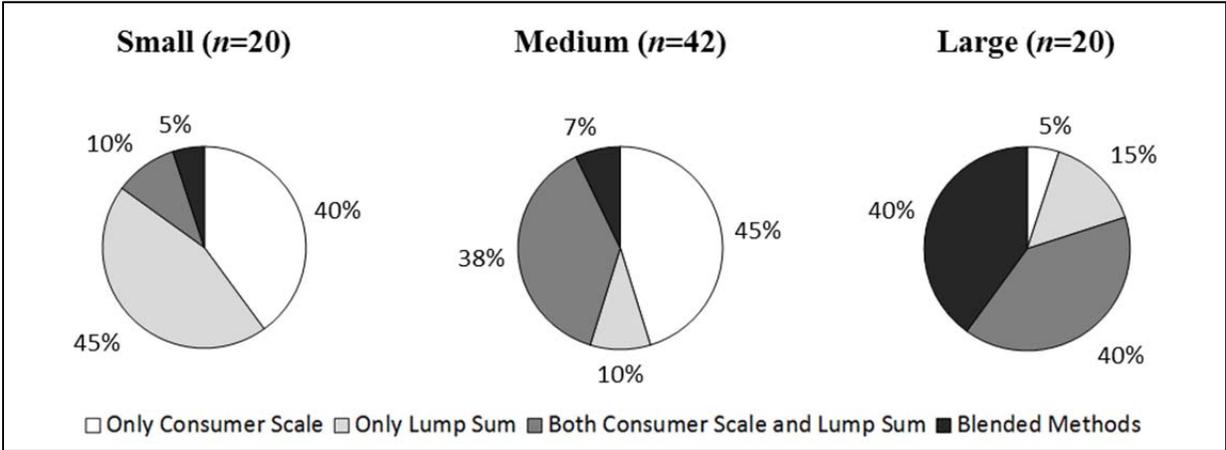


**Figure 12.** State agencies use of stumpage payment methods in fiscal year 2013 by reported method(s) (n=43).



**Figure 13.** County agencies use of stumpage payment methods in fiscal year 2013 by reported method(s) (n=39).

Agency size (as defined by number of timber sales sold in fiscal year 2013) appeared to influence how stumpage payment methods were used in the fiscal year 2013 (Figure 14). A chi-square test was performed to examine the relation between size category and use of stumpage payment methods was significant ( $p \leq 0.001$ ). Small sized agencies had a tendency to use only the lump-sum method (45%) or only the consumer-scale method (40%) and less use of both methods on separate timber sales (10%) or blended methods (5%). Medium sized agencies maintained a high use of only the consumer-scale method (45%) but also increased the use of both methods (38%) in their timber sale programs. Large sized agencies had a greater tendency to use both methods (40%) or blended methods (40%) and less use of only the lump-sum method (15%) or only the consumer-scale method (5%).



**Figure 14.** Use of stumpage payment methods by agency size category based on number of timber sales sold in fiscal year 2013 (“Small” = 1 – 7, “medium” = 8 – 53 and “large” = 54 – 982 timber sales sold in fiscal year 2013).

### 3.2.3 Influential Timber Sale Characteristics on the Use of Stumpage Payment Methods<sup>9</sup>

Program supervisors were asked to assess the extent to which various timber sale characteristics influenced the selection of stumpage payment method (consumer scale, lump sum or blended) using a 5-point Likert scale. Only two of the twelve listed timber sale characteristics were identified by program supervisors as having a significant influence on the type of stumpage payment method used (Table 5). While a low accuracy of estimated sale volume was determined to be very influential for selecting the choice of the consumer-scale method ( $p < 0.001$ ), a high accuracy of estimated sale volume was very influential for selecting the lump-sum method ( $p \leq 0.002$ ). Although not statistically significant, the blended methods scored highest on the characteristics describing timber sales that consist of multiple species-products and with low value (\$/unit) timber.

**Table 5.** Characteristics of timber sales that influence the choice of stumpage payment method used. Values shown are mean scores based on a 5-point Likert scale where 1 = not influential and 5 = very influential and resulting p-values from non-parametric tests (Kruskal-Wallis one-way ANOVA). Means followed by the same letter are not significantly different ( $p \leq 0.05$ ).

Characteristic	Stumpage Payment Method			p-value
	Consumer Scale (n)	Lump Sum (n)	Blended Methods (n)	
Low value (\$/unit) timber	2.97(38)	2.92 (38)	3.24 (17)	0.656
High value (\$/unit) timber	3.22 (38)	3.14 (37)	2.88 (16)	0.767
Small volume sale	2.72 (39)	3.03 (36)	2.65 (17)	0.485
Large volume sale	3.05 (37)	2.89 (37)	2.33 (15)	0.261
Small acre sale	2.74 (38)	2.78 (37)	2.31 (16)	0.511
Large acre sale	3.03 (37)	2.76 (37)	2.41 (17)	0.294
Single species-product in the sale	2.87 (38)	2.61 (36)	2.12 (17)	0.188
Multiple species-products in the sale	2.68 (38)	2.62 (37)	2.94 (17)	0.688
Low accuracy of estimated sale volume	3.87 (38)	2.63 (35) <sup>a</sup>	2.59 (17) <sup>a</sup>	0.001
High accuracy of estimated sale volume	2.54 (39) <sup>a</sup>	3.68 (37)	2.82 (17) <sup>a</sup>	0.002
Low logging costs and/or transportation costs	2.19 (37)	2.33 (36)	2.06 (17)	0.735
High logging costs and/or transportation costs	2.42 (38)	2.35 (37)	2.18 (17)	0.890

### 3.2.4 Evaluation of Cruising Standards<sup>10</sup>

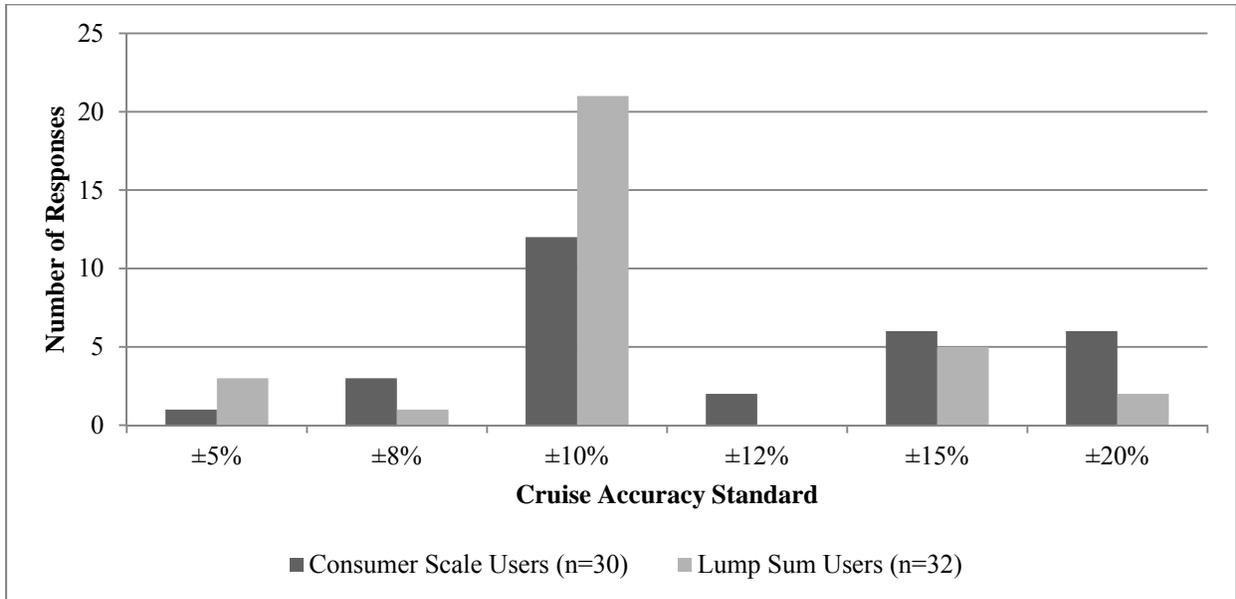
The majority (67%; n = 62) of program supervisors indicated that their agency has an established standard for cruising timber sales. The program supervisors were asked to indicate that standard for all stumpage payment methods used by their agency as either an accuracy standard (e.g., within  $\pm 10\%$  of actual stand volume) and/or an intensity standard (e.g., 2 plots per acre)

<sup>9</sup> This section discusses responses from question 12 on the questionnaire (Appendix A).

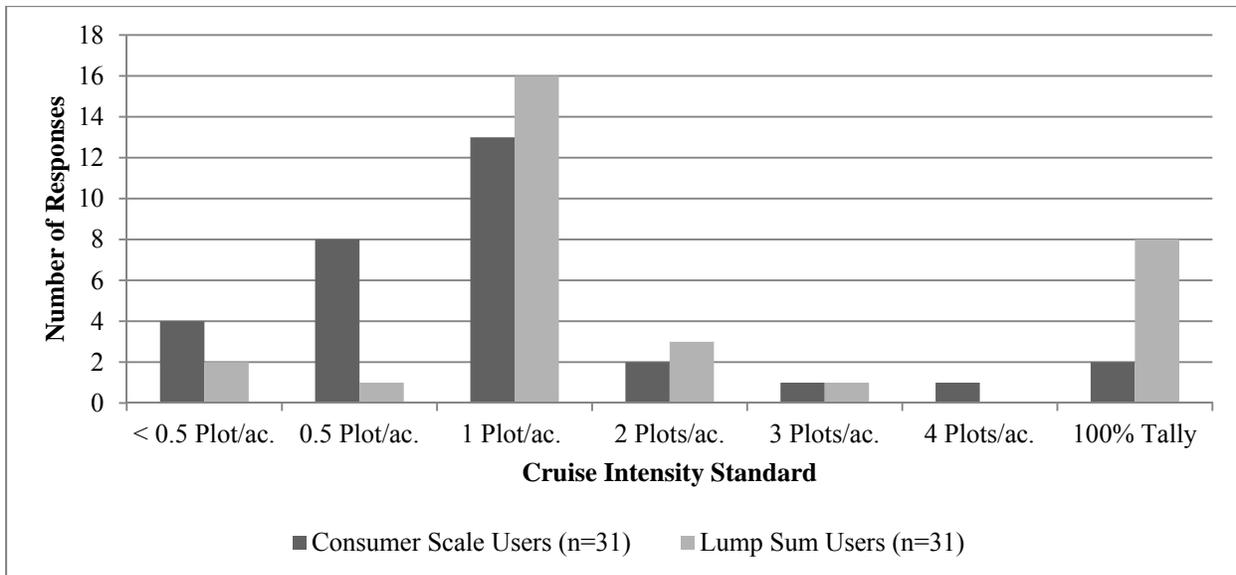
<sup>10</sup> This section discusses responses from question number 2 on the questionnaire (Appendix A).

(question 2 on survey questionnaire). The highest response as a cruise accuracy standard for both the consumer-scale and lump-sum methods was  $\pm 10\%$  of actual stand volume (Figure 15).

The most common cruise intensity standard reported for both the consumer-scale and lump-sum methods was one plot per acre (Figure 16). The second highest cruise intensity response for the consumer-scale method decreased to 0.5 plots per acre while the lump-sum method was a 100% tally.

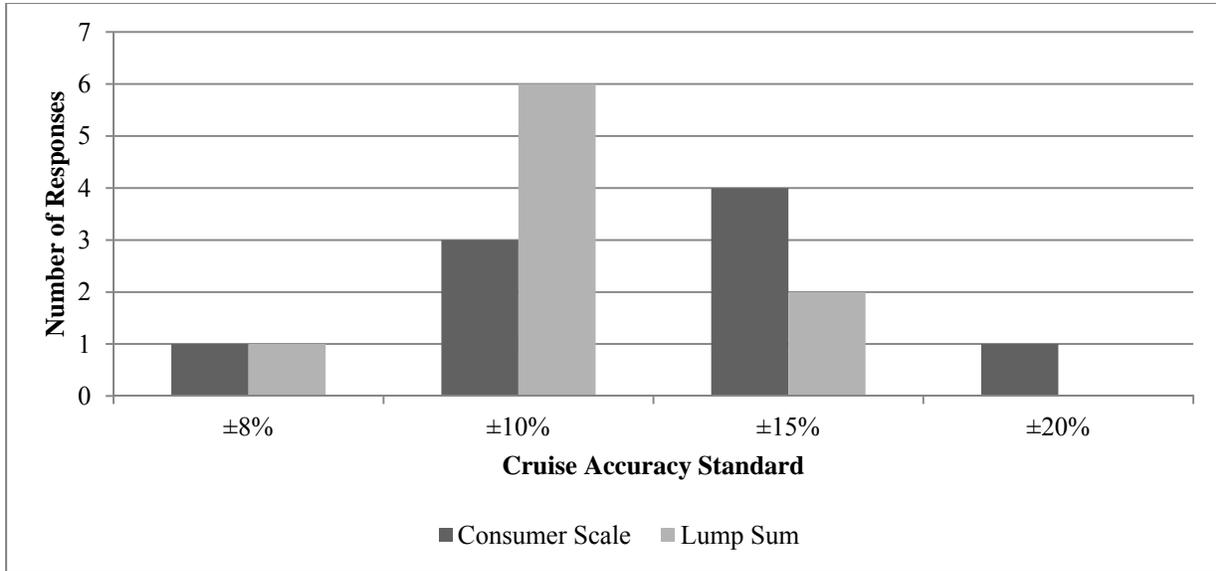


**Figure 15.** Summary of the number of responses for the reported cruise accuracy standards for the consumer-scale and lump-sum methods in fiscal year 2013 (values ranged from  $\pm 5\%$  - 20% for both methods).

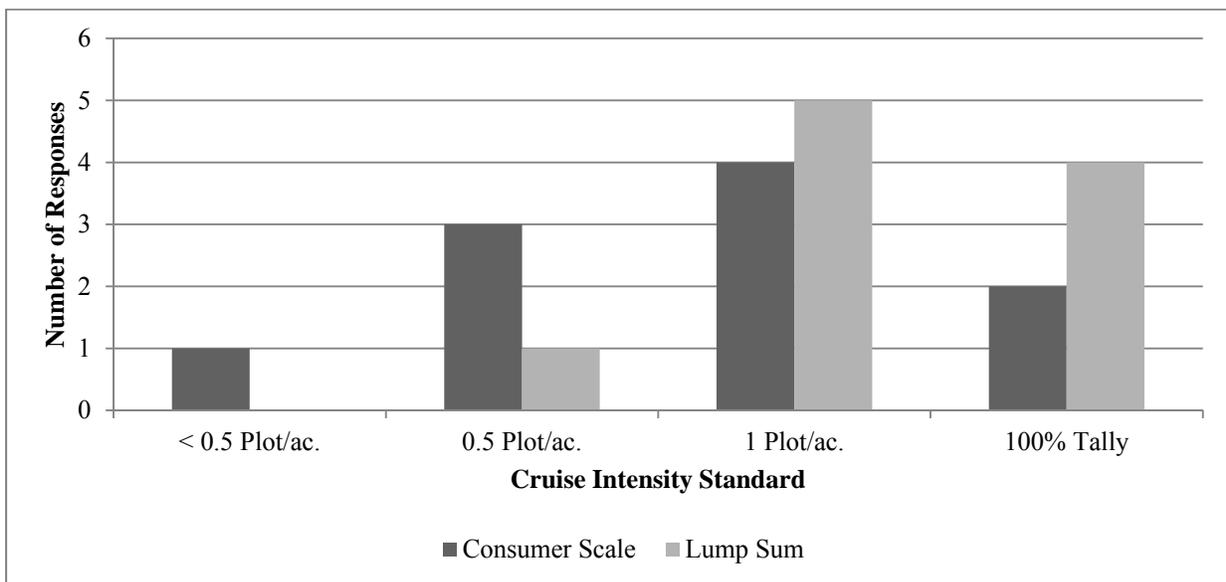


**Figure 16.** Summary of the number of responses for the reported cruise intensity standards for the consumer-scale and lump-sum methods in fiscal year 2013 (values ranged from 0.2 plots/acre to 100% tally for both methods).

Considering only those responses from program supervisors using both consumer-scale and lump-sum methods in fiscal year 2013, the most common response to a cruise accuracy standard was  $\pm 15\%$  for the consumer-scale method and  $\pm 10\%$  for the lump-sum method (Figure 17). The most common cruise intensity was 1 plot/acre for both payment methods (Figure 18).



**Figure 17.** Summary of the number of responses for the reported cruise accuracy standards for agencies that used both the consumer-scale and lump-sum methods (either on separate timber sales or with the blended methods approach) in fiscal year 2013 (n=9).

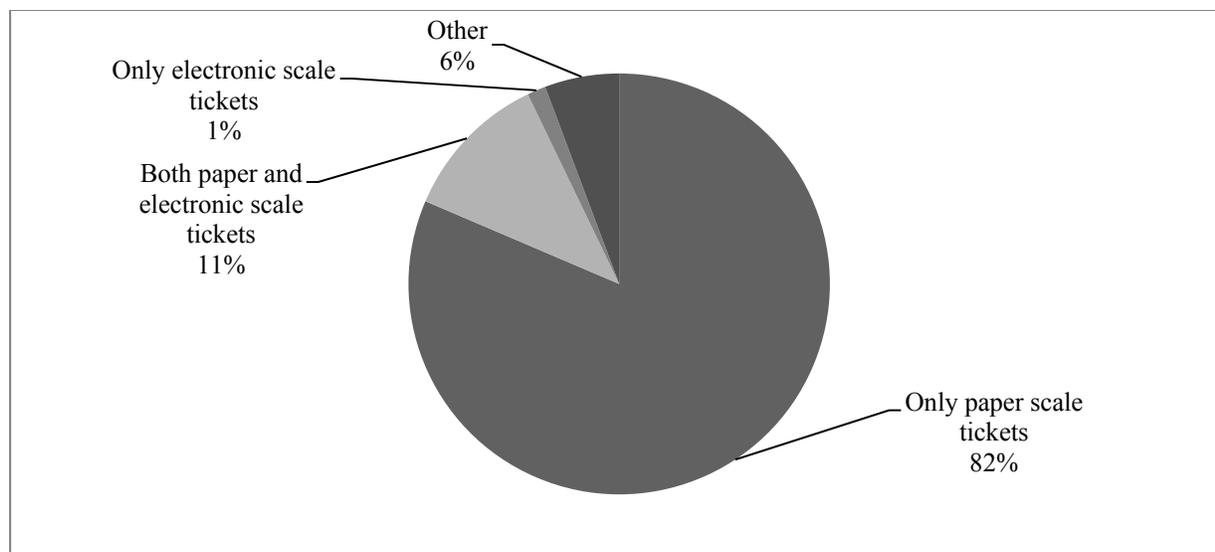


**Figure 18.** Summary of the number of responses for the reported cruise intensity standards for agencies that used both the consumer-scale and lump-sum methods (either on separate timber sales or with the blended methods approach) in fiscal year 2013 (n=10).

### 3.2.5 Characteristics Specific to the Consumer-scale Method<sup>11</sup>

The majority (82%) of program supervisors indicated that their agency uses only paper scale tickets to track individual loads of timber products from the harvest site to the consuming mill or purchaser delivery point for the consumer-scale method (Figure 19). Eleven percent of program supervisors reported also using a form of electronic scale tickets in addition to paper scale tickets and one program supervisor indicated using only electronic scale tickets.

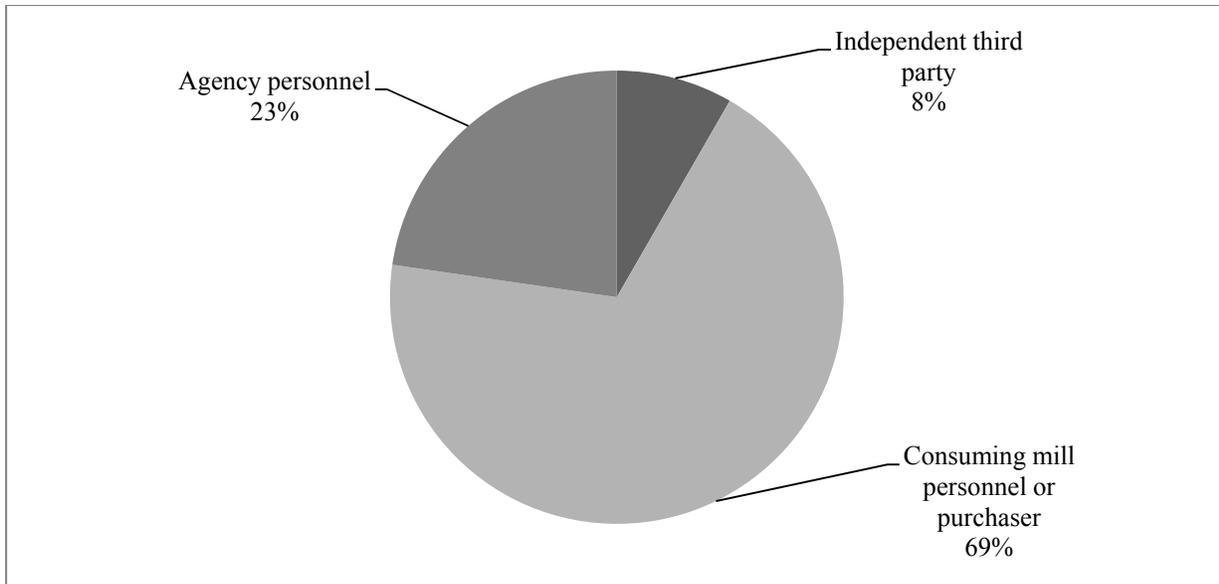
Four program supervisors indicated an “other” method (6%) of tracking loads of timber products for the consumer-scale method. One program supervisor further explained that in addition to the paper scale tickets, the agency uses security cameras on site, destination checks, and weekly reconciliation reports matching truck trip tickets to scale tickets. Another program supervisor who responded as “other” explained that no tracking method was being used.



**Figure 19.** Summary of the methods used to track timber loads from the harvest site to consuming mill for the consumer-scale method in fiscal year 2013 (n=78).

Program supervisors reported that most (66%) of the volume sold in the fiscal year 2013 using the consumer-scale method was scaled by the consuming mill personnel or purchaser (Figure 20). Volume scaled by agency personnel accounted for 23% of consumer-scale sales and less common was volume scaled by an independent third-party (8%). Program supervisors indicated that 3% of consumer-scale sales were scaled by an “other” method; one program supervisor explained that a state regulated weight scale was used while another program supervisor indicated that a general weight scale was used and one program supervisor explained that 5% of the independent third-party scaled volume is check scaled for accuracy.

<sup>11</sup> This section discusses responses from question numbers 10 and 11 on the questionnaire (Appendix A).



**Figure 20.** Summary of the methods used to scale timber volume for the consumer-scale method in fiscal year 2013 (n=65).

### ***3.3 Perceived Ecological, Financial and Administrative Differences Resulting from Use of Stumpage Payment Methods***

The consumer-scale method was contrasted against the lump-sum methods to understand what perceived advantages and disadvantages exist with using either stumpage payment method in public agency timber sale programs. Statements were designed to address the perceived ecological, financial and administrative differences and evaluated using Likert-scale questions that requested the degree of agreement from the program supervisor for each statement. The statements were designed from gleaning the published literature regarding possible advantages or disadvantages of using the consumer-scale and lump-sum methods and identifying any information gaps (e.g., absence of possible ecological impacts) in the literature. The results are presented below.

#### **3.3.1 Perceptions of the Ecological Differences<sup>12</sup>**

Program supervisors had strongly contrasting perceptions ( $p < 0.001$ ) for only two statements designed to address the potential ecological differences of using the consumer-scale and lump-sum stumpage payment methods (Table 6).

The widest range of mean Likert-scale values reported ( $p < 0.001$ ) was for the statement addressing is each method encourages high utilization of standing dead and on-the-ground dead material (consumer-scale mean value = 2.74 and lump-sum mean value = 3.38). This indicates that program supervisors perceive a significant difference between the two methods and suggests that the lump-sum method encourages higher utilization. The narrowest range of values reported was for the statement inquiring if each method allows land managers to meet regeneration

<sup>12</sup> This section discusses responses from question 7 on the questionnaire (Appendix A).

objectives ( $p \leq 0.798$ ) (consumer-scale mean value = 3.65 and lump-sum mean value = 3.67). This finding indicates that program supervisors perceive no difference between the two methods with regards to meeting regeneration objectives.

**Table 6.** Comparison of the perceived ecological differences between the consumer-scale and lump-sum stumpage payment methods. Values shown are mean scores based on a 5-point Likert scale; where 1 = strongly disagree, 3 = neutral and 5 = strongly agree and resulting p-values from paired t-tests. Standard deviations are shown in parentheses.

Statement	Stumpage Payment Method		p-value
	Consumer Scale	Lump Sum	
Allows land managers to meet regeneration objectives. (n=79)	3.65 (0.97)	3.67 (1.06)	0.798
Has a positive influence on post-harvest wildlife habitat. (n=81)	3.54 (1.01)	3.49 (1.03)	0.620
Encourages the logger to utilize timber in riparian areas. (n=77)	2.95 (0.96)	3.43 (1.08)	0.001
Encourages high utilization of standing dead and on-the-ground dead material. (n=81)	2.74 (0.93)	3.38 (1.11)	0.000
Affects which leave trees the logger will choose (If required and not marked by the forester). (n=79)	3.54 (1.05)	3.57 (1.15)	0.818
Has a positive influence on post-harvest visual and aesthetic qualities. (n=79)	3.41 (0.91)	3.30 (1.04)	0.445

Considering responses from program supervisors who used only the consumer-scale method or only the lump-sum method in fiscal year 2013, there were considerable differences in how those two groups perceived the ecological advantages and disadvantages of the stumpage payment methods (Table 7). Program supervisors who used only the lump-sum method perceived no significant difference between the two stumpage payment methods in terms of impacting post-harvest ecological conditions. In contrast, program supervisors who used only the consumer-scale method perceived differences ( $p < 0.001$ ) in terms of utilization, suggesting that the lump-sum method results in higher utilization in riparian areas and of dead material. Furthermore, agencies that only use the consumer-scale method perceived a difference ( $p \leq 0.032$ ) in which leave trees are chosen by a logger during harvest operations, again suggesting that the lump-sum method has significantly more influence on leave tree retention; a difference that was not perceived by all program supervisors. Lastly, agencies that only use the consumer-scale method perceived a difference ( $p \leq 0.029$ ) on post-harvest aesthetic qualities, suggesting that the consumer-scale method has significantly more influence; another difference that was not perceived by all program supervisors.

**Table 7.** Comparison of the perceived ecological differences between the consumer-scale and lump-sum stumpage payment methods for agencies that only use a single payment method. Values shown are resulting p-values from paired t-tests. For analyses that are significant ( $p \leq 0.05$ ), the stumpage payment method with a higher mean score is shown in parentheses where “CS” = consumer scale, “LS” = lump sum.

Statement	P-values from paired t-tests	
	Agencies only use the consumer-scale method (n=28)	Agencies only use the lump sum method (n=16)
Allows land managers to meet regeneration objectives.	0.118	0.168
Has a positive influence on post-harvest wildlife habitat.	0.088	0.192
Encourages the logger to utilize timber in riparian areas.	0.001 (LS)	0.689
Encourages high utilization of standing dead and on-the-ground dead material.	0.001 (LS)	0.504
Affects which leave trees the logger will choose (if required and not marked by the forester).	0.032 (LS)	0.392
Has a positive influence on post-harvest visual and aesthetic qualities.	0.029 (CS)	0.104

### 3.3.2 Perceptions of the Financial Differences<sup>13</sup>

Program supervisors had strongly contrasting perceptions ( $p < 0.023$ ) for all but two of the seven statements designed to address the potential financial differences of using the consumer-scale and lump-sum stumpage payment methods (Table 8).

The widest range of mean Likert-scale values reported ( $p < 0.001$ ) was for the statement addressing the administrative costs to administer for each method (consumer-scale mean value = 3.65 and lump-sum mean value = 2.55). This indicates that program supervisors perceive a significant difference with regards to the administrative costs associated with the two methods, suggesting that the lump-sum method is considerably less costly to administer. The narrowest range of values reported ( $p \leq 0.380$ ) was for the statement inquiring if each method encourages competition from potential purchasers (consumer-scale mean value = 3.73 and lump-sum mean value = 3.63). This finding suggests that program supervisors don't perceive that the two stumpage payment methods encourage bidding competition for stumpage differently.

Considering responses from program supervisors who used only a single stumpage payment method in fiscal year 2013, there are considerable differences in how those two groups perceived the financial advantages and disadvantages of using stumpage payment methods (Table 9). Consumer scale users perceived a difference ( $p \leq 0.033$ ) on stumpage bid prices received, suggesting that the consumer-scale method results in higher stumpage bids prices than normal. Lump-sum users perceived no significant difference between stumpage payment methods on stumpage bid prices. Both groups perceived a difference ( $p \leq 0.024$ ) in terms of stumpage payments being a financial risk to their agency, suggesting that each group perceives the other stumpage payment method to be the significant financial risk. However, both groups perceived a difference ( $p \leq 0.012$ ) in cost to their agency to administer timber sales using stumpage payment methods, suggesting that both groups perceive the consumer-scale method to be costly; which concurs with the perceived finding from all program supervisors.

<sup>13</sup> This section discusses responses from question 8 on the questionnaire (Appendix A).

**Table 8.** Comparison of the perceived financial differences between the consumer-scale and lump-sum stumpage payment methods. Values shown are mean scores based on a 5-point Likert scale; where 1 = strongly disagree, 3 = neutral and 5 = strongly agree and resulting p-values from paired t-tests. Standard deviations are shown in parentheses.

Statement	Stumpage Payment Method		p-value
	Consumer Scale	Lump Sum	
Will generate higher stumpage bids than normal. (n=77)	3.51 (0.79)	3.18 (0.88)	0.023
Is attractive to bidders when the sale has a high percentage of low value timber. (n=76)	3.59 (0.90)	2.92 (0.98)	0.001
Is attractive to bidders when their operating costs are high. (n=75)	3.63 (0.80)	3.01 (0.88)	0.000
Encourages competition for sales. (n=79)	3.73 (0.80)	3.63 (0.89)	0.380
Is a financial risk to your agency. (n=82)	2.73 (1.12)	3.09 (1.24)	0.111
Is costly for your agency to administer. (n=83)	3.65 (0.98)	2.55 (0.99)	0.000
Will maximize timber revenue for your agency. (n=79)	3.72 (0.88)	3.10 (0.99)	0.001

**Table 9.** Comparison of the perceived financial differences between the consumer-scale and lump-sum stumpage payment methods for agencies that only use a single payment method. Values shown are resulting p-values from paired t-tests. For analyses that are significant ( $p \leq 0.05$ ), the stumpage payment method with a higher mean score is shown in parentheses where “CS” = consumer scale, “LS” = lump sum.

Statement	P-values from paired t-tests	
	Agencies only use the consumer-scale method (n=28)	Agencies only use the lump-sum method (n=16)
Will generate higher stumpage bids than normal.	0.033 (CS)	0.591
Is attractive to bidders when the sale has a high percentage of low value timber.	0.130	0.029 (CS)
Is attractive to bidders when their operating costs are high.	0.328	0.070
Encourages competition for sales.	0.073	0.642
Is a financial risk to your agency.	0.000 (LS)	0.024 (CS)
Is costly for your agency to administer.	0.012 (CS)	0.000 (CS)
Will maximize timber revenue for your agency.	0.000 (CS)	0.832

### 3.3.3 Perceptions of the Administrative Differences<sup>14</sup>

Program supervisors had strongly contrasting perceptions ( $p < 0.001$ ) for all statements designed to address the administrative differences of using the consumer-scale and lump-sum methods (Table 10).

The widest range of values reported ( $p < 0.001$ ) was for the statements regarding the administrative time required to process paperwork and other timber sale documents (consumer-scale mean value = 4.02 and lump-sum mean value = 2.29). This finding indicates that program supervisors perceive a significant difference between the two methods in terms of the workload required to process paperwork and documents. It suggests that the consumer-scale method requires considerably more time to process paperwork and documents as compared to the lump-sum method. The narrowest range of values reported ( $p < 0.001$ ) was for the statement relating to

<sup>14</sup> This section discusses responses from question 9 on the questionnaire (Appendix A).

a forester’s ability to manage or administer several timber sales at one time (consumer-scale mean value = 3.62 and lump-sum mean value = 4.17) none-the-less suggests that the lump-sum method allows considerable more timber sales per single field forester when compared to the consumer-scale method.

**Table 10.** Comparison of the perceived administrative differences between the consumer-scale and lump-sum stumpage payment methods. Values shown are mean scores based on a 5-point Likert scale; where 1 = strongly disagree, 3 = neutral and 5 = strongly agree and resulting p-values from paired t-tests. Standard deviations are shown in parentheses.

Statement	Stumpage Payment Method		p-value
	Consumer Scale	Lump Sum	
Requires more administrative time than average to cruise and determine a volume estimate. (n=83)	2.58 (1.05)	3.72 (1.07)	0.000
Requires more administrative time than average during harvest operations (e.g., inspections). (n=84)	3.71 (0.94)	2.63 (0.88)	0.000
Requires more administrative time than average to process paperwork and other documents from the sale. (n=82)	4.02 (0.85)	2.29 (0.79)	0.000
A forester could manage or administer several sales with this payment method at one time. (n=82)	3.62 (1.11)	4.17 (0.93)	0.000
Requires more administrative personnel involved with the timber sale from start to finish. (n=82)	3.27 (1.04)	2.51 (0.84)	0.000

Considering responses from program supervisors who only used a single stumpage payment method in fiscal year 2013, there are considerable differences in how the two groups perceive the administrative advantages and disadvantages of using stumpage payment methods (Table 11). Lump-sum users did not perceive any difference in terms of administrative time to cruise timber and determine a volume estimate for using stumpage payment methods. This contrasts with the perception from all program supervisors suggesting that the lump-sum method requires more time. Consumer scale users did not perceive any difference in terms of administrative time during harvest operations; again contrasting the perceived finding from all program supervisors suggesting that the consumer-scale method requires more time. However, both user groups perceived a difference ( $p < 0.001$ ) in terms of administrative time to process paperwork, suggesting that the consumer-scale method requires more time. Lastly, consumer scale users did not perceive any difference in terms of the ability for a forester to manage several timber sales with stumpage payment methods or the number of administrative personnel required to using stumpage payment methods. However, lump-sum users had perceptions that were in-concurrence with perceived findings from all program supervisors.

**Table 11.** Comparison of the perceived administrative differences between the consumer-scale and lump-sum stumpage payment methods for agencies that only use a single payment method. Values shown are resulting p-values from paired t-tests. For analyses that are significant ( $p \leq 0.05$ ), the stumpage payment method with a higher mean score is shown in parentheses; “CS” = consumer scale, “LS” = lump sum.

Statement	P-values from paired t-tests	
	Agencies only use the consumer-scale method (n=28)	Agencies only use the lump-sum method (n=16)
Requires more administrative time than average to cruise and determine a volume estimate.	0.000 (LS)	0.435
Requires more administrative time than average during harvest operations (e.g., inspections).	0.147	0.000 (CS)
Requires more administrative time than average to process paperwork and other documents from the sale.	0.000 (CS)	0.000 (CS)
A forester could manage or administer several sales with this payment method at one time.	0.823	0.006 (LS)
Requires more administrative personnel involved with the timber sale from start to finish.	0.235	0.008 (CS)

### 3.3.4 Summary of the Perceived Differences

The program supervisors indicated several important differences between the consumer-scale and lump-sum methods. These findings suggest that certain advantages and/or disadvantages exist and should be considered when making a decision about the stumpage payment method for a timber sale. A summary of the statistically significant ( $p \leq 0.05$ ) perceived differences, according to all program supervisors, follows:

Perceived ecological differences:

- The lump-sum method encourages higher utilization in riparian areas and also of standing dead and on-the-ground dead material.

Perceived financial differences:

- The consumer-scale method generates higher stumpage bid prices and maximizes timber sale revenue as compared to the lump-sum method.
- The consumer-scale method is more attractive to bidders when a timber sale has a high percentage of low valued material and/or when operating costs are high.
- The consumer-scale method is more costly to administer.

Perceived administrative differences:

- The consumer-scale method requires more administrative time during harvest operations (i.e., inspections) and to process paperwork and other sale documents.
- The lump-sum method requires more administrative time to cruise and determine a volume estimate.
- Overall, the lump-sum method requires fewer administrative personnel involved with the timber sale process and the reduced administrative tasks allow more active timber sales per single timber sale administrator.

However, there were considerable differences in how program supervisors perceived the advantages and disadvantages of using the stumpage payment methods depending on what method was actually used by their respective agencies. Results of the perceived ecological, financial and administrative differences for those agencies that only use one payment method suggests that those agencies are most comfortable with the stumpage payment method that their agency uses and often perceive the other method as being less desirable because of the potential disadvantages.

### ***3.4 Chain-of-custody Certification Impact on Use of Stumpage Payment Methods<sup>15</sup>***

The majority (89%; n=41) of program supervisors reported that their agency has not changed how payments are collected for stumpage on timber sales as a result of using chain-of-custody certification. Of the 11% (n=5) of program supervisors that did indicate a change in how payments are collected, four program supervisors explained that the change was modified haul load documentation (e.g., adding an official Sustainable Forestry Initiative logo or certification numbers printed on the haul tickets). None of the program supervisors reported an actual change in the use of stumpage payment methods as a result of using chain-of-custody certification.

Additionally, the majority (78%; n=35) of program supervisors reported that their agency has not changed the way timber products are tracked after harvest as a result of using chain-of-custody certificates. Of the 22% (n=10) of program supervisors that indicated a change in how timber products are tracked, two program supervisors explained that their agency requires the use of scale tickets for chain-of-custody requirements on all timber sales including lump-sum timber sales. This represents significant additional administrative effort, as program supervisors indicated that the tasks associated with collecting scale tickets on consumer-scale timber sales are administratively time consuming and costly. For example:

“[State] now requires all harvests to use scale tickets. In the past we did not require tickets for SOAV loads.”

“Procedures developed for issuing tickets on lump-sum or field scaled sales - to produce chain-of-custody documentation (if requested by purchaser).”

Two program supervisors reported using scale tickets but not necessarily on lump-sum timber sales. For example:

“Scale tickets and haul tickets are required from landing to mill by logger/contractor.”

“[We] will give contractors tickets for scaled logs to maintain CoC [chain-of-custody] if requested – [it] has never been requested.”

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<sup>15</sup> This section discusses responses from questions 13 and 14 on the questionnaire (Appendix A).

Three program supervisors explained a change in haul load documentation (e.g., change wording to show that the timber is certified, stamp certification numbers or print Forestry Stewardship Council logos on scale tickets).

### ***3.5 Responses to Open -ended Questions Regarding Use of Stumpage Payment Methods<sup>16</sup>***

#### **3.5.1 Recent Changes in Timber Sale Programs in Relation to the Use of Stumpage Payment Methods**

Thirty-eight program supervisors provided open-ended responses to a question regarding any recent (within the last five years) changes in their agency's timber sale program regarding stumpage payment methods. However, not every response was actually related to stumpage payment methods. A summary of the important responses are provided below (10 themes emerged and all responses are included in Appendix C).

Five program supervisors described changes that were related to an increased use of the lump-sum method. The reasons for change were explained as being a function of limited staff time or perhaps mistrust with the consumer-scale method. For example, one program supervisor indicated:

“[County agency] has gone from roughly 20% lump sum to 70% lump sum due to a new Land Commissioner. Will hopefully increase to 90% lump sum in the next couple years. The consumer scale system is fraught with issues: Does every load that leaves a sale get scaled? Lost tickets and illegitimate tickets and the time it takes to resolve the issues.”

“We have offered the optional SOAV [“sold-on-appraised-volume”—lump-sum method] option on some of our sales at time of sale purchase. Have increased SOAV (and SOAV option). Both of these changes are in response to difficult administration of chipping/grinding operations and to make biomass utilization simple and easy.”

Four program supervisors described changes that were related to an increased use of log sales. Three explained that the change was a result of possible increased revenue from selling high quality logs or log sorts. For example:

“Addition of "merchandising" progra—the "other" category. Maximizes value of high quality logs by reducing the uncertainty of bidding on standing timber. Addition of a long term PAC [“pay-as-cut”—consumer scale method] contract from a purchase of industry property. The property had a deeded timber supply agreement.”

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<sup>16</sup> This section discusses responses from questions 19 and 20 on the questionnaire (Appendix A).

Two program supervisors described changes that were related to an increased use of pay per load, meaning that payment is collected for each truck load that leaves a timber sale, regardless of the estimated volume and not by weight or scale. For example:

“Moving to more pay per load sales so that we are only counting the number of loads removed. Reduces prep and admin time. Using primarily in low value salvage timber sales.”

### **3.5.2 Additional Information on the Use of Stumpage Payment Methods**

Twenty-seven program supervisors provided open-ended responses to a question requesting any additional information about their agency’s use of stumpage payment methods. However, not every response was actually related to stumpage payment methods. A summary of these responses are provided below (six themes emerged and all responses are included in Appendix C).

Seven program supervisors indicated that the stumpage payment method was related to the silvicultural prescription. Several commented that the consumer-scale method was preferred for commercial thin operations and salvage harvest timber sales. For example:

“Wind damage sales work best using the pay as cut method. It is often very difficult to estimate how much volume you have blown down when the trees are scattered. With no accurate volume estimate it would be risky for both buyer and seller to do a lump sum sale.”

“We use lump sum for clearcut sales. We use consumer-scale sales for thinnings and for small volume salvage sales resulting from insect or fire damage or storm damage.”

The second most common theme related the use of stumpage payment methods to designing timber sales that attract or accommodate purchasers. For example:

“Timber destination has a major influence on payment method. In the northern half of MN most timber is going to very large pulp mills. It is easy to set up and administer a consumer scaling payment method with fewer but high volume destinations. In the south half of MN timber goes to many small sawmills, fuelwood dealers, mulch producers, etc. It is much harder to set up consumer scaling in that environment. Most don’t have commercial scales or a reliable tracking system and are more difficult to do scaling enforcement visits.”

“Lump sum sales are easier to admin by the following criteria (1) no residual trees left behind (2) scaling/billing (3) admin recording of payments. Compliance checks for both methods are equally time consuming. Scaled sales: less cruise time, less likely to harvest undesignated trees. Many pulpwood contractors and sawmills seem to prefer scaled sales. They don’t like to have a lot of time invested in the bid process (in my region).”

“Lump sum sales are the preferred method for our Agency. Consumer-scale sales are used to control risk (real or perceived) and to encourage participation at auction for those purchasers who will not bid on lump sum offerings.”

## **4. Discussion**

Certain advantages and disadvantages of using the consumer-scale and lump-sum methods exist. Results of the survey of state and county timber sale programs helped explore those differences and the objectives of this research. Program supervisors perceived that the choice of stumpage payment method used to collect revenue from timber sales will affect the administrative effort associated with timber sales, the financial outcome and the post-harvest ecological conditions.

### ***4.1 Use of Stumpage Payment Methods in Fiscal Year 2013***

One objective of this research was to identify what stumpage payment methods were used in fiscal year 2013 by public agencies. The published literature suggested that two methods were commonly used by public agencies, the consumer-scale and lump-sum methods. Another method, called shares (e.g., 60% of total revenue to the seller and 40% of total revenue to the buyer) was identified as a possible third method to collecting payment on timber sales. However, the survey confirmed that in fiscal year 2013 public agencies used only the consumer-scale and lump-sum methods. The literature also indicated that relative to the year 2008, use of the lump-sum method was higher than use of the consumer-scale method by state agency timber sale programs (Brown et al. 2012). That finding holds true relative to fiscal year 2013, as state agencies reported a higher use of the lump-sum method. In contrast, county agencies reported a higher use of the consumer-scale method in fiscal year 2013.

However, when considering use of stumpage payment methods weighted by the number of acres sold in fiscal year 2013, use of both the consumer-scale and lump-sum methods within an agency was highest. This indicates that the largest agencies (in terms of acres sold in fiscal year 2013) had a tendency to use both methods in their timber sale programs. Smaller agencies had a tendency to use a single method or blended methods. Therefore, as timber sale activity increases, timber sale administrators may recognize certain advantages of using either stumpage payment method depending on the individual timber sales characteristics. This suggests that they choose the “right tool for the job.” However, from a list of timber sale characteristics, program supervisors indicated that cruise accuracy is the only influential characteristic that has a significant difference on choice of stumpage payment method.

### ***4.2 Administrative, Financial and Ecological Tradeoffs Associated with Stumpage Payment Methods***

Program supervisors perceived that the administrative tasks associated with the consumer-scale method (processing/collecting scale tickets and harvest inspections) to be significantly higher in administrative effort when compared to the lump-sum method. Only a few (12%) of program supervisors reported using an electronic form of scale tickets which can potentially provide an improved and more efficient method for processing scale tickets. For example, electronic scale tickets are less likely to be lost in the transaction process as compared to paper copy tickets that

are received in the postal mail, there is less chance of a data entry error and electronic tickets may facilitate the process of generating an invoice. However, as a result of the additional administrative tasks, program supervisors perceived that the consumer-scale method is more costly to administer. However, while considering these disadvantages, use of the consumer-scale method was higher in comparison to use of the lump-sum method in fiscal year 2013.

Program supervisors perceived the consumer-scale method to be more attractive to bidders under certain conditions (e.g., when a timber sale contains a high percentage of low value timber or when purchaser's operating costs are high). Therefore, considering that the consumer-scale method is perceived to be more attractive to potential purchasers, program supervisors perceived that the consumer-scale method generated higher stumpage bids from purchasers in comparison to the lump-sum method. This finding is supported by previous research advocating that the consumer-scale method results in higher bid prices (as a result of not having as much financial risk involved in the timber sale) (Muraoka and Watson 1983 and Deckard et al. 2011).

Program supervisors perceived significantly less effort involved with active timber sale administrative tasks (e.g., harvest inspections and processing paperwork and other documents from the sale) for the lump-sum method. As a function of the reduced administrative tasks, the lump-sum method was perceived to be significantly less costly to an agency to administer. Furthermore, program supervisors strongly perceived that a single field forester could manage more lump-sum timber sales at one time in comparison to the consumer-scale method. All of which are important advantages of the lump-sum stumpage payment method.

Program supervisors indicated cruise accuracy to be significantly influential on the choice of stumpage payment method that is used. They associated the lump-sum method with requiring a highly accurate estimate of merchantable volume. Furthermore, an evaluation of the cruise standards (as reported by program supervisors) confirmed that more administrative time is allocated to cruising lump-sum timber sales. This is a disadvantage of the lump-sum method that public agencies should recognize. However, the ability to obtain an accurate merchantable volume estimate with a timber cruise depends on the characteristics of the timber. For example, a homogenous stand of timber (e.g., pine plantation with little variability in merchantable volume among individual trees) would require less cruise effort to determine a volume estimate in comparison to a salvage stand of timber (e.g., wind damage with considerable variability in log lengths and defect among individual trees). Therefore, a homogenous stand of timber warrants the use of the lump-sum method under most circumstances.

However, program supervisors explained that the silvicultural prescription also influences the choice of stumpage payment method. They associated risk to their agencies with using the lump-sum method on partial harvests because of possibility that the purchaser would be encouraged to harvest additional merchantable volume over the purchased volume (assuming operator select partial harvest).

Public agencies commonly have other management goals besides managing forest land for timber revenue (as defined by School Trust Lands) such as acting as proper stewards of the lands they administer and will design timber sales to meet those specific objectives. For example, offering timber sales to reduce hazardous wildfire fuel loading or salvaging timber after wildfire

or wind storm events. These timber stands typically consist of low value timber. Program supervisors from the survey identified that the lump-sum method has a significant advantage over the consumer-scale method in terms of encouraging high utilization of low value material. If the management objective is to remove a considerable amount of the low value material, than the lump-sum method is best perceived to meet that objective (Sendak 1991). However, timber sales which consist of low value material can require more effort to cruise (as a function of the variability in merchantable volume of individual trees) and are administratively easier to sell with the consumer-scale method (i.e., not requiring substantial effort to cruise, as suggested by program supervisors).

There was an information gap identified in the literature review with regards to direct ecological impacts of using stumpage payment methods. For example, if wildlife habitat is impacted by stumpage payment method as a function of increased utilization. Program supervisors equally perceived the consumer-scale and lump-sum methods as having positive influences on wildlife habitat and allowing regeneration success. However, there was a perceived significant difference between the two methods with regards to utilization in riparian areas, suggesting that the lump-sum method encourages higher utilization in those ecologically sensitive areas. The degree to which any impacts occur in those ecologically sensitive areas will largely depend on the best management practices applied and the management objectives for the area.

### ***4.3 Designing Stumpage Payment Method Tradeoffs Into Timber Sale Programs***

Program supervisors perceived that the consumer-scale method has important financial advantages in comparison to the lump-sum stumpage payment method. Therefore, agencies with the administrative capacity to use the consumer-scale method (i.e., administrative staff to perform utilization inspections and process scale tickets) should consider those advantages. This is especially important for agencies tasked with maximizing financial returns from timber sale activities (i.e., School Trust Lands).

A reality with public agency timber sale programs is that limitations exist (e.g., limited administrative budgets, staff, or time available to assist with timber sale activities). Therefore, while program supervisors may acknowledge that certain advantages exist with use of the consumer-scale method but use of that method may be restricted. For example, a program supervisor of a state timber sale program tasked with managing School Trust Lands may perceive the consumer-scale method to result in higher bid prices and overall timber sale revenue but not have the staff available to carry out the administrative tasks (e.g., process scale tickets) with that method. However, all timber sale programs will have more or less limited resources.

Therefore, timber sale programs should consider the advantages of the lump-sum method, being that it was perceived by program supervisors to be administratively less costly to use as a function of the reduced administrative tasks and efforts. As well, a single field forester can manage several lump-sum timber sales at one time. Considering that state agency foresters are often tasked with other responsibilities besides timber sale administration (e.g., wildfire suppression), the ability for a single forester to manage several lump-sum timber sales is an important advantage of the lump-sum method.

However, a unique approach identified by 15% of program supervisors was the use of blended methods; meaning that both the consumer-scale and lump-sum methods were used on single timber sales but for different species-products (e.g., pulpwood sold consumer-scale and sawtimber sold lump sum). Therefore, the blended approach allows program supervisors to incorporate the administrative and financial tradeoffs of both methods into single timber sales. The blended approach can allow timber sale programs with limited resources to realize the certain advantages of using stumpage payment methods and should be recognize as a feasible alternative when considering which method to use.

#### ***4.4 Chain of Custody Certification Impact on Use of Stumpage Payment Methods***

Considering agencies that use chain-of-custody certification, the use of scale tickets on consumer-scale timber sales provides a convenient method for tracking and accounting of certified timber (e.g., timber certified by the Sustainable Forestry Initiative or the Forest Stewardship Council) along the production chain from the stump to the consuming mill. In contrast, use of the lump-sum method requires an alternative method to maintain accountability of certified timber along the production chain because of the absence of scale tickets. Therefore, an objective of this research was to understand how chain-of-custody certification has an impact on the use of stumpage payment methods.

One state agency from the North region (which used consumer-scale, lump-sum and blended methods in fiscal year 2013) cited a change requiring the use of scale tickets on all timber sales, regardless if the consumer-scale or lump-sum method was used, to provide a method to account for certified timber products. As identified by program supervisors, the tasks involved with using scale tickets were perceived to be very time consuming and costly to the agency as the seller. Therefore, use of scale tickets on lump-sum timber sales is an additional transactional cost for the seller associated with the use of chain-of-custody certification. Another state agency from the North region (which used consumer-scale and lump-sum methods in fiscal year 2013) cited developing a procedure for accountability of certified timber products on lump-sum timber sales. A follow up phone call with that program supervisor revealed the use of paper tickets (similar to haul tickets which are a different and separate ticketing system from scale tickets that are used to account for every truck load of timber that leaves a harvest site) to provide accountability of the certified timber products, but only when requested by the purchaser.

#### ***4.5 Study Limitations***

One important potential study limitation is that much of the data describes perceptions of timber sale program supervisors. Such perceptions may be influenced by a variety of factors such as memory recall, personal preferences, or specific events that may not reflect the agency's overall experience with a particular timber sale payment method(s). Controlling for these factors is difficult in a mail survey. As such, readers need to interpret data that describes the perceptions of timber sale program supervisors with some caution.

Additionally, respondents were assumed to have provided truthful responses to the survey questions. However, there may be situations where program supervisors might want to shade

their responses and introduce bias into the response. For example, if a program supervisor believes their responses might lead to a change in the agency's use of stumpage payment method which could result in changes to administrative budgets and/or number of staff required to assist with the timber sale program, there is an incentive to promote the status quo. Responses might also be influenced by concern that changes to the agency's timber sale program might upset those who purchase timber through the program. The extensive experience among respondents with their agency (16 years, on average) and with timber sales (22 years, on average) helps support their credibility to provide knowledgeable responses. However, it is difficult to control for potential response bias and readers should consider this potential limitation when interpreting the results.

Lastly, not all program supervisors have experience with both the consumer-scale and lump-sum stumpage payment methods. Considering program supervisors who use a single stumpage payment method in their timber sale programs, they may not have the ability or experience to assess the other stumpage payment method. Therefore, their perceptions of the other method lacks empirical experience with the use of that other method.

## 5. Conclusions

Timber sale program supervisors from state and county agencies indicated that certain advantages exist with the use of stumpage payment methods. Program supervisors and field foresters who have the authority to administer timber sales need to evaluate the advantages associated with the consumer-scale and lump-sum stumpage payment methods and use the most appropriate method for the given characteristics of a timber sale and/or limitations of the administrative capabilities. The findings presented from this research will help policy makers better understand the administrative, financial and ecological tradeoffs of using stumpage payment methods and they should incorporate those tradeoffs into their decision-making processes. One limitation of this study is that results are based on the *perceived* differences of responding program supervisors. Future research studies could consider these perceived findings and design empirical studies that better assess the advantages and/or disadvantages of the consumer-scale and lump-sum stumpage payment methods.

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## **Appendix A**

### **Survey Questionnaire Sent to County and State Timber Sale Program Supervisors**

ID Number (leave blank) \_\_\_\_\_

## National Survey of State and County Timber Programs to Assess Timber Sale Stumpage Payment Methods



### Instructions before you begin:

The University of Minnesota's Department of Forest Resources is conducting a study to examine the economic, policy, and administrative aspects of how public land management agencies receive payment for the stumpage they sell.

The two stumpage payment methods we are particularly interested in are:

**CONSUMER SCALE** (also commonly called *pay-as-cut*); defined as when the purchaser pays for the timber volume harvested and *scaled*.

**LUMP SUM** (also commonly called *sold-on-appraised-volume*); defined as when the purchaser pays for the tract's *estimated* timber volume regardless of what volume is actually harvested and removed from that tract.

If questions need to be referenced to other individuals in your agency, please do so. If you wish to expand on any of your responses, use the space in the margin or a separate piece of paper.

In preparing your responses, do not include timber sales administered in conjunction with other agencies (e.g., Forest Service or non-profit organization partnership) or timber sales that occurred on privately owned land that received management assistance from your agency.

Please note that all the information you provide will be kept anonymous and confidential. Only summaries of responses provided by survey participants will be reported.

Thank you in advance for your help with this research. Please return the completed survey by November 21, 2014.

**I. Use of payment methods**

The following questions address your agency's use of stumpage payment methods during the fiscal year 2013. It is important that the values you report address timber sales *sold* and not actual values harvested.

1. Report each value below by stumpage payment method for timber sales sold by your agency during fiscal year 2013.

	Sales which are 100% Consumer Scale	Sales which are 100% Lump Sum	Sales which are a combination of Consumer Scale and Lump Sum	Other
Number of sales SOLD				
% of total volume SOLD				
Number of acres SOLD				

*If you filled in "other" please describe the stumpage payment method(s) used:*

2. Does your agency have a standard when cruising timber sales for each stumpage payment method?

No

Yes, please indicate the applicable standard for each payment method:

Stumpage Payment Method	(e.g., within ±10% of actual stand volume) Cruise Accuracy	(e.g., 2 plots per acre) Cruise Intensity
Consumer scale		
Lump sum		
Other		

**3. Does your agency have a policy to use a certain stumpage payment method(s)?**

No

Yes, what are the sources for your agency's policy? (Check all that apply)

State statute

Administrative rule

Agency guideline, manual or policy directive

Other, please specify:

**4. Does your agency currently allow the purchaser to decide what stumpage payment method to use for all or some timber sales offered?**

No

Yes, for all timber sales

Yes, for some timber sales. Estimate what percent of volume was sold in fiscal year 2013 as purchaser choice: \_\_\_\_\_%

**5. When does your agency's legal ownership of its timber transfer to another party?**

When the timber is sold and payments are collected from the purchaser

When the timber is severed from the stump

When the timber leaves the harvest site

When the timber arrives at a consuming mill or purchaser delivery point

Other, please explain:

**6. Estimate the percent of annual timber volume sold (not harvested) by your agency for each month in fiscal year 2013.**

J	F	M	A	M	J	J	A	S	O	N	D	Total
___%	___%	___%	___%	___%	___%	___%	___%	___%	___%	___%	___%	100%

**II. Perceptions of the advantages and disadvantages of the two stumpage payment methods**

For each question, please respond to each statement for both payment methods, regardless of which payment method(s) your agency may use.

**7. Perceptions of the ECOLOGICAL advantages and disadvantages**

Please indicate the extent to which you agree or disagree with each statement below for each stumpage payment method.

Statement	Consumer Scale						Lump Sum					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know
Allows land managers to meet regeneration objectives	1	2	3	4	5	6	1	2	3	4	5	6
Has a positive influence on post-harvest wildlife habitat	1	2	3	4	5	6	1	2	3	4	5	6
Encourages the logger to utilize timber in riparian areas	1	2	3	4	5	6	1	2	3	4	5	6
Encourages high utilization of standing dead and on-the-ground dead material	1	2	3	4	5	6	1	2	3	4	5	6
Affects which leave trees the logger will choose (If required and not marked by the forester)	1	2	3	4	5	6	1	2	3	4	5	6
Has a positive influence on post-harvest visual and aesthetic qualities	1	2	3	4	5	6	1	2	3	4	5	6

Please respond to each statement for both payment methods, regardless of which payment method(s) your agency may use.

**8. Perceptions of the FINANCIAL advantages and disadvantages**

Please indicate the extent to which you agree or disagree with each statement below for each stumpage payment method.

Statement	Consumer Scale						Lump Sum					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know
Will generate higher stumpage bids than normal	1	2	3	4	5	6	1	2	3	4	5	6
Is attractive to bidders when the sale has a high percentage of low value timber	1	2	3	4	5	6	1	2	3	4	5	6
Is attractive to bidders when their operating costs are high	1	2	3	4	5	6	1	2	3	4	5	6
Encourages competition for sales	1	2	3	4	5	6	1	2	3	4	5	6
Is a financial risk to your agency	1	2	3	4	5	6	1	2	3	4	5	6
Is costly for your agency to administer	1	2	3	4	5	6	1	2	3	4	5	6
Will maximize timber revenue for your agency	1	2	3	4	5	6	1	2	3	4	5	6

Please respond to each statement for both payment methods, regardless of which payment method(s) your agency may use.

**9. Perceptions of the ADMINISTRATIVE advantages and disadvantages**

Please indicate the extent to which you agree or disagree with each statement below for each stumpage payment method.

Statement	Consumer Scale						Lump Sum					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know
Requires more administrative time than average to cruise and determine a volume estimate	1	2	3	4	5	6	1	2	3	4	5	6
Requires more administrative time than average during harvest operations (e.g., inspections)	1	2	3	4	5	6	1	2	3	4	5	6
Requires more administrative time than average to process paperwork and other documents from the sale	1	2	3	4	5	6	1	2	3	4	5	6
A forester could manage or administer several sales with this payment method at one time	1	2	3	4	5	6	1	2	3	4	5	6
Requires additional administrative personnel involved with the timber sale from start to finish	1	2	3	4	5	6	1	2	3	4	5	6

### III. Load tracking and influential timber sale characteristics

The following questions apply if your agency uses the consumer scale payment method. *If your agency uses **ONLY** the lump sum payment method, skip to Question 13.*

10. On consumer scale timber sales, how does your agency track individual loads of forest products between when they are harvested and arrive at the consuming mill or purchaser delivery point?

- Paper scale tickets
- Electronic scale tickets
- Other, please explain:

11. Estimate the percent of total consumer scale volume that was scaled by each of the following methods during fiscal year 2013 (total should equal 100 percent).

- Independent third party scaler
- Consuming mill personnel or purchaser
- Agency personnel
- Other, please explain:

The following question applies if your agency uses both the **consumer scale** and **lump sum** stumpage payment methods. If your agency uses only one stumpage payment method, skip to Question 13.

**12. Indicate the degree of influence that each of the following characteristics has when determining which stumpage payment method to use on a timber sale.**

If your agency does not use a combination of consumer scale and lump sum stumpage payment methods on a single timber sale, skip the column on the far right of the table below.

Characteristic	Sales which are 100% Consumer Scale			Sales which are 100% Lump Sum			Sales which are a combination of Consumer Scale and Lump Sum			
	Not Influential	Influential	Very Influential	Not Influential	Influential	Very Influential	Not Influential	Influential	Very Influential	
Low value (\$/unit) timber	1	2	3	4	5	1	2	3	4	5
High value (\$/unit) timber	1	2	3	4	5	1	2	3	4	5
Small volume sale	1	2	3	4	5	1	2	3	4	5
Large volume sale	1	2	3	4	5	1	2	3	4	5
Small acre sale	1	2	3	4	5	1	2	3	4	5
Large acre sale	1	2	3	4	5	1	2	3	4	5
Single species-product in the sale	1	2	3	4	5	1	2	3	4	5
Multiple species-products in the sale	1	2	3	4	5	1	2	3	4	5
Low accuracy of estimated sale volume	1	2	3	4	5	1	2	3	4	5
High accuracy of estimated sale volume	1	2	3	4	5	1	2	3	4	5
Low logging costs and/or transportation costs	1	2	3	4	5	1	2	3	4	5
High logging costs and/or transportation costs	1	2	3	4	5	1	2	3	4	5

#### IV. Chain-of-custody certificates

If your agency does not use chain-of-custody certificates, skip to Question 15.

13. Has chain-of-custody certification required your agency to change the way it collects payment for stumpage on timber sales?

- No  
 Yes, please explain how:

14. Has chain-of-custody certification required your agency to change the way it tracks timber once harvested (e.g., using scale tickets to track custody)?

- No  
 Yes, please explain how:

#### V. General program characteristics

15. Please indicate the number of full-time equivalent (FTE) permanent and seasonal/temporary employees that were directly involved with your timber sale program during fiscal year 2013.

Position Responsibility	# Permanent FTE Positions	# Seasonal/temporary FTE Positions
Field-based support (professional and technician foresters that are involved with any fieldwork on timber sales)		
Office-based support (professional and clerical functions supporting the timber sale program but strictly office-based tasks)		
Program administration or supervision (timber sale program leadership that is NOT involved with field-based or office-based support)		

**16. Estimate the volume size distribution (total should equal 100%) of individual timber tracts sold by your agency during fiscal year 2013. (1 cord =500 bf or 4500 lbs or 80 ft<sup>3</sup> solid wood)**

- \_\_\_ % of tracts with < 100 cord equivalents
- \_\_\_ % of tracts with 101 to 500 cord equivalents
- \_\_\_ % of tracts with 501 to 1,000 cord equivalents
- \_\_\_ % of tracts with 1,001 to 2,000 cord equivalents
- \_\_\_ % of tracts with > 2,000 cord equivalents

**17. Does your agency have defined targets or goals for ensuring that a range of timber tracts size categories (by area or volume) are sold each year? (An example of an agency target or goal might be a specified minimum percent of all timber tracts sold during a year contain no more than 1,000 cords.)**

- \_\_\_ No
- \_\_\_ Yes, please describe these targets or goals:

**18. Does your agency do anything to increase the likelihood that tracts you offer for sale will only be bought by small purchasers (e.g., limiting the amount of timber allowed to be purchased by any one company, or making small tracts available without a competitive auction)?**

- \_\_\_ No
- \_\_\_ Yes, please describe these strategies:

**19. Please describe any changes in your agency's timber sale program in the last 5 years regarding stumpage payment methods. Please include the reason(s) for each change.**

**20. Please provide any additional information about your agency's use of stumpage payment methods that we did not address or may have missed in this questionnaire.**

**For the person who completed this questionnaire:**

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Agency/Organization: \_\_\_\_\_

Total years with agency/organization: \_\_\_\_\_

Total years of experience with timber sales: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

If you are interested in receiving an email summary of the results of this survey, please check the box below. The tentative date that this research will be completed is Fall 2015.

**When you have completed the survey:**

**Please mail it back in the self-addressed and stamped envelope by November 21  
2014.**

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## Appendix B

### Contact Materials Used with Survey Questionnaire

*Pre-notice postcard sent one week before first questionnaire*

October 8, 2014

Within the next few days you will receive a questionnaire in the mail titled **-National Survey of State and County Timber Programs to Assess Timber Sale Stumpage Payment Methods -** prepared by the Department of Forest Resources, University of Minnesota. The questionnaire is designed to understand your agency's use of the two most frequently used stumpage payment methods (consumer scale and lump sum) and your individual perceptions of the advantages and disadvantages of each method.

We invite you to assist with this research by completing the questionnaire when it arrives. Your participation is voluntary and individual responses will be kept confidential in all reports.

Nicholas Reep  
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University of Minnesota –Department of Forest Resources  
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Phone: 612-624-6719

*Cover letter sent with first questionnaire*

October 16, 2014

A research study is being conducted by the University of Minnesota's Department of Forest Resources on the stumpage payment methods used by state and county agencies that administer timber sales. The objectives of this survey are to evaluate how states and counties (1) use the two payment methods, (2) perceive the ecological, financial and administrative advantages and disadvantages of each method and (3) to understand how chain-of-custody certificates may have changed or modified what methods are used.

In the survey, the **CONSUMER SCALE** stumpage payment method (commonly referred to as pay-as-cut) is defined as when the purchaser pays for the timber volume harvested and *scaled*. The **LUMP SUM** stumpage payment method (commonly referred to as sold-on-appraised-volume) is defined as when the purchaser pays for the tract's *estimated* volume, regardless of what actual volume is harvested and removed from the sale.

We request that the individual in your agency who has the responsibility for leading or supervising your agency's timber sale program complete the survey. If questions need to be referenced to other individuals in your agency, please do so. If there is a need to expand on any of the responses, use the space in the margin or on separate pieces of paper.

Your participation in the survey is voluntary. Only summaries of the information collected will be used in our final reports and responses to all questions will be kept completely confidential. If you would like to receive the final report of the survey results, please indicate your interest by checking a box at the end of the questionnaire.

Thank you for helping with this very important study!

Nicholas Reep  
Graduate Student and Research Assistant  
Phone: 612-624-6719  
Email: reep0004@umn.edu

Enclosed: Survey questionnaire and return envelope

*Reminder notice postcard sent one week after first questionnaire*

October 23, 2014

A week ago we mailed you a questionnaire titled - **National Survey of State and County Timber Programs to Assess Timber Sale Stumpage Payment Methods** - prepared by the Department of Forest Resources, University of Minnesota.

If you have already completed the questionnaire and have returned it - we thank you!

Your completed questionnaire is important to helping us understand how different state and county agencies use stumpage payment methods.

We are working hard to build a high response rate for this survey and encourage your help by participating with this research.

Nicholas Reep  
Graduate Student and Research Assistant  
University of Minnesota –Department of Forest Resources  
Email: reep0004@umn.edu  
Phone: 612-624-6719

*Cover letter sent with second questionnaire three weeks after first questionnaire*

November 6, 2014

Name  
Address

Several weeks ago we sent you a questionnaire inviting you to participate in a survey titled - **National Survey of State and County Timber Programs to Assess Timber Sale Stumpage Payment Methods** – prepared by the Department of Forest Resources, University of Minnesota. As of today, we have not received your completed questionnaire. If you have recently returned the completed questionnaire, we will expect it soon and thank you!

The responses from other agencies that completed the questionnaire have provided valuable information that will help us evaluate how states and counties agencies (1) use the two payment methods, (2) perceive the ecological, financial and administrative advantages and disadvantages of each method and (3) may have modified their use of payment methods based on chain-of-custody requirements.

We are writing again because of the importance that your questionnaire has for helping us get accurate results to reflect the use of the payment methods from agencies nationwide.

For your convenience, we have enclosed another copy of the questionnaire. **Please feel free to find assistance from other agency personnel if needed to help complete the questionnaire.** Your participation in the survey is voluntary. Only summaries of the information collected will be used in our final reports and responses to all questions will be kept completely confidential.

If you are interested in the final report summarizing the findings of this research, please indicate your interest by checking the box at the end of the enclosed questionnaire.

Thank you again for assisting with this research!

Nicholas Reep  
Graduate Student and Research Assistant  
Phone: 612-624-6719  
Email: reep0004@umn.edu  
Enclosed: Survey questionnaire and return envelope

*Email sent to respondents addressing a word mistake on Question 1*

Name,

We thank you for completing the questionnaire titled **National Survey of State and County Timber Programs to Assess Timber Sale Stumpage Payment Methods**, developed by the University of Minnesota’s Department of Forest Resources.

Your provided responses will help us complete our research: studying the economic tradeoffs of using the consumer scale and lump sum stumpage payment methods.

We humbly admit a mistake in our questionnaire. On Question 1 – we asked for “Number of acres harvested” and the information we needed was “Number of acres SOLD”.

The response you provided was:

**1. Report each value below by stumpage payment method for timber sales sold by your agency during fiscal year 2013.**

	<b>Sales which are 100% Consumer Scale</b>	<b>Sales which are 100% Lump Sum</b>	<b>Sales which are a combination of Consumer Scale and Lump Sum</b>	<b>Other</b>
Number of sales SOLD				
% of total volume SOLD				
Number of acres harvested				

For our last contact with you: to be most useful in our analysis, we request that you reply to this email by providing the number of acres SOLD during the fiscal year 2013.

If the value you provided in your response was the number of acres SOLD, please reply to this email with a statement that confirms the value.

We are sorry for this inconvenience. Thank you again for helping with this research!

Nicholas Reep  
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Phone: 612-624-6719  
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## Appendix C

### Typed Responses to Open-ended Questions

**Question 19: Please describe any changes in your agency’s timber sale program in the last 5 years regarding stumpage payment methods. Please include the reason(s) for each change.**

Theme	Responses	Agency Type	Region
Increased use of the lump sum method.	<ul style="list-style-type: none"> <li>● We are moving towards more sales sold as "lump sum" because of limited office staff time.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>● [County] has gone from roughly 20% lump sum to 70% lump sum due to a new Land Commissioner. Will hopefully increase to 90% lump sum in the next couple years. The consumer scale system is fraught with issues: Does every load that leaves a sale get scaled? Lost tickets and illegitimate tickets and the time it takes to resolve the issues.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>● Movement from 100% consumer scale to high percentage SOE.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>● We have offered the optional SOAV option on some of our sales at time of sale purchase. Have increased SOAV (and SOAV option). Both of these changes are in response to difficult administration of chipping/grinding operations and to make biomass utilization simple and easy.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>● Reduced size of sales to allow smaller firms to bid. Tried consumer scale for softwood pulp had issues with load trucking went back to lump sum for all sales.</li> </ul>	State	South
Increased use of the consumer scale method.	<ul style="list-style-type: none"> <li>● 1. Implementation of a more robust timber security program - increased number of PAC sales. 2. More uniform reporting - to communicate accomp. To legislature, local school boards and secretary of state.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>● We started selling "co-mingled" pine sales. All volume is bid at the same price whether it is pulp or saw material. We use this in plantation settings where volumes are high and pulp rations tend to be low. All material goes out on consumer scale and is sold by the ton.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>● We have only recently began selling timber using consumer sale method and we still limit these to low volume/value stands or high volume/low value stands or salvage sales due to natural disaster.</li> </ul>	State	South

Increased use of log sales.	<ul style="list-style-type: none"> <li>There have been no changes in stumpage payment method; it remains a payment-upon-(mill)-scale process. However, FY 2013 saw a major increase in the type of contract between the bureau and logging contractor, from stumpage, where the contractor markets the wood to processing facilities, to contract for logging services (CLS), where the Bureau markets the wood and pays the contractor to cut, yard, and haul it. In FY 2013, about 30% of harvest volume was under CLS, up from 10% the year before and zero in FY 2011. Under CLS the Bureau administration takes more time, but revenue per unit volume is significantly higher and control of roadwork is facilitated.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>Addition of "merchandising" program - the "other" category. Maximizes value of high quality logs by reducing the uncertainty of bidding on standing timber. Addition of a long term PAC contract from a purchase of industry property. The property had a deeded timber supply agreement.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>In our eastern (pine) forests we can (not always) merchandise (sort) timber on the landing for different markets. So on one sale, we may bid out the pulpwood to one operator and sawtimber to another. This maximizes the return to our agency.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>[State] has implemented a sort sale pilot program where we sell delivered log sorts rather than uncut stumpage. These are still consumer scale payment method.</li> </ul>	State	Pacific Coast
Increased use of pay per load.	<ul style="list-style-type: none"> <li>Moving to more pay per load sales so that we are only counting the number of loads removed. Reduces prep and admin time. Using primarily in low value salvage timber sales.</li> </ul>	State	Rocky Mountain
	<ul style="list-style-type: none"> <li>Accounting for stumpage on a per load basis instead of weighing every load.</li> </ul>	State	Rocky Mountain
Increased use of weight scale method.	<ul style="list-style-type: none"> <li>Sell by the ton rather than volume/product measure unit. Measure products [unknown text] and lump, est. chip products.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>Our agency switched from scaling all wood on the landing to using a mill scale method with haul permits for pulpwood. The change is due to increased use by mills scaling using tons to avoid conflict with conversion values/rates of cords to tons. Our agency continues to scale logs on the landing and all firewood sold to private landowners.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>Six years ago we made the move to largely sell timber by the ton. We primarily sell pulpwood to nearby paper mills that weigh trucks instead of scaling by volume. The mills initiated the move to tons and we followed. The result has saved us time and expense in scaling and painting log piles.</li> </ul>	County	North

	<ul style="list-style-type: none"> <li>● Switch to ton sales on three management areas. Species offered for sale have a similar value. Mills are many miles apart and some are out of state. Purchasers were receptive to change to ton from scale. Some sales are offered both scaled and ton. Low value products such as pulp and biomass sold by ton. Sales with small piece size also sold by ton if species are similar price.</li> </ul>	State	Rocky Mountain
Increased use of stick scale method.	<ul style="list-style-type: none"> <li>● We used to do lump sum logs and mill scale pulpwood on sales. We now do not operate that way and instead we hand scale all logs ourselves on the landing. The loggers were "sneaking" too many bolts into the lump sum paid log piles.</li> </ul>	County	North
General change in timber sale process to benefit the agency.	<ul style="list-style-type: none"> <li>● We now invoice the contractors for all wood. Previously they were responsible for sending in payment with mill scale slips monthly.</li> <li>● Interest added to stumpage payments after 30 days of non-full payment.</li> <li>● Increased emphasis on prepayment for haul tickets due to [state] fiscal audit recommendations.</li> <li>● Revised our timber sale contracts to require 20% first payment due within 30 days of bid opening. This has reduced the number of contractors sitting on sales.</li> <li>● Instituted 5-year contracting process with original 1st year contract publically bid. Future years thereafter stumpage rates negotiated. Continue with single year contracts as well.</li> <li>● Consumer scale or per unit timber sales in the past required approximately 30% payment for the timber sale up front. Now the [state] requires 50%. This change helps our agency meet its timber revenue goals each year. This increases the probability of receiving all revenue for a particular timber sale within the year it was sold.</li> <li>● Increased performance bonds required.</li> <li>● We have started having one pay as cut marked sale and one pay as cut operator select sale each year. This is to see if it increases revenue. It's hard to say yet whether it has helped to increase revenue but one benefit is we can select our very brushy tracts for operator select sales. This saves field personnel from having to work in thick brush marking the trees with paint.</li> <li>● There is an effort to move away from set stumpage fee pricing and move towards bidding price, because [state] now has 2 biomass plants so biomass and higher value timber are now available.</li> </ul>	County County State State State State State	North North North North North South South
General change in the timber sale process to benefit the purchaser.	<ul style="list-style-type: none"> <li>● We now use "letter of credit" to open permits. We no longer require payment install to extend permits. (reduce cash-flow problems for loggers).</li> </ul>	County	North

	<ul style="list-style-type: none"> <li>Offering smaller cutting block-payments to allow smaller operators an opportunity to purchase and cut county sales. This is mainly due to the financial stress of some of the smaller operators/loggers are experiencing. By state statute a sale must be paid in full before cutting begins, unless cutting blocks exist.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>We have increased the number of payments to keep the amount of locked up capital for a logger at a minimum. We are also more sensitive to the timing of payments in that we require only a 1/2 payment at contract signing with the other half not due until the harvest begins. We use the "weighed average pricing" for biomass because loggers tend to bid high prices for pulpwood and low prices for chips. Weighted average pricing requires loggers to pay the weighted average when chipping because high priced pulpwood tends to go through the chipper as biomass chips.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>We have instituted an installment payment method that allows larger sales to be broken up into smaller parts, with buyers able to pay for each part as they are about to start harvesting. This allows smaller operators with limited funding purchase larger sales.</li> </ul>	State	North
Miscellaneous response.	<ul style="list-style-type: none"> <li>Revised standard operating procedure, typically once every 5 years. More preharvest invasive plant species control.</li> </ul>	State	North
No change.	<ul style="list-style-type: none"> <li>No changes. We use primarily pay-as-cut sales with an occasional lump sum sale when conditions are appropriate.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>Stayed consistent 95% consumer scale 5% lump sum.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>No change. Lump sum preferred for our mature hardwoods.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>Payment methods have not changed.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>No changes in past 5 years. Last major change was in 2003 when deferred payments were allowed. Agency identified a goal of increasing the amount of timber sold via lump sum, to achieve administrative efficiencies.</li> </ul>	State	North

**Question 20: Please provide any additional information about your agency’s use of stumpage payment methods that we did not address or may have missed in this questionnaire.**

Theme	Responses	Agency Type	Region
Silvicultural prescription related.	<ul style="list-style-type: none"> <li>We use lump sum for clearcut sales. We use consumer scale sales for thinnings and for small volume salvage sales resulting from insect or fire damage or storm damage.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>Wind damage sales work best using the pay as cut method. It is often very difficult to estimate how much volume you have blown down when the trees are scattered. With no accurate volume estimate it would be risky for both buyer and seller to do a lump sum sale.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>PAC sales are generally only done with salvage, pine and our long term fiber supply agreement. We do not feel we can maintain public trust with high value timber and cannot fund enough sale administration to accomplish it.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>Consumer scale method is only used for small timber sales (less than 20 acres) or for salvage cuts, such as after a hurricane or tornado.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>[State] manages approximately 24,000 ac. Of state forest. The bulk of the timber sales occur in the southern county. Our primary commercial species is loblolly pine. Very few selection cuts are done with regard to hardwood species. Clearcuts and commercial thinnings are the primary harvest methods. Lump sum purchase is used for clearcuts and scale payments are used for thinnings.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>Most of our scheduled sales are from sealed bid lump sum payments with % performance bond. Salvage sales (storm damage) often are sold by truck load determined by pulpwood or sawtimber at the harvest site and billed by predetermined load prices. Very rarely we have sales where the price is predetermined and sold "by the road" like individual truck loads of firewood or individual logs from road maintenance selling.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>Harvest design is habitat driven. Most effort during marking is geared toward identifying retention that provides unique habitat benefits. Numerous trees of low merchantable value are required to be cut in order to achieve habitat attributes for rare and/or declining species. This orientation tends to suppress stumpage bids a bit, but achieves habitat goals quite well. We also require non-commercial habitat work by harvesters (e.g., construction of brush piles, mowing of fire breaks) which further depress stumpage bids.</li> </ul>	State	North

Purchaser related.	<ul style="list-style-type: none"> <li>● Timber destination has a major influence on payment method. In the northern half of [state] most timber is going to very large pulp mills. It is easy to set up and administer a consumer scaling payment method with fewer but high volume destinations. In the south half of [state] timber goes to many small sawmills, fuelwood dealers, mulch producers, etc. It is much harder to set up consumer scaling in that environment. Most don't have commercial scales or a reliable tracking system and are more difficult to do scaling enforcement visits.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>● Lump sum sales are the preferred method for our Agency. Consumer scale sales are used to control risk (real or perceived) and to encourage participation at auction for those purchasers who will not bid on Lump sum offerings.</li> </ul>	State	Pacific Coast
	<ul style="list-style-type: none"> <li>● Lump sum sales are easier to admin by the following criteria (1) no residual trees left behind (2) scaling/billing (3) admin recording of payments. Compliance checks for both methods are equally time consuming. Scaled sales: less cruise time, less likely to harvest undesigned trees. Many pulpwood contractors and sawmills seem to prefer scaled sales. They don't like to have a lot of time invested in the bid process (in my region).</li> </ul>	County	North
Specific to the consumer scale method.	<ul style="list-style-type: none"> <li>● We require no pre-payment for stumpage. The contractor has 30 days from invoice date to submit payments. We scale all sawlog products on the landing. Pulp and bolt products are tracked using haul slips and mill scale slips.</li> </ul>	County	North
	<ul style="list-style-type: none"> <li>● The cost of the time spent in using load tickets, accounting for them, purchase supplies is far outweigh by the net money collected over appraisal volume.</li> </ul>	County	North
Specific to the lump sum method.	<ul style="list-style-type: none"> <li>● We try hard to have as many sales as possible as lump sum. It saves on onsite administrative and office administration. It also reduces the amount of risk associated with timber sales. It also allows for a lower bond % for each sale. We require a 25% performance bond on scale sales and a 10% bond on lump sum sales.</li> </ul>	County	North
Timber cruise related.	<ul style="list-style-type: none"> <li>● Most all of our sales about 90% are marked and 100% tallied sales.</li> </ul>	State	South
	<ul style="list-style-type: none"> <li>● Sales are generally small and either 100% cruised or sampled to achieve more than 90% accuracy.</li> </ul>	State	Rocky Mountain
Miscellaneous information.	<ul style="list-style-type: none"> <li>● We have designated cutting areas (blocks) for the individual to cut.</li> </ul>	State	Rocky Mountain
	<ul style="list-style-type: none"> <li>● Utilize contract logging \$/mbf set price for agency sawmill about 30,000 bf/year used for state park lumber needs.</li> </ul>	State	North
	<ul style="list-style-type: none"> <li>● The timber sale program was paused for political reasons in FY 2013. Timber sales and harvesting began again in FY 2013/FY2014.</li> </ul>	State	North

- |  |        |                |
|--|--------|----------------|
| ● Possible too much to mention here.   | State  | North          |
| ● [State] law requires any [unknown text] sold by the [state] SF be estimated in value.  | State  | South          |
| ● [State] charges interest on all sales from date of sale to date of scale. 6% simple interest is charged each month volume is removed. Interest is to encourage purchasers to harvest in a timely manner and it makes money.  | State  | Rocky Mountain |
| ● [State] uses 2 methods 1. lump sum 2. scale sale by [state].   | State  | North          |
| ● Although payment is lump sum - each sale is broken into several administrative blocks. Each block is paid for before cutting, and closed, before the next block is started.  | State  | North          |
| ● We charge interest on late accounts  | County | North          |
| ● Natural Resource Managers do have the option to design multiblock or multiunit sales. This type of sale allows the purchaser to pay for 1 block at a time rather than the whole thing all at once. Usually done on larger volume sales where topography, layout and design is favorable, the multiblock sale can benefit the purchaser's cashflow. | County | North          |
| ● I've noticed that agencies that have a high % of lump sum sales provide less accurate harvest data (seasonal, etc.).   | County | North          |
| ● Lump sum or consumer scale does not play a major factor in use of stumpage payments or timber program.   | County | North          |
-