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ASSESSING THE SHORT- AND LONG-TERM EFFECTIVENESS OF FOREST PLANNING WORKSHOPS FOR FAMILY FORESTS

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Abstract

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Assessing the Short- and Long-Term Effectiveness of Forest Planning Workshops for Family Forests

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Family Forest landowners, also known as Non-Industrial Private Forests (NIPF) are subject to much scrutiny by public agencies because they own the majority of forested lands across the United States and because it is difficult to quantify what they are doing with their lands. Significant federal money is allocated for family forest assistance in the form of educational grants and cost-share for specific conservation objectives. Montana State University Extension Forestry's Montana Forest Stewardship program is a federally funded educational program that has helped forest landowners learn about and develop both short-term action plans and long-term management plans for their properties for 21 years.

This project examined the short-term and long-term impacts that the Forest Stewardship program has on landowner awareness, core beliefs and management actions with regard to their forest. The short-term component of this project compares responses of workshop participants before and after workshops. The long-term component compares members of participants of Forest Stewardship, Tree Farm, and a group without affiliation with either Stewardship or Tree Farm. Mail surveys, phone interviews, and property visit survey's were compared and analyzed in order to estimate landowners core values and forest conservation/management perspectives with and without the influence of the Stewardship program and the additional non-profit Tree Farm mentoring/educational programs.

Results indicated most family forest owners had similar core values but significantly different management priorities when considering forest generated revenue, selling parcels of land for management and ownership, and management challenges. It is likely that some of these differences where due to participation in the Stewardship and Tree Farm programs, but forest acreage owned also was significantly correlated to management priorities. Our study indicates a clear and substantial increase in conservation value from landowner topic awareness programming such as the Stewardship program as well as values from forest landowner organizations such as the Tree Farm program. It was also clearly shown that the majority of all forest landowners in Montana have strong conservation values for their lands, however, their management objectives vary considerably and thus one-size fits all expectations for family forest lands may be counterproductive.

Key words: Family forests, Stewardship, Tree Farm, Education, Conservation

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INTRODUCTION

Non-industrial private forest (NIPF) land, also known as family forests, account for approximately 58% or 430 million acres of the nation's forests (Best and Wayburn, 2001). Family forest lands have contributed towards the heritage, economic future and quality of life of United States citizens by providing habitat for wildlife, water resources, recreation, and a sustainable supply of wood products. Maintaining this land base as working forest has been recognized as a national conservation objective for many federal and state land management agencies and nongovernmental organizations (NGO's). A primary concern has been the last two decades' trend of family forest lands being subdivided and fragmented into increasingly smaller parcels that at some point no longer function as a viable natural resource. For example, Sampson and Decoster, 2000 showed, for the state of Virginia, "the probability of sustainable forest management in an area approaches zero when population density exceeds 235 people per 1,000 acres," which calculates on average as 4.25 acres per person, "probabilities of active forestry were 25% at densities of 100, 20% at 70, and 75% at 30 people per 1,000 acres". Increasing human population density resulted in an overall loss of agriculture and wood products infrastructure and thereby a primary loss of markets, management ability, land productivity and conservation value. The trends presented in that study are of concern if a similar correlation occurs across other states since an examination of all family forest tracts across the U.S. showed the number of smaller acreage landowners (10-50 acres) doubled from 2 to 4 million owners from 1978 to 1994 (Sampson and DeCoster, 2000). Projections indicated that this trend would continue with an additional 2 million landowners by 2010. At the time of this study approximately 150 million acres of productive family forests across the U.S. had been split into parcels of 100 acres or less where the average ownership size was about 17 acres.

Family forest lands across the western United States may be especially affected since there has been a consistent U.S. population migration towards western states and an increasing demand for rural home sites. This has had

significant implications for Montana since private forest land availability is limited considering that more than 70% of the state's forested area is under federal ownership. Family forests account for approximately 4.4 million acres or 17.6% of the total 25 million acres of forest land in Montana. The estimated number of privately owned forested parcels 5 acres and more is 52,848 owned by 29,749 different entities. Approximately 67% (19,997) own 90%, of the total acreage (3,950,373 acres) with parcels sizes ranging from greater than 15 to 54,642 acres. The remaining 33% (9,752) own 89,091 total acres with parcels between 1 and 15 acres. Predictions made over the last decade (Swanson, 2006) indicate that in the next 20 years the population of western Montana will most likely increase by an additional 155,500 due primarily to the influx of a projected 147,000 retiring "baby boomers", many of whom desire a rural lifestyle on 5 or more acres of forested land. As demand for rural forested parcels increase and income opportunities for wood products decrease, larger family forest landowners will continue to have lucrative financial incentives to sell portions of their working forests. If new forest landowners pursue progressive forest management and conservation objectives on their land, parcelization may have few negative consequences and even potential positive benefits as there will be a larger forest workforce caring for the land (weed control, wildlife habitat creation, forest hazard reduction, etc.). Alternatively, if new forest landowners neither appreciate nor desire to work with their forest to maintain or enhance its conservation and productive value, parcelization may lead to overall loss of functional and "working" forests on family owned lands.

Changes in forest ownership are compounded by multiple other factors that also influence the overall health and function of Montana forests. Since 2000, 4.4 million acres of Montana's forestland have burned (*Table 1*) and approximately 1/3 of this area experienced stand replacing fire behavior (DNRC, 2009).

Table 1 ***Total Montana acres affected by wildfires and mountain pine beetle in the past decade (compiled by P Kolb 2011)***

Insects, including defoliators such as western spruce budworm and bark beetles, have also caused landscape level changes across Montana's forests. Western spruce budworm has caused widespread defoliation damage on 2,554,205 acres of forest and bark beetles have killed a significant number of trees on more than 3,810,080 acres (MT DNRC and USDA, 2009, 2010). Finally, noxious weeds are becoming more pronounced across the state and forest landowners are faced with the loss of native understory plant species and their function from the spread of multiple aggressive exotic species.

Over the past decades family forests have consistently provided 30% of the fiber supply for the Montana wood products industry. Presently these lands remain an even more important supplier of logs for the remaining Montana wood product infrastructure and are also considered one of the most important

potential sources of biomass for bioenergy ventures. Montana family forest lands are the primary raw materials source for a current $500 million annual net revenue wood products industry that a few years ago produced more than 1 billion dollar annual forest products revenue. The loss of a reliable wood fiber supply from federal and industry lands coupled with poor markets from a nationwide economic slump have been primary factors responsible for more recent losses of wood processing facilities. Montana family forests also play significant ecological and recreational roles. Family forests primarily occupy the edges of valleys and lower elevation approaches to mountain ranges due to the history of human settlement and their needs for arable lands in the mountainous and inhospitable topography of the Montana landscape. This places family forest lands in the interface between federal and private land which is often winter range for many native ungulate species, and access to primary watersheds and recreational opportunities on federal lands administered by the National Forests, Bureau of Land Management, Wilderness areas, National Parks, and National Monuments. Potential conflicts and misconceptions between the public and family forest owners have been increasing, especially over expectations for adjoining federal lands, which are often referred to as “wildlands” by urban dwellers, policy makers and academics, and as “mismanaged sources of wildfires and insect pests” by many family forest owners. Since the national urban population percentage continues to grow and outnumbers the rural population 79% to 21% in 2000 (USDT FHA, 2000) and 97% to 3% in 2010 (2010 US census), and in Montana 54.1% to 45.9% (MT.gov Census, 2009), private rural lands are increasingly being viewed by a disconnected population as a cost and liability for wildland-urban interface fire suppression, endangered species habitat protection, stream water quality protection, and open space view sheds. However, how family owned forest lands are managed depends on many factors including family history, landowner paradigms, landowner knowledge, economic opportunities and financial incentives. Of these, overall landowner knowledge and paradigms about forest ecology, conservation and management are thought to be the most important influences on actual property management.

Since 1990 federal and state funding has been allocated towards providing continuing education opportunities for family forest owners as well as cost-share for non-profit land improvement practices to provide for better landowner knowledge about managing their resources. The effectiveness of this funding in achieving desired outcomes on private lands remains difficult to assess as social priorities change as well as the values represented by public funding. Interpreting and justifying how family forests benefit or detract from urban populations' expectations and needs is also difficult and can depend on the assumptions of the investigators, the current reported needs of society and new priorities such as carbon sequestration, climate change, and alternative energy production. The rights of family forest landowners to manage their lands for individual goals, which may or may not impact neighbors and communities, must also be considered. A review of western states policies with regard to individual forest landowner rights indicates that each state has developed different levels of regulation versus rights for private forest lands. Forest landowners may be influenced by: 1) Providing family forest landowners with educational programs about forest management and conservation, 2) Using state foresters/regulators to influence family land management, 3) Enacted laws that are supposed to prevent forest landowners from degrading the resources under their control, and 4) Providing landowners with incentives to implement desired practices on their lands. Each state relies on a different matrix of these tools. Montana has relied to a greater extent on landowner education, voluntary compliance, and incentives than any other state in the United States. For example, it is only one of two forested states that do not have a state forest practices act. For Montana, effective landowner educational programs provide the keystone element for voluntary and incentives based management practices.

The recent history of forest landowner educational programming in Montana began in 1990, when the United States Department of Agriculture instituted the Forest Stewardship Program with support from state officials, conservation groups, and forest landowner organizations. The intent of the program was to help keep family forest lands in an ecologically viable and wood-

fiber productive condition by promoting forest management plans. Each state was provided with a monetary allocation to be used, at the State Forester's discretion, to develop an assistance program that helping manage and conserve family forest lands by providing a mechanism through which a forest management plan was written for each non-industrial private forest. In addition, each state program was to have advisory oversight from a state forest stewardship committee composed of a majority of family forest owners and important state stakeholders as well as agency representatives. Most states fulfilled their assistance mandate by hiring professional foresters to inventory and write management plans for individual private landowners; however, Montana developed an alternate approach. A committee consisting of landowners, professional foresters, state foresters, and university faculty determined that an educational program developed and implemented by Montana State University Extension Forestry would be used to train landowners to conduct their own inventories and develop their own management plans. The premise behind this was that a program that taught landowners how to do their own work (inventory and analyze their forest and write their own plans) would have much greater short and long term effectiveness than a program that handed landowners a document that they neither understood nor had a personal stake in. The resulting Montana Forest Stewardship Program (MFSP) was developed to be an academically and professionally delivered curriculum that teaches landowners basic forestry principles including how to conduct ecological and forest products inventories of their forest lands, implement different proven management practices, and ultimately develop forest management plans that meet sustainable forestry standards. The governing philosophy is that family forest owners have the ability to pursue their personal land ownership objectives with the information provided by their forest inventory, and make balanced and state-of-the-art decisions concerning their forest management activities without being unduly influenced towards pursuing any specific goals such as intensive fiber production, grazing, recreation, or alternatively "wilderness" where natural processes determine the future forest condition. Regardless of personal

objectives for their land, landowners would be more aware of processes that affect their forests and thereby have a better ability to make thoughtful choices with regard to forest conservation, wildfire hazard, insect and disease issues, growing large trees, wildlife habitat, water quality, landscape aesthetics, neighboring landowner issues, grazing, potential markets for forest products, and other values associated with forests.

The MFSP workshops started in 1991 and by 2005 104 management planning workshops had been conducted graduating 2,549 family forest owners representing 938,601 acres and more than 1,367 forest management plans. Currently this accounts for 21% of the total family forest ownership in Montana. Post-workshop evaluations and continued communication with some landowners indicated that their needs and expectations had been met by the MFSP. Quantifiable and comprehensive data with respect to actual landowner paradigm shifts, attitudes towards forest land conservation, actual forest management practices, and longer term overall conservation impacts on family forest lands remain difficult to obtain. Adult education does play a role in attitude and opinion change (Preston, 2004). Some studies have focused on specific aspects of forest ownership. For example, a study of landowners in Tennessee showed that family forest owners who participated in training programs tended to promote more progressive forestry practices (English, 1997). However it is difficult to ascertain what is meant by “progressive”. Other studies showed that those who have written management plans are more likely to implement forest practices (Munsell and Germain, 2004); although, what practices are implemented and what their impact is on overall forest ecosystem function or societal expectations is unknown. The impact of forestry educational programs is also hard to quantify because it is unclear if landowners will follow through with practices in a timely manner that were outlined in a management plan. Although Jennings and McGill, 2005 found that implementation of forest management practices are more likely when landowners have had more time to carry out their plans, the time span may vary tremendously. Different teaching techniques may also influence outcomes. Demonstration projects where landowners can see firsthand results

of management practices have led to documented increased educational program effectiveness (Harman and Jones, 1997).

Cable, 1987 note that there are conflicting results of studies regarding education and attitude change. Their study considered the entry and exit questionnaires of visitors to a visitor center. The questionnaire focus was on forest management in Canadian forests. The results showed a favorable change in attitudes toward different management with a mean increase of 5.27.

With consideration of the past studies across other states, and the 20 years of Montana Stewardship educational workshops, the purpose of this study was to evaluate both the short- and long-term effectiveness using multiple survey techniques of the Montana Forest Stewardship program along with other key established landowner educational programs. Previous workshop surveys of family forest landowners indicated common topics of concern, in no particular order for private landowners in Montana, are tree pests, noxious weeds, wildfires, understory vegetation, wildlife habitat, income opportunities, and overall forest health. The goal of the MFSP is to improve forest landowners' general knowledge about forest ecology and management practices by increasing landowners' abilities to analyze their forests' ecological potentials and limitations, develop a management plan, and conserve water quality, wildlife habitat, aesthetic open space, biodiversity, and natural resource productivity.

The objectives of this study were:

1. To evaluate what values and objectives family forest owners had for their forested lands across Montana.
2. To determine and evaluate if there are any significant short- and long-term attitude changes resulting from Montana Forest Stewardship workshop participation.
3. To determine if continued participation with other family forest organizations such as "Tree Farm" further influences landowner attitudes and behaviors.

4. To evaluate if individual forest management practices are implemented as a result of the MFSP workshops and what key factors might have the greatest influence promoting specific management actions.

METHODS

Survey of Short-Term Workshop Impacts

To measure short-term attitude changes, written surveys (APPENDIX A: Short-Term Survey) were distributed to all participants immediately before and after 12 Forest Stewardship planning workshops that were offered over three years across Montana. The 2005 workshops were located in Hamilton, Condon, Thompson Falls, and at Yellow Bay; the 2006 workshops in Seeley Lake, Missoula, Roundup, Bozeman, and at Yellow Bay; and the 2007 workshops in Superior, White Sulphur Springs, and Heron. A total of 87 participants participated in the short-term portion of the study.

The surveys were developed to evaluate the strength of personal beliefs on major issues affecting private lands and to avoid forced ranking or prioritization of values that may actually be of equal importance. To track participant surveys, all surveys were numbered allowing before and after workshop surveys for each individual to be compared. Surveys (APPENDIX A: Short-Term Survey) were divided into three separate topic areas. The first seven questions measured landowner conservation values and changes in those values that occurred as a result of the Stewardship workshop including wildlife habitat, reducing fire risk, insect and disease free trees, controlling noxious weeds, increasing growth rates of trees, growing trees for future log harvest(s), and conserving or growing large old trees. The second topic area, questions 8-14 assessed participants' needs for implementing the conservation objectives they rated important in questions 1-7, and included potential income, cost share assistance and the option of selling land parcels. The third topic area, question 15, assessed landowners' ability and confidence to implement forest practices, potential use of outside help and value of educational programs.

Assessments of Long-Term Workshop Impacts

All Tree Farm members, past MSU Forest Stewardship Program participants, and a random sample of Montana forest landowners from the MSU Extension Forestry landowner database were sent a mail survey in 2007 (APPENDIX B:

Long-Term Mail Survey). The survey was designed to assess the effects of the Forest Stewardship Planning workshops as well as additional programs offered through the Montana Tree Farm Program on landowner attitudes and applied forest practices 2-15 years after they attended a workshop. The MSU Extension forest landowner database was compiled in 1999 from the Montana State Department of Revenue forestland tax records and updated periodically. The surveyed population was stratified into four groups:

- ST - The 1,376 graduates of the Forest Stewardship program who had participated in a workshop between 1991 and 2005 and are not current members of the Montana Tree Farm program.
- STTF - The 97 past graduates of the Forest Stewardship program who are members of Tree Farm.
- TF - 332 Tree Farm members who are not participants of the Forest Stewardship program.
- OTHER – a random sample of 1,500 forest landowners who have not participated in the Forest Stewardship program and are not members of Tree Farm.

All surveys were assigned numerical values to sort the participants according to membership group. A total of 3,305 surveys were sent via first class mail. There were several steps to the mailing in order to maximize response levels. All mailed materials and the survey are found in APPENDIX B: Long-Term Mail Survey. Beginning in April of 2007, survey mailings were made in the following manner:

1. Day one, to initiate the survey, a pre-survey letter of notice was sent to all subjects.
2. Day three, the first survey was mailed along with a card with information about the survey and a self addressed stamped envelope.
3. Day seven, a post card was mailed to thank those who participated and remind those who had not responded to please fill out the survey.

4. Day fourteen, a letter explaining the importance of the survey, replacement survey, and a self addressed stamped envelope was sent to all non-respondents.

The long-term mail survey contained the same rating categories that were in the short-term survey including: objectives, revenue, cost-share, and maintaining ownership. Additional categories were included to assess the challenges landowners have in implementing their land management objectives and the number of acres they implemented management practices on for objectives such as wildlife habitat, water quality, forest health, timber products, and wildfire hazard reduction.

Assessment of Actual Landowner Management Practices

To evaluate the difference between survey results and actual landowner implementation of management plans, a random sample of survey respondents was contacted, including 50 landowners who had attended a Stewardship workshop between 1991 and 2004 and had written a Forest Stewardship Plan that was verified by a Forest Stewardship Advisor, were visited either in person at their forest land or via phone interview to evaluate their management activities and Forest Stewardship plans. Twenty-five of this group were Stewardship only and 25 had subsequently joined the Montana Tree Farm program. These visits were completed by professional foresters trained and experienced in teaching the Forest Stewardship Workshops using a predesigned evaluation form. There were three elements to the visit.

1. The landowner participants were asked to retake the same survey which had been previously mailed to compare to mail surveys for accuracy and consistency.
2. The visiting advisors completed a monitoring form (APPENDIX D: Monitoring Form) to assess the condition and management activity on the landowners' forests. The information collected included:
    a. General property and Stewardship Plan information.

b. Changes to the original plan, implementation of management practices that had been prescribed in the original Stewardship Plan.
c. Challenges to plan implementation.
d. Extent of forest that had been inventoried and future plans for inventory.
e. Acres of Forest resources managed or protected under their Forest Stewardship Management Plan.
f. Educational topics that would be helpful to continued forest management and type of information delivery that would be desired.
g. Statements regarding the usefulness of the visit and how it might be improved.
h. An evaluation from the advisor as to whether or not the forest is being managed consistent with landowner's workshop developed Forest Stewardship Management Plan.

3. Participants were given the opportunity to join Tree Farm and to add acres and/or management units to their Stewardship Plan.

Survey Non-Response Study

To determine if there was a bias in forest ownership attitudes and values between landowners who did not respond to mail surveys compared to those who did respond a random sample of 48 non-respondents were interviewed by phone. The group contained twelve participants from each surveyed landowner category: Stewardship, Stewardship and Tree Farm, Tree Farm only, and OTHER non-participant. Prior to making each call, Montana cadastral records and aerial photos were check to verify if the individual was presently a forest property owner in Montana. It was found that the data base had some error with the Tree Farm members and substantial error for the OTHER (no organization or educational program affiliation) group. The Stewardship only (ST) and Tree Farm only (TF) lists were fairly accurate because they were generated from participation of land owners. Response ratios for all groups where adjusted to reflect actual Montana landowners.

Results for all studies were summarized and numerical average responses calculated and tested for normality. The trends of the mean responses were also evaluated among (between means two groups – among means more than two groups) membership groups and within and across groups by ownership acreage size. Different populations based on educational experiences, group affiliations, and ownership sizes were analyzed using standard ANOVA procedures through PASW Statistics. Population trends were examined using regression analysis.

RESULTS

Survey of Short-Term Workshop Impacts

Surveys conducted prior to and after Forest Stewardship workshops attempted to:

- Assess landowner core values and workshop impacts on personal beliefs concerning natural resources values and willingness/ability to conduct forest management practices.
- Landowner awareness of costs and potential revenues.
- Changes in personal desire to perform management activities.

Initial data analysis showed significant landowner response variability within test populations in both pre- and post-workshop surveys. Further examination indicated that stratifying responses by forest ownership size reduced the within population variability enough for meaningful test population comparisons. Forest ownership acreage brackets were determined by identifying obvious changes in survey core value responses for questions 1-7 and resulted in five landowner acreage classes of 1-19, 20-39, 40-79, 80-159, and 160+ acres. This study includes an in-depth evaluation of trends between acreage classes and between participant responses before and after completing the workshop. To further account for the relatively small population and the within population variability when comparing mean responses among test populations and taking into consideration that this is an exploratory study, an α significance level of 0.15 was used.

Overall mean response of landowners

The pre-workshop mean values of all surveyed forest landowners who participated in the Forest Stewardship workshops (Table 2) indicated a positive importance rating towards most core forest values asked about. The exception was “managing forests for future harvest”. Post-workshop surveys showed an increased importance rating of all core values. The results from the pre-workshop “needs for implementation” section indicated that only cutting some trees was viewed as important whereas “generating revenue, forest income,

cost-share, income needed to maintain ownership, and selling parcels of land" were seen as not important. Workshop participation increased importance to these statements of needs with the exception of needing to generate revenue or sell parcels to retain property ownership. The final portion of the survey that assessed landowners' confidence to get work on their property done showed some importance that they (landowners) could do their own work and planning and use consultants prior to the workshop. Post-workshop results indicated that many landowners were slightly less confident that they could conduct their own forestlands work, but that they had much greater confidence in planning their projects and were slightly more willing to use outside consultants. The value of educational programs was initially rated of high importance, and this showed little change as a result of the workshop.

A further analysis of responses to each question based on land ownership size showed significant divergent trends from the mean, thus individual response means and comparisons were calculated for landowner size classes (Table 2-8).

Short-term survey paired samples T-Tests

Key for Tables 2-8: Short-Term Survey Statements

Scale: 1-strongly disagree (not at all important), 2- disagree (not important), 3-neutral, 4-agree (important), 5-strongly agree (highly important)

1. Wildlife habitat is one of my forest management objectives.
2. Fire hazard reduction is one of my forest objectives.
3. Insect and/or disease free trees is one of my forest management objectives.
4. Controlling noxious weeds is one of my objectives.
5. Increasing the growth rate of my trees is one of my management objectives.
6. Growing trees for future log harvest(s) is one of my forest management objectives.
7. Conserving and/or growing large old trees on portions of my property is one of my forest management objectives.
8. To meet the above objectives indicated important, I need to cut some trees.
9. To meet the above objectives indicated important, I need to generate revenue from my forest.
10. Income from selling wood (logs, poles, posts, firewood) from my property is necessary for me to implement forest objectives.
11. **Without any revenue generated from my forest** I need federal or state cost-share assistance to meet my objectives for my forest.
12. **With revenue generated from my forest** I need federal or state cost-share assistance to meet my objectives for my forest.
13. Income from selling wood (logs, poles, posts, firewood) from my property is necessary for me to maintain ownership of my forested land.
14. Selling some of my forestland for smaller acreage home sites is an option to pay for meeting my forest objectives.
15. I physically wish to do my own work.
16. I am confident enough to do my own planning.
17. I wish to work with a consultant.
18. I would like further educational assistance.

Table 2 t-test for *paired before and after workshop survey samples*

α = 0.15 significant difference of mean before and after workshop indicated by *
Δ (change) = response after minus response before workshop

	$\bar{x}$ Before	Δ	StdD	T	Df	Sig.
1. Wildlife Habitat*	4.43	.151	.964	1.454	85	**.150**
2. Fire Hazard Reduction*	4.48	.186	.939	1.836	85	**.070**
3. Insects & Disease	4.55	.058	1.010	.534	85	.595
4. Noxious Weeds*	4.36	.221	1.011	2.027	85	**.046**
5. Growth Rate*	3.63	.198	.918	1.997	85	**.049**
6. Future Harvest*	2.72	.233	1.103	1.956	85	**.054**
7. Large Old Trees*	3.84	.198	1.196	1.532	85	**.129**
8. Cut Trees*	3.96	.306	1.155	2.442	84	**.017**
9. Generate Revenue*	2.53	.221	1.162	1.763	85	**.082**
10. Forest Income	2.38	.105	1.117	.869	85	.387
11. Without Revenue-CS*	2.65	.202	1.128	1.645	83	**.104**
12. With Revenue-CS	2.43	.108	1.036	.953	82	.343
13. Forest Income for Ownership	1.81	-.129	1.078	-1.107	84	.271
14. Sell Parcels for Ownership	1.54	-.048	1.279	-.341	83	.734
15. Do Own Work	3.52	-.024	1.115	-.197	82	.844
16. Do Own Planning*	3.20	.325	1.250	2.370	82	**.020**
17. Consultants	3.62	.155	1.237	1.147	83	.255
18. Education	4.02	.024	1.029	.212	83	.833

Table 3 *Short-Term survey response means and standard error by acreage group before and after workshop*

α = 0.15 significant difference within ownership size indicated by *
Δ (change) = response change (value before workshop – value after workshop)

		Ownership Size Group									
		1-19 acres n=21		**20-39 acres n=25**		**40-79 acres n=16**		**80-159 acres n=11**		**160+ acres n=13**	
		$\bar{x}$	StdD	$\bar{x}$	StdD	$\bar{x}$	StdD	$\bar{x}$	StdD	$\bar{x}$	StdD
Q1*	Before	**4.00**	1.265	**4.76**	.523	**4.25**	1.238	**4.45**	.934	**4.69**	.630
	Δ	**.524**	.680	**-.080**	.557	**.563***	.403	**-.364**	1.136	**-.077**	.650
Q2*	Before	**4.14**	1.236	**4.68**	.690	**4.25**	1.390	**4.73**	.467	**4.69**	.630
	Δ	**.286**	.978	**.040**	.614	**.625***	.342	**-.273***	.688	**.154**	.376
Q3	Before	**4.48**	1.030	**4.76**	.597	**4.00**	1.461	**4.73**	.467	**4.77**	.439
	Δ	**.190**	.577	**-.080**	.627	**.438**	.727	**-.182**	.688	**-.154**	.506
Q4*	Before	**4.10**	1.300	**4.48**	.714	**4.00**	1.265	**4.91**	.302	**4.54**	.660
	Δ	**.524***	.669	**.040**	.714	**.563***	.727	**-.091**	.405	**-.077**	.967
Q5*	Before	**3.62**	1.071	**3.72**	1.021	**3.25**	1.238	**3.73**	.786	**3.85**	.987
	Δ	**-.095**	.873	**.240**	1.060	**.688***	.854	**.182**	.539	**.000**	.899
Q6	Before	**2.38**	1.244	**2.56**	1.121	**2.56**	1.459	**3.09**	1.375	**3.46**	1.266
	Δ	**.238**	1.161	**.320**	1.301	**.438**	1.366	**.091**	.874	**-.077**	1.387
Q7*	Before	**3.76**	1.300	**4.04**	1.060	**3.88**	1.025	**3.73**	.786	**3.62**	1.387
	Δ	**.333**	.750	**-.080**	.935	**.125**	.894	**.364***	.831	**.308**	.862
Q8*	Before	**3.86**	1.153	**4.04**	1.083	**3.69**	1.401	**4.09**	1.136	**4.23**	1.166
	Δ	**.429**	1.078	**.125**	1.080	**.563***	.683	**.364**	.688	**.231**	1.330
Q9*	Before	**2.52**	1.327	**2.12**	1.166	**2.69**	1.401	**2.55**	1.440	**3.15**	1.345
	Δ	**-.143**	1.161	**.400***	1.085	**.063**	1.238	**.545**	1.136	**.385**	1.561
Q 10*	Before	**2.62**	1.322	**1.88**	1.054	**2.44**	1.263	**2.36**	1.502	**2.92**	1.498
	Δ	**-.429***	1.167	**.400***	1.173	**.063**	1.265	**.636***	1.183	**.000**	1.206
Q 11*	Before	**3.00**	1.257	**2.29**	1.301	**2.81**	1.377	**2.82**	1.328	**2.46**	1.561
	Δ	**.100**	.995	**.208**	1.295	**-.125**	1.448	**.545**	1.206	**.462***	1.605
Q 12	Before	**2.65**	1.268	**2.17**	1.274	**2.63**	1.408	**2.45**	1.293	**2.33**	1.371
	Δ	**-.100**	.978	**.167**	1.108	**-.125**	1.317	**.455**	1.300	**.333**	1.127
Q 13*	Before	**2.10**	1.334	**1.32**	.476	**2.19**	1.471	**1.64**	1.027	**2.00**	1.080
	Δ	**-.400**	1.044	**.200***	.714	**-.438**	1.000	**.182**	.751	**-.231**	.927
Q	Before	**1.75**	1.333	**1.28**	.614	**1.81**	1.377	**1.64**	.924	**1.31**	.751

14*	Δ	**-.500**	.966	**.120**	.913	**-.333**	.910	**.091**	1.009	**.538***	1.068
Q	Before	**3.32**	1.250	**3.80**	1.155	**3.44**	.964	**3.18**	1.328	**3.69**	1.316
15*	Δ	**.158**	1.050	**-333***	1.063	**.250**	1.138	**.273**	.820	**-308**	1.387
Q	Before	**3.35**	1.137	**3.12**	1.092	**2.69**	1.138	**3.09**	1.221	**3.85**	1.144
16*	Δ	**.474***	.834	**.042**	.932	**-.875***	.814	**.182**	1.104	**-.615***	1.092
Q	Before	**3.30**	.979	**3.60**	1.000	**3.88**	.957	**3.45**	1.036	**4.00**	.913
17	Δ	**.350**	1.155	**.03**	1.096	**-.063**	.834	**.455**	.831	**.154**	.899
Q	Before	**3.70**	.856	**4.08**	.654	**4.06**	.544	**3.91**	.603	**4.46**	.801
18	Δ	**.000**	1.081	**0**	.812	**.125**	.929	**.273**	.944	**-.308**	.660

Table 4 *Workshop Short-Term survey paired T-Test 1-19 acres.*

α = 0.15 significant difference of mean before and after workshop indicated by *
Δ (change) = response after minus response before workshop

	$\bar{x}$ Before	Δ	StdD	T	Df	Sig.
1. Wildlife Habitat*	4.00	.524	1.167	2.057	20	**.053**
2. Fire Hazard Reduction	4.14	.286	1.146	1.142	20	.267
3. Insects & Disease	4.48	.190	.873	1.000	20	.329
4. Noxious Weeds*	4.10	.524	1.123	2.137	20	**.045**
5. Growth Rate	3.62	-.095	.995	-.439	20	.666
6. Future Harvest	2.38	.238	1.091	1.000	20	.329
7. Large Old Trees	3.76	.429	1.469	1.337	20	.196
8. Cut Trees	3.86	.333	1.426	1.071	20	.297
9. Generate Revenue	2.52	-.143	1.236	-.530	20	.602
10. Forest Income*	2.62	-.429	1.028	-1.910	20	**.071**
11. Without Revenue-CS	3.00	.100	1.021	.438	19	.666
12. With Revenue-CS	2.65	-.100	.912	-.490	19	.629
13. Forest Income for Ownership	2.10	-.400	1.392	-1.285	19	.214
14. Sell Parcels for Ownership	1.75	-.500	1.606	-1.392	19	.180
15. Do Own Work	3.32	.158	1.302	.528	18	.604
16. Do Own Planning*	3.35	.474	1.307	1.580	18	.132
17. Consultants	3.30	.350	1.531	1.022	19	.320
18. Education	3.70	.000	1.338	.000	19	1.000

Table 5 *Workshop Short-Term survey paired T-Test 20-39 acres.*

α = 0.15 significant difference of mean before and after workshop indicated by *
Δ (change) = response after minus response before workshop

	$\bar{x}$ Before	Δ	StdD	T	Df	Sig.
1. Wildlife Habitat	4.76	-.080	.640	-.625	24	.538
2. Fire Hazard Reduction	4.68	.040	.455	.440	24	.664
3. Insects & Disease	4.76	-.080	.759	-.527	24	.603
4. Noxious Weeds	4.48	.040	.790	.253	24	.802
5. Growth Rate	3.72	.240	.879	1.365	24	.185
6. Future Harvest	2.56	.320	1.108	1.445	24	.161
7. Large Old Trees	4.04	-.080	.909	-.440	24	.664
8. Cut Trees	4.04	.125	.797	.768	23	.450
9. Generate Revenue*	2.12	.400	1.000	2.000	24	**.057**
10. Forest Income*	1.88	.400	.866	2.309	24	**.030**
11. Without Revenue-CS	2.29	.208	.932	1.096	23	.285
12. With Revenue-CS	2.17	.167	.702	1.163	23	.257
13. Forest Income for Ownership*	1.32	.200	.500	2.000	24	**.057**
14. Sell Parcels for Ownership	1.28	.120	.927	.647	24	.524
15. Do Own Work*	3.80	-.333	.761	-2.145	23	**.043**
16. Do Own Planning*	3.12	.417	1.100	1.856	23	**.076**
17. Consultants	3.60	.000	1.319	.000	23	1.000
18. Education	4.08	.042	.955	.214	23	.833

Table 6 Workshop Short-Term survey paired T-Test 40-70 acres.

α = 0.15 significant difference of mean before and after workshop indicated by *
Δ (change) = response after minus response before workshop

	$\bar{x}$ Before	Δ	StdD	T	Df	Sig.
1. Wildlife Habitat*	4.25	.563	1.209	1.861	15	**.083**
2. Fire Hazard Reduction*	4.25	.625	1.408	1.775	15	**.096**
3. Insects & Disease	4.00	.438	1.632	1.072	15	.300
4. Noxious Weeds*	4.00	.563	1.413	1.593	15	**.132**
5. Growth Rate*	3.25	.688	1.138	2.416	15	**.029**
6. Future Harvest	2.56	.438	1.548	1.131	15	.276
7. Large Old Trees	3.88	.125	1.310	.382	15	.708
8. Cut Trees*	3.69	.563	1.413	1.593	15	**.132**
9. Generate Revenue	2.69	.063	1.181	.212	15	.835
10. Forest Income	2.44	.063	1.237	.202	15	.843
11. Without Revenue-CS	2.81	-.125	1.544	-.324	15	.751
12. With Revenue-CS	2.63	-.125	1.408	-.355	15	.728
13. Forest Income for Ownership	2.19	-.438	1.413	-1.239	15	.234
14. Sell Parcels for Ownership	1.81	-.333	1.676	-.770	14	.454
15. Do Own Work	3.44	.250	1.571	.637	15	.534
16. Do Own Planning*	2.69	.875	1.147	3.050	15	**.008**
17. Consultants	3.88	-.063	.854	-.293	15	.774
18. Education	4.06	.125	1.025	.488	15	.633

Table 7 Workshop Short-term survey paired T-Test 80-159 acres.

α = 0.15 significant difference of mean before and after workshop indicated by *
Δ (change) = response after minus response before workshop

	$\bar{x}$ Before	Δ	StdD	T	Df	Sig.
1. Wildlife Habitat	4.45	-.364	.809	-1.491	10	.167
2. Fire Hazard Reduction*	4.73	-.273	.467	-1.936	10	**.082**
3. Insects & Disease	4.73	-.182	.982	-.614	10	.553
4. Noxious Weeds	4.91	-.091	.302	-1.000	10	.341
5. Growth Rate	3.73	.182	.751	.803	10	.441
6. Future Harvest	3.09	.091	1.044	.289	10	.779
7. Large Old Trees*	3.73	.364	.674	1.789	10	**.104**
8. Cut Trees	4.09	.364	1.433	.841	10	.420
9. Generate Revenue	2.55	.545	1.214	1.491	10	.167
10. Forest Income*	2.36	.636	1.206	1.750	10	.111
11. Without Revenue-CS	2.82	.545	1.368	1.322	10	.216
12. With Revenue-CS	2.45	.455	1.368	1.102	10	.296
13. Forest Income for Ownership	1.64	.182	.603	1.000	10	.341
14. Sell Parcels for Ownership	1.64	.091	.701	.430	10	.676
15. Do Own Work	3.18	.273	.786	1.150	10	.277
16. Do Own Planning	3.09	.182	1.168	.516	10	.617
17. Consultants	3.45	.455	1.214	1.242	10	.242
18. Education	3.91	.273	.786	1.150	10	.277

Table 8 *Workshop Short-Term survey paired T-Test 160+ acres.*

α = 0.15 significant difference of mean before and after workshop indicated by *
Δ (change) = response after minus response before workshop

	$\bar{x}$ Before	Δ	StdD	T	Df	Sig.
1. Wildlife Habitat	4.69	-.077	.494	-.562	12	.584
2. Fire Hazard Reduction	4.69	.154	.689	.805	12	.436
3. Insects & Disease	4.77	-.154	.555	-1.000	12	.337
4. Noxious Weeds	4.54	-.077	.862	-.322	12	.753
5. Growth Rate	3.85	.000	.408	.000	12	1.000
6. Future Harvest	3.46	-.077	.277	-1.000	12	.337
7. Large Old Trees	3.62	.308	1.437	.772	12	.455
8. Cut Trees	4.23	.231	.599	1.389	12	.190
9. Generate Revenue	3.15	.385	1.261	1.100	12	.293
10. Forest Income	2.92	.000	1.225	.000	12	1.000
11. Without Revenue-CS*	2.46	.462	.776	2.144	12	**.053**
12. With Revenue-CS	2.33	.333	.888	1.301	11	.220
13. Forest Income for Ownership	2.00	-.231	1.092	-.762	12	.461
14. Sell Parcels for Ownership*	1.31	.538	.967	2.007	12	**.068**
15. Do Own Work	3.69	-.308	.855	-1.298	12	.219
16. Do Own Planning*	3.85	-.615	1.261	-1.760	12	**.104**
17. Consultants	4.00	.154	1.068	.519	12	.613
18. Education	4.46	-.308	.855	-1.298	12	.219

Conservation objectives by ownership size classes

For most landowner core value objectives and across all acreage size classes the overall trend was an increase in values as a result of the Stewardship workshops. Landowners with more than 80 acres showed higher initial values for fire hazard reduction, insects and disease control, noxious weeds, increasing tree growth rates and future log harvests than landowners with less than 80 acres. As a result of the workshops landowners in the 10-79 acre ownership size classes showed the greatest increase in core values to the point of reaching the same high core values as larger acreage landowners. Smaller acreage

landowners, therefore, showed the greatest increase in core values ratings as a result of attending workshops. Wildlife habitat, wildfire hazard reduction, and noxious weed control, although rated important showed the lowest initial scores and highest increases in value for land ownerships in the 10-19 and 40-79 acreage groupings. Growth rates for trees and future log harvests consistently showed the highest increase in core-value across all acreages, though remained the overall lowest scoring core values. “Growth rates for trees” originally scored slightly higher than “neutral” for 20-79 acreage owners but improved to “important” after the workshops. Landowners with more than 80 acres showed no significant change for this core value to the original score of “important” and 1-19 acreage landowners also showed no significant change from “slightly higher than neutral”. All acreages smaller than 80 acres originally showed a low level of importance when rating “future log harvests”, and although these scores improved after the workshops they remained lower than neutral. Landowners with acreages above 80 acres initially rated future harvests as neutral or slightly above, which remained the same or slightly increased as a result of workshops.

Overall, when ratings of importance were compared, wildfire hazard reduction, insects and disease, wildlife habitat and controlling noxious weed ranked the highest in importance to all acreage landowners, whereas values associated with harvesting timber ranked the lowest in importance (Table 9).

Table 9 *Short-Term Study: Conservation objective rankings before and after workshop*

	Before	After
Insect and/or disease free trees	1	2
Fire hazard reduction	2	1
Wildlife habitat	3	3
Controlling noxious weeds	4	3
Large old trees	5	5
Increasing growth rate	6	6
Future Log Harvest	7	7

Growing large old trees initially ranked as important among all acreage groupings with 20-79 acre landowners rating this value higher than either 1-19 or > 80 acre landowners. Workshops resulted in these later ownership classes raising their ratings of importance so there were no significant differences among post-workshop acreage classes. Values associated with educational opportunities remained “important” though did not appreciably change as a result of the workshops. Landowners with more than 80 acres significantly rated educational opportunities higher into the “very important” category than landowners with fewer acres.

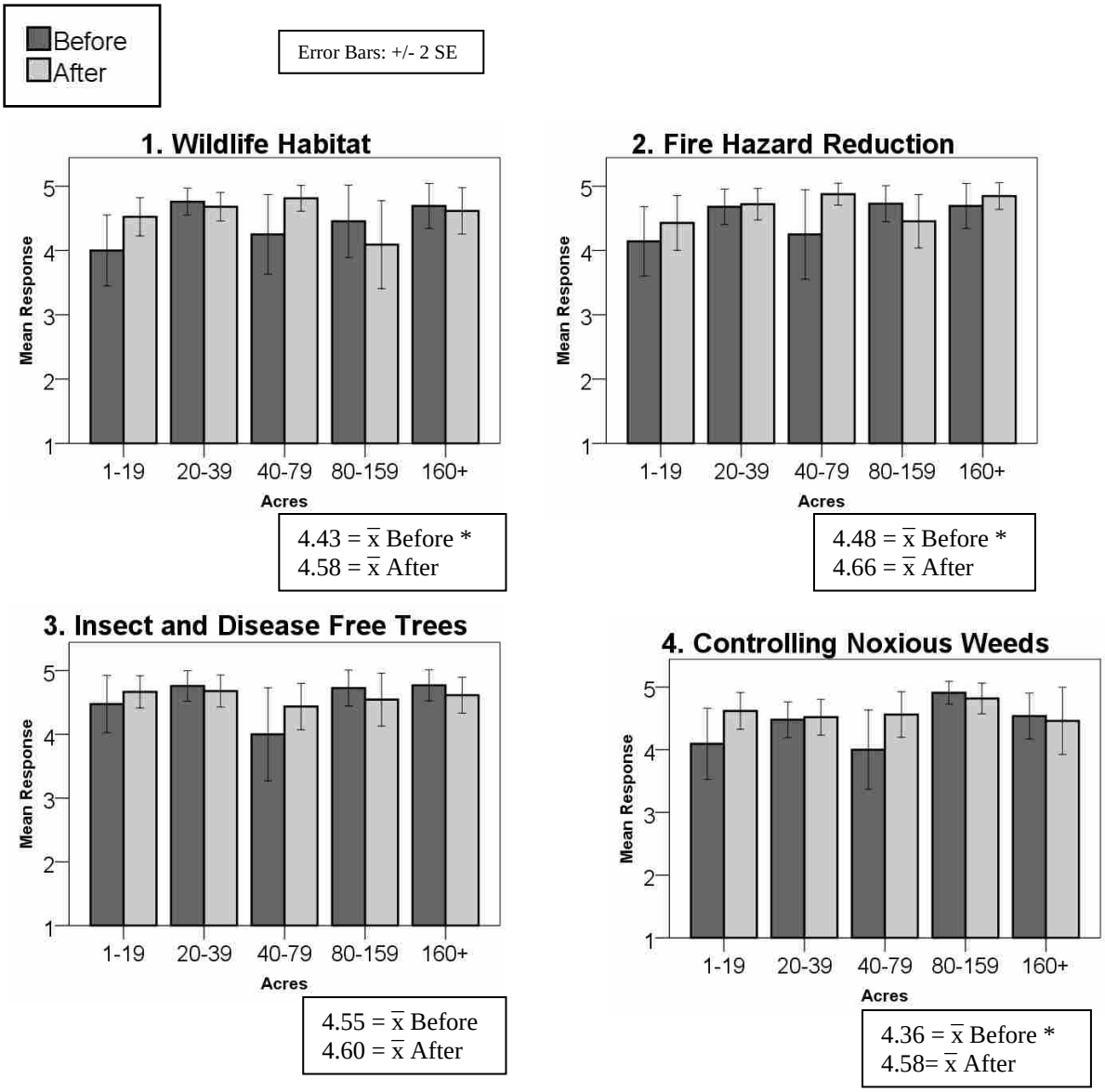
Key for Figures 1-4: Short-Term Survey Statements

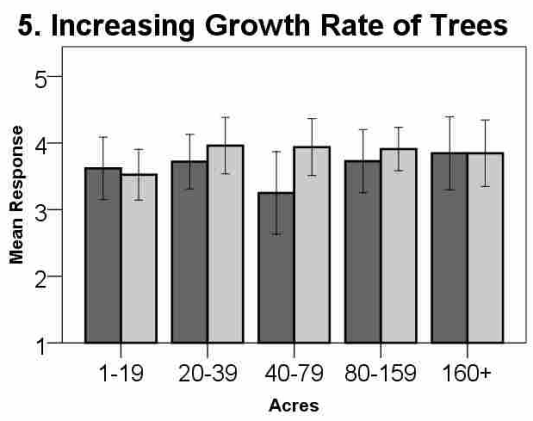
Scale: 1-strongly disagree (not at all important), 2- disagree (not important), 3-neutral, 4-agree (important), 5-strongly agree (highly important)

1. Wildlife habitat is one of my forest management objectives.
2. Fire hazard reduction is one of my forest objectives.
3. Insect and/or disease free trees is one of my forest management objectives.
4. Controlling noxious weeds is one of my objectives.
5. Increasing the growth rate of my trees is one of my management objectives.
6. Growing trees for future log harvest(s) is one of my forest management objectives.
7. Conserving and/or growing large old trees on portions of my property is one of my forest management objectives.
8. To meet the above objectives indicated important, I need to cut some trees.
9. To meet the above objectives indicated important, I need to generate revenue from my forest.
10. Income from selling wood (logs, poles, posts, firewood) from my property is necessary for me to implement forest objectives.
11. **Without any revenue generated from my forest** I need federal or state cost-share assistance to meet my objectives for my forest.
12. **With revenue generated from my forest** I need federal or state cost-share assistance to meet my objectives for my forest.
13. Income from selling wood (logs, poles, posts, firewood) from my property is necessary for me to maintain ownership of my forested land.
14. Selling some of my forestland for smaller acreage home sites is an option to pay for meeting my forest objectives.
15. I physically wish to do my own work.
16. I am confident enough to do my own planning.
17. I wish to work with a consultant.
18. I would like further educational assistance.

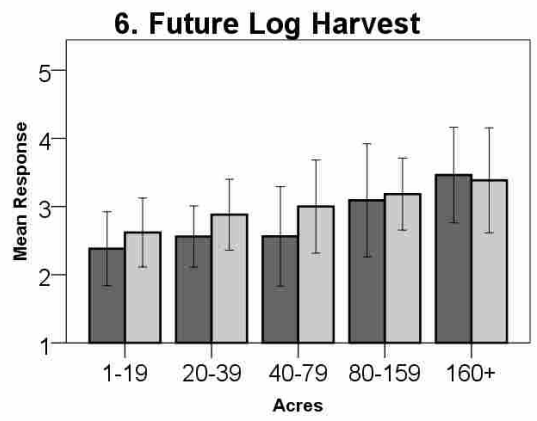
Figure 1 *Short-Term Study: Conservation objective scores*

Mean Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree
* = *Significant change* α = 0.15 *inclusive of all groups after workshop*

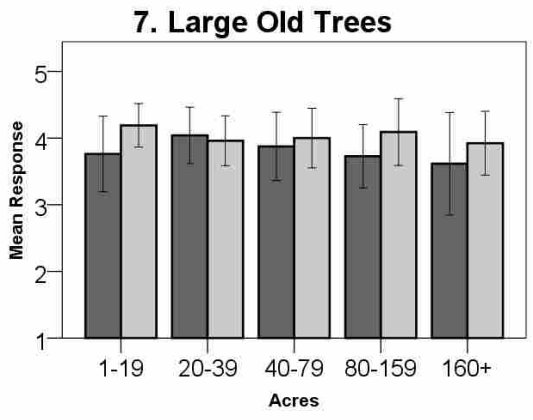




3.63 = $\bar{x}$ Before *
3.83 = $\bar{x}$ After



2.72 = $\bar{x}$ Before *
2.95 = $\bar{x}$ After



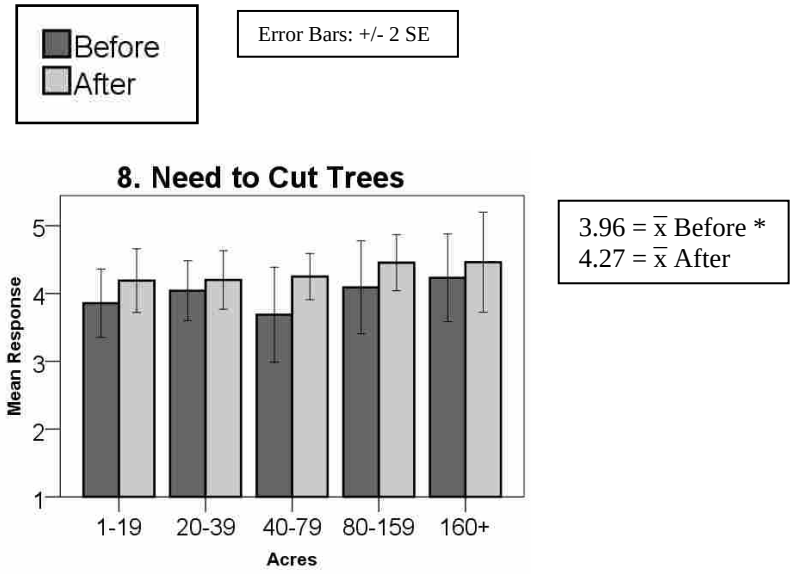
3.84 = $\bar{x}$ Before *
4.03 = $\bar{x}$ After

Need to Remove Trees to Meet Objectives

Pre-workshop participants generally rated "trees would need to be removed in order to attain their conservation objectives" as important across all ownership size classes. The 40-79 acre group began with a slightly-important response but showed a significant increase toward strong agreement as a result of the workshop (Table 5). Agreement trend increased in importance with larger acreage groupings (Figure 2). This statement showed one of the largest significant changes in attitude as a result of the workshop.

Figure 2 *Short-Term Study: Need to remove trees objective scores by acreage*

Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree
* = *Significant change* α = 0.15 *inclusive of all groups after workshop*



Revenue and Income rating among ownership size classes

Survey statements associated with implementing forestry practices and generating income from forested lands showed greater within population variances than those associated with core values (Table 2-8), (Figure 3). The statement concerning "needing to remove some trees to meet my objectives" was valued between neutral and important among all landownership groupings with high variability within each grouping. Overall there was a general trend towards "important" the larger the ownership became. Post-workshop ratings indicated tree harvesting was significantly more important than pre-workshop

ratings for all ownership groups. Although removing some trees had an "important" emphasis, "generating revenue from my forest to meet objectives ", and "income from selling logs, post, poles and firewood to implement forest objectives" received a "not important" average rating for ownerships smaller than 80 acres, a "neutral" rating from the 80-159 acre ownership grouping and a somewhat important rating from the 160+ acre grouping. The similar statement "generating forest income", but intended to specifically test the value of wood products income had an identical response trend though overall slightly lower importance value than the general forest income statement. The impact of Stewardship workshops resulted in landowners with more than 20 acres increasing their importance ratings on both these statements and landowners with 19 acres or less decreasing their importance rating.

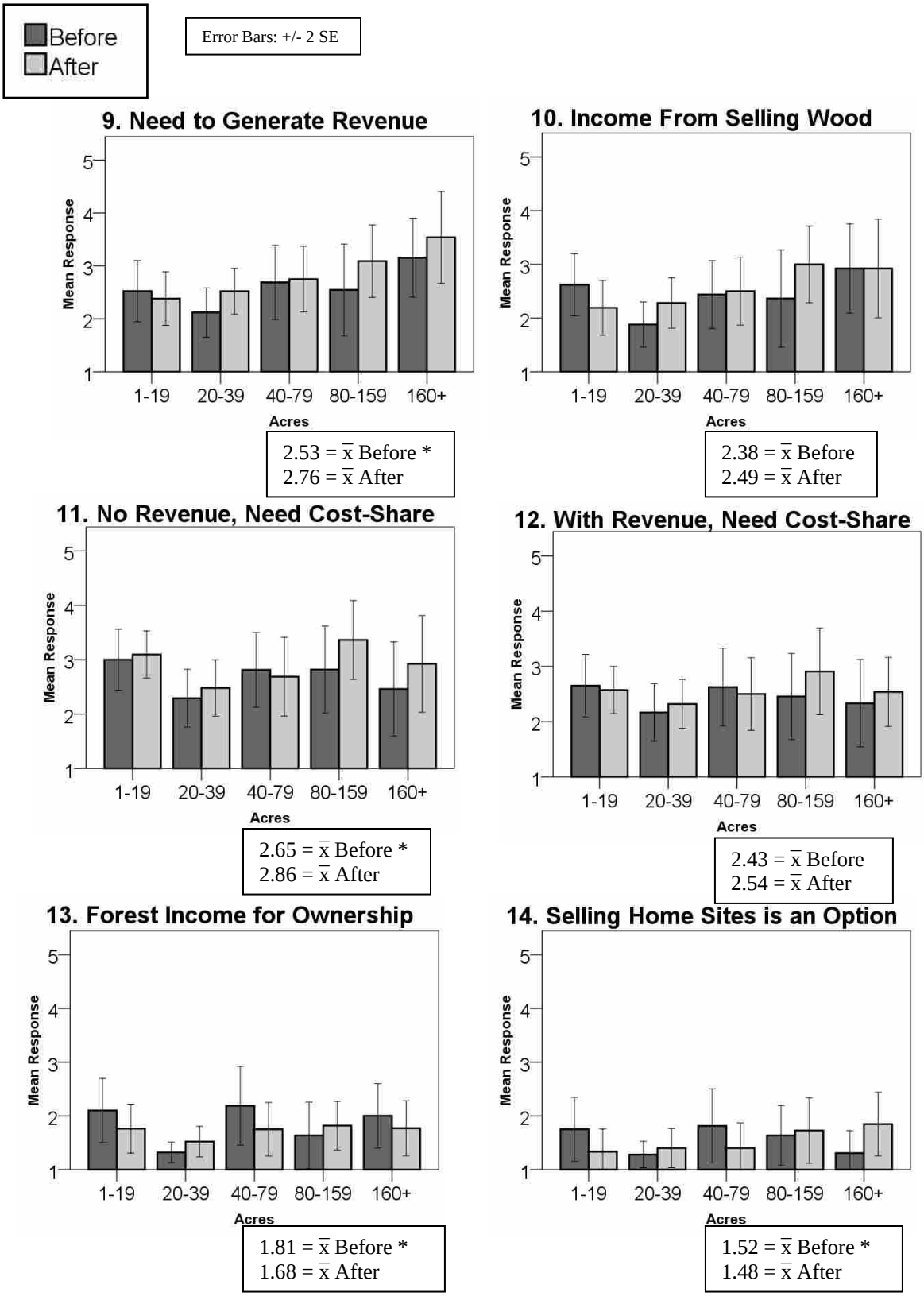
To examine the importance that generating revenue had on influencing the need for state or federal cost-share for landowners to implement their objectives, landowners were asked to rate their "estimate of importance" for cost-share opportunities if they could not generate revenue from their lands versus if they could generate revenue. Both statements resulted in very similar responses with 1-19 acre and 40-159 acre landowners close to neutral and 20-39 acre landowners considering these concepts as somewhat not important. The overall average results of the "with revenue" statement, however, showed a distinctly less-important rating for cost-share than the "without" revenue. Workshops resulted in landowners with acreages 80 acres or higher increasing their rating of cost-share importance to slightly above neutral, especially if they could not generate revenue. Overall the high degree of variability within responses to revenue statements indicated that there are some landowners to whom generating revenue and/or cost-share is important and some landowners to whom this is not important. Smaller acreage landowners (1-19 acres) and larger acreage owners (>80) found revenue and cost-share to be more important than intermediate acreage landowners (20-79).

The final revenue statements were meant to evaluate the importance of forest income for maintaining ownership of properties. The importance of forest

income for maintaining ownership received an average rating of not important to very unimportant across all acreage groupings and Stewardship workshops showed minimal influence. Similarly the concept of selling-off parcels for home sites was rated even less important than the need to generate income. Variability in the responses was also quite high for these statements indicating than most landowners did not consider these important but there were some who ranked them as neutral or slightly important.

Figure 3 *Short-Term Study: Revenue/cost-share objectives*

Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree
* = *Significant change* α = 0.15 *inclusive of all groups after workshop*

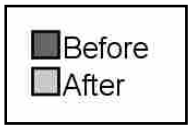


Implementation capacity among acreage size classes

The final part of the survey asked workshop participants to evaluate their ability to conduct their own work, planning, and their willingness to utilize a consultant. Initially all ownership size classes indicated that they somewhat agreed that they could do their own work with smaller intermediate (20-39 acre) and very large (160+acre) acreage landowners rating this slightly higher than either small (1-19 acre) and intermediate (40-159 acre) ownerships. The workshop influenced these rating insignificantly. Confidence to conduct their own forest management planning pre-workshop results were slightly positive for small to intermediate (1-39 acre) and larger (80+acre) ownerships and slightly negative for intermediate (40-79 acre) ownerships. Stewardship workshops had the greatest influence for small and intermediate ownerships (1-79 acres) that changed from “neutral” or “negative’ in their abilities to “able” or “confident” they could conduct their own forest planning. Interestingly larger acreages (80-159 acres) did not change their rating for this category and very large acreages (160+) actually decreased in their confidence to conduct their own planning. The value of using consultants showed a “slightly important” to “important trend” across ownership size classes initially. The Stewardship workshop increased the value of using consultants for small acreage (1-19 acres) and larger (80+acres) acreage landowners to the higher levels of importance initially reflected by intermediate and very large ownerships. Education rated as “somewhat important” among smaller acreage owners (1-19 acres), “important” to intermediate ownership size groups (20-159 acres) and “more important” for larger acreage owners (160+ acres). These ratings changed very little as a result of attending workshops.

Figure 4 *Short-Term Study: Implementation Needs Objectives*

Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree
* = *Significant change* α = 0.15 *inclusive of all groups after workshop*



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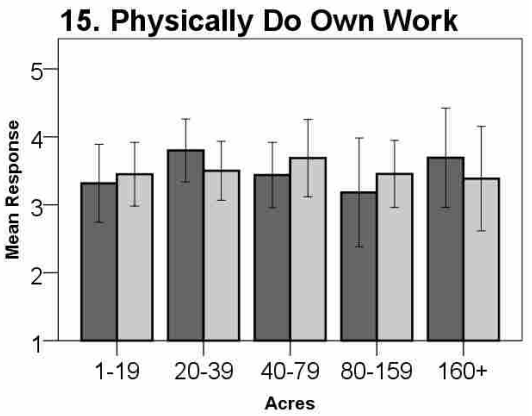
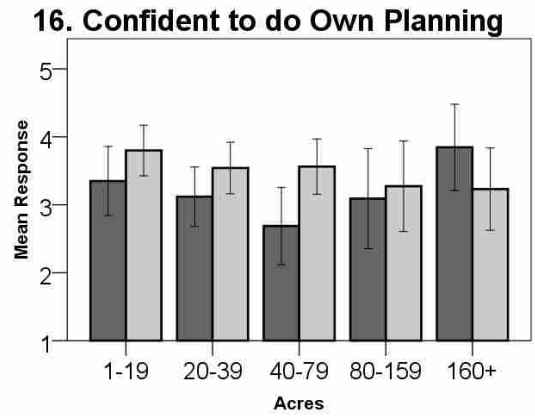
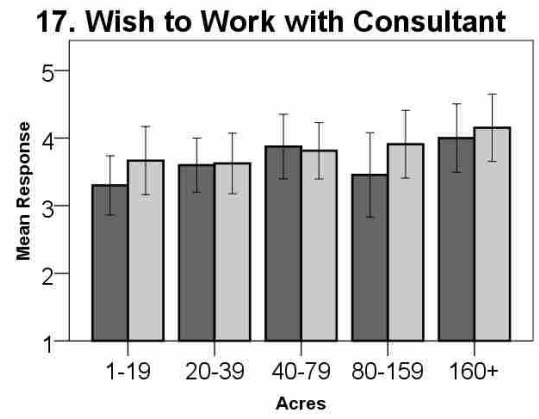


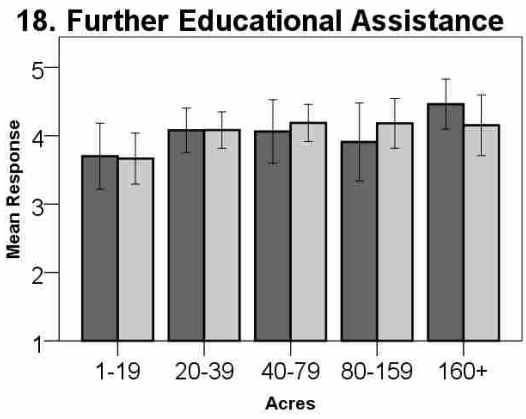
3.53 = $\bar{x}$ Before *
3.51 = $\bar{x}$ After



3.19 = $\bar{x}$ Before*
3.52 = $\bar{x}$ After



3.63 = $\bar{x}$ Before
3.79 = $\bar{x}$ After



4.01 = $\bar{x}$ Before
4.04 = $\bar{x}$ After

Survey of Forest Stewardship participants, Tree Farm members and non-affiliated forest landowners longer term forest attitudes and practices

The survey for past Forest Stewardship participants and other forest landowner groups was similar to the short-term workshop survey with additional questions regarding management implementation and challenges. The survey was designed to assess long-term impacts that the Forest Stewardship Program and affiliation with other education based programs such as the National Tree Farm System had on landowner attitudes, their forest management practices, and challenges they perceive for conducting management actions on their lands. Their responses were compared to a control group, labeled "OTHER", consisting of forest landowners who had neither participated in the Forest Stewardship educational program or were affiliated with the two predominant forest landowner organizations, the Montana Tree Farm Program or the Montana Forest Owners Association.

The response rate for returned mail surveys varied greatly among the ownership groups with the combined Stewardship and Tree Farm members (STTF) group having the highest rate of return (Table 10).

Table 10 *Long-Term Study: Survey valid response rates*

Group	Mailed	# Returned	% Returned
ST	1376	686	50%
STTF	97	76	78%
TF	290	161	55%
OTHER	580	262	45%

The analysis of survey responses showed that landowners who had completed the Forest Stewardship workshops and then joined the Tree Farm program and landowners who had independently joined the Tree Farm program had similar responses to survey statements. Because of these similarities the two groups were combined into one ownership group for analysis and are

denoted as STTF-TF. It was also noted that there were obvious differences in responses based on forest ownership size, similar to the short-term survey results. A graphical analysis of responses to core values showed obvious breaks in response trends that coincided with four acreage classes of 5-19, 20-80, 81-400 and 400+ acres. These were slightly different than the ownership size class grouping determined by the same analysis for short-term impacts to the Stewardship workshops. The ownership size-class groups were evaluated within the three forest educational and organizational affiliation groups using UNIANOVA and an α significance level of 0.10.

Mean response of all landowners

The initial mean values of all surveyed forest landowners who participated in the survey (Figure 5) indicated a positive importance rating towards most core forest values, especially fire hazard reduction, insects and disease, noxious weeds and healthy trees. There was surprisingly little variation between landowner groups for these values. The statement of "needing to remove some trees" (Figure 6) to realize conservation objectives showed one of the largest differences between forestry education/organization affiliated landowners and non-affiliated landowners with the former showing a significantly higher emphasis on removing some trees whereas the later were close to neutral. Similarly statements regarding deriving income from forests, harvesting trees for income or needs for forest revenue (Figure 7) to meet objectives were seen as important for Stewardship graduates who had also become Tree Farm members and lesser important for Stewardship graduates and "other" landowners. The need for cost-share (Figure 8) was considered a neutral point to most across all membership groups and classes. Income needed to maintain ownership, and selling parcels of land (Figure 9) were in general indicated as not important, though there was a high degree of variability in responses to these issues. The final portion of the survey that assessed landowners' challenges to accomplish work on their property (Figure 10) showed that overall landowners affiliated with forestry education and forestry programs perceived there were significant challenges for

them to achieve their objectives with lack of time ranking the highest followed by money restriction and needs for more information. The “OTHER” group showed a rating closer to neutral for perceived challenges and the need for more time but indicated a slight agreement for needing more money and information. All three landowner groups showed a slight disagreement that more loggers, professionals were needed or that regulations were an obstacle.

An analysis of responses to each question based on membership and land ownership size showed significant divergent trends from the mean, thus individual response means and comparisons were calculated for landowner size classes as well (Figure 5-10).

Conservation Objectives

There was very little statistical difference among landowner groups and acreage classes for most core values. Unlike short-term Stewardship workshop responses the most important values were fire hazard reduction and healthy trees, followed by wildlife, insects and disease, and noxious weeds that were equal in value, and “having large old trees”, though still considered important, ranked lowest (Table 11).

There were some significant differences in responses among membership groups for values of wildlife habitat, fire hazard reduction, and healthy trees. There were also significant differences among acreage size classes for values of wildlife habitat, having healthy trees, and retaining large old trees. No significant differences were noted among membership or acreage size for insects and disease and noxious weeds.

The ST group showed significantly higher values for wildlife habitat than the other two groups (Figure 5). Both ST and STTF groups in the 400+ acre class rated wildlife habitat slightly lower than the OTHER in this acreage class, although still considered this value important. For fire hazard reduction the OTHER group gave the lowest rating whereas the STTF-TF group rated this value higher than other groups. There was almost no difference among the acreage classes. All membership groups and acreage classes felt that having

insect and disease free forests and controlling noxious weeds was important to very important with no significant differences among groups or acreage classes. The importance of having healthy vigorously growing trees was significantly higher for the STTF-TF group than the ST and OTHER groups. There was a slight increasing trend within ST and OTHER groups for agreement from the smaller acreage to larger acreage classes leveling off at the 81-400 acre class. All three landowner groups indicated that growing large old trees was important with no difference among the membership groups. A trend across all landowner categories for larger acreage landowners to value big trees less than smaller acreage owners was significant.

Table 11 *Long-Term Study: Conservation objectives ranking of means by survey groups*

Conservation Objective	ST	STTF-TF	OTHER	All
Fire hazard reduction	1	2	1	1
Healthy trees	2	1	4	1
Controlling noxious weeds	3	4	3	4
Large old trees	4	6	6	6
Insect and disease	5	3	3	3
Wildlife habitat	5	5	5	5

When membership groups were combined and acreage classes compared with respect to overall importance of core values (

Table 12) fire hazard reduction was ranked the highest for 5-80 acre classes and healthy vigorously growing trees was ranked the highest for 20+ acre classes. The 5-19 acre class ranked healthy vigorously growing trees as fourth. The least important objective for all groups and acre classes with one exception in each was conserving and/or growing large old trees on portions of their property and wildlife habitat.

Table 12 *Long-Term Study: Conservation objectives ranking of means by acre class, all membership groups combined*

Conservation Objective	**5-19**	**20-80**	**81-400**	**400+**
Fire hazard reduction	1	1	2	2
Insect and disease	2	3	3	4
Noxious weeds	3	5	4	3
Healthy trees	4	1	1	1
Wildlife habitat	5	4	5	5
Large old trees	6	6	6	6

Key for Figures 5-10 and Tables 11-12: Long Term Survey Statements

Scale: 1-strongly disagree, 2- disagree, 3-neutral, 4-agree, 5-strongly agree

a. Wildlife is one of my forest management objectives.

b. Fire hazard reduction is one of my forest management objectives.

c. Insect and/or disease free trees is one of my forest management objectives.

d. Controlling noxious weeds is one of my forest management objectives.

e. Healthy vigorously growing trees is one of my forest management objectives.

f. Conserving and/or growing large old trees on portions of my property is one of my forest management objectives.

g. Getting some income return from growing and harvesting trees could be one of my forest management objectives.

h. Getting some income return from growing and harvesting trees is one of my forest management objectives.

i. To meet the above objective indicated important, I need to remove some trees.

j. To meet the above objective indicated important, I need to generate revenue from my forest.

k. To meet the above objectives indicated important, I need federal or state cost-share assistance.

l. If I can generate revenue from my forest, I still need federal or state cost-share assistance to meet my objectives for my forest.

m. Income from selling wood (logs, poles, posts, firewood from my property is important for me to maintain ownership of my forested land.

n. Selling some of my forest land for smaller acreage home sites is a potential option I will consider if I can't generate forest income by selling timber.

o. Selling some of my forest land for smaller acreage home sites is a potential option regardless of the forest income I generate.

The greatest challenges I have for implementing my land management objectives are:

p. No challenges.

q. Need more time.

r. Need more money.

s. Need more information.

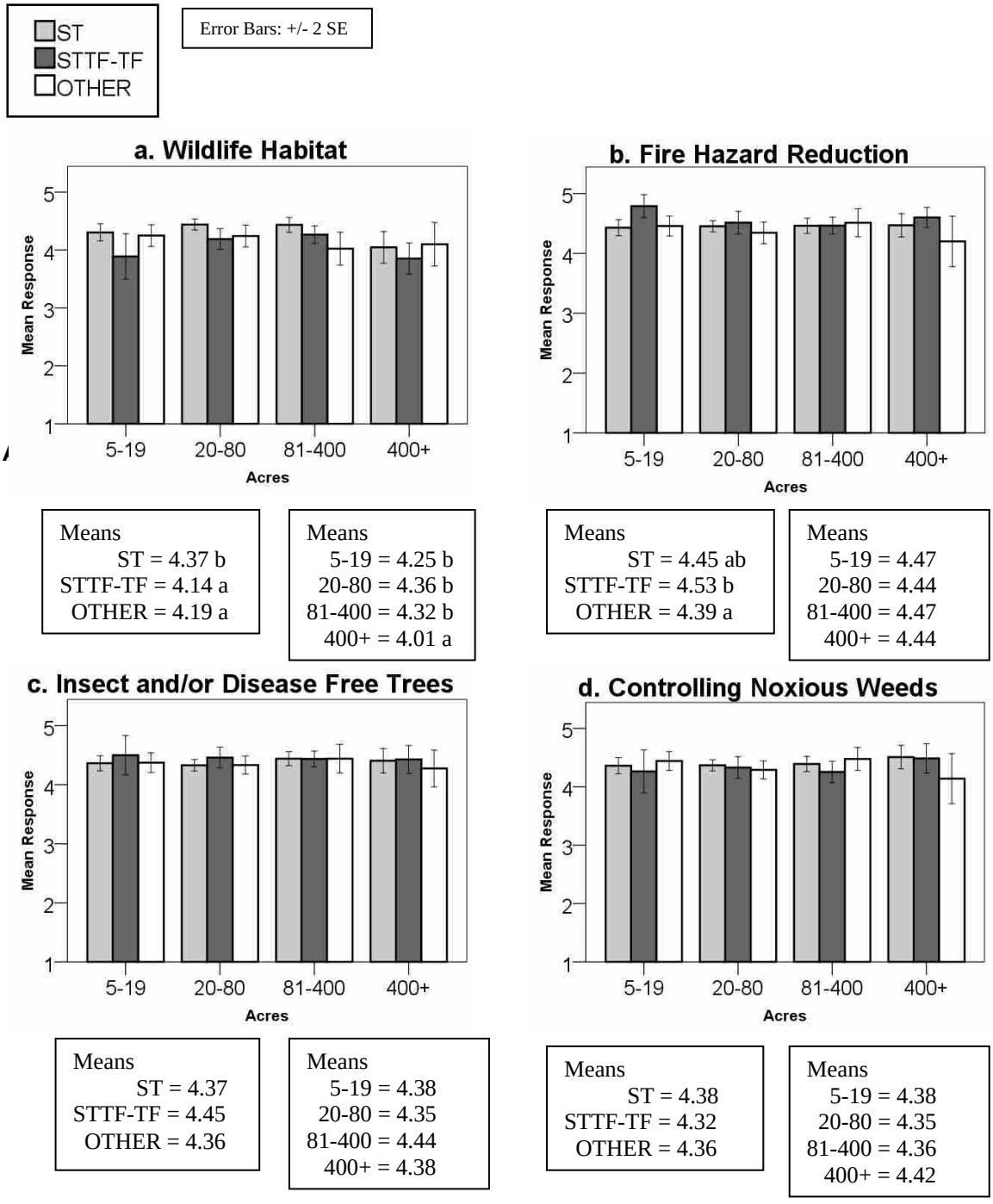
t. Need more loggers/professional contractors.

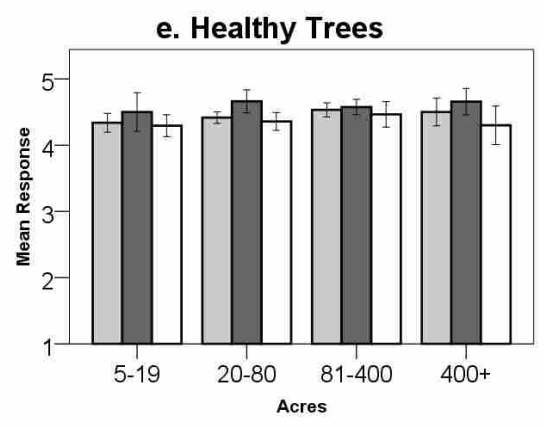
u. Regulation – laws, are an obstacle.

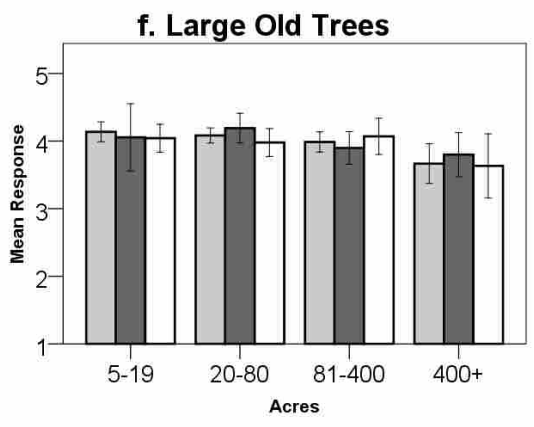
Figure 5 *Long-Term Study: Conservation objective scores by groups*

a, b, c, d indicate significant difference from each other α = 0.10
Example: Under Wildlife Habitat there is a significant difference between ST and STTF-TF and between ST and OTHER but no significant difference between STTF-TF and OTHER. Therefore, ST is 'a' and STTF-TF and OTHER are 'b'. If there is a significant difference among all acreage groups then a, b, c, and d would be noted. If there are no significant differences, there is no notation.

Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree







Means
ST = 4.43 a
STTF-TF = 4.61 b
OTHER= 4.35 a

Means
5-19 = 4.33 a
20-80 = 4.44 ab
81-400 = 4.53 b
400+ = 4.50 ab

Means
ST = 4.03
STTF-TF = 4.00
OTHER = 3.98

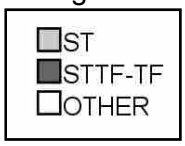
Means
5-19 = 4.10 b
20-80 = 4.08 b
81-400 = 3.97 b
400+ = 3.70 a

Need to Remove Trees to Meet Objectives

Needing to remove trees to meet conservation objectives was important to all membership groups and acreage classes, however there were significant differences among groups and acreage size classes (Figure 6). For both ST and STTF-TF groups removing trees was rated important with increasing importance for acreage size classes above 80 acres. The OTHER group showed a highly variable response with a mean rating as neutral, increasing to somewhat important for the 81+ acre classes.

Figure 6 *Long-Term Study: Need to remove trees objective*

a, b, c, d indicate significantly different from each other α = 0.10
Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree



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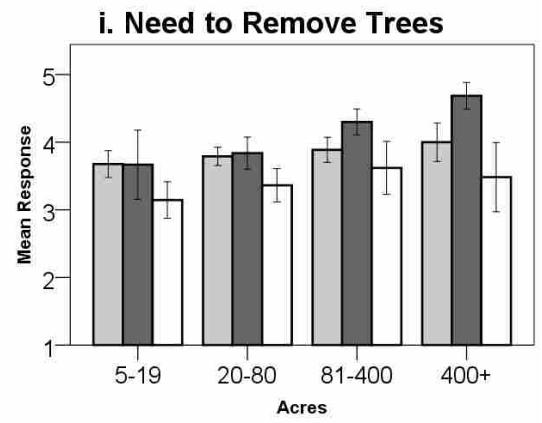


Means
ST = 3.81 b
STTF-TF = 4.14 c
OTHER = 3.34 a

Means
5-19 = 3.48 a
20-80 = 3.71 a
81-400 = 3.96 b
400+ = 4.07 b

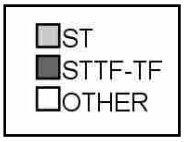
Revenue and Income

There were significant differences among the means between ownership groups and acreage size classes for the three statements concerning revenue, potential income and actual income from the sale of timber (

Figure 7). The STTF-TF group gave significantly higher ratings of these values for all ownership size classes versus the other two groups. Among all groups, increasing landowner acreage size classes showed an increasing trend for rating the importance of income. The importance of potential income in the ST and OTHER groups was rated as slightly less than neutral for smaller acreage size classes the current actual realized income was rated even less important. The STTF-TF group only showed a neutral rating for these values in the 5-19 acre ownership class and increasing importance for larger acreage classes. Similarly the “need to generate income in order to meet objectives” value was neutral for the ST-STTF group in the 5-19 acre class but rose to important for larger acreage classes. Both the ST and OTHER groups indicated this value as moderately unimportant for smaller acreage classes and neutral for larger acreage classes.

Figure 7 *Long-Term Study: Revenue and income objectives*

a, b, c indicate significantly different from each other α = 0.10
Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree



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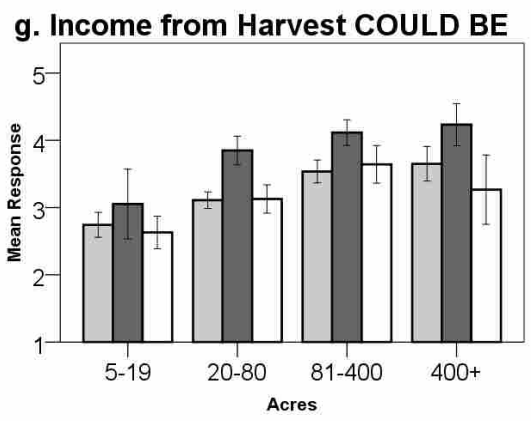
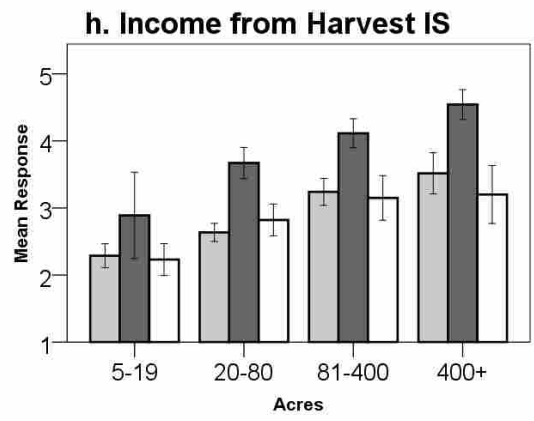


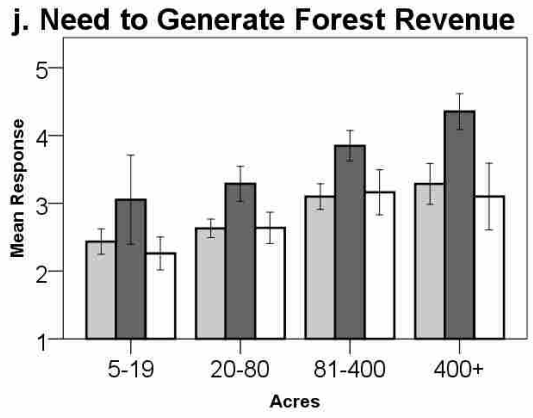
Means
ST = 3.18 a
STTF-TF = 3.94 b
OTHER = 3.05 a

Means
5-19 = 2.73 a
20-80 = 3.23 b
81-400 = 3.72 c
400+ = 3.70 c



Means
ST = 2.78 a
STTF-TF = 3.93 b
OTHER = 2.70 a

Means
5-19 = 2.31 a
20-80 = 2.83 b
81-400 = 3.48 c
400+ = 3.72 c



Means
ST = 2.76 a
STTF-TF = 3.66 b
OTHER = 2.64 a

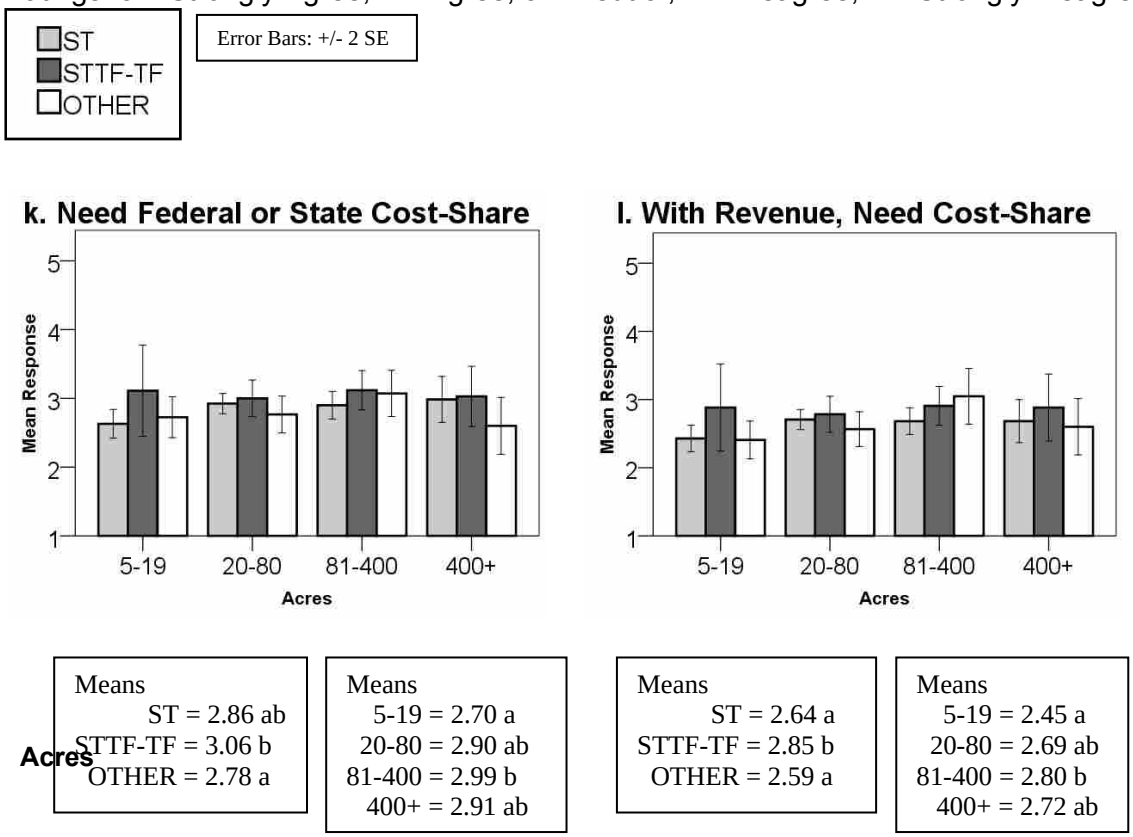
Means
5-19 = 2.42 a
20-80 = 2.74 b
81-400 = 3.32 c
400+ = 3.53 c

Cost-Share

Both the ST and OTHER landowner groups indicated a neutral or slight disagreement with regard to needing cost-share (Figure 8). The STTF-TF group response was a slight agreement response and was significantly different than the OTHER group. The value statement concerning the "need for cost-share if revenue was generated from the forest" showed consistently less need for all ownership groups and acreage classes. The need for cost-share both with and without revenue showed significant differences among acreage size classes, particularly within ST and OTHER groups. The 5-19 acre size class had the highest variability within their responses and 81-400 acreage classes indicated a significantly more neutral response than other classes that considered this need as less important.

Figure 8 *Long-Term Study: Need revenue/cost-share objectives*

a, b, c, d indicate significantly different from each other α = 0.10
Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree



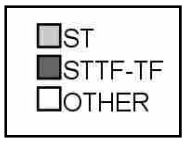
Timber and selling land importance for maintaining ownership

Responses to these statements showed a high degree of variability among landowner affiliation groups and acreage classes (

Figure 9). The mean STTF-TF group response scored near neutral for 5-80 acre classes and increasingly important for ownerships as they became larger than 80 acres. This was a significantly different response than both ST and OTHER groups that indicated this was not important for smaller acreage classes and rated closer to neutral for larger ownership classes. Selling land also had highly variable responses among all groups and acreage classes; though in general this was generally rated from disagree to strongly disagree. Without a forest income the STTF-TF group rated this as a less disagreeable option for 5-19 and 80+ acre classes. When this option was presented regardless of income the OTHER group found this less disagreeable in the 20-80 acre ownership class. Overall all ownership groups and acreage classes surveyed did not rate selling land as a favorable option.

Figure 9 *Long-Term Study: Needs for maintaining ownership*

a, b, c, d indicate significantly different from each other α = 0.10
Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree



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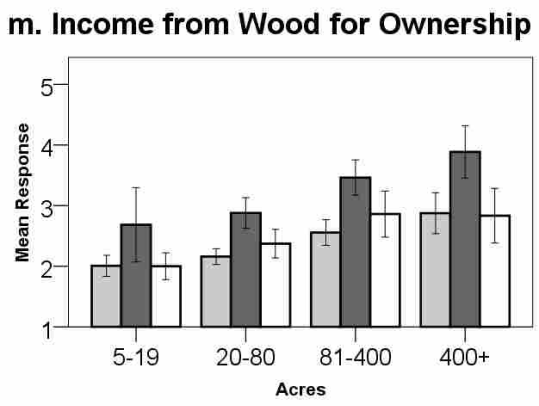
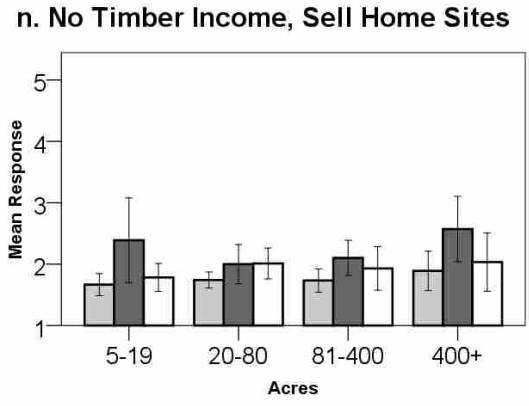


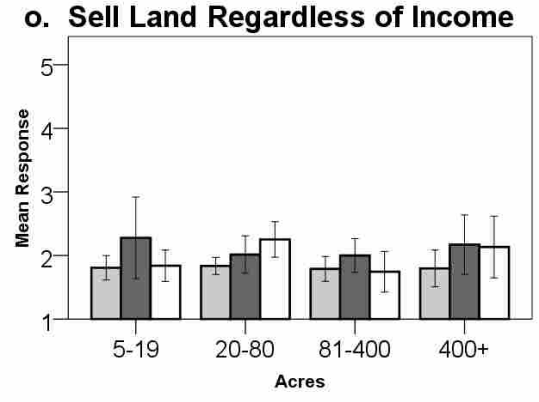
Means
ST = 2.29 a
STTF-TF = 3.25 b
OTHER = 2.37 a

Means
5-19 = 2.06 a
20-80 =2.32 b
81-400 = 2.87 c
400+ = 3.14 d



Means
ST = 1.74 a
STTF-TF = 2.17 b
OTHER = 1.92 a

Means
5-19 = 1.76 a
20-80 = 1.84 b
81-400 = 1.87 ab
400+ = 2.11 b



Means
ST = 1.81 a
STTF-TF = 2.06 b
OTHER = 2.01 ab

Means
5-19 = 1.85
20-80 = 1.95
81-400 = 1.84
400+ = 1.98

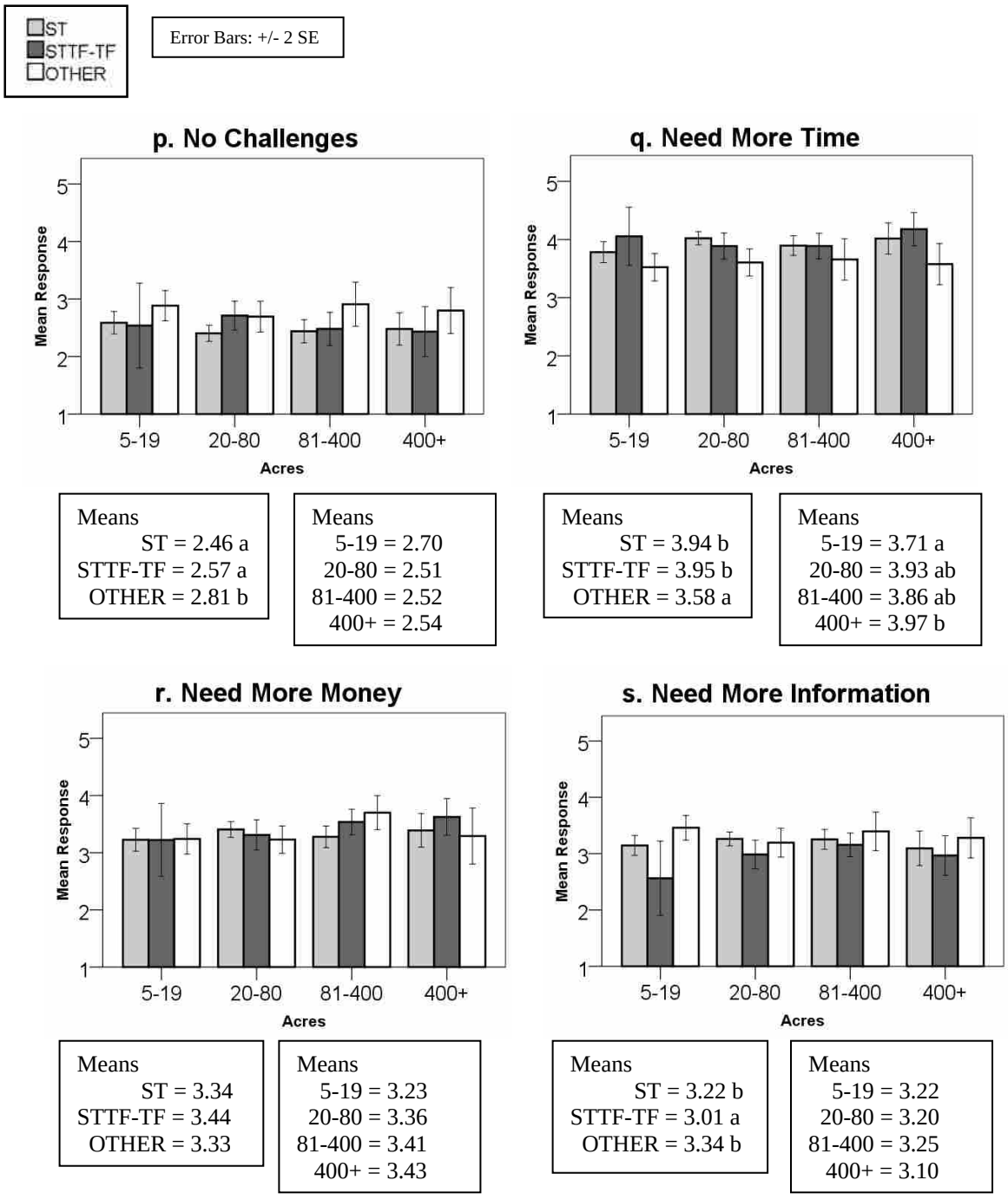
Challenges to implementation of objectives

There were six statements regarding challenges for implementing management objectives (Figure 10). The first statement was that there were no challenges. All landowner group means were in slight disagreement to the statement though the OTHER group rated their response significantly closer to neutral than either ST or STTF-TF groups. There was no signficant difference among acre size classes. All groups rated “more time” as an important challenge. The OTHER group mean was significantly closer to neutral than the ST and STTF-TF groups. In addition landowner acreage classes in the 5-19 and 400+ classes for the STTF-TF group rated this more important than intermediate acreage classes. All groups were in slight agreement that they needed more money to meet objectives with no significant differences among groups or acreage classes. “More information needed” was rated as slightly important for both ST and OTHER groups and neutral to slight disagreement for the STTF-TF group which was significantly different. STTF-TF landowners in the 5-19 and 400+ acreage classes indicated more disagreement that they needed more information.

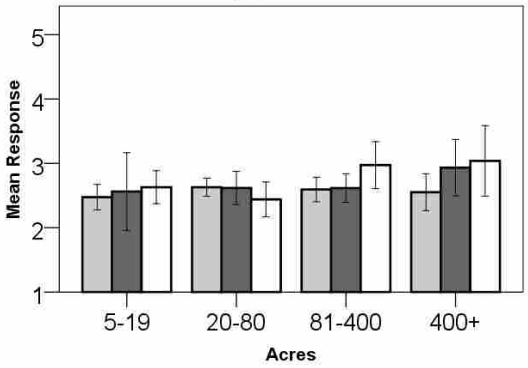
All landowner groups indicated some disagreement that they needed more skilled loggers or professionals though there was a high degree of variability in the responses to this statement particularly in the 400+ acre classes within the STTF-TF and OTHER groups that showed a greater tendency to rate this topic as neutral to slightly important. The statement “regulations/laws are an obstacle” was answered with significant differences among landowner groups and within ownership groups and acreage classes. The OTHER group was closest to neutral for 5-80 acreage classes and indicated some agreement for 81-400+ acreage classes. Both the ST and STTF-TF groups disagreed significantly more than the OTHER group, though the 400+ acreage class in the STTF-TF group agreed slightly with the statement.

Figure 10 *Long-Term Study: Challenges for objective implementation*

a, b, c, d indicate significantly different from each other α = 0.10
Ratings: 5 = Strongly Agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly Disagree



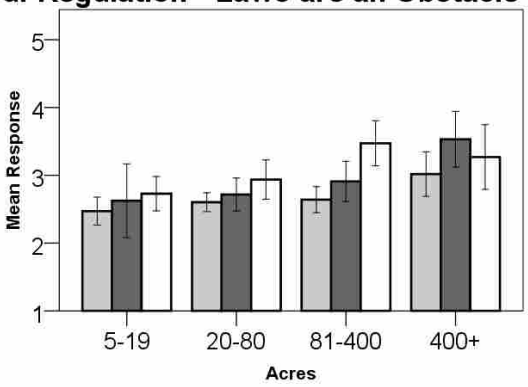
t. Need More Loggers/Professionals



Means	
ST	2.58
STTF-TF	2.66
OTHER	2.67

Means	
5-19	2.54
20-80	2.59
81-400	2.66
400+	2.76

u. Regulation - Laws are an Obstacle



Means	
ST	2.62 a
STTF-TF	2.92 b
OTHER	2.99 b

Means	
5-19	2.58 a
20-80	2.69 a
81-400	2.84 a
400+	3.22 b

Assessment of Actual Landowner Management Practices

The monitoring portion of the study compared mail surveys to actual on the ground actions and further asked questions about the implementation of the Stewardship Plans, challenges to implementation, as well as resources enhanced and/or protected through management. This portion of the study compared outcomes between Stewardship graduates who chose to join Tree Farm (STTF) versus those who did not (ST).

STTF group accounted for about 9,000 total acres and the ST group about 5,000 acres. Both groups had individual verified Forest Stewardship Plans. Of the participants visited, 21 of the 25 in the STTF group and 22 of the 25 in the ST group retained copies of their original forest management plans developed during the Stewardship workshop. Two TF and three STTF members added additional acres to their plans at the time of the visit that accounted for 345 and 415 acres respectively. Eighteen from the 25 surveyed STTF group had implemented all their objectives compared to 9 of the 25 from the ST group. Lack of time and money were the two most prevalent reasons given for not having implemented all objectives. Seven from each group responded that their objectives had changed since they had attended the Stewardship class. Some noted these changes

were due to wildfires or the threat of wildfires, insect infestations, and how they perceive aesthetics of their forest.

All of the 50 site visit participants were asked if they had implemented any commercial harvesting including salvage harvest, timber harvest, and commercial thinning. Table 13 **shows the results by group and harvest type.**

Table 13 *Long-Term Implementation Study: Harvest implementation table*

	STTF		ST	
Harvest Type	**Number**	**Acres**	**Number**	**Acres**
Salvage harvest	4	111	5	7
Timber harvest	16	1,143	5	555
Commercial thinning	5	201	5	62
Total	**25**	**1,455**	**20**	**624**

Other management activities completed are shown in Table 14. Seven of the STTF and ten of the ST group used cost-share money to fund their projects.

Table 14 *Long-Term Implementation Study: Management activity implementation chart.*

	STTF		ST	
Activity	**Number**	**Acres**	**Number**	**Acres**
Tree planting	5	23	5	38
Weed control	6	2,051	1	2,184
Wildlife	4	44	1	2
Fire hazard	7	63	4	23
Range/grazing	2	1,204	0	0
Total	**24**	**3,385**	**11**	**2,247**

An additional question asked of landowners was: “What resources have been managed or protected under your Forest Stewardship management plan as

a result of plan recommendations?" Responses included the resources of timber and forest health, followed by aesthetic quality and soil, and finally cover and habitat for fish and wildlife. There was no difference found between ST and STTF groups in their response frequency or values.

Participants who were visited also received the identical mail survey as participants for the larger mail survey. During the visit they were asked to repeat the survey in order to check for consistency and verify the accuracy of the survey answers. A comparison using ANOVA showed there was no significant difference between the surveys completed by mail and conducted during the site visit. Although not significant, there were some trends noticed. The topics with the least change were "wildlife habitat and fire hazard reduction" being an objective, and "selling some forest land for smaller acreage home sites is a potential option if I can't generate forest income by selling timber". The statement showing the most significant change was the statement "regulation – laws, are an obstacle" with a change of -0.39 toward less agreement.

Survey Non-Response Study

For each landowner group surveyed there was a percentage that did not respond. A sample of non-respondents were contact to determine if there was a bias presented by those that did respond to the mail survey versus those that did not. The target number for each group contacted was twelve. Because the size of the STTF group was smaller than other groups and the response to the mail survey was almost 100%, only seven interviews were completed within this group.

The OTHER group was especially challenging to complete largely because of there was a significant error in the state forest-tax landowner data base that listed many landowners whose land was not actually forested. In addition phone numbers were not always accessible through the on-line search engines. In addition, after verifying forest ownerships, eighteen landowners did not have a phone number that could be found. Two landowners for each of the ST and TF group declined to participate in the survey, and none of the STTF

declined an interview. Ten of the OTHER group who met the criteria of having forest land declined an interview before twelve interviews could be completed. The mail and phone surveys were compared to the long-term responses across landowner groups and acreage classes. There were no comparisons made for the STTF and TF groups in the 5-19 acre range as this was a very limited pool of landowners. Significant differences found when responses were evaluated by ANOVA are listed in Table 15. Overall there were 32 significant differences found between non-respondents and mail survey respondents from a possible 336 categories. This represents a 9.5% potential error which is well within the normal variability found within each group and acreage class.

Table 15 *Long-Term Study: Statement objectives with differences between mail and phone surveys among all membership groups*

Acre Break	Group	Statement rating means with significant differences	Δ
5-19	ST	k) To meet the above objectives indicated important, I need federal or state cost-share.	-1.03
5-19	ST	l) If I can generate revenue from my forest, I still need federal or state cost-share assistance to meet my objectives for the forest.	-1.03
5-19	OTHER	n) Selling some of my forest land for smaller acreage home sites is a potential option I will consider if I can't generate forest income by selling timber.	-0.78
5-19	OTHER	o) Selling some of my forest land for smaller acreage home sites is a potential option regardless of the forest income I generate.	-0.4
5-19	ST	Challenges to plan implementation: Need more money	-1.03
20-80	ST	g) Getting some income return from growing and harvesting trees could be one of my forest management objectives.	+1.39
20-80	OTHER	h) Getting some income return from growing and harvesting trees is one of my forest management objectives.	-1.02
20-80	OTHER	i) To meet the above objectives indicated important, I need to remove some trees.	-0.96
20-80	TF	Challenges to plan implementation: Need more time	-1.09
20-80	OTHER	Challenges to plan implementation: Need more time	-0.81
20-80	TF	Challenges to plan implementation: Need more information	-0.12
20-80	TF	Challenges to plan implementation: Need more loggers/professional contractors	-0.5
20-80	TF	Challenges to plan implementation: laws, are an obstacle	-0.7
81-400	STTF	e) Healthy vigorously growing trees is one of my forest management objectives.	-0.87

81-400	TF	f) Conserving and/or growing large old trees on portions of my property is one of my forest management objectives.	+0.98
81-400	STTF	j) To meet the above objectives indicated important, I need to generate revenue from my forest.	-1.2
81-400	TF	j) To meet the above objectives indicated important, I need to generate revenue from my forest.	-1.46
81-400	ST	k) To meet the above objectives indicated important, I need federal or state cost-share assistance.	-1.57
81-400	ST	l) If I can generate revenue from my forest, I still need federal or state cost-share assistance to meet my objectives for my forest.	-1.35
81-400	TF	m) Income from selling wood (logs, poles, posts, firewood) from my property is important for me to maintain ownership of my forested land.	-1.86
81-400	TF	No Challenges	-1.02
81-400	TF	Need more time	-1.03
81-400	TF	Need more money	-1.09
81-400	ST	Challenges to plan implementation: Need more information	-1.25
81-400	ST	Challenges to plan implementation: Need more loggers/professional contractors	-1.59
81-400	TF	Challenges to plan implementation: Need more loggers/professional contractors	-0.7
81-400	ST	Challenges to plan implementation: Regulation – laws are an obstacle	-1.31
400+	STTF	f) Conserving and/or growing large old trees on portions of my property is one of my forest management objectives.	-1.67
400+	TF	k) To meet the above objectives indicated important, I need federal or state cost-share assistance.	-2.55
400+	TF	l) If I can generate revenue from my forest, I still need federal or state cost-share assistance to meet my objectives for my forest.	-1.45
400+	STTF	o) Selling some of my forest land for smaller acreage home sites is a potential option regardless of the forest income I generate.	+2.65
400+	TF	Need more money	-1.81

DISCUSSION

Evaluating the impacts that natural resource based educational programs have is a daunting task. Private forest landowners represent one of the most challenging human audiences to survey because there are not only traditional differences in educational outcomes due to the information content and delivery method, but much larger differences due to significant audience variability. Forest landowners encompass a population from all professional backgrounds, age groups, income levels, landownership expectations and the multitude of environmental paradigms. This variety lead to the extensive conflicts prevalent today between land use with an emphasis on economic opportunity and that of environmental preservation with minimal human impact. Survey results from both short-term pre- and post-workshops, and long-term forest ownership experience indicates that both 3-day Stewardship workshops and subsequent affiliations with forestry organizations such as the Montana Tree Farm program are related to significant differences in how forest landowners may value and manage their lands. For the purposes of evaluating landowner responses to educational or organizational programs, total forested acreage owned by an individual or family can be used to help describe some of the different demographic needs and expectations of landowners. Because there is such a great diversity within the population, quantifying forest landowner attitudes, beliefs, expectations and needs without recognizing there are very different subgroups within the “forest landowner” category can lead to misleading interpretations.

Short-term impacts

The short-term impact survey was designed to test the impacts of the Forest Stewardship Education Program. Most landowners attend the workshop to learn about their forests and perhaps how to implement management practices for specific objects. Many have at this point not worked with their forest very much but desire to know what is required to keep their forest healthy – which typically means keeping their trees alive. As such the short-term survey

represents a more theoretical vision of what landowners perceive their values to be and not one gained out of applied work in their forest. Core values including wildlife habitat, fire hazard reduction, insects and disease, noxious weeds, healthy vigorous trees and growing large old trees were shown to be important at some level to all forest owners surveyed. Loss of wildlife habitat, productive forests, wildfires, tree mortality due to insects and disease, and the spread of exotic noxious weeds are all risks to trees and forests across Montana that receive significant media attention and are often highly visible when driving local roads and thus it is not surprising that most forest landowners are aware of these issues. In some cases forest owners attending workshops have been affected by these influences and want to do a better job protecting their forests. The Forest Stewardship workshop program was designed to provide landowners with an overview and awareness of basic Montana forest ecology. Furthermore participants learn how to conduct a forest inventory and risk assessment of their own property with the objective of using this information to develop a management plan that helps them implement appropriate ecologically sensitive management actions. The program does not try to influence landowners to steward their property for any specific objective, but rather seeks to increase their awareness of options and consequences. Results of the pre- and post-workshop surveys indicated that most participants did increase their overall awareness and understanding of many core forest conservation values, and in some scenarios changed what they considered their most important ones. Many landowners also learned enough about basic tree physiology to understand that trees growing too dense may negatively affect overall tree vigor and potentially forest health. Growing trees for future log harvests was not rated as important both pre- and post-workshop for most landowners, except those with larger acreages. Although, the value that might be attained both ecologically and monetarily from some harvesting became more acceptable as landowners learned about different harvesting techniques. Not surprisingly forest generated income was a value that greatly differentiated landowners based on the acreage they own. As would be expected, smaller acreage ownerships are much less dependent on income

generated from their forest whereas larger acreage ownerships may more often own their land for the specific reason of gaining an income from it. There appeared to be three basic acreage groupings that reflected similar attitudes:

1) smaller ownerships of 10-40 acres that had very high conservation objectives but low or no revenue expectations;
2) mid-sized ownerships of 40-160 acres that had some expectations of revenue but this appeared mostly needed to achieve land conservation objectives;
3) larger ownerships of 160 acres or greater who expected some consistent revenue from their land.

It must be noted that larger ownerships were fewer in number and thus not as statistically a robust dataset as smaller and intermediate ownerships. All ownership size classes showed significant variability in their responses to survey questions, for example, some smaller acreage owners indicted a high importance that their land generated revenue, and conversely, some larger ownerships placed little importance on their land generating revenue.

Publically funded cost-share opportunities as an incentive for landowners to fulfill specific objectives on their forested lands have been a recognized tool that federal and state agencies have used over the past decades in order to motivate desired changes across forests. Our workshop survey indicated that cost-share opportunities were not that important and at best slightly important. Considering that the Stewardship workshops resulted in a more positive appreciation of these opportunities would indicate a general lack of awareness or experience with these types of programs and that informing landowners about cost-share is an important awareness component. Alternatively it may also indicate a lack of opportunity to participate in a cost-share program, or a reluctance to apply for cost-share programs because of how they are administered or the caveats that must be followed for specific projects. All of these concepts have been anecdotally reported over the years as personal communication to MSU Extension faculty. The difference in the value of cost-share for land that was earning revenue, versus land that was not was a concept

in which we were very interested. Although the survey indicated that there was less need for cost-share if revenue was being generated the response was not as great as expected. However, considering that most survey participants rated generating revenue as not a highly important priority they may have felt cost-share at this time was also not all that important. Interestingly the ownership size classes most interested in cost-share opportunities were both smaller and larger ownerships with intermediate ownerships indicating the least interest.

Finally, dividing up and fragmenting forests by selling smaller parcels of land has been identified as one of the greatest threats to private non-industrial forest lands across the United States. Most participants rated selling parcels of their forest for home sites was not an objective, though some were more "neutral" towards this concept. In general smaller acreage workshop participants indicated a lesser acceptance of selling parcels after workshops than before whereas larger acreage landowners became slightly more accepting of this concept. Since much of the workshop is focused towards teaching awareness of forest ecology and management practices to conserve forest lands, one could speculate that smaller acreage ownerships became more aware of the need to maintain intact ecosystems, and thus were less willing to fragment them, whereas larger acreage ownerships might have become aware of the difficulty of single handed management of very large acreages and were more willing to adjust their property size to one they felt capable of managing. They may also have identified parts of their property where productivity did not meet their revenue objectives and decided it would better serve as real estate income. This notion might be supported by very similar ownership size class response curves between the question of selling parcels and the need for forest revenue to maintain property ownership.

Landowners attending Stewardship workshops gain an understanding of their forest and what it takes to plan and implement management on the ground. Planning for forest management can vary in difficulty depending on the size of ownership, the type of forest, and the amount of work needed to fulfill objectives. Prior to attending a Stewardship workshop landowners were fairly neutral in their

response to being confident enough to do their own planning with larger ownerships of up to 400 acres more confident in doing their own planning than the smaller ownerships. During the workshop participants spend a limited time inventorying their lands and delineating their lands into management units for specific objective implementation. It may be that landowners with larger acreages gain the realization through this exercise that they do not have enough time or interest to inventory and plan all of their own forestry work and thus need to seek professional assistance and perhaps hire a consulting forester. This concept is supported by the next question regarding hiring a consultant to assist in management. The larger acreage owners had more desire to work with a consultant following the Stewardship workshop. It appears that the content of the Stewardship workshop provides smaller acreage landowners with what is needed to conduct their own planning and work, perhaps also because there is not as strong a need for the land to earn an income thus giving landowners more time to achieve their objectives. In contrast larger acreage landowners gain an understanding of the magnitude of not only inventorying and planning their forest management activities but also the time required to implement them. As such it is part of the Forest Stewardship program objective for larger acreage landowners to become aware that consultant foresters exist and that they may gain from professional help. The Stewardship program provides a direct benefit to such landowners as they may feel more comfortable hiring a consultant as they can better communicate and review any practices a consultant may propose. According to pre and post-workshop surveys most landowners want to physically conduct their own work on their property with 20-39 acre and 160+ acre ownerships indicating a slight decrease in their desire to do their own work after the workshop.

All Stewardship participants showed a desire for further educational assistance. There was generally a slight increase in desire after the workshop among landowner size classes up to 159 acres and a decrease in those above that acreage size. Perhaps smaller acreage landowners who are more capable of conducting their own planning and work are eager to learn more, whereas

larger acreage landowners have learned enough and plan on relying more heavily on professional assistance.

Long-term impacts

The purpose of the long-term survey was to examine if workshops had a lasting impact on landowners and to contrast landowner short-term "intentions" after the workshops with follow through and multi-year experience of trying to implement objectives. The comparison within the short-term surveys was further qualified by comparing, 1) attendees of prior years' workshops with landowners that had not attended a workshop, 2) landowners that had further pursued additional education by joining the Montana Tree Farm program, and 3) those who did not attend a workshop but joined Tree Farm, whose main objective was to further forest landowner networking and idea exchange.

Results of the long-term survey indicated that landowners who had attended a Stewardship workshop and then had time to work on their forest had core values that were slightly different in priority than short-term workshop participants. Fire hazard reduction was the most important core conservation value for the ST and OTHER group and second most important for the STTF-TF group. Healthy trees ranked second and first for the ST and STTF-TF groups whereas the OTHER group ranked controlling noxious weeds and tree insect and disease issues both equally in second place. The ST group responded significantly more positive to wildlife habitat being an objective than the other two groups yet all groups ranked wildlife as a core value in fifth place, in contrast to short-term survey responses that ranked it in third place. Both State and National Tree Farm programs provide information to landowners about forest health, pests, and management for sustaining forests. Stewardship workshops include lessons about change in forests and how the health and vigor of trees affect their resistance to insects and disease and the availability of hiding cover and browse for wildlife. Also the past decade has seen unprecedented wildfires and insect outbreaks across Montana landscapes.

The value of large old trees, did not vary significantly among landowner groups though were less valued by larger acreage landowners regardless of educational programming or affiliations. This may reflect the tradeoff that landowners have between earning an income and having land for aesthetic value. Large trees have a higher value for revenue because of their wood volume, though also have value for wildlife and aesthetics. Since larger acreage landowners may be more interested in revenue, and have a larger area in which to grow some big trees they are not as high a priority as for smaller acreage landowners who may know each individual tree on their property.

Landowners in both the ST and STTF-TF groups responded more positively to having objectives involving generating revenue and needing to remove trees to meet objectives than the OTHER group. In addition the STTF-TF members owning more than 80 acres rated removing trees significantly higher than the equivalent ST members. Generating potential or real income as well as needing revenue was similar in trend with the larger the acreage the more in agreement when a landowner was in generating revenue from their forest. STTF-TF members of any ownership size class rated these three categories higher than either ST or OTHER groups. Both ST and OTHER groups were indistinguishable from each other except for the 400+ acre groups where the ST group indicated a higher agreement with revenue generation. It is difficult from this analysis to determine if landowners were influenced by the Tree Farm program to value tree harvesting and revenue generation higher than either ST or OTHER groups, or if landowners that had this intention were attracted to join the Tree Farm program. In either scenario programs such as the Tree Farm program appear to fulfill an important role for landowners who wish to pursue a more active forest management objective. In addition this data also may indicate that the Stewardship workshops do not bias participants that timber harvesting must be conducted. Most forest management activities are expensive to implement, often at a scale determined by the acres needing treatment. These costs are paid for either from forest generated income, through cost share grants, or from the landowners' personal finances. Cost-share programs have varied

greatly over the years starting as both state and Forest Service programs, then combining to a joint administration and finally moving to one program administered by the Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) which in 2009 provided $71,068 toward forest practices on family forests (Conant 2009). Cost-share has typically been available to forest owners for specific management practices and among landowners there are those who aren't interested in it and some who use it extensively. The general neutral response to cost-share may be the result of many different reasons. Inconsistent sources, lack of funding, landowner ignorance of the programs, landowner distrust, or misalignment between landowner needs and cost-share opportunities are a few. Our data indicates a slight increase in cost-share value for the STTF-TF group and some minor differences among acreage classes. Thus one might speculate that continued contact with landowners such as a combined Stewardship and Tree Farm participation makes cost share programs more visible, available or attractive. In addition, limited cost-share funds may also be a reason for a neutral rating among survey participants as personal communication with cost-share agencies indicates they typically have many more applicants than money.

As with the short-term study, the value of land earning revenue was shown to cause a small but significant decrease in the perceived need for cost share programs. The OTHER group showed the most inconsistent response to cost share with the 81-400 acre class showing the greatest interest and 5-80 and 400+ size classes indicating the lowest need. One can only speculate the reasons for the changes in perceived need by the OTHER group. It may be that this group is the most heavily targeted by state and NRCS offices because smaller acreages have a lesser impact and larger acreages exceed the maximum income limit to be considered for cost share assistance.

Most long-term survey participants were adverse to the idea of selling land and selling forest land to maintain ownership or as an option to pay for meeting objectives. Tree Farm members in the 5-19 and 400+ acre groups were the least negative to the idea if they did not produce income from their forest. Overall,

selling parcels is not a consideration for most landowners. With rising taxes and cost of living and a reduction of a wood products industry and value for timber products, it is getting harder for forest landowners to maintain and manage their lands from forest generated revenue. The Tree Farm members, through their association, may have a clearer outlook of the costs and challenges associated with forest ownership.

The OTHER group agreed the most of all groups with the statement that they had no challenges. Interestingly, this group rated highest the follow-up statements that stated they had the challenges of needing more money, more information, more loggers/professional contractors, and that laws/regulations were an obstacle. Those associated with Stewardship and Tree Farm have management plans for their forests and have had property visits with a Stewardship Advisor or a Tree Farm inspector, many have been through the Forest Stewardship Workshop or other training, and many stay informed of forest issues through their association with Tree Farm. The OTHER group was not aware of the challenges they had until they were given possible challenges to consider. The OTHER groups rated more in agreement that regulations and laws were a challenge, while those in ST and STTF-TF were probably more informed about laws, regulations and how they affect forest management.

Assessment of Actual Landowner Management Practices

Those who participate in both Stewardship and Tree Farm had a higher rate of implementing all objectives (72%) compared to the group that only attended Stewardship (implementation rate of 36%). The STTF group completed more management activities than the ST group. Both groups showed an equal desire to add acres to their management plan when visited by a professional forester.

It is apparent that though both groups are actively interested in the management of their forests, although those involved in both Stewardship and Tree Farm complete more management on the ground. This could be because through Tree Farm, there is continued contact and flow of information through

five year site visits, annual meetings, and local and national newsletters and magazines or it might be that those who are interested and have time for more active management also have an interest in joining Tree Farm.

The Montana Forest Stewardship program works closely with Montana Tree Farm. When family forest owners attend a Stewardship Workshop they are encouraged to join Tree Farm as a way to stay involved and informed, engaged in their forest management plan and to continue having a close relationship with other forest owners. From 2006-2009 about 25% of those who completed a Forest Stewardship Plan joined Tree Farm. Five of those in the ST group joined Tree Farm when offered the opportunity during their personal visit through this survey. More active forest owners may want to join Tree Farm where they can have additional support and information. Both Tree Farm and Stewardship offer landowners progressive involvement and continuing educational opportunities. The groups have similar but different functions and work together in Montana to give landowners the support at the level they desire.

Survey of non-responders (Phone)

A group selected from among the non-responders to the long-term survey was interviewed by phone. Most of the ST, STTF, and TF group were cordial and interested in talking and answering the survey. Most people wanted to take the time to talk about their forest and their management and were interested in the survey; although, there were a few who refused the calls. In general these groups were easy to talk to because most know me or of the Stewardship program. There were several in this group who noted that the reasons they rated some of the statements low was because they had completed some management and the stated objective was no longer a priority.

Within the OTHER group there were many who hung up. Some said to call back and would never answer again. Some were upset that I was bothering them, others participated in the survey, but I had to hurry through the questionnaire because they were just tolerating participation in the survey. There were also those in this group who were hungry for information and were glad to

have someone to talk to about their forest and get answers to questions about trees and insects.

General discussion

Owning land in Montana has a significant financial obligation attached to it. There may be several ways to classify forest landowner financial commitments across Montana, including 1) those that inherited their property or run it as a tax sheltered corporation and 2) those that invested earning income potential or savings to buy their lands. For the later group, acreage size might provide some indication of affluence since real-estate across Montana has reached prices that prohibit purchase based only on the potential income that might be derived from land management. Ownerships in the 10-40 acre size may reflect middle-class income earners who have invested much of their income into the purchase of their land, leaving little extra which they can invest into their management actions. Cost share for this demographic would be very important. Alternatively landowners in the 40-160 acre size class must either be top income earners or have some significant accumulated wealth in order to purchase this amount of land. In addition, this size acreage is not large enough to provide a land management income that can typically pay the mortgage for a purchase based simply on a bank loan. Thus this landowner group, with deep pockets may not consider cost-share a high priority, or does not have the time or awareness to pursue it. Finally, larger acreage landowners may either consist of individuals who specifically purchased or inherited land in order to earn an income from it and thus are seeking any financial management tool available such as many of the land-rich cash poor traditional farm and ranching families, or they are very wealthy individuals/corporations that purchased a ranch for corporate retreat, privacy, speculative investment or pure recreation. This may explain some of the great diversity in responses from the larger acreage landowners who participated in the Stewardship workshops. Regardless of their financial background or ownership size a large majority of Forest Stewardship

Workshop participants valued the program and found that it helped them manage their lands, regardless of their objectives and needs.

CONCLUSION

Montana's family forest owners own 4.4 million acres of which about one fourth are under management of participants of the MSU Extension Forestry Forest Stewardship Program. This is a diverse group with differing professional and personal backgrounds and their forests vary by conditions, species types, and acreage size. Landowner objectives vary from wanting the untouched wild forest to the manicured park-like forest.

Survey results from both short-term pre- and post-workshops, and long-term forest ownership experience indicates that both 3-day Stewardship workshops and subsequent affiliations with forestry organizations such as the Montana Tree Farm program are related to differences in how forest landowners may value and manage their lands. This reflects the findings of Preston and Feinsteen, 2004, that education can lead to more open mindedness when considering issues. Our findings were:

1) Most forest owners have high conservation values including wildlife habitat, fire hazard reduction, insect and disease free trees, reducing weeds and having a generally healthy forest. It is likely that these values increased due to participation in the Forest Stewardship program. There were trends and unique general differences among owners with different acreage size for conservation and other values. Forest Stewardship participants and Tree Farm members place higher value on forest health than owners who do not participate in Tree Farm or Stewardship.
2) Forest landowner affiliation groups and continuing education appear to have positive values in helping landowners remain motivated and achieve objectives. Forest Stewardship Program and subsequent affiliations with forestry organizations such as Tree Farm are related to significant differences in how forest landowners value and manage their lands. It is not possible from this study to determine if additional programs actually influence these values or if landowners with different inherent values are attracted to additional programs

3) There is considerable variability among all ownership size classes on the topic of income generation with both high value and low value demonstrated across acreage size classes. Income is generally not as high priority to forest owners as was expected, although those with larger acreages do consider income generation more important than those with smaller ownerships.

   Those who join Tree Farm place a higher value on generating income. There is some increase in interest in revenue that is likely due to the workshop attendance which may indicate a lack of awareness of forest income value.

4) Cost-share is rated of low importance. Most landowners have not had an opportunity to participate for various reasons.

5) For most landowners, selling parcels is not a favorable option regardless of ownership size.

6) Stewardship participants' attitude toward physically doing the work on their forest changes after the workshop. This change is also inversely related to acreage size. There are distinct differences between how landowners view their forest management when they first inventory and write their plan versus after they have experienced trying to implement their plan.

7) Stewardship participants who are Tree Farm members are more likely to complete implementation of their management plans. An important role these programs provide is peer support and more awareness of opportunities, though participation may indicate more motivation or time to deal with the topic.

8) Non-workshop participants tended to view land conservation and management issues as regulatory rather than informational.

9) Progressive educational opportunities appear to show results for a select but important subset of landowners.

13) Educational and cost-share programs may be more effective if it is understood that different ownership sizes can either create or reflect different landowner values.

14) Time seems to be the universally greatest limiting constraint for forest landowners and their ability to implement management actions.

This study found that there are attitudinal and forest management practice differences and trends among membership groups and forest land ownership sizes. Further study could be done to find if those who chose to join Tree Farm do so because they are more motivated to complete forest management projects of if their affiliation gives them the information and motivation they need to implement their plans. It would also be of interest to find what contacts would be beneficial to landowners after they complete their management plan. Some opportunities to consider are continuing education, personal visits, and associations with agencies or other forest owner groups such as MT Forest Owners Association and Tree Farm. The Forest Stewardship program is highly regarded among participants once they have completed the class, although registration for the workshops can vary greatly among workshop locations and years. To improve attendance future investigative research could be completed to see what influences forest owners' participation in these types of programs.

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APPENDICES

APPENDIX A: **Short-Term Survey**

Short-Term Cover Letter

MONTANA STATE UNIVERSITY | EXTENSION

Extension Forestry 32 Campus Dr. Missoula, MT 59812-0606

Dear Montana Forest Landowner,

Since 1991 MSU Extension Forestry has been conducting workshops designed to help private landowners assess their forest and develop a forest management plan. In the past 15 years, more than 1,800 landowners have taken the opportunity to participate in this program. Although we have received immediate feedback from participants, we would like to gain an understanding of the longer term impacts of the program. The purpose of this is to help us improve the quality of education/informational materials we offer, both in the initial program and any subsequent educational events and materials. Your responses may also help us determine what private landowners could use to help them meet their goals and expectations for their forest.

Please consider spending 10 minutes filling out the enclosed survey and return it to your Forest Stewardship Advisor. Your individual identity will be kept confidential as we are interested in determining general trends and needs. To ensure the accuracy of the mail survey we will contact a random sample of respondents via telephone. Please indicate on the survey if you do not wish to be contacted again with a short telephone call from us.

Your participation in this study is voluntary and you may withdraw at any time. Your willingness or unwillingness to participate will not affect your relationship with MSU Extension Forestry or your standing as a verified Forest Steward.

Once again, all of the information you provide will be kept confidential: only summaries of responses will be reported. This survey contains an identification number. This is done for research purposes.

Thank you for your assistance. If you have any questions concerning matters related to this research, please feel free to contact me:

Cindy Bertek (406)243-4706

The University of Montana Institutional Review Board has approved this research study.

TITLE: Assessing the short and long term effectiveness of forest planning workshops for family forests

INVESTIGATORS:
Cindy Bertek, Forest Stewardship Coordinator
Peter Kolb, Extension Forestry Specialist

SPONSOR: MSU Extension Forestry

Forest Stewardship Survey

Your needs and thoughts are very important to us. To help us determine the impacts of this workshop we are interested in getting a survey of your thoughts about forest ownership.

To maintain your privacy do not write your name on this form.

Please **circle** the number on the right that reflects your feelings.	**Strongly Disagree**		**Neutral** →		**Strongly agree**
1. Wildlife habitat is one of my forest management objectives.	**1**	**2**	**3**	**4**	**5**
2. Fire hazard reduction is one of my forest management objectives.	**1**	**2**	**3**	**4**	**5**
3. Insect and/or disease free trees is one of my forest management objectives.	**1**	**2**	**3**	**4**	**5**
4. Controlling noxious weeds is one of my objectives.	**1**	**2**	**3**	**4**	**5**
5. Increasing the growth rate of my trees is one of my forest management objectives.	**1**	**2**	**3**	**4**	**5**
6. Growing trees for future log harvest(s) is one of my forest management objectives.	**1**	**2**	**3**	**4**	**5**
7. Conserving and/or growing large old trees on portions of my property is one of my forest management objectives. ..	**1**	**2**	**3**	**4**	**5**
8. To meet the <u>above</u> objectives indicated important, I need to cut some trees. ...	**1**	**2**	**3**	**4**	**5**
9. To meet the <u>above</u> objectives indicated important, I need to generate revenue from my forest. ...	**1**	**2**	**3**	**4**	**5**
10. Income from selling wood (logs, poles, posts, firewood) from my property is necessary for me to implement forest objectives.	**1**	**2**	**3**	**4**	**5**
11. **Without any revenue generated from my forest** I need federal or state cost-share assistance to meet <u>my objectives for my forest</u>. ...	**1**	**2**	**3**	**4**	**5**
12. **With revenue generated from my forest** I need federal or state cost-share assistance to meet <u>my objectives for my forest</u>.	**1**	**2**	**3**	**4**	**5**
13. Income from selling wood (logs, poles, posts, firewood) from my property is necessary for me to maintian ownership of my forested land. ...	**1**	**2**	**3**	**4**	**5**
14. Selling some of my forestland for smaller acreage homesites is an option to pay for meeting my forest objectives.	**1**	**2**	**3**	**4**	**5**
15. For my forest I : Physically wish to do my own work	**1**	**2**	**3**	**4**	**5**
Am confident enough to do my own plannning	**1**	**2**	**3**	**4**	**5**
Wish to work with a consultant	**1**	**2**	**3**	**4**	**5**
Would like further educational assistance	**1**	**2**	**3**	**4**	**5**

16. I own/manage approximately _____ acres of forested land.

APPENDIX B: **Long-Term Mail Survey**

Pre-Survey Notice

MSU Extension Forestry
Cindy Bertek
Forest Stewardship Coordinator
32 Campus Dr MS 0606, Missoula, MT 59821-0606
406-243-4706, email: cindy.bertek@cfc.umt.edu

MONTANA STATE UNIVERSITY EXTENSION
Forestry Program

April, 2007

Dear Montana Forest Landowner,

In a few days you will receive a questionnaire in the mail. **This questionnaire is being sent to all Montana Forest Stewardship participants, Montana Tree Farm members and to a randomly selected sample of other Montana Family Forest landowners.** Extension Forestry is sponsoring this study and it is approved by the University of Montana Institutional Review Board.

Since 1991 MSU Extension Forestry has been conducting workshops designed to help private landowners assess their forest and develop a forest management plan. In the past 15 years, more than 1,800 landowners have taken the opportunity to participate in this program. Although we have received immediate feedback from participants, we would like to gain an understanding of the longer term impacts of the program. The purpose of this is to help us improve the quality of education/informational materials we offer, both in the initial program and any subsequent educational events and materials. Your responses may also help us determine what other assistance and information private landowners could use to help them meet their goals and expectations for their forest.

Please fill out the questionnaire as soon as it arrives! This survey contains an identification number. This is done for research purposes. All of the information you provide on the survey will be kept confidential and your identity anonymous. Only summaries of responses will be reported. Your participation in this study is voluntary and you may withdraw at any time. Your willingness or unwillingness to participate will not affect your relationship with MSU Extension Forestry. If the name and address on this survey is incorrect please include a card with your correct name and address. This is so we may alert you to future educational opportunities.

Thank you for your time and effort. Your answers are important. They provide the data to help us improve the quality of our educational program. Please help us portray Montana Family Forest owners' objectives and needs as accurately as possible.

The final report will be available for you to download from our web page at www.forestry.umt.edu/extensionforestry. If you have any questions regarding this survey, please contact me at 406-243-4706.

TITLE: Assessing the short and long term effectiveness of forest planning workshops for family forests

INVESTIGATORS:
Cindy Bertek, Forest Stewardship Coordinator
Dr. Peter Kolb, Extension Forestry Specialist

The Montana State University Extension Service is an ADA/EO/AA/Veteran's Preference Employer and Provider of Educational Outreach.

Sincerely,

Cindy Bertek
MSU Extension Forestry, Forest Stewardship Coordinator

Survey Insert Card

April, 2007

The University of Montana Institutional Review Board has approved this study to be conducted by Extension Forestry. I am writing to ask for your help in this study. **This questionnaire is being sent to all Montana Forest Stewardship participants, Montana Tree Farm members, and to a randomly selected sample of other Montana Family Forest landowners.**

This survey is voluntary and your answers are completely anonymous and confidential. This survey contains an identification number. This is done for research purposes. All of the information you provide will be kept confidential and your identity anonymous. Only summaries of responses will be reported.

Our lists of landowner came from a variety of sources. We have done our best to eliminate duplicates but some of you own multiple properties. So, please only fill out ONE survey (toss any duplicate you may receive).

I would be happy to answer any questions you might have.
(406) 2243-4706. Thank you!

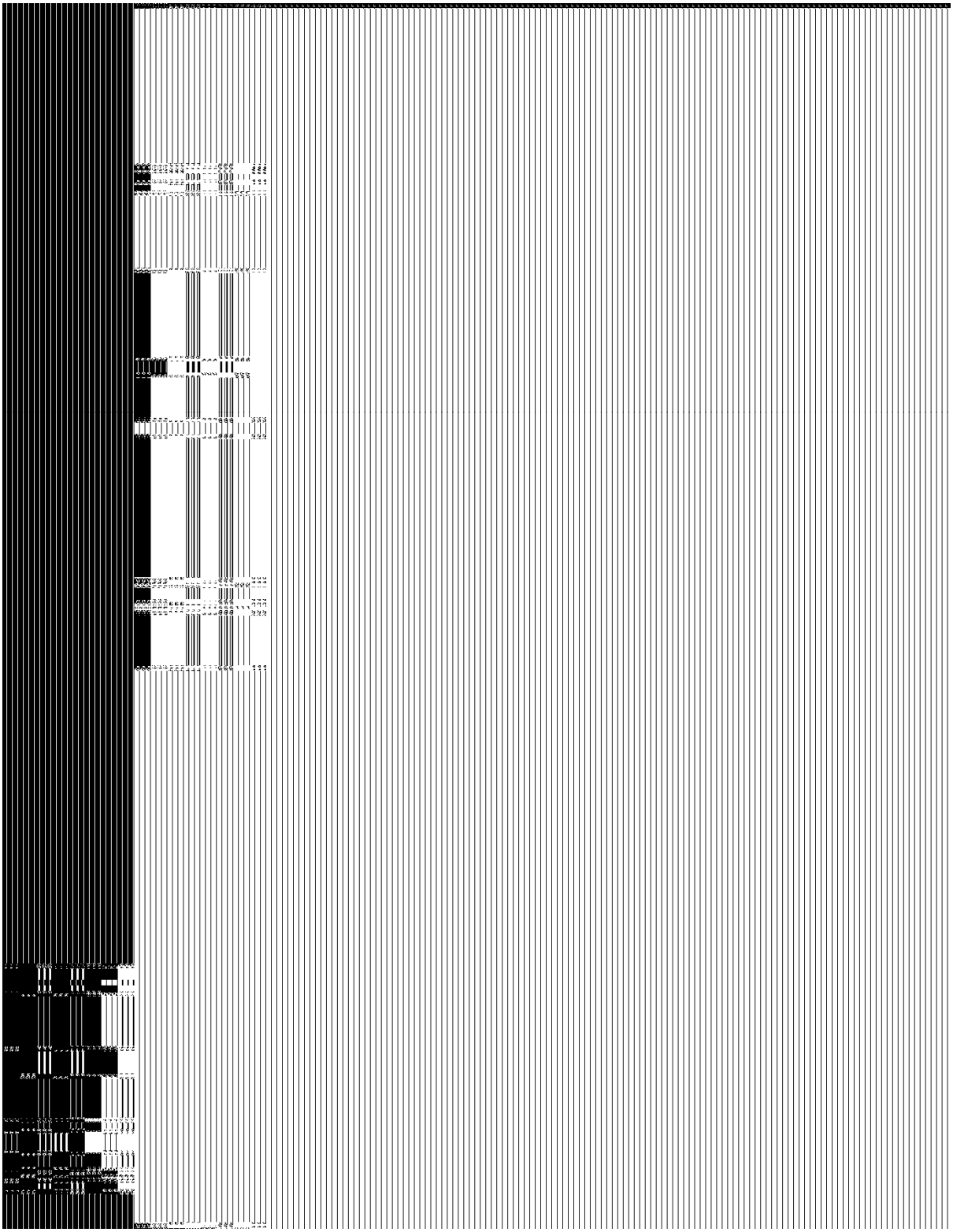
Cindy Bertek
MSU Extension Forestry,Forest
Stewardship Coordinator

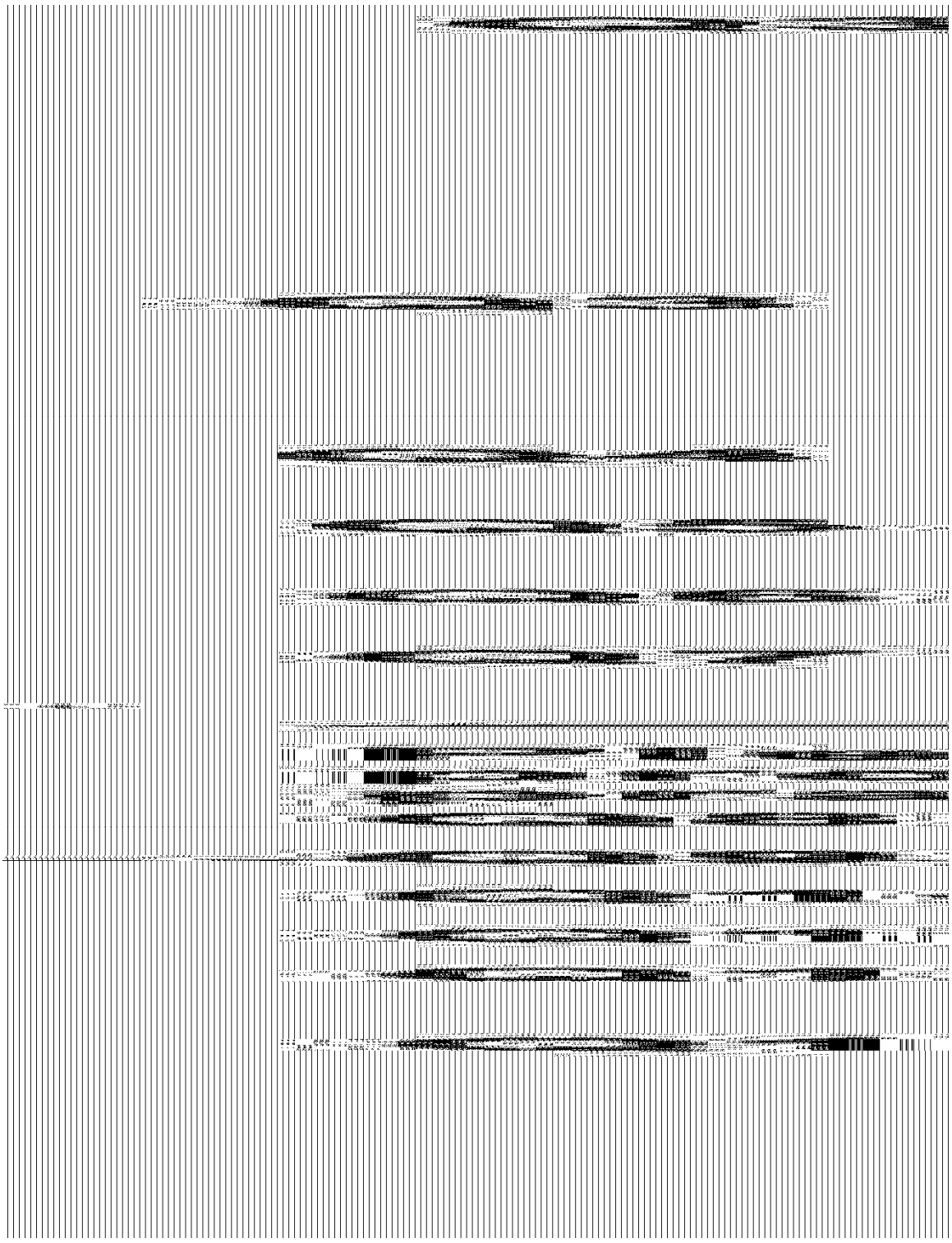
MSU Extension is an ADA/EO/AA Veteran's Preference Employer and Provider of Educational Outreach

MONTANA STATE UNIVERSITY
EXTENSION
Forestry Program

Long-Term Mail Survey

Page 1





Post Card Survey Reminder

April, 2007

Last week a questionnaire was mailed to you seeking information about Montana Family Forest owners. This questionnaire was sent to all Montana Forest Stewardship participants, Montana Tree Farm members, and a portion of all other Montana Family Forest landowners.

If you have already completed and returned the questionnaire to us, *please accept our sincere thanks*. If not, please do so today. We are especially grateful for your help because it is only by asking people like you to share your information that we can better understand how we can better serve you.

If you did not receive a questionnaire, or if it was misplaced, please call us at (406) 243-2773 and we will get another in the mail to you today.

Sincerely,

Cindy Bertek

Cindy Bertek
MSU Extension Forestry
Forest Stewardship Coordinator

MONTANA STATE UNIVERSITY
EXTENSION
Forestry Program

MSU Extension is an ADA/EO/AA Veteran's Preference Employer and Provider of Educational Outreach

Replacement Survey Letter

MONTANA STATE UNIVERSITY
EXTENSION
Forestry Program

MSU Extension Forestry
Cindy Bertek
Forest Stewardship Coordinator
32 Campus Dr MS 0606, Missoula, MT 59821 0606
406-243-4706, email: cindy.bertek@cfc.umt.edu

May, 2007

Dear Family Forest Owner,

About three weeks ago I sent you a questionnaire asking about your thoughts about your forest objectives and needs. To the best of our knowledge, it has net yet been returned. I am writing again because of the importance that your questionnaire has for helping us produce accurate results.

The information provided thus far is beginning to paint a picture of the Family Forest owners' objectives in Montana. However, without a large enough response rate from Family Forest owners, our numbers may fairly represent all Family Forest owners.

To ensure your anonymity in this survey, our mailing list will be destroyed after the survey has been completed – individual names cannot be connected to the results in any way. Protecting the confidentiality of people's answers is very important to us, as well as to Montana State University.

Thank you for your time and effort. Your answers are important – they provide the data to help describe the educational needs of Montana Family Forest owners. Please help us portray the forest owners as accurately as possible. **If you did indeed already complete and return the questionnaire, you can toss the enclosed survey…and thank you!**

In addition to the mail survey, we will also be contacting some family forest owners via telephone. The final report will be available for you to download from our web page at www.forestry.umt.edu/extensionforestry.

We hope that you will fill out and return the questionnaire soon.

Thanks again,

Cindy Bertek
MSU Extension Forestry, Forest Stewardship Coordinator

P.S. If you have any questions, please feel free to contact me at (406)243-4706, or via e-mail at cindy.bertek@cfc.umt.edu.

APPENDIX C: **Phone Survey**

Phone Script

MONTANA STATE UNIVERSITY | EXTENSION

Extension Forestry 32 Campus Dr. Missoula, MT 59812-0606

Forest Stewardship Phone Survey Script (Stewardship)

"My name is Cindy Bertek and I am the Montana Forest Stewardship educational coordinator. At MSU Extension Forestry we offer forestry related information and workshops. You recently received a short survey in the mail. I am conducting a short follow up survey."

"Would you spend about 10 minutes answering a few survey questions?"

"Your participation in this study is voluntary and you may withdraw at any time. Your willingness or unwillingness to participate will not affect your relationship with MSU Extension Forestry" (if person called has a verified Forest Stewardship plan: "your standing as a verified Forest Steward." "Your individual identity will be kept confidential as we are interested in determining general trends and needs. Only summaries of responses will be reported."

"I will be asking you several questions please answer with a number from 1-5. **1** if you **strongly disagree**, **2** if you **disagree**, **3** if your feelings are **neutral**, **4** if you **agree** and **5** if you **strongly agree**."

Survey Questions

"Thank you for your assistance. If you have any questions concerning matters related to this research, please feel free to contact me: Cindy Bertek (406)243-4706"

Additional Info to be used as needed:
Since 1991 MSU Extension Forestry has been conducting workshops designed to help private landowners such as yourself assess your forest and develop a forest management plan. In the past 15 years, more than 1,800 landowners have taken the opportunity to participate in this program. Although we have received immediate feedback from participants, we would like to gain an understanding of the longer term impacts of the program.

The University of Montana Institutional Review Board has approved this research study.
TITLE: Assessing the short and long term effectiveness of forest planning workshops for family forests

INVESTIGATORS:
Cindy Bertek, Forest Stewardship Coordinator
Peter Kolb, Extension Forestry Specialist

SPONSOR: MSU Extension Forestry

APPENDIX D: **Monitoring Form**

MONTANA STATE UNIVERSITY EXTENSION Forestry Program

Montana Forest Stewardship Plan – Implementation Monitoring Form

FOREST STEWARDSHIP MONTANA

Part 1 ID#_____Date of Inspection _____
Landowner name _____ Address _____
City, State & Zip _____email _____ Phone _____
Original FSP Completion Date_____ Original acres verified _____ Additional acres verified _____
Additional management units (MU's) verified _____ Acres not verified _____ MU's not verified _____
Landowner present? ___ yes ___ no Others Present _____
Plan preparer (landowner, state, consulting, or other) _____ Inspector _____
Reverification approved? yes no Is Landowner also enrolled in Montana Tree Farm Program? ___ yes ___ no
Landowner(s) Signature _____ **Inspector Signature** _____ Phone _____
****

Part 2 Does landowner still have the original plan? ___ yes ___ no
Has landowner implemented all objectives from original plan? ___ yes ___ no
Is no, what are the reasons given for not implementing original objectives? Check all that apply

____ catastrophic natural events
____ ownership interest/objective change
____ lack of cost-share availability
____ lack of time
____ lack of markets/loggers
____ lack of conservation contractors
____ landowner budget or cost escalation
____ lack of technical assistance
____ other (please describe) _____
_____
_____

Has landowner objectives changed since completing their original plan? ___ yes ___ no

If yes, how have they changed? Have Potentials and Limitations changed? Attitudes? Capabilities? Knowledge?

_____
_____
_____
_____

Has the landowner noticed any changes in their forest since taking the stewardship workshop? Please list, if any.

_____
_____

List activities and recommendations completed consistent with the Forest Stewardship Management Plan (FSMP) (use additional pages if needed).

Management Recommendation or Activity	Acres/Units Projects Implemented	Implemented consistent with Forest Stewardship Management Plan?	Cost share used? Yes or No

030108

Continue on back page ⟶

Part 3

Does landowner have inventory data that describes all MU's? ___ yes ___ no
Has landowner had someone else (consultant) conduct inventory on remaining land? ___ yes ___ no
If yes, please list # of acres. ____
If not, what is the total acreage that does not have inventory data? _____
Does landowner desire to survey additional MU's or use new Stand Analysis Form to resurvey their property?
___ yes ___ no
Acres/MU's landowner plans to conduct inventory/stand analysis on in the future. _____ acres/ _____ MU's

****

Part 4

What resources have been managed or protected under this Forest Stewardship Management Plan as a result of plan recommendations?

____ soil
____ water
____ cover types/habitat
____ range
____ aesthetic quality
____ recreation opportunity
____ timber
____ fish & wildlife
____ threatened and endangered species
____ forest health
____ archeological, cultural, historic sites
____ wetlands
____other (describe) _____

****

Part 5

What educational topic would help the landowner implement plans or assist in continued management of their forest?

_____
_____

What form of information delivery would the landowner find most useful? **Please indicate top three**, leave blank if not considered useful.

___ ½ day one on one with professional forester (sawmill rep. or consultant)
___ ½ day one on one with DNRC service forester
___ Topic specific handouts and booklets
___ Topic specific video's and DVD's
___ 1-day topic specific workshops
___ 2-hr evening educational programs
___ Internet web pages with information

****

Part 6

Has this visit been of any benefit to the landowner? ___ yes ___ no
How would this visit be more useful to the landowner? _____
_____

****

Part 7

Based on the responses above, is this property being managed consistent with the Forest Stewardship Management Plan?
____ yes ____ no

General Comments: _____
_____
_____
_____
_____
_____

MSU Extension Forestry • 32 Campus Drive MS 0606 • Missoula MT • 59812-0606

Site Visit Survey Cover Letter

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MONTANA STATE UNIVERSITY | EXTENSION
Extension Forestry 32 Campus Dr. Missoula, MT 59812-0606

Dear Montana Forest Landowner,

Since 1991 MSU Extension Forestry has been conducting workshops designed to help private landowners assess their forest and develop a forest management plan. In the past 15 years, more than 1,800 landowners have taken the opportunity to participate in this program. Although we have received immediate feedback from participants, we would like to gain an understanding of the longer term impacts of the program. The purpose of this is to help us improve the quality of education/informational materials we offer, both in the initial program and any subsequent educational events and materials. Your responses may also help us determine what private landowners could use to help them meet their goals and expectations for their forest.

Please consider spending 10 minutes filling out the enclosed survey **and return it to your Forest Stewardship Advisor**. Your individual identity will be kept confidential as we are interested in determining general trends and needs.

Your participation in this study is voluntary and you may withdraw at any time. Your willingness or unwillingness to participate will not affect your relationship with MSU Extension Forestry or your standing as a verified Forest Steward.

Once again, all of the information you provide will be kept confidential: only summaries of responses will be reported. This survey contains an identification number. This is done for research purposes.

Thank you for your assistance. If you have any questions concerning matters related to this research, please feel free to contact me:

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CERTIFICATE OF APPROVAL FORM

ETDP MASTER TEMPLATE