Household Use of Tanana Valley Forest Resources: An Economic and Geographical Approach (Based on Data from the Tanana Valley Forest Use Survey)

By
Andriy O. Boyar
Candidate for Master of Science in
Resource and Applied Economics

Submitted to the University of Alaska Fairbanks,
School of Management, Department of Economics
as a project in partial fulfillment of the requirements
for the Master of Science Degree
in Resource and Applied Economics

November 2004

ABSTRACT

Tanana Valley Forest Use Survey was the first attempt to gather information about the forest resources use by households in Alaska. The original study was designed to analyze and interpret the data provided by the Survey.

The paper discusses the environmental and socio-economic factors determining the forest resources use in the Tanana Valley by the residents of the region. The minimum replacement values for the various categories of forest resources harvested in the region during the period from September 2002 to August 2003 are calculated and discussed. A series of stationary maps representing the allocation of the harvested forest resources were drawn.

To reveal the relationship between the households' harvesting effort (amount harvested) and certain socio-economic household characteristics the cluster analysis and linear regression techniques were employed. No linear relationship between the two groups of the variables was determined in any resource category. However, cluster analysis shows certain non-linear relationships between the variables of income, time of Alaska residence, number of household members, education and the value of harvested by the households forest resources.

TABLE OF CONTENTS

	Page
List of Figures ……..	**4**
List of Tables ……...	**6**
List of Appendices ……...	**8**
PREFACE ……	**9**
Acknowledgments ……...	**11**
1.0. Introduction ……	**12**
1.1. Subject and Objectives of the Study ……...	**12**
1.2. Geographical Settings ……...	**13**
1.3. Factors of a Regional Forest Resource Use ……..	**15**
1.3.1. Environmental Settings ……	**16**
1.3.2. Socio-Economic Determinants ……	**19**
2.0. Methods and Results ……...	**22**
2.1. General Methods and Techniques Used ……...	**22**
2.2. Minimum Replacement value for the Forest Resources Harvested in the Tanana Valley by its Households ……	**24**
2.2.1. Per Unit Replacement Value ……...	**24**
2.2.2. Total Replacement Value ……..	**28**
2.3. Structure and Allocation of the Harvest: Geographical Approach ……	**35**
2.4. Cluster Analysis ……..	**44**
2.5. Application of Linear Regression Modeling ……	**55**
2.6. Sources of Errors and Uncertainty and Their Minimization ……...	**56**
3.0 Conclusions and Recommendations ……..	**60**
SITED LITERATURE ……...	**62**
ADDITIONAL LITERATURE …….	**65**
Appendices ……...	**67**

LIST OF FIGURES

	Title	Page
Figure 1.	Forestry complex and the subject of the study……...	**12**
Figure 2.	The study area and the Tanana river watershed……	**14**
Figure 3.	The Tanana Valley study area……	**15**
Figure 4.	Replacement value for fish harvested in the Tanana Valley by its households (by kind of fish)……...	**31**
Figure 5.	Replacement value for wood materials harvested in the Tanana Valley by its households (by category)……..	**31**
Figure 6.	Replacement value for non-wood products gathered in the Tanana Valley by its households (by specious/category)……..	**32**
Figure 7.	Replacement value for big game animals harvested in the Tanana Valley by its households (by species)……...	**33**
Figure 8.	Replacement value for small game animals harvested in the Tanana Valley by its households (by species/category)……	**33**
Figure 9.	Replacement value for animals trapped in the Tanana Valley by its households (by species)……	**34**
Figure 10.	Structure of total MRV for forest resources harvested in the Tanana Valley by its households (by category of resources)…….	**35**
Figure 11.	The Tanana Valley harvest allocation grid……	**37**
Figure 12.	Household fish harvested in the Tanana Valley (based on the TVFUS data)……..	**38**
Figure 13.	Wood materials harvested in the Tanana Valley by its households (based on the TVFUS data)…….	**39**
Figure 14.	Non-wood products harvested in the Tanana Valley by its households (based on the TVFUS data)…….	**40**
Figure 15.	Big game animals harvested in the Tanana Valley by its households (based on the TVFUS data)…….	**41**
Figure 16.	Small game animals harvested in the Tanana Valley by its households (based on the TVFUS data)…….	**42**

Figure 17. Animals trapped in the Tanana Valley by its households (based on the TVFUS data)……...……..... **43**

Figure 18. MRV for forest resources harvested in the Tanana Valley by its households: structure and allocation (based on the TVFUS data). **44**

Figure 19. Relationship between the income of the surveyed households and the estimated MRV for all forest resources harvested by the households in the Tanana Valley…..……. **46**

Figure 20. Relationship between the income of the surveyed households and the quantity of fish harvested by the households in the Tanana Valley…… **47**

Figure 21. Relationship between the income of the surveyed households and the MRV for wood materials harvested by the households in the Tanana Valley……..……. **48**

Figure 22. Relationship between the income of the surveyed households and the MRV for non-wood products harvested by the households in the Tanana Valley…….…….. **49**

Figure 23. Relationship between the income of the surveyed households and the number of hours spent by the households on hunting in the Tanana Valley……... **50**

Figure 24. Relationship between the income of the surveyed households and the MRV for animals trapped by the households in the Tanana Valley……..…….. **51**

Figure 25. Relationship between the number of people in the surveyed households and the MRV for all forest resources harvested by the households in the Tanana Valley.……. **52**

Figure 26. Relationship between the duration of Alaska residence of the surveyed households and the MRV for all forest resources harvested by the households in the Tanana Valley...……. **53**

Figure 27. Relationship between the surveyed households' education and the MRV for all forest resources harvested by the households in the Tanana Valley……...…… **54**

LIST OF TABLES

	Title	Page
Table 1.	Factors of the regional forest resource use…….	**16**
Table 2.	Weather Station Record Climate Summary, Interior Alaska, 1995-2000……...	**18**
Table 3.	Motivation for different forest resources use by surveyed households of the Tanana Valley……	**21**
Table 4.	Methods used for the study of the household forest use in the Tanana Valley…….	**22**
Table 5.	Calculation of replacement values of harvested fish……..	**25**
Table 6.	Calculation of replacement values of harvested wood products…	**26**
Table 7.	Calculation of replacement values of harvested non-wood products……...	**26**
Table 8.	Big Game Weights……..	**27**
Table 9.	Calculation of replacement values of harvested game animals…..	**27**
Table 10.	Calculation of replacement values of trapped animals……...	**28**
Table 11.	Estimated quantities and MRVs of the forest resources harvested in the Tanana Valley by its households (based on the TVFUS data)……	**29**
Table 12.	Distribution of the TVFUS household respondents by income group and estimated MRV of forest resources harvested in the Tanana Valley..……..…….……	**45**
Table 13.	Distribution of the TVFUS household respondents by income and number of fish harvested in the Tanana Valley …...……..	**47**
Table 14.	Distribution of the TVFUS household respondents by income and MRV for wood materials harvested in the Tanana Valley…..	**48**
Table 15.	Distribution of the TVFUS household respondents by income and MRV for non-wood products harvested in the Tanana Valley	**49**
Table 16.	Distribution of the TVFUS household respondents by income and hunting effort..…….	**50**

Table 17. Distribution of the TVFUS household respondents by income and MRV for animals trapped in the Tanana Valley…….. **51**

Table 18. Distribution of the TVFUS household respondents by the household size and MRV for all forest resources harvested by the households in the Tanana Valley..…….. **52**

Table 19. Distribution of the TVFUS household respondents by the time of residence in Alaska and MRV for all forest resources harvested by the households in the Tanana Valley..…….…….. **53**

Table 20. Distribution of the TVFUS household respondents by education and MRV for all forest resources harvested by the households in the Tanana Valley……..…….. **54**

Table 21. Correlations between the resource harvesting effort variables and candidate explanatory variables for 5 categories of forest resources……. **56**

Table 22. Sample sizes needed to make statistically significant inferences for resource allocation grids……..……. **59**

LIST OF APPENDICES

Appendix A. The Tanana Valley Forest Use Survey (sample)

Appendix B. 2003 population of communities in the Tanana Valley

Appendix C. Some racial and ethnic characteristics of population

Appendix D. Database for Figure 12: "Fish harvested in the Tanana Valley by its households"

Appendix E. Database for Figure 13: "Wood materials harvested in the Tanana Valley by its households"

Appendix F. Database for Figure 14: "Non-wood products harvested in the Tanana Valley by its households"

Appendix G. Database for Figure 15: "Big game (B/G) animals harvested in the Tanana Valley by its households"

Appendix H. Database for Figure 16: "Small game (S/G) animals harvested in the Tanana Valley by its households"

Appendix I. Database for Figure 17: "Animals trapped in the Tanana Valley by its households"

Appendix J. Database for Figure 18: "Structure and allocation of forest resources harvested in the Tanana Valley by its households"

Appendix K. Population and Household Characteristics by Residential Zip Codes within the Tanana Valley