Appendix D Biomass Supply and Cost Profile: Matanuska-Susitna Borough-owned Lands, Alaska

Introduction

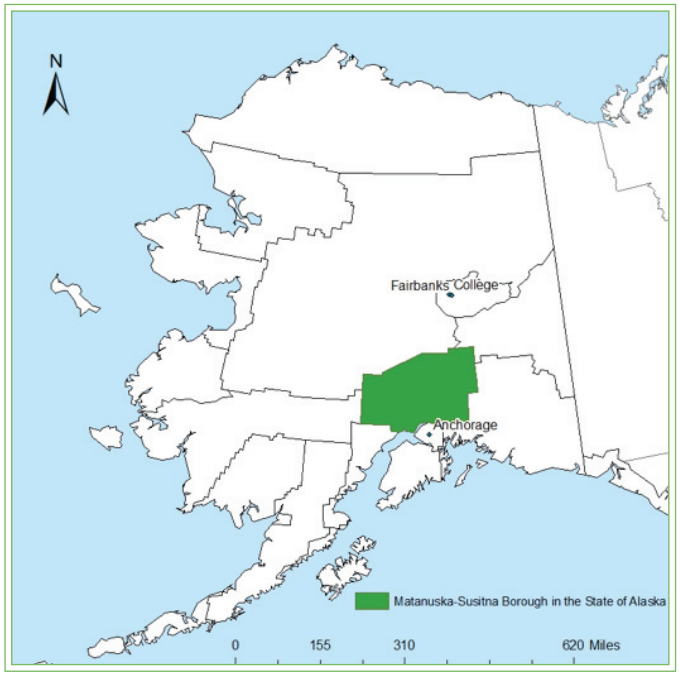
The biomass resources in the western United States have both similarities with, and differences from, those from other regions in the country. Issues of forest health on public lands play a significant role in the West, and management of naturally regenerated stands is more prevalent than tree plantations. In this supply and cost profile, we present a simplified approach to assessing the availability of biomass resources, which may be used for small-scale projects, or where data may not be widely available.

Background

The Matanaska-Susitna Borough, north of Anchorage, Alaska, contains about 24,600 miles of land, and in 2000 had a population of about 59,000. The area has abundant natural resources, including woody biomass. Thirteen Forest Management Units in the borough comprise 105,175 forested acres containing more than 2.1 million green tons of wood. There are three commercial manufacturing facilities, a wood chip export company, and many smaller firms that supply firewood and logs in the Matanuska-Susitna Valley (Northern Economics Inc., 2007).

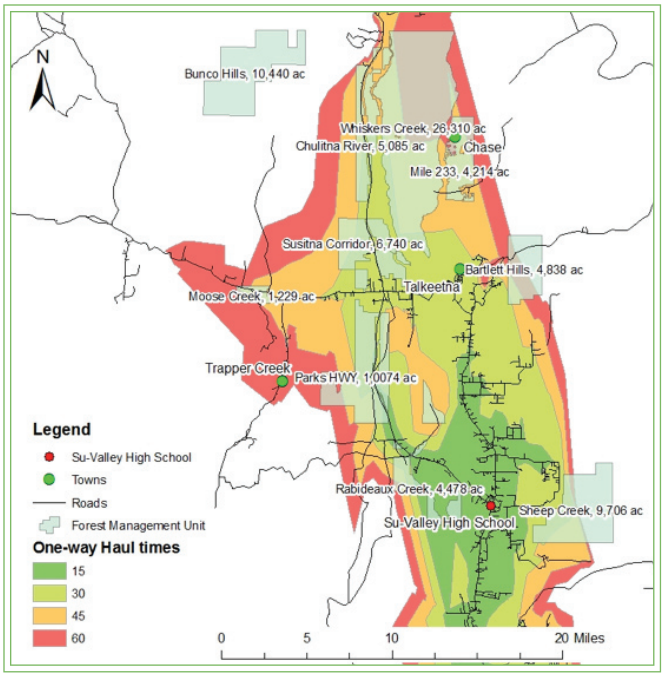
Nowhere in the U.S. is the issue of climate change more significant than in Alaska, where climate-related forest health issues have been documented. Rising temperatures cause insect outbreaks and make forests vulnerable to fire, which environmentalists cite as one reason to mitigate climate change globally. Simultaneously, forest thinning is needed to improve forest health and reduce forest fuel loads, providing an opportunity to produce carbon-neutral renewable energy from forest biomass.

Figure 1: *Location of Matanuska-Susitna Borough and the Su-Valley High School.*



At this writing, one potential bioenergy project in the Matanuska-Susitna Valley is the Su-Valley High School in Talkeetna. The school was destroyed by a fire in 2007, and reconstruction efforts aim to provide for heating the school with locally available firewood (CE2 Engineers Inc., 2008). Heating the school with firewood rather than fuel oil would provide economic and environmental benefits locally. This analysis provides an assessment of the economic availability of biomass fuels for a local bioenergy project such as the Su-Valley High School in Talkeetna, AK. Fuelwood assessed is

Figure 2: *Forest Management Units in the Matanuska-Susitna Valley area and haul times from the Su-Valley High School.*



limited to sustainably produced biomass from Matanaska-Susitna Borough Forest Management Units.

The Matanaska-Susitna Borough Land and Resource Management Division manages Forest Management Units for a variety of uses, including recreation, mining, and forestry. Operable forests in the Matanuska-Susitna Valley are primarily mature birch-spruce mixed forests, with scattered volumes of aspen and cottonwood. Spruce, a softwood saw timber species, has the highest value. Birch, a hardwood, comprises about 60 percent of Matanuska-Susitna Valley operable forest lands and is harvested for export as wood chips, with some higher-value uses as lumber, flooring, and specialty products. A significant amount of lower-quality fiber is available from birch and other species, suitable for wood chips and firewood (Northern Economics Inc., 2007). The Land and Resource Management Division administers the Wildfire Fuel Reduction Program, which is designed to reduced fuel loads and wildfire risk on Forest Management Units lands. Woody biomass for bioenergy could come from forest thinning prescribed by this program. Some combination of logging residues and forest thinnings from overstocked stands would probably provide the least-cost biomass resources in the in the Matanuska-Susitna Valley.

Economic concerns are major determinants of the feasibility of bioenergy projects. Assessing the economic availability of biomass requires learning about the delivered cost of wood, the quantity of wood that's available, and its geographic distribution. In this profile, we assess the availability of biomass that may be derived from ten area Forest Management Units, and the cost of biomass from these areas delivered to the Su-Valley High School in Talkeetna. The cost of each ton of biomass (i.e., marginal cost) at a range of quantities is then displayed in a supply curve.

Table 1: *Forest Management Units (FMU), acres, operable forest acres, and estimated annual availability of fuelwood.*

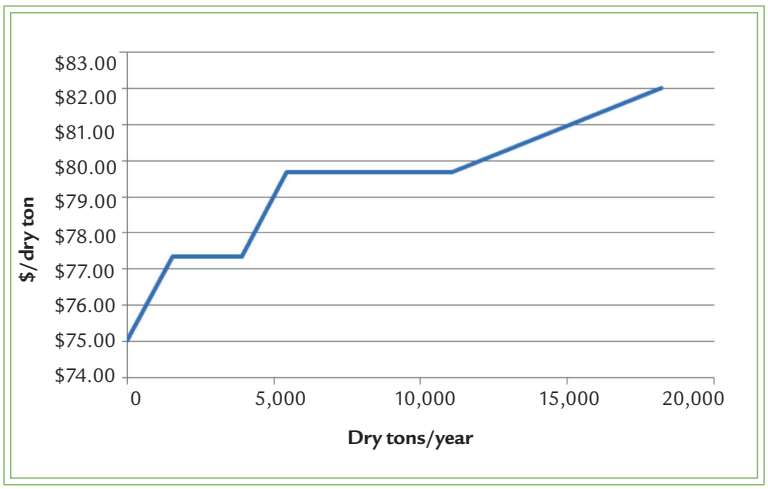
FMU Name	Operable Forest Land Acres	Assumed Fuelwood Yield (t/ac/yr)	Total t/ac/yr
Rabideaux Creek	1,568	1.0	1,568
Susitna Corridor	2,330	1.0	2,330
Parks HWY	1,540	1.0	1,540
Mile 233	3,211	1.0	3,211
Moose Creek	0	1.0	0
Sheep Creek	1,576	1.0	1,576
Chulitna River	817	1.0	817
Whiskers Creek	7,131	1.0	7,131
Bartlett Hills	2833	1.0	2833

Biomass Availability

The Matanaska-Susitna Borough owns 11 Forest Management Units totaling 105,175 acres and 49,044 operable forest land acres. Forest Management Units in and around the Matanuska-Susitna Valley and haul time from the assumed point of delivery are show in Figure 38. Assuming operable forest lands yield 1.0 dry tons per acre per year of fuelwood, estimated annual availability of biomass is shown in Table 1.

Firewood cut and delivered unsplit is available locally at about $110.00 to$120.00 per cord (Northern Economics Inc., 2007), or about $75.00 to $82.00/ dry ton, assuming 1.5 dry tons per cord. To account for transportation cost, we assume the lower cost of $75.00 per dry ton for biomass harvested from Forest Management Units that are within a 15-minute drive of the delivery point, and the higher cost of $82.00 per dry ton for biomass 1 hour from the delivery point. We interpolate between 15 minutes and 1 hour using linear regression, and calculate a cost of $77.34 per dry ton and $79.67 per dry ton for biomass from a 30-minute and 45-minute haul time, respectively. The resulting supply curve is shown in Figure 3.

Figure 3: *Supply curve for fuelwood to the Su-Valley High School.*



Summary and Conclusion

Assuming a yield of 1 dry ton per acre per year of fuelwood production from operable forestlands, approximately 21,000 tons of fuelwood are available annually from about as many acres of operable forest lands on Forest Management Units near Talkeetna, AK. This biomass is probably available for about $75.00 to $82.00 per dry ton based on existing fuelwood markets. This would total about 337 billion Btu per year, or enough biomass to power a 3 megawatt facility. This is many times the 439 green tons, or approximately 4.7 billion Btu per year that would be required for the wood-fired boiler for the Su-Valley High School described by CE2 Engineers Inc. (2008).

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References

CE2 Engineers Inc. (2008). Matanuska-Susitna Borough Su-Valley High School Wood Heat Preliminary Economic Study. Anchorage, AK.

Northern Economics Inc. (2007). Matanaska-Susitna Borough Market Analysis and Timber Appraisal Report. Anchorage, AK.