**MEC 3040 HW for Module 1: Woody and grass biomass resources**

Please note that homework asks you to go outside of lecture notes and do a bit of research on your own. You might begin by looking at resources and links provided in the Module (find those within each dropdown Module on richmond-hall.weebly.com) and then move to a search engine, book on reserve or librarian. When answering questions, please:

* Cite your source.
* Answer in complete and punctuated sentences or by using or creating tables or charts.
* Be thorough!
* Note that you can type your answers into this document if you wish.

**Section I: Answer all questions**

**2.5: Study of wood energy resources in Vermont**

1. What does NALG stand for?

2. What sort of factors were used to determine whether land in the study area was ‘inaccessible or in appropriate’?

3. Why are neighboring counties from other states included in the study? How does the amount of wood resource in these neighboring counties compare to the amount in Vermont?

4. How much wood do limbs and tops vs. boles contribute to the inventory developed in this study?

5. How much of the NALG harvest is cordwood vs. pulpwood vs. wood chips?

6. How much more intensively harvested are privately owned forest with greater than 50 acres vs. less than 50 acres in Vermont?

7. What assumptions can have very large effects on the results and conclusion of the NALG study?

8. What do you think Vermont with low-quality energy wood if it can get the harvest done?

**2.6: Role of woody biomass in the Northern Forest region?**

9. The Northern Forest region is no longer being used for pulp and paper. Plans for its future focus on incentives and public private partnerships. How does this approach reflect patterns of forest ownership in the US?

**2.8: Northern Forest region recommendations on use of woody biomass**

10. The Northern Forest report concludes that, “Reducing fossil fuel consumption by 5% per year over the next 40 years would cut carbon emissions by 50% by 2030 and by 80-90% by 2050.” What assumptions are the authors making? What factors might prevent this prediction from being valid? Would any federal policies or regulations be needed to make this happen?

**2.9: Future of wood biomass**

11. What recommendations about best use of wood chip biomass are found in the executive summary (just one page!) of the report, ‘Economic Impact Assessment of Wood Chip Heat in Maine’?

**Section II: Answer at least 3 of the following 6 questions***Note that all of the sources are linked here in the resources section of Module 2.*

*Your answers should be complete and substantial.*

**2.3: Sources of energy biomass**

A. Find resources that describe how much forestland is there in the US. How many acres are there? How much of that is harvested? How much is forest vs. plantations? Are the plantations concentrated in one part of the country?

**2.4: Wood resources**

B. A study released in July of this year (2019) suggests that Earth has space to increase forests by 25% and that replanting/regrowing forests would buy more time to fight climate change. Does this goal conflict with use of wood for biomass energy? Explain.

C. Based on our field trips, what is the range of regeneration times for forests (harvestable timber and / or energy wood) in Central Vermont? If you don’t recall from out field trips, find a source for the information.

**2.5: Study of wood energy resources in Vermont**

D. Today there are many pressures on forests and forest resources. List a few and describe whether they conflict with one another or in concert with one another.

**2.10: Grass is an herbaceous perennial biomass feedstock**

E. Some fear that the growing global population, estimated to reach 9.8 billion by 2050, will need to maximize global croplands. Development, reforestation and production of energy crops are often seen as threats to the cropland. Speculate about how development of perennial grass energy crops would impact potential agricultural lands.

**2.11: Grass biomass feedstock considerations & species**

F. Explain the ‘chicken vs. egg’ nature of biomass feedstock supply vs. market. What problems are presented? What is the advantage to having alternate (non-energy) markets for biomass resources like grasses?