**Translating the Role of Forests for NYS Climate Change Mitigation and Adaptation**

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**Introduction:**

Forests are society’s greatest combatant for mitigating climate change. New York State (NYS) has been a leader in setting stringent restrictions on future greenhouse gas (GHG) emissions and has recognized the importance of integrating natural climate solutions (Fargione, 2018) as part of addressing climate change. The Climate Leadership and Community Protection Act (CLCPA; S.B. 6599) has set goals for NYS to emit 40% of its 1990 GHG emission level by 2030 and 85% by 2050. An interpretation of the Act is forested, and natural lands will sequester the remaining 15% of GHG emissions for the NYS to achieve carbon neutrality. In an effort for the state to build an understanding of its forests, the New York State Department of Environmental Conservation (NYSDEC) has partnered with State University of New York College of Environmental Science and Forestry’s (SUNY ESF) Climate and Applied Forest Research Institute (CAFRI) to develop a statewide forest carbon inventory.

Before the initiation of the comprehensive CAFRI inventory, the NYSDEC and a partnering agency that also developments the state GHG inventories, NYS Energy Research Development Authority (NYSERDA), contracted for a preliminary forest carbon inventory. This inventory utilized the USFS Forest Inventory and Analysis (FIA) data, which extrapolates plot-level data to represent forest area and productivity throughout the state. This inventory provides a sufficient baseline but is limited by its methodology.

The central role of my internship was to create a translational report that interprets the meaning of the preliminary forest carbon inventory results and how NYS can better implement forest management practices that achieve climate change mitigation and adaptation. By providing environmental administrators with a broad and informative report on the current state of N.Y. forests and the role of forest management for carbon sequestration and storage, my work may inform future climate change policy in the forest sector.

During the summer of 2019, I interned for the NYSDEC Office of Climate Change and NYSERDA. I was positioned in the Albany Central Office of the NYSDEC, where I was able to develop translational materials. Also, I wrote the “Forest Carbon and Climate Change Mitigation and Adaptation” section of the 2020 NYS Forest Action Plan, which represents the goals and management strategies of NYS forests for the following ten years. Furthermore, I gathered data and responded to the forest sector questions of the global CDP Questionnaire, reviewed municipality grant and certification applications for the NYS Climate Smart Community Program, and attended multiple conferences to network and inform stakeholders of the CAFRI initiatives.

**Projects:**

*Translational Paper:*

The contracted preliminary report provides NYSERDA a baseline of NYS forest carbon storage and sequestration since 1990. This report was constructed using the Intergovernmental Panel on Climate Change Guidelines for GHG Inventory Guidelines (IPCC, 2006) and Forest Inventory and Analysis (FIA). FIA data extrapolates forest plot measurements in species composition, tree health, growth, soil samples, and other variables to quantify statewide estimates. My paper identified the limitations of these methods and how this impacts the understanding of changes in forest area and sequestration. Plus, this inventory method lacked spatially explicit data, which can affect future policy implementation and monitoring. I also explained possible threats to forests caused by climate change and how natural climate solutions specific to NYS may be used to create a future policy that aligns with NYS climate mitigation goals and ideal forest management. By providing this translational paper, I was able to recognize the limitations of the preliminary report, which the CAFRI inventory could address.

*State Forest Action Plan:*

The NYS Forest Action Plan sets goals and develops strategies that the state commits to between 2020 and 2030 (New York Forest Action Plan, n.d.). This Plan is the guiding document for agency directives and tactics when addressing forested land. While writing the “Forest Carbon and Climate Change Mitigation and Adaptation” section, I focused on the importance of managing forests for diverse goals, while emphasizing the importance of management for carbon sequestration and storage. Forests in the state also increase the adaptation capacity for communities in that they reduce the need for cooling systems in nearby buildings, provide a barrier against severe weather, and reduce air pollution. In addition to the benefits forests provide, I summarized the predicted impacts climate change will have on NY forests, such as predicted trends for future pests, changes in water availability, and shifts in annual temperatures (Butler-Leopold, 2018; Janowiak, 2018). All of these impacts are anticipated to alter forest productivity and carbon storage; therefore, agencies should be preparing for these changes on forested lands.

*Other Projects, Conferences, and Connections:*

I was also tasked with answering the forest sector CDP questionnaire. By acting as the NYS liaison to forest carbon, I familiarized myself with areas of forest loss and conversion and the causes of these changes. Furthermore, I reviewed, critiqued, and processed 10 NY Community’s natural resource inventories as part of the NYS Climate Smart Community Program (Climate Smart Communities, 2019). By reviewing these inventories, I was able to emphasize the critical role forests play for communities affected by climate change.

Throughout this summer, I attended four conferences: the 26th Annual Adirondack Research Consortium Conference, the 2019 Common Ground Alliance Forum, Hudson Valley Conservation Partners Meeting July Meeting, and the 3rd Interagency Climate Adaptation and Resilience Workgroup Workshop. These opportunities enabled me to interact and make connections with academics, professionals, and stakeholders who are interested in conserving NY forests.

**Personal Growth:**

Overall, this internship has been the most transformational experience of my professional career. Not only did this experience help me link course work into real-life action, but I learned much more beyond what has been taught in the classroom. Agencies work at a much faster pace than academia, and I can understand the disconnect often faced with government/academic partnerships. Furthermore, agency work is heavily influenced by politics and stakeholders, which often have misaligned goals. As a government agent, you must utilize broad interdisciplinary thought to create a policy that is restricted within the bounds of rules, funds, and politics.

As a student in an academic master's degree and a public administrative master's degree, I can see myself excelling in an agency role. This internship came at an exciting time because the new NYS Climate legislation was passed in July; I was able to see the inner workings of a regulatory agency at the beginning stages of policymaking. Not only was I witnessing many strategic planning meetings, but I was able to contribute some of my expertise in forest ecology to conversations.

**Conclusion:**

In conclusion, this internship has put my coursework into a real-life context, helped me shape my thesis, and has redirected my career goals. By working closely with my mentors, I understand the needs of the agency and can use this knowledge to help CAFRI projects provide the answers NYS administrators need. During the fall 2019 semester, I helped develop a background report for CAFRI carbon inventory, which includes a literature review of existing forest sector GHG inventories and knowing which values need to be quantified by CAFRI for a statewide inventory.

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**References:**

Butler-Leopold, P. R., Iverson, L. R., Thompson, F. R., III, Brandt, L. A., Handler, S. D.,

Janowiak, M. K., Shannon, P. D., Swanston, C. W., Bearer, S., Bryan, A. M., Clark, K. L., Czarnecki, G., DeSenze, P., Dijak, W. D., Fraser, J. S., Gugger, P. F., Hille, A., Hynicka, J., Jantz, C. A., Kelly, M. C., Krause, K. M., La Puma, I. P., Landau, D., Lathrop, R. G., Leites, L. P., Madlinger, E., Matthews, S. N., Ozbay, G., Peters, M. P., Prasad, A., Schmit, D. A., Shephard, C., Shirer, R., Skowronski, N. S., Steele, A., Stout, S., Thomas-Van Gundy, M., Thompson, J., Turcotte, R. M., Weinstein, D. A., Yáñez, A. 2018. Mid-Atlantic forest ecosystem vulnerability assessment and synthesis: a report from the Mid-Atlantic Climate Change Response Framework project. Gen. Tech. Rep. NRS-181. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 294

Climate Smart Communities. 2019. New York State Department of Environmental Conservation.

Retrieved from https://climatesmart.ny.gov/.

Fargione, J. E., Bassett, S., Boucher, T., Bridgham, S. D., Conant, R. T., Cook-Patton, S. C., …

Griscom, B. W. 2018. Natural climate solutions for the United States. *Science Advances*, *4*(11), eaat1869. <https://doi.org/10.1126/sciadv.aat1869>

IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Prepared

by the National Greenhouse Gas Inventories Programme. In: Eggleston, S., L.

Buendia, K. Miwa, T. Ngara and K. Tanabe (Eds.). Institute for Global

Environmental Strategies, Japan.

Janowiak, M. K., D'Amato, A. W., Swanston, C. W., Iverson, L., Thompson, F. R., III,Dijak, W.

D., Matthews, S., Peters, M. P., Prasad, A., Fraser, J S., Brandt, L. A., Butler-Leopold, P., Handler, S. D., Shannon, P. D., Burbank, D., Campbell, J., Cogbill, C., Duveneck, M. J., Emery, M. R., Fisichelli, N., Foster, J., Hushaw, J., Kenefic, L., Mahaffey, A., Morelli, T., Reo, N. J., Schaberg, P. G., Simmons, K. R., Weiskittel, A., Wilmot, S., Hollinger, D., Lane, E., Rustad, L., Templer, P. H. 2018. New England and northern New York forest ecosystem vulnerability assessment and synthesis: a report from the New England Climate Change Response Framework project. Gen. Tech. Rep. NRS-173. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 234 p. <https://doi.org/10.2737/NRS-GTR-173>

New York Forest Action Plan. n.d. New York State Department of Environmental Conservation.

Retrieved from https://www.dec.ny.gov/lands/60829.html.

S.B. 6599, Senate Reg. Sess. 2019-2020 (N.Y. 2019)