MANAGING TERRESTRIAL CARBON IN THE NORTHEASTERN U.S.: EARLY EXPERIENCES WITH RGGI

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1. INTRODUCTION

The Regional Greenhouse Gas Initiative (RGGI) is a multi-state plan to reduce greenhouse gas emissions from electric power plants in a 10 state region in the northeastern US that extends from Maine to Maryland. The compliance period for the Initiative started January 1, 2009 and was preceded by two auctions of CO_2 emission allowances. RGGI is the first mandatory market based program in the US to reduce CO_2 emissions. It includes the first carbon (C) auctions in the USA. The RGGI program began out of frustrations over lack of a national GHG reduction program during the previous federal administration and because of concerns about rising levels of greenhouse gases (GHGs). The goals of the RGGI program are to reduce GHG emissions by 10% by 2019 below the 2002-2004 average, set an emissions cap of 188 millions tons of CO_2, establish a price for C, encourage innovation and efficiency, provide regulatory certainty for electricity generators, and establish a model for a national US program. The 10 state RGGI region covers 330,000 km^2 (130,000 mi^2), is 60% forested, and has a population of about 50 million. The region emits about 10% of all US GHGs and has a $2.4 trillion economy comprising about 19% of the US economy.

In addition to purchasing allowances for power plants CO_2 emissions, there are a limited number of CO_2 offsets (e.g. efficiency, methane oxidation, etc.) that can be used in the program. Of direct interest to our work are the potential for offsets due to afforestation, reforestation, avoided deforestation, and forest carbon management. Our goal is to create a decision support system for RGGI management to develop "what if" scenarios related to land cover change using satellite-based metrics.

The largest mandatory GHG trading system is the EU emissions trading system that trades about $60B annually in emissions allowances. Currently being negotiated through the UNFCCC COP process is the REDD (reduced emissions from deforestation and degradation) program, which, if initiated, could dramatically increase demands on satellite monitoring and verification systems for forest cover globally as well as markedly change the entire emissions trading landscape.

This paper will provide an overview of our approach to assisting the RGGI GHG program with satellite data and model data.

2. THE ROLE OF FORESTS

Forests are highly important components of the global C cycle. Globally, deforestation accounts for about 20% of all GHG emissions [1, 2]. Currently in the US, forests sequester more C than they release thanks to regrowing forests in the Northeast and elsewhere that are offsetting about 10 to 13% of the fossil fuel GHG emissions. Consequently, growing, clearing or disturbing forests can have major impacts on C release or sequestration. In the Northeastern US, the primary threats to forests are residential and commercial developments rather than logging. We can, of course, use forests to mitigate C emissions by expanding their area, increasing their C density, substituting biomass for fossil fuels or by lessening deforestation and forest degradation. In addition, there are many ancillary benefits of forests, such as cleaner air and water and maintaining diversity.

3. REMOTE SENSING AND OTHER DATA

Satellite data have long been used to monitor landcover and are highly useful in defining land cover change. However, information on forest area must be supplemented with estimates of forest biomass if we are to develop useful C budgets [3]. Newer approaches use both optical and radar satellite data to map biomass. For example, we are using both tools to map forest biomass in the US [4] and in Africa [5]. Optical data from MODIS and Landsat are being supplemented with radar data from the Shuttle Radar Topography Mission (SRTM) and from the Japanese ALOS satellite.

4. METHODS

We are currently characterizing the land cover types of RGGI region, determining the spatial distribution of C stocks and are determining the current net sources and sinks of C of the region. We are also evaluating the potential for future C sequestration and releases of C. We will provide to RGGI a system for calculating current and potential sources and sinks of C from land use change and land management. Finally, we are defining the tradeoffs between the costs and accuracy of a satellite-based versus a model-based methodology for monitoring changes in carbon stocks for the region.

We are using the HYBRID Carbon accounting model and the NBCD data to develop a decision support tool that can then be used by RGGI to make policy and management decisions.

5. OTHER REGIONAL AND A POSSIBLE US FEDERAL GHG PRGRAM

There are two other regional GHG programs being organized in the US. The largest and most comprehensive is the Western States Climate Initiative (WCI), spearheaded by the state of California. The WCI program also has participation from several Canadian provinces and Mexican states. Also being developed is the Midwestern State Greenhouse Gas Reduction Accord (MGGA). They have similar objectives but differ in timing and details. WCI is the more comprehensive program and includes a larger range of emission sources and a larger set of offsets.

Progress toward a federal program in the US is hoped for but the likelihood is uncertain. The existing US regional programs (RGGI, WCI, MGGA) may serve as templates or local experiments for any larger federal program. If a federal system is created, several states have said that they would wish to maintain their own regulatory systems and would resist federal pre-emption fearing a less stringent or watered down system. President-elect Obama has stated a goal of 80% reduction of GHG emissions from 1990 levels by the year 2050.

6. CONCLUSIONS

GHG emission allowance auctions are becoming more common and they often include C offsets that can include the growth and management of forests to sequester C. We are determining for the RGGI region current C storage and release based on satellite and modeled data. At the same time, we are developing a decision support system for the RGGI GHG program using both modeled and satellite-based- data to allow RGGI management to develop 'what if' scenarios regarding differing forms of forest manipulation. For this effort, we will provide an estimate of forest biomass and C sequestration or release for the RGGI region and a decision support system for using those data to help RGGI staff with management and policy development.

7. REFERENCES

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