Tri State Working Group Quarterly Meeting
March 8, 2017

Meeting Notes

Participants: Edil Sepulveda (CMS Applications); Sabrina Delgado (CMS Applications); Chalita Forgotson (CMS Applications); George Hurtt (University of Maryland); Katelyn Dolan (University of Maryland); Wenli Huang (University of Maryland); Steven Flanagan (University of Maryland); Stu Sheppard (University of Maryland); Jarlath O'Neil (University of Vermont); Kristofer Johnson (USFS); Andy Lister (USFS); Elliott Campbell (MD DNR); Rob Feldt (MD Forest Service); Shawn Lehman (PA DCNR); Greg Czarnecki (PA DCNR); Mary Raley (DE Dept of Transportation); Donald Strebel (Versar); Michelle Canick (The Nature Conservancy)

I. Stakeholder context, needs, updates, plans

- Maryland DNR (Elliott Campbell)
    - Collaborating in latest NASA ROSES CMS proposal with University of Maryland Team looking into ways of using CMS remote sensing data and data products in various ways for the MD Greenhouse Gas Reduction Act (GGRA), for example targeting certain areas for reforestation, and setting reasonable goals for sequestration for the state's 2030 goals.
    - George Hurtt will present to the MD Commission of Climate Change Mitigation Working Group in May 11. This WG is the body that will be determining how the next iteration of the GGRA is going to look for the forests and wetland sectors. This is a good opportunity to update the WG on what the CMS data products will look like.

- Maryland Forest Service (Rob Feldt)
    - No major updates. Using forest cover product a lot, and making county and local users aware of it.

- Pennsylvania DCNR (Greg Czarnecki and Shawn Lehman)
    - Interested in looking at carbon footprint on their department. As part of that, they want to look into carbon sequestration on their state forest system.
    - Had a call yesterday with some folks from USFS who have being using FIA Carbon Calculator data and some other data sources to look at carbon sequestration and different forest management techniques and how they impact forest carbon sequestration.
    - There is still interest in comparing calculations from CMS and DCNR Bureau of Forestry on state forest lands.
    - Since last meeting, they have recalibrate carbon equations and estimates up to the 2013 timeframe. They used their cfi data (3rd cycle worth of data), and now they are getting close to completing the 4th cycle.

    Discussion

- CMS Science Team is interested in comparing estimates with PA DCNR Bureau of Forestry. The essential element needed is the state forest mask (GIS mask).
- Regarding the call with the USFS, Shawn mentioned that the folks from USFS talked about a carbon calculation tool and how CMS products can complement each other. Kristofer discussed that currently there has been no effort to coordinate the two things, but it would be an interesting topic of conversation going forward.
- Kristofer and Andy will work to put the right people together regarding the use of this carbon calculation tool.
- The goal of this CMS Tri-State project is not to create a product that is separate from the USFS estimate (or that is competing with that). The goal is to enhance the power of the USFS inventory data through: (1) the high-resolution approach, and (2) the modeling products generated on top of it.

- Delaware
    - No updates. [The CMS Team would like to engage the Delaware Forest Service and other state agencies in Delaware to gather feedback regarding the use, applications, challenges, and interests on the CMS lidar derived products (CMS tree canopy data used to develop urban tree canopy maps for each of Delaware's 57 communities)].

- The Nature Conservancy (Michelle Canick)
    - Rob Feldt distributed the forest cover data and forest height data to TNC.
    - Using forest cover data to improve water quality by reducing agricultural solutions in the Eastern Shore of Maryland.
    - Using also forest cover data for looking at forest connectivity for climate resilience in the central Appalachian portion of western Maryland.
    - Interested in using forest height product for looking at forest structure and stand age in western Maryland.

- Versar (Donald Strebel)
    - Key interest is in carbon offsets and overall carbon budget of the state of Maryland.
    - Interested in using CMS data for monitoring carbon sequestration projects and associated conservation projects.
    - Interested in exploring potential for correlating biomass product with stream health.
    - Also interested in carbon fluxes in wetlands, particularly methane emissions in the Chesapeake Bay.

II. Science progress, updates and plans from NASA CMS (George Hurtt, Katelyn Dolan, Jarlath O'Neil)

- The University of Maryland Team submitted a new proposal to expand what has been done in Maryland, Sonoma county, and the Tri-State area now for the entire RGGI (Regional Greenhouse Gas Initiative) region.

- They will also produce the first prototype products for the CONUS using data from the GEDI NASA mission, which will be a Lidar instrument flying on the International Space Station (ISS) starting on 2018.

- This project in Maryland is one of the success stories within the NASA Carbon Monitoring System because they are working from the bottom up with high-resolution data and working closely with MD state agencies and stakeholders.
- There is a new version of the DE land cover that corrects some very minor issues. This has been provided to DE state government for review.

- The **Ecometrica** website is a web-based reporting platform where you can both view and produce reports of different GIS layers. We have made available prototypes for:
    - Maryland - https://maryland-statecms.umd.ourecosystem.com
    - Tri-State - https://cmstristate.umd.ourecosystem.com (Products still under review).

- Some of the layers will tell you whether they are published and where you can go and download, or get more information on the publication.

The University of Maryland Team is interested in knowing how the Ecometrica website might be useful for stakeholders. Any feedback or suggestion is welcome. They will not be releasing the website to the public yet. Please email Katelyn Dolan (kdolan@umd.edu) and Stuart Sheppard (sheppard@umd.edu) if you would like access.

- The website incudes links to the CMS website as well as individual links where available data can be found.

CMS Links

- CMS Hyperwall Presentation by George Hurtt – High Resolution Carbon Monitoring and Modeling Protoype
    - http://carbon.nasa.gov/hyperwall.html

- CMS Data Products metadata
    - http://carbon.nasa.gov/cgi-bin/cms/inv_pgp.pl?pgid=3136 (Tri-State)
    - http://carbon.nasa.gov/cgi/cms/inv_pgp.pl?pgid=650 (MD- phase)

- MD – 30m Lidar-derived Above Ground Biomass with pixel uncertainty, canopy cover and height are archived at ORNL DAAC
    - https://doi.org/10.3334/ORNLDAAC/1320

    - Or visit Maryland's mapping and GIS Data Portal website:
        - http://geodata.md.gov/imap/rest/services/Biota/

- PA tree canopy cover product archived at ORNL DAAC
    - https://daac.ornl.gov/cgi-bin/dsviewer.pl?ds_id=1334

- o Or visit Pennsylvania Spatial Data Access website:
  - ▪ http://www.pasda.psu.edu

- 1m cover for PA
  - o http://letters-sal.blogspot.com/2016/03/delaware-high-resolution-land-cover.html

- 1m cover for DE
  - o http://letters-sal.blogspot.com/2015/09/pennslyvania-statewide-high-resolution.html

III. USDA Forest Service updates, relationship to NASA CMS (Kristofer Johnson and Andy Lister)

- USFS wants to engage more Forest Service users, and have some kind of portal to show data (like Lidar data), what it is, and how to use it.

- Idea to stream high-resolution products into ArcMap using a web coverage service (WCS), so there is no need to download data into computer.

MD iMAP (http://imap.maryland.gov/) allows users to connect to the data sets and directly use them on your ArcGIS software, Goggle Earth, etc.

IV. Discussion and Next Steps

- CMS focus in very high resolution products has two reasons: (1) to get a more accurate estimate, accounting for trees that may be missed under standard Forest Service definitions; and (2) to develop products that have high enough resolution that are meaningful for end users.

- The Tri-State project products do not focus in wetlands. The Team could produce estimates for wetlands.

- Donald Strebel from Versar has on-the-ground wetlands measurement projects under way. There is an opportunity to coordinate the CMS remote sensing aircraft campaign with these Versar wetland projects on the ground.

- How frequently the Lidar data will be updated?
  - o There are 3 sources of Lidar data for this project: (1) Lidar data from USGS – 3DEP and 4DEP programs* (For Maryland collections came from many sources, pre-3DEP); (2) Sigma Space Lidar; and (3) GEDI instrument aboard the ISS {scheduled for 2018}
  - o For more information on Lidar collection please contact the USGS Geospatial Liaison (MD & DE is Roger Barlow).

- There are plans to expand this Tri-State WG to all RGGI states (including Pennsylvania & New Jersey).

- The next Quarterly Meeting will be scheduled for June 2017. A doodle poll will be sent in the coming weeks.

- The meetings moving forward will include a Quarterly Presentation from stakeholders.

- A survey regarding the uses and applications of Lidar derived CMS products will be sent to the stakeholders in Delaware and Pennsylvania in the coming weeks.

- There are also plans to host a workshop and tutorial during Fall 2017. Suggestions for venues are welcome.