Decision-Making Timeframes and Carbon Data Needs:
2014 November NASA CMS Applications Workshop

Stakeholder	Goals	Timeframe	Stakeholder Data Needs
Maryland Department of Natural Resources – Maryland Forest Service	Conduct an assessment of Maryland's forests every 5 years, and counsel Maryland State and forestry decision makers on forest resource management	❖ Forest Preservation Act of 2013 - By 2020, achieve the goal of 40% canopy cover statewide ❖ Watershed Implementation Plans of Chesapeake Bay Program - By 2017, carry out plans to improve stream (riparian forest) buffers (as identified in Phase II Watershed Implementation Plans). Also in 2017, submit updated plans (Phase III) to be implemented between 2018 and 2025	- Tree canopy cover ("wall-to-wall") and biomass estimates maps for all of Maryland - Spatial scale at state level where county/municipality data can be extracted - Preferably 1 m resolution and annual intervals - Convenient data access via a user interface – similar to the NRCS Soil Data Mart or Web Soil Survey – where data and metadata are updated in the background and links for archival data are provided

California Air Resources Board	Coordinate the efforts of federal, state, and local authorities to meet ambient air quality standards and greenhouse gas reduction targets, while minimizing the impacts on the economy	❖ California's Global Warming Solutions Act, Assembly Bill 32 (AB32)
		- By 2020, reduce greenhouse gas emission levels to 1990 levels
		- Every 5 years, the Scoping Plan needs to be updated. First update in May 2014. Next update will be in 2018
		
		❖ California's Sustainable Communities Act, Senate Bill 375 (SB 375)
		- Reduce greenhouse gas (GHG) emissions through coordinated transportation and land use planning with the goal of more sustainable communities
		- In 2010, CARB set regional targets for GHG emissions reductions from passenger vehicle use for 2020 and 2035 for each region covered by one of the State's metropolitan planning organizations
		- CARB will periodically review and update the targets, as needed
		
		❖ Other California targets
		- By 2050, reduce greenhouse gas emission levels 80% below 1990 levels
		- To be accomplished within the next 15 years (by 2030):
		  ▪ Increase from 33% to 50% electricity derived from renewable sources
		  ▪ Reduce petroleum use in cars and trucks by up to 50%
		  ▪ Double the efficiency of existing buildings and make heating fuels cleaner
		  ▪ Reduce short-lived climate pollutants
		  ▪ Manage farm and rangelands, forests and wetlands so they can store carbon
			<u>Meeting Air Quality Standards</u>
			- Role and source of ozone and PM2.5 aloft
			- Role of transport from East Asia
			<u>Meeting Greenhouse Gas Reduction Targets</u>
			- Track Statewide and sector/source-specific CO_2 mitigation
			- Highly resolved CO and GHG inventories for inverse modeling
			- Quantify CH_4 emissions from dairies, landfills, oil/gas sector
			- Quantify N_2O emissions from fertilized fields/lawns, dairies, water bodies
			- Identify remaining sources of black and brown carbon
			<u>Forest Carbon Stock</u>
			- Statewide inventories of carbon stocks for forests and other lands
			- Landscape carbon accounting at the scale of offset projects
			- Screening for carbon-depleted or high carbon-containing natural areas for priority management

Sonoma County Agricultural Preservation and Open Space District	Provide long-term protection of the diverse agricultural, natural resource, and scenic open space lands of Sonoma County of California	❖ Sonoma County Vegetation Mapping and LiDAR Program - Summer 2015: Evaluate and incorporate CMS biomass estimates - Fall 2015: Publish 27-class lifeform vegetation map using CMS LiDAR and derivatives in eCognition (Definiens) - Fall 2016: Publish 45-class vegetation and habitat map using CMS canopy closure and vegetation height to crosswalk with California Wildlife Habitat Relationships classification	<u>Specifically</u>: Repeatable biomass estimates. Methane flux estimates (show benefits from methane capture projects on livestock grazing operations). Tree size and canopy cover combinations tied to carbon estimates to show sequestration benefits of uneven aged, old forests

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	through prioritization of land acquisition and stewardship	- Fall 2016: Incorporate data findings into 10-year countywide conservation plan ❖ Safeguarding California - Every two years or as necessary, conduct a review of the Sea Level Rise assessment - Immediately use best climate science data (i.e. maps and tools) available in operation and management decisions ❖ California's Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, Senate Bill 375) - Every at least 8 years, update the 2020 (short-) and 2035 (long-term) targets of regional GHG emissions reduction through *land use and transportation planning* for the *urban* regions of California. May revise the targets every 4 years - In late 2015 - early 2016, update the 2035 targets that will go into effect starting in 2018 or 2019, depending on the metropolitan planning organization - Throughout 2015, develop alternative land use and transportation scenarios that will help update targets	In general: Anything that quantitatively shows the cost of Business As Usual for the purpose of supporting local decision-makers on their land use decisions Spatial resolution: 30-meter = appropriate resolution to capture flux in the urban and rural environments Frequency: Estimate updates ideally every five years to meet 10-year planning horizons Delivery preference: GIS-based cyber-infrastructure
Asia-Pacific Program (Indonesia) at USDA Forest Service	Offer technical support for Indonesia REDD+ agency's initiatives to curb greenhouse gas emissions from deforestation and forest degradation	❖ Indonesia's National Action Plan for Reducing Greenhouse Gas Emissions - By 2020, reduce greenhouse gas emissions by 26%, up to 41% if given adequate international support ❖ Indonesia's Moratorium on New Forest Concessions - Until May 2015, prevent new clearing of primary forests and peat lands	- Belowground biomass estimates and spatial distribution of peat in Indonesia - Immediate provision of data is desired. Needed data in 2011 for the drafting of the Moratorium and are now overdue - Spatial scale of 1:50,000 (Indonesia National Standard 7925-2013). - No regular data updates needed - Preferred delivery of data as GIS files to the OneMap Peatland Working Group
Ocean Acidification Program of Ocean Conservancy	Facilitate ocean policy development to mitigate adverse effects of ocean acidification felt locally	❖ Federal Ocean Acidification Research and Monitoring Act (FOARAM) - Every at least 5 years, revise the 10-year strategic research plan that will result in development of decision support tools to assist governments in their management options ❖ Individual state commissions charged with studying ocean acidification - Coastal states (especially WA, OR, CA, ME, MD, maybe MA, others) are now gathering information about the drivers and rate of ocean acidification in their areas, and what resources will be impacted	Synthesized, overarching stories that explain scientific observations of ocean acidification and its impacts on local communities: - Partnership with in situ monitoring networks in coastal, cloudy, and particularly variable regions - Measurements of effects of major processes influencing the carbon budget, such as carbon uptake in a region due to air-sea flux, that can help prioritize policy responses - Primary production estimates Example of a synthesized story that decision makers want: - Predictions of ecosystem shifts following phytoplankton species shifts

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Climate Change Division of U.S. Environmental Protection Agency (EPA)	Compile the United States' (national-level) greenhouse gas emissions inventories	❖ GHG Emissions Inventory for Submission to United Nations Framework Convention on Climate Change (UNFCCC) - Annual Reporting Schedule: Collaborations with EPA's research team early on in the development process are ideal in order to increase the usability of the data products. ▪ May-September: Preliminary evaluation of methodological changes; Data collection ▪ October-November: Compilation of first draft ▪ December-January: Expert review period ▪ January: Preparation of 2nd draft ▪ February: Federal Register publication of draft Inventory for 30 day public comment ▪ March: Internal deadline for preparation of final document. ▪ April 15: Submission of Inventory to UNFCCC ▪ September: UNFCCC in-depth review of Inventory ❖ 2013 Wetlands Supplement - In 2017, start reporting estimates of wetland emissions in the inventories submitted to UNFCCC ❖ EPA's Greenhouse Gas Reporting Program - Annual Reporting Schedule: Reporting required for large direct emitters and suppliers (excluding agricultural, land use, and small sources) in order to compile detailed sector-level data, which help improve the U.S. GHG Inventory and guide policy actions	Sources: All **anthropogenic** sources, excludes natural sources Spatial: Important for some applications but not others such as UNFCCC reporting Temporal: Annual, data collected **consistently over time** to reflect trends Unit/Process: Emissions data should be scalable to the activities and equipment that cause emissions. Emission source level data is necessary for developing emissions reduction policies – need to understand emissions pathways from certain activities
Office of Global Change at US State Department	Negotiate international climate agreements and represent U.S. interests in multilateral partnerships	❖ UNFCCC Negotiations - By 2015, achieve a legally binding agreement for all countries to go into effect starting in 2020 - March 2015, intended nationally determined contributions (emission reduction targets and commitments) are due from all countries - Between March 2015 and December 2015, the global community will review each country's targets and strategies to provide feedback for a feasible agreement to be settled in December 2015 - Every year, sessions are held towards the end of the calendar year. For example, next session will be held on November 30th – December 11th, 2015 ❖ The Carbon Fund of Forest Carbon Partnership Facility - By the end of 2015, sign the first agreement that stipulates payments for emission reductions as part of their REDD+ efforts ❖ Biocarbon Fund Initiative for Sustainable Forest Landscapes - In the next 1-2 years, develop a carbon accounting methodology that supports emission reductions efforts beyond the forest sector. ❖ Reducing Emissions from Deforestation and Forest Degradation	- Immediate data needs. Urgent data needs over the next few months for countries that will disclose their intended nationally determined contributions for the upcoming legally binding international agreement - Information distilled to 3 main points for fast-paced policy developments - 3 different types of needs: data, capacity building, and expert review ▪ *Data*: What data is available, what are the uncertainties, and what are the future emissions projections? ▪ *Capacity Building*: Different degrees of technical capacity among countries to develop and implement inventory and monitoring programs. What is cutting-edge technology, and what is relevant and feasible in each country? ▪ *Expert Review*: Evaluate the feasibility and efficacy of countries' proposed emission reductions goals and strategies (e.g.. inventory and accounting approaches,

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		(REDD+) - Continuous data needs for developing national monitoring programs ❖Major Economies Forum on Energy and Climate - At least twice a year, discuss concrete actions outside of negotiations	especially in developing countries) - Information needed to: establish reference levels; determine price of precision (data quality willing to pay), specifically forest degradation in developing countries; and motivate governmental actions to protect coastal areas

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