



Update on USDA Project -

***Developing Science-Based Methods  
and Technical Guidelines for  
Quantifying Greenhouse Gas Sources and Sinks in the  
Forest and Agriculture Sectors***

Presented by:

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# Overview

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# Goal

## Create a standard set of GHG quantification guidelines and methods for the public and USDA.

- In accordance with Section 2709 of the 2008 Farm Bill:
  - *“USDA shall prepare technical guidelines that outline science-based methods to measure the carbon benefits from conservation and land management activities”*
- Focus on developing comprehensive and user-friendly guidelines that can be adopted for use across USDA and its stakeholders and lead to -
  - Development of integrated tool for stakeholders
  - An integrative approach to capturing current inventory and modeling techniques
  - Prioritization of research needs to reduce estimation uncertainty

# The Guidelines and Methods will:



- Build upon the current state of the science to provide a robust but simple to use entity-scale estimation tool.
- Integrate use of existing modeling tools as much as possible in order to maximize data and reporting consistency and transparency.
- Be transportable and scalable for use in local and sub-regional estimation, while remaining consistent with regional and national inventory efforts.
- Be multi-purpose to facilitate use by:
  - Private landowners
  - USDA stakeholders, including public and private GHG registries and NGOs
  - USDA for assessing the effectiveness of conservation programs and initiatives
- Undergo full expert peer, agency and public reviews.
- Provide reliable, real and verifiable estimates of on-site GHG emissions and C stocks and fluxes.
- Be made available for use by other USG agencies.

# Products to be Developed Under this Project



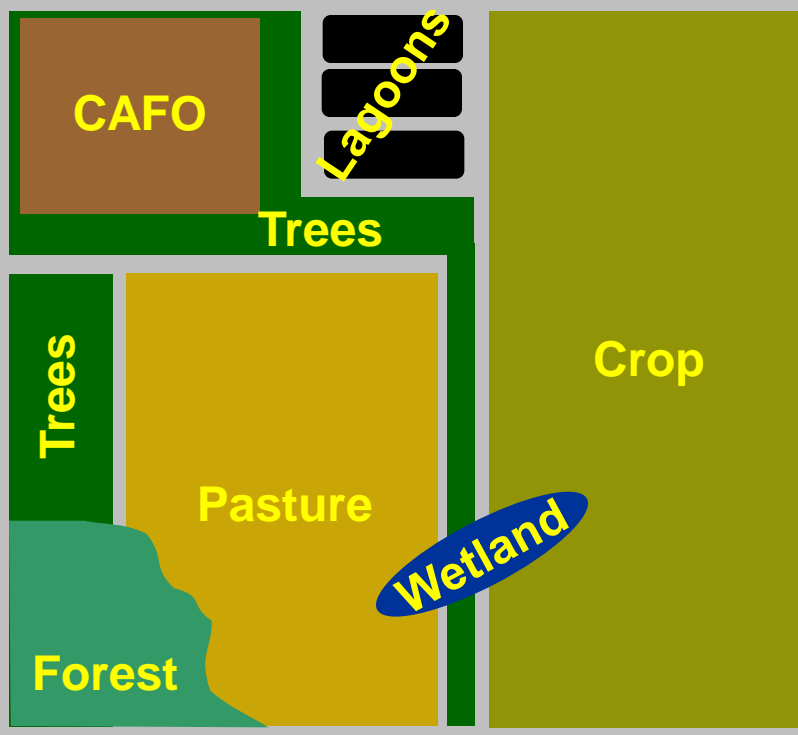
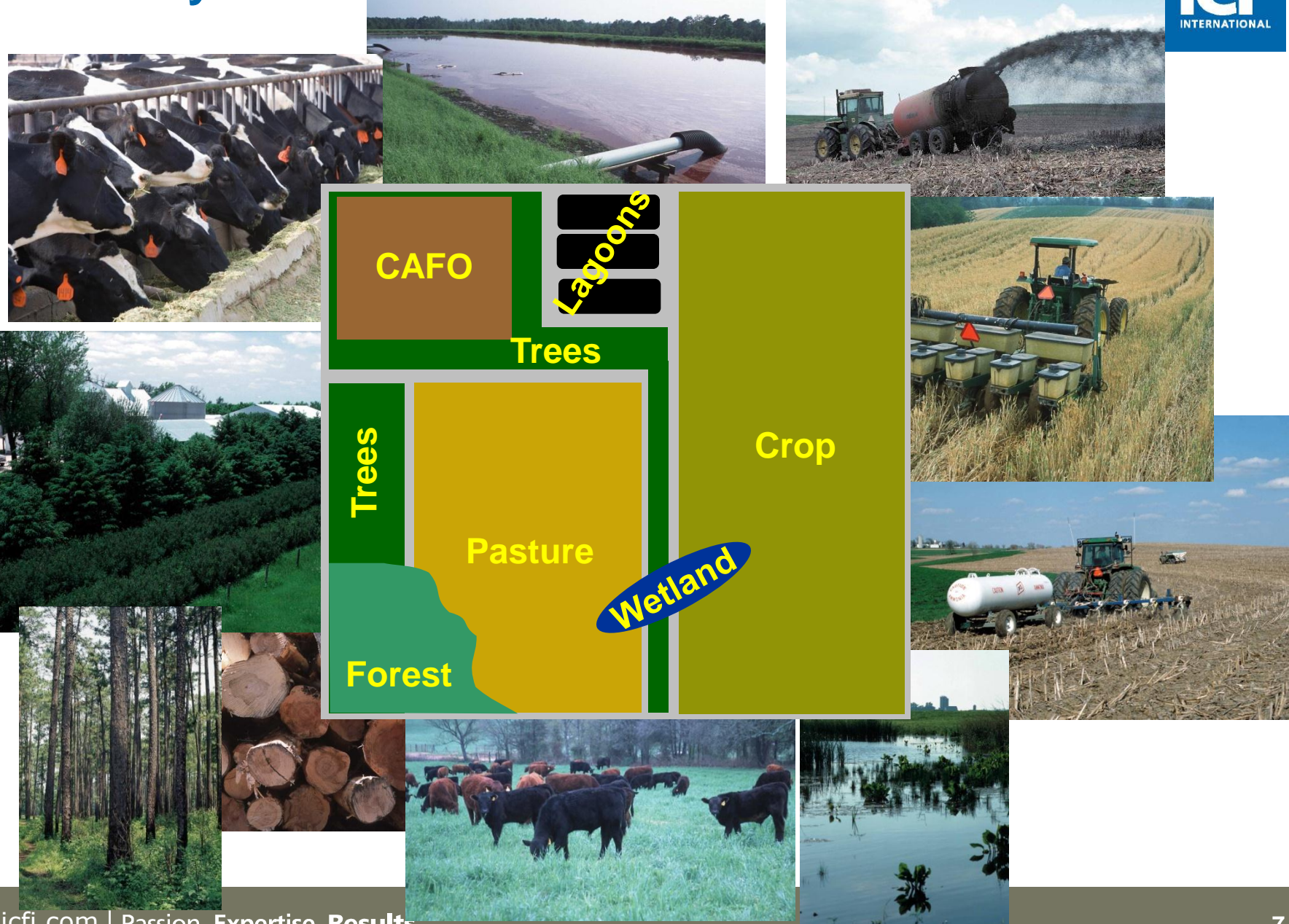
1. A comprehensive review of techniques currently in use for estimating carbon stocks and fluxes and GHG emissions from agricultural and forestry activities
2. A technical guidelines document outlining the preferred science-based approach to conducting a farm- or forest-scale GHG estimation
3. Specific methods for each source/sink category that are designed to be reliable and consistent with national inventory efforts
4. An on-line computer tool that is consistent with the specific methods and the technical guidelines

# Agriculture and Forest Management Activities



The guidelines will result in an integrated method for GHG estimation at the entity-scale for a comprehensive set of agricultural and forest management activities.

# The entity - combining a landowner's crop, livestock and forestry activities into one seamless GHG estimate.



# Croplands / Grazing Lands

## Management Practices and Technologies



### Conservation Tillage

- No- Till
- Reduced Field Pass Intensity
- Other Erosion Control Measures

### Crop Diversity Through Rotation and Cover Crops

### Efficient Nutrient Management

- Application Timing
- Fertilizer Type
- Application Method
- Application Rate
- Nitrogen Inhibitors
- Slow-Release Fertilizers

### Water Table Management

- Management of Hydric Soils
- Wetland Restoration

### Alternative Rice Cultivation Techniques

- Mid-Season Paddy Drainage
- Shallow Paddy Flooding
- Upland Cultivation
- Slow Release Fertilizers

### Rotational Grazing and Improved Forage Management

### Agroforestry (in coordination with Forestry Working Group)

### Improved Irrigation Water Management

### Biomass Burning

# Animal Agriculture

## Management Practices and Technologies



### Dietary Management

- Dietary Additives and Supplements
- Accelerated Animal Productivity
- Feed Mix/Feed Management
- Time of Feeding
- Edible Oils

### Reproductive Management

- Improved Fertility
- Genetic Selection / Breed Differences
- Gender Differences

### Manure Management

- Anaerobic Digesters
- Lagoons
- Composting
- Deep-Pit Manure Storage
- Covered Lagoons
- Land Application of Manure

# Forestry

## Management Practices and Technologies



### Stand Management

- Rotation Ages
- Thinning
- Fertilization
- Restoration
- Genetic Improvement and Species Selection
- Afforestation/Reforestation

### Agroforestry (with Croplands / Grazing Lands Working Group)

- Windbreaks
- Silvopasture with Rotational Grazing and Improved Forage
- Riparian Forest Buffers

### Reducing Risk of Emissions from Fire, Pests, and Disease

- Fire and Fuel Load Management
- Pest Management

### Wood Products Fate / Longevity

# Key Considerations

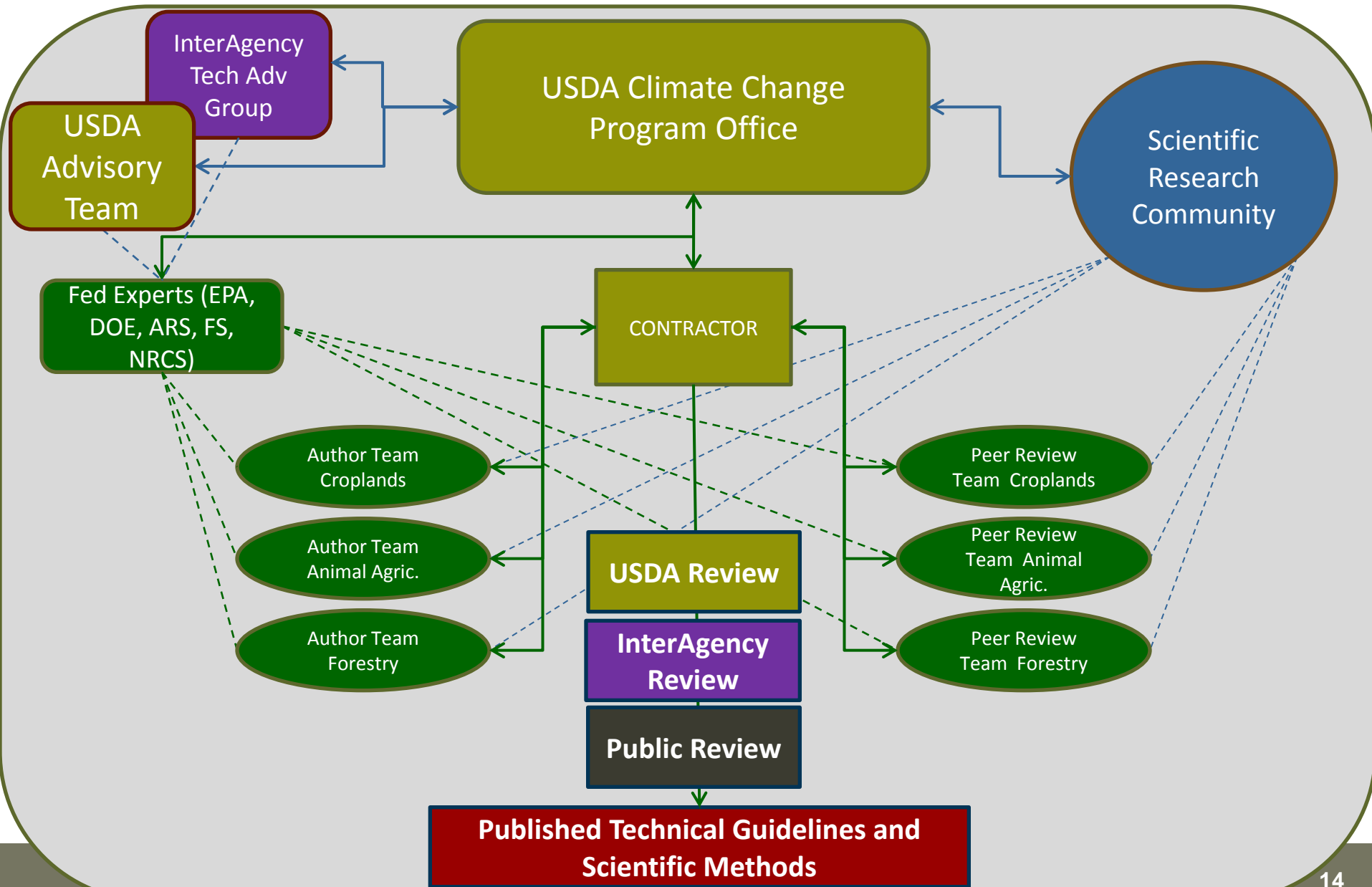
1. How to maximize accuracy while enhancing ease of use?
2. How to make the Guidelines most broadly useful to a diverse set of USDA Agencies and stakeholders?
3. How to quantify GHGs for the whole operation – are there “minor activities” or does the estimate need to capture ALL activities within the entity?
4. Should the Guidelines specify ONE method for any given activity, or allow users a menu of methods requiring differing levels of input detail?
5. How to balance scientific rigor while maintaining broad applicability, national consistency and user friendliness?
6. What models or tools currently exist for farm- or entity-scale GHG inventory and reporting and how might they be useful to this project?

1. **Transparency** – Assumptions and methodologies should be clearly explained to facilitate replication.
2. **Consistency** – The methods and estimates should be internally consistent with other years and, to the extent possible, with USDA and other inventory efforts.
3. **Comparability** – Requires that the estimates of emissions and sequestration reported by one entity be comparable to the estimates being reported by others.
4. **Completeness** – The methods must account for all sources and sinks, as well as all greenhouse gases to the greatest extent possible.
5. **Accuracy** – Estimates should be accurate in that they are systematically neither over nor under true emissions or removals as far as can be judged.
6. **Cost effectiveness** – The balance between the relative costs and benefits of additional efforts to reduce uncertainty.
7. **Ease of use** – The level of complexity of the user interface and underlying data requirements.

# Development Process

- Three year process
- Three Working Groups
  1. Forestry
  2. Croplands and Grazing Lands
  3. Animal Agriculture
- Preparing five drafts of the guidelines
- Preparing three drafts of the tool
- Federal Agency Review
- External Peer Review
- Public/Stakeholder Review

# USDA GHG Guidelines Development Process



# Where are we?



## Forest Systems

- Author team formed, lead author chosen
- In person workshop held, writing underway
- Gathering names for expert peer review

## Animal Agriculture Systems

- Author team formed, lead author chosen
- Forming writing assignments, in person workshop upcoming
- Gathering names for expert peer review

## Cropland and Grazing Land Systems

- Author team formed, lead author chosen
- Forming writing assignments, in person workshop upcoming
- Gathering names for expert peer review

## Much of the background has been assembled

- A “Review of the Reviews” has been completed
- A comprehensive indexing/assessment of existing tools, protocols and calculators has been compiled


## The FR Notice has been published

- Comment period is open until April 19th
- Seeking input on the key considerations and how to best balance competing criteria
- Desire the process to be open and transparent, the methodology to be complete and comprehensive, and the tools to have scientific rigor with ease of use

# Timeline and Key Dates

## Guidelines and Methods



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- A large green arrow pointing downwards, with the years 2011, 2012, and 2013 written vertically inside it. The arrow is positioned on the left side of the slide, spanning the height of the main content area.
- ✓ Selected Lead Authors
  - ✓ Formed Inter-Agency Tech Advisory Group (Jan 2011)
  - ✓ Published FR Notice for public input on technical considerations (Feb 2011)
  - ✓ Invited key experts to join author teams (Jan 2011)
  - ✓ Teams organized and 1<sup>st</sup> Draft underway (Feb 2011)
  
  - ❑ Select expert peer-reviewers (Aug 2011)
  - ❑ First draft completed (Sept 2011)
  - ❑ USDA and Inter-Agency Tech. Adv Group review of first draft (Oct 2011)
  - ❑ Second draft completed (Dec 2011)
  - ❑ Expert Peer Review of second draft (Dec 2011-March 2012)
  - ❑ Third draft completed (Blueprint for tool) (May 2012)
  - ❑ Full USDA and Inter-Agency review of third draft (July 2012)
  - ❑ Fourth draft released for developing version 2 of tool (Jan 2013)
  - ❑ Fourth draft released for public review (May 2013)
  - ❑ Review of and response to Public Comments on the Draft Guidelines (Aug 2013)
  - ❑ Final Guidelines formatted and prepared for printing (Sept 2013)

# Timeline and Key Dates

## Tools and Training Products



- ✓ Full assessment and review of current research, GHG estimation tools and models (in support of the working groups) (Feb 2011)
- ❑ Develop outline for training materials and reporting format (Nov 2011)
- ❑ USDA and Inter-Agency Tech. Adv. Group review of outline of training materials and reporting format ,(Nov 2011-Feb 2012 )
- ❑ Design plan for online estimation tool based on Version 3 of Guidelines (June 2012)
- ❑ First draft of the online estimation tool and training materials (Oct 2012)
- ❑ USDA and Inter-Agency Tech. Adv. Group Review of the first draft of online estimation tool and training (Nov 2012)
- ❑ Second draft of tool and training materials (May 2013)
- ❑ Second draft training, estimation and reporting tool released for public comment, USDA, and Inter-Agency Tech Advisory Group Review (May 2013)
- ❑ Review of and response to Public Comments on the Draft Guidelines (Aug 2013)
- ❑ Final training, estimation and reporting tools published on the USDA web site (Sept 2013)

2011

2012

2013

## Additional Information

### Federal Register Notice:

- Published Friday, Feb 18, 2011, Vol. 76, No. 34, pp. 9534-9537.
- Comment at: <http://www.regulations.gov>  
Search for document: USDA\_FRDOC\_0001-0685
- Comments are due by 04/19/2011

### Project Information at:

[www.usda.gov/oce/climate\\_change/techguide](http://www.usda.gov/oce/climate_change/techguide)

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