

# GRM: Change Estimation Task Team Update

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Madison, WI

# GRM Task Team Members

Team lead: Jeff Turner, SRS

Current team membership by region:

NRS

Paul Sowers

Mark Hatfield

Chuck Barnett

Pat Miles

RMRS

John Shaw

Mark Rubey

Andrea Wilson

Kyle Dodson

PNWRS

Olaf Keugler

Glenn Christensen

Kurt Campbell

Hugh Luce

Jason Brown

SRS

Jeff Turner

UNLV

Brian Cordova

# What's the Point?

FIA users want to summarize growth, removal, and mortality by all kinds of stuff:

- Ownership
  - Public, private
- Size class
  - Stand size
  - Tree diameter classes
- Temporal bases
  - Previous attributes
  - Current attributes
  - Changes within classes that change (accounting method)
- Across time periods and geographic areas that span multiple plot designs and protocols

# Why is there a GRM Task Team?

- FIA has been providing annual GRM rate estimates...
  - Only in the east
    - NOTE: RMRS has a regional GM method, but not R
  - Only in terms of volume, which is estimated for the
    - merchantable bole in cubic feet
    - sawlog in board feet (International 1/4" log rule)
- The western units now have remeasured plots
  - Need methods for mid-point estimates for removal and mortality trees
  - Required adding nuances for the macroplot in PNWRS
- Users need change estimates expressed in terms of biomass and carbon
  - Added microplot for change in biomass and carbon on saplings
  - Included changes for total above ground, tops/limbs, stumps and below ground

# Accomplishments

- GRM task team added PNWRS and RMRS to the production NIMS GRM compilation system in the summer 2015
  - Produced volume estimates just like in the east
  - Added new GRM data tables

# Accomplishments

Biomass and carbon change estimation:

- Added new data tables to both NIMS and FIADB:
  - TREE\_GRM\_COMPONENT
  - TREE\_GRM\_MIDPOINT
  - TREE\_GRM\_BEGIN
  - TREE\_GRM\_THRESHOLD

# Why not just add Biomass/Carbon GRM to TREE Table?

- These biomass estimates include microplot saplings
  - Below ground
  - Above ground
- Requires additional TPA GRM columns for microplot estimates
- There are six unique tree portion estimates for CRM biomass (and carbon)
  - Below ground
  - Above ground
  - Stump
  - Bole
  - Sawlog
  - Top and limbs
- Would require 30 new GRM biomass attributes for all live:
  - GROWDRYBIO\_BG\_AL, GROWDRYBIO\_AG\_AL, etc.
  - Plus another set for growing-stock and sawlog estimates
  - CRM carbon is simply one-half of the CRM biomass (no need to store those)

# Accomplishments

- GRM in EVALIDator (ver. 1.7.0.00), due spring 2017:
  - Uses new computational method
  - Adds biomass and carbon estimates
  - New volume estimates:
    - Sawlog in cubic feet
    - Sawlog top in cubic feet
    - Merchantable bole on sawtimber trees in cubic feet



# Demo Calculating Net Growth: Biomass

The screenshot displays the EVALIDator web application interface, which is used for calculating net growth biomass. The interface is divided into several sections:

- Header:** EVALIDator Version, Revision date: February 9, 2017, Step 1 of 4 (choosing the retrieval type).
- User Alerts:** A section for user alerts.
- Retrieval Type:** A section where the user selects the retrieval type (State(s) or Circle) and provides location information (Latitude, Longitude, Radius).
- Land Basis Selection:** A dropdown menu to select the land basis (All land, Forest land, Timberland).
- Numerator and Denominator Selection:** Two dropdown menus to select the numerator and denominator estimates from a list of options.
- Schema:** A text field indicating the schema is FS\_NIMS\_FIADB\_SRS.
- Navigation:** Continue and Back buttons.

**Please select the land basis from the dropdownlist.**

**Choose numerator estimate and/or denominator estimate**

**Please select the numerator estimation group from the dropdownlist**

**If you want to produce a ratio estimate then please select the denominator from the dropdownlist**

The schema is FS\_NIMS\_FIADB\_SRS.

The schema is FS\_NIMS\_FIADB\_SRS.

# Demo Calculating Net Growth: Biomass

Please choose an estimate from the dropdown list below

Average annual net growth of merchantable bole biomass of trees (at least 5 inches d.b.h./d.r.c.), in dry short tons, on forest land  
Average annual net growth of merchantable bole biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on forest land  
Average annual net growth of saw log biomass of sawtimber trees, in dry short tons, on forest land  
Average annual net growth of merchantable bole biomass above the saw log of sawtimber trees, in dry short tons, on forest land  
Average annual net growth of merchantable bole biomass of sawtimber trees, in dry short tons, on forest land  
**Average annual net growth of aboveground biomass of trees (at least 1 inches d.b.h./d.r.c.), in dry short tons, on forest land**  
Average annual net growth of aboveground biomass of trees (at least 5 inches d.b.h./d.r.c.), in dry short tons, on forest land  
Average annual net growth of aboveground biomass of growing-stock trees (at least 5 inches d.b.h.), in dry short tons, on forest land

Radio group to limit to accounting

Limit evaluations to only those that can do growth accounting  
 All applicable evaluations (growth accounting may not be available)

Forest land definition (FIA=National, [RPA=International \(opens in new window\)](#))

Use FIA definition of forest land  
 Use RPA definition of forest land

Show list of all inventories or just most recent inventory for each State

Limit retrieval to only most recent inventories  
 Show all available inventories

The schema is FS\_NIMS\_FIADB\_SRS.  
In step 1 you selected:  
**State** as the report type

Show list of all inventories or just most recent inventory for each State

Limit retrieval to only most recent inventories  
 Show all available inventories

The schema is FS\_NIMS\_FIADB\_SRS.  
In step 1 you selected:  
**State** as the report type

# Demo Calculating Net Growth: Biomass

**Step 3 of 4 (choosing the geographic area)**

Note: For analyzing trends choose multiple inventories for a state.

**ResearchStationCode/Evalid/State/YearsDataCollected**

(this list of evaluations was obtained from the POP\_EVAL\_ATTRIBUTE table based on the attribute(s) selected in step 1)

|         |               |  |  |
|---------|---------------|--|--|
| RSCD=33 | EVALID=11303  | ALABAMA                                  | 2006;2007;2008;2009;2010;2011;2012;2013      |
| RSCD=33 | EVALID=51303  | ARKANSAS                                 | 2007;2008;2009;2010;2011;2012;2013           |
| RSCD=33 | EVALID=121303 | FLORIDA                                  | 2009;2010;2011;2012;2013                     |
| RSCD=33 | EVALID=131303 | GEORGIA                                  | 2005;2006;2007;2009;2010;2011;2012;2013      |
| RSCD=33 | EVALID=211203 | KENTUCKY                                 | 2005;2006;2008;2009;2010;2011;2012           |
| RSCD=33 | EVALID=221303 | LOUISIANA                                | 2009;2010;2011;2012;2013                     |
| RSCD=33 | EVALID=281303 | MISSISSIPPI                              | 2009;2010;2011;2012;2013                     |
| RSCD=33 | EVALID=371303 | NORTH CAROLINA                           | 2003;2005;2006;2007;2009;2010;2011;2012;2013 |
| RSCD=33 | EVALID=401323 | OKLAHOMA                                 | 2010;2011;2012;2013                          |
| RSCD=33 | EVALID=720903 | PUERTO RICO (MAINLAND, VIEQUES, CULEBRA) | 2006;2007;2008;2009                          |

There are 15 geographic/temporal areas for which this attribute can be calculated. Please click on the geographic/temporal area of interest.

Note: To add or subtract to the list of selected items hold down the control key while clicking on individual items in the dropdown list.

The schema is FS\_NIMS\_FIADB\_SRS.

In step 1 you selected:  
**State** as the report type.

In step 2 you selected:  
**Average annual net growth of aboveground biomass of trees (at least 1 inches d.b.h./d.r.c.), in dry short tons, on forest land as the attribute of interest.**

**FIADef** as the forest land definition.

# Demo Calculating Net Growth: Biomass

http://zlphefido00...

File Edit View Favorites Tools Help

Previous  
Current  
Previous if available else current  
Current if available else previous

### Row variable

For ratio estimates, if you select 'Countycode and name' as the row variable, you may produce a choropleth map (shaded by county) by clicking on the 'Map of counties' command button."

Stand treatment 1  
Stand treatment 2  
Stand-size class  
Stand-size(field call)  
State code  
Tree class  
Tree grade  
Tree size class  
Tree status  
**Unit code**

### Row temporal basis

Accounting  
Previous  
**Current**  
Previous if available else current  
Current if available else previous

### Column variable

Damage location 2  
Damage severity 1  
Damage severity 2  
Damage type 1  
Damage type 2  
Dead tree decay  
**Diameter class : 2 inch class to 29**  
Diameter class : 2 inch class to 41  
Distance to road  
Disturbance 1

### Column temporal basis

**Accounting**  
Previous  
Current  
Previous if available else current  
Current if available else previous

There are 66 classification variables.

Show results or add filters

Show results  
 ADD/CLEAR Filters

The schema is FS\_NIMS\_FIADB\_SRS.

In step 1 you selected:  
State as the report type.

In step 2 you selected:  
Average annual net growth of aboveground biomass of trees (at least as the attribute of interest.

FIADef as the forest land definition.

In step 3 you selected:  
RSCD=33 EVALID=11303 ALABAMA 2006;2007;2008;2009;2010 as the geographic/temporal area(s) of interest.

FS\_NIMS\_FIADB\_SRS

# Demo Calculating Net Growth: Biomass

http://zlphefido00... EVALIDator Version 1.7.0.00

**EVALIDator Version 1.7.0.00 - View**

Numerator type Average annual net growth of aboveground biomass of trees (at least 1 inch s.d.b.h./d.r.c.), in dry short tons, on forest land  
 Statedc/EVALID(s): RSCD=33 EVALID=11303\_ALABAMA 2006;2007;2008;2009;2010;2011;2012;2013  
 Page variable=None (based on values from the Accounting inventory).  
 Row variable=Unit code (based on values from the Current inventory).  
 Column variable=Diameter class: 2 inch class to 29 (based on values from the Accounting inventory).  
 Filtering clause(s):  
 Uses FIA definition of forest land

**Estimate:**

| Unit code                     | Total      | 1.0-2.9   | 3.0-4.9   | 5.0-6.9   | 7.0-8.9   |
|-------------------------------|------------|-----------|-----------|-----------|-----------|
| <b>Total</b>                  | 40,593,306 | 1,330,079 | 1,304,362 | 5,034,143 | 5,512,110 |
| 0101 Alabama: Southwest-South | 4,209,793  | 97,873    | 158,470   | 366,163   | 667,047   |
| 0102 Alabama: Southwest-North | 6,475,080  | 290,512   | 428,390   | 904,218   | 1,036,655 |
| 0103 Alabama: Southeast       | 12,072,154 | 504,160   | 379,105   | 1,280,461 | 1,668,596 |
| 0104 Alabama: West Central    | 6,548,737  | 211,732   | 252,042   | 863,988   | 926,219   |
| 0105 Alabama: North Central   | 7,972,086  | 187,428   | 100,528   | 1,146,448 | 874,261   |
| 0106 Alabama: North           | 3,315,456  | 38,375    | -14,172   | 472,866   | 339,332   |

**Sampling error percent:**

| Unit code                     | Total | 1.0-2.9 | 3.0-4.9 | 5.0-6.9 | 7.0-8.9 |
|-------------------------------|-------|---------|---------|---------|---------|
| <b>Total</b>                  | 1.68  | 6.29    | 15.15   | 5.77    | 5.86    |
| 0101 Alabama: Southwest-South | 4.88  | 25.89   | 40.18   | 25.45   | 16.32   |
| 0102 Alabama: Southwest-North | 4.78  | 12.35   | 19.92   | 13.54   | 12.89   |
| 0103 Alabama: Southeast       | 3.14  | 9.17    | 28.19   | 11.65   | 11.01   |
| 0104 Alabama: West Central    | 4.05  | 15.04   | 31.16   | 13.74   | 14.19   |
| 0105 Alabama: North Central   | 3.51  | 20.38   | 85.08   | 11.68   | 15.47   |
| 0106 Alabama: North           | 5.65  | 56.20   | 374.97  | 16.97   | 21.48   |

http://zlphefido00... EVALIDator Version 1.7.0.00

**EVALIDator Version 1.7.0.00 - View report**

Numerator type Average annual net growth of aboveground biomass of trees (at least 1 inch s.d.b.h./d.r.c.), in dry short tons, on forest land  
 Statedc/EVALID(s): RSCD=33 EVALID=11303\_ALABAMA 2006;2007;2008;2009;2010;2011;2012;2013  
 Page variable=None (based on values from the Accounting inventory).  
 Row variable=Unit code (based on values from the Current inventory).  
 Column variable=Diameter class: 2 inch class to 29 (based on values from the Accounting inventory).  
 Filtering clause(s):  
 Uses FIA definition of forest land

**Estimate:**

| Unit code                     | Total      | Diameter class: 2 inch class to 29 |           |           |           |           |           |           |           |
|-------------------------------|------------|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                               |            | 1.0-2.9                            | 3.0-4.9   | 5.0-6.9   | 7.0-8.9   | 9.0-10.9  | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 |
| <b>Total</b>                  | 40,593,306 | 1,330,079                          | 1,304,362 | 5,034,143 | 5,512,110 | 6,453,291 | 5,297,125 | 4,332,296 | 3,315,456 |
| 0101 Alabama: Southwest-South | 4,209,793  | 97,873                             | 158,470   | 366,163   | 667,047   | 817,074   | 446,848   | 464,123   | 460,613   |
| 0102 Alabama: Southwest-North | 6,475,080  | 290,512                            | 428,390   | 904,218   | 1,036,655 | 690,867   | 851,567   | 522,750   | 956,099   |
| 0103 Alabama: Southeast       | 12,072,154 | 504,160                            | 379,105   | 1,280,461 | 1,668,596 | 2,158,533 | 1,763,813 | 1,413,987 | 1,187,944 |
| 0104 Alabama: West Central    | 6,548,737  | 211,732                            | 252,042   | 863,988   | 926,219   | 1,249,673 | 906,526   | 514,724   | 460,613   |
| 0105 Alabama: North Central   | 7,972,086  | 187,428                            | 100,528   | 1,146,448 | 874,261   | 1,211,167 | 1,187,944 | 956,099   | 460,613   |
| 0106 Alabama: North           | 3,315,456  | 38,375                             | -14,172   | 472,866   | 339,332   | 325,977   | 140,427   | 460,613   | 460,613   |

**Sampling error percent:**

| Unit code                     | Total | Diameter class: 2 inch class to 29 |         |         |         |          |           |           |           |           |
|-------------------------------|-------|------------------------------------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|
|                               |       | 1.0-2.9                            | 3.0-4.9 | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.5 |
| <b>Total</b>                  | 1.68  | 6.29                               | 15.15   | 5.77    | 5.86    | 5.11     | 5.83      | 7.34      | 8.78      | 13.26     |
| 0101 Alabama: Southwest-South | 4.88  | 25.89                              | 40.18   | 25.45   | 16.32   | 13.52    | 19.77     | 21.56     | 21.56     | 34.71     |
| 0102 Alabama: Southwest-North | 4.78  | 12.35                              | 19.92   | 13.54   | 12.89   | 18.14    | 13.58     | 26.40     | 16.27     | 96.41     |
| 0103 Alabama: Southeast       | 3.14  | 9.17                               | 28.19   | 11.65   | 11.01   | 8.72     | 10.09     | 11.50     | 22.34     | 19.66     |
| 0104 Alabama: West Central    | 4.05  | 15.04                              | 31.16   | 13.74   | 14.19   | 10.54    | 13.91     | 23.82     | 18.15     | 80.19     |
| 0105 Alabama: North Central   | 3.51  | 20.38                              | 85.08   | 11.68   | 15.47   | 11.80    | 11.55     | 14.66     | 23.75     | 21.86     |
| 0106 Alabama: North           | 5.65  | 56.20                              | 374.97  | 16.97   | 21.48   | 27.11    | 62.47     | 22.74     | 32.92     | 37.17     |

# Current tasks

- Completing RMRS change methodology
  - Fall 2017
- Scribner board foot volume rule
  - Fall 2017

# So what's next for the GRM Team?

- Standing dead change estimates
- All land change estimation
  - Currently we have forest land and timberland
  - Need urban change estimation
- Link with PPD/Sample Organization
  - Allow for additional flexibility in processing/analysis
  - Remove as much hard coding as we can while remaining sane