(Appendix 5.7.5)

Long history - USA NFI program

Mr. John Coulston
USDA Forest Service

United States NFI Program:
A Long History of Inventory and Monitoring

John Coulston
US Forest Service

Outline

- Overview of the US Forest Service Forest Inventory and Analysis program
  - Basic sampling scheme
  - Variables collected
  - Use of remotely sensed data
  - Forest survey design tools
- Use of Forest Inventory and Analysis data for planning and policy
  - US Greenhouse Gas Inventory
  - Forecasting

Mission

"make and keep current a comprehensive inventory and analysis of the present and prospective conditions and requirements of the renewable resources of the forest and rangelands of the United States"

- 1928 McSweeney/McNary Act
- 1978 Research Act

The US Forest Inventory and Analysis program (FIA) is charged with this mission.

The FIA Vision

- **Provide an integrated inventory and monitoring program capable of providing scientifically reliable indicators of sustainable forestry**
  - including measures of the extent, condition, and trends in forest and rangeland ecosystem status and health in a timely and consistent manner across all ownerships

Statistical Survey:
A Method To Fulfill The Mission

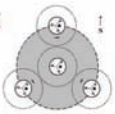
- The sampling grid is based on a global sampling scheme and a common plot design.
- A core set of measurements are made consistently across all plots.
- The National Land Cover Database (derived from Landsat TM, ETM imagery) is used to post-stratify observations.
- Standard design-based estimators (post-stratification) are used to report means and totals for attributes of interest.
- Each estimate has an accompanying standard error.
- Estimates are combined to meet a wide-range of reporting efforts across spatial scales

Global Sampling Grid

Truncated Icosohedron

North American Hexagon

248,832 area density intensification
(1 plot / 2430 ha)



Large footprint plot layout

U.S. Forest Inventory Status – across 10 time zones

Field Data Collected

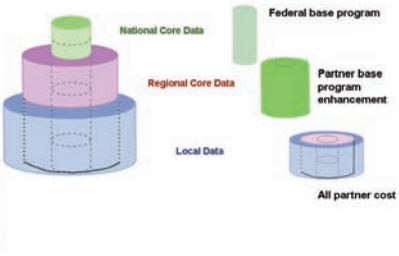
- Plot/subplot identification and location
- Observed condition (within subplots)
  - *land cover, ownership, forest type, stand age, size class, productivity class*
  - *origin, slope, aspect, physiographic class, disturbance*
- Observed tree attributes
  - *location*
  - *species, status, lean, diameter, height, crown ratio, crown class, damage, decay*
- Observed forest health variables on 1/16 subset of plots
  - *Crown condition, soils, down woody material, understory vegetation, lichen communities*
- Additional survey components
  - *Timber Products Output survey, National Woodland Owners survey, Ozone Biomonitoring*

FIA Has a History of Delivery Since 1928

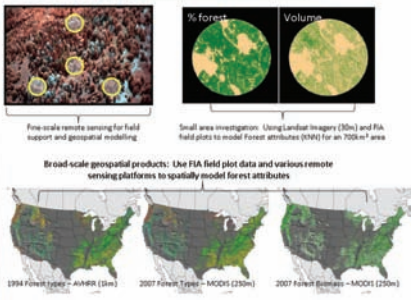
260+	STATE INVENTORIES
9	NATIONAL ASSESSMENT OF FORESTS 1953, 1963, 1970, 1977, 1987, 1992, 1997, 2002, 2007
3	NATIONAL WOODLAND OWNER STUDIES 1978, 1994, 2006
100's	PRIMARY MILL AND UTILIZATION STUDIES
3	SATELLITE FOREST COVER MAPS 1993, 1997, 2007

FIA reports from local to global

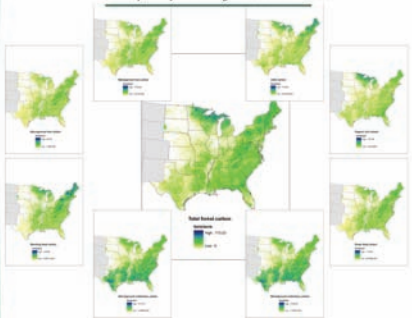
FIA is Adaptable to Address Regional And Local Issues



FIA Integration With Remote Sensing



Next Generation Integrated Field Plot - Remote Sensing Products: Spatially Modelling Forest Carbon Pools



Forest Survey Design Tools For Finer Scale Inventories

- In some situations forests within the United States require more precise information than is provided by the base FIA program.
- A survey design tool has been developed to aid in designing forest surveys but is adaptable to any spatial extent.
- Goals of the tool
  - Provide forest staffs with a method for identifying monitoring needs, and to specify sampling design to balance cost and precision in order to address monitoring questions.
  - Evaluate existing plot-based resource data to determine whether they are sufficient to answer the questions.
  - Identify unmet information needs and sample sizes to meet precision requirements and estimate acquisition costs.

Outline

- ✓ Overview of the US Forest Service Forest Inventory and Analysis program
  - ✓ Basic sampling scheme
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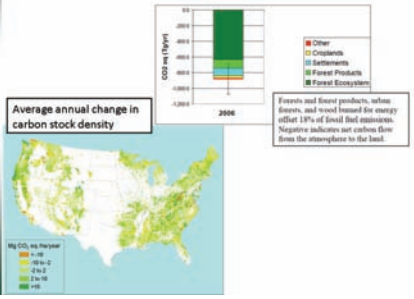
- Use of Forest Inventory and Analysis data for planning and policy
  - US Greenhouse Gas Inventory
  - Forecasting

FIA's Data and Products In Support of the US Greenhouse Gas Inventory

- Greenhouse Gas Inventory:
  - Identifying and quantifying sources and sinks of greenhouse gases is key to understanding climate change.
  - This inventory adheres to both
    - a comprehensive and detailed set of methodologies for estimating sources and sinks of anthropogenic greenhouse gases
    - a common and consistent mechanism that enables Parties to the United Nations Framework Convention on Climate Change (UNFCCC) to compare the relative contribution of different emission sources and greenhouse gases to climate change.
  - The US EPA leads the overall greenhouse gas inventory however FIA data serves as one of the primary data sources for estimates of sequestration and flux from the forest sector.
- Forests in the conterminous US are sequestering about 700 Tg CO_2 Eq. (Teragrams, or million metric tons) in 2006, with uncertainty of ± 23% at the 95% confidence interval.

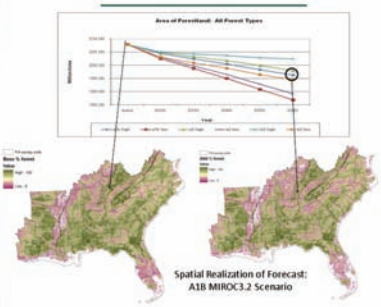
FIA's Data and Products In Support of the US Greenhouse Gas Inventory



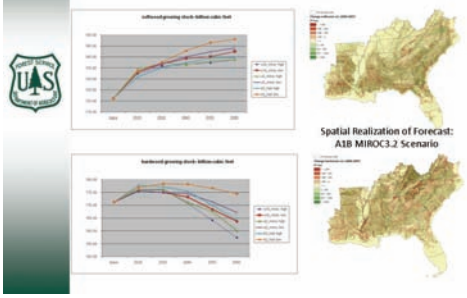
FIA's Data and Products as a Tool For Planning and Policy

- Inventory projection:
  - As the Nation's continuous forest census, our program projects how forests are likely to appear 10 to 50 years from now.
  - This enables us to evaluate whether current forest management practices are sustainable in the long run and to assess whether current policies will allow the next generation to enjoy America's forests as we do today.
  - Projections of forest resources, under different scenarios, provide vital information to government and industry for strategic planning.
- Examples from the Southern Forest Futures Project. The IPCC scenarios provide the cornerstones for these projections.

FIA's Data and Products as a Tool For Planning and Policy: Forecasted Forestland Area Under Various IPCC Scenarios



FIA's Data and Products as a Tool For Planning and Policy



Additional Information and Contributors

- USDA Forest Service Forest Inventory and Analysis: http://fia.fs.fed.us/
- National Inventory and Monitoring Applications Center: http://www.nrs.fs.fed.us/nimac/
- Southern Forest Futures project: http://www.srs.fs.usda.gov/futures/
- Forest Service Carbon work: http://www.nrs.fs.fed.us/carbon/
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