AREA CHANGE REPORTING USING THE DESKTOP FIADB

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Abstract.—The estimation of area change between two FIA inventories is complicated by the "mapping" of subplots. Subplots can be subdivided or mapped into forest and nonforest conditions, and forest conditions can be further mapped based on distinct changes in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density. The boundaries of these mapped conditions may change from one inventory to the next, resulting in complex geometries when the two sets of boundaries are combined. The SUBP_COND_CHNG_MTRX (CMX) table was added in version 4.0 of the FIADB to "facilitate the tracking of area change" between annual inventories. The AreaChangeReports form (located within downloadable FIADB Microsoft Access databases) uses the CMX table to link remeasurement plots from two successive annual inventories to produce estimates of area change. An example is provided to illustrate shifts in land use over a 5-year remeasurement period. FIADB databases for each of the 48 contiguous states and southeast Alaska, along with built-in reporting tools including the AreaChangeReports form, are available for downloading from the FIADB DataMart (http://apps.fs.fed.us/fiadb-downloads/datamart.html) as Microsoft Access 2007™ databases.

INTRODUCTION

FIADB data have been available on the Web since FIADB version 1.0 was developed in 2001. Initially FIADB data were available for downloading as comma-delimited files. In 2007 a small subset of FIADB tables, and a few SQL scripts for generating population estimates, were available in Microsoft Access database format for downloading from the Web (Miles 2008). By 2009, however, all of the FIADB tables, along with a fully developed reporting tool for generating population estimates and their associated sampling errors, were available for downloading as MS-Access databases (Miles 2009).

Under the annual inventory system, subplots can be subdivided or "mapped" into forest and nonforest conditions, and forest conditions can be further mapped based on distinct changes in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density. These subplots, when remeasured several years later, are mapped again based on the same six criteria if there is an obvious change. The mapping information from these two inventories is combined in the CMX table to form a subplot condition change matrix. The SUBP_COND_ CHNG_MTRX (CMX) table was added to the FIADB (version 4.0) in 2010. The CMX table facilitates the generation of area change reports. A detailed explanation of this process is provided in The Forest Inventory and Analysis Database: database description and users manual version 4.0 for Phase 2 (pp. 230-240 in Woudenberg et al. 2010).

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METHODS

Area change estimates can be computed only for those states with remeasured data collected under the annual inventory design. Therefore, area change estimates are

currently not available for Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming. Microsoft Access databases containing FIADB data and reporting tools can be downloaded from the FIA DataMart (http://apps.fs.fed.us/fiadb-downloads/datamart.html).

The AreaChangeBetweenInventories reporting tool is an MS-Access form. Double-clicking on the form name will initiate the program and the form in Figure 1 will appear. The user is required to (1) pick an

evaluation or reporting year, (2) pick a classification variable, (3) pick a set of plots to be used in generating the estimate, and (4) specify an additional filter if desired. In the following example, a database containing FIADB data for Minnesota is used.

Pick an Evaluation

In Minnesota, annual inventory plots were first remeasured in 2004 and every year thereafter through 2011 so there are eight different "evaluations" or reporting years to choose from. For the evaluation "Minnesota 2011: 2002-2006 to 2007-2011"
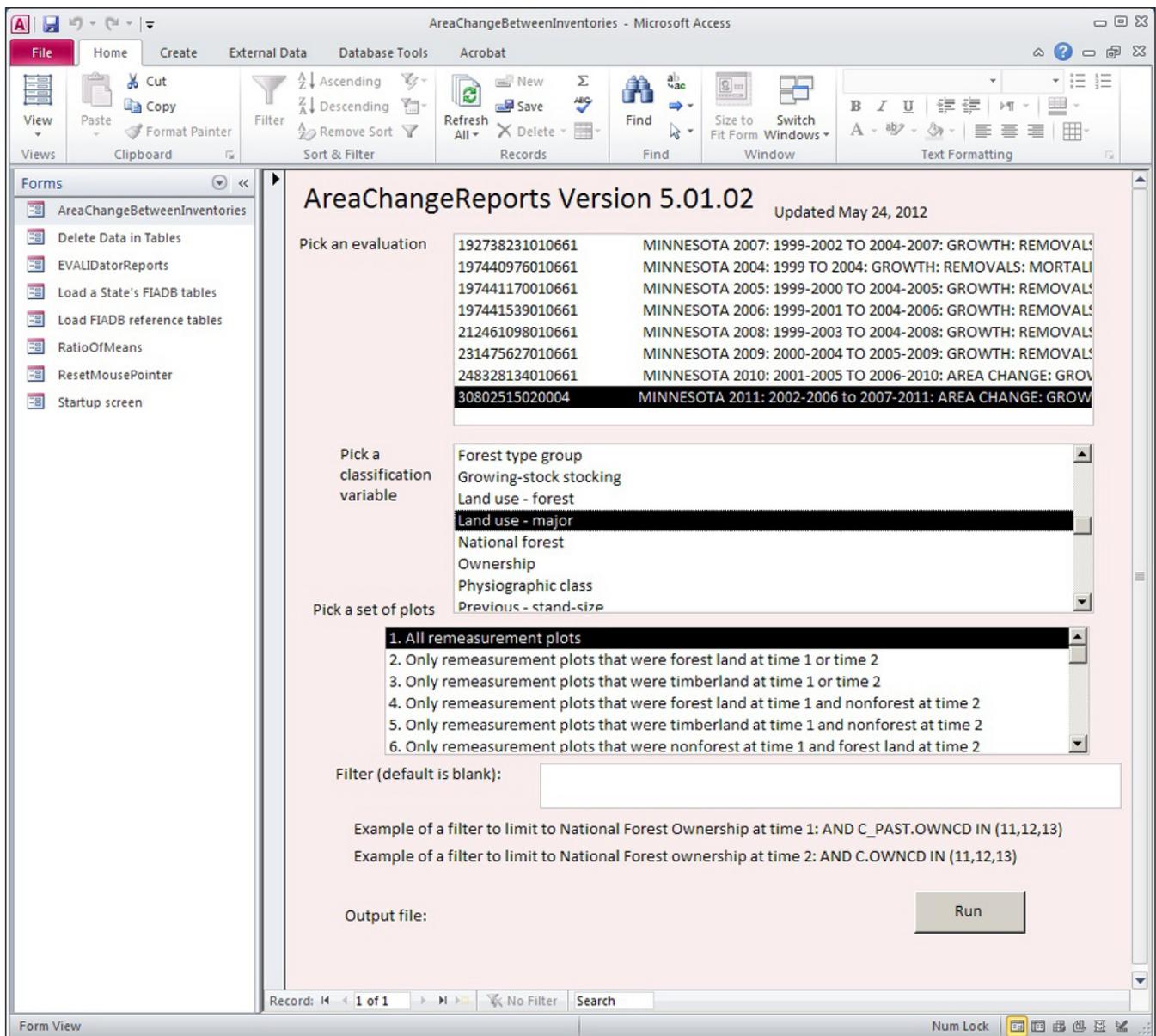

Figure 1.—AreaChangeBetweenInventories reporting form.

(highlighted in Figure 1), plots measured in 2002-2006 were remeasured in 2007-2011.

Pick a Classification Variable

Classification variable names are stored in the MS-Access table REF_PRC. Only classification variables based on a condition characteristic can be used in the AreaChangeBetweenInventories reporting tool. A list of these classification variable names is provided in Table 1. In Figure 1 the classification variable "Land use-major" is highlighted.

The FIA inventory is designed to track changes in forest land. Most of these classification variables above are not observed on conditions that are nonforest at both measurements. It is not possible to use the FIA data to estimate things such as ownership class changes on nonforest lands.

Pick the Area of Interest

The set of plots used in generating the estimate is either the entire set of remeasured plots or a subset of those plots (Table 2). "All remeasured plots" is highlighted in Figure 1 because, in this example, we are interested in how land use changed on the entire land area of Minnesota. If we were interested in how forest land made the transition between forest-type

groups over the remeasurement period, we would have selected "Only remeasurement plots that were forest land at time 1 or time 2."

Specify an Additional Filter

More specific estimates may be required in some instances. For example, if a user wanted to determine what happened on timberland that was in the jack pine forest type at the time of the previous inventory, the user would enter "AND C_PAST.FORTYPCD IN (101)" in the filter textbox. In this example no additional filter was specified.

RESULTS

A simple retrieval was run (Fig. 1) using the AreaChangeReports form. The evaluation chosen used plots measured in 2002-2006 and remeasured in 2007-2011. The classification variable selected was "Land use–major" and the report was based on all land and water. The output from this retrieval is presented in Tables 3 and 4. Table 3 contains a cross-tabulation of the number of acres by past and present major land use. Table 4 provides information on the number of plots used in providing this estimate. The retrieval also outputs the SQL script used by the AreaChangeReports form to generate the report.

Table 1.–Classification variables available in AreaChangeBetweenInventories reporting tool

All live stocking	Forest type	Ownership	Stand origin
Artificial regen species	Forest-type group	Physiographic class	Stand treatment code 1
Basal area live tree	Growing-stock stocking	Previous-stand-size	Stand treatment code 2
Disturbance code 1	Land use-forest	Site index	Stand treatment code 3
Disturbance code 2	Land use-major	Site productivity	Stand-age
Disturbance code 3	National forest	Slope	Stand-size
Forest Service Region			

Table 2.–Area of interest options in the AreaChangeBetweenInventories reporting tool

1. All land and water
2. Only land that was forest land at time 1 or time 2
3. Only land that was timberland at time 1 or time 2
4. Only land that was forest land at time 1 and nonforest at time 2
5. Only land that was timberland at time 1 and nonforest at time 2
6. Only land that was nonforest at time 1 and forest land at time 2
7. Only land that was nonforest at time 1 and timberland at time 2

Table 3.—Acres by past and present major land use, MN, 2002-2006 to 2007-2011

Past Land Use - Major	Present Land Use - Major				
	Total	Forest	Nonforest	Noncensus Water	Census Water
Total	54,008,529	17,292,981	33,415,843	214,121	3,085,584
Forest	16,335,759	16,096,331	224,383	9,685	5,360
Nonforest	34,289,917	1,125,577	32,945,644	86,916	131,780
Noncensus water	373,750	40,478	135,668	86,484	111,119
Census water	3,009,103	30,595	110,148	31,035	2,837,325

Table 4.—Number of plots by past and present major land use, MN, 2002-2006 to 2007-2011

Past Land Use - Major	Present Land Use - Major				
	Total	Forest	Nonforest	Noncensus Water	Census Water
Total	17,454	5,274	11,106	64	1,010
Forest	4,976	4,902	69	3	2
Nonforest	11,380	353	10,959	26	42
Noncensus water	113	10	43	26	35
Census water	984	9	35	9	931

The estimated area of forest land in 2011, based solely on remeasurement plots, is 17,292,981 acres, which is close to the estimate using all plots (17,370,394 acres) and within the 0.54 percent sampling error for this estimate. Of this total, 16.1 million acres, or 93.1 percent, was also forest land in 2006. Approximately 1.1 million acres, or 6.5 percent, was nonforest 5 years earlier, and 0.4 percent was in census or noncensus water. Only 0.2 million acres went from being classified as forest land in 2006 to being classified as nonforest or water in 2011. More than 98 percent of the land that was forested in 2006 remained forested in 2011. The result is a net increase in forest land over the 5-year period, from 16.3 million acres in 2006 to 17.3 million acres in 2011.

The content of this paper reflects the views of the author(s), who are responsible for the facts and accuracy of the information presented herein.

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