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Northern Forest Futures Reporting Tools and Database Guide

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Abstract

The Northern Forest Futures database (NFFDB) supports the reporting of both current and projected future forest conditions for the 20 states that make up the U.S. North, an area bounded by Maine, Maryland, Missouri, and Minnesota. The NFFDB database and attendant reporting tools are available to the public as a Microsoft Access™ database. The NFF_CurrentReports tool generates customized reports for a variety of forest statistics for the 2008 inventory year. The NFF_ProjectionReports program supports the reporting of projected forest statistics by decade through the year 2060 for any of 14 scenarios that reflect varying climatic and socioeconomic possibilities. A description is provided detailing how the NFFDB was constructed using projections from the Forest Dynamics Model (FDM) combined with data from the U.S. Forest Service's Forest Inventory and Analysis database (FIADB).

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INTRODUCTION

The Northern Forest Futures Assessment (NFFA) provides estimates of possible future scenarios given a variety of demographic, economic, and climatic assumptions, combined with statistically rigorous current[1] forest statistics. These assumptions and current statistics were all run through the Forest Dynamics Model (FDM), a peer-reviewed modeling system (Wear 2011, Wear et al. 2013). Results from the NFFA can be used to anticipate possible future forest conditions and thereby assist policy makers in shaping forest policy, and aid forest managers in practicing proactive forest management to meet future demands. The Northern Forest Futures database (NFFDB) was developed to support the NFFA by providing statistical summaries through the year 2060 for 14 projection scenarios that reflect a range of climatic and socioeconomic possibilities for the 20 states that make up the U.S. North, an area bounded by Maine, Maryland, Missouri and Minnesota.

This guide provides several examples of how to use the NFFDB and its tools to obtain estimates of current and future forest statistics. The appendices also provide detail on the technical aspects of delivering estimates of current and projected forest conditions. The models used in the FDM and the assumptions used in developing the futures scenarios are beyond the scope of this report, but are explained in Shifley and Moser 2015.

Estimates of current forest conditions can be generated from the NFFDB using the MS-Access™ form NFF_CurrentReports. Estimates of future forest conditions can be generated using two MS-Access™ forms:

1. NFF_ProjectionReports– for reporting future estimates for scenarios without the emerald ash borer (EAB).
2. NFF_ProjectionReportsEAB– for reporting future estimates for the EAB scenario.

The underlying NFFDB data and MS-Access™ forms are provided on the DVD included with "Future Forests of the Northern United States" by Shifley and Moser (2015) to allow users to generate their own reports and extend the analysis of projection data. Data and forms are also available at http://dx.doi.org/10.2737/RDS-2015-0009.

[1] Throughout this report "current" refers to data from the 2008 FIA inventory which is reported as 2010 in the projection tool.

Tutorials

The three reporting tools in the NFFDB are forms in an MS-Access™ database (Fig. 1). The NFF_CurrentReports form can generate current (2008) estimates for the 20 Northern States. The NFF_ProjectionReports can generate estimates of future forest conditions for 13 scenarios. The NFF_ProjectionReportsEAB can generate estimates of future forest conditions under EAB scenario A2-C-EAB. A complete list of NFF scenarios is provided in Appendix 1. Example retrievals are provided for the NFF_CurrentReports form and the NFF_ProjectionReports form.

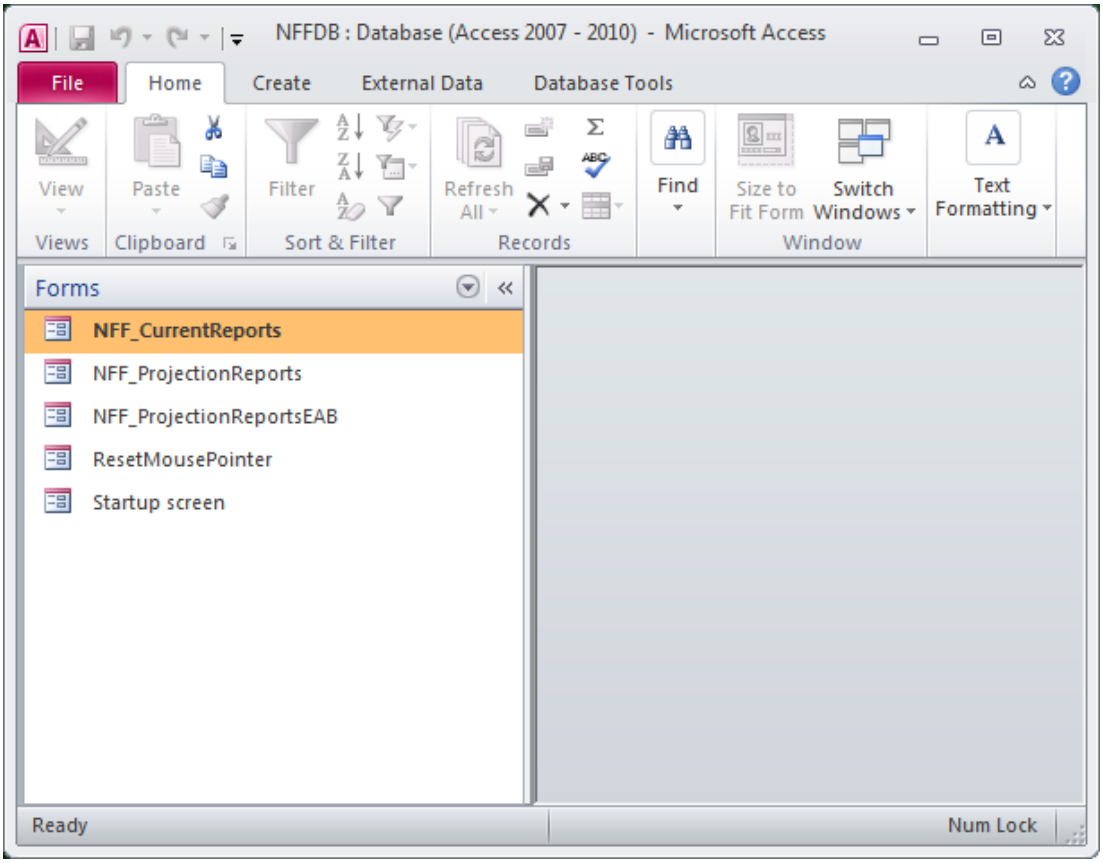

Figure 1.—The three reporting forms available in the NFFDB are NFF_CurrentReports (highlighted), NFF_ProjectionReports, and NFF_ProjectionReportsEAB.

Example 1. Current forest estimates using the NFF_CurrentReports form

This example creates an estimate of current volume of live trees on forest land for Minnesota using the NFF_CurrentReports form. To begin, double-click on "NFF_CurrentReports" as depicted in Figure 1. This leads to the "Northern Forest Futures Current Conditions vers 1.0" screen (Fig. 2).

Select "014 Volume of all live on forestland (cuft)" as the estimate then select "Step 1".

Then select "23 270801 Minnesota 2004.2005.2006.2007.2008" as the EVAL ID, "Forest type 7 groups" for the rows, and "Stand-size" for the columns (Fig. 3). Page is set to "None" because we only want to report by column and row in this example. The data used to compute the 2008

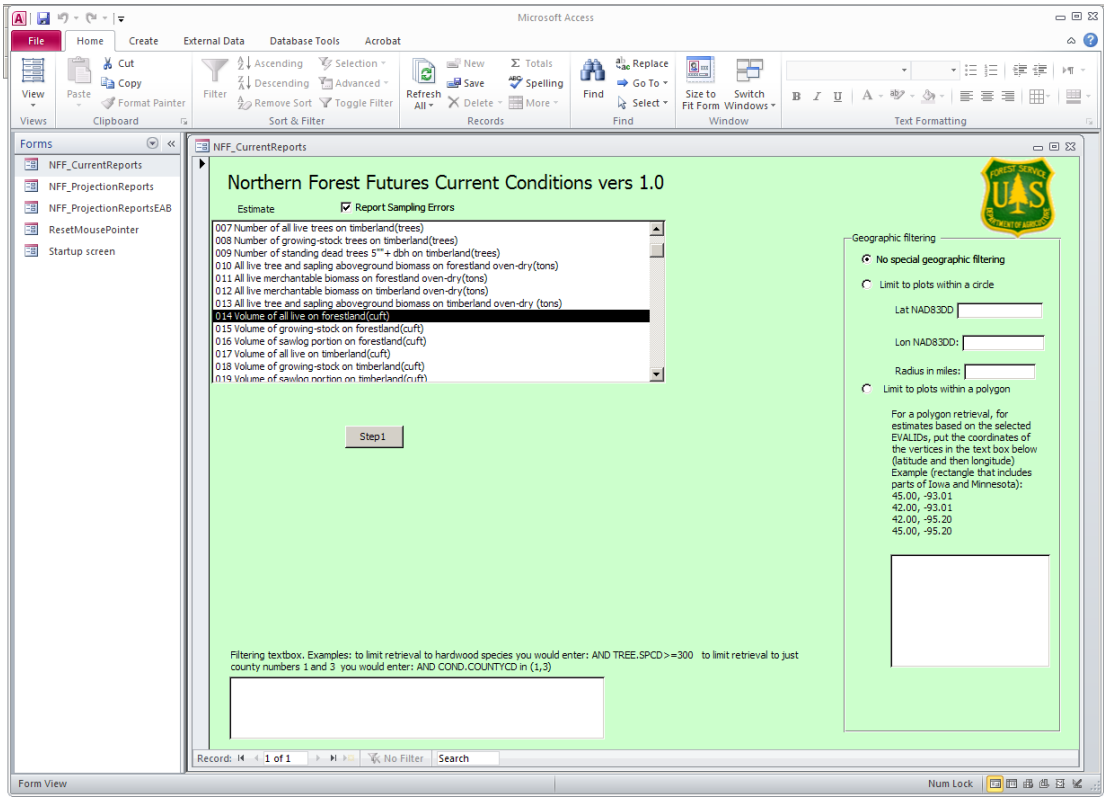

Figure 2.—Initial page of NFF_CurrentReports form.

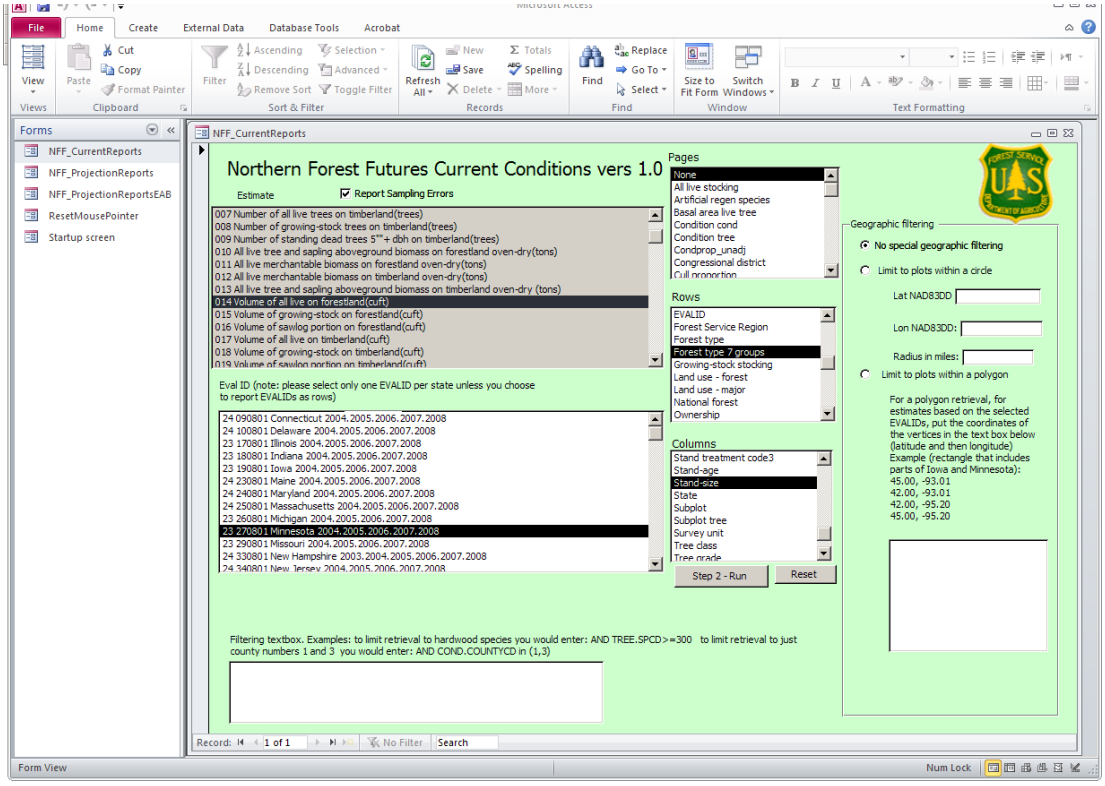

Figure 3.—Choosing an estimate and classification variables.

inventory estimate were collected in 2004, 2005, 2006, 2007 and 2008. This is a rolling average where 20 percent of the plots are collected each year. Then select "Step2 – Run". After several seconds, a "Save Output…" window (Fig. 4) will pop up; specify the output file name and location.

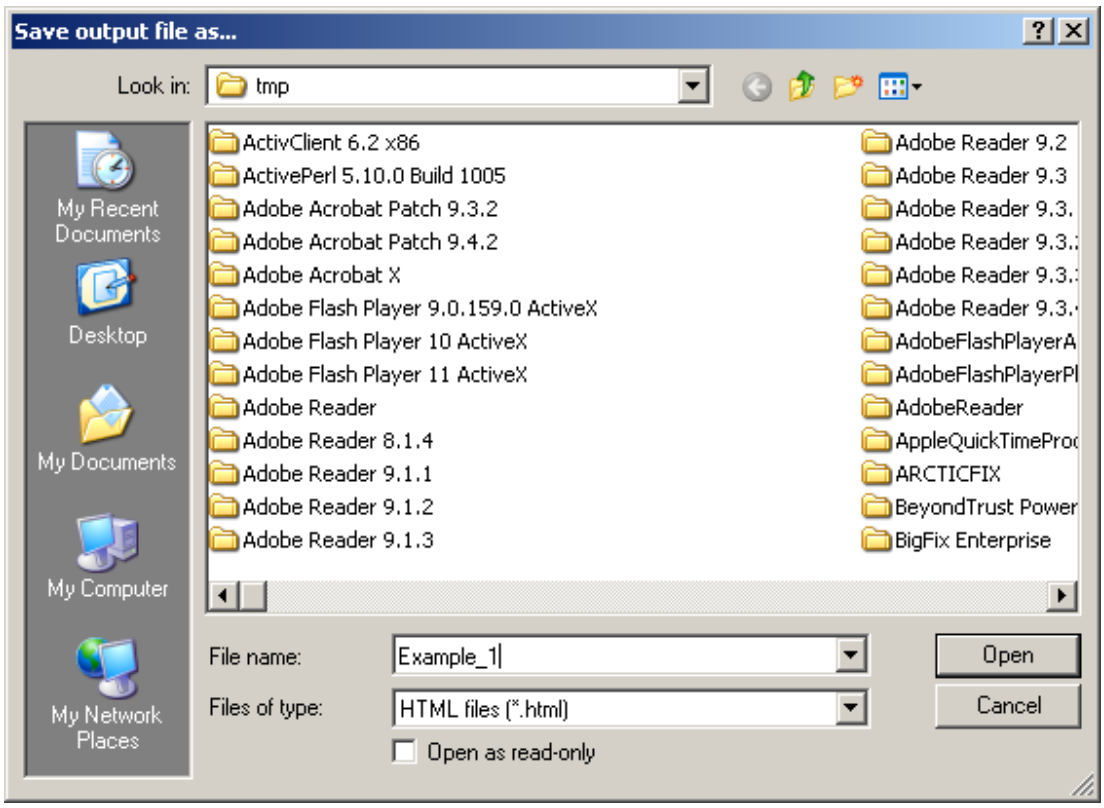

Figure 4.—Saving the output file.

Once an output file has been specified, an html page will open. It will contain both estimates and sampling-error percentages for 1 standard deviation. This output is depicted in Table 1.

Table 1.—Estimates and associated sampling error percentages for example 1

Estimate type 014 Volume of all live on forestland(cuft)
Statecd/EVALID: 23 270801 Minnesota 2004.2005.2006.2007.2008.
Page variable=None
Row variable=Forest type 7 groups
Column variable=Stand-size

9/10/2012 12:51

Estimate:

		Stand size			
Forest type 7 groups	Total	Large diameter	Medium diameter	Small diameter	Nonstocked
Total	18,099,288,091	9,514,885,990	7,308,159,670	1,260,495,993	15,746,439
White/red/jack pine group	1,754,968,032	1,275,770,422	458,475,554	20,722,057	-
Spruce/fir group	2,816,726,553	854,705,528	1,501,337,374	460,683,651	-
Oak/hickory group	3,215,688,717	2,459,239,655	712,172,876	44,276,185	-
Elm/ash/cottonwood group	1,836,236,061	890,610,308	841,744,271	103,881,481	-
Maple/beech/birch group	1,898,718,203	1,327,700,972	539,716,708	31,300,523	-
Aspen/birch group	6,033,022,309	2,349,843,946	3,138,613,026	544,565,337	-
Other	543,928,217	357,015,160	116,099,860	55,066,759	15,746,439

Sampling error percent:

		Stand size			
Forest type 7 groups	Total	Large diameter	Medium diameter	Small diameter	Nonstocked
Total	1.22	2.33	2.06	3.05	18.24
White/red/jack pine group	6.78	8.69	10.02	22.21	-
Spruce/fir group	3.58	8.1	5.08	5.56	-
Oak/hickory group	3.58	4.43	6.93	15.54	-
Elm/ash/cottonwood group	5.32	9.01	6.73	11.36	-
Maple/beech/birch group	5.4	6.93	9.02	20.63	-
Aspen/birch group	2.47	4.97	3.44	4.63	-
Other	10.06	13.84	19.13	16.53	18.24

Minnesota had an estimated 18.1 billion cubic feet of live tree volume on forest land in 2008 based on the output results listed in Table 1. In addition to providing estimates, the NFF_CurrentReports tool also provides associated sampling errors. Sampling errors are provided in the lower half of Table 1. The sampling error for the total live tree volume is 1.22 percent. Therefore we would expect that if we conducted the inventory again using the same methods, that there would be a two-thirds chance that the estimate would be within the range of 18,099,288,091 cubic feet plus or minus 1.22 percent, or between 17.9 and 18.3 billion cubic feet.

Example 2. Projected future forest estimates using the NFF_CurrentReports form

There are four types of projection retrievals: 1) single scenario, single year; 2) single scenario, all years; 3) multiple scenario, single year; and 4) multiple scenario, all years (Fig. 5). If a single scenario is selected for a single reporting year, the user has the option of picking different classification variables for pages, rows, and columns. If a single scenario is selected but "0000 (All years)" is selected for the reporting year, then the user has the option of picking different classification variables for pages and rows but the columns will be years. If two or more scenarios are selected for a single reporting year, then the user has the option of picking different classification variables for pages and columns but the rows will be "scenarios." Finally, if the user selects two or more scenarios but "0000 (All years)" is selected for reporting year, then the user has the option of picking a different classification variable for pages but rows will be "scenarios" and columns will be "reporting years." Examples of the four types of retrievals are presented in Figure 5.

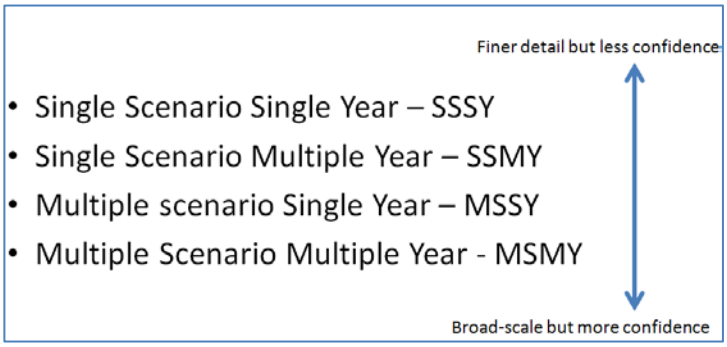

Figure 5.—Four types of retrievals and the trade off between detail and level of confidence.

In this example, we will select a single scenario for a single year (Fig. 6). After double-clicking on "NFF_ProjectionReports, we select "A1B-C" for the scenario, "2060" as the reporting year, and "002 Area of forestland (acres)" as the estimate type.

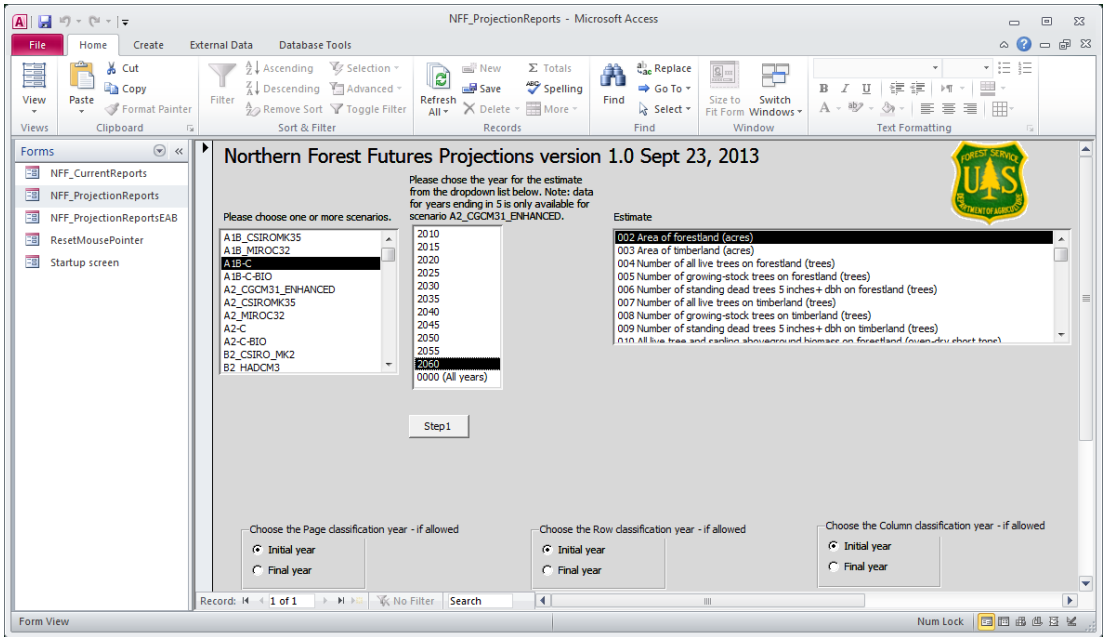

Figure 6.—Initial page of "NFF_ProjectionReports" form.

We also select “None” for pages, “Forest type 7 groups” for rows (note that the radio button below the row selection is set to “Initial year” to indicate that rows are to be based on the classification variable for the year 2010), and “Forest type 7 groups” for columns (note that the radio button for the column selection is set to “Final year” to indicate that columns are to be based on the classification variable for the year 2060) (Fig. 7). This report will show us how forest types are projected to change from 2010 to 2060 for the A1B-C scenario for Minnesota. Name and save the output file (Fig. 8).

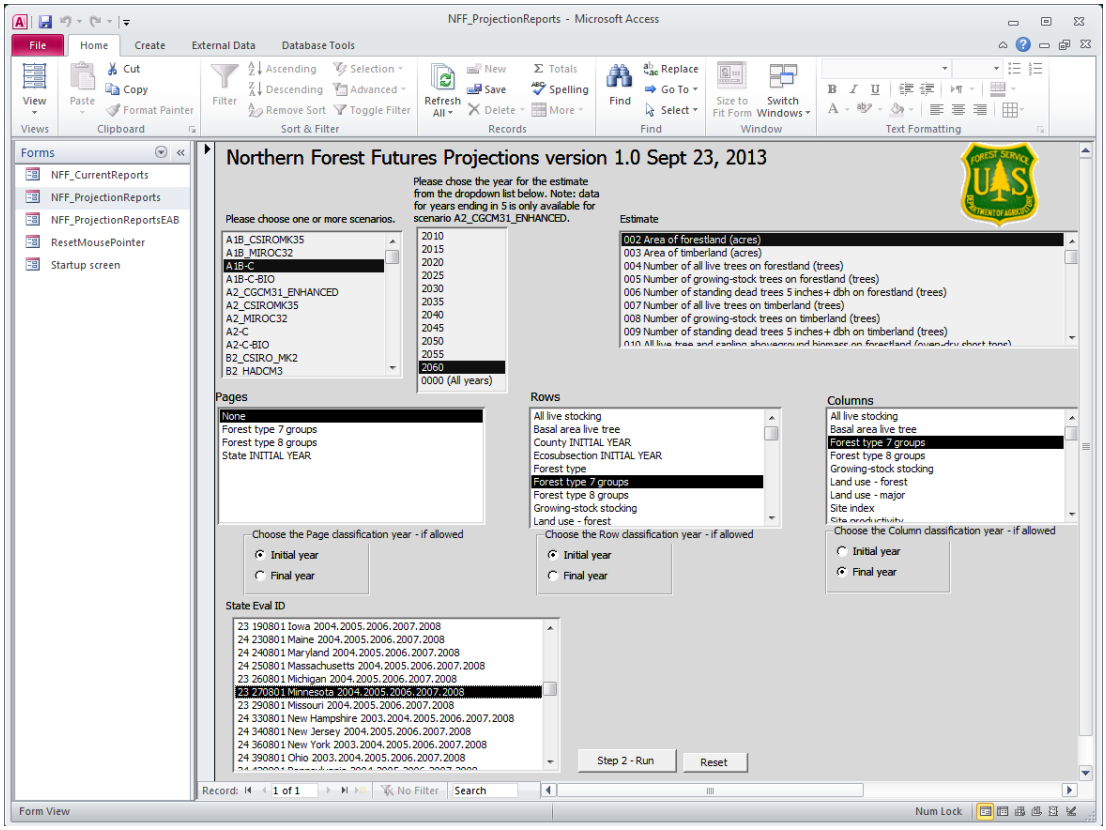

Figure 7.—Selections for a single scenario, single year report.

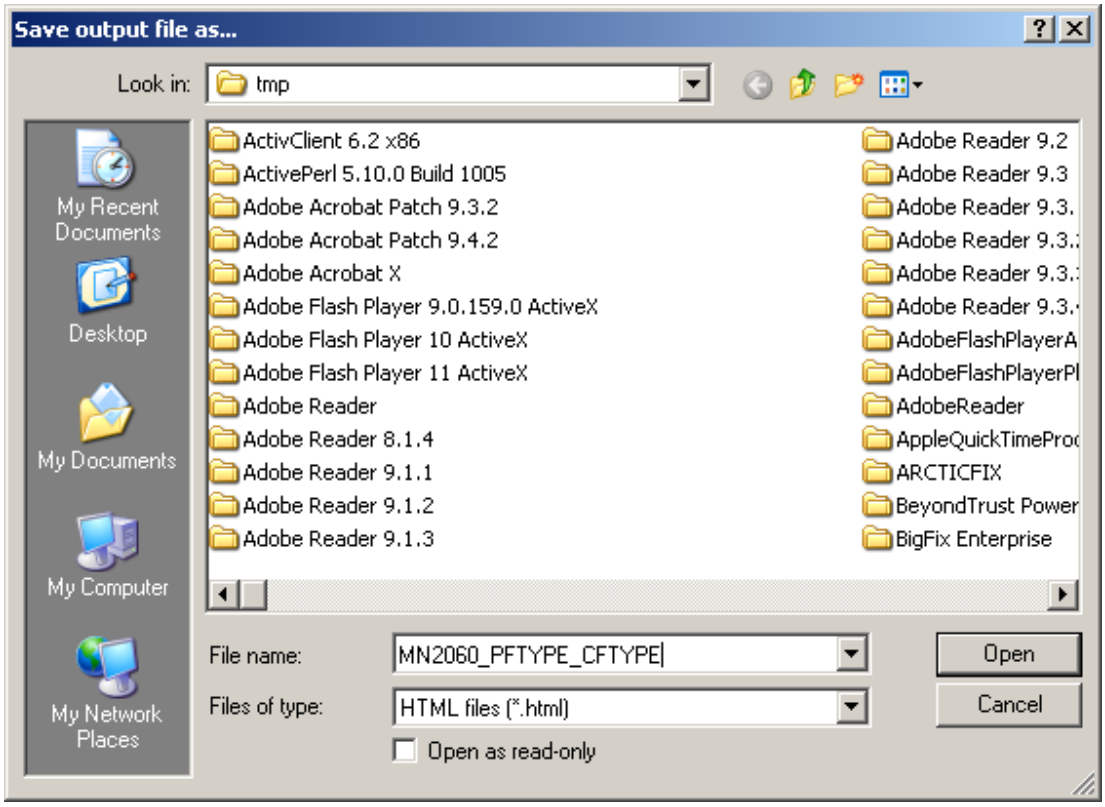

Figure 8.—Saving the output file.

Once an output file has been specified, an html page will open. It will contain both estimates and sampling error expressed as a percent for one standard deviation (Table 2).

Table 2.—Projection estimates and associated number of plots used to generate the estimate for example 2. Estimates printed in red are based on fewer than 50 plots.

Estimate type Area of forestland (acres)

Selected scenarios:A1B-C

Initial year=2010 and Final year=2060

Statecd/EVALID: 23 270801 Minnesota 2004.2005.2006.2007.2008.

Page variable=0001

Row variable=fortypcd7Label(INICND.fortypcd)

Column variable=fortypcd7Label(FINCND.fortypcd)

Page variable name=None

Row variable name=Forest type 7 groups Initial year

Column variable name=Forest type 7 groups Final year

9/10/2012 14:52

Estimate:

Forest type 7 groups	Total	White/red/jack pine group	Spruce/fir group	Oak/hickory group	Elm/ash/ cottonwood group	Maple/beech/ birch group	Aspen/birch group	Other
Total	16,388,716	931,215	3,333,743	1,605,469	2,672,952	1,104,519	6,099,270	641,547
White/red/jack pine group	977,345	313,334	72,073	73,060	84,017	45,407	336,072	53,382
Spruce/fir group	3,801,045	173,376	1,868,995	201,239	372,171	151,253	1,005,614	28,397
Oak/hickory group	1,922,697	79,926	153,709	344,963	508,820	211,568	582,463	41,249
Elm/ash/cottonwood group	1,463,385	39,416	167,541	166,632	467,337	60,703	517,195	44,561
Maple/beech/birch group	1,122,355	20,737	152,276	185,388	221,222	158,904	354,635	29,194
Aspen/birch group	6,350,638	232,947	890,841	604,555	961,878	447,765	3,080,319	132,333
Other	751,251	71,479	28,310	29,632	57,507	28,919	222,974	312,430

Plot count:

Forest type 7 groups	Total	White/red/jack pine group	Spruce/fir group	Oak/hickory group	Elm/ash/ cottonwood group	Maple/beech/ birch group	Aspen/birch group	Other
Total	7,235	415	1,416	742	1,203	491	2,636	332
White/red/jack pine group	452	141	36	35	38	25	153	24
Spruce/fir group	1,541	71	746	85	159	68	399	13
Oak/hickory group	906	37	69	162	237	95	287	19
Elm/ash/cottonwood group	728	24	85	87	224	32	252	24
Maple/beech/birch group	474	13	65	78	93	66	146	13
Aspen/birch group	2,773	103	402	280	429	195	1,304	60
Other	361	26	13	15	23	10	95	179

The area in the white/red/jack pine group is projected to decrease from 977,345 acres in the initial year (the initial year is always 2010) to 931,215 acres in the final year (which in this case is 2060). According to the model, only 313,334 acres of white/red/jack pine group will be white/red/jack pine in both 2010 and 2060. In fact, the model suggests that 336,072 acres of the 977,345 acres of timberland that was white/red/jack pine in 2010 will be in the aspen/birch group in 2060.

When an estimate is based on information from less than 50 plots, the estimate is printed in red. For example, 72,073 acres of forest land that was in the white/red/jack pine group in 2010 is projected to convert to the spruce/fir group by 2060 under this scenario. Since this estimate is based on only 36 plots, the estimate is printed in red.

The following four examples illustrate user input and resulting output for different report types (SSSY, SSMY, MSSY, and MSMY; see Fig. 5).

Single Scenario Single Year (SSSY) Report

In a SSSY report, multiple options are available for pages, rows, and columns (Fig. 9). This report type is best suited for broad-scale retrievals (multiple states). If used for a single state retrieval, the data will be stretched thinly. In Table 3, for example, only 26 plots (actually the number of conditions) were used to generate the estimate of 50,716 acres of small diameter white/red/jack pine group in Minnesota, 2060. This retrieval type is best used to look at a very specific resource over a broad area at a single point in time.
Note: When fewer than 50 conditions are used to generate an estimate, both the estimate and number of conditions will be printed in red.

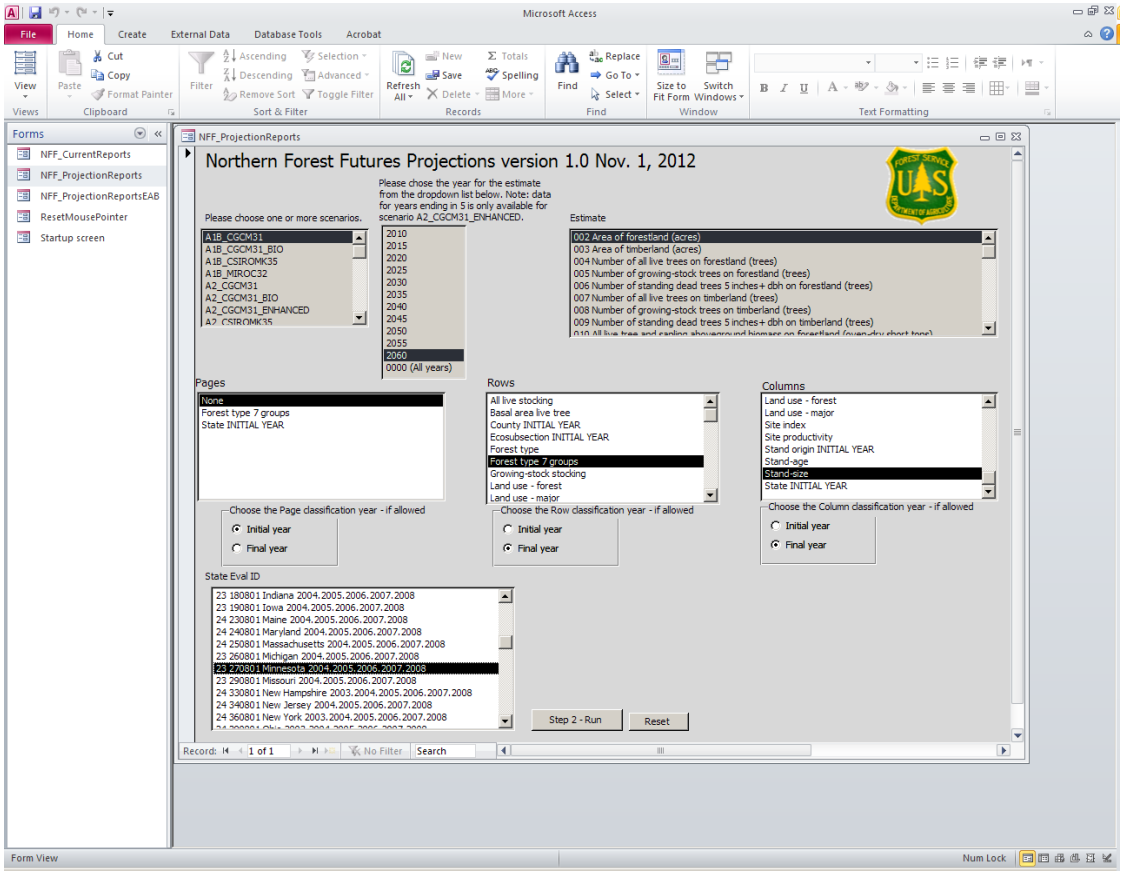

Figure 9.—Single scenario, single year (SSSY) retrieval.

Table 3.—Scenario A1B-C estimate of forest land area by forest-type group and stand size, Minnesota, 2060. Estimates printed in red are based on fewer than 50 plots.

Estimate type Area of forestland (acres)

Selected scenarios:A1B-C

Initial year=2010 and Final year=2060

Statecd/EVALID: 23 270801 Minnesota 2004.2005.2006.2007.2008.

Page variable=0001

Row variable=fortypcd7Label(FINCND.fortypcd)

Column variable=stdszcdLabel(FINCND.stdszcd)

Page variable name=None

Row variable name=Forest type 7 groups Final year

Column variable name=Stand-size Final year

Estimate:

Forest type 7 groups	Total	Stand size			Nonstocked
		Large diameter	Medium diameter	Small diameter	
Total	16,388,716	5,081,600	6,549,115	4,492,870	265,130
White/red/jack pine group	931,215	561,281	319,219	50,716	-
Spruce/fir group	3,333,743	525,022	1,219,547	1,589,175	-
Oak/hickory group	1,605,469	875,519	497,999	231,951	-
Elm/ash/cottonwood group	2,672,952	724,905	1,262,525	685,521	-
Maple/beech/birch group	1,104,519	484,704	451,283	168,532	-
Aspen/birch group	6,099,270	1,790,610	2,672,150	1,636,511	-
Other	641,547	119,560	126,391	130,466	265,130

Plot count:

Forest type 7 groups	Total	Stand-size			Nonstocked
		Large diameter	Medium diameter	Small diameter	
Total	7,247	2,299	2,820	1,973	155
White/red/jack pine group	417	267	124	26	-
Spruce/fir group	1,423	225	523	675	-
Oak/hickory group	740	412	227	101	-
Elm/ash/cottonwood group	1,202	353	542	307	-
Maple/beech/birch group	490	217	195	78	-
Aspen/birch group	2,643	771	1,147	725	-
Other	332	54	62	61	155

Single Scenario Multiple Year (SSMY) Report

In a SSMY report, multiple options are available for pages and rows but columns will be years (Fig. 10). This report type is useful for envisioning how a forest characteristic might change over time under a single scenario (Table 4).

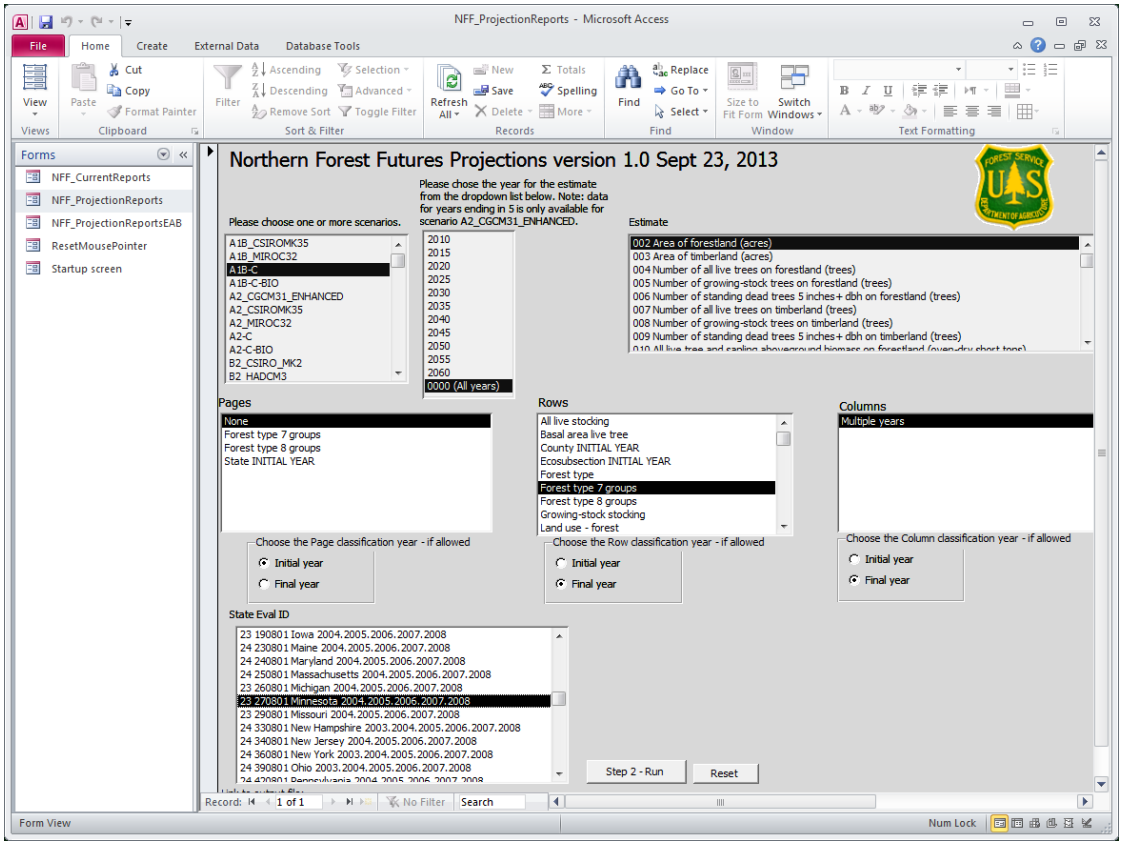

Figure 10.—Single scenario, multiple year (SSMY) retrieval.

Table 4.—Scenario A1B-C estimate of forest land area by forest-type group and year, Minnesota, 2010, 2020, 2030, 2040, 2050, 2060

Estimate type Area of forestland (acres)

Selected scenarios:A1B-C

Statecd/EVALID: 23 270801 Minnesota 2004.2005.2006.2007.2008.

Page variable=0001

Row variable=fortypcd7Label(FINCND.fortypcd)

Column variable=0011 2060

Page variable name=None

Row variable name=Forest type 7 groups Final year

Column variable name=Multiple years

Estimate:

	Multiple years					
Forest type 7 groups	2010	2020	2030	2040	2050	2060
Total	16,990,267	16,871,735	16,760,287	16,644,373	16,517,961	16,388,716
White/red/jack pine group	1,002,343	1,011,360	924,668	920,813	916,426	931,215
Spruce/fir group	3,856,079	3,789,918	3,665,391	3,652,774	3,638,520	3,333,743
Oak/hickory group	2,097,546	1,882,385	1,756,124	1,735,127	1,712,877	1,605,469
Elm/ash/cottonwood group	1,557,697	2,035,388	2,250,079	2,228,367	2,205,097	2,672,952
Maple/beech/birch group	1,179,025	1,200,166	1,252,847	1,242,307	1,230,478	1,104,519
Aspen/birch group	6,505,283	6,253,298	6,119,048	6,080,309	6,037,585	6,099,270
Other	792,293	699,220	792,129	784,676	776,979	641,547

Plot count:

	Multiple years					
Forest type 7 groups	2010	2020	2030	2040	2050	2060
Total	6,943	7,006	7,034	7,034	7,034	7,066
White/red/jack pine group	432	423	393	393	393	411
Spruce/fir group	1,459	1,464	1,447	1,447	1,447	1,395
Oak/hickory group	894	824	790	790	790	732
Elm/ash/cottonwood group	713	907	1,006	1,006	1,006	1,187
Maple/beech/birch group	466	490	509	509	509	488
Aspen/birch group	2,622	2,556	2,512	2,512	2,512	2,524
Other	357	342	377	377	377	329

Multiple Scenario Single Year (MSSY) Report

In a MSSY report, multiple options are available for pages and columns but rows will be scenarios (Fig. 11). This report type is useful for envisioning the impact of various scenarios on a single forest characteristic at a single point in time (Table 5).

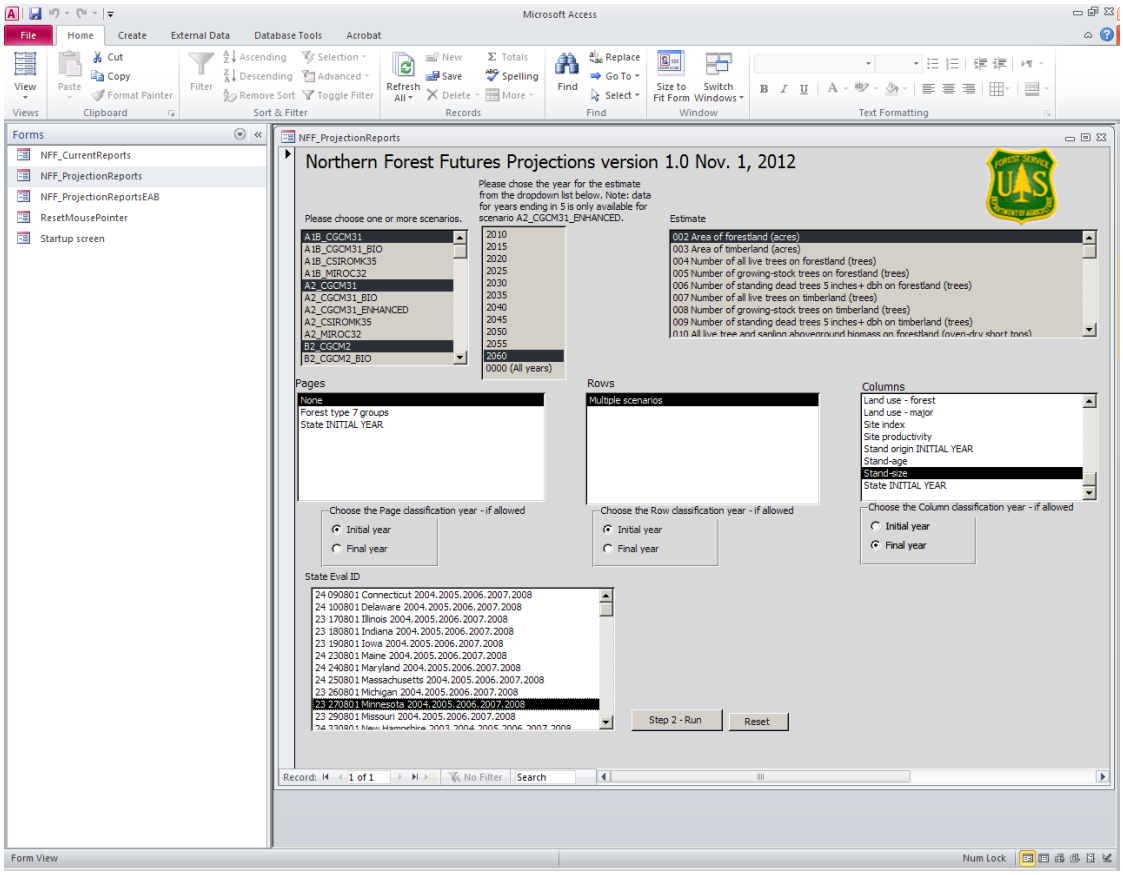

Figure 11.—Multiple scenarios, single year (MSSY) retrieval.

Table 5.—Scenarios A1B-C, A2-C, B2-C: estimate of forest land area by scenario and stand size, Minnesota, 2060

Estimate type Area of forestland (acres)

Selected scenarios:A1B-C:A2-C:B2-C

Initial year=2010 and Final year=2060

Statecd/EVALID: 23 270801 Minnesota 2004.2005.2006.2007.2008.

Page variable name=None

Row variable name=Multiple scenarios

Column variable name=Stand-size Final year

Estimate:

Multiple scenarios	Total	Stand-size			Nonstocked
		Large diameter	Medium diameter	Small diameter	
A1B-C	16,388,716	5,081,600	6,549,115	4,492,870	265,130
A2-C	16,487,156	5,358,588	6,236,003	4,626,088	266,478
B2-C	16,626,092	5,030,389	6,695,726	4,630,187	269,790

Plot count:

Multiple scenarios	Total	Stand-size			Nonstocked
		Large diameter	Medium diameter	Small diameter	
A1B-C	6,951	2,205	2,692	1,899	155
A2-C	6,931	2,277	2,544	1,955	155
B2-C	6,938	2,126	2,722	1,935	155

Multiple Scenario Multiple Year (MSMY) Report

In a MSMY report, multiple options are available only for pages (Fig.12). Rows are scenarios and columns are years. This report type is useful for envisioning the impact of various scenarios on a particular forest estimate over time (Table 6).

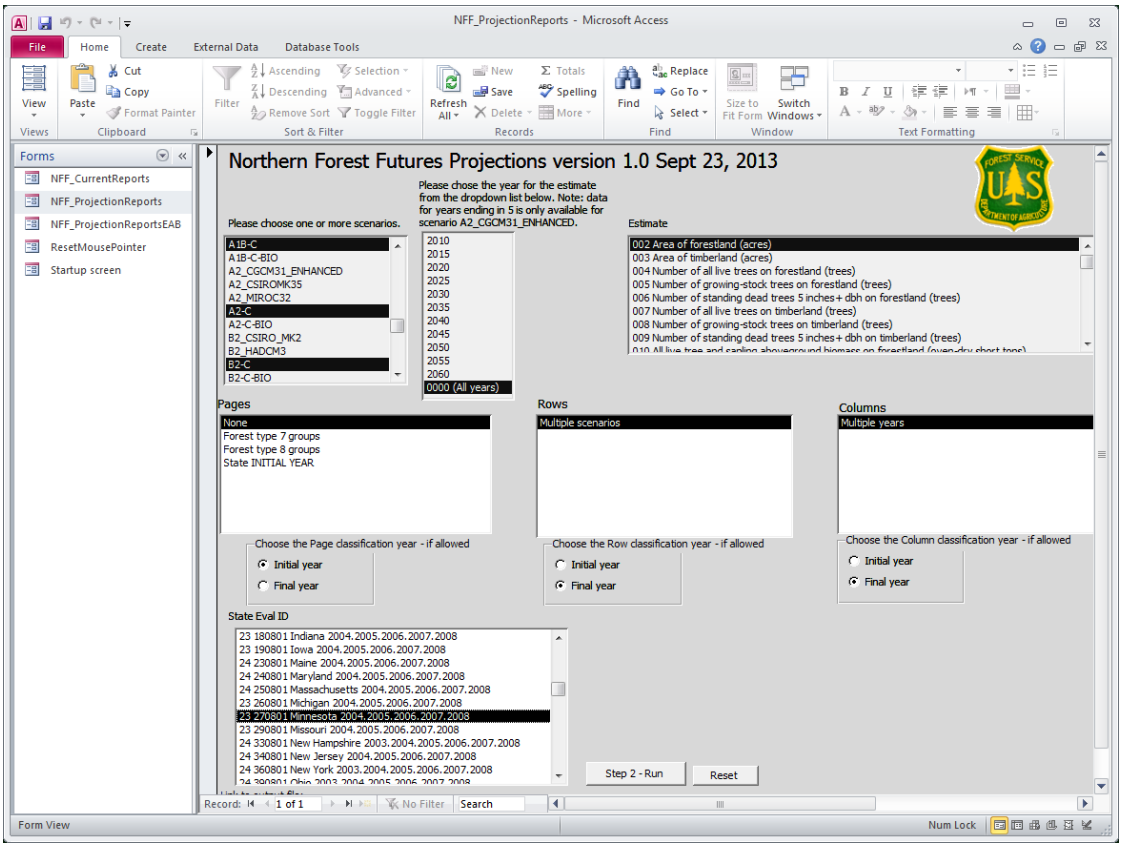

Figure 12.—Multiple scenarios, multiple year (MSMY) retrieval.

Table 6.—Scenarios A1B-C, A2-C, B2-C: estimate of forest land area by scenario and stand size, Minnesota, 2010, 2020, 2030, 2040, 2050, and 2060

Estimate type Area of forestland (acres)

Selected scenarios:A1B-C:A2-C:B2-C

Statecd/EVALID: 23 270801 Minnesota 2004.2005.2006.2007.2008.

Page variable name=None

Row variable name=Multiple scenarios

Column variable name=Multiple years

Estimate:

Multiple scenarios	Multiple years					
	2010	2020	2030	2040	2050	2060
A1B-C	16,990,267	16,871,735	16,760,287	16,644,373	16,517,961	16,388,716
A2-C	16,990,267	16,888,147	16,792,534	16,696,704	16,590,998	16,487,156
B2-C	16,990,267	16,886,562	16,821,949	16,761,197	16,686,710	16,626,092

Plot count:

Multiple scenarios	Multiple years					
	2010	2020	2030	2040	2050	2060
A1B-C	6,144	6,144	6,144	6,144	6,144	6,144
A2-C	6,144	6,144	6,144	6,144	6,144	6,144
B2-C	6,144	6,144	6,144	6,144	6,144	6,144

CONCLUSION

The Northern Forest Futures Assessment provides planners and managers with a framework for identifying potential future forests given various scenarios. The scenarios were developed to provide insight into the possible future composition of the forests in the North. The reporting tool provides planners and managers with a means of examining the data at finer scales. Caution should be used when interpreting output from the tools as the assumptions used in model development may not be appropriate for reporting certain variables at finer geographic scales. In some cases, it will not even be appropriate to report results at the state level where only a small number of plots are used in the analysis.

The reporting tools were designed to minimize the likelihood of generating estimates that go beyond the capabilities of the model. For example, only estimates of forest area can be generated at the county-level. Other estimates (e.g., volume) can only be reported at the unit- (units consist of multiple counties) or state-level. The color coding of the output from the reporting tools also serves to alert users when estimates are based on a small set of projected plots.

The NFFDB was initially created to assist with the development of the Northern Forest Futures Assessment. Many of the graphs and tables in the Assessment report (Shifley and Moser 2015) were based on output from the reporting tools. The database and reporting tools were later refined and fully documented in an effort to promote transparency and to provide tools for further review and analysis.

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APPENDIX 1
Linking Forest Dynamics Model Output to the FIADB

Appendix 1 describes how the Forest Dynamics Model (FDM) output is linked to the U.S. Forest Service's Forest Inventory and Analysis database (FIADB) to generate estimates of current and projected forest conditions. Appendix 1 is provided for those "power users" who might like to delve deeper into the data then the reporting tools allow, or, perhaps run multiple retrievals in batch mode.

For the most part the FIADB format was adopted for use in the Northern Forest Futures database (NFFDB). However, due to a MS-Access™ file size limit of 2 gigabytes, modifications to the FIADB format were made in order to accommodate all of the critical data items for all 20 states in a single MS-Access™ database file. The format change simplified the data structure but kept the values for each variable untouched. These modifications are described in Appendix 2.

The U.S. Forest Service Forest Inventory and Analysis (FIA) program monitors the status and trends of the Nation's forest resources. The FIADB "…was developed to provide users with as much FIA data as possible in a consistent manner among States." (Woudenberg et al. 2010) All of the data items collected by FIA and described in the national field manuals are available in the FIADB with the exception of exact plot location and any personally identifiable information on landowners. Data for individual States can be downloaded from the FIA DataMart (http://apps.fs.fed.us/fiadb-downloads/datamart.html) either as comma-delimited files or as MS-Access™ databases.

Output from the FDM was used to construct a condition transition table that could be linked to the condition records in the NFFDB for any of the 14 scenarios. Programs were developed within the MS-Access™ database that allow for customized futures reporting using the NFFDB and the condition transition table.

Even though estimates of current forest conditions can be generated solely from FIADB data, estimates of future forest conditions require additional information derived through modeling. Output from the FDM was used to populate the NFF_ACCESS_PROJ condition transition table for 14 different scenarios with varying climatic and socioeconomic assumptions. FIADB data and data in the NFF_ACCESS_PROJ table collectively form the NFFDB.

Output from the FDM and data from the FIADB are the sources of NFFDB data. The NFFDB contains current and projected future data for the entire U.S. North, a 20-state area that stretches from Minnesota and Missouri in the west to Maine and West Virginia. The data for the NFFDB are stored in tables described in Appendix 2 or Table 8.

Projections from the FDM - the condition transition table: NFF_ACCESS_PROJ

The FDM projections for 14 scenarios (Table 7) reflect varying climatic and socioeconomic possibilities. Appendix 3 provides additional information on the storylines and Appendix 4 provides additional information on the global circulation models. Outputs from these projections are available in an NFFDB table called NFF_ACCESS_PROJ that is also referred to as the condition transition table.

Table 7.—The 14 scenarios used in the Forest Dynamics Model

SCENARIOS	Storyline	Global circulation model	Additional assumptions
A1B-C	A1B	CGCM3.1	
A1B-C-BIO	A1B	CGCM3.1	Increased biomass demand
A1B_CSIROMK35	A1B	CSIRO-Mk3.5	
A1B_MIROC32	A1B	MIROC3.2MR	
A2-C	A2	CGCM3.1	
A2-C-BIO	A2	CGCM3.1	Increased biomass demand
A2-C-EAB	A2	CGCM3.1	Increased ash mortality due to EAB
A2_CGCM31_ENHANCED	A2	CGCM3.1	
A2_CSIROMK35	A2	CSIRO-Mk3.5	
A2_MIROC32	A2	MIROC3.2MR	
B2-C	B2	CGCM2	
B2-C-BIO	B2	CGCM2	Increased biomass demand
B2_CSIRO_MK2	B2	CSIRO-Mk2	
B2_HADCM3	B2	UKMO-HadCM3	

Interpreting the condition transition table requires an understanding of what is meant by a condition. A plot consists of one or more conditions. Plots may have more than one condition if any of the following six attributes changes across the area of the plot: reserved status, owner group, forest type, stand-size class, regeneration status, and stand density. The area of each condition is mapped.

The FDM uses information from plots measured during the 2003 inventory and remeasured during the 2008 inventory to develop possible future scenarios for each forested condition measured in the 2008 inventory. Conditions that have similar characteristics (for example, geographic area, forest-type group, or stand size) at the time of the previous inventory are grouped into donor pools. The corresponding current inventory values for conditions in the donor pool are considered to be possible futures for any condition having characteristics similar to the characteristics of the conditions forming the donor pool.

An analogy would be to pool students from last year's freshman math class by the grade they received. We also know the grades they received this year as sophomores. Now we want to predict how a freshman from this year's class will do next year as a sophomore. We could randomly pair this year's freshman with a freshman from last year who received the same grade as a freshman and assume that the two students' grades as sophomores would be the same. Of course we would not always be right, but we would probably do better than an entirely random process. If we formed our donor pools using additional relevant information, we could even improve our predictive prowess.

For example, suppose there are five single-condition plots named C1, C2, C3, C4, and C5 that form a donor group because they were all 20-year-old-aspen poletimber stands measured in Minnesota during the 2003 inventory. In 2008, C1, C2, C3, C4, and C5 were remeasured and these new conditions are respectively named D1, D2, D3, D4, and D5. Conditions D1, D3, and D4 are 25-year-old aspen poletimber stands, but D2 is a 25-year-old balsam fir poletimber stand and D5 is a 25-year-old aspen sawtimber stand. A condition X having the same characteristics in 2008 as the donor group in 2003 could be projected 5 years into the future (to the year 2013) by randomly

selecting a condition from the donor group (C1, C2, C3, C4, and C5) and assigning condition X the corresponding respective values of the donor condition in 2008. If, for example, C3 was randomly selected then X would be assigned the values of D3 for the year 2013. Because the process is random there is a 60 percent chance that condition X would be projected by the model to be a 25-year-old aspen poletimber stand, a 20 percent chance that X would be projected to be a 25-year-old balsam fir stand and a 20 percent chance that X would be projected to be a 25-year-old aspen sawtimber stand. In the case of the Northern Forest Futures Assessment, the process would then be repeated at 5-year increments through the year 2060 and the condition would move from pool to pool with the transition path being recorded in the table NFF_ACCESS_PROJ. Note: Only 10-year increments were stored in the NFF_ACCESS_PROJ for 12 of the 14 scenarios. Five-year increments were stored for the scenario used in the emerald ash borer analysis because the ash mortality impacts were assumed to be rapid and dramatic.

Outputs from the FDM were placed in the NFF_ACCESS_PROJ table. Records in NFF_ACCESS_PROJ can be uniquely identified by the combination of the CND_CN10 and SCENARIO variables. The NFF_ACCESS_PROJ table will have 14 records for each forested condition record (one for each scenario).

Data from the FIADB

Currently 67 tables are distributed with the FIADB version 1.4. Eighteen are reference tables and 49 are data tables. Because the MS-Access™ file size is limited to 2 gigabytes, the number of tables included in the NFFDB has been reduced to 22 (Table 8). Of these 22 tables, 13 are modified FIADB tables and 9 are new tables; new tables have an asterisk following their table name in Table 8. The new tables are fully described in Appendix 2 of this report whereas only changes to the 13 FIADB tables are described. For a full description of the 13 FIADB tables see Woudenberg et al. 2010.

Table 8.—List of tables in Northern Forest Futures database

Table name	Description
COND	Provides information on the discrete combination of landscape attributes that define the condition. (A condition will have the same land class, reserved status, owner group, forest type, stand-size class, regeneration status, and stand density.)
nff_access_proj*	Condition transition matrix table for tracking how a condition is projected to change over five decades.
NFF_REF_POP_ATTRIBUTE*	Reference table that contains information on how to compute estimates for projections using SQL.
NFF_REF_POP_ATTRIBUTE_EAB*	Reference table that contains information on how to compute estimates for projections for EAB scenarios using SQL.
ORACLE_CN_XWALK*	Crosswalk between NFFDB COND table sequence numbers and FIADB COND table sequence numbers in the Oracle database.
PLOT	Plot table contains information relevant to the entire field plot such as latitude and longitude. This table also includes stored area expansion factors that were obtained from the PLOTSNAP table for the 2008 inventory.
POP_ESTN_UNIT	Estimation unit (EU) table contains information on the area in each EU and number of pixels in EU. An estimation unit is a geographic area that can be drawn on a map. It has a known area, and the sampling intensity must be the same within a stratum within an estimation unit. Generally, estimation units are contiguous areas, but exceptions are made when certain ownerships, usually National Forests, are sampled at different intensities.
POP_EVAL	An evaluation is the combination of a set of plots (the sample) and a set of Phase 1 data (obtained through remote sensing, called a stratification) that can be used to produce population estimates for a State. A record in the POP_EVAL table identifies one evaluation and provides some descriptive information about how the evaluation may be used.
POP_EVAL_ATTRIBUTE	Provides information as to which population estimates can be provided by an evaluation. If an evaluation can produce 22 of the 92 currently supported population estimates, there will be 22 records in the POP_EVAL_ATTRIBUTE table (1 per population estimate) for that evaluation.
POP_EVAL_GRP	Evaluation group is used to identify which evaluations were used for a reporting year. One record in the POP_EVAL_GRP table can be linked to all the evaluations that were used in generating estimates for a State inventory report.
POP_PLOT_STRATUM_ASSGN	PPSA table connects plots to strata that were used in various evaluations.
POP_STRATUM	The area within an estimation unit is divided into strata. The area for each stratum can be calculated by determining the proportion of Phase 1 pixels/plots in each stratum and multiplying that proportion by the total area in the estimation unit. Information for a single stratum is stored in a single record of the POP_STRATUM table.
REF_ATTRIBUTE_ACCESS*	Reference table that contains information on how to compute estimates for current forest statistics using SQL.
REF_FIADB_VERSION	Reference table identifying version of FIADB.
REF_PRC*	Reference table containing classification variable names and function names for 2008 inventory.
REF_PRC_EAB*	Reference table containing classification variable names and function names for EAB projections.
REF_PRC_NFF*	Reference table containing classification variable names and function names for projected inventory.
REF_RSCDEVALID*	Reference table, created when NFF_CurrentReports is run, that contains list of evaluations.
REF_SPECIES	A reference table containing the species group code, descriptive name, and several other attributes for each species group.
REF_STCTY	Reference table that contains state and county codes and names.
TempEstnUnitDescrLU*	Reference table, created when NFF_CurrentReports is run, that contains list of estimation units for each evaluation.
TREE	Provides information for each tree 1 inch in diameter and larger found on a microplot, subplot, or core optional macroplot.

*These tables are in the NFFDB but not in the FIADB.

A relational database is used to store the NFFDB data. Data can be retrieved from this database using the Structural Query Language (SQL). Several variables in the NFF_ACCESS_PROJ table are useful for linking NFF_ACCESS_PROJ records to records in the NFFDB COND table. The most important of these are the CND_CN10, CND_CN15, CND_CN20, … , and CND_CN60 variables. These CND_CNxx variables (where xx is a two-digit number identifying the last two-digits of the projection year) are foreign keys to the COND table (linking via the COND.CND_CN variable). A foreign key is a field in a relational table that matches the primary key column of another table. The foreign key can be used to cross-reference tables.

A modeled transition of any forested condition over the 50-year period can be viewed by using a single NFF_ACCESS_PROJ record where NFF_ACCESS_PROJ.CND_CN10 = COND.CND_CN and then using the value of NFF_ACCESS_PROJ.CND_CN60 for that record to link to the COND. CND_CN value of the condition that has been selected by the model to represent the initial condition 50 years in the future. An example of a SQL script to generate an estimate of the forest land area for Connecticut in 2040 under scenario A1B-C is provided in Table 9. Notice how the initial conditions are linked to the final (year 2040) conditions via the NFF_ACCESS_PROJ table.

Table 9.—Area of forest land (acres) for Connecticut in 2040 under scenario A1B-C

```
select SUM(nz(N.EXPVOL40 * N.EXPVOL_
ADJ, 0))
  from PLOT iniplot,
       COND inicond,
       COND fincond,
       NFF_ACCESS_PROJ n
 where iniplot.cn = inicond.plt_cn
   and inicond.cnd_cn = n.cnd_cn10
   and fincond.cnd_cn = n.cnd_cn40
   AND fincond.COND_STATUS_CD = 1
   and n.scenario in ("A1B-C")
   and iniplot.statecd in (09)
```

Answer: 1,619,996 acres

Note that the CND_CN15, CND_CN25, CND_CN35, CND_CN45, and CND_CN55 variables are null except for the A2-C-EAB and A2_CGCM31_ENHANCED scenarios because these are the only scenarios where projections were output and recorded for every fifth year. Five-year increments were used for these scenarios to reflect the potential impacts of the relatively rapid spread of the emerald ash borer. There are values in CND_CN10, CND_CN20, CND_CN30, CND_CN40, CND_CN50, and CND_CN60 for all the records in the NFF_ACCESS_PROJ table.

Estimating volume of live trees on forest land (cuft) is a slightly more complicated retrieval because information from the TREE table is also needed. The SQL script for generating an estimate of live tree volume for Connecticut in 2060 is provided in Table 10.

Table 10.—Volume of live trees on forest land (ft^3) for Connecticut in 2060 under scenario A1B-C

```
select
      SUM(nz(FINTREE.volcfnet *
           (FINTREE.TPA_UNADJ /fincnd.CONDPROP_UNADJ) *
N.EXPVOL60 *
           EXPVOL_ADJ,
           0))
  from PLOT           iniplt,
      COND           inicnd,
      COND           fincnd,
      nff_access_proj n,
      tree           fintree
 where iniplt.cn = inicnd.plt_cn
   and inicnd.cnd_cn = n.cnd_cn10
   and fincnd.cnd_cn = n.cnd_cn60
   AND 1 = 1
   AND fintree.PLT_CN = fincnd.PLT_CN
   AND fintree.CONDID = fincnd.CONDID
   AND fincnd.COND_STATUS_CD = 1
   AND fintree.STATUSCD = 1
   and n.scenario in ("A1B-C")
   and iniplt.statecd in (09)
```

Answer: 4,064,559,338 cubic feet

Whereas the CND_CNxx variables provide information on how a condition changes over time the EXPVOLxx variables provide information on how many acres the condition represents on the ground in year xx. Similarly, the HW_REM_xx variables provide information on the amount of hardwood removals on the condition. Units for HW_REM_xx and SW_REM_xx (softwood removals) are in thousands of cubic feet (note: no condition expansion factor is used in the computation of removals). An example of a SQL script to generate an estimate of growing-stock removals on timberland for Connecticut in 2040 under scenario A1B-C can be found in Table 11.

Table 11.—Removals of growing stock on timberland (ft^3 per year) for Connecticut in 2040 under scenario A1B-C.

```
Select SUM((NZ(N.HW_REM_40, 0) + NZ(N.SW_REM_40, 0)) * 1000)
  from PLOT iniplot, COND inicond, COND fincond, nff_access_proj n
 where iniplot.cn = inicond.plt_cn
   and inicond.cnd_cn = n.cnd_cn10
   and fincond.cnd_cn = n.cnd_cn40
   AND 1 = 1
   and n.scenario in ("A1B-C")
   and iniplot.statecd in (09)
```

Answer: 15,696,407 cubic feet per year

The ASHxx variables (where xx is a two-digit number identifying the last two digits of the projection year) are used to identify whether, under the existing model, ash trees have 1) yet to be impacted by the emerald ash borer (values for ASHxx are left null); 2) are projected to be killed by the emerald ash borer during this interval (a value of "A" is assigned) or; 3) were killed by the emerald ash borer in a previous projection interval (a value of "B" is assigned). These variables are used only in association with scenario A2-C-EAB. The NFF_ProjectionReportsEAB reporting form in MS-Access™ was created to be used with this scenario.

APPENDIX 2
NFFDB Tables

This appendix includes all 22 NFFDB tables, here labeled 12 through 33. A brief description of each table can be found in Table 8 (page 22). Table 12 describes the COND table for both the NFFDB and the FIADB. There are five columns in Table 12. The first column provides the NFFDB field number. When this field is blank it indicates that the field existed in the FIADB (column 2) but was dropped from the NFFDB to save space. The third column in Table 12 contains the COND table field name. The fourth column identifies the field type for NFFDB variables and the fifth column indicates the size of the field in the NFFDB.

Notice that in the "COND table description" (Table 12), there are two entries for the variable PLT_CN. The first entry indicates that this variable existed in the FIADB and was the second field in the COND table. The next line in the table indicates that this variable exists in the NFFDB and is the second field. There are two entries because the COND.PLT_CN field in the FIADB can be up to 34 characters in size while the COND.PLT_CN field in the NFFDB must be six characters or less. The PLT_CN field in the NFFDB was reduced to six characters to save space.

Table 12.—COND table description

NFFDB Field Number	FIADB Field Number	NFFDB and/or FIADB Field Name	NFFDB Data Type	NFFDB Size
	1	CN		
1		CND_CN	Text	6
	2	PLT_CN		
2		PLT_CN	Text	6
	3	INVYR		
	4	STATECD		
	5	UNITCD		
	6	COUNTYCD		
	7	PLOT		
3	8	CONDID	Integer	2
4	9	COND_STATUS_CD	Integer	2
5	10	COND_NONSAMPLE_REASN_CD	Integer	2
6	11	RESERVCD	Integer	2
7	12	OWNCD	Integer	2
8	13	OWNGRPCD	Integer	2
9	14	FORINDCD	Integer	2
10	15	ADFORCD	Integer	2
11	16	FORTYPCD	Integer	2
	17	FLDTYPCD		
12	18	MAPDEN	Integer	2
13	19	STDAGE	Integer	2
14	20	STDSZCD	Integer	2
	21	FLDSZCD		
15	22	SITECLCD	Integer	2
16	23	SICOND	Integer	2

continued

Table 12.—continued

17	24	SIBASE	Integer	2
18	25	SISP	Integer	2
19	26	STDORGCD	Integer	2
20	27	STDORGSP	Integer	2
21	28	PROP_BASIS	Text	12
22	29	CONDPROP_UNADJ	Single	4
23	30	MICRPROP_UNADJ	Single	4
24	31	SUBPPROP_UNADJ	Single	4
25	32	MACRPROP_UNADJ	Single	4
26	33	SLOPE	Integer	2
27	34	ASPECT	Integer	2
28	35	PHYSCLCD	Integer	2
29	36	GSSTKCD	Integer	2
30	37	ALSTKCD	Integer	2
31	38	DSTRBCD1	Integer	2
32	39	DSTRBYR1	Integer	2
33	40	DSTRBCD2	Integer	2
34	41	DSTRBYR2	Integer	2
35	42	DSTRBCD3	Integer	2
36	43	DSTRBYR3	Integer	2
37	44	TRTCD1	Integer	2
38	45	TRTYR1	Integer	2
39	46	TRTCD2	Integer	2
40	47	TRTYR2	Integer	2
41	48	TRTCD3	Integer	2
42	49	TRTYR3	Integer	2
43	50	PRESNFCD	Integer	2
44	51	BALIVE	Double	8
	52	FLDAGE		
45	53	ALSTK	Single	4
46	54	GSSTK	Single	4
	55	FORTYPCDCALC		
	56	HABTYPCD1		
	57	HABTYPCD1_PUB_CD		
	58	HABTYPCD1_DESCR_PUB_CD		
	59	HABTYPCD2		
	60	HABTYPCD2_PUB_CD		
	61	HABTYPCD2_DESCR_PUB_CD		
	62	MIXEDCONFCD		
	63	VOL_LOC_GRP		
	64	SITECLCDEST		
	65	SITETREE_TREE		
	66	SITECL_METHOD		
47	67	CARBON_DOWN_DEAD	Double	8
48	68	CARBON_LITTER	Double	8
49	69	CARBON_SOIL_ORG	Double	8

continued

Table 12.—continued

50	70	CARBON_STANDING_DEAD	Double	8
51	71	CARBON_UNDERSTORY_AG	Double	8
52	72	CARBON_UNDERSTORY_BG	Double	8
53	73	CREATED_BY	Text	30
54	74	CREATED_DATE	Date/Time	8
55	75	CREATED_IN_INSTANCE	Text	6
	76	MODIFIED_BY		
	77	MODIFIED_DATE		
	78	MODIFIED_IN_INSTANCE		
	79	CYCLE		
	80	SUBCYCLE		
	81	SOIL_ROOTING_DEPTH_PNW		
	82	GROUND_LAND_CLASS_PNW		
	83	PLANT_STOCKABILITY_FACTOR_PNW		
	84	STND_COND_CD_PNWRS		
	85	STND_STRUC_CD_PNWRS		
	86	STUMP_CD_PNWRS		
	87	FIRE_SRS		
	88	GRAZING_SRS		
	89	HARVEST_TYPE1_SRS		
	90	HARVEST_TYPE2_SRS		
	91	HARVEST_TYPE3_SRS		
	92	LAND_USE_SRS		
	93	OPERABILITY_SRS		
	94	STAND_STRUCTURE_SRS		
	95	NF_COND_STATUS_CD		
	96	NF_COND_NONSAMPLE_REASN_CD		
	97	CANOPY_CVR_SAMPLE_METHOD_CD		
	98	LIVE_CANOPY_CVR_PCT		
	99	LIVE_MISSING_CANOPY_CVR_PCT		
	100	NBR_LIVE_STEMS		
56		NO_ASH_FORTYPCD	Integer	2

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

COND table field definitions for NFFDB fields that are not in FIADB

1. CND_CN - Sequence number. A unique sequence number used to identify a condition record.Six digit character field.
2. PLT_CN – Plot sequence number. Foreign key linking the condition record to the plot record. Six digit character field.

56. NO_ASH_FORTYPCD - Forest type assigned when ash trees are ignored. Refer to appendix D of the FIADB documentation (Woudenberg et al. 2010) for the complete list of codes.

Table 13.—NFF_ACCESS_PROJ table description

NFFDB Field Number	Field Name	Type	Size
1	SCENARIO	Text	18
2	STATEAB	Text	2
3	STATECD10	Integer	2
4	UNITCD10	Integer	2
5	COUNTYCD10	Integer	2
6	PLOT10	Long Integer	4
7	CONDID10	Integer	2
8	CND_CN10	Text	6
9	CND_CN15	Text	6
10	CND_CN20	Text	6
11	CND_CN25	Text	6
12	CND_CN30	Text	6
13	CND_CN35	Text	6
14	CND_CN40	Text	6
15	CND_CN45	Text	6
16	CND_CN50	Text	6
17	CND_CN55	Text	6
18	CND_CN60	Text	6
19	PLT_CN10	Text	6
20	PLT_CN15	Text	6
21	PLT_CN20	Text	6
22	PLT_CN25	Text	6
23	PLT_CN30	Text	6
24	PLT_CN35	Text	6
25	PLT_CN40	Text	6
26	PLT_CN45	Text	6
27	PLT_CN50	Text	6
28	PLT_CN55	Text	6
29	PLT_CN60	Text	6
30	EXPVOL_ADJ	Double	8
31	EXPVOL10	Double	8
32	EXPVOL15	Double	8
33	EXPVOL20	Double	8
34	EXPVOL25	Double	8
35	EXPVOL30	Double	8
36	EXPVOL35	Double	8
37	EXPVOL40	Double	8
38	EXPVOL45	Double	8
39	EXPVOL50	Double	8
40	EXPVOL55	Double	8
41	EXPVOL60	Double	8
42	ASH10	Text	1

continued

Table 13.—continued

43	ASH15	Text	1
44	ASH20	Text	1
45	ASH25	Text	1
46	ASH30	Text	1
47	ASH35	Text	1
48	ASH40	Text	1
49	ASH45	Text	1
50	ASH50	Text	1
51	ASH55	Text	1
52	ASH60	Text	1
53	HW_REM_10	Double	8
54	HW_REM_15	Double	8
55	HW_REM_20	Double	8
56	HW_REM_25	Double	8
57	HW_REM_30	Double	8
58	HW_REM_35	Double	8
59	HW_REM_40	Double	8
60	HW_REM_45	Double	8
61	HW_REM_50	Double	8
62	HW_REM_55	Double	8
63	HW_REM_60	Double	8
64	SW_REM_10	Double	8
65	SW_REM_15	Double	8
66	SW_REM_20	Double	8
67	SW_REM_25	Double	8
68	SW_REM_30	Double	8
69	SW_REM_35	Double	8
70	SW_REM_40	Double	8
71	SW_REM_45	Double	8
72	SW_REM_50	Double	8
73	SW_REM_55	Double	8
74	SW_REM_60	Double	8

NFF_ACCESS_PROJ table field definitions

1. SCENARIO – Northern Forest Futures scenarios that reflect varying climatic and socioeconomic possibilities. See Appendix 3 for a complete list of scenarios.
2. STATEAB – State abbreviation. The two-character State abbreviation. Refer to Appendix C in Woudenberg et al. (2010).
3. STATECD10 - State code in 2010. Bureau of the Census Federal information processing standards (FIPS) two-digit code for each State. Refer to Appendix C in Woudenberg et al. (2010) for the state code for the initial plot.
4. UNITCD10 – Survey unit code in 2010. Forest Inventory and Analysis survey unit identification number. Survey units are usually groups of counties within each State. Refer to Appendix C in Woudenberg et al. (2010) for codes. This contains the unit code for the initial plot.

5. COUNTYCD10 – County code in 2010. The identification number for a county, parish, watershed, borough, or similar governmental unit in a State. FIPS codes from the Bureau of the Census are used. Refer to Appendix C in Woudenberg et al. (2010) for codes. This contains the county code for the initial plot.
6. PLOT10 – Phase 2 plot number in 2010. An identifier for a plot. This contains the plot number for the initial plot.
7. CONDID10 – Condition class number in 2010. Unique identifying number assigned to each condition on a plot. A condition is initially defined by condition class status. Differences in reserved status, owner group, forest type, stand-size class, regeneration status, and stand density further define condition for forest land. Mapped nonforest conditions are also assigned numbers. At the time of the plot establishment, the condition class at plot center (the center of subplot 1) is usually designated as condition class 1. Other condition classes are assigned numbers sequentially at the time each condition class is delineated. On a plot, each sampled condition class must have a unique number that can change at remeasurement to reflect new conditions on the plot.
8. CND_CN10 – Sequence number for condition in 2010. A unique sequence number used to identify a condition record. This field is a foreign key to the CND_CN field in the COND table.
9. CND_CN15 – Sequence number for donor condition in 2015. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to in 2015.
10. CND_CN20 – Sequence number for donor condition in 2020. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2020
11. CND_CN25 – Sequence number for donor condition in 2025. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2025.
12. CND_CN30 – Sequence number for donor condition in 2030. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2030.
13. CND_CN35 – Sequence number for donor condition in 2035. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2035.
14. CND_CN40 – Sequence number for donor condition in 2040. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2040.
15. CND_CN45 – Sequence number for donor condition in 2045. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2045.
16. CND_CN50 – Sequence number for donor condition in 2050. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2050.

17. CND_CN55 – Sequence number for donor condition in 2055. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2055.
18. CND_CN60 – Sequence number for donor condition in 2060. This field can be joined to the CND_CN field in the COND table to identify how the initial condition (CND_CN10) is modeled to transition in 2060.
19. PLT_CN10 – Sequence number for plot in 2010.
20. PLT_CN15 – Sequence number for donor plot in 2015.
21. PLT_CN20 – Sequence number for donor plot in 2020.
22. PLT_CN25 – Sequence number for donor plot in 2025.
23. PLT_CN30 – Sequence number for donor plot in 2030.
24. PLT_CN35 – Sequence number for donor plot in 2035.
25. PLT_CN40 – Sequence number for donor plot in 2040.
26. PLT_CN45 – Sequence number for donor plot in 2045.
27. PLT_CN50 – Sequence number for donor plot in 2050.
28. PLT_CN55 – Sequence number for donor plot in 2055.
29. PLT_CN60 – Sequence number for donor plot in 2060.
30. EXPVOL_ADJ – Adjustment factor for area/trees/volume/biomass/carbon estimates. This adjustment factor should be applied to the CONDPROP_UNADJ on the condition record when generating population estimates to take into account out-of-population and denied access/hazardous portions of conditions within the stratum. Not used in removals estimates.
31. EXPVOL10 – Expansion factor for area/trees/volume/biomass/carbon for 2010 estimates. The number of acres the sample condition represents. Not used in removals estimates.
32. EXPVOL15 – Expansion factor for area/trees/volume/biomass/carbon for 2015 estimates. The number of acres the sample condition represents. Not used in removals estimates.
33. EXPVOL20 – Expansion factor for area/trees/volume/biomass/carbon for 2020 estimates. The number of acres the sample condition represents. Not used in removals estimates.
34. EXPVOL25 – Expansion factor for area/trees/volume/biomass/carbon for 2025 estimates. The number of acres the sample condition represents. Not used in removals estimates.
35. EXPVOL30 – Expansion factor for area/trees/volume/biomass/carbon for 2030 estimates. The number of acres the sample condition represents. Not used in removals estimates.
36. EXPVOL35 – Expansion factor for area/trees/volume/biomass/carbon for 2035 estimates. The number of acres the sample condition represents. Not used in removals estimates.
37. EXPVOL40 – Expansion factor for area/trees/volume/biomass/carbon for 2040 estimates. The number of acres the sample condition represents. Not used in removals estimates.

38. EXPVOL45 – Expansion factor for area/trees/volume/biomass/carbon for 2045 estimates. The number of acres the sample condition represents. Not used in removals estimates.
39. EXPVOL50 – Expansion factor for area/trees/volume/biomass/carbon for 2050 estimates. The number of acres the sample condition represents. Not used in removals estimates.
40. EXPVOL55 – Expansion factor for area/trees/volume/biomass/carbon for 2055 estimates. The number of acres the sample condition represents. Not used in removals estimates.
41. EXPVOL60 – Expansion factor for area/trees/volume/biomass/carbon for 2060 estimates. The number of acres the sample condition represents. Not used in removals estimates.
42. ASH10 – Emerald ash borer flag for 2010. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
43. ASH15 – Emerald ash borer flag for 2015. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
44. ASH20 – Emerald ash borer flag for 2020. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
45. ASH25 – Emerald ash borer flag for 2025. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
46. ASH30 – Emerald ash borer flag for 2030. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
47. ASH35 – Emerald ash borer flag for 2035. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
48. ASH40 – Emerald ash borer flag for 2040. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
49. ASH45 – Emerald ash borer flag for 2045. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash

borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.

50. ASH50 – Emerald ash borer flag for 2050. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
51. ASH55 – Emerald ash borer flag for 2055. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
52. ASH60 – Emerald ash borer flag for 2060. Null except in the case of scenario A2-C-EAB. When present, a value of "A" indicates that ash mortality, due to the emerald ash borer, was modeled to have occurred in this period. A value of "B" indicates that the ash mortality was modeled to occur in a previous period.
53. HW_REM_10 – Hardwood removals in thousand cubic feet in 2010. This value does not require the use of any expansion or adjustment factors.
54. HW_REM_15 – Hardwood removals in thousand cubic feet in 2015. This value does not require the use of any expansion or adjustment factors.
55. HW_REM_20 – Hardwood removals in thousand cubic feet in 2020. This value does not require the use of any expansion or adjustment factors.
56. HW_REM_25 – Hardwood removals in thousand cubic feet in 2025. This value does not require the use of any expansion or adjustment factors.
57. HW_REM_30 – Hardwood removals in thousand cubic feet in 2030. This value does not require the use of any expansion or adjustment factors.
58. HW_REM_35 – Hardwood removals in thousand cubic feet in 2035. This value does not require the use of any expansion or adjustment factors.
59. HW_REM_40 – Hardwood removals in thousand cubic feet in 2040. This value does not require the use of any expansion or adjustment factors.
60. HW_REM_45 – Hardwood removals in thousand cubic feet in 2045. This value does not require the use of any expansion or adjustment factors.
61. HW_REM_50 – Hardwood removals in thousand cubic feet in 2050. This value does not require the use of any expansion or adjustment factors.
62. HW_REM_55 – Hardwood removals in thousand cubic feet in 2055. This value does not require the use of any expansion or adjustment factors.
63. HW_REM_60 – Hardwood removals in thousand cubic feet in 2060. This value does not require the use of any expansion or adjustment factors.
64. SW_REM_10 – Softwood removals in thousand cubic feet in 2010. This value does not require the use of any expansion or adjustment factors.
65. SW _REM_15 – Softwood removals in thousand cubic feet in 2015. This value does not require the use of any expansion or adjustment factors.
66. SW _REM_20 – Softwood removals in thousand cubic feet in 2020. This value does not require the use of any expansion or adjustment factors.

67. SW _REM_25 – Softwood removals in thousand cubic feet in 2025. This value does not require the use of any expansion or adjustment factors.
68. SW _REM_30 – Softwood removals in thousand cubic feet in 2030. This value does not require the use of any expansion or adjustment factors.
69. SW _REM_35 – Softwood removals in thousand cubic feet in 2035. This value does not require the use of any expansion or adjustment factors.
70. SW _REM_40 – Softwood removals in thousand cubic feet in 2040. This value does not require the use of any expansion or adjustment factors.
71. SW _REM_45 – Softwood removals in thousand cubic feet in 2045. This value does not require the use of any expansion or adjustment factors.
72. SW _REM_50 – Softwood removals in thousand cubic feet in 2050. This value does not require the use of any expansion or adjustment factors.
73. SW _REM_55 – Softwood removals in thousand cubic feet in 2055. This value does not require the use of any expansion or adjustment factors.
74. SW _REM_60 – Softwood removals in thousand cubic feet in 2060. This value does not require the use of any expansion or adjustment factors.

Table 14.—NFF_REF_POP_ATTRIBUTE table description

Field	Name	Type	Size
1	ATTRIBUTE_NBR	Double	8
2	ATTRIBUTE_DESCR	Text	255
3	CONDTREESEED	Text	50
4	SORT_COL	Double	8
5	EXPRESSION_PLOTSNAP	Memo	-
6	WHERE_CLAUSE_PLOTSNAP	Memo	-

Note: This table is used exclusively by the NFF_ProjectionReports form.

Table 15.—NFF_REF_POP_ATTRIBUTE_EAB table description

Field	Name	Type	Size
1	ATTRIBUTE_NBR	Double	8
2	ATTRIBUTE_DESCR	Text	255
3	CONDTREESEED	Text	50
4	SORT_COL	Double	8
5	EXPRESSION_PLOTSNAP	Memo	-
6	WHERE_CLAUSE_PLOTSNAP	Memo	-

Note: This table is used exclusively by the NFF_ProjectionReportsEAB form.

Table 16.—ORACLE_CN_XWALK table description

Field	Name	Type	Size
1	ORACLE_CND_CN	Text	34
2	SHORT_CND_CN	Text	6
3	PLT_CN	Text	34
4	SHORT_PLT_CN	Text	6
5	STATECD	Integer	2
6	UNITCD	Integer	2
7	COUNTYCD	Integer	2
8	PLOT	Long Integer	4
9	CONDID	Integer	2
10	INVYR	Integer	2

Note: This table may be used to crosswalk between the COND table in the NFF database and the COND tables in the FIADB database found within this DVD included with this publication.

Table 17.—PLOT table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
	1	CN		
1		CN	Text	6
	2	SRV_CN		
	3	CTY_CN		
	4	PREV_PLT_CN		
2	5	INVYR	Integer	2
3	6	STATECD	Integer	2
4	7	UNITCD	Integer	2
5	8	COUNTYCD	Integer	2
6	9	PLOT	Long Integer	4
	10	PLOT_STATUS_CD		
7	11	PLOT_NONSAMPLE_REASN_CD	Integer	2
8	12	MEASYEAR	Integer	2
9	13	MEASMON	Integer	2
10	14	MEASDAY	Integer	2
11	15	REMPER	Single	4
	16	KINDCD		
	17	DESIGNCD		
12	18	RDDISTCD	Integer	2
	19	WATERCD		
13	20	LAT	Double	8
14	21	LON	Double	8
15	22	ELEV	Long Integer	4
	23	GROW_TYP_CD		
	24	MORT_TYP_CD		
	25	P2PANEL		
	26	P3PANEL		

continued

Table 17.—continued

16	27	ECOSUBCD	Text	7
17	28	CONGCD	Integer	2
	29	MANUAL		
	30	SUBPANEL		
	31	KINDCD_NC		
	32	QA_STATUS		
	33	CREATED_BY		
	34	CREATED_DATE		
	35	CREATED_IN_INSTANCE		
	36	MODIFIED_BY		
	37	MODIFIED_DATE		
	38	MODIFIED_IN_INSTANCE		
	39	MICROPLOT_LOC		
	40	DECLINATION		
	41	EMAP_HEX		
	42	SAMP_METHOD_CD		
	43	SUBP_EXAMINE_CD		
18	44	MACRO_BREAKPOINT_DIA	Integer	2
19	45	INTENSITY	Text	2
20	46	CYCLE	Integer	2
21	47	SUBCYCLE	Integer	2
	48	ECO_UNIT_PNW		
	49	TOPO_POSITION_PNW		
	50	EVAL_GRP_CN		
	51	EVAL_GRP		
22	52	EXPALL	Double	8
23	53	EXPCURR	Double	8
24	54	EXPVOL	Double	8
25	55	EXPGROW	Double	8
26	56	EXPMORT	Double	8
27	57	EXPREMV	Double	8
28	58	ADJ_EXPALL	Double	8
29	59	ADJ_EXPCURR	Double	8
30	60	ADJ_EXPVOL_MACR	Double	8
31	61	ADJ_EXPVOL_SUBP	Double	8
32	62	ADJ_EXPVOL_MICR	Double	8
33	63	ADJ_EXPGROW_MACR	Double	8
34	64	ADJ_EXPGROW_SUBP	Double	8
35	65	ADJ_EXPGROW_MICR	Double	8
36	66	ADJ_EXPMORT_MACR	Double	8
37	67	ADJ_EXPMORT_SUBP	Double	8
38	68	ADJ_EXPMORT_MICR	Double	8
39	69	ADJ_EXPREMV_MACR	Double	8
40	70	ADJ_EXPREMV_SUBP	Double	8
41	71	ADJ_EXPREMV_MICR	Double	8

Note: This table is based on the PLOTSNAP table in the FIADB. Definitions for FIADB fields can be found in Woudenberg et al. 2010.

PLOT table field definitions for NFFDB fields that are not in FIADB

1. CN - Sequence number. A unique sequence number used to identify a plot record. Six digit character field. The SHORT_PLT_CN field in the ORACLE_CN_XWALK table is a foreign key to this field.

Table 18.—POP_ESTN_UNIT table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
1	1	CN	Text	34
2	2	EVAL_CN	Text	34
3	3	RSCD	Integer	2
4	4	EVALID	Long Integer	4
5	5	ESTN_UNIT	Long Integer	4
6	6	ESTN_UNIT_DESCR	Text	255
	7	STATECD		
7	8	AREALAND_EU	Double	8
8	9	AREATOT_EU	Double	8
9	10	AREA_USED	Double	8
	11	AREA_SOURCE		
10	12	P1PNTCNT_EU	Double	8
	13	P1SOURCE		
	14	CREATED_BY		
	15	CREATED_DATE		
	16	CREATED_IN_INSTANCE		
	17	MODIFIED_BY		
	18	MODIFIED_DATE		
	19	MODIFIED_IN_INSTANCE		

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 19.—POP_EVAL table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
1	1	CN	Text	34
	2	EVAL_GRP_CN		
2	3	RSCD	Integer	2
3	4	EVALID	Long Integer	4
	5	EVAL_DESCR		
4	6	STATECD	Integer	2
5	7	LOCATION_NM	Text	255
6	8	REPORT_YEAR_NM	Text	255
	9	START_INVYR		
	10	END_INVYR		
	11	LAND_ONLY		
	12	TIMBERLAND_ONLY		
	13	ESTN_METHOD		
	14	NOTES		
	15	CREATED_BY		
	16	CREATED_DATE		
	17	CREATED_IN_INSTANCE		
	18	MODIFIED_BY		
	19	MODIFIED_DATE		
	20	MODIFIED_IN_INSTANCE		

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 20.—POP_EVAL_ATTRIBUTE table description

NFFDB Field Number	**FIADB Field Number**	**Field Name**	**Type**	**Size**
	1	CN		
1	2	EVAL_CN	Text	34
2	3	ATTRIBUTE_NBR	Integer	2
	4	STATECD		
	5	CREATED_BY		
	6	CREATED_DATE		
	7	CREATED_IN_INSTANCE		
	8	MODIFIED_BY		
	9	MODIFIED_DATE		
	10	MODIFIED_IN_INSTANCE		

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 21.—POP_EVAL_GRP table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
1	1	CN	Text	34
2	2	EVAL_CN_FOR_EXPALL	Text	34
3	3	EVAL_CN_FOR_EXPCURR	Text	34
4	4	EVAL_CN_FOR_EXPVOL	Text	34
5	5	EVAL_CN_FOR_EXPGROW	Text	34
6	6	EVAL_CN_FOR_EXPMORT	Text	34
7	7	EVAL_CN_FOR_EXPREMV	Text	34
8	8	RSCD	Integer	2
9	9	EVAL_GRP	Long Integer	4
10	10	EVAL_GRP_DESCR	Text	255
11	11	STATECD	Integer	2
12	12	LAND_ONLY	Text	1
13	13	CREATED_BY	Text	30
14	14	CREATED_DATE	Date/Time	8
15	15	CREATED_IN_INSTANCE	Text	6
16	16	MODIFIED_BY	Text	30
17	17	MODIFIED_DATE	Date/Time	8
18	18	MODIFIED_IN_INSTANCE	Text	6
19	19	NOTES	Memo	-

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 22.—POP_PLOT_STRATUM_ASSGN table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
	1	CN		
1	2	STRATUM_CN	Text	34
2	3	PLT_CN	Text	6
	4	STATECD		
	5	INVYR		
	6	UNITCD		
	7	COUNTYCD		
	8	PLOT		
3	9	RSCD	Integer	2
4	10	EVALID	Long Integer	4
5	11	ESTN_UNIT	Long Integer	4
6	12	STRATUMCD	Long Integer	4
	13	CREATED_BY		
	14	CREATED_DATE		
	15	CREATED_IN_INSTANCE		
	16	MODIFIED_BY		
	17	MODIFIED_DATE		
	18	MODIFIED_IN_INSTANCE		

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 23.—POP_STRATUM table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
1	1	CN	Text	34
2	2	ESTN_UNIT_CN	Text	34
3	3	RSCD	Integer	2
4	4	EVALID	Long Integer	4
5	5	ESTN_UNIT	Long Integer	4
6	6	STRATUMCD	Long Integer	4
7	7	STRATUM_DESCR	Text	255
	8	STATECD		
8	9	P1POINTCNT	Double	8
9	10	P2POINTCNT	Double	8
10	11	EXPNS	Double	8
11	12	ADJ_FACTOR_MACR	Single	4
12	13	ADJ_FACTOR_SUBP	Single	4
13	14	ADJ_FACTOR_MICR	Single	4
	15	CREATED_BY		
	16	CREATED_DATE		
	17	CREATED_IN_INSTANCE		
	18	MODIFIED_BY		
	19	MODIFIED_DATE		
	20	MODIFIED_IN_INSTANCE		

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 24.—REF ATTRIBUTE_ACCESS table description

Field	Name	Type	Size
1	ATTRIBUTE_NBR	Integer	2
2	ATTRIBUTE_DESCR	Text	255
3	VBA_SUMFROMWHERE	Memo	-
4	PEA_SURROGATE	Integer	2
5	CONDTREESEED	Text	50

Note: This table is used exclusively by the NFF_CurrentReports form.

Table 25.—REF_FIADB_VERSION table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
1	1	VERSION	Single	4
2	2	DESCR	Memo	-
3	3	CREATED_BY	Text	30
4	4	CREATED_DATE	Date/Time	8
5	5	CREATED_IN_INSTANCE	Text	6
6	6	MODIFIED_BY	Text	30
7	7	MODIFIED_DATE	Date/Time	8
8	8	MODIFIED_IN_INSTANCE	Text	6

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 26.—REF_PRC table description

Field	Name	Type	Size
1	CLASSNBR	Integer	2
2	CONDTREESEED	Text	50
3	CLASSNM	Text	50
4	FUNCTIONNM	Text	255
5	PAGECLASS	Text	50
6	ROWCLASS	Text	50
7	COLCLASS	Text	50

Note: This table is used by the NFF_ProjectionReports and NFF_CurrentReports reporting forms.

Table 27.—REF_PRC_EAB table description

Field	Name	Type	Size
1	CLASSNBR	Integer	2
2	CONDTREESEED	Text	50
3	CLASSNM	Text	50
4	FUNCTIONNM	Text	255
5	PAGECLASS	Text	50
6	ROWCLASS	Text	50
7	COLCLASS	Text	50

Note: This table is used by the NFF_ProjectionReportsEAB reporting form.

Table 28.—REF_PRC_NFF table description

Field	Name	Type	Size
1	CLASSNBR	Integer	2
2	CONDTREESEED	Text	50
3	CLASSNM	Text	50
4	FUNCTIONNM	Text	255
5	PAGECLASS	Text	50
6	ROWCLASS	Text	50
7	COLCLASS	Text	50

Note: This table is used by the NFF_ProjectionReports reporting form.

Table 29.—REF_RSCDEVALID table description

Field	Name	Type	Size
1	rscdEvalid	Long Integer	4
2	rscdEvalidLabel	Text	255

Note: This table is used by the NFF_CurrentReports reporting forms when reporting by evaluation. The table is dropped and created when the NFF_CurrentReports is run.

Table 30.—REF_SPECIES table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
1	1	SPCD	Long Integer	4
2	2	COMMON_NAME	Text	100
3	3	GENUS	Text	40
4	4	SPECIES	Text	50
5	5	VARIETY	Text	50
6	6	SUBSPECIES	Text	50
7	7	SPECIES_SYMBOL	Text	8
8	8	E_SPGRPCD	Integer	2
9	9	W_SPGRPCD	Integer	2
10	10	MAJOR_SPGRPCD	Integer	2
11	11	STOCKING_SPGRPCD	Integer	2
12	12	FOREST_TYPE_SPGRPCD	Integer	2
13	13	EXISTS_IN_NCRS	Text	1
14	14	EXISTS_IN_NERS	Text	1
15	15	EXISTS_IN_PNWRS	Text	1
16	16	EXISTS_IN_RMRS	Text	1
17	17	EXISTS_IN_SRS	Text	1
18	18	SITETREE	Text	1
19	19	SFTWD_HRDWD	Text	1
20	20	ST_EXISTS_IN_NCRS	Text	1
21	21	ST_EXISTS_IN_NERS	Text	1
22	22	ST_EXISTS_IN_PNWRS	Text	1
23	23	ST_EXISTS_IN_RMRS	Text	1
24	24	ST_EXISTS_IN_SRS	Text	1
25	25	EAST	Text	1
26	26	WEST	Text	1
27	27	WOODLAND	Text	1
28	28	MANUAL_START	Single	4
29	29	MANUAL_END	Single	4
30	30	CREATED_BY	Text	30
31	31	CREATED_DATE	Date/Time	8
32	32	CREATED_IN_INSTANCE	Text	6
33	33	MODIFIED_BY	Text	30
34	34	MODIFIED_DATE	Date/Time	8
35	35	MODIFIED_IN_INSTANCE	Text	6
36	36	CORE	Text	1
37	37	JENKINS_SPGRPCD	Integer	2
38	38	JENKINS_TOTAL_B1	Double	8
39	39	JENKINS_TOTAL_B2	Double	8
40	40	JENKINS_STEM_WOOD_RATIO_B1	Double	8
41	41	JENKINS_STEM_WOOD_RATIO_B2	Double	8
42	42	JENKINS_STEM_BARK_RATIO_B1	Double	8

continued

Table 30.—continued

43	43	JENKINS_STEM_BARK_RATIO_B2	Double	8
44	44	JENKINS_FOLIAGE_RATIO_B1	Double	8
45	45	JENKINS_FOLIAGE_RATIO_B2	Double	8
46	46	JENKINS_ROOT_RATIO_B1	Double	8
47	47	JENKINS_ROOT_RATIO_B2	Double	8
48	48	JENKINS_SAPLING_ADJUSTMENT	Double	8
49	49	WOOD_SPGR_GREENVOL_DRYWT	Double	8
50	50	WOOD_SPGR_GREENVOL_DRYWT_CIT	Long Integer	4
51	51	BARK_SPGR_GREENVOL_DRYWT	Double	8
52	52	BARK_SPGR_GREENVOL_DRYWT_CIT	Long Integer	4
53	53	MC_PCT_GREEN_WOOD	Double	8
54	54	MC_PCT_GREEN_WOOD_CIT	Long Integer	4
55	55	MC_PCT_GREEN_BARK	Double	8
56	56	MC_PCT_GREEN_BARK_CIT	Long Integer	4
57	57	WOOD_SPGR_MC12VOL_DRYWT	Double	8
58	58	WOOD_SPGR_MC12VOL_DRYWT_CIT	Long Integer	4
59	59	BARK_VOL_PCT	Double	8
60	60	BARK_VOL_PCT_CIT	Long Integer	4
61	61	RAILE_STUMP_DOB_B1	Double	8
62	62	RAILE_STUMP_DIB_B1	Double	8
63	63	RAILE_STUMP_DIB_B2	Double	8

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

Table 31.—REF_STCTY table description

Field	Name	Type	Size
1	STCTY	Double	8
2	STCTYLABEL	Text	255

Table 32.—TempEstnUnitDescrLU table description

Field	Name	Type	Size
1	rscd	Long Integer	4
2	evalid	Long Integer	4
3	esntunit	Long Integer	4
4	rscdEvalidEsntUnitLabel	Text	128

Note: This table is used by the NFF_CurrentReports reporting forms when reporting by estimation unit. The table is dropped and created when the NFF_CurrentReports is run.

Table 33.—TREE table description

NFFDB Field Number	FIADB Field Number	Field Name	Type	Size
	1	CN		
	2	PLT_CN		
1		PLT_CN	Text	6
	3	PREV_TRE_CN		
	4	INVYR		
	5	STATECD		
	6	UNITCD		
	7	COUNTYCD		
	8	PLOT		
2	9	SUBP	Integer	2
3	10	TREE	Long Integer	4
4	11	CONDID	Integer	2
5	12	AZIMUTH	Integer	2
6	13	DIST	Single	4
	14	PREVCOND		
7	15	STATUSCD	Integer	2
8	16	SPCD	Integer	2
	17	SPGRPCD		
9	18	DIA	Single	4
	19	DIAHTCD		
10	20	HT	Integer	2
	21	HTCD		
11	22	ACTUALHT	Integer	2
12	23	TREECLCD	Integer	2
13	24	CR	Integer	2
14	25	CCLCD	Integer	2
15	26	TREEGRCD	Integer	2
16	27	AGENTCD	Integer	2
17	28	CULL	Integer	2
	29	DAMLOC1		
	30	DAMTYP1		
	31	DAMSEV1		
	32	DAMLOC2		
	33	DAMTYP2		
	34	DAMSEV2		
18	35	DECAYCD	Integer	2
	36	STOCKING		
	37	WDLDSTEM		
19	38	VOLCFNET	Double	8
20	39	VOLCFGRS	Double	8
21	40	VOLCSNET	Double	8
22	41	VOLCSGRS	Double	8

continued

Table 33.—continued

23	42	VOLBFNET	Double	8
24	43	VOLBFGRS	Double	8
25	44	VOLCFSND	Double	8
26	45	GROWCFGS	Double	8
27	46	GROWBFSL	Double	8
28	47	GROWCFAL	Double	8
29	48	MORTCFGS	Double	8
30	49	MORTBFSL	Double	8
31	50	MORTCFAL	Double	8
32	51	REMVCFGS	Double	8
33	52	REMVBFSL	Double	8
34	53	REMVCFAL	Double	8
	54	DIACHECK		
	55	MORTYR		
35	56	SALVCD	Integer	2
	57	UNCRCD		
	58	CPOSCD		
	59	CLIGHTCD		
	60	CVIGORCD		
	61	CDENCD		
	62	CDIEBKCD		
	63	TRANSCD		
36	64	TREEHISTCD	Integer	2
	65	DIACALC		
	66	BHAGE		
	67	TOTAGE		
	68	CULLDEAD		
	69	CULLFORM		
	70	CULLMSTOP		
	71	CULLBF		
	72	CULLCF		
	73	BFSND		
	74	CFSND		
	75	SAWHT		
37	76	BOLEHT	Integer	2
	77	FORMCL		
	78	HTCALC		
	79	HRDWD_CLUMP_CD		
	80	SITREE		
	81	CREATED_BY		
	82	CREATED_DATE		
	83	CREATED_IN_INSTANCE		
	84	MODIFIED_BY		
	85	MODIFIED_DATE		

continued

Table 33.—continued

	86	MODIFIED_IN_INSTANCE		
	87	MORTCD		
	88	HTDMP		
	89	ROUGHCULL		
	90	MIST_CL_CD		
	91	CULL_FLD		
	92	RECONCILECD		
	93	PREVDIA		
38	94	FGROWCFGS	Double	8
39	95	FGROWBFSL	Double	8
40	96	FGROWCFAL	Double	8
41	97	FMORTCFGS	Double	8
42	98	FMORTBFSL	Double	8
43	99	FMORTCFAL	Double	8
44	100	FREMVCFGS	Double	8
45	101	FREMVBFSL	Double	8
46	102	FREMVCFAL	Double	8
	103	P2A_GRM_FLG		
	104	TREECLCD_NERS		
	105	TREECLCD_SRS		
	106	TREECLCD_NCRS		
	107	TREECLCD_RMRS		
47	108	STANDING_DEAD_CD	Integer	2
	109	PREV_STATUS_CD		
	110	PREV_WDLDSTEM		
48	111	TPA_UNADJ	Double	8
49	112	TPAMORT_UNADJ	Double	8
50	113	TPAREMV_UNADJ	Double	8
51	114	TPAGROW_UNADJ	Double	8
52	115	DRYBIO_BOLE	Double	8
53	116	DRYBIO_TOP	Double	8
54	117	DRYBIO_STUMP	Double	8
55	118	DRYBIO_SAPLING	Double	8
56	119	DRYBIO_WDLD_SPP	Double	8
57	120	DRYBIO_BG	Double	8
58	121	CARBON_AG	Double	8
59	122	CARBON_BG	Double	8
	123	CYCLE		
	124	SUBCYCLE		
	125	BORED_CD_PNWRS		
	126	DAMLOC1_PNWRS		
	127	DAMLOC2_PNWRS		
	128	DIACHECK_PNWRS		
	129	DMG_AGENT1_CD_PNWRS		

continued

Table 33.—continued

130	DMG_AGENT2_CD_PNWRS
131	DMG_AGENT3_CD_PNWRS
132	MIST_CL_CD_PNWRS
133	SEVERITY1_CD_PNWRS
134	SEVERITY1A_CD_PNWRS
135	SEVERITY1B_CD_PNWRS
136	SEVERITY2_CD_PNWRS
137	SEVERITY2A_CD_PNWRS
138	SEVERITY2B_CD_PNWRS
139	SEVERITY3_CD_PNWRS
140	UNKNOWN_DAMTYP1_PNWRS
141	UNKNOWN_DAMTYP2_PNWRS
142	PREV_PNTN_SRS

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

COND table field definitions for NFFDB fields that are not in FIADB

Note: Definitions for FIADB fields can be found in Woudenberg et al. 2010.

1. PLT_CN - Sequence number. A unique sequence number used to identify a plot record. Six digit character field.

APPENDIX 3

Storylines Based on Nakicenovic et al. (2000), Ince et al. (2011), and USDA Forest Service (2012)

IPCC Storylines	Storyline A1B	Storyline A2	Storyline B2
General Development Themes	Globalization; economic growth; introduction of new and more efficient energy technologies; capacity building	More differentiated world with less trade compared to storyline A1B; uneven economic growth; slower technological change	Sustainable development; diversified technology; increased concern for environmental and social sustainability compared to the A2 storyline.
Synopsis	Rapid economic globalization. International mobility of people, ideas, and technology. Strong commitment to market-based solutions. Strong commitment to education. High rates of investment and innovation in education, technology, and institutions at the national and international levels. A balanced energy portfolio including fossil intensive and non-fossil energy sources	Consolidation into economic regions. Self-reliance in terms of resources and less emphasis on economic, social, and cultural interactions between regions. Technology diffuses more slowly than in the other scenarios. International disparities in productivity, and hence income per capita, are largely maintained or increased in absolute terms.	A trend toward local self-reliance and stronger communities. Community-based solutions to social problems. Energy systems differ from region to region, depending on the availability of natural resources. The need to use energy and other resources more efficiently spurs the development of less carbon-intensive technology in some regions.

APPENDIX 4

Global Circulation Models

CGCM3.1—Canadian Centre for Climate Modeling and Analysis (CCCma) Coupled Global Climate Model (CGCM3), Medium Resolution (T47). http://www.ec.gc.ca/ccmac-cccma (last accessed: 27 July, 2012)
MIROC3.2MR—Center for Climate System Research (CCSR), University of Tokyo; National Institute for Environmental Studies (NIES) and Frontier Research Center for Global Change (FRCGC) (Japan), Model for Interdisciplinary Research on Climate (MIROC) Version 3.2 Medium Resolution. http://www.ccsr.u-tokyo.ac.jp/kyosei/hasumi/MIROC/tech-repo.pdf (last accessed: 27 July, 2012)
CSIRO-Mk3.5—Commonwealth Scientific and Industrial Research Organization (CSIRO) (Australia), CSIRO Mk3 Climate System Model. http://www.cawcr.gov.au/publications/technicalreports/CTR_021.pdf (last accessed: 27 July, 2012)
CGCM2—Coupled Global Climate Model, Medium Resolution (T47). Canadian Centre for Climate Modelling and Analysis http://http://www.ec.gc.ca/ccmac-cccma (last accessed: 27 July, 2012)
CSIRO-Mk2—Australia's Commonwealth Scientific and Industrial Research Organisation Australia (CSIRO) http://www.cmar.csiro.au/e-print/open/hennessy_1998a.html#ccm
UKMO-HadCM3—Hadley Centre for Climate Prediction and Research UK (HCCPR) http://www-pcmdi.llnl.gov/ipcc/model_documentation/HadCM3.pdf (last accessed: 27 July, 2012)

Miles, Patrick D.; Huggett, Robert J., Jr.; Moser, W. Keith. 2015. **Northern Forest Futures reporting tools and database guide.** Gen. Tech. Rep. NRS-150. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 48 p.

The Northern Forest Futures database (NFFDB) supports the reporting of both current and projected future forest conditions for the 20 states that make up the U.S. North, an area bounded by Maine, Maryland, Missouri, and Minnesota. The NFFDB database and attendant reporting tools are available to the public as a Microsoft Access™ database. The NFF_CurrentReports tool generates customized reports for a variety of forest statistics for the 2008 inventory year. The NFF_ProjectionReports program supports the reporting of projected forest statistics by decade through the year 2060 for any of 14 scenarios that reflect varying climatic and socioeconomic possibilities. A description is provided detailing how the NFFDB was constructed using projections from the Forest Dynamics Model (FDM) combined with data from the U.S. Forest Service's Forest Inventory and Analysis database (FIADB).

KEY WORDS: forest statistics, inventory, scenarios, biomass

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