Appendices

The appendices consist of supplemental text and tables related to Chapters 2, 4, 7, 8, and 10. Content is organized by chapter and labeled to indicate the chapter from which it is introduced. For example, Tables A2.1 and A2.2, are introduced in Chapter 2. References in the appendices are listed with the citations in the related chapter.

DETAILS OF THE FOREST DYNAMICS MODEL AND SUBMODELS

The simulation algorithm links the Forest Dynamics Model (FDM) submodels together and produces predictions of future forest inventories, given a beginning inventory and assumptions about future land use and climate. In preparation for the simulation, the beginning inventory is screened for major forest-type groups that include less than 2 percent of the total plots established by the Forest Inventory and Analysis (FIA) Program of the U.S. Forest Service. Any such groups are considered too sparsely populated to model future forest type transitions directly, so a different method (described later in this section) is applied to those groups. The FIA plots in each remaining forest-type group form the bucket of suitable donor plots for that forest-type group. Plots are further subdivided by the partitioning submodel, which assigns each plot to a subgroup based upon the type of harvesting (none, partial, or full) that occurred on the plot in the previous inventory cycle.

Assuming that the beginning inventory of plots is a snapshot of forest conditions for 2010, the 2010-2015 simulation continues applying the harvest submodel to estimate the probability of each management level (unharvested, partially harvested, clearcut) for each plot in the screened 2010 inventory. A random draw from a uniform distribution assigns plots to the various management categories based on the probabilities programmed into the harvesting submodel.

Following assignment, the appropriate transition model for type of harvesting is applied. Change in the group assigned to each plot in 2015 is determined by another random draw from a uniform distribution applied to the correct group transition matrix (unharvested, partially harvested, clearcut). A plot designated as clearcut has its age reset to 2.5 years for 2015, and the other plots retain their plot age as of 2015. Based on the assumptions of future climate for each scenario, the plot location, and the forecast of plot age, each plot is assigned a climate profile for temperature, precipitation, and aridity. The predicted major forest-type group, harvesting type, forecasted age, and climate (along with the inventoried slope, aspect, and ownership) are then used to find the corresponding "bucket" of plots from which the partitioning submodel can randomly draw a replacement plot to represent that location's forest conditions for 2015.

The FDM submodels operate stochastically. Many modeled events in the transition, harvesting, partitioning, and imputation submodels (for example, whether or not a plot is harvested or shifts to a different forest type) draw a random number for the purposes of selecting a specific outcome from among all possible outcomes represented in a probability matrix (in effect, a computerized roll of the dice determines the outcome for numerous events modeled at each time step). Because of the random element in choosing outcomes at each time step, repeated projections based on the same scenario will differ in their outcomes.

Therefore, each scenario was repeated 26 times to produce a range of possible outcomes and to capture variations among simulations (limits of computing time restricted the number of repeated simulations). Wood volumes were summed for each of the 26 estimates for each time step, and an index that reflects the difference from the central tendency of growing-stock volume for each time step was calculated for each of the 26 inventory projections and summed over all time steps. For each scenario, the single inventory projection with the lowest summed index (the single inventory projection that is closest to the central tendency of growing-stock volume projected for all 26 runs of a single scenario) is the outcome summarized in subsequent analyses. The representative predicted inventory selected for each scenario has the same number of forested plots as the 2010 inventory.

The land-use submodel was used to forecast forest area. The assumed percentage of change in forest area for non-Federal land for each 5-year time step was applied to adjust the plot area expansion factors associated with each FIA plot. For example, in the first time step the plot area expansion factors in the 2010 beginning inventory were adjusted (e.g., reduced to indicate loss of forest land) to arrive at the 2015 expansion factors, and then were adjusted again in the next time step to arrive at the 2020 expansion factors, and so forth. Because the land-use submodel predicts change in forest area by county, every plot on non-Federal land within a county receives the same proportional change in forest area for a given 5-year time step. Plots on Federal land retain their 2010 expansion factors because Federal forest land area is assumed to be unchanged over the forecast period.

Harvesting removals, land-use removals (or additions), and growth and mortality can be calculated for each plot to arrive at a full bookkeeping of projected change in growing-stock volume on timberland. Harvesting removals were obtained by applying the removal intensities from the harvest submodel to the beginning inventory volume. Changes to volume resulting from land-use change (e.g., conversion of forest land to urban land) were calculated by multiplying the per-acre volume at the start of the period by the area of forest converted to other uses. Volume of total removals is the sum of harvesting removals and land-use change removals. Note that any increase in volume due to an increase in expansion factors is not included here. The FDM does not consider growth and mortality explicitly, but the net sum (net growth or other net change) can be estimated from the change in inventory. The total change in inventory between two periods is the ending inventory less the beginning inventory and is equal to the sum of harvesting removals and changes resulting from land use, growth, and mortality. Therefore, net growth = change in inventory + harvest removals + land-use removals. This formulation retains land-use additions in net growth. Subtracting land-use additions from the right-hand side of the equation accounts for net growth explicitly.

Note that total removals are divided by the time step of the simulation (5 years) to produce an annual removals estimate. Each element in this bookkeeping (beginning and ending volume, removals, and net growth) can be summed over all plots to obtain state-level totals.

SEPARATION AND SIMULATION OF HARVEST REMOVALS

The Northern Forest Futures Project relied on the removals forecasts provided by the Forest Dynamics Model for the 2010 Resources Planning Act (RPA) assessment (Wear 2011, Wear et al. 2013). These forecasts did not separate harvest removals (volume of cut trees) and land-use removals (volume of trees removed from the forest inventory when forest land is converted to other uses); only state-level total removals on an annual basis were available from the RPA assessment. A simple "top down" procedure was employed to split these state-level totals into separate estimates of land use removals and harvest removals. For a given time interval, subtracting ending timberland area from beginning timberland area provides an estimate of total forest area lost (or gained) through land use change, and a rough estimate of the sum, over all timberland plots, of the change in plot area expansion factors. Dividing the beginning inventory volume by beginning timberland area yields an approximation of per-acre beginning growing-stock volume on timberland.

Multiplying the change in timberland area by this per-acre volume gives an estimate of total removals resulting from land-use change over the 5-year time step (in these analyses projected forest area decreased in all time periods for all States). Dividing this estimate by the number of years in the time step produces an annual estimate of the removals volume due to land-use change. Subtracting this annual estimate of state land-use change removals from the total annual removals in the RPA assessment provides an estimate of annual harvest removals as the remainder.

Calculating change variables—The Forest Dynamics Model (Wear et al. 2013) was applied to calculate inventory summaries (volumes, number of trees, forest-type groups) based on imputed future inventories of tree species and tree size. The removals submodel is a component of the projection model that estimates the probability of a tree being harvested based on its species and diameter. This information aids in estimating annual harvest removals. The removals estimates were converted to an annual basis. An additional factor was included in the total removals estimate—the estimate of trees that are not harvested on forested parcels, but instead are removed from the inventory due to conversion of forest to other land uses.

Calculations for determining volume changes between succeeding periods are shown in Equations 1-3. This change in volume is made up of three components: growth, mortality, and removals. The Forest Dynamics Model does not model mortality directly. All of the change variables are modeled based on growing stock on timberland, so the volume equations do so as well.

$$\Delta Vol_{12} = Vol_2 - Vol_1 \quad (1)$$

$$\Delta Vol_{12} = Net\ growth_{12} - Removals(total)_{12} \quad (2)$$

$$Net\ growth_{12} = \Delta Vol_{12} + Removals(total)_{12} \quad (3)$$

Where:

Vol is growing-stock volume on timberland

ΔVol is periodic change in growing-stock volume

Net growth is growing-stock volume growth less mortality

Removals(total) is combined removals due to harvest and land-use change

subscript 1 represents variables from time period 1

subscript 2 represents variables from time period 2

subscript 12 represents change from the time period 1 to 2.

Calculating removals—Because two types of removals (removals resulting from harvesting and removals from land-use change [LUC]) are included in the total removals estimate, removals can be calculated as in Equation 4.

$$Removals(total)_{12} = Removals(harvest)_{12} + Removals(LUC)_{12} \quad (4)$$

where the removals component is indicated within the parentheses.

Periodic removals resulting from land-use change were calculated as the product of the land area converted from forest to another land use and the mean volume per acre as shown in Equations 5 and 6.

$$Vol/acre_1 = Vol_1/Area_1 \quad (5)$$

$$\Delta Area_{12} = Area_1 - Area_2 \quad (6)$$

Where:

Vol/acre is mean growing-stock volume per acre

Area is timber land area.

Multiplying the change in timberland area (acres) over a given time interval by the mean volume per acre produces an estimate of periodic total volume removals due to land use change. Dividing this estimate by the number of years in the interval gives an annual estimate of the volume removals due to land-use change (Eq. 7), and harvest removals were estimated by subtraction (Eq. 8).

$$Removals(LUC)_{12} = (Vol_1/Area_1 * \Delta Area_{12})/ Time_{12} \quad (7)$$

$$Removals(harvest)_{12} = Removals(total)_{12} - Removals(LUC)_{12} \quad (8)$$

where *Time* is the number of years in the specified interval.

Note that for forest area estimates (Eq. 6, 7), in all cases forest land area declined at the State level between two estimation periods, but at smaller spatial scales (which were not evaluated), forest land area may occasionally increase.

MODELING EFFECTS OF THE EMERALD ASH BORER

The effects of the emerald ash borer (*Agrilus planipennis*) on the number and volume of ash trees (*Fraxinus* spp.) were summarized for the broad category of forest-type groups and at the large scale of FIA inventory units. Our modeling results suggest that effects will contribute to a small decrease in the total number of trees and saplings in many FIA inventory units from 2010 to 2060, but changes in the elm-ash-cottonwood (*Ulmus* spp.–*Fraxinus* spp.–*Populus* spp.) forest-type group will vary among FIA inventory units. Forest species composition in forests measured by FIA will change when ash trees are killed by the emerald ash borer, but modeling results suggest that effects will not cause substantial changes in the number of plots in any given forest-type group.

For example, the area of forest in the elm-ash-cottonwood group is expected to show little change over time even though emerald ash borer is expected to kill all the ash trees in many locations. Some of the impacts of infestation on ecosystem functioning may be modest because associated non-ash species not prone to infestation have the potential to offset the loss of ash trees and their associated volume. Consequently, despite the assumption that emerald ash borer will cause 100 percent ash mortality, the transition from ash to other species may progress slowly as ash is replaced by a variety of associated species. However, the effects of infestation could lead to canopy gaps and facilitate an increase in native and nonnative invasive plant species (Gandhi and Herms 2010). Because changes were analyzed by forest-type groups, considering geographic differences in the composition of each forest-type group was important. For example, ash is not a significant component of any forest-type group in Maine FIA inventory units, but the elm-ash-cottonwood forest-type group in Minnesota FIA inventory units is composed mainly of green ash (*Fraxinus pennsylvanica*) and black ash (*F. nigra*). It is also important to keep in mind that this modeling may not apply to urban areas not measured by FIA, where the extensive distribution of planted ash trees could result in a greater impact.

Table A2.1—Projected population from 2010 to 2060 in North under three greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007, Zarnoch et al. 2010).

State	Storyline[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(1,000 people)						(percent)
Connecticut	A1B	3,535	3,654	3,792	3,947	4,115	4,281	21
	A2	3,606	3,768	3,959	4,188	4,481	4,836	34
	B2	3,524	3,634	3,681	3,690	3,738	3,802	8
District of Columbia	A1B	570	548	531	518	507	500	-12
	A2	581	566	554	549	553	565	-3
	B2	568	545	515	484	461	444	-22
Delaware	A1B	884	969	1,057	1,145	1,229	1,309	48
	A2	902	999	1,103	1,215	1,338	1,478	64
	B2	881	964	1,026	1,070	1,116	1,162	32
Iowa	A1B	3,005	3,100	3,212	3,339	3,473	3,613	20
	A2	3,065	3,197	3,353	3,543	3,781	4,082	33
	B2	2,996	3,083	3,118	3,121	3,155	3,209	7
Illinois	A1B	13,042	13,717	14,451	15,160	15,794	16,365	25
	A2	13,304	14,145	15,087	16,084	17,196	18,488	39
	B2	13,002	13,641	14,030	14,170	14,347	14,534	12
Indiana	A1B	6,402	6,698	7,025	7,383	7,758	8,148	27
	A2	6,531	6,908	7,334	7,833	8,447	9,205	41
	B2	6,383	6,661	6,820	6,901	7,048	7,236	13
Massachusetts	A1B	6,498	6,731	6,997	7,272	7,539	7,801	20
	A2	6,629	6,941	7,305	7,715	8,209	8,813	33
	B2	6,479	6,694	6,793	6,798	6,849	6,928	7
Maryland	A1B	5,877	6,579	7,290	7,964	8,571	9,120	55
	A2	5,995	6,785	7,611	8,450	9,332	10,303	72
	B2	5,860	6,543	7,077	7,445	7,786	8,100	38
Maine	A1B	1,342	1,407	1,479	1,562	1,654	1,756	31
	A2	1,369	1,451	1,544	1,657	1,801	1,983	45
	B2	1,338	1,399	1,436	1,460	1,503	1,559	17

Table A2.1 continued

State	Storyline[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(1,000 people)						(percent)
Michigan	A1B	10,165	10,465	10,821	11,236	11,688	12,173	20
	A2	10,369	10,792	11,298	11,921	12,725	13,753	33
	B2	10,134	10,407	10,506	10,503	10,617	10,811	7
Minnesota	A1B	5,358	5,884	6,423	6,962	7,483	7,988	49
	A2	5,465	6,068	6,706	7,387	8,147	9,024	65
	B2	5,342	5,852	6,236	6,508	6,798	7,094	33
Missouri	A1B	5,960	6,320	6,704	7,133	7,597	8,091	36
	A2	6,080	6,518	6,999	7,568	8,271	9,141	50
	B2	5,942	6,285	6,509	6,668	6,901	7,186	21
New Hampshire	A1B	1,379	1,549	1,722	1,900	2,078	2,256	64
	A2	1,406	1,598	1,798	2,016	2,263	2,548	81
	B2	1,375	1,541	1,672	1,776	1,888	2,003	46
New Jersey	A1B	8,948	9,601	10,287	10,928	11,484	11,969	34
	A2	9,127	9,901	10,740	11,594	12,503	13,522	48
	B2	8,921	9,548	9,987	10,215	10,432	10,630	19
New York	A1B	19,382	19,820	20,371	20,934	21,448	21,929	13
	A2	19,771	20,440	21,267	22,211	23,352	24,774	25
	B2	19,323	19,711	19,776	19,568	19,484	19,475	1
Ohio	A1B	11,484	11,653	11,893	12,183	12,491	12,811	12
	A2	11,715	12,017	12,416	12,926	13,599	14,473	24
	B2	11,450	11,589	11,546	11,388	11,347	11,378	-1
Pennsylvania	A1B	12,555	12,994	13,498	14,058	14,640	15,236	21
	A2	12,807	13,400	14,092	14,916	15,940	17,213	34
	B2	12,517	12,922	13,104	13,141	13,300	13,531	8

Table A2.1 continued

State	Storyline[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(1,000 people)						(percent)
Rhode Island	A1B	1,089	1,154	1,223	1,289	1,349	1,404	29
	A2	1,111	1,190	1,277	1,367	1,469	1,586	43
	B2	1,086	1,147	1,188	1,204	1,226	1,247	15
Vermont	A1B	643	696	751	813	881	956	49
	A2	656	717	784	863	960	1,080	65
	B2	641	692	729	760	801	849	32
Wisconsin	A1B	5,687	6,073	6,481	6,922	7,383	7,861	38
	A2	5,801	6,263	6,767	7,344	8,038	8,881	53
	B2	5,670	6,040	6,292	6,470	6,707	6,981	23
West Virginia	A1B	1,818	1,840	1,873	1,919	1,972	2,034	12
	A2	1,854	1,898	1,956	2,036	2,147	2,298	24
	B2	1,812	1,830	1,819	1,793	1,792	1,806	0
All Northern States	A1B	125,621	131,454	137,881	144,565	151,134	157,598	25
	A2	128,141	135,562	143,948	153,380	164,550	178,045	39
	B2	125,242	130,727	133,860	135,132	137,294	139,964	12
U.S. total	A1B	308,936	335,805	363,584	391,946	419,854	447,308	45
	A2	315,135	346,297	379,581	415,845	457,122	505,344	60
	B2	308,004	333,948	352,980	366,372	381,404	397,259	29

[a]*Storyline A1B assumes moderate greenhouse gas emissions associated with moderate population growth and large gains in income and energy consumption but with a balanced renewable/fossil fuel portfolio; storyline A2 assumes high greenhouse gas emissions associated with high population growth, high energy consumption, and moderate gains in income; and storyline B2 assumes low greenhouse gas emissions associated with moderate increases in population, income, and energy consumption.*

Table A2.2—Projected land use from 2010 to 2060 in the North under three greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007, Wear 2011); note that percentages may not sum to 100 due to rounding and that the total area is 413,586,000 acres or 646,228 square miles.

Storyline[a]	Year	Forest	Urban	Cropland	Pasture	Range
		(percent of total land area)				
A1B	2010	41	9	39	10	< 1
	2020	41	11	39	10	< 1
	2030	40	12	38	10	< 1
	2040	40	13	38	10	< 1
	2050	39	14	37	9	< 1
	2060	39	16	37	9	< 1
A2	2010	41	9	39	10	< 1
	2020	41	10	39	10	< 1
	2030	41	11	39	10	< 1
	2040	40	12	38	10	< 1
	2050	40	13	38	10	< 1
	2060	39	14	37	9	< 1
B2	2010	41	10	39	10	< 1
	2020	41	11	39	10	< 1
	2030	41	11	39	10	< 1
	2040	40	12	38	10	< 1
	2050	40	12	38	10	< 1
	2060	40	13	38	10	< 1

[a]*Storyline A1B assumes moderate greenhouse gas emissions associated with moderate population growth and large gains in income and energy consumption, but with a balanced renewable/fossil fuel portfolio; storyline A2 assumes high greenhouse gas emissions associated with high population growth, high energy consumption, and moderate gains in income; and storyline B2 assumes low greenhouse gas emissions associated with moderate increases in population, income, and energy consumption.*

Table A2.3—Projected forest area, 2010 to 2060, and percentage change in forest area in the North under three greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007, Wear 2011).

State	Storyline[a]	Year						Change (2010 to 2060)
		2010	2020	2030	2040	2050	2060	
		(1,000 acres)						(percent)
Connecticut	A1B	1,724	1,691	1,657	1,620	1,580	1,537	-11
	A2	1,724	1,689	1,653	1,613	1,567	1,512	-12
	B2	1,724	1,694	1,676	1,663	1,644	1,626	-6
Delaware	A1B	352	339	327	315	301	287	-18
	A2	352	340	328	315	301	285	-19
	B2	352	340	332	326	318	311	-12
Illinois	A1B	4,798	4,703	4,648	4,597	4,539	4,472	-7
	A2	4,798	4,722	4,683	4,651	4,614	4,570	-5
	B2	4,798	4,712	4,677	4,645	4,607	4,582	-5
Indiana	A1B	4,744	4,654	4,569	4,475	4,364	4,235	-11
	A2	4,744	4,678	4,617	4,554	4,478	4,388	-7
	B2	4,744	4,671	4,636	4,596	4,537	4,493	-5
Iowa	A1B	3,033	3,012	2,993	2,971	2,945	2,915	-4
	A2	3,033	3,018	3,005	2,991	2,974	2,953	-3
	B2	3,033	3,017	3,009	3,000	2,986	2,977	-2
Maine	A1B	17,657	17,598	17,541	17,477	17,404	17,319	-2
	A2	17,657	17,606	17,558	17,507	17,444	17,369	-2
	B2	17,657	17,607	17,580	17,554	17,515	17,481	-1
Maryland	A1B	2,493	2,314	2,142	1,977	1,826	1,680	-33
	A2	2,493	2,328	2,167	2,019	1,883	1,746	-30
	B2	2,493	2,330	2,216	2,119	2,022	1,952	-22
Massachusetts	A1B	3,019	2,941	2,861	2,779	2,700	2,627	-13
	A2	3,019	2,939	2,858	2,774	2,687	2,597	-14
	B2	3,019	2,949	2,904	2,870	2,831	2,796	-7
Michigan	A1B	19,821	19,624	19,431	19,219	18,977	18,701	-6
	A2	19,821	19,655	19,491	19,317	19,110	18,856	-5
	B2	19,821	19,655	19,559	19,466	19,337	19,225	-3
Minnesota	A1B	16,990	16,872	16,760	16,644	16,518	16,389	-4
	A2	16,990	16,888	16,793	16,697	16,591	16,487	-3
	B2	16,990	16,887	16,822	16,761	16,687	16,626	-2
Missouri	A1B	15,397	15,262	15,132	14,987	14,819	14,625	-5
	A2	15,397	15,290	15,186	15,075	14,941	14,774	-4
	B2	15,397	15,285	15,219	15,147	15,053	14,976	-3
New Hampshire	A1B	4,803	4,727	4,654	4,577	4,493	4,401	-8
	A2	4,803	4,736	4,671	4,604	4,529	4,441	-8
	B2	4,803	4,736	4,691	4,649	4,599	4,557	-5

Table A2.3 continued

State	Storyline[a]	Year						Change (2010 to 2060)
		2010	2020	2030	2040	2050	2060	
		(1,000 acres)						(percent)
New Jersey	A1B	2,002	1,859	1,722	1,597	1,483	1,379	-31
	A2	2,002	1,849	1,706	1,572	1,441	1,309	-35
	B2	2,002	1,869	1,778	1,717	1,658	1,611	-20
New York	A1B	18,951	18,804	18,681	18,547	18,394	18,219	-4
	A2	18,951	18,824	18,719	18,608	18,476	18,312	-3
	B2	18,951	18,826	18,770	18,717	18,647	18,591	-2
Ohio	A1B	8,044	7,964	7,887	7,802	7,703	7,591	-6
	A2	8,044	7,975	7,907	7,835	7,746	7,633	-5
	B2	8,044	7,978	7,943	7,911	7,869	7,835	-3
Pennsylvania	A1B	16,652	16,368	16,092	15,787	15,439	15,044	-10
	A2	16,652	16,418	16,191	15,949	15,661	15,310	-8
	B2	16,652	16,417	16,292	16,173	16,002	15,864	-5
Rhode Island	A1B	348	323	306	290	273	257	-26
	A2	348	323	305	288	269	248	-29
	B2	348	325	315	309	302	296	-15
Vermont	A1B	4,588	4,538	4,492	4,442	4,385	4,322	-6
	A2	4,588	4,551	4,518	4,484	4,446	4,400	-4
	B2	4,588	4,547	4,525	4,500	4,466	4,439	-3
West Virginia	A1B	11,974	11,802	11,642	11,463	11,249	10,992	-8
	A2	11,974	11,859	11,758	11,656	11,529	11,370	-5
	B2	11,974	11,840	11,784	11,713	11,601	11,524	-4
Wisconsin	A1B	16,697	16,562	16,432	16,291	16,126	15,936	-5
	A2	16,697	16,589	16,488	16,381	16,253	16,096	-4
	B2	16,697	16,584	16,522	16,456	16,366	16,291	-2
All Northern States	A1B	174,090	171,958	169,967	167,857	165,520	162,925	-6
	A2	174,090	172,276	170,601	168,891	166,938	164,656	-5
	B2	174,090	172,270	171,250	170,291	169,047	168,053	-3

[a]*Storyline A1B assumes moderate greenhouse gas emissions associated with moderate population growth and large gains in income and energy consumption but with a balanced renewable/fossil fuel portfolio; storyline A2 assumes high greenhouse gas emissions associated with high population growth, high energy consumption, and moderate gains in income; and storyline B2 assumes low greenhouse gas emissions associated with moderate increases in population, income, and energy consumption.*

Table A2.4—Underlying large-scale assumptions about future biomass consumption for bioenergy in the multi-national macro-region Organization for Economic Cooperation and Development (OECD 90) (Ince et al. 2011, USDA FS 2012b) under three greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

Source	Storyline[a]	Year						
		2000	2010	2020	2030	2040	2050	2060
		(1,000,000 tons)						
Roundwood fuelwood (forests)	A1B	93.1	105.3	240.4	405.3	628.9	1,022.5	1,297.1
	A2	93.1	98.8	154.4	356.8	544.2	748.2	746.1
	B2	93.1	98.9	133.0	67.1	45.7	145.4	263.8
Energy plantations	A1B	0.0	0.0	82.8	198.2	353.4	625.0	784.2
	A2	0.0	0.0	62.4	193.7	338.4	467.6	458.9
	B2	0.0	0.0	19.6	91.9	159.2	215.2	289.0
Cropland crops and residues	A1B	257.4	210.7	209.8	209.4	207.5	205.7	203.0
	A2	257.4	216.8	220.6	224.6	229.2	233.9	239.5
	B2	257.4	216.7	221.0	225.1	228.3	231.4	234.7

[a]*Storyline A1B assumes moderate greenhouse gas emissions associated with moderate population growth and large gains in income and energy consumption but with a balanced renewable/fossil fuel portfolio; storyline A2 assumes high greenhouse gas emissions associated with high population growth, high energy consumption, and moderate gains in income; and storyline B2 assumes low greenhouse gas emissions associated with moderate increases in population, income, and energy consumption..*

Table A2.5—Projected biomass production for bioenergy from roundwood and fuelwood, 2010 to 2060, under three greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

Source	Storyline[a]	Year					
		2010	2020	2030	2040	2050	2060
		(billion cubic feet)					
(Mill) fuel residue	A1B	2.0	2.6	2.8	3.5	3.4	3.4
	A2	2.4	2.3	2.2	2.3	2.1	1.2
	B2	2.4	2.4	2.4	2.3	2.4	2.6
(Recovered) harvest residue	A1B	0.0	3.6	5.9	8.9	12.5	16.3
	A2	0.0	2.8	4.1	5.8	7.7	10.0
	B2	0.0	1.6	3.7	4.2	4.7	5.6
Hardwood pulpwood	A1B	0.0	0.0	1.0	4.1	9.5	14.3
	A2	0.0	0.0	0.0	0.4	2.6	4.5
	B2	0.0	0.0	0.0	0.0	0.0	0.0
Mill (fiber) residue	A1B	0.1	0.3	0.5	1.3	2.2	3.3
	A2	0.1	0.4	1.0	2.1	2.1	1.2
	B2	0.0	0.0	0.2	0.6	1.7	2.4
Roundwood fuelwood harvesting	A1B	1.8	2.2	3.3	4.8	7.0	9.0
	A2	1.7	1.9	2.5	3.1	4.2	5.7
	B2	1.7	1.7	2.0	2.5	2.9	3.4
Softwood pulpwood	A1B	0.2	1.1	3.4	6.9	11.2	16.5
	A2	0.1	0.1	2.3	5.0	8.5	15.1
	B2	0.0	0.0	0.0	0.1	0.2	0.6

[a]*Storyline A1B assumes moderate greenhouse gas emissions associated with moderate population growth and large gains in income and energy consumption but with a balanced renewable/fossil fuel portfolio; storyline A2 assumes high greenhouse gas emissions associated with high population growth, high energy consumption, and moderate gains in income; and storyline B2 assumes low greenhouse gas emissions associated with moderate increases in population, income, and energy consumption.*

Please refer to the Literature Cited section at the end of Chapter 2 for the references.

Table A4.1—Projected forest land area by forest-type group for the North, 2010 to 2060, under three greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

Forest-type group and storyline[a]	Year					
	2010	2020	2030	2040	2050	2060
	(1,000 acres)					
Aspen-birch						
A1B	17,255	15,964	15,324	15,213	15,087	14,451
A2	17,255	16,012	15,365	15,280	15,182	14,203
B2	17,255	16,129	15,339	15,288	15,220	14,687
Elm-ash-cottonwood						
A1B	12,147	10,976	10,222	10,068	9,903	10,213
A2	12,147	10,923	10,503	10,363	10,205	9,966
B2	12,147	10,740	10,541	10,467	10,375	10,346
Maple-beech-birch						
A1B	44,982	46,104	46,668	46,216	45,704	46,441
A2	44,982	46,191	46,805	46,467	46,063	46,635
B2	44,982	46,703	47,339	47,147	46,882	47,623
Oak-hickory						
A1B	63,184	62,851	62,459	61,455	60,342	57,730
A2	63,184	63,125	62,276	61,463	60,538	59,329
B2	63,184	62,782	62,215	61,758	61,167	60,197
Other						
A1B	12,746	12,209	12,012	11,775	11,527	11,307
A2	12,746	12,347	12,128	11,917	11,695	11,556
B2	12,746	12,271	12,020	11,909	11,778	12,361
Spruce-fir						
A1B	15,279	15,037	14,342	14,276	14,199	13,659
A2	15,279	15,039	14,682	14,632	14,573	13,836
B2	15,279	14,839	14,763	14,732	14,688	13,676
White-red-jack pine						
A1B	8,497	8,817	8,940	8,855	8,758	9,123
A2	8,497	8,639	8,843	8,769	8,682	9,131
B2	8,497	8,806	9,033	8,991	8,937	9,163

[a]*Storyline A1B assumes moderate greenhouse gas emissions associated with moderate population growth and large gains in income and energy consumption but with a balanced renewable/fossil fuel portfolio; storyline A2 assumes high greenhouse gas emissions associated with high population growth, high energy consumption, and moderate gains in income; and storyline B2 assumes low greenhouse gas emissions associated with moderate increases in population, income, and energy consumption.*

Table A4.2—Projected volume of live trees on forest land in the North, 2010 to 2060, for seven future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

State	Scenario[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(million cubic feet)						(percent)
Connecticut	A1B-C	4,127	4,232	4,669	4,564	4,450	4,065	-2
	A2-C	4,127	4,354	4,357	4,255	4,134	3,767	-9
	B2-C	4,127	4,080	4,024	3,990	3,944	4,101	-1
	A2-EAB	4,127	4,222	4,128	4,030	3,913	3,585	-13
	A1B-BIO	4,127	4,225	4,369	4,271	4,165	3,943	-4
	A2-BIO	4,127	4,247	4,308	4,205	4,083	3,914	-5
	B2-BIO	4,127	4,243	4,022	3,988	3,942	3,850	-7
Delaware	A1B-C	862	867	897	860	822	738	-14
	A2-C	862	876	841	808	771	766	-11
	B2-C	862	872	889	869	848	806	-7
	A2-EAB	862	888	765	734	700	744	-14
	A1B-BIO	862	835	857	821	783	675	-22
	A2-BIO	862	928	906	869	828	712	-17
	B2-BIO	862	858	841	823	803	825	-4
Illinois	A1B-C	8,652	9,238	8,830	8,735	8,627	8,308	-4
	A2-C	8,652	8,877	8,871	8,810	8,740	8,656	0
	B2-C	8,652	9,083	8,554	8,491	8,418	9,087	5
	A2-EAB	8,652	9,337	8,473	8,415	8,347	8,311	-4
	A1B-BIO	8,652	8,694	8,874	8,775	8,663	7,680	-11
	A2-BIO	8,652	8,804	8,966	8,896	8,817	7,829	-10
	B2-BIO	8,652	9,147	8,961	8,896	8,821	8,262	-5
Indiana	A1B-C	9,785	10,527	10,468	10,255	10,005	10,117	3
	A2-C	9,785	10,254	10,231	10,095	9,931	10,585	8
	B2-C	9,785	10,253	10,597	10,508	10,377	10,228	5
	A2-EAB	9,785	9,564	10,144	10,010	9,849	9,833	0
	A1B-BIO	9,785	10,383	10,139	9,926	9,676	8,799	-10
	A2-BIO	9,785	10,329	10,506	10,369	10,204	9,499	-3
	B2-BIO	9,785	10,136	10,793	10,703	10,571	9,840	1

Table A4.2 continued

State	Scenario[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(million cubic feet)						(percent)
Iowa	A1B-C	4,256	5,019	5,027	4,992	4,950	4,780	12
	A2-C	4,256	4,800	4,921	4,894	4,862	5,095	20
	B2-C	4,256	4,922	5,085	5,070	5,048	5,185	22
	A2-EAB	4,256	4,893	5,175	5,088	5,022	4,605	8
	A1B-BIO	4,256	4,708	4,679	4,646	4,607	3,747	-12
	A2-BIO	4,256	4,728	4,910	4,883	4,851	4,059	-5
	B2-BIO	4,256	4,724	5,003	4,986	4,962	4,569	7
Maine	A1B-C	25,474	26,738	27,130	27,013	26,877	26,046	2
	A2-C	25,474	26,551	27,544	27,446	27,329	27,043	6
	B2-C	25,474	26,804	27,084	27,035	26,965	27,191	7
	A2-EAB	25,474	26,632	26,933	26,367	26,070	25,980	2
	A1B-BIO	25,474	25,864	24,703	24,597	24,475	14,939	-41
	A2-BIO	25,474	26,168	25,782	25,686	25,571	18,810	-26
	B2-BIO	25,474	26,627	26,525	26,478	26,409	22,367	-12
Maryland	A1B-C	6,469	6,275	5,883	5,377	4,926	4,708	-27
	A2-C	6,469	6,248	5,802	5,373	4,990	4,576	-29
	B2-C	6,469	6,221	5,704	5,425	5,158	4,913	-24
	A2-EAB	6,469	6,466	6,050	5,606	5,216	4,531	-30
	A1B-BIO	6,469	6,044	5,399	4,952	4,563	3,735	-42
	A2-BIO	6,469	6,070	5,728	5,306	4,927	4,128	-36
	B2-BIO	6,469	6,404	5,751	5,486	5,227	4,617	-29
Massachusetts	A1B-C	7,754	7,863	7,359	7,175	6,991	6,630	-14
	A2-C	7,754	7,637	7,500	7,302	7,092	6,765	-13
	B2	7,754	7,577	7,490	7,418	7,331	7,021	-9
	A2-EAB	7,754	7,651	7,521	7,021	6,822	6,333	-18
	A1B-BIO	7,754	7,717	7,523	7,327	7,135	6,696	-14
	A2-BIO	7,754	7,700	7,494	7,291	7,077	6,422	-17
	B2-BIO	7,754	7,880	7,749	7,675	7,588	7,398	-5

Table A4.2 continued

State	Scenario[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(million cubic feet)						(percent)
Michigan	A1B-C	31,553	32,857	33,405	33,024	32,590	33,934	8
	A2-C	31,553	32,844	33,505	33,194	32,824	34,290	9
	B2-C	31,553	32,967	34,196	34,026	33,791	35,574	13
	A2-EAB	31,553	31,510	32,143	31,847	31,494	32,742	4
	A1B-BIO	31,553	32,515	32,146	31,787	31,379	25,620	-19
	A2-BIO	31,553	33,008	32,650	32,344	31,978	29,003	-8
	B2-BIO	31,553	32,791	33,930	33,763	33,533	32,368	3
Minnesota	A1B-C	18,099	19,232	20,498	20,314	20,116	22,013	22
	A2-C	18,099	19,569	21,021	20,843	20,649	22,403	24
	B2-C	18,099	19,292	20,487	20,387	20,268	20,968	16
	A2-EAB	18,099	19,767	20,874	19,812	18,847	20,901	15
	A1B-BIO	18,099	19,218	18,906	18,730	18,540	12,807	-29
	A2-BIO	18,099	19,520	20,591	20,428	20,253	18,504	2
	B2-BIO	18,099	19,340	20,361	20,261	20,142	17,933	-1
Missouri	A1B-C	20,143	21,930	22,529	22,309	22,054	23,298	16
	A2-C	20,143	21,625	22,161	21,996	21,798	23,451	16
	B2-C	20,143	21,075	22,396	22,290	22,152	24,064	19
	A2-EAB	20,143	21,489	22,396	21,972	21,609	23,341	16
	A1B-BIO	20,143	21,156	21,718	21,510	21,269	19,779	-2
	A2-BIO	20,143	21,707	21,859	21,700	21,507	21,649	7
	B2-BIO	20,143	21,402	22,430	22,325	22,187	22,731	13
New Hampshire	A1B-C	10,670	11,298	11,247	11,045	10,826	10,618	0
	A2-C	10,670	11,378	11,367	11,183	10,977	10,697	0
	B2-C	10,670	11,232	11,418	11,309	11,181	11,069	4
	A2-EAB	10,670	11,033	11,114	10,735	10,535	10,289	-4
	A1B-BIO	10,670	10,995	10,930	10,725	10,505	8,300	-22
	A2-BIO	10,670	11,203	10,944	10,768	10,571	9,409	-12
	B2-BIO	10,670	10,779	11,256	11,145	11,014	10,002	-6

Table A4.2 continued

State	Scenario[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(million cubic feet)						(percent)
New Jersey	A1B-C	3,919	3,835	3,557	3,308	3,078	2,768	-29
	A2-C	3,919	3,497	3,439	3,176	2,917	2,790	-29
	B2-C	3,919	3,878	3,842	3,707	3,579	3,253	-17
	A2-EAB	3,919	3,559	3,215	2,957	2,707	2,593	-34
	A1B-BIO	3,919	3,690	3,426	3,171	2,937	2,634	-33
	A2-BIO	3,919	3,726	3,668	3,399	3,134	2,567	-35
	B2-BIO	3,919	3,738	3,577	3,455	3,339	3,155	-19
New York	A1B-C	39,609	41,756	43,115	42,796	42,433	42,506	7
	A2-C	39,609	41,519	42,696	42,434	42,120	42,281	7
	B2-C	39,609	41,229	43,210	43,084	42,914	43,418	10
	A2-EAB	39,609	41,448	40,560	40,316	40,023	40,687	3
	A1B-BIO	39,609	40,856	42,585	42,276	41,924	40,247	2
	A2-BIO	39,609	40,999	42,463	42,206	41,899	41,474	5
	B2-BIO	39,609	41,208	43,145	43,021	42,854	42,156	6
Ohio	A1B-C	15,992	17,576	17,884	17,682	17,449	18,780	17
	A2-C	15,992	17,587	17,504	17,345	17,145	17,944	12
	B2-C	15,992	17,102	18,021	17,942	17,837	18,526	16
	A2-EAB	15,992	15,765	16,719	16,560	16,365	16,944	6
	A1B-BIO	15,992	17,007	16,884	16,696	16,478	13,948	-13
	A2-BIO	15,992	16,604	17,422	17,254	17,048	16,027	0
	B2-BIO	15,992	16,691	17,876	17,802	17,701	17,172	7
Pennsylvania	A1B-C	35,386	35,318	35,040	34,364	33,594	34,093	-4
	A2-C	35,386	34,921	35,469	34,922	34,269	34,847	-2
	B2-C	35,386	35,349	36,492	36,215	35,821	35,978	2
	A2-EAB	35,386	35,221	35,125	34,602	33,978	34,758	-2
	A1B-BIO	35,386	35,794	34,662	34,006	33,260	27,624	-22
	A2-BIO	35,386	35,806	35,770	35,244	34,615	31,090	-12
	B2-BIO	35,386	35,472	35,824	35,562	35,186	33,514	-5

Table A4.2 continued

State	Scenario[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(million cubic feet)						(percent)
Rhode Island	A1B-C	786	707	742	702	663	581	-26
	A2-C	786	778	695	658	616	573	-27
	B2-C	786	675	710	696	680	658	-16
	A2-EAB	786	735	725	672	629	560	-29
	A1B-BIO	786	748	812	769	726	613	-22
	A2-BIO	786	734	678	641	600	623	-21
	B2-BIO	786	739	701	688	672	633	-19
Vermont	A1B-C	10,174	10,540	10,558	10,438	10,303	10,346	2
	A2-C	10,174	10,266	10,727	10,644	10,548	10,770	6
	B2-C	10,174	10,705	10,786	10,727	10,645	10,366	2
	A2-EAB	10,174	10,404	9,908	9,834	9,750	9,830	-3
	A1B-BIO	10,174	10,544	10,473	10,352	10,217	8,288	-19
	A2-BIO	10,174	10,234	10,817	10,737	10,646	9,296	-9
	B2-BIO	10,174	10,526	10,688	10,629	10,547	10,561	4
West Virginia	A1B-C	27,102	26,327	26,897	26,487	25,995	25,546	-6
	A2-C	27,102	26,686	26,435	26,209	25,932	26,544	-2
	B2-C	27,102	26,092	26,286	26,133	25,892	26,299	-3
	A2-EAB	27,102	26,686	27,426	27,199	26,920	27,332	1
	A1B-BIO	27,102	26,534	25,579	25,198	24,740	20,069	-26
	A2-BIO	27,102	26,808	26,112	25,892	25,620	23,223	-14
	B2-BIO	27,102	26,032	26,338	26,181	25,934	24,856	-8
Wisconsin	A1B-C	23,242	25,818	27,208	26,973	26,699	28,378	22
	A2-C	23,242	25,810	27,293	27,114	26,899	28,855	24
	B2-C	23,242	25,673	27,102	26,995	26,847	28,895	24
	A2-EAB	23,242	25,608	25,402	25,236	25,038	27,074	16
	A1B-BIO	23,242	25,263	25,057	24,835	24,577	17,722	-24
	A2-BIO	23,242	25,695	26,403	26,226	26,014	22,068	-5
	B2-BIO	23,242	25,280	26,670	26,562	26,413	24,985	8

Table A4.2 continued

State	Scenario[a]	Year						Change 2010 to 2060
		2010	2020	2030	2040	2050	2060	
		(million cubic feet)						(percent)
All Northern States	A1B-C	304,055	317,951	322,940	318,412	313,447	318,255	5
	A2-C	304,055	316,077	322,381	318,700	314,544	322,699	6
	B2-C	304,055	315,081	324,374	322,317	319,695	327,599	8
	A2-EAB	304,055	312,877	314,795	309,013	303,833	310,974	2
	A1B-BIO	304,055	312,790	309,721	305,370	300,619	247,866	-18
	A2-BIO	304,055	315,018	317,979	314,345	310,242	280,307	-8
	B2-BIO	304,055	314,018	322,441	320,428	317,845	301,793	-1

[a]*There are seven scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections assume harvest will continue at recently observed levels (labeled –C) or increase to reflect increased harvest for bioenergy production (labeled –BIO). Scenario A2-EAB is a variation of scenario A2-C that also assumes all ash species will gradually succumb to an expanding zone of infestation by the nonnative emerald ash borer.*

Table A4.3—Projected volume of total annual removals in the North, 2010 to 2060, for seven future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Connecticut	A1B-C	54	22	18	16	18	15
	A2-C	54	24	17	18	20	18
	B2-C	54	17	13	5	6	8
	A2-EAB	54	31	17	11	16	15
	A1B-BIO	54	21	29	24	24	24
	A2-BIO	54	21	19	25	18	23
	B2-BIO	54	20	22	12	12	15
Delaware	A1B-C	7	6	7	12	7	9
	A2-C	7	10	7	7	9	11
	B2-C	7	9	8	7	10	7
	A2-EAB	7	8	9	6	7	10
	A1B-BIO	7	10	8	15	21	19
	A2-BIO	7	7	9	10	13	18
	B2-BIO	7	7	9	10	10	13
Illinois	A1B-C	58	49	39	64	48	50
	A2-C	58	54	38	30	57	43
	B2-C	58	54	36	71	53	39
	A2-EAB	58	51	44	33	52	55
	A1B-BIO	58	59	60	97	132	162
	A2-BIO	58	61	47	72	96	142
	B2-BIO	58	56	59	55	83	76
Indiana	A1B-C	80	115	106	142	143	115
	A2-C	80	113	115	89	111	132
	B2-C	80	97	90	104	126	110
	A2-EAB	80	94	89	95	93	133
	A1B-BIO	80	122	168	282	371	423
	A2-BIO	80	111	155	194	259	331
	B2-BIO	80	125	97	164	217	220

Table A4.3 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Iowa	A1B-C	46	39	50	69	47	48
	A2-C	46	47	64	40	39	46
	B2-C	46	48	74	56	86	69
	A2-EAB	46	39	50	53	35	42
	A1B-BIO	46	49	105	134	144	169
	A2-BIO	46	51	63	78	101	120
	B2-BIO	46	49	56	98	87	98
Maine	A1B-C	562	549	558	556	560	575
	A2-C	562	524	549	567	503	581
	B2-C	562	586	575	565	566	500
	A2-EAB	562	541	541	519	515	564
	A1B-BIO	562	630	890	1,106	1,172	1,157
	A2-BIO	562	631	709	830	1,020	1,079
	B2-BIO	562	574	645	718	836	880
Maryland	A1B-C	67	103	74	76	67	79
	A2-C	67	85	80	81	81	68
	B2-C	67	81	65	69	81	60
	A2-EAB	67	87	70	72	84	80
	A1B-BIO	67	107	126	113	144	125
	A2-BIO	67	96	90	113	118	120
	B2-BIO	67	104	75	72	105	104
Massachusetts	A1B-C	35	34	32	29	18	21
	A2-C	35	37	32	23	20	21
	B2-C	35	40	22	17	14	16
	A2-EAB	35	34	36	24	22	25
	A1B-BIO	35	53	40	34	36	36
	A2-BIO	35	46	42	29	30	31
	B2-BIO	35	41	27	24	20	19

Table A4.3 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Michigan	A1B-C	339	357	344	408	400	408
	A2-C	339	365	358	372	390	437
	B2-C	339	354	374	370	383	418
	A2-EAB	339	320	328	371	353	407
	A1B-BIO	339	399	650	845	1,114	1,188
	A2-BIO	339	363	490	615	803	939
	B2-BIO	339	389	427	508	668	725
Minnesota	A1B-C	297	249	288	291	289	321
	A2-C	297	241	303	275	318	338
	B2-C	297	230	250	298	293	293
	A2-EAB	297	257	294	295	274	348
	A1B-BIO	297	304	435	605	680	622
	A2-BIO	297	249	296	421	512	542
	B2-BIO	297	267	322	373	456	470
Missouri	A1B-C	175	142	171	179	171	170
	A2-C	175	156	143	141	160	172
	B2-C	175	153	169	170	176	190
	A2-EAB	175	157	179	183	135	178
	A1B-BIO	175	177	250	349	466	623
	A2-BIO	175	195	195	259	333	417
	B2-BIO	175	147	173	224	270	312
New Hampshire	A1B-C	92	113	103	121	144	110
	A2-C	92	90	99	108	130	125
	B2-C	92	111	90	134	127	126
	A2-EAB	92	109	108	113	104	132
	A1B-BIO	92	118	208	284	366	427
	A2-BIO	92	115	170	172	259	308
	B2-BIO	92	117	118	160	220	226

Table A4.3 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
New Jersey	A1B-C	29	35	61	50	51	40
	A2-C	29	52	44	41	46	39
	B2-C	29	44	32	31	42	33
	A2-EAB	29	47	46	38	48	42
	A1B-BIO	29	49	52	65	91	91
	A2-BIO	29	54	47	63	82	74
	B2-BIO	29	43	38	47	58	47
New York	A1B-C	300	172	181	234	219	263
	A2-C	300	170	192	180	227	234
	B2-C	300	175	169	188	197	248
	A2-EAB	300	161	206	188	210	234
	A1B-BIO	300	200	303	489	601	767
	A2-BIO	300	173	248	333	400	506
	B2-BIO	300	161	194	261	363	388
Ohio	A1B-C	189	251	204	218	227	252
	A2-C	189	213	223	244	244	253
	B2-C	189	212	229	198	243	204
	A2-EAB	189	219	186	212	230	219
	A1B-BIO	189	284	390	514	656	734
	A2-BIO	189	253	319	375	472	570
	B2-BIO	189	220	244	330	376	384
Pennsylvania	A1B-C	415	388	386	398	454	465
	A2-C	415	361	407	389	402	425
	B2-C	415	341	376	378	376	355
	A2-EAB	415	387	359	404	454	412
	A1B-BIO	415	395	577	798	1,132	1,308
	A2-BIO	415	397	421	587	741	993
	B2-BIO	415	374	363	503	696	748

Table A4.3 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Rhode Island	A1B-C	2	6	4	6	4	4
	A2-C	2	5	5	5	4	7
	B2-C	2	4	3	2	2	1
	A2-EAB	2	6	5	3	4	5
	A1B-BIO	2	7	9	5	7	6
	A2-BIO	2	6	6	4	6	6
	B2-BIO	2	6	2	1	2	1
Vermont	A1B-C	113	111	123	107	96	106
	A2-C	113	96	99	85	93	101
	B2-C	113	109	89	89	107	117
	A2-EAB	113	86	104	89	110	104
	A1B-BIO	113	109	164	220	311	367
	A2-BIO	113	102	144	162	195	249
	B2-BIO	113	89	96	128	147	190
West Virginia	A1B-C	322	330	277	350	345	321
	A2-C	322	296	280	330	311	328
	B2-C	322	319	312	344	334	304
	A2-EAB	322	355	338	330	325	325
	A1B-BIO	322	382	518	741	967	1,025
	A2-BIO	322	346	443	478	668	815
	B2-BIO	322	356	324	429	561	520
Wisconsin	A1B-C	327	394	421	449	439	486
	A2-C	327	392	417	463	446	471
	B2-C	327	408	396	447	469	492
	A2-EAB	327	383	380	413	425	448
	A1B-BIO	327	436	666	937	1,119	1,132
	A2-BIO	327	456	537	708	874	968
	B2-BIO	327	443	478	590	755	773

Table A4.3 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
All Northern States	A1B-C	3,509	3,466	3,445	3,776	3,747	3,858
	A2-C	3,509	3,332	3,475	3,485	3,612	3,851
	B2-C	3,509	3,393	3,370	3,543	3,692	3,590
	A2-EAB	3,509	3,372	3,389	3,454	3,497	3,781
	A1B-BIO	3,509	3,910	5,650	7,656	9,555	10,403
	A2-BIO	3,509	3,731	4,451	5,528	7,001	8,251
	B2-BIO	3,509	3,587	3,770	4,707	5,943	6,210

[a]*There are seven scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections assume harvest will continue at recently observed levels (labeled –C) or increase to reflect increased harvest for bioenergy production (labeled –BIO). Scenario A2-EAB is a variation of scenario A2-C that also assumes all ash species will gradually succumb to an expanding zone of infestation by the nonnative emerald ash borer.*

Table A4.4—Projected volume of annual harvest removals in the North, 2010 to 2060, for seven future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Connecticut	A1B-C	51	14	10	5	6	3
	A2-C	51	16	7	8	8	4
	B2-C	51	10	8	2	2	3
	A2-EAB	51	23	7	1	4	2
	A1B-BIO	51	13	20	14	14	12
	A2-BIO	51	12	10	15	6	9
	B2-BIO	51	13	18	9	7	11
Delaware	A1B-C	7	3	4	9	4	6
	A2-C	7	7	4	4	6	6
	B2-C	7	6	6	5	8	5
	A2-EAB	7	5	6	3	3	6
	A1B-BIO	7	7	5	12	18	16
	A2-BIO	7	4	6	7	9	14
	B2-BIO	7	5	7	8	8	11
Illinois	A1B-C	33	40	29	55	37	38
	A2-C	33	48	31	24	50	35
	B2-C	33	46	31	66	46	35
	A2-EAB	33	44	37	27	45	47
	A1B-BIO	33	50	50	88	122	150
	A2-BIO	33	55	41	65	89	133
	B2-BIO	33	48	54	49	77	71
Indiana	A1B-C	72	98	87	122	119	87
	A2-C	72	101	102	75	95	113
	B2-C	72	83	83	95	114	101
	A2-EAB	72	81	76	81	76	113
	A1B-BIO	72	105	149	261	347	395
	A2-BIO	72	98	142	181	243	311
	B2-BIO	72	111	89	155	204	210

Table A4.4 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Iowa	A1B-C	35	37	47	66	43	44
	A2-C	35	45	62	37	35	42
	B2-C	35	46	73	54	83	68
	A2-EAB	35	38	48	51	33	39
	A1B-BIO	35	47	102	131	140	164
	A2-BIO	35	50	61	76	98	116
	B2-BIO	35	47	55	96	84	96
Maine	A1B-C	542	539	547	544	546	559
	A2-C	542	515	540	557	491	567
	B2-C	542	578	569	560	559	494
	A2-EAB	542	532	532	509	503	550
	A1B-BIO	542	619	880	1,095	1,160	1,143
	A2-BIO	542	622	700	821	1,008	1,065
	B2-BIO	542	565	640	713	829	874
Maryland	A1B-C	54	62	25	28	24	38
	A2-C	54	47	34	40	45	31
	B2-C	54	44	35	43	55	42
	A2-EAB	54	49	25	29	46	42
	A1B-BIO	54	66	79	71	108	89
	A2-BIO	54	58	47	73	82	83
	B2-BIO	54	66	43	46	81	86
Massachusetts	A1B-C	13	19	14	12	< 1	3
	A2-C	13	21	14	4	0	0
	B2-C	13	26	12	11	6	8
	A2-EAB	13	18	18	6	3	4
	A1B-BIO	13	37	23	16	18	18
	A2-BIO	13	30	24	10	10	9
	B2-BIO	13	28	17	17	12	12

Table A4.4 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Michigan	A1B-C	318	327	310	370	357	359
	A2-C	318	339	330	341	354	392
	B2-C	318	328	358	353	360	398
	A2-EAB	318	294	299	340	316	360
	A1B-BIO	318	368	616	809	1,073	1,142
	A2-BIO	318	337	462	584	767	894
	B2-BIO	318	363	410	491	645	706
Minnesota	A1B-C	257	236	275	274	271	302
	A2-C	257	229	290	260	302	323
	B2-C	257	218	242	289	283	285
	A2-EAB	257	246	281	282	259	334
	A1B-BIO	257	291	422	590	663	605
	A2-BIO	257	237	283	405	496	527
	B2-BIO	257	256	314	363	445	461
Missouri	A1B-C	141	125	153	158	146	141
	A2-C	141	141	128	125	140	148
	B2-C	141	138	159	159	162	179
	A2-EAB	141	143	165	166	115	153
	A1B-BIO	141	160	232	329	442	595
	A2-BIO	141	180	181	243	314	394
	B2-BIO	141	132	164	214	257	301
New Hampshire	A1B-C	71	96	83	101	123	87
	A2-C	71	74	81	90	110	101
	B2-C	71	95	78	123	114	115
	A2-EAB	71	93	91	95	84	109
	A1B-BIO	71	100	189	263	344	404
	A2-BIO	71	100	152	155	239	285
	B2-BIO	71	101	107	149	207	215

Table A4.4 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
New Jersey	A1B-C	21	12	35	26	29	20
	A2-C	21	29	19	16	22	14
	B2-C	21	22	14	18	30	24
	A2-EAB	21	24	20	12	23	16
	A1B-BIO	21	26	27	41	69	71
	A2-BIO	21	30	19	38	58	48
	B2-BIO	21	21	22	36	47	38
New York	A1B-C	274	150	157	207	188	227
	A2-C	274	150	172	158	200	201
	B2-C	274	157	159	178	183	237
	A2-EAB	274	142	186	165	182	200
	A1B-BIO	274	177	280	463	570	732
	A2-BIO	274	154	227	311	373	473
	B2-BIO	274	142	184	251	349	377
Ohio	A1B-C	181	237	187	199	205	227
	A2-C	181	201	208	229	225	229
	B2-C	181	200	221	191	233	196
	A2-EAB	181	207	173	195	210	193
	A1B-BIO	181	270	375	496	635	710
	A2-BIO	181	241	306	360	453	546
	B2-BIO	181	209	237	323	366	376
Pennsylvania	A1B-C	362	332	327	333	379	380
	A2-C	362	315	358	336	338	349
	B2-C	362	295	349	351	338	324
	A2-EAB	362	340	309	350	389	334
	A1B-BIO	362	339	517	734	1,059	1,226
	A2-BIO	362	351	371	536	680	919
	B2-BIO	362	327	335	477	660	718

Table A4.4 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Rhode Island	A1B-C	1	3	< 1	2	< 1	< 1
	A2-C	1	2	1	1	< 1	2
	B2-C	1	1	1	< 1	< 1	< 1
	A2-EAB	1	3	1	< 1	< 1	< 1
	A1B-BIO	1	3	5	1	3	2
	A2-BIO	1	3	2	< 1	2	1
	B2-BIO	1	3	< 1	< 1	< 1	< 1
Vermont	A1B-C	105	100	113	95	82	91
	A2-C	105	88	91	76	84	90
	B2-C	105	100	84	83	99	110
	A2-EAB	105	78	96	82	101	94
	A1B-BIO	105	98	153	208	297	352
	A2-BIO	105	94	136	154	186	238
	B2-BIO	105	80	91	122	139	184
West Virginia	A1B-C	286	294	243	309	296	263
	A2-C	286	272	258	308	283	293
	B2-C	286	291	300	329	310	287
	A2-EAB	286	331	317	307	297	290
	A1B-BIO	286	346	484	703	922	970
	A2-BIO	286	322	421	456	641	781
	B2-BIO	286	328	312	413	537	503
Wisconsin	A1B-C	311	375	401	426	412	454
	A2-C	311	377	401	445	425	445
	B2-C	311	392	386	436	454	480
	A2-EAB	311	368	365	396	405	423
	A1B-BIO	311	418	646	915	1,094	1,102
	A2-BIO	311	442	521	690	853	943
	B2-BIO	311	427	469	580	741	761

Table A4.4 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
All Northern States	A1B-C	3,133	3,097	3,046	3,340	3,268	3,327
	A2-C	3,133	3,018	3,133	3,133	3,213	3,387
	B2-C	3,133	3,078	3,169	3,346	3,439	3,389
	A2-EAB	3,133	3,058	3,052	3,096	3,093	3,309
	A1B-BIO	3,133	3,541	5,255	7,240	9,099	9,899
	A2-BIO	3,133	3,418	4,113	5,179	6,607	7,790
	B2-BIO	3,133	3,272	3,566	4,513	5,694	6,012

[a]*There are seven scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections assume harvest will continue at recently observed levels (labeled –C) or increase to reflect increased harvest for bioenergy production (labeled –BIO). Scenario A2-EAB is a variation of scenario A2-C that also assumes all ash species will gradually succumb to an expanding zone of infestation by the nonnative emerald ash borer.*

Table A4.5—Projected volume of total annual removals attributed to land-use change in North, 2010 to 2060, for seven future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Connecticut	A1B-C	3	8	9	10	11	12
	A2-C	3	8	10	10	12	14
	B2-C	3	7	5	3	5	4
	A2-EAB	3	8	9	10	12	14
	A1B-BIO	3	8	9	10	10	11
	A2-BIO	3	8	9	10	12	14
	B2-BIO	3	7	5	3	4	4
Delaware	A1B-C	0	3	3	3	4	4
	A2-C	0	3	3	3	4	4
	B2-C	0	3	2	2	2	2
	A2-EAB	0	3	3	3	3	4
	A1B-BIO	0	3	3	3	3	4
	A2-BIO	0	3	3	3	4	4
	B2-BIO	0	3	2	2	2	2
Illinois	A1B-C	24	9	10	9	10	12
	A2-C	24	6	6	6	7	8
	B2-C	24	8	5	5	6	4
	A2-EAB	24	6	7	6	7	8
	A1B-BIO	24	9	10	9	11	12
	A2-BIO	24	6	7	7	8	9
	B2-BIO	24	8	5	6	7	4
Indiana	A1B-C	8	17	18	21	25	29
	A2-C	8	13	13	13	16	19
	B2-C	8	14	7	9	13	10
	A2-EAB	8	13	13	14	17	20
	A1B-BIO	8	17	19	21	24	29
	A2-BIO	8	13	13	13	16	19
	B2-BIO	8	14	8	9	13	10

Table A4.5 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Iowa	A1B-C	11	3	3	3	4	5
	A2-C	11	2	2	3	3	4
	B2-C	11	2	1	1	2	2
	A2-EAB	11	2	2	2	3	3
	A1B-BIO	11	3	3	3	4	4
	A2-BIO	11	2	2	3	3	4
	B2-BIO	11	2	1	2	2	2
Maine	A1B-C	21	10	11	12	13	15
	A2-C	21	9	9	10	12	14
	B2-C	21	9	5	5	7	6
	A2-EAB	21	9	9	10	11	14
	A1B-BIO	21	10	10	10	12	14
	A2-BIO	21	9	9	9	11	14
	B2-BIO	21	9	5	5	7	6
Maryland	A1B-C	13	40	49	48	43	41
	A2-C	13	38	46	40	36	36
	B2-C	13	37	30	27	26	18
	A2-EAB	13	38	45	44	38	38
	A1B-BIO	13	40	47	42	36	35
	A2-BIO	13	38	44	40	36	37
	B2-BIO	13	37	32	26	25	18
Massachusetts	A1B-C	22	15	18	18	18	17
	A2-C	22	16	18	19	20	22
	B2-C	22	14	10	7	8	7
	A2-EAB	22	16	18	18	19	21
	A1B-BIO	22	15	17	19	19	18
	A2-BIO	22	16	19	19	20	22
	B2-BIO	22	14	10	7	8	7

Table A4.5 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Michigan	A1B-C	21	31	33	38	43	49
	A2-C	21	26	28	31	37	45
	B2-C	21	26	17	17	23	20
	A2-EAB	21	26	28	31	37	46
	A1B-BIO	21	31	33	36	41	46
	A2-BIO	21	26	28	31	36	44
	B2-BIO	21	26	17	17	23	20
Minnesota	A1B-C	40	13	13	17	18	19
	A2-C	40	11	13	15	16	15
	B2-C	40	11	8	9	11	9
	A2-EAB	40	11	13	13	15	14
	A1B-BIO	40	13	14	15	16	17
	A2-BIO	40	11	12	15	16	15
	B2-BIO	40	11	8	9	11	9
Missouri	A1B-C	33	18	18	22	25	29
	A2-C	33	14	15	16	19	24
	B2-C	33	15	9	10	14	11
	A2-EAB	33	14	15	17	20	25
	A1B-BIO	33	18	18	20	24	27
	A2-BIO	33	14	14	16	19	24
	B2-BIO	33	15	9	10	14	11
New Hampshire	A1B-C	21	18	20	20	22	24
	A2-C	21	16	18	18	20	23
	B2-C	21	16	12	11	13	11
	A2-EAB	21	16	17	18	20	24
	A1B-BIO	21	18	19	20	22	24
	A2-BIO	21	16	17	17	19	22
	B2-BIO	21	16	12	11	13	11

Table A4.5 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
New Jersey	A1B-C	8	23	26	24	22	20
	A2-C	8	23	25	25	24	25
	B2-C	8	21	18	12	12	10
	A2-EAB	8	23	26	26	26	26
	A1B-BIO	8	23	25	24	22	20
	A2-BIO	8	23	28	25	25	26
	B2-BIO	8	21	16	12	11	9
New York	A1B-C	26	22	24	27	31	36
	A2-C	26	19	21	22	27	33
	B2-C	26	19	10	11	14	11
	A2-EAB	26	19	21	23	28	34
	A1B-BIO	26	22	23	26	30	35
	A2-BIO	26	19	21	22	27	33
	B2-BIO	26	19	10	10	14	11
Ohio	A1B-C	8	14	16	19	22	25
	A2-C	8	12	15	15	19	24
	B2-C	8	12	7	8	10	8
	A2-EAB	8	12	13	17	21	25
	A1B-BIO	8	14	16	18	21	23
	A2-BIO	8	12	13	16	19	24
	B2-BIO	8	12	7	7	10	8
Pennsylvania	A1B-C	54	56	59	66	75	85
	A2-C	54	47	49	53	63	77
	B2-C	54	47	27	27	38	31
	A2-EAB	54	47	50	54	65	78
	A1B-BIO	54	56	61	64	72	82
	A2-BIO	54	47	50	51	61	74
	B2-BIO	54	47	28	25	36	30

Table A4.5 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Rhode Island	A1B-C	2	3	4	4	4	4
	A2-C	2	4	4	4	4	5
	B2-C	2	3	2	1	2	1
	A2-EAB	2	4	4	4	4	5
	A1B-BIO	2	3	4	4	4	4
	A2-BIO	2	4	4	4	4	5
	B2-BIO	2	3	2	1	2	1
Vermont	A1B-C	8	11	11	12	13	15
	A2-C	8	8	8	8	10	11
	B2-C	8	9	5	6	8	6
	A2-EAB	8	8	8	8	9	11
	A1B-BIO	8	11	11	12	13	15
	A2-BIO	8	8	7	8	9	11
	B2-BIO	8	9	5	6	8	6
West Virginia	A1B-C	36	35	34	41	49	58
	A2-C	36	24	22	22	27	35
	B2-C	36	28	12	15	24	16
	A2-EAB	36	24	21	23	28	36
	A1B-BIO	36	35	34	38	45	54
	A2-BIO	36	24	22	22	27	34
	B2-BIO	36	28	12	16	24	17
Wisconsin	A1B-C	16	18	21	23	27	31
	A2-C	16	15	16	18	21	26
	B2-C	16	15	10	11	15	12
	A2-EAB	16	15	15	17	21	25
	A1B-BIO	16	18	20	22	26	30
	A2-BIO	16	15	16	17	21	26
	B2-BIO	16	15	10	11	15	12

Table A4.5 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
All Northern States	A1B-C	375	369	399	436	479	531
	A2-C	375	314	341	352	398	464
	B2-C	375	315	201	197	252	201
	A2-EAB	375	314	337	358	404	472
	A1B-BIO	375	369	395	416	455	505
	A2-BIO	375	314	338	349	395	461
	B2-BIO	375	315	203	194	249	198

[a]*There are seven scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections assume harvest will continue at recently observed levels (labeled –C) or increase to reflect increased harvest for bioenergy production (labeled –BIO). Scenario A2-EAB is a variation of scenario A2-C that also assumes all ash species will gradually succumb to an expanding zone of infestation by the nonnative emerald ash borer.*

Table A4.6—Projected net annual growth of growing stock in the North, 2010 to 2060, for seven future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Connecticut	A1B-C	79	15	55	-4	-4	-39
	A2-C	79	30	11	-2	-3	-32
	B2-C	79	4	2	-2	-2	11
	A2-EAB	79	31	8	-8	-7	-33
	A1B-BIO	79	15	35	5	4	-11
	A2-BIO	79	23	9	5	-5	-7
	B2-BIO	79	24	-6	6	3	-1
Delaware	A1B-C	31	1	8	5	< 1	-1
	A2-C	31	7	2	< 1	2	6
	B2-C	31	4	9	4	6	3
	A2-EAB	31	7	-4	1	< 1	11
	A1B-BIO	31	3	7	8	14	7
	A2-BIO	31	8	4	4	6	4
	B2-BIO	31	1	7	6	6	14
Illinois	A1B-C	226	110	-2	47	28	23
	A2-C	226	95	33	18	44	30
	B2-C	226	104	-21	61	41	104
	A2-EAB	226	81	38	22	39	81
	A1B-BIO	226	77	75	80	112	41
	A2-BIO	226	81	69	60	82	41
	B2-BIO	226	83	59	44	71	46
Indiana	A1B-C	318	165	104	102	96	91
	A2-C	318	154	103	63	80	171
	B2-C	318	131	120	87	102	94
	A2-EAB	318	127	142	68	60	104
	A1B-BIO	318	174	120	242	325	317
	A2-BIO	318	156	168	168	228	235
	B2-BIO	318	147	154	147	193	142

Table A4.6 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Iowa	A1B-C	103	98	47	63	40	31
	A2-C	103	93	73	35	33	66
	B2-C	103	106	93	53	82	79
	A2-EAB	103	91	77	50	31	10
	A1B-BIO	103	89	102	128	137	100
	A2-BIO	103	87	72	74	95	68
	B2-BIO	103	89	82	95	82	65
Maine	A1B-C	573	634	598	533	534	476
	A2-C	573	596	645	549	481	523
	B2-C	573	672	606	556	553	521
	A2-EAB	573	613	560	500	492	519
	A1B-BIO	573	635	769	1,086	1,149	240
	A2-BIO	573	666	656	812	998	434
	B2-BIO	573	643	627	709	823	498
Maryland	A1B-C	176	40	-8	-18	-17	18
	A2-C	176	27	-5	1	11	-11
	B2-C	176	16	-6	17	30	16
	A2-EAB	176	47	7	-13	9	-25
	A1B-BIO	176	24	14	31	74	16
	A2-BIO	176	17	22	34	47	3
	B2-BIO	176	56	-14	22	57	30
Massachusetts	A1B-C	155	21	-27	-4	-16	-41
	A2-C	155	12	1	-14	-19	-36
	B2-C	155	6	4	4	-1	-21
	A2-EAB	155	4	11	-11	-15	-52
	A1B-BIO	155	32	3	-1	1	-26
	A2-BIO	155	22	-3	-8	-9	-51
	B2-BIO	155	39	1	11	4	-9

Table A4.6 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Michigan	A1B-C	697	445	348	336	318	494
	A2-C	697	446	383	313	320	542
	B2-C	697	444	469	337	338	572
	A2-EAB	697	397	372	311	282	493
	A1B-BIO	697	450	573	776	1,036	600
	A2-BIO	697	458	434	556	733	617
	B2-BIO	697	459	523	476	624	589
Minnesota	A1B-C	421	306	391	260	255	475
	A2-C	421	325	412	247	288	486
	B2-C	421	280	367	282	273	367
	A2-EAB	421	355	399	270	247	523
	A1B-BIO	421	352	409	577	650	119
	A2-BIO	421	306	418	392	482	390
	B2-BIO	421	333	405	355	436	282
Missouri	A1B-C	510	268	229	139	124	245
	A2-C	510	263	199	111	124	295
	B2-C	510	220	284	150	151	340
	A2-EAB	510	259	256	152	98	307
	A1B-BIO	510	248	279	312	422	482
	A2-BIO	510	304	234	229	298	402
	B2-BIO	510	227	269	205	245	365
New Hampshire	A1B-C	188	153	81	82	102	59
	A2-C	188	144	69	73	91	78
	B2-C	188	157	85	113	102	96
	A2-EAB	188	132	106	78	65	98
	A1B-BIO	188	133	181	244	324	220
	A2-BIO	188	160	122	139	221	174
	B2-BIO	188	123	144	139	195	118

Table A4.6 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
New Jersey	A1B-C	95	3	15	3	9	-15
	A2-C	95	-11	18	-7	-1	-5
	B2-C	95	20	1	6	19	4
	A2-EAB	95	-14	13	-13	-2	10
	A1B-BIO	95	4	3	18	49	39
	A2-BIO	95	11	11	15	34	-5
	B2-BIO	95	2	11	25	36	18
New York	A1B-C	627	335	324	182	159	278
	A2-C	627	352	283	137	176	263
	B2-C	627	320	357	168	170	316
	A2-EAB	627	389	323	143	157	315
	A1B-BIO	627	326	459	439	542	604
	A2-BIO	627	321	362	290	349	453
	B2-BIO	627	297	402	241	336	338
Ohio	A1B-C	410	377	233	181	185	373
	A2-C	410	361	210	216	207	312
	B2-C	410	314	317	184	224	273
	A2-EAB	410	304	282	180	191	239
	A1B-BIO	410	361	379	480	616	487
	A2-BIO	410	305	390	345	435	461
	B2-BIO	410	301	335	316	357	342
Pennsylvania	A1B-C	746	354	313	270	308	436
	A2-C	746	305	415	286	279	412
	B2-C	746	307	465	326	301	362
	A2-EAB	746	434	387	299	328	396
	A1B-BIO	746	402	421	673	991	700
	A2-BIO	746	428	356	488	622	609
	B2-BIO	746	352	374	454	626	581

Table A4.6 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
Rhode Island	A1B-C	19	-2	2	-2	-4	-9
	A2-C	19	4	-9	-3	-4	-3
	B2-C	19	-7	3	-1	-1	-2
	A2-EAB	19	< 1	1	-4	-4	-9
	A1B-BIO	19	2	12	-3	-2	-11
	A2-BIO	19	< 1	-3	-3	-2	2
	B2-BIO	19	< 1	-3	-2	-1	-5
Vermont	A1B-C	192	132	122	84	70	88
	A2-C	192	92	138	69	75	116
	B2-C	192	149	92	78	92	89
	A2-EAB	192	99	104	74	93	106
	A1B-BIO	192	132	145	197	285	170
	A2-BIO	192	98	198	146	178	98
	B2-BIO	192	121	99	117	131	174
West Virginia	A1B-C	609	226	303	271	250	223
	A2-C	609	233	238	287	257	352
	B2-C	609	187	333	315	287	333
	A2-EAB	609	325	413	285	270	346
	A1B-BIO	609	299	387	667	879	523
	A2-BIO	609	298	350	436	616	560
	B2-BIO	609	223	346	399	514	401
Wisconsin	A1B-C	586	618	544	405	387	603
	A2-C	586	613	539	429	406	629
	B2-C	586	619	534	427	441	672
	A2-EAB	586	581	485	380	386	625
	A1B-BIO	586	603	643	894	1,070	467
	A2-BIO	586	675	585	674	833	596
	B2-BIO	586	612	608	570	727	648

Table A4.6 continued

State	Scenario[a]	Year					
		2010	2020	2030	2040	2050	2060
		(million cubic feet)					
All Northern States	A1B-C	6,759	4,299	3,680	2,936	2,825	3,809
	A2-C	6,759	4,144	3,758	2,807	2,845	4,194
	B2-C	6,759	4,052	4,113	3,164	3,206	4,227
	A2-EAB	6,759	4,260	3,978	2,763	2,719	4,065
	A1B-BIO	6,759	4,358	5,017	6,855	8,679	5,083
	A2-BIO	6,759	4,424	4,455	4,856	6,241	5,085
	B2-BIO	6,759	4,133	4,424	4,334	5,465	4,638

[a]*There are seven scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections assume harvest will continue at recently observed levels (labeled –C) or increase to reflect increased harvest for bioenergy production (labeled –BIO). Scenario A2-EAB is a variation of scenario A2-C that also assumes all ash species will gradually succumb to an expanding zone of infestation by the nonnative emerald ash borer.*

Please refer to the Literature Cited section at the end of Chapter 4 for the references.

Table A7.1—Projections of total aboveground biomass on timberland for enhanced biomass utilization scenarios in the North, 2010 to 2060, for three future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007).

State	Initial for all scenarios	Scenario[a]				
	2010	A2-BIO 2020	A2-BIO 2030	A2-BIO 2040	A2-BIO 2050	A2-BIO 2060
	(million dry tons)					
New York	880	921	957	950	943	933
Missouri	606	643	641	637	631	625
Ohio	452	465	490	485	479	450
Iowa	111	122	126	125	124	109
Minnesota	428	442	464	460	456	416
Indiana	250	264	268	264	260	242
Illinois	229	233	239	237	235	211
Vermont	270	273	282	280	277	247
Wisconsin	595	636	645	640	635	544
Connecticut	119	119	121	118	115	108
Michigan	774	794	783	775	766	701
Pennsylvania	980	987	983	969	951	848
New Hampshire	270	276	273	269	264	232
Massachusetts	198	194	193	188	183	169
West Virginia	766	759	737	731	723	651
Delaware	23	24	23	22	21	19
Rhode Island	22	20	19	18	17	17
Maine	647	653	639	636	634	505
New Jersey	101	96	92	85	78	64
Maryland	168	156	146	135	126	106
All Northern States	7,890	8,079	8,119	8,024	7,917	7,196

Table A7.1 continued

State	Scenario[a]				
	A1B-BIO 2060	B2-BIO 2060	A2-BIO	A1B-BIO	B2-BIO
	----------(million dry tons)----------		----------(percent change, 2010 to 2060)----------		
New York	903	948	6.1	2.6	7.7
Missouri	573	653	3.2	-5.4	7.8
Ohio	388	481	-0.6	-14.2	6.3
Iowa	99	119	-1.9	-10.4	7.3
Minnesota	303	410	-2.8	-29.3	-4.3
Indiana	226	254	-3.0	-9.7	1.5
Illinois	207	223	-8.0	-9.8	-2.5
Vermont	219	277	-8.6	-18.9	2.6
Wisconsin	447	605	-8.6	-24.9	1.7
Connecticut	111	109	-9.4	-6.8	-8.4
Michigan	625	772	-9.4	-19.3	-0.3
Pennsylvania	748	911	-13.5	-23.7	-7.1
New Hampshire	207	248	-14.1	-23.5	-8.0
Massachusetts	173	191	-14.5	-12.6	-3.3
West Virginia	553	701	-15.0	-27.9	-8.4
Delaware	18	21	-18.9	-21.8	-8.8
Rhode Island	17	18	-21.3	-23.5	-18.4
Maine	430	577	-22.0	-33.6	-10.8
New Jersey	65	80	-36.7	-36.0	-21.2
Maryland	95	119	-36.9	-43.4	-29.3
All Northern States	6,405	7,717	-8.8	-18.8	-2.2

[a]There are three scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections (labeled –BIO) assume harvest will increase to reflect increased harvest for bioenergy production.

Table A7.2—Estimates of annual net forest biomass change based on enhanced biomass utilization scenarios in the North, 2010 to 2060, for three future scenarios based on greenhouse gas emissions storylines developed by the Intergovernmental Panel on Climate Change (IPCC 2007). Note that estimates for 2060 are based on both a 10-year increment (2050 to 2060) and a 50-year increment (2010 to 2060), and the initial 2010 estimate was calculated using volume growth and removals from the current FIA inventory panel.

State	Estimated for 2010	Scenario[a]				
		A2-BIO 2010 to 2020	A2-BIO 2020 to 2030	A2-BIO 2030 to 2040	A2-BIO 2040 to 2050	A1B-BIO 2050 to 2060
	(thousand dry tons)					
Maine	-930	569	-1,433	-239	-287	-12,892
Pennsylvania	10,095	701	-364	-1,465	-1,753	-10,310
West Virginia	9,013	-680	-2,228	-637	-784	-7,200
Michigan	9,713	2,063	-1,179	-770	-917	-6,459
Maryland	3,406	-1,116	-1,057	-1,054	-952	-1,979
Wisconsin	6,784	4,111	847	-430	-517	-9,141
New Hampshire	2,708	599	-283	-440	-493	-3,165
New Jersey	2,155	-551	-433	-691	-684	-1,391
Massachusetts	3,465	-387	-106	-507	-535	-1,333
Vermont	1,184	245	912	-210	-241	-3,049
Illinois	5,612	392	630	-189	-214	-2,426
Minnesota	4,166	1,343	2,195	-356	-386	-4,051
Connecticut	459	47	192	-292	-345	-712
Indiana	6,930	1,391	365	-354	-429	-1,724
Rhode Island	565	-128	-143	-107	-117	63
Delaware	772	70	-49	-90	-101	-258
Ohio	7,555	1,312	2,403	-454	-560	-2,987
Iowa	2,274	1,119	317	-68	-81	-1,527
Missouri	11,209	3,627	-151	-466	-564	-567
New York	10,362	4,166	3,523	-619	-742	-974
All Northern States	97,497	18,893	3,959	-9,439	-10,701	-72,083

Table A7.2 continued

State	Scenario[a]				
	A2-BIO 2050 to 2060	B2-BIO 2050 to 2060	A1B-BIO 2010 to 2060	A2-BIO 2010 to 2060	B2-BIO 2010 to 2060
	(thousand dry tons)				
Maine	-18,649	-7,587	-2,856	-4,350	-1,401
Pennsylvania	-16,377	-5,266	-2,638	-4,636	-1,381
West Virginia	-14,292	-3,505	-2,306	-4,274	-1,297
Michigan	-12,563	-2,743	-1,452	-2,986	-38
Maryland	-1971	-1,505	-1,232	-1,449	-976
Wisconsin	-15,832	-4,328	-1,026	-2,965	198
New Hampshire	-5,327	-2,433	-756	-1,265	-428
New Jersey	-1,106	-713	-750	-736	-437
Massachusetts	-928	-259	-573	-499	-129
Vermont	-5,177	-107	-469	-1,029	133
Illinois	-2,537	-1,382	-361	-444	-112
Minnesota	-11,761	-4,310	-251	-2,512	-376
Connecticut	-514	-256	-222	-160	-200
Indiana	-2,260	-1,653	-150	-484	77
Rhode Island	-295	-112	-86	-96	-74
Delaware	-248	5	-86	-99	-40
Ohio	-7,743	-1,771	-57	-1,290	566
Iowa	-2,228	-1,107	-48	-235	157
Missouri	-5,001	369	376	-663	935
New York	-4,073	-2,077	1,071	471	1,357
All Northern States	-128,882	-40,740	-13,874	-29,702	-3,465

[a]*There are three scenarios, each representing a global greenhouse storyline (IPCC 2007) paired with a harvest regime. Storyline A1B assumes moderate greenhouse gas emissions, moderate gains in population, and large gains in income and energy consumption (but with a balanced renewable/fossil fuel portfolio); A2 assumes high greenhouse gas emissions, large gains in population and energy consumption, and moderate gains in income; and B2 assumes low greenhouse gas emissions with moderate gains in population, income, and energy consumption. Scenario projections (labeled –BIO) assume harvest will increase to reflect increased harvest for bioenergy production.*

Table A7.3—Values for annually available woody biomass for bioenergy by net annual woody biomass increase (NAWI), logging residues, standing dead material, and unused mill byproducts by State, 2010. Note that logging residues and standing dead material were assessed for both 100 percent availability and 65 percent availability to account for an assumed 35 percent retention rate for residues and dead material for ecological stability and physical inaccessibility.

State	NAWI	Logging Residues		Standing Dead		Unused mill byproducts
		100 percent	65 percent	100 percent	65 percent	
	(1,000 dry tons)					
Connecticut	459	921	599	935	608	13
Delaware	772	113	74	124	81	0
Illinois	5,612	539	350	2,415	1,570	58
Indiana	6,930	1,227	798	1,970	1,281	34
Iowa	2,274	522	339	981	638	1
Maine	0	9,178	5,966	7,030	4,570	141
Maryland	3,406	931	605	1,191	774	57
Massachusetts	3,465	200	130	1,603	1,042	0
Michigan	9,713	5,368	3,489	6,888	4,477	46
Minnesota	4,166	4,166	2,708	6,179	4,016	89
Missouri	11,209	2,520	1,638	3,959	2,573	259
New Hampshire	2,708	1,261	820	2,517	1,636	23
New Jersey	2,155	355	231	650	422	5
New York	10,362	4,733	3,076	7,337	4,769	91
Ohio	7,555	3,241	2,107	3,631	2,360	75
Pennsylvania	10,095	6,416	4,170	6,810	4,427	570
Rhode Island	565	10	7	137	89	1
Vermont	1,184	1,799	1,170	1,584	1,030	0
West Virginia	9,013	5,048	3,281	4,892	3,180	394
Wisconsin	6,784	5,284	3,435	5,307	3,449	212
All Northern States	98,427	53,831	34,990	66,141	42,992	2,068

Please refer to the Literature Cited section at the end of Chapter 7 for the references.

Table A8.1—Estimated value of shipment of forest products, 2001 to 2011, in the North (U.S. Census Bureau 2012).

State	Year								
	1997	2002	2005	2006	2007	2008	2009	2010	2011
	(million dollars)								
Connecticut	191	215	242	251	244	--	--	--	156
Delaware	90	89	--	--	--	--	--	--	--
Illinois	1,138	1,301	1,500	1,515	1,729	1,695	1,294	1,423	1,322
Indiana	3,167	3,121	3,558	3,434	3,243	2,823	2,173	2,328	2,502
Iowa	1,063	1,464	1,884	1,979	1,802	1,654	1,322	1,434	1,411
Maine	925	1,079	1,290	1,150	1,149	1,100	702	776	797
Maryland	567	905	1,118	1,166	802	589	457	464	441
Massachusetts	398	506	732	768	617	538	385	442	451
Michigan	2,034	2,022	2,501	2,535	2,410	2,027	1,645	1,930	1,903
Minnesota	2,499	3,002	3,697	3,643	3,585	2,977	2,228	2,415	2,398
Missouri	1,030	1,169	1,264	1,240	1,289	1,150	893	908	998
New Hampshire	476	629	606	599	544	437	383	387	401
New Jersey	406	484	715	810	806	683	558	498	455
New York	1,334	1,439	1,607	1,713	1,622	1,482	1,032	1,163	1,114
Ohio	2,386	2,505	2,749	2,784	2,559	2,352	1,818	1,909	2,019
Pennsylvania	3,293	4,090	5,539	5,401	5,027	4,359	3,475	3,386	3,261
Rhode Island	101	137	--	--	--	--	--		--
Vermont	420	429	424	416	383	344	277	239	239
West Virginia	1,074	1,620	1,999	1,887	1,808	1,522	1,034	1,191	1,185
Wisconsin	3,748	4,302	5,281	5,169	4,756	4,184	3,159	3,297	3,324
All Northern States	26,341	30,507	36,704	36,460	34,376	29,917	22,837	24,190	24,378
U.S. total	88,470	89,436	112,095	112,403	102,029	87,765	65,440	--	--

--- *Value is zero or not available.*

Table A8.2—Estimated value of shipment of paper and paperboard in the North, 2001 to 2011 (U.S. Census Bureau 2012).

State	Year								
	1997	2002	2005	2006	2007	2008	2009	2010	2011
	(million dollars)								
Connecticut	1,839	1,736	1,675	1,700	1,791	1,678	1,554	1,501	1,560
Delaware	804	647	549	--	--	--	--	--	--
Illinois	5,873	5,290	5,801	5,782	5,768	5,829	5,239	5,615	5,281
Indiana	2,765	3,158	3,305	3,416	3,834	3,777	3,517	3,872	3,901
Iowa	1,531	1,345	1,407	1,522	1,759	1,714	1,467	1,611	1,638
Maine	4,460	4,131	3,840	3,476	3,914	4,491	4,080	3,512	4,028
Maryland	1,166	1,216	1,371	1,314	1,210	1,063	1,005	1,091	1,056
Massachusetts	4,042	3,412	3,340	3,267	3,546	3,257	2,829	2,988	2,896
Michigan	4,878	4,632	4,802	4,965	4,944	5,189	4,482	4,848	4,968
Minnesota	4,050	4,050	5,067	4,384	5,204	5,420	4,791	5,504	5,853
Missouri	2,986	3,660	4,256	4,579	4,647	4,574	4,374	4,513	4,886
New Hampshire	882	511	496	415	--	--	--	--	--
New Jersey	3,211	3,255	3,476	3,241	3,216	3,198	2,760	2,427	2,582
New York	5,140	4,512	4,947	5,059	4,996	5,190	5,022	5,397	5,659
Ohio	6,844	6,858	6,904	7,422	8,119	7,785	6,653	7,188	7,415
Pennsylvania	8,901	9,236	9,793	10,935	10,285	11,057	10,503	11,336	11,554
Rhode Island	303	259	264	257	247	254	158	--	--
Vermont	382	390	302	--	--	--	--	--	--
West Virginia	130	200		--	--	--	--	--	--
Wisconsin	12,652	13,603	13,261	13,806	14,193	14,258	13,042	14,221	14,465
All Northern States	72,840	72,103	74,855	75,540	77,675	78,734	71,476	75,624	77,742
U.S. total	150,296	153,223	161,929	169,033	176,108	179,249	161,816	--	--

-- Value is zero or not available.

Please refer to the Literature Cited section at the end of Chapter 8 for the references.

Table A10.1—Percentage and area of additional urban development, 1990 to 2000, in various land-cover classes in the conterminous United States (Nowak et al. 2005).

State and region	Forest[a]	Agriculture[b]	Other[c]	Developed[d]	Woody wetland[e]	Herbaceous wetland[f]
	(percent)					
Connecticut	64.1	11.5	0.9	16.2	5.8	1.7
Delaware	28.4	45.6	1.4	15.3	5.2	4.0
Maine	54.8	7.7	1.3	26.1	3.7	6.3
Maryland	43.5	40.7	2.6	9.5	2.7	0.9
Massachusetts	62.9	7.6	1.4	17.7	6.1	4.2
New Hampshire	61.3	10.2	1.3	20.7	4.2	2.4
New Jersey	48.4	28.0	1.0	12.7	8.6	1.3
New York	51.2	28.1	0.5	17.5	1.9	0.7
Ohio	31.6	50.8	0.4	14.3	2.3	0.6
Pennsylvania	42.7	45.5	1.4	9.7	0.4	0.2
Rhode Island	64.8	5.7	0.8	19.0	7.9	1.9
Vermont	39.7	28.1	1.7	22.4	5.5	2.6
West Virginia	62.2	25.4	1.8	10.4	0.2	0.1
Northeast total	47.9	32.0	1.2	14.1	3.4	1.4
Illinois	15.2	64.8	1.8	15.2	2.4	0.7
Indiana	15.2	66.8	0.8	14.9	1.9	0.5
Iowa	12.1	52.3	8.0	25.4	1.7	0.6
Michigan	31.2	47.5	2.1	12.2	6.1	1.0
Minnesota	17.7	52.4	1.1	17.6	3.7	7.4
Missouri	28.6	44.7	6.5	19.0	0.8	0.3
Wisconsin	18.3	62.0	2.2	14.5	2.2	0.6
North Central total	20.9	56.7	2.5	15.5	3.0	1.3
All Northern States	37.0	42.0	1.7	14.7	3.3	1.4
Florida	18.8	17.9	13.8	28.9	14.4	6.1
Georgia	64.0	18.8	3.1	8.9	4.0	1.3
North Carolina	55.9	22.8	1.1	14.5	5.0	0.6
South Carolina	52.9	21.4	2.3	15.4	6.0	1.9
Virginia	48.4	28.1	3.4	13.9	4.5	1.7
Southeast total	44.9	20.6	6.1	17.8	7.8	2.8

Table A10.1 continued

State and region	Forest[a]	Agriculture[b]	Other[c]	Developed[d]	Woody wetland[e]	Herbaceous wetland[f]
	(percent)					
Alabama	55.5	30.2	1.1	8.8	4.2	0.2
Arkansas	36.8	44.8	0.6	16.3	1.1	0.4
Kentucky	38.1	46.1	0.4	13.3	1.9	0.2
Louisiana	36.3	38.7	1.1	16.5	4.4	3.1
Mississippi	41.9	39.5	1.0	11.6	5.4	0.6
Oklahoma	16.9	38.5	24.4	19.8	0.3	0.1
Tennessee	48.0	37.6	0.6	12.4	1.4	0.1
Texas	21.2	40.9	22.1	14.3	0.5	0.9
South Central total	33.8	39.3	10.6	13.7	1.8	0.7
All Southern States	39.9	29.0	8.1	16.0	5.1	1.9
Kansas	8.3	46.8	23.7	19.6	0.1	1.4
Nebraska	3.2	68.9	12.4	14.4	0.2	0.8
North Dakota	3.3	32.7	19.5	42.9	0.1	1.5
South Dakota	5.5	50.6	19.9	22.2	0.4	1.4
All Great Plains States	6.3	51.3	20.1	20.8	0.2	1.3
Arizona	8.4	19.2	60.7	11.6	0.0	0.0
Colorado	10.3	26.1	48.6	15.0	0.0	0.0
Idaho	3.1	54.6	26.0	15.5	0.5	0.2
Montana	5.5	37.4	23.9	30.9	1.9	0.3
Nevada	0.8	7.7	77.8	13.5	0.1	0.1
New Mexico	3.2	11.4	73.8	11.0	0.4	0.1
Utah	6.8	40.5	41.1	11.1	0.5	0.1
Wyoming	1.8	11.1	60.2	24.5	0.9	1.5
Intermountain total	6.2	22.5	57.6	13.4	0.2	0.1
All Rocky Mountain States	6.3	27.0	51.7	14.5	0.2	0.3
Oregon	26.3	41.3	14.2	17.3	0.3	0.5
Washington	46.5	20.4	13.9	18.4	0.7	0.1
Pacific Northwest total	40.3	26.9	14.0	18.0	0.6	0.2
California	9.3	20.1	58.9	11.3	0.1	0.4
Pacific Southwest total	9.3	20.1	58.9	11.3	0.1	0.4
All Pacific Coast States	19.1	22.2	44.7	13.4	0.2	0.3
Conterminous U.S. total	33.4	32.7	14.0	15.1	3.5	1.4

Table A10.1 continued

State and region	Forest[a]	Agriculture[b]	Other[c]	Developed[d]	Woody wetland[e]	Herbaceous wetland[f]
	(acres)					
Connecticut	108,600	19,400	1,500	27,500	9,800	2,800
Delaware	15,800	25,500	800	8,500	2,900	2,200
Maine	22,800	3,200	600	10,800	1,600	2,600
Maryland	98,800	92,500	6,000	21,600	6,100	2,100
Massachusetts	198,600	24,000	4,400	55,900	19,400	13,300
New Hampshire	66,100	11,000	1,400	22,300	4,500	2,500
New Jersey	130,200	75,300	2,600	34,200	23,300	3,400
New York	152,500	83,700	1,500	52,200	5,700	2,000
Ohio	131,600	211,500	1,800	59,400	9,700	2,600
Pennsylvania	251,800	268,600	8,500	57,500	2,600	1,500
Rhode Island	26,400	2,300	300	7,700	3,200	700
Vermont	7,000	5,000	300	4,000	1,000	500
West Virginia	47,600	19,500	1,400	8,000	100	100
Northeast total	1,257,900	841,400	30,800	369,600	89,800	36,400
Illinois	59,900	254,800	7,000	59,600	9,300	2,900
Indiana	45,900	201,100	2,300	44,800	5,600	1,400
Iowa	9,500	41,200	6,300	20,100	1,300	500
Michigan	124,800	190,100	8,400	48,700	24,500	4,100
Minnesota	30,000	88,700	1,800	29,900	6,300	12,600
Missouri	61,800	96,500	14,100	40,900	1,800	700
Wisconsin	39,000	131,700	4,700	30,900	4,800	1,400
North Central total	370,800	1,004,200	44,600	274,800	53,600	23,400
All Northern States	1,628,700	1,845,600	75,500	644,400	143,400	59,800
Florida	182,300	173,200	133,500	279,700	139,400	59,300
Georgia	472,100	138,400	22,700	65,700	29,300	9,800
North Carolina	381,900	155,900	7,700	99,400	34,100	4,000
South Carolina	161,800	65,500	6,900	47,200	18,300	6,000
Virginia	141,800	82,400	9,900	40,700	13,000	5,100
Southeast total	1,340,000	615,500	180,700	532,700	234,100	84,100

Table A10.1 continued

State and region	Forest[a]	Agriculture[b]	Other[c]	Developed[d]	Woody wetland[e]	Herbaceous wetland[f]
	(acres)					
Alabama	163,800	89,200	3,400	25,900	12,300	700
Arkansas	51,200	62,400	800	22,700	1,500	600
Kentucky	63,000	76,100	700	21,900	3,200	200
Louisiana	73,600	78,400	2,200	33,400	8,900	6,200
Mississippi	57,900	54,500	1,300	16,100	7,500	800
Oklahoma	22,200	50,400	31,900	25,900	400	100
Tennessee	190,000	148,600	2,200	48,900	5,400	300
Texas	209,600	405,300	218,800	141,800	5,300	9,000
South Central total	831,300	964,900	261,300	336,600	44,400	18,000
All Southern States	2,171,200	1,580,400	442,000	869,300	278,500	102,100
Kansas	8,700	48,900	24,700	20,500	100	1,500
Nebraska	1,500	31,600	5,700	6,600	100	400
North Dakota	600	5,700	3,400	7,500	0	200
South Dakota	1,100	10,200	4,000	4,500	100	300
All Great Plains States	11,800	96,300	37,800	39,100	300	2,300
Arizona	28,400	65,500	206,600	39,600	0	0
Colorado	18,000	45,700	85,200	26,200	0	0
Idaho	2,000	34,200	16,300	9,700	300	100
Montana	1,700	11,300	7,200	9,300	600	100
Nevada	1,200	10,800	109,100	18,900	100	100
New Mexico	4,600	16,300	105,800	15,700	600	100
Utah	7,100	42,000	42,700	11,600	500	100
Wyoming	300	2,000	10,700	4,300	200	300
Intermountain total	63,300	227,800	583,600	135,400	2,400	900
All Rocky Mountain States	75,100	324,200	621,400	174,400	2,700	3,300

Table A10.1 continued

State and region	Forest[a]	Agriculture[b]	Other[c]	Developed[d]	Woody wetland[e]	Herbaceous wetland[f]
	(acres)					
Oregon	33,700	52,900	18,200	22,200	400	700
Washington	133,400	58,600	40,000	52,600	1,900	200
Pacific Northwest total	167,100	111,400	58,100	74,800	2,300	800
California	83,600	181,200	530,400	101,500	600	3,500
Pacific Southwest total	83,600	181,200	530,400	101,500	600	3,500
All Pacific Coast States	250,700	292,600	588,600	176,200	2,900	4,300
Conterminous U.S. total	4,125,700	4,042,800	1,727,600	1,864,400	427,500	169,500

[a]*Deciduous, evergreen, or mixed forests, with 25 to 100 percent tree cover.*

[b]*Pasture, hay, row crops, small grains, or fallow (75 to 100 percent of the cover); or orchard, vineyards, or other planted woody vegetation (25 to 100 percent of the cover).*

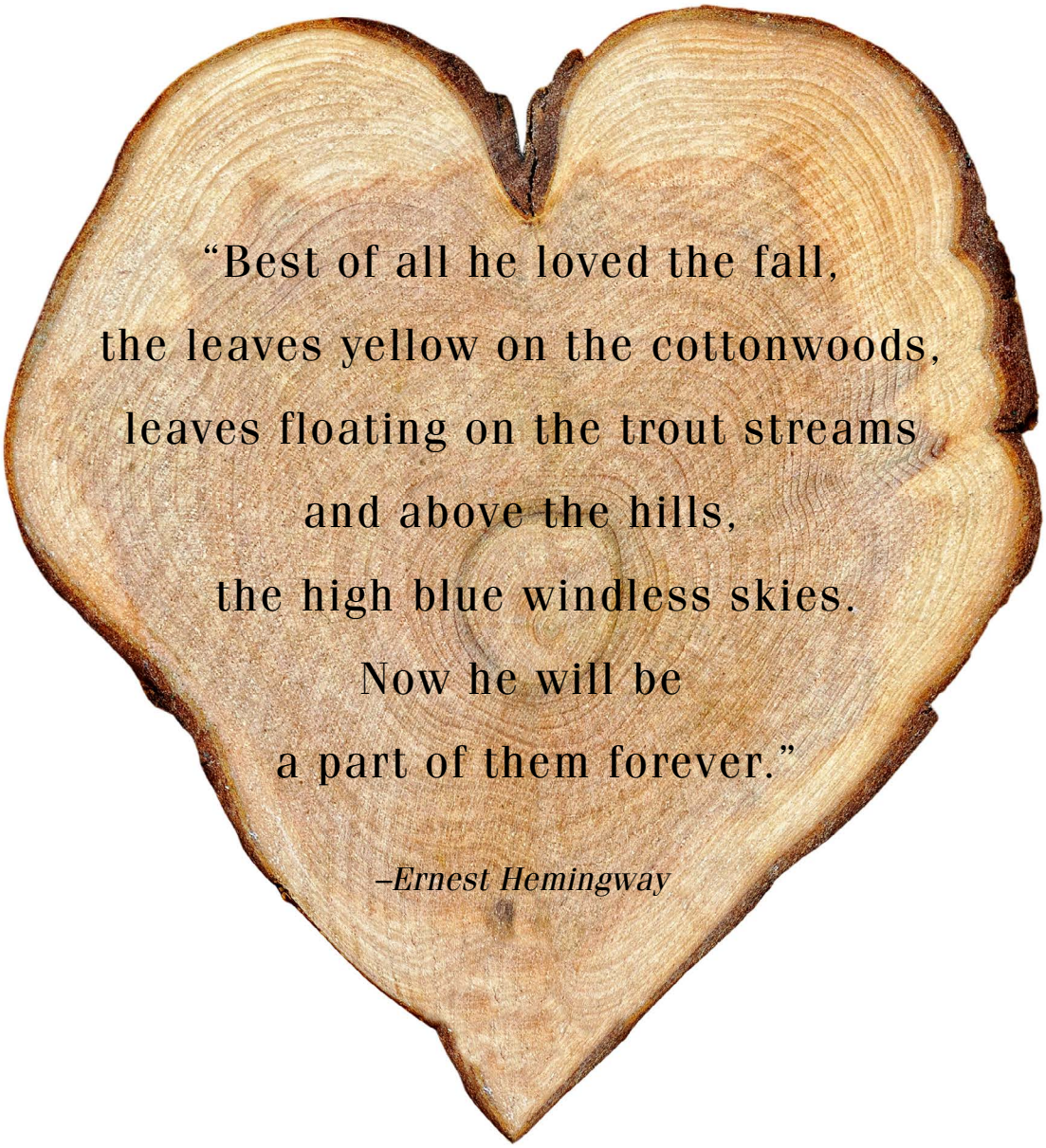
[c]*Bare, rock, sand, clay, quarries, strip mines, gravel pits, transitional areas, or shrubland (25 to 100 percent of the cover); or natural, seminatural grasslands and herbaceous plants (75 to 100 percent of the cover).*

[d]*Areas characterized by a high percentage (30 percent or more) of constructed materials or vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes (75 to 100 percent of the cover).*

[e]*Areas where forest or shrubland vegetation accounts for 25 to 100 percent of the cover and the soil or substrate is periodically saturated with or covered by water.*

[f]*Areas where perennial herbaceous vegetation accounts for 75 to 100 percent of the cover and the soil or substrate is periodically saturated with or covered by water.*

Please refer to the Literature Cited section at the end of Chapter 10 for the references.


"Best of all he loved the fall,
the leaves yellow on the cottonwoods,
leaves floating on the trout streams
and above the hills,
the high blue windless skies.
Now he will be
a part of them forever."
–Ernest Hemingway

U.S. Forest Service

General Technical Report
NRS-151
2016